

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

Received
FEB 26 1995
COMMUNICATIONS SECTION

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| In the Matter of |) | |
| |) | |
| The Non-Voice, Non-Geostationary |) | |
| Mobile Satellite Service |) | |
| Applications of |) | |
| |) | |
| CTA Commercial Systems, Inc. |) | File No. 23-SAT-P/LA-95 |
| |) | |
| E-Sat, Inc. |) | File No. 24-SAT-P/LA-95 |
| |) | |
| Final Analysis Communication |) | File No. 25-SAT-P/LA-95 |
| Services, Inc. |) | |
| |) | |
| GE American Communications, Inc. |) | File No. 26-SAT-P/LA-95 |
| |) | |
| Leo One USA Corporation |) | File No. 27-SAT-AMEND-95 |
| |) | |
| Orbital Communications Corporation |) | File No. 28-SAT-MP/ML-95 |
| |) | |
| Volunteers In Technical Assistance |) | File No. 29-SAT-AMEND-95 |
| |) | |
| To: The Commission | | |

**CONSOLIDATED PETITION TO DENY OF
STARSYS GLOBAL POSITIONING, INC.**

STARSYS GLOBAL POSITIONING, INC.

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Summary

STARSYS seeks denial of all of the second-round NVNG MSS applications because, at the present time, there is no certainty concerning how these applications will be processed, and how they might affect applicants, such as STARSYS, that are part of the first NVNG MSS processing group. Because the Commission has not yet completed processing the first-round applications for the NVNG MSS, the new applicants are currently incapable of making the showing required under the Commission's rules that they would not cause unacceptable interference to existing systems.

The number of systems that can be licensed in the second-round in the existing NVNG MSS bands is necessarily contingent upon the number of first-round systems licensed, and the conditions that are attached to those licenses. Without the baseline that will be set upon the completion of first-round processing, there is now no way for the second-round applicants to demonstrate, or the Commission to determine, which, if any, of the second-round applicants is technically qualified. Even the critical determination as to whether the second-round applicants are mutually exclusive with each other is dependent on the sharing environment that will be established only upon completion of the first round. Accordingly, critical conclusions concerning how to process the second-round applications, e.g., whether an auction or a negotiated rule making may be appropriate, cannot be made until the first round is completed, and all

pending applications have been granted or denied. For these reasons, further processing of these new applications would be premature at this time.

Notwithstanding the fact that it is not yet possible to evaluate the second round applications fully for compliance with all FCC requirements, STARSYS has examined each of the proposals carefully. It has determined that the systems proposed by each of the second-round applicants would cause unacceptable interference to STARSYS's proposed NVNG MSS system on the uplink, the downlink, or both. The interference threat presented by each applicant only compounds the uncertainty that arises from the lack of current processing guidelines for these applications, which might have helped to identify the applications that may ultimately be grantable. Without such gauges, STARSYS has no choice but to consider the interference from all of the second-round applicants in the aggregate. Taken in the aggregate, the seven NVNG MSS systems proposed in seven second-round applications -- including the modifications to systems that were proposed by two of the first-round NVNG MSS proponents -- would cause catastrophic interference in frequency bands in which STARSYS will operate, rendering the spectrum useless for provision of any service. As a result, STARSYS is petitioning to deny these applications.

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To: The Commission

**CONSOLIDATED PETITION TO DENY OF
STARSYS GLOBAL POSITIONING, INC.**

STARSYS Global Positioning, Inc. ("STARSYS"), by counsel and pursuant to the FCC Public Notice, DA 94-1323, released November 25, 1994, as modified on December 21, 1994,^{1/} hereby petitions to deny the above-captioned

^{1/} On December 21, 1994, the Chief of the Satellite and Radiocommunication Division granted a request for a thirty day extension of the comment period in this proceeding until today, February 24, 1995. See Order, DA 94-1563 (Satellite and Radiocommunication Div., released December 22, 1994) ("Second-Round Extension Order").

applications for authority to construct, launch and operate non-voice, non-geostationary mobile satellite service ("NVNG MSS") systems.

As the Commission is aware, STARSYS is an applicant for a first generation NVNG MSS system in the initial processing group. The applications addressed here constitute the second processing group for NVNG MSS applications, which were filed in response to a Commission Public Notice accepting for filing the application of LEO One USA Corporation ("LEO One").^{2/} Because the applicants in this new processing group must demonstrate that their proposed NVNG MSS systems will not cause unacceptable interference to any NVNG MSS system authorized to construct or operate,^{3/} and must also coordinate their use of the spectrum with previously authorized systems in these frequency bands under the

^{2/} See Public Notice DA 94-1011, released September 16, 1994 ("Any party wishing its application for use of the above-referenced frequency bands to be processed concurrently with that of LEO One USA must file an application to construct, launch and operate its proposed system, along with appropriate fees, on or before November 16, 1994."). The applicants are CTA Commercial Systems, Inc. ("CTA"); E-Sat, Inc. ("E-Sat"); Final Analysis Communication Services, Inc. ("Final Analysis"); GE American Communications, Inc. ("GE Americom"); Leo One USA Corporation ("Leo One"); Orbital Communications Corporation ("Orbcomm"); and Volunteers in Technical Assistance ("VITA"). Although Orbcomm now holds an NVNG MSS license, and VITA, like STARSYS, is a first-round applicant, all references herein to "second-round applicants" will include the applications that Orbcomm and VITA filed in response to the Commission's September 1994 public notice.

^{3/} See 47 C.F.R. § 25.142(a)(1) (1994). The Commission has acknowledged that beyond accepting comments and petitions on the second-round applications, it will not "process" the applications until licensing of first-round systems (including STARSYS) is complete. See Second-Round Extension Order, DA-94-1563, slip op. at 2.

Commission's rules,^{4/} STARSYS is an interested party with respect to each second-round applicant.

Inasmuch as the Commission has not yet completed the processing of the first group of applications, and litigation remains pending concerning the composition of that group, further processing of these new applications would be premature at this time. Until the Commission takes final action on the remaining applications in the initial processing group, including STARSYS's, the second-round applicants will be absolutely incapable of making the showing required under Section 25.142(a) of the Commission's Rules.^{5/} Indeed, no member of the new processing group of applicants has made any credible attempt to make such a showing based on the system designs of the initial processing group. Without the baseline that will be set upon the completion of first-round processing, there is simply no way for the Commission to determine which, if any, of the second-round applicants will be able to demonstrate its technical qualifications.

The number of systems that can be licensed in the second round in the existing NVNG MSS bands is necessarily contingent upon the number of first-round systems licensed. Therefore, even the critical determination as to whether the second-

^{4/} See 47 C.F.R. § 25.142(b)(3) (1994).

^{5/} Section 25.142(a)(1) requires that all NVNG MSS applicants "file information demonstrating compliance with all requirements of this section, and showing, based on existing system information publicly available at the Commission at the time of filing, that they will not cause unacceptable interference to any non-voice, non-geostationary mobile-satellite service system authorized to construct or operate." 47 C.F.R. § 25.142(a)(1) (1994).

round applicants are mutually exclusive with each other is dependent on the sharing environment that will be established only upon completion of the first round.

Accordingly, critical conclusions concerning how to process the second-round applications, e.g., whether an auction or a negotiated rule making may be appropriate, cannot be made until the first round is completed, and all pending applications have been granted or denied.

These assessments are extremely important. If the Commission allows too many interfering sources access to the NVNG MSS bands, it could jeopardize the commercial viability of all systems. The potential resulting capacity limitations could even affect the build out of authorized constellations.

Notwithstanding the hindrances that the "non-ripeness" of the second-round applications pose, STARSYS has evaluated each of the proposals carefully. It has determined that the systems proposed by each of the second-round applicants would cause unacceptable interference to STARSYS's proposed NVNG MSS system on the uplink, the downlink, or both. The interference threat presented by each applicant is compounded due to the uncertainty of how the Commission will process these applications and identify which applications might ultimately be grantable. For these reasons, STARSYS is also forced to consider the aggregate interference from all of the second-round applicants. As a result of both individual and aggregate interference potential, STARSYS is petitioning to deny all of the second-round applications.

I. Further Processing Of Second Round NVNG System Applications At This Time Would Be Premature Given The Existence Of Pending Issues Pertaining To The Initial Round Of Applicants And The Resulting Uncertainty Concerning Processing of The Second Round Applications.

Section 25.142(a)(1) of the Commission's rules governing the NVNG MSS requires applicants to file technical information "showing, based on existing system information publicly available at the Commission at the time of filing, that they will not cause unacceptable interference to any non-voice, non-geostationary mobile-satellite service system authorized to construct or operate."^{6/} Because the Commission has not yet completed processing the first-round applications for the NVNG MSS, the information necessary for each of the second-round applicants to comply with this requirement is not fully known at this time. The required content of the applicants' technical showings will necessarily be affected by each of the authorizations granted as a result of the first round of applications.^{7/}

Even if it were assumed that the remaining first-round applicants would receive Commission authorization "to construct or operate" that is identical to their

^{6/} 47 C.F.R. § 25.142(a)(1) (1994) (emphasis added).

^{7/} For this reason, Orbital Communications Corporation ("Orbcomm"), which was a first-round applicant and is a second-round applicant, filed a letter objecting to the establishment of a second processing round for the NVNG MSS applications on the ground that such a step was premature absent the completion of application processing for the first group. See Letter from Albert Halprin and Stephen L. Goodman, counsel for Orbcomm, to Kathleen M.H. Wallman, Chief, Common Carrier Bureau, at 1 (dated September 28, 1994). Orbcomm noted that, "without accurate knowledge regarding the character of the first round licensed systems' operations, a new applicant would find it impossible to design a system that will operate compatibly with those initial systems." *Id.* at 2.

existing system proposals, other uncertainties exist which preclude considering second-round applications premised on such an assumption. Specifically, Leosat Corporation ("Leosat"), which filed an application that the Commission determined was untimely for consideration in the first processing group, is nonetheless pursuing litigation in the United States Court of Appeals for the District of Columbia Circuit, where it is seeking to have its application treated as part of the initial processing group.^{8/} Should Leosat prevail, its application would presumably have priority over the newly-filed second-round applications, and the new applicants might be required to protect Leosat in order to comply with Section 25.142(a)(1).

None of the still pending first-round applications can be assumed away, so these applications -- namely the STARSYS application (as amended in April 1994), and the application of VITA (also as amended through April 1994) -- must be considered as limiting the availability of NVNG MSS spectrum to second-round applicants until final action is taken. Regardless of whether all of the initial applications are granted, however, it is apparent that: (1) it is very unlikely that all of the newly-filed NVNG MSS applications can be granted, and (2) the number of additional entrants that can be accommodated in the existing NVNG MSS bands is directly related to the number of first-round applications that are granted. Accordingly, the Commission's decision on how to handle the second-round

^{8/} See Leosat Corp., 8 FCC Rcd 668 (1993), appeal pending, Leosat Corp. v. FCC, No. 93-1181 (D.C. Cir. March 1, 1993). Oral argument in this case is scheduled for March 10, 1995.

applications is necessarily dependent, in critical part, on the outcome of the first processing round.

Given the uncertainty of the future sharing environment for the NVNG MSS bands, STARSYS has no choice but to petition to deny all of the second-round applications. Without a clear picture of how the FCC will handle these applications, the only reasonable assumption STARSYS can make is that it will ultimately be licensed to build and operate the system for which it has applied. On this basis, STARSYS has evaluated the impact of the second-round applicants and determined that they constitute a potential source of unacceptable interference to its system. Taken in the aggregate, the seven second-round applications would cause catastrophic interference in frequency bands in which STARSYS will operate, rendering the spectrum useless for the provision of any service. Even taken individually, each of the second-round systems, as now proposed, would cause harmful interference to STARSYS.^{2/} Until the Commission takes final action on STARSYS's application, it is therefore unclear whether any of these new applicants can demonstrate that it complies with Section 25.142(a) of the Commission's rules.

^{2/} As will be explained below with respect to individual applications, a key problem area is the 137-138 MHz band. At the conclusion of the Negotiated Rulemaking in CC Docket No. 92-76 in September 1992, it was believed that additional NVNG MSS systems could share that band with STARSYS and Orbcomm. While STARSYS's proposed use of the 137-138 MHz band has not changed appreciably since 1994, Orbcomm has made significant revisions to its proposed use of the band; the end result of which is that the system Orbcomm was licensed to build uses up much of the link margin at 137-138 MHz that allowed STARSYS and Orbcomm to co-exist, and the modified system for which it now seeks authorization would exceed the remaining margin, leaving no spectrum for future systems.

II. The Technical Proposals Of The Second-Round Applicants Are Deficient Under The NVNG MSS Rules, And Will Require Amendment Before They Are Eligible For Grant.

Based on the best available information, including the Commission's NVNG MSS rules, the authorization granted to Orbcomm, and the pending first round applications of STARSYS and VITA, all of the second-round NVNG MSS applications, as currently formulated, have deficiencies in their technical proposals that preclude grant. STARSYS does not believe that the current technical deficiencies in any application are necessarily disqualifying in all instances; it merely observes that these flaws and uncertainties must be resolved before any of the applicants can make the threshold technical demonstration with respect to the STARSYS system that is required by the Commission's rules. Of course, failure ultimately to remedy these defects when the applications are ready for processing would leave an applicant in violation of Section 25.142(a)(1), and therefore lacking the basic technical qualifications to become a Commission license.

A. CTA Commercial Systems, Inc. (File No. 23-SAT-P/LA-95)

CTA has proposed to use alternate frequency bands on a secondary basis in order to avoid spectrum congestion in the primary NVNG MSS bands. STARSYS therefore supports CTA's request for waiver to permit it to use the 312-315 MHz and 387-390 MHz bands, as this proposal will reduce somewhat the overall strain on

spectrum availability for NVNG MSS. Unfortunately, there are other aspects of CTA's proposal that make it problematic.^{10/}

As proposed, CTA's frequency plan would cause significant interference to STARSYS in the 137-138 MHz band due to conflicts with STARSYS channels centered at 137.0125 MHz and 137.5 MHz and its apparent intent to operate with dual polarization in this band.^{11/} Even if CTA were to specify polarization the opposite of STARSYS's, CTA is in error in assuming that this is automatically acceptable because "STARSYS has previously agreed to this sharing method with FDMA/TDMA systems."^{12/} In fact, STARSYS agreed to operate on a cross-polarized basis vis-à-vis Orbcomm, along with other tradeoffs, in order to reach an optimal level of sharing, while minimizing interference. Nonetheless, mutual interference cannot be

^{10/} Also problematic is CTA's current interest in first-round applicant VITA. STARSYS has petitioned to deny the VITA/CTA application on grounds including the de facto transfer of control of VITA's original non-commercial application (and the associated pioneer's preference) to CTA, which clearly intends to convert it to a commercial enterprise. See Opposition to Amendment, FCC File Nos. 30-DSS-AMEND-94 and CSS-91-007(3) (filed June 20, 1994). These circumstances raise troubling questions concerning the basic qualifications of both applicants that must be resolved through a hearing before either can be granted.

^{11/} There is some discrepancy in exactly what CTA seeks to do, as it states at one point in its application that it will operate "cross polarized with respect to STARSYS" (CTA Application, Appendix III at III-1), but elsewhere proposes both left- and right-hand circular polarization in these bands. See CTA Application, Appendix I at A-13, Table I.A-3.

^{12/} CTA Application, Appendix III at III-1. STARSYS notes that in reaching the sharing agreements between STARSYS and Orbcomm that resolved mutual exclusivity among the first-round applicants, both companies stood on equal footings vis-à-vis each other; neither applicant was subject to the provisions of Section 25.142(a)(1) because both were part of the same processing round. As a result, CTA's reliance on earlier sharing arrangements is misplaced.

avoided, and more than limited additional use by FDMA/TDMA systems will increase interference to levels intolerable to STARSYS. Indeed, STARSYS believes that the 137-138 MHz band can accommodate no more than two or three additional downlink channels (even those with right-hand circular polarization only) operating outside of the main beam of the STARSYS ground station antenna, irrespective of source(s), before STARSYS will experience unacceptable interference in violation of the Commission's rules.

B. E-Sat, Inc. (File No. 24-SAT-P/LA-95)

E-Sat has proposed an unusual heliosynchronous orbit design that is apparently intended to minimize the power demands of the space stations. Unfortunately, multiple elements of the E-Sat system proposal are not in compliance with fundamental elements of the Commission's NVNG MSS service rules.

E-Sat describes transceiver terminals transmitting at a power of five watts (7 dBW), with an antenna gain of 1.5 dB, yielding an uplink e.i.r.p. of "about 8.5 dBW."^{13/} This figure is inconsistent with E-Sat's own Figure 5(a), which indicates a transmitting antenna gain of 9.0 dBW,^{14/} a value that appears incompatible with Footnote US323, which limits power flux density to -16 dBW/4 kHz for mobile terminals using spread spectrum techniques.^{15/}

^{13/} E-Sat Application at 3-13.

^{14/} See E-Sat Application at 3-15.

^{15/} See 47 C.F.R. 2.106, Footnote US323 (1994). A five Watt, one megahertz-wide,
(continued...)

In addition, E-Sat states that its system will transmit with an uplink data rate of 100 bps,^{16/} a rate that would be virtually useless in view of the 450 millisecond duty cycle limitation imposed by Footnote US323. In order to comply with the Commission's rules, E-Sat would be constrained to a maximum message of only 45 bits of data. Apparently cognizant that such a limitation is untenable, E-Sat chooses to ignore the rule, declaring, without explanation, that it will transmit a five second low-level signal burst no more than once a day. Despite this declaration, Footnote US323 does not contain a "once a day" exception to either the 450 ms duty cycle restriction or the ¼ of one percent duty cycle restriction for spread spectrum systems that do not avoid channels in use, both of which would be flagrantly violated by the five second signal burst E-Sat describes. E-Sat does not even do so much as request a waiver of the rules.^{17/}

^{15/}(...continued)

direct-sequence, spread spectrum signal has an average pfd of -17 dBW/4 kHz, but the maximum pfd is 3.456 dB higher than the average if the spectrum has a *sin x/x* characteristic. Accordingly, it is likely that the maximum pfd of the E-Sat mobile terminal is at least -14 dBW/4 kHz.

^{16/} See E-Sat Application at 3-15.

^{17/} STARSYS wholeheartedly supports a relaxation of these duty cycle limitations, which it believes are unduly restrictive. On April 26, 1993, STARSYS filed a Petition for Partial Reconsideration seeking such a modification of Footnote US323. See STARSYS Petition for Partial Reconsideration, CC Docket No. 91-280. In short, when a CDMA mobile transceiver unit is operating in compliance with the -16 dBW/4 kHz EIRP density limit, the unit will, without the need for a transmission time limit, provide ample protection to all terrestrial systems in the band. The absolute limitation on transmissions from a single mobile earth station to 0.25% of any 15 minute period is thus completely redundant.

There are also several substantial defects that plague E-Sat's proposed use of the 137-138 MHz downlink band. Of particular concern to STARSYS is the fact that the E-Sat downlink signal is at least three dB stronger than STARSYS's^{18/} and E-Sat openly acknowledges that there will be periods when "one of the planned 24 STARSYS satellites would be interfered with by one of the 6 E-Sat satellites."^{19/} What E-Sat fails to acknowledge is that, as a second-round applicant, it is incumbent upon E-Sat to make a showing that it will not cause unacceptable interference to previously authorized systems. While it may believe that "a mutually satisfactory agreement can be reached,"^{20/} E-Sat has not even broached the subject with STARSYS. Indeed, E-Sat's application fails to offer any sharing analysis with respect to other systems.

Moreover, E-Sat's proposed downlink carrier frequency at 137.5 MHz is directly on top of STARSYS's satellite-to-Earth downlink at the same frequency, and

^{18/} In fact, the application is internally inconsistent on this point, listing a downlink pfd of $-153.3 \text{ dB(W/m}^2/4 \text{ kHz)}$ in its link budget tables, and a figure $-152.3 \text{ dB(W/m}^2/4 \text{ kHz)}$ just two pages later in its discussion of intersystem interference. In either case, the level appears to be too high to comply with the level recommended by ITU-R Study Group 7 for protection of the Meteorological Satellite Service ("METSATS"). Indeed, because the downlink pfd at the subsatellite point stated in the link budget is the average pfd across the band, the maximum value for pfd is likely to be approximately $-149.9 \text{ dB(W/m}^2/4 \text{ kHz)}$, which is nearly four times the highest pfd level at the ground produced by the STARSYS system.

^{19/} E-Sat Application at 3-17.

^{20/} E-Sat Application at 3-18.

even proposes identical left-hand circular polarization.^{21/} E-Sat states that this polarization is the opposite of the Orbcomm system, "and therefore helpful in minimizing the potential mutual interference."^{22/} E-Sat fails to mention the fact that STARSYS and Orbcomm have already employed reverse-sense polarization in order to share this band, and that newcomers, such as E-Sat, must protect all pre-existing systems from unacceptable interference. E-Sat's proposal would clearly cause destructive interference to STARSYS, and therefore cannot be granted.

**C. Final Analysis Communication Services, Inc.
(File No. 25-SAT-P/LA-95)**

Final Analysis shares with some other second-round applicants the erroneous belief that STARSYS's agreement to facilitate spectrum sharing with Orbcomm via operation on a cross-polarized basis necessarily permits all future comers to utilize cross polarization in order to share the band.^{23/} As was noted above in connection with CTA's application, the cross polarization arrangement between Orbcomm and STARSYS came as a result of painstaking negotiations designed to allow the two first-round systems to share the 137-138 MHz band without causing destructive interference to each other. In order to achieve this optimal sharing solution, each system made substantial accommodations to the other and was required

^{21/} See E-Sat Application at 3-11 and 3-12. Compare STARSYS Amended Application at A-13.

^{22/} E-Sat Application at 3-12.

^{23/} See Final Analysis Application at III-3.

to endure significant capacity loss.^{24/} Second-round applicants seeking access to this band must demonstrate that they will not cause unacceptable interference to the systems ultimately licensed in the first round, a group of which STARSYS is a member for purposes of the analyzing Final Analysis's application. Final Analysis has not met the burden of making such a demonstration.

Although operation in a cross-polarized mode does facilitate sharing by providing additional isolation, it is not by itself a solution in this case. For example, both the power of the satellite and the location of the channel are important factors in determining whether the interfering downlink causes unacceptable interference to STARSYS. Final Analysis is requesting a total of nine 25 kHz channels in the 137-138 MHz band, with the potential for simultaneous use of all nine.^{25/} Transmissions on any one of these channels within a STARSYS ground station main beam would cause unacceptable interference to the STARSYS system. Operation outside of the main beam might be acceptable, but only if the power of the interfering satellite transmitter were modest. Final Analysis must therefore adjust the power, location, and total frequency usage proposed in its application in order to avoid causing harmful interference to STARSYS. Indeed, even if it is assumed that Final Analysis would be the only other system sharing these bands (in addition to STARSYS and Orbcomm), Final Analysis must be limited to operation of a maximum of three

^{24/} See Jointly Filed Supplemental Comments of Orbcomm, STARSYS and VITA, CC Docket No. 92-76 (filed August 7, 1992).

^{25/} See Final Analysis Application at II-3.

channels at one time, and only outside of the main beam of STARSYS's ground station antenna.^{26/}

Similarly, Final Analysis has chosen a channel in the 400.15-401 MHz band that is directly in conflict with the sole space-to-Earth link for STARSYS's mobile customer terminals.^{27/} Because STARSYS will be using this channel virtually full-time while its satellites are in view, Final Analysis must identify a means to shut down its use of the channel at such times. Although it has generally stated that it ". . . will avoid interfering with these various users or proposed users by not assigning the overlapping channel to a [Final Analysis] satellite whose footprint overlaps the other user's footprint,"^{28/} Final Analysis has provided not even a preliminary analysis of the means that it will use to accomplish this desired outcome. Until Final Analysis has provided a full and satisfactory explanation of how it will shut down its transmissions when STARSYS satellites are in view, Final Analysis should not be permitted any use of this channel.

Moreover, Final Analysis has chosen channels in the 149.9-150.05 band which will conflict with the STARSYS ground station Earth-to-space feeder link channel, again supplying no demonstration of how it can share with STARSYS.^{29/}

^{26/} See pages 8 n.9 and 10, supra.

^{27/} See Final Analysis Application at III-4.

^{28/} Id.

^{29/} See Final Analysis Application at III-6.

Final Analysis cannot be permitted to use channels in this portion of the band unless and until it makes such a showing.

D. GE American Communications, Inc.
(File No. 26-SAT-P/LA-95)

The principal current defect in GE Americom's proposed system is its proposed use of twelve unspecified 17 kHz channels in the 148.0-149.9 MHz uplink band.^{30/} If authorized in the portion of the band to be used by STARSYS, the GE Americom ten Watt mobile user terminals would cause up to an 8 dB reduction in the STARSYS uplink signal-to-noise ratio. It was the potential for this type of interference that led to the negotiation of a careful division of uplink spectrum between CDMA and FDMA/TDMA techniques, and the considerations underlying that accommodation also apply to GE Americom's proposal. GE Americom's statement of intention to coordinate with STARSYS to avoid interference, while well-intentioned, is unsatisfactory because GE Americom's system could not operate in the same portion of the band as STARSYS (148.0-148.905 MHz). Thus, any channels assigned to GE Americom in the uplink band must be in the upper portion, above 148.905 MHz.

With respect to downlink frequencies, GE Americom has made a novel proposal to use both left- and right-hand polarization and operate in the reverse direction in bands allocated for space-to-Earth communications at 399.9-400.05 MHz.^{31/} If such use is not permitted, however, it seeks authorization for its

^{30/} See GE Americom Application, Attachment I at 13.

^{31/} See GE Americom Application, Attachment I at 15-16.

downlinks in 146 kHz of spectrum "elsewhere."^{32/} STARSYS comments here simply to note that dual-polarization in the downlink would be wholly unworkable in the 137-138 MHz band, because GE Americom would cause major disruption to the STARSYS inbound downlink due to co-polarization with the STARSYS spread spectrum link. Therefore, this band could not be used for GE Americom's downlinks in the event that STARSYS is authorized.^{33/}

Finally, GE Americom also proposes to make use of the TRANSIT band uplink segment at 149.9 - 150.05 MHz. Although, as others do, it incorrectly states that STARSYS has not proposed to operate in this band, the channels proposed by GE Americom do not conflict with STARSYS.^{34/}

E. Leo One USA Corporation (File No. 27-SAT-AMEND-95)

While Leo One has made several beneficial changes in its initial system proposal against which STARSYS filed its Provisional Petition to Deny on November 16, 1994,^{35/} substantial problems remain. Most significantly, Leo One has failed to

^{32/} See GE Americom Application at 1.

^{33/} The reasons why GE Americom could not successfully use the 137-138 MHz band are the same ones states above (at 9-10 and 15-16) with respect to other second-round applicants.

^{34/} See page 20, *infra*. STARSYS does note, however, that GE Americom's Table 4-2 lists use of the 148.0-150.05 MHz band for Data Communications Center uplinks, which conflicts with the specification of the TRANSIT band alone on pages 14 and 15. See GE Americom Application at 14-15 and 52.

^{35/} See STARSYS Comments and Provisional Petition to Deny, File No. 57-DSS-P/LA-94(48) (filed Nov. 16, 1994).

fully address its interference to STARSYS in the 137-138 MHz band. Leo One's proposed transceiver downlink channel at 137.0000-137.0250 MHz is in direct conflict with the STARSYS telemetry channel occupying the same frequencies.^{36/} Leo One communications with subscribers in this band would disrupt critical satellite telemetry for every STARSYS satellite operating in conjunction with an affected STARSYS ground station, with the possibility of interrupting communications to every STARSYS Command and Data Acquisition Station around the world.

Leo One has revised other transceiver downlink channels, but has simply shifted to channels previously proposed for use by Orbcomm, and vacated by Orbcomm for the very purpose of minimizing conflict with STARSYS's downlink.^{37/} Leo One's proposed downlink power for these channels appears to violate by several dB the $-125 \text{ dB(W/m}^2/4 \text{ kHz)}$ pfd coordination threshold applicable to this band.^{38/} Although Leo One lists a pfd that is within this threshold, computation of this figure by accepted means yields a value of $-118 \text{ dB(W/m}^2/4 \text{ kHz)}$. Under such conditions above, Leo One would cause harmful interference to the STARSYS downlink signal in that band. Moreover, unless the power of this link is reduced, the Leo One system will be required to coordinate with fixed and mobile systems worldwide in the 137-138 MHz band.

^{36/} See Leo One Amended Application at A-13, Table A-6, and Appendix H at H-1.

^{37/} See Leo One Amended Application at A-13.

^{38/} See ITU Footnote 599A.

Like Final Analysis, Leo One is also in error in implying that STARSYS's agreement to facilitate spectrum sharing with Orbcomm via operation on a cross-polarized basis necessarily permits all future comers to utilize cross polarization in order to share the band.^{39/} Any second-round applicants seeking access to this band must demonstrate that they will not cause unacceptable interference to the systems ultimately licensed in the first round. For this reason, STARSYS will have no obligation to coordinate with Leo One, or any second-round applicant, until that applicant demonstrates that its system will not interfere with STARSYS in any way that induces a loss of capacity to STARSYS.

Even with cross-polarized operation of the Leo One downlink channels, operation of a single downlink channel in the main beam of STARSYS ground station antenna will cause a 100% loss in capacity to STARSYS. And even when such transmissions are not in the main beam, with 48 Leo One satellites, it can be assumed that, at any given time, at least two and sometimes as many as four Leo One satellites will be in view of a STARSYS ground station antenna, causing a substantial loss of capacity to STARSYS. Accordingly, based on its current proposal, in order to prevent destructive interference to STARSYS, Leo One must, at a minimum, be prohibited from conducting satellite-transceiver downlink operations within the STARSYS antenna main beam. Furthermore, even if no other second-round systems are licensed to use the 137-138 MHz band, Leo One must be restricted to no more than two to three operating satellite-transceiver channels which are visible above the

^{39/} See Leo One Amended Application, Appendix H at H-1.

horizon from any STARSYS ground station.^{40/} Such measures are the only means to prevent prohibited interference to STARSYS.

Finally, Leo One's current application proposal repeats its erroneous statement that none of the first-round NVNG MSS applicants proposed use of the TRANSIT Band frequencies at 149.9 - 150.05 MHz.^{41/} In fact, STARSYS has proposed to make use of this allocation to operate Earth-to-space system feeder links for which these bands will be available on a secondary, non-interference basis prior to 1997, and on a primary basis thereafter.^{42/} Leo One thus continues to be incorrect in its statement that "there will be no possibility of interference with those systems in this band."^{43/} Leo One's proposal indicates a channel for transceiver-to-satellite uplinks with a center frequency at 150.0425 MHz,^{44/} which would extend into the STARSYS uplink channel with a center frequency at 150.025 MHz. There is significant potential for interference to the STARSYS system which depends upon Leo One's transmitter power density, and its proximity to a STARSYS ground station uplink antenna. Assuming STARSYS's other objections can be resolved, Leo One

^{40/} See pages 9-10, supra.

^{41/} See Leo One Amended Application, Appendix H at H-4.

^{42/} See STARSYS Amended Application, FCC File Nos. 33-DSS-P-90(24) and 31-DSS-AMEND-94, and 32-DSS-LA-94, at 6 (filed April 25, 1994).

^{43/} Leo One Amendment, Appendix H at H-4.

^{44/} See Leo One Amendment at A-13, Figure A-7.

will need to coordinate with STARSYS in order to ensure that interference situations will not occur.

**F. Orbital Communications Corporation
(File No. 28-SAT-MP/ML-95)**

Unlike the other applicants in this group, Orbcomm is seeking to modify its existing authorization to provide NVNG MSS services. Orbcomm's modification, however, is no minor alteration to its previously authorized system, but a dramatic increase in demand for spectrum. Of most concern to STARSYS is Orbcomm's request for six more 15 kHz channels in the 137-138 MHz downlink band.^{45/} STARSYS opposes this request because, among other adverse effects, it will produce destructive interference to STARSYS.

The effect of the requested additional channels, in conjunction with the increased number of satellites, would be to cause total obliteration of the STARSYS downlink signal due to the channels' proximity to the STARSYS center frequency at 137.5 MHz. As noted above, since agreeing to a sharing arrangement with STARSYS and VITA in 1992, Orbcomm has dramatically increased its demand for spectrum in the 137-138 MHz band, impinging on STARSYS.^{46/} The substantial increase represented by Orbcomm's second-round applicant would virtually preclude the ability of any new entrants to use the downlink band.

^{45/} See Orbcomm Amended Application at 5 and Second Technical Appendix at 3.

^{46/} See footnote 9, *supra*.

The unreasonable scope of Orbcomm's request for yet more downlink spectrum in the 137-138 MHz band is evidenced by the fact that Orbcomm is already allocated more than two-thirds of the spectrum available in this band for FDMA downlinks, and the amendment proposes to increase this percentage to approximately 89% of this available bandwidth.^{47/} The interference itself is compounded by the fact that the additional twelve satellites represented by Orbcomm's second-round application will mean that more satellites will be transmitting at any one time.

For this application, Orbcomm is no different from any other second-round applicant. The first-round sharing arrangement between Orbcomm and STARSYS is not operative here. Orbcomm must -- but has not yet - shown how it can comply with Section 25.142(a)(1) with respect to STARSYS.

G. Volunteers in Technical Assistance
(File No. 29-SAT-AMEND-95)

VITA's "Amendment" is defective in virtually every conceivable respect.^{48/} It fails to comply with FCC rules, ITU regulations, or the recent

^{47/} Subtracting from the 1000 kHz allocation in this band 25 kHz for STARSYS's tracking, telemetry and control downlink; the 325 kHz set aside for secondary mobile satellite spectrum; the 128 kHz reserved for U.S. meteorological satellite ("METSAT") operations; and the 60 kHz guardband between FDMA users and the METSATS yields 462 kHz remaining for FDMA systems to operate in this band. Of this allocation, Orbcomm already has exclusive access to 320 kHz (69.26%) and seeks another six 15 kHz channels, which would bring its total use to 410 kHz (88.7%). If Orbcomm's request is granted, there would be just 52 kHz available for all potential competing FDMA systems.

^{48/} Although VITA has sought to alter dramatically its original non-profit service proposal, it continues to rely on an FCC waiver, which was granted before VITA
(continued...)

agreement with the NTIA to avoid interference to fixed and mobile users in the 148-149.9 MHz band. The amendment makes no attempt to identify how the extensive changes VITA proposes would avoid interference to STARSYS or any other proposed or authorized users of the NVNG MSS bands.

Incredibly, VITA asserts its belief "that the instant amendment should be considered in the first processing round, since it relates to a first round satellite" and further states that it filed on the second round cut-off deadline "out of an abundance of caution."^{49/} VITA may possess an abundance of something, but caution is not it.^{50/} In fact, at this point, VITA's amendment explicitly purporting to alter its first round proposal should result in VITA's dismissal from the first processing round because it has clearly submitted a major amendment to the first-round application.^{51/} At a minimum, VITA's "Amendment," like Orbcomm's, is eligible for consideration only within the second processing group. In this regard, VITA is no

^{48/}(...continued)

proposed to operate a commercial system, to justify continued non-payment of application fees. See VITA Amendment at 2 n.1. VITA did not even seek a Commission waiver for its amendment, but simply elected not to pay the requisite fees. For this reason alone, VITA's amendment should be dismissed. See 47 C.F.R. § 1.1107(a)(2) (1994); see also 47 C.F.R. § 1.1115(e) (1994) (requests for waiver must be submitted along with the subject application and the required fee).

^{49/} VITA Amendment at 2.

^{50/} STARSYS has petitioned to deny VITA's first round application due to its lack of caution in entering into a highly questionable "lease" arrangement with CTA, by which CTA has apparently assumed de facto control of the application. See footnote 10, supra.

^{51/} See, 47 C.F.R. §25.116(b) and (c) (1994).

different from any other second-round applicant and must definitely demonstrate that it will not interfere with STARSYS -- consistent with Section 25.142(a)(1) of the Commission's rules. VITA's amendment is patently defective in this respect, and cannot be granted.

The specific areas where VITA's new proposal conflicts with STARSYS are numerous. In the uplink band, VITA proposes ten new channels which may range up to 90 kHz each, any two of which it proposes to operate simultaneously at a power of 20 watts and with up to 25 dBW e.i.r.p.^{52/} Such spectrum use by an FDMA system is not compatible with STARSYS's spread spectrum design, and would only be acceptable in the FDMA portion of the uplink band.

Moreover, the proposed spectrum use conflicts with both FCC rules and ITU regulations. VITA proposes ground stations with an operating power that would greatly exceed - 16 dBW/4 kHz pfd; therefore, it must employ a mechanism to avoid frequencies in use.^{53/} VITA fails to describe any such method, and simply states that it will "select the lowest interference region to be used for uplink by the VITA ground terminals."^{54/} Due to the significant bandwidth VITA requests, it is inevitable that its signals will wither interrupt or prevent other fixed and mobile users from obtaining access to frequencies. In addition, because the VITA system is to be used primarily to transfer files for durations up to the 15 minute maximum, VITA will block wide

^{52/} See VITA Amended Application, Exhibit B at 6-7.

^{53/} See Footnote US323.

^{54/} VITA Amended Application, Exhibit B at 7.

portions of spectrum for long periods of time. Such use does not meet the restrictions of Footnote US323, and also appears to violate ITU Radio Regulation 608A, which provides that "[t]he mobile-satellite service shall not constrain the development and use of the fixed, mobile and space operation services in the band 148.0 - 149.9 MHz." ^{55/}

VITA also proposes two uplink channels in the TRANSIT band, both of which are in unacceptable conflict with the STARSYS feeder link. ^{56/} VITA also apparently proposes four additional channels outside the TRANSIT band in frequencies ranging from 150.1 to 150.395 MHz. ^{57/} As no explanation is provided for this non-conforming use, it seems likely that these channels have been identified in error. If this is the case, then these channels are also likely to be in conflict with STARSYS and to cause it harmful interference.

In the downlink bands, VITA proposes ten new channels at 137-138 MHz, of which three would be active at any one time. ^{58/} Use of any of these channels would cause harmful interference to the STARSYS downlink signal when operated in the main beam of a STARSYS ground station. At 400.15-401 MHz,

^{55/} ITU Footnote 608A.

^{56/} See VITA Amended Application, Exhibit B at 7.

^{57/} Id.

^{58/} See VITA Amended Application, Exhibit B at 8.

VITA also proposes a channel at 400.640 that is in direct conflict with STARSYS forward downlink channel.^{59/}

III. GE Americom Proposes A Reasonable Change To The Milestone For Commencement Of Construction Of All Satellites; But Such A Modification Should Be Made Generally And Not Simply Granted As A Waiver To One Applicant.

In its application, GE Americom requests flexibility in the Commission's milestone for the commencement of construction of the "remaining" system satellites (exclusive of the initial two satellites required to begin service), for which construction must begin within three years of license grant. Specifically, GE Americom states that "it may prove reasonable to defer the construction commencement date of some later satellites beyond three years, to a time closer to the date that they would be launched."^{60/} GE Americom emphasizes that this change would not affect the requirement to launch all satellites by the six year benchmark.

STARSYS supports GE Americom's call for flexibility in the Commission's commencement of construction milestone. Given the fact that the Commission's general guidelines already include milestones for the initiation of satellite construction within two years of grant, the completion of the initial system

^{59/} Id.

^{60/} GE American Application at 9.

satellites within four years,^{61/} and the launch and operation of an entire system within six years, the milestone for commencement of construction of all satellites is superfluous and may interfere with a licensee's ability to make prudent business decisions. So long as the six year deadline remains in place, such a change should not have any adverse impact on the Commission's goal of ensuring prompt initiation of service. Indeed, such flexibility would likely improve a licensee's ability to effect its system plan by permitting it to adjust more easily to market requirements or funding realities.

STARSYS does believe, however, that the Commission should not alter this requirement on an *ad hoc* basis by waiver, but instead should simply modify its general approach to eliminate the intermediate commencement of construction milestone, while leaving all other milestone requirements in place. Such an approach will have the dual benefits of providing equal treatment to all applicants/licensees, while minimizing any burden to the Commission in evaluating multiple, duplicative waiver requests.

^{61/} See Amendment of the Commission's Rules to Establish Rules and Policies Pertaining to a Non-Voice, Non-Geostationary Mobile Satellite Service, 8 FCC Rcd 8450, 8455 (¶ 18) (1993).

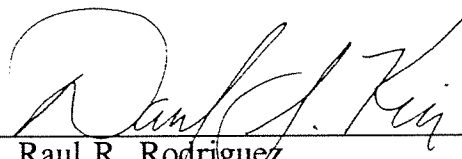
IV. Conclusion

For the forgoing reasons, STARSYS urges the Commission to deny, or at least defer action upon all of the second-round NVNG MSS applications. At this time, there are simply too many unknown factors which must become known before the Commission can be in a position to proceed with the consideration of the new applicants' proposals. Moreover, given the number of applicants for limited available spectrum, it is apparent that the Commission will need to initiate a rule making in order to determine a suitable mechanism for awarding second round NVNG licenses.

Respectfully submitted,

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February 24, 1995

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TECHNICAL CERTIFICATE

I, Kenneth E. Newcomer, hereby certify, under penalty of perjury, that I am the technically qualified person responsible for the preparation of the technical information contained in the foregoing "Consolidated Petition to Deny of STARSYS Global Positioning, Inc.," and that this information is true and correct to the best of my knowledge and belief.

By: Kenneth E. Newcomer
Kenneth E. Newcomer
Chief Engineer
STARSYS Global Positioning, Inc.

Dated: February 24, 1995

CERTIFICATE OF SERVICE

I, Kaigh K. Johnson, hereby certify that true and correct copies of the foregoing "Consolidated Petition to Deny of Starsys Global Positioning, Inc." were sent by first-class, postage prepaid mail, this 24th day of February, 1995, to the following:

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