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REGULATORY FUNCTIONS OF I.T.U. IN THE FIELD OF SPACE TELECOMMUNICATIONS

By NANDASIRI JASENTULIYANA†

QUITE APART FROM the issue of political controls and institutional regimes to encourage and sponsor international cooperation in the development of a legal order in space, there are a wide range of functional activities that lend themselves to international regulation. Functional cooperation is not only possible but is actually taking place within the United Nations family of agencies, which are working on the undramatic functional problems raised by the space age, without regard to the unedifying impasses and power struggles in political organs, which so far preclude agreements that would substantially and meaningfully further the development of a legal order in space.

The present study is an attempt to examine the regulatory role of one such agency—the International Telecommunications Union (hereinafter ITU or Union)—in one of the functional areas that lends itself to international regulation—the field of space telecommunications.

Reliable and uncluttered telecommunications are a necessity for any successful scientific exploration of outer space and application of the results for peaceful uses thereof. 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 data from space probes, no commercial use of space communications and little radio astronomy. If radio signals are jammed, they would deflect satellites from their course. Interference with the radio spectrum, therefore, could cause great damage to the space program and cause great danger and hardship to the public.

Precautions against such accidents lie primarily in the reservation of radio channels specifically for space telecommunications. Yet out of what at first glance appears to be a wide selection of frequencies ranging from 10 Kilocycles to 40,000 Megacycles per second, only certain bands of frequencies are suited for space use. Many of these portions of the spectrum are already occupied by assignment to other types of radio services. The control of frequencies for space use is complicated further, however, because orbiting satellites continuously cross international boundaries; the provision of clear channels thus implies global administration of purely local regulatory authorities.1

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1 For convenience the use of space radio communications may be grouped as follows: a) Aeronautical Mobile, b) Broadcasting, c) Meteorological, d) Navigation, e) Space Research and Guidance, Control and Associated Communication; including tracking and telemetering; and f) Communication Relay (both active and passive).

Space telecommunications, therefore, depends heavily on the judicious control of the radio spectrum and the international standardization of frequency allocation. Hence, it is no surprise that from almost the beginning of the space age, the international community recognized the necessity to push ahead with work on the establishment and maintenance of effective legal measures to regulate and control these activities. As early as 1959, the United Nations Ad Hoc Committee on the Peaceful Uses of Outer Space (having emphasized the imperativeness of regulating telecommunications in space), drew the attention of the international community to the fact 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."\(^3\)

The International Telecommunication Union (ITU), the oldest of international organizations, which has already celebrated its centenary, has been the first of the United Nations' specialized agencies to legislate on activities concerning space. Thus, while the great debate continues on the whole question of space law, the ITU has demonstrated that in some instances, case by case development may not be the best solution to the development of a legal order in space.

The ITU is a world organization established by international agreement—the International Telecommunication Convention, as revised in 1965.\(^4\) Among the purposes of the organization are to maintain and extend international cooperation for the improvement and rational use of telecommunication services. To that end the Union affects the allocation of the radio frequency spectrum and registration of radio frequency assignments in order to avoid harmful interference between radio stations of different countries;\(^5\) so that orderly development of a regime can be fastened through international cooperation.\(^6\)

The International Frequency Registration Board (hereinafter IFRB) and the International Radio Consultative Committee (hereinafter IRCC)\(^7\) are two main organs of the ITU\(^8\) that are concerned with the questions of space communications.

The essential duties of the IFRB are to affect an orderly recording of frequency assignments made by the different countries so as to establish (in accordance with the procedure provided for in the Radio Regulations and in accordance with any decisions which may be taken by competent conferences of the Union) the date, purpose and technical char-

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\(^4\) The constitutional document of the ITU—the convention signed at Montreux on November 12, 1961—entered into force according to its article 13, on January 1, 1967, between the countries and territories whose ratifications had been deposited before that date.
\(^5\) Supra note 4, at Art. 4.
\(^6\) Cooperative regulations were first undertaken by the Geneva Telegraphic Convention, signed at Paris in 1865, and subsequently modified and extended. In 1925 the International Telegraphic Conference and in 1927 the Radio-Telegraph Conference decided to combine their conventions and in 1932 at Madrid a new Telecommunication Convention was signed creating the ITU, and subsequently it was revised at the conference in Atlantic City, 1947, Buenos Aires, 1952, Geneva, 1959, and Montreux, 1965.
\(^7\) Supra note 4, at Arts. 5, 7, 13, 14.
\(^8\) The other essential organs of the ITU are these:
acteristics of each of these assignments. This is done with a view to ensure formal international recognition thereof and to furnish advice to members and associate members on the operation of the maximum practicable number of radio channels in those portions of the spectrum where harmful interference may occur. Also, advice is rendered relating to performing additional duties, concerned with the assignment and utilization of frequencies, prescribed by a competent conference of the Union, or by the Administrative Council with the consent of the majority of the members of the Union in preparation for or in pursuance of its duties.\textsuperscript{9}

The duties of the CCIR are:

[T]o study technical radio questions and operating questions, the solution of which depends primarily on consideration of a technical radio character and to issue recommendations of them.\textsuperscript{10}

The CCIR meets every three years, and in the interim periods, its work is carried on by study groups composed of representatives of numerous nations. The CCIR has studied propagation and reception characteristics in different parts of the world; has analyzed the behavior patterns of disturbances in the upper atmosphere that affect communication; and has prepared an atlas of thunderstorm activity to guide technical recommendations as a basis of frequency allocations.\textsuperscript{11} The power of CCIR has been increased by provisions in Article 14, paragraph 191 which now makes it possible for the

Plenary Assembly of the International Consultative Committees . . . . to submit to Administrative Conference proposals arising directly from their recommendations or from findings on questions under study.\textsuperscript{12}

On 28 November 1961, in Geneva at the headquarters of the Union, a joint Study Committee on Space Questions was set up under the chairmanship of the then Secretary-General of the ITU, Mr. Gerald Gross, to involve itself in the development of a legal order in space. Also created were subcommittee \( A \) dealing with juridical, economic and related aspects, under the chairmanship of the then Deputy Secretary-General, Dr. M. B. Sarwate, and subcommittee \( B \) on technical aspects, under the chairmanship of Mr. A. H. Catai, a member of the IFRB. This committee and its subcommittees, along with the IFRB and CCIR, have been involved with space communications and made immense contributions to the 1959 Geneva Radio Administrative Conference and the 1963 ITU Extraordinary Radio Conference, also held in Geneva. Through these conferences the ITU is helping in the orderly regulation of telecommunications in space.

\textsuperscript{1) A Plenipotentiary Conference,}
\textsuperscript{2) Administrative conferences,}
\textsuperscript{3) An Administrative Council, composed of twenty-nine members of the Union elected by the Plenipotentiary Conference, each member having one vote,}
\textsuperscript{4) A general secretariat, with a Secretary-General elected by the Plenipotentiary Conference.}
\textsuperscript{9 Supra note 4, at Art. 2, 5, 6, 7, 9, 10.}
\textsuperscript{\textsuperscript{10 Supra note 4, at Art. 13.}}
\textsuperscript{\textsuperscript{11 Supra note 10, at Art. 14, 1.}}
\textsuperscript{\textsuperscript{12 Supra note 2, at 22.}}
\textsuperscript{\textsuperscript{13 Supra note 4, at Art. 14, 191.}}
There were two major conferences convened by the ITU in Geneva during 1959: (1) The Plenipotentiary Conference which concluded a new Convention abrogating the 1947 Atlantic City Convention of the ITU, and (2) The Ordinary Radio Conference which for the first time allocated the frequencies for space research. At this time we shall deal mainly with the Ordinary Radio Conference which began on 17 August and ended on 21 December 1959.

Prior to the convening of the Ordinary Radio Conference, the two major space powers—the United States and the U.S.S.R.—had selected frequencies for space research without any international regulations. Thus, it should be emphasized that it was only twenty-six months after the launchings of Sputnik I that provision was made in the International Telecommunication Convention for radio allocation to the Space and Earth/Space Radio Services. Even though the need for careful allocation of frequencies for space purposes has long been discussed, it was only after the launching of Sputnik I that the matter became urgent to many people.

At the launching of Sputnik I and II, the Soviet Union used 20.005 and 40.002 megacycles, contrary to ITU regulations. The frequency 20.005 megacycles is in the center of the frequency band 19.00-20.010 megacycles, which the ITU has assigned as the standard frequency service. Stations employing frequencies in this band conduct "radio communication service for the transmission of standard and specified frequencies of known high accuracy, intended for general reception." In fact, 20.005 megacycles is the exact frequency assigned to station PEN at Kootwijik, the Netherlands.

Each nation, in agreeing to the International Radio Regulations adopted by an international conference, obligated itself to adhere to the table of frequency allocations. Each nation has the right to depart from allocations set by the table, but in doing so, assumes the obligation to hold free from harmful interference those operations of other nations which are in accordance with the table.

However, it is reported that the Russian Sputnik did cause interference to terrestrial radio communication in at least three countries—England, The Netherlands and the United States. In 1952, the Soviet Union entered a reservation to the Buenos Aires Convention of 1952—revising the 1947 Atlantic City Charter of the ITU—thereby refusing to register its allocated frequencies with the IFRB. Although the Soviet Union challenged the competence of the IFRB, she was still bound by her general undertaking not to operate any of her stations, mobile or otherwise, in such a manner as to result in harmful interference to other members.

A fundamental question is whether the Soviet Union, in view of the fact that there were no regulations regarding allocation of frequencies in space, was violating an international agreement. The Soviet Union has answered...
the question, naturally, in the negative. Insofar as the launching of the Sputniks and their frequencies caused harmful interference to the radio uses of other nations, it is clear that an international agreement—the ITU Radio Regulations—was violated. It has been argued that the International Geophysical Year (IGY) waived some of these international radio obligations and that thus the Soviet Union did not violate the ITU regulations.¹⁵

Events following the Soviet use of unallocated frequencies may have been responsible for the strong United States stand for adequate allocation of radio frequencies for space uses. The United States had completed scientific studies with various international scientific bodies including the CCIR of the ITU before introducing their proposal requesting allocations for space uses. The main objection to the United States space frequency proposals came from the Soviet bloc.

Dr. Jan Busak, a Czechoslovakian, reflecting the position of the Soviet Union and his government, criticized the provisional allocation of frequency by the 1959 Geneva Conference. He was fully aware of the desirability of legal regulations for the use of radio frequencies in space, however, he was objecting to the allocation of frequency for space uses at a time when technical knowledge of the art is limited. He concluded his argument by stating:

The International Telecommunication Union is thus the first organization attempting a legal regulation on an international level of some problems connected with the penetration into space. We must, however, bear in mind, that an international legal regulation can have practical importance only if all (and especially the technical) problems were solved, if it does not hinder further development and if it expresses the will of all interested parties.¹⁶

Questions have been raised as to why the Soviet Union, a major space power, should want to prevent radio frequency allocation for space uses. Here again the answer is suggested:

Two major factors appear to be involved: the difference in geography and the differences in political alliances throughout the world. The great land mass of the U.S.S.R. and the exercise of the rigid internal discipline over emissions within its borders permits the Soviets to control use of the airwaves and thus to prevent harmful interference over a much greater portion of a satellite traverse than is possible with the more compact continental boundaries of the United States. That is, orbiting satellites are simply over Russian territory a longer time than over the United States. Both data reception centers and tracking stations can be more widely separated than is possible

¹⁵ Reasons to explain why the Russians selected the above-mentioned frequencies have been suggested: "Why the Soviets chose the frequencies is open to speculation. They may have already have had equipment constructed prior to the IGY agreements, or they may have found from subsidiary studies that these channels had optimum propagation characteristics. Although the apparently illicit frequency selection by the Russians has been widely discussed and criticized, there must have been a strong desire on the part of the Soviets to select a channel for reception of Sputnik signals free of interference from existing terrestrial stations. The cost of experimental launchings is so gigantic and the tasks of losing scientific data so unnerving, it is doubtful that any launching team would choose a channel which might vitiate success of an experiment by being occupied, and which would cause serious interference with other transmission." (Report on Radio Frequency Control in Space Telecommunications, supra note 2, at 40).
¹⁶ BUSAK, "Radio Communication in Outer Space," supra note 14, at 1132.
in our country. Thus, through domestic control over spectrum use, the Soviets can be relatively well assured of freedom from interference, at least in certain bands.\textsuperscript{17}

As stated before, the Ordinary Radio Administrative Conference, in spite of considerable Soviet bloc opposition, established the two new services—and allocated thirteen frequency bands for research in those services. The allocation became available 1 May 1961, to the countries which have approved the Geneva Radio Regulations of 1959.\textsuperscript{18}

Furthermore, in view of the rapid development in communication with space vehicles, the plenary meeting of the Ordinary Radio Administrative Conference adopted a recommendation (No. 36) relating to the convening of an Extraordinary Administrative Radio Conference during the latter part of 1963, with an agenda including the following basic items:

- to examine the technical progress in the use of radio communication for space research and the results of technical studies by the International Radio Consultative Committee and other interested organizations,
- to decide in the light of such an examination, on the allocation of frequency bands essential for the various categories of space radio communication,
- to adopt, if such action is considered desirable, new provisions revising the Radio Regulations to provide for the identification and control of radio emissions from space vehicles, taking into account possible recommendations of the CCIR.\textsuperscript{19}

The recommendation also invited members and associate members of the Union, which launched satellites during the period of space research before the convening of the Extraordinary Administrative Radio Conference referred to above, to keep the Administrative Council, and the relevant technical organs of the Union, informed of the frequency used and the technical progress achieved in the use of radio communications for space research purposes.

Even though the ITU took brave steps in regulating activities in space so that the development of a legal order in space can be furthered, it must be realized that much remained to be accomplished after the 1959 Conference. The allocations made there were only for purposes of space research and were more in recognition of the existing uses of the spectrum rather than an effort to anticipate and provide for the possible requirements. For instance, the requirements of the meteorological, navigational, and earth resource survey satellites cannot be considered as pure research, and thus, were outside the present regulations and consequently could not be secured from interference by being registered. Although the 1959 Conference provided for two new services—"space service" and "earth-space service"—the definitions of these two services as contained in the 1959 regulations were clearly inadequate and were open to varied interpretations. These are some of the legal and administrative questions which were left to be resolved.

\textsuperscript{17} Supra note 2, at 50.

\textsuperscript{18} Of the thirteen frequency bands, twelve were assigned for space research and one for astronomical research.

\textsuperscript{19} Radio Regulations, Geneva 1959 Resolution 36.
Another novel move, besides that of allocation of frequency for space research which the ITU was concerned with at Geneva in 1959, was the request of special frequency for radio astronomy. Although astronomy is not classified by the ITU as a space service, frequencies for astronomical studies were agreed upon.

New duties were assigned to the IFRB in the light of the new developments in outer space. It was called upon to facilitate the use of a maximum number of radio channels in those parts of the spectrum where harmful interference may occur, while paying particular attention to the needs of the new and developing countries.

The other conference that met in Geneva in 1959—the Plenipotentiary Conference of the ITU—was held in Geneva from 14 October to 21 December 1959. The Geneva Conference drew up a new International Telecommunication Convention, which on 1 January 1961, replaced the previous ones established at Buenos Aires in 1952. The new Convention was signed by eighty-six members and one associate member of the ITU.

The Plenipotentiary Conference was interested in the very general aspects of outer space telecommunications. After having been informed of the action taken by the appropriate organs of the ITU, it was mindful of possible developments in the field of space telecommunication, and in Resolution 34 entitled "Telecommunications and Peaceful Uses of Outer Space Vehicles" considered "the importance of the role that telecommunications and, in consequence, the ITU will necessarily play in this sphere." The Conferees also requested the Secretary-General of ITU to keep the United Nations informed of the steps already taken by ITU in the fields of space telecommunications and further progress in that direction.

In general it may be said that the Administrative Radio Conference of 1959 had as its basic task an orderly international apportionment of the frequency bands in the spectrum between the various services. It had to undertake a most thorough overhaul of frequency band allocations, making due allowance for the extraordinary expansion of certain services. Examples of which included providing for the requirements of radio astronomy and of the organizations which need communications for research purposes in connection with outer space.

Preparatory work and studies for the 1963 Extraordinary Administrative Radio Conference were carried out by the CCIR and IFRB, working toward the allocation of such frequencies as necessary. Study groups of the CCIR met in Washington in March 1962, and in January 1963, and a number of important new recommendations were drafted by the group.

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20 It was attended by delegates of eighty-eight members and one associate member of the Union and by observers of the United Nations and several specialized agencies (General Secretariat of ITU, Report, 1959).

21 In accordance with G.A. Res. 1721, 16 U.N. GAOR Supp. 17, at 6, U.N. Doc. A/5026 (1961) ITU submits reports of its activities in the field of outer space to the U.N. General Assembly at each session through the ECOSOC. The first report was submitted in 1962 covering the period up to then and the latest is for the period May 1966 to April 1967, submitted for the 22nd Session of the U.N. General Assembly.
on technical questions concerning space telecommunication."

In accordance with the United Nations General Assembly Recommendation 1721 and the resolution adopted by the Administrative Council of the ITU during its 18th session, the Extraordinary Administrative Radio Conference (EARC), was convened in October 1963 in Geneva. The purposes of the Conference were to allocate frequency bands for space radio-communication purposes and to revise such provisions of the International Radio Regulations as were essential for the effective implementation of its decisions. Its agenda was adopted prior to the meeting by the Administrative Council of the ITU and included the recommendations made by the Ordinary Radio Conference of 1959 in its Recommendation No. 36.

The 1963 Conference successfully discharged the tasks entrusted to it as outlined in its agenda. In the first place it allocated, on a shared or exclusive basis, frequencies totalling 6,076.462 MC/S for the various kinds of space services. Apart from the allocation of bands totalling 2,800 MC/S in width for communication satellites on a shared basis with other services; provisions were made for space telecommand, telemetry and trackings, meteorological-satellites, radionavigation-satellites, space research and radio astronomy. Provisions were also made for the use of space techniques with aeronautical communication and radio navigation services and for the use of artificial satellites by amateurs.

Thus, the 1959 allocation which was made only for research purposes was considerably extended by the 1963 Conference in order to meet the requirements, not only of space research, but also, of the practical uses of outer space. While at the 1959 Conference only one percent of the frequency spectrum was made available for outer space, about fifteen percent has now been made available. The 1963 Conference also adopted a number of revisions and additions to other parts of the Radio Regulations;

23 As report stated that "recent experiments have confirmed that the land situated between 1 and 10 GO/s is the most suitable for the development of radio communications between the earth and vehicles in space. It is, however, precisely this frequency range which is the most used for terrestrial radio-relay systems, and so it appeared inevitable that this band of frequencies will have to be shared between the two services." (Second Report by ITU on Telecommunication and the Peaceful Uses of Outer Spaces, Geneva 1963). Meanwhile a report prepared by the United States in preparation for the Conference proposed to allocate a total of 2975 mc/s of spectrum space communication satellites service in the bands between 1,000 and 10,000 mc/s. Hearings on Space Communications and S.J. Reg. 32 Before the Subcomm. on Communications of the Senate Comm. on Commerce, 87th Cong., 1st Sess. 271 (1961).

24 Following the report of the Committee on Peaceful Uses of Outer Space which studied the reports of the ITU, the U.N. General Assembly has adopted two important resolutions dealing with the space in which communication satellites were specifically mentioned as well as this Extraordinary Radio Conference. In Resolution 1721 of 1961, the General Assembly recognized the common interest of mankind in furthering the urgent need to strengthen international cooperation in regulating this field, and in resolution 1802 of 1962 the importance of international cooperation to achieve effective satellite communication on a world-wide basis was emphasized. The ECOSOC at its July 1963 session adopted Resolution 980 c (XXXVI) noting the steps taken by the ITU in the peaceful uses of outer space and its response to the above two General Assembly Resolutions (1721 (XVI) and 1802 (XVII)) and called upon the member states to participate in the ITU Conference.

25 Four hundred delegates from seventy ITU member countries attended and the Final Act was signed on November 8, 1963.

mainly concerned with general rules for the assignment and use of frequencies; notification and recordation of frequencies in the Master International Frequency Register which is maintained by the IFRB; the identification of station; service documents; terms and definitions; and special rules relating to particular services. These revisions and additions were necessitated to make provision for the space services.

In addition, the Conference adopted a number of important resolutions and recommendations. One of these deals with the future action to be taken by ITU in the light of future developments in space radio communications. It recommended that members and associate members of the Union make data available to the appropriate permanent organs of ITU; that the Administrative Council should annually review the progress of Administrations in space radio communications and should, in the light of this review, recommend the convening of an Extraordinary Administrative Conference at a future date to work out further agreements for the international regulation of the use of the frequency bands allocated by the present conference. A further provision stated that notification and registration of frequency assignments to space services shall, until revised by a future conference, be effected in accordance with the procedures adopted by the present conference.

Another resolution deals with space vehicles in distress or emergency, noting that the frequency of 20,007 KC/S had been set aside by the Conference for this purpose and resolving that for the time being the distress signal used by ships or aircraft (SOS in radio telegraphing and MAYDAY in radio telephony) should also be used by spacecraft. A recommendation was addressed to the CCIR pointing out that "the use of satellite transmissions for direct reception by the general public of sound and television broadcasts may be possible in the future" and urging that CCIR to expedite its studies on the technical feasibility of broadcasting from satellites. A further recommendation called on the forthcoming ITU Aeronautical Conference to provide high frequency channels (bands between 2,850-22,000 KC/S) for communications for the routine flight to transport air-space vehicles flying between points of the earth surface both within and beyond the major part of the atmosphere.

Finally, a recommendation was adopted recognizing:

that all Members and Associate Members of the Union have an interest in and right to an equitable and rational use of frequency bands allocated for space communications, and recommending to all ITU members and associate members:

that the utilization and exploitation of the frequency spectrum for space

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29 EARC Res. 2A (1963).
30 EARC Res. 5A (1963).
31 EARC Res. 6A (1963).
communication to 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.35

One cannot emphasize too much the importance of the decisions of this Extraordinary Administrative Radio Conference which has laid down the first elements of international law specifically referring to outer space and thereby contributed to the development of a legal order in space. It is to be noted that these elements of law entered into force on 1 January 1965 and will be binding for all the members of ITU, that is, practically all the countries of the world. It is important to note in this connection that a proposal to consider the decision of the Conference as interim agreements were defeated in committee by an informal vote of 18 to 4, the minority view being taken by the U.S.S.R. and three Soviet bloc countries.

At the Extraordinary Administrative Radio Conference held in 1959, and at the next such Conference, held in 1963, the ITU reviewed its allocation of frequencies in light of drastically increased demands for adequate frequency allocation to permit space research, and eventually global space commercial uses. The limited allocations which were made at the conferences are not adequate to meet the current need, and with each passing day they become more inadequate. Consequently, the CCIR has directed its energies to solving some of the pending problems;36 and, as a participant in the work group Mr. Andrew Haley puts it, "no simple solution exists. Long and laboured hours of negotiation and discussion by scientists, lawyers and government officials are required to arrive at equitable and eventual solutions."

35 It is worth noting also how an attempt by the U.N. to establish the position of international organizations as operating agencies in the field of space telecommunications failed. The United Nations Secretariat sponsored a draft resolution which took note of G.A. Res. 1721, 16 U.N. GAOR Supp. 17, at 6, U.N. Doc. A/5026 (1961), which elaborated the interest for a worldwide communication satellite system on a world wide basis and its operative part read as follows: "All administrations participating in the establishment and/or operation of space communication facilities should take into account the requirement of the United Nations, and that United Nations enjoy the same privileges as regards access and wage as those accorded to governments." As it was felt that it went beyond the agenda adopted for the conference that saw its main task in distributing parts of frequency spectrum between different services and not between different operators it was later withdrawn on the understanding that a subsequent ITU Conference, or the ITU Plenipotentiary Conference, would be well qualified to adopt such a resolution. Draft Resolution U.N. and Space Communication; EARC, and the statement made by U.N. delegation at the ITU Conference, U.N. Doc. OR. 43/ITU (6).


It is to be noted that, apart from the Extraordinary Administrative Radio Conference, other ITU organs have, during 1963 and after, been considering problems relating to space telecommunications. Plan Committee of the Development of the International Telecommunication Network, met in Rome from 25 November to 11 December 1963. CCIR has made extensive reports relating the past conference activities to space telecommunications. In order to meet the responsibilities entrusted to it by the Final Acts of the EARC, Geneva 1963, the IFRB gave preliminary consideration to the administrative procedures for the treatment of frequency notices and for the recording of frequencies in the Master International Frequency Register. It also reviewed the technical standards recommended by the EARC on the basis of reports received from the CCIR, required for the treatment of frequency notices. All organs of the ITU are presently involved in such and other matters relating to space telecommunications. 3rd, 4th, 5th, and 6th Reports of the ITU on Telecommunication and the Peaceful Uses of Outer Space, Geneva, 1964, 1965, 1966 and 1967.

37 A. Haley, Legal Problems of a Satellite Communications System, lecture delivered on 9 Nov. 1964, at the Int'l Cong. of Aero. & Space L., Univ. of Maron, Argentina.
A latent, but important, factor that prompted and guided the two radio administrative conferences and the regulations resulting therefrom, were the events that preceded the newly formed International Satellite Communication Consortium.

In August 1962, the United States Congress passed the Communication Satellite Act and Communication Satellite Corporation (COMSAT), was formally organized as a private United States corporation in February 1963.

Though a two year period elapsed between passage of the Satellite Act and floatation of the corporation's first stock issue, activities were by no means confined to organizing the domestic financial structure of the new private enterprise. Some essential preconditions for operation had to be provided. Most important of which was the necessity of interference-free channels.

Securing interference-free channels is an international matter under the control of the ITU as we observed before. Therefore, it is a foreign affairs matter as far as the United States Government and COMSAT are concerned. With direct respect to foreign policy considerations a close relationship between the corporation and the United States Department of State is established by the Act. The relevant section reads:

Whenever the corporation shall enter into business negotiations with respect to facilities, operations or services authorized by this Act with any international or foreign entity, it shall notify the Department of State of the negotiations and the Department of State shall advise the corporation of relevant foreign policy considerations . . . and render such assistance as may be appropriate.

Accordingly, long before COMSAT was a functioning business, the United States Government began to concern itself with securing radio frequencies for space communications. As early as 1959, the administration sought and received tentative approval, from an international conference (1959 Radio Administrative Conference), under the auspices of the ITU, for its proposal to use specified channels for space communications. At that time it was decided, as we observed before, to consider the matter more carefully at a later meeting. For the next four years the United States Government leaders and experts drafted papers that were embodied in the official United States position presented at the Extraordinary Radio Administrative Conference, convened in Geneva in 1963.

The United States delegation was led by Joseph H. McConnell, President of the Reynolds Metal Co., and included representatives from the Congress, members of the Federal Communications Commission (FCC),

28 Toward the beginning of 1961, and in accordance with Resolution No. 1A of the Space Radio Communication Conference, Geneva, 1963, IPRH received the general description of a planned communication-satellite system, together with a certified copy of the corresponding agreements. The information together with copies of agreement, were forwarded by the United States Administration on behalf of the signatories to the ITU (4th Report by the ITU on Telecommunication and Peaceful Uses of Outer Space, 1965).
the Department of Commerce, NASA, the Navy, the Department of State, and the president of COMSAT, Joseph Charyk, and Leonard Marks, one of COMSAT's board of directors. At this Conference of government delegations, COMSAT's position, at least on the surface, was strictly advisory.

The United States' position was simple and single-minded. It sought and secured approval from the seventy-nation Conference to allocate immediately certain portions of the radio spectrum to space communications. It insisted, further, that the choice of channels be definitive, though many of the countries present argued that communications technology was still evolving and that a provisional allocation should be made in 1963 for consideration at a later planning conference. As the leader of the United States delegation put it:

You can understand this because many of the countries here were not as prepared as perhaps some of the rest of us were in the overall space communication field, and we had quite a little discussion about this problem.\footnote{88th Cong., 1st Sess., 110 Cong. Rec. pt. 10, at 173 (1964).}

The discussion included a resolution by Israel urging that "some form of space communication administration be entrusted with the responsibility for insuring the global interest . . . of all members. . . ."\footnote{Proceedings of the ITU Extraordinary Radio Conference, 1963.}

In the circumstances it is no surprise that the proposal to consider the decisions of the conference as interim agreements was defeated in committee by an informal vote of 18 to 4, the U.S.S.R. and three Soviet bloc countries taking the minority view.

Though, as often stated, the confused and wasteful allocation of frequencies for radio and television broadcasting in the United States emphasizes the wisdom of unhurried and considered development of new communications media, the American delegation was inflexible in its will to consolidate and extend its technological lead in space communications. At the same time it asserted that its proposals were in the best interests of the developing as well as the developed states.

Mr. Harlen Cleveland of the Department of State acknowledged that "without the agreement . . . Dr. Charyk, for example, and his Corporation would have been in great difficulty in moving ahead."\footnote{Subra note 40.} And Dr. Charyk's evaluation was that:

there is now a basis for, if you will, an investment based on some assurance the whole thing isn't going to be upset by another look at the matter in a few years without any positive decision having been taken here.\footnote{Id.}

The global communications program of COMSAT, in this view, could now proceed without endangering the private investment of COMSAT's stockholders, even if the directions should later prove unsatisfactory for technological or related reasons. (However, the Geneva Radio Conferences are regarded by all Americans concerned as a great success.) Dr. Charyk
phrased it this way, "who is there first has a priority, so to speak." Whether this is a principle upon which to rest durable international agreements is an open question.

Entirely separate from the question of the adequacy of frequency allocations for space research is the problem of enforcement of violations of international agreements directly concerned with radio usage. To date, violations of international agreements have been committed by several countries, especially in space radio activities; arguably, these actions are based upon national security interests and necessity. Since no more effective sanctions for violations are available than the irrate letters of protest exchanged between Foreign Offices, the current system of legal regulation of international radio and television practices is ineffective with regard to sanctioning violations.

If we direct our attention to the legal and regulatory implications of both the most recent Telecommunications Convention (1965) and the Radio Regulations annexed to it (that we have discussed so far) the ineffectiveness of the regulatory process of ITU becomes very apparent.

Article 3 of the Radio Regulations defines the general rules for the assignment and use of frequencies. In this regard Section 3 of this article is very emphatic; it states:

Administration of the members and associate members of the Union, 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 provision of the convention and these regulations.

What is meant by "harmful interference" is defined in Articles 1-93 thus:

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 radio communication service operating in accordance with these regulations.

These radio regulations are not, therefore, intended to prevent the sharing of duly allocated, assigned and registered frequencies by other stations which do not cause harmful interference. And even where alleged harmful interference has occurred, although in principle an obligation exists in respect of the station sharing a frequency assigned to another immediately to suspend operations upon receipt of advice of this harmful interference, the matter is to be settled primarily between the two administrations concerned. If the matter cannot be settled by direct agreement between the administrations concerned, it may be reported to the IFRB whose powers, however, consist merely in investigating the dispute.

44 Id.
45 Radio Regulations 1959, art. 3, § 3 Annexed to the ITU convention.
46 Id. at art. 1-93.
47 Supra note 45, at art. 11, §§ 4, 11.
48 Supra note 45, at art. 11, § 13(2).
and issuing "a report containing its findings and recommendations for the solution of the problem." The result, if the administrations concerned decline to accept the findings and recommendations of the Board, is now stated with unabashed candor in Article 9, Section 7, paragraph 46:

In a case where, as a result of a study, the Board submits to one or more administrations suggestions or recommendations for the solution of a problem, and where no answer has been received from one or more of these administrations within a period of thirty days, the Board shall consider that the suggestions or recommendations concerned are unacceptable to the administrations which did not answer. If it was the requesting administration which failed to answer within this period, the Board shall close the study.

If, after all these indecisive encounters, an administration still finds a need and the will to preserve with the vindication of its legal rights, arbitration is in principle possible. However, the arbitral procedure as outlined in Annex 3 of the convention is of the type which, as the advisory opinion of the International Court of Justice in the interpretation of Peace Treaties case (1950) has shown, may easily be stultified by the wilfulness of one of the parties to the dispute. Although the provision exists for the Secretary-General of ITU to select the third arbitrator in case of disagreement between the two national arbitrators as to the choice, no remedy is provided in case one of the parties wilfully refuses to appoint its own arbitrator.

Neither Article 28 of the convention nor Annex 3 rules out the possibility of submitting disputes directly to the International Court of Justice. The ITU itself could request an advisory opinion from the Court, with the proviso of informing the ECOSOC of the request. This writer knows of no occasion when the ITU has sought an advisory opinion from the Court; he is aware of only one specialized agency that has sought an advisory opinion, IMCO.

Although we have identified the relative articles of the convention and the Radio Regulations, it ought to be pointed out that juridical concepts have played a small part in the international control of radio. In disputes in which a country might conceivably claim a right as against another country, under the terms of the Regulations, there has been no resort to arbitrations or juridical process. By and large, settlements have been affected practically and technically. We should also note that in the conferences of the ITU, technicians rather than lawyers have been the dominant figures.

49 Supra note 45, at art. 9, §§ 7, 44-45.
51 At the ITU General Conference in Montreux, 1965, an Optional Additional Protocol to the ITU Convention was adopted embodying provisions for Compulsory Settlement of Disputes. It will be effective between Member States which ratify the Protocol. On 1 January 1967 it came into force with the ratification of Malawi and the Central African Republic. This Protocol will eliminate the problem to a great extent when at least a majority of the Member States ratify it and it is to be hoped that this will happen without undue delay. As of January 1968, only nine countries have ratified the Protocol, but neither of the two major space powers.
52 Agreement between the UN and the ITU, art. 7(4) (1947).
Furthermore, it is most important to recall that, in successive international telecommunication conventions, the following reservation is always maintained:

Members retain their entire freedom with regard to military radio installations of their army, naval and air forces.\textsuperscript{54}

In addition to lack of sanctions there are other reasons that compel us to conclude that the present system is either outdated or in need of reorganization.

The incorporation of radio-communication services into the Geneva revisions of the Radio Regulations placed the space telecommunication services automatically within the existing scheme of spectrum management applied by the ITU. Stated another way, by the incorporation of these services, the existing scheme of spectrum management was extended by operation of law into the dimension of outer space. It appears that while there have been several complete revisions of the law-making treaties of the ITU in the past three decades, the permanent organic structures of the Union have remained unchanged through these years.

As a result of a pattern which has endured for numerous years, only a share in the task of spectrum management—whether involving radio-communication services of world-wide application or otherwise—has been assigned to the ITU by its constituent members. Briefly, radio-communication services and frequency allocations for them are negotiated within the framework of ITU Administrative Radio Conferences which succeeded each other in intervals measured in years. The services and frequency allocation plans so negotiated are then inserted in the ITU Radio Regulations which in turn are forwarded to each member of the Union for approval or ratification, a practice consuming additional years. Actual assignment to radio-communication stations of specific frequencies within approved ITU allocation remains the exclusive prerogative of each signatory. At the times revised Radio Regulations are negotiated, each signatory is free to append to them an array of conditions or reservations which it unilaterally declares and imposes. Even the simplest type of ministerial change sought to be made to the Radio Regulations, a complex of detail now numbering 451 pages in the official ITU publication, can be accomplished only through the cumbersome treaty-making process of convening a full-blown administrative radio conference and waiting through the years to collect signatures on documents.

Hence, it is clear that the cardinal problems looming for the foreseeable future, which involve the rational use of the radio frequency spectrum, can no longer be solved by the expedient means available in the years past of simply inserting designations for new space radio communication services with frequency allocations for them into the ITU Radio Regulations.\textsuperscript{55}

\textsuperscript{54} Supra note 4, at art. 51 (1).

In pointing out the lack of effective sanction behind international frequency allocations, the intention is not to belittle their importance, but merely to show that parties to the international telecommunication agreements have intended to create not an international licensing authority for the mandatory distribution of the frequency spectrum, but an international co-ordinating center to facilitate the avoidance of mutual interference. The problem of frequency control in space research consists, therefore, not so much in preventing space and earth-space radio communications from interfering with each other's transmissions, but rather in clearing certain portions of the radio spectrum so as to protect these communications from interference that might lead not merely to the failure of these experiments, but also serious danger to property, life and international peace owing to some malfunctioning in the control of the space vehicle.

Therefore, mere allocation of frequency by the ITU will not be enough in this era of space activities. Everything that has to do with the military or peaceful uses of outer space depends too much on radio communications. As such it would appear that, in addition to frequency allocations, one of the most urgent problems in this field at the moment is an improvement in radio technology and in the legal and administrative machinery. This would allow a far stricter control over the use of the radio spectrum than has so far been achieved nationally or internationally. Thus Colonel James D. Flashman, Directorate of Communications, United States Air Force wrote:

Under concepts by which the frequency spectrum is now used, it is just not possible to guarantee that any portion of the spectrum will be interference free, regardless of national or international intentions or agreements. Controls which would make this guarantee possible simply do not exist . . . Without positive control, virtually all our activities in space communications and electronics will be conducted in an atmosphere of calculated risk, subject to the whim of the negligent, inexperienced or inept co-user of the spectrum, within whose power it is to wreck completely our operations upon which the prestige of an active nation may rest . . .

It is therefore clear that as far as the ITU's regulatory functions in the field of space communications are concerned, they have been confined to allocation of frequencies, to procedures and standards for their use and to the offering of scientific and engineering advice for those purposes from the CCIR and its other organs.

While the ITU is not overly concerned with the policing of frequencies, a growing number of people have expressed the critical need for just such a function. This is because a satellite equipped with a radio transmitter operating on solar batteries could transmit in orbit for many decades. This continuous transmission could seriously interfere with communications that operate on frequencies on or near the transmission of the satellite.

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56 Positive Control of Electromagnetic Spectrum, USAF Signal Magazine; May 1959, at 258 (as quoted by Bin Cheng, Current Legal Problems 14 (1961)).
This has already led to the setting aside of specific frequencies for outer space purposes, but has been offset by the constant advance both in quality and quantity of the growing needs for such frequencies and of the increasing importance that such space communications may soon come to play.

All of these factors necessitate a re-examination of the type of regulatory functions that ITU might desirably perform. In the United Nations Ad Hoc Committee, it was stated that the ITU is not adaptable to performing a function for monitoring, policing or regulating outer space communications because the ITU did not possess adequate facilities for engaging in such operations. Moreover, the ITU depends on the cooperation and willingness of its members to conclude formal agreements or recommendations for the development and maintenance of the orderly expansion and operation of international communications. Notwithstanding, the problems of regulation with all of its ramifications vis-a-vis outer space seems likely to become an increasingly significant and thorny problem. A decision will have to be made soon as to whether an existing or possibly a new international agency or combination of agencies would be best adapted to effectively handle such problems.