# JOURNAL

## OF

# **SPACE**

# LAW

### VOLUME 5, NUMBERS 1 & 2

1977

Published by the

L.Q.C. Lamar Society of International Law of the University of Mississippi School of Law

## JOURNAL OF SPACE LAW

VOLUME 5

#### SPRING & FALL 1977

NUMBERS 1 & 2

#### EDITORIAL ADVISORY BOARD

HAROLD BERGER Philadelphia, Pennsylvania

ALDO ARMANDO COCCA Buenos Aires, Argentina

I. H. PH. DIEDERIKS-VERSCHOOR Baarn, Holland

ERNST FASAN Neunkirchen, Austria

EDWARD R. FINCH, JR. New York, N.Y.

EILENE GALLOWAY Washington, D. C. D. GOEDHUIS London, England

MYRES S. McDOUGAL New Haven, Connecticut

> FRANK E. MOSS Washington, D. C.

> > EUGENE PEPIN Paris, France

MICHAEL S. SMIRNOFF Belgrade, Yugoslavia

> ISODORO ZANOTTI Washington, D. C.

#### STEPHEN GOROVE, Chairman University, Mississippi

All correspondence with reference to this publication should be directed to the Journal of Space Law, University of Mississippi Law Center, University, Mississippi 38677.

Journal of Space Law. The subscription rate for 1978 is U.S. \$15.00 (domestic) and \$17.00 (foreign) for two issues (or one combined issue). Single issues may be ordered at \$9.00 per issue.

Copyright© Journal of Space Law 1977

Suggested abbreviation: J. Space L.

## JOURNAL OF SPACE LAW

A journal devoted to the legal problems arising out of man's activities in outer space.

VOLUME 5	SPRING & FALL 1977 NUMBERS	1 & 2
	CONTENTS	
The Fift	h Anniversary of the Journal of Space Law	1
ARTICLES		
Eilene Organiza	Galloway, Introduction to the Symposium on International ations and the Law of Outer Space	3
Peter Jan Peaceful	akowitsch, Contributions of the United Nations Committee on the Uses of Outer Space: An Overview	7
J. H. Ca Nations	arver, The Scientific and Technical Sub-Committee of the United Committee on the Peaceful Uses of Outer Space	17
Kwen C Nations	hen, Pending Issues Before the Legal Sub-Committee of the United Committee on the Peaceful Uses of Outer Space	29
Hans Ka	ltenecker, The New European Space Agency	37
Stephen Organiza	E. Doyle, INMARSAT: The International Maritime Satellite ation—Origins and Structure	45
Richard Satellite	R. Colino, International Cooperation Between Communications Systems: An Overview of Current Practices and Future Prospects	65
Richard <i>Broadca</i>	E. Butler, World Administrative Radio Conference for Planning sting Satellite Service	93
Ronald <i>Remote</i>	F. Stowe, The Development of International Law Relating to Sensing of the Earth from Outer Space	101
Lubos P	erek, Scientific Criteria for the Delimitation of Outer Space	111
I.H. Ph Status oj Compan	Diederiks-Verschoor and W. Paul Gormley, The Future Legal Nongovernmental Entities In Outer Space: Private Individuals and ties as Subjects and Beneficiaries of International Space Law	125

### SPECIAL FEATURES

	Current Documents	157
	The Arab Corporation For Space Communications	157
	Events of Interest	175
	1. New York Conference on "Remote Sensing—Legal and Policy Considerations," March 28, 1977	175
	2. International Colloquium on Product Liability in Air and Space Transportation, Cologne, Germany, March 31-April 2, 1977	175
· · ·	3. Other Events	176
	4. Brief News	177
	Book Reviews	179
	Gorove, S., Studies in Space Law: Its Challenges and Prospects (Eilene Galloway)	179
	Piradov, A. S., International Space Law (Eilene Galloway)	180
	Gorbiel, A., Legal Status of Outer Space (Eilene Galloway)	183
	United Nations, Space Activities and Resources (Eilene Galloway)	184
	NASA, Aeronautics and Space Report of the President: 1976 Activities (Eilene Galloway)	186
	Recent Publications	187
	Books	187
	Articles	187
	Official Publications	189
	Miscellaneous	191
	Index to Volume 5	195

### JOURNAL OF SPACE LAW

A publication of the L.Q.C. Lamar Society of International Law of the University of Mississippi School of Law

VOLUME 5

#### SPRING & FALL 1977

NUMBERS 1 & 2

#### **EDITORIAL BOARD**

CHARLES DAVID SWENSON Editor-in-Chief

#### KAY BEEVERS COBB Assistant Editor

JOHN WELCH NARRON Articles Editor

EDWIN EUGENE KERSTINE Index Editor LAMPTON O'NEAL WILLIAMS Research Editor

> JERRY L. DeLAUGHTER Business Manager

#### STAFF

Robert S. Addison David M. Armstrong Thomas W. Avent, Jr. George V. Chesteen Frank John Dantone Albert G. Delgadillo Walter Reed Hillen Emile W. Holiner Gay Dawn Horne John M. McCollouch Jane Rials McWilliams John David Price William N. Reed Gail B. Richards Gwen E. Seaquist Thomas S. Shuler Joseph K. Turner, III Clarence O. Turner, IV Walter G. Watkins, Jr. Harry M. Yoste, Jr.

FACULTY ADVISOR DR. STEPHEN GOROVE

#### THE FIFTH ANNIVERSARY OF THE JOURNAL OF SPACE LAW

This year marks the fifth anniversary of the establishment of the Journal of Space Law. The founding of a law journal dedicated to the field of space law was proposed by Dr. Stephen Gorove in 1970. After two years of preparatory efforts, the Journal was established in 1973 under the direction and guidance of Dr. Gorove and with the enthusiastic support of a group of ambitious students. The Journal began operations as and remains the only legal periodical in the world devoted exclusively to the legal problems arising out of man's activities in space. Since its humble beginning the Journal has made great progress toward the ultimate goal of national and international recognition as a leading legal periodical of the Space Age.

The first five years of development of the Journal of Space Law have been extremely rewarding. The success of the Journal is the result of several primary factors. First, the Journal has benefited from the able leadership of enthusiastic student editors, namely: John H. Fitch, Jr. and John M. McCarty in 1973; Eugene A. Gasiorkiewicz and John H. Crouch in 1974-75; and Paul B. Henderson and Arlin C. Ruthven in 1976. This involvement by leading students in the editorial process has enabled the Journal to remain a viable force within the student body. Second, the support of the worldrenowned members of the Editorial Advisory Board has been invaluable. These leading authorities have not only given generous counsel but have also been instrumental in contributing to almost every issue of the Journal. Third, the growth in recognition of the Journal is a manifestation of the growing world-wide interest in space law. The Journal has responded in direct relation to this increased interest in space law with symposia and articles on the most important space law issues. Finally, the past five years of success of the Journal cannot be adequately recounted without recognition of the instrumental work of Dr. Stephen Gorove. Dr. Gorove in his role as Chairman of the Editorial Advisory Board and faculty advisor has remained the driving and stabilizing force behind the development of the Journal. It is Dr. Gorove who has the most claim to the past and continuing success of the Journal.

This issue of the *Journal* represents the culmination of the past five years of success. Since the inaugural issue of the *Journal* in 1973 was a symposium on "Earth Resources Survey Satellites and International Law" it is fitting that the fifth anniversary issue is also a symposium. This issue is devoted exclusively to "International Organizations and the Law of Outer Space." Each article either concerns an international organization and its current role in space law development or the article is written by a leading authority within an international organization about an important space law issue.

The Journal is especially pleased that Mrs. Eilene Galloway graciously consented to serve as guest editor for this issue. Mrs. Galloway is presently the Vice-President of the International Institute of Space Law and is President of the Theodore von Kármán Memorial Foundation, Inc. In addition, Mrs. Galloway acts as a consultant on international space activities to the United States Senate. Mrs. Galloway has contributed

significantly to the development of the current issue. In addition to authoring the Introduction to this Symposium and writing the book reviews, she has been instrumental in soliciting articles, providing materials and generous advice. The *Journal* is deeply grateful to Mts. Eilene Galloway.

The future development of the *Journal* is promising. Plans are underway for moving into the new University of Mississippi Law Center which will provide increased office space and an international space law library in the *Journal* offices. It is also hoped that there will be an increase in the size of the editorial staff, as well as editorial responsibilities, especially in relation to student contributions in the form of notes or comments. In the long range there are plans for the foundation of an editorial alumni group, creation of scholarship opportunities for editors, recognition for outstanding student writing, and more symposia on leading space law issues.

Those of us who have been closely associated with the *Journal* are indeed proud of its development over the past five years. On the occasion of the tenth anniversary it is expected that the *Journal* will have an even greater claim to recognition in the family of leading legal periodicals. The national and international interests surrounding the legal issues of remote sensing, space colonization, satellite communications, solar energy, and the space shuttle are increasing at an enormous rate. The future development of space law and of the *Journal of Space Law* itself appears bright and we look forward to the next five years with great anticipation.

> Charles David Swenson Editor-in-Chief



### Eilene M. Galloway

Vice-President of the International Institute of Space Law; Special Consultant on International Space Activities to the United States Senate; President of the Theodore von Kármán Memorial Foundation, Inc.; and Guest Editor for this issue.

#### INTRODUCTION TO THE SYMPOSIUM ON INTERNATIONAL ORGANIZATIONS AND THE LAW OF OUTER SPACE

#### Eilene Galloway\*

The purpose of this symposium is to furnish a basis for analyzing the relationship between institutional and legal problems involved in the uses of outer space. These are not the only two elements of multidisciplinary problems arising from the variety of space applications which also include interrelated scientific, technological, political, economic and cultural aspects. But basic problems of organization and law, created on the Earth as a result of space activities, should be combined for consideration in order to take advantage of their experience during the first two decades of the space age. Each organization actively engaged in space and space-related activities is operating from a legal base and has had to adapt to the feasibility and availability of space technology, the practicalities of economics, and the impact of political and cultural factors. Successful current practices of existing institutions should be examined to determine whether they may be applicable to future operations; methods which have been found ineffective can thus be avoided. Proposals for the future must take account of functioning institutions and space law already in force.

The development of space science and technology has influenced significantly the creation of new institutions and the use by existing organizations to improve functions which they were already performing before the space age began. Unique features of space technology led the United Nations to create the Ad hoc Committee and then the permanent Committee on the Peaceful Uses of Outer Space, followed by the Outer Space Affairs Division. There was foresighted recognition of the need to establish basic concepts to guide nations in the conduct of their space activities and to define the role of the United Nations in coordinating space applications relevant to the functions of the specialized agencies.

Space technology was a new tool which enabled the International Telecommunication Union, for example, to improve the performance of its legal functions. Similarly, the World Meteorological Organization took advantage of space science and technology to meet its operational responsibilities in a highly specialized field. UNESCO found in the analyzed data beamed from satellites toward the Earth a wealth of information to use in connection with its economic, social and cultural programs. The same pattern was followed by the Food and Agriculture Organization and other agencies which found space applications relevant to the functions for which they were originally established. Information resulting from this new technology also proved helpful in programs designed to assist developing countries.

<sup>\*</sup>Vice-President, International Institute of Space Law. The views expressed in this paper are those of the author and are not necessarily connected with any organization of which she is a member.

The idea of establishing one international agency to cover all uses of space technology was considered during UN discussions in 1958, but was abandoned because it was not practical to remove vital portions of functions already being performed in connection with meteorology, communications, agriculture, aviation, navigation, and education. This situation has not changed and, indeed, the diversity and widespread uses of space science and technology have accentuated the trend toward decentralization coupled with the centralization of some common elements.

At the national level, which can be most easily followed by information on the institutions using space science and technology in the United States, the same influences were at work: decentralization of special functions with centralized coordination of matters requiring overall direction. Space applications developed by the National Aeronautics and Space Administration were used by U. S. agencies working in the fields of agriculture and land management, communications and transportation, aviation, water resources, arms control and disarmament. All, or even a portion, of the basic functions of a large number of organized governmental bodies could not be taken over by one agency, although the necessity for coordination of outer space activities was recognized.

Whether institutions were established or newly created, they were responsible for implementing the provisions of space law developed to guide States in the conduct of their space activities. The foundation for space law was solidly laid in space treaties, the 1967 Treaty on Outer Space providing basic principles from which subsequent space treaties have been elaborated as necessary. Assistance and Return of Astronauts and Space Objects, Liability for Damage, and Registration of Space Objects-these three treaties, as well as the draft Moon Treaty which is currently on the agenda of the UN Legal Sub-Committee, stem from articles in the original Treaty on Outer Space, often repeating the wording of the primary values foresightedly set forth in the 1967 Treaty in order to attain consistency in the developing legal regime. Proposals for future space law should not be in conflict with the existing system which has been constructed on the basis of consensus among the members of the Legal Sub-Committee and the UN Committee on the Peaceful Uses of Outer Space. To the extent that space law has been developed, it has facilitated and not hampered progress in using space science and technology for purposes beneficial to mankind. Consensus was achieved because no issue was presented for discussion in such irreconcilable terms that a compromise could not be reached. The probable adoption of future proposals will also depend upon presenting a reasonable basis for reconciling differing points of view.

Guidelines for solving problems of organization and management are clearly needed because some proposals for new international institutions are being advanced without considering organizations already operating in this field. There have been proposals for an international organization to manage, regulate and sometimes even to operate, every major space activity that has come or may come into being. Late comers to this field may know only one space application, such as remote sensing or direct broadcast satellites or orbiting colonies, and do not seem to realize that adoption of each proposal would result in numerous separate and overlapping institutions. Some proposals make no provision for coordinating national and international activities while others assume that coordination is all that is required and yet fail to define "coordination." Some proposals overlook the role of the United Nations and its specialized agencies or show an obvious lack of knowledge of the UN budget and its operational capabilities as well as the history of international cooperation in space activities. Future space law proposals concerning international institutions should be based upon a thorough knowledge of all space applications and the ways in which existing institutions, both national and international, are already using space science and technology. Furthermore, proposals for the future should be realistic in identifying methods of solving problems of coordination, staffing, and financing.

There is also a tendency to propose new treaties for each space application, although the activity may adequately come under existing national arrangements and treaties. Considering the fact that each space treaty has a different membership of ratifying nations, it is obvious that too many treaties with differing rosters can create difficulties. As time goes on, there will be a question of how may treaties are required to solve individual problems. Partial approaches could result in inconsistencies which could not later be codified into a harmonious system of space law. The objective should be to strive, not so much for the maximum number of treaties as for the maximum number of States Parties to the total structure of space law created to ensure the most rewarding use and exploration of outer space.

Included in this symposium are also articles on two pending issues before the UN Legal Sub-Committee: remote sensing of the earth by satellites and the definition of outer space. They illustrate the fact that the problems which must be dealt with by institutions operating in accordance with law and arising from expanding use of the space environment, are multidisciplinary. No one problem can be singled out as being solely, or even primarily, concerned with science, technology, law, politics, economics or culture. All such elements must be identified to attain the total understanding necessary for decisions on proposed solutions. In the last analysis, the weightiest element in determining a course of action may depend upon whether or not a project is technically feasible or upon the amount of money available or upon public acceptance of a commitment to an objective. Whatever combination of elements is necessary for a complete evaluation of a space law proposal, one certainty is that an indepth factual knowledge of space science and technology is indispensable. Any difficulties likely to be encountered in formulating future space law will be caused by failure to become familiar with the scientific and technological space application for which the law is proposed. And, additionally, failure can result from not taking advantage of solutions which have proved successful in the past. Both science/technology and law can permit or prohibit, in their specialized spheres, the realization of certain activities and they must be carefully dove-tailed so as not to create unnecessary restrictions which prevent space technology from reaching its maximum potential in benefitting mankind.

#### JOURNAL OF SPACE LAW

This symposium is designed to be of assistance in understanding the multidisciplinary nature of space activities and the primary importance of law and institutions in establishing workable guidelines which can be implemented in accordance with the main objective of space law—the use of outer space for peaceful purposes for the benefit of all mankind. Those who seek to make contributions toward this objective will also be assisted by a recently published United Nations document: "Space Activities and Resources: a review of the activities and resources of the United Nations, of its specialized agencies and of other competent international bodies relating to the peaceful uses of outer space."<sup>1</sup>

By studying space institutions and law, we will be able to identify the kinds of benefits, technological and otherwise, that were contemplated in 1961 but are now actually accomplished. Foresight exercised at the beginning of the space age may now be measured in terms of specific results. A global index of organizations and their programs should form a realistic basis for plans designed to cover future eventualities. During the past 20 years, many space problems have been solved and now offer precedents for approaching new problems as they arise. The current generation of mankind is learning more about ways to cooperate. Strong regional patterns have emerged and bear continuing study. This symposium contains clear evidence of the fact that we are learning to work together as we have not in the past. The record thus far reveals an increasing level of interdependence among States as space technology brings us closer together in cooperation rather than in confrontation and conflict.

6

<sup>1</sup>U.N. Doc. A/AC.105/193 (1977).

#### CONTRIBUTIONS OF THE UNITED NATIONS COMMITTEE ON THE PEACEFUL USES OF OUTER SPACE: AN OVERVIEW

#### Peter Jankowitsch\*

#### I. INTRODUCTION

International cooperation in the field of Outer Space activities has followed technical progress closely even if not always simultaneously. This was all the more so, as it became soon evident that any potential application of space science and technology could only be beneficial if its inherent international character was recognized. The need for a fundamentally international approach towards the many questions and problems of Outer Space was soon generally recognized.

The United Nations, as the most advanced and most universal form of expression of humanity's interdependence today, constitutes a natural organizational basis and framework to ensure that this world-wide spreading of technology is carried out in such a way as to minimize potential dangers of friction among nations. Thus momentum towards resolution of key problems of Outer Space activities has come from the United Nations, the organization which has been established "to maintain international peace and security" and whose General Assembly has been entrusted to "initiate studies and make recommendations for the purpose of . . . promoting international cooperation in the political field and encouraging the progressive development of international law and its codification."

#### II. ESTABLISHMENT OF THE OUTER SPACE COMMITTEE

It was for this reason that on the morrow of the successful launching of the first satellites the initial questions relating to Outer Space reached the Agenda of the United Nations. They made their first appearance in 1957 in the context of the debate on disarmament. A year later a special item on Outer Space was placed before the General Assembly. It was then that an *Ad hoc* Committee on the Peaceful Uses of Outer Space was set up. By resolution,<sup>1</sup> the General Assembly later established the Committee on the Peaceful Uses of Outer Space, to succeed the *Ad hoc* Committee. In December 1961,<sup>2</sup> the Committee was made permanent and the membership established at 28, to be later enlarged to the present number of 37 Member States.

\*Ambassador, Permanent Representative of Austria to the United Nations. Chairman of the United Nations Committee on the Peaceful Uses of Outer Space. The views expressed in this paper are those of the author and are not necessarily connected with any organization of which he is a member.

<sup>1</sup>U.N.G.A. Res. 1472 (XIV), December 12, 1959.

<sup>2</sup>U.N.G.A. Res. 1721 (XVI), December 20, 1961.

The present Committee's tasks are to review the scope of international cooperation in peaceful uses of Outer Space, to devise programs in this field which could be undertaken under the United Nations auspices, to encourage continued research and disseminate information on research, and to study legal problems arising from the exploration of Outer Space.

The Outer Space Committee held its first session in 1962. At the first meeting its new Chairman, Ambassador Franz Matsch of Austria, read into the record a carefully drafted statement, which had resulted from extensive US-Soviet negotiation, to the effect that the Committee would endeavor to proceed by consensus wherever possible and dispense with the need for voting subject to the understanding that the General Assembly rules of procedure, making voting possible, would continue to apply. The Committee has operated under this consensus procedure since 1962. Underlying the willingness to put normal rules of procedure aside was the general recognition of the need to obtain the agreement of both space powers for new courses of action if these were to prove effective.

#### III. SUB-BODIES OF THE OUTER SPACE COMMITTEE

There are various sub-bodies of the Committee, each of which has the same membership as the Committee. The Scientific and Technical Sub-Committee deals mainly with the exchange and dissemination of information, the encouragement of international programs of space research and making the results of exploration accessible to countries which are not engaged in it. This Sub-Committee also operates in education and training in the field of space and in the evaluation of the work done by the specialized agencies engaged in space research.

The Legal Sub-Committee was entrusted with the task "to study legal problems which may arise from the exploration and use of outer space." The new dimension, like those which man penetrated earlier, could not remain a legal vacuum.

#### IV. U.N. DECLARATIONS AND INTERNATIONAL AGREEMENTS

In 1962, the General Assembly solemnly declared that Outer Space including celestial bodies is free for exploration and use by all States on a basis of equality and in accordance with international law and that it is not subject to national appropriation by claims of sovereignty, by means of use or occupation, or by any other means.<sup>3</sup>

The two main landmarks in the legislative work of the United Nations as the focal point in the development of space law, however, are the Declaration of Legal Principles

<sup>&</sup>lt;sup>3</sup>U.N.G.A. Declaration (XVII) (1962).

Governing the Activities of States in the Exploration and Use of Outer Space,<sup>4</sup> unanimously adopted by the General Assembly of the United Nations on December 13, 1963, and the Treaty on Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, including The Moon and Other Celestial Bodies,<sup>5</sup> which was opened for signature in London, Moscow and Washington on January 27, 1967 and entered into force on October 10, 1967.

In addition to setting forth certain provisions of the Declaration of Legal Principles, the Outer Space Treaty includes numerous other principles: the obligation of States not to orbit any objects carrying nuclear weapons of mass destruction, not to install such weapons on celestial bodies or to station weapons in Outer Space; the use of the moon and other celestial bodies exclusively for peaceful purposes; the prohibition of the establishment of military bases, installations and fortifications, the testing of any types of weapon and the conduct of military maneuvers on celestial bodies; the avoidance of harmful contamination and adverse changes in the environment of the earth resulting from the introduction of extraterrestrial matter; as well as the access by States Parties to the Outer Space Treaty to stations, installations, equipment and space vehicles on the moon and other celestial bodies on a basis of reciprocity.<sup>6</sup>

Consequent to this Treaty three more international agreements to implement the basic rules laid down in the two instruments just mentioned were established: the Agreement on the Rescue of Astronauts, Return of Astronauts and the Return of Objects launched into Outer Space;<sup>7</sup> the Convention on International Liability for Damage Caused by Space Objects;<sup>8</sup> and the Convention on Registration of Objects Launched into Outer Space.<sup>9</sup>

The Agreement on the Rescue of Astronauts, Return of Astronauts and the Return of Objects Launched into Outer Space provides, *inter alia*, for: cooperation between the launching authority and a contracting party to effect a prompt rescue of the personnel of a spacecraft which, owing to accident, distress, emergency or unintended landing, lands in territory under the jurisdiction of the latter State; the obligation of the contracting parties to extend assistance in search and rescue operation for such personnel who have

318 U.S.T. 2410, T.I.A.S. No. 6347, 610 U.N.T.S. 205 (1967).

Treaty on the Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, 18 U.S.T. 2410, T.I.A.S. No. 6347, 610 U.N.T.S. 205 (1967).

<sup>7</sup>19 U.S.T. 7570, T.I.A.S. No. 6599, 672 U.N.T.S. 119 (1968).

<sup>8</sup>24 U.S.T. 2389, T.I.A.S. No. 7762 (1972).

9U.N.G.A. Res. 3235 (XXIX) (1974). For text of the Convention, see 3 J. Space L. 99 (1975).

<sup>4</sup>U.N.G.A. Res. 1962 (XVIII) (1963).

alighted on the high seas or in any other place not under the jurisdiction of any State; the safe and prompt return of such personnel to representatives of the launching authority; and the obligation of each contracting party having jurisdiction over the territory on which a space object or its component parts have been discovered to take steps to recover the object or its component parts as well as the return of objects or their component parts found beyond the territorial limits of the launching authority to representatives of that authority.

The Liability Convention provides, *inter alia*, for rules of international liability for damages caused by space objects and a procedure for the presentation and settlement of claims. Accordingly, the Convention deals with the numerous matters relevant to the formulation of a system of liability and a procedure for compensation.

The Registration Convention provides, *inter alia*, for a central register of objects launched into Outer Space to be established and maintained on a mandatory basis by the Secretary-General of the United Nations, which would, in particular, assist in the identification of space objects and contribute to the application and development of international law governing the exploration and use of Outer Space.

#### V. CURRENT AREAS OF SPACE LEGISLATION

At present the Committee is concentrating on three further areas of space legislation: the draft treaty relating to the moon, the question of elaboration of principles governing the use by States of artificial satellites for direct television broadcasting, and the consideration of legal implications of remote sensing of the earth from space.

On the draft treaty relating to the moon, the Legal Sub-Committee has prepared the text of a preamble and 21 articles including final clauses.<sup>10</sup> The main outstanding issue relates to the legal status of the natural resources of the moon. Another oustanding issue is whether the treaty should be applicable to the moon only or to other celestial bodies as well.

In the area of direct broadcast satellites, agreement has been reached on a set of draft principles dealing, in substance, with such issues as: purpose and objectives, applicability of international law, rights and benefits, international cooperation, State responsibility, duty and right to consult, peaceful settlement of disputes, copyright and neighboring rights, and notification of the United Nations. The question of consent and participation, program content and unlawful inadmissible broadcasts remain, however, yet to be solved.

<sup>10</sup>U.N. Doc. No. A/AC, 105/115 (1973). For text of the Draft Convention, see 1 J. Space L. 170 (1973).

The consideration of the legal implications of earth resources survey by remote sensing satellites has led to the formulation of a number of draft principles dealing with such basic issues as international cooperation, applicability of international law, participation, protection of environment and technical assistance. Other legal work of the Committee is mainly concerned with the study of questions relating to the definition and/or delimitation of Outer Space and Outer Space activities.

#### VI. PURSUIT IN THE AREA OF SPACE APPLICATIONS

The Scientific and Technical Sub-Committee and its *ad hoc* working groups have, over the years, made a series of recommendations on exchange of information, encouraged international programs especially in the field of space applications, initiated UN sponsorship of international sounding rocket facilities, and contributed to education and training especially in the practical applications of space technology.

The need for a widespread exchange of information in the practical applications of space technology was recognized by the Committee at an early stage of its activity. As early as 1959 it was recognized that an international scientific conference for the exchange of experience in the peaceful uses of Outer Space would be essential to satisfy this need. The first United Nations Conference on the Exploration and Peaceful Uses of Outer Space was held in August 1968 in Vienna. It was conceived not only to be a meeting for exchange of information on a world-wide scale but also to examine the practical benefits of space exploration and the opportunities available for international cooperation with special reference to the needs of the developing countries. It was attended by 78 Member States, nine specialized agencies and four other international organizations. It provided an excellent opportunity for dissemination of information on practical applications of space research.

The possibility of holding a United Nations Conference on Outer Space Matters to follow the 1968 Vienna Conference is currently under consideration.

In keeping with this important concern of the Committee to ensure dissemination of information, Member States launching satellites and other space objects have been requested by the Committee to provide the United Nations with information on their launchings, for which a public registry was established by the Secretary-General in 1962. Members have also been urged to provide the Committee with information on their national and cooperative international space programs.

One of the main purposes of the Committee is to study practical and feasible means of giving effect to programs in the peaceful uses of Outer Space which could appropriately be carried out under United Nations auspices including assistance for the continuation on a permanent basis of research on Outer Space.

Expressing the interest of the Committee to promote international cooperation in furthering scientific and basic research projects the Committee has recently begun to encourage international cooperation towards the possible utilization of space technology in the generation of solar energy.

In the area of practical applications of space technology to which the Committee is giving increased importance, recommendations for international programs have been adopted in the field of space meteorology, space communications, navigation satellites, direct broadcast by satellites and remote sensing of the earth by satellites.

The Committee's concern with international cooperation in the application of space technology to meteorological programs and activities has been reflected in its recommendations to Member States and to the WMO for measures designed to advance the state of atmospheric science and technology, with a view to developing improved knowledge of basic physical forces affecting climate and the possibility of large-scale weather modification, and to develop weather forecasting capabilities through various means, including regional meteorological centers.

The Committee has also recognized the importance of space communications since its early development. Believing that communication by means of satellites should be made available to all nations of the world on a global and nondiscriminatory basis, and recognizing the important role played by the ITU in this area, the Committee urged sympathetic consideration of requests for technical and other assistance for survey of national communications needs and domestic communications facilities with a view to effective use of space communications.

Following the United Nations Conference on the Peaceful Uses of Outer Space, the Scientific and Technical Sub-Committee decided to promote more energetically international cooperation in the applications of space technology particularly for the benefit of the developing countries. A program designed to create awareness of the practical applications of space technology and to provide practical training and education in this field was initiated and an Expert on space applications to plan and coordinate this program was appointed.

A Navigational Satellite Working Group established by the Committee came to the conclusion that it will be technically feasible to develop a navigational service satellite system to meet particular needs of civil aviation and sea-borne traffic and to help resolve basic navigational requirements and made specific suggestions regarding this matter.

A Working Group on Remote Sensing of the Earth by satellites, established to examine ways for promoting the optimum utilization of the new technology for the benefit of all States, studied, *inter alia*, the potential of this new technology in solving specific environmental land resources problems and its legal implications and organizational aspects. This Working Group concluded that among the most useful potential applications of remote sensing data were the monitoring of the environment, studies in agriculture and forestry, geography and marine resources, atmosphere,

#### UNCOPUOS: AN OVERVIEW

19//

meteorology and use in cases involving natural disasters. On the organizational aspects, the Working Group outlined a possible future role for the United Nations in this area. A number of studies prepared upon recommendation of the Working Group related to the organizational and financial requirements for the establishment of one or more international regional data storage and dissemination centers with reception facilities under United Nations auspices. They were also related to the requirements for the establishment of an international center under United Nations auspices for data storage and dissemination. All these questions continue to be under consideration.

For consideration of questions relating to the use of satellites for transmitting radio and television programs intended for direct reception by the general public, the Working Group on Direct Broadcast Satellites was established to examine technical aspects as well as economic, social, cultural and legal implications. It affirmed the substantial potential for the application of direct broadcasts from satellites in the interest of all mankind, the need for the strengthening of large-scale international cooperation and stressed the belief that the United Nations, and in particular its Committee on the Peaceful Uses of Outer Space, should continue to pay special interest in coordinating activity in this field. It also underlined that the use of satellite- borne television for educational purposes, particularly in the developing countries, would contribute towards national programs of integration and community development and economic, social and cultural development in such areas as formal and adult education, agriculture, health and family planning.

The Working Group also studied some of the political and legal implications of direct broadcast satellites and dealt with a number of issues and matters for which the elaboration of principles in this field was considered essential, thus preparing the groundwork for the on going efforts of the Legal Sub-Committee.

As early as 1962 the Committee considered that the creation and use of sounding rocket launching facilities, especially in the equatorial regions and the southern hemisphere, under United Nations sponsorship, would contribute to international collaboration in space research and the advancement of human knowledge by openinng up possibilities for nations wishing to enter the field of space research and providing opportunities for practical instructions and training in this field. The United Nations decided in 1965 and 1969 to sponsor two such facilities: The Thumba Equatorial Rocket Launching Station (TERLS), established in India; and the CELPA (Centro de Experimentacion y Lanzamiento de Proyectiles Autopropulsados) Mar del Plata, established in Argentina.

Furthermore, the Scientific and Technical Sub-Committee has done important groundwork in preparation for the work of its sister Sub-Committee, *i.e.*, in the field of registration of objects launched into Outer Space, in the study of potentially harmful effects of space experiments and the monitoring of the environment through space activities.

#### VII. FUTURE CHALLENGES FOR THE OUTER SPACE COMMITTEE

As space research, development of new technology and the range and frequency of practical applications steadily and rapidly increase and expand together with bilateral, regional and international programs of cooperation in those areas, new challenging questions emerge and call for attention by the Committee.

Earth-oriented space activities such as remote sensing and new communications systems are likely to experience a most substantial growth. More and more countries, including developing countries, become involved in such earth-oriented programs and benefit from international cooperation. To mention just one impressive example: Indonesia's first domestic communications satellite "Palapa" was successfully launched in July 1976, making Indonesia the first developing nation and the third country in the world to have its own domestic satellite system. For a nation such as Indonesia with thousands of islands which span great distance and with formidable terrestrial barriers, the "Palapa" system can play an important role in fulfilling the needs of the country and its people.

But there are also activities, oriented towards Outer Space, likely to expand: the study of the universe, the fate of matter, such as tele-explosion and cosmic rays; the study of the origins and the future of life itself; the search for intelligent life in the universe. In the context of the latter activities, questions have been raised recently whether there was need for international agreement to them since the consequences of making the presence of intelligent life on earth known could not be foreseen and might in the opinion of some be detrimental to the future of mankind.

Other new areas of space-oriented activities likely to generate proposals for further development of space law might well include the establishment of colonies on the moon and on orbiting earth satellites.

Measures that may be adopted for the regulation of activities in space in the interest of peace and security may be considered in the light of developments in the field of arms control, disarmament and of continuing scientific and technological progress. It may at some point appear desirable to extend the prohibition on the stationing of weapons of mass destruction in space to include all weapons. New technological development might, furthermore, open the question of interference with or destruction of satellites in space and thus crippling of early-warning systems which are an essential stabilizing factor. Recent news reports indicate the testing by major space powers of such potentially disquieting weapons as the so called hunter-killer satellites, which use bursts of laser rays to disable enemy spacecraft. Such issues, as may be described as demilitarization of outer space, have a close bearing on and interdependence with peace and stability in general, as well as other developments in the area of arms control or limitation. Legal aspects will not be the only ones to be considered when dealing with such new or expanded programs, whether earth- or space-oriented. Many other aspects of a scientific, technological, political, economic, or cultural nature will have to be taken into account. Our approach to such new challenges will have to be multidisciplinary. New forms of international cooperation will in some instances become necessary. In accepting these challenges the Outer Space Committee will continue to discharge its duties and the importance of our work will grow.

#### THE SCIENTIFIC AND TECHNICAL SUB-COMMITTEE OF THE UNITED NATIONS COMMITTEE ON THE PEACEFUL USES OF OUTER SPACE

#### J.H. Carver'

#### I. INTRODUCTION

The Scientific and Technical Sub-Committee is one of two standing subsidiary bodies of the United Nations Committee on the Peaceful Uses of Outer Space. Established by the main Committee at its first meeting in March 1962, the Sub-Committee usually meets annually for a period of two or three weeks. Its fourteenth session was held at United Nations headquarters, New York, in February 1977. Dr. D.F. Martyn of Australia was the first chairman of the Sub-Committee and the author succeeded him in 1970. The Sub-Committee is serviced by the Outer Space Affairs Division of the United Nations Secretariat.

As with its sister body, the Legal Sub-Committee, membership of the Scientific and Technical Sub-Committee is open to all thirty-seven<sup>1</sup> Member States of the main Committee. With its broadly based membership, the Sub-Committee is a fairly large body which, throughout its history, has sought to conduct its work in such a way as to reach agreement by consensus without recourse to majority voting. While the search for consensus has often been slow and sometimes difficult the procedure has ensured that the Sub-Committee's recommendations have contained a realistic compromise between the views of a widely representative group of space and non-space powers.

Amongst the functions of the Sub-Committee are the exchange of information about international cooperation in outer space matters, the provision of advice to the Main Committee on scientific, technical and organizational questions and the promotion of international cooperation in outer space matters with particular reference to space applications programs which might benefit developing countries. Before examining some of the Sub-Committee's work in these fields it is necessary to review very briefly the relevant scientific and technical background to outer space activities.

<sup>\*</sup>Elder Professor of Physics at the University of Adelaide, Australia, and Chairman of the Scientific and Technical Sub-Committee of the United Nations Committee on the Peaceful Uses of Outer Space. The views expressed in this paper are those of the author and are not necessarily connected with any organization of which he is a member.

<sup>&</sup>lt;sup>1</sup>Albania, Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chad, Chile, Czechoslovakia, Egypt, France, German Democratic Republic, Germany (Federal Republic of), Hungary, India, Indonesia, Iran, Italy, Japan, Kenya, Lebanon, Mexico, Mongolia, Morocco, Nigeria, Pakistan, Poland, Romania, Sierra Leone, Sudan, Sweden, Union of Soviet Socialist Republics, United Kingdom of Great Britain and Northern Ireland, United States of America and Venezuela.

#### II. THE SCIENTIFIC AND TECHNICAL BACKGROUND

Sputnik I, the first artificial satellite of the Earth, was placed into orbit by the Soviet Union on October 4, 1957, and the first United States satellite was launched on January 31, 1958. In the first twenty years of the space age, men have been to the Moon; the unmanned exploration of the planets has commenced; astronomy has been freed from the limitations imposed by the Earth's atmosphere; the sun, the upper atmosphere and the outer environment of the Earth have been studied in great detail; and the application of space techniques to practical global problems has brought great improvements to meteorology, communications, navigation and Earth resources studies. That all these scientific advances and practical benefits have been achieved in so short a period is indeed impressive.

Although the space age began less than twenty years ago the scientific principles governing the motion of Earth satellites have been thoroughly understood since the time of Sir Isaac Newton (1642-1727). Some appreciation of these principles is an essential background to the work of the Scientific and Technical Sub-Committee because no amount of political dispute or legal argument can alter the natural laws of celestial mechanics which describe the motion of Earth satellites and other astronomical bodies. This is not the place to attempt to describe these scientific principles in any detail but there is, fortunately for our present purposes, a famous diagram of Newton's which illustrates most of the essential features.<sup>2</sup> Newton describes the motion of an object projected from a mountain which is imagined to be so high that air resistance is negligible. As the velocity of the object is increased it travels a further and further distance before falling back to the Earth under its own weight. When the velocity with which the object is projected is sufficiently great, it may "pass into space" without touching the Earth. Newton went on to point out that when the object returned to its launching point after first circumscribing the Earth it would have the same velocity as when first projected. If air resistance could be neglected the satellite would therefore "go on revolving through the heavens—just as planets do in their orbits."

<sup>&</sup>lt;sup>2</sup>I. Newton, Mathematical Principles of Natural Philosophy and his Systems of the World 551 (A. Motte trans. 1729, F. Cajori ed. 1934). Newton's explanation of the launching of an artificial Earth satellite:



Newton's diagram illustrates one of the most fundamental properties of Earth satellites; namely, their very great speed. There is no such thing as a slowly moving Earth satellite because the velocity must exceed 8 km per second or the object will not be able to maintain a stable satellite orbit about the Earth. Satellites are intrinsically high velocity objects which may move rapidly from one region of space to another without being confined to any particular geographical region. Of course, if a satellite is placed at just the right altitude over the equator its own rapid motion may be exactly in synchronism with the rotation of the Earth so that the satellite moves in a geostationary orbit with great advantages for communication systems. Other satellite orbits may be highly eccentric, the satellite coming low into the atmosphere at perigee and sweeping afar out into space at apogee. The motion of an Earth satellite is continuous about the globe and is most compactly described not by reference to local geographical coordinates but in terms of orbital parameters which define the complete motion of the satellite around the entire Earth. These remarks are perhaps sufficient to remind us how different are the motions of artifical satellites of the Earth from the much more familiar motions of objects on the land, the sea or even in the air.

Most of the work of the Scientific and Technical Sub-Committee has been concerned with artificial satellites in orbit around the Earth rather than with more distant space probes for the very good reason that Earth orbiting satellites have already led to a wide range of practical applications which are of interest to many countries.

#### III. INFORMATION AND ADVICE ON INTERNATIONAL COOPERATION

One function of the Sub-Committee is to encourage the exchange of information about international cooperation in outer space matters with the object of increasing the awareness within all countries of the beneficial applications of space techniques. Continued progress in space applications depends on the nature, rate of funding and success of the space programs of those nations and groups of nations which have developed the launching capability on which all space activities, whether national or international, in the end, rely. At each of its sessions, the Sub-Committee receives reports from its members in which they review their national and cooperative international space activities during the preceding calendar year. In these national reports, and in the related general debate, States are able to explain developments in their own space programs, to state how their national programs have contributed to international activities, to comment on the effectiveness of cooperative programs in which they have participated, to suggest ways for removing difficulties that may have limited their involvement in particular projects and to express any reservations they may have concerning new applications arising from the space programs of other nations. Discussion of these topics has been wide ranging and the Sub-Committee has proved to be a successful forum used by States with both large and small space programs to express their sometimes differing views on space matters in a realistic and constructive manner.

Sessions of the Sub-Committee are attended by representatives of a large group of international bodies with interests in space research and its applications, in addition to

the delegates from Member States. For example, at the thirteenth session of the Sub-Committee held in Geneva in March-April 19763 the following bodies were represented: the United Nations Environment Program (UNEP), the United Nations Development Program (UNDP), the Food and Agriculture Organization of the United Nations (FAO), the United Nations Educational, Scientific and Cultural Organization (UNESCO). the World Health Organization (WHO), the International Telecommunications Union (ITU), the World Meteorological Organization (WMO), the Inter-Governmental Maritime Consultative Organization (IMCO), the European Space Agency (ESA), the Committee on Space Research (COSPAR), and the International Astronautical Federation (IAF). Reports to the Sub-Committee from these specialized bodies have made a most valuable contribution to the exchange of information about international space activities and this expert advice has greatly strengthened the Sub-Committee in its role as a "focal point" for discussion of international cooperation in the peaceful uses of outer space.

The Committee on Space Research (COSPAR) of the International Council of Scientific Unions and the International Astronautical Federation (IAF) have close links with the Scientific and Technical Sub-Committee. Both of these organizations have advised the Sub-Committee on various scientific and technical questions and have cooperated in joint projects with the United Nations including the publication of scientific data and the holding of technical panels on space related matters. The professional advice received from COSPAR and IAF has been of great value to the Sub-Committee.

The Sub-Committee reports to the main Committee which it advises on scientific, technical and organizational matters concerned with international cooperation in the peaceful uses of outer space. It is important to remember that the Sub-Committee provides its scientific and technical advice in the political context of a government to government meeting. The delegates to the Scientific and Technical Sub-Committee are instructed by the same governments that send delegates to the main Committee and to the Legal Sub-Committee; all three bodies exist to consider outer space matters which require discussion at a governmental level. Unlike, for example, COSPAR and the IAF, the Scientific and Technical Sub-Committee is not an international college holding scientist to scientist and engineer to engineer meetings. The work of the Sub-Committee does, however, benefit considerably from the traditions of scientific and technical cooperation which have been fostered in international meetings of the collegiate type. And the members of the Sub-Committee and their advisers share a common understanding of the scientific and technical principles on which the Sub-Committee's work is based.

See U.N. Doc. A/AC.105/170 (1976).

#### IV. LAUNCHING RANGES UNDER UNITED NATIONS SPONSORSHIP

The Sub-Committee does not, of course, have the resources to function in any way as an operational space agency. Its role is to coordinate United Nations and other international space activities and to promote international cooperation in outer space matters. One of the ways in which the Sub-Committee has sought to increase international cooperation in the use of space facilities has been by recommending the granting of United Nations sponsorship to sounding rocket ranges. A Member State may request United Nations sponsorship for its range under the provisions of a resolution passed by the General Assembly in December 1962. United Nations sponsorship has been granted so far to two rocket ranges, the Thumba Equatorial Rocket Launching Station of the Vikram Sarabhai Space Centre in India and the CELPA Mar del Plata Rocket Launching Station in Argentina. The Sub-Committee annually receives reports on the use of these sounding rocket facilities for international cooperation and training in the peaceful scientific exploration of outer space.

#### V. PRACTICAL APPLICATIONS OF SATELLITES

The practical benefits to be obtained from communications and meteorological satellites were already established over a decade ago when such satellites began to be used to provide regular operational services in a number of countries. At the same time it was realized that satellites might also have a number of other important practical applications.

In 1967 a Navigational Satellite Working Group, formed by the Committee on the Peaceful Uses of Outer Space, reported that it would be technically feasible to develop a navigational services satellite system to meet particular needs of civil aviation and seaborne traffic and to help resolve basic navigational requirements.<sup>4</sup> Following discussions in the Inter-Governmental Maritime Consultative Organization (IMCO), which were reported to the Scientific and Technical Sub-Committee, the International Maritime Satellite System (INMARSAT), has now been established to facilitate the use of satellites for maritime navigation.

In 1968 the General Assembly of the United Nations set up a Working Group on direct broadcast satellites to study the technical feasibility of communications by direct broadcasting from satellites, as well as the social, legal, cultural and other implications of such communications. The Working Group concluded, *inter alia*, that direct broadcasting into community receivers could be technically feasible in the mid-1970's. This conclusion has been borne out by the success of the satellite instructional television experiment (SITE) currently being undertaken by India using the United States ATS-6 satellite. Reports on the SITE program at the 1976 session of the Scientific and Technical Sub-Committee indicated how isolated village communities could benefit from direct

<sup>&</sup>lt;sup>4</sup>See U.N. Doc. A/AC. 105/38 (1967).

satellite broadcasting designed to promote improvements in agriculture, health and cultural understanding.<sup>5</sup>

Matters relating to the practical applications of space techniques, particularly the new applications to remote sensing, have now become of major concern to the Scientific and Technical Sub-Committee.

#### VI. UNITED NATIONS SPACE APPLICATIONS PROGRAM

The first United Nations Space Conference which was held in Vienna in August 1968<sup>6</sup> focused the attention of many countries on the potential benefits which might be obtained from the practical applications of space techniques. Largely as a result of this Conference, the Scientific and Technical Sub-Committee actively sought to encourage international cooperation in the field of space applications with particular reference to programs which would enable the developing countries to share in the advantages to be gained from this new technology.

In order to achieve this objective, the Sub-Committee recommended that the Secretary-General appoint to the Outer Space Affairs Division a qualified individual whose full-time task it would be to promote the practical applications of space technology. The main Committee on the Peaceful Uses of Outer Space and the General Assembly accepted the recommendation and in March 1970 the Secretary-General appointed the first United Nations Expert on Space Applications. It is fortunate indeed that it has been possible to attract to this demanding post persons of the quality of Professor H. Ricciardi of Argentina and his successor Professor H. Murthy of India.

The tasks which the Sub-Committee set for the Expert on Space Applications were formidable. In order to promote space applications particularly amongst developing countries, the Expert was required to liaise with all components of the United Nations family and maintain contact with all Member States seeking information and assistance relevant to United Nations programs in this field. In reporting to the Sub-Committee, one of the Expert's first recommendations was the adoption of a United Nations Space Applications Program designed to create awareness on the part of policy makers and interested government agencies of benefits from space applications technology and to encourage training and education programs which would enable officials from developing countries to gain experience in the practical applications of space technology.

This Space Applications Program has been supported by the Sub-Committee. Initially the program concentrated on creating a broad awareness of the potential benefits of space applications but recent work has been increasingly directed towards practical training courses rather than more generally oriented seminars. In response to a

<sup>6</sup>Proceedings reported in 1, 2 A/CONF. 34/2 (1968).

<sup>&#</sup>x27;See U.N. Doc. A/AC.105/170 (1976).

#### SCIENTIFIC AND TECHNICAL SUB-COMMITTEE

questionnaire Member States have indicated a particular need for education and training in applications concerned with satellite communications and broadcasting, remote sensing and meteorology.

In implementing the Space Applications Program the Expert has had extensive discussions with officials in many countries about the various possibilities for development that are created by space technology. An important point of his work has been to encourage the establishment of technical panels composed particularly of representatives from developing countries to observe and study various space applications projects. The Expert maintains close contacts with the specialized agencies and with international governmental and nongovernmental organizations concerned with international cooperation in the peaceful uses of outer space. Consultations are arranged by the Expert to secure sponsorship of panels by these agencies and organizations and to seek Member States to host the meetings.

In response to offers extended by Member States, panels, seminars or workshops were organized during 1971-75 in Argentina, Brazil, Canada, Egypt, Ethiopia, France, India, Indonesia, Italy, Japan, Kenya, Mexico, and the United States.<sup>7</sup> Further offers were made for the period 1976-77 for panels, seminars or workshops to be convened in the Federal Republic of Germany, Pakistan, the United Kingdom and the Union of Soviet Socialist Republics.

Following a request made by the Sub-Committee at its 1975 session, the United Nations, in cooperation with FAO, arranged for the training during 1976 of specialists from developing countries in the area of remote sensing including the interpretation of US Landsat images, aircraft-derived data and ground truth information with particular reference to the solution of problems related to the participant's own geographical region.

United Nations Panel Meeting on Remote Sensing Systems for Earth Resources Survey (Ann Arbor, United States, May 3-14, 1971); United Nations Panel Meeting on the Establishment and Implementation of Research Programs in Remote Sensing (Sao Jose dos Campos, Brazil, November 29-December 10, 1971); United Nations/WMO Panel and Training Seminar on Uses of Meteorological Satellite data - with special emphasis on tropical ateas (Mexico City, November 29-December 8, 1972); Regional United Nations Panel Meeting on Satellite Instructional Television systems (New Delhi and Ahmedabad, India, December 12-20, 1972); Summer School on Remote Sensing of Earth Resources (Tarbes, France, August 21-September 21, 1973); United Nations/UNESCO Regional Seminar on Satellite Broadcasting Systems for Education and Development (Addis Ababa, Ethiopia, October 21-31, 1973); United Nations Panel Meeting on the Applications of Remote Sensing of Earth Resources (Buenos Aires, Argentina, December 2-8, 1973); United Nations Panel Meeting on Satellite Broadcasting Systems for Education (Tokyo, Japan, February 26-March 7, 1974); United Nations/FAO Regional Seminar on Remote Sensing of Earth Resources and Environment (Cairo, Egypt, September 4-13, 1974); United Nations Inter-regional seminar on the Applications of Geodetic and Remote Sensing Data from Satellite for Cartography - surveying and mapping (Sao Jose dos Campos, November 4-15 1974); United Nations Inter-regional Technical Seminar on Remote Sensing Applications in cooperation with Canada and UNESCO (Guelph, Canada, May 12-30, 1975); Joint United Nations/UNESCO Regional Seminar on Satellite Broadcasting Systems for Education and Development (Mexico City, September 2-11, 1975); Joint United Nations/WMO Regional Training Seminar on the Interpretation, Analysis and Use of Meteorological Satellite Data (Nairobi, Kenya, October 6-17, 1975); United Nations/FAO Regional Seminar on Remote Sensing (Jakarta, Indonesia, November 19-28, 1975).

The Sub-Committee annually reviews the progress of the United Nations Programme of Space Applications and considers proposals made by the Expert for future activities. In support of education and training through the Space Applications Programme, the Sub-Committee has been most appreciative of the offers of fellowships made by various Member States including Austria, Belgium, Brazil, India, Italy, Japan, the United Kingdom and the United States.

#### VII. COORDINATION OF THE UNITED NATIONS SPACE ACTIVITIES

. As evidenced by the large group of international bodies which attend sessions of the Scientific and Technical Sub-Committee, involvement in space activities is spread widely throughout the United Nations system. Mindful of its own role as a "focal point" for international cooperation in outer space matters the Sub-Committee has drawn attention to the need to ensure effective coordination of the activities of the United Nations and the specialized agencies in the area of space applications.

In 1974 the Sub-Committee requested the Secretary-General to report and comment on the whole question of the coordination of space application activities within the United Nations system. At its 1976 session the Sub-Committee welcomed the new administrative machinery reported by the Secretary-General to improve interagency coordination in outer space matters. The Sub-Committee indicated that it wished to continue to be kept informed of the steps being taken to coordinate the outer space activities of organizations within the United Nations system.

#### VIII. REMOTE SENSING OF THE EARTH BY SATELLITE

At its recent sessions the Scientific and Technical Sub-Committee has given considerable attention to questions relating to the remote sensing of the Earth by satellite. Remote sensing could bring significant benefits to many countries, particularly those in developing areas, provided there is a sufficiently widespread understanding of the potential benefit of this space technique. Global monitoring using remote sensing techniques could also be of great assistance in the preservation of the Earth's environment.

Recognizing the importance of remote sensing, the General Assembly in November 1971 endorsed the convening by the Scientific and Technical Sub-Committee of a Working Group on remote sensing of the Earth by satellites. The Working Group, under the vigorous chairmanship of the late Franco Fiorio of Italy, studied various means of furthering international cooperation in this field, summarized scientific and technical developments concerning remote sensing systems and reviewed methods for the collection, processing and interpretation of data.<sup>8</sup> A Task Force, open to

See U.N. Doc. A/AC.105/102 (1972).

all members of the Working Group, studied the documentation submitted for the consideration of the Working Group, analyzed responses to a questionnnaire on remote sensing sent to Member States and reviewed proposed alternatives for the dissemination and optimum utilization of remotely sensed data.

The possibility of establishing under United Nations auspices an international global centre for remote sensing, as well as setting up regional data acquisition and/or data storage and dissemination centers, with the possible attachment of education and training facilities to such centers, were important issues raised in the Working Group report. The Sub-Committee, realizing the complexity of these matters, requested that the Secretary-General undertake studies concerning their organizational and financial implications.

Reports on these studies were before the Sub-Committee at its thirteenth session in 1976. The Sub-Committee affirmed the value of keeping in mind the distinction between the current *pre-operational*/experimental phase of remote sensing and a possible future global/international *operational* remote sensing system or systems. Technical, organizational and financial aspects are likely to be major distinguishing factors between these phases.

The present pre-operational experience has arisen largely in connection with the United States Landsat system. While it is possible that other systems may be set up in the next few years, these, too, would be of an experimental nature and fully operational systems are unlikely until the 1980's. The Sub-Committee has received reports from a number of users on the experience which they have gained in the present pre-operational phase. Discussions within the Sub-Committee based on this growing experience should assist in defining the parameters of a possible operational phase which will best satisfy the interests of most users.

No commitment has yet been made to establish an operational system of remote sensing of the Earth by satellite. Discussions within the Sub-Committee have suggested, however, that satellite remote sensing systems will in time become, like weather and communications satellite systems, an integral part of the planning and production of national economies and that international cooperation will be essential at that stage as the only cost-effective approach for the majority of countries. One of the major tasks facing the Sub-Committee in the immediate future is to ensure that the means are provided to allow this international cooperation to be achieved. This will require detailed investigation of the possible forms for the space and ground segments of a future operational phase of satellite remote sensing of the Earth.

The Sub-Committee has begun to outline some of the possible operational alternatives and is seeking to clarify such basic questions as whether or not a future remote sensing operational space segment would encompass one or more nationally owned and operated systems; and to what extent the United Nations or other international organization(s) should have a coordinating role. The Sub-Committee considers that ground facilities for receiving, pre-processing and disseminating data in the operational phase would be, in all probability, financed, owned and operated by individual users and associations of users. It noted that in the case of existing satellites global coverage could be achieved with a limited number of ground stations. For example, approximately 15 ground stations, properly distributed, would be sufficient to provide complete global coverage in the case of the US Landsat system. Questions of economy and the ready availability of data to local users will be amongst the many factors that need to be considered in planning future operational systems.

Future operational systems for satellite remote sensing of the Earth will need to take account of the interests of a very wide range of users in many countries at different stages of development. In the report of its thirteenth session, the Sub-Committee pointed out:

that users' needs and interests would have a decisive influence in the future realization of operational systems for remote sensing from satellites. Thus, technology which already could be seen to provide a great potential for social and economic development of both developing and developed countries, was likely to bring significant benefits of an interdisciplinary nature in such major fields as: The mapping of areas of the world, and the recording of changes in the conditions and use of the earth's surface; Agricultural forecasting as an aid to crop, forest and animal production, and agricultural supplies and products distribution; Geological mapping to facilitate the efficient exploration and development of mineral resources; Hydrological surveys for water resources identification, to permit urban, rural and agricultural image planning and pollution monitorings; Land uses surveys to permit efficient development of urban and rural areas, and to aid in transmigration planning.<sup>9</sup>

Reiterating the view that further study of organizational, technical and financial matters should progress together with consideration of the legal aspects of remote sensing, the Scientific and Technical Sub-Committee asked the Secretariat to prepare further studies on remote sensing questions for consideration at the 1977 session of the Sub-Committee.

#### IX. FUTURE WORK

At each of its recent sessions the Scientific and Technical Sub-Committee has carefully reviewed its future work and delineated certain items to which it planned to give special attention at the following session. This has been a healthy exercise which has focused the Sub-Committee's attention on particular items of current concern.

In view of the complexity of the issues that have already been raised, it seems most likely that remote sensing of the Earth by satellites will be of major concern to the Sub-Committee for some time to come. The Sub-Committee also has a continuing interest in the Space Applications Programme and educational and training matters related to it.

9U.N. Doc. A/AC.105/170 (1976).

#### 1977

The Sub-Committee has begun to consider the options relating to a possible second United Nations Conference on Outer Space matters and these options will be discussed further at the 1977 session.

These are all matters which are on the current agenda of the Scientific and Technical Sub-Committee. In the longer term it seems probable that the Sub-Committee will continue to concentrate most of its attention on the practical applications of space technology because of the exciting possibilities for developments that are inherent in this new technology. The value of the applications of space techniques to meteorology, communication, direct broadcasting, navigation and Earth resources is now widely recognized and many countries derive substantial benefits from space technology.

The Sub-Committee will need to continue its efforts to see that the benefits of these well-recognized space applications are even more widely shared amongst the countries of the world. Many other beneficial applications of the space technique are of course possible. Materials processing in space and the utilization of solar energy are examples of applications which could be of profound importance if there are favorable technological developments. In planning its future work the Scientific and Technical Sub-Committee will need to remain alert to applicatons which may follow further innovations in space techniques.

#### PENDING ISSUES BEFORE THE LEGAL SUB-COMMITTEE OF THE UNITED NATIONS COMMITTEE ON THE PEACEFUL USES OF OUTER SPACE

#### Kwen Chen\*

The present article consists mainly of a summary of views expressed at the sixteenth (1977) session of the Legal Sub-Committee of the Committee on the Peaceful Uses of Outer Space, held from March 14 to April 8 this year, concerning the unresolved issues of the following priority items on its agenda: (1) draft treaty relating to the moon; (2) elaboration of principles governing the use by states of artificial earth satellites for direct television broadcasting; and (3) legal implications of remote sensing of the earth from space. A brief description is also given to the fourth item, *i.e.*, "matters relating to the definition and/or delimitation of outer space and outer space activities," which did not have priority and was not discussed in any detail in the Sub-Committee.

#### I. DRAFT TREATY RELATING TO THE MOON

Three main issues arising from the preparation of a treaty relating to the moon have been pending since 1973.<sup>1</sup> These are: the question of the scope of the treaty, the information to be furnished on missions to the moon, and the legal status of the natural resources of the moon. The Working Group established by the Legal Sub-Committee to deal with the draft treaty had, since 1974, focused its attention on the question of the natural resources which was generally regarded as the key issue whose solution could facilitate an agreement on the other two issues.

It was generally agreed that an international regime should be established to govern the exploitation of natural resources of the moon when such exploitation becomes feasible. The main question on which no agreement could be reached is whether the moon and its natural resources should be the common heritage of mankind.<sup>2</sup> This seems to be the central question surrounding which many other questions have arisen. Briefly those other questions are: what is meant by the expression "common heritage of mankind" in a legal context? Should this expression, as a legal principle or as a concept, be applied to both exploration and exploitation of the natural resources? If so, how

<sup>1</sup>For those provisions of the draft treaty that were approved or taken note of by the Legal Sub-Committee, see U.N. Doc. A/AC.105/101, para. 21 (1972); U.N. Doc. A/AC.105/115, para. 17 (1973).

<sup>2</sup>In 1973, two working papers, one by the Soviet Union and the other by Argentina, on the question of the "Common Heritage of all Mankind" were presented to the Legal Sub-Committee. See U.N. Doc. A/AC.105/115, Annex I (7), (11) (1973).

<sup>\*</sup>Principal Officer, General Legal Division, Office of Legal Affairs, United Nations. Secretary of the Legal Sub-Committee of the Committee on the Peaceful Uses of Outer Space. The views expressed in this paper are those of the author and are not necessarily connected with any organization of which she is a member.

should it be applied in concrete cases in relation to the principle of the freedom of exploration and use of outer space? In particular, what activities would be permitted with regard to the moon's resources before an agreed international regime governing exploitation of those resources is established and in force?

At the sixteenth session of the Legal Sub-Committee, difference of views on the above-mentioned questions remained unchanged. Essentially, certain members considered "common heritage of all mankind" as a philosophical concept lacking legal content which had no place in a legal instrument, while others maintained that it was a legal concept and a prerequisite for the elaboration of a treaty relating to the moon. Some members held the view that activities should be permitted only for scientific purposes and that no commercial exploitation of the natural resources should take place before the establishment of the international regime; others thought that utilization of the moon and its natural resources should also be allowed for other experimental purposes; still others were of the opinion that utilization should be allowed for any peaceful purpose pending the establishment of the international regime.

In the Working Group, a new idea was introduced as an informal proposal for the drafting of an additional protocol to the treaty concerning the legal regime of natural resources of the moon and other celestial bodies, but it did not receive support.

As reported by the Chairman of the Working Group, no consensus could be realized on the question of the natural resources and, consequently, no text thereon was agreed upon at the session despite the efforts made by a great number of delegations.<sup>3</sup>

#### II. ELABORATION OF PRINCIPLES GOVERNING THE USE BY STATES OF ARTIFICIAL EARTH SATELLITES FOR DIRECT TELEVISION BROADCASTING

Consideration of this item by the Legal Sub-Committee at its previous sessions resulted in the formulation of nine principles on the following subjects: purposes and objectives, applicability of international law, rights and benefits; international cooperation; State responsibility; duty and right to consult; peaceful settlement of disputes; copyright and neighboring rights; and notification to the United Nations.<sup>4</sup> When its sixteenth session opened this year, the Legal Sub-Committee had before it three remaining issues, *i.e.*, consent and participation, program content and unlawful/inadmissible broadcasts.<sup>5</sup>

<sup>&</sup>lt;sup>3</sup>U.N. Doc. A/AC.105/196, Annex I (1977).

<sup>4</sup>For texts of these principles, see U.N. Doc. A/AC.105/171, Annex II, at 1-3 (1976).

For the draft texts on these subjects on which there was an incomplete exchange of views in 1975 and 1976, see id. at 3-5.

In accordance with its practice, the Sub-Committee reestablished its Working Group on this item. Of the remaining issues, the Working Group first took up the principle of "consent and participation." Having considered the existing texts of this principle, and in an effort to harmonize the different views of delegations as well as to facilitate general agreement, the Working Group sought to replace this subject tentatively with a principle on "consultation and agreements between States" and proceeded to formulate a tentative text of a principle under this heading. The replacement was an attempt to reconcile two basic different approaches to the issue; namely, free flow of information and prior consent of the receiving State. The same issue also arose in the context of the draft preamble submitted by Canada and Sweden to the Working Group for consideration.

Discussion of this issue in the Working Group also brought out differences of views on other relevant points such as the extent to which the results of the World Administrative Radio Conference for the Planning of Broadcasting Satellite Service (WARC) convened by the International Telecommunication Union in January-February 1977 at Geneva were relevant, and the question whether a principle on consultation and agreements could replace the principle on "right and duty to consult" formulated last year.

The views on the various aspects of the issue were summarized in the report of the Chairman of the Working Group as follows:<sup>6</sup>

The view expressed in the United Kingdom Working Paper (A/AC.105/c.2/L.110) and supported by some other delegations was that, as a result of the Agreement and Plan concluded at the WARC as well as other ITU instruments, there would be little intentional State to State direct television broadcasting and minimal spill-over problems and thus no need to draw up a principle on consent and participation.

The view was expressed by other delegations that the ITU had done useful work in resolving technical problems, which would undoubtedly promote orderly utilization of satellites for direct television broadcasting, but that the results of the ITU Conference reflect broad international recognition that direct television broadcasting should be based solely on prior agreements between the interested States, and thus confirmed the necessity for a principle on consultation and agreements. Other delegations considered that there was no contradiction between the principle of free flow of information and the principle of respect for State sovereignty and non-interference in internal affairs of States.

The view was also expressed that the use of artificial earth satellites for direct television broadcasting belongs to the field of relations among States and not to the field of human rights. Some delegations were of the opinion that the drafting of the principle on "consultation and agreements between States" was necessary and compatible with the free flow of information and ideas.

Still other delegations held the view that a principle on consent and participation is not only unnecessary but would contravene the principle of free flow of information

<sup>6</sup>U.N. Doc. A/AC.105/196, Annex II, para. 5 (1977).

regardless of national frontiers as set forth in instruments of the United Nations relating to universal human rights.

Of primary importance to some delegations was the necessity to delete the principle on "duty and right to consult" formulated last year as well as the proposed principles in "programme content" and "illegal broadcasts", as the formulation of a principle on "consultation and agreements between States" would make these texts redundant, while other delegations were of the view that the draft principle on "consultation and agreements between States" did not exhaust the content of the principle of "duty and right to consult" already formulated and that the proposed principles on "programme content" and "illegal broadcasts" might be deleted only if the principle on "duty and right to consult" is retained.

Insofar as the draft preamble was concerned, no agreement could be reached on a provision relating mainly to free dissemination of information on the one hand and respect for the sovereign rights of States on the other. Several paragraphs reflecting such ideas that were put forward for inclusion in the preamble were appended to the report of the Chairman of the Working Group as a basis for further consideration.<sup>7</sup>

The texts of the principle on consultation and agreements between States, which is in square brackets, as well as of the preamble as formulated by the Working Group read as follows:

#### CONSULTATION AND AGREEMENTS BETWEEN STATES

[[A/ direct television broadcasting [satellite service] specifically directed at a foreign State [, in those cases in which the coverage of that State is permitted under the relevant instruments of the International Telecommunication Union,] shall be based on appropriate agreements and/or arrangements between the broadcasting and receiving States], in order to facilitate the freer and wider dissemination of information of all kinds and to encourage co-operation in the field of information and the exchange of information with other countries.

For that purpose [in those cases in which the coverage of that State is permitted under the relevant instruments of the International Telecommunication Union.] a State which proposes to establish or authorize the establishment of a direct television broadcasting [service] by means of artificial earth satellites specifically directed at a foreign State shall without delay notify that State of such intention and shall enter into consultations with that State if the latter so requests. No such agreements and/or arrangements shall be required with respect to the overspill of the radiation of the satellite signal within the limits established under the relevant instruments of the International Telecommunication Union.]

#### DRAFT PREAMBLE

#### The General Assembly,

In view of the actual and potential benefits for all mankind [States, peoples and individuals] in using international direct television broadcasting by means of artificial

<sup>7</sup>For texts of those paragraphs, see U.N. Doc. A/AC.105/196, Annex II, Appendix (1977). Words in square brackets are those upon which agreement has not been reached.
earth satellites; ....<sup>8</sup> Desiring to safeguard the legitimate rights and interests of all States and to encourage orderly development on an equitable basis of this new and promising means of television broadcasting; [Recognizing the unique characteristics of such satellite broadcasting [not encountered in other forms of broadcasting] which necessitates besides relevant technical regulations also specific legal principles [solely]<sup>9</sup> applicable in this field;]

*Considering* that States, as well as international governmental and non-governmental organizations, including broadcasting associations, should base their activities in this field upon and encourage international co-operation;

Solemnly declares that in international direct television broadcasting by means of artificial earth satellites, States should be guided by the following principles . . .

The Working Group expressed the hope, which was endorsed by the Sub-Committee, that in view of the progress made during the session, all delegations would try their best to overcome the remaining differences so that the task entrusted to the Sub-Committee in General Assembly resolution 31/8 to complete the elaboration of principles would be fulfilled at the forth-coming session of the Committee on the Peaceful Uses of Outer Space to be held from June 20 to July 1 in Vienna.

# III. LEGAL IMPLICATIONS OF REMOTE SENSING OF THE EARTH FROM SPACE

At the previous sessions of the Legal Sub-Committee, the Working Group on this item had formulated five draft principles on the basis of certain common elements that had been identified in the positions of delegations. These draft principles concern such matters as the carrying out of remote sensing for the benefit and in the interests of all countries; the conduct of remote sensing in accordance with international law including the Charter of the United Nations and the Outer Space Treaty; the promotions of international cooperation in remote sensing programs; the protection of the natural environment of the earth; and technical assistance.<sup>10</sup>

This year the Sub-Committee reestablished the Working Group which from the outset agreed that it would first endeavor to formulate draft principles on the basis of the three common elements identified by it last year. The Working Group accomplished this task by formulating three draft principles dealing respectively with such matters as the coordinating role of the United Nations and its relevant specialized agencies in the area of remote sensing and notification to the Secretary-General of the United Nations

1ºFor texts of these draft principles, see U.N. Doc. A/AC.105/171, Annex III, para. 6 (1976).

<sup>&</sup>quot;This blank was left in the preamble for any further consideration of the paragraphs proposed and referred to above.

<sup>&</sup>lt;sup>9</sup>A number of delegations accepted the preamble on the understanding that the word "solely" would be included therein.

of remote sensing activities; dissemination of information on impending natural disasters; and the using of remote sensing data or information without detriment to or in a manner compatible with the legitimate rights and interests of other States.<sup>11</sup>

The Working Group then proceeded to identify other common elements and draft further principles. It did this by formulating three more draft principles dealing respectively with such matters as the provision of relevant technical information involving possible operational systems, state responsibility and access to data obtained by remote sensing.<sup>12</sup>

Extensive discussion took place in the Working Group on a working paper submitted by Mongolia last year which linked permanent sovereignty of States over their natural resources to remote sensing from space. The views expressed on this issue and the result of the discussion were summarized in the report of the Chairman of the Working Group as follows:

Many delegations stated that draft principles on remote sensing should contain a text concerning full and permanent sovereignty of all States and peoples over their wealth and natural resources as well as the inalienable right to dispose of these resources and of information with respect thereto. Other delegations, while in principle not objecting to the inclusion of a principle of the permanent sovereignty of States over their natural resources, were of the opinion that there was no such sovereignty with respect to information. Still other delegations held the view that no such principle should be included in the draft principles as it had no relevance to remote sensing and there was thus no common element. In view of this position no agreement on a common element with respect to this question could be reached in the course of these discussions. A text of a possible draft principle was nevertheless prepared, parts of which commanded a substantial degree of support from among the members of the Working Group, on which, however, no consensus could be achieved. This text is thus set forth wholly within special brackets in appendix A to this report for the reason that some delegations felt that an unagreed text should not be included in appendix A.

The Working Group also considered the question of a review clause on the basis of an informal working paper submitted by the delegation of Canada. After an intensive discussion, the conclusion was reached that a decision on such a clause was premature and that the matter would require further consideration at a later stage.

It should be noted that all the eleven draft principles formulated by the Working Group contain square brackets around words on which no agreement was reached. Two sets of square brackets appear in each draft principle as they concern two general questions. The first is whether the principles should deal with remote sensing of the natural resources of the earth only or should cover also the environment of the earth. The second question relates to the nature of the instrument in which the principles are

<sup>12</sup>For texts of these draft principles, see *id.*, Principles IX, X and XI.

<sup>&</sup>lt;sup>13</sup>For texts of these draft principles, see U.N. Doc. A/AC.105/196, Annex III, Appendix A (1977) (Principles VI, VII and VIII).

to be embodied; hence square brackets were put around the alternative words "shall" and "should." Although the Working Group had hoped that at the last stage of its work it would attempt to remove some of the square brackets in the principles formulated, it was unable to do so owing to lack of time.

# IV. MATTERS RELATING TO DEFINITION AND/OR DELIMITATION OF OUTER SPACE AND OUTER SPACE ACTIVITES

While there were only several statements made in the general exchange of views on this item<sup>13</sup> and no detailed discussion took place due to lack of time, a new idea was expressed by one delegation that the methods for arriving at a definition of outer space could be initially to find common points in the views expressed and the proposals put forward, then to define a set of problems and establish provisional criteria for a definition, and finally to work out each idea in detail. Also, for the first time in the Sub-Committee, the question of the geostationary orbit in relation to the definition and/or delimitation of outer space was introduced and some delegations suggested that the Outer Space Comittee might also wish to consider this matter in detail.

<sup>13</sup>See U.N. Doc. A/AC.105/C.2/SR. 279-281 (1976). For the views expressed on this question in United Nations organs since 1970 and in literature, see U.N. Doc. A/AC.105/C.2/7/Add. 1 (1976).

## THE NEW EUROPEAN SPACE AGENCY

#### Dr. Hans Kaltenecker\*

#### I. INTRODUCTION

On May 30, 1975, the representatives of eleven European governments<sup>1</sup> signed the new Convention for the establishment of the European Space Agency (ESA) in Paris.<sup>2</sup> This event was the culmination of a long period of deliberations to determine a European space policy and the instrument which will in the future execute this policy and the European space programs.

In 1962 two European Space Organizations were created: the European Space Research Organization (ESRO), responsible for satellite development; and the European Launcher Development Organization (ELDO), responsible for the development of European launchers. Whereas ESRO successfully developed seven satellites, launched about 150 sounding rockets and created its technical and operational establishments and stations, its sister Organization, ELDO, had to abandon its launcher development work in 1974.

The European governments participating in these Organizations were conscious of the need to redefine Europe's space policy and the European space programs in the science, application and launcher fields. To this end they established a European Space Conference in 1967. Meeting at Ministerial level, this Conference was charged with the elaboration of a new concept and the coordination of the work of the two Space Organizations until a single European space body could be formed. This purpose was achieved by the conclusion and signature of the ESA Convention. It should be noted, however, that this Convention has not yet entered into force as it is subject to ratification or acceptance by all Member States of ESRO and ELDO. The ELDO and ESRO Conventions will terminate on the date of the entry into force of the ESA Convention, and on this date the new Agency will take over all rights and obligations of ELDO and ESRO.

In order to ensure a smooth transition of functions from ELDO and ESRO to ESA, the ESRO and ELDO Member States decided that, whenever possible, the terms and conditions of the new ESA Convention should be applied, pending its entry into force.

<sup>\*</sup>Assistant Director of International and Legal Affairs, European Space Agency. The views expressed in this paper are those of the author and are not necessarily connected with any organization of which he is a member.

<sup>&#</sup>x27;These governments were: the Federal Republic of Germany, Belgium, Denmark, France, Ireland, Italy, the Netherlands, Spain, United Kingdom of Great Britain and Northern Ireland, Sweden, and the Swiss Confederation.

<sup>&</sup>lt;sup>2</sup>Convention for the Establishment of a European Space Agency (signed Paris, France; May 30, 1975). For text of the convention, see 14 Int'l. Leg. Mat. 864 (1975).

The ESRO Member States decided, in addition, to change the name of that Organization to the "European Space Agency." Thus, work in the space field is executed now by ESRO which has conducted its activities under the name "ESA" since May 31, 1975, the legal basis being the ESRO Convention, but taking into account provisions of the new ESA Convention whenever legally possible.

# II. THE STRUCTURE OF THE NEW ESA

The new ESA Convention reflects the classical structure of an intergovernmental organization: It will have a Council composed of delegates of the Member States; but a new idea has been introduced insofar as this Council can also meet at Ministerial level, thus taking over the role of the former European Space Conference. This Council is the legislative organ of the Agency. Its main tasks are: to define the policy to be followed by the Agency in respect of the accomplishment of its objectives; to approve the activities and programs of the Agency; to determine and review the level of resources to be made available by the Member States; to approve the annual work plans and budgets; to decide on the admission of new Member States; and generally to take all measures necessary for the fulfillment of the Agency's objective.

The Director General of the Agency is the executive organ; he is assisted by scientific, technical and administrative staff. He represents the Agency, takes all measures necessary for the management of the Agency, the execution of its programs and the implementation of its policy, in accordance with directives issued by the Council. The Director General has authority over the establishments of the Agency, and may submit proposals concerning activities and programs of the Agency to the Council. All functions of the Director General and his staff are exclusively international in character.

Both the Council and the Executive may create such advisory bodies as are necessary for the accomplishment of their tasks. Furthermore, the Council has to establish a Science Programme Committee, to which it shall refer any matter related to the mandatory scientific program and authorize it to make relevant decisions. The Council may also establish other subordinate Committees and delegate to them the power of decision; but such transfer of authority will have to be agreed by a two-thirds majority of all Member States. Today the main committees of this type are: the ESA Science Programme Committee; the Administrative and Finance Committee; the Industrial Policy Committee (responsible, inter alia, for taking decisions on the placing of industrial contracts); the International Relations Advisory Committee; the Advisory Group on Future Earth Resources Programmes; and the Advisory Group on the Use of Spacelab. In addition, the existence of particular Programme Boards should be mentioned. These are composed of delegates of participating States, which supervise the execution of the Application programs of the Agency, and which were established under a special legal regime on the basis of arrangements concluded among ESRO Member States participating in such programs and ESRO. They still continue their supervisory

activity and have in this respect authority to make decisions regarding these programs; for instance the adoption of the annual program budgets.

As far as the establishments of the Agency are concerned, at present they include the European Space Technology Center (ESTEC) located at Noordwijk, Netherlands; the European Space Operations Center (ESOC) located at Darmstadt, Germany; and the European Space Research Institute located at Frascati, Italy, which now functions as the Agency's Space Documentation Service. Furthermore the Agency has established several tracking and telemetry stations<sup>3</sup> and arranged for the use of national stations.<sup>4</sup> In addition, the Agency also possesses a launching base in French Guyana.

## III. NEW FEATURES OF THE ESA CONVENTION

There is an essential difference between the ESRO and ELDO Conventions and the ESA Convention as far as mission and program aspects are concerned; the latter reflecting a new legal concept.

The purpose of the Agency is to provide for and promote, for peaceful purposes, cooperation among European States in space research and technology and their space applications, with a view to their use for scientific purposes and for operational space application systems. This "usage" and "application" effect is a new element which was not included in the former Conventions. To further this purpose, ESA's special task will be to elaborate and implement a long-term European space policy by recommending space objectives to the Member States, and by concerting the policies of the Member States with respect to other national and international organizations and institutions. This role of preparing space objectives and of coordinating the different interests of Member States in the international field is also new.

Furthermore, the Agency will elaborate and implement activities and programs in the space field, coordinate the European space program and national programs by integrating the latter progressively into the European program. Again this constitutes a new and important task. Also, the Agency will have to elaborate and implement an industrial policy appropriate to its program and recommend a coherent industrial policy to the Member States.

Among these mission aspects must be mentioned the Agency's role with regard to information and data dissemination. Indeed, the Agency must ensure that any scientific results be published and made widely available. Such technical inventions and data must be obtained from its contractors, as are appropriate for the protection of its interests and those of the States participating in the relevant programs, and of those of

4The national stations are located at Cnes, France; and Fucino, Italy.

<sup>&</sup>lt;sup>3</sup>These stations are located at Redu, Belgium; Odenwald, Germany; and Fairbanks, United States.

persons and bodies under their jurisdiction. The rights to be obtained for securing such interests shall include in particular the rights of access, of disclosure, and of use. Inventions and technical data will be communicated to the participating States. The Agency will furthermore disclose to Member States those inventions and technical data to which it holds proprietary rights, and they may be used for Member States' purposes or that of persons or bodies under their jurisdiction, free of charge.

## A. Mandatory, Optional and Operational Activities

Turning to program aspects, one should first recall that the ESRO and ELDO Conventions were based on the concept of unity of program and membership. In other words, all Member States participated in the different programs. Only as an exceptional measure, based on a particular legal structure, was it possible to arrive at situations where some States did not participate in programs accepted by other States. This was the difficult legal situation which ESRO faced when it started its applications satellite projects,' the ARIANE launcher and the Spacelab development programs. Now, in the ESA Convention, account has been taken of the complexity of space activities and the different interests of States in space matters, by introducing the new concept of mandatory and optional activities. The mandatory activities include the basic activities, such as: education, documentation, studies of future projects and technological research work, the dissemination of information relevant to the harmonization of international and national programs, as well as the execution of the scientific program. All Member States have to participate in these mandatory activities, whereas in respect to optional activities they may formally declare themselves to be disinterested in participation. The ESA Convention mentions as optional activities: the design, development, launching and control of satellites and other space systems;6 and the design, development and operation of launch facilities and space transport systems. When Member States agree to execute such optional activities they draw up a Declaration to this effect stating their undertaking, the financial conditions, the phasing of the program proposed, the scale of contributions, and furthermore establish implementing rules for the execution, by the Agency, of such a program. The Declaration and the rules are subsequently submitted to the Council for approval by a majority of all Member States.

A third category of activities is foreseen, called "operational activities". These are activities in the area of space applications which the Agency may carry out under conditions to be defined by the Council by a majority of all Member States. Examples of such activities are the placing at the disposal of operating agencies, such of ESA's own facilities as may be useful to them, and the launching and control of operational application satellites. These activities are not considered as Agency programs, and the cost of them is borne by the user concerned and therefore does not form part of the Agency's program budgets.

<sup>&#</sup>x27;E.g., aeronautical, telecommunications, and maritime satellite projects.

<sup>&</sup>lt;sup>6</sup>E.g., application satellites and systems.

# B. Internationalization of National Programs

In relation to programs another interesting aspect should be underlined: The internationalization of national programs mentioned among the Agency's tasks will be implemented following a special procedure set out in an Annex to the Convention. According to this each Member State shall make available for participation by other Member States, within the framework of the Agency, any new civil space project which it intends to undertake, either alone or in collaboration with another Member State. With this end in view each Member State shall notify the Director General of the Agency of any such project before the beginning of its phase B (project definition phase), the timing and content of proposals for participation. It shall use its best endeavors to accommodate all reasonable responses, subject to agreement being reached, within the time-scale demanded by project decisions. The State shall subsequently submit a formal proposal to the Council when the project is to be executed as an optional program of the Agency. This special procedure underlines the importance Member States attach to the progressive integration into the Agency of national space activities.

# C. Financial Planning and Budget

As far as the overall financial planning in respect of the Agency's mandatory and optional programs is concerned, the following should be noted: The Council shall determine, by a unanimous decision of all Member States, a level of resources for the coming five-year period, and shall, by the same majority, determine towards the end of the third year of each five-year period, and after a review of the situation, the level of resources to be made available to ESA for the new five-year period starting at the end of this third year. This procedure will certainly allow Member States and the Agency to establish an appropriately long term financial plan, with periodic review.

Each Member State contributes to the costs of the mandatory activities, and to the common costs of the Agency in accordance with a scale adopted by the Council by a twothirds majority of all Member States. This scale will be based on the average national income of each Member State for the three previous years for which statistics are available. No State shall be required to pay contributions in excess of 25 percent of the total amount of contributions assessed by the Council to meet these costs. The cost of the optional activities are borne in the same manner, unless the States participating in a particular optional program decide otherwise.

From a budgetary point of view, one distinguishes now in ESA between a general budget (covering the above mentioned basic activities and fixed common costs, as well as non-fixed common costs and the support costs covering mandatory and optional programs), and program budgets for each program, whether mandatory or optional. The general budget and each program budget will be, under the final ESA regime, approved by the Council, by a two-thirds majority of the Member States and of the participating States respectively.

## D. Miscellaneous Provisions

The main new features of ESA have been described above. In addition it should be noted that the new ESA Convention includes some other interesting provisions such as:

(1) The Agency may cooperate with other international organizations and institutions and with non-member States, and conclude agreements with them to this effect. Such cooperations may take the form of participation by such States or organizations in one or more of the mandatory or optional programs mentioned before. Particular arrangements to give effect to such participation may provide that a non-member State shall have a vote in the Council when the latter examines matter pertaining to the progam in question.

(2) Cooperation with a non-member State may also lead to according it the status of "associate member" if that State at least undertakes to contribute to the financing of the studies of future projects. This underlines the openness of the new Agency towards international cooperation.

(3) The Agency will have international legal personality. Both ESA and its staff members, and the representatives of its member States, enjoy legal capacity, privileges and immunities in accordance with special provisions defined in an Annex to the Convention. Among these provisions the Agency's immunity from jurisdiction and execution, from requisition and sequestration of its property and assets, the exemption from national direct and indirect taxes, within the scope of its official activities, and from import and export duties, should be noted.

(4) A special International Arbitration Tribunal shall decide in case of disagreement between Member States or between them and the Agency, concerning the interpretation or application of the Convention. Any Member State of the Agency, whether party to the dispute or not, may intervene in the proceedings if the Tribunal considers that it has a substantial interest in the decision of the case. This Tribunal is also competant to resolve any conflicts among the Agency and Member States arising out of damage caused by the Agency, or involving any other non-contractual responsibility of the Agency, or involving the Director General or a staff member of the Agency in which the person concerned would claim immunity from jurisdiction. In respect to disputes arising between the Agency and the staff in respect of their conditions of service, provision is made for the establishment of an internal appeals board.

## IV. CONCLUSION

The new European Space Agency must be considered, taking into account all the different political aspects which guided its creation, as a new instrument for the definition of a European space policy and as the principal means for the execution of programs decided in accordance with such a policy. It has, moreover, an important role to play in Europe's activities in the science and technology field, considering the impact of its program and budget. It will serve, also, as a lynchpin for the development of new projects and technologies. Finally, it will be used as a forum for the deliberation of international problems in the space field, in which its Member States are involved.

The new institutional framework described above<sup>7</sup> tries to combine different requirements: flexibility in the elaboration of new programs; efficiency in their execution; respect of different interests Member States have in the space field; acceptance of industrial return; sound equilibrium between legislative and executive tasks; and appropriate long term planning. It is hoped that the new Agency will, after its creation *de jure*, fulfill all these requirements in a satisfactory manner.

'See Section II, supra.

## INMARSAT: THE INTERNATIONAL MARITIME SATELLITE ORGANIZATION—ORIGINS AND STRUCTURE

#### Stephen E. Doyle\*

#### I. INTRODUCTION

On September 3, 1976, in London, England, the charter of a new international organization was brought into being culminating a four year effort of study, analysis, planning and negotiation.<sup>1</sup> The third and final session of the International Conference on the Establishment of an International Maritime Satellite System provided for creation of the International Maritime Satellite Organization (INMARSAT), the purpose of which is: "to make provision for the space segment necessary for improving maritime communications, thereby assisting in improving distress and safety of life at sea communications, efficiency and management of ships, maritime public correspondence services and radio-determination capabilities."<sup>2</sup> In addition, the Organization shall seek to serve all areas where there is need for maritime communications and shall act exclusively for peaceful purposes.<sup>3</sup>

# II. ROLE OF THE INTERGOVERNMENTAL MARITIME CONSULTATIVE ORGANIZATION (IMCO)

The principal entity in the UN family of organizations concerned with maritime affairs is IMCO; the origins, functions and history of which are well recounted in a recent congressional study on international organizations involved in space-related activities.<sup>4</sup> Since 1958, IMCO has focused the activities of seafaring nations on nautical matters of common concern. When the Secretariat of the United Nations published its first compilation of space activities and resources in the UN system, in 1972,<sup>5</sup> it noted

<sup>1</sup>Convention on the International Maritime Satellite Organization (INMARSAT), opened for Signature September 3, 1976. For reference to the Sessional Act of the International Conference on the Establishment of an International Maritime Satellite System, see 4 J. Space L. 135 (1976).

*Id.* at Art. 3.

۶Įd.

<sup>4</sup>Galloway, International Cooperation in Outer Space: A Symposium, S. Doc. No. 92-57, 92d Cong., 1st Sess. 413-21 (1971).

<sup>9</sup>U.N. Doc. No. A/AC.105/100(1972).

<sup>&</sup>lt;sup>•</sup>Deputy Assistant Administrator for International Affairs, National Aeronautics and Space Administration. Chairman of the Economic Assessment Working Group of the Panel of Experts on Maritime Satellites of the Intergovernmental Maritime Consultative Organization (1974-75). The views expressed in this paper are those of the author and are not necessarily those of any organization of which he is a member.

that during the latter half of the 1960's IMCO had taken a considerable interest in the development of space techniques for maritime purposes. That interest was based mainly on:

- (i) The need to improve the existing maritime distress system;
- (ii) The desirability of improving safety communication, safety of navigation and position determination systems;
- (iii) The opportunity to meet certain operational needs of the maritime mobile service which are beyond the scope of existing resources and methods; [and]
- (iv) The fact that the present heavy congestion in frequency bands available to the maritime mobile service together with the continuous expansion of maritime mobile communications and of the number of ships, will make these bands inadequate within the foreseeable future.<sup>6</sup>

In 1972 it was IMCO's view that a new international maritime satellite system should provide for exchange via satellite of telephone, telegraph and facsimile messages and for radio determination and, in combination with existing navigational and communication services, improve such services in safety and navigation, information and data exchange from ship-to-shore, and improve public correspondence service for passengers and crew.<sup>7</sup>

To facilitate planning for a new structure to meet all these needs, the Maritime Safety Committee of IMCO instructed its Sub-Committee on Radiocommunications to give detailed and urgent consideration to this matter. In fact, in March 1972, on the advice of the Sub-Committee on Radiocommunications, a Panel of Experts was formed by the Maritime Safety Committee to take on the study and planning function.<sup>8</sup>

The terms of reference of the Panel of Experts, which could be reviewed and expanded as necessary, were:

- (a) study of the operational requirements of a maritime mobile satellite system;
- (b) study of the essential characteristics of a maritime mobile satellite system;
- study of critical system elements, for example ship terminals;
- (d) cost/benefit and marketing studies looking to a cost evaluation;

Id. at 106.

٦ld.

<sup>8</sup>U.N. Doc. No. A/AC.105/193, at 111 (1977).

- (e) consider and make recommendations for a program of experiments and development work that may be necessary;
- (f) consider the appropriate body or bodies which might be interested in financing, establishing and operating the system;
- (g) prepare a report for the proposed International Conference in 1975.9

The Panel of Experts (POE) held five formal sessions and one extraordinary session in a two-and-one-half year period, completing its work in September 1974. The POE examined in detail the institutional, financial, technical, operational and legal aspects of creating a new entity and reported annually to the Maritime Safety Committee. Based on work of the initial sessions of the POE, it was evident by the fall of 1973 that a consensus was building for the conclusion that a new organization should be formed. Consequently, at its November 1973 session, the Assembly of IMCO, acting on a recommendation of the Maritime Safety Committee, adopted Resolution A.305 (VIII), dated November 23, 1973, in which the Assembly resolved:

- (a) to convene an International Conference of Governments for a period of two-and-a-half weeks in the early part of 1975 to decide on the principle of setting up an international maritime satellite system; and if it accepts this principle, to conclude agreements to give effect to this decision;
- (b) to request the Maritime Safety Committee to formulate the appropriate provisional agenda of the Conference...<sup>10</sup>

The Secretary-General of IMCO was invited to circulate invitations to the conference to all Member States of the United Nations, to any of the U.N. Specialized Agencies, to members of the International Atomic Energy Agency, to Parties to the Statute of the International Court of Justice, and to such inter-governmental and non-governmental organizations as are usually invited to send observers to conferences convened by IMCO.<sup>11</sup> In this manner it was expected that all possibly interested states and organizations would receive an invitation to the Conference.

Thus, a Panel of Experts working under the Maritime Safety Committee of IMCO conducted the initial studies which resulted in a report to be considered by the 1975 Conference. Additionally, IMCO provided secretariat support for the Panel of Experts and for the Conference, which required three separate sessions to conclude its work.

10Id. at 3-4.

ыld.

Report to the Maritime Safety Committee of the 4th Session of the Panel of Experts on Maritime Satellites, IMCO Doc. No. MARSAT IV/9, Annex II, at 6-7 (1974).

# III. INTERNATIONAL CONFERENCE ON THE ESTABLISHMENT OF AN INTERNATIONAL MARITIME SATELLITE SYSTEM

## A. First Conference Session-April 23 to May 9, 1975

The initial session<sup>12</sup> of the Conference was attended by delegations from 45 nations and by observer delegations of 15 international agencies and other organizations. The Conference organized its work in two main working committees. The first committee took up questions of the relationship between governments and their respective telecommunication and maritime entities, and discussed at length the distribution of powers between the Assembly of the member States and the Council of INMARSAT. The second committee considered the provisions on procurement policy for the new organization, the provisions on investment shares, including the question of initial investment shares and the implications for final investment shares.

As a result of its deliberations, the Conference concluded that in order to improve maritime communications there existed a need for a world-wide maritime satellite system and that there was a need for an international intergovernmental organization to administer and manage this system.<sup>13</sup>

The Conference also reached agreement on the following principles:

- that any entity which may be designated by a Member State to enjoy rights and fulfill obligations in the [INMARSAT] Organization...shall be designated by the Government of the Member State;
- (b) that any entity so designated shall be subject to the jurisdiction of the designating Member State;
- (c) That any entity so designated shall, to the satisfaction of the designating Member State, be competent and have the powers necessary to discharge the functions for which it will be responsible;
- (d) that the rights, obligations and functions of any entity so designated shall be clearly defined; and
- (e) that in the event of default or withdrawal of a designated entity the designating Member State shall assume the capacity of a designated entity, designate a new entity, or withdraw.<sup>14</sup>

In the limited available time the Conference could not conclude the consideration of agreements necessary to bring the new organization into being. Consequently, the

14*d*. at 5.

14Id. at 5-6.

<sup>&</sup>lt;sup>12</sup>In response to expressions of interest by the U.N. General Assembly, IMCO submitted a report on this opening session to the U.N. Committee on Peaceful Uses of Outer Space. See U.N. Doc. A/AC.105/151 (1975).

Conference decided to reconvene in a second session and to establish an Intersessional Working Group to prepare for the second session. The Conference resolved that the Working Group should meet in two or more sessions with the object of completing its tasks not later than November 30, 1975, so that its recommendations could be circulated to Governments in time for the second session of the Conference. The Working Group was explicitly instructed to consider four fundamental principles, *viz*: (1) the relationship between Governments and designated entities; (2) the distribution of powers between the Assembly and the Council; (3) the type and number of appropriate international instruments; and (4) the procurement policy for the Organization.<sup>15</sup> In addition, the Intersessional Working Group was directed to develop appropriate draft texts for inclusion in the appropriate instrument(s). In conducting this work the Working Group was to base its work on the Report of the Panel of Experts on Maritime Satellites and the documentation submitted to it, and reports and summary records of the first session of the Conference.<sup>16</sup>

Before concluding, the first session of the Conference also adopted a recommendation that, while recognizing that each country must retain whatever safeguards it considers necessary for the protection of its own communication services, all countries should be invited to consider permitting ship earth stations (on-board terminals) to operate in the radio frequency bands 1535 - 1542.5 and 1636.5 - 1644 MHz within harbor limits and other waters within national jurisdictions. The Conference invited the International Telecommunication Union to bring this recommendation to the attention of its Members for their consideration.<sup>17</sup>

#### 1. The Intersessional Working Group (IWG)

The Working Group required three sessions to conclude its assigned work.<sup>18</sup> At the conclusion of the first session of the Conference, the delegations of thirteen Western European countries and the United States agreed among themselves on major elements or principles of the institutional and organizational arrangements which would form the basis of the proposed system. As reported by Arthur L. Freeman, U.S. Representative to the Intersessional Working Group:

These arrangements, hereinafter referred to as the "package", included acceptance of the propositions that a government may designate an entity to assume financial, technical and operational responsibilities within INMARSAT; that managerial responsibility will be vested in a strong governing body in which policy making

16Id. at 8-9.

<sup>17</sup>Id. Attachment 3, at 10.

<sup>18</sup>Report to the First Intersessional Working Group Meeting on the Establishment of an International Maritime Satellite System, TD Ser. No. 60 (1975); Report to the Second Intersessional Working Group, TD Ser. No. 64 (1975); Report to the Third Intersessional Working Group, TD Ser. No. 66 (1975).

<sup>15</sup>Id. Attachment 2, at 8.

responsibilities will be given to investors in direct proportion to their utilization of the system; that the thrust of the procurement policy will be to ensure that price, quality and the most favorable delivery time are the principal criteria for the award of contracts; and that these arrangements will be embodied in an Intergovernmental Agreement and an Operating Agreement.<sup>19</sup>

The Working Group had the task of converting these agreements, en principe, into acceptable international agreement texts, taking into account the views and attitudes of other governments. The basic issues being addressed were not new to the international telecommunications community, having been well debated and resolved in the process of arriving at definitive arrangements for INTELSAT. But INMARSAT was bound to be a different matter because of two major factors: (1) interests independent of telecommunications were here involved, viz. maritime interests, including ship owners, maritime unions and national maritime ministries and regulatory bodies; and (2) the presence of the U.S.S.R. and several Eastern European countries as potential major parties in the new organization, and the necessity to take into account and accommodate their views. In the creation of INTELSAT, while the communist countries had followed developments with interest and attended some organizational meetings as observers, they had not played a major role in negotiating the agreements.<sup>20</sup> The U.S.S.R.'s approach to organization for satellite communciations is described and analyzed in a number of sources,<sup>21</sup> and differs in some major aspects from the general Western nations' approach. A principal difference is that the U.S.S.R. favors international organizational arrangements involving only states (governments) and is disinclined to enter mixed organizations involving states and private enterprise, as is the case with INTELSAT. It is the "mixed" nature of the telecommunications community that dictated a two-agreement approach to INTELSAT, i.e., an agreement among governments supplemented by an agreement among telecommunication entities. That same fact of life led to the necessity for the Intersessional Working Group to develop two agreements-the basic Convention and a related Operating Agreement.

# a. IWG First Session-August 4-8, 1975 (London)

At the first session of the Working Group thirty-seven countries and eight international organizations and entities were represented. A proposed set of agreement

<sup>21</sup>See, e.g., Sheldon, Soviet Programs, 1966-70, S. Doc. No. 92-51, 92d Cong., 1st Sess. (1971); T. Shillinglaw, The Soviet Union and International Satellite Telecommunications, in Telecommunications (1970); Doyle, An Analysis of the Socialist States' Proposal for Intersputnik: An International Communication Satellite System, 15 Villanova L. Rev. 83 (1969).

<sup>&</sup>lt;sup>19</sup>Report to the First Intersessional Working Group, supra note 18, at 1.

<sup>&</sup>lt;sup>20</sup>Several detailed studies of the negotiating history of INTELSAT have been published. *See*, *e.g.*, J.F. Galloway, The Politics and Technology of Satellite Communications (1972); R. Colino, The INTELSAT Definitive Arrangements: Ushering in a New Era in Satellite Communications, Monograph No. 9 (1973); J. Pelton, Global Communications Satellite Policy: INTELSAT Policies and Functionalism (1974); Doyle, Permanent Arrangements for the Global Commercial Communication Satellite System of INTELSAT, 6 Int'l Law. 258 (1972).

texts was tabled jointly by the Federal Republic of Germany, Norway and the United Kingdom. This draft became the primary working document of the first session.<sup>22</sup> To forestall lengthy debate on the issue of state vs. commercial entity roles, the U.S. and U.S.S.R. delegations presented a jointly agreed formulation on the basic roles of governments and operating entities in the organization. This approach reflected the principles that were contained in the resolution adopted at the first session of the Conference, recited above.<sup>23</sup> The basic functions of the Assembly of Parties, as proposed in the Western European nations' draft, were endorsed by the U.S., the U.S.S.R. and Japan. The Assembly functions thus agreed were:

- (a) Review the activities of the Organization and express views and make recommendations with regard to the purposes of the Organization.
- (b) Ensure that the activities of the Organization are consistent with this Convention and with the purposes and principles of the United Nations Charter, as well as with any other treaty by which the Organization becomes bound in accordance with its decision.
- (c) Authorize, on the recommendation of the Council, any extension of the activities of the Organization into fields other than maritime public telecommunications services. Assembly authorization shall not be required for use of maritime public telecommunications services for relaying telecommunications for radiodetermination and safety purposes.
- (d) Decide on other recommendations of the Council and express views on reports of the Council.
- (e) Adjust the minimum share required for representation on the Council in accordance with Article 13 (1).
- (f) Decide upon questions concerning formal relationships between the Organization and States, whether Parties or not, and international organizations.
- (g) Decide upon any amendment to this Convention [and to the Operating Agreement] pursuant to Article 41 [and Article XIII of the Operating Agreement].<sup>24</sup>
- (h) Consider and determine whether membership be terminated in accordance with Article 32.23

At this point in the Working Group deliberations the delegations of Mexico, Egypt, Nigeria and Turkey argued for a strengthening of the Assembly's role, in order that

<sup>22</sup>Report to the First Intersessional Working Group, supra note 18, at 4.

<sup>23</sup>See text accompanying note 14 supra.

<sup>24</sup>The brackets in this item indicate the lack of full agreement on the words within brackets.

<sup>25</sup>See Report to the First Intersessional Working Group, supra note 18, at 6-7.

- 51

aspirations of developing countries could be met through actions of that organ. They proposed the following functions to be added:

- (i) Upon recommendation of the Council, act upon the appointment and termination of such appointment of the Director General in accordance with Article 14.
- (j) Review at appropriate intervals the present Convention and the Operating Agreement as a whole to decide whether any amendments are necessary to them.
- (k) Exercise any other powers coming within the purview of the Assembly according to the provisions of this Convention.<sup>26</sup>

Discussion of the proposal was deferred to the next session of the Working Group. The substantial part of the remaining work done at the first session of the Working Group related to the development of a consensus of procurement policy. Draft provisions were developed and after several efforts by the U.S. delegation to make them more closely align with INTELSAT's procurement policy, the following provisions were adopted by the Working Group:

(1) The procurement policy of the Council shall be such as to encourage, in the interests of the Organization, world-wide competition in the supply of goods and services. To this end:

(a) Procurement of goods and services required by the Organization whether by purchase or lease shall be effected by the award of contracts, based on responses to open international invitations to tender.

(b) Contracts shall be awarded to bidders offering the best combination of quality, price and the most favorable delivery time.

(c) If there are bids offering comparable combinations of quality, price and the most favorable delivery time, the Council shall award the contract so as to give effect to the procurement policy set out above.

(2) In the following cases the requirement of open international tender may be dispensed with under procedures adopted by the Council, provided that in so doing the Council shall encourage in the interests of the Organization worldwide competition in the supply of goods and services.

(a) The estimated value of the contract does not exceed [...] and the award of the contract would not by reason of the application of such dispensation place a contractor in such a position as to prejudice at some later date the effective exercise by the Council of the procurement policy stated above. To the extent justified by changes in world prices, as reflected by relevant price indices, the financial limit may be revised by the Council [by a vote of at least two-thirds of the representatives represented in the Council representing a majority of the total investment shares in the Organization].

(b) Procurement is required urgently to meet an emergency situation.

(d) The requirement is of an administrative nature for which it would be neither practicable nor feasible to undertake open international tender.

[ (e) The procurement is for personal services.]<sup>27</sup>

The functions of the Council (best viewed as the equivalent of a board of directors in a corporation) were discussed, but in the absence of a consensus this subject was deferred to the second session of the Working Group for decision.

In an attempt to expedite progress in view of the limited time available to the Working Group, the Government of Norway extended an invitation to a meeting of experts in Oslo during September 1975, to undertake preparatory work on legal aspects of: (1) inclusion of an article on rights and obligations; (2) liability and exoneration from liability; (3) relationships with states and international organizations; (4) settlement of disputes; (5) final clauses of the Convention and the Operating Agreement; and (6) privileges and immunities and a draft protocol to deal with these topics. Sixteen delegations indicated an intention to attend the working session of legal experts.<sup>28</sup>

Thus, the first session of the Intersessional Working Group reached basic agreement on the issues assigned to it by the Conference, and made substantial progress toward draft texts for the proposed agreements. A. L. Freeman, reporting on this work as Head of the U.S. Delegation, noted: "A major factor in recording this progress was the strong support given to the elements of the package, to which only the U.S. and thirteen Western European countries had previously agreed, by the U.S.S.R. and Japan."<sup>29</sup> It was also Freeman's view that the texts thus agreed were not likely to undergo substantial revision, except as might be appropriate to reflect certain concerns of the developing countries.<sup>30</sup>

# b. IWG Second Session—October 27-31, 1975 (London)

At the second session of the Intersessional Working Group thirty-one states and six international organizations and entities were represented. The Working Group reviewed

<sup>27</sup> Id. at 8-10.			
28 <i>Id</i> . at 11.			
29 <i>Id</i> . at 12.			
30 <i>Id</i> .			

several draft articles prepared by the meeting of legal experts in Oslo, supplemented by a two-day meeting in London immediately prior to the Working Group's second session.

An article proposed early by the U.S. and U.S.S.R. on relations between a state Party and its designated entity was accepted in a slightly revised form. An article providing for the rights of all Parties and designated entities to attend and participate in all meetings of the organization was accepted without comment. The Working Group amended slightly an article defining the legal personality of the organization and its legal capacities. An article giving the Assembly power to decide upon questions of external relations of the organization was adopted without discussion, and an article and related protocol on Privileges and Immunities were forwarded without substantive comment for consideration by the resumed Conference. An article on withdrawal was revised and accepted, but the Working Group did not complete discussion of an article on suspension and termination which required further analysis in connection with the provisions for settlement of disputes. A text on signature, ratification, acceptance, approval and accession was accepted, leaving open the question of whether or not reservations to the Convention would be permitted. The latter point was referred for decision to the resumed Conference. Articles on entry into force and the depositary were accepted. An article on languages was accepted, after lengthy discussion, designating English, French, Russian and Spanish as official languages, but leaving to the Rules of Procedure of the Assembly and Council the designation of working languages.

In addition, articles for the Operating Agreement were accepted dealing with exoneration from liability, entry into force, depositary and testimonium.<sup>31</sup>

The question of liability was extensively discussed during preparatory work for the second session of the Working Group, according to A. L. Freeman, U.S. Representative, but it was not discussed in the plenary meetings of the Working Group during the second session. Freeman summarized the situation as follows:

The Europeans are arguing forcefully that the Convention must address the question of potential governmental liability for space damage. They propose an Article which would shield members (governments and possibly private entities) from claims brought by other members (thus giving the Organization a status approaching that of a corporation) and which would also require the Signatories to reimburse any member which has had to honor a claim merely because of its status as a member of this Organization. The U.S. had originally argued that no mention should be made of governmental liability or reimbursement - as in the INTELSAT Agreements - and that this matter should thus be left to other relevant treaties. At this meeting the U.S. informally indicated a willingness to consider a provision regarding governmental reimbursement if the provisions regarding governmental non-liability were dropped. This suggestion seemed to develop some support but no final resolution was reached.<sup>32</sup>

<sup>31</sup>See Report to the Second Intersessional Working Group, supra note 18, at 4-6.

34Id. at 6-7.

In the continuing consideration of Assembly and Council roles, the U.S., most Western European countries and others preferred a strong Council, with basically review functions in the Assembly. Other countries, led particularly by Egypt, Mexico, Nigeria and Turkey, continued to push for some key decision-making by the Assembly. The question was not fully resolved at the second session of the Working Group, although a compromise list of relative functions for the two bodies was produced and gained substantial support.<sup>33</sup>

Procedures for amending the Convention were readily and generally agreed; but procedures for amending the Operating Agreement were discussed extensively. The U.S. had proposed amending the Operating Agreement by decision of the Council approved by the Signatories (designated entities). The Europeans and the U.S.S.R. insisted upon an Assembly approval role for Operating Agreement amendments. A compromise resulted, in which the Assembly would confirm amendments agreed to by the Council.<sup>34</sup>

Proposals by the International Chamber of Shipping were submitted assigning to the Council functions of arranging consultation mechanisms between the Organization and maritime Recognized Private Operating Agencies responsible for ship terminal operations. Discussion of these proposals was deferred.<sup>35</sup>

The Working Group took up the full range of questions relating to investment shares, but initial investment shares proved difficult to determine. In general, countries were reluctant to take on large initial shares because of concomitant risks. A range of alternatives was explored but no decision was reached.<sup>36</sup>

The subject of a capital ceiling for the organization was discussed but no conclusion was reached. Proposals ranged from \$165 million to \$250 million with substantial variations in countries' preferences.<sup>37</sup>

Although policy relating to patents and data was discussed there were significant differences as to the basic philosophy to be adopted in this matter and delegations wished to have more time to consult with their national authorities. Consequently a compromise text was proposed, but not agreed, and the question was deferred to a subsequent meeting of the Working Group.<sup>38</sup>

<sup>39</sup>Id. at 7-8. <sup>34</sup>Id. at 9. <sup>35</sup>Id. at 10. <sup>36</sup>Id. at 10-11. <sup>37</sup>Id. at 12-13. <sup>39</sup>Id. at 13-14. Pressure of time resulted in the need for a third session of the Intersessional Working Group, and an invitation from the Dutch delegation to host the session was accepted. An agenda for the third session was agreed prior to concluding the second session.<sup>39</sup>

The second session involved the first substantive and in-depth discussion of financial matters and patent and technical information policy. In the words of the U.S. Representative "that discussion was particularly useful not because any mutually agreed positions were reached, but because the dimensions of the problems were fully revealed."<sup>40</sup> Although no agreed texts were produced on the central policy issues, substantial progress toward resolution of these issues was made.

## c. IWG Third Session—December 1-5, 1975 (Noordwijk)

The third session of the Working Group was necessary to take up a number of aspects of the draft Convention and draft Operating Agreement which had not previously been discussed and to conclude work on the articles which had been discussed but not agreed. Twenty-six states and four international organizations and entities were represented.

The meeting established two working groups dealing with: (1) financial matters; and (2) nonfinancial matters. Although an effort was made in the financial matters working group to conclude agreed texts, differences among delegations and lack of time resulted in the adoption of draft articles which included unagreed (bracketed) language. These articles, clearly identifying the areas of agreement and disagreement, were referred to the resumed Conference for completion. Articles on financial matters were prepared for the two agreements as shown in the following table. The topics bearing an asterisk were bracketed and involved substantial issues.<sup>41</sup>

CONVENTION	OPERATING AGREEMENT		
Establishment of use charges	Payment of use charges*		
Audit (ultimate placement in final texts left open)	Interest on overdue payments		
Capital contributions and compensation for use of capital	Capital ceiling (text agreed without specific number or monetary unit)		

## 39Id. at 15-16.

4ºId. at 16.

<sup>41</sup>See Report to the Third Intersessional Working Group, supra note 18, at 5-8.

Excluded costs\* (placement to be determined)

Settlement of Accounts (currency to be determined)

Investment shares\*

Priority for use of revenues

Financial adjustment between Signatories

Debt financing

Settlement upon withdrawal or termination

The second working group, dealing with nonfinancial matters, took quite a different approach to its work—Freeman explains:

The Working Group, concerned with nonfinancial matters primarily considered the texts for various articles to be incorporated in the Convention. There was a concerted effort to remove brackets from around disputed texts and frequent recourse to voting on such disputed texts. The effort to resolve issues in this fashion was undertaken in order to provide the Resumed Conference with a text enjoying wide support, and thereby narrow the issues on which the Conference will have to focus. In a number of situations, delegations, including the United States, were obliged to add notes to the texts supported by the majority reiterating their objections to such texts.<sup>42</sup>

The resulting work of the second working group included texts of the Preamble to the Convention and a series of definitions; however, not all the definitions were complete, *e.g.*, the term "ship" was not discussed, which left open the issue of whether or not permanently moored platforms would be included in that term. The question was left for the resumed Conference.

There was substantial discussion of the *purpose* of INMARSAT and serious objection arose to a U.S. proposal to refer to the "commercial basis" on which the space segment would be provided.<sup>43</sup> There was also concern about reference to radio determination as a purpose because explicit reference, it was argued, could give rise to satellites exclusively for that purpose. In the end, the following text was agreed:

42Id. at 9.

43Id. at 10.

The purpose of the Organization is to make provisions for the space segment necessary for improving maritime communications, thereby assisting in improving distress and safety of life at sea communciations, efficiency and management of ships, maritime public correspondence services and radiodetermination capabilities, by satellites.<sup>44</sup>

It was agreed without debate that INMARSAT may own or lease the space segment. The issue of a member's obligation to notify the organization of intention to establish other space segments of similar purpose was debated but not resolved.

A text was accepted setting forth the terms for access to the space segment basically insuring access for ships of all nations on conditions to be determined by the Council. "In determining such conditions, the Council shall not discriminate among ships on the basis of nationality."<sup>45</sup>

There was no debate of the article setting forth the structure of the organization, *viz.*, "The organs of the Organization shall be: (a) The Assembly; (b) The Council; and (c) The Directorate headed by a Director General."<sup>46</sup>

Meetings of the organizations; Assembly composition, meetings and voting; Council composition, procedures and functions were discussed and substantially agreed, with the exceptions of: Assembly power to elect additional signatories to the Council to ensure just geographical representation, and Council voting provisions, including required majority and a limit on a single member's voting power.<sup>47</sup>

Previously agreed texts were amended to make possible agreement on provisions controlling the relationship between suspension and termination and settlement of disputes.<sup>48</sup> Texts were agreed dealing with notifications by the headquarters host government to the International Telecommunication Union of frequency use plans of the Organization and the process of frequency coordination.

A preamble to the Operating Agreement was adopted. Texts on patent and technical information policy could not be agreed at the third session and these matters were forwarded for further consideration. It was agreed to convene a meeting of experts on this matter in London on February 5 and 6, 1976.<sup>49</sup>

#### 44*Id*. at 11.

<sup>43</sup>Convention on the International Maritime Satellite Organization (INMARSAT), opened for signature September 3, 1976.

46Id. Art.9

<sup>47</sup>See Report to the Third Intersessional Working Group, supra note 18, at 14-16.

<sup>48</sup>Id. at 17.

49*Id*. at 19.

Except for the meeting of experts on patent and technical information policy, the Intersessional Working Group completed its preparatory work at the third session. Although there was still an impressive list of issues to be resolved, in summing up his Report on the Third Session of the Intersessional Working Group, the U.S. Representative opined:

> A cautious appraisal of the likelihood that the work to date will be accepted by the Resumed Conference and that the cooperative spirit heretofore evidenced at the three sessions of the ISWG suggests that it is possible to foresee resolution of the outstanding issues at the Resumed Conference, and the possiblity of initialling the texts of a Convention and an Operating Agreement at that time.<sup>30</sup>

## B. Second Conference Session—February 9-28, 1976 (London)

The resumed Conference<sup>31</sup> was attended by delegates from 47 countries and 16 intergovernmental agencies and other international organizations. At this session the formal decision was taken that the new organization would have two basic instruments: (1) a Convention to be signed by Parties (Governments); and (2) an Operating Agreement to be signed by Signatories (Governments or designated entities). The Conference also formally decided that the organs of INMARSAT would be: (1) The Assembly, consisting of all Parties; (2) The Council, consisting of Signatories; and (3) The Directorate headed by a Director General.

The texts of the two agreements prepared by the Intersessional Working Group were adopted in large measure, although some revisions were made. In the final analysis, all of the articles of the Convention (save three) were agreed; the annex to the Convention containing procedures for settlement of disputes was adopted; and the entire Operating Agreement and an annex containing a list of initial investment shares of 40 countries were approved.<sup>52</sup>

The three issues remaining unresolved at the end of the resumed session of the Conference were: (1) maximum voting power of each councilor; (2) whether or not reservation to the Convention would be permitted; and (3) official and working languages.<sup>53</sup> Because these issues remained outstanding, the Conference decided to adjourn and to convene a third session in London, September 1-3, 1976. A resolution was adopted to this effect, which invited IMCO to make arrangements for the third session.<sup>54</sup>

52Id. at 2.

33Id.

34Id. at 4.

<sup>59</sup>*Id* . at 20.

<sup>&</sup>quot;See Report on the Outcome of the Second Session of the International Conference on the Establishment of an International Maritime Satellite System, U.N. Doc. A/AC:105/169 (1976).

With the basic documents of INMARSAT all but agreed, the Conference proceeded on the assumption that the three remaining issues could be readily resolved. Several Resolutions and Recommendations were adopted to move forward with the planning and preliminary organizational work of INMARSAT. *Resolution 1* accepted the invitation of the United Kingdom to establish the headquarters of INMARSAT in London. *Resolution 2* provided for creation of the Preparatory Committee, which is elaborated fully below.

Recommendation 1 of the Conference dealt with world-wide minimum technical and operational equipment standards as a basis for specifications for ship-borne terminals. Recommendation 2 dealt with the need to establish world-wide technical and operating standards to facilitate communication between ships and subscribers on shore. Recommendation 3 addressed again the desirability of ship-borne terminals being allowed to operate on certain frequencies within harbor limits and other waters under national jurisdiction. Recommendation 4 dealt with a study of the use by INMARSAT of multipurpose satellites.<sup>55</sup>

## 1. The INMARSAT Preparatory Committee

Convinced, as it was, that work should go forward on the development of a world maritime communciation satellite system the resumed Conference decided to take the steps necessary to facilitate planning and organizational development. Thus, *Resolution 2* called for establishment of the Preparatory Committee.

The function of the Committee broadly construed was to carry out preparatory studies and actions in the *interim* between the closing of the Conference and the entry into force of the instruments establishing INMARSAT.<sup>56</sup>

Participation in the Preparatory Committee was opened to representatives of governments which had signed the Convention and Operating Agreement and to representatives of designated entities which had signed the Operating Agreement. Also included were representatives of governments and their designated entities which had indicated their intention to initiate domestic procedures which would permit membership in INMARSAT.<sup>37</sup>

"U.N. Doc. A/AC. 105/169, at 3 (1976).

<sup>&</sup>quot;The Resolutions and Recommendations are Summarized only. Id. at 2-3. For full texts, see the Final Acts of the Second Session of the Conference.

<sup>&</sup>lt;sup>56</sup>U.N. Doc. A/AC.105/169, at 3 (1976). The relevant provisions of the Convention provide that it shall enter into force 60 days after the date on which states representing 95 percent of the initial investment have become parties. If the Convention does not enter into force within 36 months of the date it was opened for signature, it shall not enter into force at all. Convention on the International Maritime Satellite Organization (INMARSAT), Art. 33, opened for signature September 3, 1976. The Operating Agreement enters into force for the Signatory on the date that the Convention enters into force for the party. *Id.* Art. XIV of the Operating Agreement.

Committee membership and sharing of costs were to be based on a declaration to be submitted by each country to the Secretary-General of IMCO. Committee expenses were to be met from contributions of participating countries; and expense ceiling was set at \$500,000 (US) per annum, unless otherwise decided by the Committee.<sup>58</sup>

An annex to *Resolution 2* contains a detailed list of the tasks assigned to the Committee. Included, among others, were the following:

Study of performance standards of land and ship earth stations, taking into account existing IMCO and International Telecommunication Union (ITU) studies and the experiences gained from the operation of existing systems and systems under development; study of the INMARSAT space segment facilities' options; identification of tasks which might be assigned to a management services contractor or contractors; preparation of proposals concerning the tasks and responsibilities of the Director General and the Directorate; initiation of contacts with the host country prior to Council negotiation of a headquarters Agreement including the study of possible premises for INMARSAT; and preparation of draft financial and staff regulations and draft rules of procedure of the Assembly and the Council.<sup>39</sup>

The Resolution also called upon the Secretary-General of IMCO to make the necessary administrative, financial and secretariat arrangements and to convene the first session of the Preparatory Committee at the headquarters of IMCO if at least 14 states or their designated entities had notified him that they wished to participate.<sup>60</sup>

C. Third Conference Session-September 1-3, 1976 (London)

The re-resumed Conference was attended by delegates from 47 countries and observers from Yugoslavia, and delegates from 23 intergovernmental agencies and other international organizations.<sup>61</sup>

Prior to the third session of the Conference a number of interested delegations consulted informally to arrive at a common approach to the outstanding issues. The group reached a consensus on the approach to the *ceiling on a Councilor's vote*, but the agreement was modified at the third session. William K. Miller, U.S. Representative, reported the result as follows:

In the period prior to convening the Third Session, support developed for the establishment of 25% of the total voting participation in the Organization as the upper limit on the vote a representative on the Council would be able to exercise on behalf of one Signatory. However, the concept of a mandatory distribution at the option of the

58Id.

<sup>59</sup>Id.

60Id. at 4.

<sup>61</sup>See Report to the Third Session of the International Conference on the Establishment of an International Maritime Satellite System, TD Ser. No. 73 (1976).

affected Signatory of any investment in excess of 25% was dropped. Instead it was agreed that if a Signatory elected to divest itself of investment in excess of 25%, other Signatories would be invited to subscribe to the excess. To the extent the excess was not voluntarily subscribed, the Signatory possessing such excess would retain it and vote it, thereby voting a share greater than 25%. Should the affected Signatory elect not to divest itself of its investment in excess of 25%, its vote corresponding to such excess would be distributed equally to all other representatives on the Council.<sup>62</sup>

The text of an article giving effect to this approach was agreed.63

The U.S. Government, between the close of the second session and the opening of the third session, had become increasingly concerned about the question of *exemption* of INMARSAT and its property *from custom duties*. During the second session, the U.S. delegation had tried to get language in the draft Convention adjusted to conform to comparable language in the INTELSAT Agreement. The attempt was unsuccessful at the second session, but after some discussion and debate at the third session the language on exemptions was adjusted.<sup>64</sup>

On the *issue of languages*, after a long and emotional debate at the second session of the Conference, the third session agreed to omit treatment of languages from the Convention and leave this matter to the organs of the organization to decide for themselves.<sup>65</sup> On the *question of reservations*, the third session agreed, without debate, that reservations cannot be made to the Convention or to the Operating Agreement.<sup>66</sup>

The third session of the Conference agreed to accede to a recommendation of the IMCO Council that the dates of the first meeting of the INMARSAT Preparatory Committee be set at January 10-14, 1977, rather than January 11-17, 1977, as had been set by *Resolution 2* of the second session.<sup>67</sup>

The Final Act, Convention and Operating Agreement, providing for the creation of INMARSAT, were opened for signature on September 3, 1976.68

64Report to the Third Session of the International Conference, supra note 61, at 5-6.

65 Id. at 7.

6¶d. at 8.

67Id.

68Id.

<sup>62</sup> Id. at 5.

<sup>&</sup>lt;sup>63</sup>Convention on the International Maritime Satellite Organization (INMARSAT), Art. 14, opened for signature September 3, 1976.

#### INMARSAT—ORIGINS AND STRUCTURE

#### IV. CONCLUSION

The process of gestation was thus completed and the fledgling organization, INMARSAT, was born on September 3, 1976. Or was it? There is one rather remarkable feature of this new Convention which permits any one of five countries, acting alone, to prevent the entry into force of the agreements. Because 95 percent of the initial investment must be subscribed to before the agreements can take effect, the following countries, with their indicated initial investment shares, can block the coming into existence of INMARSAT.

Country	Percentage		
United States of America	17.00		
United Kingdom	12.00		
USSR (including Byelorussian SSR and Ukrainian SST)	11.00		
Norway	9.50		
Japan	8.45		

The next largest initial investor is Italy, with 4.37 percent, then France, with 3.50 percent. Any combination of two or more of major European maritime nations could also block entry into force by withholding their participation. It would seem however, that because all these countries took an active and constructive role in formulating and producing these agreements, the chances of a single nation or nation-group veto are very limited.

An article-by-article comparative analysis of INTELSAT, INMARSAT and INTERSPUTNIK could well serve as adequate challenge for a doctoral dissertation. The somewhat more notable preoccupation with financial arrangements and guarantees of continuity of members in the INMARSAT agreements is more a reflection of concern over the risks involved in this new venture than any result of experience in earlier organizations. Some countries seemed concerned lest they be left by others to sustain an organization of questionable economic potential. It is doubtful that INMARSAT will fail if launched, because the commitments necessary to the launching are the best assurance of success. The mixed governmental/commercial-entity nature of the organization, which occasioned some hesitancy on the part of some states at the start, was dealt with using the INTELSAT model of the two-level agreement. Perhaps, over time, the experience of some states in INMARSAT will lead to an increase in membership in INTELSAT. In this observer's opinion, the most significant single aspect of the new Convention may be reflected in the languages in which it is printed— English, French, Spanish and Russian.

# INTERNATIONAL COOPERATION BETWEEN COMMUNICATIONS SATELLITE SYSTEMS: AN OVERVIEW OF CURRENT PRACTICES AND FUTURE PROSPECTS

## Richard R. Colino\*

## I. INTRODUCTION

It has been almost twenty years since Sputnik I was successfully launched and orbited.<sup>1</sup> Since then outer space activities have increased, bringing both tangible and intangible benefits to mankind. The communications satellite has provided highly visible benefits, having daily impact on the lives of many people located at virtually every point on the globe. At the same time, the proliferation of communications satellites has also brought about the necessity for extensive international cooperation and coordination in their deployment and use.<sup>2</sup>

At the time of the Sputnik I launch in October 1957, standards had not yet been developed for the allocation of portions of the radio frequency spectrum for space services, and guidelines had not yet been conceived to obviate potential interference between space systems. Although experts undoubtedly appreciated the finite nature of the then available portions of the spectrum, there were not very many pundits prognosticating numerous systems with their potential for harmful interference. The various exercises underway under the aegis of the United Nations related in general to international cooperation in space endeavors with specific efforts to allocate portions of the spectrum to the space and earth-space radio services first occuring in 1959 at the Administrative Radio Conference held in Geneva, Switzerland.<sup>3</sup> Prior to that time, the astronautical services were not officially defined, either on a national governmental basis or internationally. This created an erratic situation. Sometimes coordination and clearance took place in accordance with concepts of international norms of behavior

<sup>1</sup>Space Technology Laboratories, Space Log 2 (Herrick ed. 1960); New York Times, Oct. 5, 1957, at 1, Col. 8.

<sup>2</sup>For a discussion of telecommunications development and their impact, see Charyk, Satellite Communications, in The Impact of Space Science on Mankind 25-26 (Greve, *et al* eds. 1976); Clarke, The Coming of the Space Age (1967); Dunlap, Communications in Space (1970); International Telecommunication Union, From Semaphore to Satellite (1965); Rosenberg, The Impact of Space Communications, in The Impact of Space Science on Mankind, *supra*, at 57-66.

See Section II. A. infra.

<sup>\*</sup>Vice President, U.S. INTELSAT Division, Communications Satellite Corporation. United States Governor and Chairman of the INTELSAT Board of Governors (1976-1977). The views expressed in this article are those of the author and in no way are intended to express opinions of the Communications Satellite Corporation or the International Telecommunications Satellite Organization. The author wishes to express his appreciation to Ms. Sigrid B. Badinelli, International Affairs Div., Communications Satellite Corporation, for assistance in writing this article.

and self interest. On other occasions, however, it did not take place resulting in either the threat or reality of interference for certain space programs.<sup>4</sup>

More than just time has passed. The radio frequency spectrum is a scarce resource and the geosynchronous orbit, while rather large in its circumscribed arc, cannot be utilized inefficiently. This is due to the fact that the communications satellite has been employed in geosynchronous orbit at a remarkable rate and by a strikingly large number of nations and organizations. Undoubtedly, more and more nations and organizations have come to perceive the enormous benefits offered by these satellites and have the capability, either themselves or as made available by others, to develop, construct, establish and operate communications satellite systems. Facilitating this proliferation of satellite systems is the policy of the United States Government pursuant to which launch services are provided to other nations on a cost-attractive basis, as well as the development of launch capabilities by other Governments.<sup>5</sup> Among the existing or proposed satellite telecommunications systems of several nations and organizations are: the global communications satellite system of the International Telecommunications Satellite Organization (INTELSAT); the various United States domestic systems, (the WESTAR, RCA and COMSTAR systems); in Canada, the TELESAT system; in Indonesia, the PALAPA domestic system; the STATSIONAR system of the Soviet Union; the proposed international maritime network; the U.S. Marisat program; the French/German Symphonie and Italian Sirio experimental satellite systems; and the proposed Brazilian and Colombian domestic systems.<sup>6</sup> Clearly, it is both desirable and necessary to effect coordination between and among these various systems to avoid interference and to achieve efficient use of

367 Dept. State Bull. 533-34 (1972); 65 Dept. State Bull. 624-27 (1971).

For further information on these systems, see Bichara, The Symphonie Project, in Communications Satellite Systems: An Overview of the Technology (Gould & Lum eds. 1976); Brown, The International Telecommunications Satellite Organization and The U.S.S.R. Domestic Systems, in id.; Deane & Lipke, Maritime Satellite Communications, in id.; Gould, U.S. Domestic Communication Satellite Systems, in id.; Kawan, The Canadian Domestic System, in id.; COMSAT, Pocket Guide to the Global Satellite System 4-22 (1976); COMSAT, Annual Report to the President and the Congress 2-31 (1975); Symphonie in Africa, Air & Cosmos 27 (June 12, 1976); Franco-German Utilization: Symphonie Program, Air & Cosmos 40-41 (May 10, 1975); Use of Symphonie by Canada, France and Germany, Air & Cosmos 45 (March 15, 1975); COMSAT-ATT U.S. Domestic Satellite, Air and Cosmos 41 (Sept. 8, 1973); Brazilian Bid Accepted, Aviation Week and Space Technology 47 (July 12, 1976); Brazilian Telecommunications, Financial Times 26 (Sept. 23, 1975); Indonesian Satellite, Financial Times 6 (March 25, 1975); Russia Launches First Statsionar, Flight International 83 (Jan. 10, 1976); TELESAT Canada Launches Last Anik, Flight International 891 (May 29, 1975); Matitime Satellite Conference Decisions, Flight International 809 (May 29, 1975); Advanced RCA COMSAT to use New Delta, Flight International 808 (May 15, 1975); International Maritime Satellite Conference in London, Flight International 778 (May 8, 1975); Indonesia Orders COMSAT System, Flight International 345 (Feb. 27, 1975); Commercial Applications Satellites, Flight International 880-89 (Dec. 9, 1974); Satellite Survey, Flight International 203-05 (Feb. 8, 1973; Full Marisat Services in Atlantic, ITU Journal 641 (Oct. 1976); Indonesia First Domestic Satellite Launches, ITU Journal 660 (Sept. 1976); Toward Realization of International Maritime Satellite Systems, ITU Teleclippings 1-3 (Sept. 15, 1975); Communications Needs in Developing Countries, Telecommunications 50-51 (Sept. 1976).

<sup>4</sup>A. Haley, Space Law and Government 169 (1963).

international resources. This has not been an easy task in the past and promises to be an even more complex one in the future.

It may be useful to review some of the procedures which have evolved thus far and to present a practical exposition of activities of two major international organizations concerned with these matters: The International Telecommunication Union (ITU), which is engaged in the establishment of appropriate guidelines and criteria for intersystem coordination as an international regulatory body; and the International Telecommunications Satellite Organization (INTELSAT), which has established and operates a single global satellite system with certain responsibilities relative to its own actions and those of its members regarding coordination.

While this article focuses exclusively on a particular facet of space activity and the relevant work of these two organizations, any discussion of international cooperation in outer space must at a minimum make reference to the extensive work of the United Nations. Neither the ITU nor INTELSAT could have functioned as effectively as they have with respect to intersystem coordination absent the foundation laid by the United Nations through its formulation of general principles to be followed in undertaking activities in outer space. The efforts of the United Nations in directing the attention of its members to the necessity for international cooperation has both preceded and paralleled the efforts expended by INTELSAT and the ITU. These efforts have been detailed elsewhere<sup>7</sup> and, thus, will not be reviewed again herein.

#### II. REVIEW OF THE ROLE OF THE ITU

#### A. Purposes and Structure

Throughout its history, the ITU has managed to evolve in response to developments in technology.<sup>8</sup> Pursuant to its most recent charter,<sup>9</sup> the ITU has several objectives: to maintain and extend international cooperation for the improvement and rational use of telecommunications of all kinds; to promote the development of technical facilities and their most efficient operation, with a view to improving the

<sup>&#</sup>x27;See, e.g., S. Lay and H. Taubenfeld, The Law Relating to the Activities of Man in Space 81-102 and Appendix E (1970); Abdel-Ghani, Special Report on United Nations Institutions Concerned With Space Activities, 13th Colloq. on the Law of Outer Space 39 (1970); Christol, General Report on Activities and Action of the United Nations Organizations in the Space Field, *id.*, at 11; Colino, The United Nations Organization and the Legal Problems of Outer Space: The United Nations, Its Specialized Agencies, and Communications Satellites, *id.*, at 234; Galloway, The Future of Space Law, 19th Colloq. on the Law of Outer Space 2 (1976).

<sup>\*</sup>See Leive, International Telecommunications and International Law: The Regulation of the Radio Spectrum 29-80 (1970); International Telecommunication Union, *supra* note 2, at n.2.

<sup>9</sup>International Telecommunication Convention (Signed Malaga - Torremolinos, 1973), 23 U.S.T. 1527, T.I.A.S. No. 7935.

efficiency of telecommunications services, increasing their usefulness and, as far as possible, making them generally available to the public; and to harmonize the action of nations to attain these ends.<sup>10</sup> To implement these objectives the ITU is, *inter alia*, to effect the allocation of the radio frequency spectrum and registration of radio frequency assignments in order to avoid harmful interference between radio stations of different countries. It is also to coordinate efforts to eliminate harmful interference between radio station frequency spectrum. With a view to harmonizing the development of telecommunications facilities, notably those using space techniques, the ITU is to coordinate such efforts and to seek to take full advantage of the possibilities of such facilities.<sup>11</sup>

In order to discharge this mandate the ITU has evolved a structure which consists of a Plenipotentiary Conference (the supreme organ), Administrative Conferences, the Administrative Council and four permanent organs: the General Secretariat; the International Frequency Registration Board (IFRB); the International Radio Consultative Committee (CCIR); and, the International Telephone and Telegraph Consultative Committee (CCITT).<sup>12</sup> Of particular importance to intersystem coordination is the work undertaken by the IFRB and the Administrative Radio Conferences.

The IFRB is to effect an orderly recording of frequency assignments made by different countries in order to establish the date, purpose and technical characteristics of each of these assignments with a view to ensuring formal international recognition thereof. This process is to be undertaken in accordance with the procedures provided for in the Radio Regulations and in accordance with any decisions which may be taken by ITU Conferences.<sup>13</sup> Under the same conditions and for the same purposes, the IFRB is also to achieve an orderly recording of the positions assigned by countries to geostationary satellites. In addition, the IFRB is to furnish advice to its members, with a view to the operation of the maximum practicable number of radio channels in those portions of the spectrum where harmful interference may occur, and with a view to the equitable, effective and economical utilization of the geostationary satellite orbit.<sup>14</sup> The IFRB also performs any additional duties with respect to the assignment and utilization of frequencies and the utilization of the geostationary satellite orbit, in accordance with the procedures provided for in the Radio Regulations, and as may have been prescribed by a competent ITU Conference or by the Administrative Council with the consent of a

11Id., Art. 4-2.

12Id., Art. 5.

131d., Art. 10-3.

14Id.

<sup>10</sup>Id., Chap. 1, Art. 4-1.

majority of ITU members.<sup>15</sup> It is of course recognized that an important function of the IFRB is its maintenance of essential records in connection with the performance of its various duties.<sup>16</sup>

The ITU Administrative Conferences may be either world-wide or regional and are normally convened for the purpose of considering specific telecommunications questions.<sup>17</sup> As noted earlier,<sup>18</sup> an Ordinary Administrative Radio Conference of the ITU was convened in 1959 in order to revise the 1947 Radio Regulations and to consider the allocation of certain frequency bands to the space and earth-space services on a world-wide basis for research purposes. This conference adopted definitions of new terms such as "space service", "earth-space service", "space station" and "earth station", thus paving the way for the introduction of satellite telecommunications services in the future. More significantly, however, it provided for the convening of an Extraordinary Administrative Radio Conference (EARC) in 1963 for the purpose of considering and allocating frequency bands for the space radio communications service.<sup>19</sup> The Extraordinary Administrative Radio Conference of 1963 was a critical step forward toward the introduction of commercial communications satellites and indeed, the establishment of global commercial communications satellite services. The international agreement which was concluded by the EARC on November 8, 1963, modified the Radio Regulations by allocating frequency bands for the various space services either on a shared or exclusive basis. In particular, a total of 2800 MHz in band width was allocated for communications satellites. Specifically, 100 MHz of spectrum space was designated as being available exclusively for communications satellites and approximately an additional 2700 MHz was allocated to this service on a shared basis with terrestrial radio services. The EARC also established detailed procedures for the notification to the IFRB of frequencies used by communications satellites, as well as the characteristics of such frequencies which had to be submitted.<sup>20</sup> Space telecommunications were considered again and in greater depth by the 1971 World Administrative Radio Conference (WARC) convened specifically for this purpose. As a result of this Conference further progress was made in the development of rules for the use of outer space and the frequency spectrum. The 1971 WARC took several actions of significance to satellite communications and coordination of satellite systems. The frequency allocations were amended not only to provide new frequency bands for the

uld.

16[d.

"Id., Art. 7.

<sup>18</sup>See text accompanying note 3 supra.

<sup>19</sup>International Telecommunication Union, First Report by the ITU on Telecommunications and the Peaceful Uses of Outer Space 4, 19-12 (1962).

<sup>20</sup>See ITU, Final Acts of the Extraordinary Administrative Radio Conference to Allocate Frequency Bands for Space Radiocommunication Purposes Annex 3, 6, and Recommendations Nos. 4-A, 5-A, & 10-A (1963).

fixed satellite service,<sup>21</sup> but also to provide some of these new frequency bands on a world-wide rather than a regional basis.<sup>22</sup> The Radio Regulations were also in conformity with the principle of protecting the geostationary satellite orbit and ensuring its more efficient utilization.<sup>23</sup> Finally, a new procedure for coordination of satellite systems was adopted which provided, *inter alia*, procedures for the advance publication of information on planned satellite systems, for coordination to be applied in appropriate cases, and for the notification of frequency assignments.<sup>24</sup>

Additional conferences of a similar nature have been planned. For example, the World Administrative Radio Conference of January 1977 was to endeavor to establish criteria and procedures providing for the use of bands which are shared between broadcast services and telecommunications services, *i.e.*, the 11.7-12.2 GHz band in regions 2 and 3; and, the 11.7-12.5 GHz band in region 1.<sup>25</sup> Another World Administrative Radio Conference is planned for 1979 to consider, among other things, coordination procedures, spectrum allocation, and sharing with other services of orbit and spectrum utilization.<sup>26</sup>

#### B. The ITU Coordination Procedures

As indicated above, coordination procedures are a major concern of the ITU, are reviewed from time-to-time, and will be reviewed again in 1979. The procedures presently governing the coordination of communication satellites are those set forth in Article 9A of the Radio Regulations. These procedures provide for the advance publication of information on planned systems and for coordination between space systems in appropriate cases. They have the ultimate objective of registration of an agreed upon use of frequencies in the Master Register. The purpose of these procedures

<sup>21</sup>The 1971 WARC defined "fixed satellite services" as a radio communication service: between earth stations as specified fixed points when one or more satellites are used; in some cases this service includes satellite-to-satellite links, which may also be effected in the inter-satellite services; for connection between one or more earth stations at specified fixed points and satellites used for a service other than fixed satellite service (for example, the mobile-satellite service, broadcasting satellite service, etc.).

International Telecommunication Union, Radio Regulations, Art. 1-11, 23 U.S.T. 1527, T.I.A.S. No. 7935 (1973).

<sup>22</sup>ITU, Radio Regulations, Article 5-81-82, 86, 91-93, 95-96, 103-104, 108, 110, 113, 115-117.

<sup>23</sup>Id., Art. 7-26-29.

24Id., Art. 9A. For a discussion of these procedures, see section II. B. infra.

<sup>23</sup>See, e.g., World Adminstrative Radio Conference for Planning of Broadcasting Satellite Service, ITU Journal 300-06 (April 1976). The three regions referred to are those defined in Article 5, paras. 126-132 of the Radio Regulations for the purpose of making frequency allocations.

<sup>26</sup>See, e.g., Burgeoning Spectrum Needs Seen in Views on 1979 WARC, Telecommunications Report 38 (Feb. 1975).

#### 1977

is to ensure the availability of information on planned systems to all ITU Administrations at an early date and to permit an early identification of existing systems which may receive harmful interference from future planned systems. To this end, Article 9A requires publication through the IFRB of characteristics of the new systems (as described in Appendix 1B of the Radio Regulations) no more than five years before the anticipated date of implementation of the system.<sup>27</sup> If the calculation of the risk of interference, performed in accordance with Appendix 29 of the Radio Regulations, using those characteristics of the system given during the advanced publication phase, shows a potential interference exceeding 2% of the total noise in any particular link, then coordination is required with the Administration affected.28 The actual coordination procedure consists of an exact calculation of interference using characteristics of the system provided in accordance with Appendix 1B of the Radio Regulations.<sup>29</sup> The coordination which has to take place before final notification is not to be conducted more than three years before the date of the implementation of the system.<sup>30</sup> As envisaged by the ITU, this process is intended to be flexible so that there can be voluntary relocation of existing space stations to accommodate new space stations of other ITU Administrations if, in the absence of such relocation, the new stations could not otherwise be accommodated.<sup>31</sup> Clearly, the provisions require a major, sustained good faith effort on the part of all Administrations engaged in the use of outer space and, in particular, on the part of those Administrations responsible for existing space stations. In the final analysis, however, true international cooperation is required since there must be mutual acceptability by the parties concerned if a relocation is to take place.

In brief, this outlines the salient features of the coordination process developed by the ITU, as the international regulatory authority in the field of telecommunications. Each and every nation which is a member of the ITU now numbering in excess of 140 countries, and which has adopted and approved the Radio Regulations is obliged to follow these procedures. Consequently, a very large number of countries are affected. In addition, other organizations adhere to the ITU Radio Regulations, and follow the work, findings and recommendations of the CCIR and CCITT. One such organization is INTELSAT.

29*Id.* , Art. 9A-4-5.

<sup>29</sup>Id., App. 29-1-6.

39*Id.*, Art. 9A-13.

<sup>34</sup>Id., Art. 9A-3.

<sup>&</sup>lt;sup>27</sup>International Telecommunication Union, Radio Regulations, Article 9A-1, 23 U.S.T. 1527, T.I.A.S. No. 7935 (1973).
### JOURNAL OF SPACE LAW

# III. INTELSAT AND ITS APPROACH TO COORDINATION

# A. Relationship with the ITU

To become a member of the International Telecommunications Satellite Organization (INTELSAT) a nation must be a member of the ITU.<sup>32</sup> In addition, INTELSAT has decided voluntarily to give due consideration to the relevant recommendations and procedures of the CCITT and the CCIR.<sup>33</sup> INTELSAT coordination procedures specify, *inter alia*, that all information stipulated by the appropriate ITU and CCIR recommendations are to be made available to INTELSAT by its members who are planning separate systems. INTELSAT also participates on a working level, in ITU activities, has sent observers to various ITU events, including the 1971 WARC, and plans to participate in the 1979 WARC with the possibility of developing proposals for changes to the Radio Regulations.

## B. What is INTELSAT?

INTELSAT is an organization established for the purpose of continuing and carrying forward on a definitive basis, the design, development, construction, establishment, operation and maintenance of the space segment of the global commercial telecommunications satellite system which was established in the 1960's under interim arrangements.<sup>34</sup> The organization currently has some 95 members and has placed successfully more than four generations of communications satellites into orbit for the purpose of providing telecommunications services to all areas, nations and peoples of the world. INTELSAT's constitution is to be found in two agreements: one concluded among governments, which is known as the Agreement for the Establishment of the International Telecommunications Satellite Organization and which sets forth the organizational framework; and the Operating Agreement which is concluded among Signatories who are either the Parties signing the Agreement or their designated

<sup>32</sup>Agreement Relating to the International Telecommunications Satellite Organization (INTELSAT) Art. XIX (a) (ii), T.I.A.S.7532 (1973). There is also an Operating Agreement. Both of these Agreements are collectively referred to as the definitive arrangements which superseded the Agreement Establishing Interim Arrangements for a Global Commercial Communications Satellite System, the Special Agreement, and the Supplementary Agreement on Arbitration, T.I.A.S. 5646. The interim arrangements entered into force on August 20, 1964; the definitive arrangements entered into force on February 12, 1973, and superseded the interim arrangements.

<sup>33</sup>Operating Agreement Relating to the International Telecommunications Satellite Organization Art. 13, T.I.A.S. 7532 (1973).

<sup>34</sup>Id., Agreement, Article II (a). The space segment referred to is defined in Article I (h) as the telecommunications satellites, and the tracking, telemetry, command, control, monitoring and related facilities and equipment required to support the operation of these satellites.

telecommunications entities and which sets forth more detailed technical, operational and financial aspects of system operation.<sup>35</sup>

INTELSAT's prime objective is the provision on a commercial basis of the space segment required for international public telecommunications services of high quality and reliability to be available on a non-discriminatory basis to all areas of the world.<sup>36</sup> INTELSAT has been eminently successful in achieving this objective. At present, there are four INTELSAT satellites in orbit providing daily telecommunications services of a variety of types: two INTELSAT IV-A's over the Atlantic, and a single INTELSAT IV over each of the other two ocean regions - the Pacific and Indian. In addition, there are satellites over each ocean region serving as spares in orbit as a backup to the four operational satellites. Accessing these satellites at the end of 1976 were 157 operational earth station antennae at 126 earth stations located in 82 countries.

In addition to provision of space segment capacity to meet its primary objective, INTELSAT is authorized to provide capacity on the INTELSAT space segment for domestic public telecommunications services.<sup>37</sup> Indeed, provision of certain of these services is to be treated on the same basis as provision of international public telecommunications services.<sup>38</sup> At the end of 1976 there were a number of countries either utilizing or planning to utilize the INTELSAT system exclusively for domestic

 ${}^{3}$ A. Art. III (a). Article I (k) of the Agreement defines public telecommunications services as "fixed or mobile telecommunications services which can be provided by satellite and which are available for use by the public, such as telephone, telegraphy, telex, facsimile, data transmission, transmission of radio and television programs between approved earth stations having access to the INTELSAT space segment for further transmission to the public, and leased circuits for any of these purposes; but excluding those mobile services of a type not provided under the Interim Agreement and the Special Agreement prior to the opening for signature of this Agreement, which are provided through mobile stations operating directly to a satellite which is designed, in whole or in part, to provide services relating to the safety or flight control of aircraft or to aviation or matitime radio navigation."

37Id., Art. III (b), (c).

<sup>38</sup>Atticle III (b) provides that the following are to be considered on the same basis as international public telecommunications services:

- domestic public telecommunications services between areas not under the jurisdiction of the State concerned, or between areas separated by the high seas; and
- (ii) domestic public telecommunications services between areas which are not linked by any terrestrial wide-band facilities and which are separated by natural barriers of such an exceptional nature that they impede the viable establishment of terrestrial wide-band facilities between such areas, provided that the Meeting of Signatories, having regard to advice tendered by the Board of Governors, has given the appropriate approval in advance.

<sup>&</sup>lt;sup>35</sup>Agreement Relating to the International Telecommunications Satellite Organization, T.I.A.S. 7532 (1973).

public telecommunications.<sup>39</sup> INTELSAT may also provide international and domestic specialized telecommunications services<sup>40</sup> either by means of the INTELSAT space segment or by means of separate facilities established specifically for those purposes in accordance with relevant terms and conditions as set forth in the Agreement.<sup>41</sup>

INTELSAT's structure consists of four major organs: the Assembly of Parties; the Meeting of Signatories; the Board of Governors; and an Executive Organ responsible to the Board of Governors.<sup>42</sup> The Assembly of Parties is composed of representatives of all

<sup>39</sup>Thirteen Signatories have utilized, do utilize, or plan to utilize the INTELSAT space segment for provision of domestic public telecommunications services. With the exception of some Article IJI (b) (i) services (e.g., U.K. to Hong Kong) the majority of domestic public telecommunications services are pursuant to long term (i.e., for period of 5 years) allotments. The long term allotment agreement may be either on a preemptible or a nonpreemptible basis. If on a preemptible basis (i.e., subject to removal if necessary to accommodate a higher priority service), such leases are on spare capacity and are charged for at a reduced rate. Each allotment agreement may be for either a whole, or a half, or a quarter of a transponder. Signatories currently having such allotment arrangements and the nature of the allotment either actually in effect or approved are:

Algeria	1 transponder	(spare, preemptible)
Brazil	1 transponder	(nonpreemptible)
Chile	1/4 transponder	(spare, preemptible)
Colombia	1/4 transponder	(spare, preemptible)
France	1/2 transponder	(spare, preemptible)
Malaysia	1 transponder	(spare, preemptible)
Nigeria	3 transponders	(spare, preemptible)
Norway	1/2 transponder	(spare, preemptible)
Saudi Arabia	1/4 transponder	(spare, preemptible)
Spain	1/2 transponder	(nonpreemptible)
Sudan	1 transponder	(spare, preemptible)
Zaire	1 transponder	(spare, preemptible)

The U.S. at one time leased a transpondet on a nonpreemptible basis for provision of continental U.S. to Hawaii traffic. Brazil has also been given approval for the lease of two transponders on a preemptible basis upon termination of its current lease arrangement.

<sup>40</sup>Article I (1) of the Agreement defines specialized telecommunications services as telecommunications services which can be provided by satellite, other than those defined in paragraph (k) [public telecommunications services] including, but not limited to, radio navigation services, broadcasting satellite services for reception by the general public, space research services, meteorological services and earth resources services.

<sup>41</sup>Agreement relating to the International Telecommunications Satellite Organization, Art. III (d), (e), and (f), T.I.A.S. 7532 (1973). These provisions specify that international and domestic specialized telecommunications services may be provided on the INTELSAT space segment if the provision of public telecommunications services is not unfavorably affected thereby and if the atrangements are otherwise acceptable from a technical and economic point of view. Such services may be provided on separate facilities on request and subject to appropriate terms and conditions. INTELSAT's Assembly of Parties must authorize any provision of specialized telecommunications services either on the INTELSAT space segment or on separate satellites established.

42Id., Art. VI.

governments Party to the Agreement. It has certain powers and decision making responsibility with respect to general policy and, in particular, with respect to provisions involving coordination of separate systems.<sup>43</sup> It meets approximately every two years. The Meeting of Signatories convenes annually, much as a shareholders meeting, to consider matters of interest to the telecommunications entities involved in utilizing the system.<sup>44</sup> The Board of Governors is an organ primarily concerned with management and operational responsibility, *e.g.*, it is responsible for the design, development, construction, establishment, operation and maintenance of the INTELSAT space segment. In terms of decision-making responsibilities, it is the most active and significant organ of INTELSAT. With respect to intersystem coordination, the Board has responsibility for making findings or tendering advice with respect to possible conflict with the INTELSAT space segment by systems separate from the INTELSAT space segment facilities which are expected to be established, acquired or utilized by Parties, Signatories, or other entities within the jurisdiction of Parties.<sup>43</sup> The day to day

<sup>43</sup>Id., Art. VII. Among the functions of the Assembly are: to formulate its views or make recommendations to other INTELSAT organs in the exercise of its power of considering general policy and long term objectives; to decide upon questions concerning formal relationships with States and international organizations; and to act upon amendments to the Agreement. Its specific responsibility in the area of intersystem coordination is to express in the form of recommendations, its findings regarding the technical and economic compatibility of satellites separate from the INTELSAT space segment for public international telecommunications services and technical compatibility of satellites separate from the INTELSAT space segment for specialized telecommunications services.

44d., Art. VIII. Among the functions of the Meeting of Signatories are: to consider annual reports on INTELSAT's activities and future programs and express its views thereon; to act on amendments to the Operating Agreement; to determine annually the minimum investment share for representation on the Board of Governors; to authorize increases in the capital ceiling. It has no role to play in intersystem coordination.

<sup>49</sup>*Id.*, Art. X. The Board is allocated numerous specific policy making and operational functions such as: adoption of policies, plans and programs for the design, development, construction, establishment, operation and maintenance of the INTELSAT space segment; adoption of financial policies and approval of budgets; adoption of terms and conditions for allotment of space segment capacity, approval of earth stations to access the space segment, and rates of charge. Specific responsibilities of the Board in connection with intersystem coordination are: expression of its findings in the form of recommendations with tespect to the establishment of separate satellite systems for domestic public telecommunications services; tendering of advice to the Assembly of Parties with respect to the technical and economic compatibility of separate satellite systems for international public telecommunications services; and establishment of general internal rules and adoption of decisions in each instance concerning notification to the ITU in accordance with its rules of procedure of the frequencies to be used for the INTELSAT space segment.

The Board meets approximately every two months, or six times a year, for a week at a time. Presently, the Board is composed of 25 Governors representing 73 Signatories. The Governors and respective Signatories they represent are as follows: Africa Group I (Ethiopia, Kenya, Tanzania, Uganda, Zambia); Africa Group II (Cameroon, Central African Republic, Gabon, Ivory Coast, Senegal, Zaire); Arab Group (Algeria, Arab Republic of Egypt, Jordan, Kuwait, Morocco, Saudi Arabia, Sudan, Syrian Atab Republic, Tunisia, Yemen); Argentina, Asia/Pacific Group (India, Malaysia, New Zealand, Singapore, Sri Lanka); Australia; Belgium/ Netherlands/Luxembourg; Brazil/Portugal; Canada; Caribbean Group (Barbados, Dominican Republic, Haiti, Jamaica, Trinidad & Tobago); Colombia/Ecuador/Peru; France/Monaco; Germany; Greece/ Switzerland/Austria/Liechtenstein; Israel; Italy/Vatican City; Japan; Republic of Korea/Pakistan/ management of the organization is undertaken by the Director General who is the chief executive of the organization and who is responsible for the performance of all management functions. Certain of these functions are performed in-house by the staff of the Executive Organ, and other functions are performed pursuant to a contract with an outside entity, known as the management services contractor.<sup>46</sup>

It is within this structure and in accordance with the functions allocated to the various INTELSAT organs that intersystem coordination takes place. INTELSAT Parties and Signatories have responsibilities with respect to both coordination of any separate systems in which they plan to participate with the INTELSAT system and coordination of the INTELSAT system itself in accordance with ITU requirements. These, of course, are in addition to the individual obligations of governments assumed by virtue of their membership in the ITU.

## C. Rights and Obligations of INTELSAT Members

Determination of the rights and obligations of INTELSAT members with respect to satellite systems separate from INTELSAT was a major issue in negotiation of the

Iran/Turkey; Mexico; Nordic Group (Denmark, Finland, Iceland, Norvay, Sweden); Southeast Asia Group (Indonesia, Philippines, Thailand); Spain; United Kingdom/Ireland; United States; Venezuela/ Chile/Bolivia.

49.4. Art. XI and XII. Management arrangements for INTELSAT was one of the major issues in the negotiation of the definitive arrangements. For a discussion of the nistory of the negotiation of these provisions and major positions taken with respect thereto, see Colino, The INTELSAT Definitive Arrangements: Ushering in a New Era in Satellite Communications, European Broadcasting Union Monograph No. 9, at 45-50 (1973).

INTELSAT management arrangements as set forth in Articles XI and XII may be summarized as follows: An Executive Organ responsible to the Board was created and is in the process of acquiring increasing in-house management responsibilities during the period from entry into force until 6 years thereafter, *i.e.*, February 12, 1979. This Executive Organ was headed until December 31, 1976, by a Secretary General, appointed by and responsible to the Board. Management services of a technical and operational nature are provided by Comsat under a contract with INTELSAT in effect until February 1979. During this period, *i.e.*, until December 31, 1976, Comsat as management services contractor reported directly to the Board, and the Secretary General was not interposed between the Board and Comsat. However, he was to keep the Board fully and currently informed on the performance of Comsat under the contract, and to the extent practicable was to observe, but not participate in, major contract negotiations conducted by Comsat on behalf of INTELSAT.

After December 31, 1976, and hence, currently, there is a Director General, responsible to and acting in accordance with the policies and directives of the Board for all management services. The Director General was appointed by the Board and his appointment was confirmed by the Assembly of Parties at its Second Meeting in 1976. Until the expiration of its contract, Comsat continues to provide management services of a technical and operational nature and in its performance is responsible to the Director General rather than to the Board. After the expiration of the management contract with Comsat, the Director General is to contract out to one or more competent entities, technical and operational functions to the muximum extent practicable with due regard to cost and consistent with competence, effectiveness, and efficiency. The permanent organizational structure of the Executive Organ was adopted by the Assembly, based upon a study conducted by the Board, at its Second Meeting in 1976. Permanent management arrangements are to be implemented not later than the sixth year after entry into force, or by February 12 1979.

frequency spectrum.

Numerous issues had to be considered and resolved before the rights and obligations of INTELSAT members were definitively set forth. A prime issue was the extent to which findings by INTELSAT with respect to potential interference, both technical and economic, should and could be considered binding on sovereign states, or their designated telecommunications entities. Another significant issue was whether INTELSAT should have reciprocal obligations to consult and coordinate with its members on additions to the INTELSAT system which might affect their planned or existing separate systems.<sup>47</sup> Further complicating the entire matter were the different approaches suggested with respect to the different types of services to be carried on the separate system (*i.e.*, with respect to international public telecommunications services, domestic public telecommunications services, specialized telecommunications services (either international or domestic), and separate systems contemplated for national security purposes).<sup>48</sup> There was also a question, essentially of a procedural nature, involving the possibility that INTELSAT might fail to act in an expeditious manner and hence have an impact upon plans of a member to establish a separate satellite system.<sup>49</sup>

place increased demands on the scarce resources of the orbital arc and the radio

These, and related issues, were successfully negotiated and resolved in what, judged by recent experience, appears to be a practical manner. There are, of course, various interpretations possible of the provisions of the INTELSAT Agreement causing questions to be raised. Nevertheless, most of the issues described above were resolved in a fairly straight forward fashion. Pertinent provisions of Article XIV of the Agreement provide:

(c) To the extent that any Party or Signatory or person within the jurisdiction of a Party intends to establish, acquire, or utilize space segment facilities separate from the INTELSAT space segment facilities to meet its domestic public telecommunications services requirements, such Party or Signatory, prior to the establishment, acquisition or utilization of such facilities, shall consult the Board of Governors, which shall express, in the form of recommendations, its findings regarding the technical compatibility of such

48For definitions of public and specialized telecommunications services, see notes 36 & 40 supra.

<sup>49</sup>See Colino, supra note 46, at 99.

<sup>&</sup>lt;sup>47</sup>See Colino, supra note 46, at 88-98.

facilities and their operation with the use of the radio frequency spectrum and orbital space by the existing or planned INTELSAT space segment.

(d) To the extent that any Party or Signatory or person within the jurisdiction of a Party intends individually or jointly to establish, acquire or utilize space segment facilities separate from the INTELSAT space segment facilities to meet its international public telecommunications services requirements, such Party or Signatory, prior to the establishment, acquisition or utilization of such facilities, shall furnish all relevant information to and shall consult with the Assembly of Parties, through the Board of Governors, to ensure technical compatibility of such facilities and their operation with the use of the radio frequency spectrum and orbital space by the existing or planned INTELSAT space segment and to avoid significant economic harm to the global system of INTELSAT. Upon such consultation, the Assembly of Parties, taking into account the advice of the Board of Governors, shall express, in the form of recommendations, its findings regarding the considerations set out in this paragraph, and further regarding the assurance that the provision or utilization of such facilities shall not prejudice the establishment of direct telecommunication links through the INTELSAT space segment among all the participants.

(e) To the extent that any Party or Signatory or person within the jurisdiction of a party intends to establish, acquire or utilize space segment facilities separate from the INTELSAT space segment facilities to meet its specialized telecommunications services requirements, domestic or international, such Party or Signatory, prior to the establishment, acquisition or utilization of such facilities, shall furnish all relevant information to the Assembly of Parties, through the Board of Governors. The Assembly of Parties, taking into account the advice of the Board of Governors, shall express, in the form of recommendations, its findings regarding the technical compatibility of such facilities and their operation with the use of the radio frequency spectrum and orbital space by the existing or planned INTELSAT space segment.

- (f) Recommendations by the Assembly of Parties or the Board of Governors pursuant to this Article shall be made within a period of six months from the date of commencing the procedures provided for in the foregoing paragraphs. An extraordinary meeting of the Assembly of Parties may be convened for this purpose.
- (g) This Agreement shall not apply to the establishment, acquisition or utilization of space segment facilities solely for national security purposes.<sup>50</sup>

Within this article is the policy guidance necessary to permit effective coordination. How this policy was to be implemented and what procedures and specific guidelines would be required to achieve this were questions left to be answered by the organization itself, primarily the Board of Governors.

## D. Implementation of and Adherence to the Provisions of Article XIV of the Agreement

The question of what tests should be developed to assess significant economic harm was considered rather early in the history of the Board of Governors. Obviously, the application of the significant economic harm test would be only within the context of

<sup>&</sup>lt;sup>30</sup>Agreement relating to the International Telecommunications Satellite Organization, Art. XIV, T.I.A.S. 7532 (1973).

Article XIV (d) requiring coordination of satellites, separate from INTELSAT for the provision of international public telecommunications services. This was an important undertaking because INTELSAT's primary purpose is to provide international public telecommunications services and, hence, it could be harmed "significantly" only with respect to the provision of these services on a separate system. Procedures were adopted at the Fifth Meeting of the INTELSAT Board of Governors which occurred in October 1973.<sup>51</sup> These procedures provided the specific guidelines for ascertaining economic consequences to INTELSAT, (e.g., for determining economic impact on projected INTELSAT space segment costs and utilization charges both with and without the services in question; and the impact on the magnitude of the investment shares of Signatories).<sup>52</sup> No criteria were developed, however, for ascertaining the degree of economic harm; this was left for future resolution. As matters have developed, there has been only one separate system requiring that type of coordination, namely the U.S. Marisat system.<sup>53</sup>

The thrust of all coordination, of course, is technical and operational compatibility required regardless of the type of service to be provided and hence required by Article XIV (c), (d); and (e) of the Agreement. At its Fifth and Sixth Meetings the INTELSAT Board of Governors developed procedures to be applied to such coordination.<sup>34</sup> Initially, these procedures were made equally applicable to experimental satellites but at its Seventh Meeting, in January 1974, the Board decided to exclude experimental satellites from the purview of these procedures.<sup>35</sup> INTELSAT coordination procedures require that all information stipulated by the appropriate ITU and CCIR recommendations should be furnished to the Director General of INTELSAT by Parties or Signatories planning separate satellite systems.<sup>56</sup> This information is intended to provide a reasonable basis upon which INTELSAT can ascertain the technical compatibility or incompatibility of proposed systems with the INTELSAT system. Adherence to this requirement would also permit INTELSAT to undertake necessary calculations, of the nature specified in Appendix 29 of the Radio Regulations, to determine whether or not

<sup>32</sup>INTELSAT Board of Governors, Intersystem Coordination Procedures: Proposed Procedures for Implementation of Article XIV (d) Requirements Concerning Significant Economic Harm, BG-5-43 (October 1973). The investment shares of Signatories to the Operating Agreement are normally determined annually based upon recent use of the system. See Article 6 of the Operating Agreement.

<sup>33</sup>This system is discussed in part IV. A. infra.

<sup>34</sup>INTELSAT Board of Governors, Summary Record of the Fifth Meeting, BG-5-3, paras. 119-120, at 62-63 (October 1973); Summary Record of the Sixth Meeting, BG-6-3, para. 26, at 14 (December 1973).

<sup>33</sup>INTELSAT Board of Governors, Summary Record of the Seventh Meeting, BG-7-3, paras. 38-40, at 27-28 (January 1974).

<sup>56</sup>INTELSAT Board of Governors, INTELSAT Technical Coordination Procedures, BG-7-38 (February 1974).

<sup>&</sup>lt;sup>31</sup>INTELSAT Board of Governors, Summary Record of the Fifth Meeting BG-5-3, para. 122, at 63 (October 1973).

harmful interference would result. The Director General, in conjunction with the appropriate advisory committees of INTELSAT, is to analyze the information and make recommendations with respect to the findings to be made on technical and operational compatibility. In particular, an effort will be made to determine the potential interference between systems taking into account both up path interference and down path interference to all earth stations operating with the INTELSAT system. These calculations are intended to be made in such a fashion as to take into account both existing and planned systems of INTELSAT.<sup>37</sup>

With respect to separate satellites for domestic public telecommunications services, the Board of Governors is to issue its findings as to technical compatibility and, if such findings are favorable, is to notify formally the appropriate government and/or private telecommunications officials. In the event findings are unfavorable to the Party or Signatory concerned, the Board would take steps to resolve the difficulties in an appropriate manner.<sup>58</sup> With respect to separate satellites for international public telecommunications services, and specialized telecommunications services whether international or domestic, the Board is to advise the Assembly of Parties as to the technical, and in the case of separate satellites for international public telecommunication services, economic compatibility of the proposed system in order to permit the Assembly to issue its findings in accordance with the provisions of the Agreement.<sup>59</sup> Although these procedures are not applicable to experimental satellites, the Board has indicated that it would expect, in the interest of all Parties and Signatories, that technical coordination for such systems would be undertaken on a voluntary basis in a manner similar to that applicable to satellites operating on a commercial basis. Of course, should such experimental satellites be utilized or intended for utilization at a later date on a commercial basis, then they would be subject fully to the requirements of Article XIV and the procedures established by the Board of Governors.<sup>60</sup> On a voluntary basis, thus far several experimental satellite systems have been coordinated with INTELSAT, including the European OTS, the Franco-German Symphonie, and the Italian Sirio networks.

Coordination of satellites providing specialized telecommunications services appeared to present problems of some magnitude at an early stage in the development of the INTELSAT organization under the definitive arrangements. In 1973 and 1974, it seemed likely that there could be a number of separate satellites planned to provide specialized telecommunications services which would fall within the definition of such services in Article I (1) of the Agreement. Consequently, the need might arise for many extraordinary meetings of the Assembly of Parties in order to comply with the

60INTELSAT Board of Governors, supra note 52.

<sup>&</sup>quot;Id., Attachment No. 2, at Section II.

<sup>38/</sup>d., Attachment No. 2, at Section III.

<sup>&</sup>lt;sup>39</sup>Id., Attachment No. 2, at Section IV.

requirements of Article XIV that findings be made within a six month period. In the light of experience, the concern has failed to materialize, and the Assembly has noted that in the application of Article XIV relating to such satellites no undue problems have yet arisen. The Assembly, however, is cognizant of potential difficulties and is keeping the matter under advisement for future consideration.<sup>61</sup>

Experience to date has indicated that the overwhelming majority of systems requiring coordination with the INTELSAT system have been separate satellite systems for domestic public telecommunications services. In fact, there has been only one system coordinated pursuant to Article XIV (d) (the U.S. Marisat system) and two systems coordinated pursuant to Article XIV (e).<sup>62</sup>

In spite of these procedures and efforts by INTELSAT members to comply with them, problems have been encountered in implementing the Article XIV provisions and related procedures. Interestingly enough, most of the problems have developed in connection with Article XIV (c) and technical and operational requirements, rather than with Article XIV (d), economic considerations.

## IV. INTELSAT CASE STUDIES IN COORDINATION

There are numerous examples of INTELSAT coordination, basically of two types. First of all, INTELSAT complies with the applicable ITU Radio Regulations and coordinates its satellites pursuant thereto.<sup>63</sup> No serious difficulties have yet been

<sup>62</sup>The two separate systems coordinated pursuant to Article XIV (e) were a United States Geostationary Operational Environmental Satellite (GOES) and a Japanese geostationary meteorological satellite.

<sup>63</sup>INTELSAT procedures for coordination, notification and protection of the INTELSAT system in accordance with Article 9A of the ITU Radio Regulations provide for the Director General to prepare the necessary information for compliance with the relevant provisions of the ITU Radio Regulations regarding the existing and planned INTELSAT space segment. Upon the Director General's request, the Board of Governors is to authorize him to arrange for submission of the necessary information through the Notifying Administration to the IFRB and to the Administrations concerned in the name and on behalf of INTELSAT Administrations. These procedures define an Administration as defined in the ITU Convention, *i.e.*, any governmental department or services responsible for discharging the obligations undertaken in the ITU Convention and the Regulations. An INTELSAT Administration is defined as the Administrations under the conditions adopted by INTELSAT. The Notifying Administration is to act only in the name and on behalf of those Administrations which have agreed that it should do so, in accordance with INTELSAT procedures. The Notifying Administration may decide not to include itself among the INTELSAT Administrations in whose name and on whose behalf it is acting.

1977

<sup>&</sup>lt;sup>61</sup>INTELSAT Assembly of Parties, Summary Record of the Second Meeting, AP-2-3, para. 20, at 13 (September 1976). The Assembly of Parties was initially apprised of this potential problem at its First Meeting in February 1974, by the Board of Governors. At that time the Assembly decided to note that the application of Article XIV (e) relates to satellites falling within the definition in Article I (1), "specialized telecommunications services," so postulating that such satellites shall be intended to provide services of a telecommunications nature.

encountered by INTELSAT in its dealings with various Administrations which might be affected by the location of INTELSAT satellites or the use of the radio frequency spectrum. INTELSAT also prepares comments and/or submits information with respect to existing and planned satellites which are not part of the INTELSAT system.<sup>64</sup> Secondly, INTELSAT members are obliged to coordinate both within INTELSAT and pursuant to ITU procedures with respect to their own planned systems apart from the INTELSAT system. To the extent that INTELSAT and ITU procedures overlap there are no problems; when the procedures differ or prove inadequate for one purpose or the other, then certain problems may arise of a type which are discussed further below.

ITU procedures have facilitated coordination between INTELSAT and non-INTELSAT members with respect to their communications satellite systems. One such example of this involves the STATSIONAR satellite system network of the U.S.S.R. This system engages the use of orbital arc positions in the Indian Ocean Region in proximity to the INTELSAT Indian Ocean satellites. In January 1976, in order to resolve potential problems, representatives of the U.S.S.R. and INTELSAT met to discuss comments made by INTELSAT in accordance with the Radio Regulations concerning the potential for interference between the STATSIONAR and INTELSAT networks. Comments have been submitted subsequent to the advanced publication of information regarding these networks as contained in IFRB circulars, and coordination is continuing in order to resolve any remaining concerns of either parties. A similar situation exists between satellites of the two systems located over the Atlantic Region. At a meeting held in November 1976, representatives of the U.S.S.R. and INTELSAT were able to reach agreement on the elimination of mutual interference between two specific closelyspaced satellites (one of each system), while agreeing to further studies aimed at establishing a basis for similar agreements relative to the remaining satellite in the U.S.S.R. system.65

As discussed elsewhere in this article,<sup>66</sup> no problems of an insuperable nature have developed as a consequence of this coordination. To the extent difficulties have emerged involving coordination, they have done so in connection with the implementation of Article XIV (c), coordination of separate satellite systems for domestic public telecommunications services.

Coordination of the Indonesian domestic satellite system, PALAPA, and the proposed Brazilian domestic system has proven to be somewhat complicated and has raised interesting issues. The questions which arose as a consequence of coordination of

<sup>&</sup>lt;sup>64</sup>In the case of non-INTELSAT satellite systems, the Director General is to prepare the necessary comments and/or information for transmission by the Notifying Administrations, as defined *supra* note 63, to the Administration (s) concerned and to the IFRB where appropriate. Such actions are undertaken pursuant to the conditions established by INTELSAT for obtaining the consent of INTELSAT Administrations.

<sup>&</sup>lt;sup>63</sup>INTELSAT Board of Governors, Status Report on Intersystem Coordination, BG-22-60, at 2 (July 1976); *id.* Status Report on Intersystem Coordination, BG-25-27, at 4-7 (December 1976).

<sup>66</sup>See text accompanying notes 20 through 25 supra.

these systems have caused INTELSAT to continue to keep its coordination procedures under review and to act to develop more precise guidelines and criteria appropriate to INTELSAT's needs. The technical/operational aspects of the Indonesian coordination have underscored the necessity to provide appropriate responses to technical and operational questions. The Brazilian coordination posed some interesting and complex questions concerning the relationship between INTELSAT and ITU coordination procedures and the obligation of INTELSAT Parties and Signatories to comply with two separate coordination processes.

Set forth below are three case studies of intersystem coordination which illustrate certain of the issues and questions which have emerged over the past few years.

# A. United States Marisat System

The United States through its Signatory apprised INTELSAT of its intention to establish a satellite system separate from the INTELSAT system for the purpose of providing certain maritime services, *i.e.*, various public voice and record services between points on land and stations on ships at sea. The United States Signatory provided information to the Board of Governors in accordance with Article XIV (d) of the Agreement for its review and tendering of advice to the Assembly of Parties. Upon review, and with the assistance of technical and financial experts, the Board of Governors tendered the following advice to the Assembly of Parties at its First Meeting in February 1974:

- 1. No unacceptable interference will occur between the proposed U.S. Marisat satellite system and the INTELSAT system.
- 2. While the economic impact on INTELSAT of a proposed U.S. maritime system as described to INTELSAT could not be assessed with any precision absent any firm plans as to how, when and at what charge INTELSAT might itself provide maritime satellite services, no significant harm to the INTELSAT system need be expected.
- Provision and utilization of such facilities will not prejudice the establishment of direct telecommunications links through the INTELSAT space segment among all participants.
- 4. The above advice is based upon the assumption that any significant extension of the system beyond 1979, or widening of its scope, would be the subject of a new submission and coordination under Article XIV (d).

The INTELSAT Assembly of Parties issued a finding consistent with this advice and requested the Board to make a further report on this matter to it at its Second Meeting. This additional report was requested because the economic impact could not be precisely assessed without having further information as to whether INTELSAT would or would not be providing such maritime satellite services in the same time frame. The Board of Governors implemented this request and advised the Assembly of Parties at its Second Meeting, in Nairobi, Kenya, in 1976, that the updated information on the originally approved Atlantic and Pacific Ocean Region portions of the system showed that the system remained technically and economically compatible with the INTELSAT system through 1981. The Board also advised the Assembly that any material extension of these portions of the system beyond 1981, or widening of its scope, would require reconsideration. The Assembly issued a finding consistent with this advice.<sup>67</sup>

The United States Signatory also apprised the Board prior to the Second Meeting of the Assembly, and the Board in turn advised the Assembly, that a third Marisat satellite was planned for deployment over the Indian Ocean Region in the near future for commercial maritime communication satellite services. The United States Signatory supplied the necessary technical and economic information, which was reviewed by the Board of Governors. The Board tendered advice to the Assembly of Parties similar to that provided with respect to the Atlantic and Pacific Ocean Region portions of the network, namely that there was no unacceptable technical interference into the INTELSAT system, that, based upon present INTELSAT plans, there would not be any significant economic harm to INTELSAT through 1981, and that the same findings made previously with respect to the Atlantic and Pacific Oceans Regions should apply to the Indian Ocean situation.

In coordinating the United States Marisat system the problems encountered were minimal. This was perhaps due in large measure to the fact that INTELSAT had no definite plans to provide maritime services in any of its satellites during the same time period in which the Marisat system is to be operative. This situation became clearer during the interval between the First Meeting of the Assembly of Parties in 1974 and the Second Meeting in 1976 since during this time decisions were taken by the Board of Governors on the next generation of satellites to provide service through the early 1980's. Accordingly, it was not necessary for INTELSAT to address several other rather complex questions such as, for example, whether or not traffic which has never been cartried on the INTELSAT system is a factor to be considered in determining whether significant economic harm occurs (should INTELSAT be interested in or capable of carrying such traffic at some time in the future), or whether only traffic which is subsequently removed from the INTELSAT system and placed on another separate system is to be taken into account in determining the degree of economic harm.

# B. The Indonesian Domestic Satellite System - PALAPA

Indonesia undertook coordination of its planned domestic satellite system under both ITU and INTELSAT procedures. Based upon the information thereby available to INTELSAT and application of its coordination procedures, it appeared that the

<sup>&</sup>lt;sup>67</sup>INTELSAT Assembly of Parties, Report of the Board of Governors to the Assembly of Parties Pursuant to Article XIV (d) on a United States Maritime Satellite System, AP-1-5, at 1-2 (December 1973); *id.* Record of Decisions of the First Meeting, AP-1-3, para. 19, at 14-16 (Februarv 1974); *id.* Report of the Board of Governors to the Second Assembly of Parties on the United States Maritime Satellite System, AP-2-11, at 2-3 (July 1976); *id.* Record of Decisions of the Second Meeting, AP-2-3, paras. 17-18, at 10-11 (September 1976).

PALAPA system might subject INTELSAT satellites to an unacceptable level of interference. As discussed elsewhere,<sup>68</sup> these procedures allow the international ITU procedures for international coordination (particularly Appendix 29 to the Radio Regulations) to be applied. The INTELSAT evaluation, as undertaken by the Director General (then Secretary General) and the management services contractor, revealed that the equivalent noise temperature at earth stations in the Indian Ocean INTELSAT network were increased by more than 2% due to emissions from the Indonesian satellite network and that accordingly more detailed coordination was required. Additional information was sought and provided by the Indonesian Signatory indicating that remedial action was required. One possible course of action was to impose constraints in the operation of both the INTELSAT and the Indonesian system to minimize the potential adverse effect; another possible course of action was to consider relocation of the Indonesian satellite.

In respect to INTELSAT's concerns, Indonesia informed the Board that its initial studies had indicated that there would be minimal interference pursuant to ITU procedures, but that more recent studies, undertaken in conjunction with INTELSAT and attuned to the more detailed characteristics of INTELSAT operation in the Indian Ocean Region, had shown greater potential for interference than had been ascertained previously. Consequently, Indonesia indicated its willingness to work with INTELSAT to achieve a mutually satisfactory conclusion. Indonesia noted, however, that it would be most reluctant to consider relocation of its satellite since this would impose severe constraints on its plans: a relocation would entail delay in the commencement of service, additional costs, and less efficient use of the geosynchronous arc.

For its part the Board was responsive to the Indonesian situation and determined that a relocation of the Indonesian satellite would not be necessary. The Board decided instead that the proposed location for the Indonesian satellite would be acceptable to INTELSAT subject to certain conditions, agreed to between INTELSAT and the Indonesian Signatory and set forth in a Memorandum of Understanding. This Memorandum of Understanding would then serve as a basis for notification to the IFRB that coordination had been effected.

As a result of this experience the Board deemed it appropriate to develop suitable INTELSAT separation criteria, consistent with international recommendations, to maximize efficient spectrum and orbit utilization and to assure adequate protection against harmful interference to the INTELSAT system. This was clearly prompted in part, as well, by problems expected to arise in coordination between INTELSAT and other satellites and by the view (held by some members of the Board) that the ITU procedures might not be adequate to meet all of INTELSAT's requirements. In addition, the Board deemed it necessary and desirable to undertake a general review of INTELSAT's coordination procedures and guidelines. This review is still in progress.

<sup>68</sup>See text accompanying notes 20 through 25 supra.

Subsequent to the above considerations, the Board approved a Memorandum of Understanding between INTELSAT and Indonesia and expressed, in the form of a recommendation pursuant to Article XIV (c) of the Agreement, its finding that on the basis of adherence to the conditions set forth in the Memorandum of Understanding, no harmful interference into the INTELSAT system was to be expected from the Indonesian domestic system.<sup>69</sup>

## C. The Brazilian Domestic Satellite System

In January 1976, Brazil formally commenced coordination of its proposed domestic public telecommunications satellite network with INTELSAT and submitted the technical information provided in the advance notification to the IFRB as well as additional technical information requested by INTELSAT. Based on this information and discussions between representatives of the Brazilian Signatory and INTELSAT, INTELSAT concluded that there was the potential for harmful interference into the INTELSAT system from the proposed Brazilian system. Brazil was of the view that no unacceptable interference would be caused and was reluctant to consider interference criteria which would be different from those which had been applied to coordination with Indonesia, given the characteristics of the Indonesian and the INTELSAT systems in the Indian Ocean Region. Discussions between INTELSAT and the Brazilian Signatory were continued and resulted in a proposal by INTELSAT that a Memorandum of Understanding be concluded between INTELSAT and Brazil which would endeavor to protect INTELSAT from unacceptable interference due to emissions from the Brazilian satellite system by setting forth specific operational constraints. The Brazilian Signatory, while not accepting the concept of a Memorandum of Understanding, agreed to all of the conditions, with one exception, which it suggested be modified. The provision to which Brazil objected was one requiring Brazil to undertake another coordination with INTELSAT pursuant to Article XIV (c) if it desired to change the location of any of its satellites, change the technical or operational characteristics of any such satellites or change any elements of the Memorandum of Understanding.

The Board did not sustain the Brazilian objection and instead decided to express in the form of a recommendation its finding that on the basis of adherence to the conditions set forth in the proposed Memorandum of Understanding, no unacceptable interference into the INTELSAT system would be expected from the Brazilian domestic satellite system. The Brazilian Signatory took note of the Board's decision without concurring. This nonconcurrence was the result of Brazil's reservations with respect to the appropriateness of some of the technical criteria utilized in evaluating the compatibility of the systems, the appropriateness of requesting more information than that required by ITU coordination procedures and the appropriateness of Brazil being required to inform and consult with INTELSAT on changes in the technical or operational characteristics of its system while INTELSAT did not have a reciprocal

<sup>&</sup>lt;sup>69</sup>INTELSAT Board of Governors, Summary Record of the Sixteenth Meeting, BG-16-3, paras. 171-173, at 145-147 (July 1975).

obligation.<sup>70</sup> Clearly, this latter point involved a question of interpretation of the INTELSAT Agreement since Brazil was in effect stating that INTELSAT should not have more rights or be in a position superior to that held by any one of its members.

Brazil considered certain of the questions which arose during its coordination process to be of sufficient importance to be addressed by INTELSAT's Assembly of Parties. Consequently, it informed the Assembly of Parties, at its Second Meeting, of its concerns. One point which Brazil thought should be addressed by the Assembly was the various interpretations of the application and implementation of Article XIV (c). Another point was the compatibility of the INTELSAT coordination process with the ITU process in order to avoid the existence of possibly conflicting processes. In this regard, it was noted that there are two different trends in the development and refinement of interference criteria: the Study Group of the CCIR of the ITU tended to relax the interference levels while INTELSAT tended to strengthen these figures. The consequence of these differences was the difficulty some members of both organizations had in reconciling two different positions.

In addition, the question was raised as to whether a Memorandum of Understanding was the appropriate method to register the acceptance of mutually agreed technical and nontechnical constraints pursuant to Article XIV (c). It was appropriate for the Assembly of Parties to consider this matter, in Brazil's view, because of the Assembly's function pursuant to Article VII (c) (ii) of the Agreement to "determine that measures should be taken to prevent the activities of INTELSAT from conflicting with any general multilateral convention which is consistent with this Agreement and which is adhered to by at least two thirds of the Parties."

After having considered the concerns of Brazil, the Assembly of Parties decided to note that the Board of Governors has applied a consultation process in the discharge of its responsibilities under Article XIV (c) and that the result of this consultation process, in the case of agreement, could very well facilitate the ITU process of coordination. The Assembly addressed directly the question of the method of recording coordination agreements and requested the Board of Governors to review the method by which it records a coordination agreement, keeping in mind the principles and procedures of the ITU Radio Regulations.<sup>71</sup> This matter is now under consideration by the INTELSAT Board of Governors.

<sup>&</sup>lt;sup>70</sup>INTELSAT Assembly of Parties, Considerations Concerning the Application by the Board of Governors of Article XIV (c) of the INTELSAT Agreement, AP-2-30 (September 1976).

<sup>&</sup>lt;sup>71</sup>INTELSAT Assembly of Parties, Record of Decisons of the Second Meeting, AP-2-3, paras. 31-32, at 22 (September 1976).

### JOURNAL OF SPACE LAW

# V. IMPLICATIONS FOR THE FUTURE AND CONCLUSIONS TO BE DRAWN FROM THIS REVIEW OF INTERSYSTEM COORDINATION

### A. Technical Considerations

As more satellite systems are established, the intersystem coordination process becomes more complex and the need to clarify and refine guidelines, procedures and criteria of such coordination becomes more apparent. It is quite clear that coordination may be more difficult in certain geographic areas than in others. For example, there are a greater number of INTELSAT satellites in the Atlantic Ocean Region than is the case in the other ocean regions. However, the other ocean regions are becoming more crowded not only as a consequence of INTELSAT operations, but also as a consequence of the introduction of other satellite systems as, for example, the U.S.S.R. STATSIONAR system. This increasingly complex situation calls for greater flexibility and understanding on the part of all parties concerned. In this connection, it is interesting to note that the Board of Governors in adopting the Memorandum of Understanding with Brazil had the following provision included:

In the event that a satellite or satellites of a system other than that of INTELSAT or Brazil might cause significant interference to satellites in either the INTELSAT or Brazilian systems, Brazil and INTELSAT shall consult to determine in what respects, if any this Memorandum of Understanding should be amended.<sup>72</sup>

Effective coordination is dependent upon a number of factors, including the nature of the satellite system. Clearly, a system using small antennae with greater diffusion of radio signals in outer space requires larger spacing between the satellites of that system and other systems in order to achieve the desired protection ratios. The INTELSAT system utilizes very large antennae, and its satellites can be located much closer to one another than would be the case in another type of system. Effective coordination is also dependent upon the type of transmission techniques employed in the satellites. The Indonesian coordination process made it clear that it is necessary to establish criteria to protect certain types of transmissions utilized in the INTELSAT system. At present, there are no CCIR recommendations providing interference criteria for the protection of other than FDM/FM transmission modes.<sup>73</sup>

Finally, it is obvious that neither ITU nor existing INTELSAT procedures will be totally adequate for coordination in all instances. The ITU Radio Regulations do not specify substantive criteria to be employed in resolving problems and in achieving accommodations. Thus, it is necessary to develop such criteria in a dynamic environment

<sup>&</sup>lt;sup>72</sup>INTELSAT Board of Governors, Coordination with the Brazilian Lomestic Satellite System Putsuant to Article XIV (c) of the INTELSAT Agreement, BG-22-30, at 11 (June 1976).

<sup>&</sup>lt;sup>73</sup>Frequency Division Multiplex/Frequency Modulation. For a summary discussion of technical factors affecting coordination, see Jansky, Factors Affecting Orbit Utilization in Communication Satellite Systems: An Overview of the Technology, *supra* note 6 at 103-07.

# B. Specific Legal Considerations

# 1.INTELSAT

Clarifying provisions of the INTELSAT Agreement has proved not to be without difficulty and it is unlikely that a single interpretation will be agreed to by all members of INTELSAT. In light of the Brazilian experience, there are obviously different interpretations held with respect to Article XIV. The reciprocity issue is one outgrowth of such differing interpretations. A review of the history of the INTELSAT Agreements reveals that a provision requiring such reciprocity was considered but rejected prior to adoption of the text found in Article XIV.<sup>74</sup> Questions are also raised regarding the legal implications of INTELSAT's utilization of ITU procedures *in lieu* of its own. The situations for which the two processes have been developed are quite different, of course, since in INTELSAT's case the procedures have the objective of harmonizing the actions of the organization to the common benefit of all its members. Viewed from this perspective, the obligations of INTELSAT members are seen to be greater to the organizations which they have founded and in which they participate so extensively, rather than to themselves as individual sovereign states.

## 2. ITU

The ITU process proceeds in several stages, depending on whether or not coordination is necessary to avoid harmful interference. No formal rights of protection are conferred at the first stage. However, this is not intended to imply that the status of satellite networks under the Radio Regulations depends entirely on the process and results of mutual consultation. Satellite networks which are registered in the Master Register have certain rights to protection from harmful interference against networks which are not so registered. Nevertheless, since the adoption of the Radio Regulations at the 1971 Conference, there has been a great increase in the number of satellite systems being established or planned. This has complicated the coordination process in that at various times several satellite systems may be at different stages of coordination. Thus, the precise legal status of the registered satellite network cannot be finalized. It will depend in many instances on the actions taken (or not taken) during the preceding two steps, the existence and status of other particular satellite networks, the effects on other frequency assignments, and on the findings of the IFRB concerning the networks' compliance with various provisions of the Radio Regulations.<sup>75</sup> In any event, the ITU has

<sup>&</sup>lt;sup>74</sup>Resumed Plenipotentiary Conference on Definitive Arrangements for the International Telecommunications Satellite Consortium (April-May 1971), Amendment to Article XIV submitted by the Delegation of France, Doc. 200, para. 2, at 1, Summary Record, SR/50 (Final), at 8-9 (May 18, 1971).

<sup>&</sup>lt;sup>75</sup>For a more detailed discussion of the legal ramification of ITU activities, see, e.g., Jacobson, International Institutions for Telecommunications: The ITU's Role in The International Law of

no power to impose sanctions; it is the responsibility of the parties concerned, acting in good faith to cooperate. There are still, therefore, legal difficulties to be resolved in the future.

# C. Potential Areas of Concern

Given INTELSAT's objective of a global system to serve all of its members, a potential area of concern to the organization, and hence, a stimulus to action, had to be to ensure the economic and technical viability of the INTELSAT system. This is a very real concern because of the emerging and growing demand for domestic telecommunications services by the most cost effective means. Satellites have been found by many countries to be the most desirable means to satisfy this demand. In addition, national and industrial development, technical development, and prestige contribute to a nations's desire to have a separate satellite system. Fortunately, INTELSAT has been sufficiently responsive to the needs of countries by offering many such services on the INTELSAT space segment and thereby offsetting some of the less tangible needs for separate domestic systems.

It is difficult, despite the remarkable progress which has been made by both INTELSAT and the ITU, to predict that adherence to cooperative forms of agreement will continue in the future. For countries to be expected to relinquish their rights to take unilateral action in order to cooperate to protect international endeavors is an anticipation which may not be justified. This is particularly the case since not every member of the ITU is a member of INTELSAT and since there are undoubtedly political considerations associated with certain countries' programs.

There are, of course, as indicated earlier,<sup>76</sup> very legitimate differences with respect to what is an appropriate level of coordination and what type of criteria are best employed to determine possible interference from one system into another. For one international organization to be limited by constraints which another organization deems to be appropriate, particularly when the purposes of the two organizations differ, is a concern which will not be readily resolved. Questions may also arise in those cases where the procedures of two organizations do not coincide but their membership does, as well as in those cases when there are differences between the two international organizations on what specific procedures are necessary and on what actions are therefore required of members of both organizations. Related questions are: what steps can an international organization take to achieve the objectives agreed to by its membership and how and when can one nation's goals and objectives be considered secondary to the benefit of the collective group of nations? Moreover, the situation may be further complicated by a country which is a member of both organizations, but for the achievement of its own objectives, political or otherwise, may prefer the procedures of

<sup>76</sup>See text accompanying notes 20 through 25 supra.

Communications 51-68 (McWhinney ed. 1971); Leive, International Telecommunications and International Law: The Regulation of the Radio Spectrum 144-207 (1970).

one organization to another and may maintain, therefore, that the procedures of only one of the organizations legitimately be followed. With the expected creation of the organization known as INMARSAT (International Maritime Satellite Organization) the international organization jurisdictional question may become even more complicated and the rule making for intersystem coordination even more profuse. INMARSAT is expected to establish an international maritime satellite communication system and thus, will make use of some of the same international resources as described elsewhere in this article.<sup>77</sup> Even though each of the international organizations active in the use of satellites has described its own purpose and interests and has defined its own terms and processes, it is not always a model of consistency.

It would be inaccurate to conclude because of the increasing intricacies of intersystem coordination and the ever growing importance of achieving a more satisfactory way to effect such coordination that progress has not been achieved. Quite to the contrary, a great deal has been accomplished since 1957 to develop both more formalized frameworks for international cooperation and practical methods for achieving this cooperation. Both ITU and INTELSAT procedures for intersystem coordination are sure to be modified as conditions warrant. To the extent experience has demonstrated to INTELSAT that the existing procedures of INTELSAT and perhaps the ITU are not adequate for ascertaining the degree of harmful interference to be expected from planned satellite systems, it is quite likely that a review process will result in the formulation of new processes, guidelines and criteria which will be both technically adequate and generally acceptable. Undoubtedly, a great deal of flexibility and dynamism will be required in developing such processes, guidelines and criteria. The ITU initiated work in this area and has demonstrated such flexibility through its periodic revisions to procedures. In the years that lie immediately ahead the ITU is expected to take another look at its procedures and their impact on the coordination process. While there are no direct formal relationships at this time between INTELSAT and the ITU, INTELSAT certainly is cognizant of a great deal of work done under the aegis of the ITU. The views of INTELSAT member countries are made known in ITU fora and are surely taken into account; just as the results of ITU considerations are taken into account and followed as applicable in INTELSAT fora. INTELSAT, for example, has under active review a number of proposals for modifications to the ITU coordination process, which, if adopted by INTELSAT, will be forwarded by its Director General to ITU Administrations for their consideration in preparing their positions for the 1979 World Administrative Radio Conference. These proposals are essentially the principles upon which the coordination guidelines and separation criteria of INTELSAT are based. If

<sup>&</sup>lt;sup>77</sup>Instruments for the establishment of the International Maritime Satellite Organization (INMARSAT) were adopted and opened for signature in September 1976. They consist of a Convention with an Annex entitled Procedures for the Settlement of Disputes and an Operating Agreement with an Annex entitled Investment Shares Prior to the First Determination on the Basis of Utilization. For background information on an international maritime system, see Maritime Satellites, Flight International 970-76 (April 10, 1976); Toward Realization of International Maritime Satellite Systems, ITU Teleclippings 1-3 (September 15, 1975); Maritime Satellite Conference Decisions, Flight International 890 (May 29, 1975); Commercial Applications Satellites, Flight International 889 (December 9, 1974).

eventually adopted by both INTELSAT and the ITU, another major step forward will have been taken in resolving a number of the difficulties which have arisen in the past in coordinating separate systems.<sup>78</sup>

This brief review of activities in the area of international coordination of communications satellite systems demonstrates that there is a responsiveness to the changing technical and operational challenges posed by the remarkable and rapid development of satellite communications. If the attitude underlying such responsiveness is continued, then surely the challenges posed to the limited frequency spectrum and orbital space will be met in the same cooperative manner, and in various stages of plannings, to avoid potential difficulties and, indeed, disasters. If this approach is successfully followed, then it may be expected that the close cooperation which has been evidenced in the past will be perpetuated in the future in the implementation of new coordination processes.

<sup>&</sup>lt;sup>78</sup>The INTELSAT Board of Governors' Advisory Committee on Technical Matters report on this subject, in January 1977, described principles related to various aspects of the intersystem coordination process and criteria, for consideration in relation to CCIR preparatory activities, and eventually for consideration at the 1979 WARC. Of particular interest are two recommendations. The first concerns the adoption of single entry interference criteria which are scaled as a function of the orbital separation between the interfering networks. The second involved a recognition of the need to expand the investigation which is undertaken to determine the need for coordination, to include an evaluation of the interference of slow-swept carriers (Frequency Modulation/Television, FM/TV) into narrowband carrier sizes (e.g., Single Channel Per Carrier, SCPC, and Single Channel Per Carrier Plus Code Modulation Multiplex Access Demand Assigned Equipment, SPADE).

# WORLD ADMINISTRATIVE RADIO CONFERENCE FOR PLANNING BROADCASTING SATELLITE SERVICE\*

# Richard E. Butler\*\*

The International Telecommunication Union (ITU) has worked closely with the Legal Sub-Committee of the United Nations Committee on the Peaceful Uses of Outer Space during consideration of contributions to policy formulations and regulations as well as related treaty provisions which bind the 152 member governments in the ITU on space applications, including direct satellite broadcasting.

Although the ITU obligatory texts do not regulate direct broadcasting (television) content, the policy legislation and associated decisions determine the extent to which the transmission and reception of programs can, in fact, take place. These telecommunications elements of transmission, reception and the related conditions for sharing the radio frequency spectrum, and the interrelated planning and use of satellite orbits, are fundamental considerations in the intergovernmental decision-making role of the Union. They ensure orderly operation of all the telecommunication systems.

The regulatory policy conditions to be applied by governments and their authorities are elaborated and agreed in the Plenipotentiary and Administrative Conferences. The latter determine in detail the obligatory responsibilities and requirements to permit interference-free communications and optimal utilization of the spectrum/orbits.

With regard to radiocommunications, upon which all space applications depend, these conferences determine the obligations of all members with regard to the manner in which the radio spectrum and orbits (or, as now designated, the nominal orbit/spectrum because it is impossible to consider separately these two concepts) shall be planned, used and shared by the various services and the coordination procedures to be observed in order to avoid mutual interference.

The international decisions necessitate national (governmental) responsibilities and coordination and exchange of planning data sometimes directly on a bilateral basis, and/or alternatively through the headquarters of the Union—in this case principally the International Frequency Registration Board (IFRB). In any event, obligations to reach

\*This article is based on a statement made at the 16th session of the Legal Sub-Committee of the United Nations Committee on the Peaceful Uses of Outer Space. United Nations, New York, March 14-April 8, 1977.

93

<sup>\*\*</sup>Deputy Secretary General, International Telecommunication Union, Geneva, Switzerland. The views expressed in this paper are those of the author and are not necessarily connected with any organization of which he is a member.

agreement in very detailed planning and operations are prescribed in the statutory legislative provisions.

Although the ITU has an interest in the technical, legal and operational aspects of all items on the agenda of the Legal Sub-Committee, some specific comments should be made concerning direct satellite broadcasting, especially activity since the June 1976 Sub-Committee session. The major event in this context was the holding of the World Administrative Radio Conference for the Planning of the Broadcasting Satellite Service in the 12 GHz Band. This WARC Conference took place in Geneva from January 10 to February 13, 1977. The Final Acts were signed by the accredited representatives of 106 countries.<sup>1</sup>

The Final Acts are destined to be incorporated as an integral part of the Radio Regulations by the general World Administrative Radio Conference in 1979; thus, it can be said that the outcome of the conference is binding on all members.

In 1971, the World Administrative Radio Conference established the definition of the broadcasting satellite service and allocated suitable frequency bands. It laid down the principle of equal rights in the frequency bands for space radio communication services and stated that the international registration of frequency assignments did not provide permanent priority for any individual country or groups of countries. It also determined that stations in the broadcasting satellite service should be established and operated in accordance with agreements and associated plans adopted by competent world or regional conferences of the Union.

Subsequently, after consideration in the Plenipotentiary Conference (the supreme organ of the Union) it was decided that there should be a World Administrative Radio Conference for the planning of the Broadcasting-Satellite Service in frequency bands 11.7 - 12.2 GHz (in Regions 2 and 3) and 11.7 - 12.5 GHz (in Region 1); Regions 2 and 3 being the Americas and Asia, and Region 1 being Europe - East and West - and Africa. The agenda of the conference, determined by the Administrative Council in agreement with the members of the Union, is incorporated in the Final Acts.

The great complexity of the work which was before this conference should be noted. This was due to such factors as the need for the broadcasting-satellite service to share the bands with other radiocommunication services in order to economize the frequency spectrum and also to recognize that all countries may not wish to use the channels for direct satellite broadcasting (certainly not in the near future), but would wish to have their terrestrial services protected. It has been emphasized that the ITU was making a Plan for a service which was not yet in practical operation in these bands.

<sup>&</sup>lt;sup>1</sup>Final Acts of the World Administrative Radio Conference for the planning of the Broadcasting Satellite Service in Frequency Bands 11.7 - 12.2 GHz in Regions 2 & 3 and 11.7 - 12.5 GHz in Region 1 (Signed Geneva, Switzerland; February 13, 1977).

#### 1977

The Final Acts of the Broadcasting Satellite Conference have been designated as the World Agreement envisaged at the 1971 Conference. The resulting provisions cover both general and specific world-wide obligations, as well as detailed assignments which can only be used by the countries in accordance with the Plan to assure the desired quality of service to the service areas concerned. The complexity of the technical problems involved, which is evident from the agenda, explains why the planning of frequency assignments for the broadcasting-satellite service was made for these Regions 1 and 3; that is for the whole world with the exception of the Americas. The sharing criteria were established on very strict technical bases.

In the ITU Region 2 (Americas), the sharing conditions between the broadcastingsatellite service and fixed-satellite service (in other terms telecommunication satellites) are more complex. The Conference decided that the broadcasting-satellite assignment planning, as well as the necessary planning for the fixed-satellite service in Region 2, would be undertaken by a Regional Conference (convened in accordance with the provisions of the International Telecommunication Convention) no later than 1982. The results of that proposed Regional Conference will necessarily conform to the principles of the 1977 Conference and the Radio Regulations.

The planning itself, *i.e.*, the preparation of a table containing the parameters involved (frequency, nominal orbital positions, etc.) was only possible through the use of computers, which, since 1961, have become a common-place technique in the ITU in connection with planning conferences. Several computer runs for various purposes, including those used by individual delegations to assist their own internal decisions, were made.

The application of computers has made it possible to obtain optimum use of the geostationary orbit and of the frequency spectrum, in accordance with the provisions of Article 33 of the ITU Convention:<sup>2</sup>

In using frequency bands for space radio services Members shall bear in mind that radio frequencies and the geostationary satellite orbit are limited natural resources, that they must be used efficiently and economically so that countries or groups of countries may have equitable access to both in conformity with the provisions of the Radio Regulations according to their needs and the technical facilities at their disposal.

The relevant provisions of the Radio Regulations<sup>3</sup> have also been taken into account, in particular the well-known No. 428A which states:

In devising the characteristics of a space station in the broadcasting-satellite service, all technical means available shall be used to reduce, to the maximum extent

<sup>3</sup>Administrative Regulations (Radio Regulations), annexed to International Telecommunication Convention (1973), 23 U.S.T. 1527, T.I.A.S. No. 7935).

<sup>&</sup>lt;sup>2</sup>International Telecommunications Convention (Signed Malaga-Torremolinos, 1973), 23 U.S.T. 1527, T.I.A.S. No. 7935.

practicable, the radiation over the territory of other countries unless an agreement has been previously reached with such countries.

Among all the provisions of the Radio Regulations, which of course apply to the stations foreseen in the Plan, mention should be made of provision No. 47OV, which is less well known than the previous one, but may have some bearing on the work of the Legal Sub-Committee. This provision concerns the cessation of emissions and states that:

Space stations shall be fitted with devices to ensure immediate cessation of their radio emissions by telecommand, whenever such cessation is required under the provisions of these Regulations.

The planning assignments were made in accordance with the principle inherent in No. 428A. Spillover has been minimized by taking, as the reception spot(area) from each satellite antenna beam, an ellipse of the minimum size compatible with an acceptable service in the countries (or parts of countries in the case of large countries) concerned. In the majority of cases beams are intended for national or internal domestic zones of service. In a few cases beams provided for in the Plan are intended to cover nearby countries or parts of neighboring countries. Such assignments with their extraterritorial transmission coverage provided for in the Plan were inserted only when the countries concerned gave their consent.

As far as the ellipse intended for a certain country, or part of it, covers some regions of neighboring countries, it may be admitted that in these regions it could be possible, from the point of view of the available power flux-density, to receive the signals from the first country. In the first place, however, the television set used after the converter can only reproduce the program in this case, as in the case of terrestrial broadcasting, if the television standards are the same in both countries. Moreover, some significant additional elements contribute to limit the reception of the program concerned.

The use of different orbital positions would necessitate either the use of two different antennae or a resetting of the antenna which is unlikely in the case of the average user. It should be borne in mind that antennae would have to be fixed on external structures for each reception center and placed in line-of-sight of the nominal orbit position(s) of the satellites concerned. In the present state of the art, the antenna itself is a parabolic dish of some 80 cm in diameter. Thus (and particularly in the case of those countries which have agreed to different nominal orbital positions) actual reception would be extremely difficult. These are only some of the factors to be overcome to receive transmissions (i.e., programs) from other countries. To conclude this point, it may be said that, unless special provisions have been taken and agreed in the planning process, the reception of programs from neighboring countries in the present state of the art is far less easy in the case of the broadcasting-satellite service than in the case of terrestrial broadcasting. In the Preamble of the Final Acts, the principle of equal rights of all countries, large and small, and even those countries which were not represented at the Conference, is specified. In fact, it was deemed essential at the very beginning of the Conference to take into account the potential needs of the countries not represented, taking as a basis needs similar to the average of the other countries.

The Final Acts were signed on February 13, 1977, and will enter into force on January 1, 1979. The provisions and associated Plan have been prepared to meet the present estimated needs of the broadcasting-satellite service in the bands concerned for a period of at least fifteen years from this date. They will continue in force until revised by a competent conference of the ITU.

The full text of the Final Acts reveals the depth of the detailed planning procedures and agreements reached in the Conference to achieve the objectives, including the statutory provisions already cited. The objectives, with their related inter-governmental agreement, were undoubtedly aided not merely by following the application of principles decided in the 1971 ITU Space Conference, to which there have been detailed references from time to time in the Legal Sub-Committee, but also by its work over the past years.

A broad aspect of the deliberations of the Conference was, to a certain extent, also related to the last point on the agenda of the Legal Sub-Committee, the definition of outer space. During the WARC debates some equatorial countries sought to establish recognition of national sovereignty over segments of the geostationary orbit, *i.e.*, those above internationally recognized territories. This view was not accepted by many other countries. In any event, it did not stop the Conference from establishing the necessary plans and associated obligatory principles and procedures for the planning and operation of services.

The equatorial countries concerned provided a statement in the Final Protocol indicating that they were not bound by the decisions of the Conference regarding the location of geostationary satellites on the segments of the orbit over which these States exercise sovereign rights, nor the positioning of such satellites requiring the prior authorization of the equatorial countries concerned. They would also reserve the right to take whatever steps they may deem fit to preserve and secure the observance of their rights. No claims were made on either side of the geostationary orbit or for other orbits.

Many other countries declared that the ITU Convention enabled the establishment of a Plan for the use of space, that there were no limitations in planning, and that there could be no question of sovereignty in space having regard to the Outer Space Treaty.<sup>4</sup> If the matter was to be considered further, it was one for consideration by the Legal Sub-

<sup>&</sup>lt;sup>4</sup>Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and other Celestial Bodies, January 27, 1967, [1967] 18 U.S.T. 2410, T.I.A.S. 6347, 610 U.N.T.S. 205 (effective October 10, 1967).

Committee. Thus these countries rejected any concepts of sovereignty. Some of these provided various counter-declarations in the Final Protocol associated with the Final Acts.

In establishing a Plan, ITU membership always takes into account the relevant basic provisions of the Convention and associated regulations. Furthermore, when necessary, it also takes United Nations Resolutions into account.

A Plan<sup>5</sup> is to be considered as containing a collection of all the technical parameters necessary for the purpose of ensuring the optimum use of available resources. Among these parameters we can quote the frequency, the position, the power, the direction of the antenna beam and the beam width, etc. The position is always indicated in the Plan, whether it is on the earth or orbital. In the case of the geostationary orbit the term "nominal orbital position" is used. The indication of this nominal position means that the use of this part of an orbit for a transmitter is compatible with an operation of the system free of interference to or from other users. The mention of this position does not, from the ITU point of view, constitute an appropriation. This matter has been brought to the notice of the Legal Sub-Committee, in reporting the outcome of the work of the Conference, and no doubt the member countries concerned will ask for the appropriate consideration when the definition of outer space is taken up by the Sub-Committee.

As concerns the definition of outer space, the ITU has regulatory provisions defining, for example, "deep space" to meet the operational needs of particular radiocommunication users. In this regard, there may be interest in some information on suitable definitions governing the use of space telecommunications established for the international Radio Regulations. As a general remark, it can be said that these definitions relate more to the activity than to a precise delimitation of outer space. A "space station" is defined as "a station located on an object which is beyond, is intended to go beyond, or has been beyond, the major portion of the earth's atmosphere." It is clear that this definition covers the satellite before launching or during its re-entry into the atmosphere. "Space radiocommunication" is defined as "any radiocommunication involving the use of one or more space stations or the use of one or more passive satellites or other objects in space", and "terrestrial radiocommunication" has been defined as "any radiocommunication" has been defined as "any radiocommunication" has been defined as "any radiocommunication other than space radiocommunication or radioastronomy."

<sup>&</sup>lt;sup>3</sup>The Plan for the Broadcasting Satellite Service in the Frequency Bands 11.7 - 12.2 GHz in Regions 2 & 3 and 11.7 - 12.5 GHz in Region 1 (Geneva, Switzerland, 1977). The column headings of the Plan include: (1) *Country symbol and IFRB Serial Number* (Column 1 contains the symbol designating the country or the geographical area taken from Table No. 1 of the preface to the International Frequency List); (2) Nominal Orbital Position, in degrees; (3) Channel Number; (4) Boresight geographical coordinates, in degrees and tenths of a degree; (5) Antenna beam width: This column contains two figures corresponding to the major axis and minor axis respectively of the elliptical cross-section half-power beam, in degrees and tenths of a degree; (6) Orientation of the elliptse determined as follows: in a plane normal to the beam axis, the direction of a major axis of the ellipse is specified as the angle measured anti-clockwise from a line parallel to the equatorial plane to the major axis of the ellipse to the nearest degree; (7) Polarization (1 = direct, 2 = indirect); (8) E.I.R.P. in the direction of maximum radiation in dBW; and (9) Remarks.

It should be mentioned that terrestrial radiocommunication may involve ionospheric layers at an altitude between 500 and 1,000 km. This explains why the way in which space is defined in the ITU may be qualified as a "functional approach", to use the terminology adopted in some of the documents submitted to the Legal Sub-Committee on previous occasions.

The ITU continues its studies and regulatory policies inherent in the telecommunciation aspects of the other matters of current interest to the Legal Sub-Committee, that is, radiocommunications for lunar and remote sensing activities as well as the interface requirements for transmission and transfer of data from space research and space application activities. Comments on these matters will be made by the ITU as they evolve in future deliberations of the Legal Sub-Committee.

## THE DEVELOPMENT OF INTERNATIONAL LAW RELATING TO REMOTE SENSING OF THE EARTH FROM OUTER SPACE

# Ronald F. Stowe\*

## I. INTRODUCTION

A significant review of the legal implications of remote sensing of the Earth from outer space has recently been undertaken by the Legal Sub-Committee of the United Nations Committee on the Peaceful Uses of Outer Space.<sup>1</sup> Since 1974 that Sub-Committee has devoted substantial time at each of its annual sessions to an examination of the legal issues and questions which have been raised as a growing number of States, other organizations and individuals have become involved in a burgeoning range of remote sensing programs and applications.<sup>2</sup>

The incentive for this review has come from many sources. The strongest initial impetus, however, seems to have been a concern about what the rapid growth of remote sensing activities, dramatic technological progress, and increasing practical applications would mean for the ability of a State to control the development and exploitation of its natural resources. Although natural resource identification is but one of many possible data applications, the coincidence between the development of remote sensing technology and an intensification of international concern about a shortage of natural resources has focused considerable political attention in particular on the natural resources aspects of present and future remote sensing programs.

The spectrum of issues discussed in the Legal Sub-Committee's review has gradually expanded as that group has attempted to integrate into its analysis an understanding of the technical and organizational characteristics of remote sensing systems. That integration, essential to a useful analysis of the legal implications, has been slow and at times quite uncertain.<sup>3</sup> Frequent personnel changes in the participating delegations and assignment by some States of representatives without

<sup>2</sup>Forty-five countries and five international organizations are actively participating in the Landsat remote sensing program. *See* Aeronautics and Space Report of the President: 1975 Activities, H.R. Doc. No. 94-541, 94th Cong., 2d Sess. 22 (1976).

*See* Statement by the United States Representative to the Legal Sub-Committee of the Outer Space Committee, 24 May 1976; summary in U.N. Doc. A/AC.105/C.2/SR.260 (1976).

101

<sup>\*</sup>The author is the Assistant Legal Adviser for United Nations Affairs of the United States Department of State. The views expressed in this paper are those of the author and are not necessarily those of any organization of which he is a member.

<sup>&</sup>lt;sup>1</sup>The matter of the legal implications of remote sensing of the Earth from outer space has been on the agenda of the Legal Sub-Committee since 1972, but that Sub-Committee did not address that question in any detail until its 13th Session in May 1974. The full Committee is hereinafter referred to as the Outer Space Committee.

either professional expertise in the remote sensing area or familiarity with past discussions of the subject within the United Nations continue to inhibit the progress of this analysis. On the other hand, however, the Legal Sub-Committee has adopted a thorough and constructive pattern of work in this area, and the Outer Space Division of the United Nations Secretariat has produced a number of extremely useful and informative studies which should substantially assist the Sub-Committee in its work.<sup>4</sup>

## II. STATUS OF WORK IN THE LEGAL SUB-COMMITTEE

In addition to the international agreements relating to activities in outer space already in force,<sup>5</sup> the Legal Sub-Committee has before it three specific sets of draft principles, one in the form of a draft treaty,<sup>6</sup> and a wide range of comments representing different points of view suggested by members of that body. The Sub-Committee is using these texts and comments to facilitate its examination of the legal implications of remote sensing.

The result of this examination is likely to be the elaboration of a series of principles expressly dealing with remote sensing. The UN General Assembly, upon the eventual recommendation of the Outer Space Committee, will be requested to endorse these principles as guidelines which States should respect in conducting such activities. The outlines of five draft principles were initially formulated in May 1976 by a Working Group of the Legal Sub-Committee, and efforts to expand the area of agreement were resumed when that Sub-Committee reconvened last March in New York. The texts of these first five draft principles are as follows, bracketed language being not yet agreed in the working group:<sup>7</sup>

<sup>6</sup>The three sets of draft principles include: (a) French-Russian working paper: U.N. Doc. A/AC.105/C.5/L.99 (1974); (b) Brazil-Argentian draft treaty: U.N. Doc. A/C.1/1047 (1974); and (c) United States working paper: U.N. Doc. A/AC.105/C.2/L.103 (1975).

<sup>7</sup>Report of the Legal Sub-Committee on the Work of Its Fifteenth Session (3-28 May 1976) Annex III, U.N. Doc. A/AC.105/171 (1976).

<sup>&</sup>lt;sup>4</sup>Available Studies, Reports and other Material Relevant to the Consideration of Remote Sensing From Satellites, U.N. Doc. A/AC.105/176 (1976).

<sup>&</sup>lt;sup>3</sup>International Agreements already in force include: (a) Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, 18 U.S.T. 2410, T.I.A.S. 6347, 610 U.N.T.S. 205 (entered into force October 10, 1967); (b) Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched Into Outer Space, 19 U.S.T. 7570, T.I.A.S. 6599, 672 U.N.T.S. 119 (entered into force for the United States December 3, 1968); (c) Convention on International Liability for Damage Caused by Space Objects, 24 U.S.T. 2389, T.I.A.S. 7762, (entered into force for the United States on October 9, 1973); and (d) Convention on the Registration of Objects Launched Into Outer Space (entered into force September 15, 1976; not yet proclaimed).

### Principle I

Remote sensing of [the natural resources of earth] [and its environment]from outer space and international co-operation in that field[shall] [should] be carried out for the benefit and in the interests of all countries [mankind], irrespective of their degree of economic or scientific development, and taking into consideration, in international cooperation, the particular needs of the developing countries.

#### Principle II

Remote sensing of [the natural resources of the earth] [and its environment] from outer space [shall] [should] be conducted in accordance with international law, including the Charter of the United Nations 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.

#### Principle III

1. States carrying out programmes for remote sensing of [the natural resources of the earth] [and its environment] from outer space [should] [shall] promote international cooperation in these programmes. To this end, sensing States [should] [shall] make available to other States opportunities for participation in these programmes. Such participation should be based in each case on equitable and mutually acceptable terms, due regard being paid to elements....

2. In order to maximize the availability of benefits from such temote sensing data, States are encouraged to consider agreements for the establishment of shared regional facilities.

#### Principle IV

Remote sensing [of the natural resources of the earth] [and its environment] from outer space [should] [shall] promote the protection of the natural environment of the earth. To this end States participating in remote sensing [should] [shall] identify and make available information useful for the prevention of phenomena detrimental to the natural environment of the earth.

#### Principle V

States participating in remote sensing of [the natural resources of the earth] [and its environment] from outer space [should] [shall] make available technical assistance to other interested States on mutually agreed terms.

Since its first session in March of 1963 the Outer Space Committee and each of its Sub-Committees have worked on the basis of a genuine consensus, namely that no decision is made if any participating member raises an objection, and therefore the issues addressed by these initial draft principles are naturally those on which it was easiest to obtain unanimous agreement. Efforts to identify and develop common views on the more complex issues have, of course, been undertaken, but the course of analysis and negotiation has not yet reached the point where additional specific language can be agreed.

### JOURNAL OF SPACE LAW

# III. THE KEY ISSUES

# A. The Right to Sense

When the Legal Sub-Committee began a serious examination of remote sensing, a number of members announced their beliefs that there was no extant international law which governed remote sensing of the Earth from outer space, that such law should be developed promptly, and that any such law should prohibit sensing the territory of any other State for natural resources data without the consent of the sensed State.<sup>8</sup> In addition, it was suggested by some that the data obtained by such sensing should not be disseminated to any third States or other third parties without the consent of the sensed State.<sup>9</sup> Indeed, it was briefly argued that Earth-oriented remote sensing would be illegal until international law affirmatively and expressly sanctioned it.<sup>10</sup>

The first question which needed to be clarified, therefore, was the present status of international law in this area. The view of the United States was, and remains, that there is no provision of applicable international law which restricts or inhibits remote sensing of the Earth from outer space. Quite to the contrary, the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies expressly proclaims in Article I that "[o]uter space, including the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind . . . ." That Article goes on to assert that "[t]here shall be freedom of scientific investigation in outer space . . . ." and that "States shall facilitate and encourage international cooperation in such investigation." In addition, a review of the relevant records of the Legal Sub-Committee of the Outer Space Committee, and the General Assembly reveal no intention by those bodies to exclude activities such as remote sensing of the Earth from the broad endorsement of the freedom of exploration and use of outer space.

A second question is whether recent technological advances in remote sensing have in any way introduced an activity so fundamentally different from those conceived at the time the 1967 Outer Space Treaty was negotiated and so apparently inconsistent with its basic principles that such an activity could not reasonably be considered to be covered by that treaty. In fact, there has been a long history of multinational participation in publicized and uncontested remote sensing of the Earth, including sensing related to natural resources, from the time of the earlier meteorological satellite programs and manned space flights, which well preceded the adoption of the 1967 Outer Space Treaty. Both the increase in sophistication of sensors and the wider proliferation of

<sup>&</sup>lt;sup>8</sup>Brazil-Argentina draft treaty: U.N. Doc. A/C.1/1047 (1974).

<sup>91</sup>d; French-Russian working paper: U.N. Doc. A/AC. 105/C.2/L.99 (1974).

<sup>&</sup>lt;sup>10</sup>Statement by the Brazilian Representative to the Working Group on Remote Sensing of Earth by Satellites of the UN Outer Space Committee, New York, 19 February 1974 (Brazilian Mission to the United Nations).

#### REMOTE SENSING

practical applications of the data derived have been widely predicted evolutionary advances on earlier capabilities. Thus, neither would seem to constitute any basis for a legal distinction between modern remote sensing activities and the universally accepted class of activities in the peaceful exploration and use of outer space.

Recent discussions in the Legal Sub-Committee have evinced virtually no significant continuing support for the idea that remote sensing is an activity outside the scope of the Outer Space Treaty, or for the idea that such sensing can be undertaken only with the prior consent of the sensed countries. Although one may reasonably conclude from this a general acceptance that the conduct of remote sensing is unrestricted and uninhibited by present international law, one should not also conclude that such acceptance has quieted the anxieties which gave rise to the discussion, namely whether a State's control over development of its natural resources would be diminished by the growth of remote sensing activities.

### B. Dissemination of Data

As it appeared that restrictions on the conduct of sensing did not presently exist and were neither generally feasible nor acceptable, the thrust of the discussion in the Legal Sub-Committee turned primarily to the question of the dissemination of data in any future operational remote sensing systems. Of all the issues raised during examination of the legal implications of remote sensing thus far, the most interest, whether legal, political, economic, or technical, and the most diversity of opinion have focused on the questions of how data and information from remote sensing should be disseminated and handled.

In this instance as well there has not emerged any consensus that present international law would impose any inhibition or restriction on open dissemination to any interested party of available data relating to any place on Earth. Unlike the question of sensing itself, however, the Sub-Committee has proceeded to examine in considerable detail whether any such restrictions should be applied in the future to data dissemination.<sup>11</sup> As with the question of sensing, the primary incentive of those advocating such restrictions can fairly, if not fully, be described as a concern to protect the ability of states to control activities within their respective territories, principally those activities relating to the development and exploitation of natural resources.

The right of States to exercise such control consistent with relevant principles of international law has repeatedly been supported by virtually all members of the Sub-

<sup>11</sup>See summary records of the 14th (1975), and 15th (1976) Sessions of the Legal Sub-Committee, U.N. Docs. A/AC.105/C.2/SR.226-245 (1975) and A/AC.105/C.2/SR.246-265 (1976).

1977

Committee.<sup>12</sup> The principal differences of opinion have emerged over the question whether remote sensing activities threaten such control in any way, and, if so, at what point protective measures would be useful, feasible, and desirable.

The United States, among others, has consistently taken the position that open data dissemination to all interested parties is in fact more likely to enhance than to diminish the ability of States to control their natural resources.<sup>13</sup> As a practical matter the adoption of a restricted dissemination policy would probably establish a privileged class of countries, technologically advanced enough to have their own remote sensing programs and therefore capable of obtaining worldwide or broad regional data directly, and a class consisting of most other countries which could obtain only limited portions of the available data possessed by others. Further, restricting data dissemination in order to protect local control over natural resources would seem to be an unnecessary and counterproductive legal overkill, particularly in light of the fact that neither the dissemination nor the analysis of the data could affect that control. Only at the point that someone attempts to apply that information to implement an actual plan for development or exploitation of particular natural resources is the question of State control affected.

In this context it has been argued that sovereignty over natural resources includes the right to exercise sovereign control over all information regarding those resources, regardless of where that information may be gathered or located.<sup>14</sup> This theory appealed to the imagination of a few delegations, but the fact that it never received broad support has allowed the Legal Sub-Committee to avoid extensive debates on the definition and scope of national sovereignty over natural resources, a concept much discussed in other fora.

During its 1976 session the Legal Sub-Committee for the first time addressed the fundamental but complex distinctions among raw data, processed data, and information derived from the analysis of data. There now seems to be emerging a general understanding, and perhaps agreement, that data dissemination restrictions could in fact significantly reduce the range of benefits available to non-sensing countries and might well be unnecessary to protect their interests.

The thoroughness and detail of the Sub-Committee's examination of the legal implications of remote sensing seem to have helped clarify not only the state of present

<sup>&</sup>lt;sup>12</sup>Fot example, even the most outspoken advocate of open data dissemination, namely the United States Delegation, has consistently supported this right. *See* United States Mission to the UN Press Releases USUN-10 (75) of 19 February 1975, and USUN-116 (75) of 13 October 1975.

<sup>13</sup>See USUN Press Releases, supra note 12; U.N. Doc. A/AC.105/C.2/SR.260 (1976).

<sup>&</sup>lt;sup>14</sup>See, e.g., Statement by Brazilian Representative, *supra* note 10, at 6; Statement by the Indian Representative to the 15th Session of the Legal Sub-Committee, U.N. Doc. A6AC.105/c.2/SR.249, at 6 (1976).

law in this area, but also the nature of the concern which some States continue to feel about their abilities to maintain control over their own resources. A more precise definition of that concern might reasonably be expressed as an anxiety among certain countries that others, whether governments, corporations or individuals, may be able through superior technology to learn more about the resources of a country than can the government and people of that country. As a consequence it is feared that the advantages of such foreign entities over those of the local authorities in negotiations for the exploitation of natural resources could be extraordinarily enhanced, even to the point of serious detriment of those who originally possess the resources.

As a gradual refinement in the analysis of the legal implications of remote sensing has evolved, two new types of approaches have been suggested in order to accommodate the strong desire of most States to encourage the development of remote sensing, while guarding against the disadvantages of a State knowing less about its own resources than does some foreign entity. The first of these suggestions is that data with a resolution higher than a specified number of meters should not be disseminated without the sensed country's agreement, while all lower resolution data would be unrestricted.<sup>15</sup> The underlying, if unproven, theory is that only data of high resolution would have relevance to natural resources exploitation.

The second, which has elicited much more interest among members of the Legal Sub-Committee, suggests, among other things, the possibility of certain constraints on the handling of "processed information or analysis concerning the natural resources" of a sensed State, with a view to "respecting the confidentiality of, or the need for prior access of the sensed State to, such information, to the extent necessary to avoid detrimental effects on the interests of the sensed State."<sup>16</sup> Although this proposal has not yet been discussed in detail and needs considerable clarification, the nature of the initial response it received seems to indicate that many delegations which in the past have been advocating data dissemination restrictions may now be moving toward a realization that their basic concerns do not in fact arise from open data dissemination.

In this context, it would seem, at first review, that proposals for agreements on regulation of the dissemination of information gained from analysis of data might be more appropriately the subject of bilateral or perhaps regional consideration among trade, commodities, or economic development experts than the subject of a multilateral declaration of legal principles relating to the peaceful uses of outer space.

Such agreements may well prove quite desirable; for example, the United States and Canada have a long-standing agreement on the simultaneous release of government

<sup>&</sup>lt;sup>13</sup>Proposal by the Soviet Union, See Report of the Scientific and Technical Sub-Committee [of the UN Outer Space Committee] on the Work of Its Thirteenth Session, U.N. Doc. A/AC.105/170, at 15-16 (1976).

<sup>&</sup>lt;sup>16</sup>Proposal by the Canadian Representative to the 15th Session of the Legal Sub-Committee U.N. Doc. A/AC.105/C.2/SR.257, at 5 (1976).

estimates of certain agricultural crop yields. However, an analysis of the feasibility of such regulation quickly demonstrates its complexity and the unlikely prospect that it could primarily be based on the use of data derived from remote sensing. Just as one must understand the integration of economic, political, institutional and technical, as well as the legal, characteristics of the various <u>aspects</u> of <u>remote</u> sensing in order to develop useful guidelines for the conduct of such activities, one must also be aware of the integration of data and information from many different sources which is generally essential to the production of useful analysis and knowledge such as that contained in those crop forecasts.

In such a synthesis, data from remote sensing satellites may play a major or a very minor role. The difficulties of first deciding how to measure that role and second deciding why it should make any difference in the handling of the end product of the analysis, namely the user knowledge, are apparent. In addition, one must consider the difficulties inherent in regulating the dissemination of such user knowledge in a world of diversified legal systems in which, in some cases, such knowledge would only be held by the governments, and in others it would be developed and held by either or both government and private organizations or individuals. As such differences are fundamental to the political structures of those various systems, a single, comprehensive and universal regulatory formula would probably be most difficult to develop.

### IV. FUTURE CONSIDERATIONS

If this is indeed the essence of this concern, it raises a fundamental question whether the constructive and effective answer might well lie in the direction of expanding data dissemination and technological capabilities throughout the world, rather than restricting them. Pragmatically, one must assume that such sensing, analysis and negotiations will continue to occur. If this is the case, it would seem that local governments are best protected at a minimum by an assurance that they are able to obtain at least the same data about their resources from such remote sensing systems as any third party might be able to obtain.

Because an ability to analyze the data is obviously an integral part of useful access to them, emphasis on the proliferation of such capabilities would seem to be called for. There are numerous vehicles through which this might be accomplished, regional cooperation appearing to be the most generally attractive in many parts of the world for economic and technical reasons. Realistically, no system can guarantee an absolute equality in analytical skills; nevertheless, a great deal can be done to help ensure that the potentially vast benefits of modern remote sensing technology are shared by all interested countries, rather than adding to the separation between those which are technologically advanced and those which are not. Significant steps in this direction should substantially reduce the concerns of developing countries that the widespread growth of remote sensing activities might disadvantage them. To the contrary, significant steps in this direction, coupled with an expansion in such activities, are likely to redound to their substantial benefit.

108
If this assessment of the interests represented and of the evolution evinced in the Legal Sub-Committee's review of remote sensing proves correct, the solution to what has been the most complex and controversial of the many issues discussed may in fact lie in the formulation of guiding principles which further encourage the worldwide development and sharing of remote sensing capabilities rather than principles which would inhibit them. Confidence that one is an active and capable participant in the use of this new technology would go far toward minimizing fears of disadvantage, and such participation would also presumably bring substantial benefits to those who become involved. That confidence does not always come easily; it would require a continuation and probably an expansion of present bilateral and multilateral training and assistance programs. It could reasonably be presumed, however, that such efforts, coupled with progressive, positive guiding principles and an institutional network of open international cooperative ventures would generate substantial benefits both to nations individually and the international community as a whole.

The elaboration of recommended guidelines, for the conduct of remote sensing activities, which were based on the open and cooperative principles contained in the relevant provisions of the Outer Space Treaty would seem to be the most constructive contribution which the Legal Sub-Committee could make in this area. It is probably unnecessary, and in any case premature, to attempt to formulate any additional comprehensive multilateral treaty or convention on remote sensing at this time. The elaboration of such recommended guidelines might well prove helpful as present experimental remote sensing programs are gradually replaced by more permanent operational systems. A wide range of issues in addition to those discussed above still await examination by the Legal Sub-Committee, and could constitute the basis of a useful set of principles by which States should be guided in the conduct of remote sensing activities.

#### SCIENTIFIC CRITERIA FOR THE DELIMITATION OF OUTER SPACE

#### Lubos Perek\*

#### I. INTRODUCTION

Four instruments of international law dealing explicitly with outer space are now in existence: (i) the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, (ii) the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, (iii) the Convention on International Liability for Damage Caused by Space Objects, and (iv) the Convention on Registration of Objects Launched into Outer Space. Moreover, outer space is referred to also in other documents, *e.g.*, in the Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space, and Under Water, ratified in 1963.

The area of application of the above instruments has, however, not been defined and, in a concrete case, diversity of opinion may arise. Such a diversity of opinion arose, for instance, during the World Administrative Radio Conference for the Planning of the Broadcasting Satellite Service in the 12 GHz Frequency Band, held in Geneva from January 10 to February 13, 1977. During that Conference, delegates of equatorial countries raised claims of sovereignty to segments of the geostationary orbit above their countries while delegates of other countries refuted such claims.

Without attempting to touch on the merit of the problem of the geostationary orbit, we give two quotations<sup>1</sup> from that conference in order to illustrate the relation of the above question to the definition of outer space: The delegate of Colombia stated on January 11: "There is no definition of outer space that is valid and satisfactory for the international community such as might be cited to support the argument that the geostationary orbit is included in outer space. Therefore, it is imperative to arrive at a legal definition of outer space, since to apply the 1967 Treaty without one would be merely to ratify the presence of the states that are already using the geostationary orbit...."<sup>2</sup> The delegate of Australia stated on January 31: "The status of the geostationary orbit is measurably connected with the definition and/or delimitation of Outer Space and it cannot be considered in isolation...."<sup>3</sup>

International Telecommunication Union, Broadcasting Satellite Conference (Geneva, 1977).

<sup>2</sup>Id. Doc. No. 81, at 19.

3Id. Doc. No. 181, at 1.

<sup>\*</sup>Chief, Outer Space Affairs Division, United Nations Secretariat. This article is an expression of personal views of the author and in no way represents the opinion of the United Nations. This article is an elaboration of a paper presented to the 19th Colloquium on the Law of Outer Space. *See* Perek, Remarks on Scientific Criteria for the Definition of Outer Space, Proc. 19th Colloquium on the Law of Outer Space, 185 (1977).

There may be many reasons for the absence of a definition or a delimitation of outer space, the most important being, possibly, that States have neither agreed on a particular criterion for a definition of outer space acceptable to all nor on the necessity to adopt such a definition at the present time.

It should, however, be noted that definition and delimitation of outer space is on the agenda of the Legal Sub-Committee of the United Nations Committee on the Peaceful Uses of Outer Space which has been charged by the United Nations General Assembly with the task of defining outer space. It has been giving consideration to the subject in co-operation with the Scientific and Technical Sub-Committee without yet being successful in its task. In particular, at the sixteenth meeting of the Legal Sub-Committee held from March 14 to April 7, 1977, a wide range of opinions was presented. Some delegations saw no need for a definition of outer space or considered such a definition premature. Other delegations expressed the view that a definition was important or that it should be discussed as a matter of priority. One delegation stated that a legal system whose scope of activity was not defined, was inconceivable. Some were of the opinion that the definition should be consistent with scientific criteria and should be derived from legal and political principles. Three delegations mentioned a numerical value to be adopted as a limit of outer space of 90 to 100 km while one delegation favored "a very low limit." Some delegations said that the definition should take into account the quite special character of geostationary orbit.

Evidently, the international community is in the stage of stating opinions. It can be expected that in the future, common elements in various opinions will be formulated but considerable time may be required for a thorough exploration of all possible aspects and consequences of an agreed and adopted definition of outer space.

Another reason for not having arrived at a definition of outer space may be that most attempts were directed at solving all aspects of the problem: the extent of sovereignty of States, the regime for the space between the Earth's surface and the limit of the outer space, frequently called "airspace", the implications of a distinction between "air travel" and "space travel" based on technological achievements at a particular time in history, etc. The aim of this paper is much more modest. It endeavors to show that reasonable scientific criteria can be found for a possible geometrical delimitation of outer space. Almost all space activities, especially the orbits of artificial satellites of the earth, would lie above such a limit, while all of the present and most, if not all, of the future air traffic would take place below the limit. It is also shown that measurements can be performed, even at the usual high speed of space objects, to determine the instantaneous position of such objects with respect to an exactly defined limit.

Still another reason why no definition has been adopted may be a communication gap between experts in aerospace law and scientists working in relevant areas such as geophysics, aeronomy and astronomy. Indeed, it seems that the only case of a fruitful co-operation is reported by Andrew Haley<sup>4</sup> in discussing T. von Kármán's proposal of an outer space limit at 84 km where the aerodynamical lift is exceeded by the centrifugal force.

The communication gap was extremely well perceived by Haley when he said that: "Ironically enough, the lawyer finds the main crackpots and nuisances among engineers and sociologists who assume the role of amateur lawyers and give vent to rather silly if harmless rhapsodies in a field wholly unfamiliar to them." *Mutatis mutandis*, this is an exact description of the feelings of a scientist perusing treatments by lawyers of physics involved in criteria for the definition of outer space.

What evidently is needed is a closer co-operation of experts of all professions concerned in the spirit of another of Haley's statements that: "The sound scientist, on the other hand, avoids legal interpretation while at the same time making an essential contribution by staying within his technical expertise and keeping the lawyer well advised on appropriate physical phenomena."<sup>6</sup> The sound lawyer, by the same basic principle, should ask the scientist for advice in all matters relating to science, keeping in mind the extremely important difference between the everyday physics of the surface of the earth and the sometimes surprising but well known physics of outer space.

# II. THE GENERAL PROBLEM

The outer space, whatever its definition, is a three dimensional continuum which, topologically, can be bounded by (a) one, (b) two, or (c) more than two simply connected surfaces.

In the first case, the limiting surface would be the near boundary dividing the inner space, possibly called airspace, from the outer space. In the second case, besides the near limit, there would also be the far limit, beyond which another term might be used. Such a distinction appears, *e.g.*, in the ITU Radio Regulations.<sup>7</sup> In the ITU Radio Regulations the term "deep space" has been introduced for regions at distances from the earth equal to or greater than the distance between the earth and the moon.<sup>8</sup>

4A. Haley, Space Law and Government 97 (1963).

۶Id.

1977

٩d.

<sup>7</sup>Administrative Regulations (Radio Regulations), annexed to International Telecommunication Convention (signed Malaga-Torremolinos, 1973), 23 U.S.T. 1527, T.I.A.S. No. 7935.

<sup>8</sup>The ITU definition of the deep space is ambiguous because it does not state what distance of the moon was meant. It could be either the instantaneous distance or the mean distance. The latter would be more convenient for the purpose of the definition because the instantaneous distance, as the term suggests, changes with time. The third case would apply if it was considered necessary to exempt the neighborhoods of some bodies from the concept of outer space and introduce regions such as "atmospheric space of a planet" or "contiguous space of the moon."

The present space legislation is one and the same for all parts of outer space making it thus superfluous to introduce any additional divisions of space. The terms such as "deep space," "interplanetary, interstellar, intergalactic space" should be used only in their descriptive qualities but without any legal consequences. A possible development of terminology and legislation connected with different regions of the universe, should be kept in mind although it is to be expected, probably, at a rather remote future time. The important question, for the present, concerns the first case, *i.e.*, the near limit of outer space.

# III. THE COMPETENCE OF SCIENCE TO PROPOSE A CRITERION FOR THE DEFINITION OF OUTER SPACE

Physical phenomena in such a complicated system as the earth do not yield exact limits. Most transitions are continuous but physics is able to suggest regions within which the changes have some particular significance. As an example, let us consider the border between the sea and the land. There is a region which may extend up to some kilometers in width which, due to surf, wind and tide is sometimes a part of the ocean, sometimes a part of the land. Nevertheless, for practical purposes, the shoreline has to be mapped and defined exactly, using, *e.g.*, the line of mean high water.

In space, science is in a position to indicate, e.g., the region of lowest perigees of artificial satellites. This region is quite definite and the present state of knowledge and experience with satellites launched since 1957 is sufficient to pinpoint the region with an accuracy of about 10 km. Due to variations in the density of the atmosphere and due to various designs and materials used for the construction of artificial satellites, the accuracy cannot be expected to improve in the future.

The view that science is competent and able to propose a reliable criterion is not being shared by all authors on space law. Matte<sup>9</sup> perceives a basic uncertainty in measurements and calculations of position and motion in outer space. He gives some examples from Einstein's theory of relativity such as the dilation of time, the curvature of the four-dimensional space-time continuum, the advance of Mercury's perihelion, and the bending of light by sun's gravitational field. He also gives some examples from spherical trigonometry, such as the excess of spherical triangles, or the deviation of the shortest trajectory on the earth's surface from the circle of a parallel, called straight line by Matte. According to Matte, such examples seem to be sufficient to demonstrate that the calculation of the vertical height of sovereignty would be much more complicated than it may seem. Matte also states that "astronomy has succeeded in establishing

<sup>9</sup>N.M. Matte, Aerospace Law 51 (1969).

spatial distances by taking as guidelines various celestial bodies and their movement, but calculation is not done in the same way as on an even surface. Einstein's theory of relativity helps to understand the complexity and, moreover, the uncertainty of such calculations."<sup>10</sup>

This statement might create the impression of inherent uncertainty in scientific criteria for the definition of outer space. Such an impression would be incorrect. If there were such a basic uncertainty, how was it ever possible to place satellites very accurately into predetermined orbits, how was it possible to place space probes on the moon or on the planets Venus and Mars? The statement that the laws of mechanics, as formulated by Galileo and Newton, apply only to flat surfaces<sup>11</sup> is incorrect. Newton's mechanics apply to the three-dimensional Euclidean space. Today's mechanics, with all its developments achieved since Galileo and Newton, respecting such effects as the very complicated shape of the earth, the lunisolar gravitational perturbations of satellite orbits, the solar radiation pressure and other minute forces,<sup>12</sup> is capable of solving problems of satellite motion with certainty and great precision.

None of the above consequences of Einstein's theory of relativity has any influence on the determination of satellite orbits or on the measurements and calculations of a vertical height of sovereignty. Spherical trigonometry is being daily used in maritime and air navigation and its calculations are quite certain and unequivocal.

## IV. REQUIREMENTS FOR A WORKABLE DEFINITION

The requirements for a workable definition of outer space include: (a) the limit of outer space should be fixed exactly and by international agreement within a region indicated by physical criteria. A functional definition has not been considered here. A purely functional definition, which would not use any numerical value of a particular altitude, might be more complicated to deal with in concrete cases, because the determination of which particular object is performing what function could be considerably more difficult than a simple measurement of distance. Any function, unless stated in very general terms, may become obsolete by technological progress; (b) the definition of outer space should be global and the same for all countries. And (c) the definition should be expressed in simple terms and the determination of a relative position of an object with regard to the limiting surface should be possible, easy and rapid.

As an illustration, let us examine whether a fixed distance above the surface of the earth would meet the requirements. In the first place, it would be necessary to agree on

12See U.N. Doc. A/AC. 105/164, at 28 (1976).

<sup>10</sup>Id. at 49.

<sup>11</sup>*Id.* at 50.

a well-defined basic surface from which the distance would be measured. The most suitable reference surface is the geoid which coincides with the mean level of the oceans and is well defined also on the continents as a theoretical continuation of the ocean level. The form of the geoid is at present known with an accuracy of  $\pm 3m^{13}$  and this accuracy might improve in the future when measurements from satellites over the oceans are taken into account.

Measuring the distance of an object moving hundreds of kilometers above the earth is possible with a radar and such measurements can be performed under all weather conditions. If a very high precision is required, a special satellite laser ranging telescope can be used in clear weather. Such instruments are at present operating in several countries. They are capable of measuring distances up to several thousands of kilometers with a repetition rate of several seconds and with an accuracy of about one meter. Second generation systems might be capable of measuring distances with an accuracy of about 10 cm, if the satellite or object is equipped with laser retro-reflectors. The distance of objects not equipped with the retro-reflectors can be measured with an accuracy approximately equal to the dimensions of the object in question. The direction of measurement is most suitably defined by the direction of the force of gravity, *i.e.*, perpendicular to the geoid.

It might also be necessary for the space vehicles themselves to determine whether they are inside or outside the adopted limit. Standard navigation methods are available for this purpose. Moreover, it has been shown<sup>14</sup> that a navigation satellite system is feasible, although not yet planned for a world-wide use, which would enable space objects equipped with appropriate receivers to determine their positions. The accuracy would depend on the instantaneous position of the navigation satellites and would be 9 m horizontally and 10 m vertically at 90 percent of the time.

Briefly stated, the measuring of distance of any object in space can be made quickly with equipment which is not exceedingly expensive. Also the space objects themselves could, in principle, make such determinations. From such data, the altitude of any object above the geoid can be easily computed and thus the presence of the object inside or outside a limit can be determined if the definition is stated in terms of height above the geoid. The total accuracy of the determination is of the order of 3 m if measured from the ground with a satellite laser tanging telescope and 10 m if measured from a space object and utilizing a navigation satellite system.

# V. GUIDANCE FOR THE DEFINITION OF OUTER SPACE

Whatever limits or definitions of outer space are adopted, they should be as close as possible to the generally adopted meaning of the term "outer space". Some guidance

<sup>&</sup>lt;sup>13</sup>U.N. Doc. A/AC. 105/165, at 5 (1976).

<sup>14</sup>D. Smith & W. Criss, Astronautics and Aeronautics 26 (1976).

Resolution 1721 (XVI), "International co-operation in the peaceful uses of outer space", called upon States launching objects into orbit or beyond to furnish information promptly to the Committee on the Peaceful Uses of Outer Space, through the Secretary-General, for the registration of launchings.

Since the request has been made under the general heading given above, it can be concluded that objects launched into orbit or beyond move into outer space. In accordance with the above resolution, States began to furnish information to the Secretary-General on launchings of satellites. The first such announcement<sup>15</sup> contains data on objects launched into orbit or beyond by the United States of America between February 7, 1958 and February 8, 1962. In an accompanying letter, it is stated:

The establishment of such a registry marks another step forward in the direction of open and orderly conduct of outer space activities. Outer space is the province of all mankind and the United States believes that the benefits of the exploration and use of outer space should accrue to all. We, therefore, particularly welcome the establishment of this registry in the United Nations and are pleased to supply this information to open it.

In the second announcement,<sup>16</sup> the Union of the Soviet Socialist Republics transmitted information relating to the artificial satellites of the earth and the space objects launched in 1957-1962. It states:

The Permanent Mission of the USSR to the United Nations deems it necessary to point out that, in the opinion of the Soviet Union, the information furnished to the United Nations for registration will be of real value if the countries concerned will register now and will continue to register all the artificial satellites of the earth placed in orbit and other objects launched into outer space.

Announcements by other launching countries, in addition to those of the USA and USSR, appear in the series which reached number 344 on May 18, 1976.

The spirit of the above introductory statements seems to indicate that the region which is occupied by satellites in orbit is a part of outer space. This point of view is even more strongly supported by the text of the Convention on Registration of Objects Launched into Outer Space.<sup>17</sup> This Convention uses the term "objects launched into outer space" in the preamble, and the term "space object" in Articles I, II, IV, V and VI, in all cases in the same sense. In Article IV, basic parameters of space objects are

<sup>13</sup>U.N. Doc A/AC. 105/INF. 1 (1962).

<sup>16</sup>U.N. Doc A/AC. 105/INF. 2 (1962).

<sup>17</sup>U.N. G.A. Res. 3235 (XXIX) (1974).

mentioned, such as the nodal period, apogee and perigee, all of them referring to orbits around the earth. These terms clearly indicate that artificial satellites of the earth are space objects and hence launched into outer space.

In looking for a definition of outer space we thus might be guided by the above conclusions that artificial satellites of the earth move in outer space. Our task then would be to delimit as accurately as possible the lowest altitude at which satellites can exist in orbits around the earth.

## VI. LOWEST PERIGEES OF SATELLITE ORBITS

A study on the subject has been prepared by Working Group I of COSPAR.<sup>18</sup> Theoretical considerations supported by observations lead in the study to a conclusion that satellites of usual construction cannot survive for any appreciable length of time at 90 km or lower.

Statistics of satellite orbits show that satellites launched into a variety of orbits in the last 18 years, serving many different practical purposes of research and application, invariably decayed above 100 km height. The only possible exception listed in the Table of Earth Satellites<sup>19</sup> is 1974-02A, Skynet 2A, which has a listed perigee of 96 km. This value does not seem to be very accurate and, according to D.G. King-Hele,<sup>20</sup> might be in error by about 10 km because it was based on a small number of observations and the satellite was subject to several maneuvers during its last day in orbit. The most reliable orbit with a low perigee is that of the satellite 1974-114F, Molniya 1S rocket. Its perigee, also according to King-Hele, 15 hours before decay was 105 km and 3 hours before decay decreased to 102.5 km. Satellites of very high mass-area ratio, such as the geodetical satellites Starlette or Lageos, could eventually descend into the 90-100 km region. If they survived at all, their activities would be severely impaired or made impossible by excessive heating.

The effect of heating is illustrated by evidence from the meteors. They move generally at higher velocities than artificial satellites and enter the atmosphere at a steeper angle. Heat is generated by air friction and the compressed air in front of the meteor and the meteor itself start to emit light. Within several seconds or a few minutes, most of the material evaporates and some remnants may fall to the ground. The analysis of the phenomenon yields particularly accurate results if photographs by special cameras can be taken during the light-emitting phase in the atmosphere and if meteorites can be subsequently located on the ground. Such complete data are available in two cases only:

<sup>18</sup>U.N. Doc. A/AC. 105/164 (1976).

<sup>193</sup> Table of Earth Satellites (1974-75).

<sup>&</sup>lt;sup>20</sup>Editor's note: Private communication between the author and Mr. King-Hele.

a 20 ton meteor started to shine at a height of 98 km<sup>21</sup> and a 500 kg meteor at 86 km.<sup>22</sup> Such meteors would start to shine as low as about 70 km<sup>23</sup> if they moved with a velocity typical for artificial satellites of about 10 km/s. It does not, however, follow from this low figure that the limit of outer space would have to be set to 70 km. The shining of the meteor indicated a very high temperature. The process of heating and thus the process of decay had to start at considerably higher altitudes.

The launching and re-entry trajectories of space objects cover a certain horizontal distance between the orbit and the ground. It appears from the COSPAR study<sup>24</sup> that some launcher rockets or landing vehicles might require up to 10,000 km in horizontal distance for landing from an altitude of 100 km.

At some launching ranges it would be possible to plan the launching or landing trajectories in such a way that they entirely lie either in outer space or over the territory of the launching state or over international waters. In other cases it might be necessary for the launched vehicle to travel through the airspace of some other State and such travel would possibly have to be regulated in a way analogous to international air traffic or by a special agreement.

The criterion of lowest perigees of earth satellites has the advantage that it is based primarily on physical concepts which are invariable. It depends on technological progress to a very slight degree. In principle it would be possible to construct a special purpose artificial satellite which would survive below 90 km, or at any height for that matter. There would, however, be no gain in any application of such a satellite and its cost would be out of proportion because an extreme mass-to-area ratio can be achieved only by using heavy materials such as lead, gold, uranium or platinum in large quantities.

## VII. OTHER CRITERIA FOR THE DEFINITION OF OUTER SPACE

Many criteria have been proposed in the past and books on space law frequently quote them without making a clear distinction between physically meaningful criteria and those which are less so. The result, sometimes erroneously arrived at, is that the present state of science does not permit the establishment of reliable criteria. In this section, a brief evaluation of some criteria will be attempted.

<sup>21</sup>Z. Ceplecha, Bulletin of the Astronomical Institute of Czechoslovakia, 12,21 (1961).

<sup>22</sup>R.E. McCrosky, A. Posen, G. Schwartz, C.Y. Shao, 17 J. Geophys. Res., 76 (1971).

<sup>23</sup>Editor's note: Private communication between the author and Mr. Ceplecha (1976).

24See U.N. Doc. A/AC. 105/164, at 29 (1976).

1977

# A. Limit of Sovereignty at Infinity

This theory is generally considered very weak but some authors<sup>25</sup> give theoretical legal reasons for an infinite extension of sovereignty. This theory is a return to the medieval geocentric concept which was discarded by Copernicus in the fifteenth century. All sciences and humanities have accepted the fact that the earth is not the center of the Universe and consider the earth in its proper place. We shall not elaborate on absurd implications of the infinite limit, such as the propagation of the vertical extensions of national borders with a speed exceeding the velocity of light already at the distance of the planet Neptune.

## B. Limits Based on the Field of Attraction

According to Newton's law, the attraction of a body is proportional to its mass and to the inverse square of its distance. Thus, the field of attraction of the earth extends to infinity (in Euclidean universe). Without trying to discuss the extent of the earth's attraction in other models of the Universe, let us state that:

(1) Kroell's limit, *i.e.*, Where the mathematical value of the field of the earth's gravitation is nil is not defined and cannot be used as a criterion.

(2) Another formulation of almost the same concept is a limit where *weight ceases its manifestation*.<sup>26</sup> It is, however, more ambiguous than the first one because weight ceases its manifestation for any object moving in such a direction and with such an acceleration as to cancel the acceleration due to the attraction of the earth. Thus, it is not suitable as a criterion.

(3) Altitude whence something can be dropped.<sup>27</sup> Interpreting the term "dropping" as "releasing with zero velocity with respect to the center of the earth," the criterion would lead to a very complicated limiting surface depending on the distribution of masses within and outside the solar system and changing with time. Other interpretations of the term "dropping" would lead to more difficulties and no advantages. This formulation is not suitable as a criterion.

(4) Altitude where the attraction of the earth is balanced by the attraction of the sun is by simple calculation 260,000 km at the mean distance of the earth from the sun. It varies by 2% up and down depending on the instantaneous position of the earth in its elliptical orbit around the sun. The above figure results from the comparison of two static values and is of no importance in the dynamical problem of motion of a satellite

<sup>27</sup>G. Gál, Space Law 72 (1969).

<sup>&</sup>lt;sup>25</sup>N.M. Matte, supra note 9, at 35.

<sup>&</sup>lt;sup>26</sup>J. Kroell, Eléments Créateurs d'un droit astronautique, 16, RGA 222, 230, 233 (1953).

around the earth. Such a criterion would be purely formal. It was first proposed by J.C. Cooper<sup>28</sup> and has been incorrectly quoted by Brun<sup>29</sup> and in the document<sup>30</sup> as 26,000 km.

(5) Limit of possible satellite orbits around the earth. The motion of a satellite around the earth is a "problem of three bodies" involving the sun, the earth and the satellite. Its mathematical treatment leads to limiting regions in space within which the satellites have to move at all times. These regions are bounded by complicated surfaces which for earth's satellites resemble prolate ellipsoids. The more energy the satellite has, the larger its accessible region. The largest such region around the earth extends to 1.5 million km in the direction of the sun, to 1.4 million km in the opposite direction and to 1.0 million km in the direction of the orbital motion of the earth. A satellite at a still larger distance would orbit not only around the earth but also around the sun. This limit would be a good criterion for the outer boundary of the satellite region. Our present task, however, is to look for the inner boundary of the satellite region.

(6) Limit at the distance of geostationary orbits. Satellites in such orbits remain, if they move from west to east and above the equator, permanently above the same point of the earth. Their altitude is approximately 35,900 km. The above altitude is measurable and well defined, but it would leave most of the satellite orbits below the limit, thus not in outer space.

(7) Lowest perigees of satellites define a limit which meets all the requirements for a practical and meaningful delimitation of outer space. It has been discussed in more detail in the preceding section. This limit has been proposed many times. The first proposal is probably due to J.C. Cooper<sup>31</sup> who gave an altitude of 160 km derived from data available at that time. A limit above the border of ordinary flight and below the perigee of artificial satellites has been proposed by G.P. Zhukov.<sup>32</sup> V. Kopal<sup>33</sup> is also in favor of this criterion. In 1967 he stated that the lowest perigees might lie lower than 160 km and he was shown right by subsequent development. The most recent value which hardly will change in the future is between 90 and 100 km. M. Kolosov<sup>34</sup> stated that, possibly, the limit between the airspace and outer space will be fixed by agreement

<sup>29</sup>See Proc. 11th Colloquium on the Law of Outer Space 374 (1969).

3ºU.N. Doc. A/AC. 105/C.2/7, at 49 (1976).

<sup>31</sup>N.M. Matte, *supra* note 9, at 31.

1977

<sup>32</sup>G.P. Zhukov, Kosmicheskie polety i problema vysotnoi granitsy suvereniteta 60-61 (1967).

<sup>33</sup>See Proc. 10th Colloquium on the Law of Outer Space 275 (1967).

34M. Kolosov, Bor'ba Za mirnyi Kosmos 83 (1968).

<sup>&</sup>lt;sup>28</sup>J.C. Cooper, High Altitude Flight and National Sovereignty, 1951<sup>1</sup>.C.L.Q. 411, 416.

at the level of suborbital altitude. The informal understanding reached in 1960,<sup>35</sup> qualifying as spacecraft any craft exceeding 100 km (62 mi), also supports this criterion.

# C. Limits Based on Properties of the Atmosphere

The limits based on properties of the atmosphere include:

(1) Boundary of the atmosphere. It is impossible to state where the boundary of the atmosphere is. The atmosphere in the first 100 km is a homogeneous mixture of gases. The composition changes at higher altitudes and the transition of the atmosphere into the magnetosphere and finally into interplanetary matter is gradual and continuous. Outer layers of the magnetosphere exhibit very complicated shapes considerably deviating from any spherical forms. The boundary is entirely unsuitable as a criterion for a definition of outer space.

(2) The definition proposed by B. Cheng<sup>36</sup> that airspace is the entire space where air can be found under any form defines airspace but does not define air. If air is defined as a mixture of gases found at ground level, then Cheng's definition would lead to 100 km where the composition changes.

(3) Layers in the atmosphere. The Working Paper submitted by Belgium to the thirteenth session of the Scientific and Technical Sub-Committee<sup>37</sup> gives a brief but complete survey of individual layers of the atmosphere. Among all the layers, the turbopause at  $100 \pm 10$  km, seems to be best suited as the limit of outer space. It divides the homosphere from the heterosphere. The homosphere extends from the surface to the turbopause and is characterized by turbulent diffusion of atmospheric particles. As a consequence, the composition of the homosphere is practically the same at all altitudes as the composition of air at ground level. The heterosphere, lying above the turbopause, is of an entirely different nature. Its composition is highly variable with altitude because the atmospheric gases are stratified according to their molecular mass. As was stressed by V. Bumba at the same meeting, <sup>38</sup> any process which took place above the limit of about 100 km soon became a quasi-global phenomenon, influencing large areas of the earth's surface.

(4) Von Kármán line<sup>39</sup> is defined as the theoretical limit of airflight at an altitude where aerodynamic lift is exceeded by the centrifugal force. This happens at about 84 km. The definition is expressed in terms of physics but it makes the tacit assumption

»IAF Congress, Oct. 1960.

<sup>36</sup>Cheng, Recent Developments in Air Law, 1956 Current Leg. Mat. 210-213.

<sup>37</sup>U.N. Doc. A/AC. 105/C.1/L.76 (1976).

<sup>38</sup>U.N. Doc. A/AC. 105/C.1/SR.160 (1976).

<sup>39</sup>A.G. Haley, supra note 4, at 97.

that airlift is necessary for flight. It is so at present and it may remain so in the future unless rockets on suborbital trajectories come into use. The definition is to some degree connected with a particular degree of technological development but it meets all criteria for a convenient definition. The satellite orbits lie above the line and the lowest perigees are only about 15 km higher. Had the definition been accepted in 1957 when it was first proposed by von Kármán, there would be no reason to change it now.

(5) Functional definitions would require an entirely different approach which is beyond the scope of this paper. The reader is referred to Matte.<sup>40</sup>

## VIII. CONCLUSION

It has been shown that scientific methods are sufficiently determinate and precise and that the experience with satellites launched over a period of 18 years is sufficiently extensive to suggest a specific region, between 90 and 100 km altitude, which has the property that almost all satellite orbits lie above it. From another point of view, the region between 90 and 110 km is the limit of air with the same composition as that at ground level.

It has also been shown that if a definition of an exact limit of outer space within the above regions is adopted, it would be possible to determine the relative position of any object with regard to such a limit with an accuracy of 3 m. Even the space objects themselves can determine their position with regard to the limit with a sufficient accuracy.

Support for using lowest perigees of satellite orbits for the definition of outer space is found in United Nations documents relating to registration of objects launched into outer space. No other criterion proposed for fixing the limit of outer space, with a possible exception of von Kármán's line of primary jurisdictional boundary, seems to meet the requirements for a practicable definition.

Unless the functional approach is preferred by the international community, any fixed value in the above regions would serve as the limit of outer space. A limit at 90 km altitude would be a suitable choice if it was found desirable that satellites spend their entire lifetimes, but for extremely rare exceptional cases, above the limit. A limit at the middle distance of 100 km would also keep practically all satellite orbits, at least during their useful lifetimes, in outer space. The infrequent crossings of the limit by decaying satellites could be regarded in the same light as the natural phenomenon of meteors. The choice of 110 km altitude would give States more headroom at the cost of some satellites spending hours or days below the limit before decaying.

40N.M. Matte, supra note 9.

1977

Let us assume, as an illustrative example, that the international community will agree, at some future time, on the following approach to the definition of outer space: The rounded off value of 100 km might be selected as the basic altitude of the outer space above the geoid, measured in a direction perpendicular to the geoid.

Since almost all space activities start, and some also terminate, at the ground, it might be found convenient to define functions which would be permitted and other functions which would have to be regulated between the ground and the 100 km altitude.

In outer space, *i.e.*, above the 100 km limit, the principles stated in the 1967 Outer Space Treaty apply in general. More detailed arrangements might be elaborated for specific celestial bodies, such as the Moon, or for specific parts of outer space, such as the libration centers or the geostationary orbit.

# THE FUTURE LEGAL STATUS OF NONGOVERNMENTAL ENTITIES IN OUTER SPACE: PRIVATE INDIVIDUALS AND COMPANIES AS SUBJECTS AND BENEFICIARIES OF INTERNATIONAL SPACE LAW

## I. H. Ph. Diederiks-Verschoor\* & W. Paul Gormley \*\*

# I. THE UNIQUE SUBSTANCE OF THE INTERNATIONAL LAW OF OUTER SPACE

The evolution of the law of outer space, following the launching of the first satellites by the Soviet Union and the United States in the latter 1950's, demonstrates one inescapable fact: the development of space law represents the reverse situation of early land-based exploration. Whereas the early commercially oriented expeditions were primarily private undertakings organized by a few adventurous individuals, who often possessed some sort of royal charter, the need for modern technology and tremendous financial resources has dictated that space exploration (and exploitation) be carried out as governmental activities. Examples, such as the Hudson Bay Company or the King of Belgium's personal control of the Congo, abound.<sup>1</sup>

As early as 1963 Professors McDougal and Vlasic recognized that nongovernmental entities, including private individuals, have a significant role to play in outer space.<sup>2</sup> Other scholars, notably the late C. Wilfred Jenks<sup>3</sup> and Professor Carl Christol,<sup>4</sup> have also maintained that private uses, and simultaneously mixed public-private uses of outer space, should take place for the benefit of "all of mankind." Dr. Jenks, in his classic, *The Common Law of Mankind*,<sup>5</sup> published in 1956, conceded that there was little

\*\*Ph.D. Denver, D.Jur. Brussels, LL.D. (Manc.). Member of the District of Columbia and United States Supreme Court bats.

<sup>1</sup>See, e.g., M. Lachs, The Law of Outer Space 19-20 (1972). Judge Lachs draws an analogy between present space efforts and the explorations of the 15th and 16th centuries. He observes, and quite correctly, that "frequently the practices of dividing and disposing of lands and whole continents led to conflict and strife. The lesson should have been learnt." *Id.* at 20. Accordingly, he pleads for international cooperation. *Id.* at 23.

<sup>2</sup>M. McDougal, H. Lasswell & I. Vlasic, Law and Public Order In Space 6-11 (1963).

<sup>3</sup>C. Jenks, Space Law 87-92 (1965).

4C. Christol, The International Law of Outer Space 84-88 (1966).

<sup>3</sup>C. Jenks, The Common Law of Mankind 390-391 (1956). *See especially* International Law and Activities In Space, in the Common Law of Mankind 382-407 (1956).

<sup>\*</sup>Professor of Air and Space Law, University of Utrecht; the Netherlands. The views expressed in this paper are those of the authors and are not necessarily connected with any organization of which they are members.

disposition on the part of governments to encourage the launching of rockets or satellites by private enterprise. An identical position was taken by Dr. Jenks in his later book, *Space Law.*<sup>6</sup> Nevertheless, it would be incorrect to assume that his approach was negative; rather it can be detected, Jenks was advancing the proposition that there was a place for the private individuals in space, even though it was impossible to determine the extent of such ultimate participation.<sup>7</sup> Yet, the primary examples of nonstate activities are COMSAT and EUROSPACE.<sup>8</sup>

The concept of nonstate activities, as used by the authors, is similar to that found in public international law, namely, international and multinational organizations have a legal existence, and a resulting legal personality, apart from those States ratifying the establishing treaty. As held by the International Court of Justice in the *Reparations Case*, <sup>9</sup> the United Nations, as a subject of international law, is "capable of possessing international rights and duties."<sup>10</sup> Therefore, in considering the activities of multinational and international organizations in outer space, a distinction must be drawn between the legal personality possessed by States, as contrasted with that of intergovernmental organizations and private interests. It would be incorrect to assume that intergovernmental institutions acquire the elements of state sovereignty of function at the interstate level, even though they do cooperate with States and governmental entities (such as NASA). As concerns the legal personality of the United Nations, by way of illustration:

The International Court has come to the conclusion that the Organization is an international person. That is not the same thing as saying that it is a State, which it certainly is not, or that its legal personality and rights and duties are the same as those of a State . . . What it does mean is that it is a subject of international law and capable of possessing international rights and duties, and that it has capacity to maintain its rights by bringing international claims.<sup>11</sup>

6C. Jenks, supra note 3, at 87-92.

<sup>7</sup>Dr. Jenks argued:

The question of how far private enterprise will play any part in European space operations therefore remains an open one.

It is equally premature to attempt to gauge how far private enterprise may play a part in space activities initiated in other parts of the world or in new types of space activity.

Id. at 92.

See C. Jenks, supra note 3.

<sup>9</sup>Advisory Opinion on Injuries Suffered in the Service of the United Nations, [1949] I.C.J. 174. See also C. Jenks, The Proper Law of International Organizations 56 (1962) (on the principle of implied powers conferred on an organization in order that it may effectively carry out its functions).

<sup>10</sup>Advisory Opinion on Injuries Suffered in the Service of the United Nations, [1949] I.C.J. 174, 179. See J. Fawcett, International Law and the Uses of Outer Space 6 n.2 (1968).

<sup>11</sup>Advisory Opinion on Injuries Suffered in the Service of the United Nations, [1949] I.C.J. 174, 179.

### 1977 NONGOVERNMENTAL ENTITIES IN OUTER SPACE

Indeed, some space efforts are intergovernmental, as for instance, ESA, whereas COMSAT, the Canadian Telsat Corporation,<sup>13</sup> and EUROSPACE can be more accurately classified as private ventures or even mixed public-private users. A primary example of a private user would be EUROSPACE.

Established in 1961, EUROSPACE retains its character as a purely private enterprise, enjoying the status of a French legal association. Originally a creation of EUROSAT (a Swiss legal association that has undertaken studies and has also entered into contracts with ESA, as for example regarding ESA's ground station at Redu, Belgium), EUROSPACE has not been absorbed into ESA. As such, EUROSPACE concentrates largely on the discussion of space issues among governmental authorities and private undertakings. It also attempts to influence public opinion in favor of continued space exploration.<sup>14</sup>

EUROSPACE presently consists of European and American private enterprises, e.g., industrial and professional organizations, but it is subject to a strong European influence. Nonetheless, a United States-Europe joint committee has been established for the purpose of improving cooperation between the private aerospace industries on both sides of the Atlantic, which takes the form of a dialogue between all interested

The corporate personality of international organizations created by treaty was regarded as a novelty until it was firmly established by the specific provisions which became a matter of common form in the constitutions of international organizations drafted in the nineteen forties and by the decision of the International Court of Justice in the Reparations for Injuries Case; a comparable but further development may be imminent in respect of space corporations created directly by the action of international organizations.

C. Jenks, supra note 3, at 300. See 1 H. Schermers, International Institutional Law (1972).

As concerns the law-making role of the United Nations and the law-developing role of political organs, in terms of state practice, see R. Higgins, Law, Politics, and the United Nations, in the Development of International Law Through the Political Organs of the United Nations 1-10 (1963). In regard to the legal personality of organizations, see *id.*, The Law of Treaties: United Nations Practice, at 241-346.

<sup>13</sup>Telesat Canada Act, c. T-4 Revised Statutes of Canada (1970); Hallgarten, The Influence of Communications Satellites on National Communications Laws and Regional Arrangements in the Americas, 2 J. Space L. 107, 123 (1973).

<sup>14</sup>Y. Demerliac, EUROSPACE, in International Cooperation in Outer Space, Doc. No. 92-57, 92d Cong., 1st Sess. 581-82 (1971).

<sup>&</sup>lt;sup>12</sup>Cf. id. "Practice - in particular the conclusion of conventions to which the Organization is a party - has confirmed this character of the Organization, which occupies a position in certain respects in detachment from its Members . . . . "Id. Dr. Jenks speaks of the United Nations as a corporate entity, created by the members of the world community. He maintains:

parties, including governments and private undertakings.<sup>15</sup> Considerable emphasis is placed on the reciprocal exchange of information.

A significant contribution can be seen from its legal work in the field of contracts for the benefit of the superseded ELDO and ESRO. Specifically, EUROSPACE has contributed to the contract clauses used by these European organizations; and, presumably, such legal drafting will continue in relation to ESA's current programs. Not only is EUROSPACE cooperating in European space efforts, but it has also completed a study for the European Communities "to ascertain what role Europe might play in a world meteorological system."<sup>16</sup>

In considering the future activities of EUROSPACE, at both the regional and international levels, "Eurospace has also afforded its assistance to Eurocontrol to study the conditions in which a European satellite might be used on an economic basis for air traffic control over the North Atlantic."<sup>17</sup> In addition, this private European association may render assistance to African states by setting up a system of educational television utilizing space satellites.

Therefore, a private corporation (rather than an intergovernmental organization, such as the Council of Europe or the EC) will enable Europe not only to play a significant role in the emerging utilization of outer space, but it will serve as the means of further cooperation between Western Europe and the United States, largely through the United States-Europe joint committee, mentioned above.

Our investigation, consequently, has come full cycle: not only is there a place for private interests, but governmental entities can benefit directly, notwithstanding the fact that existing distinctions between private entities and corporations, interstate programs, plus the mixed public-private activities will continue. Accordingly, in our submission, private entities will render significant contributions to future space efforts.

Professor Christol devotes considerable attention to the private uses of outer space. Beginning with the premise that there is a right under customary international law to engage in space exploration for peaceful purposes,<sup>18</sup> Christol relies on the fact that the use of space by private interests was reinforced by the unanimous vote of the United Nations General Assembly in its adoption of the Declaration of Legal Principles Governing the Peaceful Activities and Use of Outer Space.<sup>19</sup>

## ыId.

16*1d.* at 584.

17**[d**.

<sup>18</sup>C. Christol, *supra* note 4, at 147.

<sup>19</sup>U.N. G.A. Res. 1962 (XVIII) (1963); Fasan, The Meaning of the Term 'Mankind'' In Space Legal Language, 2 J. Space L. 125 (1974).

1977

In considering the future legal position of nongovernmental entities in outer space, which is a variation of the long debated issue of the status of the individual as a subject of international law,<sup>20</sup> it must be conceded that individuals and nongovernmental entities at the present time do not enjoy the status of full subjects, largely because of the inability of nonstate entities to acquire the facilities to enter the space race, *e.g.*, the tremendous cost involved, plus the high level of technology and launching facilities required. Nevertheless, in our submission, there will be an increasing role, at least within Western democracies and European organizations, for private enterprise, largely because of the position taken by the United States. Accordingly, at the present stage in the evolution of space law it has become desirable, if not mandatory, to begin a preliminary investigation of some potential contributions that can be made by nongovernmental entities and their resulting legal effects. In terms of America's space effort, significant contributions have been made by private enterprise, semigovernmental companies and international organizations. In particular the examples of COMSAT and INTELSAT can be cited.

In looking toward the future status of the individual in outer space, the reality of the East-West and North-South divisions within the United Nations must be conceded. It is the United States that has sought to utilize the resources of private enterprise, though admittedly exercising a controlling position through the supervision of the Federal Communications Commission.<sup>21</sup>

Conversely, the Soviet Union holds to its position of state supremacy, whereby activities in outer space will be undertaken exclusively by states;<sup>22</sup> however, the Soviet view was not incorporated into the 1963 General Assembly Declaration. Nevertheless, states remain responsible for the activities of their natural legal persons. As will be shown subsequently,<sup>23</sup> the Outer Space Treaty of 1967 in articles VI and VII, the 1972 Convention on International Liability for Damages Caused by Space Objects, and the 1974 Convention on Registration of Objects Launched Into Outer Space, have carried forward the legal obligations of states and of international organizations. Thus, the series of General Assembly resolutions and subsequent multinational conventions have recognized the reality of the legal status of space law: sovereign states will continue to be the dominant subjects under the rule of law.<sup>24</sup>

<sup>20</sup>W. Gormley, The Procedural Status of the Individual before International and Supranational Tribunals (1966); C. Norgaard, The Position of the Individual in International Law (1962).

<sup>21</sup>Communications Satellite Act of 1962 (COMSAT Act) Pub. L. No. 87-624, 87th Cong., 2d Sess. (1962); see S. Lay & H. Taubenfeld, The Law Relating to Activities in Space 205-13 (1970) (Appendix C - Domestic Use of Communications Satellites).

<sup>22</sup>J.C. Cooper, Free Enterprise In Outer Space, in Explorations In Aerospace Law 335-36 (I. Vlasic ed. 1968).

<sup>23</sup>See note 85 and accompanying text infra.

<sup>24</sup>Accord, H. van Panhuys, Relations and Interactions Between International and National Scenes of Law, 112 Recueil des Cours 2 (1964 II). See especially, The Forgotten Actor, id. at 61-71. Spofford maintains that it

# II. THE LEGAL STATUS OF INDIVIDUALS

Prior to examining the future legal personality of individuals and nonstate entities in international space law, it is essential briefly to reconsider the basic theories presently recognized in public international and regional law, frequently in terms of human rights protection. In terms of the legal standing of nongovernmental entities, there are three main theories: 1) object, 2) subject and 3) beneficiary.

Under doctrines of classical international law only states were subjects of the legal order and possessed *locus standi* before international fora. Accordingly, nonstate entities were the objects of the legal system. The important consideration is that individuals had no means, indeed no legal rights, to assert their claims. Even in those instances wherein their substantive rights had been violated (such as in cases of confiscation of property), only the national's state could assert his claim under the legal fiction of diplomatic protection by which the claim of the injured national was deemed to be that of the state.<sup>23</sup> As will be shown below in connection with the discussion of liability, the procedural remedy of diplomatic protection of nationals is used as a means of protecting the interests of nationals and companies lacking *locus standi* to espouse their claims in their own names against foreign governments.<sup>26</sup>

These two classical theories of the status of nonstate entities, though still predominant, have been supplemented by a third criterion, pursuant to which individuals are held to be the beneficiaries of international law.<sup>27</sup> While not a participant in the legal order, or a procedural subject, the private individual benefits from the protection accorded by international law, as can be seen from present examples of human rights guarantees.<sup>28</sup> Not infrequently, treaties are enacted for the benefit of private persons, such as the Geneva Convention on the Protection of Prisoners and Civilian Populations of 1949,<sup>29</sup> and the draft conventions to protect fresh water by the

is no longer valid to hold that only states are subjects of international law. Spofford, Third Party Judgement and International Economic Transactions, 113 Recueil des Cours 116 (1964 III). See in particular, International Status and Access to International Tribunals, id. at 171-88. See note 27 infra.

<sup>25</sup>E. Borchard, The Diplomatic Protection of Citizens Abroad (1915).

<sup>26</sup>The use of diplomatic protection as a means of safeguarding human rights is discussed in Gormley, The Protection of Individuals and Companies, Indian Y.B. Int'l Aff. (1976).

<sup>27</sup>Some cuttent authors do no include the category of beneficiaries. See, e.g., L. Sohn & T. Buergenthal, The Position of the Individual Under International Law, in International Protection of Human Rights 1-8 (1973). But see Gormley, Book Review, 5 Georgia J. Int'l. & Comp. L. 330, 331 (1975). See also the sources cited in Sohn, supra, at 19-21. As concerns the newer concept of "Mankind," compare the proposals of Fasan, Space Legal Language, 2 J. Space L. 125 (1974); especially § IV, Mankind as a New Subject of International Law, id., at 130-31, which represents the author's conclusions.

<sup>28</sup>W. Gormley, *supra* note 20, at 26-29.

<sup>29</sup>E.g., The 1949 Geneva Convention Relative to the Treatment of Prisoners of War, 6 U.S.T. 3316; 75 U.N.T.S. 135; 47 Am. J. Int'l L. Supp. 119 (1953). The 1949 Geneva Convention for the Amelioration of the

#### 1977

Council of Europe<sup>30</sup> and the European Communities.<sup>31</sup> Notwithstanding the fact that individuals cannot assert their claims, they benefit from positive law.

Through the application of the doctrine of the "Common Heritage of Mankind" (presently sought to be applied to the regime of the deep seabed, as well as to the cosmos), the Role of Mankind in the law of outer space is given additional legal support.<sup>32</sup> Pursuant to the provisions of the 1967 Space Treaty<sup>33</sup> (and the subsequent implementing conventions discussed below), states remain the procedural subjects of international space law; however, as one writer observes, the 1967 Treaty, while governing the activities of states, has sought to benefit legal entities other than states parties.

The expressions contained in the Treaty, such as "in the interest of *mankind*", "for the benefit of all peoples", "envoys of *mankind*", underline the universal scope of its norms. . . . As stated by Prof. Cocca, the United Nations documents are sufficiently clear, precise, uniform, harmonious and repetitive as to explain the establishment of *mankind* as beneficiary in the exploration and use of outer space.<sup>34</sup>

Condition of the Wounded and Sick in Armed Forces in the Field, 6 U.S.T. 3114, 75 U.N.T.S. 31; The 1949 Geneva Convention Relative to the Protection of Civilian Persons in Time of War, 6 U.S.T. 3516, 75 U.N.T.S. 287; 50 Am. J. Int'l L. Supp. 724 (1956).

As concerns protection and likewise benefits to captured human beings, no longet active combatants and all too frequently injured, see Levie, Penal Sanctions For Maltreatment of Prisoners of War, 56 Am. J. Int'l L. 433, 444-60 (1962); Levie, Prisoners of War and the Protecting Power, 55 Am. J. Int'l L. 374, 375 n.3 (1961). *See also* Forsythe, Who Guards the Guardians: Third Parties and the Law of Armed Conflict, 70 Am. J. Int'l L. 41 (1976); Draper, The Geneva Conventions of 1949, 114 Recueil des Cours 59 (1969 I).

<sup>30</sup>E.g., The earlier Water Chatter has been carried forward by the Draft European Convention for the Protection of International Watercourses Against Pollution, Lammers, The Draft European Convention of the Council of Europe for the Protection of International Watercourses Against Pollution, 6 Netherlands Y.B. Int'l L. 167 (1975). See discussion in European Symposium on the Organization of the Protection of Fresh Water, AS/COLL./EAU 7 (74) 8 (1974); Gormley, Draft Convention on the Protection of Fresh Waters, the Right of Individuals to be Guaranteed a Pure, Clean and Decent Environment: Future Programs of the Council of Europe, 1 Leg. Issues of European Integration 23, 40-42 (1975). An excellent example of efforts undertaken by a multinational organization to benefit individuals, and only secondarily to protect the state, can be seen in the European Technical Conference on Leisure and Nature Conservation, Council of Europe, Hamburg, June 9-13, 1975.

<sup>31</sup>E.g., Council Resolution of March 3, 1975 on the Convention For the Prevention of Marine Pollution From Land-Based Sources, 18 No. C168 O.J. 1 (July 25, 1975), and the text of the convention, *id.* at 2-3.

<sup>32</sup>Williams, The Role of Equity In the Law of Outer Space, 5 Int'l Rel. (Eng.) 776 (1975).

<sup>33</sup>Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, January 27, 1967, [1967] 18 U.S.T. 2410, T.I.A.S. No. 6347, 610 U.N.T.S. 205 (effective Oct. 10, 1967).

<sup>34</sup>Williams, *supra* note 32, at 792, *citing* Cocca, Caracter de la mision de los cosmonautas ante la incorporacion de la luna al patrimonio comun de la Humanidad, VII Congreso Hispano-Luso-Americano de D. Internacional (1969).

There is even substantial authority for the position that the concept of the common heritage of mankind was originally applicable to outer space and has subsequently been applied to the ocean floor, the deep seabed and Antarctica.<sup>35</sup>

These international areas, though in some danger of being appropriated by states and thereby subjected to national jurisdiction, may benefit private individuals, companies, nongovernmental entities and indeed all of mankind.

Purposely, the term "nongovernmental entities" has been used in two varying connotations in article VI of the Space Treaty, as will be discussed subsequently.<sup>36</sup> In this portion of the study, it is essential to stress: 1) the importance placed on private interests by the Space Treaty and earlier resolutions of the United Nations General Assembly and 2) the provisions of article VI, providing that activities can be carried on by non-governmental entities in outer space. Regrettably, subsequent implementing conventions do not contain similar references.

Notwithstanding the above references to article VI, individuals must be deemed to have become "objects" rather than "subjects", insofar as this convention supersedes customary international law, in connection with General Assembly Resolution 1962, which had enunciated the common interest of mankind in the exploration and use of outer space for peaceful purposes.<sup>37</sup> As is true of present attempts by the series of United Nations Conferences on the Law of the Sea to preserve the deep seabed, now conceived to constitute "inner space", outer space should similarly be deemed an area to be held in trust as a common heritage of mankind and, thereby, utilized for the benefit of all mankind. By way of definition, the newer use of the term "inner space" must not be confused with airspace, *i.e.*, that relatively small area of the ozone layer (or atmosphere) governed by aviation law, largely because of the fact that space objects and vehicles "burn up" if unprotected.<sup>38</sup> This newer definition of inner space, then, refers to the deep seabed, located beyond the outer limits of national continental shelves, which are subject to national control. Not by accident, inner space and outer space, collectively.

<sup>36</sup>See note 68 infra. In connection with art. VI, see note 85 infra.

<sup>37</sup>C. Christol, *supra* note 4, at 435.

<sup>38</sup>See, e.g., J. Kish, The Delimitation of Airspace and Outer Space, in The Law of International Spaces 42-44 (1973).

The upper limit of airspace and the lower limit of outer space determine the minimum and maximum heights of the limit of airspace and outer space. . . . Accordingly, the maximum flight height of aircraft constitutes the upper limit of airspace. . . . [T]he flight area of spacecraft in orbit around the earth determines the lower extent of outer space.

*Id.* at 42. The definition of the term "inner space," as it is presently being applied at the Third United Nations Conference on the Law of the Sea, is discussed in R. Anand, Legal Regime of the Sea-Bed and the Developing Countries (1975); Gormley, Book Review, Netherlands Int'I L. Rev. (1976).

<sup>35</sup>Williams, supra note 30, at 792-94.

#### 1977

In considering the future position of nongovernmental entities, it is valid to conclude that they will be the object of damage caused by spacecraft, pollution of outer space, and even of military satellites. Similarly, individuals are the beneficiaries of space exploration and will benefit from the increasing use of outer space. Obviously, individuals will be participants in space programs, as can be seen from the successful Apollo-Soyuz link-up in space, in which astronauts and cosmonauts cooperated on behalf of their respective governments. The role, therefore, of individuals is assured, especially for technicians, scientists and jurists. Yet, their status as legal subjects of outer space law must be reconsidered in terms of the benefits to be derived by all of the world's peoples.

# III. SPACE ACTIVITIES AND RESULTING BENEFITS

An exhaustive list of political, social and economic activities cannot be presented within the scope of this study; still, notice can be taken of a selected number of areas that will prove to be of immediate benefit to mankind. On the other hand, it seems beyond serious challenge that additional uses and benefits will subsequently be discovered, as for example the exploitation of natural resources. Professor Fawcett, President of the European Commission on Human Rights, foresaw the great potential of the uses that could be made of the space region, as for example,

communications, including the use of mass communications for education and as aids to technical development; meteorology; air and sea navigation; geodetic surveys; biology, and in particular the applications of space medicine; education and training for space operations; and finally . . . the technological and scientific by-products of the whole space enterprise, in the form of new techniques and adaptations.<sup>39</sup>

### A. Telecommunications Satellites

One of the principal benefits derived by man is in the field of telecommunications.<sup>40</sup> Since 1962, at which time the first Telstar satellite began to transmit messages and television broadcasts, increasing use has been made of communications satellites. The world's first operational commercial satellite, the Early Bird, was launched on April 6, 1965, by COMSAT, and it is in this field that private

<sup>39</sup>J. Fawcett, supra note 10, at 43.

<sup>40</sup>Symposium: The Legal Problems of International Telecommunications With Special Reference to Intelsat, 20 U. Toronto L.J. 287 (1970). See notes 47, 51 & 86 infra.

For instance, the use of satellites to benefit mankind can be seen in M. Schmidbauer, Water Pollution Control Via Satellite: A Proposal For a Pilot Project, presented to European Symposium on the Organization of the Protection of Fresh Water, Council of Europe, Strasbourg, AS/COLL./EAU (74) 5 (1974). enterprise has made its major contribution. Notwithstanding the fact that the launching rocket was furnished by the American Government, the satellite was of private origin. As shown above, it was the policy of the United States to encourage participation by private companies.

The increasing use of communications satellites raises a number of additional legal problems, not the least of which is the control being exercised by the Federal Communications Commission over COMSAT and even INTELSAT.<sup>41</sup> That is to say, even the efforts of the United Nations and of other international organizations, such as ESA and NATO,<sup>42</sup> are to some extent dependent on cooperation from NASA. At least one authority has indicated that the FCC is inadvertantly exercising control over many of the functions of INTELSAT.<sup>43</sup>

This degree of control to be exercised by the United States Government, through its regulatory agencies, over private corporations and even with international and regional organizations, has still to be resolved. Hopefully, the U.S. and the U.S.S.R. will take the lead in instituting a higher level of cooperation, within the framework of INTELSAT and INTERSPUTNIK. Owing to the Soviet's opposition to participation by private interests in space, extensive cooperation at this level seems unlikely in the near future.<sup>44</sup> But this is not to imply that a negative approach is being taken toward the

<sup>42</sup>As regards the development of satellite programs by international organizations, NATO can be cited as an example of the type of activity that can result in benefits to nonstate entities. *See*, *e.g.*, NATO's Second Communications Satellite In Orbit, 19 NATO Letter 16 (1971). A satellite communications project, "guaranteeing an ever safer, quicker and more reliable communications system for NATO's political and military use." *Id.* at 11.

<sup>43</sup>S. Lay & H. Taubenfeld, *supra* note 21, at 205-06 & n.3. "[T]he FCC may have at times exercised regulatory or adjudicatory authority over what would appear to have been INTELSAT business." *Id.* at 205.

<sup>44</sup>Professor Gorove takes a position somewhat in opposition to the present study, when he concludes that there is no "right of adventure," as follows:

The ... question is whether or not nongovernmental organizations and individuals could invoke and benefit from the principle and whether the restrictive connotations which are spelled out in relation to states would be binding on them. The fact that there is no: "right of adventure" assured in the Treaty for individuals is perhaps a negative expression of the intention of the drafters. The inclusion of such a right would likely have gone well beyond the desires of those who regard private initiative and enterprise as an important potential contributor to the exploration and development of celestial bodies. While some of the restrictions which limit the freedom of exploration and use are clearly applicable only to states, the stipulation that states bear international

<sup>&</sup>lt;sup>41</sup>McWhinney, The Antinomy of Policy and Function in the Internationalization of International Telecommunications Broadcasting, 13 Colum. J. Transnat'I L. 3 (1974). McWhinney concludes that COMSAT (as an agency owned by the U.S. Government) wears "three hats" simultaneously: "as a U.S. internal, domestic, common carrier for profit; as the U.S. national representative to INTELSAT; and, finally, as the general management authority within INTELSAT itself." *Id.* at 11. *But cf.* R. Colino, The INTELSAT Definitive Arrangements: Ushering in a New Era In Satellite Telecommunications, (Monograph 9, European Broadcasting Union) (1973).

### 1977

feasibility of future cooperation and collaboration between the two super powers. At the very least, some cooperation is presently taking place between the U.S. and the U.S.S.R. in the scientific and legal fields, as can be seen from the joint Apollo-Soyuz link-up. An additional illustration can be seen in their cooperation with the World Meteorological Organization (WMO).<sup>45</sup> In support of meteorological satellites, the communist bloc and the Americans provide all possible information.

#### B. Information and Education

In considering the rights of individuals to benefit from space technology, their right to freedom of information becomes of primary concern by reason of its importance to education and mass communication. In particular, the peoples of developing states can become the beneficiaries of mass educational television broadcasts.<sup>46</sup> Of course, at such time as television programs are transmitted across national boundaries, additional legal difficulties will arise relating to possible infringements of national sovereignty. The Voice of America can be cited as one of the types of uses to which technology can be directed.

At least one writer has argued that the Western powers cannot insist on unlimited freedom of information (and transmission across frontiers), during the formative stages.<sup>47</sup> Yet in the context of freedom of information, as a fundamental human right, it

tesponsibility for national activities of nongovernmental entities underscores the idea of continued jurisdiction of states over nongovernmental entities, including individuals and corporations.

Gorove, Freedom of Exploration and Use in the Outer Space Treaty: A Textual Analysis and Interpretation, 1 Denver J. Int'l L. & Policy 93, 94 (1971) (relying on art. I of the 1967 Space Treaty). *But cf.* the position of D. Goedhuis who indicates that the Space Treaty is silent as concerns the topic of appropriation of resources from outer space. He contends the appropriation of resources forms part of the freedom of exploration (as is true of the law of the high seas) and that such use of outer space is not prohibited. He argues, and quite correctly: "Both the United States and the Soviet Union will in a near future launch manned orbiting laboratories which, insofar as present indications are concerned, are aimed primarily at civilian uses." D. Goedhuis, The Present State of Space Law, in the Present State of International Law 213 (1973).

<sup>45</sup>A. Davis, Examples of International Cooperation, the Role of the World Meteorological Organization In Outer Space Affairs, in International Cooperation In Outer Space 331, 356-57, Doc. No. 92-57, 92d Cong., 1st Sess. (1971).

<sup>46</sup>Malik, Space Law As Inter-Systems Consensus: Contributions of the Third World to Soviet Bloc and Western Approaches to the Emerging Principles of Space Law, 17 Indian Y.B. Int'l Aff. 201 (1974). Although not active participants in the space race, developing states have a strong interest, and will benefit from the exploration of outer space. Their immediate aim is to bring the positions of the U.S. and USSR a bit closer together.

<sup>47</sup>T. Buergenthal, The Right to Receive Information Across National Boundaries, in Control of Direct Broadcast Satellite: Values In Conflict 73 (1974); see Propaganda and Related Matters, *id.* at 81-82. See also H. Eek, International Freedom of Information: New Dimensions, in Melanges offerts a Juraj Andrassy 88-98 (1968); Dauses, Direct Television Broadcasting By Satellites and Freedom of Information, 3 J. Space L. 59 (1975); Powell, Direct Broadcast Satellites: The Conceptual Convergence of the Free Flow of Information and National Sovereignty, 6 Calif. Int'l L. J. 1 (1975). appears likely that private associations will encounter considerable opposition from national authorities, even as to the transmission of educational broadcasts.

The significant consideration from our standpoint is that no prohibition has been placed upon the activities of private companies and individuals by the principles laid down by the United Nations.<sup>48</sup> Rather, the thrust of U.N. efforts has been to emphasize the importance of international cooperation.<sup>49</sup>

Part of the difficulty lies in the fact that no single international institution has the jurisdiction or competence to regulate in all fields of direct broadcasting. Consequently, the Committee on the Peaceful Uses of Outer Space, indeed the United Nations in general, "should sustain the interest it has now shown in coordinating activity in the field of direct broadcasts from satellites and, where applicable, make suggestions on regulatory procedures."<sup>50</sup>

The need for international and regional legal cooperation becomes all too obvious regarding the exchange of information.

# C. Copyright

One additional illustration of the benefits, and simultaneous impact of the law on the "objects" of the legal system, can be seen in the newer area of copyright. What are the rights of an owner of an educational or commercial film transmitted via satellite? What monetary return should a TV producer be able to obtain from either a multinational institution, a foreign government (or even his own government), or those private persons, who had made use of or had merely viewed the film, in view of the fact that existing international copyright conventions were not drafted in such a fashion as to cope with satellite transmissions? Thus, the Universal Copyright Convention and the International Union For the Protection of Literary and Artistic Works are inadequate to deal with satellite transmissions and receptions. The same situation applies to the regulatory system of the ITU. Not only are existing conventions restricted to states parties, a situation that eliminates a number of developing countries from participation,

49Eek contends:

It may be noted that private enterprise is not prohibited by the principles laid down by the United Nations, but it should also be recalled that resolution 1802 (XVII) of 14 December 1962 emphasized "the importance of international co-operation to achieve satellite communications which will be available on a world-wide basis."

*Id.* at 92. He concludes with a call for the creation of a new organization to regulate satellite broadcasts (radio and TV), so that the receiving country would be protected from propaganda (including war propaganda). *Id.* at 98.

<sup>30</sup>Space Activities and Resources: A Review of the Activities and Resources of the United Nations, of Its Specialized Agencies and of Other Competent International Bodies Relating To the Peaceful Uses of Outer Space, A/AC, 105/100, at 11 (1972).

136

<sup>48</sup>H. Eek, supra note 47, at 72.

#### 1977

but national legislation often fails to provide effective remedies. For instance, will "poaching" from satellites, not only for initial viewing but also for rebroadcasting, be permitted? Will, for example, freedom of information encompass uninhibited propaganda? These unresolved questions demonstrate the need for additional conventions.<sup>51</sup>

Hopefully, present efforts by the ITU, UNESCO and the United International Bureau for the Protection of Intellectual Property may be able to at least partially remedy such deficiencies by means of new conventions. Presumably, the U.N. Committee on the Peaceful Uses of Outer Space, or even INTELSAT, may lend support to copyright holders.

# D. Economic, Social and Cultural Rights

Professor Christol speaks of economic interests in outer space.<sup>32</sup> In fact, the great majority of man's activity, apart from purely military aspects, is related to future economic benefits; and, hopefully, future research will explore in more detail the tremendous economic benefit that can be derived from scientific research in outer space. Illustrations would be meteorology, weather forecasting and information. A reliable prediction of a forthcoming disaster, such as a hurricane or a tidal wave, only a few hours in advance of earth bound weather forecasting devices, will save countless lives and millions of dollars. Likewise, the use of space satellites and space stations will greatly facilitate existing geodetic and navigational aids.

## E. Extra Sensory and Resource Sounding Satellites

The use of remote sensing satellites will prove to be second only in importance to the benefits derived from communication satellites, and there is also the possibility that the location of new resources may prove to be of even greater value to the world community, especially as the destruction of the ecology results in diminution of available resources. So sophisticated have the resource sounding satellites become that they are being utilized to detect new deposits of minerals, especially soft minerals such as oil and natural gas fields. From the standpoint of preserving man's endangered environment, this new family of satellites is being employed to survey forestry, agricultural and marine resources. Land use and geology, as well as hydrology and cartography, are being furthered by the use of satellites. Space sensing satellites, therefore, can be used to detect ocean pollution and the destruction of the ocean

<sup>&</sup>quot;See, e.g., Symposium: Direct Broadcast Satellites and Space Law, 3 J. Space L. 1 (1975); especially, Galloway, Direct Broadcast Satellites and Space Law, *id.* at 3, & 10-15; International Legal Problems of Direct Satellite Broadcasting, 20 U. Toronto L.J. 314, 316 (1970).

<sup>&</sup>lt;sup>52</sup>C. Christol, supra note 4, at 109-11.

ecology, thereby benefiting not only the environmental programs of international and regional organizations, but also the international community and its peoples.<sup>53</sup>

Much of the present research is being carried out from aircraft, owing to the higher cost of space vehicles; however, the future potential of the use of remote sensing satellites is far greater. In this regard, it was recommended by the United Nations Food and Agriculture Organization joint seminar that

planning for continued experimental work in remote sensing applications from space be based on integrated programmes for international cooperation involving all disciplines and applications which are expected to benefit from these programmes. The programmes should ideally consist of global, regional and national activities, supported by extensive training and exchange of expertise and results should be co-ordinated with proposed or ongoing international and regional programs.<sup>34</sup>

Of such potential is the use of sensing satellites that several U.N. agencies are interested in the utilization of these devices for the purpose of implementing their own programs. Their newer classes of satellites can obtain information for the related activities of FAO, UNESCO, ITU, UNEP, WHO and others.<sup>55</sup> Accordingly, it will be highly desirable to coordinate the three main activities of space satellites, namely, remote sensing, communications and meteorology.<sup>36</sup> Such coordination at the scientific level may lead to greater cooperation between member states of the United Nations and interested specialized agencies, such as the United Nations Environmental Program. In the 1976 Report of the Secretary-General of the United Nations it was stressed:

The organizations came to the conclusion that interagency co-operation was proceeding satisfactorily in the area of communications satellites, where UNESCO, 17U and the United Nations have well-established working relationships. The same was true in the area of meteorology, involving WHO as well as the United Nations, FAO, UNESCO, and UNEP. It was felt, however, that there was a definite need for continuing and more intensive co-ordination in connection with the various programmes relating to remote sensing, in the United Nations, FAO, UNESCO, WHO and UNEP were all concerned.<sup>37</sup>

<sup>53</sup>C. Christol, Space Sensing of Harms To the Marine Environment---Damages In International Law, Proc. 16th Colloquium on the Law of Outer Space 106 (1974). See also Schmidbauer, supra note 40.

<sup>34</sup>Committee on the Peaceful Uses of Outer Space: Report on the United Nations/FAO Regional Seminar on Remote Sensing Applications (Jakarta, Indonesia, November 19-28, 1975). U.N.G.A. A/AC. 105/162, at 13, January 21, 1976.

"Coordination of Outer Space Activities Within the United Nations System: Report of the Secretary-General. Committee on the Peaceful Uses of Outer Space: U.N. G.A. A/AC. 105/166, February 5, 1976.

59*1d.* at 3.

57]d.

The Report continued:

Remote sensing, particularly by infra-red radiation, for detecting and monitoring industrial waste and domestic scwage into coastal seas, and oil pollution in open seas, is being given increasing study under the Global Investigation of Pollution in the Marine Environment (GIPME) of UNESCO's Inter-governmetal Oceanographic Commission (IOC). The global nature of observation by satellites is an asset of particular importance for the IGOSS. Studies under way on the use of satellites for oceanographic observations include: assessment of ongoing and planned national and regional satellite projects; means of incorporating data obtained from satellite data (being carried out by the joint IOC/WHO group of experts of IGOSS and the IOC Working Committee on International Oceanographic Data Exchange).<sup>36</sup>

In considering the future use of satellites for the benefit of mankind, special attention should be given to the United Nations Environmental Program, because of the fact that remote sensing can serve "as an important tool to collect data on environmental variables systematically."<sup>39</sup> Environmental data will be assembled by the Global Environmental Monitoring System (GEMS), whose purpose, and likewise that of United Nations agencies, especially UNEP, is: "to ensure that data on environmental variables are collected in an orderly and adequate manner for the purpose of obtaining a quantitative picture of the state of the environment and of the natural and man-made global and regional trends undergone by critical environmental variables."<sup>60</sup>

The future potential to the global community, and to the world's peoples, of remote sensing and resource sounding satellites seems incalculable. Individuals will be the ultimate beneficiaries, largely because of the fact that a large number of U.N. agencies will have a direct interest in the data obtained. Specifically, their availability will prove to be a major weapon in the campaign against ecological destruction.<sup>61</sup>

## F. Resources and Space Minerals

The possibility of obtaining resources from the moon and other celestial bodies is closer to reality than might at first be supposed. It is now technically possible to transfer minerals from the moon; such exploitation of resources is economically feasible. For instance, the small quantity of moon rocks and moon dust, brought back by Apollo missions, has considerable value. As a recent press report has indicated, NASA has

<sup>59</sup>Id. at 10.

60Id.

<sup>6</sup>Id. See also N. Robinson, Problems of Definition and Scope, in Law, Institutions and the Global Environment 44-89 (J.L. Hargrove ed. 1972). Robinson maintains that "the nations which possess the technical ability to circle satellites or send missions beyond earth have shown an acute concern for possible contamination. . . . [T]elecommunications satellites present a precedent for global cooperation which needs to be extended to the environmental monitoring field." *Id.* at 53.

<sup>&</sup>lt;sup>54</sup>Id. at 6.

moved its priceless bounty of moon rocks from the Johnson Space Center to a remote underground vault two hundred miles distant.<sup>62</sup> At a cost of two hundred and sixty thousand dollars, which sum includes the construction of storage facilities and the preservation of the moon material in stainless-steel containers, this precious material is being protected against future damage or destruction. Officials of NASA estimate that the materials discovered on the moon and returned to earth are, at the very least, equal in value to the twenty-five billion dollars spent on the Apollo program. These rocks, which have been painstakingly studied by scientists, hold many of the secrets of the earth's origin.

Such possession of minerals from the moon can be considered to constitute both an economic and, in addition, a scientific resource. Pure science has benefited greatly from the acquisition of such additional knowledge. At a subsequent stage, the application of this space technology will benefit all of mankind directly. The quality of life on earth will be improved, largely because of the continuing space efforts of the United States and Western European Governments with the cooperation of private enterprise.

# IV. THE FUTURE ROLE OF INDIVIDUALS

Individuals, such as astronauts and scientists, are active participants in the space programs of major powers, but they are not subjects of international law. While conceding the reality of the present situation, it is likewise desirable to reconsider the future role of private interests. For the present, COMSAT and other nonexclusive state corporations, such as the Canadian, are the primary examples of private initiative.<sup>63</sup> However, as early as 1963, Professors McDougal and Vlasic recognized the possiblity of migrations of peoples from earth<sup>64</sup> and the creation of colonies in outer space. In the first instance, scientific establishments, possibly patterned on the scientific communities maintained in Antarctica, would exercise limited functions mainly for research and exploitation. Subsequently, these inhabitants would form colonies in outer space or other inhabitable celestial bodies.<sup>65</sup>

McDougal concludes, and correctly so, that an entire new legal order in space would be formed.

<sup>64</sup>M. McDougal, H. Lasswell & I. Vlasic, *supra* note 2, at 10.; *cf.* Gorove, Property Rights in Outer Space: Focus on the Proposed Moon Treaty, 1 J. Space L. 27 (1974).

65M. McDougal, H. Lasswell & I. Vlasic, supra note 2, at 11.

140

<sup>&</sup>lt;sup>62</sup>Arizona Republic, February 22, 1976 (reprinted from the Los Angeles Times).

<sup>&</sup>lt;sup>63</sup>H. Shaw, Science and Space, in Outer Space: Prospects for Man and Society 75 (L. Bloomfield ed. 1962). See also his discussion of international cooperation, *id.* at 84-90. *See especially*, International Cooperation In Outer Space, S. Doc. No. 92-57, 1st Sess. (1971); in particular, Part 4, International Scientific Community and Professional Associations, *id.* at 527-85, and Part 3, Intergovernmental International Organization, *id.* at 437-524.

Sometime in the future the members of these newly established space communities may, like their forefathers on earth several centuries ago, decide that they can prosper better as independent and "secede" from their parent-state on earth. Admitting the strength of the popular conception which today regards the prospect of settlement in space as a horrible exile, perhaps best reserved for incorrigible criminals (or political opponents), we must, however, recall that with the presently available technology the round trip to the moon and back could be completed in several days, whereas it took Columbus some six weeks to reach North America. From the perspective of the time requirements, settlement in outer space does not appear to be so remote as completely to defy expectation.<sup>66</sup>

The writers are of the opinion that the above conclusion of Professor McDougal represents a prophesy of the future status of private individuals in outer space. But, sad to say, current cutbacks in funds for space efforts are having the effect of delaying further manned flights. The future projection of man into space will necessitate a change in existing legal standards. The Treaty on the Peaceful Uses of Outer Space,<sup>67</sup> and the supplementary conventions implementing the basic provisions, are embryonic.

These provisions of positive international law, aside from customary law and resolutions of the United Nations General Assembly, noted elsewhere in the study, relative to the rights of nongovernmental entities to take part in space activities, are to be found in article VI of the Space Treaty.68 In two differing connotations the term nongovernmental entity is used, relative to the legal responsibility of the appropriate state party. In the first instance, the distinct areas of liability are imposed, those applicable to national activities in space undertaken by the state party or by means of governmental agencies. The state is also responsible for acts of nongovernmental agencies under its jurisdiction. As such, states are primarily liable for the actions of their nationals and companies. Secondly, nongovernmental entities "shall require authorization and continuing supervision by the appropriate State Party . . ." Therefore, it was not intended that private interests, primarily corporations, would be free to act in any manner desired as had the early explorers during the fifteenth and sixteenth centuries. Here, then, a clear obligation has been imposed on the national's government or even on the state from which a launching has taken place, as will be shown below in connection with the Liability Convention.

In yet an additional instance, the state party will assume international obligations. When activities in space are conducted by intergovernmental organizations "responsibility for compliance with the Treaty shall be borne by the international organization and by the States Parties to the Treaty participating in such organization." The most complicated issue of liability, resulting from the programs of intergovernmental institutions, is governed by the Liability Convention, to be examined below. However, the fundamental legal obligations (and moral responsibilities)

## 66Id.

<sup>67</sup>See note 33 supra.

<sup>681</sup>d. In connection with article XII of the Liability Convention, reproduced in note 86 infra.

applicable to nongovernmental and intergovernmental institutions are to be found in the 1967 Space Treaty. The significant fact is that outer space, including the moon and other celestial bodies, is not subject to the exclusive jurisdiction of states, even though states for the moment exercise a dominant position. In fact, Professor Marcoff goes to the extent of contending that the state is the higher authority over international organizations.<sup>69</sup>

On the other hand, space law has only reached a formative stage; consequently, the existing corpus of space law is far from constituting a fully developed legal system of the type that will be required to cope with extensive activities by individuals and companies in outer space.

# V. COOPERATION BY PUBLIC AND PRIVATE INTERESTS

An additional category of nonstate activity can be seen from "mixed enterprises" (to quote Professor McDougal)<sup>70</sup> or "public-private users" (to cite the classification of Professor Christol).<sup>11</sup> Such mixed activities can include those undertakings in which states participate with private enterprise, regional institutions, international organizations and multinational corporations. At such time as financial contributions, insurance coverage, production facilities, technological contributions and even consultation are added to the list of participation, the possible combinations of governmental and nongovernmental entities, as they cooperate with intergovernmental organizations, seem endless. Earlier in the study the collaboration of EUROSPACE was discussed. Beyond question, the resources required for present day space launchings are of such a nature as to require the collaboration of several intergovernmental and nongovernmental entities, in addition to the contribution of launching facilities by NASA.

Considerable guidance can be gained from the growing number of multilateral trade agreements, forming part of larger development programs.<sup>72</sup> This newer class of agreements, falling within the orbit of international transactions, are neither commercial contracts nor treaties; but their significance to future agreements governing the exploitation of outer space lies in the fact that legal precedent has been established for cooperation between governments, international institutions and private interests.

<sup>&</sup>lt;sup>69</sup>M. Marcoff, Traité de droit international public de l'espace 471, 533 (1973) (The writers do not fully accept Marcoff's view as to state supremacy.).

<sup>&</sup>lt;sup>70</sup>M. McDougal, H. Lasswell & I. Vlasic, supra note 2, at 10.

<sup>&</sup>lt;sup>71</sup>C. Christol, supra note 4, at 86-88.

<sup>&</sup>lt;sup>72</sup>A. Paroutsas, Interstate Agreements on International Payments: A study in International Economic Law (1971); Gormley, Book Review, 7 J. Int'l L. & Econ. 103 (1972). *See generally*, S. Metzger, Law of International Trade (1966); Lawyer's Guide to International Business Transactions 403-26 (W.S. Surey & C. Shaw eds. 1963).

#### 1977

Part of the difficulty in dealing with the role of nongovernmental interests in outer space is to be found in the fact that it is often difficult to classify the precise nature of the joint undertaking. Though conceding that COMSAT represents a "public-private" venture, it is nonetheless somewhat difficult to detect the extent of private participation or commitment. To date, public interests have dominated, simply because of the resources required. Accordingly, an additional line of intergovernmental cooperation is worthy of note, namely, the European Space Agency (ESA), in which Western democracies are pooling their resources for the purpose of cooperation on a regional basis.<sup>74</sup> It would be incorrect to assume that a European Space Law will evolve in the sense that there is a European Law of Human Rights, a European Environmental Law or a European Economic Law. These bodies of European law have resulted from the efforts of the Council of Europe and the European Communities.<sup>79</sup> Conversely, a distinct difference exists as to the law of outer space: applicable law must necessarily be international in character.

The significance of the European space effort, though dependent on NASA for its delivery system, is that an intergovernmental organization will render a major contribution.<sup>76</sup> An example can be seen in ESA; and, as will be shown below in connection with the discussion of liability, international and multinational organizations can be held jointly and severally liable for the damages they cause. In this regard, it may also be recalled that earlier in the study the position of the Soviet Union was mentioned. Not only were the Russians opposed to recognizing private interests as legal subjects, but international and multinational institutions would have been excluded from the scope of multilateral conventions. At present ESA (with the support of the United States) represents the first major program of a regional organization.

<sup>75</sup>See, e.g., W. Gormley, Human Rights and Environment: The Need For International Co-operation (1976).

<sup>76</sup>C. Jenks, supra note 3, at 91-92. See note 74 supra.

<sup>&</sup>lt;sup>73</sup>C. Jenks, Liability For Ultra-Hazardous Activities In International Law, 117 Recueil des Cours 99 (1966 I).

<sup>&</sup>lt;sup>74</sup>Report on the European Space Agency, Draft Recommendation presented to the Committee on Science and Technology, Parliamentary Assembly, Council of Europe. Doc. 3655, September 16, 1975. Kaltenecker, European Understandings in the Application Satellites Field and Their Legal Implications, 2 J. Space L. 105 (1973).

The European Space Agency has been formed by the amalgamation of ESRO and ELDO. As the result of the decisions taken by the European Space Conference at Brussels in 1973, ESA was in a position to begin *de facto* activities as of April 1, 1974.<sup>17</sup>

# VI. THE DUTY TO REGISTER SPACE OBJECTS

International organizations will also be subject to the majority of the provisions contained in the 1974 Convention on Registration of Objects Launched Into Outer Space.<sup>78</sup> Under article VII, which provides that "references to States shall be deemed to apply to any international intergovernmental organization which conducts space activities if the organization declares its acceptance of the rights and obligations provided for in this Convention" nongovernmental institutions have been purposely excluded. An intergovernmental organization launching an object into outer space (such as ESA) will, pursuant to article II, be required to register the space orbit in an appropriate registry that must be maintained by the launching state. Of primary importance is the requirement that "Each launching state shall inform the Secretary-General of the United Nations of the establishment of such registry." If more than one state launches an object (possibly with the collaboration of one or more international organizations), at least one state has the obligation to register the object. The important consideration is that the international legal obligation has been imposed directly on the state party, regardless of the character of the object.

The most significant requirement is that "The Secretary-General of the United Nations shall maintain a register in which the information furnished in accordance with article IV shall be recorded."<sup>79</sup> This register shall be subject to full and open inspection, thereby becoming a matter of public record.

The following articles, which cannot be reviewed in detail within the scope of this specialized study, require that states furnish supplementary information relative to any changed circumstances, such as a previously registered object no longer remaining in earth orbit.<sup>80</sup>

<sup>78</sup>U.N. G.A. Res. A/Res./3235 (XXIX) [on the report of the First Committee (A/9812)] November 12, 1974. *See also* Convention on Registration of Objects Launched Into Outer Space: Analysis and Background Data, S. Doc. No. 94th Cong., 1st Sess. (1975).

<sup>79</sup>Id. art. III, para.1.

<sup>60</sup>*Id.* art. IV, para. 3.

<sup>&</sup>lt;sup>17</sup>The merging of ESRO and ELDO into ESA cannot be recounted here. Despite some remaining difficulties of a political nature, the writers are proceeding on the assumption that the establishing convention will be ratified by all the ESRO and ELDO member countries. See M. Bourély, Problems Juridiques Posés par la Signature de la convention créant l'Agence Spatial Européenne, Proc. 17th Colloquium on the Law of Outer Space 100, 101-02 (1974). See also Kaltenecker, supra note 74, at 112; M. Bourély, The Legal Framework of European Cooperation in the Execution of Space Application Programmes, Proc. 18th Colloquium on the Law of Outer Space (1975).

## 1977

Article VI is especially significant to international organizations, because of the requirement that aid be given to any state party, so as "to identify a space object which has caused damage to it or to any of its natural or juridical persons, or which space object may be of a hazardous or deleterious nature . . ." The requirement, therefore, is that states (and international organizations by virture of article VII) "including in particular States possessing space monitoring and tracking facilities, shall respond to the greatest extent feasible to a request by that State Party, or transmitted through the Secretary-General on its behalf, for assistance under equitable and reasonable conditions in the identification of the object."<sup>81</sup> Henceforth, tracking facilities, including operational satellites belonging to organizations, must be used to identify objects likely to cause damage. Apparently, the criterion of good faith and *pacta sunt servanda* will require that states and multinational organizations possessing facilities lend support once a request has been made. May it be assumed that remote sensing satellites can aid in such detection?

These obligations have been imposed on states parties. Accordingly, participating nonstate entities must be registered by the launching state, with the result that private individuals or companies (indeed even multinational organizations) will be the "objects" of state action. Private interests will not, consequently, become subjects of the law under the Registration Convention, since they will not be active participants in the registration scheme. Such lack of legal standing will have an impact on the 1972 Liability Convention, to be considered in the following section, for the reason that primary liability has been placed on the launching state by the earlier convention.

## VII. DAMAGE AND THE RESULTING STANDARDS OF LIABILITY

Individuals have become the objects of international space law, owing to the imposition of liability on their state of nationality. Although lacking the necessary procedural status to press their claims before an international claims commission, provision is made in the Convention on International Liability For Damage Caused By Space Objects<sup>82</sup> for the protection of individual interests by their governments, but less

<sup>81</sup>*Id.* art. VI.

<sup>82</sup>The Convention on International Liability for Damage Caused by Space Objects, March 29, 1972, [1973] 24 U.S.T. 2389, T.I.A.S. No. 7762 (effective Oct. 9, 1973) [hereinafter cited as Liability Convention]. See Patermann, Applicable Law In Case of Tort Damages Caused by Direct Broadcast Satellites, 3 J. Space L. 47 (1975); Smirnoff, The Problem of Security in Outer Space in Light of the Recently Adopted International Convention on Liability in Outer Space, 2 J. Space L. 121 (1973).

Convention on International Liability For Damage Caused By Space Objects: Analysis and Background Data, S. Doc. 92d Cong., 2d Sess. (1972). Diederiks-Verschoor, The Convention on International Liability Caused by Space Objects, Proc. 15th Colloquium on the Law of Outer Space 96 (1973). See also Problems Arising From the Interpretation and Application of the Convention on Liability, *id.* at 88-144. It has been concluded: "In the Convention on International Liability, non-governmental organizations are not mentioned. The Space Treaty provides for international intergovernmental and international non-governmental organizations." *Id.* at 99.
certain is the liability that can be imposed on private groupings. By way of generalization, it is valid to conclude that the general principles of liability in international law are applicable to damages caused by space activities.<sup>83</sup> From this foundation, international conventions have set forth standards of liability, although the conventions are open to serious criticism.<sup>84</sup>

Beginning with article VII of the Outer Space Treaty,<sup>85</sup> the basis of liability is set forth in the supplementary convention of 1972. Article VII was based on the earlier text of paragraph 8 of the Declaration of Legal Principles Governing the Activities of Space in the Exploration and Use of Outer Space. These provisions have, to a large extent, been superseded by article XII of the 1972 Convention on space liability.<sup>86</sup>

Article II establishes the absolute liability of the launching state, and articles IV through VI specify that joint liability will be applied (*i.e.*, joint and several liability) in

<sup>83</sup>Goldie, Liability for Damage and the Progressive Development of International Law, 14, Int'l & Comp. L.Q. 1189 (1965).

<sup>84</sup>Diederiks-Verschoor, *supra* note 82, at 102.

<sup>85</sup>See note 33 supra .Article VII provides:

Each State Party to the Treaty that launches or procures the launching of an object into outer space, including the Moon and other celestial bodies, and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air space, including the Moon and other celestial bodies.

Article VII of the 1967 Space Treaty must be read in conjunction with Article VI:

States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space, including the moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. When activities are carried on in outer space, including the moon and other celestial bodies, by an international organization, responsibility for compliance with the Treaty shall be borne by the international organization.

Hailbronner, Liability for Damage Caused by Spacecraft, 30 Zeitschrift für Auslandisches Öffentliches Recht and Völketrecht 125 (1970) (He calls for the establishment of an international organization to deal with damage caused by space objects.).

<sup>86</sup>The compensation which the launching State shall be liable to pay for damage under this Convention shall be determined in accordance with international law and the principles of justice and equity, in order to provide such reparation in respect of the damage as will restore the person, natural or juridical. State or international organizations on whose behalf the claim is presented to the condition which would have existed if the damage had not occurred.

See, e.g., Diederiks-Verschoor, Pro and Contra Liability of International Governmental Organizations in Space Law, Proc. 17th Colloquium on the Law of Outer Space 186 (1974).

#### 1977

those situations where two or more states have caused injury to a third state or to its nationals. Whereas, article VI (1) (in conjunction with article XXII) provides for the liability of international organizations, as follows: "[E]xoneration from absolute liability shall be granted to the extent that a launching State establishes that damage has resulted . . . from an act or omission done with intent to cause damage on the part of a claimant State or of natural or juridical persons it represents." Yet this provision is subject to the limitation contained in article XXII (1), namely, the convention "shall be deemed to apply to any international intergovernmental organization which conducts space activities if the organization declares its acceptance of the rights and obligations provided for in this Convention. . ." Moreover, "a majority of the States members of the organization. . . must be States Parties to this Convention and to the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space. . ."

The precise provision imposing liability on organizations is contained in the third paragraph of article XXII: "If an intergovernmental organization is liable for damages by virtue of the provisions of this Convention, that organization and those of its members which are States Parties to this Convention shall be jointly and severally liable. ..." Certain exceptions are evident, *e.g.*, the organization in question must have accepted the Convention's provisions. An additional limitation has been imposed, since no exoneration from liability will be granted in those instances in which illegal acts have been undertaken by states, organizations or private corporations, according to the provisions of article VI (2). Henceforth, absolute liability will be imposed, and no exoneration will be permitted if the actions of "a launching state are not in conformity with international law including, in particular, the Charter of the United Nations and the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space. . . ."

In our submission, the above text (and likewise the treaties and declarations under examination in this study) have not included a definition of the concept of 'international organization'.<sup>87</sup> Nevertheless, for our purposes it is valid to conclude that multinational organizations of less than a universal character (along with regional institutions) are included, but nongovernmental institutions have been deliberately omitted. COMSAT, INTELSAT and EUROSPACE have previously been mentioned as nonstate entities actively participating in space experiments. But what will be the liability of an international institution that only takes part in a space venture in order to further its primary mission in another field? Earlier in the study the use of remote sensing satellites by UNEP was mentioned, along with similar-type uses by the ITU, WHO, WMO and UNESCO. These organizations will not launch their own vehicles; instead, merely information obtained from existing satellites will be sought. In some instances there may be financial and even technical assistance. But will there be liability incurred by ITU, WHO or UNEP? Naturally, the situation will be altered if ITU or UNEP become active participants in space programs. In these situations their degree

<sup>&</sup>lt;sup>87</sup>Diederiks-Verschoor, supra note 82, at 98.

(and extent) of liability will have to be determined in each case. In the event of damage, these participating organizations might be liable, or at the very least secondarily liable. Obviously, greater specificity should have been provided by the above cited article VI. Yet, as mentioned previously, the general principles of international responsibility will be used to fill gaps in the existing conventions. Even more obviously, the writers submit: the whole area of space liability of nonstate entities is in an embryo stage of development. Still the basic reality of "the individual as a subject of the international law of outer space," and as the object of liability, must not be minimized: positive law will develop at such time as private interests become active in space flights and similarly when private groups play a larger part in joint ventures. As was true of the law of the sea, positive international law will emerge to resolve existing problems; it does not normally precede the activities of society. Typically, law reflects the evolution of society, rather than constituting a moving force to change society.

For the purpose of analysis, it is suitable to examine the 1972 Convention on Liability, even though it is primarily concerned with state responsibility. Article XII, carrying forward the intent of article VII of the 1967 Space Treaty,88 contains the basic principle of liability that will govern future compensation for space damages. In brief, the standard set forth is that of compensatory damages for the purpose of making the injured person whole. Yet, the actual extent of compensation "shall be determined in accordance with international law and the principles of justice and equity. . . " The aim, then, of such reparation is to "restore the person, natural or juridical, State or international organization on whose behalf the claim is presented to the condition which would have existed if the damage had not occurred." Left unresolved is the choice of law question. Will the lex loci delicti or the national law of the space object govern the extent of compensation? Perhaps international law will be applied to the exclusion of national standards. But we can nevertheless wonder if the law of the state having the most significant interest (or connecting factors) will be ignored? Hence, the precise degree of applicability of public and private international law (conflict of laws) has purposely been left unresolved.

In the event a settlement has not been reached by the parties, through the means of diplomatic negotiations, a claims commission of three members can be convened at the instigation of one of the parties.<sup>89</sup> These provisions for creating the claims commission are reminiscent of those in the Annex to the Vienna Convention on the Law of

\*See notes 85-86 supra.

<sup>89</sup>Article XIV of the Liability Convention, supra note 82, provides:

If no settlement of a claim is atrived at through diplomatic negotiations as provided for in Article IX, within one year from the date on which the claimant State notifies the launching State that it has submitted the documentation of its claim, the parties concerned shall establish a Claims Commission at the request of either party.

## NONGOVERNMENTAL ENTITIES IN OUTER SPACE

Treaties,<sup>90</sup> though they are much weaker. In the event that the patties are unable to agree on the selection of a neutral chairman, within the stipulated period of two months, a request can be made to the Secretary-General of the United Nations that he make the appointment. But if one of the parties does not appoint its member, the Chairman (assuming of course that a chairman has been designated) will "constitute a single-member Claims Commission."<sup>91</sup>

These provisions are obviously intended to prevent the type of default that arose in 1949 when the Communist governments of Bulgaria, Hungary and Romania refused to appoint their arbitrators as required by the 1947 Peace Treaties. In view of the inability to proceed without the required number of arbitrators, no relief was possible as to alleged violations of fundamental human rights.<sup>92</sup> Only the commission had jurisdiction to examine the substantive issues.<sup>93</sup>

But may it be suggested that difficulty is likely to occur if the provisions of articles XV and XVI are challenged? It seems as if a serious dispute can arise if in the initial stages one of the parties refuses to appoint its member to the commission, so that the process to select a neutral chairman cannot commence.

Any award given by the commission will be directed exclusively at governments; and, according to article XIX (2), two types of awards may be given. Depending on the express wishes of the parties, such award will be either: 1) final and binding, or 2) final and recommendatory, which the parties shall consider in good faith.<sup>94</sup> Fundamental to the status of the award from the Commission is the consent of the parties that must be given if the award is to be binding. Lacking such consent to be bound, only a nonbinding award can be handed down. This latter alternative can be compared with the provisions for non-binding conciliation, set forth in the Annex to the Vienna Convention on the Law of Treaties.<sup>99</sup> On the other hand, in view of article XXIII, other international agreements between the parties remain in force, with the result that the

<sup>92</sup>Advisory Opinion on the Interpretation of Peace Treaties with Bulgaria, Hungary and Romania (Second Phase), [1950] I.C.J. 221; in connection with Advisory Opinion, *id.* (First Phase), [1950] I.C.J. 65.

93Id. at 72 (First Phase).

1977

94Art. XIX, para. 2, Liability Convention, supra note 82.

<sup>97</sup>Annex, Resolution Relating to Article 66 of the Vienna Convention on the Law of Treaties and the Annex Thereto, Final Act of the United Nations Conference on the Law of Treaties, U.N.G.A., U.N. Conference on the Law of Treaties, A/CONF. 39/26, May 23, 1969; 8 Int'l Leg. Mat. 728 (1969). See note 90 subra.

<sup>&</sup>lt;sup>90</sup>Vienna Convention on the Law of Treaties, adopted May 22, 1969, opened for signature May 23, 1969, U.N.G.A., United Nations Conference on the Law of Treaties, A/CONF. 39/27, May 23, 1969; 8 Int'l Leg. Mat. 679 (1969); Gormley, The Codification of Pacta Sunt Servanda by the International Law Commission: The Preservation of Classical Norms of Moral Force and Good Faith, 14 St. Louis U. L. Rev. 367 (1970).

<sup>&</sup>lt;sup>91</sup>Art. XIV, para. 1, Liability Convention, supra note 82.

methods of pacific settlement available under article XXXIII of the United Nations Charter can be selected by the parties if they so desire.

Some sanctioning power is available; under the authority contained in paragraph 4 of article XIX, "The Commission shall make its decision or award public. It shall deliver a certified copy of its decision or award to each of the parties and to the Secretary-General of the United Nations." Immediately, the question arises: does the word "shall" mean "must", or could it be interpreted to mean "may" if the parties so stipulate perhaps in connection with article XXIII (2), providing: "No provision of this Convention shall prevent states from concluding international agreements, supplementing or extending its provisions." As can be seen from the experience of the human rights organs of the Council of Europe, the wishes of member states are accorded considerable deference. Still the fact that the contents of a "final recommendation" can be made public has the effect that world public opinion is focused on the defaulting state, thereby bringing to bear the moral sanction of international law.<sup>96</sup> This type of sanction is highly effective when applied to Western-democracies, respectful of the world rule of law, though it is of less immediate impact against the dictatorships of the "left" and the extreme "right". These governments do not respect the rights of their own nationals; consequently, they will only compensate foreign nationals and companies, and similarly foreign governments, when pressure is applied.

The procedural remedy set forth in the convention is diplomatic protection of nationals. Private individuals are not accorded *locus standi* before the claims commission. As such, the nongovernmental entities considered in this study lack legal personality. Accordingly, their claims can only be taken up by states parties. As discussed above,<sup>97</sup> this procedural remedy is the classical standard of the protection of private interests as codified and developed in article VIII.<sup>98</sup> But traditional criteria have been modified in that it is not mandatory that local remedies first be exhausted. The requirement of exhaustion of all available domestic remedies, so stringently enforced by

97E. Borchard, supra note 25; Gormley, supra note 26.

- A State which suffers damage, or whose natural or juridical persons suffer damage, may present to a launching State a claim for compensation for such damage.
  - 2. If the State of nationality has not presented a claim, another State may, in respect of damage sustained in its territory by any natural or juridical person, present a claim to a launching State.
  - 3. If neither the State of nationality nor the State in whose territory the damage was sustained has presented a claim or notified its intention of presenting a claim, another State may, in respect of damage sustained by its permanent residents, present a claim to a launching State.

<sup>&</sup>lt;sup>96</sup>Gormley, The Status of the Awards of International Tribunals: Possible Avoidance Versus Legal Enforcement, 10 Howard L.J. 33 (1964).

#### NONGOVERNMENTAL ENTITIES IN OUTER SPACE

1977

the European Commission on Human Rights, as required by article XXVI of the European Convention on Human Rights and Fundamental Freedoms,<sup>99</sup> and similarly by article 5(2) (a) of the Optional Protocol to the International Covenant on Civil and Political Rights,<sup>100</sup> have codified traditional standards. Therefore, it will be readily appreciated that the Liability Convention has moved far beyond the scope of the classical remedy by permitting direct state action.

On the other hand, article XI (2) permits a state to press its claims in the fora of the accused state; moreover, some *locus standi* has been "permitted" to individual litigants, for the reason that "Nothing in this Convention shall prevent a State, or *natural or juridical persons it may represent*, from pursuing a claim in the courts or administrative tribunals or agencies of a launching State. ..."<sup>101</sup>

A corresponding requirement protects the respondent state from simultaneously defending two actions. Lacking such a restraint, it might have been possible for individuals and companies to have pressed actions at the municipal level and, simultaneously, for the protecting state to have utilized a claims commission. Moreover, the remedies available under the convention cannot be selected in those instances where an action has been brought "under another international agreement which is binding on the States concerned."<sup>102</sup>

The traditional requirements of diplomatic protection of nationals have been modified in yet another instance: states other than those of the claimant's nationality may present the claim. According to article VIII (1) as noted above, the "state which suffers damage, or whose natural or juridical persons suffer damage, may present to a launching State a claim for compensation. . ." This criterion is fully consistent with classical notions of diplomatic protection. But, unlike this standard, the Liability Convention is not limited to the state of nationality. If the injured state does not choose to present the claim, two other possibilities of governmental intervention have been established. First, another state that has sustained damage in its territory "by any natural or juridical person may present a claim."<sup>103</sup> Secondly, "another State may, in respect of damage sustained by its permanent residents, present a claim to the launching

<sup>101</sup>(Emphasis added) art. XI, para. 2, Liability Convention, supra note 82.

<sup>102</sup>See generally A. Robertson, Human Rights in the World (1972). A. Robertson, The United Nations Covenant on Civil and Political Rights and the European Convention on Human Rights, 43 Brit. Y.B. Int'l L. 21 (1968-1969).

<sup>103</sup>Art. VIII, para. 2, Liability Convention, supra note 82.

<sup>99</sup>E.T.S. No. 5 (1969). See J. Fawcett, The Application of the European Convention on Human Rights (1969); F. Jacobs, The European Convention On Human Rights (1975).

<sup>&</sup>lt;sup>100</sup>Human Rights Covenant, adopted and opened for signature at New York, December 16, 1966. G.A. Res., Annex, A/RES/3200 (XXI); 61 Am. J. Int'l L. 887 (1967) (To date the Political and Civil Covenant has received thirty-four ratifications. The Optional Protocol has received twelve ratifications.).

State.''<sup>104</sup> This latter provision rejects the restrictive position adopted by the International Court of Justice in its judgment in *Barcelona Traction*,<sup>105</sup> in which Belgium lacked the necessary *locus standi* to present the claims of its shareholders, who owned shares in a Canadian company. As the state of incorporation, only Canada could maintain an action at The Hague.

Further, the procedural standards set forth in article VIII, tend to approach those of the interstate complaint, as employed in human rights conventions.<sup>106</sup> Conversely, definite limits have been placed on the category of states, and of international intergovernmental organizations by virtue of article XXII, that may maintain an action. Not every state party (or international organization) may press a claim. Only those alleging injury to their territory, nationals or permanent residents have the required legal personality, unlike the situation in a true interstate complaint wherein all states parties to a convention may bring a complaint.

At the very least, some progress has been made in according states parties the right to litigate claims on behalf of injured persons. Notwithstanding this conclusion, the observation of Dr. Diederiks remains especially timely: "By limiting the liability of the international organizations up till the international intergovernmental organization, the rights of the victims are not taken sufficiently into account."<sup>107</sup> Consequently, subsequent conventions will be required to accord the desired recognition and procedural status to individuals and nongovernmental entities.

## VIII. CONCLUSION

The relatively few existing space treaties considered in this study unavoidably lead to the conclusion that states and international organizations remain the primary subjects of the law, with the effect that the position adopted by the authors, that individuals and nongovernmental entities are both "subjects" and "objects" of international space law, may be open to some challenge. Indeed, the position defended by the Soviet Union (and the antithesis to the present study)<sup>108</sup> that only states should be participants in space programs has at least been partially realized. On the positive side,

104*Id*. para. 3.

<sup>105</sup>Case Concerning the Barcelona Traction, Light and Power Company, Limited (Belgium v. Spain) (Second Phase), [1970] I.C.J. 3.

<sup>106</sup>E.g., art. XXIV, European Convention on Human Rights, *supra* note 99. See also art. XLI of the U.N. Covenant on Civil and Political Rights, *supra* note 100. See generally Gormley, Future Implementation of the Universal Declaration of Human Rights By States, Multinational Institutions, and Private Organizations, Work Paper, Abidjan World Conference on World Peace Through Law (1973).

<sup>107</sup>Diederiks-Verschoor, *supra* note 82, at 99.

<sup>108</sup>But cf. J. Cooper, supra note 22; Gorove, supra note 43.

intergovernmental organizations have been accorded recognition and they are liable for damages caused by their actions.

On the other hand, individuals and nonstate entities have rights under customary international law, and they have not been excluded by the declarations of the United Nations General Assembly. Accordingly, it would be incorrect to assume that the embryonic corpus of space law is definitive. Rather, the recognition of individual legal rights will occur at such time as nonstate entities, including mixed public-private users such as private and semi-public corporations, assume a larger role in space flight. As emphasized in this study, space law will evolve as the result of changes in society. The examples of COMSAT, INTELSAT and EUROSPACE are but indications of the future course of nonstate ventures. In particular, EUROSPACE has benefited not only private interests, but it has been able to institute a dialog with governments. Thus, the precedent established by EUROSPACE, and the resulting legal and political cooperation, attest to future contributions by private undertakings in Western Europe. At the insistence of the United States and Western European Governments, private enterprise will assume an even larger position in space exploration and exploitation. As can be seen from the examples of telecommunications and remote sensing satellites, there are many areas in which individuals will become the beneficiaries, for the reason that one of the primary aims of continuing space efforts is to improve the quality of life on earth for the benefit of the world community. Human dignity values become relevant as steps are taken to benefit all of mankind through the experiments of international and regional institutions. This dedication by Western European organizations to improve the quality of life will be carried forward to yet another rubric of international and United Nations law, presumably to safeguard the common heritage of mankind.

Owing to the developing stage of the positive law of outer space, lawyers and jurists (along with scientists and space technologists) must seek new legal solutions to the increasing number of space problems, many of which (such as copyright, freedom of information, exploitation of resources, and damage to third states or their nationals) have been reviewed in this study.

In the immediate future, governmental control will predominate; however, there will be a significant place for private persons and companies. In this regard, the participation of multinational corporations must be taken into account. Contemporary authors have stressed interstate problems, but in our submission the position of Professors McDougal, Vlasic and especially Christol will prove to have been correct, *i.e.*, there is a place for private users, plus mixed public-private users, in the realm of outer space. As Professor McDougal has concluded: there will be an entirely new body of law to regulate activities in space. Realistically, we can only speculate as to the precise content of this emerging jurisprudence and positive law. Similarly, a philosophy of space law will emerge: it will undoubtedly accompany the promulgation of action programs by states and intergovernmental organizations.

#### JOURNAL OF SPACE LAW

Notwithstanding the present political climate within the General Assembly of the United Nations, caused by the East-West and the North-South divisions, there is a need for a higher degree of cooperation, not only between the two major space powers but also between governments and affected private interests. Much can be learned from the prior precedent of human rights conventions and, secondly, from the emerging environmental law. Consequently, efforts must continue at both the United Nations and regional levels to perfect the law of outer space. Additional attention must be given to the areas of damage caused by space objects and resulting state responsibility.

When seeking newer approaches to dispute settlements, the suggestion of Dr. Karl-Vasak is worthy of serious consideration; namely, it does not matter if the individual becomes recognized as a full subject of the international and regional law of human rights protection. The important factor is that his rights be recognized and that implementing machinery be placed at his disposal (and similarly at the disposal of his government).<sup>109</sup> Such a pragmatic approach may prove helpful.

The Convention on International Liability For Damage Caused By Space Objects has set forth the traditional remedy of diplomatic protection of nationals, though with significant modifications by eliminating the classical requirement of exhaustion of all domestic remedies and, secondly, by permitting states, other than the state of claimant's nationality, to press claims before an international claims commission. Conversely, private individuals and juristic persons only have *locus standi* before domestic fora. May it be suggested that the most difficult area within the evolving body of space law will, in all probability, be that of conflict-resolution. The 1967 Space Treaty and the implementing conventions have not provided a fully developed disputesettlement framework. Of course, states parties can still make use of those methods of pacific settlement contained in article XXXIII of the United Nations Charter, and similarly of provisions contained in other conventions.

Although the responsibility of the registration of space craft and also for any damages that these vehicles may cause have been placed on states parties, private participants can become liable for damages, as can international organizations.

Yet, as was shown above, considerable difficulty will be encountered when attempts are made to apportion liability. The example given of UNEP utilizing some of the information obtained by remote sensing satellites may be recalled. Will UNEP (or ITU, or WMO or UNESCO) be held liable for a portion of the total indemnity? Only a general indication has been given relative to the standards of liability that may be imposed on nonstate entities for their participation in ultrahazardous activity.

At present, it is impracticable to advance a definitive analysis as to the future legal personality of the individual as a "subject" or an "object" of international space law. For certain, when contemplating direct participation by private persons in the legal

<sup>109</sup>Le droit international des droits de l'homme: sources et institutions, 143 Recueil des Cours (1974 IV).

### 1977

order, it is helpful to recall the period of time that has been required for the individual to be recognized (even to a limited degree) as anything but an object of public law, even within the regional systems of the Council of Europe and the European Communities. If comparisons are made with the evolution of the international law of human rights, farsighted proposals seem a bit more encouraging. Beyond question, individuals and nonstate entities are the "objects" of the existing legal order, including any damage caused by space craft or military actions. Except in restricted circumstances, they are not true (or full) subjects of the legal order; yet, on the positive side, private persons and nongovernmental entities can be held to be the beneficiaries of contemporary and future space efforts under the world rule of law.

## CURRENT DOCUMENTS

#### THE ARAB CORPORATION FOR SPACE COMMUNICATIONS\*

#### AMIRI DECREE

AMIRI DECREE NO. 25/1976 CONCERNING THE RATIFICATION OF THE AGREEMENT OF THE ARAB CORPORATION FOR SPACE COMMUNICATIONS

We, Isa bin Salman Al Khalifa, Amir of the State of Bahrain, after reviewing Article 37 of the Constitution and the Amiri Decree, No. 4/1975 and the Agreement of 'The Arab Corporation' for Space Communications and on the recommendation of the Minister of Communications and after the approval of the Council of Ministers hereby decree:

#### Article 1

The Agreement of The Arab Corporation for Space Communications herewith attached, and signed in Cairo on 22nd Jumda Al Thaniya 1396 H. corresponding to 20th June 1976 is herein ratified.

Article 2

The Minister of Communications shall implement this decree and it shall be published in the Official Gazette.

> Signed: Isa bin Salman Al Khalifa Amir of the State of Bahrain

> > Issued at Rifa's Palace on 18 Rajab 1396 H. 15 July 1976

## THE AGREEMENT OF THE ARAB CORPORATION FOR SPACE COMMUNICATIONS

The Governments of :

The Hashemite Kingdom of Jordan The State of Bahrain The Democratic People's Republic of Algeria The Democratic Republic of Sudan

<sup>\*</sup>Taken from The Official Gazette, Issue No. 1185, July 22, 1976. Provided through the courtesies of Gulf Public Relations, Translation Service. For text, see also U.S. Senate, Committee on Aeronautical and Space Sciences, Space Law: Selected Basic Documents, 94th Cong., 2d Sess. 400-416 (Comm. Print, 1976).

The Democratic Republic of Somalia The Sultanate of Oman The State of Kuwait The Libyan Arab Republic The Kingdom of Morocco The Yemen Arab Republic Palestine The United Arab Emirates The Republic of Tunisia The Kingdom of Saudi Arabia The Syrian Arab Republic The Republic of Iraq The State of Qatar The Republic of Lebanon The Arab Republic of Egypt The Islamic Republic of Mauritania The Democratic People's Republic of Yemen

desiring to establish an Arab Satellite network and to use an Arab satellite as a means of serving the purposes of communications, information, culture, education and any other services for which the above-mentioned network could be utilized and towards the fulfillment of the objectives of the Arab League Charter, have sanctioned the following regulations:

#### Article 1

#### Definitions

For the purposes of this agreement, the following terms shall convey the meaning indicated alongside the said terms.

- a) The Agreement: The agreement to establish the Arab Corporation for Space Communications and the appendices attached thereto.
- b) The Corporation: The Arab Corporation for Space Communications.
- c) The Member: The State ratifying the agreement to establish the corporation of that which joins it.
- d) The General Body Meeting: The general body meeting of the corporation.
- e) The Board of Directors: The board of directors of the corporation.
- f) The Executive Committee: The executive committee of the corporation.

- g) The General Manager: The General Manager of the corporation.
- h) Space Sector: Communication satellites, monitoring and telemetery control and observation equipment and the relevant installations and the necessary equipment to operate the satellites.
- i) *Telecommunications:* Any transmission or reception of signals, signs, writing, photographs, sounds and information of any kind, whether by means of wire, wireless, optical or by means of any other electromagnetic systems.
- j) General Services of Telecommunications: The stationary or mobile telecommunication services which can be obtained and made available to the public by means of satellites such as telephone, telegraphy, telex, transmission of photographs and radio and television programmes between ground stations authorized by the corporation and which are affiliated to the Satellite Sector of the Corporation to be thence transmitted to the public and the circuits hired by any of these purposes.
- k) Specialized Telecommunication Services: Telecommunication services that can be made available by means of satellites besides those defined in clause 'j' of this article including wireless navigation services, radio, television satellite services, space research services, meteorological services and earth resource services.
- 1) The User: He who benefits from the services of the corporation but not a member thereof.
- m) *Ground Stations:* Any stationary or mobile ground installations installed for the purpose of transmission or reception via the Arab Satellite excluding monitoring telemetery control and observation stations.

Article 2

1977

## The Establishment of the Corporation:

An independent corporation shall be established within the framework of the League of Arab States, by the name of The Arab Corporation for Space Telecommunications.

The corporation shall have a full legal character and has the right, within its objects, to conclude and contract agreements and possess movable and immovable property and dispose of them and the right to litigate and undertake all legal measures.

Article 3

Objects and Activities of the Corporation

- 1. The corporation aims to provide and set up an Arab Space Sector for general and specialized services in the field of telecommunications for all member states of the Arab League in accordance with technical and economic criteria accepted in the Arab and international quarters.
- 2. Besides the realization of the said objects the corporation may undertake the following activities:
  - a) Assisting Arab countries financially or technically in designing and constructing ground stations.
  - b) Undertaking research and special studies concerning space science and technology.
  - c) Encouraging the establishment of industries necessary to supply installations to the space sector and ground stations in the Arab states.
  - d) Undertaking television and radio transmissions and telecasting among departments and organizations concerned in the Arab states, via the Arab Satellite network and laying down regulations organizing the use of T.V. and radio channels in such a manner as to satisfy the local and collective needs of the Arab states.
- 3. Any other activities that serve the objects of the corporation besides those already stated, provided that they are approved by the General Meeting of the corporation on the recommendation of one member state of the corporation or more or of the Board of Directors.

### Article 4

Membership, Head Office and Main Control Station

- 1. Membership of the corporation shall be for Arab states which are members of the League of Arab States and which subscribed to the capital of the corporation.
- 2. The Head Office of the corporation shall be in the city of Riyadh in the Kingdom of Saudi Arabia and it is competent to the corporation to have branches in the member Arab States.
- 3. The Main Control Station shall be in the Kingdom of Saudi Arabia.

Article 5

The Capital of the Corporation

The capital shall be US\$ 100 million divided into 1,000 shares, the value of each share is US\$ 100,000. The capital may be increased on the recommendations of the Board of Directors and the approval of the General Body Meeting.

## Article 6

### Subscription to the Capital of the Corporation

- 1. The contribution by the member states to the capital of the corporation shall be in accordance with the proportions set out in the appendix attached to this agreement.
- 2. However, after the lapse of two years from the date of commencement of the operations of the space sector, the following points shall be given effect to:
  - a) The subscription shall be in proportion to the actual use of the space sector by member states.
  - b) The states, which have not yet used the space sector on account of the incompletion of their ground stations, shall have the minimum subscription.
- 3. A member state of the corporation may call for its subscription, as is set out in the appendix attached to this agreement, to be reduced after submitting an application to the General Body Meeting which will decide upon the redistribution of the shares thus waived.
- 4. In all cases the minumum subscription shall be of one share.
- 5. The proportional subscription set out in the appendix attached to this agreement, shall be reviewed in the event of a new member joining the corporation or the increase of the capital or the withdrawal of a member after a resolution by the General Body Meeting.

### Article 7

#### Paying the Value of Shares

- 1. 5% of a member's subscription shall be paid on ratifying the agreement.
- 2. The remainder of the value of the shares shall be paid in accordance with a schedule drawn by the Board of Directors and approved by the General Body Meeting.

3. The Members shall settle amounts due within 60 days from the date of their maturity. In the event of an amount overdue a member is bound to pay interest on the amount overdue at the rate of 1% for every month on the said basis.

## Article 8

## Subscriber's Profits

The profits of the corporation shall be distributed among the member states in accordance with the proportion of their shares and the regulations of the Executive Committee.

## Article 9

# The Organs of the Corporation

The corporation shall consist of:

- 1. The General Body
- 2. The Board of Directors
- 3. The Executive Body

## Article 10

## The General Body

- 1. The General Body shall comprise the ministers in charge of telecommunications in the Arab member states or those whom they deputise. Each member shall have one vote.
- 2. The Chairmanship for the General Body shall be on an alternate basis according to alphabetical order of the names of the member state.
- 3. The General Body shall hold an annual ordinary session in April at the invitation of the General Manager from the Head Office of the Corporation. The General Body may hold its meetings at a branch office or in a member state at its invitation.
- 4. The General Body may hold an extraordinary session at the request of the Board of Directors or on a requisition by one member or more submitted to the General Manager and seconded by one third of the members. In the requisition the purpose for the calling of an extraordinary meeting shall be explicitly stated. The General Manager shall make the necessary arrangements to hold the meeting within 3 months of receiving the requisition.

- 5. The General Body Meeting shall be valid only if attended by the majority of the members.
- 6. The resolutions of the General Body Meeting shall be taken on major issues by a two thirds majority of the members present and voting. In procedural matters, resolutions shall be adopted by an ordinary majority of the members present and voting. The General Body shall adopt a resolution whether an issue is a major or a procedural one by the ordinary majority of the members present and voting. In the event of a tie the chairman shall have a casting vote.
- 7. The following shall be invited to attend the General Body Meeting as observers:

The League of Arab States, The Arab States Broadcasting Union, The Arab Union of Telecommunications, The Arab Organization for Education, Culture and Science.

Organizations with objects connected to those of the corporation may be invited to attend the meeting after securing the consent of the General Body.

8. The General Manager shall undertake the functions of the General Secretary of the General Body.

Article 11

### Functions of the General Body

The General Body is the supreme authority of the corporation and shall undertake the functions stipulated in Article 3 of this agreement and any other function necessary for the attainment of the objects of the corporation. The General Body shall undertake the following in particular:

- 1. Laying down the general policy of the corporation and the drawing up of plans which help to achieve the aims and activities of the corporation as stipulated in this agreement and to pass resolutions and recommendations to the Board of Directors in this respect.
- 2. Sanctioning the necessary projects to expand and develop the space sector and its requirements.
- 3. Setting the regulations pertaining to the determination of charges for using the space sector for all types of services on the recommendations of the Board of Directors.
- 4. Setting up the standards and general rules which must be maintained in the ground stations so as to make them suitable to communicate with the space sector as recommended by the Board of Directors.

- 5. Studying the reports of the Board of Directors on the various activities of the corporation and proposing relevant recommendations.
- 6. Organizing the relations of the corporation with international organizations and setting up the necessary principles for this purpose in accordance with general international regulations.
- 7. Settlement of disputes which may arise between the corporation and a member or more in accordance with Article 19 of this agreement.
- 8. Considering complaints and disagreements arising from the use of the Arab Space network which are submitted to it by the members directly or through the Board of Directors.
- 9. Adopting resolutions concerning the withdrawal of a member.
- 10. Setting up regulations with respect to financial settlements in the event of a new member joining or the withdrawal of a member or the re-allocation of shareholding proportions.
- 11. Suspension of membership rights of a member who fails to settle his financial obligations after a year of their falling due until these obligations are met.
- 12. Ratifying the General Budget and Balance Sheet of the Corporation.
- 13. Approval of the recommendation of the Board of Directors concerning the appointment of the General Manager.
- 14. Studying the reports submitted by the Board of Directors concerning future plans and the amounts allocated to them and adopting resolutions regarding them.
- 15. Adopting resolutions concerning investment shares on the recommendation of the Board of Directors.
- 16. Adopting necessary resolution concerning representation in the Board of Directors under Article 12 of this agreement.
- 17. Election of members of the Board of Directors as stipulated in clause 'B' of Article 12 of this agreement.
- 18. Appointment of auditors annually on the recommendation of the Board of Directors.
- 19. Approval regarding increase of the capital of the corporation on the recommendation of the Board of Directors.

- 20. Studying and approving proposals for the amendment of corporation's agreement.
- 21. Authorizing the Board of Directors to undertake some of its functions.
- 22. Sanctioning the time table suggested by the Board of Directors concerning the settlement of members' subscriptions under Article 7 of this agreement.
- 23. Sanctioning of financial and administrative regulations as suggested by the Board of Directors.
- 24. Drawing up the code of conduct of the General Body.

### Article 12

## The Board of Directors

- 1. The Board of Directors shall be comprised of 9 members who shall be elected as follows:
  - a) The first five members according to the proportion of their shareholding in the capital of the corporation. If more than five members are equal in their shareholding proportions, the General Body shall elect the required number from amongst them.
  - b) Four members shall be elected by the General Body from the other members on an alternate basis for an unrenewable period of two years.
- 2. The Board of Directors shall elect from amongst its members a chairman and a vice-chairman. The term of their office shall be determined by the regulations governing executive authority.
- 3. The Board of Directors shall hold its meetings in accordance with the provisions of the regulations governing executive authority.
- 4. The meetings of the Board of Directors shall be held at the Head Office of the corporation or at any of its branches unless an invitation has been extended by a member state.
- 5. The meeting shall have the requisite quorum if a minimum of seven of its members are present. If there is no quorum, the Board of Directors shall meet after 2 weeks from the date appointed for the original meeting. If again the quorum could not be maintained the General Manager shall call an extraordinary General Body Meeting after a month from the date appointed for the meeting of

the Board of Directors. The General Body Meeting shall undertake the functions of the Board of Directors at such meetings.

- 6. Each member shall have one vote.
- 7. The General Manager shall attend the meeting of the Board of Directors but he shall not be entitled to vote.
- 8. An open meeting of the Board of Directors will be attended, as observers, by a representative of the League of Arab States, the Arab Union for Telecommunications, the Arab States Broadcasting Union and the Arab Organization for Education, Culture and Science.
- 9. The Board of Directors shall have the right to invite whom it deems fit to attend its meeting.

Article 13

#### The Functions of the Board of Directors

The Board of Directors undertakes to provide, utilise and maintain the space sector and undertakes to execute the policies entrusted upon it by the General Body particularly:

- 1. Implementation of the General Policy and plans drawn by the General Body.
- 2. Execution of the policies, plans and programmes related to the design, construction, operation, development and maintenance of the space sector and undertaking any activities the corporation is authorized to carry out in accordance with the agreement and the resolutions of the General Body.
- 3. The periodical determination of charges for using the space sector for all kinds of services according to the suggestions of the Executive Body and the regulations approved by the General Body Meeting.
- 4. Proposing criteria and general rules which shall be maintained in the ground stations so as to be suitable to communicate with the space sector and submitting them to the General Body for approval.
- 5. Submitting reports to General Body concerning:
  - a) Proposed activities of the corporation.
  - b) Implementation programmes, future programmes and financial estimates thereto.

6. Adoption of standards and procedures in accordance with the general rules laid down by the executive body concerning sanctioning ground stations to communicate with the space sector and verifying their specifications to coordinate their communication with the space sector after these standards and procedures have been approved by the General Body.

- 7. Adoption of general rules which govern the distribution of the space sector capacity in accordance with the proposals of the Executive Body.
- 8. Determination of investment shares and referring them to the General Body.
- 9. Submission of annual report on the activities of the corporation, annual budget and the final account to the General Body.
- 10. Provision of information, within the limits of the corporation's activities, to a member who may ask for it so as to enable such member to meet his obligations which may exceed the jurisdiction of the Executive Body.
- 11. Proposal to increase the capital of the corporation.
- 12. Proposing the appointment of the auditors.
- 13. Appointment of the General Manager after the approval of the General Body in accordance with Clause 13 of Article 11, and terminating his services in accordance with Clause 3 of Article 15.
- 14. Determination of the remuneration of the General Manager.
- 15. Appointment of a deputy General Manager in the event of the General Manager's post falling vacant until a new General Manager is appointed at the next General Body Meeting.
- 16. Ratifying the appointment by the General Manager of high ranking employees who directly report to him.
- 17. Preparation of a time table of the payment of the value of shares and referring it to the General Body.
- 18. Approving applications to use the space sector.
- 19. Preparation of executive regulations and financial and administrative rules and referring them to the General Body.
- 20. Formation of necessary committees to undertake specific tasks to serve the objects of the corporation within the limits of its jurisdiction.

- 21. Naming organizations which may be necessary to be invited to attend its meetings.
- 22. Considering all reports, recommendations, and various views referred to it by the General Manager.

### Article 14

### The Executive Body

- 1. The Executive Body shall comprise a number of sectors and administrative units to be decided by the rules of conduct of the corporation.
- 2. The General Manager shall undertake the chairmanship of the Executive body. He shall be assisted by an adequate number of technical and administrative staff. This appointment will depend on a guarantee of their competence and efficiency. The principle of geographical representation regarding their appointment shall be adhered to as far as possible.

#### Article 15

#### The General Manager

- 1. The General Manager of the corporation shall be appointed by a three-year renewable contract.
- 2. The General Manager shall be the chairman of the Executive Body of the Corporation and its legal representative. He shall report to the Board of Directors.
- 3. The Board of Directors may decide to terminate the services of the General Manager. The reasons for such a decision shall be stated.
- 4. After the approval of the General Body the General Manager shall exercise his powers and functions laid down in the rules of conduct of the corporation.

### Article 16

#### Prerogatives and Immunities

All the provisions of the Prerogative and Immunities agreement of the League of the Arab States passed as per the League's Council resolution No. 575 dated 10.5.1953 shall be applicable in the case of the Arab Corporation for space communication and also:

1. The corporation's monies, shares, property, assets, and equipment shall be exempted from all kinds of taxation; (whether direct or indirect) customs duties

and any other duties. Laws and orders passed to ban or restrict importation and exportation concerning that which the corporation imports or exports such as instruments and special material needed for the corporation's business shall not apply to those of the corporation.

2. The corporation, its monies and financial transactions shall be exempted from restrictions imposed on currency and any other restrictions enforced in the country of the Head Office of the corporation or in the locations of its branches and the places where it has activities in the member Arab States.

## Article 17

### Withdrawal

- 1. Any member may withdraw from the corporation after submitting an official letter to the Secretary General of the League of the Arab States who, in turn shall notify the member states and the corporation thereof.
- 2. The withdrawal shall take effect only after the lapse of one year from the date of its submission to the Secretary General of the League of the Arab States. The said letter may be withdrawn before the expiry of this period.
- 3. In accordance with Clause 2 of this Article the withdrawing member shall remain responsible for all the obligations which were contracted before the discontinuance of his membership in accordance with Clause 2.
- 4. On the discontinuance of membership, the corporation shall settle the accounts of the member according to the regulations of the corporation with respect to executive authority.
- 5. On the discontinuance of membership, the General Body shall amend the shareholding proportions set out in the appendix attached to this agreement in compliance with Article 6 of this agreement.

### Article 18

### Amendment

- 1. The agreement to establish the corporation may be amended on the recommendation of one or more of the members to be submitted to the General Manager and approved by one third of its members or at the proposal of the Board of Directors. The General Manager shall notify all the member states of the said proposal.
- 2. The General Body shall consider the proposed amendment at its first ordinary meeting held after the submission of the proposed amendment.

An extraordinary meeting may be called to consider such proposal in accordance with Article 10 of this agreement, provided that the proposed amendment has been circulated among the members ninety days before the date of such meeting.

- 3. The General Body shall approve the amendment by a majority of two thirds of its members.
- 4. The amendment shall be enforced after a third of the member states have handed the documents ratifying the amendment, provided that their proportion of shareholding in the capital of the corporation is not below 60%.

### Article 19

### Settlement of Disputes

The General Body of the corporation shall adjudicate upon disputes between the corporation on the one hand and one or more members on the other or disputes amongst the members themselves. The resolutions adopted by the General Body shall come into force for a period not more than ninety days of the date of its issuance.

### Article 20

### Ratification

- 1. Each Arab State shall ratify the agreement with respect to the establishment of the corporation according to its own constitutional system. The ratification documents shall be lodged with the League of the Arab States which shall prepare minutes of acknowledgment of the ratification document of each member and notify all Arab States thereof.
- 2. An Arab state which is not a signatory to this agreement may join it and its application document shall be lodged in accordance with procedures stipulated in clause 1 of this Article.

#### Article 21

#### Reservation

The tatification of this agreement or the joining of it, shall be viewed for all purposes as a complete adherence to all its provisons and shall not be subject to any reservations.

## Article 22

## Operation of this Agreement

- 1. This agreement shall come into force after sixty days from the date on which seven Arab States have lodged with the League of the Arab States their ratification documents of this agreement.
- 2. The agreement shall come into force, as far as each member is concerned, from the date of lodging their ratification documents with the League of the Arab States.
- 3. The Secretary General of the League of the Arab States shall undertake to invite members to subscribe to the corporation's capital and the opening of the initial account of the corporation within thirty days of the agreement coming into force.
- 4. The Secretary General of the League of the Arab States shall summon the constituent meeting of the General Body within two months from the date of the enforcement of the agreement.

#### Article 23

## Corporation's Relation with the League of the Arab States

Cooperation shall be maintained between the corporation and the League of the Arab States and its organizations for the attainment of the aims and objectives of the Arab League Charter and the aims and objectives of this agreement.

Towards the foregoing, the authorized representatives, whose names are affixed hereunder have signed this agreement on behalf of their governments.

This agreement is written in Arabic in Cairo on Wednesday 14 Rabi Al Akhar 1396 H. corresponding to 14th April 1976 A.D. from an original copy which is lodged with the General Secretariat of the League of the Arab States and a duplicate of which shall be given to each contracting country.

### On behalf of the governments of:

The Hashemite Kingdom of Jordan - Mohammed Adhoob Al Zain The United Arab Emirates - Mohammed Sa'id Al Mulla

The State of Bahrain -

The Republic of Tunisia - Abdulla Farahat

The Democratic People's Republic of Algeris - Abdul Kadir Buhairi

The Kingdom of Saudi Arabia - Alawi Darwish Kayal

The Democratic Republic of Sudan - Mostapha Awad Allam

The Syrian Arab Republic - Omar Al Sibba'i

The Democratic Republic of Somalia - Abdul Rahman Farih Ismail

The Repubilc of Iraq - Askar Mahmood Rida

The Sultanate of Oman - Salem bin Nasir

The State of Kuwait - Sulaiman Hamood Al Khalid

The Republic of Lebanon -

The Libyan Arab Republic - Noori Al Fairoori Al Madani

The Arab Republic of Egypt - Abdul Fattah Abdulla

The Kingdom of Morocco -

The Islamic Republic of Mauritania -

The Yemen Arab Republic - Hussain Al Ghaffari

The Democratic People's Republic of Yemen - Ahmed Saleh Abdo Palestine - Hamed Abu Sitta

# APPENDIX

# TABLE OF SUBSCRIPTION TO THE CAPITAL OF THE ARAB CORPORATION FOR

# SPACE COMMUNICATIONS CALCULATED ON THE BASIS OF THE CAPITAL OF

## **100 MILLION DOLLARS**

S No	State	Percentage of Sharaholding	Amount of Subscription in Mil
5. 140.	State	Shareholding	
1	Kingdom of Saudi Arabia	26.2	26.2
1. 2	Libyan Arab Republic	18.5	18.5
2.	Arab Republic of Egypt	10.5	10.7
у. Л	State of Kuwait	8 2	83
ч. 5	United Arab Emirates	6.6	6.6
6	Republic of Lebanon	6.3	6.3
7	State of Oatar	5.0	5.0
,. 8	State of Bahrain	4 O	4.0
0. 0	Hashemite Kingdom of Jordan	2.2	1.0
10	Republic of Irac	2.6	2.6
10.	Democratic Republic of Sudan	2.0	2.0
12	Syrian Arab Republic	1 7	1 7
12.	Sultanate of Oman	1.7	1.7
1 <i>5</i> . 1 <i>4</i>	Democratic People's Republic of Algeria	0.9	0.0
15	Yemen Arab Republic	0.7	0.7
16	Democratic People's Republic of Yemen	0.6	0.6
17	Republic of Tunisia	0.6	0.6
18	Kingdom of Morocco	0.5	0.5
10.	Democratic Republic of Somalia	0.3	0.3
20.	Islamic Republic of Mauritania	0.2	0.2
21.	Palestine	0.2	0.2
	Tot	al 100%	100

#### **EVENTS OF INTEREST**

## 1. New York City Conference On "Remote Sensing - Legal and Policy Considerations," March 28, 1977.

The Committee on Continuing Legal Education of the Association of the Bar of the City of New York with the organizing co-sponsorship of the Association of the United States Members of the International Institute of Space Law, the American Branch of the International Law Association, the Section of International Law of the American Bar Association, the American Institute of Aeronautics and Astronautics, and the American Society of International Law held a Conference in New York City on March 28, 1977 on "Remote Sensing-Legal and Policy Considerations." The meeting was chaired and moderated by Paul G. Dembling, General Counsel of the Office of the Comptroller General of the United States. The opening address was given by Brig. Gen. Martin Menter (U.S.A.F., ret.) and the principal speakers included Leonard Jaffe, Deputy Associate Administrator for Application Programs, NASA, who spoke on "The Technology of Satellite Remote Sensing''; and N. Jasentuliyana, Outer Space Affairs Officer, United Nations Secretariat, who discussed the "U.N. Involvement in Remote Sensing'; and Professor Hamilton DeSaussure of the University of Akron School of Law whose presentation was entitled "What Future for an International Remote Sensing Regime?" Among the panelists were Eilene Galloway, Vice President of the International Institute of Space Law, Edward R. Finch, Jr., Chairman of the Aerospace Law Committee of the International Law Section of the American Bar Association, Dr. Helmut Tuerk, Counsellor at the Austrian Ministry of Foreign Affairs and Professor Stephen Gorove of the University of Mississippi Law Center. Those in attendance included a number of distinguished representatives from the United Nations and its Committee on the Peaceful Uses of Outer Space.

Stephen Gorove

Vice President for Programs, Association of the U.S. Members of the International Institute of Space Law

## 2. International Colloquium On Product Liability In Air and Space Transportation, Cologne, Germany, March 31 - April 2, 1977.

An International Colloquium on Product Liability in Air and Space Transportation, organized by the Institute of Air and Space Law of the University of Cologne in cooperation with the German Society for Aeronautics and Astronautics and the Air Law Committee of the International Law Association was held in Cologne on March 31-April 2, 1977.

The opening address by Professor Karl-Heinz Böckstiegel, Director of the Institute of Air and Space Law of the University of Cologne was followed by in- depth discussions

-175

presented by a number of eminent specialists on: (1) the Present State of Product Liability in General *de Lege Lata* and *de Lege Ferenda*, (2) Special Aspects of Product Liability in Relation to Air and Space Transportation and (3) Product Liability in the Present and Future Liability System of International Air Transportation. Professor Gerhard Kegel of the University of Cologne, Edward R. Finch of the City of New York and Professor Bin Cheng of the University of London acted as session chairmen.

Discussing the special aspects of product liability in relation to space transportation were Professor I.H. Ph. Diederiks-Verschoor of the University of Utrecht, Professor Nicolas N. Matte of McGill University and Dr. Christian Patermann of the Embassy of the Federal Republic of Germany in Washington, D.C. Among the large number of speakers and commentators were Professor Mankiewicz of Montreal, Professor Rajski of Warsaw University, Professor Guldimann of Switzerland, Professor Gorove of the University of Mississippi and Professor Klingmüller of the University of Cologne.

The papers and proceedings of the Colloquium are expected to be published by the Institute of Air and Space Law of the University of Cologne.

Stephen Gorove

Vice President for Programs, Association of the U.S. Members of the International Institute of Space Law

#### 3. Other Events

An International Conference on Global Interdependence was held at Princeton University on April 29, 1977. Among the topics pertaining to space law developments were the legal implications of solar energy, particularly with respect to the use of satellite solar power stations. These were discussed by Judge Harold Berger of Philadelphia, Conference Chairman, and Professor Stephen Gorove of the University of Mississippi Law Center. The technical aspects were presented by Dr. Peter E. Glaser, Vice President of Author D. Little, Inc. Additionally, space communications, space industrialization and other topics were discussed by Katherine Drew Hallgarten of Washington, D.C., David Berger of the Philadelphia Bar Association and Paul G. Dembling, General Counsel of the United States General Accounting Office.

During the XXth Conference of the Inter-American Bar Association held in Atlanta, Georgia, from April 30 through May 6, 1977, the Committees of Space Law and Commercial Law (Section of Communications) held a joint session under the cochairmanship of Judge Harold Berger of Philadelphia and Katherine Drew Hallgarten of Washington D.C. Presentations were made by Dr. Sergio Gonzalez, Head of the Legal Department of Entel, Chile, and Katherine Drew Hallgarten of Washington, D.C. on the law of telecommunications, by Professor Stephen Gorove of the University of Mississippi Law Center on current problems of space law and by Brig. Gen. Martin

Menter (U.S.A.F., ret.) of Washington, D.C. on recent statistics pertaining to space objects in orbit. In conclusion a film was made available and shown through the courtesy of the Embassy of the Federal Republic of Germany in Washington D.C. on the Helios project.

On May 11, 1977, during the third Princeton University Conference on Space Manufacturing Facilities co-sponsored by the American Institute of Aeronautics and Astronautics, a session was devoted to social system interactions under the chairmanship of Edward R. Finch of New York City. Topics of discussion included the social and political aspects of space manufacturing facilities and some of the international and legal considerations.

As already reported in the last issue of this Journal, the XXth Colloquium on the Law of Outer Space will be held in Prague, Czechoslovakia, during the XXVIII Congress of the International Astronautical Federation, September 26 - October 1, 1977. Also, as noted in the same issue, the AAS/AIAA Conference on Industrialization and Colonization of Space will be held in San Francisco on October 18-20, 1977. The Space Law Session of the Conference will be chaired by Professor Stephen Gorove of the University of Mississippi Law Center.

## 4. Brief News

More than 100 scientists and technicians from 23 governments and academic groups completed a major field experiment along the Pacific Coast to evaluate instruments and collect "ground-truth" for the Seasat-A oceanographic satellite, to be launched in May 1978.... The Arab Satellite Telecommunications Organization (ASTO) is expected to announce its choice of a consultative organization to help define specifications for the Arab League's Arabsat regional telecommunications system. . . . The huge, solid-propellant rocket motor that will send the space shuttle into orbit was fired for the first time on July 18, 1977. . . . The Geostationary Meteorological Satellite (GMS), built by and launched in the U.S. for Japan, is the newest member of a worldwide network of weather-watching satellites. . . . The U.S. and the U.S.S.R. renewed for 5 years their Agreement on Cooperation in Science and Technology. . . . France and the Soviet Union, in a cooperative project, will launch in 1983 an unmanned balloon to float in the atmosphere of Venus and collect scientific data. . . . Wernher von Braun (1912-1977), the man mostly responsible for the rocket which sent men to the moon, died on June 16, 1977. . . . Voyager II, launched in August, 1977, is en route to Jupiter and beyond, carrying into space, inter alia, copper discs with messages in various languages, music, pictures and greetings from President Carter.

#### BOOK REVIEWS

Studies in Space Law: Its Challenges and Prospects, by Stephen Gorove (A. W. Sijthoff, Leyden, The Netherlands, 1977, pp. 228).

During the 20 years when space law has been created as a new branch of international law, the author of this book has contributed an indepth analysis of problems encountered at each stage of development. The penetrating evaluation of space treaty provisions has enabled him to deal foresightedly with pending and future issues. The result is a scholarly book written in a readable style which should prove helpful to those who wish to learn about space law and also to those officials who are actively engaged in negotiating new guidelines for the future.

The book is divided into six parts which analyze the texts of the four space treaties drafted by the United Nations Committee on the Peaceful Uses of Outer Space and now in force. Issues now pending before the Legal Sub-Committee are also evaluated: the draft Treaty on the Moon, proposals concerning remote sensing of the earth by satellites and direct broadcasting by satellites. In addition, there are chapters on criminal jurisdiction, pollution and outer space, property rights, solar energy, the legal aspects of space stations, and a legal regime for space colonies. The book contains a table of cases pertaining to space law and a thorough subject index. Detailed footnotes extend the analysis in the text and provide a comprehensive annotated bibliography of major legal references in this field.

The author has fulfilled his objective of identifying and clarifying problems likely to arise from interpretations of the space treaties. The analysis in each case should prove helpful to those who are pioneering in this field in two ways: *first*, imagination coupled with a firm legal base will enable those who must meet problems when they arise to be prepared and not to be caught unaware by unexpected occurrences; *second*, the many ways in which language can be interpreted are set forth in such logical order that those who are negotiating future treaties should be assisted in avoiding ambiguous wording. Those students of international law who hope to become participating negotiators of treaties in the future will be rewarded by the intellectual exercise of estimating the probable consequences of different forms of legal provisions.

For example, the author points out difficulties which could arise if the Treaty on the Moon, which is now being drafted by the Legal Sub-Committee, contains provisions different from those in the 1967 Treaty on Outer Space. He states that this "will create what may turn out to be an unfortunate dichotomy with respect to situations which should be governed by the same rules, as for instance, the enforcement of treaty obligations."

Students of political science and international relations will also be interested in the contributions of the author to the analysis of sovereignty and its exercise. These ideas apply not only to current space activities, notably the relationship between airspace and

outer space, but to such future prospects as establishing a colony in free space where there are "at least two major areas of concern: the prohibition of national appropriation and the exercise of some form of sovereignty, sovereign rights, jurisdiction or control."

The application of space technology to solar energy is bound to create international problems—institutional, economic, political and legal. This subject, which is only beginning to emerge for discussion in the United Nations and is not yet on the agenda of the Legal Sub-Committee, is subjected by the author to a penetrating review which contributes to the exercise of foresight.

Continued efforts to ensure that outer space is not used for warfare make the author's analysis of arms control particularly cogent. So, too, is his discussion of the "common heritage of mankind" a concept which is currently of increasing interest in connection with developing international space law.

This book will prove valuable as a textbook for classes in international law, political science, international relations and the impact of science and technology on the conduct of foreign policy. Those who are actively engaged in devising legal language designed to cover probable future situations can benefit from this analytical approach to space law problems.

Eilene Galloway Vice-President, International Institute of Space Law

International Space Law, edited by Professor A.S. Piradov, translated into English by Boris Belitsky. Selected Soviet Bibliography (Progress Publishers, Moscow, 1976, pp. 271).

Ambassador Piradov, Permanent Representative of the U.S.S.R. to UNESCO in Paris, edited this volume which "represents a systematic exposition of the basic theoretical and practical problems of space law. The contributors to it are leading Soviet legal experts concerned with the juridical problems of space exploration." There are eight chapters followed by a conclusion: The Concept, Substance and Subject Matter of International Space Law, The History of the Establishment of Space Law, Sources of International Space Law, Fundamental Principles of International Space Law, Legal Problems of the Exploration of the Moon and the Planets, The Legal Status of Space Objects, The Regulation of Various Aspects of Space Activities, International Cooperation Involving the U.S.S.R. in the Exploration and Use of Outer Space (Legal Aspects).

The limited space permitted a book review does not allow for evaluating the historical record of space law as presented by the U.S.S.R. and this review seeks to

inform the reader of some of the major policy positions set forth in this definitive Soviet analysis of its concepts of space law.

A basic concept is that "Soviet jurisprudence thus proceeds from the concept that this [space law] is a new separate branch of international law, but within the framework of the general system of international law." The global nature of space activities is recognized as well as the function of international law in regulating the status of outer space and the effects of space activities on the Earth. The concept of "aerospace law" is rejected whereby there would be a single regime for all space above the Earth. Although there is no definition of outer space, three viewpoints are identified: those based on space activities, spatial demarcation between airspace and outer space, and the attitude that a definition is premature. A significant conclusion is that

When they launched their satellites, neither the USSR nor the USA asked permission from other states for the right to fly over their territories at such an altitude on the assumption that national sovereignty does not extend to such an altitude. Indeed, no state made any representations on the matter. The right of flights at such altitudes is therefore receiving general recognition.

The altitudes referred to are 228 km. for Soviet satellites and 184 km. for the United States. There is recognition that states have equal rights to participate in space activities, although their economic, scientific and technological development is unequal.

The Soviet authors consider that the sources of international space law cannot be other than those of public international law, including the United Nations Charter. "Customary law has not yet had sufficient time to make itself felt as a regulator in the space activities of states. . . [although it may] become a secondary, reserve source. . ." in addition to international treaties.

With regard to Soviet-United States agreements, the principles of their cooperation "are acquiring broader political and juridical significance, and transcend the boundaries of bilateral relations." The four space treaties are analyzed with emphasis on their provisions for the peaceful uses of outer space. The requirement that states conduct their activities in accordance with international law and the U.N. Charter does not abrogate "the process of legitimate self-defense." The partial demilitarization of outer space and the total demilitarization of celestial bodies would be superseded if agreement should be reached on "total demilitarization of all outer space." International responsibility of states is interpreted to mean relations between states and not "relations between states and private businessmen."

The difference in definition between "cosmonaut" and "astronaut" should prove of interest in legal interpretations. "The term 'cosmonaut' is however broader in its meaning, since it applies to persons who make any type of flights in outer space, whereas the term 'astronaut' is narrower and less definite (meaning 'a person who flies to the stars')."

After describing the difficulty of defining "celestial bodies" in legal terms, the conclusion reached is that "in the context of space law celestial bodies are natural uninhabited cosmic bodies which states are entitled to use in the interests of progress and for peaceful purposes exclusively." Should intelligent inhabitants be encountered in outer space, new specific principles would be required.

The difficulties encountered in defining space objects are described and the conclusion is that "[B]y now we can consider it established practice that space objects are taken to mean all objects launched into Earth orbit and beyond, or those intended for such purposes." The legal status of the space shuttle and the space tug are seen to be different and to raise questions. Orbital stations and space objects constructed on the Moon will require special treatment in international law. The Soviet authors state that "[a] space station. . . is considered spatial irrespective of where it is at a given moment—in outer space, in terrestrial space, or even on the Earth itself ('intended to go beyond. . .'). Consequently, even before launching or after return to the Earth it does not lose its status. The definitive factor is its purpose—not its spatial co-ordinates."

Direct television broadcasting via satellites is examined, and since television pictures are considered to have greater impact on people than other types of media, the activity "requires special regulation by international law" including prior consent by foreign states of such activity.

In analyzing the use of artificial earth satellites for navigation, the question is raised of

whether it is expedient to set up separate specialized organizations for every space technology application. The establishment of separate specialized organizations could eventually result in dispersing efforts on the problems of space exploration, and this would make it more complicated to co-ordinate the efforts of states in the peaceful exploration and use of outer space. This could also add considerably to the expenditures of states interested in participating in such organizations. It would appear much more advantageous to solve this problem by setting up a single space research organization as a specialized United Nations agency. This would make it possible to concentrate all the problems of space exploration within the UN framework, assure a more representative character of such a body, considerably reduce expenditures on financing it, and optimally organize co-operation on the entire range of problems involved in space exploration."

They would be opposed, however, to having the organization replace national space activities and consider it inopportune to "internationalize all space activities and place them under the jurisdiction of some international organization." It is also considered "premature. . . to speak of internationalizing space hardware."

Space meteorology is examined and the possibility of its being used for warfare is analyzed and attention is called to the binding provisions of the 1967 Outer Space Treaty. In reviewing the exploration of the earth's resources by space facilities, the point is made that some states regard it as possible "economic espionage", and the conclusion is that "[t]he problem may be solved by regulating the procedure for using information

#### BOOK REVIEWS

about natural resources acquired by means of space facilities." But enactment of principles would not restrict "broad study of the natural environment." International cooperation would facilitate legal regulation. Environmental protection should be a main objective.

The U.S.S.R.'s record in international cooperation is described, especially the INTERCOSMOS program, the Intersputnik International Organization of Space Communications, and the bilateral agreements with the United States, France, and India. Cooperation with international nongovernmental organizations is carried on with the Committee on Space Research (COSPAR) of the International Council of Scientific Unions (ICSU) and the International Astronautical Federation (IAF).

The Soviet authors conclude that "[t]he further development of space law will depend on progress towards agreement on general and complete disarmament."

Eilene Galloway Vice-President, International Institute of Space Law

### Legal Status of Outer Space, by Andrzej Górbiel (Lodz, Poland, 1977, pp. 174).

The author, who is Professeur agrégé à l'Université de Lodz and docteur des sciences juridiques, analyzes space law according to four main topics: the notion of outer space, foundations of legal regulations, the rights of states concerning objects and persons in outer space, and the freedom of outer space and its legal restrictions. The book is published in Polish except for a section in English on the "Legal Status of Outer Space" and the 32-page bibliography which is in several languages according to the nationality of the authors.

Commenting on the fact that the legal status of space over the Earth has been a subject of juridical consideration since Roman times, Dr. Gótbiel holds that outer space legal doctrine has "outdistanced to a great extent the progress in treaty law-making." He considers that the 1967 Treaty on Outer Space is simultaneously much too general and to a small extent "juridically precise." Thus, it is necessary to elaborate new space law conventions. He considers that there is "urgent need" for a binding definition of outer space. As between territorial and functional approaches to this problem, the author rejects a definition based on space activities and states that "the best legal formula. . .would be placing the frontier between the air space and the outer space at the altitude of eighty kilometers above the surface of the Earth."

Dr. Górbiel points out that some authors take the position that separate parts of outer space and celestial bodies can be appropriated while others hold the view that national appropriation cannot take place. His own position is that there is a

"fundamental difference of relations arising among the subjects of private law in comparison with relations arising among the sovereign states as subjects of international law." He reminds the reader that freedom of outer space and inadmissibility of national appropriation came into existence even prior to the 1967 Treaty on Outer Space and that the short duration of this practice does not diminish its legality; in fact, he concludes that even states that are parties to the 1967 Treaty "cannot abrogate their binding force by withdrawal on the basis of its Article XVI."

Dr. Górbiel's analysis is that international practice is "uniform and explicit" regarding the rights of states concerning objects and persons in outer space and it follows that even though objects launched into outer space go through some aerial territory of other states, territorial sovereignty is not violated nor is there any influence on the legal status of spacecraft.

With regard to stations on a celestial body, the author concludes that the state which installs a station has jurisdiction and control only in a necessarily needed area around the station and without interfering with other states' activities. "In the Author's opinion the international legal status of a cosmonaut is vested to all persons being in outer space or on celestial bodies irrespective of the functions or tasks which they are to realize there. Thus the term 'personnel' of space objects used in Article VIII of the 1967 Treaty must be interpreted extensively."

Dr. Górbiel discusses military and peaceful uses of outer space. He concludes that there should be clear provision in a convention on "inadmissibility" of "satellitesspies" and intelligence activities.

> Eilene Galloway Vice-President, International Institute of Space Law

Space Activities and Resources. A review of the activities and resources of the United Nations, of its specialized agencies and of other competent international bodies relating to the peaceful uses of outer space, U.N. Doc. A/AC. 105/193 (United Nations, New York, 1977, pp. 251).

In his preface, U.N. Secretary-General Kurt Waldheim writes that

The support and interest many countries have given to the exploration of outer space during this period has led to an impressive growth in the number of international organizations concerned with space-oriented activities, with the world-wide impact of these organizations becoming more and more significant. The United Nations played an active role in this effort through the establishment of the Committee on the Peaceful Uses of Outer Space which the General Assembly assigned to serve as the 'focal point' for international co-operation in this sphere. Under the guidance of the Committee, which I have had the privilege and honour of chairing for several years, action has been
taken by the United Nations Secretariat to promote scientific, technical and legal cooperation in this field on the international level. Recognizing that the elaboration of any effort in any given field requires as a first step a review and appraisal of the needs to be met and of the activities and resources available for meeting these needs, the United Nations has conducted a periodic survey of the various activities undertaken by the growing number of international organizations competent and concerned with the peaceful uses of outer space. . . What has become perfectly clear is that such activities not only concern experts, technicians, and government representatives, but touch upon the interests and needs of all of us both as individuals and members of our community. The greater our understanding of these needs and interests, the greater will be our effort to promote co-operation in the vital area of the peaceful uses of outer space, for the benefit of mankind as a whole.

The body of this report is presented in four chapters on the United Nations, Specialized Agencies, Other Intergovernmental Organizations, and Nongovernmental Organizations. Chapter I on the United Nations gives an up-to-date description of the activities of the Committee on the Peaceful Uses of Outer Space, the United Nations Secretariat, Regional Economic Commissions, the U.N. Environment Program, the U.N. Development Program, and Interdepartmental and Interagency Cooperation Consultation.

Chapter II covers the specialized agencies which have space and space-related activities: the International Telecommunication Union, World Meteorological Organization, UNESCO, Food and Agriculture Organization, World Health Organization, International Civil Aviation Organization, International Atomic Energy Agency, World Bank, and World Intellectual Property Organization.

Chapter III includes other intergovernmental organizations: the European Space Agency, the International Telecommunications Satellite Organization and the International System and Organization of Space Communications (INTERSPUTNIK).

Chapter IV on nongovernmental organizations covers the International Council of Scientific Unions, the Committee on Space Research of the International Council of Scientific Unions and the International Astronautical Federation.

The five annexes include the 1962 General Assembly resolution on legal principles as well as the texts of the four space treaties now in force. There is a list of U.N. documentation on significant outer space questions and a list of acronyms used in the review.

A worldwide pattern of interacting relationships has been formed by the international organizations which have adopted space science and technology to improve the performance of their functions.

Eilene Galloway Vice-President, International Institute of Space Law

Aeronautics and Space Report of the President: 1976 Activities. Report of the President of the United States on U.S. Activities. U.S. National Aeronautics and Space Administration (U.S. Gov't. Printing Office, Washington, 1977, pp. 108).

As required by the National Aeronautics and Space Act of 1958, this report deals with the space and space-related activities of all departments and agencies of the Federal Government. This document is basic to an understanding of the relationship between national and international space activities and is essential for a comprehension of the widespread use of space technology as well as the interaction between organizations.

A summary of the United States' aeronautical and space activities during 1976 is given, along with a description of the role of the following government organizations: NASA, Department of Defense, Department of Commerce, Energy Research and Development Administration, Department of the Interior, Department of Agriculture, National Science Foundation, Environmental Protection Agency, National Academy of Sciences (National Academy of Engineering and National Research Council), Office of Telecommunications Policy, Federal Communications Commission, Department of State, Arms Control and Disarmament Agency, Department of Transportation, the Smithsonian Institution, and the United States Information Agency.

Valuable records on spacecraft, launchings, applications, payloads, probes, and the history of United States and Soviet Manned Space Flights are to be found in the appendixes. The U. S. space budget and budget authority as well as the space activities budget of major appropriations are presented. There is a 20-year summary of the space activities of the U. S. Government. U. S. national laws related to space activities as well as international activities involving legal problems are covered, including the role of the Department of State in relation to the United Nations.

Eilene Galloway Vice-President, International Institute of Space Law

#### A. Books

Andrzej Górbiel, Status prawny kosmosu (Legal Status of Outer Space), Uniwersytet Lódzki, 1977.

Stephen Gorove, Studies in Space Law: Its Challenges and Prospects, Sijthoff, 1977.

- Michael Kinsley, Outer Space and Inner Sanctum: Government, Business and Satellite Communications, Wiley, 1976.
- Wulf von Kries, Organisation internationaler Nutzsatellitensysteme, Nomos, Baden-Baden, 1977.
- Gilbert E. LaVean and William G. Schmidt (eds.), Communications Satellite Developments, M.I.T. Press, 1976.
- A.S. Piradov (ed.), International Space Law, Progress, 1976.
- National Academy of Sciences, Resource Sensing from Space: Prospects of Developing Countries, Washington, 1977.
- William H. Schauer, The Politics of Space: A Comparison of the Soviet and American Space Program, Holmes and Meier, 1976.
- Mortimer D. Schwartz (ed.), Space Law Perspectives: Commentaries based on Volumes 1-15 of the Colloquia on the Law of Outer Space, Rothman, 1976.

Delbert D. Smith, Communication via Satellite: A Vision in Retrospect, Sijthoff, 1976.

## **B.** Articles

Bourély, The Legal Framework of the Spacelab/Space Shuttle Programs in Comparison with the Apollo/Soyuz Test Program, 4 J. Space L. 77 (1976).

Bueckling, Bleibt der Mond staatenlos?, Film & Recht 8 (No. 1, 1977).

- Bueckling, Das Übereinkommen vom 29.3.1972 über die völkerrechtliche Haftung für Schaden durch Weltraumgegenstände, 28 Versicherungsrecht 389 (1977).
- Eisenstadt and Utton, Solar Rights and Their Effect on Solar Heating and Cooling, 16 Natural Resources J. 363 (1976).

Finch and Moore, Ecospace and Some of its Legal Implications, 4 J. Space L. 117 (1976).

- Goedhuis, Influence de l'utilisation des Satellites en Particulier Ceux des Télécommunications et des Télédetections sur les Relations Internationales, 29 Revue Française de Droit Aérien 378 (1975).
- Grad and Goldfarb, Government Regulation of International Telecommunications, 15 Colum. J. Transnat'l. L. 384 (1976).

Hosenball, Space Law, Liability and Insurable Risks, 12 Forum 141 (1976).

Latin, Remote Sensing Evidence and Environmental Law, 64 Calif. L. Rev. 1300 (1976).

Menon, International Maritime Satellite System, 8 J. Maritime L. 95 (1976).

- Moskowitz, Legal Access to Light: The Solar Energy Imperative, 9 Natural Resources Lawyer 177 (1976).
- O'Neill, Engineering a Space Manufacturing Center, 14 Astronautics & Aeronautics 20 (Oct. 1976).

Polter, Remote Sensing and State Sovereignty, 4J. Space L. 99 (1976).

- Price, First Amendment and Television Broadcasting by Satellite, 23 U.C.L.A. L. Rev. 879 (1976).
- Robinson, Earth Exposure to Martian Matter: Back Contamination Procedures and International Quarantine Regulations, 15 Colum. J. Transnat'l. L. 17 (1976).
- Vereshchetin, State Sovereignty and Use of Outer Space for Applied Purposes, 15 Soviet Law and Govt. 75 (1976).

Zillman, Legal Aspects of Solar Energy Development, 1976 Ariz. St. L.J. 25 (1976).

## Notes/Comments

Legal Implications of Direct Satellite Broadcasting - the U.N. Working Group, 6 Ga. J. Int. & Comp. L. 564 (1976).

## **Book Reviews**

Courteix, S., Télévision sans Frontières (I.H. Ph. Diederiks-Verschoor), 4 J. Space L. 185 (1976).

- Herkommer, E.W., Die Rechstellung des Raumfahrers Nach geltendem Weltraumrecht (I.H. Ph. Diederiks-Verschoor), 4J. Space L. 185 (1976).
- Matte, N.M. and DeSaussure, H., Legal Implications of Remote Sensing From Outer Space (V.H. Minshew), 4 J. Space L. 183.

### C. Official Publications

#### Agreements -

- Remote Sensing for Earth Resources, Agreement Between United States and Brazil, Entered into Force April 30, 1976; T.I.A.S. 8391.
- Space Cooperation: Remote Manipulator System, Agreement Between United States and Canada, Entered into Force June 23, 1976; T.I.A.S. 8400.
- Tracking Station: Mahe Island, Agreement Between United States and Seychelles, Entered into Force June 29, 1976; T.I.A.S. 8385.

### United Nations

- U.N. Comm. on the Peaceful Uses of Outer Space, Report by Expert on Space Applications on Space Technology, U.N. Activities 1971-1976, and U.N. Programs 1977-1978, Doc. A/AC.105/191 (1976).
- U.N. Comm. on the Peaceful Uses of Outer Space, Report of the Legal Sub-Committee on the work of its Sixteenth Session, Doc. A/AC.105/196 (1977).
- U.N. Comm. on the Peaceful Uses of Outer Space, Report of the Scientific and Technical Sub-Committee on the work of its Fourteenth Session, Doc. A/AC.105/197 (1977).
- U.N. Comm. on Space Research, Report on Developments and Trends, Doc. A/AC.105/188 (1976).
- U.N. Dept. of Political and Security Affairs, Space Activities and Resources: A Review of the Activities and Resources of the U.N., of Its Specialized Agencies and Other Competent International Bodies Relating to the Peaceful Uses of Outer Space, Doc. A/AC.105/193 (1977).
- U.N. General Assembly, Information on Proposed Regional Ground Station for Remote Sensing, Doc. A/AC.105/174 (1976).
- U.N. General Assembly, Off. Rec., Report of the Committee on the Peaceful Uses of Outer Space, 31st Sess. Supp. 20, Doc. A/31/20 (1976).

- U.N. General Assembly, Report of the First Committee on Direct Television Broadcasting by Satellite, Doc. A/31/285 (1976).
- U.N. General Assembly, Report of the Fifth Committee on Direct Television Broadcasting by Satellite, Doc. A/31/319 (1976).
- U.N. General Assembly, Report of the Secretary-General on a U.N. Program of Public Information on the Peaceful Use of Outer Space, Doc. A/AC.105/172 (1976).
- U.N. General Assembly, Resolutions on Outer Space Activities, Doc. A/RES/31/8 (1976).
- U.N. Office of Public Information, The United Nations and Outer Space, (1977).
- U.N. Secretariat, Report on Remote Sensing of the Earth from Space, Doc. A/AC.105/185 (1976).

U.S. Congress

- U.S. House Appropriations Comm., Hearings Before the Subcomm. on Agriculture and Related Agencies, Appropriations on determining utility and cost effectiveness of using satellite, meteorological, and climatological data to predict world crop production, 95th Cong., 1st Sess. (1977).
- U.S. House Comm. on International Relations, Compilation of papers prepared for Subcomm. on International Security and Scientific Affairs, on the origin, purposes, contents and execution of technology and scientific transfer agreements including "U.S.-U.S.S.R. Agreement for Cooperation in Space", 95th Cong., 1st Sess. (Comm. Print, 1977).
- U.S. House Comm. on Interstate and Foreign Commerce, Staff Report: International Telecommunications, including FCC role in U.S. foreign policy and Communications Satellite Corp. and International Satellite Corp., 95th Cong., 1st Sess. (Comm. Print 1977).
- U.S. House Comm. on Science and Technology, Conference report on H.R. 4088, NASA Authorization for Fiscal Year 1978, 95th Cong. 1st Sess. (1977).
- U.S. House Comm. on Science and Technology, Hearings Before the Subcomm. on Space Science and Applications to consider possible future NASA space research programs, including global satellite information services, solar energy use program, and development of facilities for industrial manufacturing operations in space, 94th Cong., 2d Sess. (1976).
- U.S. House Comm. On Science and Technology, Hearings Before the Subcommittee on Space Science and Applications: International Space Law, 94th Cong. 2d Sess. (1976)

- U.S. Senate Comm. on Aeronautical and Space Sciences, Committee on Aeronautical and Space Sciences 1958-1976, 94th Cong. 2d Sess. (Comm. Print, 1976).
- U.S. Senate Comm. on Aeronautical and Space Sciences, Report of Activities during the 94th Congress. Includes oversight of NASA and matters relating to space and aeronautics. 95th Cong., Sess. (1977).
- U.S. Senate Comm. on Aeronautical and Space Sciences, Space Law: Selected Basic Documents, 94th Cong., 2d Sess. (Comm. Print, 1976).
- U.S. Senate Comm. on Foreign Relations, compilation by Subcomm. on International Operations of previously unpublished papers on international communications, including: "The View Ahead: Direct Satellite Broadcasting and International Communications" and "Alternatives to Intelsat: Competition in Global Satellite Telecommunications", 95th Cong., 1st Sess. (Comm. Print, 1977).
- U.S. Senate Comm. on Foreign Relations, Convention on Registration of Objects Launched into Outer Space, 94th Cong., 2d Sess. (1976).
- U.S. Dept. of State
- U.S. Reviews International Cooperation in Space Activities and Work of the U.N. Outer Space Committee in 1976 (Statement of W. Tapley Bennett, Jr.), 75 Dept. St. Bull. 668 (1976).
- U.S. Discusses Progress and Challenges in Space Technology and Law in U.N. Outer Space Committee (Statement of Herbert K. Reis), 75 Dept, St. Bull. 206 (1976).
- Convention on Registration of Objects Launched into Outer Space. Entered into Force September 15, 1976, proclaimed by U.S. President January 18, 1977, 76 Dept. St. Bull. 120 (1977).
- U.S. President
- Aeronautics and Space Report of the President: 1976 Activities. U.S. Gov't. Printing Off., 1977.

### D. Miscellaneous

International Institute of Space Law of the International Astronautical Federation, Proceedings of the XIX Colloquium on the Law of Outer Space, edited by Mortimer D. Schwartz (Davis, 1976). Included in the Proceedings were:

# INTRODUCTION

# THE FUTURE OF SPACE LAW—Part I

The Future of Space Law-Galloway
Future of Space Law—Abdurrasyid
The European Space Agency's Contribution to the
Development of Space Law-Bourely
Evolution Toward An International Space Agency—DeSaussure
The Draft Treaty Relating to the Moon: An
Overview and Evaluation—Gorove
The Future of Space Law: A Legal Regime for Space Colonies—Gorove
Exegesis del Tratado Sobre los Principios Que Deben Regir las
Actividades de los Estados en la Exploracion y Utilization
del Espacio Ultraterrestre, Inclusive la Luna—Hernandez
Mankind As a Subject of Future Law of Outer Space?—Krstic
The Future of Space Law and the Disarmament Problem-Markoff
Space Law - Earth Law: Recognizing and Accepting the Distinction-Robinson 79
The Development of International Law Relating to Remote
Sensing of the Earth from Outer Space—Stowe
Drawing up a Draft Treaty on the Moon - A Further Contribution to
the Progressive Development of International Space Law—Vassilevskaya 99
Perspectives of the Uses of Outer Space for Applied
Purposes and State Sovereignty-Vereschetin
International Law Problems Related to the Exploration of
Earth Resources from Outer Space—Zhukov
International Law Problems of Direct Television
Broadcasts from Satellites—Zhukov115

## SPACE LAW AND ENERGY—Part II A

Space Energy Law and the Hierarchy of Norms—Fasan	)
Energy - Ecospace—Finch	í
Space Law and Energy Relationship with the Outer Space Station:	
A Question of International Heritage of Mankind—Okolie	5

# RELATIONSHIP OF AIR AND SPACE LAW-Part II B

Search and Rescue in Space Law—Diederiks-Verschoor	152
Airspace, Outer Space and Mesospace—Haanappel	160
Relationship of Air and Space Law—Menter	164
The Space Shuttle and the Law of Outer Space-Moss	175
Remarks on Scientific Criteria for the Definition of Outer Space-Perek	185-

# RECENT PUBLICATIONS

# OTHER SUBJECTS—Part III

The Role of the United Nations in the Colonization of Outer Space,
or Chicken Little Was Right—Berlin and Tennen
Legal Aspects of Space Activities by Private Enterprises -
Introductory Report—Böckstiegel
Legal Problems of Use of Data Remote Sensing-Bordouvov
International Space Law and the Less Developed Countries-Christol
Legal and Economic Prerequisites to Space Industrialization-Dula
Geostationary Orbit-Technology and Law-Gehrig
Is There a General International Law of Original Ownership? The
Possible Relevance of General Doctrines Governing the
Possession of Deep Ocean-bed Resources—Goldie
Convention on Registration of Objects Launched into Outer Space:
Analysis and Commentary-Gorove
The Anti-Mesospace—Hervy
Cooperation Among States in the Exploration and Use of Outer Space -
One of the Basic Principles of International Outer Space Law-Kamenetskava, 299
On the Work on the Establishment of the International Maritime
Satellite System (INMARSAT)-Kolodkin and Volosov
Kev Features of International Satellite Enterprises—Kries
On the Definition of Space Objects—Lukin
News about the Direct Television Problem—Magno. 316
Outer Space Resources—Magno and Verdacchi 320
Remote Sensing by Satellites and Aerospace Law—Matte 325
Direct Broadcast Satellites by Treaty of Regulation: The Committee on
Peaceful Uses of Outer Space v The ITU—Moore 341
Actual Legal and Administration Problems of the
Intelsat-Organization-Patermann 351
The History of the Draft Treaty on the Moon—Reijnen 357
Direct Television Broadcasting by Satellites_Reijnen 360
Scientific and Legal Objectives in Remote Sensing-Sarkat 378
Movens de Résolution de Differences par Suite des Activities
dans L'Espace—Stellacatos 384
Frequency Allocations for Passive Use of the Radio Spectrum
To Make Scientific Studies-Stull and Alexander 200
To make occurrent ordered order and mexander
ANNEXES

	•	
XIX Colloquium on the Law of Outer Space:		
Summary of Discussions-Christol.	 	. 400

Submitted j	papers:
Interna	tional Legal Problems on the Use
of	Geostationary Orbit-Dudakov 406
Soverei	gnty in Outer Space Law—Kolossov
A New	International Agency to Coordinate the Actions of
St	ates in Outer Space: Some Preliminary Suggestions—Myers
Legal N	ature of Space Shuttle—Ferrer
Closing Ren	arks-Prof. Dr. I. H. Ph. Diederiks-Verschoor

--```

#### INDEX TO VOLUME V

Agreement on Establishment of INTELSAT (see INTELSAT) Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, 4, 9, 111 Airspace, 112, 113, 121, 122, 133 Apollo-Soyuz, 133, 135 Arab Corporation for Space Communications, 157 ARIANE launcher, 40 Artificial earth satellites for direct television broadcasting (see Direct satellite broadcasting) **Book Reviews** Górbiel, A., Legal Status of Outer Space (E. Galloway), 183 Gorove, Stephen, Studies in Space Law: Its Challenges and Prospects (E. Galloway), 179 Piradov, A.S., International Space Law (E. Galloway), 180 U.S. NASA, Aeronautics and Space Report of the President: 1976 Activities (E. Galloway), 186 United Nations, Space Activities and Resources (E. Galloway), 184 Brazilian domestic satellite system, 66, 82, 83, 86-88 Broadcasting satellite service (see Direct satellite broadcasting) Brun, A., 120 Bumba, V., 122 Butler, Richard E., World Administrative Radio Conference for Planning Broadcasting Satellite Service, 93-99 Canadian Telsat Corporation, 127, 140 Carver, J.H., The Scientific and Technical Sub-Committee of the United Nations Committee on the Peaceful Uses of Outer Space, 17-27 CELPA Mar del Plata, 13, 21 Chen, Kwen, Pending Issues Before the Legal Sub-Committee of the Committee on the Peaceful Uses of Outer Space, 29-35 Cheng, B., 122 Christol, C., 125, 128, 142, 153 Cocca, C., 131 Colino, Richard R., International Cooperation Between Communications Satellite Systems: An Overview of Current Practices and Future Prospects, 65-92 Committee on the Peaceful Uses of Outer Space (see UNCOPUOS) Committee on Space Research (COSPAR), 20, 118, 119 Common heritage of mankind, 29, 30, 131, 132, 153 Common Law of Mankind, The (W. Jenks), 125 Communications Satellite Corporation (COMSAT), 125, 127, 129, 133-147, 153 COMSTAR, 66 Conferences Inter-American Bar Association, XXth Conference, Atlanta, Georgia, April 30-May 6, 1977, 176 International Colloquium on Product Liability in Air and Space Transportation, Cologne, Germany, March 31-April 2, 1977, 175 International Conference on Global Interdependence, Princeton University, April 29, 1977, 176 New York City Conference on "Remote Sensing", New York, New York, March 28, 1977, 175 Convention on International Liability for Damage Caused by the Launching of Objects into Outer Space, 4,9, 10, 111, 128, 141, 142, 146-148, 150, 151, 154 Convention on Registration of Objects Launched into Outer Space, 4, 9, 10, 111, 117, 128, 144, 145 Cooper, J.C., 120, 121 Copyrights, 136, 153

Council of Europe, 128, 131, 143, 150, 155

Declaration of Legal Principles Governing the Peaceful Activities and Use of Quter Space, 128, 146 Deep space, 113, 114

Diederiks-Verschoor, I. (co-author), The Future Legal Status of Nongovernmental Entities in Outer Space: Private Individuals and Companies as Subjects and Beneficiaries of International Space Law, 125-155. Direct satellite broadcasting, 4, 10, 12, 21, 27, 30-33, 93-97, 135

Document, Current

Arab Corporation for Space Communication, 157

Doyle, Stephen, INMARSAT: The International Maritime Satellite Organization—Origins and Structure, 45-63.

Draft Treaty Relating to the Moon, 4, 10, 29

Early Bird commercial satellite, 133

Earth satellites, 18, 19

Earth Satellites, Table of, 118

Earth station, 69, 80, 84

Earth-space service, 69

Educational, Scientific and Cultural Organization, UN (see UNESCO)

Einstein's theory of relativity, 114, 115

Environmental Program, UN (see UNEP)

European Launcher Development Organization (ELDO), 37-40, 128, 144

European Space Agency (ESA), 20, 37-42, 127, 128, 134, 143, 144

Administrative and Finance Committee, 38.

Advisory Group on Future Earth Resources, 38

Advisory Group on the Use of Spacelab, 38

Council of, 38, 40, 41

Director General, 38, 41, 42

Industrial Policy Committee, 38

International Relations Advisory Committee, 38,

Program Boards, 38 Science Program Committee, 38

European Space Conference, 37, 38

European Space Operations Center (ESOC), 39

European Space Research Institute, 39

European Space Research Organization (ESRO), 37-40, 128, 144

European Space Technology Center (ESTEC), 39

EUROSAT 127

EUROSPACE, 125-128, 142, 147, 153

Expert on Space Applications (see UN Expert on)

Exploitation of moon's natural resources, 29, 30

Extraordinary Administrative Radio Conference (EARC), 69

Fawcett, J., 133 Federal Communications Commission (FCC), 129, 134 Fiorio, Franco, 24 Fixed satellite service, 69, 70, 95 Food and Agriculture Organization (FAO) (see UN) Freeman, Arthur L., 49, 53, 54 French/German Symphonie experimental satellite system, 66, 80

Galloway, Eilene, Introduction to the Symposium on International Organizations and the Law of Outer Space, 3-6.
Geneva Convention on the Protection of Prisoners and Civilian Populations, 130
Geoid, 116, 124
Geostationary orbit, 19, 68, 70, 95-98, 111, 112, 121, 122
Geostationary satellites, 68, 70,

Geosynchronous arc, 85 Geosynchronous orbit, 66 Global Environmental Monitoring System (GEMS), 139 Gormley, W. Paul (co-authot), Future Legal Status of Nongovernmental Entities in Outer Space: Private Individuals and Companies as Subjects and Beneficiaries of International Space Law, 125-155 Gorove, Stephen, International Colloquium on Product Liability in Air and Space Transportation, 175 New York City Conference on "Remote Sensing", 175 Haley, Andrew, 112, 113 Human rights, 37, 130, 135, 149, 150, 152, 154, 155 Inner space, 133 Intergovernmental Maritime Consultative Organization (IMCO), 20, 21, 45, 46, 59-62 Maritime Safety Committee, 45-47 Panel of Experts, 45-48 International Arbitration Tribunal, 42 International Astronautical Federation, 20 International Atomic Energy Agency, 47 International cooperation in outer space, 5, 11-15, 19-25, 65, 67, 71, 117 International Court of Justice, 47, 126, 152 International Frequency Registration Board (IFRB) (See ITU) International law, 126, 128-133, 146-155 International Maritime Satellite Organization (INMARSAT), 21, 45-63. 91 INMARSAT Preparatory Committee, 60-62 International maritime satellite system, 45, 47, 48, 66, 91 Conference on establishment of, 47-51, 56-62 Intersessional Working Group of, 49-59 International Telecommunications Satellite Organization (INTELSAT), 50, 52, 54, 62, 63, 65-92, 129, 134, 137, 147, 153 Agreement on Establishment of INTELSAT, 72, 73, 77, 80, 86 Operating Agreement, 72, 73, 77, 80, 86 Structure of, 73-76 International Telecommunication Union (ITU), 3, 12, 20, 31, 32, 49, 58, 61, 67-79, 81-85, 87-99, 136-138, 147, 154 Administrative Conference, 68, 69, 93, 94 Administrative Council, 68 General Secretariat, 68 International Frequency Registration Board (IFRB), 68-71, 82, 85, 86, 89, 93 International Radio Consultative Committee (CCIR), 68, 71, 72, 79, 87, 88 International Telephone and Telegraph Consultative Committee (CCITT), 68, 71, 72 Plenipotentiary Conference, 68, 93, 94 Radio Regulations, 68-72, 79, 81-84, 87-89, 113 International Union for the Protection of Literary and Artistic Works, 136 INTERSPUTNIK, 63, 134 Italian Sirio experimental satellite system, 66, 80

Jankowitsch, Peter, Contributions of the United Nations Committee on the Peaceful Uses of Outer Space: An Overview, 7-15 Jenks, Wilfred C., 125

Kaltenecker, Hans, *The New European Space Agency*, 37-43 Killer satellites, 14 King-Hele, D.G., 118 Kolosov, M., 121 Kopal, V., 121 Kroell, J., 120

Landsat images, U.S., 24-26 Legal Sub-Committee of UNCOPUOS (see UNCOPUOS) Liability Convention Treaty (see Convention on) Locus standi, 130, 150, 152, 154

Marcoff, M., 142 Maritime satellite (see INMARSAT) Martyn, D. F., 17 Master Register, 70, 89 Materials processing in outer space, 27 Matsch, Franz, 8 Matte, N.M., 114, 123 McDougal, M., 125, 140-142, 153 Miller, William K., 61 Moon rocks, 139, 140 Moon Treaty (see Draft Treaty) Murthy, H., 22

National Aeronautics and Space Administration (NASA), 4, 126, 134, 139, 142, 143 NATO, 134 Natural resources of the moon, 10 Navigation satellites, 12 Navigation Satellites Working Group (see UNCOPUOS) Navigational services satellite system, 12, 21, 27, 116 Newton, Sir Isaac, 18, 19 Nominal orbit/spectrum, 93-98

Orbital are positions, 82 Orbiting colonies, 4 Ordinary Administrative Radio Conference, 69 Outer space, definition of, 97, 98, 111-124 delimitation of, 111, 112, 116, 118, 120-123 Outer Space Affairs Division of U.N. (see UN) Outer space colonies, 140, 141 Outer Space Treaty, 4, 8, 9, 33, 97, 102, 103, 109, 111, 128, 131, 132, 141, 142, 146-148, 154 Overspill of satellite signal radiation, 32,96

PALAPA system, 14, 66, 82, 84-86 Perek, Lubos, Scientific Criteria for the Delimitation of Outer Space, 111-124 Plenipotentiary Conference (See ITU)

Radio Conference, World Administrative (see WARC) Radio frequency spectrum and orbital space, 65-68, 77, 85, 92-98 Radio Regulations (see ITU) Radiocommunications, space, 98 Radiocommunications, terrestrial, 98, 99 RCA, 66 Registration Convention (see Convention on) Remote sensing, 4, 5, 10-12, 14, 22-26, 33, 34, 99, 101-109, 137-139, 147, 153, 154

Rescue and Return of Astronauts and Space Objects (see Agreement on)

Resource sounding satellites, 137, 139 Ricciardi, H., 22 Rocket ranges (see Sounding rocket)

Satellite instructional television experiment (SITE), 21 Satellite laser ranging telescope, 116 Satellite signal radiation overspill, 32, 96 Scientific and Technical Sub-Committee of COPUOS (see UN) Sea, Conference on the Law of (see UN) Solar energy, 12, 27 Sounding rocket launching facilities, 11, 13, 21 Sovereignty, 8, 31, 32, 34, 97, 105, 111-115, 120, 126, 135 Space colonies, 14 Space communications, 12, 14 Space Law (W. Jenks), 125 Space radiocommunications (see Radiocommunications) Space service, 69 Space station, 69, 98, 137 Spacelab developments program, 40 Sputnik I, 18, 65 STATSIONAR, 66, 82, 88 Stowe, Ronald F., The Development of International Law Relating to Remote Sensing of the Earth from Outer Space, 101-109

TELESAT, 66, 133

Terrestrial radiocommunications (see Radiocommunications) Thumba Equatorial Rocket Launching Station (TERLS), 13, 21

Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space, and Under Water, 111

United Nations, 7, 8, 13, 20-24, 37, 126-129, 136, 138, 139, 153

U.N. Committee on the Peaceful Uses of Outer Space (UNCOPUOS), 3, 4, 7, 8, 11-13, 15, 17, 20-22, 101-109, 117, 135

Legal Sub-Committee (and Working Groups), 4, 5, 8, 10, 13, 17, 20, 29-35, 93-99, 112 Navigational Satellite Working Group, 21 Scientific and Technical Sub-Committee, 8, 11-13, 17-27, 112, 122

U.N. Conference on the Exploration and Peaceful Uses of Outer Space, 11

U.N. Conference on the Law of the Sea, 133

U.N. Development Program, 20

U.N. Educational, Scientific and Cultural Organization (UNESCO), 3, 20, 137, 138, 141, 154

U.N. Environmental Program (UNEP), 20, 138, 139, 147, 154

U.N. Expert on Space Applications Program, 12, 22-24, 26

U.N. Food and Agriculture Organization (FAO;, 3, 20, 23, 130

U.N. Outer Space Affairs Division, 3, 17, 22, 101, 102

U.N. Space Conference, 22, 27

United International Bureau for the Protection of Intellectual Property, 137

Universal Copyright Convention, 136

U.S. Landsat images, 24-26

U.S. Marisat program, 66, 79, 81, 83, 84

Vasak, K., 154 Vienna Convention on the Law of Treaties, Annex to, 148-150 Vikram Space Center, 21 Vlasic, I., 125, 140, 153 Voice of America, 135 von Kármán, T., 112, 122, 123 WESTAR, 66

World Administrative Radio Conference (WARC), 31, 69, 70, 72, 91, 94-98, 111 Final Acts, 94-98

World Health Organization (WHO), 20, 138, 139, 147 World Meteorological Organization (WMO), 3, 12, 20, 135, 147, 154

Zhukov, G.P., 121