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

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In the Matter of)
)
Mobile Satellite Ventures Subsidiary LLC)
)
Application for Minor Modification of Space)
Station License (AMSC-1))
)
Minor Amendment to Pending Application to)
Launch and Operate a Next-Generation)
Replacement MSS Satellite System)
)
Application for a Minor Modification of Blanket)
License to Operate Mobile Earth Terminals with)
MSAT-1)

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

File No. SAT-MOD-20031118-00333

File No. SAT-AMD-20031118-00332

File No. SES-MOD-20031118-01879

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**RESPONSE OF MOBILE SATELLITE VENTURES SUBSIDIARY LLC TO
OPPOSITION OF INMARSAT VENTURES LTD.**

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Summary

The path to the development of a successful regional Mobile Satellite Service system is at another critical juncture. Over twenty years after the Commission first proposed to allocate spectrum for a generic MSS and license a regional system, after over \$1.5 billion in investment, the first-generation system is at break-even, providing valuable service and critical infrastructure for public safety communications and other users. The deployment of a replacement system, however, depends on receiving immediate authority to build a system with greater capacity and the ability to overcome blockage in urban areas.

MSV first set out on this path over three years ago, with the filing of its ATC application. Following the Commission's adoption of its ATC rules last year, MSV submitted the present application, which refines and improves on the design for its terrestrial component. The result is an even better system than what MSV originally proposed, with small, lightweight user equipment capable of operating with either the satellite or the terrestrial facilities and with a degree of spectrum reuse that will permit high-quality service even in smaller cities and towns--a system that can attract the multibillion dollar investment required for deployment.

MSV urges the Commission to act as quickly as possible so that the progress that has been made to date will not have been in vain. The record is now ripe for grant of MSV's application. No one has challenged MSV's compliance with the gating factors the Commission established to insure that ATC authority is not abused. Inmarsat's opposition--the only opposition filed--is lengthy, but it lacks any substance. Despite Inmarsat's contentions to the contrary, it is clear that MSV's application is complete and that MSV's proposed terrestrial component will enhance and not detract from its satellite service. The technical issues Inmarsat raises should not delay the processing of the application, since for the most part they are identical to those Inmarsat raised in the most recent round of the rulemaking proceeding, which concluded

in September 2003. As discussed in the rulemaking and in this response, there is ample evidence for the Commission to conclude that MSV will be able to operate its proposed system without causing any harmful interference to Inmarsat.

Inmarsat is wrong when it claims that MSV's application breaks promises made to the Commission. Inmarsat has enjoyed monopoly status throughout much of its history, still dominates the MSS market, and does not have the same incentive as MSV to increase spectrum efficiency or offer the improvements in coverage that ATC makes possible. Indeed, if MSV is unable to secure sufficient flexibility for its terrestrial component and is unable to deploy a replacement system, Inmarsat would benefit by being able to take over the spectrum that MSV now uses. Far from MSV breaking promises it has made to the Commission, since filing its initial ATC application, MSV has continued to invest millions of dollars in researching and developing ways to both increase efficient use of L-band spectrum and at the same time decrease potential interference to Inmarsat and others. While Inmarsat may not appreciate the progress MSV has made, it is precisely this kind of innovation that the Commission has encouraged historically and, hopefully, will support in this case.

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Technical Certification of Dr. Peter D. Karabinis, Vice President & Chief Technical Officer of MSV

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Application for a Minor Modification of Blanket License to Operate Mobile Earth Terminals with MSAT-1)	File No. SES-MOD-20031118-01879
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**RESPONSE OF MOBILE SATELLITE VENTURES SUBSIDIARY LLC TO
OPPOSITION OF INMARSAT VENTURES LTD.**

Mobile Satellite Ventures Subsidiary LLC (“MSV”) hereby files this response to the opposition filed by Inmarsat Ventures Ltd. (“Inmarsat”) against its application for authority to operate an Ancillary Terrestrial Component (“ATC”) as part of its L-band Mobile Satellite Service (“MSS”) system – the only opposition filed. For the most part, Inmarsat merely repeats the same baseless arguments it made eight months ago in opposition to MSV’s request for reconsideration of the ATC rules. MSV responded to those arguments then, providing ample evidence that a grant of MSV’s application is in the public interest and will not cause harmful interference to MSV’s system or any other system. As such, the record is now ripe for speedy grant of MSV’s application. MSV urges the Commission to take such action and enable MSV to move forward quickly to build and develop the next generation of Mobile Satellite Service.

Background

In February 2003, two years after MSV first proposed the concept to the Commission,¹ the Commission issued new rules permitting MSS licensees to integrate a terrestrial component into their MSS systems.² The Commission's order hailed the value of ATC, finding that the expanded authority would promote public safety and national security (*ATC Order* ¶ 29), promote the efficient use of MSS spectrum (*id.* ¶¶ 1, 21, 23), allow MSS providers to offer ubiquitous service by overcoming coverage gaps in urban areas (*id.* ¶ 24) and achieve economies of scale that will dramatically reduce the cost of MSS equipment and service (*id.* ¶¶ 24, 32), and increase competition (*id.* ¶ 23). The Commission's *ATC Order* established general rules for the filing of ATC applications by MSS licensees and imposed unique restrictions on ATC deployments by L-band licensees such as MSV. The L-band rules were designed, using a hypothetical "baseline" system, to protect other satellite systems from harmful interference. *ATC Order*, Appendix C2.

On July 7, 2003, MSV filed a *Petition for Partial Reconsideration and Clarification* ("Recon Petition") of the *ATC Order* asking the Commission to allow L-band MSS operators additional flexibility for their terrestrial operations, to permit greater frequency reuse and more

¹ Application of Motient Services Inc. and Mobile Satellite Ventures Subsidiary LLC, File No. SAT-ASG-20010116-00010 (March 1, 2001).

² See *Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands, Report and Order*, 18 FCC Rcd 1962, FCC 03-15, IB Docket No. 01-185 (February 10, 2003) ("*ATC Order*"), amended by *Errata* (March 7, 2003). In July 2003, the Commission clarified the ATC application process. See *Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands, Order on Reconsideration*, IB Docket No. 01-185, FCC 03-162 (July 3, 2003) ("*ATC Sua Sponte Order*").

flexible base station deployment.³ Inmarsat opposed MSV's *Recon Petition* and the pleading cycle closed in September, nearly eight months ago.⁴

On November 18, 2003, MSV filed the present ATC application.⁵ As indicated in the application, the new proposal reflects the substantial continued research and development work that MSV has conducted since filing its initial application, including proposals for small, lightweight mobile terminals capable of operating with both the satellite and the terrestrial component, the use of interference cancellation techniques to prevent interference from the

³ See MSV, Petition for Partial Reconsideration and Clarification, IB Docket No. 01-185 (July 7, 2003) ("*MSV Recon Petition*"); see also Letter from Bruce D. Jacobs, Counsel for MSV, to Ms. Marlene H. Dortch, FCC, IB Docket No. 01-185 (November 18, 2003) (clarifying requested relaxation in power flux density ("PFD") limits for ATC base stations near airport runways/aircraft stand areas and waterways).

⁴ See Opposition of Inmarsat, IB Docket No. 01-185 (August 20, 2003) ("*Inmarsat Recon Opposition*"); Reply of MSV to Opposition of Inmarsat, IB Docket No. 01-185 (September 2, 2003) ("*MSV Recon Reply*").

⁵ Application of MSV, File No. SAT-MOD-20031118-00333 (minor modification of license for AMSC-1); File No. SAT-AMD-20031118-00332 (minor amendment of pending application to launch and operate replacement satellite); File No. SES-MOD-20031118-01879 (minor modification of earth station license authorizing access to MSAT-1 in the United States) (filed November 18, 2003) (collectively, "*MSV ATC Application*"). In most cases at the request of Commission staff, MSV subsequently filed several supplements to this application. See Letter from Bruce D. Jacobs, Counsel for MSV, to Ms. Marlene H. Dortch, FCC, File No. SAT-MOD-20031118-00333 et al (December 30, 2003) ("*MSV Dec. 30 Letter*"); Letter from Bruce D. Jacobs, Counsel for MSV, to Ms. Marlene H. Dortch, FCC, File No. SAT-MOD-20031118-00333 et al (February 4 2004) ("*MSV Feb. 4 Letter*"); Letter from Lon C. Levin, MSV, to Ms. Marlene H. Dortch, FCC, File No. SAT-MOD-20031118-00333 et al (February 27, 2004) (clarifying OOBE limits for ATC MTs in the 1605-1610 MHz band) ("*MSV Feb. 27 Letter*").

MSV's original application to operate ancillary terrestrial base stations was filed in March 2001. See Application of Motient Services Inc. and Mobile Satellite Ventures Subsidiary LLC, File No. SAT-ASG-20010116-00010 (March 1, 2001). The International Bureau placed this application on *Public Notice* in March 2001 and the pleading cycle closed in May 2001. See *Public Notice*, Report No. SAT-00066 (March 19, 2001). The Commission decided to address the issues raised in MSV's application in a *Notice of Proposed Rulemaking*. See *Flexibility for Delivery of Communications by MSS Providers, Notice of Proposed Rulemaking*, IB Docket No. 01-185, 16 FCC Rcd 15532, ¶ 5 (2001) ("*ATC NPRM*"). In February 2003, the Commission adopted its proposal and adopted rules to allow MSS licensees to supplement their MSS with ATC. See *ATC Order*.

terrestrial component to MSV's own satellite operations, and the use of CDMA protocols. This investment is reflected in the filing of over thirty related patent applications to date and the receipt of the first patent.⁶

The application largely conforms to the rules the Commission adopted for operation of terrestrial components. Consistent with the rules, MSV proposes a terrestrial component design that varies from the baseline system that was used to establish the interference threshold, including in ways that reduce the potential for interference to Inmarsat.⁷ In addition, MSV requests certain waivers of the rules that would give it greater flexibility to deploy its terrestrial component without causing harmful interference to itself or other systems.⁸ MSV explains how these variations and waivers will enable it to use its spectrum more efficiently, provide better and more service to the public without increasing interference to itself or other spectrum users, and secure the investment needed for its next generation system. *See supra notes 7 and 8.*

The vast majority of the variations and waiver request included in the application were also included in MSV's *Recon Petition*. With respect to its operations in what is referred to as the uplink direction (1626.5-1645.5 & 1646.5-1660.5 MHz), the only one that is new is the request for increased co-channel reuse based on use of mobile terminals ("MTs") that have an

⁶ *Systems and Methods for Terrestrial Reuse of Cellular Satellite Frequency Spectrum*, U.S. Patent 6,684,057 B2 (January 27, 2004).

⁷ *MSV ATC Application* at 13 and Appendix B (GSM and CDMA air interface protocols); 13-14 and Appendix C (half-rate vocoders); 17 (increased co-channel reuse based on disproportionate deployment of ATC in the United States); 18 and Appendix H (increased co-channel reuse based on use of MT with average antenna gain of -4 dBi or less); 16-17 and Appendix G (unlimited reuse of non-co-channel frequencies).

⁸ *MSV ATC Application* at 18 and Appendix I (increased co-channel reuse based on intersystem co-channel uplink interference allowance of 6% $\Delta T/T$); 20, 21 and Appendix J (reduced EIRP and PFD limits for base stations); 21 and Appendix K (elimination of dual PFD and distance restrictions on base stations near airport runway/aircraft stand areas); 23 and Appendix M (relaxed base station overhead gain suppression).

average antenna gain of -4 dBi or less when operating in ATC mode. *MSV ATC Application* at 18 and Appendix H. With respect to its operations in what is referred to as the downlink direction (1525-1554 & 1555-1559 MHz), the only new request involves a waiver to increase the aggregate base station EIRP within a 50-mile radius by 4.4 dB. *Id.* at 20 and Appendix J.

The International Bureau placed MSV's ATC application on *Public Notice* on February 9, 2004.⁹ The United States GPS Industry Council ("USGPSIC"), which represents manufacturers and users of GPS equipment, filed in support of MSV's application.¹⁰ USGPSIC commends MSV for proposing to operate its base stations and MTs at out-of-band emission levels even lower than those required by the Commission. *USGPSIC Letter* at 1. USGPSIC notes that the issues raised in MSV's application have been fully briefed in the rulemaking and urges the Commission to grant MSV's application expeditiously in order to "advance the public and national interests in promoting the responsible use of spectrum." *Id.* at 1.

Inmarsat filed the only opposition to MSV's application.¹¹ Inmarsat was formed in 1976 and throughout most of its history was owned largely by foreign government post, telephone, and telegraph ("PTT") administrations. Taking full advantage of its monopoly position in the MSS market, Inmarsat built a fleet of satellites to provide global service. As a result of its historical status as a monopoly and its ties to foreign governments, Inmarsat still has a dominant share of the MSS market. In a recent securities filing, Inmarsat boasts that it is first in market share in the three primary MSS markets (maritime, land, and aeronautical); its revenues in 2002 in the

⁹ *Public Notice*, Report No. SPB-200 (February 9, 2004).

¹⁰ See Letter from Raul Rodriguez, Counsel for USGPSIC, to Ms. Marlene H. Dortch, FCC, File No. SAT-MOD-20031118-00333; File No. SAT-AMD-20031118-00332; File No. SES-MOD-20031118-01879 (March 24, 2004) ("*USGPSIC Letter*").

¹¹ See Opposition of Inmarsat Ventures Ltd., File No. SAT-MOD-20031118-00333; File No. SAT-AMD-20031118-00332; File No. SES-MOD-20031118-01879 (March 25, 2004) ("*Inmarsat Opposition*").

maritime sector were in excess of thirty times those of its nearest competitor; and its revenues in 2002 in the market for high-speed data services to the maritime and land sectors were in excess of fifteen times those of its nearest competitor.¹² MSV has explained in other proceedings how, instead of competing fairly, Inmarsat retains its market share by stifling its competitors' access to spectrum, refusing to license intellectual property on fair terms despite a legal obligation to do so, and steadfastly opposing such efforts to offer a more valuable and ubiquitous service as MSV's ATC initiative.¹³

Inmarsat and MSV each operate in the MSS L-band, sharing roughly 30 MHz of spectrum as part of a five-way agreement with other North American systems. To the extent the United States and Canadian systems are unable to replace their satellites, Inmarsat would benefit by having less competition and more spectrum available for its use.

In its Opposition, Inmarsat argues that the MSV application is incomplete because it fails to make certain required showings. *Inmarsat Opposition* at 12-19. Inmarsat also argues that most of MSV's requested variations from the Commission's baseline should be considered as requests for waivers of the Commission's rules and that MSV has not met the standard for a waiver. *Id.* at 10-12. Inmarsat contends that MSV's application represents a breach of prior promises to the Commission and demonstrates that MSV's ATC operations will harm MSV's own satellite service. *Id.* at 8-9. According to Inmarsat, MSV is now seeking to deploy a primarily terrestrial system. *Id.* at v, 4, 23.

¹² Letter from Alan Auckenthaler, Vice President and General Counsel, Inmarsat Inc., to Ms. Marlene H. Dortch, FCC, File No. SAT-MS-C-20040210-00027 (February 10, 2004) at Attachment B ("*Offering Memorandum*") at 83-84.

¹³ See Comments of MSV, SPB-183 (April 17, 2003) ("*MSV ORBIT Act Comments*"); Reply Comments of MSV, SPB-183 (April 24, 2003) ("*MSV ORBIT Act Reply Comments*"); Supplemental Reply Comments of MSV, SPB-183 (May 23, 2003) ("*MSV ORBIT Act Supplemental Reply Comments*").

Regarding MSV's requests for additional technical flexibility, Inmarsat with few exceptions repeats the identical arguments it raised in opposition to MSV's *Recon Petition*. Attached hereto as Appendix A is a chart summarizing the claims Inmarsat makes and how MSV has already responded. The only new technical arguments Inmarsat makes are with respect to MSV's requests (i) for increased co-channel reuse based on the use of MTs with an average antenna gain of -4 dBi or less (*Inmarsat Opposition* at 26-28); (ii) to increase the aggregate base station EIRP within a 50-mile radius by 4.4 dB (*id.* at 51-52); and (iii) to relax the overhead gain suppression of L-band base stations (*id.* at 57-60). Inmarsat also challenges MSV's proposed use of interference cancellation techniques. *Id.* at 32-35.¹⁴

Discussion

I. MSV'S APPLICATION IS RIPE FOR GRANT

A. MSV's Application Complies with the Commission's Rules

1. The Application Is Complete

The deficiencies Inmarsat purports to cite in MSV's application are not deficiencies at all, but rather common sense approaches to making the showings required by the rules.¹⁵

¹⁴ Inmarsat does not object to MSV's proposal for correlating GSM and CDMA air interface protocols, its demonstration that it complies with the "integrated service" gating requirement, and its request for waiver of the on-ground spare requirement. Boeing, a 2 GHz MSS licensee, has supported MSV's request for waiver of the on-ground spare requirement. *See* Reply of The Boeing Company, IB Docket No. 01-185 (March 16, 2004), at 5 n.5 ("In light of the fact that an in-orbit spare can be brought into service much faster than a ground spare, MSV's proposal satisfies the intent of the Commission's rule.").

¹⁵ Inmarsat is also wrong that recent decisions of the International Bureau dismissing applications that were filed under first-come, first-served processing would be applicable to the processing of MSV's application. *Inmarsat Opposition* at 13-14. First-come, first-served processing applies only to an application for a new GSO satellite, an application to relocate a GSO satellite, or an application to add frequencies to a proposed GSO satellite. *See* 47 C.F.R. §§ 25.158, 25.117(d); *Space Station Licensing Rules and Policies, First Report and Order and Further Notice of Proposed Rulemaking*, 18 FCC Rcd 10760 (May 19, 2003) ("*SSLR Order*"), at ¶¶ 108-150. The Commission has explained that completeness is essential in such a licensing regime in order to deter speculative applicants who file merely to claim "first-in-line" status.

Contrary to Inmarsat's claims, MSV also has provided an appropriate showing that the cellular structure of its ATC network design will include 18 dB of link margin allocated to structural attenuation. *Inmarsat Opposition* at 15-17, 35-39.¹⁶ The rules provide that an ATC applicant can demonstrate compliance with this requirement through "certification or explanatory technical exhibit." 47 C.F.R. § 25.149(d). MSV has certified that it will comply with the 18 dB structural attenuation requirement and has explained in an exhibit how it will comply; thus, no further showing is required. Once MSV has completed the design phase for its ATC network, MSV will certify the structural attenuation that characterizes its base stations.

Inmarsat challenges MSV's plans to deploy terrestrial facilities in locations where there may be less than 18 dB of structural attenuation. *Inmarsat Opposition* at 16. The Commission's rules, however, clearly provide for some base stations needing to be deployed in such locations. The rules permit such deployments as long as there is a corresponding reduction in the number of base stations the licensee deploys. 47 C.F.R. § 25.253(a)(8). MSV recognizes this requirement and, of course, will abide by it.

SSLR Order ¶ 244. First-come, first-served processing does not apply to MSV's ATC application both because it is not an application for a new or modified GSO satellite and because it is considered to be an application for a minor modification. 47 C.F.R. § 25.117(f). Moreover, even assuming that the Commission has adopted some heightened standard for completeness for satellite applications (which it has confirmed that it has not (*see SSLR Order* ¶ 244)), the Bureau conducted an extensive review of MSV's ATC application over a three-month period and has already requested the further clarifications it considered necessary to deem the application complete. *See* E-mail from Breck Blalock, FCC, to Bruce D. Jacobs, Counsel for MSV, File No. SAT-MOD-20031118-00333, File No. SAT-AMD-20031118-00332, File No. SES-MOD-20031118-01879 (December 16, 2003); Letter from Thomas S. Tycz, FCC, to Bruce D. Jacobs, Counsel for MSV, File No. SAT-MOD-20031118-00333; File No. SAT-AMD-20031118-00332; File No. SES-MOD-20031118-01879 (January 21, 2004).

¹⁶ Inmarsat claims incorrectly that MSV has requested a waiver of the requirement for 18 dB of structural attenuation. *Inmarsat Opposition* at 39. MSV has certified that it will comply with this requirement or reduce the maximum number of base stations, as provided for in the rules. *MSV ATC Application* at 15-16. No waiver is needed.

Inmarsat also makes an odd claim that MSV has not demonstrated how mobile terminals operating in CDMA mode will avoid transmitting on open time slots. *Inmarsat Opposition* at 18-19. While such a requirement makes sense for a mobile terminal operating in GSM mode, it makes no sense when a mobile terminal is operating in CDMA mode, because there are no open time slots in CDMA.¹⁷ The key factor from an uplink interference perspective is that the mobile terminal will use a half-rate vocoder when operating within 3.5 dB of maximum power, regardless of whether transmissions are based on GSM or CDMA protocols. This will produce the same benefit in interference reduction of at least 3.5 dB, regardless of the modulation or multiple access scheme being used.

The fact that CDMA protocols use channels defined by spreading codes rather than channels defined by time slots, as GSM uses, has no impact on MSV's ability to comply with the Commission's rules limiting terrestrial frequency reuse. As MSV explained in Appendix B of its application (and Inmarsat has not challenged), the restrictions the Commission established for the GSM baseline translate easily into restrictions on a CDMA deployment. That is, for a terrestrial deployment that is entirely GSM, the maximum number of on-the-air active channels or time slots operating on a given set of frequencies is eight times the amount of reuse the rules permit; for a pure cdma2000 terrestrial deployment, the maximum number of on-the-air active channels or codes operating a given set of frequencies is fifty times the specified amount of reuse; and for a pure W-CDMA deployment, the maximum on-the-air active channels or codes operating a given set of frequencies is two hundred times the specified amount of reuse. If the deployment is based on a mix of all three technologies, the formula presented in MSV's

¹⁷ For this reason, it is unnecessary for MSV to request a waiver of Section 25.253(a)(3) of the rules which requires ATC MTs to be precluded from using open time slots. 47 C.F.R. § 25.253(a)(3).

application (Appendix B) will be used to insure that MSV's deployment will not exceed the reuse limits permitted by the Commission's rules. Thus, regardless of whether MSV uses GSM or CDMA, or some combination of GSM and CDMA, it will use a half-rate vocoder to reduce interference potential by at least 3.5 dB and will conform to the reuse limitations of the Commission's rules.¹⁸

2. The Application Justifies Grant of its Waiver Requests

The Application amply demonstrates that grant of its waivers will serve the public interest and that there exist unique or special circumstances justifying such action. MSV's application explains in great detail how its waiver requests will result in more efficient use of spectrum, better service to the public, and increased utility of MSS, while not resulting in any more potential interference to other L-band operators or to MSV's own system than that established in the *ATC Order*. See *supra* note 8.¹⁹ The technical restrictions imposed on ATC in

¹⁸ Inmarsat also claims that MSV has failed to specify a peak mobile terminal EIRP. *Inmarsat Opposition* at 14-15. This issue is discussed more fully in Section II, below. To the extent that Inmarsat is suggesting that MSV should be required to make a showing now with respect to terminals that have not yet been built, MSV has done all that any applicant can do at this stage. If the Commission chooses, MSV is fully prepared to provide a prototype ATC terminal to the Commission as soon as one is available to validate its output power.

¹⁹ Grant of a waiver here is fully consistent with prior decisions in which the Commission has waived its rules to allow for an innovative new service that would promote spectrum efficiency while not causing harmful interference to other spectrum users. See *Space Data Corporation*, 16 FCC Rcd 16421 (September 12, 2001) (waiving narrowband PCS rules to enable terrestrial wireless licensee to operate paging repeaters from a network of high-altitude balloons); *Order*, FCC 00-029 (July 14, 2000) (upholding decision of the Office of Engineering and Technology to waive Part 15 of the Commission's rules to allow marketing of ultra-wideband (UWB) devices after finding that no harmful interference would result to GPS or other services); *Aircell Inc.*, *Order*, 14 FCC Rcd 806 (December 1998) (granting Aircell a waiver of Part 22 of the Commission's rules to provide an airborne cellular service based on unique Aircell-developed technology because the public interest benefits, including enhancement of navigational safety, outweighed the minimal risk of harmful interference to terrestrial cellular services); *Interactive Video and Data Service (IVDS) Transmitter Power Limits*, *Order*, 11 FCC Rcd 4669 (April 18, 1996) (granting waiver of Part 95 of the Commission's rules to allow certain IVDS cell transmitter station (CTS) antennas to operate at a power level above that permitted by the rules

the L-band are themselves unique because they were adopted based solely on MSV's proposals and imposed solely on MSV. Moreover, it is unlikely that any entity other than MSV will apply for ATC in the L-band.²⁰ In other words, there are no similarly situated parties that will benefit from grant of MSV's waiver requests and thus the Commission need not be concerned with a flood of similar waiver requests.

In this case, the issues raised in MSV's application have already been fully vetted on reconsideration of the *ATC Order*. Moreover, Inmarsat, the only entity potentially impacted by MSV's requests for revisions in the Commission's L-band technical policies, received adequate notice of the proposals in MSV's application, as witnessed by its lengthy opposition. Under these circumstances, if the Commission were to adjust its L-band technical policies in granting this application, there is no potential for prejudice to other parties.²¹

after finding that no harmful interference would be caused provided a certain CTS antenna technology would be deployed).

²⁰ Inmarsat has stated that it does not intend to deploy ATC. See *Reply of Inmarsat*, IB Docket No. 01-185 (September 2, 2003), at 6 ("As Inmarsat has stated in the past, it has no plans to provide an ATC service."). And, aside from the parties to this application (MSV and MSV Canada), the other North American L-band operators do not provide MSS in the United States today, and have not expressed an interest in deploying ATC.

²¹ The Commission has ample discretion to proceed by either adjudication or rulemaking. See *SEC v. Chenery Corp.*, 332 U.S. 194, 201-03 (1947). Moreover, the Commission has authority to announce new or change existing policies in an adjudicative proceeding, See *NLRB v. Bell Aerospace Co.*, 416 U.S. 267, 294 (1974) (noting that an agency "is not precluded from announcing new principles in an adjudicative proceeding"); see also *Vanhu, Inc.*, 65 FCC 2d 986, ¶ 10 (1977) ("We believe that the Commission has authority to change its policies by adjudication, as well as by rulemaking."). The Commission has stated that rulemakings are appropriate when it adopts or changes industry-wide policies with far-reaching implications. See, e.g., *Second Report and Order*, 17 FCC Rcd 9614, ¶ 218 (May 23, 2002). In this case, however, the entities impacted are actively participating in this adjudicative proceeding and thus there would be no prejudice to any entity by adopting revised L-band technical policies in this adjudicative proceeding rather than in a rulemaking or through waiver of the Commission's existing rules.

Inmarsat is wrong when it claims that MSV's requests to vary from the assumptions used in the Commission's baseline interference analysis should be considered as requests for waivers of the rules. *Inmarsat Opposition* at 11. The *ATC Order* provides L-band ATC applicants the flexibility to deviate from the baseline system used to develop its rules, without a waiver request, provided a showing is made that the variation will cause no increase in interference beyond that permitted in the rules. *ATC Order* ¶ 147; *see also* Note to 47 C.F.R. § 25.253. MSV provided such a showing with respect to each of its requests.²² In any event, to the extent necessary, MSV has also requested formal waivers for these variations. *See MSV ATC Application* at 16 n.27.

B. The Application Reflects the Kind of Continued Innovation the Commission Encourages

Inmarsat is wrong when it claims that MSV's application breaks promises made to the Commission. *Inmarsat Opposition* at 8-9. As MSV has explained on reconsideration of the *ATC Order*, what Inmarsat claims were promises were technical proposals that reflected MSV's best thinking at the time.²³ As the Commission has repeatedly recognized, technology is not frozen in time.²⁴ During the past two years, MSV has continued to invest millions of dollars in

²² Specifically, MSV made the following showings for each of its variations from the baseline: (i) to increase co-channel reuse in the United States based on 80 percent deployment of ATC in the United States (*MSV ATC Application* at 17); (ii) to increase co-channel reuse based on use of MTs with an average EIRP of -4 dBW (*id.* at 18 and Appendix H); (iii) for unlimited reuse of frequencies that it does not share co-channel with other L-band operators (*id.* at 16-17 and Appendix G); and (iv) for use of half-rate rather than quarter-rate vocoders (*id.* at 13-14 and Appendix C).

²³ *MSV ATC Reply* at 5 n.9 (noting that MSV's indication that it would protect Inmarsat to a level of 1% ΔT/T was based on one illustrative system design that was proposed before MSV fully developed its self-interference mitigation techniques that allow MSV to increase terrestrial reuse while limiting self-interference to an acceptable level); *id.* at 8 n.15 (noting that MSV's initial proposal regarding base station overhead gain suppression relied on statements by CSS Antenna, Inc. which were made before the Commission required L-band ATC base stations to use left-hand circular polarization ("LHCP")).

²⁴ *The Establishment of Policies and Service Rules for the Non-Geostationary Satellite Orbit, Fixed Satellite Service in the Ka-Band, Report and Order*, FCC 03-137, 29 CR 998, ¶ 25 (July 9,

researching and developing ways to increase efficient use of L-band spectrum without increasing interference to its own satellite or other spectrum users. MSV's modifications to its previous technical proposals would increase efficient use of spectrum and offer improved service to the public without increasing interference to others or to MSV. The Commission should encourage such innovation and commitment to enhanced use of spectrum. Inmarsat, which has enjoyed legal monopoly status throughout much of its history and which still dominates the MSS market, does not have the same incentive to increase spectrum efficiency or offer the improvements in coverage that ATC makes possible--indeed, Inmarsat has an incentive to block MSV in order to take over MSV's spectrum.

Inmarsat is also wrong when it claims that MSV is turning the *ATC* Order on its head and is now proposing to deploy a primarily terrestrial system with only an ancillary satellite component. *Inmarsat Opposition* at v, 4, 23. As an initial matter, the Commission has already carefully crafted gating factors to ensure the ATC will remain ancillary and secondary to MSS. MSV has demonstrated that it complies with these gating factors.²⁵ Moreover, the facts are that MSV's terrestrial component will be secondary to MSS from both an interference and policy perspective. From an interference perspective (as discussed more fully in Section II below),

2003) ("Commission policy has generally been to allow satellite licensees to modify their systems as they deem necessary to meet changes in technology or market demands."); *Sirius Satellite Radio Inc., Order and Authorization*, 16 FCC Rcd 5419 (Int'l Bur., March 9, 2001) ("Because of the long lead time needed to construct satellites and implement service, the Commission often receives requests from licensees to modify the technical designs of their satellite systems during construction and implementation. In recognition of the several years required to construct a satellite or a constellation of satellites, the rapidly changing technology, and our goal of encouraging more efficient use of the radio spectrum, it is the Commission's policy to permit licensees to modify satellite systems, when possible, to make design improvements.").

²⁵ 2 GHz and Big LEO licensees are authorized to deploy an unlimited number of base stations, yet Inmarsat has never claimed that ATC in these bands will be anything other than secondary to MSS.

MSV will be able to operate its terrestrial component without taking capacity from its satellite operations. Such an impact can only be considered secondary. From a policy perspective, MSV's new satellite terminals will be a major improvement in MSS user equipment. While current L-band equipment is large, cumbersome, and expensive, MSV's next generation satellite terminals will be small, lightweight, and inexpensive, similar to existing cellular and PCS terminals. The next-generation satellites will offer far more capacity and will be approximately 100 times more powerful than their current-generation satellites. These advances are made possible by the improved value of the service that comes with its terrestrial component. Far from undermining MSS, the terrestrial component is critical to the financing of MSV's replacement satellites and will produce a major improvement in the utility of MSS.

II. THE TERRESTRIAL COMPONENT WILL NOT CAUSE HARMFUL INTERFERENCE TO MSV'S OWN SATELLITE OPERATIONS OR THOSE OF OTHER SYSTEMS, INCLUDING INMARSAT

A. The Vast Majority of the Technical Arguments Inmarsat Makes in Its Opposition Are Ones It Has Already Made in the Rulemaking

As demonstrated by Appendix A, the length of Inmarsat's *Opposition* belies any technical substance. Inmarsat's repeated assertions that MSV's ATC operations will cause harmful interference are just that—repeated assertions. With only a few exceptions discussed immediately below, MSV has already responded to Inmarsat's concerns. Rather than continue the debate endlessly, MSV is prepared to rest on the record that has already been established concerning these issues.

B. Inmarsat's New Arguments Do Not Demonstrate That MSV's System Would Cause Harmful Interference

1. The Commission's Interference Analysis Should Account for MSV's Use of Mobile Terminals with an Average Antenna Gain of -4dBi

Inmarsat argues that the Commission should not increase MSV's permitted co-channel reuse based on its use of mobile terminals with an average antenna gain of -4 dBi or less because, according to Inmarsat, (i) MSV is proposing the same MT antenna design which it previously presented to the Commission and upon which the Commission relied in its interference analysis (*Inmarsat Opposition* at 26-27); (ii) it is peak, not average, MT EIRP that is relevant under the Commission's uplink interference analysis (*id.* at 26-27); (iii) the antenna patterns supplied by MSV for the external stubby antenna are inaccurate (*id.* at 26, n.81); and (iv) MSV's statistical analysis does not account for head blockage and is therefore inaccurate (*id.* at 27, n. 82).

As an initial matter, the relevant parameter to any interference analysis is the EIRP potential of a device. EIRP is a directional parameter that depends on both the power that is delivered to the input port of a radiating element and the gain of the radiating element in a specific direction. The EIRP of a GSM terminal may, for example, be +1 or even +2 dBW in some specific direction and -8 or -11 dBW in some other specific direction. However, the total power being radiated by the GSM terminal, over all directions, cannot exceed 1 Watt (0 dBW) if 1 Watt (0 dBW) is being provided to the terminal's antenna input port. In the interference analysis that is incorporated into the *ATC Order*, the Commission assumes a theoretical 0 dBi isotropic antenna for the ATC terminal and, therefore, 0 dBW EIRP in every direction (based on the GSM terminal's power amplifier providing 1 Watt of peak power to the terminal's antenna input port). *See ATC Order*, Appendix C2, Tables 1.14.A, 2.1.1.A, and 2.1.1.C.

Both the Commission in its baseline case, using an ideal isotropic 0 dBi terminal antenna, and MSV in its current ATC application using measured antenna patterns of PCS terminals, use the term “peak” to describe the capability of the ATC terminal’s power amplifier to deliver power to the terminal’s antenna input port. *ATC Order*, Appendix C2, Table 1.14.A. As MSV has demonstrated, its mobile terminal EIRP in the direction of an Inmarsat satellite will **spatially-average** a peak value of no greater than -4 dBW for GSM ATC, and -13 dBW for CDMA ATC. Using spatial averaging to determine the effective peak EIRP is appropriate given the relatively large number of ATC mobile terminals, the essentially random orientation of each one, and the non-isotropic antenna pattern that these terminals will have, as MSV demonstrates in its current ATC application. This is clearly different from the 0 dBW that MSV proposed in its original application and the Commission used in its baseline analysis.

Inmarsat’s contention that the antenna patterns presented by MSV are merely theoretical is completely misplaced. As MSV stated in its application, the antenna patterns are real patterns derived from measurements conducted in an anechoic chamber by Ericsson of production-line GSM PCS terminals. *MSV ATC Application* at Appendix H. The measured patterns provide an accurate representation of what is typical and MSV has no reason to deviate from what is typical in cellular and PCS. In any event, as MSV has stated previously, L-band prototype ATC terminals will be measured and MSV will provide the measurements to the Commission to prove compliance with the -4dBi spatially-averaged antenna gain characteristic in the direction of a satellite.

Inmarsat’s claim that the radiation pattern is unreliable because it does not account for the effect of head blockage is also misplaced. As the Commission recognized in its interference analysis, it is conservative to assume no effect from body absorption. *See ATC Order*, Appendix

C2, Section 1.3.4, citing Toftgaard, J., IEEE Transactions on Antennas and Propagation, “*Effects on Portable Antennas of the Presence of a Person*,” Vol. 41, No. 6, (June 1993). It would be more reasonable to assume that as much as half of the power (*i.e.*, -3 dB) will be absorbed by the user’s body. *Id.* Moreover, the human body in proximity to a radiating element will generally alter the radiation pattern of the radiating element by reducing it in all directions. This effect is due to the impedance mismatch that the characteristics of the human body impose on the terminal’s antenna sub-system. There is no evidence, presented by Inmarsat or otherwise, indicating that the power transmitted in any direction will be increased by the terminal’s proximity to the user.

2. Inmarsat Falsely Criticizes MSV’s Interference Cancellation Techniques

Inmarsat challenges MSV’s self-interference mitigation techniques, claiming that they are not workable and will reduce the capacity of MSV’s own satellite system. These claims show a fundamental misunderstanding of the techniques and MSV’s proposal for using them. Indeed, the interference cancellation techniques are valuable for MSV’s satellite service regardless of ATC, boosting MSV’s return-link margin by as much as 3 dB for users operating at or near the edge of a satellite beam.

Contrary to Inmarsat’s claim, MSV will be able to deploy its interference cancellation technology without any reduction in its capacity to provide satellite service or any significant added cost.²⁶ The only impact is to require MSV to employ greater reuse of its feederlink frequencies than it would otherwise. MSV will accomplish this by deploying additional gateway

²⁶ Inmarsat also seems to have the mistaken impression that MSV intends to use its interference cancellation techniques in connection with the operation of the current satellites of MSV and MSV Canada. *Inmarsat Opposition* at 34. The current satellites of MSV and MSV Canada, with their relatively low gain antennas, are much less susceptible to interference than their new satellites with their higher gain antennas, so no interference cancellation is required initially.

earth stations at a relatively modest additional cost. The actual interference cancellers that will be embedded in the baseband portion of MSV's gateway receiver equipment are small and inexpensive, since they are implemented routinely as an integrated circuit on a silicon chip.

Inmarsat's complaints that MSV's use of interference cancellation techniques will not protect Inmarsat from interference are particularly odd, since MSV's application does not contend otherwise. *Inmarsat Opposition* at 32-33. If Inmarsat is interested in using similar techniques, however, MSV is willing to commit to licensing its related intellectual property to Inmarsat.

3. Inmarsat Has Failed to Refute MSV's Showing Regarding Aggregate Base Station EIRP Within a 50-Mile Radius

Inmarsat's opposition to MSV's request to increase the aggregate EIRP from L-band ATC base stations within a 50-mile radius is new, but like all the others, it lacks merit. *Inmarsat Opposition* at 51-52. Inmarsat's claim is based in part on the mistaken impression that the Commission has underestimated the sensitivity of Inmarsat airborne METs to overload. *Id.* In fact, the Commission reasonably relied on the ARINC specification to assign an overload threshold of -50 dBm to Inmarsat airborne METs.²⁷ Inmarsat claims that it can find no justification in MSV's application for increasing the aggregate EIRP of L-band base stations within a 50-mile radius by 4.4 dB, but it completely overlooked Exhibit J of MSV's application. *See MSV ATC Application* at Appendix J (pages 2-3). In Exhibit J, MSV explained that a 4.4 dB

²⁷ *See ATC Order* ¶ 151, Appendix C1 § 1.2.4, Appendix C2 §§ 1.12 and 2.2.3. Inmarsat is mistaken when it states that the Commission assigned an overload threshold of -60 dBm rather than -50 dBm to its airborne METs. *Inmarsat Opposition* at 51. To the extent Inmarsat is relying on the letter from Honeywell to support an overload threshold of -72 dBm for its airborne METs, MSV has previously explained that this letter is misleading and irrelevant because it refers to a section of an RTCA specification that applies only to continuous wave ("CW") interference; whereas MSV's ATC base stations will radiate modulated spread-spectrum (noise-like) carriers, not CW signals. *MSV Recon. Opposition* at 9-11 & Appendix B.

increase was justified because at the aggregate EIRP limit specified by the Commission, Inmarsat's airborne METs would have 10.4 dB of margin against overload, which is 4.4 dB higher than the 6 dB safety-of-life margin required in ITU and RTCA specifications. *Id.*²⁸ Finally, Inmarsat states that an aggregate EIRP limit should assume no blockage exists with respect to any ATC base stations. *Inmarsat Opposition* at 52. The analysis MSV submitted with its application is consistent with this, in that it assumes no such blockage.

4. Inmarsat's Critique of MSV's Request for a Waiver of the Overhead Gain Suppression Limit Fails to Account for the Nominal Impact of the Waiver

Inmarsat argues that the relaxation in overhead gain suppression requested by MSV would result in overload at much higher altitude. *Inmarsat Opposition* at 59-60. Inmarsat's analysis, however, assumes an airborne MET overload threshold of -75 dBm, not the -50 dBm in ARINC's specification and the Commission's analysis, and fails to account for the evidence MSV has presented that the grant of its waiver will result in no more than a 0.03 dB increase in potential interference. *MSV ATC Application* at Appendix L.

²⁸ To the extent Inmarsat objects to this analysis in its Reply to this Response, it must be dismissed as a late-filed Opposition. Moreover, it would be unfair for Inmarsat to object for the first time in its Reply. See *Application of Bellsouth Corporation, Memorandum Opinion and Order*, 13 FCC Rcd 539, ¶ 135 (December 24, 1997) ("We find that BellSouth's submission of information . . . in its reply comments to be procedurally and substantively inadequate. . . . BellSouth's presentation of new evidence on reply does not provide commenters a fair opportunity for review.").

Conclusion

For the reasons stated above, MSV requests that the Commission act consistently with the views expressed herein.

Respectfully submitted,



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Appendix A

Summary of Inmarsat's Repeated Arguments and MSV's Previous Responses

The following chart summarizes each of the issues, followed by Inmarsat's opposition (below left) and MSV's reply (below right).

1. Increased co-channel reuse based on disproportionate deployment in the United States	
MSV should be permitted to increase co-channel reuse in the United States proportionally if it deploys 80% of its ATC facilities in the United States, instead of the 50% U.S. deployment contemplated by the <i>ATC Order</i> . <i>MSV Petition for Recon</i> at 6; <i>MSV ATC Application</i> at 17.	
(a) The FCC has no authority to enforce a limit outside of the U.S. <i>Inmarsat Opposition to MSV Recon Petition</i> at 7-8; <i>Inmarsat Opposition to MSV ATC App.</i> at 24-25.	(a) The FCC can condition MSV's license on not exceeding the system-wide interference allowance. MSV will be able to account for ATC operations on frequencies it uses both inside and outside the United States. <i>MSV Reply to Inmarsat Recon. Opposition</i> at 6.
(b) The FCC needs to allow margin for other administrations that may authorize ATC. <i>Inmarsat Opposition to MSV Recon Petition</i> at 8; <i>Inmarsat Opposition to MSV ATC App.</i> at 25.	(b) Imposing a condition on MSV's license will be sufficient. <i>MSV Reply to Inmarsat Recon. Opposition</i> at 6.
(c) Disproportionate deployment of ATC in U.S. will result in higher densities of MTs than envisioned by the FCC, resulting in greater uplink interference to Inmarsat and MSV. <i>Inmarsat Opposition to MSV Recon Petition</i> at 7; <i>Inmarsat Opposition to MSV ATC App.</i> at 25.	(c) ATC operations will have the same impact on Inmarsat regardless of whether the frequency reuse is in the United States or elsewhere in North America. MSV will use interference cancellation techniques to maintain non-harmful intrasystem interference levels. <i>MSV Reply to Inmarsat Recon. Opposition</i> at 6 & Technical Appendix.

2. System-wide co-channel uplink interference allowance of 6% ΔT/T

The appropriate threshold for potential co-channel uplink interference should be 6% ΔT/T instead of the 1.4% ΔT/T set in the *ATC Order*. The proposed threshold will contribute a negligible 0.17 dB of link margin loss to Inmarsat; there is ample record evidence that 6% ΔT/T is internationally accepted and a greater amount of interference is presently accepted by Inmarsat; and a lesser intersystem interference allowance is not necessary to protect MSV from intrasystem interference due to MSV's self-interference mitigation techniques. *MSV Petition for Recon.* at 9-14 & Appendix A; *MSV Reply to Inmarsat Recon. Opposition* at 3-5 & Technical Appendix; *MSV Nov. 3 ex parte* at 3; *MSV ATC Application* at Appendix F, I.

(a) 1% ΔT/T is a reasonable accommodation for a non-conforming use. *Inmarsat Opposition to MSV Recon Petition* at 9; *Inmarsat Opposition to MSV ATC App.* at 29-30.

(b) If interference from ATC (a secondary service) approaches the level of interference from the satellite, ATC could not be ignored in satellite coordination. *Inmarsat Opposition to MSV Recon Petition* at 11; *Inmarsat Opposition to MSV ATC App.* at 30.

(c) Allowing ATC MTs to impact Inmarsat to 6% ΔT/T would consume 25% of Inmarsat's total interference budget. *Inmarsat Opposition to MSV Recon Petition* at 10; *Inmarsat Opposition to MSV ATC App.* at 31,

(d) If Canada or Mexico were to allow a similar ATC regime, even more of Inmarsat's total interference budget would have to be designated for ATC coordination. *Inmarsat Opposition to MSV Recon Petition* at 10; *Inmarsat Opposition to MSV ATC App.* at 31.

(a) There is no technically defensible reason to protect Inmarsat-4 satellites to a level of 1.4% ΔT/T or less. *MSV Reply to Inmarsat Recon. Opposition* at 5; *MSV Nov. 3 ex parte* at 3.

(b) ATC operations will have much less potential impact to Inmarsat than MSV's present satellite operations. MSV's next generation system will reduce in the aggregate the potential of interference to Inmarsat-4 satellites by approximately two orders of magnitude. *MSV Petition for Recon.* at 12-13 & Appendix A; *MSV Reply to Inmarsat Recon. Opposition* at 5; *MSV ATC Application* at Appendix I.

(c) ATC MTs impacting Inmarsat-4 satellite receivers at a level of 6% ΔT/T will contribute a negligible 0.17 dB of link margin loss to Inmarsat. Inmarsat has not refuted this. Inmarsat should be able to accommodate this impact in the 1 dB it claims to allocate for all intersystem interference sources. *MSV Reply to Inmarsat Recon. Opposition* at 5.

(d) The same frequencies are not reused by any other North American MSS systems. *MSV Reply to Inmarsat Recon. Opposition* at 6.

3. Unlimited reuse of non-co-channel frequencies

MSV's ATC facilities should be permitted unlimited reuse of frequencies that are not co-channel to frequencies used by Inmarsat satellites, since such use cannot cause harmful interference to Inmarsat satellites. The FCC did not impose co-channel interference limits on 2 GHz or Big LEO ATC operators because there is not expected to be any co-channel sharing. *MSV Opposition to Inmarsat Recon Petition* at n.13; *MSV Reply to Inmarsat Recon. Opposition* at 4, 5; *MSV Nov. 3 ex parte* at 3; *MSV ATC Application* at 16-17 and Appendix G.

(a) Unlimited non-co-channel reuse would result in increased self-interference to MSV. *Inmarsat Opposition to MSV ATC App.* at 42.

(b) L-band frequency assignments are not static. *Inmarsat Reply to MSV Recon. Opposition* at 8-9; *Inmarsat Opposition to MSV ATC App.* at 42.

(a) MSV will use interference cancellation techniques to maintain non-harmful intrasystem interference levels. *MSV Reply to Inmarsat Recon Opposition* at 6; *MSV ATC Application* at 16-17 & Appendix F.

(b) To the extent the assignment of L-band frequencies remains dynamic, MSV is willing to assume the risk that a portion of its non-co-channel frequencies with Inmarsat may become co-channel in the future and thus become subject to co-channel restrictions. *MSV Opposition to Inmarsat Recon Petition* at n.13.

4. Peak Traffic Limit

The limit of 90,000 MTs peak traffic can be lifted without affecting potential interference to Inmarsat. *MSV Opposition to Inmarsat Recon Petition* at 8-9; *MSV ATC Application* at 24-25.

The maximum peak traffic limit on MTs is integrally related to the 1725 reuse limitation. *Inmarsat Petition for Recon* at 12-13; *Inmarsat Opposition to MSV ATC App.* at 43.

The *ATC Order* states that the peak traffic limit was adopted to protect Inmarsat from adjacent channel interference. But the aggregate adjacent channel emissions from 90,000 fully-loaded ATC carriers operating at the out-of-channel emission limit adopted in the *ATC Order* will impact Inmarsat's current and next-generation satellites to a level of only 0.001% $\Delta T/T$. *MSV Opposition to Inmarsat Recon Petition* at 8-9; *MSV ATC Application* at 24-25.

5. Half-Rate Vocoder

The FCC should attribute a 3.5 dB reduction in interference potential to the use of a half-rate vocoder. *MSV Petition for Recon.* at 14 & Appendix B; *MSV Reply to Inmarsat Recon. Opposition* at 5 & Technical Annex at § 3; *MSV ATC Application* at 13-15 & Appendix C.

(a) MSV's analysis ignores the clear requirement for an effective EIRP limit of -7.4 dBW. *Inmarsat Opposition to MSV ATC App.* at 39.

(b) If a half-rate vocoder is analyzed using the Vogel user distribution pattern, the average reduction in uplink interference will be less than the 3.5 dB assumed by the FCC. *Inmarsat Opposition to MSV ATC App.* at 40.

(a) The rules do not contain any requirement for an effective EIRP limit of -7.4 dBW. The only requirement on interference reduction level due to the use of a lower (than full-rate) vocoder is 3.5 dB. MSV has shown that 3.5 dB reduction of co-channel interference potential is attained from the use of a half-rate 4.75 kbps vocoder. *MSV Petition for Recon.* at 14 & Appendix B; *MSV Reply to Inmarsat Recon. Opposition* at 5 & Technical Annex at § 3; *MSV ATC Application* at 13-15 & Appendix C.

(b) The distribution of users (whether users are outdoors, in-buildings, in-vehicles, near the base station, at the edge of the base station service area, etc.) is irrelevant. Nowhere in the FCC's uplink interference analysis is the distribution of users a relevant consideration. The key parameter (among others) is the peak EIRP of the terminal. The half-rate vocoder in effect guarantees that no terminal can ever radiate more than -3.5 dBW (in equivalent full-rate peak EIRP) even though terminals are (per the FCC's analysis) capable of outputting 0 dBW peak EIRP. *MSV Petition for Recon.* at Appendix B; *MSV Reply to Inmarsat Recon. Opposition*, Technical Appendix at § 3.

6. Increased Base Station EIRP and PFD Limits

The EIRP and PFD limits on MSV’s base stations should be based on data showing that Inmarsat’s maritime and land-based METs are not susceptible to overload at less than -45 dBm. MSV’s testing confirms that the overload threshold for Inmarsat land-based and maritime Inmarsat METs is -43 dBm. *MSV Petition for Recon* at 16-17 & Appendix C; *MSV ATC Application* at Appendix J. Modifying the FCC’s analysis to specify an overload threshold of -45 dBm increases the overload margin by 15 dB, thereby allowing the FCC to increase base station EIRP and PFD limits by 15 dB without increasing the potential for overload interference to Inmarsat user terminals. *MSV Petition for Recon* at 16-17 & Appendix C; *MSV Opposition to Inmarsat Recon. Petition* at 9-11 & Appendix B; *MSV ATC Application* at 20 & Appendix J.

The FCC should impose receiver standards on Inmarsat METs given their alleged unreasonable susceptibility to interference and their preemptive effect on efficient sharing of L-band spectrum. *MSV Petition for Recon* at n.23. METs used with MSV’s system are much more resilient to interference, with an overload threshold of approximately -30 dBm. *MSV Opposition to Inmarsat Recon. Petition* at n.16. The FCC should not restrict flexibility by protecting receivers that are poorly designed for interference immunity. *MSV Nov. 3 ex parte* at 4.

In adopting EIRP and PFD limits for L-band base stations, the FCC must consider that there are relatively few Inmarsat receivers operating in the United States today and only a fraction (if any) of these receivers can be expected to operate in areas where ATC base stations will be located. *MSV Nov. 3 ex parte* at 4-5.

(a) Testing conducted by NERA and a letter supplied by Honeywell confirm an overload threshold of -75 dBm. *Inmarsat Petition for Recon.* at 15-17 & Exhibits A, B; *Inmarsat Reply to MSV Recon. Opposition* at 9-10 & Exhibits A, B; *Inmarsat Opposition to MSV ATC App.* at 47-48 & Appendices B, C. The EIRP and PFD limits for L-band base stations should thus be reduced, not increased, by 15 dB. *Inmarsat Petition for Recon.* at 15-17; *Inmarsat Opposition to MSV ATC App.* at 51, 52, 55, 57.

(a) The NERA testing is flawed and grossly misleading because much of the data relates to interference from adjacent channel emissions, which is irrelevant to the issue of overload interference. NERA used GMSK modulation which is known for its very gradual spectral roll-off. MSV will use (GSM compatible) linear QPSK modulation which has much sharper spectral roll-off. The Honeywell letter is misleading and irrelevant because it refers to a section of an RTCA specification that applies only to continuous wave (“CW”) interference; but MSV’s ATC base stations will radiate modulated spread-spectrum (noise-like) carriers, not CW signals. If the distinction between CW and other signals was not relevant, the RTCA specification would not have made such a distinction. *MSV Opposition to Inmarsat Recon Petition* at 9-11 & Appendix B.

(b) MSV's testing is invalid because it only measures the 1 dB compression point of Inmarsat METs. It ignores inter-modulation interference. MSV has not tested the entire receiver chain. *Inmarsat Opposition to MSV Recon Petition* at 15-16 & Technical Annex; *Inmarsat Opposition to MSV ATC App.* at 48-51.

(b) In November 2001, MSV submitted the results from testing the entire receiver chain of an Inmarsat MET. These tests entailed subjectively determining the onset of degradation in the received speech of an Inmarsat Mini-M MET as a function of interfering signal level. Both this subjective testing and the objective testing of the 1 dB compression point concluded that the worst-case overload threshold for an Inmarsat MET can be set conservatively at -45 dBm. *MSV Reply to Inmarsat Recon Opposition* at 7-8 & Technical Appendix, § 3.

7. Dual PFD and Distance Restrictions for Base Stations Near Airport Runways/Aircraft Stand Areas

It is not necessary to impose both a PFD limit and a separation distance restriction on base stations near airport runways/aircraft stand areas. Allowing L-band base stations to meet either a PFD limit or a separation distance will not increase the potential for interference to Inmarsat METs located in airports. The FCC used an “either/or” approach in adopting a similar rule requiring L-band base stations to protect Inmarsat METs located on ships in waterways. *MSV Petition for Recon* at 20-22; *MSV ATC Application* at Appendix J.

(a) For base stations located greater than 470 meters from an airport runway, MSV must still calculate the PFD level because distance alone will not guarantee that the L-band base station will avoid interfering with Inmarsat METs. *Inmarsat Opposition to MSV Recon. Petition* at 19; *Inmarsat Opposition to MSV ATC App.* at 54.

(b) Verifying PFD levels is complex, thereby necessitating a distance restriction. *Inmarsat Opposition to MSV Recon. Petition* at 18-19; *Inmarsat Opposition to MSV ATC App.* at 53-54.

(a) To the extent a base station is located greater than 470 meters from an airport runways/aircraft stand areas, the FCC has calculated using a worst case, free space propagation model that 470 meters is the maximum separation distance needed between an ATC base station and an Inmarsat MET to avoid overload interference. The FCC has effectively established a safe harbor zone with a radius of 470 meters surrounding airport runways/aircraft stand areas beyond which an ATC operator should not be mandated to calculate the PFD level. Under these circumstances, no further showing should be required. *MSV Reply to Inmarsat Recon Opposition* at 9.

(b) MSV will perform all necessary calculations to ensure that its base stations operate without exceeding the PFD limit specified in the rules. MSV is willing to provide an appropriate showing in cases where it operates closer than 470 meters from an airport. *MSV Reply to Inmarsat Recon. Opposition* at 9.

8. Base Station Overhead Gain Suppression

The FCC should relax the required base station overhead gain suppression as proposed by MSV because it will make base station deployment substantially less expensive and cause no more than a 0.03 dB increase in potential interference. *MSV Petition for Recon* at 16-19 & Appendix C; *MSV Opposition to Inmarsat Recon. Petition* at 9-11 & Appendix B; *MSV ATC Application* at 21 & Appendices J & K.

The level of suppression required by the FCC was originally proposed by MSV. *Inmarsat Opposition to MSV Recon. Petition* at 17-18; *Inmarsat Opposition to MSV ATC App.* at 57-59.

MSV's initial proposal relied on statements by CSS Antenna, Inc. Those statements were made before the FCC required L-band ATC base stations to use left-hand circular polarization ("LHCP"). *MSV Reply to Inmarsat Recon Opposition* at 8.

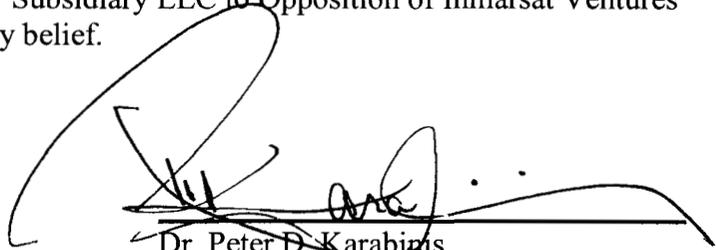
Explanation of Abbreviations

- MSV Petition for Recon* - MSV, Petition for Partial Reconsideration and Clarification of *ATC Order*, IB Docket No. 01-185 (filed July 7, 2003)
- Inmarsat Opposition to MSV Recon Petition* - Inmarsat, Opposition to MSV's Petition Partial Reconsideration and Clarification of *ATC Order*, IB Docket No. 01-185 (filed August 20, 2003)
- MSV Reply to Inmarsat Recon Opposition* - MSV, Reply to Inmarsat's Opposition to MSV's Petition for Partial Reconsideration and Clarification of *ATC Order*, IB Docket No. 01-185 (filed September 2, 2003)
- MSV Nov. 3 ex parte* - Letter from Lon C. Levin, MSV, to Ms. Marlene H. Dortch, FCC, IB Docket No. 01-185 (November 3, 2003)
- Inmarsat Petition for Recon* - Inmarsat, Petition for Reconsideration and Clarification of *ATC Order*, IB Docket No. 01-185 (filed July 7, 2003)
- MSV Opposition to Inmarsat Recon Petition* - MSV, Opposition to Inmarsat's Petition for Reconsideration and Clarification of *ATC Order*, IB Docket No. 01-185 (filed August 20, 2003)
- MSV ATC Application* - MSV, Application for Minor Modification and Amendment, File No. SAT-MOD-20031118-00333; File No. SAT-AMD-20031118-00332; File No. SES-MOD-20031118-01879 (filed November 18, 2003)
- Inmarsat Opposition to MSV ATC App.* - Inmarsat, Opposition to MSV ATC Application, File No. SAT-MOD-20031118-00333; File No. SAT-AMD-20031118-00332; File No. SES-MOD-20031118-01879 (filed November 18, 2003)

TECHNICAL CERTIFICATION

I, Dr. Peter D. Karabinis, Vice President & Chief Technical Officer of Mobile Satellite Ventures Subsidiary LLC ("MSV"), certify under penalty of perjury that:

I am the technically qualified person with overall responsibility for preparation of the technical information contained in the foregoing "Response of Mobile Satellite Ventures Subsidiary LLC to Opposition of Inmarsat Ventures Ltd." The information contained in the "Response of Mobile Satellite Ventures Subsidiary LLC to Opposition of Inmarsat Ventures Ltd." is true and correct to the best of my belief.

A handwritten signature in black ink, appearing to read 'Peter D. Karabinis', is written over a horizontal line. The signature is stylized and includes a large loop at the beginning.

Dr. Peter D. Karabinis
Vice President & Chief Technical Officer

April 14, 2004

CERTIFICATE OF SERVICE

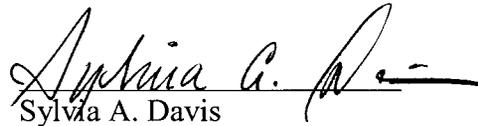
I, Sylvia A. Davis, a secretary with the law firm of Shaw Pittman LLP, hereby certify that on this 14th day of April 2004, served a true copy of the foregoing "Response" by first class United States mail, postage prepaid, upon the following:

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