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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Ms. Marlcnc H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: **Ex** Parte Submission
Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz, the L-Band, und the 1.6/2.4 GHz Band, IB Docket No. 01-185;
File No. SAT-ASG-20010302-00017, et al.

Dear Ms. Dortch:

Inmarsat Ventures plc ("Inmarsat") responds to Mobile Satellite Ventures Subsidiary LLC's ("MSV's") *ex parte* letter of December 16, 2002 in which MSV makes the stunning requcst for the first time that MSV should be allowed to deploy ancillary terrestrial facilities ("ATC") with its in-orbit satellite system.[1] For over a year, Inmarsat, in its Comments and *ex parte* filings, has opposed the use of ATC in the L-band on the grounds that ATC, either as part of the next-generation MSV system or on a terrestrial standalone basis, would cause hannful in-band and out-of-band interference to Inmarsat's satellites and mobile earth terminals ("METs").[2] In addition, use of L-band spectrum by MSV and/or terrestrial operators for ATC would contravene the Mexico City Memorandum of Understanding ("*MOU*") to which the United States is a party.[3] Now, in an off-hand manner, MSV attempts to fundamentally expand the scope of this proceeding and MSV's original proposed ATC architecture. Prior the *December 16,* 2002 *Letter*, MSV had never requested authority to deploy ATC with its current generation satellite systcm. Indeed, based on MSV's prior representations to the Commission in

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1 *See* Letter from Carson E. Agnew, President & Chief Operating Officer of MSV, and Peter D. Karabinis, Chief Tcclinical Officer or MSV, to Marlene H. Dortch, Secretary, dated December 16, 2002 (the "*Decemher 16, 2002 Letter*").

2 *See* various submissions of Inmarsat listed on Exhibit **A**

3 *See, e.g., Further Comments of Inmarsat* at 13-14; *Inmarsat Comments at* 21-24; *Inmarsat Reply Comments at* 4-5.

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its pending application for ATC authority, MSV never gave any indication that it intended to do anything other than deploy a truly ancillary terrestrial service, with handsets that communicate with both tcrrcstrial base stations and satellites, fully integrated with MSV's next generation satellite network. Excerpts of MSV's representations from its pending application for **ATC** authority are attached as Exhibit B.

In several previous filings, Inmarsat has shown that to operate ATC, MSV would need additional spectrum to what it would need to operate its satellite system alone. Inmarsat believes that to deploy ATC at the same time that it operates its current satellite system these additional spectrum requirements may be even grcater. Such use of ATC would also cause as great or greater interference problems to Inmarsat's MSS services and MSV's own satellite network as the use of **ATC** with MSV's next-generation system.

Throughout this proceeding, MSV has argued that ATC is viable in the L-band because of MSV's ability to integrate ATC into its next-generation satellite system. MSV has emphasized the importance of designing an integrated system to enhance the reuse of L-band spectrum in areas where its customers are not able to receive a satellite signal, and building monitoring systems into its satellites to avoid intra and inter-system interference. MSV has argued that its new satellites will be more efficient and able to use new spot-beam technology to allow the successful integration of **ATC.** MSV also has specifically proposed using handsets that would communicate with the proposcd terrestrial network *only if* the satellite signal was blocked. MSV's *December 16,* 2002 *Letter* marks a radical departure from the next-generation proposal that MSV has explained and advocated for during the past year and half.[4] MSV's current satellite system is not designed to monitor ATC interference at its satellites or reuse spectrum with ATC in an efficient manner. At this late date, MSV seeks to ignore its prior plans and promises to the Commission and now suggests simply adding some vague terrestrial use of the L-band.

lnmarsat has explained why and how MSV's proposed use of **ATC** in its next-generation system would disrupt Inmarsat's existing and future services both inside and outside the U.S., undermine the continued evolution of more efficient MSS technology, and exacerbate

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[4] *See, e.g.,* Mobile Satellite Ventures Subsidiary LLC, et al. Application for Assignment and Modification of Licenses and for Authority to Launch and Operate a Next-Generation Mobile Satellite System, *File No. SAT-ASG-20010302-00017* at i and ii (filed March 1, 2001)("*Application*"); Comments of Motient Services Inc., TMI Communications and Company, Limited Partnership, and Mobile Satellite Ventures Subsidiary LLC, IB Docket No. 01-185, ET Docket No. 95-18 at 2 (filed October 22, 2001) ("*MSV Comments*"); Comments of Mobile Satellite Ventures Subsidiary LLC at 5 (filed March 22, 2002) ("MSV notes that the key to its next generation system is the ability to create a more valuable service with the combination of satellite and terrestrial facilities. MSV believes that this can be accomplished with its next generation system, integrated with ATC.") ("*Further MSV Comments*").

the already severe MSS spectrum shortage at L-band.' Morcover, lnmarsat has shown that there is no practical means of establishing and enforcing protective parameters that would prevent the interference that would bc caused by even an integrated ATC system.[6]

Standalone use of ATC that MSV now proposes raises additional issues above and beyond those implicated by an integrated ATC system. For example, MSV would be unable to implement the satellite-based monitoring of interfercncc that it promised would be part of its next-generation satellites.' Morcover, Inmarsat believes that use of ATC with MSV's current spot-beam configuration may be more inefficient than an integrated use of **ATC** with MSV's next-generation system thereby resulting in MSV using more L-band spectrum, and that such a non-integrated use may cause even grcater interference to Inmarsat's services. Regardless, under either the old or the new proposal, MSV still would be using L-band spectrum for terrestrial service. which is inconsistent with the *MOU.*

Inmarsat cannot fully respond to the *December 16, 2002 Letter* -- MSV has provided no explanation of how ATC would operate with its current satellite system and no analysis of what the impact of non-integrated ATC would have on MSV itself and on other operators in the 1-band. lnmarsat and the Commission need a full understanding of what MSV is specifically proposing. Without such disclosure by MSV, lnmarsat and the other parties in the proceeding have no meaningful opportunity to respond. Based on the limited information available, however, Inmarsat believes that any deployment of terrestrial services in connection with MSV's current satellite system would create as great, if not greater, interference problems as those that would result from the integrated use of ATC with MSV's next-generation satellite systcm.

Finally, lnmarsat objects to MSV's impermissible attempt to broaden the scope of the *NPRM* on the eve of the Commission's decision.' In the *NPRM,* the Commission stated that "Motient seeks authority to operate terrestrial base stations, *as part of Motient's next-generation*

See, e.g., Ex parte presentation of Inmarsat Ventures plc at 15-16, IB **Docket** No. 01-185 (filed September 12, 2002).

See, e.g., Inmarsat Response to MSV *Ex Parte* of March 28 Concerning "Monitoring and Control of Ancillary Terrestrial Emissions by MSV's Space Segment," IB Docket No. 01-185 (filed May 15, 2002).

See Reply Comments of Motient Services, Inc., TMI Communications and Company, Limited Partnership, and Mobile Satellite Ventures Subsidiary LLC at Technical Appendix at 10, IB Docket No. 01-185 (filed November 13,2001).

See Notice of Proposed Rule Making, *In the Matter of Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz, the L-Bund, and the 1.M.4 GHz Bund; Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile Satellite Service*, IB Docket No. 01-185, ET Docket No. 95-18 (rel. August 17, 2001) ("*NPRM*").

mobile satellite system in both the upper and lower L-band."[9] It was this specific proposal about which the Commission sought comment.[10] In its prior comments and *ex parte* filings during the past year, MSV has not sought io correct or expand the scope of the *NPRM*.[11] Because the use of ATC with MSV's current satellite system has never been an issue in the proceeding, lnmarsat has not commented on the interference and other harmful implications of such a proposal. MSV's request that the Commission radically expand the scope of the *NPRM* at this late date is highly prejudicial and fundamentally unfair, because lnmarsat is left with no time to adequately analyze and comment on MSV's vague proposal.

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9 *Id.* at ¶ 15 (emphasis added).

10 *Id.* at ¶ 29 ("we seek comment on a proposal that, ifadopted, would permit ancillary terrestrial operations in the manner proposed by ICO and Morient.")

11 *See MSV Comments* at 2 ("[t]he impetus for this proceeding is the proposal by Motient, TMI, and MSV in 2001 to deploy a *next-generation* MSS system that would use ancillary terrestrial facilities.") (emphasis added); *see also Further MSV Comments* at 5 ("MSV notes that the key to its next generation system is the ability to create a more valuable service with the combination of satellite and terrestrial facilities. MSV believes that this can be accomplished with its next generation system, integrated with **ATC.").**

Inmarsat urges the Commission to limit the use of the L-band to satellite services only and to deny any request for terrestrial use of the L-band. If MSV or any other operator were permitted to use the L-band for terrestrial service, Inmarsat's satellite operations would suffer harmful interference, service to Inmarsat users would be disrupted or curtailed, and Inmarsat's ability to deploy new and innovative satellite services would be limited. Moreover, consistent with the scope of the *NPRM* and MSV's position prior to December 16, 2002, Inmarsat urges the Commission to limit its review of ATC in the L-band to MSV's use of ATC with its next-generation system. To do otherwise would impermissibly expand the scope of this proceeding and would be highly prejudicial to Inmarsat and the other parties to this proceeding.

Sincerely,

Gary M. Epstein
John P. Janka
Alexander D. Hoehn-Saric

Counsel for Inmarsat Ventures plc

cc: Chairman Michael K. Powell
Commissioner Kathleen W. Abernathy
Commissioner Michael J. Copps
Commissioner Kevin J. Martin
Commissioner Jonathan S. Adelstein
John Branscome
Samuel Feder
Paul Margie
Barry Ohlson
Bryan Tramont
Don Abelson
Thomas Sugrue
Edmond Thomas

Exhibit A

Inmarsat Technical Analyses on ATC

1. *Comments of Inmarsat Ventures plc*, IB Docket No. 01-185 (filed October 19. 2001), and *Technical Annex* thereto

2. *Reply Comments of Inmarsat Ventures plc*, IB Docket No. 01-185 (filed November 13, 2001), and *Supplemental Technical Annex* thereto

3. *Ex parte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed February 26, 2002)

4. *Further Comments of Inmarsat Ventures plc*, IB Docket No. 01 185 (filed March 22,2002)

5. "Quantification of Harmful Co-Channel L-Band Uplink Interference into Inmarsat-4 From MSV ATC Uses, Versus MSV Mobile Earth Terminal Uses," *ex parte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al* (filed May 10, 2002)

6. "Inmarsat Response to MSV Ex Parte of March 28 Concerning 'Monitoring and Control of Ancillary Terrestrial Emissions by MSV's Space Segment,"' *ex parte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed May 15. 2002)

7. "MSV is Unable to Operate ATC Without Using Additional Spectrum Beyond That Used for Its MSS System," *ex parte* presentation of Inmarsat, IB Docket No. 01-185, File No. SA7 ASG-20010302-00017 *et ul.* (filed May 21, 2002)

8. "Inmarsat's Reply to the 'Further Technical Analysis' of Mobile Satellite Ventures, dated July 29, 2002," *ex parte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed September 9. 2002)

9. *Ex parte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed September 12, 2002)

10 *Ex parte* presentation of Inmarsat to the Office of Engineering and Technology, IB Docket No. 01-185, File No. SAT-AX-20010302-00017 *et al.* (filed November 6, 2002)

Exhibit B

ShawPittman

A Law Partnership Including Professional Corporations

DUPLICATE

Lead # SAT-ASG-20010302-00017

March 1,2001

Deliver Via Courier to Mellon Bank

Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
445 12th Street, **S.W.**
Washington, DC 20554

MAR 02 2001

RE: Mobile Satellite Ventures Subsidiary LLC
Application lor Assignment and Modification **of** Licenses and for
Authority to Launch and Operate **a** Next-Generation **Mobile** Satellite System

Dear Ms. Salas:

Submitted herewith **on** behalf of Mobile Satellite Ventures Subsidiary LCC ("MSV Sub") are an original and twenty (20) copies **of** an application to (i) assign the space station and earth station licenses and STAs, Section 214 authorizations, and pending applications of Motient Services Inc. ("Motient") to MSV Sub; (ii) modify Motient's licenses, STAs, and pending applications to permit MSV **Sub** to operare using certain Canadian-licensed facilities; and (iii) launch and operate the next-generation mobile satellite system described herein.

Enclosed **is** a Form 159 and a check for $37,140 to cover the requisire filing fee. Please contact the undersigned should there be any questions regarding this filing.

Respectfully submitted,

Bruce D. Jacobs
Bruce D. Jacobs
David S. Konczal

2300 N Street, NW Washington, DC 20037-1128 | 202.663.8000 Fax: 202.663.8007 | www.shawpittman.com | Washington, DC Northern Virginia New York Los Angeles London

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

In the Matter of	)	
	)	
Motient Services Inc.	)	
	)	
and	)	File No.
	)	
Mobile Satellite Ventures Subsidiary LLC	)	
	)	
Application for Assignment of Licenses and For Authority to Launch and **Operate** a Next-Generation Mobile Satellite Service System	)	

APPLICATION

Lon C. Levin
Vice **President** and
Regulatory Counsel
Motient Services Inc. and
Mobile Satellite Ventures Subsidiary LLC
10802 Parkridge Boulevard
Reston. VA 20191
(703) 758-6000

Bruce D. Jacobs
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Counsel for Motient Services, Inc. and
Mobile Satellite Ventures Subsidiary LLC

March 1. 2001

Summary

This application presents a bold proposal for the development of the next generation of Mobile Satellite Service. Mobile Satellite Ventures Subsidiary LLC ("MSV Sub"), which will develop and operate the replacement system, is a pathbreaking union of the current United States and Canadian **MSS** licensees and a group of new investors. The proposed system will use a highly innovative and spectrum-efficient combination of spot-beam satellites and fill-in terrestrial base stations to substantially improve coverage, capacity. and reliability, without using any additional spectrum. The Commission's grant of this proposal will clear the path to a revitalized regional MSS system that will provide competitive, high-speed, and affordable communications services to the most rural and remote areas.

MSV Sub, the new licensee, will be a wholly-owned subsidiary of an entity that will be jointly owned by the parent of Motient Services Inc. ("Motient"), the operator of the United States MSS system; TMI Communications and Company, Limited Partnership ("TMI"), the operator of the Canadian-ficcnsed MSS system; and a group of new investors that bring both significant financial resources and expertise in the development of innovative radiocommunications systems. Pending deployment of the next-generation system, **MSV** Sub will serve customers using Motient's existing satellite and leased capacity on TMI's current satellite. To operate more efficiently, MSV Sub will consolidate certain of the two systems' facilities. The Canadian government will continue to be the authorizing entity for the operation of TMI's first generation satellite, its replacement satellite. and system facilities located in Canada.

Both of the first-generation satellites must be replaced within the *next* five to **six** years. If

the authority requested herein is granted by mid-2001, MSV Sub will be able to launch and begin operation of replacement satellites by early 2006. The next-generation system will employ two high-power. spot-beam geostationary satellites. Integrated with these satellites will be fill-in base stations in high-traffic areas to enable the co-channel reuse of the satellite service link frequencies, providing coverage to areas blocked from the satellite signal. This is achieved by a combination of the satellites' spot-beam design, which provides a substantial increase in frequency reuse over the satellites that are being replaced. and each base station's use of frequencies that are otherwise unused at that base station's location. The proposed system employs techniques that represent a significant breakthrough in satellite-terrestrial spectrum management and promise the development of a viable mass market for land mobile satellite services.

Using the new system, customers using lightweight, handheld mobile terminals will communicate through both the satellite and the base stations. The satellite path will be the preferred communications link, but if the user's satellite path is blocked, the communications link will he sustained via the fill-in base stations. When a user travels between the two coverage areas or between base stations, the network control facility, using highly-integrated system control functions derived from terrestrial cellular technology, will hand off the user among facilities as required to sustain a continuous communications link.

The proposed system reflects the hard lessons learned by Motient and TMI as pioneers in the Mobile Satellite Service industry, as they prepare to replace their existing systems. Motient launched the first U.S. domestic Mobile Satellite Service system in 1995 and to date has invested over $900 million in its development. TMI launched its system in 1996 and has invested a similar amount in its development. The experience of Motient and TMI in developing their

separate systems. and the recent failures of other MSS ventures, have convinced the two companies that a satellite-only system is ideal for rural areas but has insufficient capacity and poor urban coverage, particularly near and inside buildings, to be affordable and competitive. For example, one of Motient's most successful service offerings has been a combination of its L-band satellite service with the two-way data services offered over a nationwide, ground-based 800 MHz network that was acquired by Motient's parent corporation in 1998. This experience in particular has highlighted the extent to which consumers want both the wide-area coverage of a satellite system and the robust signal and in-building penetration that requires terrestrial facilities in urban areas.

In addition. Motient and TMI recognize they must combine their resources and invest in new technology that can provide better performance and establish the critical mass of customers that is needed to make the service affordable. Indeed, this proposal reflects a logical evolution in the parties' relationship. Motient and TMI have cooperated since their inception, jointly procuring their satellites and other key system components and providing restoral capacity to each other.

Thus, the companies arrived at this proposal to transition from the current system to one built on satellite technology and supplemented by terresmal base stations, with the coverage and capacity to provide an affordable service. Together with the strategic investors, who bring additional financial capability as well as experience in the development of sophisticated satellite technologies and applications, Motient and TMI are now able, and fully committed, to develop the next-generation system proposed herein.

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

In the Matter of	)	
	)	
Motient Services Inc.	)	File No.
	)	
and	)	
	)	
Mobile Satellite Ventures Subsidiary LLC	)	
	)	
Application for Assignment of Licenses and For Authority to Launch and Operate a Next-Generation Mobile Satellite Service System	)	

APPLICATION

Morient Services Inc. ("Motient") and Mobile Satellite Ventures Subsidiary LLC ("MSV Sub') hereby apply for authority, pursuant to Sections 214, 308 and 309 of the Communications Act of 1934, as amended, and Sections 25.114, 25.119, and 63.18 of the Commission's Rules (i) to assign Motient's licenses and pending applications *to* MSV Sub; (ii) to modify Motient's licenses to permit MSV Sub to operate using cenain Canadian-licensed facilities; and (iii) to launch and opcrare the next-generation system described herein. which includes the deployment of satellites and base stations operating in the same frequencies as an integrated network.

I. MOBILE SATELLITE VENTURES SUBSIDIARY LLC

This assignment request reflects the proposed combination of the United States and Canadian regional Mobile Satellite Service ("MSS") systems and the infusion of new investment

2. OPERATION OF THE COMBINED SYSTEMS

In order to operate as efficiently and flexibly as possible, Motient and MSV Sub seek to modify the existing Motient licenses to permit MSV Sub to operate using both **AMSC-I** and MSAT-I, and the Mobile Satellite Ventures (Canada) lnc. fixed earth station and switching facility in Ottawa. Other than their location, these facilities are essentially identical to those Motient is currently using. All calls to and from United States customers will be routed through a United States point of presence in Reston, Virginia. **MSV** Sub will continue to comply with all Commission obligations such as the provision of priority **and** preemptive access to aviation safety services. (The ability **of** TMI's switch to satisfy these conditions was approved **by** the Commission when it authorized TMI to provide United States service using MSAT-I.) MSV Sub also will continue to operate its Reston, Virginia and Alexandria, Virginia fixed earth stations for the benefit of its current wholesale customers. MSV Sub also may consolidate its TT&C facilities with those provided by Telesat for MSAT-I.

3. THE NEXT-GENERATION SYSTEM

The proposed next-generation system represents a major advance in the state of the an of radiocommunications.[1] Based on the pioneering experience of Motient and **TMI** in operating Nonh American MSS systems and on innovative technology being developed with the new investors, the proposed system design combines high-capacity, spot-beam satellites with terrestrial base stations that **will** be deployed at the same time as the satellites and will reuse the satellite spectrum to provide improved coverage in urban areas. MSV Sub has the financial

[1] This next-generation system proposal is being filed as an amendment to the replacement satellite system application that Motient filed two years ago and amended in December 2000. See File No. SAT-LOA-19980702-00066 (July 2, 1998); SAT-AMD-20001214-00171 (Dec. 14.2000).

resources and is prepared to deploy and begin operation of the new system within **52** months of receiving a grant of this application.

Pending deployment of the next-generation system, **MSV** Sub will provide service using Motient's existing system and leased capacity on TMI's existing satellite. After in-orbit testing of the new system, existing traffic will be moved to MSV-I and both older satellites will be used as in-orbit spares.

3.1. TECHNICAL DESCRIPTION

Figure 3-1 shows the overall system facilities. The system is designed to operate its service links in the MSS L-band. **A** component that uses 2 GHz may be added in a future proposal, contingent on the outcome of necessary design review.

The space segment will consist of two geostationary satellites and associated telemetry, tracking, and command ("TT&C") facilities. **The** satellites will cover Nonh America, the Caribbean and Central America, and northern parts of South America.

The terresmal segment will use digital cellular technology. It **will** consist of one or more Gateway Station Systems ("GSSs"), a Network Operations Center ("NOC"), mobile switching centers ("MSCs"), base station controllers ("BSCs"), base transceiver stations ("BTSs") and a variety of mobile, portable, and fixed subscriber Terminals ("MTs"). The radiocommunication facilities will be interconnected to the Public Switched Telephone Network **("PSTN")** and the Public Data Network ("PDN"). Innovative antenna design and network management techniques will he used to prevent any interference IO other systems or services.

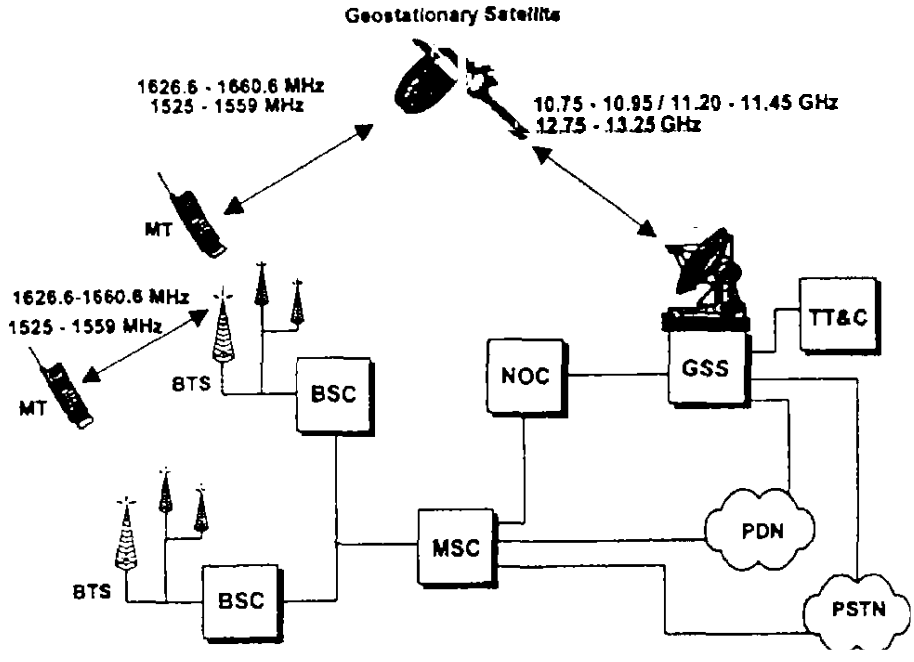

Figure 3-1 Overall System Facilities

The satellite service links will be at **1626.5-1660.5** MHz (Earth-to-space) and **1525-1559** MHz (space-to-Earth). Satellite feeder links will be at **12.75-13.25** GHz (Earth-to-space) and 10.75-10.95, 11.20-11.45 GHz (space-to-Earth). During transfer orbit, TT&C will be performed in the 14/12 GHz FSS bands. Once on station, TT&C will be performed in either the **14/12** GHz or the 13/11 GHz communications bands.

The space segment will use a flexible frequency filtering, frequency translation, and feeder link-to-service link cross-connect design that is configurable by ground command. This capability permits efficient spectrum utilization in both the service links and feeder links, the matching of bandwidth and beam type to specific service needs, and flexibility in achieving frequency coordination with other **MSS** operators.

Base stations will be used in those areas where the satellite signal is attenuated by terrain or morphological features, and to provide in-building coverage. Base station operations will use

a standard wireless protocol; GSM is the current baseline protocol. Mobile terminals will transmit at **1626.5-1660.5** MHz and receive at **1525-1559** MHz.

The new system will comply with all of the regulatory and technical requirements currently applicable to **MSS** L-band systems in the United States, including those requirements relating to emergency communications capabilities, access by law enforcement agencies, and telecommunications access for the disabled.

The new system is optimized to provide digital voice and packet-switched data services. The system will offer point-to-point and point-to-multipoint services. The satellites are designed to provide a **variety** of ground-commanded, configurable antenna beam sizes and locations that can be tailored to the specific needs of a service. For example, using spot beams or base station operation, the system will be able to provide point-to-point voice and data services at rates up to 160 kilobits per second. At the same time, the system may use a single beam that covers the entire service area to provide dispatch services.

The space segment will use bent-pipe, frequency-manslating transponders between the service links and the feeder **links,** allowing it to support all first-generation services as well as new services without the resmctions imposed by regenerative satellites. The space segment will also be able to support multiple gateways.

A more detailed description of the technical design of the next-generation system is attached as Appendix **A.**

3.2. SCHEDULES AND PROGRAM MILESTONES

Motient and MSV Sub propose to begin construction within nine months of grant. Construction of the satellite **will** be completed within **47** months of grant, it will be launched three months later and in service two months after that. The second satellite, the replacement

satellite for MSAT-I, will serve as a ground spare and be launched as capacity requires. The base stations will not begin commercial operation until the first satellite is operating.

3.3. SYSTEM COST AND FINANCIAL PLAN

The proposed satellites will have design lives of fifteen years. The cost of developing, launching, and operating the satellites is $770 million. This includes: design and development of the system; construction of two spacecraft; in-orbit delivery of two spacecraft; construction of the satellite ground segment; and operation of the ground segment for one year. The cost of deploying base stations will depend on the number of base stations MSV Sub chooses to deploy.

Particularly following the proposed restructuring, the licensee will be financially qualified to construct and operate the proposed MSS system. If necessary, however, the Commission should waive any financial qualification requirement. Permitting the licensee to go forward with the operation of the proposed system will promote the use of the L-band spectrum and provide facilities-based competition to other service providers. See Northeast Cellular Telephone Co. v. FCC. 897 F.2d 1154, 1166 (D.C. Cir. 1990); *see also* WAIT Radio v. FCC, 418 F.2d 1153, 1159 (D.C.Cir. 1969). Motient and MSV Sub have proven their commitment to the fullest possible use of the L-band spectrum and deserve the opportunity to replace their first generation system with a system that will provide even greater public interest benefits.

4. PUBLIC INTEREST BENEFITS

The Assignment of Licenser to MSV Sub and the Combination of the Motient and TMI Systems. Motient and TMI have been pioneers in the provision of wireless communications by satellite, investing approximately 51.5 billion in the development of their MSS systems. After more than four years of commercial operations, and in light of the recent failure of other MSS

satellites and the base stations also substantially increase the capacity of the system without

Appendix A

System Design

Where:

F(f) is the center frequency of Forward Link RF Channel 'f'

F, is the lower band edge frequency in MHz

F(r) is the center frequency of Return Link RF Channel carrier 'r'

F,, is the return frequency delta from forward frequency in MHz

TN is the time slot number

F(k) is the center frequency of RF channel 'k'.

F_u is the upper band edge frequency in MHz.

There will be a power control beacon, an unmodulated carrier, generated on the spacecraft and transmitted in the feeder link downlink. The frequency of this beacon will be selected as part of the spacecraft contracting process. The beacon will be used to detect signal fading and guide power control of feeder uplink transmission.

1.4. Antenna Subsystems

There will be separate antenna systems for the service and feeder links. The service link antenna will use a 12-meter reflector. The technical performance characteristics of the antenna are listed in Table 1-2. Up to 200 spot beams, capable of supporting numerous carriers, are configurable (location, shape, and sire) within the communications service area. Figure 1-2 depicts a coverage pattern similar to the current AMSC-I and MSAT-1 coverage.

Figure 1-3 illustrates how a ponion of the available spectrum may be configured with spot beams, emulating first-seneration satellites. to maintain compatibility with first generation user terminals and senices. Figure 1-4 illustrates how another portion of the spectrum can be configured using a single beam covering rhe lower forty-eight states, Alaska. Canada. Mexico, Central America, the northern pan of South America and the Caribbean. This configuration is

particularly applicable to point-tomultipoint services. Another portion **of** the spectrum **will** use an array of non-overlapping spot beams for point-to-point services. The gain contours for one of these beams **are** illustrated in Figure 1-5.

The **feeder** links **will use** a single Ku-band antenna beam, illustrated in Figure 1-6, that provides broad coverage of North America. Hawaii. Mexico. Central America. **the** northern pan of South America and the Caribbean.

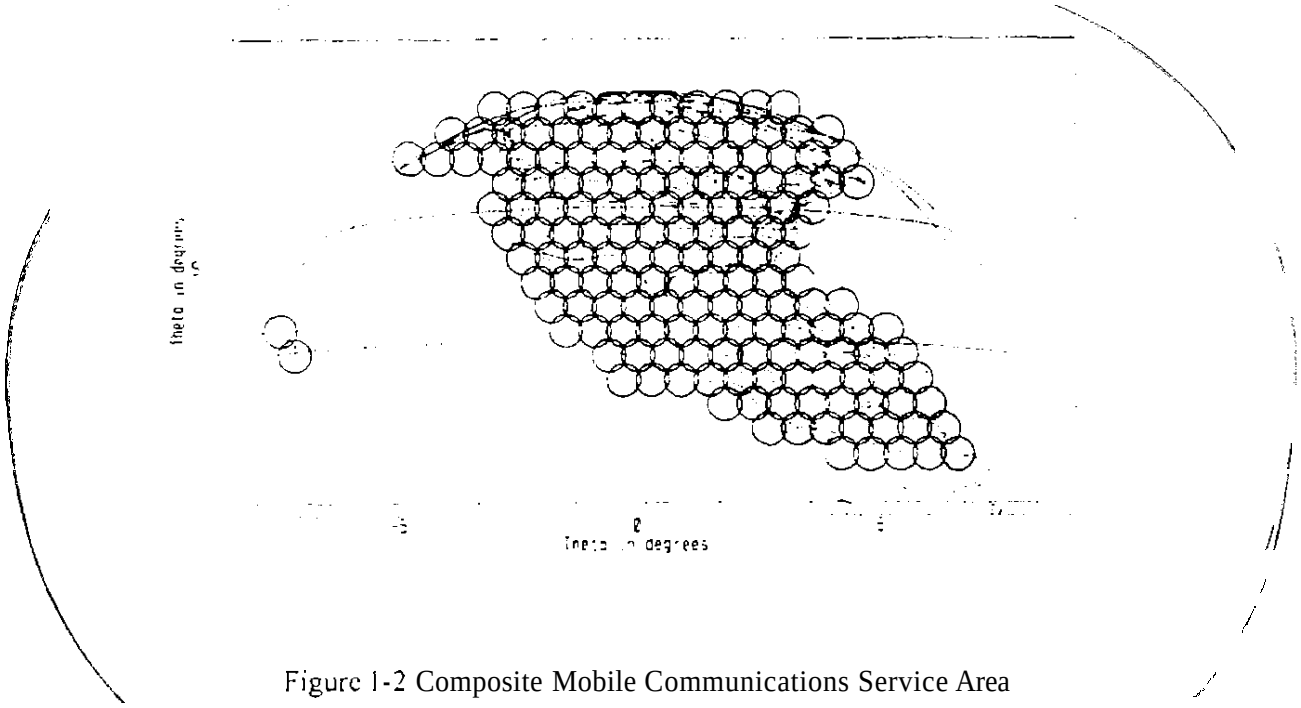

Figure 1-2 Composite Mobile Communications Service Area

2. FILL-IN BASE STATIONS

2.1. Number and Location of Fill-In Base Stations

MNET will rely on its satellites to cover approximately **99%** of the area of the United Stares. Nonetheless, multipath clutter, shadowing of the signal, and the satellite signal's inability to penetrate inside buildings severely degrade satellire coverage, making satellite service generally unavailable in urban areas. To mitigate these effects. fill-in base stations will supplement satellite coverage in these affected **areas.** The number **of** fill-in base stations deployed depends on a detailed propagation analysis of each city to be served. Subject to licensing by the Canadian authorities, MSV will also deploy fill-in base stations in major Canadian cities.

2.2. Fill-In Base Station Design

Similar to GSM systems. the design will be comprised of Fill-In Base Transceiver Srations ("BTS"), Fill-In Base Station Controllers ("BSC"), and MSCs. BTSs and BSCs provide and control the air interface to the mobile terminals. **MSCs** are comprised of a GPRS Support Nodeipacket data router. a voice switch. a Home Location Register, a Visitor's Location Register. an Authentication Center, and the connections to the **PSTN** and PDN.

Figure 2-1 **is** a block diagram ofthe fill-in base station segment.

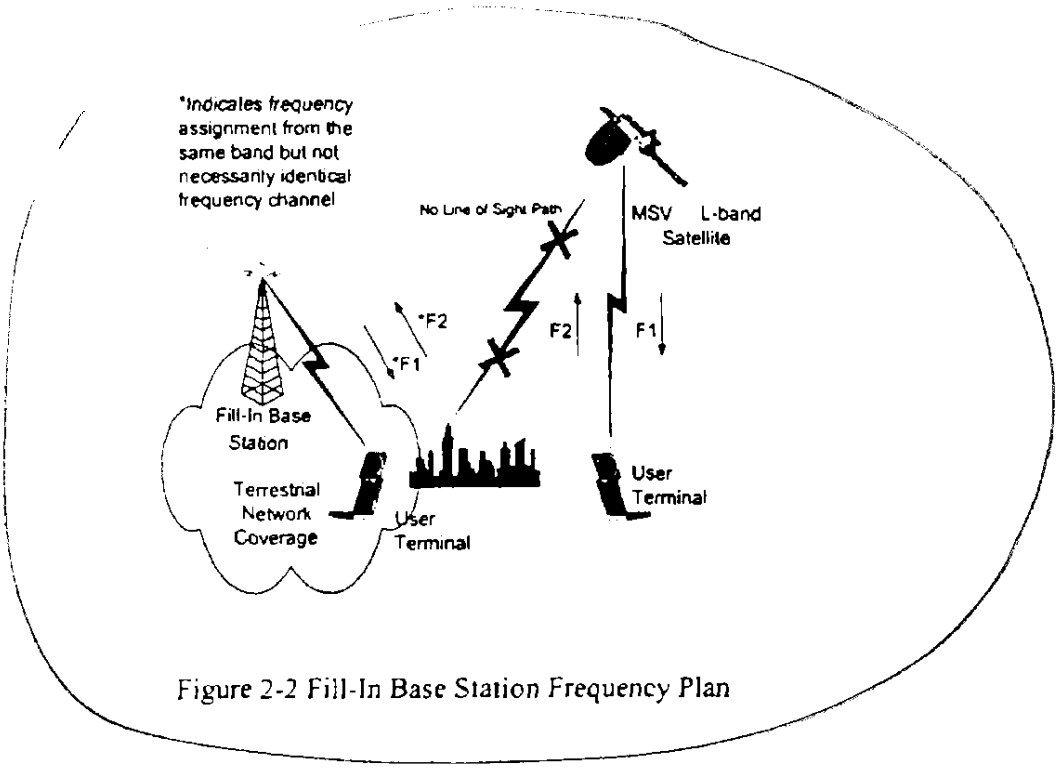

Figure 2-2 Fill-In Base Station Frequency Plan

2.4. Antenna Subsystems

An integral component of the fill-in base station is a specially designed antenna. This innovation in antenna design focuses energy toward the desired coverage area and reduces the energy radiated skyward Prototype versions of this antenna have been developed and are undergoing testing to characterize and optimize performance. The antenna pattern is shown in Figure 2-3 and Figure 2-4.

Table **2-2** Fill-In Base Station Link **Budget**

ine	RECEIVER:	BTS	MT	Unit	Derivation
A	Antenna Thermal Noise (N)	-120	-120.0	dBm	
B	Noise Figure	8	10.0	dB	
C	Ec/N0 Min Fading	8	8.0	dB	
D	RX RF-Input Sensitivity	-104	-102.0	dBm	A+B+C
E	Interference Degradauon Margin	0	0 0	dB	
F	Cable + Connector Loss (Typical)	3	0.0	dB	
G	RX Antenna Gain	16	0.0	dBi	
H	Diversity Gain	5	0.0	dB	
I	Isotropic Power, 50% Ps	-122	-109.0	dBm	D+E+F-G-H
J	Lognormal Margin 50% -->90% Ps	10	10.2	dB	
K	Isotropic Power. 90% Ps	-112	-91 8	dBm	H+I
	TRANSMITTER	MT	BTS	Unit	Derivation
L	TX RF-Output Peak Power Class 2	1	10	W	
M		30	40	dBm	
N	Combiner Loss	0	3.4	dB	
O	Cable + Connector Loss	0	3.5	dB	
P	TX Antenna Gain	0	16.0	dBi	
Q	Peak Eirp	30	49.1	dBm	M-N-O+P
		1	81.3	W	
R	Body Loss	3	3	dB	
S	Isotropic Path Loss, 50% Ps	149.0	148.1	dB	Q-J-R
T	Isotropic Path Loss. 90% Ps	138.8	137.9	dB	Q-K-R
	Balanced Max Allowable Paih Loss		137.9		
	Balanced EIRP		49.1		

directional antennas to support high-speed. high-throughput applications. These terminals will bc multi-functional, capable of supporting voice, voice dispatch, packet-data, and multi-cast services with common hardware. They will be capable of detecting potential interference and adjusting configurations *to* ensure that signal-to-noise ratios are maintained for an error-free connection. All existing terminal types will continue to be served.

The higher capacity of the new system and the use of an existing industry standard signaling protocol will make possible much higher volume production of new terminals at decreased terminal costs, with easy installation, maintenance. and improved reliability.

4. SYSTEM CONTROL

4.1. Network Operational Control

Network operational control will be staffed 7 days-per week. 24 hours-per-day to ensure continuity of service. Personnel will provide in-house maintenance and monitoring of the transmission facilities, network interconnect facilities, and the facilities that connect MNET with the PSTN, PDN. and private networks. To ensure reliable service. system monitoring will include:

- Monitoring of all active components with switchover to redundant active units upon alarm.
- Monitoring of system power levels at critical junctions of the MNET chain to insure that the transmission levels remain within tolerances.
- Line monitoring to insure the continuity of the transmission lines that interconnect the BSC to the BTS, the MSC to the PSTN/PDN and the NOC to the other network components. Upon alarm. rhc facility will switch to diversely routed redundant path where available.
- Each of the carriers present in the satellite transponders will be continuously monitored and maintained within frequency assignment and power allocation tolerances.
- The licensee will contract with a firm to monitor satellite health and safety.