Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of the Application of	)	
	)	
E-SAT, INC.	)	File Nos. 26-SAT-P/LA-95
	)	11-SAT-AMEND-98
For Authorization to Construct,	)	
Launch and Operate a Non-Voice,	)	
Non-Geostationary Mobile Satellite	)	
System in the 137-138 and 148-150.05	)	
MHz Frequency Bands	)	

ORDER AND AUTHORIZATION

Adopted: March 31, 1998 Released: April 1, 1998

By the Chief, International Bureau:

I. Introduction

1. By this order and authorization ("Order"), we authorize E-SAT, Inc. ("E-SAT") to launch and operate a six satellite non-voice, non-geostationary mobile-satellite service ("NVNG MSS" or "Little LEO") system in low Earth orbit ("LEO") in the 148-148.905 MHz uplink and the 137.0725-137.9725 MHz downlink frequency band. E-SAT's system will offer data communications services including data messaging services for the gas and electric utility industry, data messaging and retrieval in support of the direct-to-home broadcast-satellite service, messaging for environmental monitoring, and other services to users in the United States and around the world. Grant of E-SAT's application will serve the public interest, convenience and necessity by promoting the entry of new Little LEO service providers in the emerging Little LEO service markets.

II. Background

2. In 1990, Orbital Communications Corporation ("ORBCOMM") filed an application to construct, launch and operate a Little LEO system.[1] Subsequently, Starsys Global Positioning, Inc. ("Starsys") and Volunteers In Technical Assistance, Inc. ("VITA") filed applications for Little LEO systems. The Commission considered these three applications together in what is referred to as the first Little LEO processing round (the "first processing round"). In the first processing round, the Commission instituted a negotiated rulemaking[2] to consider sharing proposals and technical rules to govern the Little LEO service. During these negotiations, ORBCOMM, Starsys and VITA reached agreement on a spectrum sharing plan that would enable all three applicants to implement their systems in the available spectrum. The negotiated rulemaking committee used this spectrum sharing plan to issue a report[3] that became the basis for the rules and policies adopted by the Commission (the "*First Processing Round Report and Order*")[4] to govern the licensing of Little LEO systems in the first processing round. ORBCOMM was issued the first Little LEO license in October 1994.[5] The first processing round concluded when VITA and Starsys were issued Little LEO licenses in July and November 1995, respectively.[6]

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[1] *See* Application of Orbital Communications Corporation, dated February 28, 1990, File No. 22-DSS-P-90(20).

[2] The Commission has authority to engage in negotiated rulemakings under the Negotiated Rulemaking Act of 1990, Pub.L. 101-648, November 28, 1990. Negotiated rulemaking involves the solicitation of input from affected parties, meeting as a Federal Advisory Committee. *See* Federal Advisory Committee Act, 5 U.S.C. App. 2. Through negotiated rulemaking, the Commission endeavors to achieve better, less contested regulations by involving interested parties in a face-to-face, pre-rulemaking process of cooperation and discussion. *See generally Notice of Proposed Rulemaking*, 8 FCC Rcd 6330 (1993). The advisory committee convened by the Commission consisted of the Commission, Orbcomm, Starsys, VITA and existing users of the affected frequency bands and adjacent frequency bands.

[3] Report of the Below 1 GHz LEO Negotiated Rulemaking Committee, CC Docket 92-76 (September 16, 1992).

[4] *See In the Matter of Amendment of the Commission's Rules to Establish Rules and Policies Pertaining to a Non-Voice, Non-Geostationary Mobile-Satellite Service,* Report and Order, CC Docket No. 92-76, 8 FCC Rcd 8450 (1993).

[5] Orbital Communications Corporation, *Order and Authorization*, 9 FCC Rcd 6476 (1994), *recon. denied* 10 FCC Rcd 7801 (1995).

[6] Starsys Global Positioning, Inc., *Order and Authorization*, 11 FCC Rcd 1237 (1995); Volunteers in Technical Assistance, Inc., *Order and Authorization*, 11 FCC Rcd 1358 (1995).

3. Before the conclusion of the first processing round, Leo One USA, L.P. ("Leo One") filed an application requesting authority to construct and operate an Little LEO system in the 148-150.05 MHz uplink and the 137-138 MHz downlink frequency bands to provide Little LEO services to customers world-wide.[7]

4. In September 1994, we placed Leo One's application on public notice.[8] The public notice established a "cut-off" date for filing applications to be considered concurrently with that of Leo One. This action commenced the second Little LEO processing round (the "second processing round"). Several parties, including E-SAT, filed applications for new Little LEO systems in response to this public notice.[9] E-SAT proposed a system consisting of six satellites orbiting at an altitude of 1261 kilometers and at an inclination of 100.7 degrees ("E-SAT Application").[10] In addition, ORBCOMM and VITA filed modifications to their proposed first processing round Little LEO systems. We accepted the new applications, and modification applications filed by Orbcomm and VITA, in the second processing round.[11] We also deferred to the second processing round consideration of a Starsys amendment to its original application, filed April 25, 1994, after the "cut-off" date for filing applications in the first processing round.[12] As a result, a total of eight applications were included in the second processing round.

5. Unlike the first processing round, where sufficient spectrum existed to accommodate the requests of all the applicants, insufficient spectrum existed to accommodate the eight Little LEO systems proposed by second processing round applicants. Portions of the available spectrum, the 148-150.05 MHz uplink and 137-138 MHz and 400.15-401 MHz downlink frequency bands, were licensed to ORBCOMM, Starsys and VITA in the first processing round. In addition, the downlink frequency bands have to be shared with U.S. Government users. Specifically, the National Oceanic and Atmospheric Administration

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[7] Leo One, L.P. Satellite System Application, dated October 4, 1993.

[8] *See* Satellite Application Acceptable for Filing Cut-off Established for Additional Applications, *Public Notice, Report No. DS-1459* (September 16, 1994).

[9] In addition to E-SAT, the companies filing second processing round applications included CTA Commercial Systems, Inc. ("CTA"), Leo One, Final Analysis Communications Services, Inc. ("FAI") and GE American Communications, Inc. ("GE Americom").

[10] *E-SAT Application for a Non-Voice, Non-Geostationary Satellite System*, File No. 26-SAT-P/LA-95 (Nov. 16, 1994) at 2.

[11] *See* Non-Voice, Non-Geostationary Low Earth Orbit Satellite Applications Accepted for Filing, *Public Notice, Report No. DS-1484* (November 25, 1994).

[12] *See* Application of Starsys for Authority to Construct, Launch, and Operate a Non-Voice, Non-Geostationary Mobile-Satellite System, *Order and Authorization*, 11 FCC Rcd 1237, ¶¶ 19 and 21 (1995).

("NOAA") operates a meteorological satellite system in the 137-138 MHz downlink frequency band. Also, the Department of Defense's ("DoD") Department of Air Force has been planning to implement a meteorological satellite system in the 400.15-401 MHz downlink frequency band for national security purposes. Because the government meteorological satellite services were allocated on a primary or co-primary basis in these bands, second processing round Little LEO licensees would be required to share these bands with the NOAA and DoD meteorological satellite systems. In light of the limited spectrum available to second processing round applicants after the conclusion of the first processing round, and the required sharing between the NOAA and DoD meteorological satellite systems and the second processing round Little LEO systems, we initiated a *Notice of Proposed Rulemaking* (the "*Notice*") to develop rules and policies to govern the licensing and operation of second processing round Little LEO systems in this sharing environment.[13]

6. Generally, the *Notice* proposed to: (a) exclude first processing round licensees from participation in the second processing round in order to open Little Leo service markets to new entrants; (b) license up to three new Little LEO systems in the second processing round; (c) establish procedures that would require second processing round licensees to protect the operations of the NOAA and DoD meteorological satellite systems; and (d) use auctions to resolve mutual exclusivity among second processing round applicants. All eight applicants and other interested parties commented on the proposals in the *Notice*. Subsequently, two applicants withdrew from the second processing round and another applicant acquired the satellite operations of a third applicant.[14]

7. On September 22, 1997, the remaining applicants filed with the Commission a mutually agreed upon spectrum sharing plan (the "Joint Proposal") that accommodated all remaining second processing round applicants in the available spectrum.[15] Generally, the spectrum sharing plan requires that the applicants share the 148-150.05 MHz uplink frequency band with the proposed French satellite system S80-1 ("S80-1"), the Russian radionavigation satellite service system ("TSYKADA"), and terrestrial users of the band. The applicants

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[13] Amendment of Part 25 of the Commission's Rules to Establish Rules and Policies Pertaining to the Second Processing Round of the Non-Voice, Non-Geostationary Mobile Satellite Service, *Notice of Proposed Rulemaking*, IB Docket No. 96-220, FCC 96-426 (released October 29, 1996).

[14] Starsys and GE Americom withdrew their applications from the second processing round. Orbital Sciences Corporation, Orbcomm's parent, acquired the satellite operations of second round applicant CTA. Starsys also relinquished its first round license.

[15] *See* Joint Proposal, dated September 19, 1997, among E-SAT, Inc., Final Analysis Communications Services, Inc., Leo One Corporation, Orbital Communications Corporation, Orbital Sciences Corporation and Volunteers in Technical Assistance, Inc., IB Docket No. 96-220. Pursuant to the Joint Proposal, Orbital Sciences Corporation agreed to have CTA's parent withdraw CTA's second processing round application in connection with the grant of Orbcomm's second processing round application.

agreed to share the 137-138 MHz downlink frequency band with NOAA, S80-1, the proposed Russian Meteor satellite system and terrestrial users of the band. Finally, the applicants agreed to share the 400.15-401 MHz downlink frequency band with DoD. The Joint Proposal expressly recognized that the second processing round applicants will be required to coordinate their operations with the other users of these frequency bands. As part of the Joint Proposal, the applicants agreed to withdraw all petitions and objections against each other's pending applications.[16]

8. On October 15, 1997, the Commission released a Report and Order (the "*Report and Order*") in which it concluded that with use of appropriate transmission techniques, proper system coordination, time-sharing of frequencies and the adoption of the Joint Proposal, there was sufficient spectrum to license the five remaining second processing round applicants.[17] The *Report and Order* directed second processing round applicants to amend their applications to conform to the rules and policies adopted in the *Report and Order*.[18]

9. In response to this requirement, E-SAT filed an amendment conforming its application to the rules and policies adopted in the *Report and Order* (the "Conforming Amendment").[19] In its Conforming Amendment, E-SAT reiterated that it intended to operate its six satellite Little LEO system in the 148-150.05 MHz uplink and the 137-138 MHz downlink frequency bands, consistent with the spectrum plan adopted in the *Report and Order*. E-SAT also stated that it had demonstrated that it could fund the $49.22 million total cost to construct and launch the system and to operate it for one year.

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[16] *Joint Proposal* at 10.

[17] *In the Matter of Amendment of Part 25 of the Commission's Rules to Establish Rules and Policies Pertaining to the Second Processing Round of the Non-Voice, Non-Geostationary Mobile Satellite Service*, Report and Order, FCC 97-370 (released October 15, 1997) ("*Report and Order*").

[18] *Id.* at ¶ 129.

[19] *E-SAT Amendment to Application for a Non-Voice, Non-Geostationary Satellite System,* File No. 11-SAT-AMEND-98 (Oct. 28, 1997).

10. E-SAT's Conforming Amendment, together with the conforming amendments of the other second processing round applicants, were placed on public notice.[20] In response, Leo One, FAI, and ORBCOMM filed comments.[21]

III. Discussion

11. Under the Communications Act of 1934, as amended (the "Act"), no person is entitled to use or operate any apparatus for the transmission of energy or communications or signals by radio within the jurisdiction of the United States, except pursuant to a license granted by Federal authority .[22] The Commission is authorized to grant radio licenses to qualified persons upon written application therefor.[23] In order to grant E-SAT's application[24] to launch and operate the space segment of its Little LEO system, the Commission must find that the public interest, convenience and necessity will be served by such grant.[25] Before we can make this finding, E-SAT must demonstrate that it is legally, technically and financially qualified to hold a Commission license.[26] Based on our analysis below, we find that grant of E-SAT's application is in the public interest.

A. Qualifications

1. Technical Qualifications

12. Applicants seeking authority to launch and operate second processing round Little LEO systems must meet the technical requirements adopted in the *Report and Order*. In the *Report and Order*, we adopted the sharing plan agreed to by the parties that would

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[20] Amendments to Applications For Non-Voice, Non-Geostationary Mobile Satellite Service Accepted For Filing, *Public Notice, Report No. SPB-110* (November 19, 1997).

[21] *In the Matter of E-SAT, Inc. Applications for Authority to Construct, Launch and Operate Non-Voice, Non-Geostationary Mobile-Satellite System for Domestic and International Operation*, Comments of Leo One Corporation (Dec. 4, 1997) ("Comments of Leo One"); and *In the Matter of E-SAT, Inc. Applications for Authority to Construct, Launch and Operate Non-Voice, Non-Geostationary Mobile-Satellite System for Domestic and International Operation*, Comments of ORBCOMM (Dec. 4, 1997) ("Comments of ORBCOMM").

[22] *See* 47 U.S.C. § 301.

[23] *Id.* at §§ 303(l)(1) and 308(a).

[24] E-SAT's "application" includes the original application filed with the Commission and all subsequent amendments thereto properly filed with the Commission.

[25] 47 U.S.C. § 309(a).

[26] *See* 47 C.F.R. § 25.142(a).

accommodate three new Little LEO systems and allow ORBCOMM and VITA to expand their systems. Specifically, we identified particular frequencies and other operating parameters for each of these systems, which we designated as System 1 (Leo One), System 2 (FAI), System 3 (E-SAT), ORBCOMM, and VITA. Consistent with the *Report and Order*, E-SAT has proposed to operate a spread spectrum system in the 137.0725-137.9275 MHz downlink and the 148.00-148.905 MHz uplink spectrum formerly licensed to Starsys.[27]

13. FAI, Leo One and ORBCOMM have raised concerns about E-SAT's technical qualifications to operate a Little LEO system. Below we address these concerns and analyze E-SAT's technical qualifications to operate its Little LEO system in each of the uplink and downlink frequency bands in which it proposes to operate its system.

Uplink Operations in the 148.0-149.90 MHz Band

14. Pursuant to the *Report and Order*, E-SAT proposes to share approximately 355 KHz of spectrum in the 148-148.855 MHz band with Leo One, FAI, and ORBCOMM. E-SAT also proposes to use approximately 500 KHz of contiguous spectrum in the 148-148.855 MHz band that will not be shared with Leo One, FAI, and ORBCOMM for use with the S80-1 System. E-SAT also proposes to use the 148.855-148.905 MHz band for feeder links.[28] In addition, E-SAT proposes to make changes to the orbital altitude and orbital inclination of its satellites and to increase the number of simultaneous users it will serve.

15. Coordination Issues ORBCOMM contends that E-SAT has not demonstrated that its co-frequency operations in the 148-149.9 MHz band will not cause unacceptable interference to ORBCOMM's operations.[29] ORBCOMM also argues that coordination to resolve co-frequency operations should occur prior to the grant of E-SAT's license and that the burden is on E-SAT to protect ORBCOMM, a Little LEO first processing round licensee, from unacceptable interference pursuant to Section 25.142(a) of the Commission's Rules.[30] In reply, E-SAT notes that its conforming amendment adequately explains how it plans to avoid causing harmful interference to other Little LEO systems.[31]

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[27] *Id.* at ¶ 38; *see also* Letter from F. Thompson to M.Roman Salas, Erratum to E-SAT Amendment, FCC File No. 26-SAT-P/LA-95, December 4, 1997.

[28] The Joint Proposal provides that Leo One, FAI, and ORBCOMM may share this band if E-SAT does not use this band for feeder links.

[29] *See* Comments of Orbcomm.

[30] *Id.* at 6-7

[31] Reply Comments of E-SAT at 4.

16. We disagree with ORBCOMM that Section 25.142(a) of the Commission's Rules requires E-SAT to demonstrate that it will not cause unacceptable interference to ORBCOMM before the Commission can license E-Sat. It is important to remember that, initially, the *Notice* proposed excluding ORBCOMM and the other Little LEO first processing round licensees from participation in the second processing round. ORBCOMM and VITA joined the second processing round by participating in the negotiation and conclusion of a spectrum sharing plan with the new entrant second processing round applicants. The terms and conditions of the spectrum sharing plan were embodied in a Joint Proposal submitted to the Commission which included Orbcomm and VITA.

17. As part of the Joint Proposal, ORBCOMM expressly agreed to permit other second processing round applicants to operate in the channels comprising the 148-149.9 MHz uplink band, including those frequencies licensed to ORBCOMM in the first processing round, in exchange for gaining the right to add twelve satellites to its constellation and to operate in the lower part of the 148-149.9 MHz band (148-148.855 MHz band) and in new downlink frequencies.[32] The Joint Proposal, as adopted in the *Report and Order*, reflected all of the material terms and conditions of the spectrum sharing plan mutually agreed to by the second processing round applicants.

18. To the extent that ORBCOMM may be arguing that its second processing round application is entitled to protection from other second processing round applications, we disagree. All second processing round applicants receive equal consideration. To the extent that ORBCOMM may be arguing that the Commission should apply Section 25.142(a) to those aspects of its first processing round authorization that are discrete and separable from the modifications made as part of the second processing round, we believe that this action is not technically feasible. In light of the extensive modifications made to ORBCOMM's license through ORBCOMM's affirmative participation in the second processing round,[33] ORBCOMM may not now claim that it was authorized to use frequencies in the first processing round that are discrete and separable from those frequencies for which it is requesting authorization in the second processing round. Because ORBCOMM does not possess discrete and separable first round spectrum, ORBCOMM may not seek the protection available to previously authorized systems under Section 25.142(a) for the frequencies it was originally authorized to use in the first round. In short, ORBCOMM, as a co-equal second processing round applicant, cannot now accept the benefits flowing from its participation in the second processing round, yet reject the burdens that it assumed in order to receive those benefits.

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[32] *See* Joint Proposal.

[33] *In the Matter of the Applications of ORBITAL COMMUNICATIONS CORPORATION For Modification of Its Authorization to Construct, Launch and Operate a Non-Voice, Non-Geostationary Mobile-Satellite System*, Order and Authorization (released Mar. 31, 1998).

19. Furthermore, we are not persuaded by ORBCOMM that a pre-licensing coordination among second processing round applicants would be more helpful than our usual approach of conditioning the grant of licenses on the completion of coordination. Until licenses are granted, second processing round applicants will not know with certainty with whom to coordinate, nor will they know the parameters of the satellite systems to be coordinated. Accordingly, and in recognition of ORBCOMM's potential interference concerns, we condition E-SAT's authorization on the completion of coordination in good faith with ORBCOMM, other second processing round licensees, and U.S. Government terrestrial users authorized to operate in the 148-149.9 MHz frequency band.[34]

20. We are confident that post-licensing coordination among second processing round licensees operating in this band will resolve the potential interference concerns raised by ORBCOMM. As ORBCOMM points out, possible solutions exist to avoid the potential for interference between satellite networks in this band, for example, by using pre-defined algorithms.[35] We also encourage E-SAT and ORBCOMM to continue their coordination efforts.[36]

21. We note, moreover, that even were ORBCOMM to demonstrate that it was entitled to protection under Section 25.142(a) for the frequencies it obtained in the first processing round, we would waive the Section 25.142(a) requirement that E-SAT and the other second round Little LEO licensees complete coordination with ORBCOMM prior to licensing. In light of the benefits that ORBCOMM obtained through its participation in the second round and the licensing condition that all second round Little LEO licensees coordinate in good faith, we believe that requiring E-SAT and other second round licensees to complete coordination with ORBCOMM prior to licensing would delay competition and new services for consumers and afford little, if any, interference protection to ORBCOMM beyond that which it will obtain through the post-license coordination process.

22. Changes in Orbital Parameters. E-SAT's Conforming Amendment includes changes to the orbital parameters set forth in its initial application. E-SAT proposes amending the orbital altitude from 1262 kilometers to 893.79 kilometers and changing the orbital inclination from 100.7° to 99.01°.[37] In the *Report and Order*, we stated that conforming amendments would be accepted unconditionally if the changes were necessary to

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[34] *See* Joint Proposal at 9; *see also* 47 C.F.R. § 2.106, fn. US323.

[35] Conforming Amendment of Orbcomm at 5-6; *see also* Comments of Orbcomm at 5.

[36] *See* First Processing Round Report and Order ¶ 9 (interpreting Section 25.142(b)(3) of the Commission's Rules, 47 C.F.R. § 25.142(b)(3)).

[37] Conforming Amendment at Part II, Section 1.1

bring the application into conformance with the rules and policies adopted in the *Report and Order*. All other changes would be treated under the Commission's existing rules. Under those Rules, should a change be found to be a "major amendment" that falls under none of the exceptions set forth in the rules, the application may be treated as "newly filed" and "cut off" from further consideration in the second processing round.[38] We find that E-SAT's proposed changes to the orbital parameters are not required to bring the application into conformance with the rules adopted in the *Report and Order*. Nothing in the *Report and Order* requires a change in either orbital altitude or orbital inclination. Therefore, we must consider these changes under our existing rules.

23. Section 25.116 of our rules states that an amendment will be deemed to be a major amendment if it will increase the potential for interference.[39] E-SAT's proposed modification of orbital parameters, when considered independent of any other factors, may increase the potential for interference by, for example, increasing the power flux density ("PFD")[40]. At the same time, we note that, the Joint Proposal and the *Report and Order* require E-SAT to operate within the constraints of the Starsys license coordination agreements.[41] Accordingly, the amount of radio frequency interference caused by E-SAT's system cannot exceed the interference level that would have been caused by the Starsys system originally approved for that spectrum. Pursuant to the obligation set forth by the *Report and Order*, E-SAT's Conforming Amendment certifies that its system will not provide any greater interference than Starsys's original system.[42] We therefore find that E-SAT's proposed modifications in orbital parameters do not represent a major amendment under Section 25.116 of the Commission's Rules. Because the changes in orbital parameters should cause no additional interference, and because no other Little LEO applicants raised any objections to the proposed modifications,[43] we grant E-SAT's proposed changes to orbital altitude and inclination.

24. Pursuant to the *Report and Order*, E-SAT's system may operate its service uplinks in the 148.00-148.855 MHz spectrum formerly licensed to Starsys consistent with the

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[38] *Report and Order* at ¶130-131; 47 C.F.R. §25.116.

[39] 47 C.F.R. §25.116(b)(1).

[40] Power flux density means the power level of a satellite signal incident on the surface of the Earth (measured by watts per square meter).

[41] *Report and Order* at ¶ 38-40.

[42] Conforming Amendment at 12-13.

[43] ORBCOMM noted the change in its comments but expressed no concerns with or objections to the change. Comments of ORBCOMM at 2.

parameters associated with Starsys's first processing round authorization. E-SAT is required to share this spectrum with ORBCOMM, and with Leo One and FAI as described in the *Report and Order*.[44] In addition, consistent with the *Report and Order*, we authorize E-SAT's use of the 148.855-148.905 MHz band to operate its feeder link uplinks.[45]

25. Changes in Number of Simultaneous Users. Leo One and ORBCOMM argue that E-SAT's plans to operate as many as 81 simultaneous spread spectrum user uplinks are inconsistent with the Joint Proposal and the *Report and Order*. Leo One contends that the feasibility assessment of the uplink frequency sharing arrangement described in the *Report and Order* was based on the requirement that E-SAT adhere to the established Starsys operating parameters, including a limitation on the number of simultaneous users. Leo One further states that the Commission's assessment was based on only twelve simultaneous spread spectrum users. Leo One is concerned that an increase in the number of simultaneous spread spectrum users may cause interference to its uplink operations.[46] ORBCOMM asserts that the aggregate interference effect of 81 simultaneous E-SAT users "grossly exceeds" the dynamic channel access avoidance system ("DCAAS") interference threshold and will interfere with its operations. ORBCOMM is also concerned that the increase in the number of E-SAT's simultaneous users will increase E-SAT's out-of-band emissions and cause it even greater interference.[47] E-SAT replies that Leo One's argument ignores the technical differences between the Starsys and E-SAT systems, including the significantly lower power at which the E-SAT terminals will operate.[48] E-SAT also claims that ORBCOMM's comments are based on an erroneous calculation method and are not technically supported.[49] E-SAT further represents that its system will comply with the Commission's out-of-band emissions requirements.[50]

26. In the *Report and Order*, the Commission required that E-SAT's operations in the 148-148.905 MHz uplink band be consistent with the agreement Starsys entered into with

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[44] *Report and Order* at ¶38-40.

[45] *Id.*

[46] Comments of Leo One at 2-3.

[47] Comments of ORBCOMM at 5.

[48] Reply Comments of E-SAT at 3.

[49] *Id.* at 6.

[50] Conforming Amendment, Part III, Section 5.2.

ORBCOMM.[51] In doing so, we intended that E-SAT should develop and operate its constellation in such a way that it would impose no more interference on ORBCOMM than Starsys's system would have. We did not intend to require that E-SAT create a system that was identical to the Starsys system in all design elements. Indeed, the Commission attempts, when possible, to leave spacecraft design decisions to the space station licensee because the licensee is in a better position to determine how to tailor its system to meet the particular needs of its customers.[52] Accordingly, we will not set an arbitrary limit on the number of simultaneous E-SAT's uplink transmissions. Nevertheless, to ensure that E-SAT's spread spectrum system does not interfere with narrow band systems such as ORBCOMM's, we will limit E-SAT's aggregate uplink effective isotropic radiated power ("EIRP") spectral density to the level that would have been produced by twelve simultaneous Starsys user transmissions.[53] Further, we expect E-SAT's system to comply fully with the mobile satellite service system restrictions specified in 47 C.F.R. §2.106, fn. US323.[54] Finally, we condition E-SAT's authorization to operate in this band on coordination with other second processing round Little LEO licensees operating in the 148.0-149.9 MHz band.

27. Other Technical Issues. Leo One recommends a minor realignment of the frequency sharing arrangement outlined in the Joint Proposal and adopted in the *Report and Order*. Specifically, Leo One proposes to reposition the frequency assignments of narrowband users sharing the band edges of the spread spectrum systems so that they are at equal distances from the spread spectrum center frequency.[55] We note, however, that this change is not reflected in the Joint Proposal, the *Report and Order*, or in any second round applications (including Leo One's). We decline to initiate any frequency realignments prior to licensing all second round Little LEO applicants. In doing so, we note that our rules do not prevent licensees from proposing mutually agreed upon modifications to their licensees at a later date.

Downlink in 137.0-138.0 MHz Band

28. Consistent with the *Report and Order*, E-SAT proposes to operate in the 137.0725-137.9275 MHz downlink band.[56] This band will be shared with NOAA, ORBCOMM and FAI. We therefore condition E-SAT's authorization to operate in the 137-

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[51] *Id.*

[52] *Big LEO Notice of Proposed Rulemaking*, 9 FCC Rcd 1094 (1994) at ¶11.

[53] *Report and Order* fn. 88.

[54] This footnote places restrictions on Mobile Earth Station transmissions in the 140-149.9 MHz band.

[55] Comments of Leo One at 4.

[56] *Report and Order* ¶ 40.

138 MHz band on coordination with foreign systems operating in this band and on completion of coordination with U.S. Government and other Little LEO systems. Until such frequency coordination is completed, E-SAT shall operate on a non-interference basis with respect to those systems with which coordination has not been completed.

29. E-SAT certifies that the maximum PFD produced at the Earth's surface by each of its satellites in the 137.0725-137.9275 MHz band will not exceed -125 dB(W/m2/4 KHz).[57] Because E-SAT's system does not exceed the PFD threshold requirement for coordination with terrestrial services under the Commission's Rules, coordination will not be required.[58]

30. Final Analysis contends that E-SAT's proposed PFD may cause harmful interference to its system and exceeds the level specified in the ITU-R recommendation.[59] In reply, E-SAT argues that Final Analysis calculations are erroneous and that ITU-R recommendations are not binding. We believe Final Analysis's concerns are unwarranted. Final Analysis's operations in this band should be adequately protected by our requirement on E-SAT to complete co-channel coordination with other Little LEO licensees in this band.

31. Further, E-SAT indicates that its proposed Little LEO system will comply fully with the Commission's Rules regarding the retransmission of inter-system uplink signals.[60] E-SAT proposed a regenerative system design, which will ensure that its downlink transmissions will be independent of any uplink signals received from a source foreign to E-SAT's system.[61] In order to eliminate the retransmission of undesired signals from other systems, E-SAT's system will despread, demodulate, and process each uplink signal prior to its retransmission on the downlink.[62]

32. Accordingly, we find E-SAT's proposed system meets the Commission's technical requirements.

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[57] Conforming Amendment at 11.

[58] *See* 47 C.F.R. § 25.142(a)(2) (referencing § 2.106, Footnote 599A which requires a MSS space station licensee to coordinate with terrestrial services if the PFD exceeds -125 dB(W/m^2/4 KHz)).

[59] Comments of Final Analysis at 5. Final Analysis, in its comments, also requested clarification on inconsistencies in E-SAT's application. E-SAT resolved these inconsistencies via erratum (*see* Letter from F. Thompson to M. Roman Salas, Erratum to E-SAT Amendment Application in the Little LEO in FCC File NO. 26-SAT-P/LA-95, December 4, 1997).

[60] *See* 47 C.F.R. § 25.142(3)(ii).

[61] Conforming Amendment, Section 5.2.

[62] *Id.*

2. Financial Qualifications

33. Consistent with Section 25.142(a)(4) of the Commission's Rules, 47 C.F.R. §25.142(a)(4) applicants for Little LEO systems must demonstrate that they have the finances necessary to construct and launch the first two satellites of the proposed system and to operate these satellites for one year.[63] E-SAT has made this demonstration.[64]

34. Specifically, E-SAT certifies that the cost of constructing and launching the E-SAT system is approximately $49.22 million and the operating expenses for five years of the E-SAT system is approximately $22.731 million.[65] This total of $71.951 million overstates the amount of financing required by our rules, which covers only *first* year operating costs. E-SAT's majority owner, EchoStar Communications Corporation ("EchoStar"), has submitted a letter indicating it is committed to financing E-SAT's first two satellites and first year operating costs. To support its commitment, EchoStar has submitted its balance sheets, which show current assets well in excess of $71.951 million.[66] As a result, we find E-SAT financially qualified under Section 25.14(a)(4) of the Commission's Rules.

C. Exclusive Arrangements

35. As an Little LEO licensee, E-SAT is required to comply with the requirements of Section 25.142(d) of the Commission's Rules adopted in the *Report and Order*. Section 25.142(d) prohibits a Little LEO licensees from entering into exclusive arrangements with other countries concerning communications to and from the United States.[67] The purpose of this rule is to promote competition in the Little LEO service markets in the United States. The prohibition against exclusive arrangements reduces the likelihood that a Little LEO licensee can foreclose other Little LEO licensees from serving a foreign market, providing a global service, and competing effectively with other systems that serve the United States.

36. While we recognize that spectrum coordination and availability as well as market size and commercial opportunities in a particular country may limit the number of

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[63] See 47 C.F.R. § 25.142(a)(4).

[64] *See* Conforming Amendment at 25.

[65] Conforming Amendment at 9; E-SAT Application at 26.

[66] *Id.* at 10.

[67] See 47 C.F.R. § 25.142(d). We imposed the same type of restriction on Big Leo licensees (*See* 47 C.F.R. § 25.143(h)) and in our recent "DISCO II" Report and Order. *Amendment of Commission Regulatory Policies to Allow Non-United States Licensed Space Stations to provide Domestic and International Satellite Service in the United States*, Report and Order, FCC-97-399 (released Nov. 26, 1997) at ¶161-167.

systems that can serve a foreign country, our rules are clear that Little LEO licensees may not acquire or enjoy any exclusive rights created by contracts or working arrangement.[68]

D. Construction and Launch Milestones

37. In the *First Processing Round Report and Order*, the Commission generally required a licensee to commence construction of the first two satellites in its Little LEO system within one year of grant of its license.[69] Construction of the remaining satellites in its system was to be commenced within three years of grant. Construction of the first two satellites was to be completed within four years of grant, with the entire system launched and operational within six years of grant.

38. We will require E-SAT to adhere to this milestone schedule. Failure to meet these milestones will automatically render E-SAT's license for its system null and void.

E. International Coordination

39. In general, we will follow the applicable advance publication, coordination and notification procedures set forth in the ITU-R Regulations in coordinating E-SAT's satellites and spectrum utilization, and for consultations pursuant to Article 14 of the INTELSAT Agreement and in Article 8 of the Inmarsat Convention.[70] E-SAT shall provide the Commission with all information necessary to comply with these processes. In view of E-SAT's intention to locate earth stations and operate mobile user terminals in connection with its Little LEO system outside of the United States, the Commission will retain jurisdiction to require E-SAT to meet its international obligations. All authorizations and approvals required by another country in connection with the operation of E-SAT's Little LEO system including, but not limited to, its earth stations and mobile user terminals. will remain solely within the host country's jurisdiction.

IV. Conclusion

40. We find that E-SAT is legally, technically and financially qualified under the Commission's Rules to launch and operate the space segment of its Little LEO system in the 148-148.905 MHz and 137.0725-137.9275 MHz frequency bands designated for System 3 in the spectrum sharing plan adopted in the *Report and Order*, subject to the conditions set forth

[68] 47 C.F.R. § 25.142(d).

[69] *First Processing Round Report and Order* ¶ 18.

[70] *See* 47 C.F.R. § 25.111(b).

in this Order. Because grant of E-SAT's application will serve the public interest, convenience and necessity, E-SAT is authorized to be a Commission space segment licensee.

V. Ordering Clauses

41. Accordingly, IT IS ORDERED, subject to the conditions set forth below, that application File Nos. 26-SAT-P/LA-95, and 11-SAT-AMEND-98 ARE GRANTED, and E-SAT, Inc. IS AUTHORIZED to launch and operate six non-voice, non-geostationary (NVNG) satellites to provide mobile-satellite service (MSS) in the United States in accordance with the frequency bands designated for System 3 in the spectrum sharing plan adopted in the *Report and Order*, FCC 97-370 (released October 15, 1997), the technical specifications set forth in its application and subject to compliance with the provisions of Parts 2 and 25 of the Commission's Rules governing frequency allocations and satellite operations, unless expressly waived by the Commission. The frequencies assigned to E-SAT, Inc. include the 148-148.855 MHz band for service uplinks, the 148.855-148.905 MHz frequency band for feeder uplinks, and the 137.0725-137.9275 MHz frequency band for service downlinks.

42. IT IS FURTHER ORDERED that, unless extended by the Commission for good cause shown, E-SAT, Inc.'s authorization will become NULL AND VOID in the event that the six Little LEO space stations are not constructed, launched and successfully placed into operation in accordance with the technical parameters and terms and conditions of this authorization by the following dates:

	Construction Commenced	Construction Completed	Launch
First Two Satellites	March 1999	March 2002	September 2002
Remaining Four Satellites	March 2001	March 2004	March 2004

43. IT IS FURTHER ORDERED that E-SAT, Inc.'s authorization to operate its Little LEO system is subject to the completion of co-channel frequency sharing coordination with the other Little LEO licensees operating in the 148-149.9 MHz and 137.0-138.0 MHz as required by Section 25.142(b)(3) of the Commission's Rules, 47 C.F.R. § 25.142(b)(3).

44. IT IS FURTHER ORDERED that E-SAT, Inc.'s authorization to operate its Little LEO system is subject to the adjacent channel frequency sharing coordination with the other Little LEO licensees operating in the 148-149.9 MHz and 137-138 MHz frequency bands as required by Section 25.142(b)(3) of the Commission's Rules, 47 C.F.R. § 25.142(b)(3).

45. IT IS FURTHER ORDERED that E-SAT, Inc.'s authorization to operate its Little LEO system is subject to the completion of co-channel frequency sharing coordination with the U.S. Government space systems operating 137.0-138.0 MHz frequency bands.

46. IT IS FURTHER ORDERED that E-SAT, Inc. IS AUTHORIZED to launch and operate technically identical Little LEO replacement satellites during the license term for the purpose of replacing the six satellites authorized by this Order in accordance with technical specifications set forth in its application and consistent with the Commission's Rules, unless specifically waived by the Commission. E-SAT, Inc. shall not operate more than six satellites at any given time during the term of this license.

47. IT IS FURTHER ORDERED that the term of operation for each of the six space stations authorized by this Order, including any replacement space stations authorized by this Order, is a total of ten years and will begin to run on the earlier of: (a) the date that E-SAT, Inc. certifies to the Commission that the first satellite has been successfully placed into orbit and the operations fully conform to the terms and conditions of this authorization; or (b) such date as determined by the Commission.

48. IT IS FURTHER ORDERED that neither this authorization nor any right granted by this authorization, shall be transferred, assigned or disposed of in any manner, voluntarily or involuntarily, or by transfer of control of any corporation holding this authorization, to any person except upon application to the Commission and upon a finding by the Commission that the public interest, convenience and necessity will be served thereby, and that such transfer, assignment or disposal otherwise complies with the Act and the Commission's Rules.

49. IT IS FURTHER ORDERED that E-SAT, Inc. will prepare, within 90 days of the release of this Order, the necessary information for submission to the ITU to initiate the advance publication, international coordination, and notification process of the E-SAT, Inc. system in accordance with the ITU Radio Regulations and for consultations in accordance with Article XIV of the INTELSAT Agreement and Article 8 of the Inmarsat Convention. Upon completion of these consultations and notification by the Department of State that the United States has fulfilled its obligations with respect to INTELSAT and Inmarsat, no further action by this Commission regarding such consultations will be required. This authorization is subject to coordinations between E-SAT, Inc.'s Little LEO system and any non-U.S. licensed systems in the authorized frequency bands. We also remind E-SAT, Inc. that no protection from interference caused by radio stations authorized by other Administrations is guaranteed unless coordination procedures are timely completed or, with respect to individual Administrations, by completing coordination agreements. Any radio station authorization for which coordination has not been completed may be subject to additional terms and conditions as required to effect coordination of the frequency assignments of other Administrations, 47 C.F.R. § 25.111(b).

50. IT IS FURTHER ORDERED that: (a) this license shall not vest in E-SAT, Inc. any right to operate its Little LEO system or any right in the use of the frequencies designated in this license beyond the term thereof nor in any other manner than authorized herein; and (b) this license shall be subject to the provisions of Section 706 of the Communications Act of 1934, as amended, 47 U.S.C. § 606.

51. IT IS FURTHER ORDERED that E-SAT, Inc. is afforded 30 days from the date of release of this Order to decline this authorization as conditioned. Failure to respond within that period will constitute formal acceptance of the authorization as conditioned.

52. IT IS FURTHER ORDERED that this Order is issued pursuant to Section 0.261 of the Commission's Rules, 47 C.F.R. § 0.261. Petitions for reconsideration under Section 1.106 or applications for review under Section 1.115 of the Commission's Rules, 47 C.F.R. §§ 1.106 and 1.115, may be filed within 30 days of the date of public notice of this Order (see 47 C.F.R. § 1.4(b)(2)).

53. IT IS FURTHER ORDERED that this Order is effective upon the date of its release.

FEDERAL COMMUNICATIONS COMMISSION

Regina M. Keeney
Chief, International Bureau