

**INTERNATIONAL SPACE LAW
AND THE USE OF NATURAL RESOURCES :
SOLAR ENERGY**

by

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SOLAR ENERGY AS A SOURCE OF POWER

High altitude solar energy (1), like the geostationary orbital position, is a world natural resource. Solar energy can be transmitted to Earth by microwave or laser beams.

In this article attention will be called to the natural characteristics of this resource, to practical problems visualized in the gathering of solar energy and its transmission to Earth, to the relationship of international law essentially as stated in the 1967 Principles Treaty and in ITU agreements to solar energy, to

(1) This expression will be taken to mean that energy derived from the sun at heights where geostationary space objects are able to orbit effectively, namely, at the range of 22,300 miles (35,776 km) above the surface of the Earth.

international political-legal efforts to facilitate the acquisition and transmission to Earth of such solar-based energy, and issues raised by the Bogotá Declaration of December 3, 1976.

Solar energy is considered to be a vast, unlimited, inexhaustible, and renewable source of power. It is so vast and unlimited that no one has claimed exclusive rights to it. It is even more inexhaustible and renewable than the water of the ocean, a resource that has been treated as a *res communis* and therefore not subject to exclusive rights but rather open to the common use of all. High altitude solar energy, like the water of the free high seas, is not subject to sovereign appropriation by States at the present stage of science and technology. Other legal persons have not asserted proprietary rights affecting it.

The principal focus of an energy-hungry world on solar energy has been a scientific and technological one. The main considerations have been the development of knowledge allowing for the conversion of the solar energy situated in the space environment into electricity. To this must be added the development of processes to beam such energy safely to Earth. Finally, there is the need to develop practical means to convert the beam to useful power on Earth (2). Quite conceivably solar energy, especially at orbital levels, will be the most valuable and important of all of the space environment resources. This forecast is supported by a study made by the International Astronautical Federation (IAF). It concluded that space-based solar power plants constitute « perhaps the most imaginative and potentially significant prospect for the utilization of space in the service of mankind » (3).

The IAF study identified practical advantages resulting from the use of orbiting space objects in the gathering and transmission of solar energy. Particular emphasis was placed on the future need to have « solar power plants capable of *base-loaded* operation, without dependance on costly energy storage, or alternative energy sources for periods of low isolation » (4). It was considered that base-loaded power in space, where there is virtually constant isolation, « is available at an average rate of the order of 10 times that at the best earth-surface-location » (5). Further :

(2) Peter E. GLASER, « Testimony, Solar Power from Satellites », *Hearings before the Subcommittee on Aerospace Technology and National Needs of the Committee on Aeronautical and Space Sciences, United States Senate, 94th Cong., 2nd Sess.*, p. 3 (1976). These hearings contain numerous assessments of the solar energy problem by exvdro in the field.

See also, Peter E. GLASER, « Solar Power Satellites - A Global Power Generation Option », Presentation to Scientific and Technical Subcommittee, Committee on the Peaceful Uses of Outer Space (COPUOS), February 15, 1978.

(3) State of the Art and Assessment of Scientific and Technological Developments in the Exploration and Practical Uses of Outer Space within an International Framework, U.N. Doc. A/AC.105/173, p. 22, May 7, 1976.

(4) *Ibid.*, p. 23.

(5) *Ibid.*

Space-based power plants can be constructed without (a) the need for support against gravity (the principal mass constraint on ground-based structures), (b) design safety factors to allow for once-in-a-lifetime events such as hurricanes, typhoons, tidal waves, or earthquakes, (c) thermal-waste discharges to the terrestrial biosphere, or (d) community concerns about local power-plant siting (6).

PRACTICAL PROBLEMS

It is now common for space objects to reach geostationary orbital heights. The geostationary orbit is in fact a broad band of space directly above and concentric with the equator. More technically the 1971 WARC-ST provided a definition: It is a satellite « the circular orbit of which lies in the plane of the Earth's equator and which turns about the polar axis of the Earth in the same direction and with the same period as those of the Earth's rotation. The orbit on which a satellite should be placed to be a geostationary satellite is called the « 'geostationary satellite orbit' » (7).

Such space objects are not all in the same circular orbit in the plane of the Earth's equator. Their pattern in space « is an annuluslike three-dimensional corridor in which satellites travel at different speeds, altitudes and inclinations to the plane of the Earth's equator » (8). Estimates have varied considerably as to the number of space objects that can safely and efficiently occupy the geostationary orbital height. Between 180 and 1,800 or more, have been suggested (9). In determining the number of space objects that can be safely accommodated in geostationary orbit it is necessary to consider that the orbital radius is approximately 26,400 miles (42,164 km). Further, the circumference of such an orbit is about 165,000 miles (264,000 km). Based on these facts it has been stated that:

If satellite station-keeping were good to about ± 0.1 degree (actually it can be maintained more precisely), then one degree of orbit space would hold five satellites with virtually no danger of collision, and the full 360° could accommodate, 1,800 satellites. Actually, since the geostationary orbit has considerable depth and width

(6) *Ibid.* A separate study by the United Nations Secretariat contrasted the location of energy collection in space and on the ground. « The constant illumination of the array in space would make the solar cells about 10 times as efficient as an array on the ground. » *Solar Power Stations in Space*, U.N. Doc. A/A.C.105 (XIX) CRP, p. 1, June 1, 1976.

(7) Paragraph 84BG, Annex 1, Revision of Article 1 of the Radio Regulations, 23 UST 1527, 1579; TIAS 7435.

(8) J.J. GEHRIG, « Geostationary Orbit-Technology and Law », *Proceedings of the 19th Colloquium on the Law of Outer Space*, p. 268 (1977).

(9) The figure of 180 satellites placed along the equator was identified as a valid number by the Colombian delegate to the Legal Subcommittee of COPUOS on March 31, 1977. U.N. Doc. 105/C.2/SR.277, p. 3, 5 April 1977. However, a UN Secretariat study reported that there could be no general answer to the number of satellites that could be accommodated in geostationary orbit. U.N. Doc. A/AC.105/203, p. 8, 29 August 1977.

and present satellites range between ten and twenty feet in diameter, the orbit could physically accommodate a much greater number without collision. The question of orbital slot scarcity thus has little to do with purely physical limitations (10).

It has been estimated that between 1980 and 1991 that 274 geostationary space objects would be launched (11). It has also been estimated that up to 331 « geosynchronous » space objects, excluding military satellites, would be placed in orbit during the same period (12). These figures are to be compared with 100 geostationary satellites in 1977 and with an assumption that between 1977 and 1984 another 100 active satellites would be launched (13). While it has not been considered that this number of space objects in geostationary orbit would be likely to cause collisions, concern has remained over the possibility that harmful interferences with broadcasts from these satellites might occur. However, many techniques have been perfected to minimize this possibility. Thus, « radio systems can employ the same operating frequencies without mutual interference provided their radio signals are adequately distinguished by location, orientation and breadth of transmission paths, polarization of radiated energy or type of modulation... » (14) as well as by operating at a different time. Such technical considerations will allow for the efficient and economic use of the spectrum orbit resource. Some 10 procedures were identified by the 1977 WARC-BS (15). Additionally, launching States will be obliged to maintain effective procedures for station keeping (16). Reception of broadcasts can be adversely affected by natural causes, such as rain (17). If space objects were to be too close to each other this would produce shading of their solar panels and prevent the gathering of energy.

THE CLAIM OF FREE USE VERSUS THE CLAIM OF PREFERENCES

Perceptions of the availability of radio frequencies and orbital positions have been much influenced by the language of Article 33 (2) of the 1973 ITU Convention which stated that « radio frequencies and the geostationary

(10) W.R. HINCHMAN, « Issues in Spectrum Resource Management », in *The Future of Satellite Communications, Resource Management and the Needs of Nations*, p. 52 (1970).

(11) GERIG, *op. cit.*, p. 269.

(12) *Ibid.*, p. 270.

(13) U.N. Doc. A/AC.105/203, p. 7, 29 August 1977.

(14) HINCHMAN, *op. cit.*, p. 34.

(15) Final Acts, Annex 7, pp. 1-2. These included clustering, cross-polarization, crossed-beam geometry, paired service areas, frequency interleaving, minimum space station spacings, space station antenna discrimination, earth station antenna discrimination, minimizing of e.i.r.p. (equivalent isotropically radiated power), and realistic quality and reliability objectives.

(16) Final Acts, WARC-BS, Annex 8.

(17) M. WHITE and M. HOLMES, « The Future of Commercial Satellite Communications », 2 *Quest Magazine*, No. 1, pp. 56-60 (Spring 1978).

satellite orbit are limited natural resources » (18). Also affecting such perceptions were the results of the 1971 WARC-ST. The product of this conference was summed up by a COPUOS Working Group on Direct Broadcast Satellites in 1973. The ITU because of its technical competence was engaged in forming policies relating to the allocation, regulation, and coordinated utilization of the limited frequency spectrum. Further, the resolutions of the 1971 conference had indicated that :

all countries have equal rights in the use of the frequency bands allocated to various space radiocommunications services, and of geostationary orbit, in so far as there should be no permanent priority for these services that might create an obstacle to the establishment by other countries of their own space systems. Thus the WARC-ST introduced new coordination procedures with a view to more efficient use of the frequency spectrum and the geostationary satellite orbit. In addition, it introduced a new regulatory provision placing an obligation on a member responsible for transmissions to take all technical means available to reduce to the maximum extent practicable the radiation of the emissions over other countries unless there had been prior agreement with the countries concerned, and it established significant power flux density limitations in the two lower bands available for satellite broadcasting (19).

The studied identification of the spectrum/orbital resource as a limited natural resource, even in the face of the fact that this resource is more finite than limited — and in view of the further fact that the resource is a constantly renewing one and can be immeasurably extended through the use of scientific and technological procedures —, has produced a number of important political-legal problems (20). Thus, first, the gathering of solar energy constitutes a use or exploitation of space resources. Some States have emphasized that the mere use of an orbital slot by a space object may constitute an appropriation of the used portion of the space environment assertedly in violation of the terms of Article 2 of the Principles Treaty. Other States have emphasized the free use and access provisions of the Treaty. Secondly, other States have associated the powers of the ITU to register or record State assignments of radio frequency uses, and particularly as a consequence of the meaning accorded to the entry of such assignments on the international registry, with the newly found authority in Article 10 3.b) of the 1973 ITU Convention giving to the International Frequency Registration Board the duty to effect « an orderly recording of the positions assigned by countries to geostationary satellites ». Thirdly, there is a move to extend the powers of the ITU respecting the allocation of radio frequencies by services to regions to the allocation of geostationary orbital positions to regions or even to specific States. Fourthly, on December 3, 1976, eight equatorial States put forward

(18) Telecommunication Convention and Final Protocol, Malaga-Torremolinos. TIAS 8572.

(19) U.N. Doc. A/AC.105/117, pp. 5-6, 22 June 1973.

(20) It has been noted, for example, that it « seems likely that the spectrum/orbit resources are potentially adequate to meet almost any demand at present conceivable ». A. CHAYES and Others, *Satellite Broadcasting*, p. 17 (1973).

their special views relating to special national rights at geostationary levels. Each of these four situations has enlarged the role of law and politics relating to the spectrum/orbit resource, particularly as it affects space objects as they may become engaged in the gathering of solar energy at the geostationary height.

THE 1967 PRINCIPLES TREATY AND HIGH ALTITUDE SOLAR ENERGY

At the present time, to the extent that international law deals with the gathering and transmission of high altitude solar energy, the 1967 Principles Treaty applies the *res communis* principle to such energy. The Treaty was based on the belief that mankind should be able to derive benefits from the use of the space environment and its resources.

Although the terms of the Treaty do not in all instances contain common assurances relating to the three elements of the space environment, namely, outer space, the Moon, and other celestial bodies, nonetheless, the purpose of the Treaty is to facilitate activities by man in the beneficial and peaceful uses of the environment. Thus, Articles 1, 3, 9, 10, and 13 make reference to the exploration and use. Article 2 refers only to use. Article 4, paragraph 2, provides that only the Moon and celestial bodies shall be used exclusively for peaceful purposes. The term « outer space » is not included in the requirement to use for peaceful purposes. The same paragraph also states that « the use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited ». Article 9 and 11 refer to the peaceful exploration and use of outer space.

Another major theme of the 1967 Treaty is that of scientific investigation so that benefits might be derived from the activities and uses of the environment. Conversely, such investigations were not to result in harms to the environment. Thus, Articles 1, 4, 5, and 9 deal with the affirmative role of science and technology in the space environment. Article 1, paragraph 3, provides that there shall be freedom of scientific investigation in the space environment and that international cooperation shall be encouraged in this endeavor. Article 4 allows for scientific research on the Moon and celestial bodies. Article 4 by prohibiting the use of nuclear and mass destruction weapons in the space environment allows for effective scientific investigation and research. Article 5 facilitates use and research by requiring the reporting of phenomena, including presumably scientific information, which could constitute a danger to the life or health of astronauts.

Another major theme of the Principles Treaty relates to the avoidance of harmful contamination and the need to conduct space activities in such a manner as to give due regard to the corresponding interests of other States.

The general purport of Article 9 is twofold. First, there is the goal of facilitating scientific inquiry. Second, there is the expectation that such scientific inquiry and activities growing out of that inquiry will allow for the

exploration and use of space environment resources for the benefit of human beings. The beneficial use of high altitude solar energy certainly fits into this expectation.

Critical attention must be focused on Article 2 of the Principles Treaty in assessing the lawfulness of acquiring solar energy. This Article provides 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 ». An initial question relates to the scope of the Article. The critical term is « outer space ». Thus, while prohibiting the nationalization of outer space, the agreement says nothing about taking possession through use of the resources of outer space. The Treaty makes no reference whatever to the natural resources of the space environment. Thus, the capture and use of solar energy is clearly outside the scope of the Article. Moreover, as previously stated, the purpose of the Treaty was to facilitate the use and exploitation of the space environment. As an inexhaustible and renewable resource of the space environment it is clear that solar energy can be used for beneficial and peaceful purposes by those able to capture and transit it to Earth.

Nonetheless, the question has been raised whether the term « national appropriation » should be interpreted so as to preclude national use of space environment resources. Even if the national appropriation limitation were relevant to a resource of outer space, as opposed to the area of outer space, which it is not, the concept of national appropriation would have to be analyzed and understood. Appropriation in the sense used in Article 2 relates to acquisition of national sovereignty with the consequence that the sovereign would have the ultimate power to dispose of property rights in outer space. Article 2 denies such exclusive rights to a national sovereign. In rejecting such a possibility the Treaty accepted the *res communis* principle, thereby allowing for competing users, but not owners or potential owners of spatial areas, to exploit the available resources by taking them into possession. Thus, the national appropriation concept has no relevance to nor does it constitute a limitation on the legal freedom of legal persons to capture and use high altitude solar energy. Article 2 does not constitute an exemption from an arguable prohibition against the use of such energy. Article 2 is irrelevant and therefore inapplicable.

Up to the present, space objects have relied upon solar energy for the power required for their functioning. To date no one has advanced the notion that the capture and use of such energy is in violation of any of the provisions of the Principles Treaty, of international law generally, or the U.N. Charter. While this specific practice need not necessarily be the basis for a customary rule of international law allowing for the wholesale capture and use of high altitude solar energy, it does reinforce the view that the permissibility of such use from a legal perspective will depend very materially on the needs, wants, interests, values, and practices of the space resource States and ultimately the larger world community.

The United States has from the very beginning of the space age linked the space environment to its use exclusively for peaceful and scientific purposes (21). The United States also has often associated the objective of beneficial uses with that of peaceful purposes.

As noted above, the concept of peaceful purposes or uses has been incorporated into the 1967 Treaty, and in a not entirely consistent way. Thus, Article 4, paragraph 1, which imposes constraints on the use of nuclear weapons and other kinds of weapons of mass destruction is limited in spatial area to Earth orbits, and to outer space and celestial bodies. However, the United States regards celestial bodies as including the Moon for the purposes of Article 4, paragraph 1 (22).

However, paragraph 2 of Article 4 merely provides that only the Moon and other celestial bodies, presumably excluding both Earth orbits and outer space per se, are to be used exclusively for peaceful purposes. On the other hand, Article 9 applies the peaceful exploration and use concept both to outer space and to the Moon and other celestial bodies. Article 11 dealing with the promotion of international cooperation also applies the peaceful exploration and use concept to outer space and to the Moon and other celestial bodies.

Efforts to extend via interpretation the coverage of the « exclusively for peaceful purposes » concept contained in Article 4 to outer space per se, thereby imposing duties beyond the terms of the Article, which limits the peaceful purposes requirement to the Moon and other celestial bodies, have urged the relevance of Article 9 and 11. It has also been argued that Article 4, paragraph 2, should be read in conjunction with the provisions of Article 1, paragraph 1, which requires that the exploration and use of the totality of the space environment « shall be carried out for the benefit and in the interests of all countries » (23). While it is possible to be sympathetic to the efforts to

(21) Statement of Ambassador Henry Cabot Lodge to the Political Committee of the United Nations, January 14, 1957. 36 *Department of State Bulletin* 227 (1957). Section 102 (a) of the National Aeronautics and Space Act of 1958 states : « The Congress hereby declares that it is the policy of the United States that activities in space should be devoted to peaceful purposes for the benefit of all mankind ». *Public Law* 85-568, 72 *Stat.* 426.

(22) In the opinion of Ambassador Arthur J. Goldberg, Article 4 « contains an undertaking not to place in orbit around the earth, install on the moon or any other celestial body, or otherwise station in outer space, nuclear or any other weapons of mass destruction ». « Statement to Committee One of the General Assembly, December 17, 1966, Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies », *Staff Report, United States Senate, Committee on Aeronautical and Space Sciences*, 90th Cong., 1st Sess., p. 16 (March 1967). Italics added. To the same effect was Ambassador Goldberg's testimony before the Senate Committee on Foreign Relations on March 7, 1967. He stated with regard to paragraph 1 of Article 4 that it « relates to outer space generally and provides that any party shall not place in orbit any object, which means satellites, carrying nuclear weapons or any other kind of weapons of mass destruction, install such weapons on celestial bodies, which would include the moon... ». « Treaty on Outer Space », *United States Senate, Committee on Foreign Relations, Executive D*, 90th Cong., 1st Sess., p. 22 (1967). Italics added.

(23) For example, M. MARKOFF, « Disarmament and 'Peaceful Purposes' Provisions in the 1967 Outer Space Treaty », 4 *Journal of Space Law* 3 (1976).

extend the spatial coverage of the exclusively peaceful purposes concept to an area more extensive than the Moon and other celestial bodies, the words of the agreement and the negotiations of the agreement seem to preclude such a conclusion (24).

Since by any valid characterization the gathering of solar energy at geostationary orbital level is a peaceful use of outer space, the limited applicability of the peaceful purposes provisions in Article 4, paragraph 2, of the Principles Treaty imposes no constraints on the capture or use of the solar energy resource. The general meaning assigned to « peaceful purposes » both in the Treaty and by the practice of States clearly countenances the gathering of such high altitude solar energy and its transmission to Earth.

Nothing is to be gained if the solar energy gathered at orbital heights cannot be transmitted to Earth. The same legal considerations that govern the capture of such energy will apply to the right to transmit such solar energy to Earth. While the transmission is a free use of the space environment, and is authorized by the 1967 Principles Treaty, the radio-frequency employed would have to avoid harmful interference with other valid uses of the radio spectrum. The use of the radio spectrum would consume nothing, need not be a permanent use, and serves the well-being of the general community through the exploitation of an inexhaustible resource.

The fact that the 1967 Principles Treaty does not extend the « peaceful purposes » concept to space per se cannot be construed as a denial of the fact that such gathering and transmission can serve peaceful, beneficial, and scientific purposes. The fact that solar energy is being gathered and used by existing space objects for their general operating purposes supports the view that this natural resource not only can be, but is being used for peaceful purposes.

At the present time, following the acceptance of the *res communis* concept and the underlying theme of the 1967 Treaty that the space environment is intended to be used for the general well-being of mankind, it can be asserted with confidence that high altitude solar energy is lawfully and freely available for peaceful, scientific, and beneficial purposes on the part of all who have the capacity to gather it and to apply it to such uses. This being the case, the legal problem, to the extent that there is one, is not one of the right to gather and use the resource.

Prospects for the lawful use of high altitude solar energy are not to be determined exclusively by interpretation of the language of the 1967 Treaty and perceptions of practices that may have ripened into customary international law. Nor is the lawful use to be determined wholly by the space resource States powerfully influential though their outlooks may be.

(24) Ambassador Goldberg told the Senate Committee on Foreign Relations that the coverage of Article 4, paragraph 2, « relates only to the moon and other celestial bodies... ». *Op cit.*, p. 22. C.Q. CHRISTOL, « Article Four of the 1967 Principles Treaty : Its Meaning and Prospects for its Clarification », *Proceedings of the 21st Colloquium on the Law of Outer Space*, p. 192 (1978).

PRESENT INTEREST OF COPUOS IN LEGAL USE OF SOLAR ENERGY

Although the United States had displayed an interest in developing a Satellite Power System (SPS) at least as early as 1972, this subject did not come to the attention of COPUOS until 1975 at which time it asked the Secretariat to prepare a background paper. This resulted in « Solar Power Stations in Space » (25). In 1976 COPUOS recommended that the Secretary-General request States to submit information relating to the generation or transmission of solar energy by means of space technology. Such information was received in 1976 from three States, including the United States, and also from the European Space Agency (26). A report was received from Argentina in 1977 (27). An additional submission was made by the Soviet Union (28). This report was confined to an assessment of terrestrial uses of solar energy.

To the present the Scientific and Technical Sub-Committee of COPUOS has served as a limited forum for the consideration of solar energy matters. In 1977 several States proposed that the Sub-Committee take a larger interest in both solar energy and materials processing in space. This was resisted by other States. They urged that for the time being most applications of technology for the utilization of solar energy took place on earth and not in space (29). During its meeting in 1978, the Scientific and Technical Sub-Committee again reviewed its future role and work and made mention of solar energy platforms in space and the processing of materials in space. It decided that for the moment it should only be kept informed of developments (30). The Legal Sub-Committee has not given direct attention to the issue. Thus, despite the importance to the space-resource States of gathering and transmitting high altitude solar energy to the Earth, there has not been much direct attention given to the subject at the UN at the present.

COPUOS has maintained, however, an ongoing involvement in the physical nature and the technical attributes of the geostationary orbit. In its 1979 meeting COPUOS evidenced an interest in obtaining more information on the dynamics of the population of space objects. It also decided that a study should be undertaken to identify the most efficient and economical ways of using the orbit with a view of assessing its wider use, particularly by the

(25) U.N. Doc. A/AC.105/(XIX) CRP.1, June 1, 1976.

(26) U.N. Doc. A/AC.105/181, December 1, 1971.

(27) U.N. Doc. A/AC.105/181/Add. 1, February 15, 1977. Argentina had previously responded to a 1975 statement of the Chairman of COPUOS on sources of energy from outer space by supplying COPUOS in May 1976 with a working paper entitled « International Problems Arising from the Exploitation of Solar and other Related Energies ». U.N. Doc. A/AC.105/L.91, June 9, 1976.

(28) U.N. Doc. A/AC.105/181/Add. 2, February 16, 1977.

(29) U.N. Doc. A/AC.105/195, p. 26, March 1, 1977.

(30) U.N. Doc. 105/216, p. 32 March 6, 1978.

developing countries (31). Information of the kind indicated necessarily will have utility in determining the optimum conditions for the employment of geostationary level space objects in the gathering and transmission of solar energy to Earth. That the legality, as well as the feasibility, of the gathering and transmitting of the solar energy resource to Earth is of vital importance to all of the members of the community cannot be denied.

THE BOGOTÁ DECLARATION OF DECEMBER 3, 1976

On december 3, 1976 eight equatorial States, namely, Brazil, Colombia, Congo, Ecuador, Indonesia, Kenya, Uganda, and Zaire, asserted preferential rights respecting space environment resources (32). This outlook may affect the free and unencumbered positioning of space objects at geostationary level. To the extent that non-equatorial States may be affected by the Declaration their prospects for the gathering of solar energy through the use of geostationary orbital positions may become a matter of controversy. Colombia had previously taken the initiative on this subject. In 1975 it had made a presentation to the First Committee of the General Assembly in which it had claimed that since the geostationary orbital arc is a national resource that sovereignty could be exercised over it by subjacent States (33). A similar statement of policy was also made in 1976. Unlike the proposals that had been presented at the ITU, where the applicant States sought to gain preferential rights to use, the Bogotá Declaration urged the sovereignty of the equatorial States in areas superjacent to their respective States (34).

Since the Bogotá Declaration advanced positions in conflict with the 1967 Principles Treaty, the relationship of these States to the Treaty should be recorded. Brazil, Ecuador, and Uganda were bound by it on January 1, 1979. Indonesia and Zaire were signatories but are not included as being bound by the 1979 listing in Treaty in Force (35). Congo, Colombia, and Kenya did not sign the Treaty and are not bound by it. The 1978 position of Colombia was that there was no intention to ratify the agreement « so long as its provisions had not been expanded in such a way as to permit a definition and delimitation of outer space that recognized the geostationary orbit as a limited natural resource under the sovereignty of equatorial states insofar as those segments which correspond to their national territories were concerned » (36). Further, in the absence of a clear and precise definition of « outer

(31) U.N. Doc. A/34/20, p. 10 (1979).

(32) The Declaration is set out in the Appendix.

(33) U.N. Doc. A/C.1/PV.2049, pp. 43-46, 13 October 1975.

(34) A number of non-space resource States have endeavored to gain authority for the ITU to make allocations of orbital positions. They would extend the ITU's 1973 power « to effect allocation of the radio frequency spectrum and registration of radio frequently assignments... » to orbiting space objects. Article 42, a. TIAS 8572.

(35) *Treaties in Force*, U.S. Department of State Publication 8968 (1979).

(36) U.N. Doc. A/AC.105/C.1/SR.199, p. 2, 28 February 1978.

space », in the exercise of their « full and sole sovereignty as a subject of international law, [States] could enact laws defining their national space and therein exercise the rights and assume the obligations established under national law » (37).

The common interest of these eight States stemmed from the fact that the space resource States, because of the ellipticity of the equator, have found that geostationary space objects have an ideal orbital position at a height of approximately 22,300 miles above the equator (38). With the use by such States of the geostationary orbital position, and with plans on their part for an augmented use of such slots, the equatorial States have wondered whether such use might constitute a *de facto* « appropriation » of such positions. In convening in Bogotá these States were unquestionably influenced by the fact that space objects of the ERTS and LANDSAT type were capable of sensing and identifying the presence of natural resources. Moreover, there had been a strong tradition on the part of the new and less-developed countries at the UN to secure the adoption of resolutions dealing with permanent sovereignty over natural resources (39).

The product of the Bogotá meeting has been described both as a « pre-tension » and as a « counterpoise » by the equatorial States against a « *de facto* appropriation by states with advanced technology... [they] asserted *de jure* 'territorial' claims to sectors of the geostationary orbit notwithstanding the prohibitions against national appropriation set forth in the space treaties » (40).

The Bogotá Declaration identified five areas of concern. First, the eight States described the geostationary orbit as a natural resource. They said :

Equatorial countries declare that the geostationary synchronous orbit is a physical fact linked to the reality of our planet because its existence depends exclusively on its relation to gravitational phenomena generated by the earth, and that is why it must not be considered part of outer space. Therefore, the segments of geostationary synchronous orbit are part of the territory over which Equatorial states exercise their national sovereignty (41).

(37) *Ibid.*, p. 4.

(38) U.N. Doc. A/AC.105/203, p. 5, 29 August 1977.

(39) A notable illustration is General Assembly Resolution 1803 (XVII) of December 14, 1962. Actually, General Assembly Resolutions dating from 1952 advanced this claim. The Bogotá Declaration made reference to General Assembly Resolution 2692 (XXV) of December 11, 1970, entitled « Permanent Sovereignty over Natural Resources of Developing Countries and Expansion of Domestic Sources of Accumulation for Economic Development ». This Resolution spoke of land and marine resources but not air or space resources. Also motivating the Bogotá States was a general feeling that proposals emanating from the ITU relating to orbits and frequencies were impracticable and unfair.

(40) J.H. GLAZER, « Domicile and Industry in Outer Space », 17 *Columbia Journal of Transnational Law*, pp. 81, 114. Compare C.E. RANKIN, III, « Utilization of the Geostationary Orbit - A Need for Orbital Allocation ? » 13 *Columbia Journal of Transnational Law*, p. 102, fn. 25 (1974).

(41) « First Meeting of Equatorial Countries », p. 2, mimeo.; 6 *Journal of Space Law*, p. 193 (Fall 1978).

Consequently, they decided « to proclaim and defend on behalf of their peoples the existence of their sovereignty over this natural resource » (42).

Second, the Declaration referred to « Sovereignty of Equatorial States over the Corresponding Segments of the Geostationary Orbit ». Here the authors mentioned the concept of permanent sovereignty over natural resources, and in particular, General Assembly Resolution 2692 (XXV). Reference is also made to General Assembly Resolution 3281 (XXIX) which is « The Charter of Economic Rights and Duties of States ». Relying on these documents the Bogotá States concluded that « the above mentioned provisions lead the equatorial states to affirm that the synchronous geostationary orbit, being a natural resource, is under the sovereignty of the equatorial states » (43).

Third, they refer to the « Legal Status of the Geostationary Orbit ». In this section the Bogotá States indicated that their move would benefit their national interests and those of the universal community instead of the most developed countries. They made no claim to segments of the orbit situated above the « open sea ». This area was considered to be beyond the « national jurisdiction of states » and was to be treated as appertaining to the Common Heritage of Mankind (44). During the discussions of the Bogotá Declaration at meetings of the Scientific and Technical Sub-Committee of COPUOS, attention had been drawn to the Common Heritage of Mankind concept. Thus, Ecuador had noted that segments of the geostationary orbit « corresponding to the high seas beyond the limits of national jurisdiction would be considered the Common Heritage of Mankind, and there would be safeguards for everyone, provided the international community regulated the use and exploitation of the orbit » (45).

In the following language the Bogotá States agreed to the transiting of space objects when outside of the asserted geostationary orbital positions of the signatories. Thus, « The equatorial states do not object to the free orbital transit of satellites approved and authorized by the International Telecommunication Convention, when these satellites pass through their outer space in their gravitational flight outside their geostationary orbit » (46). This statement appears to be consistent with their view that the geostationary orbit was identified as not being a part of outer space. The equatorial States contemplated granting permission to the space-resource States to place permanently in the geostationary orbital area of the granting States the

(42) *Ibid.*

(43) *Ibid.*, p. 5.

(44) *Ibid.*, pp. 5-6.

(45) U.N. Doc. A/AC.105/C.1/SR.199, p. 7, 28 February 1978. C.Q. CHRISTOL, « The Legal Common Heritage of Mankind: Capturing an Illusive Concept and Applying it to World Needs », *Proceedings of the 18th Colloquium on the Law of Outer Space* 42 (1976). Compare C.Q. CHRISTOL, « The Common Heritage of Mankind Provision in the 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies », in press (1980).

(46) Declaration, *op. cit.*, p. 6.

foreign space object. Such permission was to be in the form of a « previous and expressed authorization on the part of the concerned states, and the operation of the device should conform with the national law of that territorial country over which it is placed » (47). By such consent the authorizing State would allow a foreign State to operate within the territory of the former. The Bogotá States also indicated that the presence of foreign space objects currently in their asserted sovereign orbital areas was not condoned nor would these States allow such presence to constitute the basis for a claim of preemptive rights.

Fourth, they assessed their relationship to the Principles Treaty. That Treaty was not to be considered a « final answer » to the exploration and use of outer space (48). It was entered into at a time when the LDCs « could not count on adequate scientific advice and were thus not able to observe and evaluate the omissions, contradictions and consequences of the proposals which were prepared with great ability by the industrialized powers for their own benefit » (49). Here the Bogotá States referred to the absence of a final definition of outer space. A consequence of the lack of such a definition, according to the Declaration, has been to allow the resource States to engage in a national appropriation. Since the Principles Treaty was regarded as incomplete, this provided a basis for the equatorial States to claim that the geostationary orbit was intended to be excluded from its coverage. Further, the absence of a definition of outer space in the Treaty allowed the equatorial States to conclude that the prohibition against appropriation had no application to the geostationary orbital area. This being the case the equatorial States that had ratified the Treaty were not inhibited from claiming the orbital slot area as a part of their sovereign areas.

Fifth, the equatorial States referred to diplomatic and political action. They acknowledged that the 1967 Treaty did not specifically exclude the geostationary orbital position from the prohibitions against national appropriation contained in Article two. They have tried to persuade countries that have not ratified the 1967 Treaty to refrain from « undertaking any procedure that allows the enforcement of provisions whose juridical omission has already been denounced » (50). Approval was given to the comparable positions previously taken by Colombia and Ecuador at the United Nations, and they promised to work together to obtain acceptance of their position that « the geostationary orbit... [is] an integral part of their sovereign territory... » (51).

The equatorial States have advanced the foregoing claims at meetings of the ITU and the UN. At the close of the February 1977 WARC-BS they

(47) *Ibid.*, p. 6.

(48) *Ibid.*, p. 7.

(49) *Ibid.*

(50) *Ibid.*, p. 8.

(51) *Ibid.*, p. 8.

submitted a formal statement which was incorporated in the Final Protocol of the conference. In this they indicated that :

they were not bound by the decisions of the Conference regarding the location of geostationary satellites on the segments of the orbit over which these States exercise sovereign rights, nor the positioning of such satellites requiring the prior authorization of the equatorial countries concerned. They would also reserve the right to take whatever steps they may deem fit to preserve and secure the observance of their rights. No claims were made on either side of the geostationary orbit or for other orbits (52).

Such claims have not gone unnoticed, and they have been vigorously rejected by the space resource States and by signatories to the 1967 Principles Treaty. Since the Bogotá Declaration focused on political-legal considerations, it was natural that the UN was to become the principal forum for debate on this subject.

REACTION TO THE BOGOTÁ DECLARATION

The first formal and extended rejection of the Bogotá Declaration reaching COPUOS was a working paper submitted by the Soviet Union entitled « Considerations on the Legal Status of Geostationary Orbits » (53). Relevant portions of the working paper stated :

1. Geostationary orbit is inseparable from outer space and all relevant provisions [of the 1967 Principles Treaty] are applicable to it. Under the Treaty, geostationary orbit, like outer space as a whole, is not subject to national appropriation by any means whatsoever.
2. The placing of satellites in geostationary orbit by States creates no rights of ownership over the respective orbital positions of the satellites or over segments of the orbit.
3. All States enjoy an equal right to the utilization of geostationary orbit. The utilization of geostationary orbit by States must not be detrimental to the interests of other States.

Paragraph 4 of the working paper emphasized the need for States to cooperate in placing communications satellites in geostationary orbit, took into account the recommendations and decisions of the ITU in this area, and linked the effective use of radio frequencies with space objects.

The position of the United States was identified at a meeting of the Scientific and Technical Sub-Committee of COPUOS on February 24, 1978. Basing its position on a study by the Secretariat of the UN (54) the United States indicated that it was « clear that there was no scientific or technical

(52) Richard E. BUTLER, « World Administrative Radio Conference for Planning Broadcasting Satellite Service », 5 *Journal of Space Law* 97 (1977); U.N. Doc. A/AC.105/CR/SR.273, p. 4, 28 March 1977.

(53) U.N. Doc. A/AC.105/L.94, 21 June 1977; U.N. Doc. A/32/20, Annex VI, p. 29, 1977.

(54) Physical Nature and Technical Attributes of the Geostationary Orbit, U.N. Doc. A/AC.105/203, 29 August 1977.

basis for a claim of sovereignty over the geostationary orbit » (55). The United States « agreed with others that had come to that inescapable conclusion » (56).

Representative of the views of the equatorial States was the position of Brazil before COPUOS. Speaking of the geostationary orbit it was the Brazilian view that « the very existence of dissimilar conditions among States with regard to the exploitation of that limited resource means, in practice, that the occupation of the synchronous orbit takes place on a 'first come, first served' basis. That practice could create situations where the annexation of a particular point of that orbit by a satellite does represent an annexion of space that contravenes the terms of the Treaty of 1967 » (57).

Support for the position of the United States and the Soviet Union came from Poland on March 31, 1977 (57). On the same date Colombia urged, since outer space had not been defined, that it was proper to assert that the geostationary orbit was within the sovereign area of a State. On this premise it was urged that a national claim was not violative of the *res communis* principles of the Principles Treaty. Consequently, « the use, enjoyment, and occupation of that segment was subject to the prior authorization of the State concerned, and any attempt by third parties to place stationary satellites in it was therefore rejected... » (59).

Also making a presentation to the Legal Sub-Committee of COPUOS was Kenya. Emphasis was placed on the need for the space resource States to obtain the prior authorization of equatorial States before stationing space objects in that orbit (60).

In discussions at the Scientific and Technical Sub-Committee on February 24, 1978, Colombia and Ecuador supported the positions advanced in the

(55) U.N. Doc. A/AC.105/C.1/SR.199, p. 9, 28 February 1978. The United States had previously advised the Legal Subcommittee that there was « no scientific or technical basis for considering the geosynchronous orbit, or any part of it, to bear any special relation to an underlying State. In fact, there is clear scientific basis for recognizing that this orbit derives its main characteristics from the properties of the entire Earth, irrespective of national boundaries or political jurisdictions, and that it is also affected by other forces at work in the orbital location ». *Press Release USUN-18 (77)*, April 7, 1977.

(56) U.N. Doc. A/AC.105/C.1/SR.199, p. 9. Compare the Ambassador of the United States to the Colombian Minister of Foreign Relations, October 21, 1976, Department of State File No. P77 0001-573, *Digest of United States Practice in International Law*, 1977, p. 661 (1979); E. GALLOWAY, « Present Status in the United Nations of Direct Television Broadcast Satellites », *2 Annals of Air and Space Law*, p. 269 (1977).

(57) U.N. Doc. A/AC.105/PV. 1976, p. 21, 27 July 1977.

(58) U.N. Doc. A/AC.105/C.2/SR.277, p. 2, April 5, 1977. A GORBIEL, « The Legal Status of Geostationary Orbit; Some Remarks », *6 Journal of Space Law*, p. 171, No. 2 (Fall 1978); Compare K. WIEWIORSKA, « LeAL AND Political Problems of the Geostationary Orbit », *Proceedings of the 21st Colloquium on the Law of Outer Space*, p. 34 (1979). For additional analyses see R. ARZINGER, O. FERNANDEZ-BRITAL, E. FINCH, J. GALLOWAY, P. HAANAPPEL, and T. KOSUGE. *Ibid.*, pp. 12-33.

(59) *Ibid.*, p. 4.

(60) U.N. Doc. A/AC.105/C.2/SR.280, p. 2, 7 April 1977.

Bogotá Declaration. Ecuador specifically identified its sovereignty to include « those segments situated above its mainland territory, its continental territorial sea in the Pacific Ocean and its island territory and territorial sea in Galapagos province » (61). Japan and Australia rejected the sovereign claims of the equatorial States on the grounds that the geostationary orbit was clearly a part of outer space (62). The Soviet Union restated its position that the geostationary orbit was an inalienable part of outer space (63). Reflecting the general views of the LDCs was the position taken by Egypt on February 24, 1978, namely, that « no country or group of countries had exclusive sovereignty over any part of outer space. Outer space did not belong to the jurisdiction of any country, and its resources were part of the common heritage of mankind » (64). Among the equatorial States there was a willingness to treat the geostationary orbit over the high seas as a Common Heritage of Mankind (65).

Both the Scientific and Technical Sub-Committee and the Legal Sub-Committee of COPUOS gave attention in their 1978 meetings to the claims of the equatorial States relating to sovereignty over geostationary orbital positions. In each of the subcommittees there were assertions of diametrically opposing points of view. These discussions occupied the attention of the Legal Subcommittee during its Seventeenth Session, 13 March-7 April 1978 (66).

At that meeting the equatorial States urged that they had sovereignty over their natural resources, and that such resources included the geographical area used by geostationary space objects while in orbit. In support of this proposition it was urged that the area is *sui generis*. It was also stated the area fell within their territory since there had not been a firmly established legal boundary between sovereign airspace and the *res communis* of the space environment. Since the equatorial States are either clearly or essentially LDCs, they have sought to obtain the support of LDCs generally by urging that the limited natural resource of the geostationary orbit should be used in priority for the benefit of the LDCs. Presumably the use would be effected on an equitable basis with advantages going first to the equatorial States, then to the other LDCs, and lastly to the developed countries because of the general advantages already possessed by the latter.

Brazil, taking into account the possibility of making a distribution of benefits to be derived from the use of the geostationary orbit, suggested that the Principles Treaty did not preclude the establishment of a specific legal

(61) U.N. Doc. A/AC.105/C.1/SR.199, p. 6, 28 February 1978.

(62) *Ibid.*, pp. 7-8.

(63) *Ibid.*, p. 8.

(64) U.N. Doc. A/AC.105/C.1/SR.200, p. 3, 1 March 1978.

(65) U.N. Doc. A/AC.105/216, p. 26, 6 March 1978.

(66) U.N. Doc. A/AC.105/218, pp. 9-10, 13 April 1978. Compare the Report of the Scientific and Technical Sub-Committee on the Work of its Fifteenth Session, U.N. Doc. 105/216, pp. 26-27, 6 March 1978.

regime for the geostationary orbit. Those States, including Colombia, which were inclined to support the formation of such a regime, mentioned the *sui generis* quality of the geostationary orbit as a limited natural resource.

On the other hand, the space resource States urged that the Principles Treaty fully covered the peaceful and beneficial use of the geostationary orbital area by space objects. They stated that pursuant to the Treaty such orbits were inseparable from the space environment, and were not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means. In their view, the geostationary orbits were free for use by all States without discrimination of any kind on a basis of equality and in accordance with international law and the UN Charter. Emphasizing that geostationary space objects were engaged in a use of the space environment, these States urged that such use did not create a right of ownership over the respective orbital positions of the satellites or over segments of the orbits. They also noted that under the Principles Treaty users of the geostationary orbit were obliged to take into account the corresponding interests of other States and that they had to be guided by the principles of cooperation. The space resource States also were inclined to doubt the legal worth of the General Assembly resolutions relating to full and complete sovereignty over natural resources. They were considered to be more a statement of political and economic expectations than existing rules of international law.

Some States made mention of the scientific and legal complexities involved in the claims of equatorial States. They suggested that further studies along such lines would be required before it would be possible to pass judgment on such claims.

The Legal Sub-Committee considered the issue of the geostationary orbit in its 1979 meeting particularly as it related to the definition/delimitation of outer space (67). As in 1978 so also in 1979 different view points were presented by the equatorial States, by the space-resource States, and by other States. The equatorial States urged that because of the physical characteristics and technical attributes of the geostationary orbit that it constituted a limited natural resource over which they exercised sovereign rights in accordance with international law. Some States which were supportive of this viewpoint also urged that an equitable legal regime should be established to regulate the utilization of the geostationary orbit for the benefit of all, but in particular for the benefit of the less developed countries.

The space-resource States in 1979, as in 1978, stated that the geostationary orbit was inseparable from outer space and that its use was governed by the 1967 Principles Treaty. They called attention to the provisions of Article 2 with its prohibition against national appropriation by claim of sovereignty, by means of use or occupation, or by any other means. They reasserted the view that the orbit was free for use by all States without discrimination of any kind on a basis of equality and in accordance with international law. In the

(67) U.N. Doc. A/AC.105/240, pp. 8-10, 10 April 1979.

light of these considerations they made the important observation that the placing of space objects into this orbit did not create a right of ownership over the position or over segments of orbits (68).

Other States offered observations that did not deal directly with the foregoing differences. Thus, it was suggested that a specific legal regime could be formulated for geostationary orbits within the context of the Principles Treaty. This outlook was conditioned by a recognition that both the Principles Treaty and the ITU Convention and Radio Regulations had prescribed that there must be an equitable use of the geostationary orbit. The conclusion was drawn that it was not necessary to formulate new legal principles respecting the orbit (69). Nonetheless, the Scientific and Technical Sub-Committee in its 1979 session gave attention to the physical nature and technical attributes of the geostationary orbit. Members of COPUOS were invited to submit assessments of the general situation. In the first submission by nine States attention was called to the limited characteristic of the geostationary orbit (70). Thus several States urged the need to share the services to be provided by the space objects using the resource. Attention was also called to the fact that antenna farms and multiple broadcasts could take place simultaneously from a single satellite. Nonetheless, the transmission of solar energy by microwave or laser from a space object to an Earth-based rectenna will require very careful planning and an allocation of frequencies among important competing uses.

In assessing the nature of the debate one commentator has added another dimension to the problem. It has been suggested that « realism appears to dictate that international rule-making either for the geostationary orbit or any other orbital location in space should only be considered when there are real as opposed to fanciful conflicts between states relative to the orbital locations involved » (71).

CONCLUSION

It is clear that successful space activities, including the gathering and transmission of solar energy, will depend on the use of the geostationary orbital position. In order to be successful such use must conform to the

(68) *Ibid.*, pp. 9-10.

(69) *Ibid.*, p. 10.

(70) U.N. Doc. A/AC.105/252, 4 October 1979.

(71) GLAZER, *op. cit.*, p. 82. In this connection it has been observed that « As a result of technological advances (the provision of higher frequency bands, use of modulation techniques which save band width and are less susceptible to interference, antenna systems of higher directivity, use of stabilization systems of greater positioning accuracy, etc.) it will in the future also be possible to accommodate increasingly more satellites within the same arc of the geostationary orbit. Furthermore, multi-mission satellites will allow for even better orbit utilization ». Appraisal of the Federal Republic of Germany, U.N. Doc. A/AC.105/252, p. 7, 4 October 1979.

principles, standards, and rules of international law. At the present time the space-resource States are using orbital slots lawfully. The introduction of very large space objects into orbit would constitute a new use of and activity in the space environment. Up to the present there has been no evidence on the part of the resource States that their orbital uses and activities reflect an intention or constitute a claim to the appropriation of an orbital slot or segments of the space environment. They have been guided by the belief that the 1967 Treaty has confirmed the application of the *res communis* principle to the space environment. The same principle would apply to very large space objects operating at geostationary orbital level. Thus, the mere presence of a large space object could not constitute evidence of the intent of a space resource State to establish either *de facto* or *de jure* rights to the orbital slot. Although the introduction of very large space objects might allow for services different from those space objects providing the present type of radio or television broadcasts, the common commitments of such space objects to a use of the space environment rather than its appropriation would require the application of the same legal guidelines. Consistency would require that the right to use rather than the acquisition of property or sovereign rights be accepted. Thus, with respect to the possible future use of very large space objects, an advanced State is entitled to urge that its prospective conduct fully conforms to existing international law.

The equatorial States, speaking for themselves and in some instances for a highly amorphous contingency of LDCs, have argued that they are now within their rights in asserting that the space environment at orbital levels is a part of their sovereign territory. The resolving of such differing views, even assuming that such views can be reconciled, will take much time. It may even lead to the formation of a new legal regime resulting in a new international organization. However, pending the resolution of contending positions, it is clear that the space resource States can rely on the Principles Treaty.

Further, a formal, treaty-contained definition of the delimitation between sovereign airspace and the non-sovereign space environment is not wholly needed (72). The practices of the resource States since 1957 have clearly established a customary rule of international law to the effect that outer space exists at distances from the Earth where space objects successfully orbit, and

(72) The subject of definition/delimitation has been an agenda item at COPUOS since 1967, and had been mentioned as early as 1958. U.N. Doc. A/AC.105/39, 6 September 1967. Following the Bogotá Declaration the subject gathered the attention of the Legal Sub-Committee, and in March of 1979 the Soviet Union submitted a working paper in which it was suggested that the boundary between airspace and outer space should be fixed at a distance of between 100 and 110 kilometers above sea level. This is still under consideration. U.N. Doc. A/34/20, p. 7 (1979). Opposition to the establishment of a formal boundary has been based on the need to obtain further scientific and technical information as to orbital patterns. Further, it has been observed that the space environment has been used peacefully and beneficially since 1957 without such a definition and that no good reasons exist at the present time to require agreement on a formal definition. An assessment of the criteria for a boundary is contained in L. PEREK, « Remarks on Scientific Criteria for the Definition of Outer Space », *Proceedings of the 19th Colloquium on the Law of Outer Space*, p. 185 (1977).

this surely must include the heights at which geostationary space objects are in orbit.

If, as is believed to be the case, the geostationary orbital level is not a limited natural resource, and if satellites located at that height will possess multifunctional characteristics in the future, then the supposed conflicts between the equatorial and space-resource States may certainly be fanciful. Indeed, it may not be possible to determine this fact unless and until the space-resource States put at least one very large space object such as a satellite power system into operation.

Moreover, it is quite possible that the claims now being put forward by the equatorial States, apparently designed to allow them to license the use of the orbital slots to the space-resource States, could be satisfied in other ways. Rather than contemplating a bilateral relationship by the users and those claiming sovereignty, it is possible that the world community will establish methods and institutions for the allocation of benefits derived from the exploration and use of the space environment. The Principles Treaty speaks of the need to consider the well-being of the entire community through the implementation of the province of mankind concept. The law of the sea and the Moon Treaty negotiations have confronted the need to take into account the Common Heritage of Mankind Principle. By the end of this century or in the next, it may be possible to employ such concepts in such a way as to favor the national-interest contentions now being raised by the equatorial States as well as to effect an equitable distribution of the solar energy outer space resource and other resources and benefits to both space resource and non-space resource States and peoples.

BOGOTÁ DECLARATION

FIRST MEETING OF EQUATORIAL COUNTRIES (*)

The undersigned representatives of the States traversed by the Equator met in Bogotá, Republic of Colombia, from November 29 through December 3rd, 1976 with the purpose of studying the geostationary orbit that corresponds to their national terrestrial, sea, and insular territory and considered as a natural resource. After an exchange of information and having studied in detail the different technical, legal, and political aspects implied in the exercise of national sovereignty of States adjacent to said orbit, have reached the following conclusions :

(*) The expression « Equatorial Countries » throughout the text means those states of the world traversed by the Equator.

1. THE GEOSTATIONARY ORBIT AS A NATURAL RESOURCE

The geostationary orbit is a circular orbit on the Equatorial plane in which the period of sidereal revolution of the satellite is equal to the period of sidereal rotation of the Earth and the satellite moves in the same direction of the Earth's rotation. When a satellite describes this particular orbit, it is said to be geostationary; such a satellite appears to be stationary in the sky, when viewed from the earth, and is fixed on the zenith of a given point of the Equator, whose longitude is by definition that of the satellite.

This orbit is located at an approximate distance of 35,871 Kmts. over the Earth's Equator.

Equatorial countries declare that the geostationary synchronous orbit is a physical fact linked to the reality of our planet because its existence depends exclusively on its relation to gravitational phenomena generated by the earth, and that is why it must not be considered part of the outer space. Therefore, the segments of geostationary synchronous orbit are part of the territory over which Equatorial states exercise their national sovereignty. The geostationary orbit is a scarce natural resource, whose importance and value increase rapidly together with the development of space technology and with the growing need for communication; therefore, the Equatorial countries meeting in Bogotá have decided to proclaim and defend on behalf of their peoples, the existence of their sovereignty over this natural resource. The geostationary orbit represents a unique facility that it alone can offer for telecommunication services and other uses which require geostationary satellites.

The frequencies and orbit of geostationary satellites are limited natural resources, fully accepted as such by current standards of the International Telecommunications Union. Technological advancement has caused a continuous increase in the number of satellites that use this orbit, which could result in a saturation in the near future.

The solutions proposed by the International Telecommunications 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 its geostationary synchronous orbit. In spite of the principle established by Article 33, sub-paragraph 2 of the International Telecommunications Convention, of 1973, that in the use of frequency bands for space radio-communications, the members shall take into account that the frequencies and the orbit for geostationary satellites are limited natural resources that must be used efficiently and economically to allow the equitable access to this orbit and to its frequencies, we can see that both the geostationary orbit and the frequencies have been used in a way that does not allow the equitable

process of the developing countries that do not have the technical and financial means that the great powers have. Therefore, it is imperative for the equatorial countries to exercise their sovereignty over the corresponding segments of the geostationary orbit.

2. SOVEREIGNTY OF EQUATORIAL STATES OVER THE CORRESPONDING SEGMENTS OF THE GEOSTATIONARY ORBIT

In qualifying this orbit as a natural resource, equatorial states reaffirm « the right of the peoples and of nations to permanent sovereignty over their wealth and natural resources that must be exercised in the interest of their national development and of the welfare of the people of the nation concerned », as it is set forth in Resolution 2692 (XXV) of the United Nations General Assembly entitled « permanent sovereignty over the natural resources of developing countries and expansion of domestic sources of accumulation for economic development ».

Furthermore, the charter on economic rights and duties of states solemnly adopted by the United Nations General Assembly through Resolution 3281 (XXIX), once more confirms the existence of a sovereign right of nations over their natural resources, in Article 2 sub-paragraph 1, which reads : « All states have and freely exercise full and permanent sovereignty, including possession, use and disposal of all their wealth, natural resources and economic activities ».

Consequently, the above mentioned provisions lead the equatorial states to affirm that the synchronous geostationary orbit, being a natural resource, is under the sovereignty of the equatorial states.

3. LEGAL STATUS OF THE GEOSTATIONARY ORBIT

Bearing in mind the existence of sovereign rights over segments of the geostationary orbit, the equatorial countries consider that the applicable legal considerations in this area must take into account the following :

- a) The sovereign rights put forward by the equatorial countries are directed towards rendering tangible benefits to their respective people and for the universal community, which is completely different from the present reality when the orbit is used to the greater benefit of the most developed countries;
- b) The segments of the orbit corresponding to the open sea are beyond the national jurisdiction of states and will be considered as common heritage of mankind. Consequently, the competent international agencies should regulate its use and exploitation for the benefit of mankind;
- c) The equatorial states do not object to the free orbital transit of satellites approved and authorized by the International Telecommunications Conven-

tion, when these satellites pass through their outer space in their gravitational flight outside their geostationary orbit;

d) The devices to be placed permanently on the segment of a geostationary orbit of an equatorial state shall require previous and expressed authorization on the part of the concerned state, and the operation of the device should conform with the national law of that territorial country over which it is placed. It must be understood that the said authorization is different from the coordination requested in cases of interference among satellite systems, which are specified in the regulations for radio-communications. The said authorization refers in very clear terms to the countries' right to allow the operation of fixed radiocommunications stations within their territory;

e) Equatorial states do not condone the existing satellites or the position they occupy on their segments of the Geostationary Orbit nor does the existence of said satellites confer any rights of placement of satellites or use of the segment unless expressly authorized by the state exercising sovereignty over this segment.

4. TREATY OF 1967

The Treaty of 1967 on « The Principles governing the activities of states in the exploration and use of outer space, including the moon and other celestial bodies », signed on January 27 of 1967, cannot be considered as a final answer to the problem of the exploration and use of outer space, even less when the international community is questioning all the terms of international law which were elaborated when the developing countries could not count on adequate scientific advice and were thus not able to observe and evaluate the omissions, contradictions and consequences of the proposals which were prepared with great ability by the industrialized powers for their own benefit.

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 the outer space. The legal affairs sub-commission which is dependent on the United Nations Commission on the Use of Outer Space for Peaceful Purposes, has been working for a long time on a definition of outer space, however, to date, there has been no agreement in this respect.

Therefore, it is imperative to elaborate a juridical definition of outer space, without which the implementation of the Treaty of 1967 is only a way to give recognition to the presence of the states that are already using the geostationary orbit. Under the name of a so-called non-national appropriation, what was actually developed was technological partition of the orbit, which is simply a national appropriation, and this must be denounced by the equatorial countries. The experiences observed up to the present and the developments foreseeable for the coming years bring to light the obvious omis-

sions of the Treaty of 1967 which force the equatorial states to claim the excluding of the geostationary orbit.

The lack of definition of outer space in the Treaty of 1967, which has already been referred to, implies that article II should not apply to geostationary orbit and therefore does not affect the right of the equatorial states that have already ratified the Treaty.

5. DIPLOMATIC AND POLITICAL ACTION

While article 2 of the aforementioned Treaty does not establish an express exception regarding the synchronous geostationary orbit, as an integral element of the territory of equatorial states, the countries that have not ratified the Treaty should refrain from undertaking any procedure that allows the enforcement of provisions whose juridical omission has already been denounced.

The representatives of the equatorial countries attending the meeting in Bogotá, wish to clearly state their position regarding the declarations of Colombia and Ecuador in the United Nations, which affirm that they consider the geostationary orbit to be an integral part of their sovereign territory; this declaration is a historical background for the defense of the sovereign rights of the equatorial countries. These countries will endeavor to make similar declarations in international agencies dealing with the same subject and to align their international policy in accordance with the principles elaborated in this document.

Signed in Bogotá 3rd December 1976 by the Heads of Delegations.

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