



Federal Communications CommissionECEIVED

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Sabilita and Redice of the Chief In the Matter of the Application of FINAL ANALYSIS COMMUNICATION SERVICES, INC.) File No. 25-SAT-P/LA-95) For Authority to Construct, Launch and Operate a Non-Voice, Non-Geostationary Low Earth Orbit Mobile Satellite System

> CONSOLIDATED OPPOSITION TO PETITIONS TO DENY AND CONSOLIDATED REPLY TO COMMENTS

Chief, International Department

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Dated: April 10, 1995

To:

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EXECUTIVE SUMMARY

Petitioners and commenters have raised issues concerning Final Analysis' technical and financial qualifications to hold Commission license in the NVNG-MSS. As demonstrated below, however, Final Analysis is both technically and financially qualified to be a licensee in this service.

In response to the concerns raised about Final Analysis' frequency plan, it is pointed out that Final Analysis has recently amended its application, greatly reducing its spectrum requirements, and at the same time removing or decreasing potential conflicts with Orbcomm, other applicants, and existing users such as the Meteorological Satellites. Thus, several of the potential problems pointed out by petitioners and commenters have been avoided.

In addition, many of the comments are adequately addressed by considering the characteristics of Final Analysis' uplink "STARS" technology, which senses available channels, and directs its ground terminals to use them and avoid channels already being used. This is similar to the system proposed by Orbcomm, the sole licensee at present.

Moreover, Final Analysis' proposed use of techniques such as GMSK and cross-polarization to "engineer around" potential conflicts with existing and proposed users is a satisfactory method that is utilized by other applicants and at least tacitly approved by the Commission in the granting of Orbcomm's license. Accordingly, the contention, raised by Starsys, that these same techniques cannot be used by second round applicants is inapposite.

Allegations raised by Leo One that Final Analysis' satellite design is flawed are not based on fact, but on speculation fueled by an amateurish review of an artist's conception of the satellite. These "concerns" cannot be taken seriously. Nor can the assertion that Final Analysis has failed to meet Commission requirements for providing details with respect to orbital accuracy.

Orbcomm has attempted to raise some doubts concerning Final Analysis' ability to share frequencies in the 137-138 MHz band. The assumptions employed by Orbcomm, however, are fatally flawed, and the resultant conclusions are invalid.

Motorola's concern that CTA and Final Analysis have proposed inconsistent orbital schemes that may result in a collision (thereby posing a potential threat to Motorola's IRIDIUM® system) are speculative and premature. Of course, Final Analysis is certainly open to coordinating its engineering plan as necessary with other satellite systems to avoid mishaps.

The financial issues raised by petitioners and commenters are baseless. Final Analysis has always had the financial means to fulfill its commitments made in its application: to put the issue to rest once and for all, Final Analysis has commissioned an independent CPA firm to audit its records, and the records of its corporate parent. The report generated by this study is attached as an exhibit hereto.

Finally, Leo One's challenge to Final Analysis character and integrity is nothing more than an audacious attempt to distract the Commission from its own questionable legal, technical and financial standing in this proceeding. To this date, the true ownership of Leo One remains uncertain; its financials remain highly questionable at best, and after a year and a half of trial and error, Leo One is still unable to produce a viable technical proposal. The only thing that can be said with certainty about Leo One's application is that the misconduct of its purported owner is a matter of record before the Commission.

In contrast, Final Analysis enjoys an exemplary record of dealing with the Government and the private sector, and is held in high professional esteem in the industry.

PR 1 0 1995

Federal Communications Commission of the Secretary

WASHINGTON, D.C. 20554

In the Matter of the Application of

FINAL ANALYSIS COMMUNICATION)		
SERVICES, INC.		File No.	25-SAT-P/LA-95
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For Authority to Construct, Launch)		
and Operate a Non-Voice, Non-)		
Geostationary Low Earth Orbit)		
Mobile Satellite System)		

To: Chief, International Department

CONSOLIDATED OPPOSITION TO PETITIONS TO DENY AND CONSOLIDATED REPLY TO COMMENTS

Final Analysis Communication Services, Inc. ("Final Analysis"), by its attorneys, hereby submits its "Consolidated Opposition" to the Petitions to Deny filed by CTA Commercial Systems, Inc. ("CTA"), E-Sat, Inc. ("E-Sat"), Leo One USA Corporation ("Leo One"), and Starsys Global Positioning, Inc. ("Starsys"); and its "Consolidated Reply" to the Comments filed by Orbital Communications Corporation ("Orbcomm"), Volunteers in Technical Assistance ("VITA") and Motorola Satellite Communications, Inc. ("Motorola").

DISCUSSION

I. Overview

CTA, E-Sat, Leo One and Starsys filed Petitions to Deny against Final Analysis' application, asserting a variety of arguments principally relating to

Final Analysis' financial and technical qualifications. Orbcomm, VITA and Motorola filed comments on Final Analysis' application, addressing both questions generally applicable to all second-round "Little LEO" applicants and financial, technical and operational issues specific to Final Analysis.

At the outset, it must be observed that many of the technical issues raised were mooted by Final Analysis' February 24, 1995 amendment (the "Amendment"), which, *inter alia*, adjusted Final Analysis' frequency usage to avoid Meteorological Satellites ("MetSats") and reduced the overall frequency requirements to coexist more peacefully with other applicants. Final Analysis addresses all technical issues contained in the Petitions to Deny first; after this, the technical and operational issues raised by the commentators are replied to.

Following the section addressing the technical issues, Final Analysis addresses the financial issues raised by the petitioners and the commentators in turn.

II. <u>Technical Issues</u>

A. <u>Petitions To Deny</u>

1. <u>CTA</u>

CTA claims in its Petition that Final Analysis' system is technically flawed due to the uplink data rates proposed in its application. According to CTA, Final Analysis' channelization plan, incorporating fourteen 25 KHz channels with data rates of 9.6 to 19.2 kbps, is incompatible with the existing RF channel structure based on 25 KHz grids. CTA opines that this

channelization scheme will "overlap with terrestrial channels" and cause interference to government users.¹

As a solution, CTA offers that Final Analysis should reduce its data rates to 4.8 bps, and channel bandwidth to 10 KHz."² Following CTA's advice, however, is fraught with its own set of difficulties. As CTA obligingly points out, such a reduction in data rates would cause a corresponding downturn in system capacity, adversely affecting the overall efficiency and service capabilities of the Final Analysis system.³ Not surprisingly, it would seem that following CTA's advice in this instance is scarcely better than failing to heed it.

Upon analysis, however, CTA's assertions concerning the channelization issue are entirely misplaced and should be rejected. As detailed in Final Analysis' application, the Scanning Telemetry Activity Receiver System ("STARS") onboard the satellites will identify unused channels in the 148.-150.05 MHz band, and assign them to the RTs to uplink data, thereby avoiding interference with terrestrial users.

¹CTA Petition at 8-9.

²Id. at 9. Surely CTA means 4.8 *kilobits* per second rather than the rate stated in its Petition, which is 1,000 times slower.

³At the end of its section addressing Final Analysis' technical issues, CTA ominously states that "[f]urther technical deficiencies in the FACS design are detailed in the Technical Appendix." Despite a careful perusal of the CTA Technical Appendix, however, Final Analysis has been unable to isolate any "further" alleged technical deficiencies — at most, the Technical Appendix reiterates what was already stated in the Petition.

The larger and more generally-applicable question of whether data rates and channel widths will ultimately have to be adjusted by Little LEO systems in actual operation in order for the systems to operate interstitially with the terrestrial channelization scheme is an open one at present, but there is no legal requirement that this particular strategy for avoiding interference be proposed at the outset. In fact, Final Analysis intends to investigate questions such as these with the experimental satellite, FAISAT-1, launched by its corporate parent. Until operational data can be obtained and analyzed, CTA's assertions concerning the channelization issue are no more than premature speculation, and most certainly do not turn up any real difficulties in Final Analysis' system design. The fact that CTA can build an argumentative "straw man" and knock him down handily adds nothing substantive to the discussion of the technical merits of Final Analysis' application.

2. Starsys

a. Global Considerations

Starsys, an equal-opportunity petitioner, seeks denial of *all* second round NVNG MSS applications because "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."⁴ In addition, Starsys evenhandedly claims that *all* of the second round applicants are technically deficient.

⁴Starsys Consolidated Petition to Deny at ii.

In response to this sweeping assessment by Starsys, Final Analysis generally notes that Starsys, Orbcomm and VITA have consistently represented to the Commission that their Joint Frequency Sharing Agreement purposefully leaves open spectrum for other, future NVNG MSS systems. Now, however, when the prospect of competition from new market entrants rears its not-overly-attractive head, Starsys harmonizes with its first-round associates to croon a very different tune. Now Starsys claims that *all* second round applicants will cause it harmful interference. Even more (as will be seen below), Starsys attempts to claim with a straight face that the very same strategies employed to avoid interference prior to the second round of filings suddenly have ceased to work, as if the laws of physics have inexplicably been suspended. This abrupt reversal of course by Starsys is so sudden and startling as to cause regulatory whiplash.

This having been said, it is not impossible that one or more of the second round applicants may be required to work out their differences with Starsys *if and when* Starsys obtains a commercial license for its proposed system.⁵ And, since the commercial license has not been granted, it is simply unknown what specific terms and conditions that license will contain if it is granted. Final Analysis based the interference analysis in its application in good faith on the frequencies requested by Starsys in its latest amended

⁵Section 25.142(a) of the Commission's rules require applicants to show "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) (emphasis supplied). As of this writing, Final Analysis has not been notified that Starsys has obtained such authorization from the Commission. Therefore, it would appear that Starsys' standard for second round application contents is somewhat more severe than the Commission's own.

application. If these parameters change, Final Analysis will be required to adjust, as will other applicants, and hereby undertakes to do so at that time.6

b. <u>Complaints Peculiar to Final Analysis</u>

Not all of Starsys' complaints are global in scope, however. Starsys' specific cavils with Final Analysis are centered around the contention that Final Analysis' proposed use of frequencies may cause harmful interference to Starsys' system. These are addressed in turn, in the order in which they appear in Starsys' Petition.

i. Use of Cross-Polarization To Reduce Interference Potential

Starsys asserts that, even though it grudgingly agreed with Orbcomm to share the 137-138 MHz band by utilizing cross-polarization to reduce the potential for interference, this doesn't mean *just anyone* can make use of this strategy. Thus, it follows, Final Analysis' proposal to utilize the same cross-polarization scheme agreed to between Orbcomm and Starsys is therefore somewhat suspect because Starsys did not specifically consent to allow it in a new sharing plan laboriously negotiated with Final Analysis at great expense.⁷

⁶Of course, the Commission's rules "encourage" applicants, licensees and permittees to coordinate their proposed frequency usage with each other by using "every reasonable effort to resolve technical problems and conflicts that may inhibit effective and efficient use of the radio spectrum. 47 C.F.R. § 25.142(b)(3). Final Analysis stands ready to lend its full and enthusiastic participation to this process at the appropriate time, and welcomes overtures from other applicants seeking a mutually-beneficial solution to potential conflicts.

⁷Starsys Petition at 13-14.

Starsys' self-appointed position as arbiter of second-round frequency sharing strategies should not be taken seriously. Obviously, all applicants are using their best efforts in good faith to "engineer around" each other in a very crowded portion of the electromagnetic spectrum. Final Analysis anticipates that, for second round applicants, as was the case for the first-round applicants, the frequency plan contained in the applications initially filed is just a starting point. More study, more data, more negotiations will undoubtedly file as these issues are sorted out. Final Analysis stands ready to devote its sincere effort to working these matters out in a spirit of cooperation. But to assert that cross-polarization may not be used to reduce interference, because we have not negotiated it with Starsys first, does not move the process forward.

ii. Use of the 137-138 MHz Band

Starsys next asserts that Final Analysis' proposed use of 137-138 MHz channels would cause unacceptable interference to Starsys' ground station main beam. According to Starsys, Final Analysis must adjust power, location and total frequency usage to be compatible with Starsys. Starsys conjectures that, even if Final Analysis were the sole second round applicant granted, it could only use a maximum of three channels at one time, and only outside of the main beam of Starsys' ground station antenna.

Starsys' position consists of the bald assertion that *any* additional activity (*viz.*, in addition to *Orbcomm*) in the 137-138 MHz band will degrade the Starsys spread spectrum transmissions. Starsys does not back up its assertion with any analysis. In addition, these remarks flatly contradict earlier statements contained in the Joint Frequency Sharing Agreement.

Moreover, the discussion in Starsys' Petition is based on the frequency plan contained in Final Analysis' original application, and is therefore inapplicable to the present state of things. Final Analysis' February 24, 1995 Amendment conservatively proposes a 40% reduction in the total frequency usage in the 137-138 MHz band. The Amendment drastically tapers Final Analysis' proposed use of frequencies in this band, greatly decreasing the potential for harmful interference. This proposed change should go far in responding to the concerns voiced by Starsys in its Petition.

iii. Use of the 400.15-401 MHz Band

Starsys contends that Final Analysis' proposed use of the 400.15-401 MHz band conflicts directly with Starsys' sole space to earth link for its mobile customer terminals. This issue has been mooted by Final Analysis' February 24, 1995 Amendment, which eliminated usage of the Starsys channel in this band. Thus, no additional discussion of this issue is warranted.

iv. Use of the 149.9-150.05 MHz Band

Starsys avers that Final Analysis' use of channels in the 149.9-150.05 MHz band conflicts with Starsys' earth-to-space feeder link, and that Final Analysis hasn't demonstrated how it can share with Starsys. Starsys is using the top 50 KHz of the 149.9-150.05 MHz band for its ground station uplink. Starsys objects to Final Analysis' use of that portion of the band for RT/MT uplink channels.

This concern on Starsys' part is unnecessary. The STARS technology employed by Final Analysis will automatically indicate when the Starsys

ground station is active and will avoid the use of those specific channels. If actual operating conditions demonstrate a need for further actions to coordinate the systems, Final Analysis will of course work together with Starsys according to the Commission's Rules to find a suitable solution.

3. Leo One

a. Alleged Conflict With Orbcomm's Frequency Plan

Ostensibly on the theory that Orbcomm is unable to defend its own interests, Leo One has thoughtfully pitched in to defend the licensee from potential incursions from Final Analysis. Leo One alleges that Final Analysis' proposed frequencies directly conflict with Orbcomm's frequency plan. To the extent that this argument ever held any water, however, it is mooted by Final Analysis' February 24, 1995 Amendment, which both significantly reduces overall frequency use in the 137-138 MHz band, and adjusts to avoid any potential difficulties with MetSats and Orbcomm's plan.8

In addition, Final Analysis cannot resist pointing out that Leo One's vehemence on this issue is revealed to be more than a little disingenuous when one reflects that one of the latest of Leo One's myriad amendments also adjusted Leo One's frequency plan to avoid an identical difficulty with Orbcomm's frequency plan.⁹ The audacity with which Leo One attempts to

⁸As discussed in Section II.B.2.c. hereof, the frequency plan and modulation scheme proposed by Final Analysis results in a C/I ratio greater than +7.5 dB in regard to Orbcomm's subscriber downlink channels. The downlink subscriber channel plan proposed by Final Analysis will not cause any harmful interference to any of the first round Little LEO applicants or the MetSats. Final Analysis is the only second round applicant that can make such a claim.

⁹As of this writing, CTA has also filed an Amendment requesting an adjustment in its frequency plan to address, *inter alia*, the same issue. See "Erratum and/or Amendment to Application" of CTA, filed March 24, 1995.

seize the high ground in this matter is nothing less than astounding:

This is vastly different from the approach taken by Leo One USA. Leo One USA reviewed Orbcomm's August 12, 1994 letter and specifically developed its frequency plan in the 137-138 MHz band to operate in a manner consistent with Orbcomm's frequency plan.

Leo One Petition at 14 n.12. As the record in this proceeding shows, however, the only "vast difference" worth considering here is the ever-widening gap between Leo One's representations to the Commission and objective reality. An examination of the relevant portion of Leo One's technical exhibit from its September 1, 1994 application (which was accepted for filing by the Commission) (attached as "Exhibit 2A" hereto) indicates that Leo One's own frequency plan in the 137-138 MHz band directly interfered with that of Orbcomm. It was not until November 16, 1994, the cut-off date for other second-round applicants, that Leo One addressed this issue for the first time, and changed its frequency plan for this segment. (This portion of Leo One's technical exhibit, as amended, is attached as "Exhibit 2B" hereto.) Thus, in attempting to differentiate itself from Final Analysis, Leo One is yet again playing fast and loose with the truth; although this may be successful occasionally in the short term, sometimes such a strategy backfires. See reference to David Bayer, 7 FCC Rcd 5054 (1992), infra at page 23.

b. <u>Alleged Satellite Design Flaws</u>

Leo One is nothing if not bold. After being forced to completely redesign its own satellite system from the ground up, and being thoroughly thrashed on technical grounds by applicants who have genuine experience in

the design, construction and deployment of real satellites, Leo One is not in the least deterred. Leo One has jumped back in the fray and now purports to criticize Final Analysis on its satellite design. The problem is that Leo One's analysis is so absurd that, instead of having the desired effect, it further underscores its own technical shortcomings.¹⁰

Even more amazingly, Leo One has made bald assertions concerning technical aspects of satellite design (a field in which its own performance so far has been considerably less than impressive) without even attempting to support it with expert opinion. Apparently Leo One's attorneys have now taken over that function, and are liberally offering their own expert satellite engineering advice. One suspects that this is because no qualified technician could be induced to risk his professional reputation on such a nonsensical representation.

Leo One's attorneys appear to be claiming that the satellite antenna depicted in Final Analysis' application cannot generate the antenna pattern given in Figure II-8. Even if lawyers were regarded as competent to testify on

November, 16, 1994 to correct precisely the same flagrant satellite system design and conceptual flaws which Final Analysis and other commentators criticized in their Petitions to Deny filed on the same date. It is worth considering that Leo One, which first filed its application on October 4, 1993, amended its application twice before (April 19, 1994 and September 1, 1994) over a period of more than one year without addressing its severe technical deficiencies; whereas Leo One's more experienced competitors spotted the flaws in a few short weeks. After entirely revamping its system design and concept in its November 16, 1994 amendment, Leo One took one more bite at the apple on December 14, 1994 with a not-so-cleverly concealed Major Amendment which it disingenuously termed "Errata" (despite the fact that it proposed to change its dedicated Ground Station uplink center frequencies from 149.71 MHz to 149.975 MHz, thus falling precisely into the definition of "major amendment" set forth in the Commission's Rules at 47 C.F.R. § 25.116(b)(1)). Leo One's application in its various manifestations remains a notable exception to the conventional wisdom that "practice makes perfect."

b. Use of Uplink Frequencies in the 148-150.05 MHz Band

Orbcomm states that it is "concerned that Final Analysis' channel assignment proposal may not be effective in avoiding harmful interference, insofar as it has not indicated an intention to use a predictive algorithm for channel selection like Orbcomm DCAAS system."¹⁴ In addition, Orbcomm contends that "because the user terminals will utilize linear polarization, the fact that Final Analysis proposes to operate cross-polarized with Orbcomm will not impact intersystem sharing."¹⁵

Orbcomm need not be overly concerned. The STARS technology contains the necessary algorithms to select unused uplink channels. This will allow simultaneous operation of Final Analysis, Orbcomm and the various terrestrial users in the 148-150.05 MHz uplink band. Final Analysis intends to verify this with FAISAT-1, the experimental satellite launched by its corporate parent. Orbcomm is correct that the cross-polarization will not impact intersystem sharing for the RT/MT terminals. However, cross-polarization will most definitely impact intersystem sharing for ground station uplink transmissions. This issue was clarified in Final Analysis' February 24, 1995 Amendment.

c. <u>Sharing Analysis</u>

In Attachment 2, Orbcomm presents a sharing/interference analysis. This analysis purports to show for both the uplinks and downlinks that the

¹⁴ Orbcomm Comments at 4.

¹⁵ *Id.* at 4-5.

resulting C/I ratio is negative.¹⁶ Table A2-1 presents subscriber downlink analysis and shows a C/I ratio of -7.5 dB.

The results set forth in the table are not accurate. Orbcomm's table does not include a polarization loss (which should be at least -3 dB) and assumes erroneously that the Final Analysis' channels overlap those of Orbcomm. However, in Final Analysis' Amendment, downlink channels were selected that do not overlap Orbcomm or the MetSats. This was accomplished by moving the downlink channels to unused regions of the 137-138 MHz band and cutting the data rate (and signal bandwidth) in half. In addition, as noted above in Section II.B.2.a., *supra*, the modulation schemes utilized by Final Analysis exhibit low side-lobes. Consideration of all these factors result in a net increase in the C/I ratio by 15-20 dB. This results in a C/I ratio greater than +7.5 dB and significantly reduces the potential for interference.

Table A2-2 in Orbcomm's petition presents a similar analysis for ground station and subscriber uplinks. For the ground station, Orbcomm again claims the C/I ratio is negative. However, if Orbcomm would double-check its addition, it should find that according to Orbcomm's own numbers, the C/I ratio is in fact *positive*. In addition, Orbcomm incorrectly assumed both that the interfering signals overlap the desired signals and that, for the subscriber uplink, there is no polarization loss. Signal overlap is avoided by using dedicated ground station uplink channels and using the DCAAS/STARS algorithms for subscriber uplink channels. Also, Orbcomm

¹⁶A negative ratio indicates that the interfering signal is greater than the desired signal.

such matters, this is a stupendously fatuous claim. In point of fact, the antenna shown on the satellite is just an artist's conception, and was never intended to support the type of analysis Leo One is attempting to conduct.¹¹

The pattern shown in Figure II-8 represents a typical response for the various FAISAT antennas. The actual antennas will maintain the isoflux response between 0° and +/-60° as shown in the figure, in accordance with the details contained in Final Analysis' application. Final Analysis is in compliance with all applicable Commission rules with respect to its antennas, and Leo One's "analysis" is merely an attempt to fabricate an issue where none exists. In point of fact, Final Analysis provided in its application more detail on the design of its satellites than any of the second round Little LEO applicants.

c. Orbital Accuracy Issue

Leo One desperately claims that "FACS violated 47 C.F.R. §25.114 (c) (10)" by not providing "information pertaining to the accuracy with which the orbital inclination, the antenna axis attitude, and longitudinal drift will be maintained."¹²

¹¹Surely the Commission has more compelling responsibilities than presiding over bickering between applicants as to the speculative "scientific implications" of artists' renderings. If this is truly the argumentative level to which Leo One wishes to descend, it should be noted that the "generic satellite" presented by Leo One in its November 16, 1994 amended application looks as if it were copied from a science-fiction novel. This is not a position from which to cast aspersions at other applicants' artwork.

¹²Leo One Petition at 15.

Leo One should read more carefully. This information, as it pertains to low-earth orbit satellites, is contained in Section II-7 of Final Analysis' application.

B. Replies to Comments

1. <u>VITA</u>

VITA asserts that Final Analysis has not demonstrated that its system is not mutually exclusive with VITA's. VITA claims that Final Analysis' uplink in the 148.905 to 149.9 MHz band overlaps the 90 KHz of spectrum, 149.81-149.9 MHz, that VITA has requested for uplink. In addition, VITA states as a general complaint that Final Analysis has not demonstrated precisely how its STARS technology can prevent harmful interference. Accordingly, VITA concludes, Final Analysis should not be licensed until this potential difficulty is resolved.

VITA's perceived problem with Final Analysis is essentially the same as its perceived problem with Orbcomm. Both Orbcomm and Final Analysis propose the use of scanning satellite receivers to identify available channels for uplink. VITA just doesn't want to believe that this will work. To this end, VITA filed comments in May, 1994 against Orbcomm, in essence claiming that Orbcomm's "DCAAS" system may not provide adequate protection against interference. To ensure that this point has not been lost, VITA attached a copy of those comments to beef up its two pages of comments against Final Analysis. VITA also makes reference to its Petition for Reconsideration filed against Orbcomm.

To ensure that the Commission's point has not been lost, Final Analysis notes that the Commission duly considered these complaints almost one year ago, and determined to reject them by the issuance of a commercial license to Orbcomm in the fall of 1994. Final Analysis believes the rejection of these arguments was entirely appropriate last year, and it still rings true in 1995.

2. Orbcomm

a. Use of Downlink Frequencies in the 137-138 MHz Band

Orbcomm alleges that Final Analysis' use of downlink frequencies in the 137-138 MHz range conflicts with Orbcomm's frequency plan (thus demonstrating, *inter alia*, that it can defend itself without Leo One's intervention). As noted above in Section I hereof, however, Final Analysis amended its Application on February 24, 1994. Final Analysis repositioned its downlink center frequencies and reduced their channel width from 25 KHz to 15 KHz. This change effectively resolves, *inter alia*, any question of overlap with Orbcomm's downlink channels. In addition, one of the modulation techniques utilized by Final Analysis (GMSK) exhibits side-lobes which are at least 30 dB below the main lobe. This results in low adjacent channel interference. These factors will reduce the potential for harmful interference between Final Analysis and Orbcomm and result in a positive C/I ratio in the 137-138 MHz downlink band.

¹³See "Exhibit 1-A", attached hereto.

inexplicably, or artfully, included a fading loss for the desired subscriber uplink signal, but did not include the same for the interfering signal. All of these factors, taken together, result in the depiction of worst case C/I ratios greater than +10 dB for both the ground station and subscriber uplinks. This again significantly reduces the potential for interference between Orbcomm and Final Analysis.

C. Motorola

In its comments, Motorola points out that both CTA and Final Analysis propose low-earth orbit satellites in 1000 km orbit, and claims that, if both systems were launched, there would be a "substantial risk of collision between satellites of the two system," exposing IRIDIUM® satellites to jeopardy "from the resulting space debris." Motorola accordingly suggests to the Commission that it should "focus its attention" on the orbital parameters requested by the applicants, and "require close compliance" to them in any authorization issued. 18

Although Motorola's comments are not entirely clear, Final Analysis believes they refer to the two satellites Final Analysis intends to deploy in 83° orbit, and the six satellites CTA proposes to place in polar orbit. The probability that the events feared by Motorola will occur is extremely low. The two satellites proposed to be fielded by Final Analysis do not appreciably

¹⁷ Motorola Comments at 3-4.

¹⁸*Id*. at 4.

change the potential collision picture Motorola must face, in view of the large number of objects already in orbit.

In the event that CTA and Final Analysis are both authorized to provide commercial satellite service, Final Analysis has no objection to coordinating the orbital parameters of both systems to avoid potential conflicts. Obviously, this could not have been done at the time Final Analysis filed its November 16, 1994 application, since the details of CTA's proposal were unknown.

III. Financial Issues

Leo One, CTA, E-Sat and Orbcomm raise a number of financial issues with respect to Final Analysis' application, principally centering around the issue of whether Final Analysis has demonstrated sufficient resources to meet Commission criteria requiring the construction, launch and operation of the first two satellites of the system for a period of one year. *See* 47 C.F.R. § 25.142(a)(4). These issues are addressed in turn below.

A. Leo One

In its Petition, Leo One raises the question of whether Final Analysis is financially qualified under the Commission's Rules. Leo One observes, as stated in Final Analysis' application, that Final Analysis relies in its application on the "current assets and operating income" of its parent company. Leo One questions the inclusion of an item labeled "Equipment"

¹⁹Leo One Petition at 5.

in Final Analysis' balance sheet as a current asset, both because Leo One conjectures that this item is not an asset that is "reasonably expected to be realized in cash or sold or consumed during a normal operating cycle of a business," 20 and because Leo One is not satisfied that it has been adequately described. In addition, Leo One opines that Final Analysis should have provided the basis for its valuation of the asset. Leo One also questions numerous entries in the financial statement on the theory that they are not in accordance with GAAP.

Finally, Leo One calls into question the qualifications of the company which was retained by Final Analysis to prepare its financial statements, Business Accounting Services of Gaithersburg, MD. Leo One contends that the principal of Business Accounting Services falsely represented that he was a Certified Public Accountant ("C.P.A.")²¹

As an initial matter, Final Analysis is most certainly able to meet the Commission's standards for financial qualification. To demonstrate this beyond any reasonable question, Final Analysis has incurred the additional expense and effort of retaining an independent C.P.A. firm, Zimmerman & Associates, L.L.C. to conduct a comprehensive audit of its financial status. This report of Zimmerman & Associates, L.L.C. is attached as "Exhibit 3" hereto. The results of this independent audit unquestionably establish that

²⁰Id. at 6, citing the Commission's Report and Order in CC Docket No. 85-135, FCC 85-396, released August 29, 1985 at n.4.

²¹Leo One Petition at 5.

Final Analysis is, and at all relevant times was, financially qualified under the Commission's Rules.²²

In particular, the item labeled "Equipment" which Leo One claims cannot be regarded to be a "current asset" included "FAISAT-1," a satellite belonging to Final Analysis' corporate parent. This asset is an item of inventory for Final Analysis' corporate parent, which is in the business of designing, building and selling satellites. As such, it is most definitely a current asset under the Commission's Rules. *See* Report of Zimmerman & Associates, L.L.C., "Exhibit 3" hereto, at 2 and 5 n.1.

In addition, there can be no doubt that the valuation of the satellite, since it was appraised prior to the filing of Final Analysis' application at a value of between USD \$8 Million and USD \$12 Million, is accurate. In fact, this appraisal was conducted, and delivered to Final Analysis on November 15, 1994, by the very same public accounting firm that Leo One has retained to criticize Final Analysis' application, KMPG Peat Marwick! The KMPG Peat

²²It should be noted that, for purposes of establishing beyond any reasonable doubt that Final Analysis was at all relevant times, and *continues to be*, financially qualified to construct, launch and operate the first two satellites of its constellation, the independent auditor's report covers the entire year of 1994, including the approximately two month period *after* the filing of Final Analysis' application. This, of course, goes beyond the requirements of the Commission's Rules, and provides additional information which is not required to be submitted. To the extent that there is any residual question as to Final Analysis' financial status as of the date of filing of the application, however, the auditing firm has included its separate written opinion that "there were no material or significant variations or events that affected the financial position of Final Analysis, Inc. and subsidiary from November 16, 1994 to December 31, 1994." This opinion is attached as "Exhibit 4" hereto. In addition, as noted hereinbelow, and as established by an independent appraisal, Final Analysis' parent corporation was in possession of very valuable current assets prior to the filing of its application on November 16, 1994.

Marwick appraisal is included as an exhibit to the independent auditor's report.²³

In these circumstances, it would seem that Leo One is between Scylla and Charybdis: how can it now claim that KMPG Peat Marwick's opinions criticizing Final Analysis' financial statement are correct, while at the same time claim that KMPG Peat Marwick incorrectly valuated FAISAT-1?

Apart from this very intriguing question, the basic fact remains: Final Analysis was, and is, financially qualified under the Commission's Rules to perform on the promises it made in its application. In fact, Final Analysis' parent is at this very moment seeking permission to construct and launch its second experimental satellite in the late summer/fall of 1995 to gather data to further the interests of the United States Government and of all NVNG-MSS applicants at the 1995 and future World Radiocommunications Conferences.²⁴ In view of this, it would seem a trifle disingenuous to claim that Final Analysis and its parent do not have the financial capability to construct and launch two satellites.

²³See "Exhibit 3", attachment entitled "Exhibits," November 15, 1994 Letter of KMPG Peat Marwick, L.L.P. to Nader Modanlo. The validity of this valuation is additionally buttressed by the fact that Final Analysis was able to purchase insurance for FAISAT-1 at a valuation of \$10,000,000. See Letter of Dan Cassidy, Sedgwick Space Services, to Nader Modanlo, in "Exhibit 3", attachment entitled "Exhibits".

²⁴This is in addition to Final Analysis' work on advancing the search for new spectrum for NVNG MSS use in pre-WRC-95 meetings, and its co-sponsorship, along with other second-round Little LEO applicants, of an engineering analysis performed by Cohen, Dippell and Everist, P.C.

Finally, in response to the questions raised by Leo One concerning the certification of the principal of Business Accounting Services, Final Analysis has consulted with Maryland State licensing authorities, provided them a complete record of the transaction for their review, and has formally requested referral of the matter to the State Attorney for criminal prosecution. At this point, the matter is under review by duly authorized officials of the State of Maryland. See March 27, 1995 Response of State of Maryland, Department of Licensing and Regulation, Division of Occupational and Professional Licensing to Complaint filed by Nader Modanlo on behalf of Final Analysis (attached as "Exhibit 5" hereto).

However, Final Analysis vehemently objects to the assertions in Leo One's Petition that it is somehow complicit with a deception, or that Final Analysis intended "to obfuscate rather than elucidate" its financial qualifications before the Commission in order to "impress the Commission with financial qualifications which it plainly does not have." These insulting and execrable allegations go beyond the bounds of responsible litigation. There is absolutely no basis for the assertion that Final Analysis itself has acted improperly. Final Analysis did not misrepresent, or "obfuscate" anything to the Commission.

In fact, Final Analysis has been forthcoming, and has attempted to respond in good faith to all of the issues raised by its opponents, both financial and technical, no matter how baseless. This open and honest approach is preferable that taken by Leo One in its Opposition to the Petitions

²⁵Leo One Petition at 10.

filed against it, which simply ignored many of the issues raised by opposing parties. Final Analysis, for one, is still waiting patiently for a response to myriad technical, ownership and financial questions raised by Leo One's application. In particular, Final Analysis would be interested in an open, honest and forthcoming discussion concerning the rather peculiar financials of Leo One, based as they are on a bizarre trust whose contents we are not privileged to assess, except through the lens of a very defensive accountants' report that essentially says nothing.

Leo One should also be very cautious in throwing stones about the character of other applicants, in view of the Commission's relatively recent sanctioning of David Bayer, Leo One's alleged principal, in a prior proceeding. See David A. Bayer, 7 FCC Rcd 5054, 5057 (1992). As the Commission is aware, Mr. Bayer was fined \$505,000 for continuous violations of the Commission's rules, and for "egregious and intentional misconduct" engaged in by his cellular radiotelephone enterprise. *Id.* As can be seen, with this track record, Leo One is scarcely in the position to call into question *anyone's* integrity or intentions.

By way of contrast, Final Analysis, its parent corporation, and their principals have a distinguished track record of honorable dealings with the Government and industry, and are held in high esteem not only for their technical capabilities, but also for their high professional standards and integrity. See Letter of Dr. David Boyle, Deputy Director of NASA Center for Space Power and Letter of Dr. Henry Helmken, Associate Director, NASA Space Communications Technology Center, attached as "Exhibit 6" hereto.

B. CTA

CTA claims that Final Analysis is not financially qualified under the Commission's Rules, which require NVNG MSS applicants to demonstrate sufficient current assets and operating income to meet the costs of construction, launch and first-year operation of the first two satellites in their proposed systems. Final Analysis need not face this charge alone, however: according to CTA, *none* of the other second round applicants (except for itself) has demonstrated financial qualification.

At any rate, CTA's contentions are addressed above in the response to issues raised by Leo One, and need not be discussed further here.

C. E-Sat

Although E-Sat also raises a financial issue with respect to Final Analysis, its analysis is not materially different than that of Leo One and the answer is the same.

D. Orbcomm

The majority of Orbcomm's comments with regard to Final Analysis' financial qualifications are answered above in the discussion responsive to Leo One's issues. However, Orbcomm raises one additional issue: Orbcomm asserts that Final Analysis has understated the real cost of constructing and launching its first two satellites. The contention is that the first two satellites should be disproportionately *high* in cost relative to the projected average cost of the satellites in the system, not disproportionately *low*.

The answer to this is relatively simple. Unlike other applicants, Final Analysis worked closely with the Government in the development of an experimental satellite system, FAISAT-1, which is the prototype for its proposed commercial satellites. The very costly non-recurring expenses of design, engineering and testing which is part of fielding any new satellite have for the most part *already been incurred*. In addition, Final Analysis has in its possession very valuable and expensive components that can be used for its first two satellites to lower their overall costs.

Finally, Final Analysis has demonstrated its ability to engineer and launch satellites at a very low cost with the experimental FAISAT-1. Accordingly, the first two satellites can be put into place very economically.

Orbcomm's concern that it is illogical that the initial satellites will be less expensive, on a unit basis, than later ones is misplaced in this instance.²⁶ In fact, the first two satellites can be launched quite inexpensively because they can be "piggy backed" on other launch vehicles, and do not require a dedicated launch. Also, it is planned that they will be deployed in the near future, when costs will not be as high as they are projected to be later, allowing for inflation

²⁶This is not to say that Orbcomm is incorrect in representing that it is normal for the first satellites of a new system to be disproportionately expensive in relation to later satellites, reflecting the incurrence of high R&D and design costs, and allowing for construction errors and their correction. But Final Analysis has already incurred the great majority of these costs: contrast this with Leo One, which claims to have disproportionately low initial costs for its first two satellites without having spent any significant time or money in design or development. Indeed, Leo One's costing of its initial two satellites is even more questionable when it is realized that it does not have any in-house capabilities or experience in the design, construction and launch of spacecraft. Instead, Leo One will have to "contract out" for these services, resulting in an extra layer of cost structure, and inevitably higher costs.

The cost of deploying the later satellites, which will be launched several at a time to meet the deployment schedule, is anticipated to be higher. In addition, since they are manufactured later, costs will likely have risen, and thus all aspects of expense related to them will be inflated relative to the first two satellites. Thus, it is not at all illogical that the first two satellites, benefiting from non-recurring costs, near-term launch and relatively inexpensive "piggy-backing," should be less expensive overall than the average of the later-deployed satellites.

CONCLUSION

In view of the foregoing, Final Analysis respectfully requests that the Commission reject the petitions to deny filed by CTA, Leo One, Starsys and E-Sat, and the comments filed by Orbcomm, VITA and Motorola.

Respectfully submitted,

FINAL ANALYSIS COMMUNICATION SERVICES, INC.

By Albert J. Catalano

Ronald I. Iarvis

Its Attorneys

CATALANO & JARVIS, P.C. 1101 30th Street, N.W., Ste 300 Washington, D.C. 20007 Telephone: (202) 338-3500

Facsimile: (202) 333-3585

Dated: April 10, 1995

Exhibit 1: Declaration of Burton J. Levin, Ph.D.

Declaration of Burton J. Levin, Ph.D.

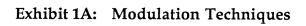
I, Burton J. Levin, Ph.D., hereby declare under penalty of perjury as follows:

- 1. I am the technically qualified person responsible for the preparation of the technical information contained in the foregoing "Consolidated Opposition to Petitions to Deny and Consolidated Reply to Comments" (the "Opposition") of Final Analysis Communication Services, Inc.
- 2. I am also responsible for the preparation of Exhibit 1A, entitled "Modulation Techniques," which is annexed hereto.
- 2. The technical information contained in the Opposition and in Exhibit 1A is true and correct to the best of my knowledge and belief.

Dated: April 10, 1995

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Burton I. Levin, Ph.D.



Modulation Techniques

Final Analysis uses both OQPSK and GMSK modulation for its various uplink and downlink transmissions. The corresponding normalized power spectral density for these modulation schemes is given by:

- 1. OQPSK: $G_1(f) = (\sin 2\pi fT/2\pi fT)^2$
- 2. GMSK: $G_2(f) = [\cos 2\pi f T/(1 16f^2 T^2)]^2 \exp[-f^2 T^2/(2\sigma^2)]$.

In these equations, T is the inverse of the modulation data rate. In equation 2, sigma is a measure of the Gaussian filter response. For a Gaussian filter with half power point at 0.5 of the bit data rate (BT=0.5) the value of sigma is 0.425 (i.e., σ =0.425).

Plots of the power spectral density for OQPSK and GMSK (BT=0.5) are given below. As can be seen, OQPSK has a narrower mainlobe than GMSK and results in a smaller null-null signal bandwidth. However, the GMSK spectral density plot exhibits extremely low secondary lobes. Final Analysis uses GMSK modulation for its low to moderate data rates (9600 bps and lower), which results in low out of band interference. Likewise, for its higher data rate links, Final Analysis uses OQPSK. This results in lower signal bandwidth (null-null) requirements.

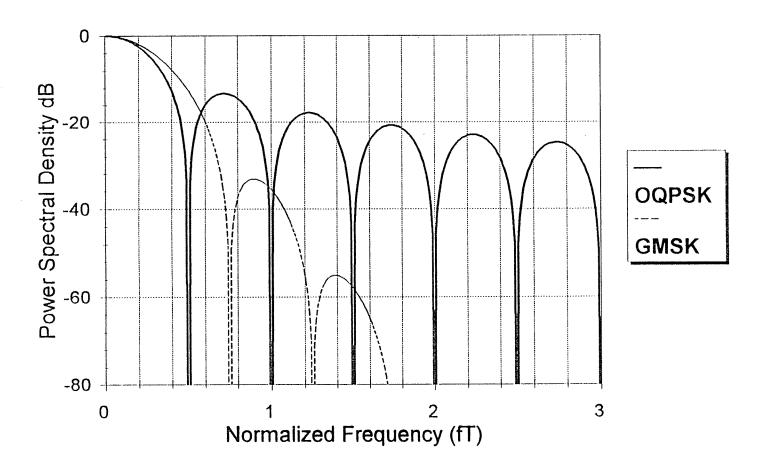


Exhibit 2A: Excerpt from Technical Exhibit in Leo One USA's September 1, 1994 Application

For each link, the transmit polarization is shown in Table A-8, the emission designators in Figure A-9, and the chanel bandwidths in Table A-10.

Table A-6. Frequency Bands, Requested Frequencies, and Total Bandwidth

Table	Frequency Band	Requested Frequencies	Total Requested Bandwidth
TCII	148 - 150.05 MHz	148.905-150.05 MHz°	1,145 kHz
TSD	137 - 138 MHz	137.3375 - 137.3625 MHz* 137.4875 - 137.5125 MHz* 137.6075 - 137.6325 MHz* 137.6395 - 137.6645 MHz 137.6675 - 137.6925 MHz 137.6955 - 137.7205 MHz 137.7235 - 137.7485 MHz 137.7575 - 137.7825 MHz*	200 kHz
GSU	148 - 150.05 MHz	149.685 - 149.735 MHz	50 kHz
GSD	400.15 - 401 MHz	400.440 - 400.500 MHz 400.520 - 400.580 MHz 400.650 - 400.710 MHz	180 kHz
ISL	22.55 - 23.55 GHz & 24.45 - 24.75 GHz	23.4997 - 23.5003 GHz 24.4997 - 24.5003 GHz	1,200 kHz

Leo One USA will not use the 149.0-150.05 band segment until after January 1, 1997.

Leo One USA will not use these band segments until after January 1, 2000.

Exhibit 2B: Excerpt from Technical Exhibit in Leo One USA's November 16, 1994 Amended Application

For each link, the transmit polarization is shown in Table A-8, the emission designators in Figure A-9, and the chanel bandwidths in Table A-10.

Table A-6. Frequency Bands, Requested Frequencies, and Total Bandwidth

	Frequency Band	Requested Frequencies	Total Requested Bandwidth
TSU	148 - 150.05 MHz	148.905-150.05 MHz°	1,145 kHz
TSD	137 - 138 MHz	137.0000 - 137.0250 MHz 137.3375 - 137.3625 MHz** 137.4050 - 137.4300 MHz 137.4320 - 137.4570 MHz 137.4600 - 137.4850 MHz 137.4875 - 137.5125 MHz** 137.6075 - 137.6325 MHz**	200 kHz
GSU	148 - 150.05 MHz	149.685 - 149.735 MHz	50 kHz
GSD	400.15 - 401 MHz	400.440 - 400.500 MHz 400.520 - 400.580 MHz 400.650 - 400.710 MHz	180 kHz

Leo One USA will not use the 149.9-150.05 band segment until after January 1, 1997.

Table A-7. Proposed Center Frequencies

TSU	148.9125 MHz, 148.915 MHz, 148.9175, 148.92 MHz,, 149.8925 MHz, 149.895 MHz, 149.8975 MHz, 149.9 MHz, 150.0425 MHz
TSD	137.0125 MHz, 137.35 MHz ^{**} , 137.4175, 137.4445, 137.4725, 137.5 MHz ^{**} , 137.62 MHz ^{**} , 137.77 MHz ^{**}
GSU	149.71 MHz
GSD	400.470 MHz, 400.550 MHz, 400.680 MHz

Leo One USA will not use these channels until after January 1, 1997.

Leo One USA will not use these band segments until after January 1, 2000.

Leo One USA will not use these channels until after January 1, 2000.

FINAL ANALYSIS, INC. AND SUBSIDIARY DECEMBER 31, 1994

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Zimmerman & Associates, L.L.C.

CERTIFIED PUBLIC ACCOUNTANTS

403 Church Lane Baltimore, MD 21208 (410) 486-8100 Fax (410) 486-0847

6136 Landover Road Suite 8 Landover, MD 20785 (301) 925-2260 Fax (301) 925-2261

The Board of Directors Final Analysis, Inc. Greenbelt, Maryland

INDEPENDENT AUDITOR'S REPORT

We have audited the accompanying balance sheet of Final Analysis, Inc. and Subsidiary as of December 31, 1994, and the related statements of income and retained earnings and cash flows for the year then ended. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

Also enclosed with these financial reports are exhibits of information supplied by other outside professionals. These exhibits have not been audited by us and, accordingly, we do not express an opinion or any other form of assurance on them.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of Final Analysis, Inc. and Subsidiary as of December 31, 1994, and the results of its operations and its cash flows for the year then ended in conformity with generally accepted accounting principles.

March 23, 1995

Zymmuman · associates

FINAL ANALYSIS, INC. AND SUBSIDIARY

CONSOLIDATED FINANCIAL STATEMENTS

DECEMBER 31, 1994

Exhibit 3: Consolidated Financial Statement of

Final Analysis, Inc. and Subsidiary as of December 31, 1994, Prepared by Zimmerman & Associates, L.L.C., Certified Public Accountants

FINAL ANALYSIS, INC. AND SUBSIDIARY CONSOLIDATED BALANCE SHEET DECEMBER 31, 1994

ASSETS

CURRENT ASSETS Cash Accounts receivable - trade Accounts receivable - other Inventory (Note 1) Deposits	\$ 34,107 1,078,671 2,333 8,622,252 6,099	
Total Current Assets		\$ 9,743,462
PROPERTY AND EQUIPMENT (Note 1) Communication equipment Computer equipment Office furniture and fixtures Less: Accumulated depreciation OTHER ASSETS (Note 2) License application fee	39,907 33,055 33,897 106,859 50,545	56,314 247,970

\$10,047,746

FINAL ANALYSIS, INC. AND SUBSIDIARY CONSOLIDATED BALANCE SHEET DECEMBER 31, 1994

LIABILITIES AND STOCKHOLDERS' EQUITY

CURRENT LIABILITIES Note payable - bank (Note 3) Accounts payable Accrued payroll Deferred income taxes - current (Notes 1 and 4)	\$ 233,950 345,404 6,760 680,932	
Total Current Liabilities		\$ 1,267,046
STOCKHOLDERS' EQUITY Common stock - \$1 par value - authorized 100 shares; issued and outstanding 100 shares Additional paid-in-capital Retained earnings	675,100 6,785,171 1,320,429	8,780,700

\$10,047,746

FINAL ANALYSIS, INC. AND SUBSIDIARY CONSOLIDATED STATEMENT OF INCOME AND RETAINED EARNINGS FOR THE YEAR ENDED DECEMBER 31, 1994

	AMOUNT	% TO SALES
Sales	\$3,976,605	100.0
Cost of goods sold	2,222,453	55.9
Gross profit from operations	1,754,152	44.1
General and administrative expenses	234,215	5.9
Operating profit	1,519,937	38.2
Other income (expenses) (Note 5)	(4,855)	(1)
Profit before income taxes	1,515,082	38.1
Provision for income taxes (Notes 1 and 4)	680;932	<u> 17.1</u>
Net income	834,150	_21.0
Retained éarnings - January 1, 1994	486,279	
Retained earnings - December 31, 1994	\$1,320,429	

FINAL ANALYSIS, INC. AND SUBSIDIARY CONSOLIDATED STATEMENT OF CASH FLOWS FOR THE YEAR ENDED DECEMBER 31, 1994

CASH FLOWS FROM OPERATING ACTIVITIES:		
Cash received from contracts	\$ 3,312,138	
Cash provided by operating activities		\$ 3,312,138
Cash disbursed for direct and indirect costs Interest paid	10,675,013 7,327	
Cash disbursed for operating activities		10,682,340
Net cash used in operating activities		(7,370,202)
CASH FLOWS FROM INVESTING ACTIVITIES:		
Capital asset expenditures License application fee expenditure	(41,536) (247,970)	
Net cash used in investing activities		(289,506)
CASH FLOWS FROM FINANCING ACTIVITIES:		
Additional paid-in-capital Disbursements for officer loans Proceeds from borrowed debt Proceeds from sale of capital stock	6,785,171 (83,109) 233,950 675,000	
Net cash provided by financing activities		7,611,012
Net decrease in cash		(48,696)
Cash at beginning of the year		82,803
Cash at end of the year		\$ 34,107

FINAL ANALYSIS, INC. AND SUBSIDIARY CONSOLIDATED STATEMENT OF CASH FLOWS FOR THE YEAR ENDED DECEMBER 31, 1994

RECONCILIATION OF NET INCOME TO NET CASH USED IN OPERATING ACTIVITIES:

NET INCOME Adjustments to reconcile net income to net cash used in operating activities:		\$ 834,150
Depreciation	\$ 17,947	
Increase in deferred income taxes	<u>680,932</u>	<u>698,879</u>
		1,533,029
CHANGE IN CURRENT ASSETS AND LIABILITIES (Increase) in accounts receivable - trade (Increase) in accounts receivable - other	(626,589)	
(Increase) in inventory	(2,333) (8,622,252)	
(Increase) in deposits	(4,221)	
Increase in accounts payable	345,404	
Increase in accrued payroll	6,760	(_8,903,231)

NET CASH USED IN OPERATING ACTIVITIES

(\$7,370,202)

FINAL ANALYSIS, INC. AND SUBSIDIARY NOTES TO FINANCIAL STATEMENTS DECEMBER 31, 1994

NOTE 1 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

<u>PRINCIPLES OF CONSOLIDATION</u> - The accompanying financial statements include the accounts of the Company and its controlled subsidiary, Final Analysis Communication Services, Inc. (FACS). All significant intercompany transactions have been eliminated in consolidation.

ORGANIZATION - Final Analysis, Inc. and its subsidiary were both incorporated under the laws of the State of Maryland. The primary business of the Companies is the manufacture, launch, sale and subsequent operations control of low earth orbit satellite systems and the supplying of supervision, design and engineering support for reactivating and upgrading satellite ground receiving stations for the United States government and various foreign countries.

The Companies both record income for financial statement purposes on the accrual method of accounting.

<u>INVENTORY</u> - Inventory, which is composed of a completed satellite and various components required for the manufacture of future additional satellites, is valued at the lower of cost, determined on the first-in, first-out method, or market. See the accompanying exhibit valuation appraisals for fair market value analysis.

PROPERTY AND EQUIPMENT - Property and equipment are stated at cost. Individual purchases over \$200 and improvements which prolong the useful life of an asset are capitalized, while expenditures for maintenance, small items and minor repairs are expensed as incurred. Depreciation for financial statement purposes is calculated on the straight-line method and is provided on a consistent basis, based upon the estimated useful life of the particular asset. The Company has adopted the appropriate depreciation methods for income tax purposes.

INCOME TAXES - The parent company reports profits and losses for income tax purposes on a modified cash basis of accounting. In prior years the stockholders elected to file the Company's income tax returns as a tax option Subchapter "S" Corporation. Under this tax option election, the stockholders of record at the end of the year recorded the corporate profits or losses on their personal income tax returns. During the current year the Company completed transactions which resulted in the revocation of the Subchapter "S" status. Therefore, effective for the current year and in future years the Company will be taxed as a regular "C" status corporation. FACS is a "C" Corporation and reports profits and losses on the accrual basis of accounting for income tax purposes. Provision is made on the financial statements for deferred income taxes applicable to the timing difference between income recognized for financial statement purposes and income recognized for income tax purposes.

<u>BAD DEBTS</u> - Due to the infrequency of accounts receivable becoming uncollectible, the Companies have elected to use the direct write-off method of bad debt recognition. There were no bad debts incurred during the current year.

FINAL ANALYSIS, INC. AND SUBSIDIARY NOTES TO FINANCIAL STATEMENTS DECEMBER 31, 1994

NOTE 2 - OTHER ASSET

LICENSE APPLICATION FEE - FACS paid \$247,970 to the Federal Communications Commission for an application fee to be a licensed operator of low orbit satellite systems. Upon approval, the Company will amortize the license fee over the 10 year life of the license.

NOTE 3 - BANK LINE-OF-CREDIT

The Companies have a line-of-credit bearing interest at prime plus 1%, with Loyola Federal Savings Bank in the amount of \$250,000. The line is secured by all assets of the Companies and the personal guarantees of the majority stockholders. The Companies have used \$233,950 of the line-of-credit at December 31, 1994.

NOTE 4 - INCOME TAXES

INCOME TAX METHOD - The parent company is a "C" Corporation (Note 1) and reports profits and losses for income tax purposes on a modified cash method. FASB 109 requires an asset and liability approach to financial accounting and reporting for income taxes. Deferred income tax liabilities are computed annually and are adjusted based on enacted tax laws and rates applicable to the years in which the differences affect taxable income.

INCOME TAXES PAYABLE - The Companies had a combined tax basis loss for the current year of \$251,323, resulting in no federal or state income tax liabilities.

<u>DEFERRED INCOME TAXES</u> - Provision has been made on the accompanying financial statements for deferred income taxes applicable to the timing difference between financial statement income and income tax income (Note 1). The timing difference has caused an increase in deferred income and related deferred income taxes of \$2,002,740 and \$680,932, respectively. The deferred income taxes will not become taxable until such time that the timing difference reverses itself and the "modified cash method" income equals or exceeds the "accrual method" income.

PROVISION FOR INCOME TAXES - The provision for income taxes resulted from the increase in deferred income taxes of \$680,932, as shown on the accompanying income statement as provision for income taxes.

NOTE 5 - OTHER INCOME (EXPENSE)

Other income net of other expense consists of the following:

OTHER INCOME

Miscellaneous income

\$2,472

OTHER EXPENSE

Interest expense

7,327

(\$4,855)

FINAL ANALYSIS, INC. AND SUBSIDIARY NOTES TO FINANCIAL STATEMENTS DECEMBER 31, 1994

NOTE 6 - LEASES

The Companies lease their corporate headquarters from the OAO Corporation. The lease was entered into on April 12, 1994 with a term of fifty-seven months, commencing on May 1, 1994 and ending on January 31, 1999. The annual lease rental schedule is as follows:

May 1, 1994 to June 30,	1994 \$ -0-
July 1, 1994 to April 30	, 1995 \$60,993
May 1, 1995 to April 30,	1996 \$79.727
May 1, 1996 to April 30,	1997 \$82,132
May 1, 1997 to April 30,	1998 \$84,589
May 1, 1998 to January 3:	

In addition, the Companies lease office space from Utah State University in Logan, Utah. The lease was entered into on May 13, 1994 with a term of one year, commencing on May 15, 1994 and ending on May 15, 1995. At such time when the lease expires, a month-to-month tenancy will exist thereafter. The annual lease amount is \$11,693.

NOTE 7 - MAJOR CUSTOMERS

In addition to contracts entered into with the United States Government as well as the private sector, Final Analysis, Inc. has entered into a fixed price contract with a foreign corporation to provide supervision, design and engineering services in connection with upgrading a remote sensing ground station. The amount of the contract is \$9,900,000, of which \$300,000 has been completed, leaving a backlog of \$9,600,000. Contract financing is being arranged through the Bank of New York which will provide bank letters of credit. The Company maintains an accounts receivable of \$300,000 pending the completion of financing arrangements. Management believes the account receivable will be collected in 1995; however, the ultimate amount of revenue to be earned under the contract may be subject to the successful arrangement of financing by the customer and, furthermore, may be affected by fluctuating economic and political conditions in the foreign country.

NOTE 8 - RELATED PARTY TRANSACTIONS

The parent company purchased a substantial portion of its inventory from its stockholders. Final Analysis, Inc. specifically purchased the satellite titled FAISAT-1 from Nader Modanlo and Michael H. Ahan for the lowest range of fair market value for the satellite as established by KPMG Peat Marwick LLP, professional consultants and certified public accountants. See the accompanying KPMG fair market value appraisal exhibit. The stockholders returned the net proceeds of the sale to the Company in the form of additional-paid-in capital.

NOTE 9 - SUBSEQUENT EVENTS

On January 24, 1995, Final Analysis, Incs.' satellite titled FAISAT-1 was launched into orbit aboard a Russian Cosmos Rocket. From the time of launch and for the first 120 days in orbit, the satellite was insurable up to \$10,000,000 by Sedgwick Space Services. See the accompanying insurance exhibit for further information and clarification.

FINAL ANALYSIS, INC. AND SUBSIDIARY

EXHIBITS

DECEMBER 31, 1994

(UNAUDITED)



2001 M Street, N.W. Washington, DC 20036 Telephone 202 467 3000

Telefax 202 223 2199

November 15, 1994

Mr. Nader Modanlo President Final Analysis Inc. 7500 Greenway Center Greenbelt, Maryland 20770

Dear Mr. Modanlo:

As per our agreement of November 2, 1994, KPMG has conducted an independent assessment of the range of reasonable on-ground market values for FAISAT 1. The estimated range we have developed is contingent on the accuracy of the information provided to KPMG Peat Marwick by Final Analysis Inc. regarding the composition and capabilities of FAISAT 1.

During the course of our evaluation, we spoke with numerous industry experts, ranging from satellite manufacturers and operators to insurers and space consultants. These experts included representatives from AeroAstro, SpaceVest, Willis Corroon In-Space, and in-house valuation specialists at KPMG Peat Marwick.

Using the characteristics/capabilities of FAISAT 1 provided to us by Final Analysis, we conducted comparisons with both existing and planned satellites designed to perform similar functions. On the basis of research, KPMG Peat Marwick has established the reasonable range of on-ground values for FAISAT 1 to be between \$8 million and \$12 million.

This range includes a premium over the satellite's construction value, reflecting costs incurred by Final Analysis Inc. for the insuring and launch of FAISAT 1. However, this range does not include any premium for "opportunity cost" associated with the potential revenue loss due to delays resulting from construction of a satellite by a potential buyer.

Very truly yours,

KPMG Peat Marwick LLP
KPMG Reat Marrish LLP

thadeat mark



Sedgwick Space Services
Sedgwick Aviation, North America
4001 North Fairfax Drive, Suite 300
Arilington, Virginia 22203-1624
Telephone (703) 528-8865/0641

November 21, 1994

TO:

Nader Modanlo

Final Analysis, Inc.

FROM:

Dan Cassidy

SUBJECT:

FAISAT Launch Insurance

Please be advised of the following terms offered by

will underwrite 100 percent of the risk (USD 10,000,000) for a premium rate of percent subject to the following terms and conditions.

- i) Coverage period Launch and 120 days maximum
- ii) Information provided by Final Analysis, Inc., including the definition of successful launch and operational capability.
 - (a) Successful launch of FAISAT on the COSMOS launch vehicle and separation from the COSPAS satellite (primary payload) in earth orbit with orbital altitudes falling between 600km and 1200km.
 - (b) For a period minimum 90 days, maximum 120 days after launch, the satellite has the capability to: communicate with the Master Ground Station (MGS); transmit wakeup signals to the Remote Terminals (RTs); and, upon receiving message communications from the RTs, the satellite has the capability to directly transmit the message communications to the MGS when the MGS is in line of sight, and when the MGS is not in line of sight, to provide on-board storage of messages and later transmission to the MGS.
- iii) Agreement to a policy form.
- iv) Confirmation that no launch failures have occurred since the beginning of 1994.

Sincerely,

Exhibit 4: Opinion of Zimmerman & Associates, L.L.C.



403 Church Lane Baltimore, MD 21208 (410) 486-8100 Fax (410) 486-0847 6136 Landover Road Suite 8 Landover, MD 20785 (301) 925-2260 Fax (301) 925-2261

April 7, 1995

To Whom It May Concern:

Zimmerman & Associates, L.L.C. was retained by Final Analysis, Inc. and its subsidiary, Final Analysis Communication Services, Inc. to perform an audit of the consolidated financial statements for the year ending December 31, 1994.

We conducted our audits in accordance with generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.

We believe that there were no material or significant variations or events that affected the financial position of Final Analysis, Inc. and subsidiary from November 16, 1994 to December 31, 1994, when we issued our opinion regarding the financial statements referred to above.

Sincerely,

Richard W. Brunner CAA

Partner

Exhibit 5: Response of State of Maryland Department of Licensing and Regulation to Complaint filed on behalf of Final Analysis by Nader Modanlo

STATE OF MARYLAND

PARRIS N. GLENDENING Governor



Department of Licensing and Regulation Division of Occupational and Professional Licensing OCCUPATIONAL AND PROFESSIONAL LICENSING BOARDS

> ROOM 902 501 ST. PAUL PLACE BALTIMORE, MARYLAND 21202-2272 (410) 333-6322

March 27, 1995

A Regulator Helping People

95-PA-27 COMPLAINT NUMBER

Nader Modanlo 7575 Greenway Ctr., Ste. 1240 Greenbelt, MD 20770

RE: Farrokh Baik

Dear Complainant:

The Division of Occupational and Professional Licensing acknowledges receipt of your complaint. Please be advised that

the non-licensed respondent has been asked to respond to the allegations.

You will receive a status report approximately every 30 days. It is possible that action in your complaint may take longer than 30 days due to a Board's meeting schedule.

Occupational and Professional Licensing Boards are only authorized to suspend or revoke licenses. Administrative action can not be taken to settle fee disputes or to negotiate for further services by a licensee. Simultaneous with action by this Board however, you may proceed with civil remedies that are available to you. You may wish to consult an attorney or pursue this matter through the small claims courts.

If your complaint involves an unlicensed individual, this Board lacks jurisdiction to take any administrative action. We will proceed with an investigation to determine whether your complaint should be referred to the States Attorney for criminal prosecution. You may, of course, proceed with any civil remedies that are available to you or refer the matter on your own to the States Attorney's Office.

Sincerely

Daphne A. Thomas

MD CPA Board

Letters of Support from NASA Center for Space Power and NASA Space Communications Technology Center Exhibit 6:



A NASA Center for the Commercial Development of Space

223 WERC College Station, Texas 77843-3118

409/845-8768 Fax 409/847-8857 March 21, 1995

Mr. William F. Caton, Acting Secretary Federal Communications Commission 1919 M Street, N.W. Washington, D.C. 20554

Re: Application of Final Analysis for NVNG License

Dear Mr. Caton:

The Center for Space Power (CSP), a NASA Center for the Commercial Development of Space, strongly supports the efforts of Final Analysis to obtain a commercial license in the NVNG MSS below 1 GHz. The system proposed by Final Analysis is designed to satisfy the potentially significant market for remote, world-wide data acquisition and material tracking services.

Pursuant to a Memorandum of Agreement between the CSP and FAI, we have been working with Final Analysis on a variety of technical issues, including the development of spacecraft power systems and the design of remote terminals, related to its proposed satellite program. The CSP has agreed to make available to Final Analysis technical assistance and services, including research and development, to help satisfy FAI's space power-related and other technical needs.

The CSP is familiar with Final Analysis and its principals. Their high professional standards, integrity and demonstrated capabilities in the design and implementation of satellite systems makes FAI well qualified to enter this emerging field.

Should you have any questions concerning this letter, or CSP's position relative to this matter, please give me a call.

Sincerely yours,

Dr. David R. Boyle Deputy Director

Center for Space Power

March 25, 1995

College of Englneering Florida Atlantic University 777 Glades Road P.O. Box 3091 Boca Raton, Florida 33431-0991 (407) 367-2343; FAX (407) 367-3418

Mr. William F. Caton, Acting Secretary Federal Communications Commission 1919 M. Street, N.W. Washington, D.C. 20554

Re: FCC File No. 25-SAT-P/LA-95

Dear Mr. Caton:

I am writing to you on behalf of the NASA Space Communications Technology Center ("SCTC"), a NASA supported Center for the Commercial Development of Space ("CCDS"), to lend SCTC's support to the commercial license application of Final Analysis in the Low Earth Orbit Mobile Satellite Service (Below 1 GHz). Final Analysis is a small company founded to provide the aerospace industry with high technology, top quality engineering products and services. The Little LEO commercial satellite system proposed by Final Analysis in its application now pending before the Commission will provide the American public with advanced data, paging and tracking communications services.

SCTC has signed a Memorandum of Understanding (MOU) with Final Analysis for cooperative research and development of satellite communications technology. Pursuant to the MOU, SCTC is presently working with Final Analysis on a large range of issues centering around development of commercial satellite communications technology.

Final Analysis is well-qualified to participate in the provision of commercial satellite services. In all dealings with SCTC, the company has consistently demonstrated a high level of professionalism, engineering talent and integrity. Accordingly, SCTC enthusiastically supports Final Analysis' efforts to obtain a commercial authorization for Little Leo satellite service.

If there are any questions concerning the letter, please contact me directly.

Yours truly.

Dr. Henry Helmken

Assoc. Director, SCTC

cc W. Glenn, SCTC Director

Certificate of Service

I, Ronald J. Jarvis, an attorney in the law firm of Catalano & Jarvis, P.C., hereby certify that on this 10th day of April, 1995, I caused a true and complete photocopy of the foregoing "Consolidated Opposition to Petitions To Deny and Consolidated Reply to Comments" to be sent, via U.S. first class mail, postage prepaid, to the following:

Scott Harris, Chief International Bureau Federal Communications Commission 2000 M Street, N.W., Room 830 Washington, D.C. 20554

Thomas S. Tycz, Chief Satellite & Radiocommunications Division Federal Communications Commission 2000 M Street, N.W., Room 811 Washington, D.C. 20554

Cecily C. Holiday, Deputy Chief International Bureau Federal Communications Commission 2000 M Street, N.W., Room 520 Washington, D.C. 20554

Fern J. Jarmulnek, Chief Satellite Policy Branch Federal Communications Commission 2000 M Street, N.W., Room 518 Washington, D.C. 20554

Kristi Kendall, Esquire International Bureau Federal Communications Commission 2000 M Street, N.W., Room 517 Washington, D.C. 20554

Mr. Harold Ng International Bureau Federal Communications Commission 2000 M Street, N.W., Room 512 Washington, D.C. 20554 Albert Halprin, Esquire Halprin, Temple & Goodman Suite 650 East Tower 1100 New York Avenue, N.W. Washington, D.C. 20005 Counsel for Orbcomm

Raul Rodriguez, Esquire Leventhal, Senter & Lerman 2000 K Street, N.W., Suite 600 Washington, D.C. 20006-1809 Counsel for Starsys

Jonathan Wiener, Esquire Goldberg, Godles, Wiener & Wright 1229 19th Street, N.W. Washington, D.C. 20036 Counsel for VITA

Robert A. Mazer, Esquire Rosenman & Colin 1300 -- 19th Street, N.W., Suite 200 Washington, D.C. 20036 Counsel for Leo One USA

Mr. Philip V. Otero Vice President & General Counsel GE American Communications, Inc. Four Research Way Princeton, New Jersey 08540 Counsel for GE Americom

Jill Abeshouse Stern, Esquire Shaw, Pittman, Potts & Trowbridge 2300 N Street, N.W. Washington, D.C. 20037 Counsel for CTA

Leslie A. Taylor Leslie Taylor Associates, Inc. 6800 Carlynn Court Bethesda, MD 20817-4301 Representing E-SAT

Ronald J. Jarvis