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

In the Matter of	)	
	)	
Motient Services, Inc.	)	
	)	
and	)	
	)	
Mobile Satellite Ventures Subsidiary LLC	)	File No. SAT-ASG-20010302-00017
	)	
Application for Assignment of Licenses and For Authority to Launch and Operate a Next-Generation Mobile Satellite Service System	)	
	)	
TMI Communications and Company, Limited Partnership	)	File No. SES-ASG-20010116-00099
	)	
Application for Modification and Assignment of Licenses to Operate Mobile Earth Terminals for Mobile Satellite Services	)	

CONSOLIDATED OPPOSITION TO PETITIONS TO DENY AND REPLY TO COMMENTS

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Summary

Perhaps the most challenging problem facing the Commission is the disparate access Americans now have to advanced communication services -- the so-called "digital divide." The problem is particularly acute in rural and remote areas where the density of potential customers is low and the cost of deploying facilities is high. Closing the gap between rural and urban America has been a national priority since at least 1934 when Congress mandated the Commission "to make available . . . nationwide . . . radio communication service." Most recently, in passing the Telecommunications Act of 1996, Congress mandated that the Commission encourage the deployment of high-speed data service to rural America.

Satellites play a leading role in closing this gap between rural and urban areas, and must continue to do so. Satellite technology is uniquely capable of providing instant connectivity to the most remote parts of our country. The availability of high-speed data connections to rural America depends on satellite delivery. Terrestrial facilities will never cover hundreds of thousands of square miles of the United States that can only be covered efficiently and economically by satellite service. Communications satellites are also a key part of United States leadership in the commercialization of space, which the recent Rumsfeld report reaffirms as a national goal. Over the years, the Commission has recognized this critical role for satellites and has done everything it could to foster United States leadership and the deployment of satellite technology to serve the communications needs of the American public.

The use of satellites to provide mobile communications is at a critical juncture, particularly in the MSS L-band where it was pioneered. The time to begin replacing the existing L-band satellites is now. In a few short years, the existing North American satellites will reach the end of their ability to provide comprehensive and reliable services. Motient and TMI, as well

as the FCC, must act soon if thousands of customers, including many public safety users, are not to be stranded.

Based on their many years of experience, including the investment of roughly $1.5 billion dollars in their existing facilities, Motient, TMI, and the new investors have concluded that the only future for using satellites to bridge the digital divide and provide nationwide mobile service lies in the combination of their Mobile Satellite Service systems and the deployment of an innovative next-generation MSS system. With the Commission's approval, they are prepared to renew their commitment and proceed with that system. The MSV system will provide a nationwide satellite-based service by deploying a higher-power satellite that uses spot-beam technology and integrated, ancillary, in-band terrestrial facilities that operate strictly on a non-interference basis to improve coverage in urban areas. The new system will be able to provide data rates of at least 384 kbps. The urban extensions will be used to overcome the line-of-sight limitations of satellite technology and increase spectrum efficiency. Altogether, the next-generation system will be financially viable and provide consumers more reliable and affordable service.

There is no significant opposition to most elements of the applications, including the combination of the two existing systems, foreign ownership of the Commission licensee of up to 35 percent, and the deployment of replacement satellites. The opposition focuses on the deployment of the terrestrial base stations. It comes primarily from established terrestrial mobile service providers that appear to believe that the L-band spectrum now being used by Motient and TMI should be used solely for terrestrial mobile service without any use by satellite. Inmarsat, which operates a global MSS system in the same band as the Motient and TMI systems, expresses concern about potential interference to its operations.

The established operators that propose the complete elimination of MSS and the reallocation of MSS spectrum to terrestrial use make two fundamental mistakes. First, they fail to appreciate the essential role satellites play in providing truly nationwide service, just as to date they have failed to use terrestrial facilities to provide advanced services to rural areas. If one thing should be apparent as the Commission considers the MSV application, it is that the allocation of more spectrum to terrestrial-only use will not accelerate the deployment of high-speed data to rural areas. A spectrum shortage is not what prevents the delivery of such service; it is the insurmountable economics that terrestrial operations face.

The other mistake made by the proponents of a reallocation to terrestrial is that they ignore the treaty obligation of the United States to use this spectrum in a manner that is consistent with the international allocation to MSS, including aviation and maritime safety services. Unlike their proposed terrestrial-only use, MSV's system will operate in a manner that is fully consistent with the existing allocation. All of the frequencies will be used by the satellites, all of the mobile terminals will be capable of operating with the satellites, and none of the terrestrial facilities will detract in any way from maximum use of the satellites.

The proponents of a reallocation also argue that MSV does not need to deploy its own terrestrial facilities to provide improved urban coverage; that it can accomplish the same thing by developing dual-band user equipment. This argument ignores the spectrum efficiency that can be gained by MSV's technological innovation. There is no good reason to forfeit that spectrum efficiency even if dual-band equipment were practical. The experiences of Iridium and Globalstar demonstrate the outcome of such a dual-band, dual-carrier strategy. It fails.

The interference objections are based on faulty analysis. As demonstrated in the attached Technical Appendix, Inmarsat's interference analysis neglects to include several important

factors that, when included, show there will be no interference from MSV's system to Inmarsat's satellites. The Technical Appendix also demonstrates that MSS mobile terminals and GPS receivers will not suffer harmful interference.

Finally, in an apparent effort to delay the grant of MSV's application, opponents of MSV's deployment of terrestrial extensions argue that the Commission may proceed only by a rulemaking. There is ample legal precedent for the Commission to resolve the administrative law and spectrum licensing issues before it in the current docket and, to the extent necessary, to waive its rules in order to accept and grant the applications. *See* Exhibit B. The Commission's statutory obligation is to provide public notice and an opportunity for interested parties to comment, something that it clearly has done in this case. Moreover, what MSV is requesting is not a radical change. The operation of ancillary base stations does not eliminate the system's primary mission as the provider of a satellite service; from a geographic perspective, the vast majority of the U.S. will continue to be served by the system's satellites. MSS is already a Commercial Mobile Radio Service, so there is no need to develop a new regulatory regime for the service. Moreover, prompt action on the pending applications is needed so that deployment of a replacement system can proceed in a timely way without jeopardizing ongoing service to the public.

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CONSOLIDATED OPPOSITION TO PETITIONS TO DENY AND REPLY TO COMMENTS

Motient Services, Inc. ("Motient"), TMI Communications and Company, L.P. ("TMI"), and Mobile Satellite Ventures Subsidiary LLC ("MSV") (collectively, "the Applicants") hereby respond to the comments and petitions filed in connection with the above-referenced applications.[1] As discussed below, the record demonstrates that the public interest in improved

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[1] Motient and MSV originally filed their application on January 16, 2001. *See* File No. SAT-ASG-20010116-00010 (Jan. 16, 2001). At the request of Commission staff, MSV withdrew this application and refiled an identical application on March 2, 2001. *See* Letter from Bruce D. Jacobs, Counsel for Motient and MSV, to Magalie Roman Salas, FCC, File No. SAT-ASG-20010116-00010 (March 1, 2001).

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communications in rural and remote, as well as urban, areas throughout North America would be served by prompt grant of the applications.

Background

The Applicants seek authority to combine their first-generation regional Mobile Satellite Service ("MSS") systems and to launch and operate a next-generation MSS system within 52 months of grant. Within the next five to six years, the Applicant's present satellites will no longer be able to provide comprehensive and reliable service. Included in the consolidation of the two systems is the creation of a new entity, MSV, that will be owned by Motient, TMI and certain new investors. The applications seek approval for not more than 35% foreign ownership of MSV.

As described in the application, the design of the next-generation system represents a bold proposal to substantially improve coverage, capacity and reliability, without using any additional spectrum. At the heart of that proposal is the deployment of ancillary terrestrial facilities in urban areas that will reuse the satellite service link frequencies where necessary to provide coverage to urban areas blocked from the satellite signal.

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On March 19, 2001, the Commission released a Public Notice formally accepting for filing the above-captioned application insofar as it requested authority to (i) assign Motient's licenses and pending applications to MSV Sub; (ii) modify Motient's licenses to permit MSV Sub to operate using certain Canadian-licensed facilities; and (iii) launch and operate a next-generation satellite system. *See* "International Bureau Sets Deadlines Concerning Motient/TMI Assignment and Transfer of Control Applications, and Motient's Request for Second Generation Satellite/Terrestrial Base Station System," *Public Notice*, Report No. SAT-00066 (March 19, 2001). The Commission also requested comments on MSV's request for a waiver to deploy terrestrial base stations.

On April 27, 2001, the Commission granted Motient's and MSV's Motion for Extension of Time to establish May 7 as the due date for replies or oppositions and May 14 as the

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The next generation system's technical design promises the development for the first time of a viable mass market for mobile satellite services in North America. Motient and TMI have learned the hard way that a mass market is critical to the financial viability of regional MSS systems. Together, they have invested approximately $1.5 billion in the development of their first-generation systems and have concluded that they will be able to afford its replacement only if the new system can offer sufficiently better value to customers. This value will be achieved by providing service using smaller, less expensive mobile terminals that operate reliably in both rural and urban environments. In addition to voice service, the new system will offer wireless data, including high-speed data. MSV's system design is based on GSM technology, which has the potential to offer speeds up to 384 kbps. Technological advancements could increase this speed even further in coming years. This added value will permit the development of a sufficiently large market to continue to provide subscribers with better and less expensive services and equipment.

The proposed system also is highly spectrum efficient. It improves spectrum efficiency two ways: (i) by using advanced, spot-beam technology to provide greater frequency reuse by the satellite, and (ii) by assigning to the fill-in base stations the frequencies that, in that local area at that time, the satellites cannot use. The result is improved capacity that maximizes spectrum efficiency while maintaining nationwide coverage and improving urban coverage. In short, the service is not just better, but can serve more users.

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due date for responses. *See* Motient Services Inc. and MSV Sub, Motion for Extension of Time, File No. SAT-ASG-20010302-00017 (filed April 25, 2001).

Several users of the current system and New ICO, an applicant in the 2 GHz MSS proceeding, filed comments in support of the applications.[2]

Inmarsat, ARINC, and SITA raised technical concerns that MSV's proposed base station operations will cause potential harmful interference to other L-band satellite systems and the provision of aeronautical service.[3] Inmarsat claims that terrestrial operations in the L-band will damage co-channel satellite frequency reuse capacity and cause harmful interference to Global Positioning System ("GPS") receivers and Inmarsat mobile earth terminals operating in proximity to base stations.

Terrestrial wireless interests opposed the addition of terrestrial base stations on the grounds that the Commission instead should reallocate the L-band to terrestrial use.[4] They join

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2 Letter from EmTRAC Project of the American Red Cross (April 9, 2001); Letter from Wayne Tousley, Sheriff of Twin Falls County, Idaho (April 3, 2001); Letter from Sheriff's Office of Montrose County, Colorado (April 10, 2001); Naselle Youth Camp to Magalie Roman Salas, FCC (March 26, 2001); Letter from Virgil Fernandez, Fire Marshall, City of Miami to Magalie Roman Salas, FCC (March 28, 2001); Letter from International Space Brokers, Inc. (April 10, 2001); Comments of New ICO Global Communications (Holdings) Ltd. (April 18, 2001). New ICO has proposed to provide a similar terrestrial component to its 2 GHz MSS system. *See* Letter from Lawrence H. Williams, New ICO, to Chairman Michael K. Powell, FCC, IB Docket No. 99-81 (March 8, 2001)

3 Petition to Deny in Part of Aeronautical Radio, Inc. (April 18, 2001) ("ARINC"); Partial Petition to Deny of Inmarsat Ventures PLC (April 18, 2001); Reply Comments of SITA Information Networking Computing Canada, Inc. (April 30, 2001) ("SITA"), at 2.

4 Comments of AT&T Wireless Services, Inc. (April 18, 2001) ("AT&T"), at 3, 16; Comments of the Cellular Telecommunications and Internet Association (April 18, 2001) ("CTIA"), at 2-3; Opposition of Cingular Wireless LLC (April 18, 2001) ("Cingular"), at n.14, 9-10; Opposition of Sprint Corporation (April 18, 2001) ("Sprint"), at 6; Opposition of Verizon Wireless (April 18, 2001) ("Verizon"), at 5.

ARINC in arguing that the Commission must conduct a rulemaking before considering the base station proposal.[5]

Two parties, Deere and KITComm, address issues pertaining to the consolidation of Motient and TMI and the launch of the next-generation satellite system.[6] Deere argues that the merger of Motient and TMI will eliminate Motient's only competitor. KITComm argues that the Commission should restrict MSV to operation on only those L-band frequencies for which Motient and TMI have already been authorized so that KITComm is not foreclosed from providing service in the L-band.[7]

Discussion

I. CONTINUED SATELLITE-BASED SERVICE IS CRITICALLY IMPORTANT

The Commission has identified rural America's lack of sufficient access to telecommunications services, and "advanced telecommunications capability" in particular, as a

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5 ARINC at 4; AT&T at 2; Cingular at 5; Sprint at 4.

6 Petition to Deny of Deere & Company (April 18, 2001) ("Deere"); Opposition of KITComm Satellite Communications Ltd. (April 18, 2001) ("KITComm"). Because these petitions also oppose grant of the TMI assignment applications, TMI is simultaneously filing a separate reply pleading to address the TMI application-specific concerns alleged by these two parties.

7 Motient and TMI joined with the Federal Bureau of Investigation ("FBI") and the Department of Justice ("DOJ") in a Joint Petition to Defer stating that the parties have been working diligently towards the execution of an agreement to address the national security, law enforcement, and public safety issues presented by the application and that the Commission should defer approval of the application absent such an agreement and imposition of appropriate conditions. Joint Petition to Defer of Motient, TMI, FBI, and DOJ (April 18, 2001). The applicants are optimistic, based on the agreement TMI previously reached with the FBI and DOJ in connection with its provision of service in the United States, that such an agreement can be reached quickly in this case.

major problem.[8] The Commission has also found that satellite technology can effectively solve this problem,[9] in many cases (as the Wireless Bureau recently found) better than terrestrial wireless technology.[10]

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[8] *See, e.g.*, Amendment of Part 1 of the Commission's Rules – Competitive Bidding Procedures, *Fifth Report and Order*, 15 FCC Rcd 15293, ¶ 52 (April 14, 2000) ("The Commission has great interest in ensuring that rural and underserved areas have access to competitive advanced telecommunications services."). For example, in the recent *Section 706 Report*, the Commission concluded that (i) "many rural Americans, particularly those outside of rural population centers and in the U.S. territories, are particularly vulnerable to untimely access to advanced services if left to market forces alone" and (ii) "[a]reas with low population density are much less likely to have subscribers to high-speed services than are urban or suburban areas." Inquiry Concerning the Deployment of Advanced Telecommunications Capability, Second Report, CC Docket 98-146, ¶¶ 220-223, 237-241 (August 21, 2000) ("*Section 706 Report*").

[9] *See, e.g.*, The Establishment of Policies and Service Rules for the Mobile Satellite Service in the 2 GHz Band, 15 FCC Rcd 16127, ¶ 35 (August 25, 2000) ("*2 GHz Service Order*") ("we believe satellites are an excellent technology for delivering basic and advanced telecommunication services to unserved, rural, insular or economically isolated areas. . . . We remain committed to encouraging the expeditious delivery of telecommunications services, via satellite services, to unserved communities."); Extending Wireless Telecommunications Services To Tribal Lands, *Report and Order and Further Notice of Proposed Rulemaking*, 15 FCC Rcd 11794, ¶ 13 (June 30, 2000) ("Satellites have large coverage areas and, in many cases, can reach an entire nation, thereby spreading the costs of deployment across a number of communities.").

[10] *See* Qualcomm Incorporated, *Order*, DA 00-2438, ¶ 7 (Chief, Wireless Bureau, Oct. 30, 2000) ("[M]obile satellite service may provide an important additional emergency telecommunications resource, especially to callers located in remote and rural areas and callers located in underpopulated regions where neither landline nor terrestrial mobile services exists. Mobile satellite systems . . . can provide continuous, reliable coverage in many areas where cellular coverage is patchy."); *see also* Establishing Rules and Policies for the Use of Spectrum for Mobile Satellite Service in the Upper and Lower L-band, *Notice of Proposed Rulemaking*, 11 FCC Rcd 11675, ¶ 12 (1996) ("MSS can serve areas of the country that are too remote or sparsely populated to be served by terrestrial land mobile systems. It can generate a host of new services by providing communication between virtually any point in the country, irrespective of distance. . . It can meet rural public safety needs and provide emergency communications to any area in times of emergencies and natural disasters."); Extending Wireless Telecommunications Services To Tribal Lands, *Report and Order and Further Notice of Proposed Rulemaking*, 15 FCC Rcd 11794, ¶ 13 (June 30, 2000) ("Satellites also provide communications opportunities for communities in

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The findings of the recent Rumsfeld Report lend further support to the critical role of satellites in the national interest. *See* Report of the Commission to Assess United States National Security, Space Management and Organization (January 2001). A distinguished panel of Executive and Legislative Branch appointees, led by Secretary of Defense Donald Rumsfeld concluded that the United States government should (i) use the nation's potential in space to support its domestic, economic, diplomatic, and national security objectives and (ii) encourage the United States commercial space industry to field systems one generation ahead of international competitors to assure that the United States remains the world's leading space-faring nation.[11]

Today, Motient and TMI provide exactly this type of critical telecommunications to rural and remote areas, and are poised to develop the next generation of satellite-based service. Motient provides service to hundreds of federal, state, and local governmental agencies, including critical public safety organizations like the Federal Emergency Management Agency,

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geographically isolated areas, such as mountainous regions and deep valleys, where rugged and impassable terrain may make service via terrestrial wireless or wireline telephony economically impractical."); *2 GHz Service Order*, Separate Statement of Commissioner Susan Ness ("Satellite technologies have long held the promise of providing communications services to rural areas in this country. Compared with terrestrial systems, there is relatively little incremental cost for satellites to reach customers located in high-cost areas, since providers do not have to extend network infrastructure across vast stretches of sparsely populated terrain.").

[11] Rumsfeld Report at 7-9, 40. The Commission was established pursuant to the National Defense Authorization Act for Fiscal Year 2000. *See* Pub. Law No. 106-65. Members of the Commission were appointed by the House and Senate Armed Services Committees and by the Secretary of Defense in consultation with the Director of Central Intelligence.

U.S. Coast Guard, and local fire and police departments.[12] Motient also serves many private sector customers in critical industries such as interstate transportation and oil and natural gas exploration and drilling. A financially viable MSS system will be able to develop new services and equipment for these customers.[13]

Continued support for the efforts of Motient and TMI to develop a more valuable and a financially viable regional MSS system is critical to the existence of a reliable, robust, nationwide mobile service. Both companies have already taken tremendous risk and committed tremendous resources to providing this service. They deserve the Commission's continued support as they renew their commitment.

AT&T argues that the Applicants have not demonstrated that subscribers will pay premium rates to "subsidize" MSS in rural and remote areas. AT&T at 14. The Applicants are not asking for a subsidy, however, either from the government or from urban customers. A subsidy is impossible, because MSV's service will have to compete with terrestrial-only services in urban areas, thereby eliminating the potential to raise prices above their competitive level. Instead, the additional revenue and added efficiency comes from having a critical mass of subscribers; a critical mass that is reached by increasing the utility and value of the service. There is a market for the kind of truly nationwide service that MSV can offer, particularly with the added functionality and value that will be provided. Subscribers in rural and remote areas

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[12] For example, Motient provides service to over 50 federal governmental agencies, over 50 state agencies (including National Guards, state police, and fish and wildlife agencies) in over 20 states (including Alaska), and hundreds of local governmental agencies, including over 50 fire, police, and emergency/rescue departments.

[13] For example, as demonstrated in the attached Statement of Rear Admiral M. Edward Gilbert, US Coast Guard, Retired, one critical benefit of the MSV system will be the ability

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want access to wireless high-speed data and good coverage using an inexpensive, lightweight mobile phone—just like what is available to their urban counterparts. Many urban subscribers want a single, lightweight mobile phone that will provide reliable service (including high-speed data service) when they travel in rural and remote areas that are not and likely never will be served by terrestrial-only carriers. Urban, suburban, and rural customers of MSV will choose MSV because they want and need its unique capabilities. No customer will "subsidize" another.

Increasing the spectrum efficiency of the satellite system's use of the L-band is a critical public interest benefit. AT&T argues that "it is inexcusable to allow any spectrum to remain idle." AT&T at 3. MSV agrees. Inmarsat claims that terrestrial operation in the L-band is "unnecessary,"[14] but in light of the spectrum shortage that exists nationwide, it is not only necessary but critical.[15]

Some commenters claim that MSV can simply acquire spectrum in other bands to serve urban areas. CTIA at 4; Inmarsat at 2, 3-4. This argument also ignores the need to use spectrum as efficiently as possible. Why should the Commission require MSV's spectrum to be used inefficiently? The public policy goal should be to increase the public's supply of accessible spectrum, not to increase the demand for existing spectrum. MSV's proposal is an innovative

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to allow for small, affordable, and reliable phones for the fishing industry and operators of small boats. *See* Exhibit A.

[14] Inmarsat at 3.

[15] *See* Principles for Promoting the Efficient Use of Spectrum by Encouraging the Development of Secondary Markets, *Policy Statement*, 2000 FCC LEXIS 6337, ¶ 10 (Dec. 1, 2000) ("To meet the spectrum needs of new and existing services and users in this growing market, we need to continue to look for innovative approaches that will ensure the most efficient and effective use of spectrum so as to maximize opportunities for new technologies, services, and users.").

approach to spectrum management that allows MSV to use its currently-licensed spectrum in a more effective and efficient manner.[16]

II. ELIMINATING SATELLITE SERVICE FROM THE L-BAND IN FAVOR OF ONLY TERRESTRIAL USE WOULD NOT SERVE THE PUBLIC INTEREST AND WOULD BE OTHERWISE IMPRACTICAL

A. Only a Satellite System Can Provide Truly Nationwide Service

Judging from the comments, if the terrestrial wireless industry had its way, the two currently-operating MSS satellites would fall from the sky, MSS in the L-band would cease to exist, and the L-band would be reallocated to terrestrial-only use.[17] While the allocation of more spectrum to terrestrial service means that high-density areas would receive more service, a laudable goal (and one that would be met by grant of this application), residents of and travelers to rural, remote, and unserved areas would lose one of their only options for telecommunications service. In contrast, MSV's proposal presents the extraordinary opportunity for rural and remote areas to receive an advanced telecommunications service at the same time as urban areas.[18]

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[16] The experience of Iridium and Globalstar demonstrate that resale of another carrier's terrestrial service is a fatal strategy for a satellite system. Resale of mobile services has generally not been successful. *See* Interconnection and Resale Obligations Pertaining to Commercial Mobile Radio Services, *Memorandum Opinion and Order on Reconsideration*, 14 FCC Rcd 16340, ¶¶ 23-25 (Sept. 27, 1999) (noting difficulties of wireless resellers, including carriers' simple refusal to provide certain service offerings for resale). Moreover, after November 24, 2002, resale may no longer be an option for MSV because CMRS providers will no longer be required to resell their services. *See* Interconnection and Resale Obligations Pertaining to Commercial Mobile Radio Services, *First Report and Order*, 11 FCC Rcd 18455 (1996), aff'd sub nom. Cellnet Communications v. FCC, 149 F.3d 429 (6th Cir. 1998).

[17] Cingular at n.14, 9-10; CTIA at 2-3; Sprint at 1, 3-4; Verizon at 5.

[18] MSV's proposed services will meet Congress's goal of enabling "all Americans" to enjoy "advanced telecommunications capability," which the Commission has defined as telecommunications capabilities offering speeds in excess of 200 kbps per second in each direction. *See Section 706 Report.*

If the Commission were to allocate the L-band exclusively to terrestrial service, the critical coverage provided by MSS in rural areas would be lost. AT&T is simply wrong when it suggests that terrestrial wireless technology can serve rural areas as effectively as satellites. AT&T at 13, 14 n.39. Unlike with satellites, terrestrial wireless technology simply cannot cover the millions of square miles of the United States landmass and adjacent oceans. *See* Exhibit A. The Commission itself has stated on numerous occasions that terrestrial wireless technology simply cannot serve rural and remote areas as effectively as satellites. *See supra* note 10. [19]

B. International Coordination of U.S. Terrestrial Operations Would Be Impractical

Even if the United States were to adopt the proposal of terrestrial interests and allocate the L-band to terrestrial-only use, this does not mean MSS systems will cease to operate in the L-band. Inmarsat as well as MSS systems licensed by Canada, Mexico, Russia, and Japan will still operate in the L-band in or near North America. Coordinating many different terrestrial systems in the United States with these MSS systems will be an enormously difficult, if not impossible, task. Cingular and Sprint suggest that the L-band should be reallocated for 3G wireless use. Cingular at n.14, 9-10; Sprint at 6. Again, this is impractical. In addition to interference

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[19] Several proponents of a reallocation urge the Commission to require an auction. AT&T at 10-13; CTIA at 3. The Applicants obviously oppose such a proposal, both because they oppose a reallocation of the spectrum and because they would oppose the acceptance of mutually exclusive applications to use frequencies that have already been assigned and are to be used for a replacement system. In the absence of mutual exclusivity, there is no basis for an auction. 47 U.S.C. § 309(j)(1). The Commission has a strong policy favoring renewal for satellite licensees. *See, e.g.*, Assignment of Orbital Locations to Space Stations in the Domestic Fixed-Satellite Service, Memorandum Opinion and Order, 3 FCC Rcd 6972, 6976 n.31 (1988). In light of these considerations, the Applicants will not address the issue of the applicability of the ORBIT Act prohibition on the auctioning of global satellite spectrum. *See* Open-market Reorganization for the Betterment of International Telecommunications ("ORBIT Act"), Pub. L. No. 106-180, § 647 (2000); *see also* AT&T at 2; CTIA at n.7.

concerns, the international frequency coordination process of the frequencies being used by Motient and TMI has led to each system gaining access to relatively small "slivers" of spectrum in different parts of the band. As a result, it would be impossible to deploy true 3G technology.

Verizon is similarly wrong to suggest that the frequencies could be used to relocate displaced Federal Government agencies in the 1710-1850 MHz band. Verizon at 4. The 1710-1755 MHz band is currently used by the Federal Government for point-to-point microwave communications, military tactical radio relay, airborne telemetry, and precision guided munitions. *See Notice of Proposed Rulemaking and Order*, 2001 FCC LEXIS 74, ¶ 40 (January 5, 2001). The 1755-1850 MHz band is used by the Federal Government for TT&C, medium capacity fixed microwave services, tactical radio battlefield networks, and aeronautical mobile applications, including telemetry, video, target scoring systems, and precision munitions. *See id.* at ¶ 45. There is only a small amount of spectrum available and its coordination would be impossible for these kinds of services.

C. Allocating the L-band to Terrestrial-Only Use Would Be in Derogation of the International Table of Frequency Allocations

The International Table of Frequency Allocations allocates the L-band on a primary basis to Mobile Satellite Service and related aeronautical and maritime safety services, with a requirement throughout most of the band that priority access be provided to these satellite-based safety services. The United States and U.S. aviation and maritime interests were proponents of these allocations and have worked to develop aeronautical safety and maritime distress and safety systems which rely on these frequencies. Even if the United States were to decide to reverse its support for these systems, it is obligated by treaty to allocate spectrum in a manner that is consistent with this international allocation and does not cause harmful interference to

other users.[20] In light of the harmful interference that would be caused by terrestrial-only operations, the terrestrial wireless industry's proposal to allocate the L-band to terrestrial use would cause the United States to violate its treaty obligations.

In contrast, MSV's proposal is consistent with the international allocation of the L-band to MSS, including the related safety systems. Those filing oppositions mischaracterize the application as proposing to offer a new terrestrial wireless service and argue as such that MSV is seeking to replace its existing service rather than supplement it.[21] In fact, as should be clear from the application and this filing, MSV's next-generation system will remain a satellite-based system. The fill-in urban extensions are an important but supplemental part of that system and will not take away capacity or cause interference to any satellite system.[22] Every customer will have access to the satellite and the operation of ancillary terrestrial facilities will never take away spectrum or reduce the capacity of the satellite system.

III. MSV'S OPERATIONS WILL NOT CAUSE HARMFUL INTERFERENCE TO OTHER SPECTRUM USERS

Next to the question of whether the Commission remains committed to the use of satellites to meet the need for mobile service in rural America, the most fundamental issue presented by the applications is whether fill-in base stations can be deployed without causing

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[20] International Telecommunication Convention, Nov. 6, 1982, S. Treaty Doc. No. 6, 99th Cong., 1st Sess. (1985), ratified, 131 CONG. REC. 17,674 (1985); ITU, Final Acts of the 1979 World Administrative Radio Conference (1979 WARC); ITU, Final Acts of the World Administrative Radio Conference for the Mobile Services (MOB-87), Oct. 17, 1987, Final Protocol No. 58.

[21] *See* Verizon at 2; CTIA at 2-4; AT&T at 2, 6-7; Immarsat at 3.

[22] This role is much like the role of terrestrial repeaters in the Digital Audio Radio Service, which the Commission found to be "supplemental." *See* Establishment of Rules and

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harmful interference to other spectrum users. The Applicants are critically sensitive to this concern and are committed to operating the base stations without causing such interference. As discussed in more detail below and in the attached Technical Appendix, the record evidence demonstrates that the next-generation system will not cause harmful interference to other users.

A. Terrestrial Operation Will Not Cause Interference to Other L-Band and Adjacent Band Satellites or Reduce the Potential For Frequency Reuse

Thanks to MSV's innovative spot-beam and antenna technologies and network design, there is no technical reason to limit operations in the L-band to satellite use only. MSV can operate both satellites and terrestrial base stations using its currently-licensed spectrum without causing interference to its own satellites or other L-band satellite systems. MSV's proposed system is designed, and will be managed, to avoid interference to other L-band satellite systems. Indeed, MSV will be operating its own satellites in the L-band and thus has every incentive to ensure that terrestrial operations do not interfere with satellite operations. As indicated in the attached Technical Appendix, Inmarsat's analysis, which purports to show otherwise, neglected to consider several major factors. Inmarsat argues that the increased interference will lead to a reduction in sharing and in spectrum efficient use of the band. Inmarsat at 10-11. In the same way that there is no risk of causing interference to Inmarsat's satellites, there is no impact on the current ability to share the L-band among the various MSS systems that operate in the band.

B. Terrestrial Operations Will Not Affect Sensitive Mobile Terminals

Inmarsat also overstates the potential desensitization effect of base station operations on its MTs. Inmarsat at 9. As a matter of common sense, the base stations will be deployed only in

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Policies for the Digital Audio Radio Satellite (DARS) Service in the 2310-2360 MHz

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urban areas where Inmarsat users would not ordinarily attempt to use a satellite terminal because of blockage by buildings or the availability of other options, such as cellular. Moreover, as the attached Technical Appendix indicates, the zone surrounding a base station in which desensitization to an Inmarsat MT could occur is typically less than two percent of the base station's coverage area. Because MSV's base stations themselves will cover less than one percent of the United States landmass, there is no significant probability of causing harmful interference to an Inmarsat terminal -- far less than the overall practical limitations of using such a terminal in the typical urban environment.

C. Terrestrial Operations Will Not Cause Harmful Interference to GPS Receivers

Contrary to Inmarsat's claims, MSV's terrestrial operations will not cause harmful interference to GPS receivers. Inmarsat at 9. As indicated in the Technical Appendix, based on tests that Motient has conducted of GPS receivers, using a 0.5 MHz guardband, there will be no desensitization of GPS receivers even at the base of MSV transmitters. The worst-case GPS receiver identified in our measurements does not reach its desensitization threshold anywhere within the base station's service area. In fact, there is significant margin against desensitization.

D. The Next Generation System Will Provide Priority and Preemptive Access to Aviation Safety Service

ARINC argues without any technical support that the proposed terrestrial operations will interfere with aviation safety operations. ARINC at 6-7. As discussed in the Technical Appendix, the MSV system will provide priority and preemptive access to aviation and maritime safety services.

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Frequency Band, 12 FCC Rcd 5754 (1997).

IV. THE COMMISSION SHOULD PROCESS MSV'S APPLICATION WITHOUT CONDUCTING A RULEMAKING

A. The Commission Has Broad Discretion to Choose How to Proceed As Long As it Provides Adequate Notice and Opportunity to Comment

It is a well-established principle of American jurisprudence that an administrative agency has discretion to proceed by either adjudication or rulemaking as long as it provides interested parties adequate notice and opportunity for comment. *See* SEC v. Chenery Corp., 332 U.S. 194, 201-03 (1947). This principle is ignored by those that argue that the Commission must conduct a rulemaking before considering MSV's application.[23] The Public Notice initiating this proceeding could not have been more explicit as to MSV's proposed terrestrial operations. Indeed, as witnessed by the comments received, interested parties have fully discussed their positions on MSV's application.[24] If what the proponents of a rulemaking want is a more complete record, they must show that the record to date is insufficient. Absent such a showing, the only effect an additional rulemaking proceeding would have is to delay action on the

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[23] AT&T at 2; ARINC at 4; Cingular at 5; Sprint at 4.

[24] Despite AT&T's claims, Section 303(y) does not apply to the MSV application because MSV is not seeking to reallocate the L-band for flexible use, but is only seeking a waiver of the Table of Allocations to the extent necessary to operate terrestrial base stations in the L-band. Even if Section 303(y) did apply to the MSV application, this section does not require the Commission to conduct a rulemaking, but only to provide notice and seek comment, which the Commission clearly has done in this case. In addition, even if Section 303(y) did apply, the other requirements of this Section have been met: (i) the MSV application is in the public interest because it will allow for continued MSS to all Americans and increase spectrum utilization in the L-band; (ii) the MSV application is "consistent with international agreements" because MSV's integrated terrestrial operations will be on a non-interference basis as permitted by the International Table of Allocations; (iii) MSV's integrated terrestrial operations will spur, not deter, investment in communications service and technology because they will allow for use of L-band spectrum in areas where it is unusable by the satellites; and (iv) MSV's proposed operations will not result in harmful interference, as discussed in the Technical Appendix.

applications and deployment of the next-generation system. Introducing such delay solely for its own sake is neither necessary nor appropriate.

B. MSV Does Not Need a Waiver to Supplement its MSS System

While several commenters argue that MSV has not made a sufficient showing for a waiver of the Commission's rules,[25] the Commission can reasonably decide that a waiver is not needed in this case. MSV requested a waiver only to the extent that operations of base stations are not consistent with the Commission's rules. MSV Application at 15. As discussed in the application, the operation of "extensions" is fully consistent with the existing allocation which in the context of the aeronautical allocation explicitly permits such extensions. MSV Application at 15. While no specific similar footnote was adopted for non-aeronautical service, the same logic that applies to permitting aeronautical extensions applies to permitting extensions of non-aeronautical service. Thus, it is possible for the Commission to grant MSV's application, including the use of terrestrial base stations, without considering MSV's waiver request.

C. If a Waiver is Required, MSV Has Fully Justified Its Grant

If the Commission determines that a waiver of its rules is required to allow MSV to operate terrestrial base stations, MSV has made an ample showing of the need for such a waiver and the public interest benefit from the Commission's grant of such a waiver. Those claiming that MSV has not made such a showing, put forth a number of prerequisites MSV must fulfill to receive a waiver of the Commission's Rules, including that an applicant must (i) demonstrate that unique or special circumstances exist justifying deviation from the general rule;[26] (ii) show

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[25] ARINC at 5; SITA at 2; Sprint at 3-4; Cingular at 1, 5-9; Inmarsat at 6.

[26] ARINC at 3 (citing WAIT Radio v. FCC, 418 F.3d 1153, 1157 (D.C. Cir. 1969), cert. denied, 409 U.S. 1027 (1972)); Sprint at 3.

that good cause exists for the waiver and that the public interest would be served;[27] and (iii) plead with particularity the facts justifying the waiver. Sprint at 2-3. MSV has met all of these prerequisites.

The requirement for a demonstration of unique circumstances stems from the need for adequate notice to affected parties and administrative efficiency.[28] When a proposal raises issues of general applicability that could affect a large number of parties, the Commission is wise to proceed by rulemaking or it risks providing inadequate notice to those interested parties and being subject to a flood of identical waiver requests. The cases cited by Cingular and Sprint present exactly this situation.[29]

MSV's proposal is uniquely applicable to the North American L-band MSS system. In contrast to other satellite services, the L-band licensees, both in the U.S. and Canada, face an urgent need to begin constructing and preparing for the launch of a second generation system. The parties' current satellites, launched in the mid-1990s, will soon reach the end of their ability to provide comprehensive and reliable service. Yet, until Motient and TMI had sufficient market experience with their first generation systems, they could not reasonably design an effective (and

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27 ARINC at 3; Inmarsat at 2; SITA at 2.

28 *See* Turro v. FCC, 859 F 2d 1498 (D.C. Cir. 1988) (noting Commission's concern that grant of a waiver would lead to a flood of similar requests).

29 Cingular at 8 (citing *Turro*); Sprint at 4 (citing the *28 GHz Proceeding*). In *Turro*, for example, the DC Circuit upheld the Commission's decision to deny an FM translator station's waiver request that would enable it to originate local programming because grant of the waiver would subject the Commission to a flood of similar requests from other translator stations. *See Turro*. In the *28 GHz Proceeding*, the Commission rejected 971 separate waiver requests and decided to conduct a rulemaking instead because, otherwise, acting on each individual application would involve a *de facto* reallocation of the spectrum at issue. *See* Rulemaking to Amend Parts 1, 2, 21, And 25 of the Commission's Rules to Redesignate

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improved) follow-on system. As such, the parties now face unique timing pressures which, if unresolved, may have a serious impact on the thousands of public safety and other users who have come to depend on the parties' existing services. The North American L-band MSS system is also unique in terms of key characteristics such as the interference environment, the extent of existing development and use of the band, and the obligation to provide priority and preemptive access to aviation safety services.

The FCC has repeatedly waived its spectrum allocation rules to foster a more efficient use of available frequencies or where doing so would otherwise serve the public interest. A compilation of relevant cases is appended as Exhibit B. The deployment of fill-in base stations that reuse satellite spectrum is fully consistent with this precedent. The chief reason for having the Table of Allocations is to protect the reliability of the communications paths, not to stifle technological innovations. MSV has developed a breakthrough technological concept that will protect the reliability of satellite-earth communications, and in fact **improve** their reliability. Thus, the policy of the rule (reliable satellite-based communications links) is preserved and advanced by MSV's waiver request.

AT&T objects to MSV's waiver request on the grounds that there is no precedent that would allow a licensee "to use the application process to alter its authorization to provide an entirely distinct service on spectrum never allocated for that purpose." AT&T at 2. Not only is there ample precedent for precisely such uses, and for their authorization by waiver,[30] but AT&T is also wrong because MSV is not proposing an "an entirely distinct" service. Rather, as clearly

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the 27.5-29.5 GHz Frequency Band, *Second Report and Order*, 12 FCC Rcd 12545 (March 13, 1997).

30 *See* Exhibit B.

stated in its application, MSV seeks to deploy fill-in base stations as a means to supplement its existing and future MSS system in urban areas. MSV Application at 11-15. The claims of AT&T and Inmarsat that MSV is seeking to operate a stand-alone terrestrial wireless system are wrong. AT&T at 6-7; Inmarsat at 3. Given the enormous investment MSV proposes in the design, construction, and deployment of its next-generation satellite system and the sophisticated network management facilities needed to operate the satellite and terrestrial segments, it is clear that MSV in not interested in being simply another terrestrial-only carrier. Satellite coverage is the key to MSV's differentiation in the marketplace and to its long-term viability.

Cingular argues that MSV has not met the *Big Bend* test, which sets forth the standard for a waiver to use frequencies for a purpose other than that for which they are allocated.[31] *Big Bend*, however, involved a request for a waiver to use additional frequencies for a purpose that was inconsistent with the allocation for those frequencies by an applicant whose existing frequency assignment was inadequate.[32] Thus, *Big Bend* is not applicable to MSV's application because MSV is not proposing to use frequencies in a different band for its satellite and terrestrial operations; rather, it is proposing to use its own licensed frequencies for terrestrial operations. Even if *Big Bend* were applicable, however, the Applicants have met the four part test of *Big Bend*: (i) the existing MSS allocation is not "suitable" to the extent that it does not

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[31] Cingular at 9 (citing Big Bend Tel. Co., *Memorandum Opinion and Order*, 2 FCC Rcd 2413, 2414 (1986)). Specifically, Big Bend requires a waiver applicant to demonstrate: (1) the existing frequency allocation is not suited or insufficient to accommodate the applicant's requirements; (2) the frequencies requested are underutilized; (3) the proposed use of the frequencies will not be detrimental to their assigned users; and (4) the public interest will be served by a grant of the waiver. *See* Hye Crest Management, Inc., Memorandum Opinion and Order, 6 FCC Rcd 332, ¶ 20 (January 18, 1991) (citing *Big Bend*).

explicitly permit terrestrial operations; (ii) the frequencies are "underutilized," inasmuch as the new system would increase their spectrum efficiency; (iii) the proposed operations will not be "detrimental to their assigned users" (*i.e.*, MSV and other satellite operators in the band); and (iv) the proposed new operations will serve the public interest.

Finally, ARINC argues that, in order to operate in derogation of the U.S. Table of Frequency Allocations, an applicant must demonstrate that the use will be on a non-interference basis. ARINC at 4. In other cases, the Commission has granted waivers for "non-conforming uses" when "there is little potential for interference into any service authorized under the Table of Frequency Allocations and when the non-conforming operator accepts any interference from authorized users."[33] Even assuming that MSV's proposal is a "non-conforming use," however, as demonstrated above and in the attached Technical Appendix, MSV's proposed terrestrial operations will not cause interference to MSS systems in the L-band or users in adjacent bands. Thus, MSV's terrestrial use fully complies with the requirements for waiver of the Table of Allocations.

D. No Rulemaking Is Required to Address MSV's Obligations as a CMRS Provider

Verizon suggests that a rulemaking is required to address the extent of MSV's obligations as a CMRS provider and other regulatory requirements. Verizon at 5 n.5. This suggestion overlooks that Motient is already considered to be a CMRS provider and is already

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[32] In *Big Bend*, the applicant requested a waiver to use frequencies in the 2 GHz band which were allocated to the Broadcast Auxiliary Service for point-to-point microwave communications.

subject to regulation as such.[34] As a result, no rulemaking is required to further address these obligations. To the extent that a particular Commission rule or requirement is not applicable to satellite operations, such as the automatic location information element of E911 obligations,[35] MSV has assumed that such a requirement would apply to at least the terrestrial operation of its next-generation system and is fully prepared to meet that requirement.

V. THE PROPOSED ASSIGNMENT OF LICENSES IS IN THE PUBLIC INTEREST

Deere objects to grant of the Motient and TMI applications because the consolidation of the parties' satellite licenses will allegedly deprive Deere of its "only possible alternative service provider."[36] But, Deere currently takes United States service from Motient and has a pending application to operate its fleet of receive-only METs via Inmarsat. Moreover, in its pending Inmarsat service application and related STA request, it has made it clear that it has no wish to

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33 The Boeing Company, *Order and Authorization*, File No. SES-LIC-20000828-01578 (April 13, 2001) (quoting Furor-Chance, 10 FCC Rcd 2860, 2860 (1995)).

34 47 C.F.R. § 20.9(a)(10); *see* Implementation of Sections 3(n) and 332 of the Communications Act Regulatory Treatment of Mobile Services, Second Report and Order, 9 FCC Rcd 1411, ¶ 118 (1994) ("We decline on this record, however, to change the regulatory classification of AMSC, the sole domestic MSS space station licensee. AMSC is authorized as a provider of space segment capacity directly to end users through its own earth stations. AMSC has not demonstrated why, under our existing procedures, it should not continue to be regulated as a common carrier.")

35 MSS providers are currently not required to comply with E911. *See* Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems, *Report and Order and Further Notice of Proposed Rule Making*, 11 FCC Rcd 18676 (1996). The Commission, however, is already conducting a rulemaking regarding extending E911 obligations to MSS providers and has specifically requested comment on the application of E911 requirements to dual terrestrial/satellite phones. *See* International Bureau Invites Further Comment Regarding Adoption of 911 Requirements for Satellite Services, *Public Notice*, IB Docket No. 99-67, DA 00-2826 (reel. December 15, 2000).

36 Deere at 2.

take service from TMI because that would require reprogramming of its United States METs to adjust for the difference between the Motient and TMI satellite beam coverage.[37] Consequently, Deere's concerns about competition have no basis in fact and its Petition to Deny seems designed largely to apply additional pressure on the FCC to grant its pending Inmarsat service application. In any case, as TMI makes clear in its own reply pleading, consolidation of the TMI and Motient licenses will not reduce the satellite facilities or services available to consumers in the United States.[38]

KITComm alleges that grant of the Motient and TMI applications would amount to a "spectrum grab"[39] which would deprive prospective L-band competitors, such as KITComm, of adequate spectrum. The fact is, however, that the grant of the pending applications would be spectrum-neutral. Motient and TMI are seeking only to use spectrum for which they are already licensed. Moreover, these licenses and any new spectrum license issued for the next generation satellite system would be subject to international coordination and KITComm will have the opportunity to participate in that coordination process once it receives the necessary governmental authorizations. At best, therefore, KITComm's concerns are premature and there is no current basis for thinking that favorable FCC action on the Motient and TMI applications will adversely affect KITComm.

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37 Consolidated Opposition to Petition to Deny, File No. SES-LIC-20010112-00051, at 11 (March 22, 2001).

38 Reply of TMI at 2-3.

39 KITComm at 4.

Conclusion

For the aforementioned reasons, the Applicants ask the Commission to grant the above-captioned applications.

Respectfully submitted,

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TECHNICAL APPENDIX

Technical Appendix

I. INTERFERENCE FROM MOBILE TERMINALS TO CO-CHANNEL SATELLITES

Contrary to Inmarsat's contention, the operation of MSV's next-generation system in North America will not cause harmful interference either to Inmarsat satellites operating co-channel in other parts of the Western Hemisphere or to MSV's own satellites. The Inmarsat analysis fails to consider several key factors that mitigate the interference potential of the proposed operations. Moreover, MSV is willing to provide periodic verification reports to the FCC during the operation of the system that will indicate the power levels being emitted by MSV's users.

MSV's proposed new system achieves complete unification and coordination between space and ground assets. One master system-wide network controller is responsible for the dynamic allocation and management of the total available resource (frequency) pool. As such, maximum frequency re-use (and hence capacity) is achieved while signal levels are kept at a minimum and well within acceptable limits.

A. Potential Interference from MSV to Inmarsat

Inmarsat's analysis fails to consider the following factors:

- **Terrestrial to MSS channel/carrier bandwidth difference.** The MSV mobiles, communicating terrestrially with a base station, will be transmitting GSM carriers. Carriers used by the Inmarsat system are significantly narrower relative to those of GSM. Hence, only a fraction of the power transmitted by a MSV mobile will be seen as interference by an Inmarsat carrier.

- **Power control.** In the MSV system, mobile-to-base station and base station-to-mobile transmissions will use closed-loop power control so as to maintain minimum radiated power levels while satisfying acceptable link performance. This closed-loop power control system results in average mobile terminal transmit power levels that are 6 dB lower than the maximum value of 0 dBW.

- **Mobile linear to MSS RHCP.** In the MSV system, when a mobile is communicating with a base station, the mobile radiates linearly polarized waveforms. The Inmarsat satellites (as well as other MSS systems) use antennas that receive circularly polarized waveforms (typically Right Hand Circular Polarization [RHCP]). Since a linearly-polarized waveform comprises a Left Hand Circularly Polarized (LHCP) component as well as a RHCP component, each containing (on average) equal power, half of the power radiated by a terrestrially-engaged mobile will not be seen by the Inmarsat satellite.

- Inmarsat's assumed satellite antenna discrimination of 20 dB is too conservative.

The following table reflects elements of Inmarsat's own analysis and those described above. The new (or modified) factors are shown in **bold**. Typical values associated with the urban environment are used to derive results.

Inter-system interference C/(N+I) requirement	20 dB
C/(N+I) without terrestrial mobile interference	21 dB
Mobile earth station mode EIRP(mobile to satellite)	5 dBW
Mobile station mode EIRP(mobile to base station)	0 dBW
Satellite antenna discrimination (Inmarsat used the value of 20 dB; 22 dB is more realistic)	**22 dB**
Average shielding	15 dB
Terrestrial to MSS carrier bandwidth ratio (Note 1)	**13 dB**
Power control	**6 dB**
Mobile linear to MSS RHCP	**3 dB**
Number of co-frequency carriers from mobiles	**5,164**
C/I from MTs for 1 dB C/(N+I) degradation	26.87 dB
Total net interference power for 1 dB degradation	- 21.87 dBW

Note 1: The terrestrial channel/carrier bandwidth is 200 kHz. The Inmarsat channel/carrier bandwidth is assumed to be 10 kHz.

As can be seen from the numbers above, the allowed number of co-frequency carriers from MSV mobile terminals (communicating with base stations) is more than 5,000 and not 20, as Inmarsat asserts. This means that it is possible to introduce over 5,000 carriers for communications between mobile terminals and BTSs in an environment in which obstructions are typical (operating co-frequency with the MSS carrier), without imposing any more inter-system interference than is allowed by Inmarsat's own analysis. For clarity, it is pointed out that in accordance with GSM a minimum of seven users (eight maximum) is supported by a single carrier in the MSV system.[1]

B. Potential MSV Intra-system Interference

For the intra-system interference case, which considers the potential for terrestrially-engaged mobiles on MSV's system to interfere with MSV's own satellites, the relevant parameters are:

Mobile earth station mode EIRP (mobile to satellite)	5 dBW	
Mobile station mode EIRP (mobile to base station)	0 dBW	
Allowance for C/I from mobile earth stations	**17 dB**	(Inmarsat used the value of 26.87 dB but this is excessive for MSV's system)
Average shielding	15 dB	
Satellite antenna discrimination	**10 dB**	(adjacent beam frequency use)

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[1] Inmarsat also attempts to translate the number of carriers into a number of subscribers. While the Applicants believe this part of Inmarsat's analysis is also flawed, this Technical Appendix does not address it because it is irrelevant to an analysis of the potential for harmful interference.

Power control ---------- 6 dB

Terrestrial to MSS channel/carrier bandwidth difference (Note 1) ---------- 6 dB

Number of times carrier can be re-used terrestrially within a non co-channel satellite spot beam ---------- 316

Note 1: Terrestrial channel is 200 kHz; satellite return link channel is 50 kHz.

Moreover, MSV as part of normal operations will monitor the levels of power being transmitted in each band segment. MSV can provide this information to the FCC on a periodic basis in order to validate that its operations are not at a level that could possibly cause interference to Inmarsat's satellites.

II. INTERFERENCE FROM BASE STATIONS TO MOBILE SATELLITE TERMINALS

Inmarsat contends that MSV base stations will interfere with MSS downlinks by overloading Mobile Earth Station (MES) receivers. To the contrary, our results (based on analysis and experiment) show that MES receiver desensitization will not occur under real-world conditions. The MSV base stations will maintain sufficient guard bands and will also be subject to stringent out-of-band emission limits. Furthermore, MSV's base stations will use a combination of techniques to manage and minimize BTS output power levels. These techniques will include:

- **Power control;** providing an average benefit of at least 6 dB of output power reduction in an urban environment.
- **Voice activation;** providing an average benefit of 4 dB in output power reduction.

- **Left Hand Circular Polarized (LHCP) transmission;** providing a benefit of at least 8 dB reduction in effective BTS output power (satellite terminals receive RHCP, MSV base stations will be transmitting LHCP).

- **Proprietary radio resource management algorithms,** enabling dynamic frequency allocation and further reductions in BTS output power.

MSV has performed desensitization measurements on several satellite terminals from a variety of manufacturers. These measurements indicate that the weakest (GSM carrier) signal that can cause front-end gain compression to a MES is –88 dBW, referenced at the MES antenna output, with 400 kHz (or greater) frequency offset from the desired signal carrier. The above represents a worst case for the five terminals that were subjected to the tests.

Free space propagation was assumed for BTS to airborne aircraft paths. The COST Walfish-Ikegami (Non Line-Of-Sight) NLOS propagation model was used to derive desensitization distances for non-airborne MES terminals.[2] The BTS antenna pattern shown in figure 1 was used in generating numerical results. This BTS antenna pattern was tilted towards

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[2] The COST Walfish-Ikegami propagation model is described in Propagation Prediction Models, Dieter J. Cichon and Thomas Kurner, Section 4.4. The COST Walfish-Ikegami non-line-of-sight model uses physical parameters to characterize the signal propagation environment and assumes outdoor antennas (building penetration losses are not included). Physical parameter values were selected to underestimate the propagation losses expected in the urban environments where BTS will be deployed. The angle of incidence between the ray to the BTS and the street at which the MES is located was set at 0° (i.e., there is open corridor between the MT and any buildings in the direction of the BTS). Building separation and street width are taken to be 35 meters and 18 meters, respectively (i.e., there is good clearance around the MT). Rooftop heights are taken to be no higher than 15 meters (five floors) and the BTS antenna is assumed to be at 30 meters height (i.e., well above rooftops). A MES antenna height of 1.5 meters is assumed, which is commensurate with a vehicular or pedestrian MES.

earth by 5 degrees (per established BTS antenna practices). Also, the BTS EIRP was set at 9.1 dBW (reflecting power control and voice activity benefit).

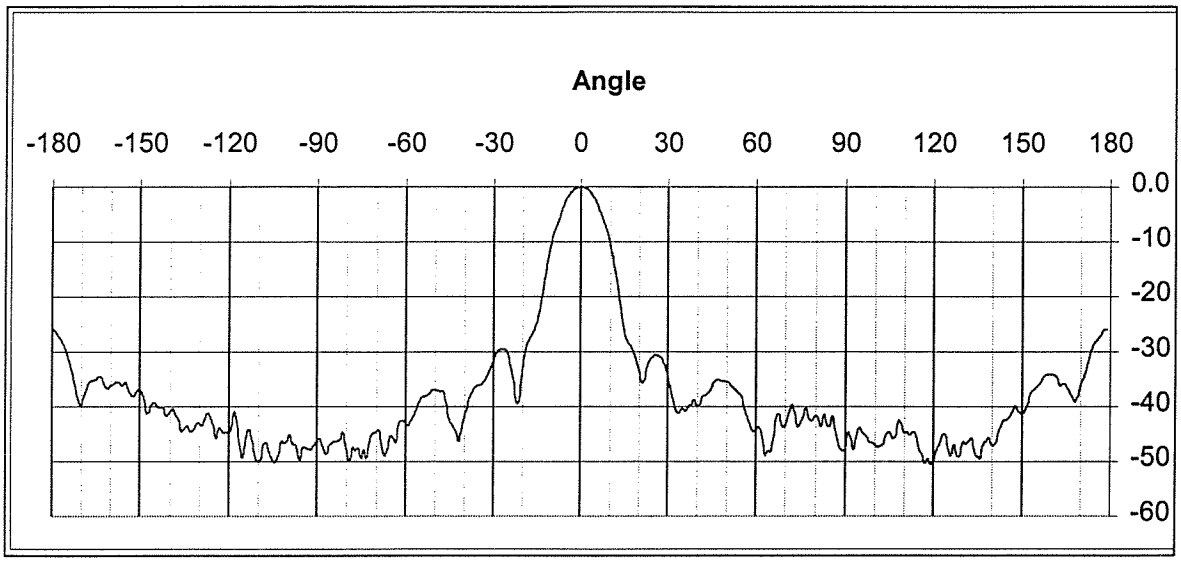

Figure 1. BTS Antenna radiation Pattern (Main Beam Elevation Plane)

Figure 2 shows aircraft altitude vs. (horizontal) distance from the BTS beyond which desensitization cannot occur. The figure shows that MES performance on-board aircraft will not be degraded for aircraft altitudes of 42 meters or more (12 meters above the BTS height of 30 meters). Because aircraft over urban areas must fly at altitudes exceeding 1000 feet (304 meters) (see RTCA/DO-235 Document, Appendix A) no degradation in MES performance will occur. In the vicinity of airports, MSV will provide service via the deployment of micro/mini base stations radiating much lower EIRP levels.

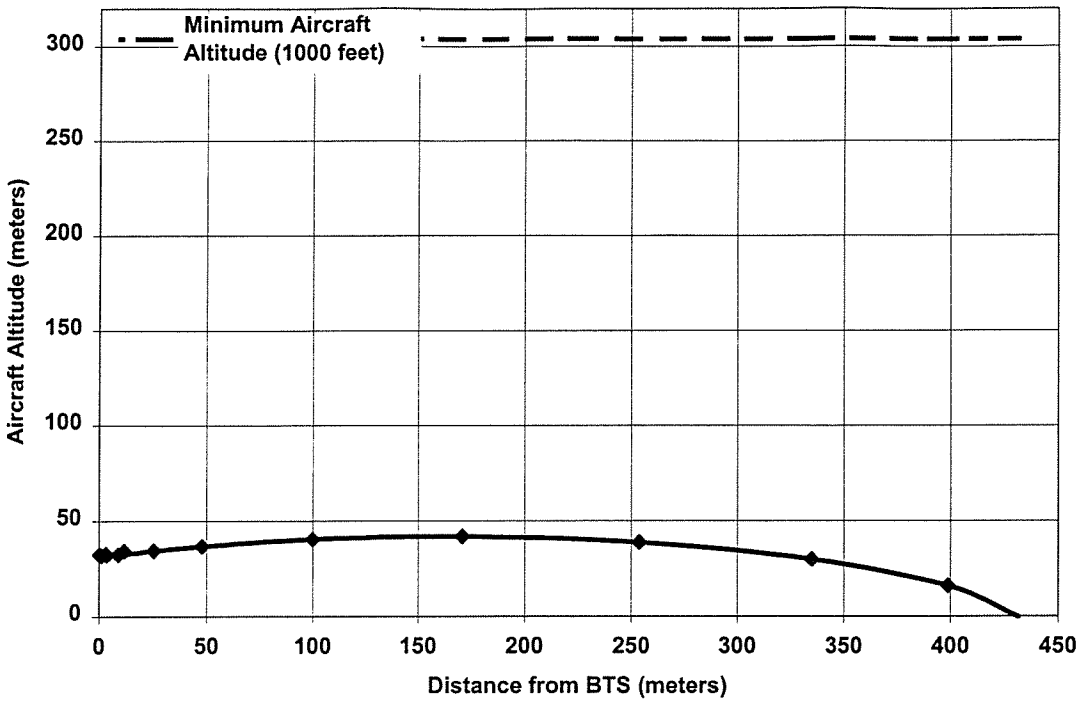

Figure 2. Aircraft altitudes above which MES receiver desensitization will not occur.

For the non-aeronautical case, in the unlikely event that a MES is attempting to operate in a densely populated environment, we have calculated the small area around the BTS site within which reception by MES with low-, medium-, and high-gain antennas may be degraded by the BTS transmissions. This area is found to occupy less than 2% of the total BTS service area and in close proximity to the BTS. That is, a randomly situated (within an urban area) MES has a 98% chance of never encountering desensitization. It is well known that MES reception inherently is not possible in many locations within an urban area.[3] For example, the Hess model

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[3] MES performance in urban areas can be predicted using the Hess model, which is described in Propagation Effects for LMSS Systems, NASA Reference Publication 1274, Chapter 8.3. It predicts the MSS power fade margin needed to serve a certain percentage of large areas (e.g., of the order of a BTS coverage area or larger) and a certain percentage of sites within these large areas (the percentage of sites can be interpreted as percentage of time in the case of an MES in motion). The model indicates that the typical MSS downlink fade margin of 4 dB would enable MES operation at 50% of the sites within only 50% of urban areas.

indicates that about 50% of the sites would be unavailable. Hence, the presence of MSV BTSs, will hardly be noticeable. Furthermore, if a problem does occur, MSV is committed to working with any affected party on a case-by-case basis, using standard interference mitigation techniques, including antenna pattern modifications and EIRP reduction.

III. INTERFERENCE FROM BASE STATIONS TO GPS RECEIVERS

Inmarsat asserts that the level of transmitted power from MSV's terrestrial base stations could be sufficient to block reception of the satellite navigation signals in the adjacent GPS band. Inmarsat states that this can occur because GPS receivers have only a limited amount of filtering to reduce the adjacent band signal to a level that will not overload the sensitive receiving amplifier.

The MSV system will provide the required protection to GPS against degradation from base station transmissions. Base stations will comply with the same out-of-band emissions limits into the GPS/GLONASS band that are applied to existing L-band mobile terminals, namely -70 dBW/MHz for wide-band emissions and -80 dBW/600 Hz for CW emissions.

Besides meeting the stringent out-of-band emission requirements identified above, MSV base stations will use a combination of techniques to minimize their output power levels:

- **Power control.** In the MSV system, base station-to-mobile transmissions will utilize closed-loop power control so as to maintain minimum radiated power levels while satisfying acceptable link performance.

- **Voice activation.** In the MSV system, base station transmissions will utilize voice activation to suppress carrier transmission during periods of no voice activity, thus reducing the average transmitted EIRP.

- **Polarization discrimination.** MSV Base stations will be configured to transmit circular polarization but in the opposite sense from that used by GPS receivers. This increases base station-to-GPS isolation by at least 8 dB.

- **Proprietary radio resource management algorithms**, enabling dynamic frequency management and further reductions in base station transmission levels.

- **Natural isolation**. GPS antenna gain toward a base station will be low due to the GPS receiver's omni-directional pattern. In addition, base station antennas will typically be installed on towers or rooftops offering significant separation between themselves and the nearest GPS receiver.

As discussed below, GPS receiver desensitization will not occur. Our analysis and experiments confirm this.

As with mobile terminals, MSV evaluated a number of commercially available GPS receivers for desensitization. Each receiver was subjected to out-of-band GSM carrier interference and the threshold at which the receiver could not provide a fix (based on at least three GPS satellites) was recorded. The measurements were conducted outdoors with real GPS signals while a GSM carrier was being radiated toward the direction of the GPS receiver. In some cases, MSV was unable to desensitize a unit even at a distance of six feet.[4] Further analysis was conducted using the worst case at each frequency.

MSV base stations will be transmitting at an effective average carrier EIRP of 31 dBm (1 dBW) as a result of power control, voice activity, and LHCP-to-RHCP isolation. As can clearly be seen from the graph below, the worst-case GPS receiver identified in our measurements does not reach its desensitization threshold anywhere within the base station service area. In fact, the curve shows significant margin against desensitization.

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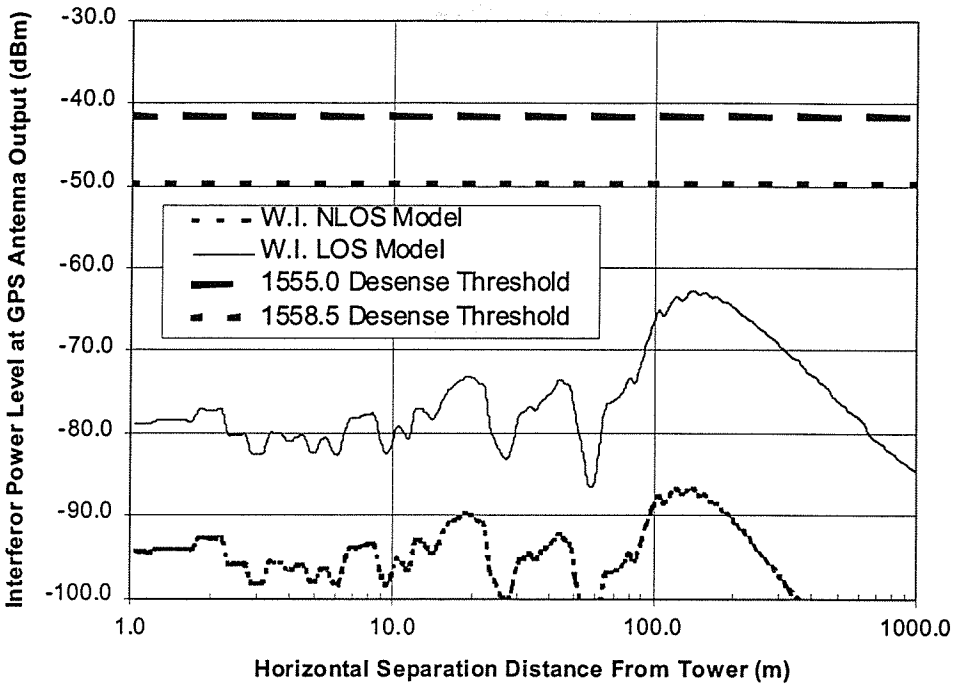
[4] The GSM interferer was being radiated (RHCP) at +28 dBm EIRP, at bore-sight to the GPS receiver. The GPS receiver antenna gain was estimated at -5 dBi in the direction of the interferer.



Note that the dotted (lower) curve is generally valid at distances of about 20 meters or more from the base station. This curve predicts the interfering signal power in the absence of a direct line-of-sight path and has been derived using the COST Walfish-Ikegami NLOS propagation model. The solid curve on the figure (the upper curve) is generally valid at distances of less than 20 meters from the base station, where a line-of-sight component is more likely to be present, and has been derived using the LOS version of the propagation model stated above. Based on these two curves, and their corresponding validity intervals, it is seen that at any distance from the base station, the worst-case GPS receiver maintains more than 20 dB desensitization margin. Over significant portions of the curve, the desensitization margin is seen to approach (and even exceed) 30 dB. Furthermore, it is seen that the margin is maintained with respect to the GSM interferer closest to the GPS/GLONASS band, with only a 0.5 MHz guard band.

IV. COMPLIANCE WITH REQUIREMENTS FOR PRIORITY AND REAL TIME PREEMPTIVE ACCESS FOR AERONAUTICAL AND MARITIME SAFETY SERVICES

The MSV next-generation system will comply with the requirements of footnotes US308 and US315, which require systems operating in the upper and lower L-band to provide priority and preemptive access to Aeronautical Mobile Satellite (Route) Service and maritime safety operations, respectively. Motient's existing system design already provides this capability as will the MSV first-generation system, which consolidates the existing facilities of TMI and Motient.

The purpose of this capability is to ensure that United States aeronautical and maritime safety communications using the satellite will be able to access up to the full amount of assigned spectrum virtually instantly and as needed. In the case of aeronautical safety communications, the upper half of L-band is the applicable spectrum, and in the case of maritime safety communications, the lower half of L-band is the applicable spectrum.

A U.S. domestic AMS(R)S system has not been fully defined. Motient therefore developed a spectrum management concept to use with an AMS(R)S provider. To ensure access to spectrum for the AMS(R)S system, Motient is prepared to:

- Maintain a "reserve pool" of vacant spectrum in each beam that upon request would be instantly available for AMS(R)S use.
- If the AMS(R)S system requires an amount of spectrum greater than the reserve pool, Motient would first retrieve spectrum not in the reserve pool, but currently not carrying traffic, and transfer that spectrum to AMS(R)S use.
- If the AMS(R)S system requires an even greater amount of spectrum, Motient would preempt channels actively carrying traffic, and transfer that spectrum to AMS(R)S use.

Thus, Motient would rapidly transfer upper L-band spectrum to a domestic AMS(R)S provider in response to requests for spectrum and power in specific beams of the satellite. The request and response could be either automatic (requiring no human intervention) or manually initiated, at the discretion of the AMS(R)S system operator.

The preceding description applies to the next-generation system as well. There may be differences, however, because of the beam structure of the new satellite. While the existing satellite has six large beams distributed across the United States, the new system will have about two hundred small beams, each several hundred miles across on the earth.

An AMS(R)S system could take advantage of the new satellite's MSAT-2 emulation mode. In emulation mode, a portion of the available spectrum is assigned to beams comparable to MSAT-2 beams that can be thought of as combinations of the smaller MSV-1 satellite beams. Alternatively, an AMS(R)S system could take advantage of the increased capacity and smaller antennas that would derive from the use of the small, high G/T spot-beams that would be available from the new MSV-1 satellite. In either case, a request from the AMS(R)S system for spectrum would include both the amount of spectrum, and the region to be covered. In response, the MSV system would acknowledge the request and identify the available frequencies that fulfill the request.

Coordinated frequency/area clearing with limited system impact. This concept is based on the observation that frequency reuse exists among the satellite spot beams, and also between the spot beams and terrestrial cells. According to the frequency reuse plan developed by MSV, individual channels do not co-exist in both a given satellite spot beam and the terrestrial network within that spot beam. Thus, individual channels used in a satellite beam will not be used for terrestrial operations in the area defined by the spot beam and can thus be reallocated to

emergency services (in the satellite mode) without disrupting terrestrial operations. According to MSV's system concept, the space and terrestrial assets are fully integrated, communicate with each other, and are operated in coordination by the radio resource manager(s). This provides the essential flexibility and agility to assign resources where needed (in hot spots) while areas of lesser traffic are assigned minimal resources. The "bandwidth on demand" feature of MSV's system, whereby resources (frequencies) can dynamically be re-directed from satellite spot beam-to-satellite spot beam, depending on capacity requests, can prove extremely useful during periods of natural disaster and/or other emergency situations where capacity hot spots can develop quickly. MSV's ability to meet such a challenge, while at the same time continuing undisrupted terrestrial service, is a direct consequence of the level of integration and built-in intelligence transfer between space and ground assets.

Total system shutdown. If a large spectrum request over a large area is issued, total system shutdown may be needed. In such a case, a single master "switch" would shut down the MSS non-safety networks at their control points. Since MSV plans to operate a single control point with a back up facility for redundancy, this could be accomplished in much the same manner as preemptive access is accomplished today.

Technical Certification

I, Dr. Peter Karabinis, Chief Technical Officer of Mobile Satellite Ventures LLC, certify under penalty of perjury that:

I am the technically qualified person with overall responsibility for the preparation of the technical information contained in the above-captioned "Consolidated Opposition to Petitions to Deny and Reply to Comments." The information contained in this document is true and correct to the best of my belief.

Dr. Peter D. Karabinis

Dated: May 7, 2001

Exhibit A
Statement of Rear Admiral M. Edward Gilbert, US Coast Guard, Retired

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May 7, 2001

Statement by Rear Admiral M. Edward Gilbert, US Coast Guard, Retired.

I served more than 35 years in the US Coast Guard in operational and telecommunications assignments. Presently, I am a consultant to MSV.

During my Coast Guard career I led many US Delegations participating in international telecommunications meetings. From 1981 to 1985, when the International Maritime Organization (IMO) was establishing the foundation for the Global Maritime Distress and Safety System (GMDSS), I was the leader of the US Delegation to the IMO's Communications Subcommittee. I was the senior technical advisor for the US Delegation to the 1983 World Radio Conference that provided the enabling telecommunications framework for the GMDSS.

Much of my career has been devoted to improving maritime safety through the effective use of telecommunications. Since retirement in 1993, I have been President of Gilbert & Associates, Inc. providing consulting support in the fields of telecommunications, coastal zone management, crisis leadership, and technical support for emergency organizations plus state and local governments. I served on the Public Safety Wireless Advisory Committee (PSWAC), the GMDSS Implementation Task Force, and the Emergency Information Partnership Committee formed by the Federal Emergency Management Agency (FEMA).

1. MSV's next-generation satellite system will provide an exceptionally useful capability for mariners operating offshore near the United States and in the many inland rivers and lakes. The 300-400 miles offshore coverage to be provided with spot beams will allow use of the MSV satellite system for the more than 11 million boats less than 65 feet in length presently in use. Well over 95% of all search and rescue cases occur in this coverage region. MSV's next-generation system will allow access via small handheld terminals from these boats. Current geostationary systems require user terminals that are too large for these types of boats to use effectively and economically. For the first time, boaters will have access to affordable terminals suitable for their use.
2. Commercial fishing is an exceptionally dangerous occupation partially because of the lack of reliable telecommunications. MSV's proposed system will cover the vast majority of all U.S. fishing grounds, thereby bringing users reliable and affordable telecommunications for safety and commercial uses. In addition, reception of vital weather and navigational warning information, public correspondence, and contact with the Coast Guard in emergencies will be enabled by the proposed system.

3. Most of the US Exclusive Economic Zone (EEZ), the maritime areas within 200 miles of the US Coastline, will be covered by the proposed system. This will allow commercial organizations operating in the EEZ and regulatory agencies to have effective and affordable telecommunications support.
4. Effective telecommunications will be provided to organizations responding to natural disasters such as, earthquakes, hurricanes, and man made incidents such as oil spills. Often these disasters, such as earthquakes, disrupt terrestrial wireline and wireless telecommunications systems. MSV's satellites will be located 22,000 miles above the earth unaffected by these disruptions. Reliable communications for emergency response organizations will be assured.
5. The Public Safety Wireless Advisory Committee identified *nationwide interoperability* as a key need for Federal, state and local governments and other emergency response organizations. The Public Safety Wireless Network Organization is working to improve wireless access for many different agencies. MSV's proposed system will provide a strong foundation for an interoperable, nationwide wireless system available to all of these users for normal and emergency communications.
6. State and local governments are implementing terrestrial programs to satisfy telecommunications needs. Much of the expense comes from providing rural coverage. Many of these rural locations will never have terrestrial coverage by commercial or government systems. The proposed systems will offer an inexpensive and effective way to serve remote areas and offer the potential for substantially lowering the cost and complexity for implementing statewide systems.

In summary, the system proposed by MSV offers exciting new capabilities to a large number of maritime and public safety organizations

Rear Admiral M. Edward Gilbert,
US Coast Guard, Retired

Exhibit B

Precedent for Waiver of the Table of Allocations Without Conducting a Separate Rulemaking

Qualcomm, Inc., *Memorandum Opinion, Order and Authorization*, 4 FCC Rcd 1543 (Feb. 14, 1989) (granting Qualcomm's application to provide MSS via fixed-satellites in the 11.7-12.2 GHz space-to-Earth frequency band and waiving the Table of Allocations, which does not contain an allocation for MSS in the 17.7-12.2 GHz band, without conducting a separate rulemaking)

The Boeing Company, *Order and Authorization*, File No. SES-LIC-20000828-01578 (Chief, International Bureau and Chief, OET, April 13, 2001) (granting Boeing's application to provide AMSS in the 11.7 – 12.2 GHz band and waiving the Table of Allocations, which does not contain an allocation for AMSS in this band, after placing application on Public Notice, but not conducting separate rulemaking)

USA Today Sky Radio, *Order and Authorization*,7 FCC Rcd 7943 (Chief, Domestic Facilities Division, Dec. 7, 1992) (granting application to provide aeronautical MSS via fixed-satellites in the 11.7-12 GHz space-to-Earth frequency band and waiving the Table of Allocations, which does not contain an allocation for MSS in the 11.7-12 GHz band, without conducting a separate rulemaking)

AirTouch Satellite Services US, Inc., *Order and Authorization*, 14 FCC Rcd 1732 8 (Chief, International Bureau, Oct. 4, 1999) (granting AirTouch's request to provide ancillary fixed-satellite service in the 1.6 GHz MSS/RDSS bands and waiving the Table of Allocations, which does not have an allocation for FSS in these bands, without conducting a separate rulemaking)

Motorola Satellite Communications, Inc., *Order and Authorization*, 11 FCC Rcd 13952 (Chief, International Bureau, October 30, 1996) (granting Iridium's request to provide ancillary fixed-satellite service in the 1.6 GHz MSS/RDSS bands and waiving the Table of Allocations, which does not have an allocation for FSS in these bands, without conducting a separate rulemaking)

Fugro-Chance, *Order and Authorization*, 10 FCC Rcd 2860 (Chief, International Bureau, March 16, 1995) (granting waiver of Table of Allocations to allow for MSS in the 3700-4200 MHz band, which is allocated to FSS and fixed terrestrial service, without conducting a separate rulemaking)

Newcomb Communications, Inc., *Order and Authorization*, 11 FCC Rcd 3084 (Chief, International Bureau, and Chief, OET, February 2, 1996) (granting Newcomb's application and waiving the Table of Frequency Allocations to permit satellite-to-mobile unit links in the 3700-4200 MHz frequency band, which is not allocated to MSS, without conducting a separate rulemaking)

Mobile Datacom Corporation, *Order and Authorization*, 10 FCC Rcd 4552 (Chief, International Bureau, April 3, 1995) (granting Mobile Datacom's application and waiving the Table of Frequency Allocations to permit satellite-to-mobile unit links in the 3700-4200 MHz frequency band, which is not allocated to MSS, without conducting a separate rulemaking)

Geostar Positioning Corporation, *Order and Authorization*, 4 FCC Rcd 4538 (May 25, 1989) (granting Geostar's application to operate receive-only radiodetermination satellite service (RDSS) mobile terminals in the 3700-4200 MHz band and waiving the Table of Allocations, which does not contain an allocation for MSS in the 3700-4200 MHz band, without conducting a separate rulemaking)

Loral Orion Services, Inc., *Order and Authorization*, 14 FCC Rcd 4636 (Chief, International Bureau, April 2, 1999) (granting Loral's application to use the 12.25-12.7 GHz frequency band for FSS downlink and waiving the Table of Allocations, which allocates this band to BSS, after placing application on Public Notice, but not conducting separate rulemaking)

Rockwell Collins, Inc., *Order*, 14 FCC Rcd 3340 (Chief, Public Safety and Private Wireless Division, Wireless Telecommunications Bureau, Feb. 26, 1999) (granting waiver request of Rockwell-Collins to extend the upper limit of VHF aviation transceivers' transmit range to 152 MHz and waiving Table of Allocations, which does not allow for such use from 138-152 MHz, after putting waiver request on Public Notice, but not conducting separate rulemaking)

Waiver of Parts 2 and 90 of the Commission's Rules to Permit New York Metropolitan Area Public Safety Agencies to Use Frequencies at 482-488 MHz on a Conditional Basis, *Order*, 10 FCC Rcd 4466 (March 17, 1995) (granting waiver of Table of Allocations to allow public safety agencies in New York City to use television Channel 16, allocated to broadcasting service, for land mobile public safety service, after putting waiving request out for public comment, but not conducting a rulemaking)

COMSAT and AMSC, *Memorandum Opinion and Order*, 5 FCC Rcd 4117 (July 3, 1990) (granting COMSAT's and AMSC's request for wavier of the Table of Allocations to allow for use of maritime mobile-satellite service (MMSS) frequencies for land mobile-satellite service (LMSS) and aeronautical mobile-satellite service (AMSS), without conducting separate rulemaking)

Waiver of Parts 2 and 97 of the Rules Concerning Frequency Sharing Requirements Applicable to the Amateur Service in Portions of Colorado and Wyoming, *Order*, 5 FCC Rcd 3041 (Chief, Private Radio Bureau and Chief Engineer, May 16, 1990) (waiving Table of Allocations to allow certain amateur stations in Colorado and Wyoming to transmit in the 33 centimeter band, without conducting a separate rulemaking)

The Offshore Telephone Company, *Memorandum Opinion and Order*, 80 FCC 2d 383 (July 23, 1980) (granting waiver of Section 2.106 to allow for Rural Radio Service operations above 1000 MHz, when Rural Radio Service operations were restricted to below 1000 MHz, without conducting a separate rulemaking)

CERTIFICATE OF SERVICE

I, Gera M. Christian , a secretary with the law firm of Shaw Pittman, hereby certify that on this 7th day of May 2001, served a true copy of the foregoing "**CONSOLIDATED OPPOSITION TO PETITIONS TO DENY AND REPLY TO COMMENTS**" by first-class mail, postage prepaid or by hand delivery (as indicated) upon the following:

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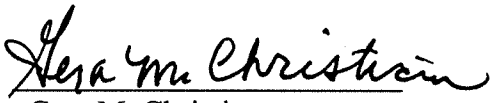

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***Via Hand Delivery**

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