

BEFORE THE
Federal Communications Commission
WASHINGTON, D.C. 20554

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APR 23 1992

In the Matter of)
)
Amendment of Section 2.106 of the)
Commission's Rules to Allocate)
Spectrum to the Mobile-Satellite)
Service above 1 GHz for)
Low-Earth Orbit Satellites --)
Requests for Pioneer's Preference by)
Constellation, Ellipsat, Loral,)
Motorola, and TRW.)

Federal Communications Commission
Office of the Secretary

ET Docket No. 92-28

PP-29
PP-30
PP-31
PP-32
PP-33

To: The Chief Engineer

CONSOLIDATED REPLY COMMENTS OF TRW INC.

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Summary

TRW Inc. ("TRW") replies to various Comments and Oppositions concerning pioneer's preference requests consolidated in ET Docket No. 92-28. Motorola Satellite Communications, Inc. ("Motorola") seeks a preference for its proposed Iridium system, which cannot be authorized because it is technically unworkable, spectrum-inefficient, and inconsistent with the RDSS rules. Iridium also is based largely on technologies originally developed by others, which have not been proven feasible in the context of Motorola's grandiose scheme. Perhaps most significantly, Iridium is inimical to the Commission's policies promoting multiple entry -- it is the only non-geostationary system proposed that would preclude grant of all of the other applicants.

Both Loral Qualcomm Satellite Services ("LQSS") and Ellipsat Corporation seek preferences for proposals that they are unable to differentiate from those of the other applicants, including TRW, that would employ spread spectrum modulation techniques consistent with the Commission's RDSS rules. LQSS' request also relies on future development of technology for some of its claimed system attributes. Clearly, this does not meet the requirement that a preference applicant demonstrate the feasibility of its system.

TRW strongly urges the Commission to reject Motorola's preference request and reiterates its belief that the Commission should not grant any pioneer's preference in ET Docket No. 92-28.

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CONSOLIDATED REPLY COMMENTS OF TRW INC.

TRW Inc. ("TRW"), by its attorneys, hereby replies to various comments and oppositions submitted in connection with the above-captioned requests for pioneer's preference. In particular, TRW responds to the vague generalities and half-truths propounded by Motorola Satellite Communications, Inc. ("Motorola")^{1/} in its comments supporting its own preference request and urging the denial of the pioneer's preference requests of TRW, Loral Qualcomm Satellite Services

^{1/} In addition to filing "Comments" in this proceeding, Motorola filed two days later a document styled "Supplement to Request for Pioneer's Preference." Because this document was not timely filed by the April 8, 1992 deadline established by the Commission for the submission of materials relating to the pioneer's preference requests consolidated into ET Docket No. 92-28, TRW has filed today a motion to strike Motorola's unauthorized April 10, 1992 pleading.

("LQSS"), Constellation Communications, Inc. ("Constellation"), and Ellipsat Corporation ("Ellipsat"). TRW also responds to comments filed by LQSS and Ellipsat.^{2/}

Motorola seeks a pioneer's preference in connection with its proposal to establish and operate a satellite system in the Radiodetermination Satellite Service ("RDSS") frequency bands (1610-1626.5 MHz and 2483.5-2500 MHz). However, its proposed Iridium system is an overcomplicated and spectrum-inefficient scheme that has not been shown to be feasible and will not provide reasonably-priced service to the public. A pioneer's preference cannot be awarded to Motorola when its design flouts the requirements of the RDSS rules, and the system is based largely on technologies originally developed by others. Motorola's Iridium system is also inimical to the Commission's policies promoting multiple entry, as Motorola is the only preference applicant whose proposed system would preclude grant of all of the other applicants.

^{2/} AMSC Subsidiary Corporation ("AMSC") has also filed Comments opposing all of the pioneer's preference requests submitted in this proceeding. AMSC's Comments gratuitously rehash the unfounded arguments AMSC has raised regarding TRW's license application, and TRW has previously addressed and refuted these arguments in the Opposition and Reply Comments it filed in that proceeding (File Nos. 20-DSS-P-91(12) and CSS-91-015). See Consolidated Opposition To Petitions to Deny And/Or Dismiss and Reply Comments of TRW Inc. (filed January 31, 1992); Consolidated Response of TRW Inc. (filed March 27, 1992).

LQSS seeks a preference for a proposal that it is unable to differentiate from those of the other applicants that would comply with the requirement in the RDSS rules to employ spread spectrum or Code Division Multiple Access ("CDMA") modulation techniques. The CDMA proposals of TRW, Ellipsat, and Constellation incorporate similar features. Moreover, LQSS' request relies on future development of technology for some of its claimed system attributes. Clearly, this does not meet the requirement that a preference applicant demonstrate the feasibility of its system.

TRW also submits that neither LQSS nor any of the other applicants proposing CDMA modulation has justified the exclusive award of a pioneer's preference. For example, Ellipsat's claimed entitlement to a preference is premised in large part upon its choice of elliptical orbits, which makes its system no more unique than TRW's Odyssey system, the only application proposing medium-Earth orbits.

TRW urges the Commission to reject Motorola's preference request as non-complaint with both the letter and intent of its pioneer's preference rules. TRW also reiterates its belief that the Commission should not grant a pioneer's preference to any of the applicants in ET Docket No. 92-28, as such a grant would only muddle the ongoing proceedings and hinder rather than facilitate the introduction of RDSS service.

I. Motorola Is Not Entitled To A Pioneer's Preference

A. Motorola's Claimed Innovations Are Either Unoriginal Or Unproven

Motorola's claim of entitlement to a pioneer's preference is founded largely upon the alleged uniqueness of its Iridium system proposal. See Motorola Comments at 13-17. However, with the exception of the amendment filed by AMSC Subsidiary Corporation to its proposed geostationary mobile satellite service system, each of the pending applications for the RDSS bands incorporates some individual technical features that may be described as unique or advanced. The existence of these distinguishing characteristics is not by itself sufficient to support an award of a pioneer's preference.

Iridium is essentially an amalgam of existing technologies that were originally developed by others. See TRW Opposition to Motorola Pioneer's Preference Request at 11-13. Many of the features for which Motorola seeks credit in the preference analysis are not unique to Motorola's RDSS band proposal -- for example, several of the other systems, including TRW's Odyssey, will offer RDSS, voice, and data communications to handheld portable units. See Motorola Comments at 4.

On the other hand, Motorola's claim that TRW has proposed "merely a reformulation of Motorola's service concepts

announced almost one year" before is simply false. See Motorola Comments at 20. The key elements of TRW's Odyssey proposal differ substantially from Iridium, particularly its use of more efficient CDMA sharing technology, and higher orbits that optimize coverage of continental land masses while minimizing the number of satellites required. These design features in turn will allow Odyssey to operate in the RDSS bands on a non-exclusive basis that will promote competition and provide lower costs to users. Moreover, they will do so in a manner that will not require sacrifices in the quality or variety of service offerings.

To the extent that Iridium proposes new applications of some technologies, the feasibility of these applications remains unproven. In short, Motorola has not developed a unique new technology that makes a global personal voice communications possible, it has merely presented one theoretical model for implementing such a service. And it has not shown that this method of providing RDSS and mobile voice services is viable.

B. Motorola's Vague Assertions of Feasibility Are Unsupported

One of the essential elements in the showing required to obtain a pioneer's preference is a demonstration that the innovation proposed is feasible, either through a detailed

feasibility showing, or through application for an experimental license and the presentation of experimental results to the Commission. See Establishment of Procedures to Provide a Preference to Applicants Proposing an Allocation for New Services, 6 FCC Rcd 3488, 3493 (¶39) (1991) ("Pioneer's Preference Order"), recon. in part, FCC 92-57 (released February 26, 1992) ("Pioneer's Preference Recon Order"), further recon. pending. Without proof that a new service will work, the Commission will not grant a pioneer's preference. Pioneer's Preference Recon. Order, slip op. at 5 (¶11).

A substantial portion of Motorola's Comments is devoted to conclusory assertions that Motorola has already "demonstrated" that Iridium is feasible. This is simply not the case. Indeed, Motorola's statements concerning its field tests are characterized by a complete lack of meaningful detail and internally inconsistent statements.

For example, Motorola states that it is "the only applicant that can be credited for conducting propagation experiments." Motorola Comments at 25. However, Motorola provides no actual results of these tests in its filing, and it acknowledges that the initial "experiments are being conducted." Motorola Comments at 25 n.27 (emphasis added). It also states that the experiments proposed in Motorola's pending experimental license application must be performed before Motorola can "establish the validity of its system

design . . ." Motorola Opposition to TRW Petition to Deny Experimental Application, File Nos. 2303-EX-PL-91, et seq., at 2 (filed March 18, 1992). Despite the fact that even its initial experiments are ongoing, and that as yet unauthorized experiments must be conducted to validate its system design, Motorola incredibly asserts that the "preliminary results [of these experiments] confirm the Iridium system's design characteristics under adverse propagation conditions." Id. at 25.

At this point, all Motorola can claim to have done is the preliminary system design work that all of the applicants have done in preparing and prosecuting their applications -- functions to which Motorola attaches the appellation "analysis and simulation." See Motorola Comments at 26. This routine technical support activity does not "demonstrate" anything, and fails completely to support Motorola's preference request. Similarly unavailing is Motorola's reference to something called an "independent 'Red Team'" study. Motorola alleges that this internal study, which supposedly was conducted during 1990, confirms Iridium's feasibility. See Motorola Comments at 26-27. Nowhere, however, is this report even summarized, let

alone submitted to the Commission or the other parties for review.^{3/}

Clearly, Motorola is not eligible for a pioneer's preference grant -- it cannot be granted one because, among other reasons, it has not demonstrated that its system is feasible, much less that its proposal would ever be a spectrum-efficient and cost-effective means of providing service to the public. The Commission cannot be satisfied with Motorola's mere representations that it believes its system to be workable.^{4/} In view of the existence of four other applicants that are mutually-exclusive with Motorola, each seeking to provide similar services in the same spectrum, this determination can only be made through the statutorily required comparative process that fully evaluates the basic

^{3/} Moreover, it is interesting, yet totally irrelevant, that certain unidentified "international investors" also evaluated the feasibility of the Iridium "technical design." See Motorola Comments at 27. This, TRW submits, is the Commission's function, based upon an open, public record.

^{4/} In light of its failure to provide significant specifics concerning its claims of technical feasibility, it is particularly bold for Motorola to assert that "[t]he Commission simply cannot wait any longer to license Motorola's truly innovative satellite system." Motorola Comments at 12. Certainly, the Commission cannot be accused of taking a leisurely approach in this proceeding, nor does Motorola have any legitimate expectation to receive a system license at this stage. Moreover, as TRW explains in its motion to strike Motorola's April 10, 1992 "Supplement," Motorola is itself responsible for taking actions that would delay the inauguration of services in the RDSS bands.

qualifications of all of the applicants and that analyzes which application or applications are most consistent with the public interest. See TRW Opposition to Motorola Pioneer's Preference Request at 17-21; Ashbacker Radio Corp. v. FCC, 326 U.S. 327 (1945).

C. Motorola's Claim That It Was First To Announce A LEO MSS/RDSS Proposal Is Irrelevant To Its Pioneer's Preference Request

Much of Motorola's justification for its preference request is premised on the fact that it was the first entity publicly to announce plans to file an application for an RDSS-band satellite system for the provision of mobile voice and RDSS services. See, e.g., Motorola Comments at 19. It asserts that as a result of its June 1990 announcement, it is "misleading" for Ellipsat -- the first to apply for a low-Earth orbit system in the RDSS bands -- to claim credit for pioneering the expanded use of these frequencies. See Motorola Comments at 19.^{5/}

^{5/} Ellipsat itself has placed great reliance on the fact that it was the first to file its system application, and that it proposes the first commercial use of Elliptical orbits. See Ellipsat Opposition to Motorola Pioneer's Preference Request at 15-16. These attributes, however, do not meaningfully distinguish Ellipsat from the other spread spectrum applicants. As Ellipsat itself admits, "[n]o applicant . . . can take sole credit for small satellite technology or the concept of a non-geostationary satellite orbit, both of which have been used by the military and scientific communities." Ellipsat Request at 2 n.5.

Contrary to Motorola's audacious claims, it is neither being the first to announce a proposal nor even the first to apply for a license that identifies an entity as worthy of a preference; rather it is being the first to formulate a realistic and workable plan to implement a credibly innovative idea that is truly "pioneering."^{6/} No one recalls today, for example, the hundreds of self-styled innovators who boldly announced the advent of "flying machines," but it is widely remembered that the Wright brothers succeeded in making the airplane a reality. While Motorola has proven itself able to make bold announcements and predictions -- and to obtain widespread press coverage for its hyperbole -- it has simply not shown that it can get its system off the ground.

D. Motorola's Contention That An Exclusive Allotment Of Spectrum For Its Sole Provider System Is Not Monopolistic Is Absurd

Motorola has repeatedly made the specious argument that an allocation of 10 MHz of L-Band spectrum for Iridium's sole use would not result in a monopoly. See Motorola Comments at 6 & 28. Despite these protestations, there can be no question that an exclusive allocation of scarce and highly

^{6/} The Commission itself made this fact clear in adopting the pioneer's preference, stating that it might not "accord the first filer a preference because the first filer may not be the person who most deserves the preference." Pioneer's Preference Order, 6 FCC Rcd at 3492 n.10.

valuable spectrum is unavoidably monopolistic. Iridium's use of two-thirds of the RDSS uplink bands for its system would require all of the other applicants to adapt their systems for operation in one-third of the RDSS frequency allocation, an adaptation that is simply not feasible. Because bi-directional operation is not permitted in the S-band frequencies allocated to RDSS, the other applicants necessarily would be limited to use of one-third of the S-band downlink allotment paired with the remaining one-third of the L-band spectrum; the other two-thirds of the S-band frequencies would remain fallow due to Motorola's usurpation of the uplink frequencies. Therefore, Motorola's proposal would preclude the introduction of all of the other non-exclusive systems, and permit it to operate as a monopoly.

Motorola's empty statement that it "encourages the Commission to grant other competitive systems, as it has so successfully done for terrestrial cellular systems" is insulting both to the other applicants and to the Commission. See Motorola Comments at 28. As described above, the competition from "other LEO applicants" that Motorola welcomes would be impossible if Iridium were licensed. Moreover, the non-voice "Little LEO" systems expected to be authorized in frequency bands below 1 GHz will not provide competing radiodetermination service, as Motorola erroneously contends. See Motorola Comments at 6.

In sum, Motorola's suggestion that ceding two-thirds of the RDSS uplink band to Iridium will leave substantial spectrum for "other qualified applicants" is absurd. Motorola is undeniably a putative monopolist. The ability to subsist within leftover segments of the RDSS bands that would not be used by Motorola, even if such an ability existed, is not a requisite of qualification, and Motorola cannot evade its "monopolist" label by trying self-servingly to recast the other applications to fit its own subjective desires.

II. **LQSS Is No More Entitled to A Pioneer's Preference Than Any Of The Other Applicants Proposing CDMA/Spread Spectrum Technology**

A. **LQSS is Not the Sole Developer of CDMA Technology for Low-Earth Orbit Applications**

LQSS seeks a pioneer's preference primarily for its use of CDMA technology. Its own argument in support of this request, however, reveals that its basis for such a preference is no stronger than the basis for preferring the other CDMA applicants. Specifically, LQSS maintains that "the pioneering development of CDMA for commercial use in mobile voice and data communications and its extension to use from low-earth orbit satellites merits a pioneer's preference." LQSS Comments at 5 (heading). The syntax of this sentence illustrates that "pioneering development" could easily apply to all of the other

preference applicants proposing spread spectrum, i.e., all of the applicants save Motorola.

While LQSS may be able to claim some innovations in the use of spread spectrum modulation, other applicants, especially TRW, can claim similar advances that pertain to their own systems. None of the applicants can claim to have developed spread spectrum technology itself.^{7/} As LQSS states, much of that accomplishment belongs to the United States military. See LQSS Comments at 9. Much credit also belongs to TRW, which has been involved in the development of CDMA technology for more than a quarter century. TRW's contributions have included the development of the Space Ground Link System for the U.S. Air Force and the Defense Satellite Communications System II, both in the 1960s. More recently, TRW built the NASA Tracking Data and Relay System satellites, which utilize CDMA modulation to combine signals from twenty different satellites operating in low-Earth orbit.

LQSS also makes claims concerning its particular application of CDMA technology that cannot be credited. For example, it is simply not true that LQSS alone among the

^{7/} Indeed, in adopting the current RDSS rules, the Commission used GEOSTAR's spread spectrum modulation proposal as the service baseline. See Amendment to the Commission's Rules To Allocate Spectrum for, and to Establish Other Rules and Policies Pertaining to, a Radiodetermination Satellite Service, 104 F.C.C.2d 650, 661-62 (1986) ("RDSS Licensing Order").

applicants will be capable of providing new services to the public in an innovative manner using spectrum efficient technology to permit multiple entry, see LQSS Comments at 7, or to interoperate with the public switched telephone network. Id. at 2. These statements conceivably apply to all of the applicants proposing to utilize spread spectrum.

B. LQSS Has Not Demonstrated the Technical Feasibility of Its Proposal, and Indeed Relies On Projected Future Developments

As described above, one of the key prerequisites for obtaining a pioneer's preference is the ability to demonstrate that the service concept is feasible. While some of LQSS' claims are clearly realistic, including the ability to utilize CDMA efficiently in the RDSS bands, others are projections of expected developments. See LQSS Comments at 11-12. In particular, prefacing a list of desirable system features, LQSS states that the capabilities listed "will be made possible," but does not indicate when, or even how. It also identifies these elements as part of the "next stage" of its program development. Id.

Vague claims of what may someday be achievable are not sufficient to support the guarantee of a system license. As the Commission has made clear, pioneer's preference grants are not appropriate absent a feasibility showing or supporting

experimental data. See Pioneer's Preference Order, 6 FCC Rcd at 3493 (¶39).

C. The Outcome of WARC-92 Provides No Support for LQSS' Specific Preference Request

Finally, LQSS rather curiously contends that its system should be awarded a preference "to comport with the WARC-92 results." LQSS Comments at 12. This assertion is based upon the WARC's decision to permit mobile satellite system development in the RDSS bands, and reflects the determination that multiple low-Earth orbit systems could be supported in this spectrum. See LQSS Comments at 12.

While LQSS' use of spread spectrum technology clearly comports with this worthy and realistic goal, it does not follow that LQSS should receive a preference to implement its system. Mere compliance with the RDSS rules and internationally accepted policies is a thin reed upon which to premise a preference grant. LQSS' observation that the Iridium system is fundamentally at odds with the decisions made at the WARC is certainly correct, but the Globalstar system's consistency with these decisions does not make it uniquely qualified for a preference. Other CDMA applicants are equally deserving in this regard.

III. Conclusion

For the foregoing reasons, TRW respectfully urges the Commission to deny Motorola's pioneer's preference request, and to give LQSS no more consideration for such a preference than the other CDMA applicants. As TRW argued in its Comments on the pioneer's preference requests of LQSS, Constellation, and Ellipsat, however, the Commission should conclude that this proceeding is one where the public interest dictates that no pioneer's preference should be granted. Nothing presented in any of the comments has altered this belief.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I, Kaigh K. Johnson, hereby certify that a copy of the foregoing "Consolidated Reply Comments of TRW Inc." was served by first-class mail, postage prepaid, this 23rd day of April, 1992 on the following persons:

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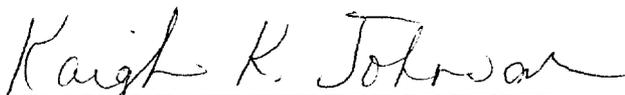
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