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*Michael S. Straubel**

I. Introduction

Shortly after the launch of the Syncom II telecommunications satellite in 1963,[1] the practicality and utility of the geostationary orbit[2] (orbit) became apparent. Telecommunication satellites placed in the orbit proved to be more reliable, more versatile, and less expensive to operate than existing terrestrial communication systems. As a result, a new age of world communication was born. Telecommunication satellites now allow instantaneous worldwide communication, the results of which are continually being felt.[3] Coverage of the Persian Gulf War is perhaps the most vivid recent example of the use of telecommunication satellites.

Also born with this new age of communications was a race to exploit the orbit's business potential. There are currently twenty-nine United States licensed telecommunication satellites dedicated to domestic services and one dedicated to international service[4] in the geostationary orbit. By the year 2000, the Center for Space Policy expects between forty-seven and fifty-four U.S. domestic telecommunication satellites to be in orbit.[5] Domestic revenues for both telecommunication satellite services and satellite sales in the year

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1 Syncom II was the first satellite placed in the geostationary orbit. CENTRE FOR RESEARCH OF AIR AND SPACE LAW, SPACE ACTIVITIES AND EMERGING INTERNATIONAL LAW 25 (Nicolas M. Matte ed. 1984).

2 A satellite in the geostationary orbit orbits above the equator at an altitude of 22,300 miles (35,800 kilometers). At this altitude the satellite orbits the earth once every 24 hours (equal to the speed of the earth's rotation) and appears to be stationary from any given point on the earth. DANIEL L. BRENNER & MONROE E. PRICE, CABLE TELEVISION AND OTHER NONBROADCAST VIDEO § 14.02[1] (1986).

3 Only through the use of telecommunication satellites could the world experience the events of early June, 1989, in Tiananmen Square as they happened.

4 Telephone Interview with an official from the Common Carrier Bureau of the Federal Communications Commission (July 5, 1989).

5 CENTER FOR SPACE POLICY, INC., COMMERCIAL SPACE INDUSTRY IN THE YEAR 2000: A MARKET FORECAST 46 (1985).

2000 are expected to be between $8.8 and $15.3 billion annually.[6] However, the geostationary orbit can only accommodate a finite number of telecommunication satellites. And, notwithstanding some temporary technical reprieves, the orbit has begun to reach its saturation point. Therefore, the time has come to ask whether the Federal Communication Commission's (F.C.C.) current regulatory system will be adequate to mediate future competing demands for orbital positions. This Article will explore the existing international and domestic regimes, assess future demands on those regimes, and suggest possible changes in the licensing regime to meet those demands.

II. Technical Background

The geostationary orbit and radio spectrum (orbital-spectrum), both used by telecommunication satellites, are limited natural resources. Telecommunication satellites are essentially radio stations in earth orbit. As radio stations, if satellites utilize the same radio frequency too close to each other, harmful interference between their transmissions will occur. Therefore, the F.C.C., on the domestic level, and the International Telecommunications Union (ITU), on the international level, have created rules for the use of the orbital-spectrum. However, the increasing demands placed upon the orbital-spectrum are forcing the ITU and F.C.C. to re-evaluate their respective rules. It is the purpose of this Article to examine where these re-evaluations will lead. However, before embarking on this mission, an examination of some of the technical matters involved in the regulation of telecommunication satellites is necessary to understand the issues faced by the ITU and F.C.C.

Radio signals, which include television signals, travel as electromagnetic radiation (radio waves) and are measured in hertz or cycles. The length of radio wave cycles (frequency) can vary from very low to extremely high frequencies on the radio spectrum.[7] To facilitate the regulation of radio spectrum use, the radio spectrum has been divided into frequency bands by the ITU.[8] So far three frequency bands have been identified for telecommunication satellite use. Those bands are the C-Band (6/4 GHz), the Ku-Band (14/12 GHz), and the Ka-Band (30/20 GHz).[9] The C-Band is currently the most used band. The Ku-Band and Ka-Band are not yet heavily used because the technology needed is more expensive than the technology

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[6] *Id.* at 47.

[7] CENTRE FOR RESEARCH OF AIR AND SPACE LAW, SPACE ACTIVITIES AND EMERGING INTERNATIONAL LAW, *supra* note 1, at 21.

[8] COMMERCIAL SPACE INDUSTRY IN THE YEAR 2000: A MARKET FORECAST, *supra* note 5, at 15.

[9] *Id.* at 27.

necessary to use the C-Band.[10]

The telecommunication satellites that use these different frequency bands can be separated into three categories based on their uses: fixed satellite services (FSS), broadcast satellite services (BSS), and mobile satellite services (MSS).[11] Fixed satellite services link one point (a ground station) to another point (known as point-to-point) or from one point to several points simultaneously (known as point-to-multipoint). Point-to-point service is primarily used for telephony and point-to-multipoint is used by the major television networks to distribute their programming nationwide.[12] Broadcast satellite service uses high powered satellites to transmit signals directly to homes equipped with small antenna (2-4 feet in diameter).[13] Mobile satellite service links any two points, whether fixed or mobile. A possible mobile satellite service use would be communication between a trucking service and trucks on the road.[14] The first telecommunication satellites were located in low earth orbit. However, such satellites proved to be difficult and expensive to use because both the up-link and down-link earth stations had to follow the satellite across the sky. Additionally, several satellites had to be orbited to provide continuous coverage as each satellite was only in a useful position for a limited period of time. In 1963, the first geostationary satellite, SYNCOM II, was launched.[15] First popularized by Arthur C. Clark in his paper "Extraterrestrial Relays,"[16] satellites placed in the geostationary orbit circle the earth at the same speed that the earth rotates. Therefore, each satellite appears to remain fixed above any given point on the earth's surface. Satellites in the geostationary orbit (35,800 kilometers or 22,300 miles) can provide twenty-four hour service, and depending on the orbital arc used, cover all fifty states or link the United States to Europe or Asia in an economical manner.[17]

While outerspace is relatively limitless, the physical characteristics of radio waves limits the number of telecommunication satellites that can be accommodated in the geostationary orbit. Current technology and F.C.C. regulations require a minimum separation of two degrees 2° for the C and Ku Bands to prevent harmful interfer-

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[10] *Id.*

[11] The F.C.C. recognizes a fourth category of satellite. Radiodetermination satellites use the propagation properties of radio waves to determine the position, velocity, and characteristics of an object. However, no commercial radiodetermination satellites are in service or likely in the near future. 47 C.F.R. § 2.1 (1990).

[12] COMMERCIAL SPACE INDUSTRY IN THE YEAR 2000: A MARKET FORECAST, *supra* note 5, at 27.

[13] *Id.* at 23.

[14] *Id.* at 24.

[15] CENTRE FOR RESEARCH OF AIR AND SPACE LAW, SPACE ACTIVITIES AND EMERGING INTERNATIONAL LAW, *supra* note 1, at 25.

[16] *Id.* at 23.

[17] BRENNER & PRICE, *supra* note 2, § 14.02[1].

ence.[18] Considering the need for satellite separation, even if technological improvements permit closer spacing, the geostationary orbit will remain a limited resource. Therefore, international and national regulation of the orbital-spectrum is necessary to realize its maximum use.

III. International Regulation of Telecommunication Satellites

Because the radio spectrum is a limited physical resource that does not respect national boundaries, international regulation or at least international coordination between spectrum users is necessary. International regulation of the radio spectrum and accompanying geostationary orbital positions[19] is accomplished by the ITU's conventions and regulations.[20] The ITU is a specialized agency of the United Nations which (under different names) has regulated and coordinated international radio, telegraph, and telephone communications since 1865.[21] The rules created by the ITU to govern orbital-spectrum use are found in the International Telecommunication Convention and the Radio Regulations. Both the Convention and the Radio Regulations are frequently amended.[22] The latest version

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[18] *Id.* § 14.02[2][a].

[19] The ITU also coordinates and regulates telecommunication satellites which are not in the geostationary orbit. Such satellites are generally regulated and coordinated in the same manner as satellites which are in the geostationary orbit, except that the concern over exclusion from the orbit is not present.

[20] Two additional intergovernmental agreements regulate the use of telecommunication satellites. Their impact is, however, much less than that of the ITU. The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies provides that outer space including the moon and other celestial bodies, shall be used freely by all states. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, U.S.-U.K.-U.S.S.R., art.1, 18 U.S.T. 2410, 2412, 610 U.N.T.S. 205, 207 [hereinafter Outer Space Treaty]. The treaty also provides that outer space, including the moon and other celestial bodies, cannot be subject to national claims of sovereignty or appropriation. *Id.* art. II, 18 U.S.T. at 2413, 610 U.N.T.S. at 208. The Convention on Registration of Objects Launched into Outer Space requires the registration of space objects in national and United Nation Registries. Convention on Registration of Objects Launched into Outer Space, *opened for signature* Jan. 14, 1975, art. II, 28 U.S.T. 695, 698, 1023 U.N.T.S. 15, 17 [hereinafter Registration of Objects Launched into Space]. The registration include information on the space objects' orbit and general function. *Id.* art IV, 28 U.S.T. at 699, 1023 U.N.T.S. at 17.

[21] International Telecommunication Convention, Oct. 2, 1947, art. 23, 63 Stat. 1399, 1439, 193 U.N.T.S. 188, 225. *See generally* GEORGE A. CODDING, JR. & ANTHONY M. RUTKOWSKI, THE INTERNATIONAL TELECOMMUNICATION UNION IN A CHANGING WORLD (1982).

[22] The Plenipotentiary Conference of the ITU has, among its other powers, the ability to revise the convention (article 6 of Convention done in Nairobi, Nov. 6, 1982). The first such Convention was adopted by the Atlantic City Plenipotentiary Conference in 1947 International Telecommunication Convention, *supra* note 21. The most recent version of the Convention was adopted in Nairobi on Nov. 6, 1982, and was ratified by the United States on Jan. 10, 1986. The Radio Regulations are promulgated and amended by World Administrative Radio Conferences (WARCs) and Regional Administrative Radio Conferences (RARCs). International Telecommunications Convention, Oct. 25, 1973, art. 7, 28 U.S.T. 2495, 2515, 1209 U.N.T.S. 32, 259. WARCs and RARCs are convened under the

of the International Telecommunication Convention was drafted in Nairobi, Kenya, in 1982, and was adopted by the United States in early 1986.

Presently, under the "first-come, first-served" regulatory system created by the Convention and Radio Regulations, the ITU first "allocates" portions of the radio spectrum to particular types of uses. Allocation, the first of the two steps in the licensing scheme, is the distribution of radio frequencies among service categories and occasionally individual countries.[23] The service categories cover all known uses of the radio spectrum and include categories such as radar, broadcasting, and broadcast satellite services.[24] Allocation is done at World Administrative Radio Conferences (WARCs) and given effect by the International Frequency Registration Board (IFRB)[25] through the second step in the "first-come, first-serve" system: "registration."

Registration is the process by which a country obtains use of a portion of the radio-spectrum (and orbit in the case of geostationary orbit use) for individual users (e.g., T.V. stations, radio stations, and telecommunication satellites). Before a country proceeds with the registration process, that country will "assign" individual users a spectrum position. Once an assignment has been made by a country, that country will initiate the registration process with the ITU. The domestic process of assignment in the United States will be covered at length in section IV of this Article.

The registration process for telecommunication satellites involves the substeps of advanced notification, notification for final registration, review of the table of allocations, and possibly coordination. Advanced notification to the IFRB of a proposed satellite's specifications (including frequency and orbital location) five years before the scheduled operation of the satellite, while not mandatory, is designed to allow nations an opportunity to resolve conflicts before large amounts of capital are expended in the construction of a satellite.[26] Following advance notification, notification for final registration purposes must be given to the IFRB.[27] Upon

procedure spelled out in article 62 of the Convention. *Id.* art. 62, 28 U.S.T. at 2556, 1209 U.N.T.S. at 284.

[23] International Telecommunications Convention, *supra* note 21, art. 4, 28 U.S.T. at 2514, 1209 U.N.T.S. at 257-58.

[24] Glen O. Robinson, *Regulating International Airwaves: The 1979 WARC*, 21 VA. J. INT'L L. 1, 9 (1980).

[25] The IFRB is made up of five independent members elected at Plenipotentiary Conferences. International Telecommunications Convention, *supra* note 21, art. 10, 28 U.S.T. at 2518, 1209 U.N.T.S. at 261. The IFRB's primary responsibilities are the registration of frequency assignments and the furnishing of advice to ITU members. *Id.*

[26] Final Acts of the Extraordinary Administrative Radio Conference to Allocate Frequency Bands for Space Radiocommunications Purposes, Nov. 8, 1963, art. 9A, 15 U.S.T. 887.

[27] ITU Radio Regulations, arts. N12/9, N13/9A.

notification, the IFRB reviews the assignment to ensure compliance with the table of allocations and regulations and to ensure that the assignment will not cause harmful interference with an already registered assignment. If the IFRB finds that the assignment conforms with the regulations and causes no harmful interference, the assignment is registered in the Master Register of Frequencies.

If harmful interference is found, the assigning country is asked to modify the assignment as necessary to eliminate the interference. Sometimes called coordination, under the "first-come, first-serve" system, the user of the previously registered assignment is not under an obligation to modify its use of the orbital-spectrum. However, if the new assignment user can use the orbital-spectrum for four months without complaints of interference, then the assignment may be registered. If the new assignment cannot be coordinated, modified, or used for four months without complaint, the assignment may still be registered. However, the registration is given the special status of being registered "on a non-interference basis."[28] Although the ITU cannot refuse to register an assignment, very few assignments are registered on a non-interference basis. The loss of the benefits derived from adhering to the ITU system dissuades countries from violating and thereby undermining the ITU system. In this vein, it must be recognized that the benefits of using the ITU system are the international recognition and corresponding rights given registered assignments. Where international recognition is not necessary (systems for domestic use only - no cross border interference or use), the ITU system is often not used.

Despite its efficiency, not all ITU members like the current "first-come, first-served" system. Many less developed countries (LDCs) fear exclusion from the orbital-spectrum. Developed countries, the LDCs fear, will by overuse foreclose future use of the orbital-spectrum. Though the ITU, through its members, has adopted a resolution stating that frequency assignments do not create permanent priority rights in a frequency assignment,[29] existing telecommunication satellites have priority over later coming satellites that might

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28 ITU Radio Regulations, arts. N12/9 Nos. 4310A-4310/C & N13/9A No. 4616.

29 *Final Acts of the World Administrative Radio Conference For Space Communications*, Res. No. Spa 2-1 ITU(Geneva 1971). Resolution Spa 2-1 in part reads:

> 1. that the registration with the I.T.U. of frequency assignments for space radiocommunication services and their use should not provide any permanent priority for any individual country or groups of countries and should not create an obstacle to the establishment of space systems by other countries;
>
> 2. that, accordingly, a country or group of countries having registered with the I.T.U. frequencies for their space radiocommunication services should take all practicable measures to realize the possibility of the use of new space systems by other countries or groups of countries so desiring;
>
> 3. that the provisions contained in paragraphs 1 and 2 of this Resolution should be taken into account by the administration and the permanent organs of the Union.

interfere with the existing satellite. Therefore, because of this priority system and the extensive use of the geostationary orbit by developed countries, the LDCs have pushed for an assignment system which guarantees their access to the geostationary orbit. Many LDCs have endeavored to replace the "first-come, first-served" system with an *a priori* system for obtaining orbital-spectrum slots.[30]

The effort to create an *a priori* system for orbital-spectrum use was carried out in the Radio Regulation amendment process. Radio Regulations, which supplement the convention, are adopted and amended at World Administrative Radio Conferences (WARCs) and Regional Administrative Radio Conferences (RARCs).[31] At the 1979 WARC in Geneva, the LDCs successfully presented Resolution BP(3) calling for an *a priori* planning of the orbital-spectrum and the convening of two subsequent WARCs to decide which space services and frequency bands should be planned.[32] The first of these two WARCs was held in 1985.

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30 An *a priori* system of frequency and orbital position regulation uses administrative conferences to subdivide and allot radio frequencies and orbital positions to countries in advance of need or use. On the other hand, an *a posteriori* system requires subsequent satellites operators to coordinate with pre-existing satellites to avoid harmful interference. *See* M. Rothblatt, *ITU Regulation of Satellite Communication*, 18 STAN. J. INT'L L. 1, 10-11 (1982).

31 Multinational Telecommunication Convention with Annexes and Final Protocol, Oct. 25, 1973, art. 7, 28 U.S.T. 2495(1976-77).

32 Final Acts of the World Administrative Radio Conference, Res. BP No. 3, ITU (Geneva, 1979). Resolution BP reads:

> Considering:
>
> a) that the geostationary-satellite orbit and the radio frequency spectrum are limited natural resources and are utilized by space services;
>
> b) that there is a need for equitable access to, and efficient and economical use of these resources by all countries as provided for in Article 33 of the International Telecommunication Convention (Malaga-Torremolinos, 1973) and Resolution 2;
>
> c) that the utilization of radio frequencies and the geostationary-satellite orbit by individual countries and groups of countries can take place at various points in time, based on their requirements and the availability of the resources at their disposal;
>
> d) that there are growing requirements all over the world for orbital position and frequency assignments for the space services;
>
> e) that in the use of the geostationary-satellite orbit for space services, attention should be given to the relevant technical aspects concerning the special geographical situation of particular countries;
>
> resolves
>
> 1. that a world administrative radio conference shall be convened not later than 1984 to guarantee in practice for all countries equitable access to the geostationary-satellite orbit and the frequency bands allocated to space services;
>
> 2. that this conference shall be held in two sessions;
>
> 3. that the first session shall:
>
> 3.1 decide which space service and frequency bands should be planned;
>
> 3.2 establish the principles, technical parameters and criteria for the planning, including those for orbit and frequency assignments of the services and frequency bands identified as per 3.1, taking into account the relevant technical aspects concerning the special geographi-

The first of the two WARCs,[33] WARC-ORB-85, held in Geneva, decided on a two-step approach (dual-plan) for ensuring equitable access for all countries to the orbital-spectrum. First, an allotment plan, guaranteeing at least one orbital position to each ITU member for domestic satellite service, was approved for parts of the expansion bands (lightly used portions of the C and Ku Bands).[34] Second, "an improved procedure," probably consisting of periodic multiplanning meetings, were to be developed for the distribution of orbital positions outside the allotted expansion bands.[35] However, WARC-ORB-85 left the particulars of both steps to be worked out at a second WARC, WARC-ORB-88. Despite the potential for rancorous debate and political divisions, WARC-ORB-88 completed the charge of Resolution BP(3) and completed the details of the dual-plan developed by WARC-ORB-85 with relatively little dissention. However, the allotment plan, for technical reasons more than political reasons, proved to be the source of some problems.

The allotment plan gives each ITU member sufficient positions in the orbital-spectrum to provide complete national coverage.[36] Two hundred and forty allotments were assigned to the ITU's 165 members. The geographically larger countries, like the United States, received as many as three allotments.[37] Each allotment is currently in the form of a predetermined arc, which consists of a nominal position and ten degrees to either side of the position.[38] As each country moves to use its allotment, it is able to position its satel-

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cal situation of particular countries; and provide guidelines for associated regulatory procedures;

3.3 establish guidelines for regulatory procedures in respect of services and frequency bands not covered by paragraph 3.2;

3.4 consider other possible approaches that could meet the objective of *resolve* 1;

4. that the second session shall be held not sooner than twelve months and not later than eighteen months after the first session and implement the decisions taken at the first session.

[33] The first Space WARC is formally known as the First Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of the Space Services Utilizing It.

[34] The allotment plan will apply to 300 Megahertz (MH$_z$) in the C band (both up-link and down-link) and 500 MH$_z$ in the Ku band (both up-link, and down-link). Milton L. Smith, *Space WARC 1985 — Round One Ends*, 2 AIR & SPACE LAW. 1 (Summer/Fall 1985).

[35] The "improved procedures" will be modifications of the Radio Regulations that govern the normal process for obtaining use of the orbital-spectrum. *See* World Administrative Radio Conference on the Use of the Geostationary Orbit and the Planning of the Space Services Utilizing It, Addendum to Report to the Second Session of the Conference.

[36] *See* app. 30B of the Final Acts of WARC-ORB-88; *Top of the Week: U.S. Pleased with WARC Results*, BROADCASTING, Oct. 10, 1988, at 41-42.

[37] The United States received two allotments: the first at 159 degrees west to cover Alaska, Hawaii, and Guam and the second at 101 degrees west to cover the continental United States and Puerto Rico. *Id.* at 42.

[38] UNITED STATES DEPARTMENT OF STATE, ITU WORLD ADMINISTRATIVE RADIO CONFERENCE FOR THE SPACE SERVICES: REPORT OF THE UNITED STATES DELEGATION 21 (1988) (hereinafter SPACE SERVICES CONFERENCE).

lite anywhere within its predetermined arc as the demands of coordination with existing satellites dictate.

The allotment plan applies to only the so-called expansion bands. Targeted for the allotment plan at WARC-ORB-85, only the frequency bands chosen at the 1979 WARC for additional fixed satellite service use come within the plan's preview.[39] By so limiting the allotment plan to the expansion bands, the developed countries effectively continued the first-come, first-served regime for the conventional bands.[40]

The most controversial aspect of the allotment plan was the accommodation of satellite systems that were currently being used or were planned for future use in the expansion bands.[41] The developed countries, particularly the United States, wanted their existing systems to be considered on the same basis as national allotments. The compromise developed at WARC-ORB-88, which involved a good deal of technical work to find a position for all allotments and existing systems,[42] requires existing systems to bear the burden of adjusting to accommodate national systems and requires existing systems to discontinue their use in twenty years.[43]

The second plan envisioned in the dual-plan developed at WARC-ORB-85 proved to be less troublesome than the allotment plan. The call for an "improved procedure" (the second plan) for the distribution of positions within the conventional bands (other than the expansion bands) had started in 1985 with the concept of multilateral planning meetings (MPMs).[44] As originally proposed by

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39 *Id.* at 1. The expansion bands are:

(1) 4500 to 4800 MHz (down link) and 6725 to 7025 MHz (up link) (6/4 ghz or C-band)

and

(2) 10.70 to 10.95 GHz (down link) and 11.20 to 11.45 GHz (down link) and 12.75 to 13.25 GHz (up link) (14/11-12 GHz or Ku-band)

Within the band each orbital position will have a bandwidth of 800 mhz. *Id.* at 21.

40 A major objective of the United States negotiating team at WARC-ORB-88 was to limit the allotment plan to the expansion bands. The United States felt that if the allotment plan was applied to the conventional bands, the already heavy U.S. investment in domestic satellites and the growth of domestic satellite communications would be threatened. *Id.* at 17.

41 The United States has two existing systems, each comprised of two satellites, in the expansion bands. American - ISI has a satellite at 56 degrees west and one at 58 degrees west. Pan American Satellite has a satellite at 57 degrees west and one at 45 degrees west. *Id.* at 42.

42 The computer software (programs) to pick each country's pre-determined arc, developed before the WARC-ORB-88 session, proved to be inadequate. Many long hours were put in by programming experts from both the ITU and member delegations in fashioning a program that would produce a list of pre-determined arcs. *Id.* at 24.

43 While the results of WARC-ORB-88 nominally limit the life of an existing system to twenty years, a compromise in the language of the final act may allow for a longer life. The compromise allows two countries to displace a national allotment "if agreed to" by the countries affected. *Id.* at 42. Systems are included in the plan if information on the system was transmitted to the IFRB before October 5, 1988. *Id.* at 29.

44 Multilateral planning meetings, as the name suggests, are meetings where more

the United States, MPMs were to take the place of the allotment plan.[45] However, the MPM concept soon began to take on the characteristics of a WARC, with decisions to be taken by a vote of all ITU members. Some ITU members saw the MPM concept as a way to extend the allotment concept or *a priori* planning to the conventional bands. This turn in events was more than the United States had envisioned and would have threatened the existing "first-come, first-served" system then in place. This bureaucratic system for obtaining positions in the orbit promised to cost United States operators more money.[46]

While MPMs were retained by WARC-ORB-88, MPMs are now an informal and voluntary method of coordination and not the binding and formal process intended by countries such as Kenya. The United States' efforts resulted in MPMs being used only when a country has experienced major coordination difficulties. While any country may call an MPM, countries are not obligated to participate. Further, the results of an MPM are considered to be agreements between participants only and neither bind nor prejudice the rights of non participants.[47]

Thus, after WARC-ORB-88, a two-track scheme exists at the international level for licensing telecommunication satellites in the geostationary orbit. The "first come, first served" system is still the general rule for obtaining a position in the orbital-spectrum. However, now portions of the orbital-spectrum are covered by the allotment plan exception to the general rule. While this two-track system will lead to a more equitable use of the orbital-spectrum, it signals the coming of the end of the relatively unlimited access to the orbital-spectrum enjoyed by the developed countries and particularly the United States. The two-track system is flexible and will allow the United States to license most of its proposed satellites in the near future. However, the combination of the ITU's two-track system and the continuing growth of satellites in the orbital-spectrum will force the United States to reexamine its current domestic licensing scheme.

IV. United States Regulation of Telecommunication Satellites

The international regulatory regime just described is the environment to which the United States must conform when it decides to license a telecommunications satellite. However, because of the "first-come, first-served" system of the ITU, not until the recent de-

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than two administrations work out coordination problems between existing and proposed uses or plan the use of a particular portion of the orbital-spectrum.

45 SPACE SERVICES CONFERENCE, *supra* note 38, at 42.

46 *Id.*

47 *Id.* at 4, 40-42.

velopments in ITU procedures has the United States been forced to take international pressures on the use of the geostationary orbit into consideration. Therefore, most of the development of the United States' regulatory regime has taken place without concerns about international constraints. The following history of the regimes for telecommunication satellites providing domestic services (domsats) and telecommunication satellites providing international services shows the evolution of the regime from a regime looking solely toward domestic concerns to a regime starting to feel the pressures of international concerns.

A. Satellites Providing Domestic Satellite Services

Shortly after the utility of the geostationary orbit had been demonstrated,[48] attention within the United States began to focus on the private, commercial use of telecommunication satellites. In 1965, the American Broadcasting System's (ABC) request for permission to orbit a domsat prompted the F.C.C. to initiate a comprehensive study of the regulatory issues raised by the use of domsats.[49] Up to this time only governmentally owned and operated satellites were in orbit. The F.C.C.'s study resulted in a policy designed to accommodate all qualified operators that has come to be known as the "open skies" policy.

By 1970 the F.C.C. had completed the initial phase of its policy review. In *Establishment of Domestic Communication-Satellite Facilities by Non-Governmental Entities* (Domsat I),[50] the F.C.C. announced that the national interest would be best served by licensing non-governmentally owned and operated telecommunication satellites. In reaching this conclusion, the F.C.C. looked at two fundamental questions: first, did the F.C.C. have the legal authority to regulate the construction and use of domsat systems, and second, if the F.C.C. had such authority, how would the public interest be best served.[51]

In analyzing the first question, the F.C.C. noted three provisions of the Federal Communications Act of 1934.[52] First, all nongovernment owned radio stations must be licensed by the F.C.C.[53] Second, a radio station is defined as a station equipped to engage in radio

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[48] In July, 1963, NASA's Syncom satellite became the first satellite to achieve and remain in geostationary orbit. Later, in 1965, Intelsat launched Intelsat I ("Early Bird") into geostationary orbit. BRENNER & PRICE, *supra* note 2, § 14.02[1].

[49] ABC requested F.C.C. approval to establish a satellite system to transmit programming from earth stations to affiliate stations nationwide. ROBERT R. BRUCE ET AL., FROM TELECOMMUNICATIONS TO ELECTRONIC SERVICE: A GLOBAL SPECTRUM OF DEFINITIONS, BOUNDARY LINES, AND STRUCTURES 262 (1986).

[50] 22 F.C.C.2d 86 (1970) (hereinafter DOMSAT I).

[51] *Id.*

[52] Communications Act of 1934, ch. 652, 48 Stat. 1064 (1934)(codified as amended at 47 U.S.C. §§ 151-617 (1988)).

[53] 47 U.S.C. §§ 301, 303, 305, 307, 308, 309 (1988).

communications.[54] And, third, radio communication is defined as the "transmission by radio of writing, signs, signals, pictures, and sounds of all kinds, including . . . [among other things, the receipt, forwarding, and delivery of communications] incidental to such transmissions."[55] Together, these three provisions led the F.C.C. to the conclusion that because a telecommunication satellite is a radio station engaged in receiving and forwarding radio communications, domsats (the space segment and earth-stations) may be regulated by the F.C.C.[56]

The second question, just how such authority should be used, has proven to be more difficult to answer. In *Domsat I*, the F.C.C., after finding that domsats would positively contribute to the nation's communication system,[57] announced that it was unable at that time to choose between the various proposed satellite systems and regulatory schemes.[58] Therefore, the Commission would take applications from all qualified entities and examine the details of each proposed system or regulatory regime before authorizing a particular system or regime.[59] Each proposal would be measured against what was in the public interest as defined in section I of the 1936 Communications Act.[60]

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[54] *Id.* § 153(k).

[55] *Id.* § 153(b).

[56] DOMSAT I, Appendix C — Memorandum on Legal Issues, 22 F.C.C.2d 86, 129.

[57] The Commission concluded that satellite technology held the potential of providing improved and economical point-to-point communication, point-to-multipoint communication, and record communication services. Further, satellite technology held the promise of advantages at that time unforeseeable. DOMSAT I, 22 F.C.C.2d at 88.

[58] *Id.* at 93.

[59] The systems and regimes proposed to the F.C.C. were:

(1) *Specialized systems*

The Ford Foundation and ABC proposed a special purpose point-to-point multipoint system devoted to the distribution of television programs.

(2) *Multipurpose systems*

Comsat and domestic common carriers proposed a multipurpose system capable of accommodating all types of satellite services on a common carrier basis.

(3) *Part specialized, part multipurpose system*

General Electric proposed a system that would divide satellite services into specialized services for large users and multipurpose services for the remaining users.

(4) *Common carrier regime*

In 1968, the Johnson Administration proposed that a multipurpose system be developed with the space segment (satellites) being owned by Comsat. Then, after three years of operation, the plan would be evaluated.

(5) *Unrestricted access ("open skies") regime*

In 1970, the Nixon Administration proposed an open entry system which would essentially allow any financially qualified public or private entity to operate a domsat for its own needs. No ranking of potential users would be allowed to restrict operators. Common carriers and private users would have the same right of access. The F.C.C. would have the right to modify or rescind the operating rights of established spectrum users in order to accommodate new users. DOMSAT I, 22 F.C.C.2d at 90-92.

[60] Section 1 of the Communications Act in part reads:

For the purpose of regulating interstate and foreign commerce, in communi-

Two years after *Domsat I*, the F.C.C., *in Domsat II*,[61] decided that the best way to test and develop satellite technology was through a multiple entry policy; later dubbed the "open skies" policy.[62] The Commission rejected selecting a single system or conducting comparative hearings[63] reasoning that both methods would not realize the Commission's objectives, namely:

> (a) to maximize the opportunities for the early acquisition of technical, operational, and marketing data and experience in the use of this technology as a new communications resource for all types of services;
>
> (b) to afford a reasonable opportunity for multiple entities to demonstrate how any operational and economic characteristics peculiar to the satellite technology can be used to provide existing and new specialized services more economically and efficiently than can be done by terrestrial facilities;
>
> (c) to facilitate the efficient development of this new resource by removing or neutralizing existing institutional restraints or inhibitions; and
>
> (d) to retain leeway and flexibility in our policy making with respect to the use of satellite technology for domestic communications so as to make such adjustments therein future experience and circumstances may dictate.[64]

While the open skies policy appears to have been shaped by a free enterprise approach, the decision to adopt the open skies method was equally founded on technical considerations. In *Domsat II*, the Commission had eight applications for domestic satellite systems before it.[65] Of those eight systems, only Comsat sought a monopoly grant.[66] In rejecting Comsat's monopoly approach to the use of domestic telecommunication satellite technology, the Commission noted that the selection of one or just a few of the proposed systems would force the selection of one satellite technology over another.[67] Such a selection, at this formative stage in the development of telecommunications technology, might inhibit and retard the development of new, innovative, and competing technology.[68] Further, by reducing orbital separations to three degrees, all eight applicants

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> cation by wire and radio, so as to make available, so far as possible, to all the people of the United States a rapid, efficient, nationwide, and world-wide wire and radio communication service with adequate facilities at reasonable charges, for the purpose of national defense, . . .

47 U.S.C. § 151 (1988).

61 Domestic Communication-Satellite Facilities by Non-Governmental Entities, 35 F.C.C.2d 844 (1972) (hereinafter DOMSAT II).

62 *Id.* at 847.

63 The comparative hearing requirement was first discussed in Ashbacker Radio Corp. v. F.C.C., 326 U.S. 327 (1945).

64 DOMSAT II, 35 F.C.C.2d at 847, 850.

65 Establishment of Domestic Communications-Satellite Facilities by Non-Governmental Entities, 34 F.C.C.2d 9, 27 (1972)(F.C.C. staff report later cited in DOMSAT II).

66 *Id.* at 29.

67 *Id.* at 33.

68 *Id.*

could be accommodated.[69] Therefore, the Commission decided to not foreclose any applicant from proving that it could survive in the market place.[70] Any applicant capable of showing the requisite financial, technical, and other qualifications, including potential for serving the public benefit, would be allowed to deploy domsats in the geostationary orbit.[71]

Using the open access policy and procedures announced in *Domsat II*, the F.C.C. licensed nine domsats between 1972 and 1980.[72] However, by 1980, the large number of applications for domsat licenses forced the F.C.C. to re-examine its open skies policy.[73] The F.C.C., in *In the Matter of Assignment of Orbital Locations to Space Stations in the Domestic Fixed-Satellite Service* (Orbit Deployment Plan),[74] was faced with the problem of the number of domsat applications possibly exceeding the number of available positions in the usable geostationary orbital arc.[75] While the final number of applications did not force the F.C.C. to abandon the open skies policy, the F.C.C. did point out that future domestic demands and international use of the orbital arc forced it to adopt a flexible policy.[76] Particularly, the Commission reserved the authority to change orbital assignments in the future should changing circumstances require the accommodation of additional satellites. Also, all assignments are considered temporary and subject to relocation on thirty days' notice.[77] Therefore, as of 1981, though under pressure, the F.C.C. was able to continue the open skies policy.

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69 *Id.* at 29.

70 DOMSAT II, 35 F.C.C.2d at 850, 860.

71 Though called an open skies policy, the policy announced by the F.C.C. in DOMSAT II was not a policy of "unlimited or unrestricted open entry." *Id.* at 850. Applicants were required to meet financial and technical standards, and AT&T and Comsat were allowed only restricted use of domsats. AT&T was initially limited to non-specialized services such as message toll telephone (MTT) and wide area telephone services (WATS). The Commission restricted AT&T's entry into specialized services out of a fear that the other qualified, but smaller, competitors would be driven or discouraged from the market by AT&T's market power, created by its monopoly over terrestrial telephone services. The Commission feared that AT&T could cross subsidize its specialized satellite services or use its terrestrial public switched service dominance to monopolize the specialized services market. Similarly, Comsat, because of its monopoly in international satellite services as the sole U.S. participant in Intelsat, was required to form a separate corporate subsidiary to engage in domestic satellite ventures and was forbidden from joining in a joint venture with AT&T as anything other than a carrier's carrier. *Id.* at 847-52.

72 Assignment of Orbital Locations to Space Stations in the Domestic Fixed-Satellite Service, 84 F.C.C.2d 584, 587 (1981).

73 Of the applications filed on or before May 1, 1980, the construction of twenty-five new satellites and the launch of twenty other new or previously constructed satellites were authorized. *Id.* at 585.

74 84 F.C.C.2d 584 (1981).

75 For U.S. domsat use, the orbital arc bounded by 119 degrees West and 135 degees West provides coverage for all fifty states and the orbital arc bounded by 55 degrees West and 148 degrees West provides coverage for the contiguous forty-eight states. *Id.* at 599.

76 *Id.* at 612.

77 *Id.* at 601.

In 1983, the open skies policy was again tested when the F.C.C. was faced with more applications than spots available on the orbital arc. This time, again, the F.C.C. was able to avoid discarding the open skies policy. By reducing the orbital spacing between satellites and using the batch system of processing where all the applications received over a specified period of time are processed together, the F.C.C. was able to continue its policy of providing entrepreneurial opportunities for the expansion of existing systems and the entry of new systems.[78] The preservation of the open skies policy in 1983 came at a price. By reducing the spacing from four degrees to two degrees for the C-Band[79] and from three degrees to two degrees for the Ku-Band, the F.C.C. forced system operators to use more expensive equipment.[80] Also, to assure the maximum use of orbital arc locations, minimum technical standards and deployment dates were established.[81] The combination of these measures permitted the F.C.C. to delay deciding between conflicting applications, though many of the applicants urged a prioritizing of applications.[82]

In 1985, the F.C.C. was again faced with a batch of domsat applications that exceeded the number of available orbital locations.[83] This situation forced the F.C.C. to seriously examine alternative policies and to discuss the demise of the open skies policy. Applicants in *In the Matter of Licensing Space Stations in the Domestic Fixed-Satellite Service*[84] proposed five alternatives to the open skies policy. Those alternatives were: (1) a preference for new entrants; (2) a preference for established carriers; (3) comparative hearings; (4) lotteries; and, (5) auctions.[85]

However, by strictly enforcing the licensing requirements first announced in the 1983 Processing Order,[86] the F.C.C. was able to eliminate enough unqualified applicants to avoid denying licenses to qualified applicants and thereby avoid scrapping the open skies policy.[87] Particularly, the F.C.C. now requires proof of sufficient financial resources to construct, launch, and operate the proposed

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78 Licensing of Space Stations in the Domestic Fixed-Satellite Service and Related Revisions, 48 Fed. Reg. 40,233, 40,234 (1983).

79 Because of the extensive use of the C-Band and the cost of immediately implementing the 2 degrees spacings, the F.C.C. adopted a transitional spacing plan of 3 degrees, 2.5 degrees, and 2 degrees spacings for the C-Band. *Id.*

80 *Id.* at 40,235.

81 *Id.* at 40,244, 40,246.

82 Among the arguments made by applicants was that existing operators should be given preference because those operators have proven their ability to supply market demands. *Id.* at 40,245.

83 Licensing Space Stations in the Domestic Fixed-Satellite Service, 101 F.C.C.2d 223-24 (1985).

84 *Id.*

85 *Id.* at 225.

86 93 F.C.C.2d 1260 (1983).

87 Licensing Space Stations in the Domestic Fixed-Satellite Serv., 101 F.C.C.2d at 224.

satellite for one year.[88] Also, in the case of existing systems, applicants hoping to expand their system must produce proof that more than eighty percent of its existing transponder capacity is being used.[89]

Therefore, since its formulation in 1972 in *Domsat II*, the open skies policy has retained its fundamental character despite the pressure of increased demand for orbital locations. Rather than employing an alternative method, such as comparative hearings or auctions, the F.C.C. has been able to continue the open skies policy by adjusting and tightening licensing requirements and conditions. While an argument can be made that the F.C.C. has rendered the open skies concept empty by withholding licenses from all but the clearly financially qualified, the regulations are only speeding up the natural selection process of the market place.[90] The nature of the telecommunications market naturally excludes unsupported new entrepreneurs. When the cost of constructing a telecommunication satellite, launching the satellite, insuring the satellite, and providing ground control services are added together the total will likely exceed $300 million.[91] Such a cost barrier will exclude all but experienced operators or the well-financed who can afford to buy experience. However, more well-financed operators are seeking licenses.

Domsats are not the only United States satellites seeking licenses and thereby putting pressure on the capacity of the orbit. Recently, privately operated satellites offering international services have begun to seek and have been granted licenses. Satellites offering international services add to the need for a comprehensive and new regime for licensing satellites in the geostationary orbit.[92]

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88 The F.C.C. then amended part 25 of the Commission's Rules and Regulations to detail the financial requirements. *See* 47 C.F.R. § 25.391 (1990).

89 Following the 1983 Processing Order, 93 F.C.C.2d 1260 (1983), the F.C.C. restricted newly authorized systems to two orbital locations and existing operators to replacement locations unless the applicant demonstrates concrete need for additional orbital locations. To meet this standard applicants must show that the additional satellites will have 80% of their capacity utilized within three years. Also, existing operators must already be using 80% of their existing satellite's capacity. Licensing Space Stations in the Domestic Fixed-Satellite Serv., 101 F.C.C.2d at 235-37.

90 The financial requirements articulated in In the Matter of Licensing Space Stations in the Domestic Fixed-Satellite Serv., 101 F.C.C.2d 223 (1985), prevents the licensing of a system without extensive committed capital. Thus, only applicants who have sources of income other than from the proposed satellite system will receive licenses. This means that only existing system operators, organizations with other business income, or organizations capable of raising capital from large lenders will meet the requirements. Few entrepreneurs gambling on their ability to tap future market forces will be able to obtain a license.

91 Licensing Space Stations in the Domestic Fixed-Satellite Serv., 101 F.C.C.2d at 231.

92 Demand for satellite telecommunication services may be reduced by the use of fiber optics in terrestrial systems. Fiber optic lines are both cost competitive and quality

B. Satellites Providing International Services

The story of United States regulation of domestically owned satellites providing international services begins with the Communications Satellite Corporation (COMSAT), a statutorily created quasi private entity. From there the story moves to the International Telecommunications Satellite Consortium (INTELSAT), an entity designed to operate as a nonprofit provider of worldwide satellite telecommunications. And, finally, the story focuses on the question of whether INTELSAT can survive the introduction of competing private satellite systems.

In 1961 the Soviet Union was ahead of the United States in developing a communication satellite system.[93] Fearing that the Soviet's lead would cause third world countries to turn to the Soviet Union for their communication needs,[94] the Kennedy Administration initiated and Congress passed the Communications Satellite Act of 1962 (Satellite Act).[95] The Satellite Act called for the creation of a quasi-private corporation which would spearhead the organization of an international satellite consortium.[96] This quasi-private corporation (COMSAT) was to operate as any other private corporation, except for its objective.[97] Specifically, Congress declared that COMSAT shall "be responsive to public needs and national objectives, which will serve the communication needs of the United States and other countries, and which will contribute to world peace and understanding."[98] Therefore, while COMSAT was to be a for profit organization, significant governmental oversight would be required.

To realize the dual objectives of turning a profit and implementing United States foreign policy, Congress gave COMSAT a traditional corporate structure with some modifications. Like other corporations, COMSAT can issue shares of common stock with voting rights.[99] However, unlike other corporations, fifty per centum of issued stock is reserved for purchase by communication common carriers as authorized by the F.C.C., and fifty per centum of the shares are available to the public (non-common carriers).[100] Again

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competitive with satellite transponders for point-to-point communications. Interview with Professor Edgar J. Luecke, Valparaiso University School of Engineering (June 27, 1988).

93 PAUL JOHNSON, MODERN TIMES: *The World from the Twenties to the Eighties* 615 (1983).

94 *Id.*

95 Communication Satellite Act of 1962, Pub. L. No. 87-624, 76 Stat. 419, (codified at 47 U.S.C. §§ 701-744 (1983)).

96 Communication Satellite Act, 47 U.S.C. § 701(c).

97 There was extensive debate within Congress over the form that COMSAT should assume. The proposals ranged from a wholly private corporation to a government-owned utility. The resulting form was a compromise between the two extremes. *See* DELBERT D. SMITH, COMMUNICATIONS VIA SATELLITE, A VISION IN RETROSPECT 93-108 (1976).

98 Communication Satellite Act, 47 U.S.C. § 701.

99 *Id.*

100 *Id.* § 734(b).

like other corporations, a board of directors, with fifteen members, oversees COMSAT.[101] However, six board members are elected by non-common carrier stockholders, six board member are elected by common carriers, and the remaining three members are appointed by the President of the United States.[102] Further, the President of the United States is charged with supervising COMSAT's relationship with foreign governments, foreign entities, and international bodies to assure that these relationships are consistent with the national interest and foreign policy of the United States.[103] Together these features have created a rather unique business entity with some inbred conflicts of interest.

With the domestic component of an international telecommunication system in place, the United States proceeded to negotiate the construction of an international telecommunications system. Although COMSAT preferred a system based upon a series of bilateral agreements, the State Department's preference for a multilateral arrangement was ultimately implemented.[104] Thereby, at a meeting of the ITU in October of 1963, the foundation of a global satellite communication union was discussed.[105] The following year nineteen nations signed the Interim Arrangements for a Global Commercial Communications Satellite System[106] and gave birth to the International Telecommunications Satellite Consortium (INTELSAT).

During the life of the Interim agreement, prior to the enactment of a definitive agreement, COMSAT played a dominant role in the operation of INTELSAT. Pursuant to the Interim Arrangements, COMSAT was given sixty-one percent of the voting power because of its share of the initial contribution required to start the system.[107] This voting power, along with COMSAT's role as the systems general manager responsible for the design, construction, operation, and maintenance of the system,[108] gave COMSAT virtually unrestrained control over INTELSAT.[109] While COMSAT can be credited with using this control to build a reliable international satellite system, many members of INTELSAT were unhappy with COM-

101 *Id.* § 733(a).

102 *Id.*

103 *Id.* § 721(a)(4).

104 SMITH, *supra* note 97, at 131-35.

105 HERBERT I. SCHILLER, MASS COMMUNICATIONS AND AMERICAN EMPIRE 131-32 (1969).

106 Multinational Communication Satellite System, Aug. 20, 1964, 15 U.S.T. 1705, 514 U.N.T.S. 26.

107 Each signatory to the Interim agreement was asked to contribute a portion of the estimated $200,000,000.00 necessary to start the system. In turn, each signatory's voting share was based upon its contribution. *Id.* arts. IV, V, VI, Annex to the Interim Arrangement.

108 *Id.* art. VIII.

109 JONATHAN F. GALLOWAY, THE POLITICS AND TECHNOLOGY OF SATELLITE COMMUNICATIONS 158 (1972).

SAT's management and eventually won a modification of INTELSAT's management structure.

Perhaps the major cause of discontent with COMSAT's management of INTELSAT can be traced to COMSAT's procurement practices. While European countries had made twenty-five percent of the original contributions to INTELSAT, they received only four percent of INTELSAT's procurement contracts.[110] Ninety-five percent of the $380 million spent by INTELSAT between 1964 and 1971 was spent within the United States.[111] In addition to its procurement practices, COMSAT was criticized for its day-to-day management of INTELSAT. One representative to INTELSAT attributed this problem to the three and sometimes conflicting roles played by COMSAT.[112] COMSAT functioned as a U.S. for profit common carrier, as the U.S. representative to INTELSAT, and as the general manager of INTELSAT. After protracted negotiations, a definitive INTELSAT agreement was reached in 1971 and became effective in 1973.[113] The definitive agreement created four operating organs within INTELSAT: the Assembly of Parties, the Meeting of Signatories, the Board of Governors, and the Director General.[114] The pri-

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[110] Jordan R. Kerner, Note, *The Communications Satellite Corporation: Toward a Workable Telecommunications Policy*, 27 HASTINGS L. J. 740 (1976).

[111] MICHAEL E. KINSLEY, OUTER SPACE AND INNER SANCTUMS 119 (1976).

[112] *Id.* at 115.

[113] Agreement Relating to the International Telecommunications Satellite Organization "INTELSAT," Aug. 20, 1971 [1972], 23 U.S.T. 3813.

[114] The powers and duties of the four organs are as follows:

> *Assembly of Parties*: The Assembly is responsible for representing the interests of the parties as sovereign states and setting long term goals for INTELSAT. Accordingly, each signatory has one vote within the Assembly and substantive matters must be approved by a two-thirds vote. Among the Assembly's most important powers is the appointment of the Director General and the power to make a finding in the form of a recommendation on whether separate telecommunications systems will technically or economically interfere with the operation of INTELSAT pursuant to Article XIV. See Article VII of the INTELSAT Agreement. *Id.*
>
> *Meeting of Signatories*: Members of the Meeting of Signatories are the entities authorized by states to conduct their telecommunications operations. As the United States has done, states may authorize private entities as their representative to the Meeting of Signatories. Each representative has one vote within the Meeting of Signatories. The Meeting of Signatories' primary function is to oversee INTELSAT's financial affairs. See Article VIII of the INTELSAT Agreement, *Id.*
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> *Board of Governors*: The Board of Governors consists of 27 members coming from one of three categories: (1) signatories with an investment quota of 1.5% or greater, (2) one representative of two or more signatories with a combined investment quota of 1.5% or greater, and (3) one representative from each of five regions (as designated by the ITV) who represents at least five signatories from that region. Investment quota is determined by a signatory's usage of the INTELSAT system. The Board of Governors is responsible for the design, development, construction, establishment, operation, and maintenance of the INTELSAT space segment. In other words, the Board of Governors is the primary body within INTELSAT and controls the actual operation of the system. Decisions by the Board of Governors is based upon the investment quota for substantive issues. An affirmative vote must consist of either two-thirds of all the investment quota, constituted by at least

mary difference between the Interim agreement and the definitive agreement is the existence and function of the Board of Governors and Director General. The Board of Governors and Director General now have the responsibility of managing INTELSAT; once the responsibility of COMSAT.[115] However, though COMSAT's investment quota and therefore voting power has decreased over the years, within the Board of Governors, where voting power is based upon a parties investment quota, COMSAT still possesses the largest vote: now twenty-four percent.[116]

From 1973 until 1988, with the exception of some regional systems,[117] INTELSAT was the only provider of commercial international satellite telecommunication services. As of 1985, INTELSAT served 170 countries and territories and carried two-thirds of all overseas communications.[118] However, in 1985 the United States determined that competition with INTELSAT in international satellite telecommunication services, within defined areas, was appropriate and the first satellite to directly compete with INTELSAT was launched in 1988. In 1983 Orion Satellite Corporation filed an application to launch a separate international satellite system and thereby started the F.C.C.'s deliberations on the question of INTELSAT competition.[119] However, because of foreign policy implications and section 102(d) of the Communications Satellite System Act of 1963 (Satellite Act), the F.C.C. delayed action on Orion's application until after the Executive Branch had examined the issue.[120] Pursuant to section 102(d) the President must find separate communications satellite systems to be in the national interest before a license may be issued.[121] On November 28, 1984, President Reagan determined that separate communication satellite systems were

four governors or all governors but three. See Articles IX and X of the INTELSAT Agreement, *Id.*

Director General: The Director General of INTELSAT, appointed by and responsible to the Board of Governors, oversees the day-to-day operations of INTELSAT. As the executive of INTELSAT, the Director General has many ministerial duties including the role of legal representative of INTELSAT. See Article XI and Annex A of the INTELSAT Agreement, *Id.*

115 *See id.* art. XII for details on the transition of control from COMSAT to the Director General.

116 ROBERT R. BRUCE, FROM TELECOMMUNICATIONS TO ELECTRONIC SERVICES 270 (1986).

117 The regional systems now in operation include ARABSTA, PALAPA, and INTERSPUTNIK. *See* RICHARD R. COLINO, *The Possible Introduction of Separate Satellite Systems: International Satellite Communications at the Crossroad*, 24 COLUM. J. TRANSNATION'L L. 13, 19 n.18 (1985).

118 *Id.* at 16.

119 *See In re* Application of Orion Satellite Corp., 101 F.C.C.2d 1302(1985).

120 Cheryl L. Sarreals, *International Telecommunications Satellite Services: The Spirit of Cooperation Versus the Battle for Competition*, JURIMETRICS J. 267, 291 n. 142 (1986)(citing letter from David J. Markey, Assistant Secretary of Commerce and Diana Lady Dougan, Coordinator, International Communications and Information Policy, Department of State, to Mark S. Fowler, Chairman, F.C.C. (April 6, 1983)).

121 47 U.S.C. § 721(a)(6)(1983).

"required in the national interest" as defined within section 102(d) of the Satellite Act.[122] Later, on February 8, 1985, the Departments of State and Commerce jointly submitted "A White Paper on New International Satellite Systems" (White Paper) to the F.C.C. which detailed the President's policy grounds for his previous finding.[123] The White Paper was prepared by the Senior Interagency Group on International Communication and Information Policy (SIG), a group made up of representatives from fourteen executive agencies.[124]

The President, as stated in the White Paper, found that by restricting the separate systems to providing "customized" services the U.S. could continue its commitment to INTELSAT and yet stimulate competition in international satellite communication services. Article XIV(d) of the INTELSAT agreement requires each signatory who establishes a separate system "to avoid significant economic harm to the global system of INTELSAT." Significant economic harm would be avoided, according to the President, by restricting separate systems to providing "the sale or long-term lease of transponder or space segment capacity for communications not interconnected with public switched message networks."[125] By restricting separate systems to non public-switched services, INTELSAT's "core" revenues could be protected. The President reasoned that by fencing off "public-switched traffic," as he defined public-switched traffic, eighty-six percent of INTELSAT's 1983 revenues would be protected.[126] Therefore, significant economic harm would not occur because the separate systems would be unable to compete with a majority of INTELSAT's service offerings and INTELSAT is in a good position to compete for the customized (unprotected non public-switched traffic) services market.[127]

Shortly after the President's determination, the F.C.C., in *In the Matter of Establishment of Satellite Systems Providing International Communications* (*Separate Systems*),[128] found competition with INTELSAT to be in the public interest and authorized the licensing of three (eventu-

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122 Pres. Determ. No. 85-2, 49 Fed. Reg. 46987 (1984).

123 Report No. I-4032, placed in C.C. Docket No. 84-1299, on February 11, 1985, for the record of the proceedings of Establishment of Satellite Systems Providing International Communications, 101 F.C.C.2d 1046 (1985) (hereinafter Separate Systems).

124 *See* Separate Systems, 101 F.C.C.2d at 1054. *See also* Senior Interagency Group on International Communication and Information Policy, A White Paper on New International Satellite System 1 n.1(1985)(available in F.C.C. file for cc Docket No. 84-1299).

125 Letter from George P. Schultz, Secretary of State, and Malcolm Baldridge, Secretary of Commerce, to F.C.C. Chairman Fowler (November 28, 1984). Separate Systems, 101 F.C.C.2d at 1090. Public switched message services are message telephone services (MTS), telex, telegraph, teletext, facsimile, TWX, and high speed switched data services. *Id.* at 1101.

126 *See id.* at 1089-90, 1097-99.

127 *Id.* at 1056.

128 101 F.C.C.2d 1046 (1985).

ally six) separate systems.[129] The F.C.C. placed three basic restrictions on the new separate systems: (1) all licensees could provide only the sale or long-term lease of transponders or space-segment capacity for communications not interconnected with public-switched message networks, except for emergency restoration service; (2) the first restriction must be enforced against all levels of resellers and users of the separate systems; and (3) licensees must enforce all restrictions through contractual and other means and resellers must enforce the restrictions on their customers. Additionally, each licensee must obtain the authorization of the necessary foreign authorities[130] and enter into consultations with INTELSAT to ensure technical compatibility and to avoid significant economic harm as is required by article XIV(d) of the INTELSAT agreement.[131]

Much of the F.C.C.'s *Separate Systems* opinion focused on the advantages competition would bring to the users of satellite telecommunication services. Using the U.S. domestic satellite industry as an example, the F.C.C. concluded that the pressures of the marketplace will provide new diversity in satellite services, create markets in new areas of satellite services, create incentives for INTELSAT to operate more efficiently, promote the development of new satellite technology, and encourage outside financing sources to invest in more speculative communication ventures. These conclusions were supported by customer complaints of existing INTELSAT services. Among those complaints were assertions that INTELSAT charged more than comparable U.S. domestic service, that INTELSAT does not offer the sale or long term lease of transponders (necessary for the needs of some customers), and that INTELSAT does not offer the services proposed by some of the proposed separate systems (users could use small, low-cost earth stations not available through INTELSAT).[132]

Predictably, INTELSAT and many of INTELSAT's users were concerned by the F.C.C.'s decision and reasoning. In 1984, a report commissioned by INTELSAT concluded that the introduction of separate systems that compete with INTELSAT would work against the interest and objectives of INTELSAT.[133] Additionally, both the Meeting of Signatories and Assembly of Parties of INTELSAT adopted resolutions urging INTELSAT members to refrain from and

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129 *Id.*

130 Because international communications require the cooperation of the sender state (e.g. the United States) and the receiving state (e.g. the United Kingdom), a foreign communications entity, usually a government controlled entity, must cooperate in the establishment of a separate satellite telecommunications system.

131 Separate Systems, 101 F.C.C.2d at 1054.

132 *Id.* at 1065, 1087.

133 INTELSAT, Final Report on the Study of the Economics of International Satellite Communications 8 (May 18, 1984) (Attachment No. 1 to BG-59-34E) (prepared by Walter Hinchman Associates, Inc.).

oppose actions which would threaten the viability of a single global system.[134] However, despite these reservations and concerns, the Assembly of Parties,[135] pursuant to the recommendations of the Director General and Board of Governors, found that the operation of five Ku-band transponders between the United States and Peru by PanAmSat would not cause significant economic harm to INTELSAT.[136]

Recently, the United States, United Kingdom, and Germany have requested consultation with INTELSAT pursuant to article XIV(d). Each country seeks coordination for the use of six Ku-band transponders on the PanAmSat satellite now located at 315 degrees, for nonpublic switched message service. As of the date of writing, the Director General has recommended to the Board of Governors and the Assembly of Parties that no incompatibility be found.[137]

In reaching his recommendation, the Director General adopted the results of a previous study that concluded that significant economic harm to the INTELSAT system would not result if the cumulative loss of revenue from all separate systems remained below 10% during a ten year planning horizon.[138] In PanAmSat's case, the Director General projected revenue loss to INTELSAT of 2.6%. This projection, coupled with the 6.4% estimated loss from all existing separate systems, resulted in a total projected loss of 9.0%, below the 10% ceiling.[139] Therefore, though the proposed PanAmSat would compete with and draw traffic away from INTELSAT, as long as PanAmSat provides only nonpublic switched message service no significant economic harm will befall INTELSAT. If INTELSAT's Assembly of Parties adopts the Director General's recommendation, approves PanAmSat's U.S. to Europe service, and thereby employs the 10% revenue loss test for significant economic harm, the U.S. policy of open entry for international telecommunication satellites will have run into a major roadblock. That roadblock is the 10% revenue loss ceiling. Within the next ten year planning horizon, the

[134] INTELSAT meeting of Signatories, Record of the Thirteenth Meeting, MS-13-3 ¶ 14 (Apr. 18-21, 1983); INTELSTAT Meeting of Signatories, Record of Decisions of the Fourteenth Meeting, MS-14-3E ¶ 22(Apr. 9-12, 1984); INTELSTAT Assembly of Parties, Record of Decisions of the Eighth Meeting, AP-8-3E ¶ 21(Oct. 3-6, 1983); INTELSAT Assembly of Parties, Record of Decisions of the Ninth (Extraordinary) Meeting, AP-9-3-E ¶ 14 (Jan. 29-31, 1985); INTELSTAT Assembly of Parties, Record of Decisions of the Tenth Meeting, AP-10-3E ¶¶ 32(c), 33(a)-33(b) (Oct. 11, 1985).

[135] Within the INTELSAT organizational framework, the Director General makes recommendations to the Board of Governors which in turn tenders advice to the Assembly of Parties which makes the final determination.

[136] Article XIV(d) Consultation Concerning the Use of the Pan Am Sat Satellite Network to Provide Telecommunication Services Between the United States and the United Kingdom, BG-76-50E 5/6/88, May 27, 1988.

[137] INTELSAT document "Addendum No. 1" to BF-76-50E 5/6/85, June 13, 1988.

[138] INTELSAT document, BG-76-50E, 5/6/88, May 27, 1988, p. 8.

[139] *Id.* at 9.

period used by INTELSAT for testing traffic loss, the United States cannot license separate systems which would cause more than 1% loss in revenue to INTELSAT. With the current cumulative revenue loss suffered by INTELSAT standing at 9%, 1% or more in lost revenue would put the total over the 10% ceiling and would amount to significant economic harm as defined by the Director General. INTELSAT is not likely to allow such an action and would find any additional separate system to be a significant economic threat. The United States, in such a situation, would be faced with a choice between its open skies policy or the INTELSAT system. The next application to launch an international telecommunication will bring the question to a head.

V. The Alternative Licensing Schemes

Faced with the increasing demand for orbital-spectrum slots and the decrease in available orbital slots after WARC-ORB-88, the open skies licensing philosophy of the F.C.C. cannot long continue. Soon, if not already, the F.C.C. will face more viable license applications than it has currently technically feasible orbital slots.[140] Therefore, in order to carry out its congressional mandate of providing "to all the people of the United States a rapid, efficient, nationwide, and worldwide . . . communication service . . . ,"[141] the F.C.C. must move from the licensing system of the open skies policy to a method of selective licensing. But, if the F.C.C. is to meet the judicially created test for its conduct of assuring the "public convenience, interest, or necessity," what form should a new licensing method take?[142]

Before moving to discuss a new selection method, the goals of a selection system must be established. Of course, these goals must work to the public's benefit. But defining what is in the public's best interest has and will be controversial. Nevertheless, few would disagree with the goals of (a) stimulating technological development, (b) stimulating competition (competition in price, quality of service, and variety of service), and (c) preventing monopolistic or near monopolistic control of the orbital-spectrum.[143] In fact, these goals can be

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140 If all technically feasible slots are not taken, the economically and technically desirable slots have been taken. Currently the only unassigned orbital locations are at the edges of the orbital arc usable for the United States and are primarily in the more expensive to use ku band. Locations at the edges of the usable orbital arc generally provide poorer coverage. Therefore, in terms of desirable slots, the orbital-spectrum has reached its current capacity.

141 47 U.S.C. § 151 (1988).

142 In interpreting the FCC licensing guidelines,the Court has stated that the Commission's touchstone for exercising its authority is "the public convenience, interest, or necessity." *See* Federal Communications Commission v. Pottsville Broadcasting Co., 309 U.S. 134, 137-38 (1939).

143 Many would argue that competition by its very definition means the absence of monopolistic control. Whether this is correct or not, domination of the orbital-spectrum would create concerns other than economic. Domination of the orbital-spectrum could,

seen in the earliest of the F.C.C.'s statements on orbital-spectrum management.[144]

One important feature of the satellite telecommunications industry, that until recently was a basic assumption, is that all telecommunication satellites operated as common carriers and as such had rates regulated by the F.C.C. under title II of the Communications Act. However, in 1982 the F.C.C. authorized the sale of transponders on a limited basis in *Domestic Fixed-Satellite Transponder Sales* (Transponder Sales Order).[145] Though the F.C.C. will closely scrutinize sale applications to ensure that sufficient common carrier capacity exists, the *Transponder Sales Order* policy will effect regulatory policy decisions by reducing the quantity of transponders available to the general public. One might argue that by taking some transponder capacity out of the common carrier category, the result of the *Transponder Sales Order* is that the orbital-spectrum resource has been made even more scarce. Beside the fact that fewer satellite operators will offer common carrier services, it is quite arguable that the new transponder owners will not utilize their transponders to their maximum capacity and thereby cause the orbital spectrum to be less efficiently used than when common carriers were able to sell otherwise unused time at reduced prices.[146] The result may be a reduced supply, higher prices, and greater demand on the orbit.[147]

A second basic feature of the telecommunications industry that may effect the use of and regulation of the orbital-spectrum is the competition posed by optical-fiber technology.[148] At the service

despite the F.C.C.'s best efforts, lead to the exclusion of uses and users. The exclusion of users could mean the exclusion of messages. Congress and the F.C.C. have long attempted to ensure diversity in broadcast licenses. If the orbital-spectrum becomes the dominant method of disseminating broadcast signals, the dominant user of the orbital-spectrum could exclude unfavored messages. Also, national security concerns may require a nonmonopolistic market.

144 See Domsat II, 35 F.C.C.2d 844, 846 (1972).

145 Domestic Fixed-Satellite Transponder Sales, 90 F.C.C.2d 1238 (1982), *aff'd*, WOLD Communications, Inc. v. F.C.C., 735 F.2d 1465, 1468 (D.C. Cir. 1984).

146 One owner of a transponder could quite possibly not have a need to use all of a transponder's channel capacity. In addition, he may not use the transponder around the clock. Therefore, unless the owner is able to resell this unused capacity (which may be more difficult for an owner not familiar with the common carrier market for telecommunications than an experienced common carrier), transponder capacity will go unused.

147 Though the majority of satellites in the orbit should operate as common carriers to ensure widespread access to and efficient use of the orbit, the geostationary orbit does not fit the traditional definition of a common carrier. Traditionally, common carriers fall into the category of "natural monopolies" such as electric and telephone companies. Natural monopolies exist when the need for large initial investments cause the average cost of the units produced by two or more competitors to not drop below the cost per unit of the first competitor to enter the market. While satellite operators experience large initial investments, technological advances have been reducing the cost per unit rather quickly and substantially since the orbit was first put to use.

148 Fiber-optic cables now link the United States to Europe and the far east. While fiber-optic cables are not yet used for television signals, fiber-optic cables now compete with satellites for long-haul (transAtlantic and transPacific) phone calls, computer traffic,

level, optical-fibers can provide or possibly even exceed the services provided by telecommunication satellites. However, the high cost of installing optical-fiber cables to individual users will delay the widespread use of optical-fibers.[149]

To date, three types of selective licensing methods have been proposed by writers or used by the F.C.C. Those methods are lotteries, auctions, and comparative hearings. Each method has its merits and must be evaluated separately in terms of its ability to meet the above mentioned goals of stimulating technology, stimulating competition, and preventing a monopoly of the orbital-spectrum. Each method can probably be adapted, in some degree, to achieve the stated goals.

A. *Comparative Hearings*

Comparative hearings have been used to select between mutually exclusive broadcast license applications since 1945.[150] The comparative hearing process is required when two or more applications are found to be mutually exclusive.[151] In the process, the F.C.C.'s two primary objectives are to first secure the best practical service to the public and second to maximize the diffusion of control of the medium of mass communications.[152] The factors considered by the F.C.C. in pursuing its two primary objectives are (a) whether the applicant will bring diversification of control of the medium of mass communications, (b) whether the owners (applicant) will participate in station operations, (c) whether the applicant's programming will serve the public's needs, (d) whether the applicant's past operation of a station suggest good future operation, (e) whether the application will result in efficient use of the frequency, and (f) the character of the applicant.[153]

Comparative hearings were developed for competing *broadcast*

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and video conferences. *1st Fiber-optic Pacific Cable Links U.S., Japan*, CHI. TRIB., Apr. 19, 1989, § 3, at 3.

149 Fiber-optics will not reach residential and small business users for some time because of the high cost of replacing the existing copper network with fiber-optical cables. A national fiber-optic distribution system is estimated to cost at least 200 billion. R. NATHAN, TELEVISION MANUFACTURING IN THE UNITED STATES: ECONOMIC CONTRIBUTIONS-PAST, PRESENT, AND FUTURE F3, Co. 6 (Elecs. Indus. Ass'n 1988).

150 Comparative hearings were first required by the Supreme Court in Ashbacker Radio Corp. v. F.C.C., 326 U.S. 327, 333 (1945).

151 The test for mutual exclusivity will be very important to orbital-spectrum applications. The F.C.C. has extended the definition of "mutually exclusive" to include applications that would have a "substantial and material adverse effect upon the other's prospect for success." Little Dixie Radio, Inc., 11 R.R.2d 1083 (1967). This is a very broad definition that could be widely applied to orbital-spectrum license applications. However, so far the F.C.C. has concluded that as long as the F.C.C. can accommodate a new applicant on the orbital-arc, there is no mutual exclusivity. Domestic Fixed Satellite Service, FCC 83-183 (released June 20, 1983), 53 R.R.2d 1597 (1983).

152 Policy Statement on Comparative Broadcast Hearings, 1 F.C.C.2d 393, 394 (1965).

153 *Id.* at 394-99.

license application. If comparative hearings were employed for selecting orbital-spectrum licensees, the criteria evaluated would have to be modified. Orbital-spectrum users are not broadcasters, they are primarily common carriers and in some instances rebroadcasters. Only if an entire satellite was employed by a broadcaster as its primary means of signal distribution would the license application take on the features of a broadcasting license. In the majority of situations, the applicant will be a common carrier or operate sufficiently enough like a common carrier to be treated like a common carrier for licensing purposes.

The criteria that the F.C.C. should look at in a comparative hearing for an orbital-spectrum license should include some of the criteria from the broadcasting comparative hearings and new criteria. From the broadcasting hearings the F.C.C. should ask (a) whether the applicant will bring diversification of control of the media of mass communications, (b) whether the applicant's past operations of a satellite suggests good future operation, (c) whether the application will result in efficient use of the frequency, and (d) the character of the applicant. In addition to these criteria, or perhaps as elaboration of criteria (c) above, the F.C.C. should inquire (e) whether the proposed satellite will be technically superior to preceding satellites or the competing satellite and (f) whether the satellite operator intends and has the capability to offer competitive prices to consumers. The use of these six criteria in a comparative hearing should allow the F.C.C. to achieve the three goals listed at the beginning of this section.

By requiring an applicant to show that it will bring diversification of control to the medium of mass communication, the goal of preventing monopolistic control will be met and the goal of stimulating competition will be furthered. By requiring a showing of good past operation of a satellite, efficient use of the frequency, and technical superiority, the goal of stimulating technical development and furthering competition will be met. And, finally, a showing of good character and lower prices will meet the goal of stimulating competition. Therefore, aside from the effectiveness of comparative hearings and other considerations that will be examined later, comparative hearings can be used to achieve the goals set out earlier.

B. Lotteries

Lotteries, as a method of licensee selection, were authorized by Congress in 1981.[154] After the amendment, by Congress, of this authorization in 1982,[155] the F.C.C. promulgated regulations to complete the details of the lottery system and eventually employed a

[154] 47 U.S.C. § 309(i).
[155] *Id.* § 309(i)(3)(A).

lottery method for the selection of initial licensees to operate Low Powered Television Stations.[156] Generally, the lottery system is rather simple. Applications for initial licenses are assigned numbers for the lottery, with qualifying minority applicants receiving a preference in the form of additional numbers.[157] After the lottery winner is identified, petitions to deny may be filed.[158]

To use this lottery system for orbital-spectrum license applications, some modifications and additions would be necessary to meet the objectives of stimulating technical development, competition, and a nonmonopolistic market.[159] First, the limitation of the method to only initial licenses would have to be eliminated. Instead, as orbital-spectrum locations opened up, assuming either a time limit on existing licenses or the satellite becoming inoperable,[160] a lottery between applications for each open location would have to be held. Second, a preliminary review of an application to ensure minimum technical competence and financial support would be necessary. A process like that announced in the *1983 Processing Order* would be appropriate.[161] Such a preliminary review would be necessary to prevent speculative filings.

In order to encourage technical developments within a lottery system, the F.C.C. would be required to give applications judged technically innovative a preference - additional numbers - in the lottery. However, the granting of a preference to technically innovative applications could be seen as nothing more than a comparative hearing in lottery clothing since the F.C.C. would be forced to judge an application's technical merit.

To prevent monopolistic control of the orbital-spectrum when assigning lottery numbers to applicants, the F.C.C. would also have to give additional numbers to new players in the satellite-telecommunications market. Alternatively, during any post lottery hearing on a petition to deny, the F.C.C. could closely scrutinize whether the licensee will contribute to market diversity. Finally, while a lottery system that produces diversified satellite operators will most likely produce a price competitive market, there is no certainty that a variety of innovative services will be produced. To ensure a variety of services, the F.C.C. would have to award additional lottery numbers to applicants proposing unique and innovative services.

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156 47 C.F.R. §§ 1.1601-1.1604, 1.1621-1.1623 (1983).

157 Applicants who meet the minimum ownership levels of 47 C.F.R. § 1.1622(b) and are either Black, Hispanic, American Indian, Alaska Natives, Asians, or Pacific Islanders, receive a larger block of numbers for the lottery. *Id.* §§ 1.1621, 1.1622, 1.1602.

158 *Id.* § 1.1604.

159 Currently, the definition of "media of mass communication," used to describe when a lottery may be used, might exclude telecommunication satellites. This definition would have to be amended.

160 Currently licenses have a maximum life of ten years. 47 U.S.C. § 307(c)(1983).

161 93 F.C.C.2d 1260 (1983).

A lottery system can be developed to achieve the goals of *Domsat I*. However, the system would have many of the features of a comparative hearing. The F.C.C. would be forced to evaluate features of each application in order to determine if the applicant should receive preferential treatment (additional numbers). Such evaluation would demand F.C.C. time and might even be subject to *Ashbacker* comparative hearing requirements.[162]

C. *Auctions*

Auctions, or some other method of employing market forces to make licensing decisions, have been proposed by a number of different sources for some time now.[163] Perhaps the most influential of these proposals was made by Professor R.H. Coase.[164] Though Professor Coase's proposal was targeted primarily on broadcast licensing, the principles of his proposal can be easily adapted to orbital-spectrum licensing.

When creating an auction system, the fundamental decision of how far the use of market forces is to be taken must be made. At a limited level, an auction would be used to determine license holders but further sale would be strictly controlled. Also, the F.C.C. would continue to closely regulate the operation of geostationary satellites. At the other extreme, an auction would be used to distribute orbital locations, the winning bidders would own and be able to resell the orbital locations, and the F.C.C. would act as little more than a traffic cop to protect the owner's rights. The choice between these two extremes hinges on an analysis of the role and value of the public trustee model of regulation for the orbital-spectrum.

Congress, through the Federal Communications Act, has declared the radio spectrum to be the common property of the citizens of the United States.[165] As such, the federal government has the responsibility of regulating the use of the spectrum so as to achieve the greatest public good.[166] This is the public trustee model. Implicit in the public trustee model is the exclusion of private ownership of the spectrum. Therefore, unless Congress is willing to abandon the public trustee model (and the res communis nature of the spectrum), the full use of market forces (complete ownership and alienation rights) to manage the orbital-spectrum will not happen.[167] Never-

162 *See supra* notes 150-53 and accompanying text.

163 The use of auctions, as a method of employing market forces, to realize the public's best interest, is likely within the F.C.C.'s authority. See F.C.C. v. WNCN Listener's Guild, 450 U.S. 582 (1981).

164 R.H. Coase, *The Federal Communications Commission*, 2 J. L. & ECON. 1 (1959).

165 This declaration is limited by the interests of other countries as spelled out in the Convention of the International Telecommunications Union. International Telecommunication Convention, *supra* note 21.

166 *See* 47 U.S.C. § 309(a).

167 Professor Coase would nevertheless continue to argue that market forces would

theless, within the bounds of political reality, an auction model that utilizes as much market forces as is politically feasible is possible.

In an auction system, to be true to a market model, the F.C.C. would conduct little more in the way of a preliminary evaluation of bidders than to check the application to ensure compliance with United States obligations to the ITU and INTELSAT. The pressures of the market place would shape the features of the application. The public's demand for services (or the entrepreneur's best guess of what the public will buy) would shape whether the satellite will be built to provide point-to-point public switched services, point-to-multipoint service, direct broadcast service, common carrier services, or the sale of transponders. The financing for the satellites construction and launch would also depend on the market's perception of the project's viability.

Letting market forces shape what the application looks like is really nothing new. The open skies system already allows this. The really tough question is whether the F.C.C. should let market forces shape what is bid upon. Currently the F.C.C. determines orbital spacing and frequency allocation. Could the objectives of the public trustee model be satisfied if potential bidders were allowed to negotiate between themselves on how close satellites would be located and upon which frequencies they would operate?

If the F.C.C. determines orbital spacing and frequency use, only the services offered by satellite operators and not the technology of spectrum use will be driven by market forces. Market forces will not speed the technology that allows more efficient use of the orbital-spectrum through closer spacing. The development of technology that would allow closer orbital spacing will be in the hands of the F.C.C. Only when the F.C.C. determines that existing technology will allow closer orbital spacing will progress in increasing the number of satellites on the orbit be made. This method would have the regulatory regime respond to advances in technology rather than having the regulatory regime stimulate technological advances. The policy of not restricting technological possibilities, the policy underlying the open skies system, would seem to support the use of market forces to set orbital spacing and frequency use within designated spectrum bands.

Therefore, an auction system that uses market forces to their maximum extent, without allowing for the private ownership of the orbital-spectrum, would have the following basic features. When an orbital location capable of accommodating at least one telecommunications satellite becomes available, the F.C.C. would take preliminary

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ultimately achieve the better public good. According to Professor Coase, through the market the public, rather than the government, could decide what kind of services and in what amount would be offered.

applications and review them for compliance with ITU and INTELSAT requirements. If more than one application is received, the F.C.C. would set a minimum price for an orbital-spectrum license and allow applicants to negotiate over how the arc will be used before bidding begins. Applicants would be able to negotiate any use of the arc that does not interfere with neighboring users of orbital-spectrum.[168] Applicants, whether they have reached an agreement or not, would then bid on licenses. After the bidding was complete, the F.C.C. would review the winning applicants for their ability to not interfere with neighboring users and in the absence of an agreement, United States international obligations. Satisfying this review, licenses lasting the useful life of the satellite would be issued.

Such an auction system would stimulate technological development. Under the system, satellite operators would feel the pressures of the market to become more competitive. Technological advances make an operator more competitive. Auctions would stimulate price, quality, and variety of service competition because licensees will need to recoup their costs. To recoup their costs, licensees must attract as many customers as possible. However, preventing monopolistic control of the orbital-spectrum would not be guaranteed with the auction system. It is conceivable that one or a few operators could outbid all other applicants.[169] The prevention of monopolistic control of the orbital-spectrum would have to be left to anti-trust laws or the F.C.C. in some kind of post bidding screening system.

VI. The Best System

Which method, comparative hearings, lotteries, or auctions will produce the greatest technological development, competition, and nonmonopolistic market for orbital-spectrum services? To answer this question the likelihood of each method reaching the stated goals and any other collateral benefits or detriments must be evaluated.

Of the three methods, a lottery system appears to be the least efficient in producing the desired goals. Except when the F.C.C. is extensively involved in screening applicants, a lottery system will not necessarily lead to the selection of an efficient competitor, let alone one of the best. Even with preferences being given to applicants with desirable attributes, uncompetitive or subpar applicants can win a lottery. Further, a lottery system, even with preferences given to technically innovative applications, will not stimulate technological

168 Applicants could even ask and negotiate with neighboring users for the neighbors to modify their use of the orbital-spectrum.

169 Professor Coase would argue that such a result would not be bad though. An operator's ability to outbid other applicants merely means that the operator has and will be able to put the orbital-spectrum to the most efficient use as determined by the market.

advances to the degree that either auctions or comparative hearings would. Because a lottery license is free, aside from the application preparation costs inherent in any licensing scheme, a licensee will have less start up costs to recover and therefore less incentive to capture a large share of the market with innovative technology. Also, in a lottery system the F.C.C. will continue to determine where a satellite may be positioned. When the F.C.C. decides where a satellite may be positioned, positioning is done according to accepted technology rather than according to innovative technology, driven by the desire to reduce costs through innovation, and the give and take of negotiations between potential orbital-spectrum neighbors.

As for price competition, if we assume a worst case scenario of a seller's market[170] for telecommunication services, a lottery method appears to offer no advantage over either an auction or comparative hearing method. The exception may be that because of a relatively free license, the licensee will feel less pressure to operate efficiently in order to recover fixed costs.

Between auctions and comparative hearings, auctions offer the most promise. Comparative hearings, assuming an impartial process,[171] can produce technical innovation when competing applicants try to out do one another. However, as with lotteries, the F.C.C. will still select orbital-spectrum spacings and the benefits of competitive driven technological innovations and neighbor negotiations will be lost. Similarly, comparative hearings will result in a diversity of services and a nonmonopolistic market if the F.C.C. values those characteristics in making its choices. However, it is arguable that the new and diverse services valued by the F.C.C. will not be the services valued by the consuming public. Inefficiencies in supply selection may result from comparative hearings. Finally, in a sellers' market, comparative hearing will likely lead to no less price competition than will lotteries or auctions. However, because of the costs of comparative hearings to the applicants, licensees may need to pass the cost on to their customers. The size of the passed on cost will depend on how closely the F.C.C. decides to control common carrier rates.

Comparative hearings have some additional drawbacks that cannot be ignored. Comparative hearings for broadcast licenses are expensive and time consuming. The applicants must hire consultants and attorneys to prepare and prosecute application for times of up to five years.[172] The F.C.C. must also allocate increasingly scarce re-

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170 A worst case scenario is the best and truest test of any system.

171 The history of comparative hearings contains numerous allegations of improper practices. *See* BERNARD SCHWARTZ, THE PROFESSOR AND THE COMMISSIONS (1959).

172 Time delays of five years will not likely occur in orbital-spectrum hearings after the issuance of new comparative hearing rules by the F.C.C. and because an orbital-spectrum hearing would not involve questions of programming. 56 Fed. Reg. 787 (1991).

sources to the decision process. In the words of economists, comparative hearings involve high transactional costs. Because of these high transactional costs and other reasons, the F.C.C., as early as *Domsat I*,[173] has done its best to avoid comparative hearings in orbital-spectrum licensing decisions.[174]

While comparative hearings will bring about many of the results sought, auctions will do a better job and also reap added benefits. When the auctioning of unlimited orbital-spectrum licenses is permitted, the incentive to use a license in the most efficient manner possible is at its highest. New competitors will search for any nook or cranny in the orbital-spectrum that will accommodate a satellite. That search will be more than a combing of existing charts and tables, it will include looking for new ways to squeeze a new orbital-spectrum location out of an apparently saturated orbit or negotiating two uses out of what was once just a one use location. Undoubtedly engineers will be involved in this search and new technologies will be tried. If a profit can be made from putting another satellite in the orbit, and doing so means developing new technology, the use of the geostationary orbit and the service received by the public will be the better for it. Also, if operators have to pay for orbital slots they will be discouraged from stockpiling locations and encouraged to use as little of the orbit as possible.

The auctioning of unlimited licenses will also stimulate price and service competition better than lotteries or comparative hearings. More licensed users of the orbit means more providers offering services to the consuming public. A larger supply should lead to a reduced price as there will be fewer customers per provider to bid up the price. While providers will be paying for the right to use the orbital-spectrum, something not done now, and passing that cost on to their customers, the increased competition should at the least balance off the added cost.

Auctions, in some observer's opinions, might have the potential to create a monopolistic or oligopolistic market. With the high cost of market entry this is possible. However, the F.C.C., with the help of the Justice Department, could easily develop a pre-bidding or post-bidding oversight process. Additionally, if the F.C.C., using its authority under title II over common carriers, maintains its control over the rates changed, the potential abuses of an oligopoly can be guarded against.

Auction can also produce some desirable side effects. First, the

173 *In re* Domestic Communication-Satellite Facilities by Non-Governmental Entities, 22 F.C.C.86 (1970).

174 The F.C.C. first stated this position in Domsat 11. *See* Domestic Communication-Satellite Facilities by Non-Governmental Entities, 35 F.C.C.2d 844, 850 (1972). *See also In re* Assignment of Orbital Locations to Space Stations in the Domestic Fixed-Satellite Service, 3 F.C.C.R. 6972 (1988).

government will receive payment, rents, for what is now given away free. Second, if satellite operators are forced to pay for the use of the radio-spectrum, their prices will reflect the true cost of the service rather than an artificial and subsidized price. With prices that reflect true costs, the consuming public will be able to make a true comparison between satellite services and competing technologies like fiber-optics. Third, the censorship that might develop in a comparative hearing system will be avoided.

VII. Conclusion

In the final analysis, the open skies policy served the F.C.C., the telecommunications industry, and the consuming public well. Under the policy, the United States has developed a world leading telecommunication's market. However, the time has come to move beyond the open skies licensing system in order to maintain the dynamics and leading character of the current market. The satellite telecommunications industry has matured and no longer needs the subsidy of free use of the orbital-spectrum. But equally, the industry cannot flourish in a regulatory system that retards innovation and competition. The open skies system is dead. Long live the auction system.