

**ADDENDUM  
TO THE REPORT  
OF THE COMMITTEE  
ON THE PEACEFUL USES  
OF OUTER SPACE**

**GENERAL ASSEMBLY**

OFFICIAL RECORDS : TWENTY-FOURTH SESSION

SUPPLEMENT No. 21A (A/7621/Add.1)



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NOTE

Symbols of United Nations documents are composed of capital letters combined with figures. Mention of such a symbol indicates a reference to a United Nations document.

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## I. INTRODUCTION

1. In conformity with the decision recorded in paragraph 9 of its interim report to the General Assembly, <sup>1/</sup> the Committee on the Peaceful Uses of Outer Space met at United Nations Headquarters, New York, on 12 November 1969 to discuss the results of the negotiations and consultations undertaken among the States members of the Committee regarding the preparation of a draft agreement on liability for damage caused by the launching of objects into outer space.
2. The Committee held nine meetings, the verbatim records of which were circulated as documents A/AC.105/PV.70-78. In accordance with the decision taken by the Committee at the first part of its twelfth session, a number of informal meetings were held and consultations and negotiations were continued under the guidance of the Chairman of the Committee and in consultation with the Chairman of the Legal Subcommittee.
3. At its 70th meeting on 12 November 1969, the Committee agreed also to discuss the report of the scientific group established at the request of the Government of Argentina to visit the rocket-launching site at Mar Chiquita Station near Mar del Plata (A/AC.105/69 and Add.1).
4. The opening statement by the Chairman is reproduced in annex I.
5. In the course of the discussion, statements were made by a number of delegations. The texts are reproduced in the verbatim records of the session.
6. At the 78th meeting on 5 December the Chairman made a statement. The text of the statement is reproduced in paragraph 8 below.
7. The Committee adopted its report to the General Assembly on the second part of its twelfth session at the 78th meeting on 5 December 1969. The Committee's recommendations and decisions are set out below.

## II. RECOMMENDATIONS AND DECISIONS

### Preparation of a draft agreement on liability for damage caused by the launching of objects into outer space

8. The text of the statement made by the Chairman at the 78th meeting, to which the Committee agreed, was as follows:
  - (a) In resolution 2453 B (XXIII), the General Assembly requested the Committee on the Peaceful Uses of Outer Space to complete urgently the preparation of a draft agreement on liability for damage caused by the launching of objects into outer space and to submit it to the General Assembly at its twenty-fourth session;

<sup>1/</sup> Official Records of the General Assembly, Twenty-fourth Session,  
Supplement No. 21 (A/7621).

(b) Since it had not been possible to complete the text of the draft agreement in time for the opening of the twenty-fourth session, the Committee, in view of its mandate, decided that consultations and negotiations should be undertaken among the States members of the Committee, under the leadership of its Chairman and in consultation with the Chairman of the Legal Sub-Committee, with a view to coming to an agreement on a draft convention on liability for damage, and that it should resume its session not later than 12 November 1969;

(c) Following extensive consultations and negotiations, the Committee resumed its session on 12 November and continued its meetings, as well as consultations, until 5 December 1969;

(d) The consultations and negotiations were conducted in a constructive atmosphere. They made the positions of delegations clearer and led to a certain rapprochement of views;

(e) There was agreement that the main outstanding issues in the elaboration of the convention were: first, the settlement of claims; secondly, the question of the applicable law; thirdly, the question of a limit on liability; and fourthly, the problem of liability in connexion with activities of international organizations in the exploration and use of outer space;

(f) A number of suggestions were made by several delegations and several working papers were presented;

(g) It was the consensus of members of the Committee that agreement on the four main outstanding issues should be reached in one package;

(h) On this understanding, the positions on the four main outstanding issues appeared to be the following:

(i) On the settlement of claims, it appeared that all delegations agreed on a first phase of diplomatic negotiations, and on a second phase in which the claimant and the respondent at the request of either would establish an inquiry commission on the basis of parity. Both phases should be of a specified duration. With regard to the establishment of a claims commission which would include a third member, it appeared there was an understanding that it would be possible to include in the convention provisions concerning the establishment of such a commission, if an agreement were reached on the nature of the conclusions of this commission, particularly whether the conclusions would be binding or recommendatory. The third member would be selected by agreement of the two sides, or, if there were no such agreement within a specified time, the third member would be appointed by some international authority. All conclusions of the claims commission should be made by majority vote, and the claims commission should have competence only with regard to the specific claim before it and should determine the causality and the amount of compensation. In addition to the proposals already submitted in this respect and contained in the report of the Legal Sub-Committee (A/AC.105/58), two further proposals were put forward. The delegation of France proposed the following provision, emphasizing that it was meant as a compromise proposal:

"The commission shall state the reasons for its decision, which shall be final and with which the respondent State and the claimant State shall comply."

The delegation of Brazil proposed the following provision, emphasizing that it was meant as a compromise proposal:

"The award of the commission shall be final and binding if the Parties have so decided, otherwise the commission will render a final and recommendatory award."

(ii) As to the question of the applicable law, differences of opinion still persist. Many delegations considered that the best basis for the solution of this question would be "international law, taking into account the law of the place where the damage occurred". Other delegations were of the opinion that the respective provisions of the Indian draft (A/AC.105/C.2/L.32/Rev.2), "international law, taking into consideration the law of the claimant State and, where considered appropriate, the law of the respondent State", would serve as the best basis for reaching a compromise solution. In addition to the proposals already submitted in this respect and contained in the report of the Legal Sub-Committee (A/AC.105/58), the delegation of Belgium proposed the following provision, emphasizing that it was meant as a compromise proposal based on the Indian draft:

"The compensation which the respondent State shall be required to pay for the damage under this convention shall be determined in accordance with the law agreed upon by the claimant and the respondent States. In the absence of such an agreement, the compensation shall be determined in accordance with international law and the law of the respondent State or of the claimant State, at the discretion of the latter."

(iii) On the question of a limit on liability, the solution most widely advocated was not to have any ceiling on the amount. However, it was stated that a limit could be accepted, if it were possible to agree upon the amount of such a limit;

(iv) On the issue of international intergovernmental organizations, it appeared that, if all other problems in dispute are settled, agreement might be possible on a provision which would be based on the following principles: first, the corresponding provisions of the convention would apply to an international intergovernmental organization which declared its acceptance of the rights and obligations provided for in the convention, and if a majority of the States members of the organization are contracting parties to the convention and to the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies; secondly, the States members of such an organization which are contracting parties to the convention will take appropriate steps in the organization with a view to the making of such a declaration; thirdly, if an international

intergovernmental organization is liable for damage under the convention, claims must first be presented to the organization and only when it has not paid, within a specified period, the sum due, may the claim be presented to one or more States members which are contracting parties to the convention; and fourthly, if damage is caused by a space object to the property of an international intergovernmental organization, the claim should be presented by one of the States members of the international intergovernmental organizations which are parties to the convention;

(i) All delegations agreed that consultations and negotiations should be resumed early in 1970 to prepare the next session of the Legal Sub-Committee with a view to arriving as soon as possible at an agreement on a draft convention on liability for damage, and that a special effort should be made by the Committee to complete the draft convention in time for submission to the General Assembly at its twenty-fifth session.

#### International sounding rocket launching facilities

9. The scientific group nominated by the United Nations in accordance with General Assembly resolution 2453 B (XXIII) visited the new international sounding rocket launching station at Mar Chiquita near Mar del Plata, in Argentina, during the period 2-10 October 1969 and submitted its report to the Committee (A/AC.105/69) for its consideration at the second part of the twelfth session.

10. The Committee noted that since the scientific group's visit the launching station had been officially designated CELPA Mar del Plata.

11. The Committee endorsed the scientific group's recommendation in paragraph 5 of the scientific group's report that, in accordance with the basic principles approved by the General Assembly in resolution 1802 (XVII), United Nations sponsorship be granted for the operation of the CELPA Mar del Plata sounding rocket launching facility.

#### Appointment of a qualified individual to promote the practical applications of space technology

12. The Committee received the text of a note by the Secretary-General (A/AC.105/L.49) concerning its recommendation for the appointment of a qualified individual with the full-time task of promoting the practical applications of space technology. The text of the note is reproduced in annex II. In this connexion, the representative of the Secretary-General made a statement at the 78th meeting concerning the questions raised by the representative of Belgium at the 75th meeting.

#### Working Group on Direct Broadcast Satellites

13. The Committee agreed to recommend that the Working Group on Direct Broadcast Satellites should hold a further two-week session in 1970, from 11-22 May. The Committee decided also that the texts of the two reports of the Working Group (A/AC.105/51 and A/AC.105/66 and Corr.1 and 2) should be reproduced as annexes to

this report and that the report of the Working Group on its 1970 session should be submitted to the Legal Sub-Committee at its next session. It should be borne in mind that the primary and major task of the Legal Sub-Committee is the immediate completion of the draft agreement on liability for damage caused by the launching of objects into outer space. The Legal Sub-Committee will examine the report of the Working Group if time permits.

#### Programme of meetings in 1970

14. The Committee approved the following programme of meetings for 1970:

Committee on the Peaceful Uses of Outer Space	20-22 January	United Nations Headquarters
Scientific and Technical Sub-Committee	14-24 April	United Nations Headquarters
Working Group on Direct Broadcast Satellites	11-22 May	United Nations Headquarters
Legal Sub-Committee	8 June-3 July	Geneva
Committee on the Peaceful Uses of Outer Space	1-14 September	United Nations Headquarters

ANNEXES

Annex I

Opening statement by the Chairman at the 70th meeting  
of the Committee on 12 November 1969

At its last meeting on 17 September 1969, the Committee decided that, in view of its mandate in General Assembly resolution 2453 B (XXIII),

"To complete urgently the preparation of a draft agreement on liability for damage caused by the launching of objects into outer space and to submit it to the General Assembly at its twenty-fourth session",

consultations and negotiations should be undertaken among the States members of the Committee, under the leadership of its Chairman and in consultation with the Chairman of the Legal Sub-Committee, with a view to coming to an agreement on a draft convention on liability for damage.

These consultations and negotiations have taken place during past weeks, both at a number of meetings attended by all members of the Committee and in private consultations among delegations. There was agreement that the main outstanding issues in the elaboration of the convention were: first, the settlement of claims; secondly, the question of the applicable law; thirdly, the question of a ceiling on liability; and fourthly, the problem of liability in connexion with activities of international organizations in the exploration and use of outer space. The consultations dealt with these four issues and focused particularly on the problem of the settlement of claims and of the question of the applicable law. A number of suggestions were made by several delegations and several working papers were presented. Agreement was, however, not reached on the outstanding issues.

So far as the settlement of claims is concerned, all delegations appear to agree on a first phase of diplomatic negotiations and on a second phase of a commission of inquiry established by the claimant State and by the respondent State on the basis of parity. As to a third phase, in case a settlement could not be reached either by diplomatic negotiations or by a commission of inquiry, differences of opinion still persist.

I believe that the consultations undertaken during these past weeks were frank, open and conducted in a constructive atmosphere. They have, I am sure, made the positions of delegations clearer and will, I hope, facilitate and stimulate further useful negotiations with a view to arriving at an early agreement on a draft convention on liability for damage.

I should like to take this opportunity to thank all delegations for their co-operation during the consultations.

There is a second question to which the Committee will wish to turn its attention. As you will recall, in paragraph 14 of its interim report <sup>a/</sup> the Committee took note that, in accordance with General Assembly resolution 2453 (XXIII), the Secretary-General, in consultation with the Chairman of the Committee, had appointed a small group of scientists drawn from States members of the Committee to visit the Mar Chiquita Station in Argentina between 2 and 10 October of this year in order to report to the Committee concerning its eligibility for United Nations sponsorship. The Committee welcomed the Secretary-General's decision and looked forward to receiving the experts' report.

Since our last meeting the Expert Group has completed its work and has submitted its report to this Committee (A/AC.105/69 and Add.1). In paragraphs 4 and 5 of its report, the Group expressed its satisfaction that the Mar Chiquita Sounding Launching Station is being established and operated in accordance with the principles set forth in General Assembly resolution 1802 (XVII) of 14 December 1962 and recommends to the Committee that United Nations sponsorship be granted.

We shall have to take appropriate action, therefore, on the report submitted by the Expert Group. Thus, these are the questions before our resumed session today.

If the Committee agrees, I would suggest that we might first deal with the report submitted by the Expert Group (A/AC.105/69 and Add.1). I take it that the Committee decides, if there is no objection, to proceed accordingly.

<sup>a/</sup> Official Records of the General Assembly, Twenty-fourth Session,  
Supplement No. 21 (A/7621).

Note by the Secretary-General dated 13 November 1969\*

In the report adopted at the first part of its last session, the Committee on the Peaceful Uses of Outer Space made the following recommendations relating to the work of the Secretariat:

"The Committee endorsed the recommendation for the appointment by the Secretary-General of a qualified individual with the full-time task of promoting the practical applications of space technology. It was noted that the Scientific and Technical Sub-Committee had recommended in paragraph 24 of its report (A/AC.105/55 and Corr.1) that this individual should be appointed to the Outer Space Affairs Division of the United Nations Secretariat. In this connexion a proposal was made that the individual appointed should be attached to the Department of Economic and Social Affairs. A suggestion was also made that discretion should be left to the Secretary-General in deciding where in the Secretariat the expert should work. Some delegations further considered that the Secretary-General should request the inter-departmental working group mentioned in document A/AC.105/L.41, paragraph 20, to review the Secretariat arrangements dealing with outer space, and present a report on this subject to the Committee at a subsequent stage." b/

The arrangements within the Secretariat in this field, as in the case of other fields of activity, are made by the Secretary-General after careful consideration of all the factors involved. He uses his discretion in such matters depending on what is, in his judgement, the most effective manner in which the Secretariat could discharge the responsibilities entrusted to it.

With the assistance of the Inter-Departmental Working Group, the Secretary-General has studied carefully the question of where the post involved should be established within the Secretariat. Recognizing in particular the fact that the appointment of this staff member is to be on an ad hoc basis for a short term in order to carry out a specific task, the Secretary-General has arrived at the conclusion that he should be assigned to the Outer Space Affairs Division, where he will be given all the necessary support in the performance of his functions. He will also be associated with the Office of the Secretary-General through the Chairman of the Inter-Departmental Working Group on outer space in carrying out his liaison responsibilities with the other departments and offices concerned and with the specialized agencies.

As requested by the Committee, it is the intention of the Secretary-General to provide the Committee at a subsequent stage with a report on the Secretariat arrangements in this field. In doing so, the Secretary-General will naturally take into account the various viewpoints expressed in the bodies concerned, while bearing in mind the need to achieve optimum co-ordination in the work of the Secretariat to promote the peaceful uses of outer space.

The Secretary-General intends to request budgetary authorization, as required, from the General Assembly.

\* Previously issued under the symbol A/AC.105/L.49.

b/ Ibid., para. 12.

Report of the Working Group on Direct Broadcast Satellites on its first session\*

1. The Working Group on Direct Broadcast Satellites established to study and report on the technical feasibility of communication by direct broadcast from satellites and the current and foreseeable developments in this field, including comparative user costs and other economic considerations, as well as the implications of such developments in the social, cultural, legal and other areas, held a series of meetings at United Nations Headquarters between 11 February and 20 February 1969.

2. Mr. Olof Rydbeck of Sweden, Director-General of Sveriges Radio (Sweden), was elected Chairman. The Working Group held eight meetings.

3. A list of the representatives of the States members of the Working Group, and of the representatives of the specialized agencies participating in the Working Group's proceedings as observers, is contained in appendix I.

4. The provisional agenda (A/AC.105/WG.3/R.1) was adopted and is reproduced in appendix II.

5. The Working Group received papers from Australia, Canada (A/AC.105/49), France, India, Italy, Japan, Sweden (A/AC.105/49) and the United States of America (A/AC.105/50), and also from the International Telecommunication Union (ITU) (A/AC.105/52) and the United Nations Educational, Scientific and Cultural Organization (UNESCO), on the subject of direct broadcast satellites. The Working Group also had before it two background papers prepared by the Secretariat: a study of systems of direct broadcasting by means of satellites, and excerpts of statements made in the Committee on the Peaceful Uses of Outer Space, its Scientific and Technical Sub-Committee and its Legal Sub-Committee, as well as excerpts from reports of ITU and UNESCO on the subject of direct broadcast satellites.

6. On 20 February 1969, the Working Group completed its work on the study of technical feasibility of communication by direct broadcast from satellites and the current and foreseeable developments in this field, including comparative user costs and other economic considerations.

7. A general description of the technical review developed by the Working Group on the basis of the working papers submitted appears in appendix III. In this review, the Working Group used - purely for illustrative purposes:

(a) Fifteen examples of single-channel systems for television broadcasting directly to augmented home receivers, i.e., more elaborate receiving installations than those needed for terrestrial broadcasting;

(b) One example of a system for direct television broadcasting to community or collective receivers, i.e., more sensitive receiving arrangements serving a school or a small village, or through some sort of distribution system.

Only two orders of frequencies, i.e. 300 MHz and 12 GHz, are indicated in the examples since only these figures in the studies submitted to the Working Group.

\* Previously issued under the symbol A/AC.105/51.

This however does not preclude the consideration of other frequencies, nor prejudice the decision to be taken by member State Administrations at the ITU World Administrative Conference in 1970 (or 1971) at which allocations of frequency bands for direct broadcasting services will be considered.

#### CONCLUSIONS

8. A summary table is reproduced below containing comparative data on the estimated costs and dates of availability of various elements of those direct satellite broadcasting systems that have been selected as examples in appendix III to this report. The costs of the satellites themselves are not included, however, because they are likely to vary greatly. The relatively modest cost of the earth stations transmitting to the satellite has not been included either. Taking the cost of existing unaugmented receivers as a reference, and assuming mass production of the order of a million or more units, the extra cost per receiving installation is estimated as being of the order of:

- (a) For direct-to-home television broadcasting using augmented receivers: \$US40-\$US270;
- (b) For television broadcasting to community or collective receiving arrangements: \$US150.

Clearly, where reception at a very large number of locations is envisioned, the increase in cost in receiving equipment can amount to very large sums; for example, if 10 million home television receivers were already in use, the cost of "augmenting" them for satellite reception could be from \$400 million to \$2,700 million.

9. The following general conclusions emerge from this review. All assume that appropriate frequency allocations will have been made; with regard to any of the suggested operational systems, the importance of further prior experimentation cannot be stressed too highly:

(a) While it is considered that satellite technology has reached the stage at which it is possible to contemplate the future development of satellites capable of direct broadcasting to the public at large, direct broadcasting television signals into existing, unaugmented home receivers on an operational basis is not foreseen for the period 1970-1985. This reflects the lack of technological means to transmit signals of sufficient strength from satellites;

(b) Direct broadcast of television into augmented home receivers could become feasible technologically as soon as 1975. However, the cost factors for both the earth and space segments of such a system are inhibiting factors. For example, the cost to the home owner/consumer who wishes to augment his home receiver (and antenna), while not precisely measurable at this time, appears to be at least \$40 (not including cost of installation) and may be considerably more expensive, depending in part, for example, on the frequency employed. Many other factors enter into the cost equation, and in countries lacking large numbers of existing conventional television receivers, completely different cost figures apply. As to the space segment, the development and launching of the powerful - therefore heavy - transmitters, which are not yet within the state-of-the-art, involve considerable

expenses, which cannot be estimated at this time; the development costs might run as high as \$100 million. Therefore, it is most unlikely that this type of system will be ready for development on an operational basis until many years after the projected date of feasibility;

(c) Direct broadcast into community receivers could be close at hand. Technology currently under development might allow this in the mid-1970s. Such a system is considered to be less expensive to launch than one intended for reception directly in people's homes. It will also be easier to establish and less expensive for locations where the radio noise level is low.

10. The uncertainty which attaches to the development of appropriate technology, the selection of system combinations, the numerous trade-offs involved among elements of systems, the cost factors, the radio frequency aspects and other parameters for direct broadcasting all suggest that it is desirable that member State Administrations continue their studies of the design of direct broadcasting systems and conduct appropriate experiments with a view to improving the future planning and operation of such systems and to ensuring the optimum use of the radio-frequency spectrum. All the relevant results of these studies and experiments should be contributed to the International Radio Consultative Committee (CCIR) of ITU, which is the competent international body for establishing the technical basis for the ITU world and regional administrative radio conferences which must, of necessity, provide the basic regulatory framework within which satellite broadcasting would operate.

11. It is also necessary that the radio-frequency requirements of direct broadcasting from satellites be fully and urgently considered by ITU and that the necessary provisions be made for this service at the forthcoming World Administrative Radio Conference on Space Services, if direct broadcasting from satellites is to be accommodated on an operational basis.

12. From the discussion, the Working Group notes that international co-operation is necessarily an important factor in establishing satellite systems for direct broadcasting.

13. The Working Group wishes to stress the fact that the information contained in this report is subject to revision on the basis of further knowledge and should be viewed in this light.



Appendix I

LIST OF PARTICIPANTS

Chairman: Mr. Olof Rydbeck (Sweden)

ARGENTINA

Representatives

Vice Commodore Jorgo Martínez Castro  
 Dr. Rafael M. Gowland  
 Permanent Mission of Argentina to the United Nations  
 Counsellor Raúl Estrada Oyuola  
 Third Secretary, Argentine Embassy, Washington, D.C.

AUSTRALIA

Representatives

Mr. A. Kellock  
 Planning Engineer  
 Postmaster-General's Department  
 Mr. E.G. Hayman  
 Australian Embassy  
 Washington  
 Mr. D.W. Evans  
 Australian Mission to the United Nations

AUSTRIA

Representatives

Mr. Friedrich Zimmormann  
 Counsellor  
 Post and Telegraph Office Department, Austria  
 Vienna  
 Mr. Robert Marschik  
 Austrian Mission to the United Nations  
 New York

Summary table

Estimated costs and dates of availability of illustrative television satellite broadcasting systems

	800 MHz AM	800 MHz AM	800 MHz FM	12 GHz AM	12 GHz FM	800 MHz FM*	
Satellite weight (useful, in orbit) (in kg.)	350-450	1050-1200	250-300	~3200	300-400	-	1000 km. coverage zone
Satellite cost	-	-	-	-	-	-	
Launch cost (\$US million)	8-12	20-25	8-10	>30	8-12	-	
Date of availability	1977-1978	1978-1980	1977	1982-1985	1975	-	
Cost of "augmentation" equipment (in production quantities of \$US 1 million)**	\$40	\$40	\$65	\$250	\$270	-	
Satellite weight (useful, in orbit) (in kg.)	650-750	~3200	300-400	?	500-600	750-900	2000 km. coverage zone
Satellite cost (\$US million)	-	-	-	-	-	15	
Launch cost (\$US million)	12-16	>30	8-12	?	12-16	12-16	
Date of availability	1975-1976	1982-1985	1975	?	1977-1979	1975	
Cost of "augmentation" equipment (in production quantities of \$US 1 million)**	\$40	\$40	\$65	\$250	\$270	150***	
Satellite weight (useful, in orbit) (in kg.)	1900-2100	?	650-750	?	1500-1700	-	3200 km. coverage zone
Satellite cost	-	-	-	-	-	-	
Launch cost (\$US million)	20-30	?	12-16	?	20-30	-	
Date of availability	1978-1980	?	1975-1976	?	1980-1985	-	
Cost of "augmentation" equipment (in production quantities of \$US 1 million)**	\$40	\$40	\$65	\$250	\$270	-	

Note: The quality of television pictures obtained would be equivalent to average accepted terrestrial service or better, except in the first example, where it would be lower.

\* Single-channel community or collective receiving arrangements, three television channels transmitted from satellite.

\*\* These are 1966 estimates.

\*\*\* This is a present estimate.

BELGIUM

Representative

Professor Louis J. Groven  
Scientific Counsellor  
Belgian Embassy, Washington, D.C.

BRAZIL

Representatives

Mr. Evaldo Cabral de Mello  
Second Secretary  
Brazilian Mission to the United Nations

Mr. Jorge Mesquite  
Engineer  
National Commission for Space Activities (CNAE)

Professor Carlos Dunshoe de Abranches  
Special Legal Adviser of the Ministry  
of Communications

BULGARIA

Representative

Mr. Dimitar Kostov  
Second Secretary to the Permanent Mission of the  
People's Republic of Bulgaria to the United Nations

CANADA

Representatives

Mr. A.E. Gotlieb  
Deputy Minister-designate  
Department of Communications

Mr. J.H. Chapman  
Assistant Deputy Minister-designate  
Department of Communications

Mr. J.R. Marchand  
Department of Communications

Dr. C.A. Siocos  
Canadian Broadcasting Corporation

CANADA (continued)

Representatives (continued)

Mr. D.M. Miller  
Department of External Affairs

Mr. A.W. Robertson  
First Secretary  
Permanent Mission of Canada to the United Nations

CZECHOSLOVAKIA

Representatives

Mr. Jaroslav Maršiček  
Chief of the Division of Radiocommunications  
Federal Committee of Posts and Telecommunications  
Prague

Mr. Gustav Vodnansky  
Chief of the International Division  
Federal Committee of Posts and Telecommunications  
Prague

Mr. Miroslav Sykora  
Third Secretary  
Permanent Mission of the Czechoslovak Socialist  
Republic to the United Nations

FRANCE

Representatives

M. Gerard Boelle  
Engineer  
Centre National d'Etudes Spatiales  
Paris

Miss Sylvie Alvarez  
Secretary of Embassy  
Permanent Mission of France to the United Nations

HUNGARY

Representative

Mr. Gyula Budai  
Second Secretary  
Permanent Mission of the Hungarian People's  
Republic to the United Nations

INDIA

Representatives

Professor E.V. Chitnis  
Member Secretary, Indian National Committee for  
Space Research, Ahmedabad

Mr. R.C. Arora  
First Secretary  
Permanent Mission of India to the United Nations

Mr. B. Swaraj  
Attaché  
Permanent Mission of India to the United Nations

IRAN

Representative

Mr. Davoud H. Bavand  
Attaché  
Permanent Mission of Iran to the United Nations

ITALY

Representatives

Mr. Mario Franzi  
Deputy Permanent Representative to the  
United Nations

Mr. Gino Orsini  
Technical Director  
Radiotelevisione Italiana

Mr. Enzo Castello  
Assistant Director  
Radiotelevisione Italiana

Mr. Mario Vittorio Zamboni  
Second Secretary  
Permanent Mission of Italy to the  
United Nations

Mr. Vittorio Bussini  
Chief Engineer  
Istituto Italiano Poste e Telecomunicazione

Mr. Franco Cappuccini  
Professor, University of Naples  
Ministry of Posts and Telecommunications

JAPAN

Representative

Mr. Tokichiro Uomoto  
Minister  
Permanent Mission of Japan to the  
United Nations

Advisers

Mr. Shigeo Iwai  
Second Secretary  
Permanent Mission of Japan to the  
United Nations

Mr. Noboru Ohyama  
Staff Engineer  
Japan Office, INTELSAT  
Washington, D.C.

Mr. Kenjiro Sase  
Second Secretary  
Japanese Embassy, Washington, D.C.

MOROCCO

Representative

Mr. Mohamed Mahjoubi  
Counsellor  
Permanent Mission of the Kingdom of  
Morocco to the United Nations

POLAND

Representative

Dr. Tadeusz Kozluk  
Second Secretary  
Permanent Mission of the Polish People's  
Republic to the United Nations

ROMANIA

Representative

Mr. Gheorghe Popa  
Second Secretary  
Permanent Mission of the Socialist Republic  
of Romania to the United Nations

SWEDEN

Representative

Mr. Olof Rydbeck  
Director-General  
Swedish Broadcasting Corporation

Alternative Representatives

Mr. Edward Ploman  
Swedish Broadcasting Corporation

Mr. Arne Rohdin  
Swedish Telecommunications Administration

Adviser

Mr. Björn Skala  
Permanent Mission of Sweden to the United Nations

UNION OF SOVIET SOCIALIST REPUBLICS

Representative

Vladimir P. Minashin  
Chief of the Division  
Ministry of Communications

Advisers

Vladimir V. Aldoshin  
Ministry for Foreign Affairs

Yuri M. Ribakov  
Ministry for Foreign Affairs

Igor I. Andreev  
Permanent Mission of the Union of Soviet Socialist  
Republics to the United Nations

Guennadi S. Stachevski  
Permanent Mission of the Union of Soviet Socialist  
Republics to the United Nations

UNITED ARAB REPUBLIC

Representative

Mr. Hamdy Mohamed Ibrahim Nada  
Third Secretary  
Permanent Mission of the United Arab Republic  
to the United Nations

UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND

Representative

Mr. Harold Stanesby  
Deputy Director of Engineering  
General Post Office, London

Alternate Representatives

Mr. D.H.T. Hildyard, C.M.G., D.F.C.  
Minister  
United Kingdom Mission to the United Nations

Mr. H.G. Darwin  
Counsellor, Legal Advisor  
United Kingdom Mission to the United Nations

Adviser

Mr. S.L. Egerton  
First Secretary  
United Kingdom Mission to the United Nations

UNITED STATES OF AMERICA

Representative

Leonard Jaffe  
Director, Space Applications Programs Office  
National Aeronautics and Space Administration

Alternate Representatives

Arnold W. Frutkin  
Assistant Administrator, Office of International Affairs  
National Aeronautics and Space Administration

Peter S. Thacher  
Counsellor for Disarmament and Outer Space Affairs  
United States Mission to the United Nations

Advisers

Oscar E. Anderson  
Director, International Organization Division  
Office of International Affairs  
National Aeronautics and Space Administration

A.M. Greg Andrus  
Director, Communications Program  
Office of Space Science and Applications  
National Aeronautics and Space Administration

Advisors (continued)

Gordon L. Huffcutt  
Office of Telecommunications  
Department of State

Specialized agencies

International Telecommunication Union

Mr. R.E. Butler  
Deputy Secretary-General

Mr. A. Berrada  
Member, International Frequency Registration Board

Mr. N.V. Gadadhar  
Senior Counsellor  
International Radio Consultative Committee

Mr. H. Poulinquen  
Technical Adviser, General Secretariat

United Nations Educational, Scientific and Cultural Organization

Mr. Tor Gjesdal  
Assistant Director-General for Communication

United Nations Secretariat

Mr. A.H. Abdel-Ghani  
Chief, Outer Space Affairs Division

Mr. M. Robinson  
Secretary of the Working Group

Mr. N. Jasentuliyana  
Outer Space Affairs Division

Appendix II

WORKING GROUP ON DIRECT BROADCAST SATELLITES

AGENDA FOR THE FIRST SESSION

Convened at United Nations Headquarters  
on Monday, 10 February 1969, at 3 p.m.

1. Election of the Chairman.
2. Discussion of the technical feasibility of communication by direct broadcast from satellites and the current and foreseeable developments in this field, including comparative user costs and other economic considerations.
3. The implications of such developments in the social, cultural, legal and other areas.
4. Report of the Working Group.

### Appendix III

#### REVIEW OF THE TECHNICAL FEASIBILITY OF DIRECT TELEVISION BROADCASTING FROM SATELLITES

1. It is now possible to envisage the technical feasibility of direct broadcasting from satellites within the forthcoming decade. The number of parameters which enter into the design of a satellite system is rather large and it is impractical to describe all the possible combinations. The examples given in the accompanying tables give an appreciation of many of the factors involved.

2. The following discussion will cover only the most important parameters which have a more direct and immediate bearing on the practical choice of a particular system.

2.1 Choice of orbit: This study has only considered geostationary satellites, which maintain a fixed position relative to the surface of the earth. It may be relevant to note that the documents submitted to the Working Group did not propose any other arrangement and the International Radio Consultative Committee (CCIR) of the International Telecommunication Union (ITU) in its studies, has also concluded that the use of geostationary satellites has significant advantages (CCIR Report No. 215-1). This does not preclude the possibility of adopting other arrangements such as the high elliptical orbit, although they may require more elaborate receiving antennas.

2.2 Frequencies: In the examples given in paragraph 3, two orders of frequencies have been utilized:

(a) Frequency bands which are presently used for terrestrial broadcasting services (e.g. 800 MHz). This prospect has been studied by CCIR (Report No. E.2.m (X)) and it has concluded that in many parts of the world, sharing between space and terrestrial broadcasting would unduly restrict both services; indeed, in certain areas, extensive frequency reassignment would be required. In other parts of the world, where UHF television has not been fully developed or planned for, it would be possible to introduce television broadcasting from satellites, subject to the Radio Regulations of ITU, particularly in respect of co-ordination of the required radio-frequencies in consideration of pertinent technical and operational parameters;

(b) Frequency bands which are not extensively utilized by any form of broadcasting (e.g. 12 GHz). Further study of broadcasting needs and of technological developments could lead to the allocation of frequencies of this order for space broadcasting.

Studies could also be made concerning the use of other frequency bands in certain parts of the world. These complex frequency problems are of course subject to consideration by ITU and an examination of this particular band would be most desirable at the forthcoming World Administrative Radio Conference on Space Radiocommunications which ITU has scheduled for late 1970 or early 1971. It might

be noted that the frequency bands near 12 GHz are presently allocated to several services.

In respect of the selection of appropriate frequencies, it is necessary to consider the economics related to existing receiving equipment, radio-frequency propagation effects such as rain absorption and other environmental aspects.

2.3 Coverage zones: In the examples described in paragraph 3.0 and further elaborated upon in tables I to IV, a number of coverage zones were considered representative or typical of certain requirements for television:

(a) A circular coverage zone (beneath the satellite at the equator), of a diameter of 1,000 km., which corresponds to a satellite antenna beamwidth of  $1.4^\circ$  (table II);

(b) A zone of a diameter of 2,000 km., corresponding to a satellite antenna beamwidth of  $2.5^\circ$  (table III);

(c) A zone of a diameter of 3,200 km., corresponding to a satellite antenna beamwidth of  $5^\circ$  (table IV).

While it is possible to envisage even broader coverage zones for television, the rapid increase in satellite power, weight and resulting costs can, by extrapolation, be found to be rather formidable. For sound broadcasting, where the frequencies used may be lower, broader coverage zones may be unavoidable.

2.4 Reception quality: The power requirement of a satellite rises very quickly with increasing quality requirements. In the examples described in paragraph 3.0, examples 1 (b) and 3 would provide excellent quality and would compare with that of the best terrestrial service. In examples 1 (a), 2 and 4, the quality would be somewhat less but would be of a level found quite acceptable, when compared to existing services.

2.5 Receiving equipment: (receivers and antennas). Depending on the choice of transmission method (frequency band, modulation method, quality objectives, etc.), it is necessary to envisage the need, either for entirely new types of receivers, or for converters to adapt existing receivers. Different antennae must also be considered. In the chosen examples, the performance assumed for the receivers, taking costs into account, is well within present technology and it is expected that improved receivers will be available by the time broadcasting from satellites can be implemented. This would further reduce satellite power requirements, and related space segment costs. It may be of interest to note that for particular applications or requirements, substantial reductions in satellite transmitting power, launching requirements and related costs can be achieved by utilizing more elaborate receiving equipment which would provide for community and for collective receiving arrangements.

2.6 Satellite weight: The satellite weights are the useful weight in orbit. They correspond to single-channel satellites, except in the example for community or collective reception where up to three channels could be accommodated in the indicated satellite weight. These weights, as indicated, are based on the projection of existing technology. It can be hoped however that for the higher primary power requirements, other forms of power generation might be envisaged which would reduce substantially the weight of such satellites.

2.7 Useful life: At present, the lifetimes of such high-power satellites cannot be estimated, due to the need for additional development and experience. One must realize, however, that extended lifetime involves considerable additional costs and should be considered with care since a rapidly developing technology could overtake an adopted design and render it obsolescent. Additionally, forecasts of rapidly increasing service requirements could favour the initial choice of a shorter life system in anticipation of the availability of more advanced techniques a few years later, thereby reducing the cost of the initial system.

3.0 Summary review of certain examples of systems for direct television broadcasting from satellites: In view of the many possible variations of systems for space broadcasting, this review limits itself to a few examples which are described in tables I to IV. Some of these have been studied extensively by CCIR and similar systems were described in the contributions presented at this meeting.

3.1 Television: Amplitude modulation (AM) satellite transmission at 800 MHz. The technical details are covered under system 1 (a) and 1 (b) in tables I to IV. This would represent an application of space broadcasting which would require a minimum of modification of existing receivers, possibly only the antenna, in countries and regions already equipped to utilize the UHF television band. In countries using VHF, a frequency converter would be required. While system 1 (b) would provide a quality equivalent to the average accepted terrestrial service or better, system 1 (a) would provide a lower quality.

3.2 Television: Frequency modulation (FM) transmission by the satellite at 800 MHz. The technical details are covered under system 2 of tables I to IV. This application would require the use of a converter (FM to AM) to adapt existing receivers, and possibly an improved antenna as for the AM case. Similarly, in countries at present using VHF only frequency conversion would be required. It would be desirable to emphasize that although the use of FM at 800 MHz means the use of wider bandwidths than for the AM case, it may reduce impositions on both space and terrestrial broadcasting in many parts of the world. FM-AM converters can represent a significant increase in receiver costs as compared with the AM case, while FM can reduce satellite power requirements and space segment costs.

3.3 Television: AM transmission at 12 GHz: This application would require a frequency converter in order to adapt existing VHF and/or UHF receivers. A different antenna (such as a small parabolic antenna two feet in diameter) would also be necessary. The use of frequencies of this order is contingent, of course, on appropriate allocation action by ITU.

It is not inconceivable, of course, that in a country where television broadcasting has not developed yet, the cost of such converters would be absorbed in the cost of new receivers which would, in any event, be required.

3.4 Television: FM transmission at 12 GHz. This application would require both frequency and FM-AM conversion in order to adapt it to existing VHF and/or UHF receivers. As for the AM case, a new antenna would be necessary. Frequency considerations given in 3.3 would also be applicable to this case.

3.5 Television: FM transmission at 800 MHz to community or collective receivers. System 5 describes a satellite which could transmit up to three television channels into single-channel community or collective receiving arrangements. Through the

use of more sophisticated receivers and larger antennas, as compared with the direct-to-home examples, satellite power and weight requirements would be substantially reduced. The quality provided would be equivalent to average accepted terrestrial service, or better.

Table 1  
Examples of system parameters and costs for television broadcasting  
Factors which are applicable irrespective of the coverage area

SYSTEM	1(a)	1(b)	2	3	4	5*
Frequency of carrier (MHz)	800	800	800	12000	12000	800
Type of modulation	AM	FM	FM	AM	FM	FM
Effective radio-frequency noise bandwidth (MHz)	4	6	20	6	20	20**
Carrier-to-noise ratio before demodulation (exceeded for 99 per cent of the time), (in dB)	30	36	17	36	17	17
RECEIVING INSTALLATION						
Noise power in radio-frequency bandwidth or a noise factor of 7 dB (dB)	-132	-130	-125	-130	-125	-128***
Carrier power required (dBW)	-102	-94	-108	-94	-108	-115***
Receiving antenna gain, relative to an isotropic source (dB)	17	17	17	39	39	25
Miscellaneous losses (dB)	1	1	1	1	1	1
Effective area of antenna relative to 1 m <sup>2</sup> (dB)	-3	-3	-3	-5	-5	-3
Required flux (99 per cent time) (in dBW/m <sup>2</sup> )	-99	-91	-105	-89	-103	-112
Equivalent field strength, (dB rel. 1 uV/m)	47 (220uV/m)	55 (560uV/m)	41 (110uV/m)	57 (730uV/m)	43 (140uV/m)	
Free-space attenuation between isotropic sources 39 000 km. apart (dB)	182	182	182	206	206	182
Total atmospheric attenuation exceeded 1 per cent of time (dB)	1	1	1	4	4	1
Required e.i.r.p. from satellite (dBW)	65	73	59	78	64	50**

\* Community or collective reception.  
\*\* Per channel.  
\*\*\* 5 dB noise factor.

Table II  
Factors particular to a coverage zone 1,000 km. in diameter

	(800-AM)	(800-FM)	(12-AM)	(12-FM)	
SATELLITE TRANSMITTER	1 (a)	1 (b)	2	3	4
Antenna beamwidth at -3dB points (degrees)	1.4°	1.4°	1.4°	1.4°	1.4°
Antenna gain at edge of zone, relative to an isotropic source (dB)	38	38	38	38	38
Approximate diameter of antenna (m)	20	20	20	1.3	1.3
Loss in feeders, filters, joints, etc. (dB)	1	1	1	1	1
Satellite transmitter power (dBW)	28 (0.63kW)	36 (4kW)	22 (150W)	41 (13kW)	27 (0.5kW)
Primary power requirement	1.26 kW	8kW	300W	26kW	1.0kW
Useful satellite weight, in orbit (kg.)	350-450	1050-1200	250-300	3200	300-400
Projected period at availability	1977-1978	1978-1980	1977	1982-1985	1975
Estimated cost, 1 satellite					
Estimated launch cost (\$USmillion)	8-12	20-25	8-10	30	8-12
Estimated cost* of antennae-converter units in quantity (\$US)					
10,000	75	165	560	600	
100,000	55	125	400	430	
1,000,000	40	85	250	270	

\* These estimates are based on data developed in 1966.



Table III

Factors particular to a coverage zone 2,000 km. in diameter

SATELLITE TRANSMITTER	(800-AM)		(800-FM)	(12-AM)	(12-FM)	(800-FM)
	1 (a)	1 (b)	2	3	4	5
Antenna beamwidth at -3dB points (degrees)	2.5°	2.5°	2.5°	2.5°	2.5°	2.9°
Antenna gain at edge of zone, relative to an isotropic source (dB)	33	33	33	33	33	33
Approximate diameter of antenna (m)	10	10	10	0.65	0.65	10
Loss in feeders, filters, joints, etc. (dB)	1	1	1	1	1	1
Satellite transmitter power (dBW)	33 (2kW)	41 (13kW)	27 (0.5kW)	46 (4.0kW)	32 (1.5kW)	19* (80W)
Primary power requirement	4kW	26kW	1.0kW	80kW	3.0kW	900W
Useful satellite weight, in orbit (kg.)	650-750	3200	300-400	?	500-600	750-900
Projected period at availability	1975-1976	1982-1985	1975	?	1977-1979	1975
Estimated cost, 1 satellite						15M
Estimated launch cost (\$USmillion)	12-16	30	8-12	?	12-16	12-16
Estimated cost** of antennae-converters in quantity (\$US)						
10,000		75	165	560	600	
100,000		55	125	400	430	
1,000,000		40	85	250	270	150***

\* Per channel.

\*\* These estimates are based on data developed in 1966.

\*\*\* Present estimates.

Table IV

Factors particular to a coverage zone 3,200 km. in diameter

SATELLITE TRANSMITTER	(800-AM)		(800-FM)	(12-AM)	(12-FM)
	1 (a)	1 (b)	2	3	4
Antenna beamwidth at -3dB points (degrees)	5°	5°	5°	5°	5°
Antenna gain at edge of zone, relative to an isotropic source (dB)	27	27	27	27	27
Approximate diameter of antenna (m)	5	5	5	0.35	0.35
Loss in feeders, filters, joints, etc. (dB)	1	1	1	1	1
Satellite transmitter power (dBW)	39 (8kW)	47 (52kW)	33 (2.2kW)	52 (160kW)	38 (6.2kW)
Primary power requirement	16kW	104kW	4kW	320kW	12.4kW
Useful satellite weight, in orbit (kg.)	1900-2100	?	650-750	?	1500-1700
Projected period at availability	1978-1980	?	1975-1976	?	1980-1985
Estimated cost, 1 satellite					
Estimated launch cost (\$US million)	20-30	?	12-16	?	20-30
Estimated cost* of antennae-converters in quantity (\$US)					
10,000		75	165	560	600
100,000		55	125	400	430
1,000,000		40	85	250	270

\* These estimates are based on data developed in 1966.

ANNEX IV

Report of the Working Group  
on Direct Broadcast Satellites on its second session\*

I. INTRODUCTION

1. The Working Group on Direct Broadcast Satellites established under General Assembly resolution 2453 B (XXIII) held its second session at the United Nations Office at Geneva between 28 July and 7 August 1969, under the chairmanship of Mr. Olof Rydbeck, Director-General of Sveriges Radio (Sweden). The Working Group held nine meetings.
2. A list of the representatives of the States members of the Working Group, and of the representatives of the specialized agencies participating in the Working Group's proceedings as observers is contained in appendix I.
3. The provisional agenda (A/AC.105/WG.3/R.4) was adopted and is reproduced in appendix II.
4. The Working Group received papers on the subject of direct broadcast satellites from Argentina (A/AC.105/WG.3/WP.1), Australia (A/AC.105/63), Canada and Sweden (A/AC.105/59), Czechoslovakia (A/AC.105/61), France (A/AC.105/62), Mexico (A/AC.105/64) and the United Kingdom (A/AC.105/65) and from the United Nations Educational, Scientific and Cultural Organization (A/AC.105/60), and heard the statements of several delegations on the same matter.
5. At its fourth meeting on 31 July, the Working Group appointed a Drafting Group to prepare for it a draft report; the composition was as follows: Australia, Brazil, Canada, Czechoslovakia, France, India, Mexico, Sweden, the Union of Soviet Socialist Republics, the United Kingdom and the United States of America. It was also agreed that the representatives of ITU and UNESCO would assist in the work of the Drafting Group, which elected the leader of the Australian delegation, Mr. Douglas Brooke, as its Chairman.
6. At its first session, the Working Group had carried out a study of the technical feasibility of communication by direct broadcasts from satellites and the current and foreseeable developments in this field, including comparative user costs and other economic considerations for certain enumerated cases. At its second session, the Working Group considered the implications of such developments in the social, cultural, legal and other areas.
7. The Working Group referred to the report of its first session, which included, in its conclusions (see annex III above, paragraph 9), the following estimated time scales for satellite broadcasting:

\* Previously issued under the symbol /AC.105/66 and Corr.1 and 2.

- (a) "Direct broadcast into community receivers could be close at hand. Technology currently under development might allow this in the mid-1970s. Such a system is considered to be less expensive to launch than one intended for reception directly in people's homes."
- (b) "Direct broadcast of television into augmented home receivers could become feasible technologically as soon as 1975. However, the cost factors for both the earth and space segments of such a system are inhibiting factors... Therefore, it is most unlikely that this type of system will be ready for deployment on an operational basis until many years after the projected date of feasibility."
- (c) "... direct broadcasting television signals into existing, unaugmented home receivers on an operational basis is not foreseen for the period 1970-1985. This reflects the lack of technological means to transmit signals of sufficient strength from satellites."

8. The Working Group at its second session discussed the social, cultural, legal and other questions involved in direct broadcasts from satellites within the framework of the conclusions quoted in paragraph 7 above. It recognized that direct broadcasts from satellites could be used for either domestic, regional or global service.
9. In the case of community television service intended for purely domestic coverage, a Government, while bound to fulfil its international legal obligations, will be able to adopt such regulations as it considers appropriate. In this situation there would be few international co-ordination or control problems. It would only be at the stage of direct broadcasting into unaugmented home receivers for domestic coverage that limited problems of unintentional spill-over might arise.
10. For regional or global coverage into community receivers, there would appear to be a requirement for regional or international co-operation and co-ordination in such matters as use of satellites, common technical standards, languages, time sharing and programme content. A significant degree of control by individual Governments would still be possible in this type of situation. In the case of direct broadcasting from satellites into unaugmented home receivers, this control will be much more difficult. But in any case, early and continuous international co-operation will be necessary. Some delegations thought that the passage from one phase to the other will most probably be progressive and the problems to be solved will not be markedly different in nature but only in intensity, while others disputed this view.
11. After considering the material available to it, the Working Group recognized that there were considerable areas of overlap in the various issues which it was requested to study. It decided therefore to arrange this material under the following major headings.

- I. INTRODUCTION
- II. POTENTIAL FOR DIRECT BROADCASTS FROM SATELLITES
- III. CONSIDERATIONS RELATING TO TECHNICAL ASPECTS
- IV. INTERNATIONAL LEGAL ASPECTS
- V. CONTENT OF BROADCASTS
- VI. INTERNATIONAL CO-OPERATION
- VII. CONCLUSIONS

## II. POTENTIAL FOR DIRECT BROADCASTS FROM SATELLITES

12. The Working Group recognizes that the development of technology for direct broadcasting from satellites holds the promise of unprecedented progress in communications and understanding between peoples and cultures. It is firmly of the view that this new developing technology should be utilized for the benefit of all mankind. The Working Group considers that the medium of television is especially suited to increasing contacts between peoples of the world and to advancing the purposes and principles of the United Nations. Among the potential benefits from direct broadcasts from satellites would be improved education and health benefits, greater flow of news and information of general interest, including cultural programmes and the development of closer ties between peoples of countries and within countries. The Working Group considers that broadcasting via satellite offers an opportunity to the developing nations which have still not developed a general telecommunications network; for this new means permits the acceleration of their national programmes of integration, economic development, health, agriculture, education, communal development and culture. The potential benefits are being considered by several international organizations, such as the Food and Agriculture Organization of the United Nations (FAO), ITU, UNESCO and the World Meteorological Organization (WMO).

13. This assumes the technical and economic accessibility for developing countries to this new technological means, and consequently relies on the concrete realization of the common will to perfect international collaboration. It was pointed out that this collaboration must include recognition of the rights of all nations to utilize this means of broadcasting in an orderly and equitable manner, and it was expected that there would be the active participation of all States in the exploitation of regional and global systems, through international legal instruments, bilateral or multilateral, which would have to be in conformity with the principles of international law, the United Nations Charter and the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.

14. While expressing the hope that the potential advantages of direct broadcasts from satellites will be fully realized, the Working Group nevertheless acknowledges that the new technology would, if abused, give rise to serious adverse effects. Some delegations considered that these adverse effects could include recriminations through abuse or interference in the internal affairs of other States. The opinion was also expressed by some delegations that to avoid such possibilities, direct broadcasting from satellites should be in line with international legal order, be based upon international co-operation, and should have the agreement of all States concerned if it is to be carried out in the most orderly and equitable manner possible. The Working Group was strongly of the view that direct broadcasting from satellites must be based on international co-operation to ensure its most effective utilization.

## III. CONSIDERATIONS RELATING TO TECHNICAL ASPECTS

15. The Working Group appreciates that successful technical exploitation of satellites for all communication purposes, including direct broadcasting, is one of the fields which requires such international co-operation and regulation. This involves the statutory responsibility of ITU.

16. The Working Group notes that the Second World Administrative Radio Conference on Space Communication will be convened in Geneva on 7 June 1971 in order to make the necessary changes in the Radio Regulations on the basis of proposals made to the Conference. (The Regulations are an integral part of the International Telecommunication Convention.) The Conference will consider new frequency allocations for all the space services and will take the necessary action on the co-ordinated frequency planning requirements. Some delegations raised the question of the use of the geostationary orbit, and it was noted that consideration of this matter is included in the agenda of the World Administrative Radio Conference. The agenda of the Conference will enable proposals for direct broadcasting service radio frequency allocations and the technical regulatory requirements to be resolved.

17. In the meantime, studies are actively proceeding in ITU's International Radio Consultative Committee (CCIR), which has also programmed a Plenary Assembly open to all members of the Union, to consider firm recommendations and associated findings directed towards ensuring optimum application of techniques in the establishment, use and interconnection of radiocommunication systems, including space systems. This Plenary Assembly, which will be held in January 1970, will also provide the basic technical planning criteria for the Second World Administrative Radio Conference for Space Telecommunications.

18. The Working Group notes too the special attention being given by ITU to the importance of this Conference, and the separate series of meetings approved by the Administrative Council of the Union to take technical planning to a more detailed level in order to ensure that the Conference has the best and the latest technical advice so that participating Governments will be able to reach the best possible agreements on the future use of the radio spectrum for space services. The Working Group recognizes that in developing these agreements member Governments of ITU should pay due attention to appropriate political, legal and social considerations.

## IV. INTERNATIONAL LEGAL ASPECTS

19. The Working Group found in the material presented to it a considerable amount of detail on the various legal principles which might apply to direct broadcasts from satellites. It accordingly devoted a good deal of attention to this aspect of its mandate. A number of suggestions were put forward concerning both positive principles and the possible need for regulations of various kinds if there is to be orderly development of direct broadcasts from satellites on an internationally acceptable legal basis.

### A. General legal framework (international public law)

20. The Working Group notes that among the international legal instruments already applicable to direct broadcasts from satellites are the United Nations Charter, the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, and the relevant articles of the ITU Convention and Radio Regulations. In addition, a number of relevant principles is contained in the United Nations General Assembly resolutions relating to the peaceful uses of outer space.

21. The Charter, inter alia, specifies the sovereign equality of States, the development of friendly relations, the achievement of international co-operation, promotion of respect for human rights and fundamental freedoms, and the principle of non-interference in matters within the domestic jurisdiction of any State. The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, provides, in article III, for the use of outer space in the interest of maintaining international peace and security and promoting international co-operation and understanding. Article VI of the Treaty provides that States shall bear international responsibility for national activities in outer space whether they are undertaken by States, international organizations or non-governmental entities. Some delegations stated that article IX of the Treaty, requiring "due regard to the corresponding interests of all other States" concerned, was also relevant, while other delegations maintained that article IX related solely to interference and contamination.

22. Other principles suggested by various members of the Working Group included the need for international co-operation, mutual restraint, the use of outer space for exclusively peaceful purposes, freedom of the use of space and freedom of information. Some delegations felt that freedom of the use of space, and freedom of information in the field of satellite broadcasting, should be qualified freedoms.

23. In the course of discussion of general legal issues, a number of suggestions were put forward to the effect that in order to ensure that the principles of national sovereignty and non-interference in the internal affairs of States are respected, some prohibitions would be necessary in any legal regulations devised. Among these suggestions was a prohibition on broadcasts beamed from satellites by one State to others without the explicit prior consent of the Governments concerned through bilateral or multilateral agreements. It was suggested by some delegations that in order to enhance friendly relations among peoples and States, it would be unsuitable to broadcast programmes which might hurt the national sentiments of the people of a country, even if the broadcast were not intended for them. Another suggestion was that it might be more consistent with generally accepted international law to put stress on the right of every State to refuse a satellite broadcast directed at its territory rather than oblige those responsible for such a satellite system to seek the prior consent of each country likely to be covered by its broadcasts. Doubts were expressed, however, about the practicability of doing this.

24. It was pointed out, in the context of concerns expressed at the possibility of harmful propaganda, that the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, incorporates a reference to General Assembly resolution 110 (II), which condemned propaganda "designed or likely to provoke or encourage any threat to the peace, breach of the peace or act of aggression", and states that this resolution is applicable to outer space.

25. It was also suggested by some delegations that the emphasis placed by some other delegations on measures to protect "national sovereignty" and "non-interference in internal affairs" was not justified. More thought had to be given to this problem; a careful discussion in depth was required.

26. In the light of its discussion of general legal principles, the Working Group considers that further study should be undertaken with a view to ascertaining what additional legal rules might apply to direct broadcasts from satellites. The

Working Group believes that the Committee on the Peaceful Uses of Outer Space should recommend to the United Nations General Assembly that the Committee undertake this further study. It also considers that although direct broadcasts from satellites into home receivers are not foreseen for some years, nevertheless it is essential that such further study should proceed now to keep pace with technological development.

#### B. Protection of rights (international private law)

##### Copyright and neighbouring rights

27. Social concepts, and thus national legislation concerning the protection of copyright and neighbouring rights, differ as to the extent and kind of protection provided. Existing international conventions do not offer uniform protection, nor are they universally accepted.

28. It is the understanding of the Working Group that UNESCO and the United International Bureaux for the Protection of Intellectual Property (BIRPI), as well as other organizations, have these questions under consideration. The Working Group considers that these questions, in view of the difficulty involved in preparing and implementing international conventions in this field, should urgently be studied by all international bodies concerned, if necessary under the co-ordination of the Committee on the Peaceful Uses of Outer Space, with a view to reaching globally acceptable international arrangements.

##### Protection of broadcasts

29. The attention of the Working Group was drawn to the need, expressed by broadcasters all over the world, for a readily and globally acceptable international instrument protecting television programmes, transmitted or broadcast via satellites, against the retransmission and public utilization of such programmes without the authorization of the originating television organization. <sup>c/</sup> The Working Group was also informed of the resolution adopted by the 1968 UNESCO General Conference in this respect and believes that this matter should be given urgent attention at the meeting of governmental experts on international arrangements in the space communication field which will be convened by UNESCO from 2 to 9 December 1969.

#### V. CONTENT OF BROADCASTS

30. The Working Group notes that national social concepts and legislations differ with regard to rules concerning programme content. Globally accepted rules and adequate international agreements do not exist at present. Nor, considering the diversity of national cultures, would it be a simple matter to develop such principles on a global basis. Such agreed principles should be based on respect for national cultures and State sovereignty.

<sup>c/</sup> See report of the meeting of experts on the use of satellite communication for broadcasting, UNESCO document COM/CS/68/1/7, Paris, 25 March 1968.

31. It was recognized that extreme measures to protect national sovereignty against unwanted or unauthorized satellite broadcasts should preferably be avoided through international co-operation and regulation, taking into account all legitimate interests. The view was expressed, however, that States should have the right to counteract unauthorized broadcasts.

#### Political

32. A number of general principles of importance in the political field was dealt with under the heading "International legal aspects" above. The Working Group recognizes that there could be difficulty for many countries in deciding what form of direct broadcasts from satellites they would be able to accept from the political point of view. The likely political impact of direct broadcasts from satellites on an international scale is such that some regulation in its use was thought by some delegations to be desirable. For example, interference in the internal affairs of States, incitement to racial or religious intolerance, violation of fundamental human freedoms, and possibly the use of subliminal techniques, would be unacceptable. Some delegations stressed also the importance of the prohibition of war propaganda. It is recognized that some States may take objection to programme material which they regard as harmful to peace or to international or internal stability or conducive to social unrest.

33. It was suggested that the problems of political content of transmissions via satellites might be overcome by the acceptance of a code of conduct or programme standards through international co-operation. Some delegations suggested that such a code would need to embody bans on specific activities. Some scepticism was expressed, however, as to whether a generally acceptable code could be prepared and implemented, given differing views regarding, for example, freedom of speech, censorship and control of media. The Working Group considers, however, in view of the interest of many States in seeking protection against unwanted political interference, that this subject should be further considered by the Committee on the Peaceful Uses of Outer Space.

#### Cultural and social

34. The Working Group recognizes that the use of direct broadcasts from satellites could considerably increase the knowledge of the peoples of all countries of current events in the world, and of each other's cultures, customs and beliefs and social interests. To this extent it could contribute significantly to improved international awareness, understanding and tolerance. If misused, however, this medium could disturb cultural, religious and social mores, particularly if programmes ridiculed the beliefs of others or contained items involving obscenity, violence or horror. Problems might also be caused by exposure to material emphasizing inequalities of standards of living.

35. The Working Group recognizes that a related aspect of the question of cultural and social standards is embodied in national legislations affecting such matters as libel, slander, right to privacy and similar matters. Different rules also apply to right of reply and rectification. Programme content in respect of these matters which is lawful in the country of origin may be unlawful in receiving countries. The Working Group considers that these questions need further study by the Committee on the Peaceful Uses of Outer Space in consultation with UNESCO and other appropriate bodies. Here again it was suggested that solutions might be sought through such

measures as internationally acceptable codes of conduct, and bilateral and multilateral agreements, including where appropriate agreements between broadcasting organizations, both national and multinational.

36. The Working Group notes with appreciation the contents of the UNESCO paper (A/AC.105/60) submitted to it on cultural and social questions. It further notes that at its Inter-Governmental Conference of Experts in December 1969, UNESCO intends to continue its examination of the requirements of education, science and culture in the field of direct broadcasts from satellites. The Working Group suggests that the Committee on the Peaceful Uses of Outer Space should request UNESCO to keep it informed of all developments of interest to the Committee in this particular field, especially in reference to the presentation of programmes, education and national development.

#### Commercial

37. The Working Group recognizes that advertising by television through direct broadcast satellites, including the sponsorship of programmes by advertisers, could have significant financial and economic consequences. Some delegations felt that sponsorship of programmes, for example on a regional basis, may be one way whereby a satellite television system becomes economically viable. There could, however, be adverse effects on the operation of domestic or national television and advertising services, changes in established trading patterns. Some delegations pointed out that commercial advertising by direct broadcast from satellites could conflict with domestic legislation and practices in potential recipient States, and with established trading patterns. If, however, advertising on television programmes via direct broadcast satellites having regional or global coverage were to be permitted, harmonization of international codes of practice in commercial advertising would be desirable. It was suggested that an alternative solution would be to ban all commercial advertising from direct broadcast satellites, the financial balance of the system being ensured by other means.

### VI. INTERNATIONAL CO-OPERATION

38. The Working Group considers that there are some additional points to which it feels particular attention should be given, and it lists these for convenience in this section.

#### General

39. The Working Group cannot over-emphasize the importance of international and regional co-operation if the full potential of direct broadcasts from satellites is to be realized. Having considered the various aspects of its mandate, the Working Group is strongly of the opinion that considerable further study is necessary of appropriate international arrangements in all related fields.

40. The Working Group notes that international co-operation can be fostered by various means, including special agreements. International co-operation will be essential if States are to be encouraged to exercise restraint in various aspects of direct broadcasting from satellites in the interests of the international community as a whole. Some delegations pointed out that this co-operation should be conducted on a basis of equality and mutual respect for interests.

41. The Working Group sets out in the conclusions to this report (section VII) various courses of action which it feels could appropriately be undertaken.

#### Developing countries

42. The advent of direct broadcast satellites transmitting television signals into community receivers by the mid-1970s will have a special relevance to developing nations which have not yet acquired an extensive infra-structure of telecommunications using conventional technologies. Even though the optimum system in future is expected to have ground telecommunications as well as satellite telecommunications, there are unique opportunities for optimizing a system in respect of its cost and effectiveness where the existing investment is relatively small. The Working Group believes that these countries will greatly benefit from the use of satellite television systems through programmes of their own choice and suited to their specific needs. The UNESCO Expert Missions on Satellite Instructional Television have endorsed the unique contribution which this new technology can make to developing nations.

43. Direct broadcasting from satellites into community receivers will have great practical benefits for national integration and development because it makes it possible to link together isolated rural communities and distant centres of population. It would thus be possible to implement schemes of economic and social development such as teachers' training, improving agriculture, health, and facilitating family planning, etc. It would also stimulate and promote the electronics industry and other industrial enterprises generally in these countries.

44. The Working Group notes with interest the studies that are being carried out in many developing countries. It particularly looks forward to the results of the experiments that India and Brazil have proposed to conduct, in each case with the collaboration of the United States. The Working Group draws attention to the need for competent international bodies to consider the most effective ways to assist States in acquiring the benefits of satellite broadcasts, including the possibility of making available:

- (a) Information regarding the latest developments in the technology;
- (b) Fellowships;
- (c) Survey missions.

The hope was expressed that countries advanced in space research would make technological information and appropriate assistance available to developing countries on the basis of international co-operation.

#### Broadcasters

45. One of the particular areas in which international co-operation is already effective is between existing broadcasting organizations. The Working Group notes that the national patterns and structure of broadcasting have been complemented by this steadily increasing international co-operation. Apart from increasing bilateral and multilateral contacts among broadcasters themselves, co-operative patterns have also evolved within the framework of regionally based associations of broadcasting organizations whose membership, however, comprises broadcasters in many parts of the world. These organizations include the European Broadcasting

UNION (EBU), the International Radio and Television Organization (OIRT), the Asian Broadcasting Union (ABU) and the Union of African National Radio and Television Organizations (URTNA).

46. This co-operation, which is particularly evident in the activities carried out by broadcasting organizations in Europe under the names of Eurovision (EBU) and Intervision (OIRT), includes, among others, arrangements for live television programme exchanges, as well as co-operation in some matters of common concern to the member organizations. The patterns which have grown up with Eurovision and Intervision for the use of terrestrial circuits have already been extended to the use of communication satellite systems. The use of satellite systems for television has already made possible new patterns of co-operation between broadcasting organizations in widely separated areas of the world and provides opportunities for extending regionally evolved co-operation to a broader international level.

47. Through such activity and arrangements carried out as the basis of voluntary common action, respecting the independence of each individual broadcasting organization, broadcasters have been able to solve a number of international problems in various areas. These include arrangements for harmonizing activities, joint programme presentation and production, the solution of language problems, and differences in legal rules and technical standards.

48. The Working Group recognizes the role that broadcasting organizations are playing and can continue to play in the co-ordinated development of broadcasting via satellites.

#### VII. CONCLUSIONS

49. The Working Group notes that in the case of direct broadcasts from satellites for community television intended for purely domestic coverage, a Government, while bound to fulfil its international legal obligations, will be able to adopt such regulations as it considers appropriate. In this situation there would be few international, co-ordination or control problems. At the stage of direct broadcasting into unaugmented home receivers for domestic coverage, limited problems of unintentional national spill-over might arise. For regional or global coverage into community receivers, a significant degree of control by individual Governments would still be possible. In the case of direct broadcasting into unaugmented home receivers, this control will be much more difficult. But in any case, early and continuous international co-operation will be necessary. Some delegations thought that the passage from one phase to the other will most probably be progressive and the problems to be solved will not be markedly different in nature but only in intensity, while others disputed this view.

50. The Working Group concludes that there is substantial potential in the long run for the application of direct broadcasts from satellites in the interests of all mankind. In the view of the Working Group, there is a need for bilateral and multilateral, including regional, international co-operation leading to the strengthening of international arrangements. While recognizing that substantial potential exists for the use of direct broadcasts from satellites, difficulties may none the less be encountered. It will of course be necessary to seek wide international co-operation and orderly progress in all related fields.

51. The Working Group notes that there is no international institution which has the competence to take action in all these fields. It therefore believes that the United Nations, and in particular its Committee on the Peaceful Uses of Outer Space, should sustain the interest it has now shown in co-ordinating activity in the field of direct broadcasts from satellites, and, where appropriate, make suggestions on regulatory procedures. It considers that the Committee on the Peaceful Uses of Outer Space is the most appropriate body to co-ordinate and keep under review in a comprehensive fashion the activities of international institutions and to keep Members of the United Nations informed in a general way of all relevant developments. It also recognizes the important role which individual international organizations such as ITU and UNESCO have to play in their particular fields of competence.

52. The Working Group considers that even though the technical feasibility predictions contained in its first report (annex III) indicate that a number of the problems discussed may not come to a head for some years, nevertheless there is a need to continue studies in the intervening period with a view to completing, where possible, satisfactory international arrangements. It believes in particular that the Committee on the Peaceful Uses of Outer Space should consider closely the following matters.

A. Considerations related to technical aspects

53. The Working Group, at its first session, discussed in detail the role of ITU in space broadcasting and arrived at useful conclusions in paragraphs 10 and 11 of its report (annex III). The Working Group now notes with satisfaction the actions subsequently taken by the Administrative Council of the Union in setting a date and agenda for the Second World Administrative Radio Conference on Space Communication in 1971. This Conference will take up the questions relating to space broadcasting as included in its agenda and will consider frequency allocations and related technical matters such as efficient use of orbits, power, band-width and other associated matters.

54. The Working Group believes that member States of ITU should be urged to present in their proposals for the Second World Administrative Radio Conference on Space Communication their radio frequency and associated requirements of direct broadcasting in order to enable the Conference to consider the appropriate provisions under which services may be subsequently established.

B. International legal questions

General legal framework

55. The Working Group notes the existence of a number of international legal instruments which would apply to direct broadcasts from satellites, including the United Nations Charter, the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, and the applicable provisions of the ITU Convention and Radio Regulations. The Working Group also notes the existence of other relevant principles contained in resolutions of the United Nations General Assembly. A number of other possible principles were suggested by some delegations.

56. The Working Group believes that the Committee on the Peaceful Uses of Outer Space should recommend to the General Assembly that the Committee undertake further study of legal questions which might relate to direct broadcasts from satellites.

Protection of copyright and neighbouring rights

57. The Working Group considers that international agreements concerning copyrights and neighbouring rights in connexion with direct broadcasting of television programmes via satellites require particular and urgent expert study by the competent international agencies, inter alia, by UNESCO and BIRPI, in co-operation with the future users of direct broadcast systems, particularly the broadcasters. The international organizations concerned should be requested to prepare reports and studies for the attention of the Committee on the Peaceful Uses of Outer Space.

Protection of broadcasts

58. The Working Group considers that the Committee on the Peaceful Uses of Outer Space should commend to the attention of the meeting of governmental experts on international arrangements in the space communication field convened by UNESCO the need for protection against unauthorized use of television programmes broadcast via satellites. The Working Group also considers that UNESCO and BIRPI should be requested to inform the Committee on the Peaceful Uses of Outer Space of progress in this field.

C. Content of broadcasts

59. The Working Group considers that considerable difficulties lie in the way of producing a generally acceptable code which might govern the content of direct broadcasts from satellites, having regard to the different standards of programme acceptability which exist in different States, these standards having a close relationship to the levels of accepted social customs and practices in respective States. Nevertheless, it considers that future study might be conducted as follows.

Political

60. The United Nations Committee on the Peaceful Uses of Outer Space should continue to examine the political aspects of direct broadcasts from satellites, being guided by the purposes and principles embodied in the United Nations Charter and likewise by the resolutions of the General Assembly concerning the peaceful uses of outer space.

Cultural and social

61. The Working Group suggests that UNESCO be requested to keep the Committee on the Peaceful Uses of Outer Space informed of all developments of interest to the Committee in UNESCO's particular fields of competence relating to direct broadcasts from satellites, especially in studies and projects on national development, education and cultural exchanges.

62. The Working Group recognizes that the question of cultural and social standards embodied in national legislations affects such matters as libel, slander, obscenity, violence or horror, right to privacy, and a number of related problems. It suggests that these matters be further studied by the Committee on the Peaceful Uses of Outer Space in consultation with UNESCO and other appropriate bodies.

#### Commercial aspects

63. The Working Group considers that the range of issues involved in the commercial field suggests that the Committee on the Peaceful Uses of Outer Space retain an interest in the study of these questions. Information from UNESCO and the broadcasting organizations and other appropriate sources could be of value.

#### D. International co-operation

##### Broadcasters

64. The Working Group notes the role that broadcasting organizations are playing in developing new patterns of co-operation in broadcasting, using existing means of telecommunications, including satellites, which could be significant for future direct broadcasting from satellites. The Working Group feels that these developments could be studied with due attention.

##### Developing countries

65. The Working Group, noting the special value of direct broadcasting into community receivers for developing countries, strongly believes that direct broadcasting from satellites can make an effective contribution to meeting the needs and the particular interests of developing countries. The appropriate international agencies, such as FAO, ITU, UNESCO and WMO, and the United Nations Development Programme, should further study these needs and interests and provide information and, in conformity with their established procedures, appropriate assistance to developing countries in this regard. The hope was also expressed that States would do the same.

#### E. Future of the Working Group

66. In the light of the above report and conclusions, the Working Group is of the opinion that the Committee on the Peaceful Uses of Outer Space should consider whether the Working Group should continue to assist the Committee in the further study of the particular questions which the General Assembly might decide require further attention by it. The Working Group believes that it could, if continued, play a useful role in helping to co-ordinate and study various matters related to direct broadcasts from satellites as outlined in the conclusions of its reports.

## Appendix I

### LIST OF PARTICIPANTS

Chairman: Mr. Olof Rydbeck (Sweden)

#### ARGENTINA

##### Representative

Mr. Toófilo Tabanora  
Engineer

##### Alternate

Mr. Luis María Laurelli  
Secretary of Embassy  
Permanent Mission  
Geneva

##### Adviser

Mr. Luis Fernando Giménez  
Permanent Mission  
Geneva

#### AUSTRALIA

##### Representative

Mr. Douglas Albert Brooke  
Australian Post Office Representative  
in the United Kingdom

##### Alternates

Mr. John I. Coker  
Director, Policy and Licensing Division  
Australian Broadcasting Control Board

Mr. David Wyko Evans  
First Secretary  
Australian Mission to the United Nations  
New York

##### Adviser

Mr. Ernst Willheim  
Senior Legal Officer  
Attorney-General's Department



AUSTRIA

Representative

Mr. Friedrich Zimmermann  
Deputy Director  
Federal Ministry of Transport and  
Nationalized Industry

Alternate

Mr. Franz Coska  
Deputy Permanent Representative of Austria  
to the United Nations Office at Geneva

BELGIUM

Representative

Mr. Louis A.F. Delrot  
Head of the International Civil  
Service Department  
Ministry of Foreign Affairs

BRAZIL

Representative

Mr. Fanor Cumplido, Jr.  
Minister of Trade Relations  
Permanent Delegation of Brazil, Geneva

Alternate

Mr. Mauro Sergio Couto  
First Secretary of Embassy  
Permanent Delegation of Brazil, Geneva

Adviser

Mr. José Torquato Pedrosa de Souza  
Research Engineer  
National Commission for Space Activities  
(CNAE)

Observers

Mr. Carlos Furtado de Simas  
Minister of Communications

Mr. Soane Nazareth de Andrade  
Chef de Cabinet  
Ministry of Communications

BRAZIL (continued)

Observers (continued)

Mr. Wiler Castelo Branco Freaza  
Inspector General of Finance  
Ministry of Communications

BULGARIA

Representative

Mr. Ivan Peinirdjiev  
Ministry of Foreign Affairs

CANADA

Representative

Mr. A.E. Gotlieb  
Deputy Minister  
Department of Communications

Alternate

Mr. Angus W.J. Robertson  
First Secretary  
Permanent Mission of Canada  
to the United Nations  
New York

Advisers

Professor Charles Marvin Dalfen  
Consultant  
Department of Communications

Mr. Spencer Moore  
International Liaison Officer (Satellites)  
Canadian Broadcasting Corporation

CZECHOSLOVAKIA

Representative

Mr. Jaroslav Maršiček  
Chief of the Division of Radiocommunications  
Federal Committee of Posts and Telecommunications

Alternate

Mr. Petr Kríž  
Attaché  
Ministry of Foreign Affairs

Adviser

Mr. Jirí Cingroš  
Ministry of Foreign Affairs

FRANCE

Representative

Mr. Gilles de Boisgelin  
Assistant Director, Department of  
Scientific Affairs  
Ministry of Foreign Affairs

Alternate

Mr. Jean-Félix Charvet  
Counsellor  
Ministry of Foreign Affairs

HUNGARY

Representative

Dr. János Petráň  
Senior Official  
Department of International Law  
Ministry of Foreign Affairs

Alternate

Mr. Otto Villányi  
Senior Official  
Ministry for Transport and  
Telecommunication

INDIA

Representative

Professor E.V. Chitnis  
Secretary, INCOSPAR

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Alternate

Mr. K.P. Jain  
First Secretary  
Permanent Mission of India  
Geneva

Adviser

Mr. G.S. Balakrishnan  
Ministry of External Affairs

IRAN

Representative

Dr. Sadegh Azimi, Doctor of Engineering  
Minister Counsellor  
Permanent Delegation of Iran  
Geneva

Adviser

Mr. Gholam-Ali Sayar  
Second Secretary  
Permanent Delegation of Iran  
Geneva

ITALY

Representative

Mr. Emilio Bettini  
Deputy Representative  
Permanent Mission of Italy  
to the International Organizations

Advisers

Mr. Franco Cappuccini  
Counsellor  
Ministry of Posts and Telecommunications

Mr. Luigi Battaglini  
Counsel, Court of Appeals  
Legislative Bureau, Ministry of Justice

Mr. Enzo Castellitto  
Deputy Director of Engineering  
Radiotelevisione Italiana

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ITALY (continued)

Advisers (continued)

Mr. Giorgio Salvatori  
Chief, Engineering Department  
Telespazio

Mr. Pompeo Magno  
President  
Istituto Italiano Diritto Spaziale

Mr. Alberto Schepisi  
Second Secretary  
Permanent Mission of Italy to the  
International Organizations  
Geneva

Mr. Piero Aslan  
Attaché  
Permanent Mission of Italy to the  
International Organizations  
Geneva

JAPAN

Representative

Mr. Shigeru Tokuhisa  
Counsellor  
Permanent Delegation of Japan to the  
International Organizations  
Geneva

Alternate

Mr. Minoru Niki  
First Secretary  
Permanent Delegation of Japan to the  
International Organizations  
Geneva

MEXICO

Representative

Mr. Eugenio Méndez Docurro  
Assistant Secretary of Communications  
and Transport

POLAND

Representatives

Dr. Sławomir Dąbrowski  
First Secretary  
Permanent Mission of Poland to the  
United Nations Office at Geneva

Alternate

Dr. Tadeusz Kozłuk  
Permanent Mission of the Polish People's Republic  
to the United Nations  
New York

ROMANIA

Representative

Mr. Ion Pah  
Second Secretary  
Permanent Mission of the Socialist Republic of  
Romania to the United Nations Office at Geneva

SWEDEN

Alternate

Mr. Edward W. Ploman  
Director, International Relations  
Swedish Broadcasting Corporation

Adviser

Mr. Klas R. Stenström  
Secretary of Embassy  
Permanent Delegation of Sweden  
Geneva

UNION OF SOVIET SOCIALIST REPUBLICS

Representative

Mr. Enver Mamedov  
First Deputy Chairman of  
Soviet Radio and Television

UNION OF SOVIET SOCIALIST REPUBLICS (continued)

Advisers

Mr. Yuri Kolossov  
Second Secretary  
Legal and Treaty Department  
Ministry of Foreign Affairs

Miss Irina Vasilieva  
Institute of Sociology of the  
USSR Academy of Sciences

UNITED ARAB REPUBLIC

Representative

Mr. El Sayed El Reedy  
First Secretary  
Permanent Mission of the United Arab Republic  
to the United Nations Office at Geneva

Adviser

Mr. Motie Ismail  
Third Secretary  
Permanent Mission of the United Arab Republic  
to the United Nations Office at Geneva

UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND

Representative

Mr. A.C. Buxton  
Counsellor  
United Kingdom Permanent Mission  
Geneva

Alternate

Mr. D.J. Johnson  
Second Secretary  
United Kingdom Permanent Mission  
Geneva

Advisers

Mr. Kenneth Alan Law  
Chief Executive Officer  
Ministry of Overseas Development

Mr. C.E. Lovell  
Assistant Secretary  
General Post Office

UNITED STATES OF AMERICA

Representative

Mr. Herbert K. Reis  
Assistant Legal Adviser for  
United Nations Affairs  
Department of State

Advisers

Dr. A.M. Greg Andrus  
Chief, Communications Program  
Office of Space Science and Applications  
National Aeronautics and Space Administration

Mr. Stephen E. Doyle  
Office of Telecommunications  
Bureau of Economic Affairs  
Department of State

Mr. Joseph P. Lorenz  
Office of United Nations Political Affairs  
Bureau of International Organization Affairs  
Department of State

Mr. William H. Watkins  
Chief Engineer  
Federal Communications Commission

Specialised Agencies

International Telecommunication Union

Mr. R.E. Butler  
Deputy Secretary-General

Mr. A. Berrada  
Member, International Frequency Registration Board

Mr. NaGadadhar  
Senior Counsellor  
Mr. A. David  
Legal Adviser

Mr. H. Pouliquen  
Technical Adviser

United Nations Educational, Scientific and Cultural Organization

Mr. Tor Gjesdal  
Assistant Director-General for Communication

Mr. Julian Behrstock  
Director, Office of Free Flow of Information and  
International Exchanges

United Nations Secretariat

Mr. Marvin Robinson  
Secretary of the Working Group

Mr. N. Jasentuliyana  
Deputy Secretary of the Working Group

Miss Kwen Chen  
Legal Adviser

Mr. Jean D'Arcy  
Office of Public Information

Appendix II

WORKING GROUP ON DIRECT BROADCAST SATELLITES

AGENDA FOR THE SECOND SESSION

Convened at the Palais des Nations, Geneva,  
on Monday, 28 July 1969, at 10 a.m.

1. Statement by the Chairman.
2. Discussion of the implications of communication by direct broadcast from satellites in the social, cultural, legal and other areas.
3. Report of the Working Group on its second session.

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