THE LEGAL REGIME OF THE GEOSTATIONARY ORBIT

by

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ABSTRACT

Access to, and use of the geostationary orbit - a limited natural resource - is governed by the legal norms of international space law and international telecommunication law. In order to better understand the issues involved in its regulation, the fundamental elements of the geostationary orbit, its definition, technical characteristics, advantages and nature as a limited natural resource are examined (Chapter I). The legal regime governing an area or environment is built primarily upon its legal status; hence, in Chapter II, the legal status of the orbit is discussed. An analysis of the applicable legal principles of international space law follows (Chapter III); while Chapter IV contains detailed consideration of the regulatory regime established through the International Telecommunication Union. In addition to the UN and ITU, other international organisations are, to some extent, involved in regulation of the use of the goestationary orbit by their respective members. Relevant provisions of the treaties setting up these organisations are briefly discussed in Chapter V. This is followed by a final analysis, conclusions and recommendations (Chapter VI). An extensive, but selective bibliography completes the study.

SOMMAIRE

Les normes juridiques du droit spatial international et du droit international des télécommunications régissent l'utilisation et l'accès à l'orbite géostationnaire, ressource naturelle limitée. Pour mieux expliquer les questions entournant sa réglementation, le chapitre I met en lumière les notions de base de l'orbite géostationnaire: définition, caractéristiques techniques, avantages et nature en tant que ressource naturelle limitée. Comme le régime juridique d'un secteur ou d'un environnement se fonde d'abord sur son statut juridique, le chapitre II passe en revue le statut juridique de l'orbite géostationnaire. Dans le chapitre III, les principes juridiques du droit spatial international qui sont applicables font l'objet d'une analyse détaillée. Le chapitre IV est consacré à l'étude et à un débat en profondeur du régime réglementaire implanté par le biais de l'Union internationale des télécommunications. A part les Nations Unies et l'UIT, quelques autres organisations internationales réglementent, jusqu'à un certain point, l'utilisation de l'orbite géostationnaire par leurs membres respectifs.

Dans le chapitre V, on discute brièvement des disposi- tions des traités qui ont particulièrement crée ces organisations. Suivent ensuite une analyse finale, une conclusion et quelques recommandations. Une biblio- graphie extensive, mais choisie, termine le travail.

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PREFACE

It is through radiocommunications that the geostationary orbit - a natural phenomenon in outer space - became an exploitable resource. Accordingly, its use is governed generally by the law of outer space and more specifically by the law of radiocommunications. Traditionally, engineers rather than international lawyers have participated in the formulation of the radiocommunication regulatory regime, given its complex technical nature. International space lawyers became more actively involved following the Bogota Declaration of 1976 which raised serious questions concerning access to, and use of the orbit. The laws governing radiocommunication and those applicable to outer space developed in isolation, which accounts for the absence of interaction. A similar problem occurred among scholars belonging to the two legal systems. This study is an attempt to bridge that gap.*

It would not have been possible to undertake the mammoth task of preparing this dissertation without

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* Chapter II of the study is a revised version of an article published in VII, Annals of Air and Space Law, (1982).

the assistance of numerous experts in the fields of air and space law, engineering, technology, economics, and political science.

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Ram S. Jakhu

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LIST OF ABBREVIATIONS

A.A.S.L.	Annals of Air and Space Law
A.F.D.I.	Annuaire français de droit international
A.J.I.L.	American Journal of International Law
A.W.S.T.	Aviation Week and Space Technology
BSS	Broadcasting-Satellite Service
CCIR	International Radio Consultative Committee (ITU) (Comité consultatif international des radiocommunications)
CCITT	International Telegraph and Telephone Consultative Committee (ITU) (Comité consultatif international télégraphique et téléphonique)
CNRS	Centre national d'études spatiales (France)
Colloquium	Colloquium on the Law of Outer Space (IISL)
COMSAT	Communications Satellite Corporation (US)
COPUOS	Committee on the Peaceful Uses of Outer Space
ESA	European Space Agency
EUTELSAT	European Telecommunications Satellite Organization
FCC	Federal Communications Commission (US)

FSS	Fixed-Satellite Service
GHz	Gigahertz
GSO	Geostationary-Satellite Orbit
I.C.J.	International Court of Justice
IEEE	Institute of Electrical and Electronics Engineers
IFRB	International Frequency Registration Board (ITU)
IGY	International Geophysical Year
IISL	International Institute of Space Law
ILA	International Law Association
INMARSAT	International Maritime Satellite Organization
INTELSAT	International Telecommunications Satellite Organization
ITU	International Telecommunication Union
J. Space L.	Journal of Space Law
KHz	Kilohertz
MHz	Megahertz
NASA	National Aeronautical and Space Administration (US)
RARC	Regional Administrative Radio Conference (ITU)
Recueil des cours	Recueil des cours de l'Académie de droit international de La Haye

T.J.	Telecommunication Journal (ITU)
T.R.	Telecommunications Reports (US)
UAR	United Arab Republic
UN	United Nations
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNGA	United Nations General Assembly
UNTS	United Nations Treaty Series
US	United States of America
USSR	Union of Soviet Socialist Republics
WARC	World Administrative Radio Conference (ITU)
WARC-BS	World Administrative Radio Conference for Broadcasting-Satellite Service (1977)
WARC-ST	World Administrative Radio Conference for Satellite Telecommunications (1971)
ZLW	Zeitschrift für Luft und Weltraumrecht

INTRODUCTION

On December 3, 1976 certain equatorial states signed the so-called Bogota Declaration,[1] claiming sovereignty over those portions of the geostationary orbit above their respective territories. The Declaration caused an international controversy with respect to access to, and use of this natural resource of outer space, which had always been considered free for exploration and use by all states. The Declaration raised serious questions as to the existing practice of utilization of the orbit and, for the first time, posed a challenge to the viability of the international legal order of outer space. Since 1976, this issue has been discussed extensively in international fora, as well as in doctrine. The main purpose of this study is to attempt to clarify the legal rights and obligations of states with respect to access to, and use of the orbit and to suggest some possible ways in which to resolve the controversy.

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1. Declaration of the First Meeting of Equatorial countries, signed at Bogota, Colombia on December 3, 1976. The Declaration is reprinted in Jasentuliyana, N., and Lee, R.S.K., (ed.), Manual on Space Law, (Dobbs Ferry, 1979), Vol. II, 383 et seq. The Declaration was signed by the Heads of Delegations of Brazil, Colombia, Congo, Ecuador, Indonesia, Kenya, Uganda, and Zaire.

The Bogota Declaration is primarily a political statement on the part of its signatories - the developing countries - and other countries of the Third World, in retaliation against what they consider to be an infringement of their interests. These interests are measured in economic terms and concern their developmental aspirations. The present status, scope and purpose of international law must, therefore, be examined. With the almost complete decolonization of the world, the subjects of international law are no longer the "European Christian" or "civilized" nations but rather, all "peace loving" nations. Indeed, since the adoption of the Charter of the United Nations, the world has become an international community[2] and a definite trend may be observed towards the recognition of mankind as the ultimate subject of international law.[3]

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2. See, generally, Mosler, H., <u>International Society as a Legal Community</u>, (Alphen a/d Rijn, 1980); Singh, N., <u>Recent Trends in the Development of International Law and Organisation Promoting Inter-State-Co-operation and World Peace</u>, (Delhi, 1969); Anand, R.P., "The Development of a Universal International Law", in Lepawsky, A. <u>et al</u> (ed.), <u>The Search for World Order</u>, (N.Y., 1971); van Asbeck, B.F.M., "Growth and Movement of International Law", 11, <u>International and Comparative Law Quarterly</u>, 1962, 1054 <u>et seq</u>.; Bull, H., "The Third World and International Society", in <u>The Yearbook of World Affairs</u>, 1979, 15, at 26 <u>et seq</u>.

3. It is interesting to note that various classical legal writers stressed the unity of all mankind, to whom, they considered, the law of nations applied. For example, according to Grotius, the law of nations "derives its authority from the combined will of all

Traditional international law, the primary object of which was to establish order between independent states in order to ensure peaceful co-existence has largely been supplemented by an international "cooperative" law which is a product of, and future guideline for global cooperation to ensure the welfare and development of all mankind.[4] This change has come about as a result of the necessary

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"the people, or at least many." (Quoted in Guggenheim, Paul, "The Birth of Autonomous International Law", in International Law in a Changing World, 1963, 80, at 86; and at 83, the author mentions "Grotian's Decree", in which the law of nations was considered "as applying to the whole of mankind: 'Hoc unde jus gentium appellatur, quia es jure omnes fere gentes utuntur'"). Grotius advocated that the law of nations is the same among all nations, christian or non-christian. The universality of the law of nations was also asserted by Vittoria, Suarez, Gentiti, Pufendorf, Bynkershoeck, Wolff, Vattel, etc. (Jenks, C.W., The Common Law of Mankind, N.Y., 1958, 66-69). Gentili, in his De Jure Belli Libri Tres pleaded for the unity of the entire human race and stated that "the law of nations being a natural law, commands universal application: Abundant light is afforded us by the definitions which the authors of our laws are unanimous in giving to this law of nations which we are investigating. For they all say that the law of nations is that which is in use among all the nations of men, which native reason has established among all human beings, and which is equally observed by all mankind". (Quoted in Jenks, ibid.). The concept of the unity of mankind is re-emerging in contemporary international law. We are "in recent times experiencing a revival of the Stoic sense of the unity of mankind as the only meaningful basis for social and political organization of human affairs": Falk, Richard A., "The World Community: An Inventory of Issues", in The Search for World Order, op. cit., supra note 2, 353, at 355.

4. See, generally, Friedmann, W., "The Changing Dimensions of International Law", 62, Columbia Law Review, 1962, 1147 et seq.; Schachter, O., "The Evolving International

interdependence of states, which is being further strengthened through recent developments in international relations relating to the beneficial co-sharing of the natural resources of the global commons, such as the ocean floor, the moon and other celestial bodies. Contemporary international law is, therefore, a step towards an international law of co-sharing of natural resources for global development. It involves the establishment of a New International Economic Order and New International Information and Communications Order;[5] the elaboration of international regimes to govern the global commons; and the strengthening of the already established regimes. Most of the laws applicable to the utilization of the geostationary orbit

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Law of Development", 15(1), Columbia Journal of Transnational Law, 1 et seq.; Mutharika, A.P., The International Law of Development, Vol. I, (Dobbs Ferry, 1978); Friedmann, W., "National Sovereignty, International Cooperation, and the Reality of International Law", 10 UCLA Law Review, 1963, 739 et seq.; Report of the Fifty-Sixth Conference of the I.L.A., New Delhi, 1971, 4 et seq.; Busak, J., "The Geostationary Satellite Orbit - International Cooperation or National Sovereignty?", 45, T.J., 1978, 167 at 170.

5. See, generally, Cox, R.W., "Ideologies and the New International Economic Order: Reflections on Some Recent Literature", 33(2), International Organisation, 1979, 257 et seq.; Haq, I.,"From Charity to Obligation: A Third World Perspective on Concessional Resource Transfers", 14, Texas International Law Journal, 1979, 389 et seq.; Vicas, A.G., "The New International Economic Order and the Emerging Space Regime", in Space Activities and Implications: Where From and Where To at the Threshold of the 80's, Proceedings of the Symposium held on October 16-17, 1980, (Montreal, 1981), 298 et seq.

are the result of international cooperation and are increasingly becoming an integral part of the international law of beneficial co-sharing.

An international "regime is composed of sets of explicit or implicit principles, norms, rules, and decision-making procedures around which actor expectations converge in a given area of international relations and which may help to coordinate their behaviour."[6] It is from this perspective that the legal regime of the geostationary orbit is understood and discussed. Numerous international regimes have been established for various purposes and they each differ in their functional scope and membership.[7] One element is, however, common to all, i.e., they embody the rights and duties of their participant states to protect individual as well as common interests. International regimes with "regard

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6. Finlayson, J.A. and Zacher, N.W., "The GATT and the Regulation of Trade Barriers: Regime Dynamics and Functions", 35 (4), International Organisation, 1981, 561, at 563.

7. For detailed discussions of international regimes, see, Young, O.N., "International Regimes: Problems of Concept Formulation", 32, World Politics, 198, 331 et seq.

to objects of common use serve to implement and make concrete principles or rules of general international law", and objects of common use can be "those belonging to the common heritage of mankind", like "the resources of the sea and the seabed, the atmosphere and outer space."[8]

In clarifying the principles and rules of international law applicable to utilization of the geostationary orbit, the general rules of interpretation - of international legal instruments as incorporated in the 1969 Vienna Convention on the Law of Treaties - are followed.[9] Accordingly, the text of a treaty must be interpreted in light of its object and purpose. However, the general

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8. Mosler, op. cit., supra note 2, 238.

9. Article 31 of the Vienna Convention (reprinted in 63, A.J.I.L., 1969, 875 et seq.) specifies the "General Rules of Interpretation" as follows:
"1. A treaty shall be interpreted in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose.

2. The context for the purpose of the interpretation of treaty shall comprise, in addition to the text, including its preamble and annexes:

....

3. These shall be taken into account, together with the context:

....

(c) any relevant rules of international law applicable in the relations between the parties.

4. A special meaning shall be given to a term if it is established that the parties so intended."

nature of the provisions of the Outer Space Treaty necessitate recourse to supplementary means of interpretation.[10]

As an integral part of outer space the geostationary orbit is governed primarily by international space law. It can be explored and used only with radio communication links and, therefore, international telecommunication law is equally applicable. The study therefore focusses on a detailed analysis of the principles and rules of both legal systems and the fora through which they have been established.[11] Additionally, member states of certain operational international telecommunication organisations have undertaken to coordinate their use of the orbit with the respective organisation. Relevant provisions of international treaties setting up these organisations are briefly discussed.[12] No legal regime can be developed

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10. "Supplementary means of interpretation" incorporated in article 32 of the Vienna Convention, ibid., provide that "Recourse may be had to supplementary means of interpretation, including the preparatory work of the treaty and the circumstances of its conclusion, in order to confirm the meaning resulting from the application of article 31, or to determine the meaning when the interpretation according to article 31:
(a) leaves the meaning ambiguous or obscure; or
(b) leads to a result which is manifestly absurd or unreasonable."

11. See infra, Chapter III and IV.

12. See infra, Chapter V.

without *a priori* understanding of the technical nature and basic legal status of the object or environment – the subject of the regime. A detailed analysis[13] of the fundamental physical characteristics of the geostationary orbit is undertaken, together with its advantages and the situation which currently prevails with respect to its utilization. This is done with a view to highlighting the seriousness of the problem, if any, regarding access to, and use of the geostationary orbit. United Nations studies in this regard are heavily relied upon, and the views of various experts in the field are quoted extensively because of the technical nature of the issues involved. The legal status of the orbit is analysed with a view to determining the validity of the claims of the equatorial countries, in accordance with the established law and generally accepted facts and to "place" the orbit within the general framework of outer space.[14] In view of the nature of the controversy and the applicable legal principles and rules of space law and telecommunication law, an assessment is made of the present situation, problem areas identified and solutions proposed.[15] Alternatives are also examined in order to identify the most appropriate and viable approach.

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13. See *infra*, Chapter I.

14. See *infra*, Chapter II.

15. See *infra*, Chapter VI.

This study is devoted exclusively to matters relating to the peaceful uses of the geostationary orbit. Reference to military activities is avoided, since international telecommunication law does not expressly regulate the use of the radio spectrum for this purpose, and information on the subject is not readily available.

This dissertation is also intended to fulfill the purpose of any study of international law which is, according to van Asbeck, to "explore how the present law has come to be what it is, how it is involved in a process of reform and extension and intensification, in order that we may be able to assist in the building ... of a transnational legal order for states and peoples and men. All our thinking and all our efforts should be directed towards this end, towards an order which transcends power and calls for service."[16]

16. Van Asbeck, op.cit., supra, note 2, at 1072.

CHAPTER I: SOME IMPORTANT ELEMENTS OF THE GEOSTATIONARY ORBIT

A. Definition

When a man-made object sent "beyond the major portion of the earth's atmosphere", revolves around the earth primarily because of natural forces (including the force of earth's gravity), it is called an artificial earth satellite.[1] The path it follows is its orbit. If the period of revolution of a satellite is equal to the period of rotation of the earth, it is called a geosynchronous satellite.[2] While a geostationary satellite is a geosynchronous satellite whose circular and direct orbit lies in the plane of the earth's equator, the geostationary satellite orbit is that "in which a satellite must be placed to be a geo-stationary satellite."[3] In other words, the geo-stationary orbit is the orbit of a satellite which revolves with the speed of the earth's rotation and thus appears to remain stationary over a given point on the earth's surface. It is, however, important to note that for all practical purposes the geostationary orbit becomes useful only with the use of a satellite, or when a satellite is

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1. Radio Regulations, 1982 Edition, ITU, Geneva, (hereinafter cited as Radio Regulations), Nos. 170 and 171.

2. Ibid., No. 180.

3. Ibid., Nos. 181 and 182.

placed in it. This is why it is properly referred to as the geostationary-satellite-orbit.

B. Physical and Technical Characteristics

The nominal altitude of the geostationary orbit above the earth's equator is 35,786.557 km. (app. 36,000 km.) and the period of revolution of a geostationary satellite is 23 hours, 56 minutes and 4 seconds.[4] There are various natural forces acting on a geostationary satellite including the attraction and oblateness of the earth, the ellipticity of the equator, the attraction of the moon and sun, and solar radiation pressure.[5] The effect of these forces is that a satellite drifts in a figure 8 pattern and its altitude varies by about 30 km.

> 'Station keeping' systems on board the satellite are used to counteract these forces and maintain the satellite in the desired position within the orbit. Recent geostationary satellites can maintain position to an accuracy of ± 0.1° both in longitude and latitude, corresponding to a square of 150 km. from North to South and 150 km. from East to West... The geo-

4. Physical Nature and Technical Attributes of the Geostationary Orbit, (A study prepared by the UN Secretariat), UN Doc. A/AC.105/203, (August, 1977), 3 and 5. See also Gehrig J.J., "Geostationary Orbit-Technology and Law", XIX Colloquium, 1977, 267 et seq.; An IIC Report, "The Most Valuable Parking-Place in Space", 7(1), Intermedia, (January, 1979), 15 et seq.

5. UN Doc. A/AC.105/203, ibid., 4-6.

> stationary orbit, (therefore), rather than being a line in space, is actually a ring 150 km. from North to South and 30 km. thick.[6]

Most of the satellites in the geostationary orbit use solar radiation as their source of operational power. Thus, for continuous operation the sources of energy must not be interrupted. However, when the earth comes between the sun and the satellite, the required solar radiation is unavailable. Such eclipses normally occur at midnight and may last as long as 72 minutes. Such interruption could be avoided by having alternative sources of power, such as small nuclear reactors or batteries on board, which could be switched on for the duration of the eclipse. The interruption could also be avoided by having a back-up satellite which is positioned at a sufficient distance from the first, so that it is not subject to a similar eclipse, at the same time. If a satellite is placed at least 8.7° West in longitude of the service area of the satellite, it will be eclipsed after midnight when it may be easily switched off given that there may be limited telecommunication

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6. Efficient Use of the Geostationary Orbit, (A background paper prepared for the Second UN Conference on the Exploration and Peaceful Uses of Outer Space, held in Vienna in August 1982, UN Doc. A/CONF.101/BP/7, January, 1981), 5. See also Guepin, C., "Le satellite dans l'espace", in C.N.R.S., Les télécommunications par satellites: aspects juridiques, (Paris, 1968), 1 et seq.

traffic at that time.[7] Similar eclipses also occur when the moon or another satellite come between the satellite and the sun. However, such eclipses are of relatively limited duration (for one minute or less), and therefore negligible.[8]

In order to operate and function, almost all satellites, including geostationary ones, use radio (wireless) communications from, and to earth station(s). In other words, the geostationary orbit cannot be used without proper radio links.[9] A very close relationship thus exists between the radio frequency spectrum and the geostationary orbit, and they are often referred to as

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7. Siocos, C.A., "A New Service at the Starting Line: Direct Broadcasting from Satellites", in Earth-oriented Space Activities and their Legal Implications, Proceedings of the Symposium organized by the Centre for Research of Air and Space Law, McGill University, Montreal, 1981, 50, at 57.

8. UN Doc. A/AC.105/203, op. cit., supra note 4, 9. See also Lowndes, J.C., "U.S. Facing Competition for Satellite Positions", A.W.S.T., March 8, 1982, 103, at 104.

9. See, generally, Haley, A.G., Space Law and Government, (N.Y., 1963), 165; Glazer, J.H.,"'Infelix' ITU - The Need for Space Age Revisions to the International Telecommunication Convention", 23, Federal Bar Journal (1963), 1, at 7; Balakrishnan, A.V. (ed.), Space Communications, (1963), Preface; Bandazzi, C., "Telecommunications and Space", 38, T.J., (1971) 479, at 480; Busak, J., "The Geostationary Satellite Orbit - International Cooperation or National Sovereignty?", 45, T.J., (1978), 178.

a spectrum/orbit resource.[10]

Radio frequencies (wave lengths) are electromagnetic radiations, measured in hertz, i.e. cycles per second. The entire radio frequency spectrum, consisting of frequencies arbitrarily lower than 3000 GH_z as defined by the ITU Radio Regulations,[11] is divided as follows: very low (from 3 to 30 KH_z), low (from 30 to 300 KH_z), medium (from 300 to 3000 KH_z), high (from 3 to 30 MH_z), very high (from 30 to 300 MH_z), ultra high (from 300 to 3000 MH_z), super high (from 3 to 30 GH_z), extremely high (from 30 to 300 GH_z) and frequencies from 300 to 3000 GH_z, which are known as decimillimetric waves.[12] A group of frequencies is called a "band".

The physical characteristics of radio frequencies are similar to those of light. They "travel" (without assistance) in a straight line at the speed of light (300,000 km. per second) and are subject to absorption,

10. Sarkar, S.K., "Geostational Orbital Positions for Space Stations", XX, Colloquium, (1977), 450, at 453. See also IIC Report, supra note 4, at 17.

11. Radio Regulations, 1982, No. 6.

12. Ibid., No. 208. See also, McPhail, T.L., Electronic Colonialism, (Beverly Hills, 1981), 166-168; Jones, W.K., "Use and Regulation of the Radio Spectrum: Report on a Conference", Washington University Law Quarterly, 1968, 71 et seq.

diffraction, reflection and scattering. Two important physical characteristics (natural principles) of radio communications must be understood; i.e. first, for two radio stations to communicate, they must use the same frequency; and second, if two or more radio stations are operating at the same frequency, within the same area, at the same time, there is a likelihood of mutual interference which could reduce the quality of the communication or make it unintelligible.[13] There are other physical and technical limitations on the utilization of radio frequencies. Low frequencies reach a limited distance. Therefore, high and very high frequencies (short waves) are used for long distance radio communications and broadcasting. Since the latter bounce off the ionosphere, (do not pass through it), they cannot be

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13. Codding, Jr. G.A., The International Telecommunication Union: An Experiment in International Cooperation, (N.Y., 1972), 94-95. See also Armstrong, C.A., "Present and Future Impact of Technical, Economic and Organizational Aspects", X, Colloquium, (1967), 73 at 74. For details of physical characteristics of the radio spectrum, see generally, Smith, M.S., "Radio Frequency Allocation in Space Communications", in World-Wide Space Activities, Report prepared for the Subcommittee on Space Science and Applications of the U.S. House of Representatives' Committee on Science and Technology, 95th Congress, Ist Session, (Washington, 1977), 516 et seq., (hereinafter cited as World-Wide Space Activities).

used for the operation and functioning of a geostationary satellite.

According to Sawitz:

> VHF and lower frequencies are unsuitable (for use by satellites) because of high atmospheric noise and ionospheric effects, and because large structures are required for high gain antennas. Millimeter waves (extremely high frequencies, i.e. from 30 to 300 GH_z) and beyond are subject to large attenuations due to rain and other atmospheric effects.[14]

Therefore, only a limited portion of the radio spectrum is useful for the geostationary satellite service, the ideal range, both technically and economically, being from 1 to 10 GH_z. Most of the present generation of satellites use these frequencies.[15] Radio technology is

14. Sawitz, P.H., "Spectrum-Orbit Utilization: An Overview", National Telecommunications Conference, (December, 1975), 43-1 and 43-2. See also Smith, ibid., 519; UN Doc. A/CONF/101/BP/7, (1981), 7; Beakley, G.W., "Satellite Communication", 14(11), Telecommunications, (November, 1980), 19, at 23.

15. Sawitz, ibid.; Smith, ibid.; UN Doc., ibid. See also Hogg, D.C. and Chu, T.S., "The Role of Rain in Satellite Communications" in Van Trees, H.L. (ed.), Satellite Communications, (N.Y., 1979), 554 et seq.; McAvoy, N., "Frequencies Above 10 GH_z", in Gould, R.G. and Lum, Y.F., (ed.), Communications Satellite Systems: An Overview of the Technology, (N.Y., 1975), 87 et seq.; UN Doc. A/CONF. 101/BP/2, (March, 1981), 15; Jowett, J.K.S., "Effective Use for Satellite Communications of the Radio Frequency Spectrum and the Geostationary Satellite Orbit", World Telecommunications Forum Conference Proceedings, (October, 1975), 2.4.1.1., at 2.4.1.4 and 2.4.1.5; Murie, R.D., "Guest Editorial Future Directions in Satellite Communications", IEEE, 18(5), Communications, (September, 1980), 3, at 4.

constantly developing and a few operational and experimental satellites have used frequencies up to 14.5 GH_Z; some have also used frequencies up to 31 GH_Z.[16] However, further technological advancements will have to be made before these, and other higher frequencies may be used extensively on an operational basis for geostationary satellite services.[17] The ideal frequencies for geostationary satellites (i.e. from 1 to 14 GH_Z) are also shared by other terrestrial, and space research satellite services.[18] Hence, there is a competition for use of the radio spectrum. This fact has been recognized in the International Telecommunication Convention (1973) in which it is stated that the radio spectrum is a limited natural resource.[19] It should be noted, however, that the radio spectrum has always been a limited resource, irrespective of technological developments; hence the reason for the ITU's complex involvement in the allocation of frequency bands to the various radio services of its member

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16. UN Doc. A/CONF. 101/BP/7, (1981), 7.

17. Ibid. See also Sawitz, op. cit., supra note 14; Smith, op. cit., supra note 13.

18. Radio Regulations, 1982, Article 8.

19. Article 33(2), International Telecommunication Convention, Malaga-Torremolinos, 1973, Published by the General Secretariat of the International Telecommunication Union, Geneva (hereinafter referred to as ITU Convention). For detailed analysis of this provision, see infra Chapter IV.

countries.[20] These limitations on the use of the radio

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20. According to Codding, following the discovery of short waves (500 to 1500 Kc/s) during and shortly after the First World War, it was considered that "the science of radio had advanced another important step... Short wave communications had many important advantages... The most important advantage lay in the fact that many more wavelengths were made available for communication purposes. (This) advantage, however, was short-lived. In the United States alone, by 1927, it became apparent that the actual and potential demand (for short wave assignments) surpassed the number of frequencies available": (See Codding, op. cit., supra note 13, 115-116). Similarly, after the Second World War, "outstanding innovations" were made in radio technology. However, increased use of radio for expanded radio services gave rise to further problems of sharing this limited resource. "Despite the laudable work of the ITU in dividing up the radio spectrum among different types of radio services, it was becoming apparent that the desirable bands of frequencies were being filled to overflowing with stations. Consequently, it was becoming increasingly difficult for administrations to find frequency space for the operation of new stations": (Codding, ibid., 184-186). It is also interesting to see that at the time of the first international radiocommunication conference in 1906, only frequencies below 188 Kc/s (KH_z) were allocated (Codding, ibid., 95), while the 1979 WARC has made allocations up to 300 GH_z. In spite of this increase in range of the radio spectrum, it is still a limited natural resource, i.e. demand for radio frequencies far exceeds their availability. According to the Staff Report on Policy Planning for Space Telecommunications, (prepared for the US Senate's Committee on Aeronautical and Space Sciences, 86th Congress, 2nd Session, 1966, at 33) the radio spectrum "must be regarded as finite." According to Glazer "the radio frequency spectrum is finite" mainly because of the fact that "it is the perennial tragedy of radio that no matter what new bands of frequencies are opened up to practical use through advances in the art, the supply of frequencies never catches up with the demand. Expanding populations, burgeoning commerce, and the technological advancement of developing global regions constitute some of the factors responsible for this situation. Through the years this unrelating saturation of available spectrum space has been mirrored in the

spectrum has a direct and important effect on the

progressive complexity of international radio regulation and the legal inventions devised by the ITU to strike an accommodation among competitors for spectrum space": Glazer, op. cit., supra note 9, at 22. See also, Bernard, A., "The Price of a Hertz", 46, T.J., 1979, 554; Jones, op. cit., supra note 12, at 78. Levin, H.J., The Invisible Resource: Use and Regulation of the Radio Spectrum, (Baltimore, 1971), 1; Smith, D.D., International Telecommunication Control, (Leyden, 1969), 18. Perhaps the best description of the radio spectrum as a natural resource can be found in a 1965 study according to which:

"1) This resource is used - not consumed; it is being wasted when it is not being used.

...

2) This resource has dimensions of space, time and frequency, and all three are interrelated.

...

3) It is an international resource - available to all. Any one nation cannot operate solely under its own scheme of allocation. Just as surely as it might unconcernedly interfere with the spectrum allocations of a neighbour, so it will be subject to return situations of interference - both of which actions will multiply waste of the spectrum throughout the world. Local plans and possibilities can be developed only within an overall framework of international agreement.

...

4) This resource is wasted when assigned to do tasks that can be done as easily in other ways.

...

5) This resource is wasted when its parameters are not correctly applied to a task.

...

6) This resource is subject to pollution":

Joint Technical Advisory Council of the Institute of Electrical and Electronics Engineers and Electronic Industries Association, Radio Spectrum Utilization: A use of the geostationary orbit,

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Program for the Administration of the Radio Spectrum (1965), 3-6 (cited in Leive, D.M., International Telecommunications and Internatinal Law: The Regulation of the Radio Spectrum (Leyden, 1970), 15-16). For more details of its international characteristics, see Levin, H.J., "Foreign and Domestic US Policies: Spectrum Reservations and Media Balance", Telecommunications Policy, June, 1982, 123 et seq., and especially authorities cited in fn. 2, ibid., at 124. "Depending on power, propagation characteristics, and patterns of use, virtually all radio communications are potentially international": Robinson, G.O., "Regulatory International Airways: the 1979 WARC", 21(1), Virginia Journal of International Law, (Fall, 1980), 1, at 2, fn. 3. In a UN document on Radio and Broadcasting and Freedom of Information (of March, 1948), it has been pointed out that "(t)he universal propagation of radio waves which ignore national frontiers, the limited number of available frequencies and the danger of mutual interference between stations require legislative measures if the proper functioning of services is to be ensured... ...The limitation of the frequency spectrum makes it impossible to establish an unlimited number of radio stations. Frequencies must be allocated to the different radio communication services ... and to the stations in the different regions and countries. It is often necessary to limit the power of the stations in order to reduce their service area and to limit the transmission time in order to enable another station to use the same frequency": see UN Economic and Social Council, doc. E/CONF.6/30, March 19, 1948, 3-4 (cited in Evensen, J., "Aspects of International Law Relating to Modern Radio Communications", 115, Recueil des cours, 1965, (II), 471, at 480-481. "There has been an informal international consensus on the principle that the spectrum of electromagnetic frequencies, including the radio waves, are the common possession of mankind": Soroos, M.S., "The Commons in the Sky: The Radio Spectrum and Geosynchronous Orbit as Issues in Global Policy", 36, International Organization, (Summer, 1982), 665, at 666. While Article 10(2) of the ITU Convention, 1973, ibid., refers to the whole of the radio spectrum as "an international public trust", Rothblatt has concluded that "customary international law does appear to underscore neatly the expressly recognized commitment to universal distribution of communications satellite channels observed in positive international law": Rothblatt, M.A., "International Legal Norms Governing Development of the Orbit/Spectrum Resource", Telecommunications Policy,

C. Advantages and Uses

The 24-hour "visibility" of a satellite in the geostationary orbit makes it uniquely advantageous for telecommunications and certain other services. The earth stations required for transmitting and receiving radio signals from geostationary satellites do not have to be steerable; therefore, they are far less expensive than those required for non-geostationary satellites.

In 1969, the US delegation to the UN COPUOS stated

(June, 1981), 63, at 73. See also, Courteix, S., "La Conférence administrative mondiale des radiocommunications de 1979 et le nouvel ordre international de l'éther", XXVI, Annuaire français de droit international, (1980), 625, at 628-629 and 643: "L'éther ayant cessé d'être uniquement une voie de passage pour devenir aussi une réserve de ressources naturelles, les Etats tendent peu à peu de reconnaître, ---que le spectre électromagnétique constitue le patrimoine commun de l'humanité". Similarly, Armstrong asserted that it "has long been recognized, and there is general agreement, on the fact that the frequency spectrum is a natural resource; that, to a major degree, must be considered as international and administered on that basis": Armstrong, C.A., "Present and Future Impact of Technical, Economic, and Organizational Aspects", X, Colloquium, 1967, 73, at 74. The delegate of Uruguay to the 1959 WARC stressed the necessity for a mechanism for "the most efficient and equitable distribution among the various countries of the common property of mankind, which is the radio spectrum": Doc. No. 55-E, August 19, 1959, Minutes of the Plenary Meetings, Administrative Radio Conference, 1959, Geneva (cited in Glazer, J.H., "The Law-Making Treaties of the International Telecommunication Union Through Time and in Space", 60, Michigan Law Review, 1962, 269, at 311, emphasis added).

that:

> advantages of a fixed or geostationary satellite in simplifying the earth receiving installations are so great that the use of any orbit other than synchronous needs exceptional justification.[21]

A single satellite (maybe with a spare placed at an appropriate position in the geostationary orbit) can cover the national territory of most countries; while, to provide 24 hour service in a non-geostationary orbit more than one satellite is required. Three satellites in the geostationary orbit can cover the world, with the exception of some areas close to the North and South Poles. Elliptical orbit satellites (non-geostationary) such as the MOLNIYA series used by the USSR, cross the Van Allen line several times a day. The energetic particles of this line deteriorate the mechanism of the satellites and, consequently, reduce their life-span. Geostationary satellites are not adversely affected by this physical phenomenon, and thus last longer.[22]

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21. UN Doc. A/AC.105/50, (February, 1969), para. 3-1. See also UN Doc. A/AC.105/203 (August, 1977), 15.

22. See Matte, N.M., Aerospace Law: From Scientific Exploration to Commercial Utilization, (Toronto, Paris, 1977), 86. It is to be noted that the Soviet Union uses MOLNIYA, elliptical orbit satellites to provide effective communication services to northern portions of its territory, which could not be covered as effectively by geostationary satellites. However, given their various other advantages, the Soviet Union has also started using geostationary satellites for telecommunication purposes. Its first geostationary MOLNIYA-1S was launched in 1974, ibid. Since that time, a number of geostationary satellites, called STATIONAR, have been launched. STATIONAR satellites are of three kinds, classified according to their telecommunication functions, i.e. EKRAN, RADUGA, and GORIZONT: see National Paper: USSR, UN Doc. A/CONF. 101/NP/30 (September, 1981).

In light of these advantages, geostationary satellites, are increasingly being used for various purposes, which may be classified as follows:

1. Telecommunication

Undoubtedly, the first and most extensive use of the geostationary orbit is for satellite telecommunications, since the orbit provides inexpensive, efficient, effective, extensive and reliable telecommunication links. Before the advent of geostationary telecommunication satellites,[23] long distance communications were carried via high frequency radio links and/or underwater cables. High frequency radio links are vulnerable to various atmospheric and ionospheric conditions, and are thus unreliable. With telecommunication satellites, 99.99% reliability has been achieved. Underwater cables have limited

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23. The use of the geostationary orbit for telecommunication purposes was first conceived by the British science fiction writer, Arthur C. Clark. In his paper on "The Space Stations: Its Radio Applications" submitted to the British Interplanetary Society in 1945, he opined that "An 'artificial satellite' at the correct distance from the earth would make one revolution every 24 hours; that is, it would remain stationary above the same spot... within optical range of nearly half of the earth's surface. Three repeater stations...could give microwave coverage to the entire planet": see "Extra Terrestrial Relays", Wireless World, 1945, 305. This paper has also been published in Spaceflight, March 1968, 85-86.

capacity,[24] take longer to install and can provide single-route links only. The traditional means of long distance communications are, therefore, unable to meet the ever-increasing demand for telecommunications. Telecommunication satellites are not only capable of providing traditional telecommunication services such as telegraph, telephone, television, facsimile, etc., but also new services like high speed data transmissions, telemedicine, teleconferencing, computer linkage, international realtime television, etc. Raleigh rightly points out that telecommunication satellites have

> introduced an unprecedented versatility in communications services, enabling for the first time a variety of communications - voice, video, pictures, and data - to be transmitted simultaneously.[25]

Assisted by telecommunication satellites, simultaenous printing of newspapers at various places has already

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24. The most powerful underwater transatlantic cable the TAT-7, which will be operational in 1983, will have a capacity of 4000 simultaneous calls, while INTELSAT-V A which was launched into geostationary orbit in December 1980 and became operational on July 14, 1981, has a capacity of 12,000 simultaneous telephone calls plus two television channels: see "New Transatlantic Telephone Cable", 46, T.J., 1979, 641; INTELSAT, News, July 14, 1981.

25. Raleigh, L.H., "Specific International Applications Satellite Programs", in World-Wide Space Activities, op. cit., supra note 13, 348, at 353. See also Luard, E., International Agencies: The Emerging Framework of Interdependence, (London, 1977), 31.

commenced on an operational basis.[26] The geostationary satellites have also proved useful for various other innovations, including "detection and control functions for the public service sector, such as electronic mail, personal and police communication."[27] Above all, long distance communication links via satellite are cheaper becaue: a) the cost of these links is generally dependent of the distance between the two interconnecting points; and b) the cost of telephone circuits is also less because of the flexibility of satellites for connecting any points within the service area with any pattern of traffic volume.[28]

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26. Telesat, News Release, Ottawa, October 23, 1980.

27. 19, SPACEFLIGHT, (April, 1977), 123. In fact, satellites operating from the geostationary orbit have revolutionized long-distance communications. For details see Young, P., "Countdown for the Future of Space", HORIZONS, USA, 27, (published by International Communication Agency, Washington, D.C.), 5, at 7; "Communications Satellites", N-11-167, Space World, (1977), 30 et seq.; Satellites for World Communication, Report of the US House of Representatives' Committee on Science and Astronautics, 86th Congress, 1st Session, (April, 1959), 1 et seq.

28. See, generally, Matte, N.M., Aerospace Law: Telecommunications Satellites, (Toronto, 1982), 2 et seq.; Armstrong, op. cit., supra note 13, 72 at 76; Hinchman, W.R., "The Technological Environment for International Communications Law", in McWhinney, E. (ed.), The International Law of Communications, (Leyden, 1971), 21-28; Space Communication and the Mass Media, a UNESCO Report on the occasion of the Space Communications Conference, 1963, 11. "Before satellites, a West Coast-to-Japan cable circuit cost $15,000 a month; today (1977) a communications satellite makes the same service available for $4,000": Fletcher, James C., "Public Service Satellites 19, SPACEFLIGHT, (April, 1977), 122. The charges for a telephone circuit provided by INTELSAT have been constantly decreasing since the launch of its first telecommunication satellites, Early Bird, in 1965; for example, annual charges for a full-time telephone circuit in 1965 was (US) $32,000, while in 1981 it was only (US) $9,360: see INTELSAT, Annual Report (1981), 3, 33 and 34.

The various advantages of geostationary satellite telecommunications have resulted in more than two-thirds of the world's overseas international public telecommunications traffic being carried by INTELSAT alone,[29] hence increasing the importance of the geostationary orbit.

Geostationary satellite telecommunication services may be classified as: fixed, mobile and broadcasting. This division corresponds to the various stages of development of telecommunication satellite technology. The transmitting power of a space station (satellite) is inversely related to the size and complexity of the earth stations. The greater the transmitting power, the simpler the composition and smaller the size of the earth stations.

According to the ITU Radio Regulations, a fixed satellite service is a "radio communication service between earth stations at specified fixed points when one or more satellites are used."[30] This service is also referred to as point-to-point communications. Since the satellites used have relatively limited emitting power, the signals may be/are received only

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29. INTELSAT, Annual Report, (1981), 3.

30. Radio Regulations, 1982, No. 22.

by large, complex and expensive earth station antennas. This is the first telecommunications service to be provided by satellite, and at present, numerous international and national telecommunication systems are providing this service on an operational basis. For example, since 1965, INTELSAT - a 108 member international organization - has been providing international and domestic public telecommunication services,[31] and has numerous geostationary satellites over the Atlantic, Indian and Pacific Oceans.[32] Each INTELSAT-V (the latest series of its geostationary satellites) has a design life of seven years, and considerably increased capacity to carry telephone, telegraph, telex and television traffic.[33] Similar services are also provided by INTERSPUTNIK, the international telecommunication satellite system of nine socialist States, with its STATIONAR satellites.[34] Additionally, NATO also operates two geostationary orbit satellites for military communication services.[35]

While 18 countries are using INTELSAT satellites

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31. See infra Chapter V.

32. See infra Appendix.

33. INTELSAT, Annual Report, 1982, 10-11.

34. For details, see Matte, op. cit., supra note 28, 141 et seq.

35. UN Doc. A/CONF.101/BP/7, (1981), 28-29.

for their domestic telecommunication services,[36] a number of others have established national geostationary satellite telecommunication networks; e.g., Canada (ANIK), India (INSAT), Indonesia (PALAPA-A), the Soviet Union (STATIONAR), and the United States (COMSTAR, RCA, SATCOM, SBS, WESTAR) Soon to be added to this list are France's TELECOM-1, and Japan's CS-2.[37] INTELSAT satellites are often used by countries for their domestic telecommunication services in order that they might gain experience in their use before establishing independent national satellite telecommunication networks. This is true of Australia, which is planning to launch its geostationary satellite, DOMSAT, France, India, Saudi Arabia, etc.

PALAPA-B (of the ASEAN countries), ECS (Europe), and ARABSAT (the Arab countries) will soon be placed in the geostationary orbit for regional fixed satellite telecommunication services.[38]

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36. See supra note 33. They are Algeria, Australia, Brazil, Chile, Colombia, Denmark (Greenland), France, India, Mexico, Niger, Nigeria, Norway, Oman, Peru, Saudi Arabia, Spain, Sudan, and Zaire. Other countries, such as Argentina, Libya, Malaysia, Morocco, Portugal, Thailand, and Venezuela plan to initiate, or are actively considering the use of INTELSAT satellites for their domestic services.

37. For details see Matte, op. cit., supra note 28, 165 et seq.

38. Ibid., 153-160.

Mobile satellite service is a radio-communication service between mobile earth stations by means of one or more (space stations) satellites.[39] Earth stations may be located on aircraft, and ships, and on other vehicles or locations on land. The transmitting power of a satellite used for this service is sufficiently strong for radio signals to be scattered over large areas and received by relatively small, mobile earth stations (antennas). A satellite used in this service

> offers the reliability which is unavailable from shortwave radio, the principal medium used when ships are more than a few kilometres distant from VHF shore radio stations.[40]

A geostationary satellite for maritime mobile telecommunication services was used for the first time by MARISAT - a US consortium - which started providing communication services in 1976 on a commercial basis to US navy and civilian ships. This service was taken over by INMARSAT, (established in 1979), on February 1, 1982.[41] In

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39. ITU, Radio Regulations, 1982, No. 27:
Mobile-Satellite Service is "A radiocommunication service:
-between mobile earth stations and one or more space stations, or between space stations used by this service; or
-between mobile earth stations by means of one or more space stations.
This service may also include feeder links necessary for its operation."

40. UN Doc. A/CONF.101/BP/2, March 16, 1981, (A Background paper on "Current and Future State of Space Technology", prepared for the 1982 UNISPACE), 7.

41. INMARSAT, News Release, (February 2, 1982), 1.
For details, see infra Chapter V.

addition to three MARISAT satellites, INMARSAT will also use two MARECS and three INTELSAT geostationary satellites to provide telephone, telegraph, telex, facsimile, high to low speed data, and distress, urgency, and safety communication services.[42] There is a strong possibility that, in the near future, communications and safety services will be provided to a large majority of ships, presently numbering about 70,000 (each over 100 tons).[43]

The use of geostationary orbit satellites for air-mobile communication services[44]

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42. News Release, ibid.

43. INMARSAT, News Release, (January 21, 1982), 1. According to Lundberg, Director General of INMARSAT, "INMARSAT services mean that ships can be as easy to reach as offices on shore, and this can have a dramatic impact on the way they are managed, as well as on the quality of life enjoyed by ships' crews, and - most important of all - safety of life and property. The services offered at present are only a start. Our goal is to extend to ships all present and future telecommunications services available on land and to provide a range of specific maritime safety-related services. The potential for growth of mobile satellite communications is enormous": see INMARSAT, News Release, (February 2, 1982), 1-2.

44. See Memorandum of Understanding on a Joint Programme of Experimentation and Evaluation Using an Aeronautical Satellite Capability between the United States Department of Transportation (Federal Aviation Administration), the European Space Research Organization, and the Government of Canada, entered into force on August 2, 1974, published in ESA, Basic Texts of European Space Agency, Vol. II, bis, 1980, chapter G.1.b.

and search and rescue emergency operations at sea and in the air (SARSAT).[45]

<u>Broadcasting satellite service</u> is a radio communication service to community or individual home television or radio sets via one or more space stations (satellites).[46] It is also known as the direct broadcasting satellite service (DBS). The transmitting power of these satellites is high enough for signals to be received by antennas which are as small as one meter in diameter or smaller.

If the transmitting power of a broadcasting satellite is not sufficiently high, relatively larger antennas could be used to provide broadcasting service to communities or schools, etc. Various countries which have conducted experiments in this respect, favour the direct broadcasting service for many reasons:

> For some countries, it is to extend basic service to areas difficult to cover with terrestrial broadcasting because of distance or terrain; for others, it is to provide additional

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45. See "International Trial of Satellite-aided Search and Rescue", 46, <u>T.J.</u>, 1979, 727; "SARSAT, A Life-Saving Satellite", <u>Modulation</u>, Government of Canada, Department of Communications, No. 25 (May, 1980), 1-2; "Canada and the U.S. To Study Use of Satellites for Mobile Communications", <u>News Release</u>, Government of Canada, Department of Communications, (November 28, 1980), 1; "Norway Joins SARSAT Project", <u>News Release</u>, <u>ibid.</u>, (December 10, 1981), 1.

46. Radio Regulations, 1982, No. 37.

> channels of television more economically than can be done terrestrially; for some, where the radio-frequency spectrum for conventional television is already congested, it provides additional spectrum for broadcasting.[47]

The US, USSR, Canada, France, Germany, Japan, India, Australia, the Scandinavian countries (NORDSAT), and the Arab countries (ARABSAT), now have firm plans to commence this service on an operational basis.[48] They will soon be joined by many more countries. In view of technological and economic advantages, some countries may prefer to provide braodcasting, along with fixed (point-to-point) service via the same satellite or satellites instead of launching separate satellites for individual services; for example, India's INSAT satellites provide fixed telecommunication, television broadcasting and meteorological services;[49] Canada's ANIK-C satellite is designed to provide fixed as well as TV broadcasting services;[50] and the Arab countries' ARABSAT will carry not only fixed telecommunication services but also television broadcasting

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47. UN Doc. A/CONF.101/BP/2, (March 16, 1981), 8.

48. Ibid., 9.

49. For details, see Elson, B.M., "India's Multi-service Satellites Seen Most Economical", A.W.S.T., (December 10, 1979), 72 et seq.; Jayaraman, K.S., 16 (10), Indian and Foreign Review, (March 1, 1979), 15 et seq.

50. For details, see Parkhill, D.F., "Canada: At the Fore of Communications", IEEE Communications Magazine, (January, 1981), 3 et seq., and also ibid., at 10 et seq. See Almond, J., "Commercial Communication Satellite Systems in Canada",

between member countries.[51]

In the developing countries, satellites for direct television broadcasting are generally considered to be more advantageous than terrestrial networks, since a satellite system can provide national coverage much more quickly and economically. They are equally favoured in countries with extensive surface areas such as Canada, the USA, the USSR, etc. A large number of countries, may, therefore, be expected to use the geostationary orbit for direct broadcasting satellite services.

2. Meteorology

Although a large majority of satellites presently using the geostationary orbit are for telecommunication purposes, the orbit is also used for meteorological

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51. For details, see Ropelewski, R., "Arabs Near Satcom Network Go Ahead", A.W.S.T., July 21, 1975, 56 et seq.; "Arabs Agree on Communications Satellite", A.W.S.T., (April 26, 1976), 21 et seq.; Arab Satellite Communications Organization (ARABSAT), UN Doc. A/CONF. 101/BP/IGO/4 (July, 1981).

services.[52]

> The geostationary orbit allows the satellite to make frequent observations of the earth's atmosphere, unlike lower altitude satellites which provide coverage only once every 12 hours...Geostationary meteorological satellites are also capable of collecting information from a large number (up to 10,000) of fixed and moving data collection platforms (DCPs) of various types (meteorological, oceanographic, hydrological, etc.) and of relaying these data to central ground stations for further processing and dissemination.[53]

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52. Radio Regulations, 1982, No. 49, defines Meteorological-Satellite Service as "An earth exploration-satellite service for meteorological purposes". No. 48 of these Regulations, in turn, defines Earth Exploration-Satellite Service as:
"A radio communication service between earth stations and one or more space stations, which may include links between space stations, in which:
-information relating to the characteristics of the earth and its natural phenomena is obtained from active sensors or passive sensors on earth satellites;
-similar information is collected from airborne or earth-based platforms;
-such information may be distributed to earth stations within the systems concerned;
-platform interrogation may be included.
This service may also include feeder links necessary for its operation."

53. UN Doc. A/CONF.101/BP/7 (January 16, 1981), 10. Although a geostationary meteorological satellite is unable to "see" the polar regions, "the advantage of its geosynchronous orbit is that it is relatively immobile in relation to the earth's surface and can therefore provide continuous coverage of the same portion of the globe. Continuous coverage is particularly significant for the detection and tracking of severe sorms which are small in size and transient in nature. These satellites enable meteorologists to study tornados which strike quickly with little warning. They also permit constant monitoring of larger weather patterns such as tropical storms. In addition, it is possible to measure the velocity of winds by tracing selected clouds imaged at half-hour intervals and deriving the direction and speed of their movement": Raleigh, L.M., "Specific International Applications Satellite Programs", in World-Wide Space Activities, op. cit., supra note 13, 425.

The idea of using the geostationary orbit for meteorological and oceanographic purposes has long been advocated by many concerned scientists. NASA's experimental Application Technology Satellites ATS-I and ATS-3 launched in 1966 and 1967 provided useful meteorological observations of the earth's clouds, and "demonstrated the practicability of geostationary satellites for sensing environmental data."[54] The success of these experiments led NASA to launch synchronous meteorological (SMS) in 1974 and operational geostationary environmental satellites (GOES) in 1975.[55]

The World Meteorological Organization (WMO) - a specialized agency of the UN - has initiated the World Weather Watch (WWW) Programme. Meteorological data, collected with the use of operational geostationary satellites belonging to various countries, is distributed world-wide.[56]

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54. Vaeth, J.G., "Geostationary Environmental Satellites", 14(10), SPACEFLIGHT, (October, 1972), 370.

55. World-Wide Space Activities, op. cit., supra note 13, 425.

56. Ibid., 429 et seq.; UN Docs. A/AC.105/149 (March 14, 1975), 11-12; A/CONF.101/BP/7 (January 16, 1981), 10 and 29; A/CONF.101/BP/2 (March 16, 1981), 18.

3. Space Research

Since the geostationary orbit satellite provides 24-hour continuous contact with the earth station, it is also advantageous for space research purposes. Presently, there are two satellites being used in this respect, i.e., the international ultra-violet explorer launched on January 26, 1978 for astronomical observations, and ESA's geostationary earth orbiting satellite (GEOS-2) launched on July 14, 1978.[57]

4. Future Systems/Structures

There are already plans to launch numerous geostationary satellite systems in the near future. Although the majority of them are for telecommunication and direct broadcasting, the use of geostationary satellites for various other purposes is also being actively explored.

Multiplicity of lower orbit satellites poses tracking difficulties. Geostationary orbit tracking satellites enable a single ground station to replace a world-wide network of tracking and receiving stations. The US Tracking and Data Relay Satellite (TDRS) System

57. UN Doc. A/CONF.101/BP/7 (January 16, 1981), 11 and 29. See also World-Wide Space Activities, op. cit., supra note 13, 319-321.

consisting of three geostationary satellites, will be used for this purpose and will relay data to a control earth station.[58]

Fears and predictions of overcrowding and saturation of the relevant portions of the geostationary orbit, have resulted in various proposals for the launching of large satellites - sometimes referred to as geostationary platforms or orbital antenna farms. Such geostationary platforms could consist of a number of payloads and

> may house in space a gigantic telephone switching centre, a large number of broadcasting channels, capabilities for observation of earth's resources and a number of scientific experiments.[59]

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58. "Space Shuttle Flight Assignment Schedule Developed", A.W.S.T., March 8, 1982, 100; Smith, B.A., "Data Relay System Made Ready for January Launch", A.W.S.T., July 12, 1982, 67-68; Tracking and Data Relay Satellite System, hearings before the Sub-Committee on Space Science and Applications of the US House of Representatives' Committee on Science and Technology, 94th Congress, Second Session, (September, 1976), Washington, 1-34; Blyth, R. and Haldeman, D., "TDRSS Multiple Access Telecommunications Service", in A Collection of Technical Papers, AIAA 8th Communications Satellite Systems Conference, April 20-24, 1980, (N.Y., 1980), 317 et seq.

59. Das, S., A Report on the Technological Aspects of Regulatory-Policy Issues of Geostationary Platforms, a study conducted for the US Federal Communications Commission (FCC), Washington, (December, 1981), 2.

While research into the various aspects of this concept has produced a wealth of literature[60], no firm

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60. See bibliography attached to the Das Report, *ibid.*, 27. See also Smith, D.D., "Space Information Stations: Technological and Institutional Aspects", XIII, *Colloquium*, (1980) 197-200; Smith, D.D. and Rothblatt, M.A., "Geostationary Platforms: Legal Estates in Space", 10(1), *J. Space L.*, (1982), 31 *et seq.*; Edelson, B.I., and Morgan, W.L., "Orbital Antenna Farms", 15(9), *Astronautics and Aeronautics*, (September, 1977), 20-29; Carey, W.T., "Developing the Concept of a Geostationary Platform", in *A Collection of Technical Papers*, *op. cit.*, *supra* note 58, 1982 *et seq.*; Morgan, W.L., "Multi-Mission Space Stations; the Case for Developing Orbital Antenna Farms", *Satellite Communications*, (April, 1978), 32-39; UN Doc. A/CONF.101/BP/2, 55 *et seq.*; Edelson, B.I., *et al*, "Future Satellite Communications", in *Space Telecommunications and Radio-Broadcasting: Objective for the 80's*; Proceedings of the International Conference held at Toulouse on March 5-9, 1979, (Toulouse, 1979), 391 *et seq.*; Slachmuylders, E., "The ESA Advanced Technology Development Programme for Future Telecommunication Satellite Platforms", *ibid.*, 527 *et seq.*; Covault, C., "Platform Designed for Numerous Uses", *A.W.S.T.*, June 19, 1978, 67 *et seq.*; Fordyce, S.W. *et al*, "Switchboard in the Sky - Antenna Platform for Domestic Satellite Communications Systems", 20, *SPACEFLIGHT*, (June, 1978), 203-217; Bond, F.E., "Communication Architecture for Large Geostationary Platforms", in Napolitano, L.G. (ed.), *Space Developments for the Future of Mankind*, (Oxford, 1980), 45-60. The European Space Agency and Canada are studying an L-Sat (Large Satellite) concept. L-Sat will be a multipurpose telecommunication platform carrying payloads of various countries for point-to-point and DBS communications. See, generally, *News Release*, Government of Canada, Department of Communications, January 20, 1980, I; "L-Sat: Europe's Heavy-Weight Communications Satellite", *Flight International*, December 20, 1979, 2053; Bassett, E.W., "European Space Agency Planning New Telecommunications Satellite", *A.W.S.T.*, December 31, 1979, 12-13; Langereux, P., "L'Italie utilisera le satellite 'L-Sat' pour la TV directe", *Air et Cosmos*, October 20, 1979, 49-52.

decision has yet been taken to produce a construction design or start experimentation. A geostationary platform is considered to help in increasing the availability of additional orbital locations. According to Das:

> Use of a (geostationary) platform by the USA would make a large amount of orbital arc available for the neighbouring American countries. Assuming the current technology, another satellite or platform may be located approximately four degrees from the USA platform. Improvement in the current technology may reduce this spacing to three degrees. Use of platforms by different countries and organizations would leave a large portion of the orbit unused.[61]

The cost estimates have varied between \$3.5 - \$4.9 billion, while the best option has been estimated at as much as \$21.7 billion. To justify expenditure of such a large amount of money and to lower the cost of services, it is logical that a geostationary platform should have a relatively longer life-span than that of the present generation of geostationary satellites. There are a number of other factors which make it difficult to predict when it may be constructed and launched, such as technical performance, amount of frequency re-use, and multiple service operation.[62]

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61. Das, op. cit., supra note 59, 9.

62. Ibid., 8, 9 and 18.

Since the non-renewable energy resources of the earth are rapidly diminishing, there have also been a number of proposals concerning the development of an energy collector satellite, or what is generally referred to as a solar power satellite (SPS).[63] Such a satellite will convert solar energy into microwaves and relay them

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63. See, generally, UN Doc A/CONF.101/BP/2 (March 16, 1981), 43 et seq.; Solar Power Satellites, Congress of the United States, Office of Technology Assessment, (Washington, 1981); O'Neill, G.K., "Space Colonization and Energy Supply to the Earth", in Future Space Programs 1975, Hearings before the Sub-Committee on Space Science and Applications of the US House of Representatives' Committee on Science and Technology, 94th Congress, 1st Session, (Washington, 1975), 112, at 129 et seq.; Glaser, P.E., "The Benefits of Solar Power Satellites", in Grey, J., and Krop, C. (ed.), Space Manufacturing III, Proceedings of the Fourth Princeton/AIAA Conference, May 14-17, 1979, (N.Y., 1979), 235 et seq.; Magdelénat, J.-L., "L'énergie solaire via satellites et la coopération internationale", III, A.A.S.L., (1978), 467 et seq.; Covault, C., "Solar Power Satellite Studied", A.W.S.T., January 22, 1979, 14 et seq.; Westphal, W., and Ruth, J., "Conditions and Requirements for a Potential Application of Solar Power Satellites (SPS) for Europe", 33, Journal of the British Interplanetary Society, (1980), 411 et seq.; Brown, W.C., "Solar Power Satellites: Microwaves Deliver the Power", IEEE Spectrum, June 1979, 36 et seq.; Drummond, J.E., "Solar Power Satellites Revisited", in Energy Technology V: Challenges to Technology, (ed. by R.F. Hill), Proceedings of the 5th Energy Conference, Feb. 25 - March 1, 1978, Washington, 487 et seq.; Ching, B.K., "Space Power Systems - What Environmental Impact", Astronautics and Aeronautics, February, 1977, 60 et seq.

to earth stations, which in turn would convert them into electricity. Various forms of the proposed SPS include solar reflector, power relay and larger power transmission satellites, etc. The size of an SPS would be approximately 55 km^2 and it could weigh between 35,000 and 50,000 tons. The cost estimates vary from $40 to $100 billion. The US Office of Technology Assessment which conducted an intensive study of various concepts of SPS, reached the conclusion that

> Too little is currently known about the technical, economic and environmental aspects of SPS to make a sound decision whether to proceed with its development and deployment.[64]

Launching of an SPS does not, therefore, seem feasible in the near future.

The use of the geostationary orbit by telecommunications, meteorological and space research satellites, however, seems to be increasing, and according to a study conducted at ESA's European Space Operations Center, the number of geostationary satellites is growing at a rate of about 20 per year.[65]

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64. Solar Power Satellites, (1981), ibid., 3.

65. See Hechler, M., and Van der Ha, J.C., "Probability of Collisions in the Geostationary Ring", 18(4), Journal of Spacecraft and Rockets, (July-August, 1981), 361 et seq. This study was also presented at the XXXIInd Congress of the International Astronautical Federation held in Rome, September 6-21, 1981.

Similarly, the UN study on Efficient Use of the Geostationary Orbit (1981) stated that during the period between 1970 and 1980

> the number of geostationary satellites has increased at an average rate of about 18 per cent per year.[66]

This is indicative of the fact that the demand for geostationary orbital slots will continue to increase. The attached Appendix shows that as at May 4, 1982, 113 such positions have been taken up by the developed countries, 47 by INTELSAT, and only 16 by the developing countries. While the latter have realized the importance of satellite communications for rapid development, they are hindered in their efforts to establish their own satellite systems by economic and technological difficulties. The question arises as to whether these countries, along with others wishing to launch their satellites into geostationary orbit, will readily find a slot in that orbit in the future. In other words, what is the orbit's capacity; is it a limited or unlimited natural resource?

D. A Limited Natural Resource: Problem of Access

In the writer's opinion, the geostationary orbit is limited, both in law and in fact. It is, in substance,

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66. UN Doc. A/CONF.101/BP/7, (January 16, 1981), 18.

a natural resource (physical phenomenon) which can be/ is being used for various purposes by earth artificial satellites. As early as 1973, Article 33(2) of the presently applicable International Telecommunication Convention declared it to be a limited natural resource, and since this Convention is widely adhered to,[67] the provisions of Article 33(2) are of almost universal nature. The adjective "limited" signifies that the geostationary orbit can accommodate only a finite number of space stations (satellites) operating on the same frequency without mutual harmful interference.[68] According to Gorove, the use of the phrase "limited natural resource" in Article 33(2) conveys the idea of the finite availability of geostationary orbital positions for use in an orderly and beneficial manner.[69]

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67. The 1973 Convention is the basic instrument (constitution) of the ITU the membership of which presently stands at 155 countries. For details, see <u>infra</u> Chapter IV.

68. Gehrig, <u>op. cit.</u>, <u>supra</u> note 4, at 273.

69. Gorove, S., "The Geostationary Orbit: Issues of Law and Policy", 73, <u>A.J.I.L.</u>, (1979), 444, at 446. See also Krause-Ablass, G.B., "The Need for International Community Systems of Satellite Telecommunications", XV <u>Colloquium</u>, (1972), at 81: "there exists a limit to the number of advantageous positions for the orbiting of stationary telecommunications satellites as well as to the number of available frequencies for radio communications."

The limited nature of the orbit is due to natural and technological factors. The natural limitation is that it lies at approximately 36,000 km. only above the equator and nowhere else, and is a three dimensional belt, band or ring. Only a limited portion of the orbit is of use to a country since the satellite must be in a position to "see" the area which it is required to serve. Hence, there is a direct link between a particular portion of the geostationary orbit and the country/countries which wish to be served.

The technological limitations concern the possibility of physical collision between satellites as well as radio interference.[70] Although not of a serious nature at present, in view of the relatively small size of the present generation of satellites which are placed at a sufficient distance from each other, serious problems could develop once large satellites, such as geostationary platforms or SPS are placed in orbit and when spacing between them is reduced. The ESA study, referred to above, concluded that:

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70. See Murie, op. cit., supra note 15, at 4. See also UN Doc. A/CONF.101/BP/7, (January 16, 1981), 12; Jeruchim, M., "A Survey of Interference Problems and Applications to Geostationary Satellite Networks", 65(3), Proceedings of the IEEE, (March, 1977), 317; Jowett, op. cit., supra note 15.

> Whereas, at present, the chance of a collision is rather small (about 6 x 10^{-6}/yr), it certainly will increase considerably over the next 20 years. With the appearance of solar power satellites some time in the future, it will become unacceptably high. Typically, collision may then occur every 5 years.[71]

The limited number of radio frequencies allocated for individual space services, together with the possibility of interference between satellite systems using the same frequency band, further restricts the capacity of the geostationary orbit. Indeed, it appears that it will always be a limited natural resource because it is a belt, and hence finite, despite the fact that technical progress may make it possible to place twice, three times or ten times as many satellites in it.[72]

It must, however, be remembered that it is not a depletable natural resource, i.e. its use by satellites

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71. "Probability of Collisions in the Geostationary Ring", op. cit., supra note 65, 365.

72. Cocca, A.A., "The Geostationary Orbit, Focal Point of Space Telecommunication Law", 45, T.J., 1978, 171. See also Armstrong, op. cit., supra note 13, at 75; Gehrig, J.J., op. cit., supra note 4, at 273; Bradley, W.E., "Communications Strategy of Geostationary Orbit", Astronautics and Aeronautics, (April, 1968), 34; Smith, D.D., "Space Information Stations: Technological and Institutional Aspects", XXIII, Colloquium (1980), 197, at 198.

does not consume it. Its capacity to accommodate various satellites depends upon a number of technical factors such as radio frequencies used, bandwidth, the type of satellite service and its general traffic configurations, transmitted power, modulation techniques, receiver sensitivities, areas on the earth to be served, etc.[73] The geostationary orbit may be viewed as a multi-layered resource, one layer for each pair of frequency bands. The layers are essentially independent of one another, which means that orbital locations, inter-satellite spacing, and overall efficient use of the spectrum in that layer are free to be determined on their merits. In fact, a satellite in one layer can, for example, be co-located with a satellite in another layer (frequency band pair).[74]

While it has been asserted that the geostationary orbit cannot accommodate more than 180 satellites placed

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73. CCIR, Recommendations and Reports of the CCIR, 1978, XIVth Plenary Assembly, Kyoto, 1978, Vol. IV, Report no. 453-2.

74. Weinberger, H.L., "Communication Satellite Spectrum Conservation Through Advanced Technology", a paper presented at EMC 80, International Wroclaw Symposium on Electromagnetic Compatibility; Weiss, H.L., "Relating to the Efficiency of Utilization of the Geostationary Orbit/Spectrum in the Fixed-Satellite Service", 68(12), Proceedings of the IEEE, (December, 1980), 1484 et seq.

at 2° apart at any given time,[75] a UN study has pointed out that such a statement is impossible.[76] Nevertheless, since only certain portions of the orbit are relevant and useful, it is not an unlimited resource. It is generally accepted that certain portions of the geostationary orbit are already saturated, especially with satellites using the 6/4 GH_z frequency band. Withers, writing as early as 1977, stated that:

> In some parts of the geostationary orbit it is already necessary to pay careful attention to intersatellite interference problems when choosing the location for a new satellite using the 4 and 6 GH_z bands. The time is fast approaching when new geostationary satellites using these bands will be constrained as to their location and technical parameters if they are not to cause unacceptable interference to satellites already in service.[77]

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75. See a statement of the Colombian Delegate to the Legal Sub-Committee on the UN COPUOS, UN Doc. A/AC.105/C.2/SR.277, (April, 1977), 3-5.

76. UN Doc. A/AC.105/203, (August, 1977), 1.

77. Withers, D.J., "Effective Utilization of the Geostationary Orbit for Satellite Communication", 65, Proceedings of the IEEE, (March, 1977), 308. Even as early as 1976, Morgan noted that "the increased number of satellites in (the geostationary orbit has already resulted in potential 'parking' problems, especially in certain preferred sectors of the orbit": Morgan, W.L., "Satellite Utilization of the Geosynchronous Orbit", 6(1), Comsat Technical Review, (Spring, 1976), 195. Weiss also stated that "Looking at the fixed-satellite service in the popular (technologically well developed and economically most attractive) 6/4 GH_z bands, one finds that a combination of protectionism, economic conservatism and unsophisticated implementation has created the quasi-reality of a rapidly depleting natural resource which new claimants may find progressively difficult to tap": Weiss, H.J.,

The UN study conducted in 1981 on the Efficient Use of the Geostationary Orbit, also noted that:

"Planning in the Fixed-Satellite Service", a paper presented at the IEEE Antennas and Propagation Symposium, Seattle, Washington on June 18-22, 1979, 1-2. In a paper on "The Efficient Use of the Geostationary Orbit", presented at the Seminar on Frequency Management and the Use of the Radio Frequency Spectrum and of the Geostationary Orbit, organized by ITU's IFRB in October, 1978, L.Y. Kantor of the USSR stated that the "geostationary orbit, with its unique properties, is now so widely used that the placing of further satellites working in the most convenient frequency range 4-6 GH_z often proves difficult, owing to intersystem interference. This is particularly true of some of the most convenient parts of the orbit, for example over the Atlantic and Indian Oceans": see IFRB Seminar, (October, 1978), Doc. no. 21/78-E (Rev.), 1; Van Trees, H.L. (ed.), Satellite Communications, IEEE, (N.Y., 1979), at 621: "the number of satellites in the geostationary orbit is increasing rapidly. In the 4 and 6 GH_z band, there are already segments of the orbital arc where inter-satellite interference is an issue". According to an IIC Report, the "first time it was suggested that the geostationary orbit might become a valuable piece of 'real estate', people reacted with incredulity and derision and the matter was relegated to science fiction. But there are now (1979) more than a hundred satellites in the geostationary orbit... A further 15 to 20 launchings a year are expected over the next three years... Overcrowding in favourite segments of the orbit is already seen as a real and serious problem": op. cit., supra note 4, 15 and 16; "'Hottest Real Estate' is 22,300 Miles Up", The Gazette, Montreal, (June 13, 1981), A-5; "Hughes Seeks C-Band Satcom Authority", A.W.S.T., (December 17, 1979), at 62-63; The FCC Commissioner Joseph Fogarty considers the geostationary orbit to be "a very scarce resource", 48(21), T.R., May 24, 1982, 11.

> The portions of the orbit serving regions of the highest volume of communications already have satellites as closely spaced as possible. Thus, the orbital arcs from 49°E to 90°E (over the Indian Ocean), from 135°W to 87°W (serving North America), and from 1°W to 35°W (over the Atlantic Ocean) <u>are virtually full with</u> respect to the 'standard' satellite.[78]

A 'standard satellite' has been defined as one which uses:

> essentially the entire 500 MH_z bandwidth in the 6/4 GH_z band by means of 12 transponders, each using 40 MH_z bandwidth and (is) capable of carrying 1,000 telephone channels or 1 television channel.[79]

A study by Das (a staff member of the Federal Communications Commission (FCC)) also concluded that:

> a crowding of 6/4 GH_z satellites, for serving North American countries, could take place by 1985 based upon current technology and four degree spacing. Some 14/12 GH_z orbital locations are likely to remain available for use by the North American countries by 1985. NASA studies[80] indicate that,

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78. UN Doc. A/CONF.101/BP/7, (1981), 18, (emphasis added).

79. <u>Ibid.</u>

80. Gabnszeski, T., <u>et al.</u>, "18/30 GH_z Fixed Communications System Service Demand Assessment", Vols. 1, 2 and 3, NAS-3-834505, July, 1979, and Gamble, R.B., <u>et al</u>, "30/20 GH_z Fixed Communications Systems Service Demand Assessment", Vols. I, II and III, NAS-3-21366, NASA Report. No. CR 159620, August, 1979 (cited in Das, <u>op. cit.</u>, <u>supra</u> note 59), 3.

> in the 1990-1995 time frame, the 6/4 and 14/12 GH_z band orbital locations would be overcrowded... A similar situation exists over the Atlantic Ocean region... The orbital locations between 11 and 35 degrees West longitudes are overcrowded (for satellites operating in 6/4 GH_z bands.[81]

The CCIR in its 1978 Report recognized that "certain parts of the geostationary satellite orbit have become increasingly congested."[82] Similarly, the FCC concluded in its Notice of Inquiry of November, 1981,[83] with respect to the reducing of inter-satellite spacing from 3° to 2° that:

> At 3 degree spacing in the 6/4 GH_z bands, only about three or four orbital locations would be unassigned after the remaining requests filed before May 1, 1980 are honoured.[84]

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81. Das, op. cit., supra note 59, 3. See also Castledine, S., "Communication Channels Nearing Saturation Point", A.W.S.T., (March 9, 1981), 101; Lowndes, J.C., "U.S. Facing Competition for Satellite Positions", A.W.S.T., (March 8, 1982), 103 et seq.

82. CCIR "Technical Factors Influencing the Efficiency of Use of the Geostationary Satellite Orbit by Radiocommunication Satellites Sharing the Same Frequency Bands", Report no. 453-2, in Recommendations and Reports of the CCIR, 1978, XIVth Plenary Assembly, Kyoto, 1978, Vol. IV, (Geneva, 1978).

83. A.W.S.T., (November 23, 1981), 29.

84. Quoted in Lowndes, J.C., "FCC Weighs Problems in Cutting Orbital Spacing", A.W.S.T., (December 7, 1981), 24.

These requests were actually honoured in December 1980 when the FCC authorized the launch of 20 new satellites.

The situation with respect to the availability of desirable orbital positions for North America is rather serious. In 1970, when the US FCC decided that satellite communications were feasible and desirable for domestic needs, it adopted "an open entry policy" allowing anyone legally, technically and financially qualified to establish and operate a domestic satellite communications system. This led a number of corporations to establish and commence operating such systems, among them, Western Union's WESTAR, RCA's SATCOM, COMSAT's COMSTAR, and Satellite Business Systems (SBS).[85] The FCC policy with respect to the assignment of geostationary orbital positions, "is to accommodate as many applicants as possible with a minimum of regulatory intrusion."[86] In accordance with this policy, the construction and launch of 20 new domestic communications satellites was authorized[87]

85. For details, see Matte, op. cit., supra note 28, 165-169.

86. Kessler, D.J. et al., "Collision Avoidance in Space", 17, IEEE Spectrum, (June, 1980), 37-61.

87. "FCC Approves Communications Satellites", A.W.S.T., (January 5, 1981), 46.

and the appropriate orbital positions for US domestic service assigned. While only two of the twenty were able to use the government bands (relating to the Tracking and Data Relay Satellite System), three could operate on the 14/12 GH_z band, and fifteen others in the 6/4 GH_z band only.[88] The result of this authorization was that only three[89] (or two)[90] unassigned orbital positions remained in the 6/4 GH_z band. With respect to the applications for these new orbital positions, Beakley has remarked that:

> The fixed frequency allocation for domestic satellites combined with potential interference from adjacent satellites mean an immediate lack of new orbital positions above the United States for the 4/6 GH_z satellites. The FCC currently (November, 1980) has applications to increase the number of satellites serving the US to 26 by 1987.[91]

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88. Ibid.

89. Ibid.

90. Castledine, S., op. cit., supra note 81, "Already all but two available Western Hemisphere (from about 50 W. Long. to about 150 W. Long.) C band orbital slots have been allocated, according to the Federal Communications Commission, last December (1980), when there were just nine domestic commercial satellites in the geosynchronous orbit, the FCC authorized the launch of 20 new or previously construdted satellites. If launched as scheduled, these should be in place by the mid 1980's."

91. Beakley, op. cit., supra note 14, 23. According to Carey, et al., "4/6 GH_z slots for 50-state coverage are gone, and the less desirable 48-state slots are rapidly disappearing. Projections for 11/14 GH_z saturation are out of date almost before they are printed. Even though we understand that as a result of G WARC 79, some additional 4/6 GH_z and 11/14 GH_z spectrum has been made available, this action only serves to delay by a year or so the

The primary reason for new domestic communication satellites is the anticipated demand for services which they could provide. In February, 1980, Aviation Week and Space Technology reported the results of NASA chartered studies to the effect that

> by 2000 as much as 25% of all long distance voice communications and 50% of all data and video traffic will be carried by communications spacecraft. The studies...found that by the early 1990's this growing demand for long-distance telecommunications services will have saturated the nation's existing domestic satellite capacity in the C-band, 4-6 GH_Z range and K_u-band, 11-14 GH_Z range. The contractor study showed that in the future most data services traffic will originate and end at terminals served by computers, with executive videoconferencing expected to become a partial substitute for business travel by 2000. The study also found that 90% of all telecommunications traffic will require real-time or instantaneous service by the turn of the century. The remaining 10% such as electronic mail delivery, will involve less urgent needs.[92]

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inevitable saturation": see Carey, W.I., et al, "Developing the Concept of a Geostationary Platform", in A Collection of Technical Papers, op. cit., supra note 58, 192, at 193.

92. "Studies Forecast Satcom Capacity Shortage", A.W.S.T., February 25, 1980, 42. See also Das, op. cit., supra note 59, 2; Sivo, J.N. et al, "Communications Systems", Astronautics and Aeronautics, (December, 1980), at 38: "The Demand for U.S. domestic satellite circuits exceeded the available supply in 1980, and a seller's market exists for the operating satellite carriers. The surge in demand results largely from distributing TV programmes by satellite to cable-TV operators"; Frosch, R.A., "Space Telecommunications Applications to the Year 2000 - and Beyond", World Telecommunication Forum, (1979), VII 2.3. - VII 2.5.

In May 1980, the FCC has to impose a deadline for further applications in order to ensure that a finite, well-defined set of proposals could be considered together in connection with issues relating to the availability and assignment of orbital locations.[93] Many of the applications filed with the FCC before this deadline were opposed for a variety of reasons, but there was one area of controversy common to all, i.e. the availability of orbital locations to accommodate them as proposed.[94] The FCC continued to receive requests from various communication entities for further geostationary orbital slots and the situation became so serious that "a sudden and surprising action at an emergency open meeting" had to be taken to impose the cut-off date as of May 18, 1982 so that applications filed prior to that date could

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93. 46(17) T.R., (April 28, 1980), 7.

94. Ibid. Another reason given by the FCC for the imposition of this deadline was that "while it is anticipating the initiation in the near future of a general proceeding lookind toward longer-term policies and technical means of increasing the number and capacity of domestic satellites operated by existing and new applicants to meet growing consumer demand over the next decade, it is essential that (the FCC) act promptly to permit those now willing and able to launch additional satellites to proceed": ibid. See also "GTE Seeks FCC Slot Approval to Compete for Satcom Traffic", A.W.S.T., (April 28, 1980), 22; "Hughes Seeks C-Band Satcom Authority", A.W.S.T., (December 17, 1979), 62 et seq.

be processed.[95] The FCC had to move rapidly in order to avoid a flood of applications that might have been filed if word got out that it was going to consider suspension of the processing of new applications. FCC commissioner Joseph R. Fogarty "considered expeditious action necessary in order to manage a very scarce resource", i.e. the geostationary orbit.[96]

The limited availability of appropriate orbital positions has prompted American telecommunication entities to speedily state their requirements. Satellite Business Systems (SBS) applied in April 1982 for FCC approval of orbital positions required for its fourth satellite to be launched in July 1984 and a fifth to be launched in 1986. SBS, in its applications, asserted that the demand for message service was high and was expected to continue to grow at a rapid rate. It anticipated increased traffic over its system as a result of recent initiatives in the international arena.[97]

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95. "FCC Designates Cut-off Date for Domsat Space Applications to be Processed, as of Last Tuesday; Others will be Accepted for Later Consideration; Tied to 2^{o} Spacing Inquiry", 48(21), T.R., May 24, 1982, 11.

96. Ibid.

97. "SBS, Steadily Increasing Range of Services from Large Businesses to Residences, Goes to Commission for Authority to Launch Fourth and Fifth In-orbit Satellites", 48(18), T.R., (May 3, 1982), 19.

RCA Americom sought authority to launch and operate three Ku-band satellites between 1985 and 1987 over the Eastern geostationary orbital arc positions for newly emerging telecommunications markets;[98] and in June 1982, Western Union Telegraph Co. applied to FCC for authorization to launch its seventh (in 1984) and eighth (in 1985) satellites which will operate in the C-band.[99] In July, 1982, Western Union also requested FCC approval for the launch of three Ku-band satellites in 1985 and 1987. The orbital positions required should be appropriate for the entire continental US , and at least one for service to 50 states.[100] The most ambitious move was taken by GTE Satellite Corporation which requested FCC authority to construct a fourth G-STAR domestic satellite to be held spare, and reservation of an orbital location of 100^{o} West longitude for ultimate placement of the G-STAR A-4 by the third quarter of 1987.[101]

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98. "RCA Americom Seeks Authority to Orbit Three Ku-band Satellites in 1985-87 Frame", 48(19), T.R., (May 10, 1982), 21.

99. "Authority for Seventh, Eighth Westar Domestic Satellites is Required by Western Union", 48(27) T.R., (July 5, 1982), 36.

100. "Western Union Seeks FCC Authority to Construct and Launch three Ku-band Satellites", 48(30), T.R., (July 26, 1982), 26.

101. "GSAT Requests Authority to ~~Launch~~ Third Satellite, Build New Spare for Use in 1987", 48(29) T.R., (July 19, 1982), 36.

According to G-SAT, the demand for telecommunications service would "far exceed the aggregate capacity available on (its) two 16-transponder satellites."[102] Since G-SAT did not file its application for such authorization before the cut-off date imposed by the FCC, it petitioned the FCC to reconsider its order, which it felt,

> arises out of a well-justified concern that demand upon the usable portions of the orbital arc for domestic satellites operating at the C and Ku-bands is fast approaching a point where the arc will be saturated, even if the two-degree spacing standards proposed in docket 81-704 are adopted. However, the solution to that problem lies in postponing processing and consideration of pending applications until completion of the proceedings in docket 81-704, rather than in foreclosing consideration only of post-May 18 applications which may be mutually exclusive with pre-May 18 applications under existing standards.[103]

G-SAT plans to launch its fourth satellite in 1987, while its first satellite will not be launched until mid-1984.

In light of the above, it is evident that there is fierce competition for, and controversy over geostationary orbital positions desirable for US domestic

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102. *Ibid.*

103. "GSAT Seeks Partial Reconsideration of FCC Order On Processing of Domsat Applications", 48(26), *T.R.* (June 28, 1982), 27.

satellite services. In this regard, the following cases may be noted:

(1) In December 1981, Western Union Telegraph Co. filed a pleading with the FCC in which it opposed an application by the American Telephone and Telegraph Co. for authority to lauhch its fourth satellite, on the grounds that

> a grant of the requested authority would reduce the number of unused C-band orbital positions and thereby impose a constraint on the needed expansion of Western Union satellite operations into an additional orbital location.[104]

(2) When the United States Satellite Systems, Inc. (USSSI) applied to the FCC for authorization to launch its U-SAT domestic satellite telecommunication system in 1985 to serve all 50 US States, the application was opposed by the American Satellite Company (ASC) which had already planned use of the same orbital positions. The ASC asserted that it "should also consider a 'new entrant' in the field, and should be accorded any preferences given to other new entrants."[105] Both ASC and Satellite Business Systems (SBS) opposed the USSSI application, on the grounds that sufficient marketing information had not been provided, and that

104. Quoted in 48(1), T.R., (January 4, 1982), 24.

105. Chaviello, A., "USSSI Vies With ASC for Slot", Satellite Communications, April, 1982, 24.

financial and operational capabilities had not been demonstrated. ASC contended that to permit such an unqualified applicant to occupy scarce orbital slots would not be in the public interest, and that to grant the USSSI application would encourage transponder speculation.[106]

(3) Western Union Telegraph Co's application, for launch authority for its seventh and eighth satellites - filed with the FCC in July 1982 - was opposed by Southern Pacific Communications Co., which stated that the application was filed after the Commissions' cut-off date for the processing of Domsat applications already in hand and that Western Union offered only 'unsupported general statements' to support its need for additional facilities.[107]

(4) The SBS, which currently uses the 100° West longitude slot for its Ku band satellite launched in 1980 and wishes to retain it for future use, opposed the GTE Satellite Corporation request for reservation of this position for emplacement of GTE's fourth (GSTAR A-4) domestic satellite by late 1987.[108]

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106. Ibid.

107. "SPCC Asks FCC to Deny Western Union's Application For Seventh and Eighth Westar Satellites", 48(35) T.R., (August 30, 1982), 24.

108. "SBS Opposes as Premature GSAT's Request for the Fourth Satellite to be placed at 100° W.L.", 48(37), T.R., (September 13, 1982), 19.

In its comments filed with the FCC in early September 1982, SBS asserted that

> G-SAT is now claiming, two years before it launches its first satellite, that it will require capacity in excess of 48 transponders ...within three years of its initial offering of service, over five years from now.
> ...such ambitious forecasts for a period so far in the future exceed anything the Commission could reasonably consider as justification for reservation of a fourth orbital slot.[109]

G-SAT's request for reconsideration by the FCC of its cut-off date is opposed by RCA Americom which considers that the "proposal would delay or destroy needed services in favour of unidentified services, in order to reserve for those unidentified services orbital arc which will be available anyhow."[110]

In view of the high demand for satellite communications, the cost of available transponders is equally high, i.e. in the range of $10 to $14 million.[111]

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109. Ibid.

110. "RCA Americom opposes GSAT Petition for Partial Reconsideration of Domsat Cut-off Order", 48(28), T.R., (July 12, 1982), 27.

111. "RCA Auction This Week Will Set New Price Line for Transponders", 3(45), Satellite Week, (November 9, 1981), 5-6.

Since it costs approximately $3 million to put a transponder in orbit,[112] US telecommunication entities are not only encouraged to establish their own satellite telecommunication systems and to add more satellites to those which they already possess, but also to continue occupation of the geostationary orbital positions which they have been assigned. For example, (US) Western Union Telegraph Co. recently launched WESTAR IV and V which replaced WESTAR I and II launched in 1974 at 99° and 123° West longitude respectively.[113] WESTAR I and II are relocated at a new position, i.e. 79° West longitude and will continue to operate from this position as a single satellite. It is important to note that while these satellites occupied their original orbital positions for eight years, the replacement satellites (WESTAR IV and V) will continue

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112. Ibid., 6.

113. See "Western Union's WESTAR IV Satellite Successfully Launched, Will Operate at 99° W. Longitude", 48(9), T.R., (March 1, 1982), 37; "Spacecraft Launched", A.W.S.T., March 15, 1982, 68; "Westar IV in Orbit", Satellite Communications, April, 1982, 27-28; "Westar 5 Satellite Placed in Orbit", A.W.S.T., June 14, 1982, 22; "Western Union Files Plan for Positions, Operation of Satellites after Westar V Launch", 48(20), T.R., (May 17, 1982), 21.

occupation of the same positions for at least ten more years (i.e., their expected life-span).[114] By so doing, Western Union not only continues to hold the orbital slots at 99° and 123° West longitude, but also occupies a new slot at 79° West longitude, in addition to other orbital positions occupied (or to be occupied) by its existing (or planned) satellites.

The overcrowding of portions of the geostationary orbit desirable for US domestic satellites has some serious implications for other countries in the Western hemisphere, especially Canada and some South American countries situated near the equator, because of difficulties in beam isolation.

> Recognized orbital arc for the 50 States of the US is from 70°W to 140°W. The arc from 50°W to 70°W can be used to provide look angles greater than 5° for the US States. However, most of this arc is being considered by South American countries and North and South beam isolation may not provide satisfactory discrimination to serve both hemispheres.

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114. Ibid. It is interesting to compare the operating life of geostationary telecommunication satellites. While Early Bird, launched in 1965, was designed for a 3 year operational life (although it lasted longer), WESTAR IV has an operating life of 10 years: see The Economist, (September 20, 1980), 106; 48(9), T.R., (March 1, 1982), 37. This illustrates the fact that satellites have been 'occupying' the geostationary orbit for increasingly longer duration. This trend could be expected to continue with technological developments in the design and construction of geostationary satellites, especially large-scale geostationary platforms and SPS.

All of this combines for contention for orbital positions above the US.[115]

It is to be expected, therefore, that guarantees will be demanded to ensure that no difficulties will be encountered by other such countries whenever they are ready to launch their first, or additional satellite systems. It is, of course, possible that the situation which prevails in this portion of the orbit may extend to other portions. Indeed, orbital slots over the Atlantic and Indian Ocean are already becoming crowded.

As is true of the US domestic market, world telecommunication needs are expected to increase substantially.

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115. Beakley, op. cit., supra note 14. See also "FCC Approves Communications Satellites", A.W.S.T., (January 5, 1981), 46; "Hughes Seeks C-Band Satcom Authority", A.W.S.T., (December 17, 1979), 62, at 63. "For years, the poorer countries have been afraid that the best orbital slots for direct-broadcast satellites will be snapped up on a first-come, first-served basis by the technologically sophisticated rich. That has already happened with telecommunications satellites in the section of the orbit over the equator which serves North and South America. Any Latin American country wanting to put up a telecommunications satellite is apt to find its desired position occupied by an American or Canadian satellite": The Economist, February 28, 1981, 83.

> A cost-effective substitute will be to exchange telecommunications for travel. Telephony will increase at a rapid rate. The percentage of telephony carried over the satellite will increase with interconnection of business networks. Data communications, which is still in its infancy, will grow extremely rapidly, as new devices are developed that use existing and projected transponder capacity. The rising costs and inconvenience of business travel will become a strong incentive to substitute telecommunications for some travel. This has led Future Systems Incorporated to project a world-wide need for 102 transponders for data, 1000 transponders for voice, and 8000 transponders for video-conferencing by 1995.[116]

INTELSAT's estimate is that global <u>international</u> satellite communications will increase by about 85% from 1983 to 1986.[117] INTELSAT's share in this increase will be about 2/3, while the rest will be met by existing and new regional systems. There is a likelihood of increased demand for satellite communications for domestic purposes, which will be met by the expansion of existing domestic satellite systems and the establishment

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116. Beakley, <u>ibid.</u>, at 24. See also Das, <u>op. cit.</u>, <u>supra</u> note 59, 2.

117. "INTELSAT Meeting Data Show a 85% Increase in Next Four Years in Satellite Requirements", 48(29), <u>T.R.</u>, (July 19, 1982), 36. INTELSAT had already estimated such requirements to increase 100% from 1979 to 1982. See "Big Increase Seen for Satellite Communications", 46, <u>T.J.</u>, (1979), 640. See also "Demand Rise for Satellite Communications", 46, <u>T.J.</u>, (1979), 586.

of new ones. It is important to note that new domestic satellites systems are considered to be more economic and take less time to establish than terrestrial (traditional) means, but it appears that an increase in national systems is also due to political and other reasons. This is particularly true in the case of the developing countries.[118] Canada was the first country to establish a domestic geostationary satellite system in 1972, and was later joined by the US, Indonesia, and the USSR.[119] Australia,

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118. See generally, ITU, "The International Telecommunications Union and Space" in UNESCO, Broadcasting From Space, (Paris, 1970), 38, at 46; Chayes, A., "Introduction" to Satellite Broadcasting, (London, 1973), 1, at 12-15; Al-Mashat, A., "The Arab View of Satellite Services", 8(5), Intermedia, (September, 1980), 18 et seq.; Pierce, W.B. and Jéquier, N., "Telecommunications and Development", 12(2), Dialogue, 1979, 23 et seq.; Beakley, op. cit., supra note 14, at 20; Hudson, H.E., "The Role of Telecommunications in the Development Process: Rural Telecommunications in Developing Countries", in Levin, L. (ed.), Telecommunications in the U.S.: Trends and Policies, (Dedham, 1981), 415 et seq.; Parker, E.B., "Communication Satellites for Rural Development", Telecommunications Policy, December, 1978, 309 et seq.; Al Ghunaim, A.R.K., "Establishment of Telecommunication Services - Social Benefit or a Development Prerequisite: Views from Developing Country", World Telecommunications Forum, 1979, I.G. 1 et seq.; Wheelan, A.D., "The Economics of Telecommunications in the Century of Satellite", ibid., III.5.1. et seq.; Hornik, R., "Communication as Complement in Development", 30(2), Journal of Communication, (Spring, 1980), 10 et seq.; Saunders, R.S. and Dickenson, C.R., "Telecommunications: Priority Needs for Economic Development", 46, T.J., 1979, 566 et seq.; Wellenius, B., "Telecommunications in Developing Countries", Telecommunications Policy, September, 1977, 289 et seq.; Clippinger, J.H., "Can Communications Development Benefit the Third World?", ibid., 298 et seq.

119. Matte, N.M., op. cit., supra note 28, 165-178.

France, Italy, Japan and the UK will establish their own systems in the near future.[120] The allocation of orbital positions on a "first come, first served" basis[121] is a major factor in accelerating acquisition by states of the most appropriate geostationary orbital slots and radio frequencies. For example, Canada took the decision to establish a domestic telecommunication system primarily because of the fear of losing appropriate geostationary orbital positions to other countries. According to a Canadian Privy Council commissioned study:

> A fundamental question is whether Canada should own its own domestic satellites or rent them from COMSAT. The principal factor in this question is that the space 22,300 miles above the equator along a belt approximately 18,000 miles long (20° either side of 95° W longitude), is available to any country for operation of a synchronous satellite for domestic TV transmission. ...The sky territory for location of Canada's satellite is valuable. If

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120. See infra Appendix. See also "Space Shuttle Flight Assignment Schedule Developed", A.W.S.T., (March 8, 1982), 100 et seq.; "Japan Space Effort Moves Into Operational Phase", ibid., 107 et seq.; Kolcum, E.H., "U.S./ESA Vie for Commercial Payloads", ibid., 93 et seq.; "20 à 39 satellites pour 'Ariane' en 1980-1990?", Air et Cosmos, no. 562, (1-II-1975), 35; "40 à 50 satellites géostationnaires civils à lancer entre 1980-1990", Air et Cosmos, no. 461 (16-XII-1972), 38.

121. See infra Chapter IV.

> given over to the US, or any other country, this territory could be lost for ever.[122]

The White Paper on A Domestic Satellite Communication System for Canada (1968) which was prepared by the Canadian Department of Industry, Trade and Commerce, was based essentially on this study. The White Paper stressed the urgency of establishing a domestic satellite communications system, pointing out that:

> Parking spaces and frequencies are essentially international, in the sense that they cannot be claimed by one country...In most instances of radio frequency use, formal international recognition of a country's requirements tends to be achieved on a first-come, first-served basis. There is, therefore, a degree of urgency that planning for the Canadian domestic system should proceed apace.[123]

The Australian government has decided to launch two geostationary satellites for domestic communication

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122. Privy Council, Science Secretariat, Special Study No. 1, Upper Atmosphere and Space Programs in Canada, (by Chapman, J.H. et al), (Ottawa, 1967), 86. Similarly, Science Council of Canada Report No. 1, A Space Program for Canada, (July, 1967), at 28, stressed the fact that "there is only one orbit for geostationary satellites, and in due course it could become overcrowded."

123. White Paper on A Domestic Satellite Communication System for Canada, The Honourable C.M. Drury, Minister of Industry, Trade and Commerce, (Ottawa, 1968), 66.

purposes in 1985.[124] This decision was taken following the Government Task Force report on a National Communications Satellite System (1978) which states that:

> It might be imagined that, with a synchronous satellite orbit lying 35,780 kilometres out in space, there would be ample room for all the synchronous satellites which might be required by all countries. Such is not the case... Certain parts of it are in great demand because of the areas on the earth's surface which they can command...
> It is in Australia's interest to establish the orbital positions it will need for both Fixed Satellite Services and Broadcasting Satellite Services and to ensure that these positions are not lost to her by allocation to other countries... it is clear that early action would be needed to secure suitable orbital positions.[125]

Given the present and future demand for appropriate positions in the geostationary orbit, new entrants into the domestic satellite systems market are already facing difficulties. As Robinson has noted there have been

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124. See, generally, "Space Shuttle Flight Assignment Schedule Developed", op. cit., supra note ~~120~~; "Domestic Satellite System for Australia", World Space News, (January/February, 1981), 2; "Australia Plans Domestic Satcom System", A.W.S.T., (November 19, 1979), 18; "Regional Comsat for Australia", Flight International, (April 15, 1978), 1055.

125. Australia, Commonwealth Government Task Force, National Communications Satellite System, Report, Canberra, 1978), 84. See also National Communications Satellite System, Working Group Report, (Canberra, 1979), 74.

some "administrative difficulties in completing advanced coordination procedures for two domestic systems, Indonesia's Palapa and India's Insat";[126] and according to India's delegate to the 1979 WARC, T.V. Srirangan, India

> encountered considerable problems in ensuring a reasonable location in the (geostationary) orbit, and also in ensuring appropriate frequency assignments..., (and consequently) paid a fairly heavy and severe penalty.[127]

France's Telecom I (a National Satellite for Domestic and Business Services) system faced similar "difficulty in finding a suitable orbital location."[128] A controversy also arose between Japan and the USSR with respect to the use of an orbital location at 130° E longitude.[129] In July, 1981 the USSR announced plans to place a STATIONAR 10 in this position in 1984, and requested

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126. Robinson, op. cit., supra note 20, at 45, fn. 139.

127. The statement of T.V. Srirangan in the meeting of Working Group Six Ad-hoc Two of the 1979 WARC (quoted in Rutkowski, A.M., "Six Ad-hoc Two: The Third World Speaks its Mind", Satellite Communications, March, 1980, 22, at 23).

128. Rothblatt, M.A., "Satellite Communication and Spectrum Allocation", 76, A.J.I.L., 1982, 56, at 66, fn. 68 (The author refers to Grenier, Popot, Lombard, & Payet, "Telecom I, a National Satellite for Domestic and Business Services" in 3 International Conference on Communications, 1979, 45.5.1.).

129. "Japan and the Soviet Union Each Plan to Place a Communications Satellite into the Geosynchronous Orbit at 130° E. Long.", A.W.S.T., April 26, 1982, 15.

Japan to change the orbital position of a Japanese CS-2A spacecraft to 135° E. longitude. Japan, however, refused asserting that it had already registered the 130° E. longitude position with the IFRB in June 1981 and thus had priority rights to its use.[130] There have recently been reports about the difficulties being faced by Mexico in acquiring orbital positions for its new satellite telecommunications system to be launched by mid-1985. Problems such as those mentioned above establish without question that the geostationary orbit is a limited natural resource, even at this early stage of its utilization.

It has been suggested[131] that scientific and technological innovations will devise means for the economic and efficient use of the geostationary orbit and various technical methods have been proposed[132] to

130. Ibid.

131. National Paper: United States of America, UN Doc. A/CONF.101/NP/53, (March 23, 1982), 34: "present concerns regarding spectrum shortages and imminent congestion of the geostationary arc will likely be amenable to technological solutions."

132. See, generally, UN Doc. A/CONF.101/BP/7, (January 16, 1981), 20-23; CCIR, Technical Bases for the World Administrative Radio Conference 1979, Report of the Joint Meeting of CCIR Study Groups. Special Preparatory Meeting for the WARC-79, (Geneva, 1978), sections 5.3.5. et seq.; CCIR, "Technical Factors Influencing the Efficiency of Use of the Geo-stationary Satellite Orbit by Radio Communication Satellite Sharing the Same Frequency Bands", op. cit.,

this end, some of which may be identified as follows:

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supra note 82; Weiss, H.J., "Relating to the Efficiency of Utilization of the Geostationary Orbit/Spectrum in the Fixed-Satellite Service", 68(12), Proceedings of the IEEE, (December, 1980), 1484 et seq.; Jansky, D., "Factors Affecting Orbit Utilization", in Gould, R.G. and Lum, Y.F. (ed.), op. cit., supra note 15, (N.Y., 1975), 103-107; Withers, D.J., op. cit., supra note 77, 623 et seq.; Murie, R.D., op. cit., supra note 15, 3 et seq.; Hult, J.L. and Reinhart, E.E., "Satellite Spacing and Requency Sharing for Communication and Broadcast Services", 59(2), Proceedings of the IEEE, (February, 1971), 118 et seq.; Ackerman, P.G., Satellite Systems for Industrialized Nations - After WARC 79", A Collection of Technical Papers, op. cit., supra note 58, 776 et seq.; Frosch, R.A., "Space Telecommunications Applications to the Year 2000 - and Beyond", World Telecommunication Forum, (Geneva, 1979), VIII 2.1. et seq.; Kantor, L. Ya, op. cit., supra, note 77; Gehrig, J.J., op. cit., supra note 4; Chayes, A., op. cit., supra note 118, 16-17. In the ITU Radio Regulations, some techniques have been identified the application of which is considered to lead to a more efficient use of the spectrum/orbit resource. Administrations have undertaken to apply them "to the maximum extent technically and economically practicable". These techniques include clustering, cross-polarization, cross-beam geometry, paired service areas, frequency interleaving, minimum space station spacing, space station antenna discrimination, earth station antenna discrimination, minimizing e.i.r.p. (equivalent isotropically radiated power) differences, and realistic quality and reliability objectives: see, Annex 7 to Appendix 30 of the Radio Regulations, 1982. It is important to note that these techniques are suggested for efficient use of the spectrum/orbit resource for two space services: the fixed-satellite service and the broadcasting-satellite service in Region 2 - the Americas). Some of them may, or may not be appropriate, or possible to adopt in order to achieve efficient use of this resource in the case of other services, and in other regions. See, generally, references in this footnote for details with respect to infra notes 133 to 153.

(a) Uplink/downlink reversal

(b) Frequency re-use by means of narrow beam (beam separation) and polarization

(c) Frequency band pairing

(d) Inter-satellite links

(e) Satellite station-keeping

(f) Satellite spacing

(g) Use of non-stationary geosynchronous orbits.

Before discussing these techniques in light of their potential to accommodate more satellites in the geo-stationary orbit, it is appropriate to examine how much of the frequency spectrum is available for space services. At the 1979 WARC,

> the band width allocated to the fixed-satellite service in the 6/4 GHz region was approximately doubled, as was the bandwidth allocated in the 14/11 GHz region...The 3500 MHz bandwidth in the 30/20 GHz band, previously allocated and currently used experimentally, was not changed, giving a total of about 500 MHz bandwidth in these bands. This total allocation amounts to 11 times the bandwidth of the currently allocated 6/4 GHz band that is used by most general communications satellites today, (i.e. January, 1981).[133]

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133. UN Doc. A/CONF.101/BP/7, (January 16, 1981), 20, (emphasis added).

This statement may give the impression that there should be enough room for everyone. However, such is not the case. Firstly, the "11 times" capacity is calculated on the basis of what was actually being used in the late 1980's or early 1981 when this study was conducted. It does not take into account that portion of the allocated bands which was assigned to numerous satellites and which will be used when they become operational in the near future. Secondly, as noted earlier, technical proof is still required that the 30/20 GH_z band is commercially exploitable, and the necessary technical infrastructure remains to be developed. Thirdly, use of the spectrum is uneven, i.e. a few countries use most of it.[134] Thus, other states may have difficulty in obtaining access when required. Fourthly, there is already overcrowding in certain portions of the geostationary orbit, especially in the 6/4 GH_z band.

At the 1979 WARC, new frequencies were allocated to space services. They include the 50/40 GH_z, 80/70 GH_z, 105/95 GH_z, 210/150 GH_z and 270/240 GH_z bands.[135]

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134. See infra Appendix.

135. For details, see Radio Regulations, (1982), Article 8: "Frequency Allocations".

While this "new" spectrum is immense when compared to the "old", extensive experiments in its use are not being conducted. According to Weiss, since the "new spectrum is more costly to implement, ... there is therefore strong pressure towards more intensive and 'efficient, utilization of the old spectrum."[136] He also points out that:

> it is often preferable, sometimes necessary, to accommodate part of the demand increase through progressively more intensive use of the "old" spectrum in which cost, prior implementation and operating experience, plant and equipment availability, and a mature technology basis provide a desirable expansion environment. Added to this may be political 'equal rights' considerations raised by those in the early stages of implementation and desirous of gaining access to the increasingly more crowded but lower cost 'old' spectrum.[137]

According to the uplink/downlink reversal technique, a satellite may operate with reversed uplink/downlink frequency bands between two satellites using the frequencies in the presently designated sense, thereby increasing the capacity of the geostationary orbit. For example, if two satellites are operating at 6 GH_z (uplink) and 4 GH_z (downlink), a third satellite may operate in between these two by using 4 GH_z for uplink and 6 GH_z for downlink.

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136. Weiss, H.J., op. cit., supra note 132, 1484.

137. Ibid.

However, this raises new problems of interference between satellites on opposite sides of the orbit, between earth stations, and between earth stations and terrestrial communications systems.[138]

The frequency re-use technique concerns two methods of using the same frequency. Firstly, by orthogonal polarization as used by PALAPA and INTELSAT V satellites, and secondly, by "use of multiple satellite antennas with narrow beamwidths serving different areas", as used by INTELSAT IV-A satellites.[139] However, this technique creates problems of depolarization due to precipitation, especially for frequencies above 10 GHz and narrow beam widths, which are not of much practical gain where "traffic is concentrated in certain regions."[140]

Radio regulations contain frequency bands for earth-to-space (uplink) and space-to-earth (downlink) services.[141] However, there is no express requirement that a specific pairing of bands should be used for a particular satellite. It has been suggested by the CCIR that

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138. See <u>supra</u> note 133.

139. UN Doc. A/CONF.101/BP/2, (March 16, 1981), 12.

140. See <u>supra</u> note 133.

141. See Radio Regulations, 1982, Article 8 (Frequency Allocations).

> Utilization of the geostationary satellite orbit and the frequency spectrum would be more efficient, and coordination of satellite or satellite networks would be facilitated if certain frequency bands were paired.[142]

However, the CCIR has also recognized the fact that any particular pairings have not yet been identified as the best technical arrangement because "there are no very strong technical reasons for preferring one pairing to another."[143]

With the use of direct links between the satellites (without any intervening earth station), "double-hops" could be avoided and, consequently, the capacity of the orbit/spectrum resource could be increased. "Double-hops" refer to radio links used by two satellites through an earth station, to carry a message beyond the area of visibility of a satellite; *i.e.*, to interconnect two earth stations situated beyond (more than about 8000 km) the area of visibility of a single geostationary satellite. However,

> in cases where it would be necessary to increase the requirement in respect of bandwidth or e.i.r.p. per channel in the Earth-to-space or space-to-Earth path to offset the noise

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142. See *Recommendations and Reports of the CCIR*, 1978, *op. cit.*, *supra* note 82, section 7.1.

143. *Ibid.*

> contribution introduced by an inter-satellite link, the efficiency of orbit and/or spectrum utilization could be adversely affected.[144]

A geostationary satellite is subject to drift due to gravitational forces and could therefore cause interference to other networks, consequently reducing the capacity of the geostationary orbit. Station-keeping techniques are used to counteract these drifts and to keep a satellite in its desired position.[145] Such techniques are already developed. The 1979 WARC reduced station-keeping requirements from approximately 1.0° to approximately 0.1°.[146]

> Thus where heretofore a minimally permissible intersatellite spacing of, e.g., 4° of arc demanded actual intersatellite spacing of 6°, it now demands only 4.2° with a loss in relative orbit utilization efficiency of 5 percent as against previous 33 percent.[147]

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144. Ibid., section 10.5. According to the UN study on Current and Future State of Space Technology, (UN Doc. A/CONF.101/BP/2 of March 16, 1981, 15): "There are still some problems yet to be solved before implementation (of intersatellite link techniques): accuracy of antenna tracking wide-band modulation and demodulation equipment, and selection of frequency bands."

145. See Recommendations and Reports of the CCIR, XIVth Plenary Assembly, Kyoto, 1978, Vol. IV, Report no. 556-1 on "Factors Affecting Station-Keeping of Geostationary Satellites of the Fixed Satellite Service."

146. Radio Regulations, 1982, Article 29, (section III: Station Keeping of Space Stations).

147. Weiss, op. cit., supra note 132, 1488-1489.

Improved station-keeping techniques would perhaps make it possible to place satellites closer to each other (i.e., intersatellite spacing could be reduced). In November 1981, the (US) FCC issued a Notice of Inquiry[148] to gather the views of the concerned public on the question of reducing intersatellite spacing, of US domestic satellites operating in the 6/4 GH_z and 14/12 GH_z bands. According to Ron Lepkowski, the FCC Satellite Radio Branch chief, "no less than 30 satellites in the C band, and 30 in the Ku-band, creating some 1500 new transponders could be available for users in the next decade."[149] However, when intersatellite spacing is reduced, "interference between traffic on adjacent satellites increases."[150] The problem of interference becomes more serious in the case of smaller earth antennas, as in the broadcasting satellite service.[151] Therefore, a reduction in inter-satellite spacing to 2° for satellites operating in the

148. See A.W.S.T., (November, 1981), 29. See also Lowndes, J.C., "FCC Weighs Problems in Cutting Orbital Spacing", A.W.S.T., (December 7, 1981), 24-25.

149. "FCC Proposes 2° Spacing", Satellite Communications, (November, 1981), 18, at 19.

150. Braun, W.H., "2° Spacing: Its Impact on Domestic Satellite Systems", ibid., 32.

151. UN Doc. A/CONF.101/BP/7, op. cit., 21. See also Samarkandy, M.K. and Han, C.C., "Efficient Utilization of the Geostationary Satellite Orbit", Proceedings of the IEEE, 1981, 54 et seq.

6/4 GH_z and 14/12 GH_z bands "mandates technological improvements in antennas and poses the possibility of obsolescence of existing facilities."[152] This will impose additional financial burdens on present and future earth station manufacturers and users for the redesign of antennas, etc. in the range of \$500,000 - \$800,000 for each antenna model.[153]

It has also been proposed that to decrease over-

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152. Braun, op. cit., supra note 150, 34.

153. 48(12), T.R., (March 22, 1982), 23. According to Marshall, I., "The only ones who stand to loose from this move are the end-users. Cable systems, which are today able to achieve satisfactory reception with 4.5 meter antennas, would be forced to upgrade equipment to receive similar quality signals. Those who suffer the most would be the users of large networks of small antennas, which are already in place. They will have to carefully evaluate their systems, to see what will be necessary to achieve compatibility with two degrees spacing. Considerable investment may be needed to upgrade systems which were quite adequate when they were installed. Another angle is international reaction. Two degree spacing will be seen by some as a monumental 'land grab' in outer space. The U.S. must remain consistent with its international commitments. The benefits of space communications must be available to all:" "Users = Losers?", Satellite Communications, (November, 1981), 6. See also, "Reduction in Orbital Spacing to 2° for Domsat Satellites Could Create Problems, Parties State in Comments Filed in FCC Inquiry; Creation of Panel to Examine Situation is Urged", 48(11), T.R., (March 15, 1982), 27-29; "Parties Continue to Urge Caution by FCC in Any Plans to Reduce Domsat Spacing", 48(19) T.R., (May 10, 1982), 33-34.

crowding of the orbit, inclined/elliptic 24 hour satellite orbits should be used. The latter can accommodate three to four times more satellites than the geostationary orbit. However, among the disadvantages are the requirements for more expensive steerable antennas and satellite position control mechanism.[154]

It is frequently stated that, "necessity is the mother of invention", hence, as the need arises, undoubtedly more techniques will be developed in order to achieve efficient use of the geostationary orbit. The history of satellite technology shows that improvements have been achieved not only in satellite capacity but also in station-keeping techniques, and more effective and economic use of the radio spectrum. New radio frequency bands are being introduced as a result of technological innovation. Given certain assumptions, the UN study on the <u>Efficient Use of the Geostationary Orbit</u> concluded that:

> it would appear that foreseeable technological advances will permit the geostationary orbit to accommodate both the growth of existing

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154. See Kumar, K., "Some Aspects Related to Applications of Non-Stationary 24-hour Orbits", a paper presented at the XXXIst Congress of the International Astronautical Federation, Tokyo, September 21-28, 1980. See also UN Doc. A/CONF.101/BP/7, (1981), 23.

> systems and the introduction of new systems, by new users for at least the next two decades. 155

However, this optimistic view is tempered by some very important considerations. The proposed techniques enumerated above have built-in disadvantages and weaknesses which make them difficult to adopt at the same time. It must also be remembered that the geostationary orbit and the radio spectrum are natural phenomena (resources), subject to the laws of nature. Since, "each step toward more sophisticated technology risks transgression against nature",[156] there are limits

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155. UN Doc. A/CONF.101/BP/7, (1981), 23-24. This conclusion was based on the following assumptions:
"(a) That the rate of growth in demand will not greatly exceed current rates;
(b) That most of the technologies which now appear feasible will prove to be so and will be developed and used;
(c) That the users of the geostationary orbit will co-ordinate their programmes".
See also Christol, C.Q., "The Geostationary Orbital Position as a Natural Resource of the Space Environment", XXVI(I), Netherlands International Law Review, (1979), 5, at 6 and 9: "depending on the scientific and technological capabilities brought to bear on the subject, the contention that the orbital position is a limited natural resource becomes somewhat less meaningful... With a suitable use of the (some) elements in the management of the radio frequency spectrum, it can be concluded that radio frequencies emanating from space objects located in the geostationary orbit need not be a limited natural resource."

156. Passell and Ross, The Retreat from Riches, 35. (Quoted in Falk, R.R., A Study of Future Worlds, N.Y., 1975, at 398).

to the extent that man can defy nature. In other words, there are limits to growth.[157] While the financial burden has until now been borne by the first comer developed countries, which spend nearly 98% of the total cost of the world's research and development programmes,[158] it will ultimately be borne by the late comer developing countries which will be forced to pay for new technology since that used in the past will no longer be useful in finding appropriate geostationary orbital slots. This adds to the seriousness of the problem of access to the geostationary orbit.

The gravity of the situation has been recognized in the UN study, which states that:

> (a) Competing requests for specific positions using the most desirable frequency bands have started to occur and will occur more frequently in the future;

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157. It has correctly been observed by Smith that the use of "geostationary orbital slots for the operation of various conventional satellites is a difficult administrative task of a global resource management. This is because geostationary orbital slot availability will reach a saturation point beyond which limits to the growth of satellite traffic will be a reality. Moreover, technical and international frequency regulations also restrict the amount of additional frequency bands available to satellites": Smith, D.D., "Space Information Stations: Technological and Institutional Aspects ", XXIII, Colloquium, 1980, 197.

158. De Mattos, H.C., "Technology and Developing Countries", in World Telecommunication Forum, Executive Symposium, Telecommunication Perspectives and Economic Implications, (1979), II.2.1.

(b) Future systems desiring access to the orbit, especially in the congested arcs, may have to use more advanced, and probably more expensive technology;
(c) Advanced technology being developed and used on a voluntary basis will gradually become mandatory;
(d) The technology and the planning required to improve the efficiency of utilization of the orbit will exact a price, and the improvements realized will be closely related to the resources invested.[159]

Among the other conclusions reached, three are of importance to this study:

> The burdens imposed by these considerations will fall most heavily on the developing countries, because of both their limited resources and their later entry into the orbit. Special measures have to be taken in their favour.
> It is possible that the assumptions made... may be invalid. If the demand grows very rapidly and technological advances are not realized, conflicts could appear rather soon, especially in certain portions of the orbit and in the most widely used frequencies (6/4 GH_z).
> If radically new systems make large demands on the orbit, in particular very large systems such as solar power satellites, the situation might be altered profoundly, and solutions that would satisfy all demands for geostationary services might be very difficult to find.[160]

While the latter statement is not a major concern at present, given that the concept of SPS is relatively too premature, it would appear from the UN report that relatively less emphasis is placed on the serious-

159. UN Doc. A/CONF.101/BP/7, (1981), 24.

160. *Ibid.*

ness of the problem "in certain portions of the orbit and in the most widely used frequencies".

CHAPTER II : THE LEGAL STATUS OF THE GEOSTATIONARY ORBIT

The legal status of the geostationary orbit[1] depends primarily upon whether it may be considered part of outer space. If the answer is affirmative, then its legal status is allied to that of outer space. It is generally held that the geostationary orbit is "located" in outer space, and thus its status is determined by the Outer Space Treaty of 1967.[2] However, in December 1976, a number of equatorial states, in the Bogota Declaration, denied this generally held view and instead declared their sovereignty over those portions of the geostationary orbit above their national territories.[3] Since that time, the question of the legal status of the geostationary orbit has come under intensive scrutiny by the international community. Its recent and rapidly increasing use by a handful of countries has aroused controversy with respect to the right of access. There

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1. For detailed technical characteristics, see supra Chapter I, A and B.

2. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and other Celestial Bodies, signed in London, Moscow and Washington on January 27, 1967; and entered into force on October 10, 1967 (hereinafter cited as the Outer Space Treaty).

3. See Declaration of the First Meeting of Equatorial Countries, signed in Bogota, December, 3, 1976, by Brazil, Colombia, Congo, Ecuador, Indonesia, Kenya, Uganda, Zaire (hereinafter cited as the Bogota Declaration). The Declaration is reprinted in Jasentuliyana, N. and Lee, R.S.K. (ed.), Manual on Space Law, (N.Y., 1979), Vol. II, 383 et seq.

have been calls for the establishment of a special detailed legal regime to govern its use and, for this purpose, it is necessary to examine its basic legal nature or status. This Chapter will, therefore, focus on this particular aspect of the geostationary orbit issue.

A. <u>A Part of Outer Space</u>

It has been asserted by the equatorial states, in the Bogota Declaration that

> the geostationary synchronous orbit is a physical fact linked to the reality of our planet because its existence depends <u>exclusively</u> on its relation to gravitational phenomena generated by the earth, and that is why it must not be considered part of outer space.[4]

However, the definition of an orbit[5] of a satellite (geostationary or non-geostationary) given in the Radio Regulations appended to the 1973 ITU Convention,[6] makes it clear that a satellite orbit is a natural phenomenon resulting from <u>various</u> natural forces, gravity being <u>only</u> one.[7]

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4. <u>Ibid</u>., (emphasis added).
5. See <u>supra</u> Chapter I.A.
6. International Telecommunication Convention, 1973, ITU, Geneva.
7. UN Doc. A/CONF.101/BP/7 (January 16, 1981), 5. See also <u>infra</u> note 8; UN Doc. A/AC.105/259 (January, 1980), 4 <u>et seq</u>.; A/AC.105/C.2/SR.377 (1982), 3.

The gravitational forces of the sun and moon, in addition to that of the earth, interact on a satellite in the geostationary orbit, and therefore earth's gravity is a major, but not an exclusive force, as contended by the equatorial states. It is the gravitional force of the earth as a whole, that is necessary for the creation and existence of the geostationary orbit. It has been stated in a report of the International Institute of Communications that:

> It is the gravity of the entire Earth that keeps satellites in orbit; and any attempt to subdivide gravity is scientifically absurd... the position of a satellite in a geo-stationary orbit is affected by a number of forces, as well as gravity, none of which can be subdivided. To press this argument would lead to scientific absurdities in view of the various motions of the earth, the sidereal period around its axis, its revolution around the Sun, the movements of the solar system with the galaxy and the movements of the galaxy itself.[8]

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8. "The Most Valuable Parking-Place in Space", Intermedia, International Institute of Communications, (January, 1979), Vol. 17, no. 1, 15, at 17. The Physical Nature and Technical Attributes of the Geostationary Orbit, UN Doc. No. A/AC.105/203, August, 1977; see also, Busak, J., "The Geo-stationary Satellite Orbit - International Co-operation or National Sovereignty?", 45, T.J., (1978), 167, at 169; UN Docs. A/AC.105/C.2/SR.375 (1982), 2 and 3, UN Doc. A/AC.105/C.2/SR.377 (1982), 2 and 3 (USA); Ferrer, M.A., "The Use of the Geo-stationary Orbit", XX, Colloquium, 1977, 216, at 217; Galloway, J.F., "Telecommunications, National Sovereignty and the Geostationary Orbit", ibid., 226, at 233; Gorbiel, A., "Le statut de l'orbite géostationnaire", ibid., 238, at 239.

The earth's gravitational force is also a primary factor, for the existence of all other satellite orbits (both geostationary and non-geostationary). To apply the test of 'exclusive gravitational force of the earth' to all non-geostationary satellite orbits would lead to the conclusion that they are not a part of outer space, which is hardly acceptable. Similarly, it is difficult to accept the assertion that the geostationary orbit may not be part of outer space.

Having recognized this fact, it is evident that the Outer Space Treaty of 1967 must be applied. However, signatories of the Bogota Declaration denied its applicability to the orbit, stating that:

> There is no valid or satisfactory definition of outer space which may be advanced to support the argument that the geostationary orbit is included in Outer Space.[9]

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9. See Bogota Declaration, op. cit., supra note 3. The Declaration further states that the "lack of definition of outer space in the Treaty of 1967, ... implies that Article II (which prohibits national appropriation of outer space) should not apply to the geostationary orbit and, therefore, does not affect the right of the equatorial states that have already ratified the Treaty". See also UN Docs. A/AC.105/PV./184 (1978), 16-26 (Colombia); A/AC.105/PV.181 (1978), 58 (Ecuador); A/AC.105/PV.184 (1978), 72-73 (Kenya); A/AC.105/C.2/SR.366 (1982), 4; A/AC.105/C.2/SR.372 (1982), 4.

It is, of course, true that there is no universally accepted definition of outer space and that the problem of the delimitation or demarcation of air space and outer space is as old as the Space Age itself. The search for an appropriate solution continues both in doctrine and international fora, such as the UN Committee on the Peaceful Uses of Outer Space (COPUOS).[10] Until 1967, COPUOS was of the opinion that the boundary problem did not merit priority consideration because the lack of demarcation between air and outer space did

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10. The boundary issue has been discussed extensively in legal literature, see generally, Gorbiel, A., Legal Definition of Outer Space, University of Lodz, 1980); Cheng, B., "The Legal Regime of Air Space and Outer Space: The Boundary Problem. Functionalism versus Spatialism: The Major Premises", V, A.A.S.L., (1980), 323 et seq.; Background Paper on the Question of the Definition and/or the Delimitation of Outer Space, UN Doc. A/AC.105/C.2/7/Add.1, (January, 1977); Goedhuis, D., "Some Observations on the Problems of the Definition and/or the Delimitation of Outer Space", II, A.A.S.L., (1977), 287 et seq.; Matte, N.M., Aerospace Law, (London and Toronto, 1969), 13-74; Ogunbanwo, O.O., International Law and Outer Space Activities, (The Hague, 1975), 50-59; Lay, S.H. and Taubenfeld, H.J., The Law Relating to Activities of Man in Space, (Chicago and London, 1970), 36-62; Perek, L., "Remarks on Scientific Criteria for the Definition of Outer Space", XIX, Colloquium, (1976), 185-195; various articles by Almond, Gorbiel, DeSaussure, Smirnoff, and Stoebner in XXI, Colloquium, (1978), 77-108, and by Matte, Haanappel, Sloup, Rosenfeld, and Safavi in XX, Colloquium, (1977), 47-72; McDougal, M.S., Lasswell, H.D., Vlasic, I.A., Law and Public Order in Space, (New Haven and London, 1963), 323-349; Zhukov, G.P., "Delimitation of Outer Space", XXII, Colloquium, (1979), 221-223; Report of the Fifty-Eighth Conference of the I.L.A., (1978), 159-185; Jenks, C.W., Space Law, (London, 1965), 189 et seq.; Lachs, M., The Law of Outer Space, (Leiden, 1972); 55 et seq.; Report of the Fifth-Ninth Conference of the I.L.A., (1980), 168 et seq.

not create any particular problems. This was no doubt due to the fact that the two space powers were dominant in COPUOS and it was not in their interest to have boundaries which might restrict their freedom to get into space.[11] In UN General Assembly Resolution no. 2222 (XXI), the Outer Space Treaty was recommended to members for signature and ratification, and COPUOS requested to undertake study of the boundary problem. The Scientific and Technical Sub-Committee of COPUOS reported in 1967 that

> it is not possible at the present time to identify scientific or technical criteria which would permit a precise and lasting definition of outer space.[12]

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11. Cheng, _ibid._, 324.

12. _Official Records of the General Assembly_, 22nd Session, UN Doc. A/6804, Annex II, para. 36. A recent study on the physical bases for defining a boundary between air and outer space also concludes that "there in fact exist no physical bases which might be used as a sound and absolute reason for defining a boundary between air space and outer space... The notion of a 'boundary' is simply a humanly conceived constraint, possibly a matter of convenience or a means of controlling conflicting human objectives. The definition must therefore be sought in human terms. In terms of human experience this means that such a definition is an act of wilful desire, an arbitrary decision and the answer must be achieved through well-known processes of human decision-making in such cases. Such decisions may be achieved on social, cultural, economic, historial, and political grounds as an act of collective will, through negotiated agreement"; Mishra, S. and Pavlasek, T., _On the Lack of Physical Bases for Defining a Boundary Between Air Space and Outer Space_, Centre for Research of Air and Space Law, McGill University, Montreal, SSHRCC doc. No. 20 (1981), 23 (also published in VII, _A.A.S.L._, 1982, 399, at 412).

Thereafter, the Legal Sub-Committee commenced discussion of the issue in order to reach an agreement on an acceptable demarcation between air and outer space. It is still on the COPUOS agenda.[13] It is interesting to note that after the Bogota Declaration, in 1977, COPUOS added the "Questions Relating to the Geostationary Orbit" to its agenda item on "Matters Relating to the Definition and/or Delimitation of Outer Space and Outer Space Activities", and has since been dealing with these issues together.[14]

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13. See Report of the Legal Sub-Committee (of the COPUOS) on The Work of Its Twenty-First Session (February 1-19, 1982), UN Doc. A/AC.105/305, (February, 1982), 7 et seq.

14. Ibid. It is also noteworthy that the UN General Assembly in its resolution 36/35 of November 18, 1981 requested COPUOS to study matters relating to the definition and/or delimitation of outer space and outer space activities, bearing in mind, inter alia, questions relating to the geostationary orbit. Given the urgency of resolving these issues, the General Assembly wanted COPUOS to allow adequate time for more in-depth consideration of these questions. Pursuant to that resolution, the Legal Sub-Committee considered these matters, at its 1982 session. Some delagations (USSR, Colombia, Indonesia, Brazil, Chile, India, G.D.R., Romania, Spain, Mongalia, and Hungary) proposed the establishment of an informal working group but this view was not shared by others (US, Italy, UK and F.R.G.). Consequently, the working group was not established. For details, see UN Docs. A/AC.105/C.2/SR.372, (1982), 8-10; A/AC.105/C.2/SR.373, (1982), 4-7; A/AC.105/C.2/SR.374, (1982), 3; A/AC.105/C.2/SR.374, (1982), 2; and A/AC.105/C.2/SR.377, (1982), 4.

Two opposing schools of thought have emerged in this respect: the so-called functionalists and spatialists. Essentially, the functionalists maintain that, at least for the moment, there is no need to establish a boundary between air and outer space. Air space and outer space are an aerospace continuum and activities carried out in it should be governed by law according to their nature, i.e., aeronautical activities by aeronautical law and space activities by aerospace law.[15] On the other hand, spatialists stress the need for a clear demarcation between air and outer space, since their legal regimes are completely different i.e., in the air space above its territories and territorial waters, each country has "complete" and "exclusive" sovereignty,[16] while outer space is free for exploration and use by all states.[17]

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15. For a detailed discussion of the functional approach, see Matte, N.M., op. cit., supra note 10. See also statements of the delegates of the USA, the Netherlands, and Japan in UN Docs. A/AC.105/C.2/SR.377, (1982), 2 and 4; A/AC.105/C.2/SR.375 (1982), 3 and 4, and A/AC.105/C.2/SR.377 (1982), 6 respectively.

16. Article 1, International Civil Aviation Convention, signed at Chicago, 1944, 15, UNTS 296 (1948).

17. Article 1, The Outer Space Treaty of 1967, op. cit., supra note 2. It is generally recognized that the principle of freedom of outer space has in fact become an integral part of general international law independent of any treaty; see infra Chapter III.C.

According to spatialists, delimitation of outer space should be established, without delay

> to provide a clear area of application for existing outer space law and to facilitate further development of that law, to define the upper limit of State sovereignty, to safeguard the security of national air space, and to prevent disputes arising between states.[18]

If it is necessary to establish a boundary the question then arises as to what height should be fixed for this purpose and according to what criteria. Various proposals have been put forward, among them, gravitational effect, lowest possible perigee of a satellite, the von Karman line, the limit of air flight, the limit or end of the atmosphere, and arbitrary heights such as 100 km. from the equator or one-hundredth of the earth's radius (64 km.), etc.[19]

While there is no agreement on this question within COPUOS, a trend can be seen towards adoption of the

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18. UN Doc. A/AC.105/305 (February, 1982), 9. Cheng is also of the opinion that "the establishment of a precise legal framework, consonant with the basic principles of international law, for the future activities of states in outer space will, it is still believed, remove a source of potentially dangerous conflicts between states, and furthermore afford some safeguard of the rights and interests of non-space powers which otherwise are likely to be eroded by incipient customs based on the at present almost complete freedom of action of the space powers". Cheng, op. cit., supra note 10, 358.

19. Cheng, ibid., 324-325. See also Report of the Forty-Ninth Conference of the I.L.A., 1960, 264-265.

spatialist approach. Some states which originally belonged to the functionalist school have changed positions and now express a preference for delimitation. The outstanding examples are Belgium[20] and the USSR.[21] More important from the perspective of this study is the view held by the functionalists, who, while seeing no need for a precise boundary between air and outer space, still maintain that use of the geostationary

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20. UN. Doc. A/AC.105/C.1/L.76 of March 23, 1976. (A Working paper submitted by Belgium to the Scientific and Technical Sub-Committee of the COPUOS).

21. UN Doc. A/AC.105/C.2/L.121 ("Approach to the Solution of the Problems of the Delimitation of Air Space and Outer Space") submitted to the Legal Sub-Committee at its eighteenth session (1979) by the USSR delegation. This approach provides that "(1) The region above 100 (110) kilometers altitude from the sea level of the earth is outer space. (2) The boundary between air space and outer space shall be subject to agreement among states and shall subsequently be established by a treaty at an altitude not exceeding 100 (110) kilometers above sea level". The report of the Chairman of the Space Law Committee at the 58th ILA Conference also states that a "very great majority of States declared to favour a spatial approach toward solving the problem of defining the scope of applicability of space law" (infra note 22, 176). See also the statements of representatives of various States to the twenty-first session of the Legal Sub-Committee of the COPUOS, in UN Docs. A/AC.105/C.2/SR. 366 (1982), 2 (Mongolia), ibid., 3 (Czechoslovakia); A/AC.105/C.2/SR.368, (1982), 3 (Bulgaria); ibid., 6 (Viet Nam); A/AC.105/C.2/SR.369, (1982), 3 (India); A/AC.105/C.2/SR.372, (1982), 6 (Ecuador); A/AC.105/C.2/SR.373, (1982), 3 (India); ibid., 5 and 6 (USSR); ibid., 7 (Romania); A/AC.105/C.2/SR.375 (1982), 4 (Indonesia). It is interesting to note that all these States, except Indonesia, expressly declared preference for a 100 or 110 km. limit for the upward extent of sovereign air space, as proposed by the Soviet Union.

orbit constitutes an outer space activity which is governed by the principles and rules of aerospace law, including the Outer Space Treaty of 1967. Although there is no agreement among spatialists as to a precise boundary, the geostationary orbit is viewed as part of outer space. According to Cheng, by applying "the lowest perigee so far achieved by an unchallenged satellite" test,

> one can say that at 96 kilometres one is definitely in outer space... the 110 kilometre line should satisfy even the most sceptical. Above this height one is definitely in outer space, according to lex lata.[22]

The conclusion that the geostationary orbit is part of outer space is further supported by the following considerations:

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22. Cheng, B., op. cit., supra note 10, 356. See also Ogunbanwo, O.O., op. cit., supra, note 10, 58; Report of the Fifty-Eighth Conference of the I.L.A., (1978), at 2: "the space at and above the altitude of about 110 km. above sea level has been growingly acknowledged by states as well as by experts in the field of outer space activities as outer space", and ibid., at 170, according to Herczeg: "Over the last twenty years, states have tacitly consented to satellites with different perigees flying over their territory. This long-term conduct has formed the basis of a customary rule of international law". See also, McDougal, M.S., "The Emerging Customary Law of Space", 58 N.W.U.L. Rev. (1968), 618; Lay and Taubenfeld, op. cit., supra note 10, 73; Busak, J., op. cit., supra note 8, at 169; Gorove, S., "The Geo-stationary Orbit: Issues of Law and Policy", 73, A.J.I.L., 1979, 444, at 447. The definition of a space station (i.e. a radio 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", Radio Regulations, 1982, No. 61 also suggests a boundary between air and outer space and has already been agreed upon by ITU member countries.

1) All satellites (both in the geostationary and non-geostationary orbits) use the radio frequencies allocated to space services in the Radio Regulations. This implies that member states of the ITU (including states parties to the Bogota Declaration) recognize and accept the fact that all satellites are in outer space.

2) Both super powers consider the geostationary orbit to be part of outer space. The US along with other exponents of the functional approach, is of the opinion that

> at an altitude of approximately 35,000 Km. the GSO (geostationary satellite orbit) (is) clearly subject to the provisions in the 1967 Outer Space Treaty prohibiting any appropriation by claim of sovereignty and stipulating that outer space should be free for exploration and use by all States.[23]

The USSR which previously favoured the functional approach but is now an advocate of spatialism considers "the geostationary orbit situated at an altitude of

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23. UN. Doc. A/AC.105/C.2/SR.377, (1982), 2. See also, for similar statements made in the COPUOS by the representatives of other States, ibid., 6 (Japan); A/AC.105/C.2/SR.375, (1982), 2 (UK): A/AC.105/C.2/SR.373, (1982), 8 (Sweden); A/AC.105/PV.185, (1978), 11 (Czechoslovakia); A/AC.105/PV.182, (1978), 16 (F.R.G.); A/AC.105/PV. 180, (1978), 31 (Belgium); A/AC.105/PV.183, (1978), 32 (Italy); ibid., 74 (Bulgaria); A/AC.105/PV.180, (1978), 26 (US); A/AC.105/PV.182 (1978), 7 (UK); A/AC.105/252, (1979), 8 (Italy); ibid., 9 (Sweden); A/AC.105/C.2/SR.377, (1982), 2 (US); A/AC.105/C.2/SR.373, (1982), 4 (G.D.R.).

about 36,000 kilometres, ... obviously lays in outer space".[24]

3) The true purpose of the Bogota Declaration seems to have been to exert political pressure on the few developed countries which are monopolizing the geostationary orbit. This is clear from the Declaration itself which provides that:

> The solution proposed by the International Telecommunication Union and the relevant documents that attempt to achieve a better use of the geostationary orbit that shall prevent its imminent saturation, are at present impracticable and unfair and would considerably increase the exploitation costs of this resource especially for developing countries that do not have equal technological and financial resources as compared to industrialized countries, who enjoy an apparent monopoly in the exploitation and use of the geostationary synchronous orbit ... both the geostationary orbit and the frequencies have been used in a way that does not allow the equitable access of the developing countries... Therefore, it is imperative for the equatorial countries to exercise their sovereignty over the corresponding segments of the geostationary orbit.[25]

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24. UN. Doc. A/AC.105/C.2/SR.373, (1982), 5. The views of all states which favour the Soviet proposal are similar; see, supra, note 21.

25. Bogota Declaration, op. cit., supra note 3. It is interesting to note that although no formal claims have been made by the Canadian Government, the necessity for exclusive ownership of certain portions of the geostationary orbit was proposed for reasons similar to those specified in the Bogota Declaration, in a study on the Upper Atmosphere and Space Programs in Canada, by Chapman, J.H. et al, (Science Secretariat, Privy Council Office, Ottawa, February, 1967). This study, known as the Chapman Report, pointed out Canada's "Unique

According to Columbia's representative at the twenty-first session (1982) of the Legal Sub-Committee of COPUOS, the Bogota Declaration:

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geographical position" and "Canada's struggle to retain an independent identity while at the same time providing an acceptable standard of living for its people" (*ibid.*, 4). Since "the space available for locating synchronous communications satellites is limited, and Canada has a clear claim to a reasonable number of positions for domestic communications satellites", (*ibid.*, 111), the study recommended "that Canadian rights to station satellites in the synchronous orbit locations between 75°W and 115°W longitude be established by international agreement and taken up by occupation within a reasonable time" (*ibid.*, 112). This recommendation was mainly based on the study's view that "space law at the present time (*i.e.* 1967) would seem to permit Canada the right to lay claim to a piece of this sky (the geostationary orbit) as a location for satellites for Canada's particular needs...
Staked in the near future, it could be used to fullfil Canada's particular and distinctive requirements. Ownership of this property would give Canada due bargaining power in the evolution of an overall domestic satellite TV service for all North and South America. This territory should be treated as prudently as Canada's water resources. It should be shared, rented or sold only on terms that are good for Canada" (*ibid.*, 86).

> sought to ensure genuine benefits for the international community as a whole, through equitable utilization of the geostationary orbit in such a way as to take into account the needs and safeguard the rights and interests of the developing countries in the various regions of the world. It was for that reason that not only the equatorial countries, but the developing world as a whole, had been urging, with ever increasing emphasis, the need to update the 1967 Treaty. Only in that way could a more equitable, harmonious and consistent body of space law be established.[26]

The concerns expressed in the Declaration, with respect to saturation of the geostationary orbit and the urgent need for its more equitable use are also shared by other developing, as well as some developed, states.[27]

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26. UN Doc. A/AC.105/C.2/SR.366, (1982), 4. See also UN Doc. A/AC.105/C.2/SR.372, (1982), 6 and 7 (Ecuador).

27. For example, the delegate of India to the twenty-first session (1982) of the Legal Sub-Committee stated that:

    the geostationary orbit was a scarce resource that belonged to mankind as a whole and was being exploited by a few countries in possession of the necessary means to pre-empt orbit and frequency positions merely because of the present inequitable first-come, first-served method of allocation adopted by the International Telecommunication Union and its organs. The geostationary orbit should be allocated among nations on principles of equity and justice based on each country's terrain, population density, size and present and future needs. The allocation plan should also leave room for future developments, such as solar power satellites in the geostationary orbit:

    UN Doc. A/AC.105/C.2/SR.373, (1982), 4. See also ibid., (G.D.R.); A/AC.105/C.2/SR.362, (1982), 2 (Chile); A/AC.105/C.2/SR.373, (1982), 8 (Sweden); A/AC.105/C.2/SR.374, (1982), 3 (Spain); A/AC.105/C.2/SR.375, (1982), 3 (The Netherlands).

However, the assertion that the geostationary orbit is not part of outer space, and thus not governed by the 1967 Outer Space Treaty, is equally rejected by both.[28] Moreover, the questions of saturation and a more equitable regime of the geostationary orbit are unrelated to the question of whether the orbit is in outer space. Although the signatories of the Declaration still adhere to some of their original claims,[29] a change in attitude

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28. See UN Docs. A/AC.105/C.2/SR.369, (1982), 3 (India); A/AC.105/C.2/SR.373, (1982), 5 (USSR); ibid., 8, (Sweden); A/AC.105/C.2/SR.375, (1982), 2 (UK); A/AC.105/C.2/SR.377, (1982), 6 (Japan). See also supra notes 23 and 24.

29. Brazil, Colombia, Ecuador, and Indonesia consider that the issue of a definition/delimitation of outer space is tied together with the question of the geostationary orbit. See UN Docs. A/AC.105/C.2/SR.373, (1982), 2 (Brazil); A/AC.105/C.2/SR.372, (1982), 2 (Brazil); A/AC.105/C.2/SR.372, (1982), 2 (Indonesia); ibid., 4 (Colombia); ibid., 7 (Ecuador). Indonesia restated that there exists a special relationship between the geostationary orbit and the equatorial states. "The fact that placing a satellite over, say the South Pole would fail to produce the same effect as placing it over the equator meant precisely that a special physical relationship did exist. The argument that the geostationary orbit was the property of the earth as a whole might be true *in abstracto*, but, unfortunately perhaps, the earth's territory happened to be divided into sovereign states. The logical extension of the argument would be to say that the earth as a whole belonged equally to all states, something which was manifestly not the case"; UN Doc. A/AC.105/C.2/SR:377, (1982), 8.

is becoming apparent in the face of severe criticism. Ecuador, for example submitted that

> it would be useful to delimit outer space by setting the upper limit of air space at an altitude of about 100 Km.[30]

which implies that it does accept that the geostationary orbit is part of outer space. Indonesia, while expressing support of the 1976 Declaration, proclaimed itself

> prepared to cooperate with all delegates (attending the twenty-first session of the Legal Sub-Committee of COPUOS) in seeking to develop a sui generis legal regime which would promote co-operation and efficient and equitable use of the orbit for national and regional development.[31]

Colombia judged the Soviet proposal to limit air space to an altitude of 100-110 Km. to be "interesting".[32] It is, therefore, evident that there is implicit acceptance of the fact that the geostationary orbit is part of outer space. Hence it is difficult to agree with the assertion that the

> lack of definition of outer space in the Treaty of 1967... implies that Article II (which prohibits national appropriation of outer space) should not apply to the geostationary orbit.

It is submitted that consideration by COPUOS of the question of delimitation and the geostationary orbit

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30. See UN Doc. A/AC.105/C.2/SR.372, (1982), 6.

31. Ibid., 3.

32. Ibid.

together, is inappropriate since there is little doubt that the geostationary orbit is in outer space. Problems with respect to its limitations, saturation and equitable access should be dealt with as a separate item.[33]

B. Legal Status of Outer Space

Traditional international law, based on the principle of territorial sovereignty, determines the legal status of anything located beyond the national jurisdiction of states, according to concepts such as *res nullius* or *terra nullius*, *res communis* and *res communis omnium*.[34] Since it was generally recognized, before and immediately after the dawn of the space era, that state sovereignty does not extend upwards limitlessly, concepts such as *res nullius*, or *terra nullius* were not commonly used to describe the legal status of outer space, which was/is considered free.

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33. This view is opposed by the equatorial countries but shared by The Netherlands, Spain and Viet Nam; see UN Docs. A/AC.105/C.2/SR.375, (1982), 4; A/AC.105/C.2/SR.374, (1982), 3, and A/AC.105/C.2/SR.377, (1982), 6; and A/AC.105/C.2/SR.368, (1982), 7 respectively.

34. Brownlie, I., *Principles of Public International Law*, 2nd Edition, (Oxford, 1973), 179-181.

for use by all and incapable of appropriation.[35] However, the legal status of outer space has generally been equated with _res extra commercium_, _res communis_, or _res communis omnium_.[36] The question arises as to whether these terms are sufficient to provide a complete and lucid picture of the rights and obligations of states with respect to the use of outer space and especially the geostationary orbit. In this respect, the advice of Mr. Justice Frankfurter of the U.S. Supreme Court is worthy of note:

> One of the most treacherous tendencies in legal reasoning is the transfer of generalizations developed for one set of situations to seemingly analogous, yet essentially very different situations.[37]

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35. Wilfred Jenks thoroughly reviewed the space law literature published before and after 1957 up to 1965 and found that "the general theme that outer space and celestial bodies should be regarded as free for exploration and use by all States....and not subject to national appropriation, tends, though with varying degrees of emphasis and completeness, to run through them all": Jenks, _op. cit._, _supra_ note 10, 170.

36. Jenks, _ibid._, 98-99; Cheng, B., "The 1967 Space Treaty", 95, _Journal du droit international_, (1968), 532, at 564.

37. Frankfurter, J., in _Braniff Airways Inc._ v. _Nebraska, State Board of Equalization and Assessment et al._, (1954), 347 U.S. 590, at 603. It is equally interesting to note Lord Mansfield's warning that "there is nothing in law so misleading as a metaphor or an analogy" and Einstein's assertion that analogies have been "a source not only of the most fruitful theories, but also of the most misleading fallacies", cited in Lachs, _op. cit._, _supra_ note 10, 21.

It has also been pointed out by Manfred Lachs that:

> It is true that some of these definitions (concepts) have been accepted in other areas of international law. However, their application to outer space and celestial bodies is conditioned by a reply to a basic question: 'Is outer space with the celestial bodies a 'thing' - *res* within the meaning of the law?' It is this which raises serious doubts. The term itself has many meanings. Municipal law qualifies *res* in the context of its institutions - in particular of the real rights established. Though the notion has also been adopted by international law, one can hardly argue that outer space and celestial bodies, though physically later may be reminiscent of some parts of our globe, can be encompassed by this term. None of them being a *res*, they cannot in fact become *res extra commercium* or *communis*.[38]

To designate the legal status of outer space as *res communis* like the high seas[39] is even more doubt-

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38. Lachs, M., *ibid.*, 48. See also Lachs, M., "Some Reflections on the State of the Law of Outer Space", 9, *J.Space L.* (1981), 3, at 9.

39. Analogies are often drawn between the high seas and outer space and both are considered as *res communis* or *res extra commercium*, see Lay and Taubenfeld, *op. cit., supra* note 10, 56-58; *Report of the Forty-Ninth Conference* of the I.L.A., 1960, 247. In this regard, it is interesting to note Evensen's opinion, *i.e.* the "established concepts of international law are hardly adequate for the solution of the many problems of international law and international politics which have been created by the opening of space to human activities. These problems are vastly different and so entirely new in their many and complex facets that a too narrow and traditional approach based on the law of the sea, on traditional air law, on the traditional concepts connected with occupation of territories, etc., might hamper rather than

ful since:

1) There is a fundamental difference between the high seas and outer space from the viewpoint of their physical nature, i.e., "the sea has a definite and measurable surface; on the other hand, space is infinite - it is a vacuum and has no surface."[40] Sea is material substance, while space is non-material. Everything exists in space, but space itself is without an objective nature. The uses of outer space and the

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promote the development of a rational space law. ...What mankind must strive for in developing the international law of space is to avoid a repetition of the many and catastrophic blunders which have burdened traditional international law and international politics, based on the concept of nations and national sovereignty": Evensen, J., "Aspects of International Law Relating to Modern Radio Communications", 115 Recueil des cours, 1965, (II), 475, at 550.

40. Matte, op. cit., supra note 10, 49. "Unfortunately, the analogy (between high seas and outer space) is more romance than science. The sea, as relates to pertinent law, is a surface of two dimensions; space is a three dimensional volume within which man operates. Time itself contracts; gravity ceases. The shortest distance between two points is a curved line; navigation, as used on earth, is meaningless: Prevost, "Law of Outer Space - Summarized", 19, Clev. State Law Review, 1970, 595, at 601.

high seas are also substantially different.[41]

2) If one equates presently known or yet to be discovered islands on the high seas with the celestial bodies, there is a clear inconsistency between the legal regimes by which they are governed.

3) In the law of outer space, it is prohibited to place in orbit around the earth, "any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies or station such weapons in outer space in any other manner."[42] No such prohibition exists in the law of the sea.

4) The law of the high seas evolved in accordance with the realities of its time, while the law of outer space is of much more recent origin and is being developed according to the needs and realities of the present day world. However, the main difficulty in equating the legal regime of the high seas with that of outer space is of a more practical nature, *i.e.*, at

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41. Lay and Taubenfeld, *op. cit.*, *supra* note 10, 57. Goedhuis, D., in *Report of the Forty-Ninth Conference* of the I.L.A., 1960, 277.

42. The Outer Space Treaty of 1967, *op. cit.*, *supra* note 2, Article IV.

what stage or time should the law of the high seas be applicable to outer space.

The concept of _res communis_, if applied to each of these domaines could explain some aspects of the law applicable to both, but not the details of the legal rights and duties of states. There may be _certain similarities_ between the respective legal regimes/status but such similarities do not imply sameness _in toto_.[43] The development of a legal regime for one could also influence the development of an appropriate regime for the other, but each should be considered and interpreted independently and in the context of, or according to the respective issues involved.

The rights and duties of the states with respect to access to and use of the geostationary orbit must be considered primarily according to the law applicable to outer space, rather than in the light of abstract concepts and analogies applicable to other areas.

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43. Bridge, R.L., "International Law and Military Activities in Outer Space", 13(4), _Akron Law Review_, (Spring, 1980), 649, at 662: "The legal regime of high seas cannot be adopted _in toto_ in outer space". See also Aldrich, A., _Law for Outer Space_, (unpublished) doctoral thesis submitted to the School of Law, New York University, 1966, 107; Goedhuis, _op. cit._, _supra_ note 41.

> Outer space and celestial bodies are to be viewed as spheres of states' activities; as an environment subjected to a <u>special legal regime</u> and enjoying the particular protection of the law.[44]

Various outer space treaties,[45] together with certain other international agreements such as the 1973 ITU Convention applicable to outer space activities, make up this "special legal regime". The most important is, of course, the 1967 Outer Space Treaty which does not refer to concepts such as *res extra commercium* or *res communis*, but rather contains provisions which set out in precise fashion the legal status of outer space and the celestial bodies. These provisions can be found in

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44. Lachs, *op. cit.*, *supra* note 10 (emphasis added). See also UN Docs. A/AC.105/C.2/SR.373, (1982), 2 (Brazil); A/AC.105/C.2/SR.375, (1982), 2 (Hungary); A/AC.105/C.2/SR.377, (1982), 5 (France).

45. Treaty on Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, 1967 (610 *UNTS* 206); Agreement on the Rescue of Astronauts, Return of Astronauts and Return of Objects Launched into Outer Space, 1968 (672 *UNTS* 119); Convention on International Liability for Damage Caused by Space Objects, 1972 (24 *UST* 2389); Convention on Registration of Objects Launched into Outer Space, 1974 (UN General Assembly Resolution 3235 of 1974); and Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, 1979 (UN General Assembly Resolution 34/68 of December 14, 1979).

article I, and article II, which establish the general principles of international space law. Accordingly, the geostationary orbit - an integral part of outer space - is viewed as an international resource which is free for exploration and use by all states on a basis of equality, and is not subject to national appropriation.[46]

C. A Special Legal Status

The distinctive nature of the geostationary orbit is due to its unique advantages which may not be derived from the use of other orbits around the earth.[47] For

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46. For details, see *infra* Chapter III.

47. Dudakov, B.G., "International Legal Problems on the Use of the Geostationary Orbit", XIX, *Colloquium*, 1976, 406 at 409: "Because of the extraordinary features of the geostationary orbit, its legal regime needs special regulations". The geostationary satellite orbit "is a unique natural resource of vital importance to a variety of space applications": *Report of the Conference*, UNISPACE, UN Doc. A/CONF. 101/10, (1982), 69, para. 277. The Science Council of Canada, which recommended the establishment of a domestic telecommunication satellite system in 1967, stressed that "there is only one orbit for geo-stationary satellites, and in due course it could become overcrowded": see, Science Council of Canada, Report no. 1, *A Space Program for Canada*, July 1967, 28 (emphasis added). "The geostationary orbit (is) without any doubt a phenomenon of a complex and unique kind and offer(s) considerable advantages both for scientific purposes and for many applied uses of outer space": UN Doc. A/AC.105/C.2/SR.377, (1982), 6 (USSR). See also, Jasentuliyana, N., "Regulations Governing Space Telecommunication",

satellite telecommunications, the use of any other orbit would require "exceptional justification".[48] Similarly, it has been referred to as a "privileged portion of space".[49] The mere fact that it has been specifically declared a limited natural resource by article 33(2) of the ITU Convention,[50] is indicative of its special nature.[51]

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in Jasentuliyana, N. and Lee, R.S.K. (ed.), Manual on Space Law, Vol. I, (N.Y., 1979), 195, at 200; Armstrong, ibid.; UN Doc. A/AC.105/259 (January, 1980), 8; Soroos, M.S., "The Commons in the Sky: The Radio Spectrum and Geosynchronous Orbit as Issues in Global Policy", 36, International Organisation, (Summer, 1982), 665, at 667; Armstrong, C.A., "Present and Future Impact of Technical, Economic, and Organizational Aspects", X, Colloquium, 1967, 73, at 74; Estrade, S., "The Utilization of Space as a Source of Energy for the Earth", XXIII, Colloquium, 1975, 7, at 12-13; Von Kries, V., "The Legal Status of the Geostationary Orbit, Introductory Report", XVII, Colloquium, 1974, 27, at 29; Gehrig, J.J., "Geostationary Orbit - Technology and Law", XIX, Colloquium, 1976, 266, at 273. See also, supra Chapter I.

48. UN Doc. A/AC.105/50, (February, 1979), para. 3-1. See also A/AC.105/203 (August, 1977), 15.

49. UN Doc. A/AC.105/62, (June, 1979), 3-4.

50. For details, see infra Chapter IV.

51. Special legal status of the geostationary orbit could further be inferred from: (1) various Radio Regulations adopted to specifically regulate the use of the orbit and giving dominant status to geostationary satellites (e.g., see article 29 of the ITU Radio Regulations); and (2) from the fact that a special WARC is convened, to be held in two sessions in 1985 and 1987 to guarantee in practice equitable access to the geostationary orbit (in addition to the radio spectrum) by all countries (see Resolution 3 of the Radio Regulations, op.cit.). See also, Wiewiorowski, K., "Legal and Political Problems of the Geostationary Orbit", XXI, Colloquium, 1978, 34, at 39.

This fact has been almost universally recognized (<u>i.e.</u> by the 155 member countries of the ITU); hence, the need for an agreement to regulate its use in such a way that all countries may have access, and may thus derive the benefits offered by this limited natural resource - the province of all mankind.

CHAPTER III: THE UNITED NATIONS AND THE DIRECTIVE PRINCIPLES OF INTERNATIONAL SPACE LAW

As a part of outer space, the geostationary orbit is governed by the legal norms applicable to this new frontier (environment or medium). In the quarter century which has elapsed since the dawn of the space age, some fundamental principles of international space law have been elaborated through an international convention. Since these principles have become a part of customary international law, they are binding on all states as regards access to, and use of the geostationary orbit. In this Chapter, these general, but fundamental principles will be discussed; and, to better understand the rights and duties which they engender, attention will also briefly focus on the way in which they have emerged.

A. The Law-Making Process

The United Nations is the major forum for the formulation of international space law. Although not specifically provided in its Charter, the UN is generally considered to have the proper competence to consider legal issues arising from space activities. The UN is a centre for harmonising the actions of nations in the attainment of common ends.[1] The General Assembly - the supreme organ of the UN - initiates studies and makes recommendations for the purpose of promoting international cooperation in the political field and encouraging the progressive development of international law and its codification.[2] It has, "on behalf of the international community, undertaken the legislative function of elaborating certain principles and rules concerning space activities."[3] The General Assembly has assumed overall responsibility for all outer space matters, which it discharges primarily through its Committee on the Peaceful Uses of Outer Space (COPUOS). The predominance of the UN (COPUOS) has been affirmed by the recently held Second UN Conference on The Peaceful Uses of Outer Space (UNISPACE 82) which in its report stated that the "COPUOS, which is responsible to the General Assembly, will remain the only intergovernmental body exclusively concerned with all aspects of peaceful uses of outer space and all related activities in the United Nations system."[4]

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1. The Charter of the United Nations, Article 1(4).

2. Ibid., Article 13(1).

3. UNESCO, Meeting of Governmental Experts on International Arrangements in the Space Communications Field, (December, 1969), Doc. COM/SPACE/6, 10.

4. Report of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna, 9-12 August, 1982, UN Doc. A/CONF.101/10, 103.

The COPUOS was first established in 1958 as an *ad hoc* Committee with eighteen member states.[5] A year later it was re-established as a permanent body and its membership has since been increased periodically to the present number of fifty-three.[6] The COPUOS has two Sub-Committees: the Scientific and Technical Sub-Committee,[7] and the Legal Sub-Committee.[8] These Sub-Committees perform the functions related to their respective fields of expertise. The Legal Sub-Committee drafts treaties and agreements regarding outer space and presents them to the General Assembly. The General Assembly, in turn, adopts them as resolutions and recommends them for adherence and ratification by its member states. This is how all space treaties and

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5. UN General Assembly Resolution No. 1348(XIII), "Question of the Peaceful Uses of Outer Space", of December 13, 1958.

6. UN General Assembly Resolution No. 35/16 of November 3, 1980. See also UN Doc. A/AC.105/XXV/INF.1 of March 26, 1982.

7. For details about this Sub-Committee, see Carver, J.H., "The Scientific and Technical Sub-Committee of the United Nations Committee on the Peaceful Uses of Outer Space", 5 (1 and 2), *J. Space L.*, 1977, 17 *et seq*.

8. For details, see Jankowitsch, P., "Contributions of the United Nations Committee on the Peaceful Uses of Outer Space: An Overview", *ibid.*, 7 *et seq*.

agreements,[9] have been formulated. The Outer Space Treaty of 1967 - generally considered to be the Magna carta or the constitution of outer space[10] - is the most important instrument for the present discussion as it establishes the fundamental principles of international space law, some of which have been further elaborated in separate treaties and agreements. It was drafted by COPUOS and unanimously adopted by the General Assembly;[11] it entered into force on October 10, 1967. By January 31, 1982, 92 states had signed and 84 had ratified or acceded to it.[12] This is the most adhered to UN treaty on outer space.

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9. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space Including the Moon and Other Celestial Bodies, 1967 (hereinafter, the Outer Space Treaty); Agreement on the Rescue of Astronauts, the Return of Astronauts on the Return of Objects Launched into Outer Space, 1969; Convention on the International Liability for Damage Caused by Space Objects, 1972; Convention on Registration of Objects Launched into Outer Space, 1975 (The texts of these instruments are reprinted in Jasentuliyana, N. and Lee, R.S.K. (ed.), Manual on Space Law, 1979 Vol. II, 1-28), and Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, 1979 (UN Doc. A/RES.34/68 of 14 December 1979, Annex, hereinafter, The Moon Treaty).

10. Hyman, W.N., Magna Carta of Space (Amherst, 1966); Almond, H.H., "A Public Order in Outer Space for Peaceful Purposes: The Will of the World Community and the Constitutive Process", XXII, Colloquium, (1979), 83 et seq.; Dauses, M.A., "The Relative Autonomy of Space Law", XVIII, Colloquium, (1975), 75, at 77. See also infra note 56.

11. UN General Assembly Resolution No. 2222(XXI) of December 19, 1966.

12. 1(2), Space Journal, 1982, 9; Christol, C.Q., The Modern International Law of Outer Space, (N.Y., 1982), 912.

The membership of COPUOS is based on the principle of equitable representation of developed and developing countries, space powers and non-space powers as well as all the regions of the world. The decisions in COPUOS (as well as in its Sub-Committees) are taken on the basis of consensus. In 1962 it was informally agreed that "it will be the aim of all members of the Committee and its Sub-Committees to conduct the Committee's work in such a way that the Committee will be able to reach agreement in its work without need for voting."[13] Such a procedure ensured the participation of all member countries since each member became entitled to a veto power. "In practice, however, such power is accorded only to the United States and the Soviet Union. An attempt by a smaller country to have its proposals adopted will almost certainly be doomed to failure unless both super powers find them acceptable... The whole process of codification is largely geared to the desires of the Soviet Union and the United States."[14] This is evident

13. UN Docs. A/AC.105/SR.2, (1962) 5.

14. Vlasic, I.A., "The Relevance of International Law to Emerging Trends in the Law of Outer Space", in Falk, R.A. (ed.), The Future of the International Legal Order: Wealth and Resources, vol. 2, 1970, 315.

from the fact that COPUOS could not resolve issues such as a boundary between air and outer space, direct broadcast satellites, remote sensing of the earth's resources and the use of nuclear power sources in outer space, etc. which have been topics of discussion for some considerable time.[15] It took almost seven years to successfully draft, and adopt the 1979 Moon Treaty. Thus, there is no doubt that COPUOS has become stagnant primarily because of the consensus rule,[16] and that it is unable to respond effectively to the need for the progressive development of international space law at a time when outer space activities have become so extensive and so economically, politically and strategically complex. Revitalization of COPUOS is needed, and could, to a great extent, be achieved by altering the consensus rule.

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15. For details see, Vlasic *ibid.*, 315 *et seq.*; Warren, G., "A Canadian Perspective On Direct Broadcast Satellites and the New World Information and Communications Order", 8, *Syracuse Jl of Intern. L. & Com.*, 1981, 391 *et seq*.

16. The representative of Greece at the 1982 Session of the Legal Sub-Committee of COPUOS stated that, "despite strenuous efforts, the Sub-Committee was not advancing sufficiently rapidly towards its aim of reconciling conflicting national interests and formulating legal solutions"; UN Doc. A/AC.105/C.2/SR.369 (1982), 4. Nigeria, "shared the concern which had been expressed that the Legal Sub-Committee might be losing its credibility as a treaty-making body for the legal rules on the peaceful uses of outer space": UN Doc. A/AC.105/C.2/SR.377 (1982), 5. See also *ibid.*, 7 (USSR). France, on the other hand, expressed the relatively optimistic view that COPUOS had managed to elaborate legal principles on certain issues but admitted that "progress had sometimes been slow owing to the consensus rule", *ibid.*, 4.

The *de facto* hegemony of the super powers in COPUOS does not mean that other states have not played any part in the formulation of international space law.[17] However, their views could not prevail without the consent of the super powers as much as the super powers could not gain everything they wanted without the consent of other members of COPUOS. All the treaties and agreements which have been drafted and adopted within its framework, are therefore, the result of compromise and consensus. The Outer Space Treaty was negotiated in this way and accordingly established the principle that the exploration and use of outer space must be carried out in the common interest of all countries.

B. The Common Interest Principle

The principle of common interest was put forward as early as 1932, by Mandl, who asserted that a state's sovereignty over the air space above its territory did not extend to outer space;[18] and, in 1952, Oscar Schachter

17. See Jakhu, R.S., "Outer Space Activities and Law: A Third World Perspective", in *Padjadjaran*, (Bandung, November 1981), 63 *et seq.*; Christol, Q.C., "International Space Law and the Less Developed Countries", XIX, *Colloquium*, 1976, 243 *et seq.* See also *infra* note 88.

18. See generally, Reintanz, G., "Vladimir Mandl - Father of Space Law", XI, *Colloquium*, 1978, 263 *et seq.*; Kopal, V., "Vladimir Mandl - Founder of Space Law", XI, *Colloquium*, 1968, 357 *et seq.*

predicted that:

> outer space and the celestial bodies would be the common property of all mankind over which no nation would be permitted to exercise domination. A legal order would be developed on the principle of free and equal use.[19]

Several other international legal scholars, including air law experts, advocated that national sovereignty did not extend to outer space and that the latter be used for peaceful purposes to the benefit of all countries on the basis of freedom and equality.[20] To a great extent, their views influenced the international space law-makers.

In 1958, the UN General Assembly, in its first resolution specifically concerned with outer space, expressly recognized the principle of "the common interest of mankind in Outer Space."[21] Since freedom of exploration was taken for granted and generally recognized, the resolution contains no reference to such freedom and instead lays emphasis on "the common interest of mankind", "common aim that outer space should be used for peaceful purposes only", "benefit of mankind", "strengthening of

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19. Schachter, O., "Who Owns the Universe?", 1952, re-published in Space Law - A Symposium, U.S. Senate, 85th Congress, 2nd Session, 1959, Special Committee on Space and Astronautics, 8, at 17.

20. For a detailed analysis of their works, see Jenks, C. Wilfred; Space Law, (London, 1965), 95-181.

21. UN General Assembly Resolution 1348(XII) of 13 December 1958.

friendly relations among people", "international cooperation", etc. The General Assembly was also conscious that uncontrolled freedom (particularly since all countries are not equally developed economically and scientifically) could lead to the monopolization of outer space by a few countries, which was contrary to its desire "to promote energetically the fullest exploration and exploitation of outer space for the benefit of mankind." COPUOS was called upon to report any international cooperative programmes that could be undertaken for "the benefit of states irrespective ... of their economic or scientific development."[22] This provision, which implies the acceptance and recognition of the special interests and needs of the non-space powers was advocated by the developing countries. At the 1958 session of the General Assembly's First Committee, the U.A.R. delegate asserted that

> the new sources which might be provided by outer space should be used for the welfare of all mankind and that the interests of the under-developed countries should be recognized from the

22. Ibid.

> very beginning as a basic principle of the international regulation of space.[23]

The 1958 resolution initiated some of the basic principles of international space law which were later repeated, developed and clarified by the General Assembly in its unanimously adopted resolutions on outer space.[24] The dedication of outer space to all mankind[25] and the

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23. Official Records of the General Assembly, First Committee, Thirteenth Session, 16 September - 13 December 1958, United Nations (hereinafter, 1958 Official Records), 224, para. 17 (emphasis added). For similar observations, see, ibid., 225, para. 19 (Portugal); ibid., 226, para. 33 (Peru); ibid., 228, paras. 16 and 17 (Bolivia); ibid., 231-232, para. 6 (El Salvador); ibid., 235-236, paras. 14 and 16 (Mexico); ibid., 237, para. 26 (Czechslovakia); ibid., 238-239, para. 51 (Roumania).

24. UN General Assembly Resolutions, 1472(XIV) of 12 December 1959; 1721(XVI) of 20 December 1961; 1802(XVII) of 14 December 1963 ("Declaration on Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space"); 1963 (XVIII) of 13 December 1963.

25. See, generally, infra, note 26. In this regard, it is interesting to note the statement of the US delegate, Mr. Johnson, who at the Thirteenth Session (1958) of the General Assembly's First Committee, "emphasized that there were no differences within the United States Government, among its political parties or among the American people on the goal of dedicating outer space to peaceful purposes for the benefit of all mankind. Nor should there be any differences in the General Assembly in taking advantage of the unprecedented opportunity offered it...to ensure full, complete and immediate cooperation among all States." See supra, note 23, 208, para. 5.

protection of the interests of non-space powers[26] were often stressed during the discussion of these resolutions. The Preamble to the 1963 Declaration on Legal Principles Governing Outer Space[27] (third paragraph) expresses the belief that

> the exploration and use of outer space should be carried on for the betterment of mankind and for the benefit of states irrespective of their degree of economic or scientific development.

In the opinion of the Brazilian delegate, assistance in the training of space technicians from the developing

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26. See, generally, Official Records of the General Assembly, Sixteenth Session, First Committee, Summary Records of Meetings, 20 September 1961 - 15 February 1962, UN, New York, 1962 (hereinafter, 1962 Official Records), 245-270; Official Records of the General Assembly, Eighteenth Session, First Committee, Summary Records of Meetings, 17 September - 11 December 1963, UN, New York, 1965, (hereinafter, 1965 Official Records), 159-191.

27. See supra, note 24. Several delegates to the UN General Assembly, while discussing the 1963 Declaration, had declared that their governments would consider the Declaration legally binding if it were adopted unanimously (which, in fact, it was), see for example, 1965 Official Records, op. cit., 159, (US); ibid., 161, (USSR); ibid., 168, (India); ibid., 117, (Iraq); ibid., 184, (Iran); ibid., 189, (Canada). However, the delegate of France asserted differnetly, i.e. the resolution "could not be looked on as more than a statement of intention": ibid., 183. See, generally Lachs, M., "The Law-Making Process for Outer Space", in McWhinney, E. and Bradley, M.A. (ed.), New Frontiers in Space Law, (Leyden, 1969), 13 et seq.; Matte, N., Aerospace Law, (London, 1969), 106-107 and 274 et seq.

countries "would be a logical outgrowth of this principle."[28] He was not fully satisfied with the scope and extent of the declaration and held that

> in view of the importance of the principle involved, especially for the developing countries, the idea expressed in the third preambular paragraph properly belonged to paragraph 1 (operative part) of the declaration.[29]

Brazil thus played an active role in securing binding force for the principle during negotiation of the 1967 Outer Space Treaty, which in article I, paragraph 1, provides that

> The exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.

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28. 1965 Official Records, op. cit., supra note 26, 191. The delegate of the Soviet Union was also of the opinion that: "if the exploration of outer space was to benefit mankind, there must be the widest possible measure of cooperation, embracing even those who were unable to engage in independent space exploration": ibid., 168. See also ibid., 164, (Italy); ibid., 167, (India); ibid., 177, (Iraq); ibid., 182, (Czechoslovakia); ibid., 183, (Australia); ibid., 183, (Iran); ibid., 186, (Argentina); ibid., 189, (Canada); ibid., 190, (Nigeria); ibid., 170, (Pakistan).

29. Ibid., 190.

The legislative history of the Treaty clearly illustrates that to include this principle in the operative part, rather than to repeat it in the Preamble, was an intentional and concerted action. A proposal[30] to refer it to the Preamble was strongly rejected by the delegates of several countries.[31] Its adoption with treaty obligations was generally appreciated.[32] The Soviet delegate stated

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30. Krishna Rao of India "wondered whether ('the benefit and in the interests of all countries')...perhaps be transferred to the preamble, since it did not seem to lay down a legal obligation": UN Doc. A/AC. 105/C.2/SR.63, (1966), 7. However, after strong criticism (see infra, note 31) of his proposal, he later admitted that the arguments against it were "very convincing": UN Doc. A/AC.105/C.2/SR.65, (1966), 8-9.

31. See, for example, UN Docs. A/AC.105/C.2/SR.63, 9, (Brazil); A/AC.105/C.2/SR.64, 9, (USSR); A/AC.105/ C.2/SR.65, 8, (UAR).

32. See, for example, the comments of the Swedish delegate, in UN Doc. A/AC.105/C.2/SR.59, (1966), 4, who stated that the provisions of Article I, besides others, "were extremely important to all nations, whether space powers or not"; UN Doc. A/AC.105/C.2/SR.62, (1966), 2-3, (UAR); the Polish delegate, ibid., 7, asserted that: "Article I which stated the principle that the use of outer space and celestial bodies should be for the benefit of all countries,...sought to exclude all monopoly and discrimination in that field"; ibid., (Brazil); UN Doc. A/AC.105.C.2/SR.64, (1966), 6, (France); ibid., 9, (USSR); UN Doc. A/AC. 105/C.2/SR.70, (1966), 8, (Italy); ibid., 11 (UAR); ibid., 14, (Canada); UN Doc. A/AC.105/C.2/SR.71 and Add. 1, (21 October 1966), 22, (Hungary); ibid., 23, (Bulgaria). The delegate of the United Kingdom (UN Doc. A/AC.105/C.2/PR.71, 2) stated that "The states represented in this Sub-Committee have recorded their unanimous wish that a solemn treaty obligation should be created. This treaty obligation should

that not as "a mere statement of the rights of states" but "to guarantee that the interests, not only of individual states, but of all countries and of the international community as a whole, would be protected"[33]; and the US delegate held that

> The spirit of compromise shown by the space Powers and the other Powers had produced a treaty which established a fair balance between the interests and obligations of all concerned, including the countries which had as yet undertaken no space activities.[34]

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confirm with legal force that outer space including the moon and celestial bodies, ...should be free for exploration and use for the benefit and in the interests of all countries. We are indebted to the representative of Brazil for his urging which had led the Sub-Committee to underline that this must be for the benefit and in the interests of all countries, irrespective of the degree of their economic and scientific development"; UN Doc. A/AC.105/C.2/PR.71, 57, (Brazil); ibid., 78-80, (Bulgaria); infra., note 34, 437, (Roumania); ibid., 440, (Canada); ibid., 441, (Kenya); ibid., 442, (Pakistan). The delegate of the UAR, ibid., stated that "His delegation particularly appreciated the statement in Article I (which) gave a genuine assurance that all countries not at present engaged in space activities would be able to take part in the peaceful use of outer space"; ibid., 443-444, (Dahomey).

33. UN Doc. A/AC.105/C.2/SR.57, (1966), 12.

34. Official Records of the General Assembly, Twenty-First Session, First Committee, Summary Records of Meetings, 20 September - 17 December 1966, UN, New York, (hereinafter, 1966 Official Records), 427-428. (emphasis added). See also, Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies; Analysis and Background Data, Staff Report prepared for the use of the US Senate's Committee on Aeronautical and Space Sciences, March 1967, US Government Printing Office, Washington, 16.

The term "province of all mankind" used in article I, paragraph 1 of the Outer Space Treaty reinforces the common interest principle. It implies that outer space is within the domain and under the jurisdiction of all mankind as opposed to an individual or a group of states.[35]

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35. According to Argentina, the question of outer space is "one which affected all mankind and not merely the countries which had the technical means of exploring space": 1962 Official Records, op. cit., supra note 26, 251. The United Nations "should exercise the jurisdiction of the international community over space":
Peru, (ibid, 253-254);
Over the Outer Space "jurisdiction of the international community would prevail: The question of the use of Outer Space was clearly a matter of international concern":
Peru, in 1958 Official Records, op. cit., supra note 23, 226.
"Outer Space, which in a sense was the domain of all the peoples of the world, belonged to none of them individually":
Greece, (ibid, 228);
"The peaceful utilization of cosmic space was a matter that concerned all mankind. It was essential, therefore, that it should be studied in a manner acceptable to all governments and not to one group of Powers only":
Ukrainian SSR, (ibid, 238);
The French delegation expressed its appreciation of the fact that "the question of the peaceful use of outer space had been brought before the United Nations...in order to serve the welfare of mankind as a whole":
(ibid, 203);
"The United States recognized - as all men must - that the penetration into outer space was the concern of all mankind":
(ibid., 208);
Outer space "should be regarded as belonging in its entirety to the whole world and not be subject to various sovereignties":
Iran, (ibid, 215);
"The question of the peaceful use of outer space was not merely academic; States conducting programmes

To govern this province of mankind, it is natural that

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in the field of outer space should find common grounds for cooperation in the interests of all peoples:
Indonesia, (ibid., 216);
"By virtue of its very nature and of the fact that penetration into it had been brought about by the common efforts and progress of the whole of mankind, no less than by virtue of the fact that its abuse could be fatal to the whole world, outer space could only be regarded as res communis":
Yugoslavia, (ibid., 218);
"As the Canadian Prime Minister had stated in February 1958, outer space should belong to the world as a whole and jurisdiction over it should be vested in the United Nations":
Canada, (ibid., 220);
In 1958, Jenks suggested that: "Legislative authority over (space) activities might be regarded as vested in the General Assembly of the United Nations":
see Jenks, C. Wilfred, The Common Law of Mankind, (N.Y., 1958), 394 and 406;
"It should not be forgotten that activity in outer space and on celestial bodies concerned mankind and not a single state":
US (A/AC.105/C.2/SR.70, 7);
Outer space "is the domain of all mankind":
Bulgaria (A/AC.105/C.2/PR.71, 78-80);
With adoption of the Outer Space Treaty, "the international community had endowed (the) new subject of international law - mankind - with the vastest common property (res communis humanitatis) which the human mind could at present conceive of, namely, outer space itself, including the Moon and the other celestial bodies":
Argentina (A/AC.105/C.2/SR.75, 8);
The Outer Space "Treaty went beyond international law and the Charter, which regarded nations as independent sovereign agents, whereas the treaty saw mankind as a single entity":
Cyprus, 1966 Official Records, op. cit., supra note 34, 443.

space law should be elaborated by all concerned.[36] Undoubtedly, the Outer Space Treaty has been "shaped with the cooperation of the international community as a whole. That fact was all the more instructive since, in practice, outer space was being explored and utilized by only a very small number of states."[37] The common interest principle, as incorporated in the 1967 Treaty, protects not only the interests of the space powers but also those of non-space powers in legally binding terms.

Some commentators have alleged that the Outer "Space Treaty immerses the entire scene of outer space in the ethereal light of a lofty humanity."[38] It has been asserted that the provisions of Article I, paragraph 1 are of a "legally unsubstantial nature"[39] and do not create "rights

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36. UN Doc. A/AC.105/C.2/SR.62, (1966), 2-3. See also 1965 Official Records, op. cit., supra note 26, 176.

37. UN Doc. A/AC.105/C.2/SR.92, (1968), 23, (India).

38. Bueckling, A., "The Strategy of Semantics in the 'Mankind Provisions' of the Space Treaty", 7(1), J. Space L., (1979), 15, at 18.

39. Goedhuis, D., "Some Substantive and Procedural Issues Presently at Stake in Space Legislation", 25 ZLW (1976), 198, at 199; the writer also asserts that: "a strict interpretation of the benefit provision (Article I, paragraph 1), leads to a result which in the context of the Treaty as a whole can hardly be considered as anything else but absurd."

of a legal nature (though they) might give rise to a moral obligation."[40] In the writer's view, these interpretations are inaccurate.

The intentions of the authors of the Treaty could only have been to create a treaty obligation with binding force under internationdl law and not merely a statement of goals and good will.[41] In his testimony before the US Senate Committee on Foreign Relations, Ambassador Goldberg stated that the Outer Space Treaty was negotiated to create "firm treaty commitments which would be binding upon the particular parties involved."[42] It would be wrong to assume that Article I of the Treaty is not legally binding while other Articles of the same Treaty are. Senator Gore observed that "Article I is just as operable as Article IV or Article V..."[43] To interpret the Treaty otherwise or

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40. Cheng, B., "The 1967 Space Treaty", 95, Journal du droit international, 1968, 532, at 578.

41. Markoff, M.G., "The International Space Agency Project, the Bogota Declaration and the Common Interests Rule", XX, Colloquium, 1977, 29, at 34.

42. See "Statement of Hon. Arthur J. Goldberg, Ambassador to the United Nations", in Treaty on Outer Space, Hearings before the US Senate's Committee on Foreign Relations, 90th Congress, 1st Session, (March 7, 13 and April 12, 1967), G.P.O., Washington, 5, at 8-9.

43. Treaty on Outer Space, ibid., 33.

to allow a division of the Treaty into operative and non-operative parts goes against the purpose and object of the Treaty as mentioned in its Preamble and confirmed by its legislative history.

International law has generally been formulated to regulate developments which have already occurred. However, the opening up of outer space was anticipated and visualized long before the dawn of the space age in 1957. In order to avoid a laissez faire approach and to make space a battlefield for earthly rivalries, it was generally recognized that appropriate legal principles had to be adopted, in anticipation, to regulate the use of outer space for the benefit of mankind. Jenks believed that

> while it is healthy that the evolution of the law should follow rather than anticipate that of life, there are circumstances in which the possibility of developing the law on sound principles depends primarily on an initiative being taken in the matter before de facto situations have crystallized too far.[44]

States seem to have acted on Jenks' advice: The Philippine delegate to the UN observed that "the fundamental

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44. Jenks, C. Wilfred, The Common Law of Mankind, (New York, 1958), 384.

legal principles had been framed before it was too late."[45] These principles can only be interpreted as legally authoritative directives which should govern international relations in matters relating to outer space. Traditional international law "has been the legal justification a posteriori for international politics. It is the reverse of this relationship between law and politics regarding outer space."[46]

The general nature of the common interest principle may give rise to some problems of interpretation and application in the light of international politics. Individual states may, for example, interpret the provisions of the Outer Space Treaty differently to justify their exclusive interests. But the legal principles enunciated in the Treaty were intentionally drafted in general terms in order to regulate a field of activity

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45. See infra, note 47, 444. See also, a statement by the Iranian delegate at the time of adoption of the 1963 Declaration on Legal Principles Governing Outer Space Activities, 1965 Official Records, op. cit., supra note 26, 184. See ibid., 255, (Poland); 1958 Official Records, op. cit., supra note 20, 244, (UAR); ibid., 237, (Cambodia); ibid., 211 (Union of South Africa); ibid., 212, (Costa Rica); ibid., (Belgium); ibid., 216, (Indonesia); ibid., 218, (Yougoslavia); ibid., 220, (Canada).

46. Myers, D.S., "Political Considerations On Some Aspects of the Law of Outer Space", XVIII, Colloquium, 1976, 66, at 71.

which was still in its infancy and, for the most part, confined to research. As observed by the US delegate, the broad nature of the principles is due to the fact that

> The aim of the negotiators had not been to provide in detail for every contingency in the exploration and use of outer space but rather to establish a set of basic principles. That was why the provisions of the Treaty were purposely broad.[47]

They are nonetheless fundamental in directing and restricting the freedom of action of individual states.[48] Any interpretation of the Outer Space Treaty which goes against its intent, purpose and objective should be

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47. 1966 Official Records, op. cit., supra note 36, 428.

48. The Soviet delegate (ibid., 429), while enumerating the efforts made by the Soviet Union "to bring about an international treaty which would define the principles governing activities in outer space and would be binding on all states", noted that "the basic principles concerning the definition of the important legal norms governing activities in outer space...(have been)...incorporated in the text of the Treaty." He further expressed that: "It was essential to conclude a treaty governing activities in outer space. ...the number of states engaged in the exploration of outer space was constantly increasing. It was therefore more and more necessary to determine in what direction and on what basis the activities of states in the field would be conducted whether those states were space Powers or non-Space Powers." See also, similar statements by Canada, ibid., 440; ibid., 440, (Belgium);

considered void.[49] Moreover, all of its provisions, including the common interest principle,

> can hardly be regarded as nominal or devoid of substantive meaning. Nor could the rights arising out of them be viewed as imperfect, for they have become vincula juris; thus it can hardly be suggested that they were not intended to become effective.[50]

Specific rules to define, clarify, develop and elaborate the principles enunciated in the Treaty have been formulated in various other agreements and continue to be formulated by the UN and its specialized agencies.[51]

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49. Article 31(1) of the Vienna Convention on the Law of Treaty, (printed in 63, A.J.I.L., 1969, 875 et seq.) provides that a "treaty shall be interpreted in good faith in accordance with the ordinary meaning to be given to the terms of the Treaty in their context and in the light of its object and purpose."

50. Lachs, M., The Law of Outer Space: An Experience in Contemporary Law-Making, (Leyden, 1972), 117. In a similar vein, Tanaka observes that the "lack of definition of Human Rights and Fundamental Freedoms in the Charter and in later legislation and the absence of juridical mechanisms for enforcing them do not constitute a reason for denying their existence or the need for their legal protection. That a norm is lex imperfecta does not deprive it of its legal character": Tanaka, K., "Transnational Law in A Changing Society", in Observations on Peace, Law and Human Rights, Essays in Honour of Phillip Jessup, (N.Y. and London, 1972), 250 (emphasis added).

51. See supra, note 9. See also INTELSAT, INTERSPUTNIK and INMARSAT Agreements of 1971, 1973 and 1976 respectively (see Jasentuliyana, op. cit., supra note 9, 159-264 and 291-344). International Telecommunication Convention, 1973 especially Articles 4, 10 and 33 and the 1982 Radio Regulations, (forming part of the Convention and concerning space activities), Appendix 30.

"(N)othing has been said in the Treaty (as to) who is going to determine whether or not a particular use of space is, in a given case, for the benefit of all countries."[52] This does not imply, however, that the provisions of Article I, paragraph 1, are of 'a legally unsubstantial nature'. International space law is a product of international cooperation whereby states undertake legal obligations to respect each others' rights. Each state is entitled to judge the actions of the others and a state whose rights and interests have been, or are likely to be infringed upon, may, individually, or in association with others, seek the condemnation of the actions of the violating state(s) in various international fora. The United Nations undoubtedly falls into this latter category.[53] Since 1976, the geostationary

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52. See *supra* note 39.

53. This is not only because the Outer Space Treaty was negotiated through the UN but also because the UN Charter "definitely is the first international treaty which issued the principle, universally known and accepted nowadays, according to which the community of nations has the right to discuss and judge the behaviour of its members on an international plan": Gilles Gregoire, "United Nations", a lecture delivered at Sainte-Justine Hospital on October 21, 1980, in *Newsletter*, United Nations Association, Montreal Branch, November 1980, 1 (Memo).

orbit has been a point of discussion[54] as some members of the UN feel that their right to use and exploit this natural resource is being violated. They have proposed that a special agreement or treaty be negotiated to further clarify the rights and duties of states in this respect.

It can therefore be clearly established that the common interest principle is of a legally binding nature[55] and operates in predominantly obligatory fashion.[56]

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54. See supra, Chapter II.

55. For further discussions see, generally, "Importance of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space Including the Moon and Other Celestial Bodies for the Development of International Cooperation in the Practical Application of Space Technology", UN Doc. A/AC.105/219, (1978); Matte, N.M., Aerospace Law: Tele-Communications Satellites, (Toronto, 1982), at 77-78: "A closer perusal of the provision (i.e., Article I, paragraph 1 of the Outer Space Treaty), however, leads to the conclusion that it is legally binding. If it were to be a mere non-binding principle, the mention of the 'common interest' in the Preamble to the Treaty would have been sufficient". Markoff, M.G., "Implementing the Contractual Obligation of Article I, para. 1 of the Outer Space Treaty 1967", 13 Diritto Aereo, 1974, 153 et seq. (also printed in XVII, Colloquium, 1974, 136 et seq.); Gorove, S., "Energy from Space: An Imperative for International Cooperation", 9 J. Space L., 1981, 41 at 44; Dauses, M.A., "The Relative Autonomy of Space Law", XVIII, Colloquium, 1976, 75, at 79; Markoff, op.cit., supra note 41, 29 et seq.; Okolie, C.C., "Space Law and Energy Relationship with the Outer Space Station: A Question of International Heritage of Mankind", XIX, Colloquium, 1976, 135 et seq.

56. "The (Outer Space) Treaty stands out by its predominating emphasis on the interest for the international community as a whole in the research and the use of outer space and also on the necessity for international cooperation", UN Doc. A/AC.105/210, (1978), 15, (Netherlands). The "principles of international space law, which are particular aspects of the general principles of international

law, simultaneously serve as basic principles of that branch of the law and...constitute a criterion for the legality of all special norms of international space law. A state is entitled to conclude any international agreement relating to activities for the exploration and conquest of outer space for peaceful purposes. However, such an agreement must not conflict with the basic principles and norms of international space law, in other words, with its main source, the 1967 Outer Space Treaty", ibid., 20, (USSR). See also, UN Doc. A/AC.105/219/ Add. 2, (1978), 2, (Canada); Lachs, M., "The Law-Making Process for Outer Space", op. cit., supra note 27, 27. According to Dauses, "(t)he guiding principle of common interest of all mankind (bonum commune humanitatis)...raises space law to a new, higher level of international relations. As it has been rightly stated, for the first time in legal history, international law imposes on states the obligation and uses of a newly opened-up space area for the benefit and in the interests of all states...According to its contractual nature, it has binding effect even if it is, as a generic and, hence, implemetable princople, not self-executory in itself": Dauses, op. cit., supra note 55, at 79. See also Gorove, S., "Limitations on the Principle of Freedom of Exploration and Use in the Outer Space Treaty: Benefits and Interests", XIII, Colloquium, 1970, 74, at 78; Cocca, A.A., "The Advances in International Law through the Law of Outer Space", 9 (1 and 2), J. Space L., 1981, 13, at 18. Writing in 1963, McDougal, Laswell and Vlasic concluded that the "recognition of the common interest of all peoples in achieving the most efficient exploiration, with the optimal production and widest distribution of values, has resulted in a...consensus establishing inclusive use and competence. This consensus has been expressed in the practice of states and is supported by an important United Nations resolution": McDougal, M.S., et al., Law and Public Order in Space, (New Haven, 1963), 802-803. "The Outer Space Treaty necessarily prohibits the converse of inclusive control": Rothblatt, M.A., "International Legal Norms Governing Development of the Orbit/Spectrum Resource", Telecommunications Policy, June 1981, 63, at 70-71. From the beginning of the conquest of outer space, "efforts were made to arrive at a legal system under which the common interest would take precedence over any national interest. These efforts led to the acceptance are a natural derivation and extension of this principle. It is their source as well as the controlling authority.[57]

in the (Outer Space) Treaty" of the provisions incorporated in its Article I, paragraph 1: Report of the Fifty-Fourth Conference, of the I.L.A., 1970, 426. Goedhuis holds that "states cannot ignore the obligation founded on the common and real intention of the (1967) Space Treaty, namely that apart from the specific national interest, there are the interests both of other states and the common interest which needs to be taken into account": Goedhuis, D., "Some Legal Aspects of the Use of Communication Satellites", XVII, Colloquium, 1974, 53, at 57; see also Report of the Fifty-Sixth Conference of the I.L.A., 1975, 483. Jessup and Taubenfeld, in 1959, observed that "(s)teadily the trend on the face of the earth has been towards organized multinational action in common interest. There will be no reversal of that trend as man moves on into outer space": Jessup, P.C., and Taubenfeld, H.J., Controls for Outer Space, (N.Y., 1959), 282. See also Kopal, V., "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies", at 481; Csabafi, I.A., The Concept of State Jurisdiction in International Space Law, (The Hague, 1971), 116: The "fundamental principles" incorporated in Article I of the Outer Space Treaty, "ipso jure determine the limits and patterns of the exercise of state jurisdiction in outer space. As a general rule, it should be pointed out here that state jurisdiction may not be exercised in an abusive manner, which would lead to the creation of monopoly positions by certain states, vis-à-vis the international community"; see also ibid., 47.

57. Jenks, commenting on the 1963 Declaration of Legal Principles Governing the Activities of States on the Moon and in Outer Space, holds that while the principle of common interest of mankind in space "in itself so general as to lack any clearly defined content, it is important precisely because it is so general. The more specific principles enumerated in the Declaration itself derive from it; freedom of exploration and use on a basis of equality, the impossibility of national appropriation, ...the principles of cooperation and mutual assistance, and the duty to avoid harmful interference with the space activities of others are all natural deductions from the recognition that space is a common interest of mankind. But the scope and vitality of the general principle are not exhausted by the specific applications of it embodied in the later paragraphs of the Declaration:

The predominant nature of the common interest principle and its authority over the principle of freedom[58] suggest that in space law the 'general presumption in favour of freedom of action' does not hold true. This principle of general presumption is based on concepts of total independence and absolute sovereignty of states. In 1927, the Permanent Court of International Justice in the Lotus case,[59] declared that 'restrictions upon the independence of states cannot be presumed'. In other words, 'whatever is not prohibited is allowed' is a rule of international law which, according to some, also applies to the exploration and use of outer space.[60] This position is difficult to

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Jenks, C.W., Space Law, (London, 1965), 193. Since the Outer Space Treaty incorporated all the provisions of the 1963 Declaration, these comments are equally true of the common interest principle as incorporated in the Outer Space Treaty. Moreover, the Treaty gave this principle unambiguous legal authority.

58. See infra, Chapter III, C.

59. P.C.I.J., Series A, No. 10 (1977). This case involved a controversy over the applicability of Turkish criminal law to the crew of a French ship, Lotus, whose negligence caused the sinking of a Turkish ship and the loss of eight Turkish nationals. The Court was asked to rule on the question whether Turkey acted in accordance with principles of international law in prosecuting the crew of the Lotus.

60. Böckstiegel, K.-H., "Legal Implications of Commercial Space Activities", XXIV, Colloquium, 1981, 1 at 9; Bridge, R.L., "International Law and Military Activities in Outer Space", 13(4), Akron Law Review, 1980, 649 at 664; Goedhuis, D., "Efforts to Prevent Military Escalation in Space", 10(1), J. Space L., 1982, 25.

accept for the following reasons:

1. The Lotus case was decided with the President's casting vote, since the Court was divided equally. In fact, its opinion on the presumption in favour of sovereignty or freedom of action was "voluntaristic sentence"[61] (obiter dicta), not necessarily indispensable for the determination of the real issue of controversy. Both of its opinions, i.e. on the obiter dicata as well as the real issue, were extensively criticized in later years.[62] For example, the Premanent Court's "emphasis on state discretion[63] is contradicted by the views of the International Court in the Fisheries and Nottebohm cases,

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61. Markoff, op. cit., supra note 55, at 154. See also, Larson, op. cit., infra, note 64.

62. Columbus, C.J., The International Law of the Sea, (N.Y., 1962), 262-263; Starke, J.G., An Introduction to International Law, (London, 1972), 43, fn. 4 and 281-282; McDougal, et al, op. cit., supra note 56, 699, fn. 150; von Glahn, G., Law Among Nations, (London, 1976, 249-250; Brownlie, I., Principles of Public International Law, (Oxford, 1973), 250 and 295, fn. 6.

63. On the question of jurisdictional discretion or sovereign freedom of action, the Permanent Court in the Lotus case opined that: "Far from laying down a general prohibition to the effect that States may not extend the application of their laws and the jurisdiction of their courts to persons, property or acts outside their territory, it leaves them in this respect a wide measure of discretion which is only limited in certain cases by prohibitive rules; as regards other cases, every state remains free to adopt the principles which it regards as best and most suitable." (cf. Brownlie, ibid., 205).

which concerned the comparable competences of states, respectively, to delimit the territorial sea and to confer nationality on individuals."[64] The opinion of the Court on the real issue (*i.e.*, applicability of penal laws to a ship of a state other than those of the state whose flag that ship carries), is negated by subsequent international law conventions; *e.g.*, a diplomatic conference meeting at Brussels in 1952, disagreeing with the *Lotus* decision, drafted the International Convention for the Unification of Certain Rules relating to Penal Jurisdiction in Matters of Collision and other Incidents of Navigation which was signed on May 10, 1952. Article 11 of the 1958 Convention on the High Seas as well as Article 27 of the recently concluded Convention on the Law of the Sea[65] contain provisions with respect to the

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64. Brownlie, *ibid*. Larson, after an extensive discussion of the decisions of international tribunals reaches the conclusion that "there remains little force in the frequently quoted dictum in the *S.S. Lotus* case that rules of law binding upon the states emanate from their own free will": see Larson, A., "Decisions of Tribunals", in Jenks, C.W. and Larson, A. (ed.), *Sovereignty Within the Law*, (London, 1965), 375, at 405.

65. *United Nations Convention on the Law of the Sea*, *UN Doc. A/CONF.62/122*, (1982).

exclusive criminal jurisdiction over a ship of the flag state - a rule contrary to that in the Lotus case.

2. International law, like any other law, is not static but dynamic[66] and has evolved from the law of co-existence to the law of cooperation.[67] In fact, the world is no longer composed of sovereign states but has become an international community[68] and "we are witnessing the growth of a world community."[69] Since the "effective authority of any legal system depends upon the common underlying interests of the participants in the system and their recognition of such common interests",[70] the law of this growing community is

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66. Kunz, J.L., "The Law of Nations, Static and Dynamic", 27, A.J.I.L., 1933, 630 et seq.

67. Friedmann, W., "The Changing Dimensions of International Law", 62, Columbia Law Review, 1962, 1147 et seq..

68. For details, see Mosler, H., The International Society as a Legal Community, (Alphen a/d Rijn, 1980); Schiffer, W., The Legal Community of Mankind (N.Y., 1954); Jenks, C.W., A New World of Law?, (London, 1969), 219-270; Anand, R.P., "The Development of a Universal International Law", in Lepowsky, A., et al. (ed.), The Search for World Order, (N.Y., 1971), 157 at 177.

69. Falk, R.A., "The Trend Toward World Community: An Inventory of Issues", in The Search for World Order, ibid., 353, at 366.

70. Gandhi, I., in The Report of the Fifty-Sixth Conference of the I.L.A. held at New Delhi, December 29, 1974 to January 4, 1975, 15.

evolving to become the Common Law of Mankind.[71] The Covenants of the League of Nations and the Charter of the United Nations have played an effective part in the development of current international law, which is based primarily on interdependence and international cooperation rather than merely strict observation of state sovereignty and independence.[72] "The traditional system of international law", observes Friedmann, "regulates the rules of co-existence between sovereign states. It is essentially a collection of 'don'ts' (prohibitions).[73] On the other hand, the "developing 'cooperative' law of nations...bind(s) the nations, not in the traditional rules of abstention and respect, but in positive principles of cooperation for common interests."[74] This difference in traditional and contemporary international law is caused mainly because of the indispensable

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71. See Jenks, C.W., The Common Law of Mankind, (London, 1958).

72. Matte, N.M., Le droit international nouveau, (Paris, 1948), 155 et seq., and - De la mer territoriale à l'air territorial, (Paris, 1965), 231 et seq.

73. Friedmann, W., "National Sovereignty, International Cooperation and the Reality of International Law", 10, UCLA Law Review, (1963), 739, at 744.

74. Ibid.

interdependence of states which can no longer afford to remain totally independent. Peremptory norms of international law (jus cogens)[75] undoubtedly limit the freedom of action of states. In other words, contemporary international law, not only comprises traditional "prohibitions" but, overwhelmingly, positive, declaratory rights and duties of states to serve the common interests of the world community. Interdependence, not sovereignty, thus seems to be the determinant factor in contemporary international law.

3. International space law - a part of contemporary international law - is not based on the unrestricted freedom of action or sovereignty of states but on international cooperation. Hence, the rule of presumption in favour of sovereignty has no place in international space law. The prohibition of appropriation of outer space by any means whatsoever has not only been recognized as conventional but also as customary international law,[76] and the predominant effect of the common

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75. See article 53 of the 1969 Vienna Convention on the Law of Treaties, op.cit., supra note 49. For details, see Sztucki, J., Jus Cogens and the Vienna Convention on the Law of Treaties: A Critical Appraisal, (N.Y., 1974); Rozakis, C.L., The Concept of Jus Cogens in the Law of Treaties, (N.Y., 1976).

76. See infra, Chapter III D.

interest principle renders the presumption in favour of sovereignty inapplicable. Above all, this principle - as a part of general international law - has become invalid with the application of special legal principles and rules specifically designed to govern the exploration and use of outer space, i.e., lex specialis derogat generali, "except where general principle is clearly stipulated to have an overriding effect."[77]

An increasing number of space law experts and publicists deny the application of the Lotus case principle to outer space. For example, Lachs holds that "(t)he old principle that everything not prohibited is permitted is not valid today. The freedom of action is determined by the possibility of infringing upon the rights of others. Hence the limitation of rights and the need for cooperation and consultation in all cases where a state may by its activity affect the rights of others. This is of particular importance in regard to outer space."[78]

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77. Starke, op. cit., supra note 62, 449.

78. Cf. Vereshchetin, V.S., "Against Arbitrary Interpretation of Some Important Provisions of International Space Law", XXV, Colloquium, 1982 (memo.).

Similarly, Markoff states that "(l)ack of prohibition does not mean under contemporary international law, authorization or permission. Claiming that a given activity which has not been expressly prohibited, should be recognized as a permissible one, gets back international law with a half a century."[79] Vlasic, discussing the increasing militarization of outer space, similarly concludes that the "(m)ajor space powers have demonstrably been acting on the premise that whatever is not prohibited _verbis expressis_ by the (Outer Space) Treaty is permissible, and therefore lawful. While the document as a whole does not permit such an interpretation."[80]

The inapplicability of the principle of "whatever is not prohibited is allowed" to outer space, does not mean that all activities with respect to its exploration and use should be presumed to be prohibited until allowed or permitted. It simply means that all outer space activities must be carried out in such a way as not to conflict with the common interest principle, _i.e._ the

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79. Markoff, _op. cit._, _supra_ note 55, 154.

80. Vlasic, I.A., "Disarmament Decade, Outer Space and International Law", 26(2) _McGill Law Journal_, 1981, 135, at 171.

interests and rights of other states. All states are free to conduct outer space activities as long as, or to such an extent that, they do not violate the principles and rules (both prohibitive or declaratory) of international space law. As early as 1962, Christol wrote that "(t)he Lotus Case does not constitute a precedent in favour of unrestricted national uses and activities in outer space."[81] He further stated that "a state may engage in reasonable conduct until inhibited by clearly established principles and rules of international law."[82] This thesis holds good even today. It is, in fact, strengthened by the provisions of the Treaty. "The contest between permissible and non-permissible conduct" according to Christol, "must be resolved in a structured space law regime by the concept of reasonableness... (This concept) doctrine is based upon reciprocal benefits and on a generalized on-going mutuality of interest. Reasonableness emphasizes the essential values of a world community of interests, and when conditioned by acceptable tolerances provides the basis for effective and cooperative international relations."[83] The doctrine of reasonableness, as perceived by Christol, is undoubtedly incorporated in

81. Christol, C.Q., The International Law of Outer Space, (Washington, 1962), 267.

82. Ibid., 268.

83. Ibid.

the Outer Space Treaty, since it stresses the common interest of mankind in the exploration and use of outer space and the fact that such activities must be conducted "in the interest of maintaining international peace and security and promoting international cooperation and understanding."[84]

The predominant nature of the common interest principle also implies that exploration and use of outer space must be in some way beneficial to mankind. This does not, however, imply that all outer space activities must be undertaken <u>only</u> if they are <u>exclusively</u> beneficial to all mankind. It simply means that benefits derived from the exploration and use of outer space, including the geostationary orbit, must be distributed equitably. Interpreting article I, paragraph 1 of the Outer Space Treaty, Matte holds that "it adopts a global viewpoint by providing that interests of all countries are to be taken into account regardless of their degree of economic or scientific development"[85]; and, that "(c)onsequently, there is a basic obligation that falls upon states carrying out space activities to be responsive to the interests

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84. The 1967 Outer Space Treaty, Article III.

85. Matte, <u>op. cit.</u>, <u>supra</u> note 55, 77.

of developing countries and to provide for some method of distributing the benefits derived from such activities. The ways and means in which this cooperation will be achieved is a matter for agreement between the states concerned."[86]

The object and purpose of the Outer Space Treaty is clearly expressed in its Preamble, and is reinforced and authenticated by the provisions of Article I, paragraph 1. The term "benefit" generally means advantage, or anything contributing to improvement, while the "plural term 'interests' seems to indicate that more may be involved than just the vague, general 'interest' of all countries. In a sense the plural phrase may perhaps be regarded as a victory for the less developed countries which entertained strong hopes of receiving benefits from man's exploration and use of outer space."[87] Such terms were included in the operative part of the Treaty on the insistence of developing countries which, in light of this principle, perceived themselves to be the recipients

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86. Ibid., 78.

87. Gorove, S., Studies in Space Law: Its Challenges and Prospects, (Leyden, 1977), 47.

of the benefits, including the transfer of technology.[88] It is interesting to note that these provisions are equated - and rightly so - with the principle of the Common Heritage of Mankind (CHM).[89]

The CHM principle, generally attributed to the Maltese Ambassador Pardo in the context of the Law of the Sea, in fact originated in the context of outer space activities. Schachter, as early as 1951, stated that

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88. See supra note 28. Paul Dembling, discussing the negotiating history of the Outer Space Treaty, noted that the "Treaty provides that the benefits of the exploration and use of outer space, including the moon and other celestial bodies, shall accrue to all countries, 'irrespective of their degree of economic or scientific development'. The implied reference to the developing countries appeared initially in the Preamble to the Soviet draft. However, the delegations from those countries took the position that such language should be included as a part of the binding treaty commitment, and it was ultimately agreed that such language should be included in the Treaty": Dembling, P.G., "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space Including the Moon and Other Celestial Bodies", in Manual on Space Law, op. cit., supra note 9, 1, at 10. The analysis of Article I, para. 1, of the Outer Space Treaty in the Staff Report, also holds that "(i)nstead of space activities being regarded as a monopoly of those nations able to afford the expense of launching satellites, all nations are to share in the benefits of space" activities: Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, op.cit. supra, note 34, 22.

89. Matte, op.cit., supra note 55, 77-78.

> (T)he 'universe' (that is, the region of outer space and celestial bodies) belongs to all of us, it is part of the common heritage of mankind and therefore should not be subject to dominion by any particular national state.[90]

Lachs, who was Chairman of COPUOS at the time the Outer Space Treaty was drafted and adopted, observed that the principle of the common heritage of mankind "itself, while now applied in regard to outer space, to the resources of the moon, to the ocean floor and seabed, may expand further; in particular in the context of a new international economic order certain resources may become the common heritage of mankind in order to make the distribution of wealth more equitable. It is interesting to record that the institution and the term originated in the first treaty for outer space", *i.e.*, the 1967 Outer Space Treaty.[91] Though the CHM

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90. Schachter, O., "A Preview of Space Law Problems Warning: Early Unilateral Position", in (US) Senate Doc. 26, *Legal Problems of Space Exploration*, (Washington, 1961), 345.

91. Lachs, M., "Some Reflections on the State of Law of Outer Space", 9, *J. Space L.*, 1981, 3, at 9. Similarly, Ambassador Cocca of Argentina, states that "the idea of a common heritage of mankind is basic to the law of space and space activities and it was from that principle - the law of space - that the new law of the seabed was derived, and not vice versa": UN Doc. A/AC.105/PV.113 (1972), 51; see also Cocca, A.A., "The Advances in International Law Through the Law of Outer Space", *J. Space L.*, *ibid.*, 13, at 15.

principle is specifically mentioned in the 1982 Convention on the Law of the Sea and the 1979 Moon Treaty only, various member states of COPUOS repeatedly assert that outer space as a whole (not only the moon and other celestial bodies) is a common heritage of mankind,[92] a view which is also shared by some legal commentators.[93]

The CHM principle implies the equitable sharing of benefits derived from the exploitation of the natural resources of the seabed, the moon, other celestial bodies, and outer space. "A resource subject to the ownership of the international community such as the deep sea and outer space is said to be 'the common heritage of mankind'. It is assumed that all states are entitled to participate in decisions regarding its use and to

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92. See, for example, UN Docs. A/AC.105/C.2/SR.373 (1982), 7 (Romania); A/AC.105/C.2/SR.362 (1982), 2 (Chile); A/AC.105/PV.235 (1982), 8 (Egypt): "Universal Heritage of Mankind".

93. According to Rosenfield, the "common heritage of mankind" doctrine "is enunciated in the constitution for outer space, the 1967 Outer Space Treaty, where it is provided that outer space shall be for the benefit and in the interest of all countries": Rosenfield, S.B., "Solar Energy and the Common Heritage of Mankind", XXI, Colloquium, 1978, 58. See also Matte, op. cit., supra note 55; Soroos, M.S., "The Commons in the Sky: The Radio Spectrum and Geosynchronous Orbit as Issues in Global Policy", 36(3), International Organization, 1982, 665, at 668.

share in the economic pay-offs from exploiting it."[94] The present practice of first-come, first-served,[95] as regards use of the geostationary orbit places non-users at a disadvantage not only in so far as equitable access is concerned but also with respect to sharing the benefits derived from its exploitation. Users of this resource, i.e. those who are the first to register their orbital assignments with the IFRB, are the exclusive beneficiaries of the geostationary orbit. This is contrary to the common interest principle enunciated in the Outer Space Treaty. Hence the need to elaborate a special agreement or treaty which makes provision not only for the rights and duties of states in the utilization of the geostationary orbit but also

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94. Soroos, ibid. See also Matte, op. cit., supra note 55, 78; McDougal, op. cit., supra note 56; Cocca, op. cit., supra note 91. According to the Report of the ILA Space Law Committee, before the adoption of the Outer Space Treaty "(t)here was a widespread feeling that since only a very small minority of states would in the foreseeable future have the capacity of exploiting this new domain, a legal system for outer space should be developed which would enable all states, whatever their technological or economic development, to share the profits obtained by the exploitation and use of outer space": Report of the Fifty-fourth Conference of the ILA, 1970, 426. This was achieved through the adoption of the Outer Space Treaty especially Article I, para. 1, ibid.

95. See infra Chapter IV.

for the equitable distribution of benefits accruing from such utilization. The geostationary orbit should be expressly declared a common heritage of mankind.[96]

The 1979 Moon Treaty applies to the orbits around or other trajectories to, or around the moon and other celestial bodies.[97] COPUOS interprets Article I,

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96. This express declaration is needed to remove the doubts which are currently expressed by a number of states. It is interesting to note that signatories of the Bogota Declaration while claiming sovereignty over portions of the geostationary orbit above their respective territories, have recognized that those parts of the orbit which are above the high seas are a "common heritage of mankind". A trend towards achieving this objective is already evident. "While the 'province of mankind' principle applied initially to the geostationary orbit, swift technological and geopolitical forces are now vesting title to it as the 'common heritage of mankind'": Rothblatt, M.A., "ITU Regulation of Satellite Communication", XVIII, Stanford Journal of International Law, 1982, 1, at 20. The radio spectrum, which is indispensable to use of the geostationary orbit has been generally recognized as "an international public trust" and "common possession of mankind". For details, see *supra* Chapter I, fn. 20. It is also interesting note that according to Section 3(a) of the Canadian Broadcasting Act (S.C. 1967-68, c. 25) "radio frequencies... are public property".

97. Agreement Governing the Activities of States on The Moon and Other Celestial Bodies, (UN General Assembly Resolution No. 34/68 of December 14, 1979, Annex) Article 1.

paragraph 2 of this Treaty to expressly exclude its application to "trajectories and orbits of space objects in earth orbits only and trajectories of space objects between the earth and such orbits,"[98] i.e., the geostationary orbit around the earth. Such an exclusion seems logical since the Treaty was not concerned with the earth or its natural resources. It should be viewed as a precedent for future specific agreement on the geostationary orbit, since it declares the orbits around the moon and other celestial bodies to be the common heritage of mankind.[99]

C. The Freedom Principle

Article I, paragraph 2 of the Outer Space Treaty incorporates the freedom principle, i.e.,

> Outer space, including the Moon and other celestial bodies, shall be free for exploration and use by all states without discrimination of any kind, on a basis of equality and in accordance with international law.

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98. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Prepared at the Request of the Chairman of the US Senate's Committee on Commerce, Science, and Transportation, parts 1 and 2, (Washington, 1980), 47.

99. See supra note 97, Article 11.

This is an essential extension, or consequence of the common interest principle. Outer space, including the geostationary orbit, cannot be explored and used for the benefit and in the interests of all countries unless all are free to do so. At the time the Outer Space Treaty was negotiated, the freedom principle did not pose any serious problems of acceptance by COPUOS member states. This was due to various developments which had occurred prior to that time. The space age began during the International Geophysical Year (sponsored by the International Council of Scientific Unions) which took place from July 1, 1957 to December 31, 1958 and resulted in the "most intensive observations of the earth and its cosmic environs that mankind had ever seen".[100] The *ad hoc* COPUOS in its 1959 Report to the General Assembly concluded that:

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100. Staff Report on the International Geophysical Year and Space Research, US House of Representatives, 86th Congress, 1st Session, (Washington, 1959), 1. For details, also see, Annals of the International Geophysical Year, (N.Y., 1959).

> During the International Geophysical Year 1957-58 and subsequently, countries throughout the world proceded on the premise of the permissibility of the launching and flight of the space vehicles which were launched, regardless of what territory they passed 'over' during the course of their flight through outer space. The Committee, bearing in mind that its terms of reference refer exclusively to the peaceful uses of outer space, believes that, with this practice, there may have been initiated the recognition or establishment of a generally accepted rule to the effect that, in principle, outer space is, on conditions of equality, freely available for exploration and use by all in accordance with existing or future international law or agreements.[101]

This resulted in the practice of states to allow the free passage of space objects over their territories, thereby creating customary international law.

"With regard to the time factor", Judge Lachs opined that

> the formulation of law by state practice has in the past frequently been associated with the passage of a long period of time. However, the greater acceleration of social and economic change, combined with that of science and technology, have confronted law with a serious challenge: one it must meet, lest it lag even farther behind events than it has been

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101. UN Doc. A/4141 (July 14, 1959), 63-64. See also "Statement of George J. Feldman", in International Control of Outer Space, Hearings before the US House of Representatives' Committee on Science and Astronautics, 86th Congress, Ist Session, (Washington, 1959), 29.

wont to do.[102]

The freedom of exploration and use of outer space and the celestial bodies was expressly declared in UNGA Resolution No. 1721 XVI of 1961[103] and Resolution No. 1962 (XVII) of 1963.[104] Since the Declaration is viewed

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102. I.C.J., North Sea Continental Shelf Case, 1969, 230, (cf. Lachs, M., "Some Reflections on the State of the Law of Outer Space", 9, J. Space L., 1981, 3, at 8. See also Lachs, M., "The Law-Making Process for Outer Space", in New Frontiers in Space Law, op. cit., supra note 27, at 15.

103. The same Resolution also expressed the General Assembly's belief that "communication by means of satellites should be available to the nations of the world as soon as practicable on a global and non-discriminatory basis." The 1963 Extraordinary Administrative Radio Conference of the ITU, taking note of this resolution, recognized that all members of the "Union have an interest in and right to an equitable and rational use of frequency bands allocated for space communications": Recommendation No. 10A, Final Acts of the Extraordinary Administrative Radio Conference to Allocate Frequency Bands for Space Radiocommunication Purposes, (Geneva, 1963), ITU. Similarly, the 1965 Plenipotentiary Conference of the ITU, taking into consideration Resolution No. 1721 of the General Assembly, reminded its members to promote the principle that "all countries should have equal opportunity to use space telecommunication facilities": International Telecommunication Convention, 1965, Resolution No. 24.

104. UN General Assembly Resolution No. 1962 (XVII) of December 13, 1963.

as having enunciated legally binding principles[105] and the freedom principle has been incorporated in toto in the Outer Space Treaty, it is generally considered to be a part of customary international law (jus cogens) binding upon all states, whether parties to the Treaty or not.[106] This principle was not challenged until

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105. See generally, Matte, op. cit., supra note 55, 30-31, fns 60 to 62; Jenks, C.W., "The Evolution of Space Law Continues", in Mélanges offerts à Juraj Andrassy, (La Haye, 1968), 135, at 139: "denunciation of the (Outer Space) Treaty would not affect the validity of terms of the Declaration which would remain an authoritative statement of an accepted body of law which would continue to be binding on any state withdrawing from the Treaty". See also Goedhuis, D., "Some Recent Trends in the Interpretation and the Implementation of the Rules of International Space Law", 19 (2), Columbia Journal of Transnational Law, 1981, 213, at 215; Vlasic, I.A., "The Growth of Space Law 1957-65: Achievements and Issues", 1965, Yearbook of Air and Space Law, 365, at 380, also fns 25-34 on 374-379.

106. See, generally, Gorbiel, A., "Le statut international juridique de l'orbite géostationnaire", R.F.D.A., 1978 (3), 303, at 314: "le principe de non-appropriation et celui de la liberté de l'espace extra-atmosphérique, ont sans nul doute un caractère des règles absolument obligatoires du droit des gens universel (ius cogens)"; Vlasic, I. A., "The Space Treaty: A Preliminary Evaluation", 55, Columbia Law Review, 1967, 507, at 512; UN Doc. A/AC.105/219 (1978), 19 and 25 (USSR); Dauses, op. cit., supra note 10, 77; Vereschetin, V., "On the Importance of the Principle of State Sovereignty in International Space Law", 17, Indian Journal of International Law, 1977, 203-205; Poulantzas, N.M., "Development or Retrogression of International Law in View of Outer Space Activities?", VIII, Colloquium, 1965, 272, at 277; supra Chapter II, fn. 17; Krause-Ablass, G.B., "The Need for International Community Systems of Satellite Telecommunications", XV, Colloquium, 1972, 81; International Space Law,

The Bogota Declaration of 1976;[107] but the claims of the equatorial states have generally been dismissed as contrary to the established principles of international law,[108] and do not seem to have affected the universal validity of the freedom principle.

(Moscow, 1976), 84: "The principle of the freedom to explore and use outer space and celestial bodies is universally recognized". As a general rule; incorporated in article 34 of the Vienna Convention on the Law of Treaties, (op.cit., supra note 49), "a treaty does not create either obligations or rights for a third state without its consent." However, article 36 of this Treaty creates a presumption as to the existence of the consent of the third state, i.e., "A right arises for a third state from a provision of a treaty if the parties to the treaty intend the provision to accord that right either to the third state, or a group of states to which it belongs, or to all states, and the third state assents thereto. Its assent shall be presumed so long as the contrary is not indicated, unless the treaty otherwise provides." The negotiating history of the Outer Space Treaty clearly shows that it was intended that "all states" would be entitled to the freedom of exploration and use of outer space. Above all, "since no state not a party to the (Outer Space) Treaty has declared its refusal of the rights indicated above, for exmple, the right of exploration and use of outer space, on a basis of equality without discrimination of any kind and in accordance with international law, it may be assumed that the above mentioned provisions of article I, para. 2 extend to all, including third states": UN Doc. A/AC.105/219 (1978), 25. Moreover, article 38 of the Vienna Convention provides that a principle or rule in a treaty may become binding on a third state if it becomes part of customary international law. It is, therefore, logical to conclude that the right of freedom of exploration and use of outer space, including the geostationary orbit, is accorded to all states, whether parties to the Outer Space Treaty or not.

107. Reprinted in Manual on Space Law, op.cit., supra note 9, 383 et seq.

198. See supra Chapter II.

Although the terms "freedom of exploration" and "use" are not defined in the Outer Space Treaty, they are generally understood to mean what their natural/normal sense conveys, and to include exploitation of this new environment for the practical application of space technology.[109] The phrase "all states" does not mean that only "states" are allowed to explore and use outer space. This freedom extends to states, their private natural or legal persons under their authority and supervision,[110] and to the international organizations of which they are members.[111] Hence, states are free to explore and use outer space individually or in association with other states.

Such freedom is not absolute but rather an attribute of state sovereignty which may be referred to as

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109. See generally, Christol, op. cit., supra note 81, 88 et seq.; Jenks, op. cit., supra note 20, 196-197; Dembling, op. cit., supra note 88, 11; UN Doc. A/AC.105/C.2/SR.58 (1966), 23 (Austria).

110. For details, see Gorove, op. cit., supra note 87, 50.

111. The Outer Space Treaty, Article VI.

independence or freedom of action.[112] Since this sovereignty is not outside or above the law,[113] freedom of action can thus be exercised only within the limitations prescribed and to the extent allowed by law. Even Bodin, who has been recognized as the father of the concept of state sovereignty, "recognized that the absolute power of the state is subject to the authority of the divine law, of the natural law and of the law of nations.[114] While article I, paragraph 2, of the Outer Space Treaty entitles all states to freedom of action, it must be exercised "without discrimination of any kind", "on a basis of equality", and "in accordance with international law."

112. See, generally, Cohen, H.E., Recent Theories of Sovereignty, (Chicago, 1937), at 83; Adams, T.R., "The Outer Space Treaty: An Interpretation in Light of the No-Sovereignty Provision", 9(1) Harvard International Law Journal, 1968, 140, at 141.

113. For details, see generally, Sovereignty Within the Law, op. cit., supra note 64. The "sovereignty of the state consists of its competence as defined and limited by international law and is not a discretionary power which overrides the law": ibid., 433. Similarly, Sir Gerald Fitzmaurice said: "States are sovereign; but this does not imply for them an unlimited freedom of action, or a right to engage in unregulated activity. What it means, in the case of fully sovereign states, is equality with and independence of one another, but not of the law... No state can, within the international order, determine unilaterally in any ultimately final and decisive sense whether international law does not govern a given matter or whether certain activities are permitted to it or not - any more than the individual could be allowed to determine this for himself within the statal order": Fitzmaurice, G., "The General Principles of International Law Considered from the Stand-point of the Rule of Law", 92, Recueil des cours, 1957, 5, at 49-50.

114. Jenks, C.W., "The Thesis in Historical Perspective", in Sovereignty Within the Law, op. cit., supra note 64, 24.

The phrase "without discrimination of any kind" is quite broad. Read in conjunction with the Preamble and provisions of Article I paragraph 1, it is implied that the economic or scientific underdevelopment of states is not a reason for their freedom to be jeopardized by the more developed states. Similarly, if certain states are able, only at a later stage, to make use of outer space, their freedom shall not be circumscribed by those states fortunate enough to already possess the required technological capability.

"On the basis of equality" refers to the equal rights of all states to explore and use outer space; but, there are no provisions in the Treaty to indicate what "equality" means, i.e. equity in law or in fact. Since all states are not equal in fact, "equality" in article I, paragraph 2 must refer to equality in law, i.e. de jure equality or "sovereign equality" as recognized in article 2 (1) of the Charter of the United Nations. "Equality" like "independence" is an associated component of the concept of state sovereignty. It is interesting to note that the Outer Space Treaty explicitly retains the concept of sovereign equality in unchanged form, while imposing severe constraints on freedom of action, i.e. independence. This seems logical, since absolute freedom of action may lead to chaos; while emphasis on the equality of states could serve to guarantee the protection of the rights of all states.[115] This logic prevailed during the negotiation of the Outer Space Treaty, and was succintly stated by the US delegate to the UN General Assembly in the following terms:

> Article I (para. 2) stated that the exploration and use of outer space (is) the right of all states without discrimination of any kind and on a basis of equality. That provision like the provision prohibiting national appropriation by claim of sovereignty, (is) a strong safeguard for those states which at present (have) no space programme of their own.[116]

Article I, therefore, "sought to exclude all monopoly and discrimination"[117] of any kind in the utilization of the geostationary orbit. These provisions entitle states to equal rights of access to, and use of the orbit. However, it is to be noted that equal right does not mean equal access. 'Equality of rights' determines the legal relationship between various states with respect to access to and the use of the orbit.

115. For details see Dickinson, The Equality of States in International Law, 1929. "International persons (states) are equal before the law when they are equally protected in the enjoyment of their rights and equally compelled to fullfil their obligations", ibid., 3.

116. 1966 Official Records, op. cit., supra note 34, 427-428 (emphasis added).

117. UN Doc. A/AC.105/C.2/SR.62, (October 24, 1966), 7 (Poland). See also Gibbons, K.G., "Orbital Saturation: The Necessity for International Regulation of Geosynchronous Orbits", 9, California Western International Law Journal, 1979, 139, at 151.

On the other hand, the extent of such access or use is determined by equity,[118] fairness and justice, in light of various elements including population, languages, time zones, surface area of states, etc.[119] For example, the plan adopted by the WARC - BSS in 1977 alloted different amounts of radio frequencies and geostationary orbital positions to various countries in Regions 1 and 3, taking these factors into account.[120] The WARC proceeded on the premise that all states have an equal right to explore and use the geostationary orbit and subjected all states concerned to technical limitations, mutually agreed upon by the participants.

Other provisions of the Outer Space Treaty limit the freedom of utilization, which is subject to the common interest principle.[121] In Gorove's view, freedom "is limited by the provision that the exploration and use (of outer space) must be carried out for the 'benefit and in the interests' of all countries

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118. For details about equity, see Williams, S.M., "The Role of Equity in the Law of Outer Space", 4-5, International Relations, 1972-76, 776 et seq.

119. See ITU, Radio Regulations, 1982, Appendix 30, article 12.9.1.

120. For details, see infra Chapter IV.

121. See supra note 56.

irrespective of their degree of economic or scientific development."[122] The limited availability of appropriate geostationary orbital positions[123] requires that the inclusive interest of the international community should predominate in order to maintain public order in outer space. Under the pretext of unfettered freedom, exclusive exploitation of this natural resource could disrupt public order. According to McDougal, Laswell and Vlasic

> The frequency of periods of high expectations of violence in recent history has been a further factor favouring inclusivity. Exclusive use has often meant boundary disputes, arguments over trespass; conflicting claims, and attempted aggrandizement. There have, however, been few cases of conflict when these resources are

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122. Gorove, S., "The Geostationary Orbit. Issues of Law and Policy", 73, A.J.I.L., 1979, 444, at 447-448. See also authorities cited in supra note 56; Vencatassin, J.-L., "Problèmes économiques, juridiques et sociaux résultant de l'exploration et de l'utilisation de l'espace extra-atmosphérique", 23, R.F.D.A., 1969, 15, at 18; Diederiks-Verschoor, I.H.Ph., "Space Law As It Effects Domestic Law", 7(1), J. Space L., 1979, 39, at 42.

123. See supra Chapter I.D.

accepted sharable.[124]

Article III of the Outer Space Treaty imposes further limitations, stipulating that outer space activities must be carried out "in the interest of maintaining international peace and security and promoting international cooperation and understanding". Various provisions[125] of the Treaty stress the requirement of international cooperation. "The principle of cooperation in the conquest of space... implies that states have a strict obligation to cooperate with each other in the exploration and use of outer space."[126] This

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124. McDougal et al, op. cit., supra note 56, 795: "The total production of values and range of their distribution have been observed to increase directly in proportion to the number of participants and their aggregation of base values, and the recognition has been general that since an increase in participants does not diminish the returns of any single participant, the world community has had much to gain and no participant any thing to lose through the sharing of ... resources ... Inclusive use ... has been found to give each participant the benefit of the entire resource, while exclusive appropriation might largely destroy its value for all", ibid., 794-795.

125. The Outer Space Treaty, Articles IX, X and XI.

126. UN Doc. A/AC.105/219 (1978), 40. Though the form and extent of international cooperation is a matter for further agreement between states, these provisions in the Outer Space Treaty seem to impose a legal obligation to promote international cooperation in good faith. In other words, outer space activities must be pursued according to the basic premise of the interdependence of states rather than independence, and total freedom of action; hence the obligation to accommodate the interests of other states.

obligation is reinforced by the duty to conduct all outer space activities "with due regard to the corresponding interests of all other states parties to the Treaty".[127] This duty restricts the freedom of action of both the first-comers as well as the late-comers. While the first-comers must keep in mind the interests of the late arrivals, and must not unduly restrict their entry into space exploration and utilization, the late-comers are equally obliged not to use their freedom in such a way as to cause harmful interference to the activities already being carried on by other states. This interpretation is supported by the provisions of Article IX of the Treaty which states that

> If a state party to the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space ... would cause potentially harmful interference with activities of other state parties in the peaceful exploration and use of outer space ... it shall undertake appropriate international consultations before proceeding with any such activity or experiment.

The first-comers may also request consultation concerning any activity which might interfere with their activities. This would seem to give preference to first-comers over the late arrivals and hence to

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127. The Outer Space Treaty, Article IX.

support the present practice of first-come, first-served in the case of access to, and use of geostationary orbital positions. However, the provisions must be understood in the context of the other provisions and basic purpose of the Treaty. Ambassador Goldberg in his testimony before the US Senate's Committee on Foreign Relations, points out that

> any document must be read in its entirety, and you must take article I and read it in reference to articles II, III, IV, the whole Treaty. You cannot isolate one section and read it in isolation, and when you read it as a whole, you get the meaning of the Treaty.[128]

Thus, Article IX appears to lay emphasis on the need to coordinate the activities of various states parties to the Treaty, rather than merely according preferential treatment to the first-comers. In any event, it must not be interpreted as protecting the interests of one category of state parties to the derogation of others.[129] If first-comers unduly disregard the corresponding interests of the late-comers, the latter may invoke a material breach of the Treaty or fundamental change of circumstances as

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128. See <u>supra</u> note 42, 33-34.

129. Citing, <u>Kolovrat V. Oregon</u> (366 U.S. 187 (1969)), Starke observes that a treaty should not "be interpreted so as to restrict unduly the rights intended to be protected by it:" Starke, <u>op. cit.</u>, <u>supra</u> note 62, 448.

grounds for its termination or suspension.[130] The freedom of exploration and use must not amount to national appropriation of outer space or any part of it.[131]

Article I, paragraph 2, as well as Article III require that space activities must be carried out in accordance with international law including the Charter of the United Nations. It is interesting to note that while Article III enunciates the general principle, its repetition in Article I, paragraph 2, is of special significance in emphasizing the limitation on the freedom

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130. Vienna Convention on the Law of Treaties, op. cit., supra note 49;
Article 60(2): A material breach of a multilateral treaty by one of the parties entitles ... other parties by unanimous agreement to suspend the operation of the treaty in whole or in part or to terminate it...

(3): A material breach of a treaty, for the purposes of this article, consists in ... the violation of a provision essential to the accomplishment of the object or purpose of the treaty.

Article 62(1): A fundamental change of circumstances which has occurred with regard to those existing at the time of the conclusion of a treaty, and which was not foreseen by the parties, may not be invoked as a ground for terminating or withdrawing from the treaty, unless:

a) The existence of those circumstances constituted an essential basis of the consent of the parties to be bound by the treaty; and
b) the effect of the change is radically to transform the extent of obligations still to be performed under the treaty.

131. The Outer Space Treaty, Article II. For details, see infra Chapter III.D.

of exploration and use. It is also indicative of the fact that UN member states have always favoured the dominance of international law over freedom of action,[132] *i.e.* sovereignty within the law.

Outer space has never been a "legal vacuum", since international law has always regulated relations between states.[133] Specific mention in the General Assembly Resolutions and the Outer Space Treaty of the applicability of international law and the UN Charter to the exploration and use of outer space serves to remove any doubt about their applicability. However, neither the Resolutions nor the Treaty make it clear what part of international law and which provisions of the Charter are applicable. Indeed, the unconditional extension of traditional international law and the UN Charter to the new environment was not acceptable to many members of the UN.[134] For example, the French

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132. See the report of the *ad hoc* COPUOS, *op. cit.*, *supra* note 101, as well as UN General Assembly Resolutions on outer space which recognise "freedom of exploration and use" only "in accordance with international law."

133. Lachs, *op. cit.*, *supra* note 50, 12 *et seq.*

134. See UN Docs. A/AC.105/C.2/SR.70 (1966), 14 (France); A/AC.105/C.2/SR.71 and Add. 1 (1966), 17 (Brazil); *ibid.*, 22 (Hungary); A/AC.105/C.2/SR.64 (1966), 6, *ibid.*, 2-3 (U.A.R.); *ibid.*, 8; 1965 *Official Records*, *op. cit.*, *supra* note 24, 190-191; 1962 *Official Records*, *op. cit.*, *supra* note 26, 265 (India); 1958 *Official Records*, *op. cit.*, *supra* note 23, 211 (Netherlands).

delegate to the COPUOS Legal Sub-Committee stated that

> the reference to the conformity with international law was perhaps not as clear as it seemed *a priori*, for if international law was based on sovereignty, how could one act within that if the principle was proclaimed that there was no sovereignty in space and on celestial bodies? ... It would therefore be advisable to determine which principles of international law were meant when international law in general was mentioned.[135]

The French proposal was rejected, and the Treaty finally adopted without further explanation. At the time of the discussions concerning the Treaty, the French delegate reiterated his Government's fear that,

> There would no doubt be some difficulty in implementing the Treaty, whose provisions clearly constituted an innovation from the standpoint of traditional international law based on the sovereignty of states.[136]

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135. UN Doc. A/AC.105/C.2/SR.64 (1966), 6.

136. 1966 Official Records, *op. cit.*, *supra* note 34, 429. The delegate of Hungary to the Legal Sub-Committee shared "the doubt expressed by the French representative concerning the applicability of international law, including the United Nations Charter, to space activities; the conduct of certain states justified the fear that they would no more respect international law in space than they did on earth": UN Doc. A/AC.105/C.2/SR.71 and Add.1 (1966), 22.

This concern was not without foundation and has in fact proved to be realistic in light of the present monopolization of the geostationary orbit by a handful of countries which act on the premise of total sovereign freedom of action.

On the question of which parts of general international law and the UN Charter are applicable to outer space activities, Lachs states that

> (m)any parts of their chapters are destined for specific environments and thus do not lend themselves to application in other areas. Some rules cannot be applied to outer space _ex definitione_. Some others are of the nature of _lex specialis_ for specific environments. Others still require adaptation on the needs and characteristics of the new dimension, thus modification is needed.[137]

Areas not covered by space law are regulated by general international law. In cases of inconsistency between principles and rules of space law and those of international law, the former prevail, given the applicability of the principle of _lex specialis derogat generali_. In some cases certain rules which have become _jus cogens_ will apply and Article 103 of the UN Charter which provides that,

137. Lachs, _op. cit._, _supra_ note 50, 15. For details, see also Csabafi, _op. cit._, _supra_ note 56, 36 _et seq_.

> (i)n the event of a conflict between the obligation of the Members of the United Nations under the present Charter and their obligations under any other international agreement, their obligations under the present Charter shall prevail.

Perhaps the most important rule of international law which applies to the use of outer space, including the geostationary orbit, is that states must exercise their rights in such a way as not to infringe on the similar rights of other states.[138] In other words, the right of freedom of exploration and use of outer space of "states is limited by analogous rights of other states."[139] This rule has also been reiterated in Article IX of the Outer Space Treaty. In Lachs' opinion

> There can be no doubt that the freedom of action of States in outer space or on celestial bodies is neither unlimited, absolute or unqualified, but is determined by the right and interest of other states. It can therefore be exercised only to the extent to which ... it does

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138. At "its 1980 session, the International Law Commission has opined that a universe of law postulated that the freedom of each of its subjects should be bounded by equal respect for the freedoms of other subjects; that states engaging in an activity which might cause injurious consequences internationally should take reasonable account of the interests and wishes of other states likely to be effected": (UN Doc. A/CN.4/334/Add.2, paras 52, 56, and 60) (cf. UN Doc. A/AC.105/C.2/SR.369, February 15, 1982, 4.).

139. Dudakov, B., "International Legal Problems on the Use of Geostationary Orbit", XV, Colloquium, 1972, 71.

> not conflict with those rights and interests. There would therefore be no antimony between the freedom of some and the interest of all.[140]

A corollary to the rule of "respect for the rights of others" is that the legitimate interests of other states must also be taken into consideration when a state exercises its freedom of action. In the (1951) Anglo-Norwegian Fisheries[141] case, the International Court of Justice,

> did not purport to do anything other than apply existing rules, but it had to justify the special application of the normal rules to the Norwegian coastline. In doing so the Court stated: 'Finally, there is one consideration not to be overlooked... that of certain economic interests peculiar to a region, the reality and importance of which are clearly evidenced by a long usage'. Moreover, the Court referred to traditional fishing rights buttressed by 'the vital needs of the population' in determining particular baselines... the law is inevitably bound up with accommodation of the different interests of states, and the rules often require an element of appreciation.[142]

It would seem that the latter observation is being

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140. Lachs, op. cit., supra note 50, 117. See also Goedhuis, op. cit., supra note 56; Vereschetin, V., "On the Importance of the Principle of State Sovereignty in International Space Law", 17, Indian Jl of Int'l L., 1977, 203, at 205. National self-interest must take account of the fact that legal "rights must be exercised without malice, they must not be abused or misused"; Lachs, M., "The International Law of Outer Space", 113, Recueil des cours, 1964 (III), 69.

141. I.C.J., Reports, (1951), 116.

142. Brownlie, op. cit., supra note 62, 30.

strengthened in contemporary international law-making, since the special interests and needs of the developing countries have been recognized in general international law[143] as well as international space law.[144] For example, the recently revised version of the International Telecommunication Convention, declares that the geostationary orbit must be used in such a way as to allow equitable access, "taking into account the special needs of the developing countries."[145]

Freedom of use does not include "misuse".[146] Under international law, the concept of "abuse of right" provides that states are responsible for their acts "which are not unlawful in the sense of being

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143. For details, see Verwey, W.D., *Economic Development, Peace and International Law*, (Asean, 1972), 265 *et seq*.

144. For details, see Jakhu, *op. cit.*, *supra* note 17, 77 *et seq*.

145. *International Telecommunication Convention*, 1982, (ITU, Geneva) Article 33(2). The Convention shall enter into force on January 1, 1984, *ibid.*, Article 52.

146. Jenks, *op. cit.*, *supra* note 20, 197. See also Lachs, *op. cit.*, *supra* note 140. "Misuse", however, "cannot be presumed, and it rests with the party who states that there has been such misuse to prove his statement": *Certain German Interests in Polish Upper Silesia*, *P.C.I.J.*, Ser. A, no. 7 (cf. Brownlie, *op. cit.*, *supra* note 62, 431).

prohibited"[147] but cause injury to other states. "There is no legal right, however well established, which could not, in some circumstances, be refused recognition on the ground that it has been abused."[148] In the case of the exploration and use of outer space, the activities of certain technologically advanced states are already being viewed as an abuse of their rights. For example, the Chilean delegate to the COPUOS Legal Sub-Committee stated that the

> exploration and use of outer space were lawful only if they sought to satisfy the needs of mankind as a whole, and in particular those of the poorest nations. Otherwise, they would constitute an abuse of rights. The developing countries were actually sustaining a moral injury because their interests were not being taken into account in the exploration and use of outer space.[149]

Freedom of exploration and use of outer space is further limited by what has been referred to as "inherent rules and principles" or "basic general norms" without which minimum public order in the international community cannot be maintained. They include the duty to

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147. Brownlie, ibid., 430.

148. Lauterpacht, The Development of International Law by the International Court, 164 (cf. Brownlie, ibid., 432).

149. UN Doc. A/AC.105/C.2/SR.362 (1982), 2.

refrain from the use of force, and to settle international disputes or conflicts peacefully, etc.[150]

However, it "is difficult to imagine a reasonable claim that any activity in space is 'essentially within the domestic jurisdiction' of any state, within the meaning of Article 2, paragraph 7 of the UN Charter."[151] Corollary to this is that freedom of action originating from the concept of territorial sovereignty as understood in non-space relations is also not applicable to outer space. Neither does the concept of territorial appropriation, nor analogies with the Law of the Sea apply.[152]

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150. See, generally, McDougal, et al, op. cit., supra note 56, 144 et seq.; Marcoff, M.G., Traité de droit international public de l'espace, (Fribourg, 1973), 354 et seq.; Hailbronner, K., "Principles of New International Law and the Emerging Space Law", XVII, Colloquium, 1974, 118 et seq.

151. Jenks, op. cit., supra note 20, 209.

152. "Outer Space law has neither adopted the analogy of terrestrial land law nor that of international maritime law. While declaring outer space and celestial bodies a res omnium communis it has, for the first time in the history of law, not only removed a fluid but also terra from the workings of effective occupation rules": Dauses, op. cit., supra note 56, 78. See also supra Chapter II.B; 1962 Official Records, op. cit., supra note 26, 254: "As Outer space was a new subject which differed intrinsically from subjects previously studied, the temptation to draw analogies between outer space and other fields must be resisted." An analogy between the law of outer space and that of the Antarctic is always drawn because of the similarity of the régimes governing these regions.

An obvious conclusion drawn from this discussion is that the freedom of exploration and use of outer space is a principle not only of the Outer Space Treaty but also of customary international law and is well-established as jus cogens. Also, it is not absolute or unrestricted. In the exercise of their freedom of exploration and use of the geostationary orbit, states may not act entirely at their own discretion. Every state is guaranteed an equal right to use the orbit without discrimination of any kind, the

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"However, there also exists some obviously fundamental difference. For example, each is endowed with a different historical tradition. Thus the Antarctic Treaty provides that existing territorial claims will be recognized, while the Outer Space Treaty states that outer space is not subject to national appropriation. ...Related to this historical difference, but even more fundamental, is the difference attributable to the physical characteristics of space and Antarctica": (Staub, H.G., "The Antarctic Treaty as Precedent to the Outer Space Treaty", XVII, Colloquium, 1974, 282, at 284-285.

"balance of interests", having thereby been established.[153] The Treaty must always be interpreted to maintain that balance.

D. <u>The Non-Appropriation Principle</u>

Article II of the Outer Space Treaty states that:

> Outer Space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.

Similar to the freedom principle, little attention was paid to this aspect of the Treaty by the delegations

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153. Various states stressed "the necessity of maintaining a proper balance between the rights and obligations of the Space Powers and those of non-Space Powers": (<u>1966 Official Records</u>, <u>op. cit.</u>, <u>supra</u> note 34, 432). The principles of the Outer Space Treaty were designed to take into account the "need to leave the Powers capable of engaging in space activities enough freedom to carry out useful enterprises without undue difficulty while not depriving the other Powers of the necessary safeguards": (<u>ibid.</u>, 430). See also UN Docs. A/AC.105/C.2/SR.71 and Add. 1 (1966), 17; A/AC.105/C.2/SR.71 (1966), 57; A/AC.105/C.2/SR.64 (1966), 9. According to Reis, the developing countries "considered the Outer Space Treaty reflected a balance of rights and obligations as between space powers, on the one hand, and on the other hand, the large majority of the international community which for the foreseeable future, would be able to carry out space activities, if at all, only in cooperation with more developed nations": <u>International Space Law</u>, Hearings before the Sub-Committee on Space Science and Applications of the U.S. House of Representatives' Committee on Science and Technology, 94th Congress, 2nd Session, (Washington, 1976), 29.

to COPUOS responsible for the Treaty's elaboration. By the time it was adopted, it was well-established that outer space cannot be subjected to appropriation by any means. This principle is an essential element of, and supplementary to the common interest principle; if outer space could be appropriated to serve exclusive interests, it would not be in the common interest of mankind.[154] Dauses regarded the adoption of the non-appropriation principle as "a clear victory of the *unanimous opinio juris*, (which) expressed from the very outset of space law, that any claim of territorial rights whatsoever to the exclusion of others should be regarded as unlawful."[155] This principle has become a legal norm not only of conventional international law but also general international law (*jus cogens*) binding upon

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154. Soroos, *op. cit.*, *supra* note 93, 669; Goedhuis, D., "Some Recent Trends in the Interpretation and the Implementation of the Rules of International Space Law", 19(2), *Columbia Journal of Transnational Law*, 1981, 212. Citing numerous authorities, he concluded that even before the adoption of the Outer Space Treaty, it "was realised that by denying the legality of such (sovereignty) claims the interests of the world community as a whole would be best served.", *ibid.*, 214.

155. Dauses, *op. cit.*, *supra* note 56, 77. See also Goedhuis, *ibid.*; and "The Present State of Space Law", in Bos, M. (ed.), *The Present State of International Law*, 1973, 201, at 210; Jenks, *op. cit.*, *supra* note 20, 170.

all states -[156] and this because of the declaratory nature of the principle and its inclusion in the unanimously adopted resolutions of the UN General Assembly[157] as well as in article II of the Outer Space Treaty. Monopolies in the exploration and use of outer space are ruled out, which states negotiating the Treaty viewed as a strong safeguard of the interests

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156. Csabafi, I.A., The Concept of State Jurisdiction in International Space Law, (The Hague, 1971), 47: "There is now sufficient evidence that the principle of non-appropriation of outer space including celestial bodies has become jus cogens". See also Gotlieb, A.E., "The Impact of Technology on the Development of Contemporary International Law", 170, Recueil des cours, 1981, (I), 115, at 232; Vlasic, op. cit., supra note 106, 512; Goedhuis, op. cit., supra note 155; Vereshchetin, V.S., International Cooperation in Space Law: Legal Question, 1980, (Translated by Foreign Broadcast Information Service, Springfield), 17; UN Doc. A/AC.105/219 (1978), 25.
As mentioned earlier (supra note 106), a treaty does not create legal obligations for a third state. However, under Article 38 of the Vienna Convention, op. cit., supra note 49, if a provision in a treaty has become a norm of customary international law, it also imposes legal obligations on a third state.

157. UN General Assembly Resolution No. 1721 (XVI) A, of December 20, 1981, and No. 1962 (XVIII) of December 13, 1963.

of the late-comer countries.[158]

Article II prohibits "national" appropriation but is silent on the question of appropriation by individuals or private entities. According to Gorove, "at present, an individual acting on his own behalf or on behalf of another individual or a private association or an international organisation could lawfully appropriate any part of outer space."[159] In the light of the negotiating history of the Treaty as well as its provisions, however, his views give rise to serious doubt. In the COPUOS Legal Sub-Committee when drafting the Treaty it was clearly stated that such prohibition applies both to public and private appropriation.[160] Also, the title of the Treaty, as well as its provisions, clearly indicate that space activities are primarily "national" in nature. Under article VI, states have undertaken

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158. See supra note 116.

159. Gorove, op. cit., supra note 87, 81. See also Report of the Fifty-fourth Conference of the ILA, 1971, 409-410.

160. UN Doc. A/AC.105/C.2/SR.70 (1966), 13; Williams, S.M., "The Principle of Non-Appropriation Concerning Resources of the Moon and Celestial Bodies", XIV Colloquium, 1971, 157: The intention of the drafters of the Treaty had been "none other than to fully ban national appropriation."

responsibility for all activities whether carried on by government agencies or by non-governmental entities; and, they are obligated to assure conformity with the provisions set forth in the Treaty. States members of an international organization are similarly obliged to ensure such conformity. According to Goedhuis,

> all activities whether carried out by governmental or by non-governmental entities are to be considered as national activities. A study of the preparatory work of the Treaty clearly shows that the draftsmen of the principle of non-appropriation never intended this principle to be circumvented by allowing private entities to appropriate.[161]

Above all, to allow appropriation by private individuals would defeat the purpose of the Treaty and nullify the common interest principle. Hence, in this writer's opinion, Gorove's interpretation of article II must be rejected.

Article II prohibits appropriation of the whole, as

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161. Goedhuis, D., in his report on "Some Legal Problems Arising from the Utilization of Outer Space" in The Report of the Fifty-fourth Conference of the ILA, (emphasis in the original), 1971, 422, at 429. Also see ibid., 417 and 439; ibid., 411 (Marcoff).

well as any part of outer space, which includes the geostationary orbit.[162,163]

Under traditional international law, a state may appropriate anything outside its national jurisdiction through the acquisition of sovereignty over, or ownership of a thing, through continuous and effective occupation, prescription, discovery, etc. A detailed analysis of the applicable mode of acquisition[164] will determine whether a particular territory or thing has been legally appropriated by the claimant state. Article II of the Outer Space Treaty established a general prohibition of appropriation by any means whatsoever. Therefore, reference to the means of appropriation, as expounded in international law, for the purpose of interpreting "appropriation" in article II has to be

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162. Gorove, in Report of the Fifty-fourth Conference, ibid., 409: "I am in agreement with Professor Cocca and Professor Mankiewicz that the (Outer Space) Treaty as it stands fully prohibits national appropriation of outer space, including the Moon and other celestial bodies - which would include not only the entity as a whole but also a part of it."

163. See supra Chapter II. See also UN Doc. A/AC.105/219 (1978), 64-65.

164. For details, see Brownlie, op. cit., supra note 62, 108-174; Shaw, M.N., "Territory in International Law", XIII, Netherlands Year Book of International Law, 1982, 61 et seq.

rejected.[165] The fallacious analogies[166] drawn between outer space and other human environments demand that such reliance be discarded.[167] This does

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165. The assertion that satellites placed in the orbit do not appropriate outer space because "there is no intent to appropriate" (Rankin, op. cit., infra note 186, 100-101) should, therefore, be rejected since animus occipandi or animus possidendi necessary to constitute proper appropria- under general international law are inapplicable to outer space. Moreover, there may not be an "intention to appropriate", but exclusive control over a particular orbital slot can always be presumed on the part of a state which neither cancels the assignment at the request of the IFRB, nor uses the slot.

166. See supra Chapter II.B.

167. Some commentators have discussed the application of article II with respect to the geostationary orbit relying entirely on the means of acquiring territory or property under general international law. For example, Gorove asserts that "while the 'keeping' of a GEOSAT (geostationary satellite) in orbit for a period of 30 years may be argued to contribute to national appropriation - since 30 years may satisfy the requirement that to constitute appropriation the act must be done with a 'sense of permanence' - in actuality it would not if the geostationary orbit is regarded as a natural resource, as characterized by the 1973 International Telecommunication Convention and claimed by the equatorial countries. The reason is that there is authority to support the view that the ban does not relate to natural resources". (Gorove, S., "The Geostationary Orbit: Isssues of Law and Policy", 73, A.J.I.L., 1979, 444, 449; - "Implications of International Space Law for Private Enterprise", VII, A.A.S.L., 1982, 319, at 325). The authority cited by Gorove to support his view is Goedhuis's comments in the Report of the 54th Conference of the ILA where he states

not imply that general international law is totally

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that a "distinction should be made between; (1) the appropriation of areas of outer space which is prohibited by the Treaty; and (2) the appropriation of resources on which the Treaty is silent. With respect to the appropriation of outer space, a subdivision should be made between, on the one hand, the non-appropriation of areas of the Moon and other celestial bodies and on the other hand, the non-appropriation of outer space sensu stricto": (Goedhuis, op. cit., supra note 161, 427). In a later article, Goedhuis discussed his views further: "Whereas the Treaty prohibits the appropriation of outer space sensu lato, it is silent on the permissibility of appropriation of the resources of outer space. It is submitted that, by analogy with the present rules underlying the freedom of the seas, the appropriation of the natural resources of outer space merely forms part of the freedom of exploration and use of that space that is not prohibited:" (Goedhuis, D., "The Changing Legal Regime of Air and Outer Space", 27, International and Comparative Law Quarterly, 1978, 576, at 583 - emphasis in the original ; by the same author, "Some Legal Aspects of the Use of Communication Satellites", XVII, Colloquium, 1974, 53, at 56). Goedhuis's views, and consequently those of Gorove, are unacceptable for the following reasons:

(1) an analogy between the law of outer space and the law of the sea is erroneaous (see supra Chapter II) because of the fundamental difference in the nature of the subjects of these two different legal systems. Goedhuis himself accepted such difference (see comments in the Report of Forty-ninth Conference of the ILA, 1960, 277);

(2) although the geostationary orbit is declared a natural resource, it is completely different, in nature, from the natural resources of the sea, which are consumeable, depletable and tangible. The orbit, like the radio spectrum, is a natural phenomenon non-consumeable, non-depletable and intangible;

(3) the lack of prohibition against appropriation, especially of the natural resources of outer space does not mean that they may be appropriated (see supra Chapter III.B.) in total disregard of applicable principles and rules of international space law;

inapplicable to the question of appropriation of outer space. It may apply subject to the provisions of international space law. It is, therefore, submitted that the question of appropriation of the geostationary orbit should be decided primarily through the application of all the provisions of the Outer Space Treaty interpreted according to the general rules of interpretation of treaties.[168]

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(4) if an analogy with the present law of the sea is used in order to allow the appropriation of the natural resources of outer space, a question arises as to whether all these resources will automatically become a "common heritage of mankind" when the 1982 Convention on the Law of the Sea enters into force. Indeed, the necessity of developing a law of outer space could also be questioned if outer space could be regulated by the law of the sea or any other analogous environment on the earth's surface. In discussing the draft Outer Space Treaty, the Soviet delegate to the Legal Sub-Committee pointed out that "one could not automatically apply conditions which were appropriate to one set of circumstances to an entirely different situation", UN Doc. A/AC.105/C.2/SR.63, October 20, 1966, 10. It is the principle of general non-appropriation which primarily distinguishes space law from the law of the sea, as well as general international law which in certain cases allow appropriation of res nullius as well as res communis.

168. See article 31(1) of the Vienna Convention on The Law of Treaties, op. cit., supra note 49.

'Appropriation' ordinarily means an 'act of appropriating to oneself' and 'to appropriate' signifies 'to claim or use as if by an exclusive or preeminent right' to the exclusion of all others.[169] Every use of the orbit excludes others from using the same slot because of the possibility of harmful interference. Therefore, proper interpretation of article II, taking into consideration the objective of the Outer Space Treaty, especially the freedom principle, would be that the use of the geostationary orbit is allowed as long as it does not amount to appropriation, i.e. it does not exclude others from using the orbit. Since the Treaty prohibits "appropriation by means of use" and not actual use of the geostationary orbit, it seems logical that such use must be temporary in nature.

> The term 'appropriation by means of use' may be interpreted as the establishment of exclusive rights over certain uses of particular segments or celestial bodies, such as exclusionary rights of way or the monopolistic exploitation of cosmic resources.[170]

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169. Webster's Third New International Dictionary, (Springfield, 1971), Vol. I, 106: "let no man appropriate a common benefit." "The term 'appropriation'" according to Gorove, "is used most frequently to denote the taking of property for one's own or exclusive use with a sense of permanence": Gorove, S., "Interpreting Article II of the Outer Space Treaty", 37, Fordham Law Review, 1969, 349, at 352.

170. Dauses, op. cit., supra note 56, 77.

A line must be drawn between "use" and "appropriation by use" on the basis of the period involved. This may be difficult to achieve in practice, but cannot affect or nullify the legal principle of non-appropriation. The draftsmen of the Treaty were aware of this difficulty. The French delegate to the First Committee of the General Assembly stated that "while principles established by the Treaty would no doubt be easy to apply in the case of exploration of space, their application would be more difficult when state activities involved exploitation, and particularly where simple occupation had to be distinguished from appropriation."[171] This distinction between "occupation" or "use" on the one hand, and "appropriation" on the other, was to be considered in future discussions within COPUOS.

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171. 1966 Official Records, op. cit., supra note 34, 430. Similarly, the French delegate to the Legal Sub-Committee in discussing the draft Outer Space Treaty had pointed out the necessity to clarify the term "use" in the Treaty and expressed his desire to know whether it covered exploitation of the resources of the moon. (UN Doc. A/AC.105/C.2/SR.63, October 20, 1966, 8). The Soviet delegate responded that "it was not possible to say everything in one article and he believed that adequate clarification was to be found in article II... In other words, no human activity on the Moon or any other celestial bodies could be taken as justification for national appropriation. Needless to say, a treaty could deal only with the problems arising at the current stage of human evolution, and future developments would give rise to new problems, requiring subsequent solution." ibid., 10. From this exchange of views, it could be inferred that article II was designed to prohibit appropriation in principle, while leaving the question of determination of whether appropriation had taken place in a particular case to future deliberations.

The French delegate, in the COPUOS Working Group on DBS raised the issue of the geostationary orbit and asserted that:

> The rule of non-appropriation ... in itself implies a limitation on the complete freedom of states in space. In fact, the very use of geostationary satellites can be regarded as an "appropriation" of the equatorial orbit, which is a privileged portion of space.[172]

The US delegate responded with a detailed statement, as follows:

> The negotiating history of the Treaty shows that the purpose of this provision (article II) was to prohibit a repetition of the race for the acquisition of national sovereignty over overseas territories that developed in the sixteenth, seventeenth, eighteenth and nineteenth centuries. The Treaty makes clear that no user of space may lay claim to, or seek to establish, national sovereignty over outer space... On the other hand, the use of space or a celestial body for activities that are peaceful in character and compatible with the provisions of the Outer Space Treaty is, by definition, entirely legitimate. Using a favourable orbit for a legitimate activity cannot reasonably be classified as a prohibited national appropriation in the sense of Article II. ...using a favourable geostationary orbit is no more an "appropriation" or "de facto occupation" than using a particular fabourable area of the lunar surface - the Sea of

172. UN Doc. A/AC.105/62, (1969), at 3 and 4.

> Tranquility, for example - for a manned landing.[173]

Both these statements clarify certain points regarding the prohibition of "national appropriation". The French view (that merely to place a satellite in the geostationary orbit amounts to national appropriation) does not appear to be valid since it will, in practice, prohibit each and every use of the orbit which will be contrary to the Treaty's provisions. The US statement "does not address itself to the problem implicit in the French working paper, that continued and exclusive use amounts to *de facto* appropriation."[174] However, there is nothing in the US statement to suggest that "continued and exclusive use" does not amount to "appropriation". It simply points out that article II prohibits national sovereignty (permanent claim); that the use of the orbit must be like a 'landing' (temporary); and that it must be in accordance with the provisions of the Outer Space Treaty.

Thus, in light of the above, it appears that every use of the geostationary orbit is legitimate

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173. United States Delegation to the Second Session of the Working Group on Direct Broadcasting Satellites, Statement by the United States representative, Herbert Reis, at the Working Group meeting, July 31, 1969 (cf. Valters, E.N., "Perspectives in the Emerging Law of Satellite Communications", 5, Stanford Journal of International Studies, 1970, 53, at 66-67, emphasis added).

174. Valters, *ibid.*

provided that it does not exclude others permanently from such use or impose undue restrictions. This interpretation of the Treaty is supported by state practice. A number of states have been using the orbit since 1963 and no serious objections were raised until the Bogota Declaration.

Glazer, commenting on the French statement stated that the "French position on de facto appropriation of the geostationary orbit at least raises a real conflict since states with advanced technology do have the capability of preempting the use of that orbit to the exclusion of other states."[175]

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175. Glazer, J.H., "Domicile and Industry in Outer Space", 17, Columbia Journal of Transnational Law, 1978, 67, at 81. See also Dr. Gardner's testimony in Satellite Broadcasting: Implications for Foreign Policy, Hearings before the Sub-Committee on National Security, Policy and Scientific Development of the (US) House of Representatives' Committee on Foreign Affairs, 91st Congress, 1st Session (Washington, 1969), 78; Fawcett, J.E.S., and Parry, A., Law and International Resource Conflicts, (Oxford, 1981), 160. Haanappel also states that "only few nations and international organisations possess the technical capability to put communications satellites into geostationary orbit and the danger exists that these 'happy few' may monopolize the number of available positions in that orbit. Such a situation might then be regarded as an illegal "appropriation by use or occupation" in the sense of article II of the Outer Space Treaty": Haanappel, P.P.C., "Article II of the Outer Space Treaty and the Status of the Geostationary Orbit", XXI, Colloquium, 1978, 28.

Similarly, Valters concluded that "continued and exclusive use might indeed constitute inadmissible national appropriation of a portion of outer space."[176] Rights that are exclusive and unlimited in time are accorded to states that register their orbital assignments with the IFRB.[177] Such assignments cannot be cancelled without the consent of the registering state and thereby impose limitations on possible use by the late-comers. This rule would thus seem to contribute to appropriation of an important part of outer space and, accordingly, is contrary to the Outer Space Treaty. If there existed a time limitation on the use a state could make of a particular geostationary slot, such use would then be temporary and would not amount to national appropriation. Legal "rationale for the utilization of the orbit must lie in the fact that its utilization is temporary."[178]

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176. Valters, op. cit., supra note 173. See also Krause-Ablass, G.B., "The Need for International Community Systems of Satellite Telecommunications", XV, Colloquium, 1972, 81-82; Busak, J., "Quelques réflexions sur le statut juridique de l'orbite géostationnaire", XVIII, Colloquium, 1975, 37; Dudakov, op. cit., supra note 139, 71. According to Gibbons, a "reasonable interpretation of article II is that no state may permanently claim a segment of the orbit belt by placing a satellite therein": Gibbons, K.G., "Orbital Saturation: The Necessity for International Regulation of Geosynchronous Orbits", 9, California Western International Law Journal, 1979, 139, at 151.

177. See infra Chapter IV.

178. Gotlieb, op. cit., supra note 156, 241.

Gotlieb asserts that:

> At the present time (1980), no satellite can rest in geostationary orbit for more than five to seven years without drifting off, because of the limited amount of fuel it can carry to keep it in orbit. Temporary occupation does not, it is reasonable to agree, constitute appropriation. Moreover, the placing in orbit of a geostationary satellite by a launching state does not, according to ITU provisions or any rule of law, automatically allow the launching state to replace it in the same slot. It must follow the same procedure that it originally followed to use the orbit.[179]

His certainty about the life-span of satellites is questionable since already in 1980, they were capable of remaining in orbit for ten years or longer. INTELSAT-III (F-3), for example, was shot out of orbit in 1980 after 10

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179. ibid. Similarly, von Kries states that "(s)ince the stationing of a geostationary satellite precludes the use of the position by other states, this fact could already as such be construed as national appropriation of outer space or a part of it by means of use or occupation. It must be borne in mind, however, that this type of use is not an indefinite but a temporary one (i.e. confined by the lifetime of the satellite) comparable to any other common use of space by satellites; it can therefore not be regarded as an act of appropriation": von Kries, W., "The Legal Status of the Geostationary Orbit: Introductory Report", XVIII, Colloquium, 1975, 27, at 29-30. His views could also be refuted on the same grounds as those of Gotlieb.

years of active service.[180] Again, if a satellite having spent its operational life, were to drift off its orbit, its orbital position would not automatically become free for use by another state. Positions, already registered cannot be cancelled without the consent of the state concerned and international telecommunication law does not forbid a state to replace a decaying satellite with a new one.[181] The US replaced WESTAR I and II with WESTAR IV and V in the same slots.[182] The ATS-I and ATS-3 satellites were launched in 1966 and 1967 respectively and the orbital positions assigned to them are still shown in the Master Register. On the basis of Resolution 4 of the ITU Radio Regulations, Gotlieb holds that a state "must follow the same procedures that it originally followed" in the event that it wishes to replace a decaying satellite. The legal status of this Resolution (and its weaknesses), as well as the present state of the law[184] contradict Gotlieb's conclusions.

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180. See "End of an Era: A Satellite's Passing", in INTELSAT, Intellink, First Quarter, 1980, 3.

181. See infra Chapter IV.

182. See supra Chapter I.

183. See infra Appendix; 7 (1), Intermedia, January 1979, 17. See also Morgan, W.L., "Satellite Utilization of the Geosynchronous Orbit", 6(1), Comsat Technical Review (Spring, 1976), 195, at 201 and 203.

184. See infra Chapter IV.

If the provisions of this Resolution were strengthened and incorporated in the legally binding Radio Regulations, the "temporary use" of the orbit by a satellite could possibly be achieved and appropriation avoided. However, as the life-span of the satellites increases, these provisions may prove to be of little help. For example, would it be considered national appropriation to keep a satellite with a 25, or 50-year life-span in the same place in orbit throughout that period? The answer would seem to be affirmative, since such occupation could not reasonably be interpreted as temporary.[185]

In such cases, it might be advisable to allow the launch of the satellites only in accordance with an allotment plan agreed upon by all countries.[186] Another solution might be to charge the operator (user) an international duty or fee and to equitably distribute the funds so accumulated among the members of the international community.

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185. Gotlieb, op. cit., supra note 156, 242.

186. The use of the geostationary orbit in accordance with allotment plan drawn up through the ITU will not amount to national appropriation, see infra Chapter IV. See also Gotlieb, ibid. Rankin, C.E., "Utilization of the Geostationary Orbit - A Need for Orbital Allocation?", 13, Columbia Journal of International Law, 1974, 101.

An attempt to preclude any monopoly of the radio spectrum and the geostationary orbit was made by the 1971 WARC for satellite telecommunications which adopted Resolution Spa 2-1 (now no. 2). It provided that registration with the IFRB of any frequency or orbital position should not provide permanent priority for any one country or group of countries and should not create any obstacle to the establishment of space systems by other countries. As stated by Goedhuis, the rationale for this new approach is that:

> The recognition of priority rights in the case of terrestrial stations was regarded as both normal and natural from the standpoint of international law since every state is technically and economically able to operate non-space radio communication services on a footing of equality. With space communications, however, the situation was different since the ability to launch and operate artificial space objects is confined - at least for the present and the near future - to the handful of countries which possess the necessary technical and economic potential. The recognition of any priority rights of these countries would constitute an obstacle to the subsequent establishment of space systems by other states.[187]

The WARC Resolution is non-binding[188] and its provisions are opposed to the currently binding Radio

187. Goedhuis, D., "The Present State of Space Law", in Bos, M. (ed.), The Present State of International Law and Other Essays, (Kluwer, 1973), 201, at 228.

188. See *infra* Chapter IV, fn. 84.

Regulations. This renders the policy adopted in the Resolution worthless, though its rationale is in accordance with the letter and spirit of the Outer Space Treaty. The geostationary orbit, therefore, remains open to monopolization by a few states to the detriment of other states.

The Outer Space Treaty provides no mechanism for the formal interpretation of its provisions and states parties are free to interpret it individually or in appropriate international fora. The Bogota Declaration is the first serious attempt at interpreting article II. According to its signatories, the present method of use of the orbit "is simply a national appropriation".[189]

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189. See Bogota Declaration, op. cit., supra note 107. See also supra Chapter II; Glazer, op. cit., supra note 174, at 114; "Fears are no longer idle that states with advanced technology will appropriate such locations by de facto use. The process has, in fact, already begun with respect to the geostationary orbit. As a counterpoise to this de facto appropriation by states with advanced technology, those with none have now asserted de jure 'territorial' claims to sectors of the geostationary orbit notwithstanding the prohibitions against national appropriation set forth in the space Treaties". Marcoff interpreted the sovereignty claims as "a strong response and a measure undertaken by the equatorial states in retaliation for the continuing infringements of their rights, which are protected by international law and their interests which are recognized by the leading space law provision": Marcoff, op. cit., supra note 41, at 37. Similarly, according to Busak, the "claims put forward by equatorial countries many of which are developing countries, could also be seen as an attempt to secure a better distribution among all countries of the advantages offered

Numerous states have expressed their views with respect to the use of the geostationary orbit since then both in COPUOS[190] and at ITU Conferences.[191] The proposals put forward in COPUOS for the establishment of a special regime and the call for a special WARC (85/87) to guarantee equitable access to the orbit imply that its use is not in accordance with the recognized legal norms of international space law, including non-appropriation. Violation of the fundamental principles of space law necessitates specific regulation to govern the utilization of the geostationary orbit, a view which appears to be shared by the French delegate who has suggested that "(i)n return for such a de facto occupation, the state responsible for the satellite should agree to submit to certain rules".[192]

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by the specific characteristics of the geostationary satellite orbit and a better use of that orbit, for the benefit of those countries in particular": Busak, J., "The Geostationary Satellite Orbit - International Cooperation or National Sovereignty?", 45, T.J., 1978, 167, at 170. On the other hand, if the Bogota Declaration really purports to appropriate certain positions of the geostationary orbit by claim of sovereignty, then this is also contrary to the established principle of non-appropriation of outer space.

190. See supra Chapter II.

191. See infra Chapter IV.

192. See supra note 172.

E. Other Principles and Rules

All activities relating to the exploration and use of the geostationary orbit must be carried out in the interest of maintaining international peace and security and promoting international cooperation and understanding.[193] Objects carrying nuclear weapons or any other kinds of weapons of mass destruction must not be "placed" or "stationed" in the geostationary orbit.[194]

All satellites are registered with the state which launches or procures their launch[195] which in turn registers them with the UN Secretary-General.[196] The state of registration retains jurisdiction and control over, and ownership of its satellites.[197] A state party to the Outer Space Treaty is responsible for the activities of its public or private persons as well as those of international organisations of which it is a member.[198] It is also internationally liable for damage caused to any other state or its natural or juridical person

193. The Outer Space Treaty, Article III.

194. Ibid., Article IV.

195. Convention on the Registration of Objects Launched into Outer Space, 1975, op. cit., supra note 9, Article II.

196. Ibid., Article IV.

197. The Outer Space Treaty, Article VIII.

198. Ibid., Article VI.

by its satellite.[199] This provision of the Outer Space Treaty has been further elaborated in the 1972 Liability Convention[201] which established a detailed procedure with respect to liability for damage caused by space objects and the settlement of disputes. The launching state[201] has absolute liability to pay compensation for damage caused by its geostationary satellite - a space object - on the surface of the earth or to aircraft in flight.[202] However, if a satellite causes damage to other satellites in the geostationary orbit, the launching state is liable only if the damage is caused by its fault or the fault of persons for whom it is responsible.[203]

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199. Ibid., Artiole VII.

200. Convention on International Liability for Damage Caused by Space Objects, 1972, op. cit., supra note 9.

201. Ibid., Article I(c):

    A launching state means:

    (i) A state which launches or procures the launching of a space object;

    (ii) A state from whose territory or facility a space object is launched.

202. Ibid., Article II.

203. Ibid., III.

From the definition of the term "damage"[204] in the Liability Convention, it appears the the launching state is liable for physical damage only and not for harmful interference caused by its satellite to other satellites or to earth stations of other states.[205] Cases of such interference are regulated by the International Telecommunication Convention and Radio Regulations[206] which provide a mechanism through which to avoid, and/or to require the cessation of harmful interference.

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204. Ibid., Article I(a): The term damage means loss of life, personal injury or other impairment of health; or loss of or damage to property of states or of persons, natural or juridical, or property of international inter-governmental organizations.

205. Matte, op. cit., supra note 55, 82-83.

206. See infra Chapter IV.

CHAPTER IV: THE INTERNATIONAL TELECOMMUNICATION UNION AND ITS REGULATORY REGIME

The principles and rules of international telecommunication law, which regulate access to and use of the geostationary orbit, have been adopted primarily through international conferences organized by the International Telecommunication Union (ITU). The purpose of this Chapter is to discuss in detail the rights and duties of states with respect to access to, and use of the geostationary orbit. For this purpose, it is necessary to analyse the presently applicable 1973 International Telecommunication Convention (the constitution of the ITU)[1] and the relevant Radio Regulations[2] appended to it. Since the ITU's traditional role has been to regulate telecommunications per se, its competence with respect to regulation of the utilization of the geostationary orbit may be questioned. Attention will thus focus briefly on this aspect of its activites.

A. COMPETENCE

The 1979 ITU general WARC adopted resolution

1. International Telecommunication Convention, Malaga-Torremolinos, 1973, ITU, Secretariat, Geneva.

2. Radio Regulations (entered into force on January 1, 1982), ITU, Geneva, 1982.

BP (now No. 3) to hold a WARC in 1985 (originally in 1984) to "guarantee in practice for all countries equitable access to the geostationary satellite orbit".

The competence (jurisdiction and/or nature of activities) of an organization is determined by its constitution and/or other related legal instruments. The ITU is no exception to this general rule. It has always been, and continues to be an international forum (centre) through which its member nations have been/are able to harmonize their actions for the attainment of common goals with respect to telecommunications of all kinds.[3] Its competence or jurisdiction stems from the

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3. The purposes of the ITU (expressly incorporated for the first time in the 1947 Atlantic City Convention , which have continuously been repeated in each revision of the Convention) are:

"a) to maintain and extend international cooperation for the improvement and rational use of telecommunications of all kinds;

b) to promote the development of technical facilities and their most efficient operation with a view to improving the efficiency of telecommunications services, increasing their usefulness and making them, so far as possible, generally available to the public;

c) to harmonize the actions of nations in the attainment of those common ends".

Article 4(1), the 1973 ITU Convention, op. cit., supra note 1.

common decisions of ITU members incorporated in the ITU Convention and other related agreements, with respect to the kind of telecommunication or related activities to be regulated, and the manner in which to carry out these decisions.

Decisions which are taken mainly at the intergovernmental ITU conferences (plenipotentiary and administrative)[4] in the form of draft international treaties or conventions, are not binding on ITU members unless they ratify or adhere to them. In other words, the treaties which determine or prescribe ITU's competence are not the instruments of the ITU itself but, rather the expression of the sovereign will of its members.[5] Therefore, ITU's competence is derived from the common decisions of its members, who are free to change, increase or decrease it as and when they wish.

More than 100 years of history shows that the ITU has been a dynamic and pragmatic organization and that its members have always revised and up-dated its mandate

4. See <u>infra</u> Chapter IV.B.

5. For details, see Mosler, H., <u>The International Society as a Legal Community</u>, (Alphen van den Rijn, 1980), 181-182.

to make, and keep it an all-embracing, comprehensive body capable of dealing with telecommunications of all kinds.[6] Although created in 1865 to deal with telegraphy, the ITU's jurisdiction has periodically been extended to include not only telephone and radio, but also various communications uses (services), technical standards for telecommunication facilities, tariffs for telecommunications services, sharing of natural resources such as the radio spectrum, etc.[7] Its organizational

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6. For details see, generally, Codding, Jr., G.A., The International Telecommunication Union, (Leyden, 1952); ITU, From Semaphore to Satellite, (Geneva, 1965); Leive, D.M., International Telecommunications and International Law: The Regulation of the Radio Spectrum, (Leyden, 1970); 40-80; Mili, M., "International Jurisdiction in Telecommunication Affairs", 40, T.J., 1971, 122-128, 174-182, 286-290, 344-348, 562-566, 746-749; Jacobson, H.K., "International Institutions for Telecommunications: The ITU's Role", in McWhinney, E., The International Law of Communications, (Leyden, 1971), 51 et seq., Evensen, J., "Aspects of International Law Relating to Modern Radio Communications", in The Hague Academy of International Law, 115, Recueil des cours, 1965, 477 et seq.; Luard, E., International Agencies: The Emerging Framework of Interdependence, (London, 1977), 27 et seq.

7. Although the 1885 Administrative Conference of the International Telegraph Union had taken notice of the new means of communication (i.e. telephone), it was the 1903 Plenipotentiary Conference of the Union which incorporated elaborated provisions, regarding telephone in the Convention of the Union. Therefore, it has aptly been stated that from 1903, "the Union could be entitled the International Telegraph and Telephone Union":

Codding, op. cit., supra note 6, 30 (emphasis in the original). The regulation of radio or wireless commenced with the International Radiotelegraph Conference of 1906, which adopted the first International Radiotelegraph Convention and created the International Radiotelegraph Union, and which entrusted the Bureau of the International Telegraph Union at Berne to serve as the Bureau of the new Union also (see Codding, op. cit., supra note 6, 87-97). This action of the 1906 Conference "seems to have been a fortunate one. From the outset, coordination and cooperation were established between the two unions, which later facilitated the merger of them in the Telecommunication Union of today" (Evensen, op. cit., supra note 6, 486). Since, at that time, radio was considered to be "simply an extension of telegraphy", the 1906 Conference adopted regulations similar to those for telegraph and telephone drafted by the Telegraph Union. In fact, the following general provision adopted at the 1906 Conference brought uniformity of the legal regimes governing the means of communication:

"The provisions of the International Telegraph Regulations shall be applicable analogously so far as they are not contrary to the provisions of the present (Radiotelegraph) regulations." (Cited in Codding, op. cit., supra, note 6, 94).

On the other hand, since radio was then used for the purpose of sending telegraphs only, it was natural that the Telegraph Union should also adopt rules to regulate all international telegraphs irrespective of the means of communication. This issue was raised at the Lisbon Telegraph (administrative) Conference of 1908 which adopted "administrative rules concerning the transmission, over the international telegraph network, of telegrams originating from, or destined to, a radio station". (Codding, ibid. 79). However, these rules were limited in nature, since it was within the exclusive competence of the Radiotelegraph Union to deal with radiotelegraphs. In order to avoid any encroachment of the Radiotelegraph Union, the Lisbon Conference adopted the following provision that "modifications of the present regulations, relating to radiotelegrams, which become necessary in consequence of decisions of subsequent Radiotelegraph Conferences, will be put into force on the date fixed for the application of the provisions agreed upon by each of these latter Conferences." (Cited in Codding, ibid., 80). This shows that structure,[8] permits a uniform approach to all methods of telecommunication which are considered to constitute a single entity and have been treated as such. It is, therefore, not surprising that in 1947 the United Nations recognized the ITU as the sole specialized agency for

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the three means of communication were considered complementary to each other, rather than competitors, to allow their normal growth though two different international treaties have been adopted to establish their regulatory regimes. Thus, there has always been coordination and cooperation between the various means of communication and all formed a composite competence though strictly legally speaking were governed by separate international treaties. Even that artificial division was done away with in 1932 when a single Union (i.e. the present ITU) was created to regulate all the means of communications, and "it was finally recognized that telecommunications constituted a single entity and should be treated as such." (Mili, op. cit., supra note 6, 344-345).

The term "service" desigantes a branch of telecommunications such as telephony, television, etc. For definitions of various services see Annex 2 to the 1973 ITU Convention, op. cit. as well as Nos. 20-57 (radio services) of the Radio Regulations, 1982.

8. For details, see infra Chapter IV.B.

telecommunications.[9]

ITU's competence to regulate the use of the geostationary orbit is, in fact, an extension of its jurisdiction over the radio spectrum for space services,[10] which in turn grew out of its traditional activities relating to radio communications.[11] Radio link is a necessary instrumentality for the exploration and use of outer space, and virtually no meaningful activity can be undertaken in outer space without radio communications. It has rightly been stated that

> Without reliable telecommunications in space, there can be no guidance, little tracking, no telemetry or command system, no contact with astronauts, no reception of scientific

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9. See "Agreement Between the United Nations and the International Telecommunication Union", Annex 5, The International Telecommunication Convention, in Final Acts of the International Telecommunication and Radio Conferences, Atlantic City, 1947, 80-E *et seq*. This Agreement is still in force and is incorporated, as Annex 3, in the 1973 International Telecommunication Convention.

10. The term "space service" designates a radiocommunication service in which spacecraft (satellite) or other objects in outer space are used.

11. As defined in No. 20 of the 1982 Radio Regulations, radiocommunication service involves "the transmission, emission and/or reception of radio waves for specific telecommunication purposes."

> data from space probes, no commercial use of space communications and little radio astronomy.[12]

Such radio link must be interference-free because any interference in radio communications used for space programmes could not only harm a space activity[13] but also endanger the life of astronauts. Thus, it is necessary that legal guarantees be provided against any such interference. Since satellites or other objects

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12. Jasentuliyana, N., "Regulatory Functions of ITU in the Field of Space Telecommunications", 34 Journal of Air Law and Commerce, 1968, 62. See also Glazer, J.H., "The Law-Making Treaties of the International Telecommunication Union Through Time and In Space", 60 Michigan Law Review, 1962, 269, at 284-7; Jenks, C.W., Space Law, (London, 1965), 251; Estep, S.D., "International Law-Makers in a Technological World: Space Communications and Nuclear Energy", 33, The George Washington Law Review, 1964, 162, at 167; First Report by the International Telecommunication Union on Telecommunication and the Peaceful Uses of Outer Space, (Geneva, 1962), 1 (hereinafter, First Report by the ITU); Evensen, op. cit., supra note 6, 551.

13. In this respect, it is to be noted that during the 1979 probes of Titan - a moon of Saturn - by Pioneer II, extremely important data was lost because of interference in radio communication between the satellite and the earth station. This was caused by a Soviet satellite transmission, the U.S. having neglected to request that it be turned off. See Matte, N.M., Aerospace Law: Telecommunications Satellites, (Toronto, 1982), 210.

launched in outer space cross national boundaries, guarantees have to be achieved at the international level.[14] They are needed not only for the successful operation of satellites or other spacecraft, but also for some terrestrial radio services which could also be subject to harmful interference.[15]

After the dawn of the space era in October 1957, the search began for an international forum through which guarantees against interference could be achieved

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14. See Report on Radio Frequency Control in Space Telecommunications, 86th Congress, 2nd Session, (Washington, 1960), 87.

15. During the first twenty-six months of the space age, both the USSR and US launched their satellites using radio frequencies which were not allocated specifically for space exploration. Interference was caused to certain radio services operating correctly. See for details, Haley, A.G., "Law of Outer Space - Radio Controls Urgently Needed", in Space Law: A Symposium Prepared at the Request of Honorable Lyndon B. Johnson, Chairman, Special Committee on Space and Astronautics, U.S. Senate, 85th Congress, 2nd Session (Washington, 1959), 458 et seq.

for space services. It was generally argued[16] that the ITU was the most suited organization for this purpose firstly, because of its extensive experience in the regulation of radio communications in general; secondly, because of the possible interference which could ensue if the radio spectrum was regulated by two different organizations for terrestrial and space radio use; and thirdly, satellite communications were not considered to be a new means of communication but rather a sophisticated method or technique by which to make use of the old means, i.e., Radio. The ITU's competence to regulate the use of the radio spectrum for space activities was, therefore, generally, and readily accepted.

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16. In 1959, the UN Ad hoc COPUOS pointed out that "there is already in existence and operation an international organization suited to consider the problems of radio frequency allocation for outer space uses, namely ITU": See UN Doc. A/4141 (cited in Jasentuliyana, op. cit., supra note 12, 63). See also Jenks, op. cit., supra note 12; Estep, op. cit., supra note 12; Jessup, P.C. and Taubenfeld, H.J., Controls for Outer Space, (N.Y., 1959), 239-240; Haley, A.G., Space Law and Government, (N.Y., 1963), 172-173; Valters, E.N., International Law of Communications Satellites: Scarce Resources in a New Environment, 1970, (unpublished doctoral thesis submitted to Columbia University), 86; Smith, D.D., International Telecommunication Control, (Leyden, 1969), 142 and 160 et seq.; Matte, N.M., op. cit., supra note 13, 93; Garmier, J., L'UIT et les télécommunications par satellites, (Brussels, 1975), 35.

In April 1959, the CCIR established a special study group for space communications.[17] During the same year, the ITU plenipotentiary Conference, meeting at Geneva, revised the 1952 ITU Convention and took note of the developments and problems which had arisen in the international field from the use of outer space for peaceful purposes. Though no change was made to the Convention to incorporate ITU's responsibility in this new field, the Conference adopted a resolution[18] in which it considered "the importance of the role that telecommunication, and in consequence the Union, will necessarily play in that sphere". This is the first official statement concerning ITU's competence over space radio communications. The general WARC, meeting together with the Plenipotentiary Conference, considered the requirements for space activities and expressly acknowledged that "the Union is the specialized agency in the field of telecommunications and that it is necessary for the Union to provide adequate frequency allocations for all categories of space radiocommunications."[19] It adopted

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17. For details see, First Report by the ITU, op. cit., supra note 12, 4.

18. For the text of the Resolution, see Annex I of the First Report by the ITU, op. cit., supra note 12, 9.

19. Radio Regulations, 1959, (Reprinted, Geneva, 1963), Recommendation No. 36.

some provisions in which it allocated certain frequency bands for space research purposes and defined certain new (space) services and stations.[20] The provisions were incorporated in the 1959 Revision of the 1947 General Radio Regulations. Since the 1959 ITU Convention, allocation of frequencies has been for "research" purposes only. The WARC therefore recommended that an extraordinary world administrative radio conference be convened in 1963 to decide on the allocation of frequency bands for space radiocommunications, after an examination of technical progress in this field and the results of relevant studies undertaken by the CCIR.[21]

Pursuant to this recommendation, an Extraordinary Administrative Radio Conference (EARC) was convened in 1963 which allocated frequency bands on a shared and/or exclusive basis not only for space research but also for operational space radiocommunications to meet existing

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20. Ibid. Article 1 (definitions of terms; Space Service, Earth Space Service, Space Station, and Earth Station) and Article 5 (Table of Allocation of Frequencies).

21. See supra note 19.

as well as future needs.[22] In addition, the EARC adopted definitions of new space services and stations and the procedure for notification and registration of frequency assignments in the Master International Frequency Register.[23] The 1963 Conference thus initiated the extension of ITU's responsibility into a new area of space radio communications. The 1963 EARC expressly recognized the interest and right of <u>all</u> ITU members to equitable use of the frequency bands allocated for space services; and recommended that the principles of justice and equity be adopted in the sharing of these bands in the mutual interest of all nations.[24] To enhance the technological capability of the developing countries, the Conference resolved that technical and financial assistance be facilitated and provided to these countries in the development of

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22. See <u>Final Acts of the Extraordinary Administrative Radio Conference to Allocate Frequency Bands for Space Radiocommunications Purposes</u>, Geneva, 1963, ITU, Annex 3 (Revision of Article 5 of the RAdio Regulations - The Table of Frequency Allocation).

23. <u>Ibid.</u>, Annexes 1 and 5.

24. <u>Ibid.</u>, Recommendation No. 10A (Relating to the Utilization and Sharing of Frequency Bands Allocated to Space Radiocommunications).

space radiocommunications.[25]

The principles and rules adopted by the 1963 EARC were further extended and strengthened by the World Administrative Radio Conference for Space Telecommunications (WARC-ST) held in 1971.[26] While previous ITU conferences had been concerned with the management of the radio spectrum for space communications only, the 1971 Conference introduced a new element, i.e., the management of the geostationary orbit. The 1971 Conference discussed the suggestion that a special WARC be convened to prepare a World Plan for the use of the geostationary orbit - a limited natural resource. The suggested conference was, however, considered premature;[27] nevertheless, the 1971 Conference specifically recognized that the appropriate orbital positions (and radio frequencies) were limited and that

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25. Ibid., Resolution No. 4A (Relating to International Cooperation and Technical Assistance in the Field of Space Radio Communications).

26. See Final Acts of the World Administrative Radio Conference for Space Telecommunications, Geneva, 1971.

27. See The Future of the International Telecommunication Union: A Report for the 1973 Plenipotentiary Conference, prepared by D.M. Leive (for Panel on International Telecommunications Policy of the American Society of International Law), Washington, 1972, 44.

all countries had equal rights of use.[28] It recommended that the next appropriate WARC be empowered to deal with the issue of "undue difficulty", if faced by administrations, in the use of frequencies and orbital positions.[29] The possibility of such difficulty was anticipated despite the provisions adopted by the 1971 Conference, with a view to the accommodation of all space systems.

The views expressed by the 1971 Conference in a resolution and recommendation seem to have enlarged the ITU's responsibility to embrace the management of use of the geostationary orbit and the distribution of this limited natural resource among its member countries. This was put in definitive terms by the 1973 ITU Plenipotentiary Conference, which adopted legally binding commitments for ITU to effect rational use of the geostationary orbit. The ITU Convention, revised by the 1973 Conference, declared the orbit to be a limited natural resource.[30] Member countries undertook to use it efficiently and economically so that all countries would have equitable access. The powers of the IFRB were also enlarged to include functions

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28. Resolution No. Spa. 2-1, see supra note 26.

29. Recommendation No. Spa. 2-1, ibid.

30. International Telecommunication Convention, 1973, Article 33(2).

concerning the geostationary orbit, which are similar to those relating to the radio spectrum.[31] This extension of the ITU's role has been justified on the basis of the close relationship between radio frequencies and the geostationary orbital positions of space stations. The orbit can be used only with radio frequencies; and the orbital positions of space stations need to be pre-determined in order to avoid harmful interference. Sarkar points out that the "geostationary orbital positions and frequency spectrum cannot be separated from one another (and they) must be considered equally and simultaneously for the purpose of technical criteria as well as of regulation of all space radio communication services."[32] Thus they are referred to as a combined orbit/spectrum resource.

In the regulatory regime for terrestrial radio communications established through the ITU, the position of a radio station has always played a dominant role. It is important to determine whether it will cause inter-

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31. Ibid., Article 10(3).

32. Sarkar, S.K., "Geostationary Orbital Positions for Space Stations", XX, Colloquium, 1977, 450, at 453. See also "The Most Valuable Parking-Place in Space", 7, Intermedia, 1979, 15, at 17.

ference to, and be interfered with by other radio stations. The orbital position of a station in any space service is important for the same reasons. In other words, the proper and effective regulation of the radio spectrum for space services implies that orbital positions of space stations should be notified to, and registered with the ITU; hence regulated by the ITU.

Above all, it must be borne in mind that the regulation of the geostationary orbit by ITU is not regulation of the orbit alone; it is primarily the regulation of the radio spectrum for space services. The question of distribution of geostationary orbital positions among the member countries of the ITU is subsidiary and closely related to its primary function, to maintain and extend international cooperation for the improvement and rational use of telecommunications of all kinds (including radio communications).[33]

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33. International Telecommunication Convention, 1973, Article 4. It is interesting to note that under the first international treaty to regulate radio (i.e., International Radiotelegraph Convention of 1906), the contracting parties undertook to inform the Bureau of the Telegraph Union, for publication of the geographical location of their coastal radio stations, together with other relevant information. See Codding, op. cit., supra note 6, 95. Since then, the geographical locations of radio stations have always been taken into consideration in devising regulatory regimes for radio communications. See also Butler, R., "World Administrative Radio Conference for Planning Boradcasting Satellite Service", 5 J. Space L.,

The extention of the ITU's competence over the management of the geostationary orbit is justified on the basis of the legal doctrine of "implied powers", which means that an international organization "must be deemed to have those powers which, though not expressly provided in its charter (or constitutional Convention), are conferred upon it by necessary implication as being essential to the performance of its duties."[34]

One of the ways in which to distribute radio frequencies equitably among (or to guarantee equitable access to) all ITU members is through the adoption of allotment (assignment) plans. There is express provision for the ITU's competence in this respect in the

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1977, 93, at 98. In a similar vein, the working paper jointly submitted by Canada and Sweden to the Second Session of the Working Group on Direct Broadcast Satellite, emphasized that "the questions of frequency allocations and use of the synchronous equatorial orbit are technically interrelated and are fundamentally similar as regards the administrative need for international cooperation and coordination. The positioning of satellites in orbital slots can be seen as part of the process of frequency coordination (just as the location of terrestrial radio stations is an essential element in this process). The combination of spectrum and orbital slots is referred to as a 'multidimensional spectrum'": UN Doc. A/AC.105/59 (1969), 11.

34. The International Court of Justice in Reparation for Inquiries suffered in the service of the United Nations, ICJ, Reports of Judgments, Advisory Opinions and Orders, 1949, 174, at 182. This principle of law was also applied to the International Labour Organization by the Permanent Court of International Justice in its Advisory Opinion No. 13 of July 23, 1926; ibid.

Radio Regulations;[35] and, since 1930,[36] various plans have been adopted, both on a world-wide and regional level.[37] Such an allotment plan for space radio communication services was prepared for the first time by the ITU's WARC for the Broadcasting

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35. Radio Regulations, 1982, Article 7(3), No. 376 specifies that "Members may, under the provisions for special arrangements in Article 31 of the Convention, conclude, on a world-wide basis, and as a result of a conference to which all members have been invited, special agreements concerning the assignments of frequencies to those of their stations participating in a specific service, on condition that such assignments are within the frequency bands allocated exclusively to that service". For similar provisions in the 1947 and 1959 Radio Regulations, see Article 4.3 of the Radio Regulations in <u>Final Acts of the International Telecommunication and Radio Conferences</u>, Atlantic City, 1947 and Article 4.3 of the Radio Regulations, Additional Radio Regulations, Additional Protocol, Resolutions and Recommendations - Geneva, ITU, 1959.

36. The first allotment (assignment) plan, whereby frequency channels were alloted to member countries' respective radio broadcasting stations, in the European area, was the Lucerne Plan prepared and adopted by the First European Broadcasting Convention held at Lucerne in 1933. It was signed by 27 participating States. For the text of the Plan, see Hudson, M.O., <u>International Legislation</u>, Vol. VI (1932-34), 345-363.

37. See Appendixes Nos. 25, 26, 27 and 30, Radio Regulations, 1982; Evensen, <u>op. cit.</u>, <u>supra</u> note 6, 503-9 and 519-523. See also <u>Final Acts of the Regional Administrative MF Broadcasting Conference</u>, Region 2, Rio de Janeiro, 1981.

Satellite Service in 1977.[38] The 1977 Plan alloted particular frequency channels (in the 12 GH_z bands) and geostationary orbital positions to space radio stations of ITU member countries in Regions 1 and 3. Similarly, a detailed plan is to be adopted for Region 2 in 1983.[39] Although the 1977 Plan guaranteed equitable access to the appropriate geostationary orbital positions, such guarantee was necessary for the distribution of radio frequencies among ITU members.[40]

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38. See Final Acts of the World Administrative Radio Conference for the Planning of the Broadcasting-Satellite Service in Frequency Bands 11.7 - 12.2 GH_Z (in Regions 2 and 3) and 11.7 - 12.5 GH_Z (in Region 1), Geneva, ITU, 1977. The 1977 Plan has been incorporated in the 1982 Radio Regulations as Appendix 30, by the 1979 WARC, (see Appendix 29 of the Final Acts of the World Administrative Radio Conference, Geneva, ITU, 1979) and came into force on January 1, 1979. For details, see infra Chapter IV.C.3.

39. Radio Regulations, 1982, Resolution No. 701.

40. The primary functions of the 1977 WARC, as mentioned in its Final Acts (op. cit., supra note 38), were:
"-to establish the sharing criteria for the bands 11.7-12.2 GH_Z (in Regions 2 and 3) and 11.7-12.5 GH_Z (in Region 1) between the broadcasting-satellite service and the other services to which these bands are allocated;

-to plan for the broadcasting-satellite service in the above mentioned bands;

-to establish procedures to govern the use of these bands by the broadcasting-satellite service and by the other services to which these bands are allocated."

The ITU's competence to allot geostationary orbital positions "can be justified on the same grounds as the allotment of radio frequencies".[41] Its legitimacy can also be seen in the declarations of various ITU members according to whom the allotment of positions on the geostationary orbit for broadcasting satellites are entirely in conformity with generally recognized principles and rules of international law, including the 1973 ITU Convention, the Radio Regulations and other instruments of international law regulating ques-

41. Matte, N.M., op. cit., supra note 13, 104. Cf., Csabafi, I.A., The Concept of State Jurisdiction in International Space Law, (The Hague, 1971), at 154: ITU "does not have power to allocate parking locations" on the geostationary orbit. See also Christol, C.Q., "The Geostationary Orbital Position as a Natural Resource of the Space Environment", 26, Netherlands Institutional Law Review, 1979, 5, at 11: "No international institution exists having allocative powers with respect to orbital slots, and it is unlikely that such an institution will be formed in the near future". However, in 1982, he concluded that the "ITU through 1977, despite some assessments that would constrict it to fairly narrow influences and powers, had staked out for itself a wide-ranging function regarding what has come to be identified as the geostationary orbit/spectrum resource. The ITU's involvement stems from Article 33 of the 1973 Convention". See Christol, C.Q., The Modern International Law of Outer Space, (New York, 1982), 578.

tions of space communications.[42] Also, it is both "logical and desirable", since ITU "is an international, intergovernmental organization having almost universal membership and represents all political and economic philosophies, as well as rich and poor, developed and developing."[43]

B. ORGANIZATIONAL STRUCTURE AND LAW-MAKING PROCESS

The growth of international relations has been a major reason for the origin and development of international organizations.

> In those fields where cooperation between governments became imperative, there developed the public international unions; these were, in fact, an essay into international organization in the administrative sphere. 44

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42. Final Protocol No. 10 (for the Byelorussian Soviet Social Republic, the People's Republic of Bulgaria, the Hungarian People's Republic, the Mongolian People's Republic, the People's Republic of Poland, the German Democratic Republic, the Ukrainian Soviet Socialist Republic, the Czechoslovak Socialist Republic, the Union of Soviet Socialist Republics), Final Acts, op. cit., supra note 38. (For the Federal Republic of Germany, Austria, Belgium, Canada, Denmark, United States of America, Finland, France, Ireland, Italy, Luxembourg, Monaco, Norway, Kingdom of the Netherlands, the United Kingdom of Great Britain and Northern Ireland, Sweden), ibid.

43. Matte, op. cit., supra note 13, 105.

44. Bowett, D.W., The Law of International Institutions, (London, 1963), at 5.

Electric telegraphy was one such field and hence the establishment of the International Telegraph Union in 1865. It later developed to become the International Telecommunication Union, with an elaborate and complex organizational structure to deal with telecommunications of all kinds. The primary reason for the ITU's growth is the nature of its activities, especially radio communications, which have been/are developing rapidly and necessitate extensive international cooperation for their successful operation, not only at the international level but also within the national boundaries of each state. Indeed, no state can afford not to cooperate with other states at least in so far as radio communications are concerned. It is for this reason that 155 countries are members of the ITU which makes it the most adhered to organization. In light of this fact, it is interesting to examine the ITU's present organizational structure especially as regards decision-making with respect to regulation of the geostationary orbit.

1. Purposes and Membership

The purposes and functions of the ITU are identical to those first specified in the 1947 ITU Convention, with the addition of two new functions, decided upon at the 1965 Plenipotentiary Conference. They are reiterated in article 4 of the presently applicable Convention and state that the ITU shall

> Article 4(b): coordinate efforts to eliminate harmful interference between radio stations of different countries and to improve the use made of the radio spectrum; ...
>
> Article 4(d): foster the creation, development and improvement of telecommunication equipment and networks in developing countries by every means at its disposal, especially its participation in the appropriate programmes of the United Nations.

The necessity for the first function arose out of the rapidly increasing congestion in the radio spectrum; while the second was added to respond to the political realities of the 1960's. "Twenty-four new nations had achieved independence in the 16-year period between 1945 and 1959. In 1960, the trickle became a flood. Eighteen new States came into existence in 1960 alone."[45] Having become independent and having acquired membership in the United Nations, they immediately joined the ITU thus swelling its ranks from 78 members at the time of the Atlantic City (1947) Telecommunication Conference to 125 by the Montreux (1965) Conference.[46] The new states were the underdeveloped countries, with desperately

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45. Codding, G.A., "The United States and the ITU in a Changing World", 44, T.J., 1977, 231, at 232.

46. Ibid., 233.

inadequate telecommunication networks. They turned to the UN and its specialized agencies, including the ITU, for assistance. It is at their insistence that the 1965 Plenipotentiary Conference added to the ITU's responsibility, that of providing technical assistance to the developing countries for which financial support was to be forthcoming from the United Nations Development Programme (UNDP). Since 1965, ITU has undertaken numerous activities to carry out this task.[47] An important

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47. For example, in 1968, the ITU reported that it had "through its various programs of technical cooperation, provided assistance to developing countries for a total value of U.S. $5,557,688 in the form of 231 expert missions, 274 fellowships implemented or under implementation and U.S. $809,800 equipment delivered": see ITU, Report on the Activities of the International Telecommunication Union in 1968, (Geneva, 1969), 36. It is interesting to compare the 1968 cooperation programmes with those of 1979. "The volume of aid rendered by the Union to developing countries in 1979 was considerably increased due to the improved financial situation of the UNDP. The main features of aid provided from all sources were: (a) 584 expert missions were carried out; (b) 618 fellows underwent training abroad, (c) 210 projects were assigned to the Union, (d) U.S. $6,609,758 worth of equipment was delivered, (e) 4 projects are being implemented... The total expenditure for project implementation amounted to U.S. $26,064,268 against U.S. $21,614,714 in 1978": see ITU, Report of the Activities of the International Telecommunication Union in 1979, (Geneva, 1980), 70. It is generally recommended that technical assistance to the developing countries should be continued and increased. "All of the commissions which have studied the North-South dilemma", as observed by Segal, "have argued strongly that developing countries require much greater access to international development finance. There is clearly a role for the ITU in facilitating access to international development finance for the third world countries": Segal, B., Preparatory Study for the 1982 ITU Plenipotentiary Conference, (Ottawa, 1982), 23.

implication of the provisions of article 4(b), and other provisions in the Convention,[48] is that the special interests and needs of the developing countries have been recognized and concrete steps are being taken towards improving their situation.

ITU membership comprises countries listed in Annex I of the 1973 Convention, which sign, ratify or accede to the Convention.[49] Any country which becomes a member of the UN, and any sovereign country which is not listed in Annex I and has not become a member of the UN, may also accede to the ITU Convention in accordance with article 46.[50] It is interesting to note the difference in status of countries which may accede to the ITU Convention. Non-members of the UN must be sovereign states in order to be eligible for

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48. For example, see Article 11(1) (3) of the 1973 ITU Convention; Article 11(4); Article 8(4) (3). See also resolutions adopted by the 1973 Plenipotentiary Conference, e.g. Resolution No. 17 (Improvement of Union Facilities for Rendering Technical Assistance to Developing Countries); Resolution No. 18 (Application of Science and Telecommunication Technology in the Interest of Developing Countries). Resolution No. 19 (Special Measures for the Least Developed Countries), Resolution No. 20 (Inter-Country Projects Financed by the United Nations Development Programme - U.N.D.P. - in the Field of Telecommunications), and Resolution No. 21 (Special Fund for Technical Cooperation).

49. International Telecommunication Convention, 1973, Article 1(1)(a).

50. *Ibid.*, Article 1(1) (b) and (c).

ITU membership, but a country, which is not sovereign and which is accepted as a member by the UN,[51] is also eligible to become a member of the ITU. The application for membership from a sovereign, non-UN member country must first be approved by two-thirds of the ITU members for such country to be able to accede to the organisation in accordance with article 46.[52]

The operation of traditional international telecommunications (non-space) have been carried out by states (or their duly recognized and authorized private entities) on a bilateral or multilateral basis. The concerned states were directly and individually responsible for their actions and such responsibility was not passed on to their operating agencies or consortiums. However, the possibility of international telecommunications via satellite has resulted in the emergence of new international organizations, such as INTELSAT, INMARSAT, INTERSPUTNIK, etc., which are international legal persons in their own right. Within less than two decades, these organizations have become the giants in the telecommunication field and utilize the orbit/

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51. According to Article 4 of the UN Charter any "peace loving" state - which accepts the obligations contained in the Charter, and in the judgment of the UN, is able and willing to carry out these obligations - may become its member.

52. See <u>supra</u> note 50.

spectrum resource to a greater extent than the majority of countries. For example, as of May 1982,[53] INTELSAT had forty-seven geostationary orbital positions and their number may be expected to increase. This makes INTELSAT the largest single user of the geostationary orbit. Since ITU's regulatory regime is primarily intergovernmental in nature, international organizations such as INTELSAT - while retaining a distinct legal personality - commenced operation within the existing regulatory framework by authorizing one of its members (for example, the US in the case of INTELSAT) to act on its behalf, among other things, with respect to the notification and registration of frequency and orbital position assignments for INTELSAT satellites, with the ITU. In other words, INTELSAT has no legal "status" or "standing" before the ITU. It is submitted that the ITU Convention and Radio Regulations should be amended to grant such "status" by entitling international organizations, like INTELSAT, to become associate members, and thereby according them the rights, and imposing the responsibilities provided for by the ITU Convention and Radio Regulations. This is desirable for the following reasons:

a) Although no serious conflict of interest has yet arisen between INTELSAT and its members, this

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53. See <u>infra</u> Appendix

possibility cannot be ruled out in the future particularly as the appropriate portions of the spectrum/orbit resource become congested, and if INTELSAT, like any other user of this scarce resource, makes exaggerated claims for orbital positions and frequencies which it does not immediately require. As the major user of this resource, INTELSAT can be seen as restricting the rights not only of its lesser developing user-members but also those of its more powerful members, like the US. The latter is one of the largest users of the spectrum/orbit resource for national needs, and thus has interests which compete with those of INTELSAT. In the long run, continuation of the present system whereby INTELSAT is represented in the ITU by the US is neither in the interests of INTELSAT nor its individual members. Since decisions on major issues within INTELSAT are made on the basis of weighted votes the smaller and developing countries with less voting power, are unable to exert any influence or control. INTELSAT does not directly participate in the ITU plenipotentiary and administrative conferences, and cannot be questioned or held directly responsible for its actions, i.e. it is not accountable internationally for its use of the spectrum/orbit resource. Nor can it directly protect its interests, which may be different from, or even opposite to those of its individual members. The seriousness of the problem is evident if consideration is given to a possible conflict arising between INTELSAT and the US on the use of the spectrum/orbit resource.

Legally speaking, radio frequencies and orbital positions for all INTELSAT satellites are registered, in the name of the US, in the Master International Frequency Register (Master Register). It is the US which is entitled to the rights, and subject to the obligations which ensue from such registration, and not INTELSAT, the real owner and operator of the satellites, which has a legal personality distinct from that of the US. The present system was initiated during the interim period of INTELSAT for the sake of convenience and because there were doubts about its possible success and the extent of its operations. However, as a well-established and powerful telecommunication operator, it is time that the system was changed.

b) The participation of private operating entities and international organizations in the ITU is not a new phenomenon. Under the present Convention, international organizations may be invited as observers to the administrative conferences and to the meetings of the CCIR and CCITT.[54] However, they do not have

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54. International Telecommunication Convention, 1973, Articles 40, 61(2) and 68(2).

the right to participate, or to voice their concerns. Present provisions could serve as a precedent for more active participation by international organizations in ITU affairs. The UN already enjoys the rights, and is bound by the obligations of the ITU Convention and Radio Regulations, with respect to its telecommunication services. It is also entitled to attend all conferences of the Union, including meetings of the CCIR and CCITT in a consultative capacity.[55]

The admission of international organizations to the ITU as associate members would ensure their total participation and would also provide an additional source of financing. The concept of associate membership formed

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55. International Telecommunication Convention, 1973, Article 39(2), and Article XVI of Annex 3. The Panel on International Telecommunication Policy of the American Society of International Law, as early as 1972, suggested that "a formula should be adopted to insure that appropriate articles of the ITU Convention and Radio Regulations would apply to international organizations and other international entities which owned, operated, or were responsible for the operation of international telecommunications facilities, provided that those organizations declared their acceptance of the rights and obligations of the specified provisions of the ITU Convention and Radio Regulations. In this way, the organization would have standing and rights where necessary, and also obligations as appropriate": see supra note 27, 43.

part of the ITU conventions from 1947 to 1973. As introduced in 1947, any territory or group of territories not fully responsible for the conduct of its international relations could be admitted as associate members of the ITU, if a member accepted the Convention on their behalf and the application was approved by a majority of ITU members.[56] Similarly, any trust territory, on behalf of which the UN had accepted the Convention and had sponsored its application, could also be admitted.[57] Two important points are to be noted from these provisions, i.e. territories not fully responsible for the conduct of their international relations were allowed to become associate members; and the UN - an international organization - was entitled to accept the Convention. While the precedent established by these provisions is not particularly strong, the fact remains that if an international organization is able to accept the Convention on behalf of a territory, there is no reason why it should be barred from accepting the Convention on its own behalf.

c) Acceptance of international treaties by international organizations has already been initiated.

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56. The Atlantic City ITU Convention (1947), Article 1(4)(b).

57. Ibid., Articles 1(4)(c) and 19.

For example, all the space treaties concluded by the UN, including the 1967 Outer Space Treaty contain provisions regarding their acceptance by international organizations.[58] Above all, international organizations are recognized as subjects of international law, with a distinct international legal personality. Thus, they can operate at par with states although they may not be entitled to all the rights, or subject to the obligations incumbent upon states.[59]

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58. The Outer Space Treaty, 1967, Article XIII; Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space of 1968, Article 6; Convention on International Liability for Damage Caused by Space Objects of 1972, Article XXII; Convention on Registration of Objects Launched into Outer Space of 1975, Article VII; Agreement Governing the Activities of States on the Moon and Other Celestial Bodies of 1979, Article 16. It is noteworthy that the European Space Agency - an international organization - has already accepted the Rescue and Return Agreement of 1968 (ibid.), and the Registration Convention of 1975 (ibid.). See Christol, op. cit., supra note 41, 912.

59. It is interesting to note the advisory opinion of the International Court of Justice with respect to the legal status of the United Nations. The Court concluded that the UN "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. Still less is it the same thing as saying that it is a "super-state" whatever that expression may mean. It does not even imply that all its rights and duties must be upon the international plane, any more than all the rights and duties of a state must be upon that plane. 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": see supra note 34, 179.

It is submitted that international telecommunications operating organizations - as associate members of the ITU - should have the same rights and obligations as the ITU members excepting the right to vote in any conference or meeting of the ITU's organs. Also, associate members should not be eligible for election to any organ of the ITU. Applications for associate membership should be accepted on condition that: (a) the organization expressly declares its acceptance of the applicable ITU Convention and administrative regulations annexed to it; (b) the organization has a distinct international legal personality; (c) the majority of its members are members of the ITU; and d) its application for associate membership has been approved by two-thirds of the ITU members. Once admitted as an associate member, an international organization should also be entitled to denounce its membership. It is recommended that the ITU Convention should be amended to this effect at the next ITU Plenipotentiary Conference.

2. The Plenipotentiary Conference and the ITU Convention

The Plenipotentiary Conference is "the supreme organ"[60] of the ITU, and comprises the delegations representing member countries.[61]

60. International Telecommunication Convention, 1973, Article 5(1).

61. *Ibid.*, Article 6(1).

Each member is free to form its national delegation as it pleases. All delegations to the Plenipotentiary Conference must be duly accredited by means of the proper instruments signed by the Head of State, the Head of Government or by the Minister of Foreign Affairs.[62] Such instrument must either confer full powers, or authorize the delegation to represent its government, without restrictions, or give the delegation the right to sign the Final Acts.[63]

The Plenipotentiary Conference is a purely inter-governmental organ of the ITU. The Convention, which is its basic instrument (or constitution) can be amended only by a Plenipotentiary Conference, the other essential functions of which include the determination of general policies for fulfilment of the Union's purposes, the conclusion or revision, if necessary, of agreements between the Union and other international organizations; and the election of the members of the Administrative Council, Secretary-General and Deputy Secretary General and the members of the IFRB.[64]

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62. _Ibid._, Article 67(1) and (2).

63. _Ibid._, Article 67(3)

64. _Ibid._, Article 6(2).

In the Plenipotentiary Conference (as well as in the conferences, meetings and sessions of all other organs of the ITU) decisions are taken on the basis of one-member one-vote.[65] Since 1872, the provisions of colonial territory class membership in the (International Telegraph Union and) ITU entitled the colonial powers to hold more than one vote. At one time, France had five votes; and Spain, Portugal, France, the United States, and the United Kingdom still had such voting rights in 1973.[66] The 1973 Plenipotentiary Conference put an end to this practice by abolishing the colonial territory class of membership, and establishing the rule of one-member, one-vote.

The Plenipotentiary Conferences are supposed to be convened at regular intervals - normally once every five years.[67] The 1982 Conference was convened after an interval of nine years, the longest period between

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65. Ibid., Article 2(2).

66. Codding, G.A., op. cit., supra note 45, at 234. For details on the issue of multiple voting in the ITU, see Glazer, J.H., "Infelix Revisions to the International Telecommunication Convention", 23 Federal Bar Journal, 1963, 1, at 2-5: "Apart from the peculiar case of the Soviet Union it is difficult to discover any legitimate justification for multiple voting."

67. International Telecommunication Convention, 1973, Article 6(1).

such conferences since the Second World War. As the supreme and "true political organ"[68] of the ITU, the Plenipotentiary Conferences must be held on a regular basis in order to discuss international telecommunication policy issues and to enable the ITU to deal more effectively with the changing international environment.[69]

The issue of access to the geostationary orbit is not merely a technical matter. It is a policy issue which has not yet been fully discussed at the global level. Various participants at an "International Conference on Global Communications in the Space Age" rightly observed that "major policy issues implicit in the ITU's regulatory function are not being addressed by governments at the international level in a timely or systematic fashion. Among these issues are general guidelines for the preservation and use of the limited international resources of the frequency spectrum and of

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68. Mili, op. cit., supra note 6, 176.

69. Segal, B., op. cit., supra note 47, 10. Similar views were expressed by the Canadian delegation at the 1973 Plenipotentiary Conference of the ITU, see Minutes of the Plenipotentiary Conference of the ITU, 1973 (Geneva, ITU, 1974), 52.

the geostationary orbit."[70] Consideration was given to the importance of the ITU's role with respect to the use of outer space in Resolution No. 34 of the 1959 Plenipotentiary Conference but no detailed policy discussion took place until 1973. At that time, the Plenipotentiary Conference incorporated in the ITU Convention general, but important provisions with respect to the radio spectrum and the geostationary orbit.

Until now, the ITU has been concerned with technical solutions to telecommunication conflicts and has to a great extent been successful. However, in a changed

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70. Global Communications in the Space Age: Towards a new ITU, Report of an International Conference, (New York, 1972), 9. The Panel on International Telecommunications Policy of the American Society of International Law has similarly concluded that "(al)though fully authorized to do so by its Convention, the ITU itself has rarely exercised its powers to discuss, in a general way, international telecommunication (policy) issues within its jurisdiction". It further concluded that "to any given telecommunication matter within the ITU's jurisdiction, there might be several technical solutions or responses which could be adopted by an Administrative Conference. The decision on this matter may be essentially a matter of policy and of judgment based on political, technical, economic and administrative factors. For example, one of the basic issues considered by nearly every Radio Conference is the use of limited resources by old and new users. The problem has generally been resolved by resorting to the "first-come, first-served" principle, but the matter is rarely discussed in any thorough-going or fundamental way": see supra note 27, 8-10. See also Segal, op. cit., supra note 47, 7.

world where technical and political issues are difficult to deal with in isolation, there is an obvious need to revitalize the ITU, in order to avoid conflict and even disorder. Kurt Waldheim, former Secretary-General of the UN, holds that

> Failure to assert the primacy of policy over technology is an alarming and increasingly dangerous phenomenon of the modern world. All too often, those responsible for the future development of technology are insufficiently aware of the far reaching political, economic and social implications of their choices. This danger is present also in the area of communication. Unless that danger is removed, future developments in the field of communication may well produce consequences which were neither foreseen nor desired from a more comprehensive national and international perspective. Often such consequences can only be modified later at considerable cost, if at all.[71]

These policy objectives can be achieved without modification of ITU's present structure. The policy-making functions of the Plenipotentiary Conference as authorized by the ITU Convention could be further intensified. Codding, in suggesting a new strategy for US participation in the ITU, stressed that "American delegates to international conferences must be aware of

71. Cited in Global Communications in Space Age, ibid., XI.

the fact that they and the rest of the industrial West are now in the minority, and will continue to be for the foreseeable future. (It is necessary that) the United States reverse her negative position as concerns bringing the politics of development into the ITU. I believe it is clear that there is no way that this trend can be avoided."[72] Cooperation is a prerequisite for the improved effectiveness of the ITU to deal with new issues relating to the regulation of the geostationary orbit and the radio spectrum.

Most national delegations have in the past been dominated by technical telecommunication experts. However, it seems more appropriate nowadays to include experts in other aspects of telecommunications via satellite.

Special or extraordinary Plenipotentiary Conferences could also be convened for policy decisions on exclusively general matters. Indeed, the present ITU Convention expressly entitles the Plenipotentiary Conference not only to determine the general policies for fulfilment of the purposes of the Union, but also to deal with such

72. Supra note 45, 234.

other telecommunications questions as may be necessary.[73]

Plenipotentiary Conferences convened on a more regular basis will mean that the implementation of policy decisions could be left to the administrative conferences, which are of a more technical nature. At present, purely political issues and the political aspects of technical issues are discussed at both the Plenipotentiary and administrative conferences which renders the ITU a far less effective organization in resolving telecommunication problems.

3. Administrative Conferences and the Radio Regulations

The second level of law-making within the ITU is that of administrative conferences, which may be convened to consider telecommunication matters related to the partial or complete revision of administrative regulations, or any other question of a universal character within their competence.[74] Administrative regulations include, (a) Telegraph, (b) Telephone, (c) Radio and (d) Additional Radio Regulations.[75] Attention will focus on

73. International Telecommunication Convention, 1973, Article 6(2) (a) and (b).

74. Ibid., Article 7.

75. Ibid., Article 82.

the Radio Regulations, since they are the ones which govern use of the geostationary orbit.

The Radio Regulations are an integral part of the ITU Convention and thus are binding on all ITU members. In the event of inconsistency between a provision of the Convention and that of the Radio Regulations, the Convention prevails.[76]

An administrative conference may be convened at the global, as well as regional level. Accordingly, reference is made to a World Administrative Conference (WARC) or Regional Administrative Conference (RARC). A regional conference may consider, and decide specific telecommunication matters of a regional nature only and its decisions must be in conformity with the Convention and the Radio Regulations. The decisions of the WARC must not contravene the Convention.[77] Radio Regulations are drafted, adopted and/or revised by the WARC, whose decisions (Final Acts) are international treaties, binding on those countries which ratify them. The ratification of, or accession to the ITU Convention also involves acceptance of the Radio Regulations "in force at the

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76. Ibid., Article 42.

77. Ibid., Article 7.

time of ratification or accession."[78]

WARC's are convened, when considered necessary, by a decision of a Plenipotentiary Conference, on the recommendation of a previous WARC, at the request of not less than one quarter of the members of the Union, or on a proposal of the Administrative Council. The administrative conferences are composed of (a) national delegations of ITU members; (b) observers of the UN, its specialized agencies, and of regional telecommunications organizations and international organizations admitted in accordance with relevant provisions of the ITU Convention; and (c) the permanent organs of the ITU and the representatives of recognized private operating agencies, duly authorized by the member to which they belong.[79] It is to be noted that only national delegations have the right to vote in administrative conferences, thereby making them intergovernmental in character.

Since the Plenipotentiary Conferences are primarily concerned with the overall organization and operation of the ITU, WARC's and RARC's are in fact the most

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78. Ibid., Article 42(2).

79. Ibid., Article 61.

important organs of the ITU, which draft and adopt detailed and precise regulations to govern actual use of the geostationary orbit and the radio spectrum. Except for the provisions in articles 10 and 33 of the ITU Convention, adopted in 1973, the legal regime of the ITU with respect to use and sharing of the spectrum/orbit resource has been effected by administrative radio conferences, i.e., the general 1959 WARC, Extraordinary Administrative Radio Conference of 1963; the 1971 WARC for Space Telecommunications; the 1974 WARC for Maritime Mobile Telecommunications; the 1977 WARC for Broadcasting-Satellite Service (in 12 GH_Z band); and the 1979 general WARC. All the provisions adopted by the Conferences have been consolidated, after appropriate revisions, in the presently applicable Radio Regulations (1982). Planned similar conferences are the 1983 RARC for Broadcasting-Satellite Service (12 GH_Z band) for region 2, and the 1985-87 WARC for space services, which has been specifically planned to guarantee in practice equitable access by all countries to the geostationary orbit and radio frequencies allocated to space services.

The decisions at the WARC's are made on the basis of one-member one-vote. As a general rule, any delegation whose views are not shared by the remaining delegation is expected to endeavour, to the extent possible, to abide by the opinion of the majority. However, if any decision would prevent a government from approving the revision of the Radio Regulations, that delegation may make reservations, final or provisional, regarding such decision.[80] This may be done in the form of a footnote to a particular regulation adopted by a WARC. The final texts approved by the plenary meeting of a conference are signed by delegations present at the conference. Any revision of the Radio Regulations by a competent administrative radio conference must be approved by member countries, which are required to inform the ITU Secretary-General of their approval.[81] Decisions of a WARC are not binding on a member country without its agreement or consent. All members are under obligation to take the necessary steps to impose observation of the provisions of the Radio Regulations (as well as the Convention) upon private operating agencies authorized by them to establish and operate telecommunications.[82]

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80. Ibid., Article 77(17).

81. Ibid., Article 42(3).

82. Ibid., Article 44.

Radio Regulations are supplemented by many appendices which are an integral part of the Regulations, and which comprise the numerous resolutions and recommendations adopted by various WARC's. They "deal with questions of a provisional nature"[83] such as the convening of future administrative conferences (e.g. the 1985 WARC), instructions to the IFRB, the study of certain subjects by the CCIR, or the establishment of procedures. Legally speaking, the resolutions and recommendations, as their titles suggest, are not binding upon ITU member countries although they are generally followed.[84] Their provisions dealing with the rights and duties of ITU members with respect to the use and sharing of the

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83. Mili, op. cit., supra note 6, 348.

84. Gorove, S., "The Geostationary Orbit: Issues of Law and Policy", 73, A.J.I.L., (1979), 444, at 458; by the same author, "Implications of International Space Law for Private Enterprise", VII, A.A.S.L., 1982, 319, at 326. Gorove, S., Satellite Power System (SPS): International Agreements, a study prepared for the US Department of Energy, 1978, at 22; Gotlieb, A., "The Impact of Technology on the Development of Contemporary International Law", 170, Recueil des cours, 1981 (1), 114, at 242. Glazer, J.H., "The Law Making Treaties of the International Telecommunication Union Through Time and in Space", 60, Michigan Law Review, 1962, 269, at 289, fn. 69; Rothblatt, M.A., "International Legal Norms Governing Development of the Orbit/Spectrum Resource", Telecommunications Policy, June 1981, 63, at 66.

spectrum/orbit resource are of a "provisional nature", (since they are not considered sufficiently permanent to be incorporated in the Radio Regulations).

Many countries, especially the developing ones, are unable to participate fully in the radio conferences and thus cannot protect their interests; hence their continuing frustration with respect to the results of the conferences.[85] Their frustration has increased in the face of the ITU's inability to deal with problematic issues, which has also reinforced their distrust of the

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Gehrig, J.J., "Broadcasting Satellites: Prospects and Problems", XVII, Colloquium, (1974), 42, at 44; The Modern International Law of Outer Space, op. cit., supra note 41, at 560. Some resolutions concerning the internal management of the ITU, or instructions to its permanent organs or when Radio Regulations contain some reference to the application of certain resolutions or recommendation, may be considered to have binding force. For example, Radio Regulation No. 2149, (1982) requires administrations to assign identity to stations in the maritime mobile service in accordance with the provisions of Appendix 43 and Resolution 313 and taking into consideration relevant CCIR and CCITT Recommendations; similarly, article 12.8 of Appendix 30 to the Radio Regulations specifies that the provisions of Resolution 33 shall continue to apply to the broadcasting-satellite service in region 2 as long as a detailed plan has not been adopted for this purpose.

85. See supra note 27, 34. See also Honig, D.E., "Lessons for the 1999 WARC", 30 (2), Journal of Communication, 1980, 56-57.

developed countries. The law-making process adopted by the radio conferences, is, therefore, inadequate to protect the interests of all countries and needs to be revised. It is suggested that all radio conferences be preceded by preparatory meetings and seminars at the regional or sub-regional level. In this way, participating countries will be better able to prepare and organize themselves and regulations will be elaborated which are satisfactory to the maximum number, if not all, of the ITU member countries. This will also enhance the ITU's effectiveness and make it a more acceptable international forum for the resolution of communications problems.

4. International Consultative Committees and Their Recommendations

The International Radio Consultative Committee (CCIR) and the International Consultative Committee for Telegraph and Telephone (CCITT) are "the real technical organs of the ITU" [86] which draft and adopt technical recommendations. Although these recommendations

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86. Mili, op. cit., supra note 6, 562.

are not binding[87] on member countries of the ITU, they are highly important in the ITU law-making process since they form the bases on which the administrative conferences adopt legally binding regulations. The issue of access to and use of the geostationary orbit is primarily within the competence of the CCIR, hence attention will focus on this Committee alone.

Under Resolution No. 3 (BP), the CCIR has been invited by the 1979 WARC to carry out preparatory studies and provide the first session of the 1985/87 Space WARC with technical information concerning principles, criteria and technical parameters, including those required for planning space services. The CCIR has already commenced its studies pursuant to this invitation and has formulated several draft planning options which will be discussed in detail <u>infra</u> (Chapter VI).

The duties of the CCIR are to study technical and operating questions relating specifically to radio.

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87. Jacobson, <u>op. cit.</u>, <u>supra</u> note 6, 57; Mili, <u>op. cit.</u>, <u>supra</u> note 6, 565; <u>The International Telecommunication Union: Issues and Next Steps</u>, A Report of the Panel on International Telecommunications Policy of the American Society of International Law, Occasional Paper No. 10, (June 1971), 23; <u>The Future of the International Telecommunication Union</u>, <u>op. cit.</u>, <u>supra</u> note 27, 3. See also <u>supra</u> note 84.

communication. It works through its Plenary Assembly and study groups. The CCIR is headed by a director, elected by a Plenary Assembly in accordance with the relevant provisions of the ITU Convention.[88]

The administrations of all ITU member countries are entitled to participate in the activities and meetings of the CCIR. Furthermore, any recognized private operating agency, with the approval of the ITU member by which it was recognized, international organizations and regional telecommunications organizations, and scientific or industrial organizations concerned with the study of, or manufacture of equipment for, telecommunications can be/are admitted after following the procedure laid down in the ITU Convention. A recognized private operating agency cannot act on behalf of the member country by which it was recognized unless that member informs the CCIR in each particular case that it is authorized to do so.[89]

The Plenary Assembly is the main body of the CCIR. It considers and prepares the list of questions to be

88. International Telecommunication Convention, (1973), Article 58.

89. Ibid., Article 68.

studied and then allots them to its appropriate study groups for detailed consideration. Study groups report back to the Plenary Assembly on their findings which may be approved, modified or rejected.[90]

A study group may set up interim working parties to conduct intensive study of certain aspects of the question under examination by that particular group. The CCIR has eleven such groups which are concerned with various aspects of the use of radio for communications.[91] The interim working party (IWP) 4/1 of the CCIR's Study Group No. 4 has been conducting studies on the efficient use of the geostationary orbit since 1969. Its work has been instrumental in enabling the various radio conferences to arrive at solutions with respect to the

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90. _Ibid._, Article 69.

91. They are Study Group No. 1 (spectrum utilization and monitoring), No. 2 (space research and radio astronomy), No. 3 (fixed service at frequencies below 30 MH_z), No. 4 (fixed service using communication satellites), No. 5 (propagation in nonionized media), No. 6 (propagation in ionized media), No. 7 (standard frequencies and time signals), No. 8 (mobile services), No. 9 (fixed service using radio-relay systems), No. 10 (broadcasting service-sound), and No. 11 (broadcasting service-television). For details see _Report on the Activities of the International Telecommunication Union in 1979_ (Geneva, 1980), 32-36.

utilization of the geostationary orbit for various space services.[92] It was, therefore, natural that this IWP should assume primary responsibility for the CCIR's technical studies in preparation for the 1985 Space WARC. For this purpose it undertook to work in close collaboration with other CCIR study groups, 1, 2, 7, 8, 10 and 11.[93] After the 1979 WARC, the IWP 4/1 held three meetings and prepared a Provisional Technical Report for the 1985/87 WARC to be discussed by Study Group 4 and other concerned groups. In this Provisional Report, the IWP 4/1 has, among other things, elaborated the technical characteristics and bases

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92. Ibid., 33; see also 30-31. Similarly, IWP 4/1 held two meetings, in 1969 and in October, 1970, and drafted provisional reports and recommendations which were approved by the XIIth Plenary Assembly of the CCIR. They "formed the technical basis for the WARC-ST (1971)": 40, T.J., 1973, 413.

93. For details see CCIR Report No. 453. Excerpts from the report of the first meeting of the IWP 4/1 has also been presented in Jansky, D.M., "Recent Work of ITU, CCIR IWP 4/1 and Effective Use of the Geostationary Orbit", National Telecommunication Conference, 1980, 33.1.1 - 33.1.5.

of five planning methods[94] to ensure equitable access to the geostationary orbit and spectrum.[95]

The real work of formulating recommendations is done by the study groups and their interim working parties, if any, which comprise scientists and technical experts in the matters under consideration. The provisional or draft reports or recommendations prepared by the study groups are generally approved without modification, or with minor changes, by the Plenary Assembly of the CCIR.[96] CCIR recommendations are not legally binding on the member countries, but the Radio Regulations "are founded on the results of the technical studies" which it conducts.[97] It is, therefore, to be expected that

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94. These five methods are:
Method 1: World or Regional Detailed Long-Term (10-20 years) a Priori Allotment Plan
Method 2: Periodically Revised (3-5 years) World or Regional Detailed Allotment Plan
Method 3: World, Regional or Sub-Regional Allotment Plan with Guaranteed Access
Method 4: Guaranteed Access by Means of Multilateral Coordination
Method 5: Co-ordination Procedures and Technical Factors which are Revised Periodically.

95. For details, see Interim Working Party 4/1, Provisional Technical Report for WARC - 84, CCIR document no. 4/286-E of June 12, 1981.

96. See Mili, op. cit., supra note 6, 565; Jacobson, op. cit., supra note 6, 57.

97. Mili, op. cit., supra note 6, 564.

the above mentioned Provisional Report of IWP 4/1, on the efficient and equitable use of the geostationary orbit and radio spectrum, will be approved, without any modifications or with minor changes, by the Plenary Assembly and will ultimately become the foundation upon which the 1985 WARC will adopt a revision to the Radio Regulations. It was recently decided to hold a single session of the CCIR Conference Preparatory Meeting from June 25 to July 27, 1984. This session will be the Joint Meeting of Study Groups to Prepare Technical Basis for World Administrative Radio Conference Relating to the Use of the Geostationary-Satellite Orbit and to the Planning of the Space Service Utilizing it and will provide the basis for CCIR planning.[98]

The CCIR recommendations and technical preparatory studies are of a great importance, yet its composition and working methods are quite different from those of the administrative radio conferences and the Plenipotentiary Conferences. Although participation in the work of the CCIR is open to all ITU member countries, very few actually participate in its Plenary Assembly,

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98. CCIR Administrative Circular no. A.C./246 of August 4, 1982.

study groups, or interim working parties. Participation in the interim meetings of the CCIR in April 1972, for example, "shows scarce attendance of representatives from African, Asian and South American countries. On the other hand, the developed countries unfailingly send delegations - and very numerous, in some cases".[99] IWP 4/1 is no exception to this general rule.

Both the level and quality of participation[100] in the work of the CCIR shows an imbalance of power, and

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99. De Mesquita, J., "Developing Countries and the Work of the International Consultative Committees", 40, T.J., 1973, 151. "The low level of participation by the developing countries in the CCI study groups", according to Segal, "has been a matter of concern to many administrations and to the CCI secretariats... In 1977 an average of 29 administrations participated in the CCIR study groups. At the CCIR XIV Plenary Assembly in Kyoto in June 1978, 61 administrations participated. This is less than half of the membership of the ITU. Participation by administrations in the special autonomous study groups has also been low... The low level of participation in the CCIR and CCITT study groups by developing countries is due in part to a shortage of fiscal and human resources": see Segal, op. cit., supra note 47, 40-41. See also Jacobson, op. cit., supra note 6, 57-58.

100. CCIR doc. no. 4/286-E, op. cit., supra note 95, Appendices II and III, 456-459; Appendices IV and V, 460-462. In this respect, it is interesting to note that in IWP 4/1 there are fifteen registered participants from the developed countries and nine from developing countries. Of course, this does not mean that other ITU member countries are excluded from participation. Also on the list are the EBU, ESA, INTELSAT, CTNE, CCIR's other study groups, IFRB and CCIR Secretariat. See ibid., Appendix I, 454-455.

its recommendations and reports can, thus, be expected to reflect a bias in favour of the more powerful group of nations. In the study groups a specified quorum is not required. A vote is taken among participants entitled to vote, whatever their number. In the CCIR Plenary Assemblies, such a situation rarely accurs since decisions are, for the most part, the result of compromise. The texts which are approved have generally been prepared in final draft form by a "small group of specialists from those countries which have the necessary human and technical resources to carry out the study".[101] As observed by Jacobson,

> The unequal distribution of influence in Study Groups seldom results in states exercising veto powers. Rather it means that all participants will compromise but some will compromise more than others... In any case, it is not difficult to understand why the process of the International Consultative Committees could leave ITU's less developed members uneasy. Inputs come almost exclusively from the highly developed states, and bargains are struck among their representatives.[102]

The working method of the CCIR raises serious doubts about the preparatory technical studies, which it conducts, for the administrative Radio Conferences,

101. Mili, op. cit., supra note 6, 565.

102. Jacobson, op. cit., supra note 6, 58.

and it is questionable whether dependence on such studies should continue especially in so far as the elaboration of regulations to govern the use of the geostationary orbit is concerned.

5. International Frequency Registration Board (IFRB)

The IFRB (Board) is one of the four permanent organs of the ITU. While those already discussed are directly involved in the law-making process of the ITU, the Board is primarily concerned with the application of the legal principles and rules adopted through that process. In addition to the performance of this function - which is both administrative and semi-judicial - the Board also performs other duties assigned to it by various administrative radio conferences, and which may have an important bearing on the formulation and adoption of Radio Regulations to govern use of the geostationary orbit. For example, under Resolution No. 3, the 1979 WARC invited the IFRB (a) to prepare a report on the operation of relevant provisions of the Radio Regulations (i.e. articles 11 and 13) including information about difficulties which may be reported to it by the administrations in gaining access to suitable orbital locations and frequencies, and to circulate this report to administrations one year before the first session of the 1985/87 WARC; and (b) to carry out technical preparations for that Conference.

The prime responsibilities of the IFRB relate to the orderly recording of assigned frequencies and orbital positions (which will be discussed infra).

The Board was created in 1947, and was considered to be so important that the US, at the 1959 ITU Conference, favoured electing its members for life.[103] By the time of the 1965 Plenipotentiary Conference, however, its very existence was threatened since the US and other developed countries no longer saw a need for it. The Board survived the 1965 Conference mainly as a result of the efforts of the developing countries though its membership was reduced from 11 to 5. Since then, it has gained in popularity and its functions have been enlarged. As an independent body within the ITU, the IFRB's importance lies in the proper application of the Radio Regulations at the international level.

It consists of five independent members elected

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103. Ibid., 62.

by the Plenipotentiary Conference.[104] Each member must be sponsored by the ITU member country of which he is a national. A member country of the ITU may not sponsor more than one candidate for election and such election should ensure equitable distribution amongst the various regions of the world. This provision is a guarantee against domination of its members by one region, and is an attempt to distribute power in the Board amongst developed and developing countries.[105]

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104. International Telecommunication Convention, 1973, Article 10(1). It is to be noted that the 1973 Plenipotentiary Conference, recognizing the importance and nature of the work performed by the IFRB, its members must be elected by the supreme organ (i.e. the Plenipotentiary Conference) of the ITU rather than by world administrative radio conferences, as was the practice before 1973. Since the Montreux Convention of 1965, which was applicable in 1973, required that members of the IFRB be elected by an administrative radio conference, it was not possible to hold such an election during the 1973 Plenipotentiary Conference. Thus, the 1973 Conference authorized the WARC for Maritime Mobile Telecommunications scheduled for 1974 to elect the members of the IFRB (See Resolution No. 3, International Telecommunication Convention, 1973). The 1974 Conference elected those members accordingly. The recently concluded 1982 Plenipotentiary Conference was the first such Conference to elect the members of the IFRB.

105. For example, the 1982 Plenipotentiary Conference elected five members of the IFRB as follows: Gary C. Brooks of Canada from Region 1 (the Americas); William H. Bellchambers of the UK from Region 2 (Western Europe); Yoshitaka Kurihara of Japan from Region 3 (Asia and Australasia); Alenderrazah Berrada of Morocco from Region 4 (Africa); and Peter S. Kurakov of the USSR from Region 5 (Eastern Europe and Northern Asia). See 43, Telecommunications Reports, October 25, 1982, 15. It may also be noted that these regions for the election of the members of IFRB are different from those for frequency allocations.

When compared to the composition of the CCIR and its study groups, it seems that the radio conferences would be better placed to depend more upon the studies and findings of the IFRB. The Board should be entrusted with additional functions relating to the preparatory technical studies required for revision of the Radio Regulations. Members of the IFRB have to be thoroughly trained in the field of radio and must have practical experience in the assignment and utilization of frequencies.[106] Since it is one of the duties of the Board to furnish advice to ITU members with respect to the utilization of the radio spectrum and "to the equitable, effective and economical use of the geo-stationary orbit,"[107] each member of the Board, in addition to the above, must be familiar with geographic, economic and demographic conditions within a particular area of the world.[108]

The members of the Board are independent and are obliged to serve not as representatives of their respective countries or a region, but as custodians of an

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106. International Telecommunication Convention, 1973, Article 57(1), para. 1.

107. Ibid., Article 10(3)(c).

108. Ibid., Article 57(1) para. 2.

international public trust,[109] i.e. the spectrum/orbit resource. The members of the Board, as well as ITU member countries are obliged to respect the independent character of the IFRB. Similarly, member countries have undertaken to respect the international character of the Board and of the duties of its members and to refrain from any attempt to influence any of them in the exercise of their duties.[110] These provisions were first adopted in 1947 when the IFRB was created to manage the equitable distribution of the radio spectrum at an international level, i.e. to help achieve an "engineered spectrum".[111] They have been continued since then through every revision of the ITU Convention.

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109. Ibid., Article 10(2).

110. Ibid., Article 57(4).

111. As stated by Leive, (op. cit., supra note 6, 56, fn. 56), the term "engineered spectrum" refers to "those portions of the frequency spectrum for which ITU administrative radio conferences have adopted worldwide or regional frequency allotment or assignment plans. Under these plans, specific requirements for frequency bandwidths of ITU members or of specific geographic areas are internationally recognized. These agreed-upon requirements are matched with specific frequencies or bandwidths, and technical and operating conditions are specified. In essence, ITU members through such plans agree in detail on how a scarce natural resource shall be apportioned and used by countries competing for frequencies. In this sense, the affected portion of the spectrum can be said to be 'engineered' or 'planned'".

The need for these provisions (which guarantee the international and independent character of the IFRB) is significant nowadays when the Board is required to manage not only the radio spectrum but also the geostationary orbit.

The IFRB's main task, to record the radio frequencies and geostationary orbital positions assigned by ITU member countries to their various radio stations in the Master Register,[112] is effected only after careful examination and interpretation of the applicable provisions of the ITU Convention and Radio Regulations. This requires careful judgment in cases of conflicting claims of two or more countries. The findings of the IFRB have an important bearing on the legal status of the frequency assignments and orbital positions; and it plays a significant role in the settlement of problems of interference. These functions are, therefore, of a semi-judicial nature, and require that the Board be as independent as possible.

Additional duties may be assigned to the IFRB by the administrative radio conferences with respect

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112. International Telecommunication Convention, 1973. Article 10(3)(a) and (b).

to the utilization of frequencies and the geostationary orbit, and in preparation for a radio conference.[113] The 1973 ITU Convention expressly specified the duties of the IFRB with respect to the geostationary satellite orbit which were essentially similar to those related to the radio spectrum. They were in fact actually being performed by the IFRB prior to 1973, pursuant to the Final Acts of the 1971 WARC. The 1977 WARC added numerous other duties, but for the purposes of this discussion, perhaps the most important was imposed by the 1979 WARC and incorporated in Resolution No. 4 of the Radio Regulations. In recording the radio frequencies and geostationary orbital positions in the Master Register, the Board is required to apply the provisional method described in this resolution with respect to the period of validity of frequency assignments to the space station using the geostationary satellite orbit. The application of the provisions of this resolution is important, since the 1985/87 WARC has been invited to take cognizance of the initial results of such application which may influence its decisions.[114]

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113. Ibid., Article 10(3)(d).

114. Radio Regulations, 1982, Resolution No. 4.

To deal expeditiously with its work, the Board may meet as frequently as necessary.[115] It elects a Chairman and a Vice Chairman from among its members to hold office for one year. After the expiry of the term of office of the Chairman, the Vice Chairman succeeds to the Chairmanship and a new Vice Chairman is elected. A quorum of the board is one half of the number of the members of the Board, and it is required to endeavour to reach its decisions by unanimous agreement. In the absence of unanimity, a decision may be taken by a two-thirds majority of votes of members present. Each member, including the Chairman, has one vote and no voting by proxy or correspondence is allowed. Minutes of the Board's meetings must mention whether a decision was unanimous or by a majority. For its own guidance and for the performance of its duties, the Board may make such internal arrangements as it may consider necessary. Pursuant to this, it adopts and updates its Technical Standards and the Rules of Procedure,[116] which are distributed

115. Ibid., Article 10 (Section II: Methods of Work of the Board).

116. The Technical Standards of the IFRB dealing with the radio frequencies and geostationary orbital positions for space radio services must be "based on the relevant provisions (Radio) Regulations and the Appendices thereto, the decisions of administrative conferences of the Union as appropriate, the Recommendations of the CCIR, the state of the radio art and the development of new transmission techniques, accounts being taken of exceptional propagation conditions which may prevail in certain regions"; ibid., No. 1582.

to all members of the ITU and are open to comment.[117] If a country disagrees with the substantive contents of the Technical Standards, the Board, in agreement with the country concerned, is required to refer the question to the CCIR for international study and the development of a recommendation thereon by the next CCIR Plenary Assembly.[118] In the event of the CCIR not having formulated the Recommendation, or in the event of an unresolved disagreement over the substantive contents of the Rules of Procedure, the matter may be referred to the Administrative Council to be included in the agenda of the next World Administrative Radio Conference.[119] In light of the actual composition and working methods of the CCIR, this procedure seems somewhat ironic. The CCIR is dominated by the representatives of a handful of countries, and yet has been endowed with powers to decide on matters concerning disagreements between an independent and equitably representative body (IFRB) and a member of the ITU. Given the importance of the IFRB's Technical Standards and Rules of Procedure in the application and implementation of the principles and rules of the ITU Convention and the Radio Regulations, it is suggested that ques-

117. Ibid., No. 1001.1.

118. Ibid., Resolution 35.

119. Ibid.

tions of disagreement in this respect be referred directly to the Administrative Council for inclusion on the agenda of the next WARC, rather than first referred to the CCIR. The CCIR's role in the resolution of such disagreements should be eliminated. It may be argued that this could delay the resolution of disagreements. However, the frequency of the WARC's is not significantly different from that of the Plenary Assemblies of the CCIR. Furthermore, the present procedure of continuing to apply the unresolved Technical Standard or Rule of Procedure until finally settled,[120] should be continued.

C. CURRENT LEGAL PRINCIPLES AND RULES

1. General Characteristics

The practice of "taking up" or "occupying" a particular radio frequency (for use by a state, country or administration) for terrestrial radiocommunication services has been extended not only to the radio frequencies for space services, but also to their associated geostationary orbital positions. In other words, the traditional practice of "first-come, first-served" has been extended to the new field of space

120. *Ibid.*

communications and applies to the use of frequencies as well as to the occupation of orbital "parking slots".[121] This practice is based on freedom of action which is an essential attribute of state sovereignty. Since the successful operation of radiocommunications is primarily dependent upon cooperation among states, the principle of avoidance of harmful interference was devised and has been respected. Cooperation is achieved through international agreements in the form of ITU Conventions and Radio Regulations, and is pursued mainly on the basis of self-interest and reciprocity since there are no provisions for sanctions against violators of the obligations specified under these international agreements. The Preamble of the presently applicable ITU Convention makes clear that ITU member countries adopted the Convention in order to cooperate with each other to operate their telecommunications services efficiently while "fully recognizing the sovereign right of each country to regulate its telecommunications".

The principle of sovereign right, first incorporated in the Preamble in 1947, has been repeated in all the revisions of the Convention. It is closely related to

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121. Valters, E.N., International Law of Communications Satellites: Scarce Resources in a New Environment, Ph.D. thesis submitted to Columbia University, 1970, 190.

another important principle, i.e. the sovereign equality of all nations - one of the most important tenets of international law - which has been expressly recognized in article 2 of the United Nations Charter. "The principle of equality means that all states are entitled to equal rights under the law regardless of their size, power, and influence."[122] Therefore, each state has an equal right of access to, and use of the geostationary orbit and the radio spectrum. This is well established and has been generally recognized. For example, the US was from the outset committed to maintaining INTELSAT as a single global system for satellite communications. However, as interest in establishing separate satellite systems for domestic communications developed, it changed its approach. US President L.B. Johnson, in his message to Congress on US Communication Policy, stated that

> we should take no action in the establishment of a domestic system which is incompatible with (our) support for a global system. This does not mean that the United States - or any other nation - will give up vital sovereignty over domestic communications.[123]

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122. Woetzel, R.K., "International Coordination of Different Space Telecommunications Systems", XI, Colloquium, 1968, 214. See also supra Chapter III.C.

123. 57, Department of State Bulletin, 1967, 296, at 299.

In later years, the US, exercising its "vital sovereignty", established its own satellite telecommunication systems. In a recently issued Notice of Inquiry, the (US) FCC reiterated that the geostationary orbit is available to all on a non-discriminatory basis.[124] Article I of the 1967 Outer Space Treaty also specifies that outer space (including the geostationary orbit) "shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality". Similarly, the Radio Regulations and various Resolutions and Recommendations of the ITU clearly express the equal right of nations to use the geostationary orbit and the radio spectrum.[125]

Access to (the choice or "taking up" of) an orbital position and associated radio frequency (position/frequency) depends upon the action of an individual country. In other words, it chooses and assigns a position/frequency to its radio stations as it wishes. ITU member countries have always fiercely protected this freedom of choice and relinquished a part of it only when obliged to do so. For example, ITU members have

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124. Second Notice of Inquiry, FCC General Docket No. 80-741, June 1, 1982, 32, para. 89.

125. Radio Regulations, 1982, Appendix 30, Annex 6(4); Resolutions Nos. 2, 3 and 4; and Recommendation No. 700.

undertaken to operate their telecommunications in accordance with the provisions of the ITU Convention and the Radio Regulations[126] which impose certain restrictions on their absolute freedom of action. Such restrictions were accepted because they were deemed necessary for interference-free operation of the telecommunications systems of all ITU members.

The major part of the ITU's functions is limited to the allocation (distribution) of radio frequencies among various radiocommunication services, and not among its member countries, i.e. to "effect allocation of the radio frequency spectrum and registration of radio frequency assignments in order to avoid harmful interference between radio stations of different countries."[127] It is the frequencies and orbital positions assigned by countries which are recorded by the IFRB in the Master Register. In this respect, it is important to bear in mind that allocation means the entry by a competent ITU Conference "in the Table of Frequency Allocations of a given frequency band for the purpose of its use by one or more terrestrial or space radiocommunication

126. International Telecommunication Convention, 1973, Article 44.

127. Ibid., Article 4(2)(a).

services".[128] On the other hand, assignment means an authorization granted by an administration (nation, country, state) for a radio station to use a certain frequency or channel.[129] While "assignment" is a product of national action, "allotment"[130] is the product of international (cooperation) agreement (reached at an ITU conference, WARC or RARC), through which participating countries distribute among themselves the geostationary orbital positions and radio frequencies based upon mutually agreed criteria and technical parameters. Although it is within the ITU's competence to distribute the geostationary orbital positions and associated radio frequencies among its members, it has been done, so far, only in the case of an allotment plan for the broadcasting-satellite service operating band.[131] The rarity of such allotment plan is

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128. Radio Regulations, 1982, Article 1, No. 17 (emphasis added). See Table of Frequency Allocation in Article 8, _ibid_.

129. _Ibid._, No. 19.

130. _Ibid._, No. 10: Allotment (of a radio frequency or radio frequency channel) means an entry "of a designated frequency channel in an agreed plan, adopted by a competent conference, _for use by one or more administrations for a terrestrial or space radiocommunication service_ in one or more identified countries or geographical areas and under specified conditions". (emphasis added).

131. _Ibid._, Appendix 30.

attributable to the unwillingness of ITU member countries to accept any restrictions on their sovereign freedom of action.

The general legal principles with respect to the distribution of the geostationary orbit and the radio spectrum among ITU members are contained in the following provisions of article 33 of the ITU Convention:

> 1. Members shall endeavour to limit the number of frequencies and the spectrum space used to the minimum essential to provide in a satisfactory manner the necessary services. To that end they shall endeavour to apply the latest technical advances as soon as possible.
>
> 2. 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 second paragraph of this article was added by the 1973 Plenipotentiary Conference where various proposals were put forward with respect to the ITU's role in the distribution of scarce natural resources. The most forceful of these proposals was perhaps that of Israel, which was accepted in part and resulted in revisions to article 10 of the Convention providing the IFRB with new functions relating to the geostationary orbit.[132] Apart from Israel, certain other countries stressed that the ITU "should be given the means of ensuring the fair distribution of such limited resources as the frequency spectrum or the geostationary orbit, to avoid a situation in which the first-comer rich countries would monopolise the best services."[133] While most of the developed countries were satisfied with the status quo, Canada seemed to share some of the developing countries' concerns. The Canadian delegate to the 1973 Plenipotentiary Conference observed that

> As the only truly global organisation responsible for international communications matters, the ITU has a special responsibility to the international community in ensuring that the benefits of new communications technologies are made available to all .[134]

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132. See Proposals for the Work of the Conference, (State of Israel), the 1973 Plenipotentiary Conference Doc. no. 49-E of August 1, 1973. For detailed discussion of Israel's proposals see, Rankin, C.E., "Utilization of the Geostationary Orbit - A Need for Orbital Allocation?", 13, Columbia Journal of Transnational Law, 1974, 98, at 102-109.

133. See "Statement by the Delegate of the Ivory Coast" in Minutes of the Plenipotentiary Conference of ITU, 1973, (Geneva, ITU, 1974), 30. (Doc. No. 99-E, 17). See also ibid., 37, Annex 6 to Document No. 99-E, 24 (China).

134. Ibid., 51 (Doc. No. 109-E, 11).

The provisions of article 33(2) emphasize the duty of member countries to use the spectrum/orbit resource efficiently and economically in order to ensure equitable access. While no definition of "equitable access" may be found in the Convention and the Radio Regulations, two provisos which qualify the term make its meaning clear: countries may have equitable access only in conformity with the Radio Regulations; and the justification for such access must be the need for, and capability to use the spectrum/orbit resource.

Accordingly, "equitable access" does not mean equal access and "equal right" does not imply entitlement to equal access. What it does mean is that all countries have a right of access. Through the provisions of article 33(2), ITU member countries have agreed to make this right of access more equitable than it was before 1973. This is, in fact, the <u>raison d'être</u> of article 33(2) which is clear from its historical background. The concept of "equitable access" was introduced primarily because of the dissatisfaction of various ITU member countries with the existing system of access to the spectrum/orbit resource, <u>i.e.</u> first-come, first-served. According to

Resolution Spa 2-1 (now 2),[135] which formed the basis of article 33(2)[136] and in which an "equal right" to use of the orbit/spectrum resource was recognized, actual use of the resource can start at different times depending on the requirements and readiness of a country's technical facilities. ITU member countries, therefore, resolved to "take all practical measure to realise" the use of this resource by the late-comers. This Resolution was a further step towards strengthening the trend started by Recommendation No. 10 (now Recommendation No. 700) adopted by the Extraordinary Administrative Radio Conference for space communications held in 1963. In this Recommendation, member countries of the ITU recognized that all ITU members have an interest in, and right to equitable use of the radio spectrum allocated to space services, and recommended that the utilization and exploitation

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135. The 1979 WARC has replaced Resolution No. Spa 2-1 with Resolution No. (AY) 2 which contains almost identical provisions.

136. Mili, M., "World Administrative Radio Conference for the Planning of the Broadcasting-Satellite Service in Frequency Bands 11.7-12.2 GH_Z (in Regions 2 and 3) and 11.7-12.5 GH_Z (in Region 1)", XX, Colloquium, 1977, 346, at 353. See also Jasentuliyana, N., "Regulations Governing Space Telecommunication", in Jasentuliyana, N. and Lee, R.S.K. (ed.), Manual on Space Law, Vol. I, (Dobbs Ferry, 1979), 195, at 221.

of such spectrum "be subject to international agreements based on principles of justice and equity permitting the use and sharing of allocated frequency bands in the mutual interest of all nations". The concept of equity or equitable access was thus introduced with respect to the use or sharing of the orbit/spectrum resource, and relates to principles of justice and fairness.

Article 33(2) emphasizes the obligation to use the orbit/spectrum resource "efficiently" and "economically", but does not define these terms.[137] It is left to the discretion of each ITU member to interpret what is efficient and economic. It is generally asserted that efficiency and economy can be achieved with the use of the most advanced technology. However, the expectation of large-scale use of such technology is unrealistic. Above all, the provisions of article 33(1) to the effect that members "shall endeavour to apply the latest technical advances as soon as possible",[138] render fulfillment of the obligation to use the orbit/spectrum resource efficiently and economically by employing the most advanced technology doubtful. It is generally

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137. Perrin, op. cit., infra note 140, 16.

138. Emphasis added. See also Radio Regulations, 1982, No. 339, Article 6(1).

accepted that a single satellite system, or minimum number of satellite systems, results in efficient and economic use of the orbit and the radio frequencies.[139] Therefore, it is difficult to see how the obligation imposed by article 33(2) can be fulfilled in a world which is witnessing the rapid proliferation of often competing geostationary satellite systems for international, as well as national radiocommunication services.

The provisions of article 33(2) have not resulted in satisfactory "equitable access" by all countries (except in the case of the broadcasting satellite service operating in the 12 GHz band in Regions 1 and 3).[140]

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139. This was one of the main arguments put forward by the US to maintain INTELSAT as the "single" global system for telecommunications and the reason why INTELSAT has been given "priority" to use the geostationary orbit and radio spectrum over its member states. For details, see <u>infra</u> Chapter V.

140. Mr. Perrin of the IFRB observed that the "state of readiness of individual countries for the utilization of the spectrum and the geostationary orbit will evidently differ greatly. The application of the principle of equal rights may, with the worldwide growth of requirements for orbital positions and frequency assignments, conceivably lead to practical difficulties. One may therefore foresee a probable situation where the negation of first come, first served may not necessarily produce the most rational solution. Accordingly, some additional measures should be taken 'to guarantee in practice for all countries equitable access to the geostationary orbit and the frequency bands allocated to space services'. In response to this consideration a world administrative radio conference

While emphasizing efficient and economic use of the geostationary orbit, article 33(2) contains no provision to ensure equity. Resolution 3 of the 1979 WARC calls for a conference in 1985/87 to remedy this situation.

Although international cooperation to ensure equitable use of the geostationary orbit is lacking, such cooperation has been sufficiently developed to ensure interference-free use of the orbit. Article 35 of the Convention specifies the obligations incumbent upon member countries to avoid harmful interference to the radio stations of other members:

> 1. All stations, whatever their purpose, must be established and operated in such a manner as not to cause harmful interference to the radio services or communications of other members or of recognized private operating agencies, or of other duly authorized operating agencies which carry on radio service, and which operate in accordance with the provisions of the Radio Regulations.

Related, and supplementary to these provisions are those

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will be convened to consider the possible approaches, including planning of the spectrum and the orbit, to meet the objective of equitable access":
Perrin, F.G., "The Broadcasting-Satellite Service: Freedom or Control", in Earth-Oriented Space Activities and their Legal Implications: Proceedings of the Symposium held on October 15-16, 1981, McGill Univ., (Montreal, 1983), 7, at 29.

provided in article 6 (Nos. 341 and 342) of the Radio Regulations which state:

> 341. Any new assignment or any change of frequency or other basic characteristic of an existing assignment shall be made in such a way as to avoid causing harmful interference to services by stations using frequencies assigned in accordance with the Table of Frequency Allocations in this chapter and the other provisions of these Regulations, the characteristics of which assignments are recorded in the Master International Frequency Register.
>
> 342. Administrations of the members shall not assign to a station any frequency in derogation of either the Table of Frequency Allocations given in this chapter or the other provisions of these Regulations, except on the express condition that harmful interference shall not be caused to services carried on by stations operating in accordance with the provisions of the Convention and of these Regulations.

Accordingly, the principle of the avoidance of harmful interference is established.[141] Even a cursory reading of these provisions shows that ITU member countries are obliged to assign new radio frequencies (and consequently geostationary orbital positions) in such a way that their use will not cause harmful interference to those stations whose frequency assignments

141. The term "harmful interference" has been defined in the 1973 ITU Convention, Annex 2 as: "Any emission, radiation or induction which endangers the functioning of a radio navigation service or of other safety services, or seriously degrades, obstructs or repeatedly interrupts a radiocommunication service operating in accordance with the Radio Regulations."

have already been properly recorded by the IFRB in the Master Register. In other words, the first user of a radio frequency and a geostationary orbital position has the right to that frequency and orbital position without harmful interference; hence the rule of first come, first served. These provisions also confirm the freedom of use of any frequency or orbital position if such use will not cause harmful interference to the stations already operating in accordance with the ITU Convention and Radio Regulations. Avoidance of harmful interference is the most important element of the ITU regulatory regime governing the spectrum/orbit resource.

To benefit from the right of international protection against harmful interference (or the right to interference-free use of the geostationary orbit) the assigned orbital position and the associated radio frequency must be in conformity with the ITU Convention and the Radio Regulations which prescribe two types of "right vesting mechanism", (a) the notification to, and registration by the IFRB (applicable to all space services except the broadcasting satellite service); and (b) the procedure prescribed by an <u>a priori</u> plan (applicable only to the broadcasting-satellite service).

2. First-Come, First-Served: A General Rule

The main purpose of orderly recording by the IFRB (Board) of the assigned frequencies and geostationary orbital positions by countries is to establish "the date, purpose and technical characteristics of each of these assignments, with a view to ensuring formal international recognition thereof."[142] International recognition provides stations whose frequencies/positions have been properly recorded in the Master Register with protection against interference; the interfering stations whose frequencies/positions have been subsequently recorded must, upon receipt of advice thereof, immediately eliminate harmful interference.[143]

Before an administration notifies the Board of its assigned frequency/position, it must follow the procedure for advance publication of information and

142. International Telecommunication Convention, 1973, Article 10(3).

143. Radio Regulations, 1982, Article 13(22), (Nos. 1559 and 1560). It is required that all 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 (Radio) Regulations": ibid., Article 29(1), (No. 2612).

coordination, as prescribed in article 11 of the Radio Regulations. "The purpose of the advance information procedure is to bring to light, in the very early stages of planning, any major system incompatibilities utilizing relatively simple methods of calculation."[144] The coordination procedure is to ensure system compatibility, during the period a geostationary satellite system is being planned, and that use of a geostationary satellite may not cause interference to other services or be subject to such interference. The very detailed technical information and criteria incorporated in Appendix 29 of the Radio Regulations[145] and developed by the CCIR in its Recommendations could be used to resolve difficulties during the coordination procedure. The assistance of the Board could also be sought to resolve the differences. However, coordination procedure is primarily a matter of bilateral negotiation between the concerned administrations. While the latter are expected to negotiate in good faith, there is no legal obligation

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144. DuCharme, E.D. <u>et al.</u>, "The Genesis of the 1985/87 ITU World Administrative Radio Conference on the Use of the Geostationary Satellite Orbit and the Planning of Space Services Utilizing it", VII, <u>A.A.S.L.</u>, 1982, 261, at 270.

145. Radio Regulations, 1982, Appendix 29: "Method of Calculation for Determining if Coordination is Required Between Geostationary-Satellite Networks Sharing the Same Frequency Bands".

on the part of the administration, whose services are expected to be adversely affected, to change the technical characteristics of its existing stations or to make efforts to accommodate the new geostationary satellite systems. Successful coordination does, however, facilitate the notification and registration procedure.[146]

When an administration wants to use a new frequency and an associated geostationary orbital position, or wants to make a change in an assignment already recorded in the Master Register, it must notify the IFRB, if (a) it desires to obtain international protection against harmful interference; or (b) the assigned frequency and the associated position are going to be used for international services; or (c) the use of the frequency/position concerned is liable to cause harmful interference to any service of another administration.[147] Such notices, which must contain the relevant information including, at least, the basic characteristics specified in Appendix 3 of the Radio Regulations, are published by the Board in its weekly circular within a period of forty days after their receipt.[148] The

146. Ibid., Article 13 (13 and 14), Nos. 1520 to 1532.

147. Ibid., Nos. 1488 to 1491, and A.13.1.

148. Ibid., Nos. 1498 and 1499.

Board examines each notice with respect to (a) its conformity with the ITU Convention, the Table of Frequency Allocations and the other provisions of the Radio Regulations;[149] (b) its conformity with the provisions relating to pre-notification coordination;[150] and (c) the probability of harmful interference when the coordination has not been successfully effected.[151]

If the Board finds an assignment notice unfavourable as to its conformity with the Convention and the Radio Regulations, and if the submitting administration agrees to use the notified orbital position/frequency on a basis of non-interference,[152] the concerned position/frequency will be recorded in the Master Register,[153] on the understanding that if interference is caused to other stations operating in accordance with the ITU Convention and the Radio Regulations, it shall eliminate that interference.[154]

Where the Board finds the assignment notice favourable (with respect to its conformity with the Convention and

149. Ibid., No. 1503.
150. Ibid., Nos. 1504 and 1505.
151. Ibid., Nos. 1506 to 1512.
152. Ibid., Articles 13(13) and 6(4).
153. Ibid., Article 13(13), Nos. 1520-1524.
154. Ibid., Article 13(22), No. 1560.

the Radio Regulations, and coordination procedure required under article 11 of the Radio Regulations) it shall record the assignment in the Master Register. However, if the Board's finding is unfavourable because coordination procedure has not been complied with, it shall, if so requested, effect coordination. If the Board is either not approached or has failed in securing successful coordination, it shall return the notice to the notifying administration with its views on the possibility of successful coordination. When the notifying administration resubmits the notice to the Board insisting that it should be reconsidered, and when the Board's findings are still unfavourable with respect to conformity with the coordination procedure, the assignment shall be recorded in the Master Register "if the Board is informed that the new assignment has been in use together with the frequency assignment to the station which was the basis for the unfavourable finding for at least four months, without any complaint or harmful interference."[155] The same provision applies to notice of a position/frequency assignment which has been found favourable by the Board but whose use will, in the Board's opinion, cause harmful interference to the already recorded frequencies.

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155. Ibid., Article 13(16), No. 1544.

Thus, it may be concluded that firstly, coordination is not a must for an assignment of orbital position and radio frequency to be recorded in the Master Register and to be entitled to international recognition (protection against harmful interference from subsequently recorded stations). Secondly, if an assignment is not in conformity with the Convention and the Radio Regulations, the notifying country may still have it recorded in the Master Register, but its use must be on a non-interference basis.[9] In such cases, the IFRB is not empowered to reject a notice or prevent an assignment from being recorded in the Master Register. To be entitled to the right of international protection against harmful interference, it is, of course, essential that the assigned orbital position and radio frequency is properly recorded by the Board.

3. A priori Plan: An Exception

ITU member countries may conclude agreements among themselves with respect to guaranteeing access to and interference-free use of the orbit/spectrum resource. This procedure is called a priori planning. The 1977 WARC-BS in its Final Acts adopted a plan and other related provisions which are now incorporated in the 1982 Radio Regulations as Appendix 30. This deals with broadcasting satellite service (BSS) operating in the 12 GH_Z band, i.e. frequency bands 11.7 - 12.5 GH_Z in Region 1 and 11.7-12.2 GH_Z in Region 3. In addition to the plan for BSS, Appendix 30 also contains provisions for coordination, notification to, and registration by the IFRB of frequency/orbital position assignments for other space and terrestrial radiocommunication services which share the 12 GH_Z band in Regions 1 and 3.

If an administration, in Regions 1 and 3, wants to use any radio frequency and associated geostationary orbital position for its BSS, it must file a notice to that effect with the IFRB. The Board examines each notice with respect to its conformity with the ITU Convention and the Radio Regulations including the plan. If the Board's findings are favourable it shall record the notified frequency/orbital position in the Master Register.[156] However, if the Board's findings are unfavourable it shall return the notice to the notifying administration with the reasons for its findings and recommendations. If the Board finds the modified notice favourable, then it shall record

156. Ibid., Appendix 30, Article 5.2.3.

it in the Master Register.[157] However, if the findings of the Board still remain unfavourable, the notifying administration is obliged not to use that frequency and orbital position.[158] Similarly, the administrations in Regions 1 and 3 are obliged to follow the coordination, notification and the registration procedure if they want to use any radio frequency (in the 12 GH_z band) for their terrestrial and space services (other than the BSS).[159] If coordination, notification and registration procedure is not successfully completed, the assigned radio frequency, and associated orbital position wherever relevant, cannot be recorded in the Master Register.[160]

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157. Ibid., Articles 5.2.4. and 5.2.9.

158. Ibid., Article 5.2.6.

159. Ibid., Article 6 (Coordination, Notification and Recording in the Master International Frequency Register of Frequency Assignments of Terrestrial Stations Affecting Broadcasting-Satellite Frequency Assignments in the Bands 11.7 - 12.2 GH_z in Regions 2 and 3 and 11.7 - 12.5 GH_z in Region 1) and Article 7 (Preliminary Procedures, Notification and Recording in the Master International Frequency Register of Frequency Assignments to Stations in the Fixed Satellite Service in the Frequency Band 11.7 - 12.2 GH_z in Region 2, when Frequency Assignments to Broadcasting-Satellite Stations in Accordance with the Plan are Involved).

160. Ibid., Articles 6.3.32 and 7.4.8.2.

The provisions of Appendix 30 are an exception to the general rule of first come, first served. The importance of the date of notification is irrelevant for the determination of the rights of countries with respect to the use of this resource.[161] This is so because the plan contains the specific number of frequencies and orbital position to which a country is entitled and is obliged to use under specified technical parameters. The concurrence of the Board is a pre-requisite for the recording of assignments under the provisions of Appendix 30.[162] Countries which have ratified the plan are obliged not to use any frequency/position - for which provisions have been made in Appendix 30 - in derogation of these provisions not even on a non-interference basis. In accordance with article 4 of Appendix 30, if an administration wishes to use a frequency/orbital position which did not receive a favourable finding from the Board, it can do so only for a specified period, and in agreement with the affected administrations. In such cases, an administration is not entitled "to justify the continued use of the frequency (as well as the orbital position) beyond the period specified unless it obtains the agreement of the administration(s) concerned."[163]

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161. Ibid., Article 5.2.2.

162. Ibid., Article 5.2.6.

163. Ibid.

Resolution No. 507,[164] which replaced Resolution No. Spa 2-2 of the 1971 WARC-ST, requires the establishment of international agreements and associated plans for broadcasting-satellite service in all the frequency bands allocated for this service. Since no other plan has so far been adopted and since there are no provisions in the Radio Regulations concerning the procedure for notification and registration of assignments for broadcasting-satellite service, an interim procedure had to be established in order to effect notification and registration of frequency assignments pending conclusion of the envisioned plans. Resolution No. 33,[165] which replaced Resolution No. Spa 2-3 of the WARC-ST, specifies such procedure for broadcasting-

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164. Radio Regulations, 1982, Resolution No. 507 "Relating to the Establishment of Agreements and Associated Plans for the Broadcasting-Satellite Service", resolved that "stations in the Broadcasting-satellite shall be established and operated in accordance with agreements and associated plans adopted by world or regional administrative conferences, as the case may be" (emphasis added).

165. Ibid., Resolution No. 33 "Relating to the Bringing into Use of Space Stations in the Broadcasting-Satellite Service, Prior to the Entry into Force of Agreements and Associated Plans for the Broadcasting-Satellite Service" resolved that, "except in those cases where agreements and associated plans for the broadcasting-satellite service have been established and have entered into force", the procedure prescribed by this Resolution "shall be applied" (emphasis added).

satellite service except in cases where agreement has already been reached. These provisions are similar to those of articles 11 and 13 of the Radio Regulations. Resolution No. 33, therefore, allows access to and use of the geostationary orbit and radio spectrum for the broadcasting-satellite service in all the allocated frequency bands (except the 12 GH_Z band) for this service on the basis of first come, first served. It is difficult to speculate on the nature of the future plans but it is to be noted that the provisions of Appendix 30 are expressly declared to be a world agreement (and associated plan) as required by Resolution No. 507.[166] Thus, they may be invoked by some countries at the forthcoming 1985 Space WARC to serve as a precedent for other plans for broadcasting-satellite service or even for all space services.

4. Efficient and Economic Use

To achieve efficiency in the use of the orbit/spectrum resource, there is provision in the Radio Regulations for the review, modification and cancellation of entries in the Master Register by the IFRB

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166. Radio Regulations, 1982, Appendix, 30, Article 13.

under certain circumstances. Registered orbital positions and radio frequencies which are not actually utilized inhibit their use by other countries. The IFRB is, therefore, required to take steps to avoid hoarding by ITU member countries.

Article 13 (section VI) of the Radio Regulations requires the IFRB, at intervals not exceeding two years, to request confirmation from the administration in whose name an orbital position and radio frequency is recorded in the Master Register whether that administration uses, and will continue to use regularly, the recorded frequency/position in accordance with its recorded characteristics.[167] On the other hand, if an administration suspends the use of its recorded frequency/orbital position for a period of eighteen months, it is obliged to inform the Board, within that period, about the date on which the use was suspended and of the date on which it is to be brought back into regular use.[168] In such cases, the Board may, of its own accord, also make inquiries from the administration concerned.[169] If the administration does not reply within six months of the date of the Board's inquiry,

167. Radio Regulations, 1982, Article 13; No. 1569.

168. Ibid., No. 1570.

169. Ibid., No. 1571.

or if the reply does not confirm that the recorded frequency/position will be brought back into regular use within the six month time limit, the Board shall apply a mark against that assignment in the Master Register. Thereafter, that recorded assignment shall be considered to be out of regular use for two years and it shall not be taken into account for the purposes of the examination of new frequency/position assignments by the Board with respect to their conformity, and the possibility of harmful interference to the previously recorded assignments.[170] In other words, the recorded assignments of frequencies and positions, which have been out of regular use for two years, are not entitled to protection against harmful interference from subsequently recorded assignments and, therefore, cannot preempt the recording of the later assignments.

Each administration is obliged to inform the Board about the permanent discontinuation of use of the recorded assignment of a frequency/position, within a period of three months of such discontinuation. On receiving such information, the Board removes that entry from the Master Register.[171] The Board is also

170. Ibid., Nos. 1572 and 1513.

171. Ibid., No. 1573.

entitled to cancel or modify a recorded assignment, if it appears to the Board from the information available to it, that a recorded frequency/orbital position has not been brought into regular operation or is not being used in accordance with the basic characteristics notified to the Board.[172] However, before cancelling or changing an entry, the Board must consult the concerned administration and take only such action as is agreed upon with that administration. In this case, if an administration fails to supply to the Board pertinent or relevant information within three months from the date of the inquiry, the Board shall make "suitable entries" in the Remarks Column of the Master Register.[173] "Suitable entries" merely indicate the situation, but do not cancel or modify the entry.

5. Nature of Acquired Rights

(i) Right to "use" and "not to own"

It is generally accepted that a country has the right to use (not to own) the geostationary orbital positions, and radio frequencies recorded in its name,[174]

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172. Ibid., No. 1574.

173. Ibid., No. 1575.

174. Leive, D.M., "Regulating the Use of the Radio Spectrum", 5 Stanford Journal of International Studies, 1970, 21, at 35.

but this does not imply national property rights. This is true both in the case of the rights acquired on a first come, first served basis, as well as on the basis of an *a priori* plan approach. It has been pointed out in the FCC's *Second Notice of Inquiry* that

> the rights of interference-free operation of satellite systems, as determined by an allotment approach, (does not) include national property rights. The allotment approach has as its purpose the avoidance of harmful interference to stations operated in conformity with an allotment plan. No ITU plan, be it of the terrestrial or space variety, has to-date, explicitly conveyed property rights, in orbit or spectrum.[175]

The provisions of the Radio Regulations dealing with the review, modification and cancellation of entries in the Master Register also seem to emphasize the right of every country to use the orbit/spectrum resource and once a particular orbital position/radio frequency has been recorded in the Master Register to use it regularly. Otherwise it should be cancelled to allow others to use it.

(ii) Right to use perpetually

As a general rule, once a right is acquired to use a particular orbital position/associated radio

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175. FCC, *Second Notice of Inquiry*, General Docket No. 80-741, (June 1, 1982), 11. See also *ibid.*, Appendix B.

frequency, the notifying administration is entitled to use it continuously without any time limitation, if no basic characteristics are changed. Thus, it is in fact a right to perpetual use. The 1979 WARC considered that limiting the period of validity of frequency assignments to space stations using the geo-stationary-satellite orbit could promote rational and efficient use. It therefore introduced, in Resolution No. 4, provisions to the effect that radio frequency and geostationary orbital positions assignment to a space station[176] "shall be deemed definitely discontinued after the expiry of the period of operation shown on the assignment notice." This period is limited to that for which the concerned satellite-network[177] was designed. At the end of such period, the Board must invite the notifying administration to take steps to cancel the assignment. If it does not receive any reply within three months following the expiry of the

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176. "The expression 'space station' may apply to more than one satellite provided that only one satellite is in operation at any particular moment and that the stations installed on board successive satellites have identical basic characteristics": ibid., Resolution No. 4, resolves 1.1. fn.

177. "Satellite Network" as defined in the 1982 Radio Regulations (No. 106) means a "satellite system or a part of a satellite system consisting of only one satellite and the operating earth stations."

period of operation, the Board shall insert a symbol in the Remarks Column, that the assignment is not in conformity with Resolution No. 4. However, if the notifying administration wishes to extend the period of operation of its assignments, it must inform the Board at least three years before the expiry of the recorded period of operation, and all the other basic characteristics of that assignment must remain unchanged. An administration can even retain the same orbital position/frequency for new satellites with different technical characteristics, if the concerned administration initiates coordination, as required under article 11 of the Radio Regulations, and the Board's findings are favourable with respect to its conformity with the ITU Convention and Radio Regulations and the new satellite will not increase the probability of interference to the detriment of a frequency assignment already recorded in the Master Register. If an administration wishes to continue the use of its recorded assignments it may do so with the concurrence of the Board. Resolution No. 4, therefore, simply attempts to limit the period of validity of assignments of those administrations which, in fact, do not want to use their recorded assignments beyond their originally specified period of operation.

The 1985 Space WARC has been invited to take cognizance of the initial results of the application of this Resolution. However, since its provisions would be operative for only a short period of time (from July 1, 1980 to the time the 1985 WARC is convened) and are unable to impose any definite limitation on the validity of the recorded assignments, it is difficult to imagine that any viable results will emerge which could serve as a guide or basis for the adoption of more rigorous provisions. While this procedure was introduced on an experimental basis for the purpose of gaining experience, nothing seems to have changed with respect to the right to continuous use of a recorded assignment.

The 1977 Plan, on the other hand, expressly provides that it has been designed to meet the requirements of the concerned countries for a period of fifteen years, commencing January 1, 1979. This could be revised by a competent WARC.[178] The provisions are evidence of the fact that rights acquired under the 1977 Plan, unlike those under the general rule, are not perpetual but are limited in time.

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178. Radio Regulations, 1982, Appendix 30, Article 16,

(iii) Right to Sell or Barter a Geostationary "Slot"

According to the general rule, the right to use a particular recorded position/frequency is not transferable to another country.[179] However, once a country, under an a priori plan, acquires radio frequencies or geostationary "slots" which it does not use or has no plans to use, it may be tempted to sell or barter such slots in exchange for benefits. The question arises as to whether this is allowed under the presently applicable regulations? Under the provisions of the Plan incorporated in Appendix 30 of the Radio Regulations (the 1977 Plan), the use of any orbital position and associated radio frequency must be in accordance with the Plan, otherwise it may not be used by any administration even on a non-interference basis. The Plan contains specific radio frequencies and orbital positions which are allotted to individual countries. Since the use of country A's slot by country B will entail the use of a slot which is not allotted in country B's name in the Plan, it is not permitted. Above all, the technical characteristics of the requirements of country B may be different from those of country A.

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179. Leive, op. cit., supra note 174.

However, by successfully following the procedure for modifications, as prescribed in article 4 of Appendix 30, it appears that country B could use country A's slot, since such use will entail modification to a frequency assignment in accordance with the Plan or inclusion of a new frequency assignment. Country B must propose the modification and seek agreement with those countries whose allotted frequencies might be adversely affected, or in whose territory the power flux-density value exceeds the prescribed limit as a result of the proposed modification. Before agreeing to the proposed modification, or inclusion of new frequency in the Plan, the affected country A may demand, and actually receive, compensation from country B. There is nothing in Appendix 30 which seems to prohibit country A from obtaining compensation. More than one country may be affected and country B must seek agreement with all concerned. It seems that only adjacent states may exchange allotments because the proposed modification or inclusion of a new frequency assignment would affect the nearby allotments only. In its submission to the FCC's <u>Second Notice of Inquiry</u>, COMSAT pointed out that "the opportunities for allotment exchanges between administrations would be limited because of the interdependence of parameters within an allotment scheme."[180]

(iv) Right to Replace a Dead Satellite

As the geostationary orbit becomes increasingly congested, countries which have already launched satellites may be tempted to hold on to recorded orbital assignments in the event that they may encounter difficulties in the future in obtaining appropriate locations on the geostationary orbit. This can be achieved by simply replacing decaying satellites with new ones.

International protection against harmful interference is accorded to the assigned radio frequency to be used by a space station. "Station" is defined in the Radio Regulations as "one or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying on a radiocommunication service".[181] A geostationary satellite is nothing more than a station on board a satellite in the geostationary orbit.

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180. See supra note 175, B-2. Similarly, Robinson opined that "under current plans, frequency allotments are not in a form which could be transferred except perhaps to closely adjacent countries"; Robinson, G.O., "Regulating International Airways: the 1979 WARC", 21(1), Virginia Journal of International Law, 1980, 1, at 43.

181. Radio Regulations, 1982, Article 1 (4.1), No. 58.

In the case of a radio station on the surface of the earth, a change of outdated transmitters or receivers and/or related equipment, and its name (without changing the technical characteristics of the use of the assigned frequency) does not affect its right to international protection. The same is true of geo-stationary satellites. The Radio Regulations require that a new notification be filed with the Board if there is a change in an assignment already recorded in the Master Register.[182] A change in an assignment may be viewed as a change in the basic characteristics of that assignment as specified in Appendix 3 of the Radio Regulations which includes identity of space station(s). This may give the impression that a change in the identity of a space station effected by the replacement of satellites, is a change in the assignment, which should be notified to the Board in order to ensure international protection for the replacement satellite. In fact, this is not the case. The Radio Regulations governing the notification and recording of frequency assignments to space stations expressly exclude from a change in the basic characteristics of an assigned frequency already recorded in the Master Register which must be notified to the Board to be

182. Ibid., Article 13, (A.13.1.).

entitled to international protection:[183] (a) a change in the name of space stations; and (b) a change in the date of bringing into use an assignment frequency. As of July 1, 1980, Resolution No. 4 limits (to a degree) the validity of frequency assignments to a space station to the period of operation of the satellite network. However, the provisions of this Resolution, as previously noted, are not strong enough to impose any definite limitation. Thus, by replacing its expired satellite with one bearing identical basic characteristics, an administration can retain the international protection accorded to the original recording of the assigned frequency in the Master Register. The US, in fact, replaced its WESTAR I and II satellites with WESTAR IV and V in the same orbital positions.[184]

Space platforms, being space stations,[185] are governed by the same provisions regardless of the fact

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183. Ibid., No. 1548.

184. See supra Chapter I.D.

185. Smith, D.D. and Rothblatt, M.A., "Geostationary Platforms: Legal Estates in Space", 10(1) J. Space L., 1982, 31, at 32. For details of DBS Platforms, see infra Chapter I.C.4; Cohen, N.L. and Stone, G.L., "DBS Platforms: A Viable Solution", Satellite Communications, December 1982, 22 et seq.

that they may have a lifespan of as long as 30 years. These could be replaced by successive platforms having the identical basic technical characteristics. If a space platform having expired after 30 years is replaced by another, for a further 30 years, the owner country would be holding the frequency and orbital position assigned to, and used by these platforms for 60 years - which may hardly be considered temporary. This situation necessitates changes to the present Radio Regulations if the question of appropriation of the geostationary orbit is to be addressed.[186]

(v) Right to More Recorded Assignments than Satellites

A country or an international organization may have more recorded orbital positions and associated radio frequencies than the actual number of its satellites in orbit. There could be two reasons for this; firstly to hoard orbital positions for future satellites; and secondly, to make the best use of available satellites in providing service wherever and whenever needed. For example, if INTELSAT has a satellite positioned over the Indian Ocean and there is more demand for capacity over the Atlantic Ocean, the satellite may be removed

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186. See *supra*, Chapter III.D.

from its orbital position to cover the Atlantic Ocean.[187] But before INTELSAT does this, it would seem necessary for the orbital position over the Atlantic Ocean to be recorded in the Master Register so that it may function without the possibility of harmful interference. The question arises as to whether a country or INTELSAT is permitted to act in this way under the present regulations. The answer is affirmative since it is the recorded position/frequency assignments, not particular satellites, which are entitled to the right of international protection. This right may be maintained irrespective of the satellites used to operate on a recorded orbital position and radio frequency. The provisions of the Radio Regulations relating to review, modification and cancellation of recorded assignments stress that they should be kept in "regular use", which does not imply that such use must be continuous and without interruption. If the assignments are not in regular use, the Board may intervene and make inquiries of the notifying administration, but its efforts are unlikely to result in freeing the occasionally, or never used assignments without the consent of the user.

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187. INTELSAT used its INTELSAT-III (F-3) satellite in this way. See "End of an Era: A Satellite's Passing", INTELSAT, Intellink, First Quarter, 1980, 3.

Abuse in the form of excessive recording of orbital positions and radio frequencies by INTELSAT is no different than that which may occur in so far as ITU member countries are concerned. One way to control such abuse, is to make INTELSAT, and other similar organizations associate members of the ITU, and thus directly accountable for their actions to all ITU members. In this way, countries which have a minor role in INTELSAT because of their relatively weak financial participation, as well as non-INTELSAT members of the ITU, could serve as a check on such undesirable activities. The provisions of the Radio Regulations should be amended to incorporate more stringent controls with respect to the use of the recorded assignments, which may necessitate enlarging the scope of the IFRB's competence with respect to the review, modification and cancellation of recorded assignments. Finally, it may also be advisable to adopt a planning method by which to control the abuse of excessive recording of orbit/frequency assignments, thereby entitling a country or an international organization only to those positions/frequencies which are necessary for its immediate requirements.

D. RESOLUTION NO. 3

Occasional references have been made in this study to Resolution No. 3. Here, discussion will be confined to its mandate for the 1985/87 space WARC. The objective of that Conference is to

> guarantee in practice for all countries equitable access to the geostationary-satellite orbit and the frequency bands allocated to the space services.

This objective is to be achieved through two sessions of the planned Conference; the first to be held in 1985, and the second in 1987. The first session will "decide which space services and frequency bands should be planned" and the second, will implement the decisions taken at the first session. There was a difference of opinion between the developing and developed countries with respect to the method for achieving the stated objective. The developing countries preferred to adopt <u>a priori</u> plans for space, while developed countries maintained that the objective of the 1985/87 WARC could be achieved through means other than <u>a priori</u> planning. It was on the insistence of the developed countries that the first session of the 1985/87 Conference shall also "consider other possible approaches that could meet the objective" of that Conference.[188] The 1985/87

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188. See "Statement by the Delegate of the United States" republished in DuCharme, <u>op. cit.</u>, <u>supra</u> note 144, Annex 3, 278-279. It is interesting to note that because of the "ambiguity associated with the terms 'plan', 'planning method' or 'other approaches' the (US) FCC preferred to replace them with the term 'resource management mechanism'" See <u>Second Notice of Inquiry</u>, <u>op. cit.</u>, <u>supra</u> note 175, 9, fn. 17.

WARC, therefore, will not only consider the planning methods, but also other possible approaches to guarantee equitable access to the orbit/spectrum resource. It is questionable whether this Conference will decide on which space services should be planned, since the developed countries prefer to interpret the mandate to include the question of whether there is a need to plan <u>any</u> of the space services.[189]

Under the present Radio Regulations, there are fourteen space services[190] which could, theoretically, be subjected to such planning. However, it is unlikely that the 1985/87 Conference will decide (a) to plan the earth exploration satellite service (for which there is no congestion in the geostationary orbit) and (b) not to plan the broadcasting-satellite service. Between these two extremes, there may be other space services under discussion. The fixed-satellite service, in the 6/4 GH_Z and 14/11 GH_Z bands, will most certainly be included in the discussions in view of the current situation of these bands.

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189. DuCharme, <u>ibid</u>., 274.

190. Radio Regulations, 1982, Article 8. See also ITU <u>News Release</u>, December 6, 1979, Annex 1.

The mandate contained in Resolution No. 3 will form the general basis for the agenda of the 1985/87 WARC. The precise wording and final determination of a WARC agenda falls within the Administrative Council's realm of responsibility. The importance of the agenda lies in the fact that only those items which it includes may be discussed.[191] To date no final decision has been taken on the agenda for the 1985/87 WARC. Canada, France and West Germany jointly proposed an agenda to the Administrative Council, but consideration was postponed until the 38th session to be held in May 1983.

Since it will be an intergovernmental conference, the 1985/87 WARC will be free to decide whether or not to achieve the objectives set out in Resolution 3 and the manner in which to implement those decisions. The only legal restriction will be that its decisions (or amendments to the Radio Regulations) must not be contrary to the provisions of the applicable ITU Convention. The 1985/87 WARC is, therefore, entitled to consider all the planning methods and other approaches to "guarantee in practice an equitable access", and to establish the mechanism for their implementation. The ambiguity of the objectives merely serves to provide the 1985/87 WARC with still more freedom of action.

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191. International Telecommunication Convention, 1973, Article 7(2).

CHAPTER V: OTHER INTERNATIONAL FORA TO REGULATE THE GEOSTATIONARY ORBIT

The UN and the ITU are the major international fora through which the regulatory regime governing access to and use of the geostationary orbit is established. Additionally, member states of INTELSAT and INMARSAT have also undertaken to coordinate their use of the orbit/spectrum with these organizations which enjoy priority use of this resource. In this Chapter, the relevant provisions of the international treaties setting up these organizations will be briefly discussed.

A. INTELSAT

After the first successful launch of an experimental telecommunication satellite (Syncom-1) in the geostationary orbit in 1963,[1] the United States began the search for arrangements with other states to commercially exploit this new technology for international telecommunications. In 1964, US efforts resulted in interim arrangements between eleven states and in the creation of a global commercial communications satellite system.[2] Given the

1. NASA, Satellite Situation Report, Vol. 22(4), August 31, 1982, 2.

2. For the text of the Agreement Establishing Interim Arrangements for a Global Commercial Communications Satellite System and 'Special Agreement', see Matte, N.M., Aerospace Law, (Toronto, 1969), 406 et seq.

success of this venture, interim arrangements were replaced by definitive agreements which came into force in 1973[3] with the establishment of the International Telecommunications Satellite Organization (INTELSAT). The present structure of INTELSAT comprises the Assembly of Parties, the Meeting of Signatories, the Board of Governors, and the Executive organ headed by a Director General, directly responsible to the Board of Governors.[4] The Assembly of Parties is composed of all the states which have ratified the INTELSAT Agreement and is its principal organ. It meets every two years and considers those aspects of INTELSAT operations which are primarily of interest to the parties as sovereign states. Each

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3. These agreements are the: Agreement Relating to the International Telecommunications Satellite Organization (INTELSAT Agreement) and Operating Agreement Relating to the International Telecommunications Satellite Organization (Operating Agreement), 1971. For the texts of these agreements, see 10, International Legal Material, 1971, 909 et seq.; Jasentuliyana, N. and Lee, R.S.K. (ed.), Manual on Space Law, (Dobbs-Ferry, 1979), Vol. II, 159 et seq. For detailed historical background of INTELSAT, generally, see Matte, N.M., op. cit., supra note 2, 195 et seq.; Matte, N.M., Aerospace Law: Telecommunications Satellites, (Toronto, 1982), 108 et seq.; Colino, R.R., "Intelsat: Doing Business in Outer Space", 8, Columbia Journal of Transnational Law, (1967), 57 et seq.; by the same author, The Intelsat Definitive Arrangements: Ushering in a New Era in Satellite Communications, (Geneva, 1973); Trooboff, P.D., "Intelsat: Approaches to the Renegotiation", 9, Harvard International Law Journal, (1968), I et seq.

4. INTELSAT Agreement, ibid., article VI.

member state has one vote in the Assembly of Parties.[5] The Meeting of Signatories comprises all the Signatories (governments, or their public or private telecommunications operating entities) to the INTELSAT Operating Agreement. It meets every year and performs such functions as are important to the Signatories as investors in the INTELSAT system. In the Meeting, each Signatory has one vote.[6] The principal managing body of INTELSAT is the Board of Governors whose prime responsibilities relate to the design, development, construction, establishment, operation and maintenance of the space segment owned by INTELSAT.[7] The Board of Governors consists of individuals representing a) each Signatory whose investment is more than a minimum investment share as determined by the relevant provisions of the INTELSAT Agreement; b) any two or more Signatories whose combined investment share is more than the determined minimum share; and c) any group of at least five Signatories, not otherwise represented, from any one of the five ITU regions provided that no more than two Governors are from any one region

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5. <u>Ibid.</u>, article VII.

6. <u>Ibid.</u>, article VIII.

7. <u>Ibid.</u>, article X(a), "Space segment" means "the telecommunications satellites, and the tracking, telemetry, command, control, monitoring and related facilities and equipment required to support the operation of these satellites", <u>ibid.</u>, Article I(h).

and no more than five from all such regions.[8] On all substantive matters, decisions in the Board are taken on the basis of weighted votes. Each Governor has voting power equal to the investment share of the Signatory or Signatories he represents.[9] This decision-making process - devised to provide the major investors with more controlling power - obviously results in the concentration of decision-making in the hands of the few major investors in the INTELSAT system. The design, construction and operation of telecommunication satellites, including the choice of particular radio frequencies and geostationary orbital positions, are substantive matters, decided upon by the Board of Governors.

There are currently 108 states members of

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8. Ibid., article IX(a).

9. Ibid., article IX(b) and (j). The level of investment share of each Signatory, or group of Signatories, is derived from its, or their, utilization of the INTELSAT space segment for (i) international public telecommunication services; (ii) domestic public telecommunication services between areas separated by areas not under the jurisdiction of the state concerned, or between areas separated by the high seas; and (iii) domestic public telecommunication 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. Ibid.

INTELSAT,[10] which provides satellite telecommunication services to 160 countries, territories and possessions.[11] It carries two-thirds of the world's overseas public telecommunications[12] a figure which is expected to increase approximately 85% by 1986.[13] Though its primary purpose is to provide international telecommunication services, INTELSAT also provides domestic communications services to eighteen countries.[14] It has already launched its fifth generation of satellites and by 1986 will start launching its sixth.[15] While INTELSAT V satellites have a 12,000 telephone circuit capacity as compared to INTELSAT IV, (4,000-6,000), INTELSAT VI will be capable of handling 40,000 simultaneous telephone calls.[16] In view of the demand for satellite communications and INTELSAT's capability to meet that demand, it is the largest single user of the geostationary orbit,[17] and will no doubt continue to hold this position at least in the near future.

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10. 49(2), T.R., January 17, 1983, 35.

11. Facts Sheet: Intelsat, February 1982, 2.

12. Intelsat, Annual Report, 1981, 3.

13. 48(29), Telecommunications Reports, July 19, 1982, 36.

14. Intelsat, Annual Report, 1982, 13.

15. "Intelsat V Launched", Intelsat News, May 26, 1981, 1.

16. Ibid. See also "Intelsat Signs with Hughes for Next Satellite Series", Intelsat News, March 31, 1982, 1.

17. See infra Appendix.

Although at the outset, INTELSAT was intended to be a single global system, it was generally expected that a number of different systems, both for national and international telecommunications, would be established.[18] It was also felt that some coordination between INTELSAT and the other systems was necessary. Article XIV of the 1971 INTELSAT Agreement specifies a coordination procedure which was adopted primarily to safeguard the interests of INTELSAT by avoiding economic harm to the organization and entitling it to priority use of the spectrum/orbit resource. Since the main function of INTELSAT is to operate the space segment for international public telecommunication services, INTELSAT members are required to coordinate their separate satellite systems for such services.

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18. For details see Aerospace Law: Telecommunications Satellites, op. cit., supra note 3, 125-129; Colino, R.R., "Global Satellite Communications and International Organization: A Focus on Intelsat", X, Colloquium, 1967, 80, at 90-91; Donahue, T.E., "The Definitive Arrangements for Intelsat", XI, Colloquium, 1968, 176, at 178-181; Kildow, J.T., INTELSAT: Policy-Maker's Dilemma, (Toronto, 1973), 59 et seq.; Rothblatt, M.A., "International Legal Norms Governing Development of the Orbit/Spectrum Resource", Telecommunications Policy, June 1981, 63, at 69; Gotlieb, A.E. and Dalfen, C.M., "International Relations and Outer Space: The Politics of Cooperation", XXV, International Journal, (1969-70), 685, at 691-692.

Members of INTELSAT "must exercise their rights and meet their obligations under this (INTELSAT) Agreement in a manner fully consistent with and in furtherance of the principles stated in the Preamble and other provisions of this (INTELSAT) Agreement".[19] The Preamble stipulates the aim of the organization, which is to achieve "a single global commercial telecommunications satellite system" and to make "the best and most equitable use of the radio frequency spectrum and of orbital space". In order to achieve this goal, INTELSAT members have undertaken under article XIV to coordinate their separate systems with INTELSAT. Its relevant provisions are as follows:

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

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19. INTELSAT Agreement, op. cit., supra note 3, article XIV(a).

(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.

Thus, provision is made for three different ways in which to coordinate separate satellite systems with INTELSAT. The definitions of the terms "public telecommunications services"[20] and "specialized telecommunications services"[21] in the INTELSAT Agreement are broad enough to embrace almost every conceivable telecommunication service that can be provided by satellite for domestic, international, fixed, mobile, broadcasting, navigational, or remote sensing purposes. However, if an INTELSAT member intends to use a separate system "solely for national security purposes" coordination with INTELSAT is not required.[22]

Article XIV obliges INTELSAT members to consult with the organization and to provide all relevant information regarding the proposed use of separate satellite

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20. Ibid., article I (K): "Public telecommunications services means fixed or mobile telecommunications services which can be provided by satellite and which are available for use by the public, such as telephony, telegraphy, telex, fasximile, data transmission, transmission of radio and television programs...".

21. Ibid., article I(l): "Specialized telecommunications services means telecommunications services which can be provided by satellite, other than those defined (as 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."

22. Ibid., article XIV(g).

systems. INTELSAT examines the information with respect to technical conformity not only with existing, but also with planned satellite systems. INTELSAT therefore has priority use of the spectrum/orbit resource over its own members. These "preferential rights" are, in fact, quite extensive since member states must coordinate almost every use of a satellite system other than that of INTELSAT. The pervasive nature of such rights is further evident from the fact that 108 states have agreed to grant INTELSAT priority in the use of the spectrum/orbit even though the coordination procedure provided by article XIV is contrary to the general principles of law. According to Matte, "parties to the coordination are the INTELSAT members on one side, and INTELSAT on the other. Decisions concerning technical compatibility and significant economic harm are made by INTELSAT. This seems to be contrary to the general principle of law that no one should be a judge in his own case."[23]

While in the case of inter-system coordination for domestic public telecommunication services, the final decision is made by the Board of Governors, in the case of international and specialized telecommunications, it

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23. Aerospace Law: Telecommunications Satellites, op. cit., supra note 3, 130.

is the Assembly of Parties, on the advice of the Board of Governors, which states INTELSAT's final position. The Inter-system Coordination Office of INTELSAT's Executive Organ conducts all the technical background work in each coordination case. Since there is no definition of "technical compatibility" in the INTELSAT agreements, the Board of Governors has established its own guidelines, criteria and procedures for the guidance of the Coordination Office.[24] Appendix 29 of the ITU Radio Regulations and relevant Recommendations of the CCIR specify technical criteria to be used for inter-system coordination. However, the Board of Governors, when determining the technical compatibility of Indonesia's PALAPA system using the ITU standards and technical criteria, found that they were inadequate to protect INTELSAT satellite systems against undesirable harmful interference.

> 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

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24. Galante, F., "Regulating Traffic in the Geostationary Orbit", Intelsat, Intellink, First Quarter 1980, 9.

> satellites and by the view (held by some members of the Board) that the ITU procedures might not be adequate to meet all INTELSAT's requirements.[25]

This is indicative of the fact that the Board of Governors uses technical standards and criteria which are more rigorous than those provided in the ITU Regulations and Recommendations, and is thereby attempting to achieve the efficient and economic use of the geostationary orbit. It is to be noted that inter-system coordination under article XIV is not a substitute for the coordination requirement specified in article 11 of the Radio Regulations. Successful coordination under article XIV may facilitate coordination according to the Radio Regulations since the results so obtained may be filed with the IFRB. It must not be forgotten, however, that article XIV is limited to coordination between INTELSAT and a member's system, while coordination with other systems must be undertaken under article 11 of the Radio Regulations.

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25. Colino, R.R., "International Cooperation Between Communications Satellite Systems: An Overview of Current Practices and Future Prospects", <u>5 J. Space L.</u>, 1977, 65, at 85. See also, Rothblatt, M.A., "The Impact of International Satellite Communications Law upon Access to the Geostationary Orbit and the Electromagnetic Spectrum", 16, <u>Texas International Law Journal</u>, 1981, 207, at 219 footnotes 75 and 80.

The final decision of the Assembly of Parties or the Board of Governors, with respect to technical compatibility is given in the form of recommendations; but in the INTELSAT Agreements, there is no mention that the recommendations shall be legally binding on INTELSAT members. The term "recommendation" prima facie implies non-binding determinations. However, so far, INTELSAT members have complied with the requirements of article XIV in all cases of use of satellite systems other than INTELSAT.[26] Consistent practice seems to have established a precedent to the effect that member states should abide by such recommendations. However, it is difficult to foresee whether they will continue to be respected in the future, especially as the appropriate portion of the spectrum/orbit resource is becoming increasingly congested and INTELSAT continues to hold more orbital positions than immediately required. Given the severe limitations which this approach is already imposing on its members with respect to the use of the spectrum/orbit resource, some displeasure with INTELSAT's dominance seems to be developing.

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26. For a detailed analysis of various inter-systems coordination cases, see Matte, Aerospace Law: Telecommunications Satellites, op. cit., supra note 3, 131-140. See also "Intelsat Coordinates with European System", Intelsat News, October 8, 1982; "Intelsat Assembly of Parties Accepts Coordination of US/Canada Transborder Domsats", 48(42), T.R., October 18, 1982, 13; "Intelsat donne son accord (provisoire) au réseau Eutelsat", Air et cosmos, (Oct. 16, 1982), No. 924, 59; Courteix, S., "Organisations internationales à vocation mondiale ou régionale dans le domaine des télécommunications par satellites", Droit international, Facsimile 141, 1979(1), at 8; Bourély, M. and Thynne, J., "Télécommunications par satellites européens", XIV, Colloq., 1971, 115 et seq.

The Secretary-General of the European regional satellite telecommunications system, EUTELSAT, recently voiced the most serious concerns. He urged a reappraisal of "some of the outdated provisions of the INTELSAT Agreement... before violations of the INTELSAT Agreement or disregard for recommendations of the Assembly of Parties become frequent."[27] Objecting to INTELSAT's "arbitrary interpretation" of article XIV, he stressed the need for its "proper interpretation which cannot ignore the realistic context of the situation of today, or alternatively, amend the INTELSAT Agreement to make it compatible with present-day reality, which firmly proclaims that regional telecommunication satellite systems do exist..."[28]

All members of EUTELSAT are also members of INTELSAT. Thus, the final resolution of the differences between the two organizations rests with the countries which they comprise. Although EUTELSAT is mainly concerned

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27. Cf. "Head of Provisional Eutelsat Organization sees need to Re-interpret or Amend Intelsat Rule on Economic Coordination, Proposes Intra-Europe/Intercontinental Split of Traffic", 48(50), T.R., December 13, 1982, 22.

28. Ibid. See also "Menace persistante sur l'avenir d'Eutelsat", Air et cosmos, (Oct. 23, 1982), No. 925, 56, "Intelsat Viewed as Threat to Eutelsat's Operations", A.W.S.T., October 25, 1982, 25; Lowndes, J.C., "Intelsat Studies Monopoly Alternatives", A.W.S.T., November 22, 1982, 70 et seq.

with INTELSAT's economic hegemony no doubt similar problems exist with respect to INTELSAT's priority use of geostationary orbital positions and radio frequencies. While multi-administration systems like INTELSAT do help in achieving the efficient and economic use of the orbit/spectrum resource and for this reason should be granted some sort of priority access over single administrations or small regional satellite systems, it is difficult to specify the precise extent of such priority. Steps to prevent abuse could to some extent be achieved by the adoption of definitive provisions to limit the validity of orbital position / frequency assignments as proposed in Resolution No. 4 of the Radio Regulations. Above all, INTELSAT should be accepted as an associate member of the ITU, and hence become directly accountable internationally for its actions. More importantly, INTELSAT member states should be encouraged to increase their use of the system rather than establishing their own individual satellite systems. The INTELSAT Agreement emphasizes the primary purpose of the organization, i.e., to provide international telecommunication services, while domestic telecommunication services are provided on space satellite capacity and on a pre-emptible basis.[29] It is interesting to note that

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29. It is because of such a policy that 85% of INTELSAT's revenue is derived from full-time international services and only 7% from transponder leases for domestic services. See Intelsat, Annual Report, 1982, 30.

the Assembly of Parties recently requested the Board of Governors, "when considering the provision of domestic leased services via INTELSAT satellites, to give emphasis to ways in which such services could be provided on a planned and non-pre-emptible basis."[30] This policy may enhance confidence in the use of the INTELSAT system for domestic telecommunications. However, since the investment quota, and consequently voting power in the Board of Governors, is primarily determined on the basis of actual use of the INTELSAT space segment for public international telecommunication services, merely assuring domestic service is insufficient to really encourage use of the INTELSAT system instead of the establishment of separate individual, or small regional systems. Article IX(f) of the INTELSAT Agreement should be amended in such a way as to entitle all Signatories to have investment shares equal to their use of the INTELSAT system irrespective of the services provided. Smaller countries, for example, which presently have relatively little international traffic, may prefer to use INTELSAT for domestic and other services instead of developing a separate system (which may not be economically viable). Their controlling power in INTELSAT would increase with such use and they would be in a better

30. Intelsat News, October 8, 1982, 2.

position to safeguard their interests. Consequently, the end result will be more economic and efficient use of the geostationary orbit.

While article XIV may appear to be contrary to the provision of the Outer Space Treaty, which stipulates that outer space is free for use on the basis of equality, such is not the case. Article XIV enables INTELSAT to conduct its operations securely and thus to prosper. Its prosperity is ultimately that of its members who share INTELSAT profits in accordance with their investment quotas. INTELSAT members have agreed to limit their freedom of use of the geostationary orbit because it is in their interests. They are free to withdraw if they so desire, but to-date they have derived economic advantage from their membership.

B. INMARSAT

Member states of INMARSAT have also voluntarily agreed to limit their freedom of action and to grant INMARSAT a position of pre-eminence which is similar to that of INTELSAT. INMARSAT - an international maritime satellite system - was established to "make provision for the space segment necessary for improving 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."[31] It became operational on February 1, 1982 leasing satellites from the (US) MARISAT consortium, the European Space Agency (MARECS), and INTELSAT.[32] At present, there are 38 states members of INMARSAT.[33] As of December 1982 there were more than 1500 users of the INMARSAT system.[34]

The organizational structure of INMARSAT consists of an Assembly, a Council and a Directorate, headed by a Director General. The Assembly is composed of all the member states and is concerned with the organization's general policies and long-term objectives. It meets once

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31. Convention on the International Maritime Satellite Organization (INMARSAT), 1976, Article 3(1). The text of the Convention is printed in Manual on Space Law, op. cit., supra note 3, 291 et seq.

32. "New Maritime Satellite System Launched", Inmarsat, New Release, February 2, 1982, 1.

33. Inmarsat, News Release, January 17, 1983, 1.

34. Inmarsat, "Notes for Remarks by Olof Lundberg, Director General of the International Maritime Satellite Organization to the Satellite Summit", Washington, D.C., December 7, 1982, 2.

every two years, and each member has one vote. The managing body of INMARSAT is the Council which comprises eighteen representatives of the largest investors, and four representing other investors, in the system. Decisions on substantive matters are taken by weighted votes and the Council has prime responsibility for providing the space segment necessary for the carrying out of the purposes of the organization in the most economic, effective and efficient manner.[35]

The Preamble to the INMARSAT Convention reiterates the determination of member states to make use of the "most efficient and economic facilities possible consistent with the most efficient and equitable use of the radio frequency spectrum and of satellite orbits." Article 8 of the Convention contains provisions similar to those in article XIV of the INTELSAT Agreement. A member is obliged to notify INMARSAT in the event that it, or any person within its jurisdiction, intends to use a satellite system (separate from that of INMARSAT) for purposes similar to that of INMARSAT.[36] Such notification is required to ensure technical compatibility and to avoid

35. INMARSAT Convention, op. cit., supra note 31, article 15.

36. Ibid., article 8(1).

economic harm to the INMARSAT system. There is no definition of "technical compatibility" in the INMSARSAT Convention, but it would appear to refer to the avoidance of harmful interference. Accordingly, member states have undertaken not to use those radio frequencies and orbital positions which are already used by INMARSAT or whose use could result in harmful interference to INMARSAT satellites. On receiving such notification, the Council expresses its views in the form of non-binding recommendations. It is noteworthy that the INMSARSAT Convention expressly specifies that the Council's recommendations shall be non-binding. Inter-system coordination is required if the proposed use of a separate system is for "national security purposes."[37]

The inter-system coordination requirement under article 8 of the INMARSAT Convention may not be substituted for similar requirements under article XIV of the INTELSAT Agreement and article 11 of the Radio Regulations. INMARSAT members who are also members of INTELSAT must coordinate their use of satellite systems for purposes similar to that of INMARSAT with INMARSAT and INTELSAT, since the INTELSAT Agreement provides for inter-system coordination in almost all cases of satellite system use other than that of INTELSAT. INMARSAT members must further meet the requirements of article 11 of the Radio Regulations

37. Ibid., article 8(5).

regarding coordination with the satellite systems of other states.

No coordination under article 8 has yet taken place since INMARSAT became operational only recently and no other satellite system for similar purposes has so far been established. The provisions of article 8, as compared with those of article XIV of the INTELSAT Agreement, are simpler and more limited in scope since membership of INMARSAT is still restricted to 38 states. Also, article 8 requires coordination only in those cases of use of a separate system for the same purpose as that of INMARSAT. Article XIV on the other hand, is comprehensive. In light of the express stipulation concerning the non-binding nature of the Council's recommendations it is expected that INMARSAT members will abide by the recommendations only if it is in their interests. Irrespective of this inherent weakness, however, article 8 is an attempt to achieve efficient and economic use of the geostationary orbit, which serves the inclusive interests of the international community.

CHAPTER VI: FINAL ANALYSIS, CONCLUSIONS AND RECOMMENDATIONS

A. A LIMITED RESOURCE WITH SPECIAL LEGAL STATUS

The geostationary orbit is a ringlike natural phenomenon approximately 30 km. wide and 150 km. thick at a distance of about 36,000 km. above the earth's equator - an area which has proved to be highly advantageous for earth-oriented space activities, such as telecommunication, meteorology, etc. In less than a quarter of a century, this seemingly unlimited resource has begun to show signs of scarcity since the availability of radio frequencies with which the orbit is used, is limited by technological and regulatory factors. This is compounded by the fact that only certain portions of the orbit can be used by a particular country, depending upon its geographical location. The orbital positions taken up can be held in "quasi" perpetuity and this has already lead to congestion, thereby causing serious problems.

The unbalanced use of the orbit is not confined to geographical areas alone. A handful of techno-economically developed countries have occupied the most suited and useful positions, to the detriment of a large majority of late-comers. The traditional practice of first come, first served with respect to the acquisition of rights to the use of radio frequencies has been extended to the acquisition of orbital slots. 90% of the radio spectrum has, historically, been controlled by roughly 10% of the world's population (living mainly in the developed countries).[1]

The same percentage of orbital positions has been taken up by INTELSAT[2] and a few developed countries.[3] The late-comers are already experiencing undue difficulties

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1. See Soroos, M.S., "The Commons in the Sky: The Radio Spectrum and Geosynchronous Orbit as Issues in Global Policy", 36(3) International Organization, 1982, 665, at 673; Rothblatt, M.A., "ITU Regulation of Satellite Communication", XVIII (1), Stanford Journal of International Law, 1982, 1, at 15, fn. 72; Courteix, S., "La Conférence administrative mondiale des radiocommunications de 1979 et le nouvel ordre international de l'éther", XXVI, Annuaire français de droit international, 1980, 625, at 633; Wijkman, P.M., "Managing the Global Commons", 36(3), International Organization, 1982, 511, at 535.

2. INTELSAT is predominantly controlled by developed countries. According to the 1982 INTELSAT, Annual Report, about 23% of membership (developed countries) has about 67% investment in it, consequently controlling power, while 77% of its membership (developing countries) has only 33% of such a controlling power.

3. See infra Appendix.

in obtaining access to this natural resource and the continuation of the traditional practice will not contribute to the amelioration of the present situation.

The *de facto* monopoly in the exploitation of the geostationary orbit impelled some equatorial countries to declare *de jure* sovereignty over certain portions directly above their territories. This aroused an international conflict and distrust, as witnessed in the COPUOS proceedings and at the 1979 WARC, and goes against the provisions of article III of the Outer Space Treaty which require the conduct of space activities in the interest of promoting international cooperation and understanding.[4] Despite *de jure* claims, which are

4. For example, Uruguay in its reply to the UN General Assembly's inquiry regarding the application of the Treaty over the past ten years and showing its importance for the development of international cooperation in the practical application of space technology, responded that the Outer Space Treaty "has not been sufficiently developed, either juridically or practically to really implement the vital principles which it contains. Uruguay therefore draws attention to the need to accelerate the juridical development and practical implementation of the Treaty on a universal basis, including in those countries which are not directly involved in outer space activities and have not been the main beneficiaries of such activities": UN Doc. A/AC.105/219/Add.2, (1978), 3. With respect to the access to and the use of the geostationary orbit a majority of the countries, especially the developing ones, are

generally denied, the status of the orbit remains unchanged: it is a part of outer space and hence, governed by the law of outer space. The orbit is a limited resource with unique advantages and is universally recognized as a phenomenon that enjoys special legal status within the general framework of outer space. Any de jure claims of exclusive sovereignty are necessarily inadmissible. De facto monopolistic claims are, on the other hand, equally contrary to the established legal norms of international space law which views the geostationary orbit as a common heritage of mankind.[5]

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dissatisfied with the inadequate implementation of the Outer Space Treaty. See for details, "Bogota Declaration" of 1976 in Jasentuliyana, N. and Lee, R.S.K., Manual on Space Law, (Dobbs Ferry, 1979), Vol. II, 383 et seq.; UN Docs. A/AC.105/252 (1979), 3 (Chile); Report of the Legal Sub-Committee on the Work of the Twenty-first Session, A/AC.105/305 (February 24, 1982), 10, para. 10; A/AC.105/C.2/SR.336 (1982), 3-4 (Colombia); Declaration of the Group of 77, UN Doc. A/CONF.101/5 (1982), 2.

5. "On the one hand, claims of any states to sovereignty rights to the outer space environment are objectionable; on the other hand, widespread occupation of the geostationary orbit, which clearly is limited, simply for the furtherance of purely national interests is equally unacceptable. One should not forget that the exploration and use of outer space is to be carried out for the benefit and in the interests of all countries": Matte, N.M., "The Law of the Sea and Outer Space: A Comparative Survey of Specific Issues", 3, Ocean Yearbook, 1982, 3, at 32.

B. A COMMON HERITAGE OF MANKIND

The international community, through the UN, has established directive principles to govern all activities relating to the exploration and use of outer space, including the geostationary orbit. These principles of common interest, freedom and non-appropriation have become peremptory norms of international law (jus cogens). They determine the legal rights and duties of all states, whether parties to the Outer Space Treaty or not, with respect to access to, and use of the geostationary orbit. The legal effects of these principles are a) that the geostationary orbit must be utilized for the benefit and in the interest of all countries, irrespective of the degree of their scientific and economic development; b) that the freedom of use is a right of all states without discrimination of any kind; c) that such freedom is not unlimited and is to be exercised with due regard to the corresponding interests of other states without infringing upon their rights; and d) that the geostationary orbit must not be appropriated by any means whatsoever. The present practice of first come, first served is contrary to these principles. It results in benefits accruing to only a handful of states, creates monopolies by the first-comers, infringes upon the rights of others, imposes limitations on the late-comers and encourages quasi appropriation of the geostationary orbit. The continuation of this practice disrupts the legal order established by the fundamental principles, and necessitates immediate change.

The application of these directive principles to the utilization of the geostationary orbit implies a) that all countries are entitled to an equitable share of the benefits accruing from exploitation, and b) that they have equal right to equitable access to, and use of the geostationary orbit. These principles are neither self-executing, nor is there any specific authority established for their implementation. Therefore, the UN and ITU, as the two organizations directly concerned with the regulation of the orbit, should take the necessary steps to develop further the legal regime by which it is governed in an attempt to implement these directive principles.

C. EQUITABLE DISTRIBUTION OF BENEFITS

The UN COPUOS has been discussing the issue of the geostationary orbit for some considerable time and has not yet succeeded in agreeing on specific regulations.

It is, however, submitted that consideration of the question of the geostationary orbit together with the boundary issue is undesirable given the nature of the problems underlying each of these issues. A solution to the boundary question will not necessarily result in a solution to the problems posed by the exploitation of the geostationary orbit. The question of access to, and use of the orbit should be left to the ITU which has already embarked upon consideration of this problem and may be expected to succeed in its mission at the 1985/87 WARC and/or other conferences. It seems more appropriate that the UN should continue to fulfil its responsibility for further developing the general legal regime to govern outer space. Having succeeded in drafting specific treaties, to further improve and elaborate the provisions of the parent treaty, i.e. the Outer Space Treaty of 1967, it should now undertake to draft a special treaty for the establishment of an international legal regime. A specific (separate) regime to govern the geostationary orbit may be justified on the grounds that it already enjoys special legal status, and that it is being exploited extensively. It is interesting to note that the necessity of such a special regime is generally acknowledged by COPUOS member states,[6] with the exception of the US and the UK.[7]

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6. See, generally, UN Docs. A/AC.105/C.2/SR.373, (1982), 6 (USSR): "some special norms might be adopted to regulate the utilization of the geostationary orbit, which formed part and parcel of outer space, on a planned basis that was in keeping with the spirit of the Outer Space Treaty"; and also A/AC.105/C.2/SR.377, 7; A/AC.105/C.2/SR.374, (1982), 3 (Spain): "The geostationary orbit did have a particular legal nature that warranted the application of specific legal rules. The fact that the orbit was a limited natural resource could also justify priority treatment". A/AC.105/C.2/SR.375, (1982), 3, and A/AC.105/PV.181, (1978), 52 (Argentina); A/AC.105/PV.180, (1978), 31 (Belgium); A/AC.105/PV.185, (1978), 11 (Czechoslovakia); A/AC.105/PV.183, (1978), 56 (Mexico); A/AC.105/218, (1978), 9-10. See also Report of the Fifty-ninth Conference of ILA, 1980, 171. Though the Bogota Declaration states have declared their national sovereignty over the portions of the geostationary orbit above their territories, yet they favour the development of a special international legal regime to regulate the use of the orbit to allow equitable access to it: see A/AC.105/C.2/SR.372, (1982), 3 (Indonesia); ibid., 4 (Colombia); ibid., 7 (Ecuador). See also Courteix, S., "Question d'actualité en matière de droit de l'espace", XXIV, A.F.D.I., 1978, 890, at 901.

7. UN Docs. A/AC.105/C.2/SR.377, (1982), 4 (US); A/AC.105/C.2/SR.375, (1982), 3 (UK). However, the UK expressed its confidence of ITU's ability to continue to safeguard the best interests of the international community in its management of the geostationary orbit, ibid.

Discussion of the use of the geostationary orbit also took place during the Second UN Conference on the Peaceful Uses of Outer Space (UNISPACE '82) held in Vienna in 1982. The Conference debated various proposals and approaches to use of the orbit and, in its final report, expressed concerns with respect to the present inequitable distribution of geostationary orbital positions. It recommended that the ITU should "continue to evolve some criteria for the most equitable and efficient usage of the GSO and the RF (radio frequency) spectrum and to develop planning methods and/or arrangements that are based on the genuine needs, both present and future, identified by each country".[8] It further recommended that "such planning method should take into account the specific needs of the developing countries, as well as the special geographical situation of particular countries."[9] The Conference finally concluded that

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8. Report of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna, 9-21 August, 1982, UN Doc. A/CONF.101/10, 71.

9. Ibid. Reference to "special geographical situation" relates not only to the equatorial countries but also to those where satellite signals are affected by climatic conditions. See UN Docs. A/AC.105/271, (1980), 5, para. 41; A/AC.105/C.2/SR.373, (1982), 8. See also Danielson, S., "An Interdisciplinary Approach in the Regulation by the United Nations of Activities in Outer Space: Some Technical Considerations", in Proceedings of the Symposium, op. cit., supra Introduction, fn. 5, 99, at 115-116; DuCharme, E.D., et al., "The Genesis of the 1985/87 ITU World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services", VII, A.A.S.L., 1982, 261, at 274.

"considering the long-term implications of the growing activities in GSO, any solution on the use of GSO should be both equitable and flexible and take into consideration the economic, technical and legal aspects".[10] The Conference did not adopt any specific regulations or treaty, as it was not within its competence to do so, but it has submitted its report to the UN General Assembly and requested it to take appropriate action on its recommendations. Although these recommendations do not create any legal rights and duties on the part of UN members, they do seem to present a consensus that the international community and General Assembly should act as soon as possible. It is, therefore, submitted that the General Assembly should request the COPUOS to consider the establishment of a special international regime to govern the geostationary orbit taking into consideration the relevant economic, technical and legal aspects. Such a regime should establish the general basic principles with respect to access to, and use of the orbit, but detailed implementation of the provisions should be left to the ITU.

Under the present regulatory regime, countries able to make use of the orbit benefit from such exploita-

10. See <u>supra</u> note 8.

tion of outer space, while others, because of economic and scientific inadequacies are deprived of its advantages. In addition to general principles governing access to the orbit, the UN must incorporate some provisions for the equitable distribution of benefits accruing from exploitation of this natural resource. To this end, it is suggested that an international duty or "parking fee" for use of the geostationary orbit should be levied on users. The delegate of the Netherlands to the UN COPUOS, aptly observed that:

> The MacBride Report[11] also contains an interesting suggestion concerning the geostationary orbit. As one of the means to secure sufficient financial resources for development in the field of communications, it mentions the possibility of an international duty on the use of the geostationary orbit for the benefit of the developing countries. I am of the view that this suggestion could be explored further, since it is correctly founded on the concept of the geostationary orbit as a phenomenon to be exploited for the benefit of all, regardless of the level of technological development or geographical position.[12]

Others sharing this view have stated that,

> We favor user fees that would bring

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11. Many Voices, One World, Report of the International Commission for the Study of Communication Problems, UNESCO, 1980.

12. Un Doc. A/AC.105/PV.207, (July 3, 1980), 62.

> the direct costs of using these resources into line with their value (as determined by availability), for this would free some portions of the spectrum that are now underutilized for use by others. Moreover, such user fees would constitute de facto recognition that the spectrum and orbits are internationally owned resources. Finally, the user fees could provide revenue to the international community to be applied to lessen the disparities in communications capabilities among nations.[13]

The situation which currently prevails has disrupted the "balance of interests" established by the Outer Space Treaty, and hence the calls

> for a more just and equitable legal order to correct in some measure the imbalanced situation resulting from the differing degree of technological development among nations, since only a very small number of states (possess) a genuine space technology and the remainder (are) no more than helpless spectators of the applications of such technology, often for the exclusive benefit of the minority .[14]

It is hoped that the interests of both the developed and developing countries could be served by means of the international regime suggested above incorporating a mechanism that will tend to balance the interests of both users and non-users and thereby implementing the

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13. Brown, S., et al, Regimes for the Ocean, Outer Space, and Weather, (Washington, 1977), 201.

14. UN Doc. A/AC.105/C.2/SR.366, (1982), 3.

common interest principle enunciated in the Outer Space Treaty. The proposed international regime will thus form part of the bulk of "new law which comes with or from international organizations (and) aims directly not at order but at distributive justice and general welfare."[15]

The establishment of the proposed regime is, without doubt, a major challenge to the international

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15. Henkin, L., "International Organisation and the Rule of Law", 23, International Organization, 1969, 656, at 660-61. Similarly, Gorove holds that "(l)aw in the sense of legislation in the domestic field or treaty making in the international arena, seldom is the result of isolated efforts. More frequently it comes about because of the operation of power, political and other value processes directly influencing it, thus ... some of the issues pertaining to the geostationary orbit and the planning of space services must be seen in the light of recent trends in the world community. Such trends reveal persistent efforts and a strong determination on the part of developing nations to insist on rights and champion interest which would give them a greater share of the world's material benefits. The challenging task facing legal technicians and policy makers will be to formulate principles and procedures which will serve the interests of developing and developed nations alike": Gorove, S., "The World Administrative Radio Conference 1979: Some Legal Political Implications", in Zeitschrift für Luftrecht und Weltraumrechtsfragen, (September, 1980), 214, at 220.

community which has only recently succeeded in drafting the monumental international treaty on the law of the sea. There are difficult questions to be answered involving not only technical and organizational, but also economic and political considerations, before a compromise may reasonably be expected. However, in the writer's view, the initiation of discussion at the international level, both in governmental fora and in doctrine, will bring to light possible solutions to the envisioned problems.

The intention is not to delimit the task of the ITU, but rather to complement it and to leave the organization to fulfil the purposes for which it was created. The ITU to date has had a great deal of success in creating legal "order" in outer space and should continue in accordance with the suggestions mentioned above.

To achieve international agreement, the UN COPUOS has two possible options: *i.e.*, (a) to draft a treaty establishing a special international legal regime for the geostationary orbit, as has been done in the case of natural resources of the moon and other celestial bodies, or (b) to convene an international conference similar to the Third (UN) Law of the Sea

Conference, in close association or under the co-sponsorship of the ITU,[16] to establish a comprehensive international regime for the sharing of benefits derived from exploitation of this natural resource.

It has already been stated that COPUOS has become a stagnant body, and, under these circumstances, it is unrealistic to expect that much will be achieved with respect to a separate geostationary orbit regime.

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16. Gehrig, as early as 1976, suggested that it "would be useful to carry out studies leading to recommendations as to what additional legal and technical international agreements States should enter into with respect to spectrum-orbit utilization. Technical studies are being carried out by the ITU, but it would be appropriate, I think, for the United Nations jointly with the ITU, to make a special study of spectrum-orbit use which takes into consideration both the technical and appropriate legal questions." Gehrig, J.J., "Geostationary Orbit - Technology and Law", XIX, Colloquium, 1976, 267, at 274. He further holds that "ITU activities are directed primarily to technical matters and the general feeling is that the ITU should not become involved in legal matters because they are more directly impacted by political questions." (Ibid., 277, fn. 27). Similarly, in 1977, Sarkar suggested that "UN General Assembly should elaborate the basic principles governing the use of the geostationary orbital positions, but leave the detailed elaboration and coordination procedures for allocation/assignment to the Radio Regulations"; see Sarkar, S.K., "Geostationary Orbital Positions for Space Stations", XX, Colloquium, 1977, 450.

First and foremost, the decision-making mechanism within COPUOS has to be changed. The consensus rule, which worked well in the past, is no longer appropriate for an organization which now comprises 53 member states. Also, outer space activities are no longer confined to exploration. Commercial exploitation has entered into the picture, inciting some states to make use of their veto power in order to block any decisions which may harm their particular interests. The rules of procedure used by the Third United Nations Conference on the Law of the Sea should also be adopted within COPUOS, *i.e.*, it

> ... should make every effort to reach agreement on substantive matters by way of consensus and there should be no voting on such matters until all efforts at consensus have been exhausted.[17]

The same rule has been adopted in article 312 of the 1982 Convention on the Law of the Sea, and shall be applicable at any conference convened to amend a provision of the Convention. If adopted in COPUOS, this procedure could help in achieving agreement on major issues and COPUOS would thus be able to continue its role as an effective and active forum dealing with

17. UN Doc. A/CONF.62/121, (1982), 13-14.

all outer space matters.

D. GUARANTEED EQUITABLE ACCESS

I. General

Access to the orbit is determined primarily by the sovereign right of freedom of action. Therefore, the general rule regarding access to the orbit is first come, first served, while pre-determined guaranteed access is an exception to the ITU regulatory regime. This results from the traditional approach towards regulation of telecommunications and the new issues raised by space age technology. While a majority of ITU member nations are dissatisfied with the present system, they have been unable to make any significant change, despite the prevailing rule of one member, one vote and the efforts devoted to this end since 1963. This is due to the working method of the ITU Conferences and the inability of the developing countries to participate as effectively as the developed states.

The philosophy of the present ITU Convention and Radio Regulations with respect to access to, and use of the orbit/spectrum resource, as outlined in article

33(2) is that it must be used efficiently and economically so that all countries may have equitable access. In other words, emphasis is placed on maximizing the availability of the resource to achieve the objective of equitable distribution. The fallacy of this approach is that there is no strong mechanism by which to achieve efficient and economic use of the orbit and hence no possibility of its equitable distribution. Whatever portion of the orbit is spared as a result of its (expected) efficient and economic use, it will again be occupied by those states which are already making use of the other portions of the orbit. This approach, therefore, is inherently inequitable, and, it is evident that the continuation of this practice will merely serve to worsen the situation.

The present ITU regulatory regime, originally devised in 1927 and strengthened in 1947, has been continued without major modifications, while the nature of telecommunications as well as the political composition of the world, have undergone drastic changes. Traditional international legal rules with respect to the exploitation of global common natural resources stem primarily from Grotius's outdated assumptions that the "resources of the sea were inexhaustible."[18] The laissez-faire approach of total freedom to exploit the world's common resources has resulted in "overuse and possible depletion or destruction of the resource along the lines of Garrett Hardin's 'tragedy of the commons'".[19] The basis for exploitation of the natural resources of the high seas has been changed in the 1982 Convention on the Law of the Sea. The geostationary orbit, while not depletable like other natural resources of the earth, is subject to congestion and saturation because of technological limitations. Given the need for international cooperation, it is essential that inclusive interests should prevail over exclusive claims. Such a regulatory philosophy will not diminish the benefits to individual participants, but rather will increase the total benefits derived for all to share.[20] The determination of inclusive interests and the sharing of geostationary orbital positions - a common property - is primarily a policy matter and must be settled at international political forums. As noted by Garrett Hardin, technology, and technological solutions,

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18. Eisenbud, R., "Understanding the International Fisheries Debate", 4, Natural Resources Lawyer, 1971, 19, at 26.

19. Soroos, op. cit., supra note 1, at 670.

20. McDougal, M.S. et al, Law and Public Order in Space, (New Haven and London, 1963), 793 et seq.

cannot always solve the problems of the world's commons.[21] Reliance on purely technical solutions, or approaches adopted by the ITU as regards the equitable sharing of orbital positions must, therefore, be eliminated and the UN obliged to discuss the issue with a view to establishing a special regulatory regime. Similarly, the ITU's supreme political organ - the Plenipotentiary Conference - should extensively discuss questions of equitable access to the geostationary orbit and instruct other organs on the detailed implementation of its policies.

The directive principles of international space law have clearly established the inclusive interest of the international community in the exploitation of the geostationary orbit, while the ITU regulatory regime has developed independently of those principles and favours exclusive claims in such exploitation. The obvious inconsistency[22] of the two regimes must be resolved since the peremptory nature (jus cogens) of the directive principles renders the conflicting provisions

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21. Hardin, G., "The Tragedy of the Commons", in Knelman, F.H. (ed.), 1984 and All That, (Belmont, 1971), 67 et seq.

22. For details on the question of inconsistency of treaties, see Jenks, C.W., "The Conflict of Law-Making Treaties", 30, British YearBook of International Law, 1953, 401 et seq.

of the International Telecommunication Convention and Radio Regulations void.[23] These provisions should be amended[24] to bring them into line with the peremptory norms of space law. WARC 85/87 should undertake prime responsibility for the accomplishment of this task. The future principles and rules of international telecommunication law should also be oriented towards ensuring greater international accountability on the part of individual countries and international organizations with respect to access to, and use of the geostationary orbit. For this purpose, the powers of the IFRB should be strengthened.

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23. Article 53 of the Vienna Convention on the Law of Treaties of 1969 (reprinted in 63, A.J.I.L., 1969, 875 *et seq.*) provides that a "treaty is void if, at the time of its conclusion, it conflicts with a peremptory norm of general international law. For the purpose of the present Convention, a peremptory norm of general international law is a norm accepted and recognized by the international community of states as a whole as a norm from which no derogation is permitted and which can be modified only by a subsequent norm of general international law having the same character." Article 64 of the Convention, entitled "Emergence of a new peremptory norm of general international law (*jus cogens*)" further provides that "(if) a new peremptory norm of general international law emerges, any existing treaty which is in conflict with that norm becomes void and terminates."

24. See Article 71 of the Vienna Convention on the Law of Treaties, *ibid.* See also Jenks, *op. cit., supra* note 22.

2. Extension of the IFRB's Powers

The sovereign right of freedom of action not only governs access to the geostationary orbit but also facilitates retention of the first occupied geostationary orbital positions. In other words, the Board is without power to cancel or modify frequency/orbital assignments.

The Board does not have its own system by which to monitor observance of the provisions of the ITU Convention and the Radio Regulations and administrations are not strictly obliged to forward information gathered by their respective monitoring systems. They are merely required to "make every effort to arrange for monitoring observations to be submitted to the Board as soon as possible."[25] Assignments may not be cancelled without the consent of the notifying administration. As the radio spectrum becomes increasingly congested, it is obvious that administrations will attempt to hold on to already recorded assignments, even if they are not actually used.

These "deadwood" assignments remain on the Master Register, and prevent the recording of subsequent assignments which may appear to cause harmful inter-

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25. Radio Regulations, 1982, Article 20(11), No. 1883.

ference. Although this is not the case, restrictions are, nevertheless, imposed on their use by other countries. Similarly, frequency/orbital position assignments which are not being used according to their originally notified purposes and basic characteristics, once recorded in the Master Register, inhibit the recording of subsequent assignments which would, theoretically, cause interference. The present ITU regulatory regime is based primarily on the need to avoid such harmful interference, rather than on the requirement to distribute natural resources. It would, however, seem appropriate that there should be provision in the Radio Regulations which would require administrations to cancel "deadwood" assignments and the assignments not being used in accordance with recorded characteristics before they are allowed to register new assignments.

The inability of the ITU to effectively manage and distribute natural resources is evident from the lack of observance of the Convention and the Radio Regulations. If the needs of all states were being reasonably and adequately met, greater adherence to the principles and rules of the ITU and the Radio Regulations could be expected. It is in the interest of every state that cooperation, rather than conflict, should dominate international relations regarding the sharing of geostationary orbital positions and radio frequencies. It is, therefore, important to devise new methods to achieve this end. It is equally important that they be made sufficiently effective in order to ensure the dominance of law over absolute freedom of action of a nation or a group of nations. Given the political climate which currently prevails, it is difficult to imagine that states are ready to accept serious limitations on their sovereign freedom of action; but, it is also important to remember that the protection of the interests of all may only be accomplished if there is provision for sanctions or, at least, some possible form of coercion. Four possible approaches to ensure that the principle of sharing of the frequency/spectrum resource are strictly observed are proposed as follows:

a) The provisions of Resolution No. 4 should be strengthened and incorporated into the Radio Regulations. This action will not only encourage technological development but also subject all countries to an equitable burden of using the most recent (generally expensive) technical means by which to utilize the orbit efficiently and economically. In this way, there will be no privileged first-comers and unlucky late-comers. The present regulatory regime, originally devised to protect the use of radio stations which were of a more permanent nature, would produce staggering results if applied to space stations, such as space platforms or solar power satellites with a life-span of 30 years or more. The use of the radio frequency and orbital positions for these devices must be subjected to some kind of time limitation;

b) In addition to agreement on guaranteed and equitable access to the orbit/spectrum resource, the Board should be empowered to cancel and modify registrations, as appropriate, in cases of hoarding of unused assignments or misuse, even over the objections of the administration concerned. Specific provisions for this purpose should be included in article 13 (section VI) of the Radio Regulations;

c) Under the present Radio Regulations, the Board can, at most, conduct studies and make recommendations at the request of an administration about the alleged contravention or non-observance of the Radio

Regulations by other administrations.[26] Compliance with such recommendations depends entirely upon the goodwill of the administrations concerned. The offending entries in the Master Register should be cancelled by the Board even over the objections of the notifying administration;

d) In the case of b) and c) above, provision should be made for an appeal procedure against the decisions of the Board. There is no provision in the ITU Convention and the Radio Regulations with respect to the settlement of disputes between an organ and a member of the ITU. The provisions of the Convention which deal with the settlement of disputes apply only to controversies between ITU members.[27] It is suggested that a "right to appeal" should be incorporated in the Convention

26. Radio Regulations, 1982, Article 13, (Section VII).

27. International Telecommunication Convention, 1973, Articles 50 and 81. An Optimal Additional Protocol to the ITU Convention, which also applies to disputes between members, prescribes compulsory settlement of disputes. This is not of significant value, since it has been ratified by very few member countries and neither of the superpowers ratified it. See Jasentuliyana, N., "Regulations Governing Space Telecommunications", in Jasentuliyana, N. and Lee, R.S.K. (ed.), Manual on Space Law, (Dobbs Ferry, 1979), Vol. I, 195, at 234, fn. 126. For details of the dispute settlement procedure in the ITU, see Ichowitz, A.H., "The Role of the International Telecommunication Union in the Settlement of Harmful Interference Disputes", 13 Columbia Journal of International Law, 1974, 82 et seq.

in order to settle disputes between the Board and a member country. Furthermore, it is suggested that the Administrative Council select a small group of experts from a list compiled after consultation with the Board and the country which is a party to the dispute. The list of independent experts should be revised by the Plenipotentiary Conferences, and candidates proposed by member countries should be elected to be on the list. They should be experienced in the management of the orbit/spectrum resource and ITU's regulatory regime. The composition of each ad hoc group should be such that all ITU regions are represented by persons other than a national or resident of, or directly or indirectly employed by the state party to the dispute. Such a group should conduct its investigations and hearings in an open forum providing every possible opportunity for the parties in dispute to present their case. The Board could be represented by any one of its members or an expert appointed by the Board for this purpose. The decision of the group should be based primarily on the application of the appropriate provisions of the ITU Convention and the Radio Regulations. The method of work of the group could be developed by the Administrative Council and submitted to, and approved by a WARC. Similarly, revisions suggested to WARC on the initiative of the group or on its own behalf could be undertaken. The implementation of the decisions of the ad hoc group should lie with the Administrative Council which may decide which steps should be taken with respect to implementation. In the case of non-acceptance of the decisions by the country in dispute, it should (a) be entitled, under certain circumstances, to appeal to the next Plenipotentiary Conference and the Administrative Council should ensure that such an appeal is included on the agenda of the Plenipotentiary Conference; and (b) if a country does not wish either to appeal or to implement the decision of the group, the Administrative Council should be entitled to refer the matter to the next Plenipotentiary Conference for final action, as it considers appropriate. Such mandatory procedure for the settlement of disputes is necessary in view of the fact that the ITU is concerned not only with ensuring avoidance of harmful interference but also with the sharing of the geo-stationary orbit for the benefit and in the interest of all countries.

3. Spectrum/Orbit Planning

The question of access to, and the use of the geo-stationary orbit is not only one of avoidance of harmful interference, but also of equitable distribution, which is a policy matter. Such policy decisions have always been avoided in the ITU Conferences, even in the Plenipotentiary Conference which is the supreme political organ of the ITU. In fact, there is no international forum in which to discuss the problems of access to and the use of the orbit/spectrum resource. Rutkowski aptly points out that:

> During the last two decades in which these problems have arisen, there has been relatively little discussion of them, and few alternatives have been proposed. The situation is greatly aggravated by the tendency of many developed countries to view the ITU as competent to consider only technical matters, leaving no international forum available to establish a meaningful dialogue on legal, economic and organizational matters.[28]

He further points out that the "developed countries have not been very active in devising new kinds of a posteriori arrangements which are responsive to the concerns of the new ITU members."[29]

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28. Rutkowski, A.M.; "The 1979 World Administrative Radio Conference: The ITU in a Changing World", 13(2), International Lawyer, 1979, 289, at 307.

29. Ibid.

Even two decades after the first ITU Conference on space telecommunications, the ITU regulatory regime contains virtually no provisions to safeguard the interests of late-comer countries. In view of the distrust of the developed countries which has, consequently, arisen the developing countries are becoming more active in their attempts to protect their own interests. For example, according to a study conducted by the (US) Congressional Research Service before the 1979 WARC, "India takes an essentially technical rather than political approach"[30] with respect to the issues before the Conference. However, the unwillingness of the developed countries to change the status quo with respect to access to the geostationary orbit, compelled India to become the main exponent of, and major driving force behind the adoption of Resolution No. 3 to convene a special WARC to guarantee equitable access to the orbit.

This has also led to greater emphasis being placed, by the developing countries, on a priori rigid and long-term planning. No viable solution may be expected if the non-cooperative attidue of both sides continues.

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30. Congressional Record-Senate, July 12, 1979, S 9311.

The avowed domestic policy of the US that,

> continued maintenance of a scheme which perpetuates the advantages of the first-comer would not be favoured even within the most domestic systems of government. For example, patent rights and copy rights are granted only for limited periods of time; in the United States the rights granted by the FCC to broadcast stations are limited in time, subject to review, and conditioned on serving the '...public convenience, interest, or necessity'[31]

is in sharp contrast to its foreign policy with respect to access to, and use of the orbit/spectrum resources. Levin points out that the US has been opposing "Third World demands for a priori planning of the geostationary orbit, of space frequencies, and of short-wave (HF) spectrum. This opposition to spectrum planning abroad contrasts with the quite different US domestic approval of pre-planned TV and FM allocation tables. Its opposition contrasts, also, with the US domestic policy of long-term channel reservations, whose purpose it is to safeguard late-comer access in TV and FM by less affluent public, minority, and local community applicants.[32]

31. Rutkowski, op. cit., supra note 28.

32. Levin, H.J., "Foreign and Domestic US Policies: Spectrum Reservations and Media Balance", Telecommunications Policy, June 1982, 123. See also Levin, H.J., The Invisible Resource, (Baltimore, 1971), 5: The US domestic policy with respect to the sharing of the radio spectrum is effected by the FCC which "sought to diffuse the benefits of spectrum utilization widely, and to ensure diversified programs of high quality... This pertained (also) to the reservation of special channels for non-commercial educational use. Program choice was to be widened and benefits diffused, not just by structural diversity but by institutional diversity as well."

The inconsistency of US policies has merely served to reinforce the distrust referred to above.

Rothblatt argues that an a priori plan discourages the development of technology because it remains within the technological parameters current at the time of elaboration of the plan.[33] This is equally true of frequency/position assignments occupied and used on a first-come, first-served basis. A country retains a frequency/position along with its basic technical characteristics indefinitely. The introduction of more efficient technology will result in changes in technical characteristics. Since such a change might also lead to the loss of the original right to international protection, the new technology is not introduced and the recorded assignments are retained and used with old technology.

While it is true that technological retardation may occur when there is a long-term (e.g. 20 or 25 years) a priori plan, this does not have to be so in every case. A Plan could be of shorter duration as suggested in the five methods or approaches which are being developed by the CCIR for the 1985/87 WARC. The main objection of the developed countries to a priori planning

33. Rothblatt, op. cit., supra note 1, 23.

could thus be met by adopting a plan/plans for a shorter period of time, say 5 to 7 years. They could subsequently be reviewed in light of technological developments which may have occurred since the adoption of the plan/plans. The requirement to apply the latest technological standards or methods could be incorporated within the adopted plans. In this respect, the principles of Resolution No. Spa 2-6 adopted by the 1971 WARC (now 703) and of Annex 6 of Appendix 30 of the Radio Regulations are potential guidelines. The Resolution specifies that, in certain situations, where technical criteria incorporated in the Radio Regulations have become obsolete or have been superseded by the Recommendations of the CCIR, two or more administrations could agree to the application of the methods and criteria defined in the most recent CCIR Recommendations. Such an *ad hoc* procedure would help the introduction of the latest technology, even before the revision of the plan. Annex 6 stipulates the principles for the Plan to be adopted by the 1983 RARC (for Region 2). One of the principles is that the forthcoming Plan "must be sufficiently flexible to allow for future technical developments."

Opposition to planning has been more psychological than real, the advantages not having been fully recognized in light of the dogmatic non-acceptance of planning which is viewed as restricting absolute freedom of action. The first and most important advantage of a priori planning is that it allows coordinated, maximum possible use of the available resource. In this regard, the views of two experts who are closely involved in the ITU are worthy of note. According to Mr. Butler, the present Secretary-General of the ITU,

> A plan 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.[34]

Similarly, Mr. Perrin, a former member of the IFRB, holds that,

> One advantage of planning is the adoption of uniform system parameters and conditions of operation. This facilitates sharing between different services and systems and contributes to the efficient use of the spectrum and the orbit. It also enables the resolution of likely difficult problems, before the design of a system. In the absence of international planning, a situation may arise where an introduction of a new system may adversely affect many existing systems by chain repercussions.[35]

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34. Butler, R.E., "World Administrative Radio Conference Planning Broadcasting Satellite Service", 5 J. Space L., 1977, 93, at 98.

35. Perrin, F.G., "The Broadcasting-Satellite Service: Freedom of Control", in Earth-Oriented Space Activities and Their Legal Implications, Proceedings of the Symposium held on October 15-16, 1981, McGill University, (Montreal, 1983), 7, at 19.

Another objection to planning is that major space services are technically different[36] from BSS, for which a plan could be (and has been) developed. However, these differences do not imply that planning is disadvantageous for other space services. Moreover, planning to obtain the maximum use of available resources is applicable to all space services.

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36. Perrin, ibid., 26-27, points out the following main differences between the fixed-satellite service and the broadcasting-satellite service: "The transmissions from space stations in the point-to-point satellite communications (Fixed Satellite Service) are intended for reception by the earth stations which have been installed after careful planning of site and coordination with other users of the same frequency band. Since these stations are expensive installations of highly sophisticated equipment, relatively low power is required from the space stations to establish and maintain communications. The siting of the earth stations ensures that there is no mutual harmful interference with terrestrial stations sharing the same band. The relatively low power levels from the space stations facilitate the simultaneous operation along with the terrestrial services, provided certain enunciated technical constraints are deserved. Contrary to the situation in the Fixed-Satellite Service, the power radiated from the space station in BSS for individual reception is generally considerably higher, and the earth stations are randomly distributed over the entire intended area of service. This situation is not conducive to an easy coexistence between the BSS on the one hand, and the FSS and terrestrial services on the other."

The merit of a priori planning lies, first and foremost, in effecting equitable access to the orbit/spectrum resource. Such sharing is not possible on the basis of first-come, first-served. The determination of equitable access is influenced by various factors and the developed as well as the developing countries are allotted orbital positions and radio frequencies according to their needs.[37] For example, under the 1977 Plan, countries and territories in Regions 1 and 3 are alloted orbital positions and radio/frequency channels taking into consideration their service areas, size, time zones, language differences, etc. The USSR having 21 service areas was allotted 65 frequency channels; Australia with 6 service areas has 36 channels; India, with 12 service areas, has 48 channels, and Indonesia with 5 service areas has 21 channels. The majority of countries and territories have four or five channels per

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37. Article 12 of Appendix 30 of the Radio Regulations, 1982, provides some guidance with respect to equitable access to be guaranteed to all the countries in Region 2 by the 1983 RARC. It lays down that 1983 "plan shall provide for the detailed assignment of the orbital positions and frequency channels available, ensuring that the broadcasting-satellite service requirements submitted by the various administrations are met in an equitable manner satisfactory to all the countries concerned. It should be laid down as a matter of principle that each administration in the Region should be guaranteed a minimum number of channels (4) for the operation of the broadcasting-satellite service. Above this minimum, the special characteristics of the countries (size, time zones, language differences, etc.) shall be taken into account."

each service area. "But Brunie, the Maldive Islands, Miue Island and the Tokelay Islands, each with only one service area, have a total of two channel assignments each."[38] Since a total of 35 geostationary orbital positions were designated, "each orbital slot is assigned to a number of nations, the number of satellites occupying a particular slot will depend on how many nations use their assignment in the master plan."[39] Since the countries of Regions 1 and 3 were divided into various geographically separated service areas, maximum possible use could be derived from each broadcasting channel. "Channel No. 15 (frequency 11 996.83 MH_z), for example, serves 33 service areas in 30 different countries."[40] Thus, the 1977 Plan not only attempts to achieve efficient use of the available resources, but also ensures their equitable distribution. Such results would be virtually impossible to achieve without a priori planning.

While the US in particular, and other developed countries in general were adament advocates of planning of the whole radio spectrum at the 1947 Atlantic City

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38. Johnsen, K., "Service Date for Fixed Satellite Pressed", A.W.S.T., September 10, 1979, 77. For details see Article 11 of Appendix 30, Radio Regulations, 1982.

39. Johnsen, ibid.

40. Ibid.

Conference, they now oppose adoption of a priori plans for space services. This view is not shared by everybody in the US. The Chairman of the US delegation to the 1979 WARC, Mr. G.O. Robinson, for example, holds that:

> US interests must have some flexibility. While the United States has a great stake in terms of its use of these resources (radio spectrum and geostationary orbit) it is also better equipped than most countries to adapt technologically to the regulatory constraints of planning. Also, the extensive space requirements of the United States give it a basis on which to claim a relatively large allotment of frequencies and space positions. By any distribution criteria that are likely to be acceptable to the major countries, the United States should do as well as any other in having its needs met.[41]

Similarly, the Office of Technology Assessment of the US Congress has conducted a thorough analysis of the decisions of the 1979 WARC and has reached the following conclusion with respect to a priori allotment plans for space services:

> The United States could agree to participate with other nations in the development of a long-range plan for the utilization of satellite orbit locations to serve participating nations' domestic communications requirements. This plan would assure that orbital slots would be available for the use of all nations when needed. In exchange for this agreement, the

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41. Robinson, G.O., "Regulating International Airways: the 1979 WARC", 21, Virginia Journal of International Law, 1980, 1, at 46-47.

> developed nations would likely insist that the plan be based on sound operating principles and be updated regularly to take account of the latest, most efficient technology available...
>
> The United States has opposed *a priori* allotment plans for satellite services as wasteful and inhibiting to technological advancement. Although this option goes a long way towards accommodating the position of the developing countries, it maintains a substantital degree of flexibility important to the United States, including the key qualification of a requirement for regular technological updating that would help to avoid the worst consequences associated with rigid allotment schemes...
>
> As far as the United States is concerned, certain types of *a priori* allotment plans would not be as objectionable as others. Plans based on sound engineering and operational parameters might be workable internationally, at least on a regional basis. Indeed, US domestic satellite operations are based more or less on an *a priori* approach.[42]

These opinions are common to almost all the developed countries which oppose *a priori* planning of services. In any event, the geostationary orbit has created a division of the world in two, with the

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42. The Office of Technology Assessment, *Radio Frequency Use and Management: Impacts from the World Administrative Radio Conference of 1979*, (Washington, 1982), 19.

dividing line being drawn between the developed (Northern) countries and developing (Southern) countries. Thus, except in very limited areas (of Mexico and the US, and Southern Western Europe and Western North Africa), it appears that if an *a priori* plan is adopted, the developing countries would not seriously inhibit use of the orbit/spectrum resource by the developed countries, because the satellite signals would be beamed in different directions.[43] Moreover, in light of this geographical division of the world, it is important for the developed countries to clearly define their access to the spectrum/orbit resource so that their interests may be protected. The case of North America is significant. While Mexico's

43. The Office of Technology Assessment, (*ibid.*, 23-24), also concluded that in "addition to the possible advantages that may result from improvements in technology, there are (some other) factors that may help reduce the impact of a priori allotment plans on the United States... From the standpoint of using the geostationary satellite orbit, Region 2 is naturally divided into two parts - those nations located in the Northern Hemisphere and those in the Southern Hemisphere. A second geographic factor that serves to separate the hemispheres is the displacement in longitude of the nations in the Northern and Southern Hemispheres. Also, those nations closer to the Equator enjoy the widest possible visibility of the orbit and have the greatest flexibility in positioning satellites. Moreover, the North American Continent consists of the three countries with very large land areas that made use of advanced technology using shaped beam antennas attractive."

choice of orbital positions could be restricted by the increasing number of US satellites, the real danger is to Canada which, because of its Northern geographical position, can only benefit from a relatively small portion of the orbit.

4. The 85/87 WARC and Equitable Access

Various methods or approaches to guarantee equitable access to the geostationary orbit by all countries have been suggested.[44] However, it seems that the forthcoming 85/87 Space WARC will give special consideration to the recommendations of the CCIR as has been the practice in the past.

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44. See, generally, Rothblatt, M.A., "International Legal Norms Governing Development of the Orbit/Spectrum Resource", Telecommunications Policy, June 1981, 63 et seq.; by the same author, "ITU Regulations of Satellite Communication", XVIII (1), Stanford Journal of International Law, 1982, 1 et seq.; by the same author, "Satellite Communication and Spectrum Allocation", 76, A.J.I.L., 1982, 56 et seq.; Levin, H.J., "Orbit and Spectrum Resource Strategies", Telecommunications Policy, June, 1981, 102 et seq.; Soroos, op. cit., supra note 1; Wijkman, op. cit., supra note 1; Wihlborg, C.G. and Wijkman, P.M., "Outer Space Resources in Efficient and Equitable Use: New Frontiers for Old Principles", XXIV(1), The Journal of Law and Economics, 1981, 23 et seq.; Ewing, D.R., "Controlled Markets for Spectrum Management", 68(12), Proceedings of the IEEE, 1980, 1536 et seq.; Views of Member States on the Most Efficient and Economical Means of Using the Geostationary Orbit, UN Doc. A/AC.105/259, (1979); UN Doc. A/AC.105/C.2/SR.362, (1982), 2; Rankin, C.E., "Utilization of the Geostationary Orbit - A Need for Orbital Allocation?", 13, Columbia Journal of Transnational Law, 1974, 98 et seq.

The CCIR is drafting five planning methods for consideration.[45] The first method[46] pertains to rigid *a priori* planning similar to the 1977 Plan and the fifth method[47] is nothing more than a continuation of the present system with minor modifications. Both these approaches should be rejected for various reasons mentioned above, and especially, because of the rigidity and long duration of the first method and the lack of a strong guarantee of access in the fifth.[48]

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45. For an economic analysis of these five methods, see Vicas, A.G., "An Economic Assessment of CCIR's Five Methods for Assuring Guaranteed Access to the Orbit - Spectrum Resource", VII, *A.A.S.L.*, 1982, 431 *et seq.*

46. See CCIR Doc. 4/286-E of June 12, 1981: Method I: World or Regional Detailed Long-term (10-20 years) A Priori Allotment Plan - "A long-term world or regional a priori frequency/orbit allotment plan with a procedure for the revision of the requirements that is similar to Article 4 of Appendix 30 (the 1977 Broadcasting Satellite Plan). Under this procedure new requirements may be accommodated only if they do not cause unacceptable interference to those networks within the Plan."

47. *Ibid.* Method 5: Coordination Procedures and Technical Factors which are Revised Periodically - "This approach to planning is a phased revision of the existing regulatory procedures, regulations and the CCIR Recommendations as well as the development of new procedures, regulations and Recommendations (simplified to the extent possible), leading to more efficient use of the geostationary satellite orbit/spectrum resource."

48. *Ibid.*, 106 and 116.

The second method is that of a "Periodically Revised (3-5) World or Regional Detailed Allotment Plan". Once such a plan is adopted, various "conferences could be convened periodically (3-5 years) to revise the technical parameters and regulatory procedures for the plan and to accommodate new requirements. At each conference it is understood that all the existing networks and all of the new or modified requirements would be accommodated. During the interval between conferences, new requirements would be accommodated to the extent that they did not cause unacceptable interference to networks in the plan."[49] This method seems to be the most suited to guaranteeing equitable access (especially for DBS) to frequency bands which become usable in the near future. However, 3-5 years duration seems rather short for BSS, and it is suggested that the Plan be revised only after 5-7 years. Provision would be made for the introduction of modifications, and to allow for the use of the latest technology during the interim period between conferences, which would not cause unacceptable harmful interference to systems within the Plan. Secondly, an interval of 5 to 7 years would reduce the excessive administrative costs incurred for conferences convened at shorter intervals. It is further suggested that the FSS for the 6/4 and

49. Ibid., 100.

14/11 bands should also be subject to such planning given the saturation of these bands and difficulties of access currently being faced by certain countries.

Method 3 ("World, Regional or Sub-Regional Allotment Plan with Guaranteed Access"), pertains to the adoption of a plan for which various conferences "could be convened from time to time as required (at intervals of 10 years or less), to revise the overall technical parameters and regulatory procedures. At these conferences, all the existing networks and new requirements would be accommodated in the plan. Between conferences, there would be guaranteed access for new requirements. This would be possible through such mechanisms as reserving spectrum/orbital capacity for future requirements unforeseen at the time of the conference or by the subsequent convening of a special conference.[50] This method would seem to be useful for all other space services in all the bands allocated to them, except in certain cases where the 1985/87 conference decides not to establish any formal plan, since there is absolutely no danger of any country being denied access to the orbit/spectrum resource. In such exceptional cases,

50. *Ibid.*

Method 4 could be applied.[51] The most important general principles of planning could be established at the WARC, leaving the details to be completed by RARC's according to the requirements of each region. This would help decentralize the decision-making process in administrative radio conferences, as well as the exercise of unnecessary influence from one group of nations to the other. The regional conferences could thus become more specialized and better understand the requirements of each country in a particular region - hence more effective. The main advantages of Method 3 planning are that:

(a) the allotment plan could specify particular orbital positions and frequencies or alternatively, the allotments could be made to provide flexibility in implementing systems, e.g. using such techniques as block frequency allotments, and,

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51. Ibid. Method 4: Guaranteed Access by Means of Multilateral Coordination: - The "Conference" would not establish a formal plan, but would establish procedures for guaranteed frequency/orbit access for new requirements. Normally, frequency orbit access would be coordinated in accordance with the procedures contained in Method 5. When a new requirement could not readily be accommodated, a special meeting would be called of those administrations which might be affected and a means would be found to accommodate the new requirement." It is suggested that the Radio Regulations should contain specific duties of the administrations to accommodate the new networks with maximum changes to be made to the existing systems and minimum burdens to be imposed on the new systems.

(b) modifications could be made in both Conferences, as well as in cases where difficulties are faced, - regulatory procedures could be invoked to guarantee access.

Method 3 offers equitable access, and the tendency to over-estimate requirements would be minimized through periodic revisions of the Plan. This would encourage the introduction of technical innovations as well as the accommodation of new networks on an equal footing with existing systems. The cost of participating in the planning conference could be substantial, but may be partially offset by a reduction in actual system coordination.[52]

It is suggested that the present practice of first come, first served as a general rule, and *a priori* rigid planning as an exception, should be replaced by Method 3 as a general rule, and Methods 2 and 4 as exceptions. It is, however, unlikely that a particular method will be appropriate for all space services in all the allocated bands at all times. The 1985/87 WARC should therefore decide not only which services should be planned, but also according to what methods. A decision should also be taken with respect to what services not to plan, for the time being. Space services in bands

52. *Ibid.*, 111-113.

above 100 GH_z for example need not be planned since these frequencies are unlikely to be used extensively for regular operations before, at least, the year 2000.

The ITU's competence and expertise is confined to technical considerations. As already stated, the Plenipotentiary Conference should be more active in policy decisions, but more importantly, there should be global discussion of the political, economic and organizational aspects of the sharing of benefits derived from utilization of the geostationary orbit - a natural resource of outer space. A special international regime should be developed which would be in the interest and for the benefit of all countries, irrespective of the state of their technological development.

APPENDIX

GEOSTATIONARY ORBITAL POSITIONS AS OF MAY 4, 1982*

No. 1 By Country or Organization

Owners	Already coordinated	Country/Organization	Under coordination with ITU	Total	% of the grand total
INTELSAT	18	INTELSAT	29	47	26.7%
Developed countries	27	U.S.A.	11	38	
	18	U.S.S.R.	23	41	(incl. 2 for Intersputnik)
	4	Canada	3	7	
	4	Japan	3	7	
	-	France	2	2	
	5	France (E.S.A.)	8	13	
	2	France/Germany (Symphonie)	-	2	
	1	Belgium	1	2	
	1	Italy	-	1	
Sub-total	62	8 countries, 1 organization	51	113	64.21%
Developing countries	2	Indonesia	3	5	
	2	Colombia	-	2	
	1	India	2	3	
	-	Iran	3	3	
	-	ARABSAT	2	2	
	-	China	1	1	
Sub-total	5	5 countries, 1 organization	11	16	9.09%
Total	85	13 countries, 2 organizations	91	176	100 %

Grand Total: 176

* Compiled from the attached 'List of Geostationary Space Stations by Orbital Position", Annex to I.F.R.B. Circular No. 1508, ITU, Geneva, 1982. For details, see next page.

No. 2 By Radio Frequency

Radio Frequency		Number of Satellites
6/4	GHz	96
14/11	GHz	20
6/4 + 14/11	GHz	13
7	GHz	20
3	GHz	15
OTHERS		12
Total:		176

No. 3 By Function

Telecommunications (including DBS)	164
Others (Meteorology, Space Research, etc.)	12
Total:	176

Annexe à la Circulaire N° 1517 de l'I.F.R.B.
Annex to I.F.R.B. Circular No. 1517
Anexo a la Circular N.° 1517 de la I.F.R.B.

(Voir lettre-circulaire N° 437 de l'I.F.R.B. du 7.5.1979)
(See I.F.R.B. Circular-Letter No. 437 of 7.5.1979)
(Véase la carta circular N.° 437 de la I.F.R.B. de 7.5.1979)

LISTE DES STATIONS SPATIALES GEOST. PAR POSITIONS ORBITALES
LIST OF GEOST. SPACE STATIONS BY ORBITAL POSITIONS
LISTA DE ESTACIONES ESPACIALES GEOEST. CON ARREGLO A SU POSICION ORBITAL
(RR639AJ,639AA)

9.5.1982

BANDES DE FREQUENCES / FREQUENCY BANDS / BANDAS DE FRECUENCIAS				GHZ	<1	<3	4	6	7	11	12	14	>15
172	W	*	F/MRS	MARECS-B	1	3	4	6					
172	W		USA	TDRS WEST		3						14	15
170	W	*	URS	GALS-4					7				
170	W	*	URS	LOUTCH P4						11		14	
170	W		URS	STATSIONAR-10			4	6					
170	W	*	URS	VOLNA-7	1	3							
149	W		USA	ATS-1	1		4	6					
134	W		USA	US SATCOM-1			4	6					
135	W		USA	GOES WEST	1	3							
135	W		USA	USGCSS PHASE2 E PAC					7				
135	W	*	USA	USGCSS PHASE3 E PAC					7				
128	W		USA	COMSTAR D1			4	6					
123.5	W		USA	WESTAR-2			4	6					
119	W		USA	US SATCOM-2			4	6					
116	W	*	CAN	ANIK-C2						11		14	
114	W		CAN	ANIK-A3			4	6					
112.5	W	*	CAN	ANIK-C1						11		14	
109	W		CAN	ANIK-A2			4	6					
109	W		CAN	ANIK-B1			4	6		11		14	
106	W		USA	USASAT-6A						11		14	
105	W	*	USA	ATS-5	1	3							
104	W	*	CAN	ANIK-D1			4	6					
104	W		CAN	ANIK-A1			4	6					
100	W		USA	FLTSATC E PAC	1				7				
99	W		USA	WESTAR-1			4	6					
95	W		USA	COMSTAR D2			4	6					
91	W	*	USA	WESTAR-3			4	6					
87	W		USA	COMSTAR D3			4	6					
86	W		USA	ATS-3	1								
79	W		USA	TDRS CENTRAL		3						14	15
75.4	W		CLM	SATCOL-2			4	6					
75	W		USA	GOES EAST	1	3							
75	W		CLM	SATCOL-1			4	6					
53	W	*	USA/IT	INTELSAT4 ATL5			4	6					
53	W	*	USA/IT	INTELSAT4A ATL3			4	6					
41	W		USA	TDRS EAST		3						14	15
34.5	W		USA/IT	INTELSAT4 ATL5			4	6					
34.5	W	*	USA/IT	INTELSAT4A ATL4			4	6					
34.5	W	*	USA/IT	INTELSAT MCS ATL E		3	4	6					
34.5	W	*	USA/IT	INTELSAT5 ATL4			4	6		11		14	
31	W	*	USA/IT	INTELSAT4A ATL6			4	6					
29.5	W		USA/IT	INTELSAT4 ATL2			4	6					
29.5	W		USA/IT	INTELSAT4A ATL3			4	6					
29.5	W		USA/IT	INTELSAT5 ATL3			4	6		11		14	
27.5	W	*	USA/IT	INTELSAT4A ATL3			4	6					
27.5	W	*	USA/IT	INTELSAT5 ATL3			4	6		11		14	
27.5	W	*	USA/IT	INTELSAT MCS ATL B		3	4	6					
26.5	W	*	URS	GALS-1					7				
25	W	*	URS	VOLNA-1	1	3							
25	W		URS	STATSIONAR-8			4	6					
25	W	*	URS	LOUTCH P1						11		14	
25	W	*	F/SIR	SIRIO-2	1	3							
24.5	W		USA/IT	INTELSAT4A ATL1			4	6					
24.5	W		USA/IT	INTELSAT5 ATL1			4	6		11		14	
24.5	W	*	USA/IT	INTELSAT MCS ATL D		3	4	6					
24	W	*	URS	PROGNOZ-1		3	4						
23	W		USA	FLTSATC ATL	1				7				
21.5	W	*	USA	INTELSAT5 ATL5			4	6		11		14	
21.5	W	*	USA/IT	INTELSAT4 ATL2			4	6					
21.5	W	*	USA/IT	INTELSAT4A ATL1			4	6					
21.5	W	*	USA/IT	INTELSAT MCS ATL C		3	4	6					
19.5	W		USA/IT	INTELSAT4 ATL3			4	6					
19.5	W		USA/IT	INTELSAT4A ATL2			4	6					
18.5	W	*	USA/IT	INTELSAT4 ATL3			4	6					
18.5	W	*	USA/IT	INTELSAT4A ATL2			4	6					
18.5	W	*	USA/IT	INTELSAT5 ATL2			4	6		11		14	
18.5	W	*	USA/IT	INTELSAT MCS ATL A		3	4	6					
18	W		BEL	SATCOM-II					7				
18	W	*	BEL	SATCOM PHASE3					7				
15	W	*	I	SIRIO	1					11			
15	W		USA	MARISAT-ATL	1	3	4	6					
15	W	*	F/MRS	MARECS-A	1	3	4	6					
14	W	*	URS	LOUTCH-1						11		14	
14	W		URS/IK	STATSIONAR-4			4	6					
14	W		URS	VOLNA-2		3							
12	W	*	USA	USGCSS PHASE3 ATL					7				
12	W		USA	USGCSS PHASE2 ATL					7				
11.5	W		F/SYM	SYMPHONIE-2	1		4	6					
11.5	W		F/SYM	SYMPHONIE-3	1		4	6					
10	W	*	F	TELECOM-1A		3	4	6	7	8	12	14	
8.5	W	*	URS	STATSIONAR-11			4	6					
7	W	*	F	TELECOM-1B		3	4	6	7	8	12	14	
4	W		USA/IT	INTELSAT4 ATL1			4	6					
1	W	*	USA	INTELSAT4A ATL2			4	6					
1	W		USA/IT	INTELSAT4 ATL4			4	6					

BANDES DE FREQUENCES / FREQUENCY BANDS / BANDAS DE FRECUENCIAS				GHZ	<1	<3	4	6	7	11	12	14	>15
0	E		F/GEO	GEOS-2	1	3							
0	E		F/MET	METEOSAT	1	3							
5	E		F/OTS	OTS	1					11		14	
10	E	*	F	EUTELSAT I	1					11		14	
10	E		F/OTS	OTS	1					11		14	
12	E	*	URS	PROGNOZ-2		3	4						
13	E	*	F	EUTELSAT I-2	1					11		14	
19	E	*	ARS	ARABSAT I		3	4	6					
20	E	*	F/SIR	SIRIO-2	1	3							
26	E	*	ARS	ARABSAT II		3	4	6					
26	E	*	IRN	ZOHREH-2						11		14	
29	E		F/GEO	GEOS-2	1	3							
34	E	*	IRN	ZOHREH-1						11	12	14	
35	E	*	URS	PROGNOZ-3		3	4						
35	E		URS	STATSIONAR-2			4	6					
40	E	*	F/MRS	MARECS-D	1	3	4	6					
40	E	*	URS	STATSIONAR-12			4	6					
45	E	*	URS	GALS-2					7				
45	E	*	URS	LOUTCH P2						11		14	
45	E		URS	STATSIONAR-9			4	6					
45	E	*	URS	VOLNA-3	1	3							
47	E	*	IRN	ZOHREH-3						11		14	
53	E		URS	LOUTCH-2						11		14	
53	E		URS/IK	STATSIONAR-5			4	6					
53	E		URS	VOLNA-4		3							
56.5	E		USA/IT	INTELSAT3 INDN1			4	6					
57	E	*	USA	INTELSAT5 INDN3			4	6		11		14	
57	E	*	USA/IT	INTELSAT4 INDN2			4	6					
57	E	*	USA/IT	INTELSAT4A INDN2			4	6					
57	E	*	USA/IT	INTELSAT MCS INDN C		3	4	6					
60	E		USA/IT	INTELSAT4 INDN2			4	6					
60	E		USA/IT	INTELSAT4A INDN2			4	6					
60	E	*	USA/IT	INTELSAT5 INDN2			4	6		11		14	
60	E	*	USA/IT	INTELSAT MCS INDN B		3	4	6					
60	E		USA	USGCSS PHASE2 INDN					7				
60	E	*	USA	USGCSS PHASE3 INDN					7				
63	E		USA/IT	INTELSAT4 INDN1			4	6					
63	E		USA/IT	INTELSAT4A INDN1			4	6					
63	E	*	USA/IT	INTELSAT5 INDN1			4	6		11		14	
63	E	*	USA/IT	INTELSAT MCS INDN A		3	4	6					
64.5	E	*	F/MRS	MARECS-C	1	3	4	6					
66	E	*	USA/IT	INTELSAT4 INDN1			4	6					
66	E	*	USA/IT	INTELSAT4A INDN1			4	6					
66	E	*	USA	INTELSAT5 INDN4			4	6		11		14	
66	E	*	USA/IT	INTELSAT MCS INDN D		3	4	6					
73	E		USA	MARISAT-INDN	1	3*	4*	6*					
74	E		IND	INSAT-1A	1	3	4	6					
75	E		USA	FLTSATC INDN	1				7				
76	E	*	URS	GOMS	1	3							
77	E		INS	PALAPA-2			4	6					
80	E	*	URS	PROGNOZ-4		3	4						
80	E		URS	STATSIONAR-1			4	6					
80	E	*	URS	STATSIONAR-13			4	6					
83	E		INS	PALAPA-1			4	6					
85	E	*	URS	GALS-3					7				
85	E	*	URS	LOUTCH P3						11		14	
85	E		URS	STATSIONAR-3			4	6					
85	E	*	URS	VOLNA-5	1	3							
90	E		URS	LOUTCH-3						11		14	
90	E		URS	STATSIONAR-6			4	6					
94	E	*	IND	INSAT-1B	1	3	4	6					
95	E	*	URS	STATSIONAR-14			4	6					
99	E		URS	STATSIONAR-T	1			6					
99	E	*	URS	STATSIONAR-T2	1			6					
102	E	*	IND	ISCOM	1		4	6					
108	E	*	INS	PALAPA-B1			4	6					
110	E		J	BSE		3						14	
113	E	*	INS	PALAPA-B2			4	6					
118	E	*	INS	PALAPA-B3			4	6					
125	E	*	CHN	STW-1			4	6					
130	E	*	J	CS-2A		3	4	6					20/30
130	E		J	ETS-2	1	3				11			34
130	E	*	URS	STATSIONAR-15			4	6					
135	E	*	J	CS-2B		3	4	6					20/30
135	E		J	CSE		3	4	6					18/29
140	E		J	GMS	1	3							
140	E	*	J	GMS-2	1	3							
140	E		URS	LOUTCH-4						11		14	
140	E		URS	STATSIONAR-7			4	6					
140	E		URS	VOLNA-6		3							
172	E		USA	FLTSATC W PAC	1				7				
174	E		USA/IT	INTELSAT4 PAC1			4	6					
174	E	*	USA/IT	INTELSAT4A PAC1			4	6					
174	E	*	USA	INTELSAT5 PAC1			4	6		11		14	
175	E		USA	USGCSS PHASE2 W PAC					7				
175	E	*	USA	USGCSS PHASE3 W PAC					7				
176.5	E		USA	MARISAT-PAC	1	3	4	6					
179	E		USA/IT	INTELSAT4 PAC2			4	6					
179	E	*	USA/IT	INTELSAT4A PAC2			4	6					
179	E	*	USA	INTELSAT5 PAC2			4	6		11		14	
179	E	*	USA/IT	INTELSAT MCS PAC A		3	4	6					

* ACTUELLEMENT EN COURS DE COORDINATION SELON RR639AJ

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