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Implications of the 1983 Regional Administrative Radio Conference on Direct Broadcast Satellite Services: a Building Block for WARC-85

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NOTES AND COMMENTS

IMPLICATIONS OF THE 1983 REGIONAL ADMINISTRATIVE RADIO CONFERENCE ON DIRECT BROADCAST SATELLITE SERVICES: A BUILDING BLOCK FOR WARC-85

I. INTRODUCTION

The 1983 Regional Administrative Radio Conference (RARC-83) will serve as a building block for the 1985 World Administrative Radio Conference (WARC-85).[1] These conferences are held under the auspices of the

1. The World Administrative Radio Conference on the Use of the Geostationary Satellite Orbit and the Planning of the Space Services Utilizing It is scheduled to meet August 8-September 13, 1985 in Geneva. Calendar, 52-I TELECOM. J. (1985); FCC, Notice, 49 Fed. Reg. 21,419 (1984). The Radio Regulations (Geneva, 1959) 12 U.S.T. 2377, T.I.A.S. No.

International Telecommunication Union (ITU), a specialized agency of the United Nations. The ITU manages the electromagnetic spectrum, the entire range of wavelengths or frequencies, and is responsible for virtually all international telecommunication regulations. Its duties are carried out through regional and world conferences, such as RARC-83.[2] The purpose of RARC-83 was to devise an equitable and efficient plan which assigned space frequencies and orbital positions for the development of broadcast satellite services (BSS), including the most technologically advanced Direct Broadcast Satellite (DBS) services, in the Western Hemisphere (Region 2). This plan will be proposed for formal incorporation into the ITU's Radio Regulations at the upcoming WARC-85.

RARC-83 succeeded in allocating high frequency bands and orbital positions in an equitable and orderly pattern. In order to reach this agreement most participating nations, including the United States, made concessions. Nevertheless, the U.S. was successful in achieving its major objectives for the accommodation of domestic direct DBS, better known as Direct Broadcast Satellite services. In fact, the plan is flexible enough to enable future U.S. satellite growth.

Part II of this note presents a brief overview of DBS technology. Part III surveys the International Telecommunication Union's international regulatory framework. Part IV discusses the RARC-83 plan and the concessions made by member nations during the proceedings. Finally, Part V evaluates the potential for DBS growth in the United States under the RARC-83 proposal.

II. DBS TECHNOLOGY

A Direct Broadcast Satellite service transmits video programming by satellite to individual homes through small parabolic ("dish") receiving antennas. The satellite itself is "located in the geostationary orbit, 22,300 miles above the equator".[3] It receives signals from earth and retransmits them to receiving antennas installed at individual homes.[4] Satellite technology is such that a more powerful satellite transmission requires less sophis-

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4893, are amended at each conference; the most recent revisions are contained in the Senate Committee on Foreign Relations Hearings, May 18, 1982, *infra* note 35. *See infra* notes 36-49 and accompanying text.

2. *See infra* notes 40-52 and accompanying text.

3. FEDERAL COMMUNICATIONS COMMISSION, DIRECT BROADCAST SATELLITE FACT SHEET I (1984) [hereinafter cited as FCC, FACT SHEET]. The "dishes" are approximately 2.5 feet in diameter. *Id.*

4. *Id.*

ticated and less costly ground receiving antennas.[5] Direct broadcasting satellites transmit such a high power signal that they require only a small, inexpensive antenna and receiving equipment.[6]

Conventional communications satellites (non-high frequency technology) are relatively low in power and require very expensive and elaborate earth receiving stations. Their programs are transmitted by satellite from one large central earth station to a similar receiving earth station and are then transmitted by broadcast facilities, *e.g.*, TV stations. These "fixed" satellites perform a distribution rather than a broadcast function.[7] Thus, "the big difference between DBS and other similar services is that DBS 'bypasses' the local TV station and instead is transmitted directly into the consumer's home."[8]

According to the Federal Communications Commission (FCC), a DBS system can:

a. Provide service to remote areas currently with little or no television service.
b. Make available additional channels of TV programming throughout the country.
c. Bring individualized programming to viewers by tailoring programs to small audiences with specialized tastes.
d. Provide innovative services such as high definition TV, stereophonic sound, telex and dual-language sound tracks.
e. Provide a variety of non-entertainment services, including educational programming and transmission of medical data.[9]

Proponents of DBS systems contend that DBS signals will supplement

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5. A. CHAYES, P. LASKIN & M. PRICE, DIRECT BROADCASTING FROM SATELLITES: POLICIES AND PROBLEMS 3 (1975) [hereinafter cited as A. CHAYES].

6. U.S. GENERAL ACCOUNTING OFFICE, PUB. NO. RCED-84-157, U.S. OBJECTIVES GENERALLY ACHIEVED AT BROADCASTING SATELLITE INTERNATIONAL CONFERENCE—IMPROVEMENTS CAN HELP IN FUTURE CONFERENCES 2 [hereinafter cited as GAO, OBJECTIVES]. The receiving equipment is attached to a conventional television set to convert the signal to the appropriate viewing frequency. The cost of all necessary equipment to enable viewing on a conventional television set should be no more than $500. FCC, FACT SHEET, *supra* note 3, at 2.

7. A. CHAYES, *supra* note 5, at 2. However, GAO, OBJECTIVES, *supra* note 6, at 2, states, "Reception of these lower-power conventional 'fixed' satellites has typically required dish antenna receivers up to 20 feet wide and costing thousands of dollars."

The difference between "fixed" satellite broadcasting and DBS broadcasting methods is illustrated in APPENDIX I.

8. FCC, FACT SHEET, *supra* note 3, at 3.

9. *Id.* at 1.

current television sources, not simply compete for television viewers.[10] In addition, a more competitive environment may force the broadcasting industry to provide services which fit the demands of society more accurately. To generate the proper operation of market forces and thus guarantee the best possible service, the FCC recommends that DBS services be allowed to operate as flexibly as possible, that is, with little or no regulation.[11]

III. BACKGROUND FOR THE REGIONAL ADMINISTRATIVE RADIO CONFERENCE

A. *History and Policies of the International Telecommunication Union*

The International Telecommunication Union's (ITU) origin can be traced to the signing of the 1865 International Telegraph Convention in Paris.[12] At this conference, the first multilateral agreements for the development of radio communications were signed and the International Telegraph Union was formed to regulate international telegraph transmissions and to establish an administrative structure. The Union expanded its functions and administrative structure as new communication technologies developed, *e.g.*, telephones.[13] In 1932, the International Telegraph Union merged with the International Radio Telegraph Union, created in 1906, and other international organizations dealing with telephone, telegraph, and radio to become a central international bureau, known as the International Telecommunication Union.[14]

Today the ITU is a specialized agency of the United Nations and is responsible for all international telecommunications regulation. The agency

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10. GAO, OBJECTIVES, *supra* note 6, at 2.

11. FCC, FACT SHEET, *supra* note 3, at 4. In support of their view that no further regulation of DBS is necessary, the FCC maintains that:

> [A]n abundance of programming from such varied sources will provide assurance of enough competition to force operators to attempt to meet consumer preferences. It will also make available a greater variety of programming, much of it directed at specialized audiences, and will expand the opportunity for new talents and points of view to gain expression. The operators in this market will serve the public interest best if they are allowed as much flexibility as possible to provide the programming technical services and financial arrangements that consumers desire.

Id.

12. E. MCWHINNEY, THE INTERNATIONAL LAW OF COMMUNICATIONS 51 (1971). The French text of the International Telegraph Convention, May 17, 1865, may be found in 130 Parry's T.S. 198.

13. E. PLOWMAN, INTERNATIONAL LAW GOVERNING COMMUNICATIONS AND INFORMATION 227 (1982).

14. E. MCWHINNEY, *supra* note 12, at 52; Rothblatt, *ITU Regulation of Satellite Communication*, 18 STAN. J. INT'L L. 1, 3 (1982).

is defined by its "Convention", a dual purpose document which establishes the structure and general purpose of the ITU, and sets out the relevant law. This instrument must be "re-adopted in toto by each ITU Plenipotentiary Conference, the supreme organ of the Union."[15]

The technical standards for DBS are suggested by a permanent committee of the ITU, namely the International Radio Consultative Committee (CCIR). The CCIR conducts studies and makes non-binding recommendations about technological developments to the Administrative Conferences. The International Frequency Registration Board (IFRB), another permanent committee of the ITU, serves a regulatory function by implementing the Radio Regulations (developed in administrative conferences) and maintaining the Master Register which lists the frequencies assigned to member nations.[16]

The ITU's rule-making functions are carried out by Administrative Conferences which convene only when there is a need to revise their regulations. Once adopted by a conference, these rules are binding upon the 157 member nations as additions to the Convention.[17] The conferences are responsible for allocating the radio frequency spectrum for all types of satellites.[18] The conferences, held on regional and world-wide levels, "include the World Administration Radio Conferences (WARCs), which meet infrequently to discuss specific topics, the Regional Administrative Radio Conferences (RARCs), which convene to discuss communications problems of a regional scope, and the Plenipotentiary Conferences," which decide administrative issues.[19]

The conferences set up committees, which are responsible for developing solutions to particular problems within specific areas. The committees then present their proposed resolutions to the entire conference body for approval. A general consensus of all member nations must be reached before any committee rules or assignments are accepted. The assignments agreed to in these conferences are Radio Regulations, and are reported and recorded in the Master Register by the IFRB, and accepted as additions to the Convention.[20]

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15. E. PLOWMAN, *supra* note 13, at 227. For the original Convention, see Final Acts of the International Telecommunication and Radio Conference, Atlantic City, 1947.

16. *Id.*; Georgetown Space Law Group, *DBS Under FCC and International Regulation*, 37 VAND. L. REV. 66, 99 (1984) [hereinafter cited as Georgetown].

17. Georgetown, *supra* note 16, at 99.

18. E. MCWHINNEY, *supra* note 12, at 61. Frequency allocation is important for the coordinated use of the spectrum. *Id.* at 60-64.

19. Georgetown, *supra* note 16, at 101.

20. E. MCWHINNEY, *supra* note 12, at 61. Consensus is based on a one vote per country system. Once accepted as an addition to the Convention, a regulation is binding on all member

B. Review of the World Administrative Radio Conferences

The following conferences have been the most significant to the development of DBS: the 1971 Space WARC, the 1977 Broadcasting-Satellite WARC, the 1979 WARC, and the 1983 RARC.[21]

1. *WARC-71*

The 1971 WARC for Space Telecommunications allocated the operational bands for BSS and established two basic principles for the international regulation of the electromagnetic spectrum—(1) "efficient use" and (2) "equitable sharing."[22] "The[se] twin principles . . . are based on the valid premise that the resources involved—space service frequencies and the geostationary orbit—are both finite and a *res communes*."[23] The IFRB traditionally assigned spectrum and orbital frequencies on a "first-come, first-served" basis to those applicants with the requisite technical ability. Thus, the first registrants, generally the more developed countries, have requested and received preferred orbital slots.[24]

WARC-71 promulgated a resolution expressing the intent that the mere registration of frequency assignments with the ITU would not establish those assignments as a permanent priority.[25] The resolution provides:

> 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.[26]

The 1971 conference also developed rules which restricted unilateral action in space by imposing obligations to promote efficiency and equity. The obligations mandate that member nations are:

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states. Georgetown, *supra* note 16, at 104-05. *But see* discussions of reservation *infra* at note 63.

21. Georgetown, *supra* note 16, at 101.

22. Final Acts of the World Administrative Conference for Space Telecommunications, July 17, 1971, 23 U.S.T. 1527, T.I.A.S. No. 7435.

23. Rothblatt, *supra* note 14, at 7.

24. K. QUEENEY, DIRECT BROADCAST SATELLITES AND THE UNITED NATIONS 90 (1978).

25. Rothblatt, *supra* note 14, at 9.

26. Final Acts of the World Administrative Conference for Space Telecommunications, July 17, 1971, Res. No. Spa 2-1, pt. 1, 23 U.S.T. 1527, 1820, T.I.A.S. No. 7435; K. QUEENEY, *supra* note 24, at 90.

(1) to provide the IFRB with basic operational data on any planned satellite system; (2) to coordinate with foreign administrations in eliminating potential interference; and (3) to design systems in a manner that would minimize satellite transmissions over foreign territory.[27]

WARC-71 succeeded in arranging the frequency channels and the use of orbital positions and in modifying the technical standards embodied in the "Table of Frequency Allocations." The conference also adopted a resolution directing later conferences to draft technical criteria, principles, and plans in an orderly and equitable global pattern.[28] Thus WARC-71 "set the direction for the orderly development of the broadcast satellite service."[29]

2. *WARC-77*

The plan designed by the 1977 WARC for the planning of the Broadcasting-Satellite Service in the frequency bands 11.7-12.2 GHz (in Regions 2 & 3) and 11.7-12.5 GHz (in Region 1) emphasized equitable use of space service by basing allocation on "at least for the 12 GHz band broadcasting-satellite service, *a priori* assignment of the orbit/spectrum resource."[30] This method of assignment derives from stated future needs. Previous ITU policy had been to allocate by *a posteriori* assignment in which the frequencies and orbital positions were assigned when a country was technologically capable of utilizing them.[31] Under the new plan, every country in Regions 1 (Europe) and 3 (Asia) was granted rights to future use of particular frequencies in conjunction with specific orbital slots.[32] One purpose of this allocation was to prevent countries with sufficient technical ability and resources from establishing direct broadcast satellite service to countries which desired to exclude such transmissions.[33] Region 2 (Western Hemisphere), however, did not participate in the Conference largely because of

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27. Rothblatt, *supra* note 14, at 9. This conference amended the Radio Regulations.

28. Georgetown, *supra* note 16, at 101; K. QUEENEY, *supra* note 24, at 94.

29. K. QUEENEY, *supra* note 24, at 80-81.

30. Final Acts of the World Administrative Conference for the Planning of the Broadcasting-Satellite Service in the Frequency Band 11.7-12.2 GHz (in Regions 2 and 3) and 11.7-12.5 GHz (in Region 1), Geneva, 1977; Rothblatt, *supra* note 14, at 11.

"The *a priori* plan approach relies upon specialized administrative conferences to subdivide and allot radio channels or satellite orbit positions to countries in advance of present need or capacity to use them." Rutkowski, *The 1979 World Administrative Radio Conference: The ITU in a Changing World*, 13 INT'L LAW. 289, 294 n.13 (1979).

31. *Id.*; Georgetown, *supra* note 16, at 101.

32. Rothblatt, *supra* note 14, at 11-14. Technical parameters are identification, location, and power designations assigned to the satellites.

33. K. QUEENEY, *supra* note 24, at 212.

the influence of the United States.[34] Specific arrangements for Region 2 were thus postponed until RARC-83.

3. *WARC-79*

The WARC-79 conference made specific recommendations to assure "equitable access" to the broadcast spectrum for less developed countries (LDCs).[35] This conference did not specifically discuss DBS issues, but its results directly affect all satellite systems.[36] It further defined the orbital slots by segmenting the 12 GHz frequency band. Both fixed and broadcast satellites had been sharing the 11.7-12.7 GHz band since 1971.[37]

The resulting plan allocated the 11.7-12.1 GHz band to fixed satellites and the 12.3-12.7 GHz band to direct broadcast satellites. The two services were permitted, however, to operate in each other's band under certain conditions and were to share the unassigned 12.1-12.3 band until permanent rules could be established.[38]

This separation has allowed orbital positions to be patterned in a more orderly fashion (*i.e.*, the geostationary orbital arc need not be so segmented), thus keeping with the WARC-71 efficient use principle. In addition, it has created a more interference-free environment in which the development of fixed and direct broadcasting systems can be maximized, and the equitable access requirement should assure all nations of this opportunity.[39]

IV. 1983 REGIONAL ADMINISTRATIVE RADIO CONFERENCE

A. *Evolution of the 1983 Agreement*

The RARC-83 was convened to establish technical standards and procedures for broadcasting satellite service in the Western Hemisphere (Re-

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34. *See* FCC Report and Order, Notice, 48 Fed. Reg. 19,212 (1983); FCC, GENERAL DOC. NO. 80-398; FCC 83-102.

35. Final Acts of the World Administrative Radio Conference, Geneva, 1979 entered into force Jan. 1, 1982, ___ U.S.T. ___, T.I.A.S. ___ available in *Treaty 97-21, Radio Regulations (Geneva, 1979) and Final Protocol (The Result of the World Administrative Radio Conference, 1979): Hearing Before the Senate Comm. on Foreign Relations*, 97th Cong., 2d Sess. (May 18, 1982). Hart, *A Review of the WARC-79 and its Implications for the Development of Satellite Communications Services*, 12 LAW. AM. U. MIAMI J. INT'L L. 442 (1980).

36. Georgetown, *supra* note 16, at 102.

37. Hart, *supra* note 35, at 453. GHz is the abbreviation for gigahertz which is defined as one billion cycles per second and is used to measure the frequency of radio waves.

38. Rothblatt, *supra* note 14, at 13.

39. Hart, *supra* note 35, at 453-54.

gion 2), based on WARC-71, WARC-77, and WARC-79.[40] The 1983 conference resolved "problems of sharing the designated broadcasting satellite service radio frequencies with existing [fixed] communications satellite services [(FSS)]," as well as the division of the 12.1-12.3 band.[41]

RARC-83 was in session for five weeks and set up seven committees to draft the plan. As a precursor to any committee work, the operational bandwidth had to be established. The division was made at 12.2 GHz; the upper half (12.2-12.3) for use by BSS and the lower half (12.1-12.2) for use by FSS.[42]

The final RARC-83 agreement was the result of numerous proposals from participating nations.[43] Most of these nations had to make concessions on the number of slots and orbital positions and the orbital elevation angles they desired.[44] The RARC-83 agreement, however, is only a recommended plan for WARC-85.[45]

Two factors had significant impact on the development of the 1983 plan. The RARC-83 agreement was premised on an *a priori* rather than an *a posteriori* allocation system, and could only be approved by a consensus using the one-vote per nation system.[46] These requirements put lesser devel-

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40. GAO, OBJECTIVES, *supra* note 6, at 1. It should be noted that the term direct broadcast satellite (DBS) is used by the Federal Communications Commission (FCC) when discussing domestic policy matters and BSS is used in regard to international frequency allocation matters. *Id.* at 1 n.1.

For the official version of RARC-83, see Final Acts of the Region 2 Administrative Radio Conference for the Planning of the 12 GHz Broadcasting-Satellite Service and Associated Uplinks, Geneva, 1983, available from the General Secretariat of the ITU, International Telecommunication Union, Places des Nations, CH-1211 Geneve 20, Switzerland.

41. U.S. GENERAL ACCOUNTING OFFICE, PUB. NO. RCED-83-121, U.S. PREPARATIONS FOR AN INTERNATIONAL CONFERENCE ON BROADCAST SATELLITES 1 (1983) [hereinafter cited as GAO, PREPARATIONS].

42. B. PATTAN, SUMMARY OF THE TECHNICAL AND PLANNING OUTPUT OF THE REGIONAL ADMINISTRATIVE RADIO CONFERENCE (RARC) HELD IN JUNE 1983, FEDERAL COMMUNICATIONS COMMISSION, PUB. NO. FCC/OST TM84-1 (1984) (hereinafter cited as B. PATTAN]. Each committee was given "terms of reference" to guide it in its decision-making process and these decisions were all achieved by consensus.

43. *Coming to Consensus in Geneva,* BROADCASTING, June 18, 1983, at 24 [hereinafter cited as *Consensus in Geneva*]. The participating nations at RARC-83 were Argentina, Belize, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Denmark, Ecuador, France, Honduras, Grenada, Guyana, Jamaica, Mexico, Nicaragua, Netherlands (Antilles), Peru, Suriname, United Kingdom of Great Britain and Northern Ireland, United States of America, Uruguay and Venezuela. GAO, OBJECTIVES, *supra* note 6, at app. I.

44. *See infra* notes 53-59 and accompanying text. *U.S. Team Back from Geneva Pleased with Itself and ITU,* BROADCASTING, July 25, 1983, at 27 [hereinafter cited as *Back from Geneva*].

45. Georgetown, *supra* note 16, at 141.

46. *Back from Geneva, supra* note 44, at 26. The acceptance of the *a priori* method for

oped countries (LDCs) in a powerful position because their stated needs and their votes had the same weight as those of more developed countries.

Cuba initially proposed an overall plan for the allocation of orbital slots which appealed to smaller countries because it promoted equal access. Although the advanced countries wished to maintain good relations with the LDCs, they could not accept the Cuban plan because it would not satisfy their stated needs.[47] The technologically advanced countries responded with their own plan, which was essentially a combination of the U.S. and Canadian plans.[48] Fortunately for the advanced countries, their "high capacity" plan provided better protection margins from interference and "spill-over" than the Cuban plan. In fact, the final consensus, which included Cuba, was that this plan was superior. It will therefore be recommended for adoption at WARC-85.[49]

Under the plan finally adopted, the RARC-83 delegates elected to assign orbital slots to the service areas of Region 2 using the approach suggested by the U.S., that is, a flexible set of procedures which allows use of the full range of available frequencies, rather than the plan adopted by the other ITU regions, regions 1 and 3, which assigned specific orbital locations and frequencies.[50] The plan's inherent flexibility permits a wide range of technical standards and BSS configurations.[51] This flexibility facilitated the accomplishment of major U.S. goals, including: (1) "obtaining adequate geostationary orbit and frequency capacity;" and (2) "providing for procedural/technical flexibility and minimal coordination with other nations" to introduce or modify broadcasting satellite service.[52]

B. *Issues Resolved by Compromise*

The RARC-83 plan was the result of numerous compromises. Countries were required to give and take on a variety of issues, including: (1) the number of orbital slots and channels, their positions, and the amount of eclipse protection; (2) the power flux density (satellite signal strength), and

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orbital slot assignment was rejected by the United States until RARC-83. The United States preferred a "first-come, first-served" method for orbital frequency allocations, GAO, OBJECTIVES, *supra* note 6, at 19.

47. *Consensus in Geneva, supra* note 43, at 25.

48. B. PATTAN, *supra* note 42, at 16. This plan was also referred to as the high capacity plan. *See also Consensus in Geneva, supra* note 43, at 25.

49. *Consensus in Geneva, supra* note 43, at 25.

50. GAO, OBJECTIVES, *supra* note 6, at 8-10.

51. *Id.; Consensus in Geneva, supra* note 43, at 25.

52. GAO, OBJECTIVES, *supra* note 6, at 8-10. The bandwidth division made at the opening of the conference furthered the U.S.'s objectives because it allows adequate spectrum space for both FSS and BSS. Georgetown, *supra* note 16, at 103.

polarization (signal transmission plane); (3) the type of interim system to be implemented; and (4) political disputes.

1. *Orbital Slots and Channels*

Many countries had to make concessions concerning orbital slots and channels. According to an American delegate on the planning committee, the South American countries did the most compromising. For instance, Brazil "gave up one of the six slots it had sought along with the 32 channels it could have accommodated."[53] Cuba compromised by accepting a less favorable position at 89°W. Mexico gave up several channels, and accepted assignments for four orbital positions which differed from their original IFRB submissions.[54] Several Caribbean administrations submitted a proposal for a single "Caribbean beam" but were unable to convince the others of its efficiency. Instead, the Caribbean received "five beams each centered on a particular country, but also serving contiguous service areas."[55]

The U.S. requested eight eclipse-protected orbital slots with 36 channels each, all capable of serving two time zones, *i.e.*, "half of the continental United States."[56] Several compromises resulted in the U.S. receiving a total of eight west longitude slots, each with 32 rather than 36 channels. Five of these slots are good orbital positions, allowing the U.S. to supply half CONUS (continental U.S. coverage). These locations (101°, 110°, 119°, 148°, and 157°) also have adequate elevation angles.[57] Of the remaining slots, the 175° and 166° locations cannot serve the mountain time zone and have low elevation angles which means that rain or other obstructions could cause signal interference, and the 61.5° slot has an eclipse protection problem which will occasionally deprive the satellite of power.[58]

The U.S. was not the only advanced country to make concessions regarding orbital slots. The Canadians also had to accept two easterly satel-

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53. *Consensus in Geneva, supra* note 43, at 25.

54. B. PATTAN, *supra* note 42, at 16.

55. *Id.* at 21. This beam involved transmitting common viable information to several Caribbean nations. In addition, each country would be assigned at least four of the 32 channels of a satellite. *Id.*

56. GAO, OBJECTIVES, *supra* note 6, at 11.

57. B. PATTAN, *supra* note 42, at 26.

58. *Consensus in Geneva, supra* note 43, at 24. The easternmost slot, at 61.5°W, has poor eclipse-time protection during the fall and spring equinoxes. The satellite would go dark as early as 9:23 p.m. and remain dark for as long as 72 minutes while the earth passes between the sun and the satellite and prevents the sun's rays from reaching the satellite's solar-powered batteries. *Id.*

See illustration of the United States' slots at APPENDIX II.

lite positions with poor eclipse protection.[59]

2. *Power Flux Density and Polarization*

Opinions diverged substantially regarding the power flux density (pfd) standard. Canada and Brazil favored a standard lower (minus 107 pfd to the square meter) than the United States' proposal (minus 105 pfd to the square meter). The two proposals represent a difference in power of 60 percent.[60] The U.S. stressed the importance of the higher standard to help stimulate the domestic DBS market by accommodating a high-definition television service and enhancing the quality of television color.[61] Canada and Brazil, however, have different priorities than the U.S. Both Canada and Brazil preferred the lower standard because of their particular concern about "spill-over" from surrounding countries.[62] In addition, in Canada, 80 percent of the homes have cable television; therefore, they prefer a less expensive and lower power system. Moreover, in Brazil the very heavy rainfall makes a lower power system more advantageous. When the RARC-83 selected the lower 107 pfd standard, the U.S. refused to acquiesce, claiming a reservation on this issue.[63]

The U.S. also refused to join the compromise decision to separate each channel by alternating polarization directions. "The United States proposed that polarization be left unspecified to allow the combination of channels to give enough frequency capacity for the domestic industry's proposed and enhanced television formats;" the RARC-83 agreement for polarization of the 32 channels requires that each channel must be specified in either a clockwise or counterclockwise direction to provide channel discrimination.[64]

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59. B. PATTAN, *supra* note 42, at 16. *See also Consensus in Geneva, supra* note 43, at 25.

60. *Back from Geneva, supra* note 44, at 27; Georgetown, *supra* note 16, at 103; *U.S. Outvoted at RARC on DBS Power Standard*, BROADCASTING, July 18, 1983, at 25 [hereinafter cited as *U.S. Outvoted*].

61. *U.S. Outvoted, supra* note 60, at 26.

62. *Id.* A lower power would be adequate to transmit DBS signals to large antennas for relay to Canadian cable television. However for high rain areas such as Brazil, high satellite power cost would be prohibitive because of rain attenuation. B. PATTAN, *supra* note 42, at 8.

63. *Back from Geneva, supra* note 44, at 27. "A reservation on an ITU agreement means that a nation takes exception to a specific decision of the conference and gives notice as to how it will act on the disagreement." GAO, OBJECTIVES, *supra* note 6, at 9. Thus, the U.S. can launch high-power satellites as long as they do not violate the plan's interference standard. E. MCWHINNEY, *supra* note 12, at 61.

64. GAO, OBJECTIVES, *supra* note 6, at 11. Polarization is "the plane in which signals are transmitted." *Id.* at 9. It is "a feature of the transmitting antenna. The plan requires that the polarization of any given channel be specified in either a clockwise or counterclockwise direction to provide a measure of discrimination between channels of service. The U.S. proposed that polarization of a given channel be specified in either direction as a means of affording the

Again, the U.S. took a reservation.

3. *Interim System*

The U.S. and its allies, Mexico and Brazil, persuaded the conference to allow the introduction of an interim broadcast system and to provide permissive procedures for its introduction.[65] Under such a system, countries may broadcast on frequencies allocated to other nations with the permission of those nations.[66] This adds a great deal of flexibility to the overall plan because countries may use satellite assignments with characteristics different from those specified in the plan, provided they adhere to interference limits. In addition, "a satellite's interference to other designated satellite assignments not in use may be disregarded until the other country notifies the ITU that it intends to use the assignment."[67] Controversy may arise, however, when a country notifies the ITU of its intention to use a designated assignment which is currently experiencing interference from another country's system.

The Canadian interim system proposal, which would have protected existing interim assignments beyond the U.S. plan's prescribed protections for permanent assignments, was rejected. Had the proposal been accepted, it would have preserved the "first-come, first-served" approach, but its adoption was successfully blocked by the U.S., which supported the more flexible method.[68]

4. *Political Disputes*

Most of the concessions made by the nations participating in RARC-83 were technical in nature. There was, however, one important extraneous political issue involving the Falkland Islands dispute. While the Master Register relegates the geostationary orbit above the Falklands to the United Kingdom, Argentina wanted to raise a claim of sovereignty over that orbit at the Conference.[69] The United Kingdom maintained that the dispute was

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flexibility that would be gained from combining channels." *Back from Geneva, supra* note 44, at 26-27.

65. Countries opposed to this approach include Cuba, Ecuador, and Colombia. *Consensus in Geneva, supra* note 43, at 25.

66. *Consensus in Geneva, supra* note 43, at 25. "Although this procedure may require the consent of other nations, the process is less formal than that required for modifications of the plan." GAO, OBJECTIVES, *supra* note 6, at 8.

67. GAO, OBJECTIVES, *supra* note 6, at 10.

68. *Consensus in Geneva, supra* note 43, at 25.

69. This claim was initially raised in the Declaration of Equatorial States, signed in Bogotá, Colombia, on December 3, 1946, I.T.U. 1977 BROADCASTING SATELLITE DOC. NO. 81,

a juridical matter which was beyond the reach of the conference's power. The IFRB accepted the United Kingdom's argument because the ITU Radio Regulations require strict adherence to the Master Register.[70] Thus the conference quickly skirted the "political crossfire."

V. IMPLICATIONS OF RARC-83 FOR DBS SERVICE IN THE UNITED STATES

A. *Administration by the FCC*

In the United States, frequency allocations to individual service providers are coordinated on both a national and an international level. The Federal Communications Commission (FCC), which determines the allocation at the national level, must act within the constraints set by the ITU.[71] Under the auspices of the ITU, the RARC-83 has enabled the FCC to authorize eight United States companies to construct satellite systems.[72]

Between April 21, 1981 and the RARC-83, in June 1983, the FCC promulgated Interim Rules for DBS operations and licensing, pursuant to Title III of the Communications Act of 1934.[73] The FCC's DBS policy is based on a flexible regulatory approach, "[t]hus, the Interim Rules impose[d] a minimum number of regulatory requirements on applicants for licenses to operate DBS systems."[74] These rules, however, were changed to accommodate RARC-83 requirements.

On June 1, 1981, the FCC released a Proposed Policy Statement and Rulemaking, setting forth "proposed policies and conditions to govern the authorization of interim BSS services," and accepted an application from the Satellite Television Corporation (STC), a subsidiary of the Communications Satellite Corporation (COMSAT), requesting authority to begin satellite construction for a satellite-to-home video broadcasting system.[75] In 1982, the FCC granted STC and seven other first-round applicants condi-

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ANNEX 4.

70. *Consensus in Geneva, supra* note 43, at 25.

71. E. DIAMOND, N. SANDLER & M. MUELLER, TELECOMMUNICATIONS IN CRISIS: THE FIRST AMENDMENT, TECHNOLOGY, AND DEREGULATION 74 (1983) [hereinafter cited as E. DIAMOND]. "The Communications Act of 1934 created the Federal Communications Commission and gave it the responsibility and authority to regulate non-Government telecommunications." GAO, PREPARATIONS, *supra* note 41, app. I., at 3.

72. FCC, FACT SHEET, *supra* note 3, at 6.

73. The Communications Act of 1934, 47 U.S.C. §§ 301-332 (1982).

74. Georgetown, *supra* note 16, at 77.

75. GAO, PREPARATIONS, *supra* note 41, app. I., at 8; Notice of Proposed Policy Statement and Rulemaking, 86 F.C.C.2d 719 (1981), Interim Direct Broadcast Satellite Applications, 46 Fed. Reg. 32,497 (1981).

tional construction permits for the DBS system. The seven other DBS applicants were CBS, Inc., DBSC, Graphic, RCA, USSB, Videosat, and Western Union.[76] These companies were warned that they would have to conform to RARC-83 revisions and requirements and could not be assigned frequencies or orbital positions until after the conference.[77]

The revision most likely to have affected the DBS applicants would have been an assignment to the U.S. of fewer spectrum-orbits than those already allocated. Because the U.S. was able to obtain the eight orbital slots it requested, the FCC was correct in its judgment that RARC-83 would not significantly damage its interim authorizations.[78]

B. *Present Orbital Allocations*

At RARC-83 the U.S. fulfilled its geostationary orbital needs and frequency capacity and gained the flexibility it required as well.[79] Ambassador Washburn, Chairman of the U.S. RARC-83 delegation, stated that the needs of the eight approved DBS applicants and others could be met.[80] However, as noted, only five of the obtained orbital slots are trouble-free. The westernmost locations at 175° and 166° are only capable of serving the Pacific time zone, Alaska, and Hawaii, and their elevation angles are low, which makes them susceptible to interference. Thus, they are much less economical to use.[81] The easternmost slot, 61.5°W, has the eclipsing problem, but Washburn believes that "by the time there is a demand for it, technology might well have solved the battery problem. In the meantime . . . it [can act as] a spare."[82]

Despite the eclipsing and interference problems, the FCC plans to treat all orbital positions and frequencies within the relevant range as having equal value in order "to prevent conflicts from arising over a particular frequency or orbital position."[83] Thus, the problems associated with the three marginal orbital slots will not be taken into consideration, and the approved applicant will have to bear the loss. The U.S. RARC-83 delegates believe that the five slots "in the middle" will be the first chosen because each "permit[s] coverage of half the country, as well as a single time zone."[84]

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76. FCC, FACT SHEET, *supra* note 3, at 6; Georgetown, *supra* note 16, at 89.
77. FCC, FACT SHEET, *supra* note 3, at 6.
78. Georgetown, *supra* note 16, at 79, 83.
79. GAO, OBJECTIVES, *supra* note 6, at 8.
80. *Consensus in Geneva, supra* note 43, at 24.
81. GAO, OBJECTIVES, *supra* note 6, at 11. *See* APPENDIX II.
82. *Consensus in Geneva, supra* note 43, at 24.
83. Georgetown, *supra* note 16, at 81; codified at 47 C.F.R. § 100.13(b) (1982).
84. *Consensus in Geneva, supra* note 43, at 24. The 61.5°W location is also "half-

VI. CONCLUSION: POSITIVE DBS GROWTH

The U.S. delegates believe that the RARC-83 plan is flexible enough to meet future U.S. requirements, as well as present ones. The plan allows an interim system to operate for 12 years, with a possible two year extension, as long as the system does not cause interference, or if agreement of the affected country is obtained. In addition, the plan can be modified so that a new system can be introduced without any other country's agreement, if it does not cause interference.[85]

Washburn has concluded that the plan is a "major achievement."[86] In fact, while an advisory committee of industry experts has predicted that the U.S. will need between 68 and 215 channels of DBS service by the end of this century, the RARC-83 plan has already given the U.S. "256 channels—on the basis of 32 for each of the eight orbital slots."[87] Thus, as Washburn states, the plan provides amply for the United States' present and future needs.[88]

RARC-83 concluded by adopting a high capacity plan for the Western Hemisphere which is very favorable to DBS growth in the United States. In fact, "[w]hat evolved for the U.S. was a flexible *a priori* plan in which entire blocks of frequencies are assigned to a service area, with specific channel and polarization assignments."[89] However, the U.S. need not follow these specific restrictions because it took reservations on both polarization and power flux density.[90] The U.S. is thus able to tailor its systems to its own needs.

If, as expected,[91] the RARC-83 recommended plan is approved at WARC-85, it will pave the way for DBS development and market success. The channel capacity seems more than adequate for the United States' present needs, and the plan's flexibility will help facilitate and encourage future growth. In fact, DBS "could develop into a multibillion dollar industry in the United States by the end of the decade" with this approach.[92]

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CONUS" but its current eclipsing problem makes it the least desirable.

85. *Consensus in Geneva, supra* note 43, at 25.

86. *Back from Geneva, supra* note 44, at 26.

87. *Id.*

88. *Id.*

89. B. PATTAN, *supra* note 38, at 27.

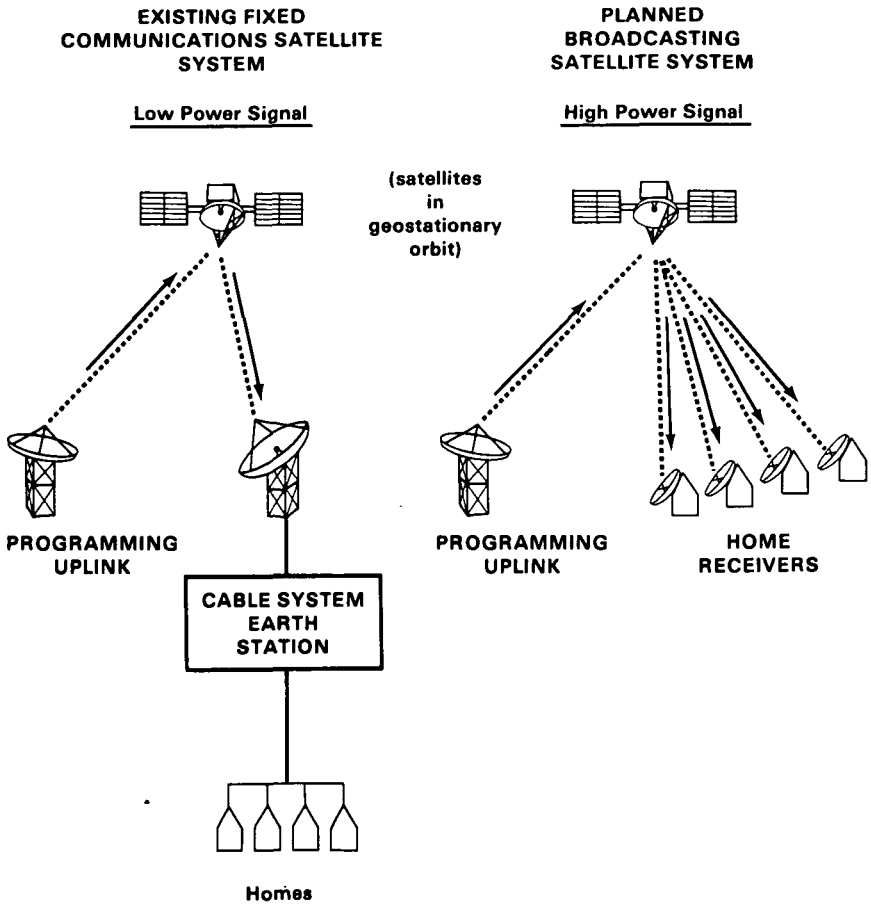
90. *Id.* The power flux density reservation will allow the U.S. to use a higher power standard which will enable greater signal coverage per channel.

91. Telephone interview with Bruce Franca, Mass Media Bureau, Federal Communications Commission (March 6, 1985).

92. GAO, PREPARATIONS, *supra* note 41, at 2.

APPENDIX I

Satellite Systems



GAO, OBJECTIVES, *supra* note 6, at 3.

APPENDIX II

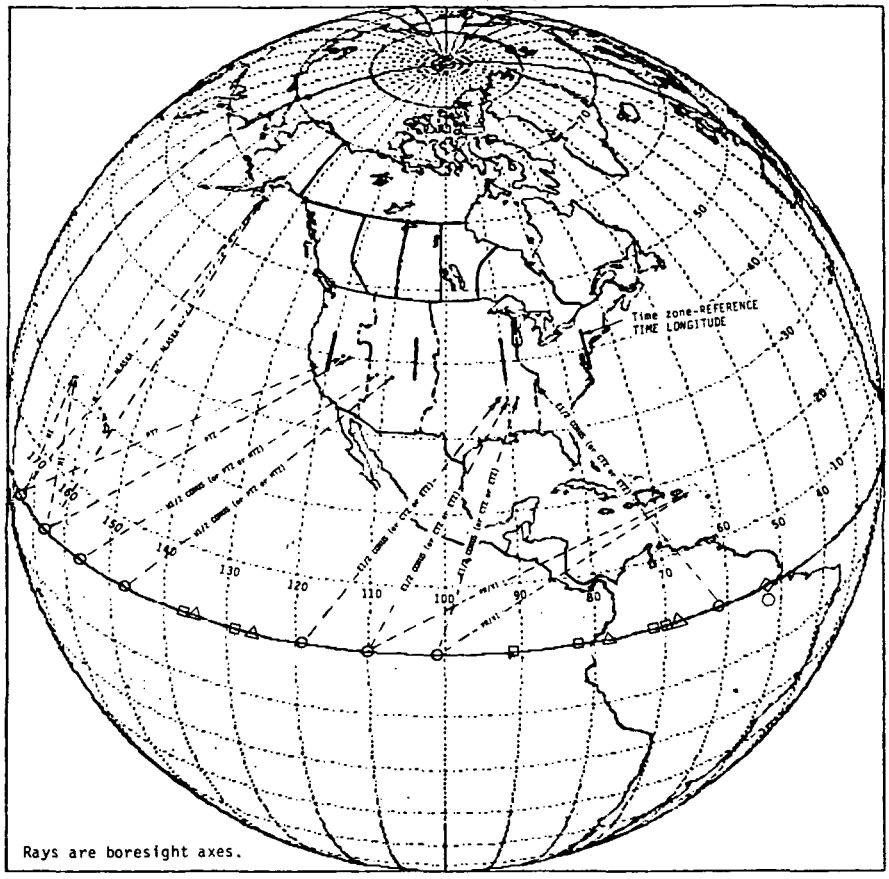
North America DBS Satellite Locations (RARC-83)

○ : U.S.A. (175°W, 166, 157, 148, 119, 110, 101, 61.5), [these locations may support multiple U.S. satellites (clustering)]

□ : CANADA (138°W, 129, 91, 82, 72.5, 70.5)

△ : MEXICO (136°W, 127, 78, 69)

Note: Other Administration satellites are interposed, but not shown.



B. PATTAN, *supra* note 42, at 18.