

UNITED STATES GOVERNMENT  
MEMORANDUM

RECEIVED

SEP 2 '92

DATE: September 2, 1992

SUBJECT: Record Information, Docket # 92-76

FEDERAL COMMUNICATIONS  
COMMISSION  
OFFICE OF THE  
SECRETARY

Kris Kendall

Attached is the most recent List of Documents, identifying certain information that has been included for consideration by the Below 1 GHz LEO Negotiated Rulemaking Committee. Advisory Committee documents have been given "LEOAC-" numbers. This List of Documents has been identified as LEOAC-0, and bears revision numbers as it is updated to reflect the inclusion of additional record information. The most recent version of the List is LEOAC-0 (Rev.3), but additional revisions may follow.

List of Documents

- LEOAC-0 (Rev.3) List of Documents
- LEOAC-1 Public Notice "Below 1 GHz Negotiated Rulemaking Committee"
- LEOAC-2 (Rev.1) Work Program - Below 1 GHz LEO Negotiated Rulemaking Committee
- LEOAC-3 VITA's application - File No. \*\*\*
- LEOAC-4 ORBCOMM's application - File No. 22-DSS-P-90(22)
- LEOAC-5 Amendment to ORBCOMM application
- LEOAC-6 STARSYS's application - File No. 33-DSS-P-90(26)
- LEOAC-7 LEOSAT's application - File No. 12-DSS-P-91(2)
- LEOAC-8 List of IFRB Publications
- LEOAC-9 Federal Use of the 148-149.9 MHz band
- LEOAC-10 Extract from "DOC's Spectrum Sharing Study Phase 2 (Final Report)"
- LEOAC-11 CCIR Doc. 8D/TEMP/13 "Method for Determining Sharing between Stations in the Mobile Service below 1 GHz and FDMA Non-GSO Mobile Earth Stations"
- LEOAC-12 CCIR Doc. 8D/TEMP/36 "Methods for Analyzing Sharing between existing Fixed and Mobile and Meteorological Systems and Spread-Spectrum CDMA LEO MSS below 1 GHz"
- LEOAC-13 Charter for the Below 1 GHz LEO Negotiated Rulemaking Committee
- LEOAC-14 "Jointly Filed Comments of ORBCOMM, STARSYS and VITA"  
CC Docket No. 92-76, dated May 18, 1992  
Addendum 1 - Identification of technical service proposals
- LEOAC-15 "Jointly Filed Supplemental Comments of ORBCOMM, STARSYS and VITA", CC Docket No. 92-76, dated August 7, 1992  
Addendum 1 - Graph, Uplink Band  
Addendum 2 - LEO Possible Sharing Scenario (ORBCOMM, STARSYS & VITA)  
Addendum 3 - Graph, Downlink Channelization Plan
- LEOAC-16 LEOSAT Reply Comments dated May 29, 1992
- LEOAC-17 Notice of Proposed Rule Making, ET Docket No. 91-280
- LEOAC-18 Extracts from Final Acts of the World Administrative Radio Conference (WARC-92), Addendum + Corrigendum to the Final Acts and from the Radio Regulations
- LEOAC-19 Chapter 10, NTIA Regulations
- LEOAC-20 Part 25, FCC Regulations
- LEOAC-21 Public Notice dated August 4, 1992
- LEOAC-22 FAA's Letter of August 14, 1992 re: VHF AM(R)S
- LEOAC-23 CCIR Report (Excerpts) "Technical and Operational Bases for WARC-92
- LEOAC-24 Reply Comments of ORBCOMM, ET Docket No.91-280 dated January 23, 1992
- LEOAC-25 Possible STARSYS Earth Station Locations
- LEOAC-26 Comments of STARSYS, ET Docket No.91-280 dated December 24, 1991
- LEOAC-27 IWG draft language, §§25.401, 25.407
- LEOAC-28 IWG draft language, §§25.202(f) and (g), 25.203
- LEOAC-29 Public Notice dated August 14, 1992 re: Aug. 28 meeting
- LEOAC-30 Comments of LEOSAT, ET Docket 91-280 dated December 24, 1991
- LEOAC-31 Minutes of the August 10-11, 1992 Committee Meeting
- LEOAC-32 Minutes of the August 18, 1992 Committee Meeting
- LEOAC-33 IWG Draft Service Rules Forwarded for Consideration by the Advisory Committee
- LEOAC-34 Statement of the Navy dated Aug. 24, 1992
- LEOAC-35 Minutes of the August 24, 1992 Committee Meeting

August 24, 1992

In regard to draft Section 25.202(A)(3), the Navy feels it may be inadvisable to encourage early secondary use of the spectrum, allocated to the Land Mobile-Satellite Service on a secondary basis until 1 January 1997 by WARC-92, in the band 149.9-150.05 MHz because the Radionavigation-Satellite Service remains an active safety service in this band as well as in the band 399.9-400.05 MHz until 1997. According to ITU RR No. 953, radionavigation, as a safety service, requires special measures to ensure freedom from harmful interference and this factor should be taken into account when assigning and using frequencies. The Transit Radionavigation System remains in the United States Navigation Plan until 1997 and is thought to have over 30,000 users. It is for this reason we recommend rethinking on this matter.

MINUTES OF THE AUGUST 24, 1992 MEETING OF  
THE BELOW 1 GHZ LEO NEGOTIATED RULEMAKING COMMITTEE

1. The third meeting of the Below 1 GHz LEO Negotiated Rulemaking Committee (Committee) was convened at 9:30 a.m. on August 24, 1992 in the Commission's meeting room at the Federal Communications Commission (FCC), 1919 M Street, N.W., Washington, D.C.

2. The following Committee members were present:

Air Force - Nelson Pollack  
Navy - Pat James  
LEOSAT - Brent Weingardt  
FAA - Carroll Sturm  
Army - Thomas Trimmer  
FCC - Thomas S. Tycz  
STARSYS - Alan Renshaw  
NOAA - Richard Barth  
ORBCOMM - Alan L. Parker  
VITA - Joseph Sedlak  
Facilitator - William A. Luther

(NASA and ARINC were not present at the Committee table.)

3. The meeting was open to the public, and approximately 22 observers were present. A list of attendees is attached as Appendix A. No written remarks were submitted by the public.

4. Approval of agenda. Mr. Luther opened the meeting and called for comments on the meeting agenda (attached as Appendix B.) There were no comments from the members, and Mr. Luther noted that document LEOAC-33 would be considered under agenda item 7. Mr. Pollack remarked that it may be wise to schedule the sharing presentations by STARSYS, VITA and ORBCOMM prior to consideration of LEOAC-33. Mr. Parker commented that ORBCOMM had no difficulty with presenting its remarks prior to discussion of LEOAC-33, but that he was troubled by the implication that the government users had not had sufficient exposure to the sharing issues prior to today's meeting. Mr. Pollack responded that, while he was aware of the sharing issues in general, he would appreciate the benefit of a short synopsis of the proponents' views. He further stated his belief that the informal working group (IWG) proposals should be completely discussed and revised by the entire Committee. Mr. Luther assured Mr. Pollack that there was no intent to "rubber stamp" any proposal from the IWG, and that LEOAC-33 would be examined paragraph by paragraph, or line by line if necessary, to assure that all interests are fully represented in the final output. Mr. Luther went on to voice his belief that the presentations by the applicants would not have an impact on the discussion of matters involved in LEOAC-33. There was no further discussion, and the agenda was approved.

5. Opening remarks. Mr. Luther reminded the participants of their expressed intent to negotiate the issues at hand with straightforward good will.

6. Approval of minutes. The minutes of the August 10-11, 1992 and August 18, 1992 Committee meetings were distributed for review, and Mr. Luther called

for additions or corrections thereto. Mr. Pollack requested that LEOAC-31, paragraph 8, be amended to include his statement that the government considers as "existing" those systems that have either (1) been listed in the government's master file, or (2) are the subject of a stage 1, 2, 3 or 4 application submitted to the Spectrum Planning Subcommittee, in accordance with Chapter 10 of the NTIA manual. Ms. James requested that the attendance list, attached as Appendix A to LEOAC-31, be corrected to reflect her attendance at that meeting. Both corrections were made to the record. There were no further comments, and the minutes of both meetings were approved by the Committee, as amended. Mr. Luther noted that if a member discovers any other error or omission, corrections can be made at subsequent Committee meetings.

7. Consideration of co-facilitator. Mr. Luther remarked that the IWG had been making good progress, and that it is still not apparent if the election of a co-facilitator to chair the Committee after September 6 will be necessary. Accordingly, he suggested that the selection of a co-facilitator be postponed until the Committee meeting on September 1, 1992. This suggestion was approved by the Committee.

8. Identification of additional record information. LEOACs-30-33 were included in the new List of Documents (LEOAC-0 (Rev.3)). LEOAC-30, which was identified and distributed at the meeting on August 18, 1992, is a copy of the Comments of LEOSAT Corporation in Docket ET 91-280, dated December 24, 1991. Documents LEOAC-31 and 32 are the minutes of the Committee meetings of August 10 & 11 and August 18, 1992, respectively. LEOAC-33 is a draft proposal presented by the IWG for consideration by the full Committee. Mr. Renshaw submitted, on behalf of STARSYS, a response to LEOSAT's record statement of August 18 (LEOAC-32, Appendix C). STARSYS's response will not be given a separate LEOAC number, but will be attached to the minutes of this meeting as Appendix C. There were no further documents presented for identification in the record of this proceeding.

9. Report on progress of informal working group. Mr. Jacobs reported that the IWG has met on four occasions since the last Committee meeting, and has completed a significant portion of its work. The IWG has yet to consider the 400.15-401 MHz band, and items B and C of the work program. LEOAC-33 is a compilation of the IWG's output to date.

10. Discussion of informal working group report. Mr. Luther then called for consideration of the IWG document, LEOAC-33. He commented that, although the Committee would be considering this document in detail today, he anticipated reexamination of the contents when the total package of rules proposed is prepared. Mr. Weingardt inquired whether specific proposals would be voted upon, or otherwise finally approved by the Committee, at this meeting, and indicated LEOSAT's preference that rules be adopted as a whole package. Mr. Luther concurred with Mr. Weingardt, and assured him that today's discussion would not constitute binding acceptance of the proposed rules by any party. Mr. Jacobs then went on to discuss the proposed changes to Part 2 of the FCC's rules (LEOAC-33, items 1-4). With regard to the four international footnotes that are proposed for inclusion in the Part 2 allocation tables, Mr. Jacobs voiced the IWG's belief that it will be preferable to include them verbatim in Part 2 in lieu of developing Part 25 service rules based thereon.

This will assure that the IWG is not imposing its own interpretation on the footnote requirements. Mr. Jacobs noted that the IWG participants had considerable discussion regarding the PFD limits for user terminals. Most parties felt that the limits set forth in footnotes 608X and 608Y are not absolute limits, but are triggers for coordination with the affected jurisdiction. Mr. Tycz expressed his concern that the wording of these footnotes may allow neighboring administrations to interpret these notes very strictly, and to refuse coordination if the PFD limits exceed those set forth. Mr. Luther commented that it is always possible for separate jurisdictions to work out their differences on a case by case basis, and that it is well understood that the U.S. operators must meet the concerns of their neighbors. Accordingly, the Committee offered no objection at this time to the inclusion of the proposed footnotes into Part 2. Mr. Parker noted that the wording of the footnotes (but not the substance) may ultimately need to be edited for inclusion in the domestic tables. Mr. Tycz suggested three additional footnotes that may need to be incorporated into the rules governing this service: numbers 599B, 608Z and 609B. Mr. Parker indicated that those footnotes had already been identified by ORBCOMM and would be addressed in a document to be presented to the IWG in the near future. Mr. Luther queried whether the international footnotes would be given new identifying numbers upon inclusion into the domestic table, and was informed by Mr. Jacobs that the international numbers are likely to be used. There was no further discussion of LEOAC-33, items 1-4.

11. The Committee next addressed item 5. Mr. Jacobs stated the IWG's belief that section 25.111 is sufficiently broad to enable the FCC to request the information necessary for the licensing and regulation of the proposed LEO services. Mr. Tycz went on to explain that the IWG specifically declined to impose an affirmative obligation on applicants initially to demonstrate compliance with all international obligations. The group felt that these obligations are best handled in the context of international coordination, not domestic licensing. There was no further discussion of item 5.

12. Mr. Jacobs explained that item 6 consists simply of a cross-reference in section 25.114 to a new rule, 25.401, and is included to assure that applicable rules are apparent to new applicants. Item 7 lists the frequencies available for the non-voice, non-GSO satellite service (<1GHz). Mr. Jacobs noted that the frequencies listed in brackets have not yet been allocated for these services. Mr. Luther commented that, while allocation issues are not before the Committee, the Committee report can indicate a preference that these bands be considered for ultimate use. Ms. James then read a statement for the record (identified as LEOAC-34) setting forth the Navy's views with regard to use of the 149.9-150.05 MHz and 399.9-400.05 MHz bands. Mr. Parker and Mr. Tycz expressed confusion regarding the intent of the Navy statement, and the parties agreed to discuss the matter further in the IWG, including the possibility of establishing the identity of the approximately 30,000 users mentioned in the statement.

13. There was no discussion of item 8, beyond the comment that it was editorial in nature. With regard to item 9, the IWG contemplated redefinition of earth stations in section 25.203, but ultimately decided to include a new section 25.409 that will clearly exempt MSS user transceivers from the

provisions of section 25.203. Mr. Luther suggested that the Committee reexamine this section when it considers proposed section 25.409. Mr. Tycz noted that gateway earth stations would continue to fall within the purview of 25.203. There were no further comments on LEOAC-33, items 8 and 9.

14. Item 10 involved a discussion of section 25.208, which addresses PFD limits. Mr. Jacobs stated that the IWG had determined that it will be redundant to include the footnote PFD limits, previously proposed for inclusion in Part 2, into a second Part of the FCC's rules. Mr. Tycz suggested that the report accompanying the final proposals of the Committee should indicate that LEO applicants need not present specific showings of compliance with these limits as part of the application process.

15. In item 11, the IWG recommends a new subpart F of Part 25 of the FCC's rules. Mr. Luther asked whether a definition of this new satellite service should be included in section 25.201. Mr. Weingardt commented that a concise definition would be an excellent idea. Mr. Luther suggested that the IWG consider such a definition near the end of its deliberations. Mr. Jacobs then went on to note that, because of the differing natures of geostationary (GSO) and non-geostationary (non-GSO) satellite systems, additional information will be necessary to process applications to provide non-GSO services. Accordingly, the IWG has added a new section 25.401, which lists additional required information. With regard to the bold-faced note under item 11, Mr. Tycz commented that a multi-stage financial showing is merely a proposal, not a rule, and that the FCC will ultimately have to determine at what point an applicant is authorized to construct a system. Mr. Pollack stated that the new section 401 should require a showing by the applicant that it will not interfere with existing systems. Mr. Luther responded by noting that proposed section 25.408 is intended to cover sharing with existing systems, and that proposed section 25.401 is meant to address sharing only with other LEO satellite systems. Mr. Pollack suggested that section 401 should cross-refer to section 408, and Mr. Jacobs suggested that section 408 simply be renumbered to become section 402, and that cross-referencing may not be necessary. Mr. Pollack then noted that the terms of sections 401 and 408 are not parallel; section 25.401 contemplates a showing of compatibility, while section 408 imposes operating conditions, but not a demonstration of coordination. Mr. Jacobs stated that proposed section 25.408(b) is intended to address Mr. Pollack's concerns, and that it is not possible for applicants to make an initial showing of coordination because the existing government systems are not in the public domain. Mr. Pollack countered that much information regarding government usage is available to potential users. Mr. Renshaw related that it was not until very late in the development of its system that STARSYS learned of an impending Air Force program in these frequency bands. Accordingly, he believes that the application process should be kept separate from mandatory coordination requirements. Mr. Tycz agreed that the availability of information regarding government systems is a problem, and that it would not seem reasonable to impose such a pre-coordination showing. Mr. Pollack suggested that perhaps language could be included to require a demonstration of compatibility with that information which is in the public domain. Mr. Tycz questioned the method of determining whether information is in the public domain, and Mr. Pollack noted that a process exists for adjudicating things in the public domain. Mr. Luther closed the discussion of 401 at this point, and

noted that the timing of the showing contemplated by proposed section 408 should be discussed when that section is addressed. He then suspended discussion of LEOAC-33, and called for a five minute break prior to the sharing presentations of STARSYS, VITA and ORBCOMM. LEOSAT will give its sharing presentation at the next meeting on September 1, 1992.

16. Presentations on sharing. At this point, STARSYS, VITA and ORBCOMM made sharing presentations to the group. The graphic representations of their presentations are attached as Appendices D, E and F, respectively, and an audio tape of these presentations is available for review upon request to the Committee's designated Federal employee, Thomas S. Tycz.

17. Discussion of additional/revised tasks for IWG. There were no comments in response to Mr. Luther's call for discussion of any proposed new tasks for the informal working group.

18. Formation of editorial working group. Mr. Luther next called for volunteers to serve as members of an editorial working group to prepare the Committee's report to the FCC. He noted that Messrs. Jacobs and Tycz, and Ms. Kendall, in addition to himself, will serve on the group. Mr. Parker volunteered his services, as well as those of Steve Goodman, counsel to ORBCOMM. Representatives of STARSYS, VITA, LEOSAT, NOAA, the Navy and the Air Force also offered their services. No firm date was set for the initial meeting of the editorial working group.

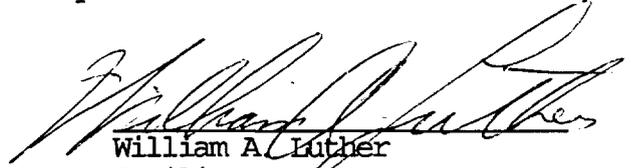
19. Agenda for next meeting. Mr. Luther noted that the consideration of a co-facilitator for the Committee will be added to next week's agenda, and that the Committee will continue its discussion of LEOAC-33. There were no further additions to the agenda for September 1, and it was tentatively approved.

20. Other business. Mr. Luther queried whether the IWG would meet again on the afternoon of September 1, 1992. Mr. Jacobs indicated his availability, and the Committee proceeded to schedule an IWG meeting on that date from 2:00-4:00 p.m. in the Commission meeting room. Mr. Pollack requested that there be no IWG meetings on the afternoons of September 8 and 9, 1992, in light of the need for government representatives to prepare for, attend and recover from an IRAC meeting on the morning of September 9. These meetings were accordingly cancelled by the Committee. A copy of the proposed remaining schedule of the IWG and of the full Committee is attached as Appendix G. Mr. Tycz noted that he will be unavailable to attend meeting on September 10 and 11 due to scheduling conflicts. Mr. Luther then called for comments from the observers. There were none. Mr. Weingardt then asked Mr. Luther for his views on whether the IWG should be considering the development of a rule requiring a certain percentage of U.S. coverage by potential licensees. Mr. Luther commented that such a rule is marginally technical, and seems to be arguably within the scope of the IWG's deliberations. Mr. Jacobs concurred, and expressed his belief that the issue falls under item B of the work program. Mr. Luther requested that consideration of such a rule be left until the end of deliberations, and should be afforded only a short discussion in light of the time that has already been spent on the issue. There was no further business, and the Committee was adjourned at 1:22 p.m.



TO WHOM IT MAY CONCERN:

After examining the minutes of the August 24, 1992 meeting of the Below 1 GHz LEO Negotiated Rulemaking Committee, I certify that these minutes are accurate to the best of my knowledge.

A handwritten signature in cursive script, appearing to read "William A. Luther", written over a horizontal line.

William A. Luther  
Facilitator

Below 1 GHz LEO Negotiated  
Rulemaking Committee

ATTENDEES  
Below 1 GHz LEO Negotiated Rulemaking Committee  
August 24, 1992

| <u>Name</u>         | <u>Organization</u> | <u>Telephone #</u> | <u>FAX #</u> |
|---------------------|---------------------|--------------------|--------------|
| Nelson Pollack      | *HQ AF/FMA          | 202-475-1807       | 202-475-7634 |
| Pat James           | *U.S. Navy          | 703-697-6494       | 703-697-0930 |
| Carroll Sturm       | *FAA                | 202-267-9721       | 202-267-5901 |
| Tom Trimmer         | *U.S Army           | 703-325-8233       | 703-325-8235 |
| Tom Tycz            | *FCC                | 202-634-1817       | 202-653-8772 |
| Alan Renshaw        | *STARSYS            | 301-459-8832       | 301-794-7106 |
| Richard Barth       | *Commerce/NOAA      | 301-763-4640       | 301-420-0932 |
| Alan L. Parker      | *ORBCOMM            | 703-818-3762       | 703-631-3610 |
| Joe Sedlak          | *VITA               | 703-276-1800       | 703-243-1865 |
| Brent Weingardt     | *LEOSAT             |                    |              |
| Bill Luther         | Facilitator         | 202-632-7592       | 202-632-0160 |
| Ed Jacobs           | IWG Coordinator     | 202-632-7597       |              |
| Kris Kendall        | FCC                 | 202-634-7058       | 202-653-8772 |
| Steve Goodman       | ORBCOMM             | 202-371-9100       | 202-371-1497 |
| David Schoen        | ORBCOMM             | 703-818-2846       | 703-631-3610 |
| Bruce Ferguson      | ORBCOMM             | 703-818-2865       | 703-631-3610 |
| Don Jansky          | JBTI                | 202-467-6400       | 202-296-6892 |
| Jonathan Weiner     | VITA                | 202-429-4900       | 202-429-4912 |
| Amy Span Wergeles   | Ellipsat            | 202-663-9436       | 202-663-8007 |
| Stephen Baruch      | STARSYS             | 202-429-8970       | 202-293-7783 |
| Raul Rodriguez      | STARSYS             | 202-416-6760       | 202-293-7783 |
| Alan Rinker         | *NASA/ARC           | 703-834-5606       | 703-834-1094 |
| Greg Masters        | AMSC                | 202-659-3494       | 202-296-6518 |
| Julie Garcia        | FCC                 | 202-634-1841       |              |
| Harry Ng            | FCC                 | 202-634-1834       | 202-653-8772 |
| Gerald Wiggen       | SFA, Inc/Navy       | 301-839-5495       | 301-839-4995 |
| Ken Newcomer        | STARSYS             | 301-794-5203       | 301-794-7106 |
| Gilles Brunshwig    | STARSYS             | 301-341-1814       | 301-341-2130 |
| Roger Porter        | U.S.A.F.            | 202-475-1678       | 202-475-7634 |
| Art Yamada          | Aerospace Corp.     | 310-336-8816       |              |
| Francois Giorgio    | LEOSAT              | 202-296-6104       | 202-296-6142 |
| Joseph Roldan       | LEOSAT              | 202-296-6104       | 202-296-6142 |
| Paul Locke          | ORBCOMM             | 703-631-3600       | 703-631-3610 |
| James P. Fitzgerald | Comsearch           | 703-476-2661       | 703-476-2787 |
| Jim Vorhies         | NTIA                | 202-377-1138       | 202-377-4396 |

\*Denotes Committee member.

AGENDA  
BELOW 1 GHz LEO NEGOTIATED RULEMAKING COMMITTEE  
August 24, 1992

1. Approval of agenda
  2. Opening remarks
  3. Approval of minutes
  4. Consideration of Co-Facilitator
  5. Identification of additional record information
  6. Report on progress of informal working group
  7. Discussion of informal working group reports
  8. Presentations on sharing (limited to twenty minutes each)
    - STARSYS
    - VITA
    - ORBCOMM
  9. Discussion of additional/revised tasks, if any, for informal working group (Work program - LEOAC-2 (Rev.1))
  10. Formation of informal editorial working group to prepare the Committee's report to the Federal Communications Commission
  11. Agenda for next meeting
  12. Other business
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**STATEMENT OF STARSYS GLOBAL POSITIONING, INC.  
IN RESPONSE TO  
LEOSAT CORPORATION STATEMENT OF AUGUST 18, 1992**

On August 18, 1992 LEOSAT Corporation ("Leosat") submitted a statement into the Summary Record of the Advisory Committee established by the Commission in CC Docket No. 92-76. STARSYS Global Positioning, Inc. ("STARSYS") requested an opportunity to respond to Leosat's statement, and presents its response below.

STARSYS and Orbital Communications Corporation ("ORBCOMM") each proposed in its original application to employ a modulation technique across the entire 148-149.9 MHz and 137-138 MHz bands that would preclude operation by the other. STARSYS asserted that its approach -- code division multiple access ("CDMA") -- is the only approach that enabled true spectrum sharing by multiple systems, while ORBCOMM's frequency division multiple access ("FDMA") approach would enable sharing only by dividing a finite number of users between additional systems. The all or nothing battle for spectrum between STARSYS and ORBCOMM continued for more than two years -- commencing at the time STARSYS filed its application in May 1990, and culminating with the filing of the August 7, 1992 sharing document that is included as Document No. LEOAC-15 in this proceeding.

In April 1992, following the Commission's issuance of its proposal to utilize the new negotiated rulemaking procedure to derive service rules for the Little LEO applicants, and following the Commission's dismissal of Leosat's application as unacceptable for filing, STARSYS, ORBCOMM, and Volunteers in Technical Assistance Inc. ("VITA") realized that they would be called upon to resolve many of the technical differences that existed between them. As a result, the companies commenced a series of discussions that led first to the service rule proposals embodied in Document No. LEOAC-14, and ultimately to the sharing plan proposed in Document No. LEOAC-15. In the latter document, STARSYS and ORBCOMM agree that they can each operate somewhat scaled back versions of their proposed CDMA and FDMA systems compatibly in the frequency bands currently available for such services.

Leosat implies that it was excluded from the development of these proposals. As noted above, however, Leosat's application had been dismissed prior to the commencement of substantive discussions among the pending applicants. In any event, Leosat has identified a series of inconsistent spectrum utilization plans that called into question its ability to contribute meaningfully to the applicants' discussions.

Next, and contrary to another of Leosat's assertions, Document No. LEOAC-15 does not represent "STARSYS' disavowal of the technically optimal CDMA alternative." Indeed, STARSYS would still employ CDMA modulation from its user terminals, as it has proposed all along. While STARSYS has, for technical reasons, incorporated some FDMA links (namely to avoid the generation of additional self-interference that dual CDMA links would represent in the 148-149.9 MHz and 137-138 MHz bands), these modifications have been contemplated as a result of the reduction in bandwidth that STARSYS has to operate in.

STARSYS remains a firm believer in the viability and efficiency of CDMA modulation. It merely has made a determination that after two years, it was time to reach a reasonable accommodation with ORBCOMM to break the regulatory stalemate that had developed and avoid the need for a lengthy and costly comparative hearing that would inevitably result in the surrender of the Non-Voice Non-Geostationary Satellite Service (< 1 GHz) market to systems licensed outside the United States. Whatever system may be "optimal" in theory can become irrelevant in practice, depending upon other factors affecting the various bands of operation. Sharing between STARSYS, ORBCOMM, and VITA is workable, and the sharing plan proposed by the applicants allows entry by additional systems (whether CDMA, FDMA, or some as yet unidentified modulation technique). Indeed, the proposed joint sharing plan retains for STARSYS all the desired benefits of a spread-spectrum system.

STARSYS trusts that the foregoing recitation will put to rest Leosat's spurious assertion that STARSYS has "disavowed" its CDMA proposal in order to limit competition in the service. Nevertheless, STARSYS looks forward with anticipation to Leosat's forthcoming presentation of the current technical aspects of its forthcoming application, and welcomes the opportunity to identify possible ways in which Leosat's system will be able to share the Non-Voice Non-Geostationary Satellite Service (< 1 GHz) spectrum. -



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# FREQUENCY SHARING FOR LEO MSS < 1 GHz:

THE STARSYS PERSPECTIVE

*FCC Advisory Committee  
for  
Negotiated Rulemaking*

ALAN RENSHAW

STARSYS GLOBAL POSITIONING INC.

24 AUGUST 1992

# VITASAT

**INTERNATIONAL NON-VOICE, NON- GEOSTATIONARY  
SATELLITE SERVICE < 1 GHz**

**Presentation to the Below 1 GHz Negotiated Rulemaking Committee  
August 24, 1992**

***Orbital Communications  
Corporation***

An **CSC** Company

***ORBCOMM<sup>sm</sup>***

**FDMA Sharing Techniques for LEO MSS**

**August 24, 1992**

***"Vital Communications Absolutely Anyplace on Earth<sup>sm</sup>"***

SCHEDULE  
Below 1 GHz LEO Negotiated Rulemaking Committee  
and Informal Working Group  
August 24, 1992

Tue., September 1 -- 9:30-12:00 at 1919 M (Full Committee); 2:00-4:00 (IWG)  
Wed., September 2 -- 2:00-4:00 at 1919 M (IWG)  
Thu., September 3 -- 9:30-12:00 at 1919 M (IWG)  
Fri., September 4 -- 9:30-12:00 at 1919 M (IWG)

Mon., September 7 -- Labor Day  
Tue., September 8 -- 9:30-12:00 at 1919 M (Full Committee)  
Thu., September 10 -- 9:30-12:00 at 2000 K (IWG)  
Fri., September 11 -- 9:30-12:00 at 2000 L (IWG)

Mon., September 14 -- 9:30-12:00 at 2000 L (IWG)  
Tue., September 15 -- 9:30-12:00 at 2000 K (IWG)  
Wed., September 16 -- 9:30-5:00 at 1919 M (Full Committee)

Meeting Rooms: 2000 K -- Suite 600  
2000 L -- Training Room, 2nd Floor  
1919 M -- Rm. 856



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# **FREQUENCY SHARING FOR LEO MSS < 1 GHz:**

**THE STARSYS PERSPECTIVE**

*FCC Advisory Committee  
for  
Negotiated Rulemaking*

**ALAN RENSHAW**

**STARSYS GLOBAL POSITIONING INC.**

**24 AUGUST 1992**



## AGENDA

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- FREQUENCY ALLOCATION
- SHARING CONSTRAINTS
- STARSYS COMMUNICATIONS LINKS IN SHARING PLAN
- SUMMARY: COMPROMISES AND BENEFITS
- FUTURE SPECTRUM AVAILABILITY



## WARC-92 LITTLE LEO ALLOCATION

| <u>CO-PRIMARY</u>   | <u>WIDTH</u>                   | <u>SECONDARY</u>     | <u>WIDTH</u> |
|---------------------|--------------------------------|----------------------|--------------|
| 148.000-149.900 MHz | 1.900 MHz                      | 149.900-150.050 MHz* | 0.150 MHz    |
| 137.000-137.025 MHz | 0.025 MHz                      | 137.025-137.175 MHz  | 0.150 MHz    |
| 137.175-137.825 MHz | 0.650 MHz                      | 137.825-138.000 MHz  | 0.175 MHz    |
| 400.150-401.000 MHz | 0.850 MHz                      |                      |              |
| GRAND TOTALS:       | 3.425 MHz                      |                      | 475 kHz      |
| ALLOCATION TOTAL:   | 3.9 MHz Primary plus Secondary |                      |              |

\* Primary after 1 January 1997



## SPECTRUM AVAILABILITY

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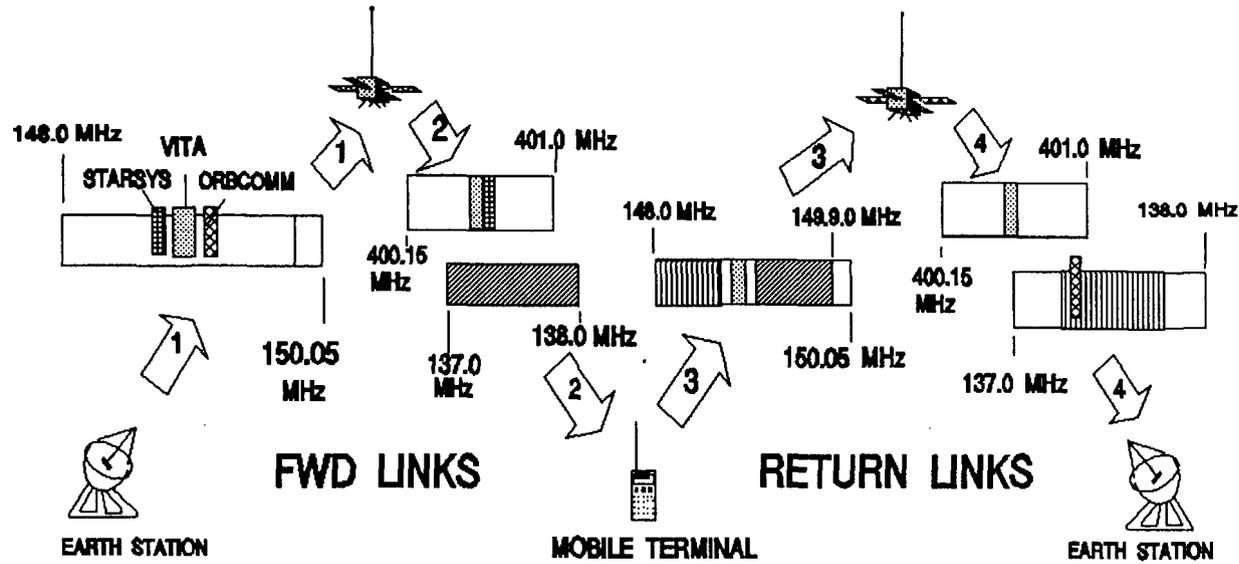
### TOTAL AVAILABLE

|                     | <u>CO-PRIMARY</u> | <u>SECONDARY</u>     | <u>TOTAL</u> |
|---------------------|-------------------|----------------------|--------------|
| WARC ALLOCATION =   | 3.425 MHz         | 475 kHz              | 3.9 MHz      |
| - METSAT 130 KHz =  | 3.295 MHz         | 605 kHz (UNTIL 2000) | 3.9 MHz      |
| - TRANSIT 150 KHz = | 3.295 MHz         | 455 kHz (US ALLOC ?) | 3.75 MHz     |
| - DMSP 710 KHz =    | 2.585 MHz         | 455 kHz              | 3.040 MHz    |
| <hr/>               |                   |                      |              |
| 1997                | 2.735 MHz         | 455 kHz              | 3.190 MHz    |
| 2000                | 2.865 MHz         | 325 kHz              | 3.190 MHz    |





# LEO MSS < 1 GHz SYSTEM LINKS

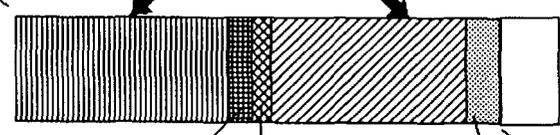




# UPLINK BAND

148.0 MHz

855 KHz Each



150.05 MHz

- CDMA
- FDMA

149.9 MHz

50 KHz  
STARSYS  
NB FWD UPLINK

50 KHz  
ORBCOMM  
NB GATEWAY

90 KHz  
VITA NB

855 KHz  
855 KHz  
50 KHz  
90 KHz  
50 KHz  
1,900 KHz