

**Use of Negotiated Rulemaking in Developing Technical Rules
for Low-Earth Orbit Mobile Satellite Systems**

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ABSTRACT

Technical innovations have converged with the exploding market demand for mobile telecommunications to create the impetus for low-earth orbit (LEO) communications satellite systems. The so-called "Little LEOs" propose use of VHF and UHF spectrum to provide position - location and data messaging services. The so-called "Big LEOs" propose to utilize the RDSS bands to provide voice and data services. In the United States, several applications have been filed with the U.S. Federal Communications Commission (FCC) to construct and operate these mobile satellite systems. To enable the prompt introduction of such new technology services, the FCC is using innovative approaches to process the applications.

Traditionally, when the FCC is faced with "mutually exclusive" applications, e.g., a grant of one would preclude a grant of the others, it uses selection mechanisms such as comparative hearings or lotteries. In the case of the LEO systems, the FCC has sought to avoid these time-consuming approaches by using negotiated rulemakings. The FCC's objective is to enable the multiple applicants and other interested parties to agree on technical and service rules which will enable the grant of all

qualified applications. With regard to the VHF/UHF systems, the Advisory Committee submitted a consensus report to the FCC. The process for the systems operating in the bands above 1 GHz involved more parties and more issues but still provided the FCC useful technical information to guide the adoption of rules for the new mobile satellite service.

INTRODUCTION

Miniaturization has enabled the space industry to build smaller satellites with more efficient power. The shrinking of satellites is accompanied by a decrease in costs, both for building the satellite and launching it. This has brought about a revolution in designing communications satellite systems, and has enabled entrepreneurs to consider deploying satellite systems to deliver mobile voice and/or data communications. Nine companies have applied to the FCC for authority to construct and operate constellations of non-geostationary satellite systems to provide mobile voice, data and position-location services.

The FCC instituted a new regulatory procedure to enable these systems to be licensed and placed into service promptly. This procedure is called Negotiated Rulemaking.

BELOW 1 GHz APPLICATIONS: THE LITTLE LEOS

In February 1990, ORBCOMM, a subsidiary of Orbital Sciences Corporation, filed an application to build, launch and operate a constellation of small satellites in low earth orbit to provide low cost, position determination and messaging services to millions of consumers in the United States and abroad. It represented the first private, global satellite system designed to provide direct access to the satellite for the user. Orbcomm's 24 satellites are projected to weigh just 330 pounds, with a per satellite cost of \$8.6 million. To keep costs down, Orbcomm proposed the use of UHF and VHF frequencies to enable terminals to be built with currently available radio components.

LEOs below 1 GHz

**ORBCOMM
STARSYS
VITA**

Other applications for "Little LEO" service were filed by STARSYS, Inc., an affiliate of North American CLS, Inc., Volunteers in Technical Assistance VITA), and Leosat Corporation. North American CLS provides services and equipment to North American users of the French/U.S. Argos satellite system. VITA sought authorization to use three small satellites for a packet-switched network, for its non-profit disaster and medical relief service in developing countries. Leosat proposed serving the automotive market primarily. The FCC consolidated these proposals, and their associated rulemaking petitions, for purposes of spectrum allocation,

development of technical and service rules, and application processing.

The applicants petitioned for frequencies used primarily in the United States by the Department of Defense and for various fixed and mobile services around the world. After gaining the support of the United States government, the applicants, particularly ORBCOMM, marshalled support for the new mobile satellite service from countries throughout the world, and gained the needed spectrum allocations at the 1992 World Administrative Radio Conference. The bands allocated are 137-138 MHz, 148-150.05 MHz, 400.15-401 MHz and 399.9-400.05 MHz.

ABOVE 1 GHz APPLICATIONS: THE BIG LEOS

Motorola Satellite Corp., in June, 1990, announced its plans to launch and operate a LEO satellite network to provide mobile voice communications to virtually any point on earth. The Iridium™ system is essentially a cellular network with the microwave repeating towers, consisting originally of 77 satellites, orbiting 413 nautical miles above the ground. Motorola has since reduced the number of satellites to 66.

Ellipsat Corp., a small entrepreneurial firm (Fairchild is now an investor), in November 1990, filed an FCC application to launch six small satellites into elliptical orbit, to provide voice as well as position location service. In addition to being the first U.S. commercial system to propose use of elliptical orbits, Ellipsat was the first of the LEO applicants to request the RDSS frequencies for its system.

The RDSS frequencies -- 1610-1626.5 MHz (Earth-to-space) and 2483.5-2500 MHz (space-to-Earth)-- had been allocated for position location services at the 1987 World Administrative Radio Conference on Mobile Services.

In December 1990, Motorola filed for its system with the FCC, also proposing to use the RDSS frequencies for the Iridium™ system. The FCC then established a "cut-off date," requiring comments on the Motorola and Ellipsat application, as well as any other applications proposing to use the RDSS frequencies, to be filed by June 3, 1991. Four entities filed applications on June 3, 1991: (1) including Loral Qualcomm Satellite Services (LQSS) for its 48 satellite Globalstar™ system; (2) TRW Inc. for a medium earth orbit, 12 satellite system, Odysseysm; (3) Constellation Communications, for a 48 satellite system, Aries; and (4) the American Mobile Satellite Corp., AMSC, for use of the 1616.5-1626.5 MHz band for its geosynchronous mobile satellite system.

LEOs above 1 GHz

Motorola
Loral Qualcomm
TRW
Constellation
Ellipsat

The United States, with the support of these entities, was able to obtain a primary allocation in the 1610-1626.5 MHz and 2483.5-2500 MHz band, and a secondary allocation in the 1613.8-1626.5 MHz (space-to-Earth) to accommodate Motorola's desire to operate bidirectionally in the upper part of the L-band.

The FCC, in August, 1992, proposed adopting the spectrum allocations in the United States. In its Notice of Proposed Rulemaking (NPRM), ET Docket No. 92-28, FCC 92-358, the Commission sought comment on numerous technical aspects regarding operation of systems in these

bands and noted the need for a separate proceeding to address MSS service rules and licensing, as well as the possibility of adopting a limitation on the type of access method to be used to maximize sharing possibilities.

The NPRM highlighted the many technical issues that would have to be addressed, if not resolved, before the Commission could proceed to process the pending applications. Not the least of these was Motorola's proposed bidirectional operation, which vastly complicates, if not precludes sharing spectrum with any other communications system, including other MSS systems. Another thorny issue concerns the extent to which compatible operations could be attained by the four CDMA systems, as well as compatibility with the FDD-TDD system proposed by Motorola.

FCC PROCESSING METHODS FOR MUTUALLY EXCLUSIVE APPLICATIONS

In the case of applications for the same spectrum which are "mutually exclusive," that is, the grant of one would result in a de facto denial of the other, Section 309 of the Communications Act requires a hearing. This right was affirmed by the U.S. Supreme Court in the case of Ashbacker v. United States, 326 U.S. 327 (1945) which states that, "where two bona fide applications are mutually exclusive the grant of one without a hearing to both" is improper." Hearings for radio licenses have been used extensively, although they are expensive and time-consuming. In some cases, radio license hearings have taken up to 10 years.

Wherever possible, the FCC has sought to use various mechanisms to avoid the hearing requirement of the Communications Act. The FCC has obtained authority from the Congress to conduct lotteries and has used this mechanism, in place of hearings, to

grant licenses for such services as cellular, paging and multipoint distribution service. In the case of the domestic-fixed satellite service, the Commission has established threshold financial qualifications which have enabled it to eliminate sufficient applicants for orbital locations to avoid comparative hearings. The use of so-called threshold qualifications have been permitted by the Courts.

FCC Processing Methods

- **Comparative Hearings**
 - **Lotteries**
 - **Pioneer's Preference**
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Most recently, the Commission has developed a "Pioneer's Preference," which it is attempting to utilize as a threshold qualification to aid in the processing of multiple applications. See, Pioneer's Preference Order, 6 FCC Rcd 3488 (1991), recon. granted in part, denied in part, 7 FCC Rcd 1808 (1992), further recon., FCC 93-116, released March 8, 1993. The Pioneer's Preference allows an applicant that demonstrates that it "has developed an innovative proposal that leads to the establishment of a service not currently provided or an enhancement of an existing service" will be placed on a pioneer's preference track, and will not be subject to competing applications. Thus, if otherwise qualified, the applicants will receive a license. Other applicants will compete for the remaining licenses on a separate track. The Commission has stated that a preference will not be granted unless there is sufficient spectrum "to permit at least one additional license to be granted for the same geographic area." Further Reconsideration, Footnote 4.

While noble in intent, the Pioneer's Preference is based on the subjective judgment of the FCC as to what is "innovative." As the financial stakes are high in numerous new communications services, such as PCS, disappointed applicants have already taken the Commission to Court. This author believes that ultimately, the use of the Pioneer's Preference will be determined inconsistent with rights of applicants to comparative consideration.

The next approach to expediting the processing of applications for new communications services is likely to be the auctioning of spectrum. The Congress, in making available spectrum currently allocated for use by the U.S. government, is expected to establish an auction mechanism for commercial use to expedite the use of the spectrum as well as to provide revenue for the federal government. There is a possibility that the Congress may also authorize the FCC to use auctions for spectrum other than that which will be made available from spectrum allocated to the government. In particular, the Congress is considering the applicability of auctions to aware licenses for the provision of Personal Communications Services (PCS).

In the meantime, the FCC is attempting to use new alternative dispute resolution mechanisms to develop technical rules for new services which will enable it to grant all qualified applications. This approach will allow the marketplace, rather than the government, to determine which systems will succeed, and which will fail.

NEGOTIATED RULEMAKING PROCEEDINGS

The FCC's authority to use a negotiating committee mechanism is contained in the Federal Advisory Committee Act (FACA), 5 U.S.C. App. 2, and the Negotiated

Rulemaking Act of 1990 (NRA), Public Law 101-648, November 28, 1990. By law, the committee consists of representatives of the parties whose interests will be significantly affected by the outcome of the rules.

The goal of the Committee is to reach consensus on the language and substance of appropriate rules. If a consensus is reached, it is used as the basis of the FCC's proposals. If a consensus is not reached, majority and minority input can still be used by the FCC in developing regulations. The Commission can use a negotiated rulemaking (NRM) process if it determines that there is a "reasonable likelihood" that the committee can be adequately staffed with interested persons able to negotiate in good faith, and that there is a reasonable possibility of consensus.

In setting up an advisory committee, the FCC can identify specific issues it wishes addressed, suggest limits as to the number of participants, and nominate a facilitator to serve as chair of the committee. The facilitator is a neutral party, without direct interest in the rules being discussed, helps the meetings proceed and manages the record and minute keeping.

While consensus is the goal, the FCC recognizes that such will not always be possible. Accommodation is made for such an eventuality, with the FCC leaving up to the committee the definition of consensus. If necessary, majority and minority reports can be submitted. Records of the meetings are placed in the public record and meetings are open to the public.

USE OF NEGOTIATED RULEMAKING FOR LEOS BELOW 1 GHz

In October 1991, the FCC issued a Notice of Proposed Rule Making, proposing allocation of the requested UHF/VHF frequencies to the "little LEOS." In February 1992, the FCC tentatively awarded

a pioneer's preference award to VITA. Leosat's application was dismissed as improperly filed.

Prior to the commencement of the NRM, Orbcomm, Starsys and VITA met and agreed on a proposed set of rules, which were submitted to the FCC. The joint comments stated that all three systems could operate compatibly in the spectrum available. In addition, rules were agreed to concerning application requirements, license qualifications and technical conditions.

With this favorable environment, the NRM was convened, consisting of the applicants, existing users of the frequencies, potential band users and adjacent band users. The parties met for approximately six weeks and issued a report on September 16, 1992, reflecting the unanimous agreement of all the parties. This report formed the basis for the Notice of Proposed Rulemaking issued by the FCC in February 1993.

By all accounts, this first FCC negotiated rulemaking procedure worked to the advantage of the applicants, the FCC and the public interest. The affected parties quickly reached agreement, expediting FCC action on the service and technical rules and enabling the Commission to move forward on the processing of the applications.

USE OF NEGOTIATED RULEMAKING FOR LEOS ABOVE 1 GHz

The "Big LEO" regulatory situation is more complex than that of the "Little LEOS." This is in part due to the number of parties (five "Big LEO" applicants plus AMSC in contrast to two commercial "Little LEO" applicants and one non-profit applicant).

In addition, in the Big LEO proceeding, Motorola has repeatedly emphasized its requirement for sole use of the spectrum it seeks (1616-1626.5 MHz on a bidirectional basis) as well as its unwillingness to revise

any aspect of its system design.

Having already tentatively concluded not to award a Pioneer's Preference to any of the Big LEO applicants, in August 1992, the FCC proposed the establishment of a negotiated rulemaking to settle the outstanding technical and operational rules for the Big LEO systems. Most importantly, the Commission was seeking a mechanism by which it could grant all of the applications and would not have to make the hard choices between the Motorola proposal to band segment, which would leave virtually unusable spectrum in the lower L-band to the other applicants, and the full band sharing approach which would require major system changes by Motorola.

The FCC identified two primary issues to be addressed by the NRM: (a) what technical rules should be adopted for the service "to maximize the sharing of the spectrum and the capacity for multiple entry;" and (b) what technical rules should be adopted in order for the service to co-exist with other services.

The NRM began its work on January 13, 1993 and concluded on April 5, 1993. The Committee consisted of the applicants, including AMSC, potential future applicant Celsat, various federal agencies such as NASA, DOD and the FAA, and representatives of the aviation industry, including ARINC and manufacturers of GLONASS and GPS receivers.

The main issues addressed by the committee, in addition to the fundamental question of sharing the available spectrum, were sharing with radioastronomy, GLONASS and other primary users of the band.

As this paper was being written, it appeared that a majority report -- supporting total band sharing -- and a minority report proposing band segmentation, is the most likely outcome. This result would place the toughest decision

back in the lap of the FCC.

Despite the inability of the negotiation to unanimously resolve the most difficult issues, consensus as to methods of sharing with radioastronomy, GLONASS and other services appears likely. These parts of the report, as well as the tremendous amount of technical material and analysis presented, constitute valuable inputs to the Commission as well as the participants. This input will ease the Commission's enormous task of resolving this complex, but extremely important proceeding.

Negotiated Rulemaking

- less adversarial
 - technical focus
 - consensus input to FCC
 - speeds process
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The participants had the opportunity to work together on complex interference and sharing issues. This experience should reduce the controversy over proposed rules that the FCC issues, provide a useful foundation for actual system coordinations, and provide a basis for revising system technical characteristics to enable the MSS systems to operate compatibly with other users of the spectrum.

CONCLUSION

The FCC has now concluded two negotiated rulemakings. Both involved the development of rules for new mobile satellite systems. While a complete consensus was not achieved in both cases, the process appears to have reduced costs, and expedited FCC rulemaking and licensing actions with resultant benefit to the users of these new communications services.