Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands;	)	IB Docker No. 01-I85
	)	
Review of the Spectrum Sharing Plan Among Non-Geostationaiy Satellite Orbit Mobile Satellite Service Systems in the 1.6/2.4 GHz Bands	)	IB Docket No. 02-364
	)	

REPORT AND ORDER
AND NOTICE OF PROPOSED RULEMAKING

Adopted: January 29. 2003 **Released:** February 10, 2003

Comment date **[30 days after Federal Register publication]**
Reply Comment date **[45 days after Federal Register publication]**

By the Commission: *Chairman Powell, Commissioners* Abernathy and *Adelstein* issuing separate statements; Commissioner Copps approving in part, dissenting in part and issuing a statement

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I. INTRODUCTION

1. Today we decide to permit flexibility in the delivery of communications by Mobile Satellite Service (MSS) providers that operate in three sets of radio frequency bands: the 2 GHz MSS band,[1] the L-band[2] and the Big LEO bands.[3] Specifically, we permit MSS licensees to integrate ancillary terrestrial components (ATCs) into their MSS networks. Flexibility in this context differs from a so-called "flexible-use" allocation in which licensees can provide any service that appears in the U.S. Table of Allocations for the band either individually or in combination with other allocated services. We decide here to permit MSS operators to seek authority to integrate ATCs into their networks for the purpose of enhancing their ability to offer high-quality. affordable mobile services on land, in the air and over the oceans without using any additional spectrum resources beyond spectrum already allocated and authorized by the Commission for MSS in these hands. We will authorize MSS ATC subject to

[1] The term "2 GHz MSS band" is used in this Order to refer to the 1990-2025 MHz uplink (Earth-to-space transmissions) and 2165-2200 MHz downlink (space-to-Earth transmissions) frequencies. originally allocated to MSS in the United States. *See* U.S. Table of Frequency Allocations, 47 C.F.R. § **2.106 (2002)** (providing a precise frequency allocation list and stating various encumbrances on particular sub-bands). A companion item to today's decision alters the 2 GHz MSS band to **2000-2020** MHz for uplink transmissions and 2180-2200 MHz for downlink transmissions. *See Amendment of Part 2 of rlie Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services. including Third Generation Wireless Systems*, ET Docket No.00-258, Third Report and Order, Third Notice of Proposed Rulemaking. and Second Memorandum Opinion and Order, FCC 03-16 (adopted Jan. 30, 2003) (*AWS Third Report and Order).*

[2] The "L-band' is a general designation for frequencies from 1 to 2 GHz. In the United States, the Commission has allocated L-band spectrum for MSS downlinks in the 1525-1544 MHz and 1545-1559 MHz bands and for MSS uplinks in the 1626.5-1645.5 MHz and 1646.5-1660.5 MHz bands. See 47 C.F.R. § 2.106.

[3] The term "Big LEO bands" is used in this *Order* to refer to the 1.6/2.4 GHz bands. In general. the Big LEO MSS systems rely on *uplinks* within the 1610-1626.5 MHz band and downlinks in the 2483.5-2500 MHz band.

conditions that ensure that the added terrestrial component remains ancillary to the principal MSS offering. We do not intend. nor will we permit. the terrestrial component to become a stand-alone service. We believe that permitting MSS ATCs in this manner should: (1) increase the efficiency of spectrum use through MSS network integration and terrestrial reuse and permit better coverage in areas that **MSS** providers could not otherwise serve; (2) reduce costs. eliminate inefficiencies and enhance operational ability in MSS system; **(3)** provide additional communications that **may** enhance public protection: and (4) strengthen competition in the markets served by MSS.[4]

2. Our decision today balances the traditional goals of effective and efficient use of spectrum with preserving the optimal amount of spectrum for the provision of international satellite services. In this instance, we find that grant of ATC appears to best balance these competing public interest goals. Specifically, based on the record and our detailed technical analyses, we find that granting shared usage of the same MSS frequency band to separate MSS and terrestrial operators would likely compromise the effectiveness of both systems. particularly satellites already operating in the L-band and Big LEO band. In this case, making limited terrestrial authority available to licensed **MSS** operators in the form of ATC better serves the public interest than the more limited and technically difficult prospect of attempting to share the MSS spectrum, which would pose an unacceptable risk of harmful interference to the existing end planned operations of licensed MSS operators. At bottom, the Commission must choose between two alternatives. We could either prohibit MSS licensees from deploying MSS ATC in order to preserve, on principal, the initial service and operational rules for **MSS.** ***Or*** we could grant additional authority to the MSS incumbents to improve their services and efficient use of spectrum at the cost of giving the incumbents more operational authority than they had originally sought. Forced to choose, we believe granting, rather than withholding. access to spectrum resources represents the better course.

3. Consistent with this Order and the rules we adopt today, *2* GHz **MSS,** L-band and Big LEO operators may seek authority to integrate ATCs into existing and planned systems. We will authorize MSS licensees to implement ATCs, provided that the MSS licensee: (I) has launched and operates its own satellite facilities; *(2)* provides substantial satellite service to the public; **(3)** provides integrated ATC; (4) observes existing satellite geographic coverage requirements; and (5) limits ATC operations only to the authorized satellite footprint.[5] As explained below, observing certain space-segment requirements constitutes the provision of substantial satellite service to the public and should ensure that MSS remains

[4] For an overview of historical and current MSS operations. ***see*** *generally, e.g., Establishing* Rules and Policies ***for Use*** *of Spectrum* ***for*** *Mobile Satellite* Services *in* ***Upper and*** *Lower* L-Band. Report and Order, 17 FCC Rcd **2704.** 2708-13, ¶ 11-20 (2002) (discussing technical innovations in MSS, reviewing some of the "strides made in spectrum-efficient MSS technologies" within the L-band and noting that **"MSS** systems **are** particularly well suited for providing mobile communication services to areas that are not being adequately served by terrestrial radio facilities").

[5] As we have repeatedly indicated, we intend to authorize ATC ***only*** **as** an ancillary service to the provision **of** the principal service. MSS. We have established a number of gating requirements to ensure that ATC may only operate after the provision of MSS has commenced and during the period in which MSS continues lo operate. ***See*** *infra* §§ III(C)(2)-(4); **see** *also infra* App. B. While it is impossible to anticipate or imagine every possible way in which it might be possible to "game" our rules by providing ATC without also simultaneously providing MSS and while we ***do*** *not* expecr our licensees to make such attempts. we do not intend to allow such "gaming." For **example,** even *if* an MSS licensee were to enter an agreement to lease some or all of the access to its authorized MSS spectrum to **a** terrestrial licensee. such spectrum could only be used if its usage met the requirements to ensure it remained ancillary to MSS and were used in conjunction with MSS operations. i.e., that it met **all** of our gating requirements. The purpose of our grant of ATC authority is to provide satellite licensees flexibility in providing satellite services that will benefit consumers. not to allow licensees to profit by selling access to their spectrum for **a** terrestrial-only service.

first and foremost a satellite service. For planned. licensed MSS systems. licensees may seek ATC authorization prior to launch and operation. but shall not provide ATCs prior to meeting the above criteria, and must have complied with MSS implementation milestones imposed on licensees at the time of seeking authority.

4. To prevent harmful interference and achieve other important public interest goals. we limit ATC deployments to certain "core" spectrum within each **MSS** licensee's respective spectrum assignments. These core spectrum requirements vary by band due to the unique characteristics of each **MSS** system's spectrum assignment. In the 2 GHz MSS band. ATC is confined to each MSS operator's "Selected Assignment." In the L-band, ATC is confined to each operator's variable spectrum assignment acquired pursuant to the 1996 Mexico City Memorandum of Understanding and related Operating Agreements (Mexico City MoU). In the Big LEO band. ATC is confined to no more than 5.5 megahertz in each direction of transmission per licensee. We implement this decision through the addition of a footnote to the **U.S.** Table of Frequency Allocations in section 2.106 of our Rules.[6] We also establish procedures for the authorization of **MSS** ATC operations consistent with the terms and conditions of this Order.

5. Finally. we initiate a new rulemaking in response to a petition for rulemaking filed by Iridium Satellite LLC (Iridium).' In its petition, Iridium requests that we revise our current rules to require MSS systems operating in the 1615.5-1621.35 MHz band to use time division/frequency division multiple access (TDMA/FDMA) technology,[8] rather than code division multiple access (CDMA) technology.' In effect, Iridium requests that we make 5.85 megahertz of MSS spectrum currently used by Globalstar L.P. (Globalstar). which uses CDMA technology, available to Iridium, which uses TDMA/FDMA technology. We tentatively conclude that a rebalancing of spectrum in the Big LEO band would serve the public interest and seek comment on the proposal in Iridium's petition and on various alternative uses for the Big LEO spectrum. including whether we should reallocate spectrum for unlicensed services, an additional commercial mobile radio service (CMRS) licensee or other services, or initiate a second processing round by which we could authorize new **MSS** entry.

II. BACKGROUND

6. We initiated this proceeding to consider the proposals of two MSS operators. ICO Global Communications (Holdings) Ltd. (ICO) and the Mobile Satellite Ventures Subsidiary LLC (MSV), to

[h] 47 C.F.R. § 2.106; *see infra* App. B. This footnote *to* the allocation table allows MSS licensees to implement MSS ATC pursuant to rules and policies adopted in this Order.

[1] Peririon for Rulemaking of Iridium Satellite LLC (filed. July 26.2002) (Iridium Petition) (Included in the record of IB Docket No. 02-364).

[8] TDMA is a transmission technique in which users of the same frequency band are provided alternating time slots for their transmissions in the system. thereby avoiding mutual interference.

CDMA is a transmission technique in which the signal occupies a bandwidth larger than that needed to contain the information being transmitted. The signal is spread over a wide bandwidth. the power is dispersed. and a code is used to send and retrieve the information. The spreading. the variation in the code, and other technical parameters permit a number of users to operate on the same frequency simultaneously without causing mutual harmful interference.

integrate ATCs into their MSS networks using assigned MSS frequencies.[10] ICO is one of five systems currently authorized to provide 2 GHz MSS in the United States.[11] ICO submitted its proposal in *ex parte* filings in Docket No. 99-81,[12] in which we promulgated service rules for operators in the 2 GHz MSS band.[13] MSV is currently licensed to provide MSS in the L-band.[14] MSV submitted its proposal in the

[10] *Flexibility for Deliver?, of Communications bv Mobile Satellite Service Providers in the 2 GH: Band. the L-Band, and rhe 1.6/2.4 GHz Band,* IB Docket No. 01-185, Notice of Proposed Rulemaking. 16 FCC Rcd 15532 (2001) *(Flexibility* Norice). During the course of this proceeding, New ICO Global Communications (Holdings) Ltd. (referred to in the *Flexibility Notice*) merged with ICO Global Ltd. to form ICO Global Communications (Holdings) Ltd. (referred to in this Order as "ICO"). *See* Letter from Cheryl A. Tritt to Magalie Roman Salas. Secretary, Federal Communications Commission, File Nos. SAT-T/C-20000531-00097 and SATAMD-20000612-00107 (December 13, 2001). Also during the course of this proceeding, Motient Services. Inc. (Motient), the U.S.-licensed L-band MSS operator, and TMI Communications and Company. Limited Partnership (TMI), a Canadian-licensed L-band MSS provider. combined their MSS systems into a jointly-owned subsidiary. MSV. *See Morienr* Services *Inc. and TMI Communications ond Company. LP/Mobile Sorellire Ventures Subsidiary LLC,* Order and Authorization. *16* FCC Rcd 20469 (Int'l Bur. 2001). Due to the substantial commonality of interest among Motient, TMI and MSV. we will refer to the three parties collectively as MSV in this Order unless otherwise indicated

[11] *See The Boeing Company,* Order and Authorization, 16 FCC Rcd 13691 (Int'l Bur. 2001) *(Boeing 2 GHz MSS License); Celsat America, Inc.,* Order and Authorization. 16 FCC Rcd 13712 (Int'l Bur. 2001) *(Celsat 2 GHz MSS License); Constellation Communicarions Holdings. Inc.,* Order and Authorization, 16 FCC Rcd 13724 (Int'l Bur./OET 2001) (*Constellation 2 GHz MSS License), authorization declared null and void, Mobile Comnrunicarions Holdings, Inc. and ICO Global Communications (Holdings) Limited for Transfer of Conrrol: Constellation Communicarions Holdings. Inc. ond ICO Global Communications (Holdings) Limited for Transfer of Conrrol.* Memorandum Opinion and Order. DA 03-285 (Int'l Bur., rel., Jan. 30, 2003) *(Constellation/MCHI Nullification Order); Globalstar, L.P.,* Order and Authorization. 16 FCC Rcd 13739 (Int'l Bur./OET 2001) *(Globalsrar 2 GHz MSS License), authorization declared null and void. Globalsrar. L P.. for Modification of License for a Mobile-Satellite Service System in the 2 GHz Band.* Memorandum Opinion and Order. DA No. 03-328 (Int'l Bur., rel., Jan. 30,2003) *(Globalsror Nullification Order); ICO Services Limited,* Order, 16 FCC Rcd 13762 (Int'l Bur./OET 2001) *(ICO 2 GHz MSS Order); Iridium LLC,* Order and Authorization, 16 FCC Rcd 13778 (Int'l Bur. 2001) *(Iridium 2 GHz MSS License); Mobile Communicarions Holdings. Inc.,* Order and Authorization. 16 FCC Rcd 13794 (Int'l Bur./OET 2001) *(MCHI 2 GH; MSS License), authorization declared null and void. Constellation/MCHI Nullification Order.* DA 03-285; *TMI Communications and Company, Limited Partnership,* Order, 16 FCC Rcd 13808 (Int'l Bur. 2001) *(TMI 2 GHz MSS Order).*

[12] Letter from Lawrence H. Williams and Suzanne Hutchings. ICO Global Communications (Holdings) Ltd., to Chairman Michael K. Powell, Federal Communications Commission, IB Docket No. 99-81 (filed Mar. 8, 2001) (ICO Mar. 8 *Ex Pone* Letter); *see also* Letter from Cheryl A. Tritt, Counsel to ICO Services Limited to Magalie Roman Salas. Secretary. Federal Communications Commission, IB Docket 99-81 (April 20, 2001) (ICO April 20, 2001 *Ex Pane* Letter).

[13] *See Establishment of Policies arid Service Rules for rlie Mobile Sorellire Service in rlie 2 GHz Band,* IB Docket No. 99-81, Report and Order, 15 FCC Rcd 16127 (2000) (*2 GHz MSS Rules Order).*

[14] In 1989, the Commission authorized Motient's predecessor in interest, American Mobile Satellite Corporation. to construct, launch and operate an MSS system in the upper L-band. *Amendment of Pans 2, 22 orrd 25 of the Commission's Rules ID Allocate Spectrum for and to Establish Other Rules and Policies Pertaining lo the Use of Radio Frequencies in a Land Mobile Satellite Service for the Provision of Various Common Carrier Services,* GEN Docket No. 88-1234, Memorandum Opinion. Order and Authorization. 4 FCC Rcd 6041 (1989) (*MSV License), tentative decision on remand,* 6 FCC Rcd 4900 (1991), *final decision on remand,* 7 FCC Rcd 266 (1992), *offd sub nom. Aeronautical Radio, Inc. v. FCC.* 983 F.2d 275 (D.C.Cir. 1993). Beginning in 1999, the Commission granted TMI blanket authority to provide MSS to mobile terminals located in the United States. *See Satcom Systems, Inc./TMI Communications and Company, L.P..* Order and Auihorization. 14 FCC Rcd 20798 (1999). *aff'd sub nom. AMSC Subsidiary Corp. v. FCC.* 216 F.3d 1154 (D.C. Cir. 20001, *modified,* Order and Authorization. 15 FCC Rcd (continued...)

context of an application for authority to launch and operate a next generation L-band satellite system.[15] Other MSS licensees subsequently proposed similar plans."

A. ATC Concept

7. The various proposals for ATC are conceptually different and would rely on different techniques to increase spectrum efficiency by carrying more communications traffic within the same licensed MSS spectrum.

8. MSV, a geostationary MSS operator, would take advantage of the geographic areas that are not served by specific MSS channels because of intra-system interference concerns." These areas are a necessary product of the frequency and geographic intra-system sharing that occurs within their multi-beam satellite system. By way of background, MSV's next generation system uses satellites that can produce a large number of relatively small "spot-beams" on the surface of the earth. These spot-beams can be small enough to provide satellite coverage to an area on the earth's surface 400 to 500 km across. Figure 1 demonstrates a sample frequency reuse plan for a geostationary MSS system.

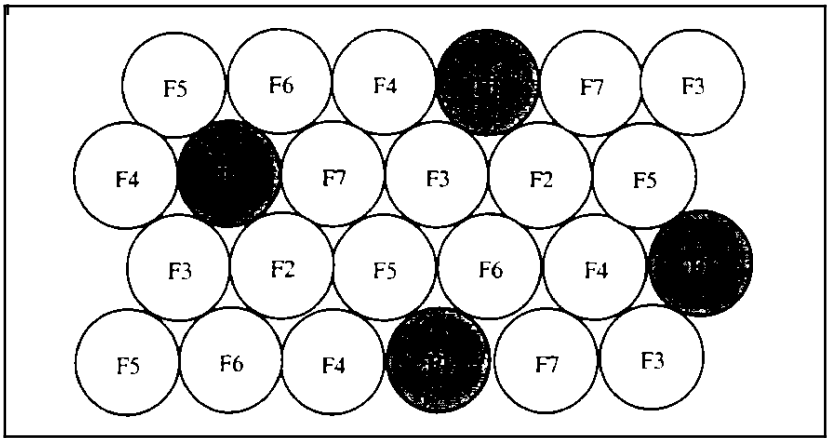
(Conrinued from previous page)
24467 (Sat. Radiocomm. Div.. Int'l Bur. 2000): see *also TMI Communications and* Conipany. *L.P.*. Order and Authorization, 15 FCC Rcd 18117 (Sat. Radiocomm. Div., Int'l Bur. 2000).

[15] Application of Motient Services Inc., File Nos. SAT-LOA-19980702-00066, SAT-AMD-20001214-00171 & SAT-AMD-20010302. *See* Public Notice. Report No. SAT-00066 ai 2 (rel. Mar. 19.2001) (*MSV Application*). MSV later indicated that it would seek to use the same ATC network with its current-generation MSS system. *See* Letter from Carson E. Agnew. President and Chief Operaring Officer. and Peter D. Karabinis, Chief Technical Officer, Mobile Satellite Ventures, to Marlene H. Dortch, Secretary. Federal Communications Commission. IB Docket 01-185 at 1 (filed. Dec. 16, 2002) (MSV Dec. 16.2002 *Ex Parte* Letter).

[16] *See, e.g.*, Globalstar Comments at 2.20; Letter from Cheryl A. Tritt. Counsel, ICO Global Communications (Holdings) Ltd. to William F. Canton, Acting Secretary. Federal Communications. IB Docket 01-185 at 6-10 (filed Mar. 8,2001) (ICO Mar. 8,2001 *Ex Parte* Letter).

[17] Letter from David S. Konczal, Counsel. Mobile Satellite Ventures Subsidiary. LLC to Marlene Dortch, Secretary. Federal Communications Commission, IB Docket No. 01-185 at 4-6 (tiled Jan. I I. 2002) (MSV Jan. } I, 2002 *Ex Pone* Letter).

Figure 1: Example of a Seven-Fold Frequency Reuse Plan

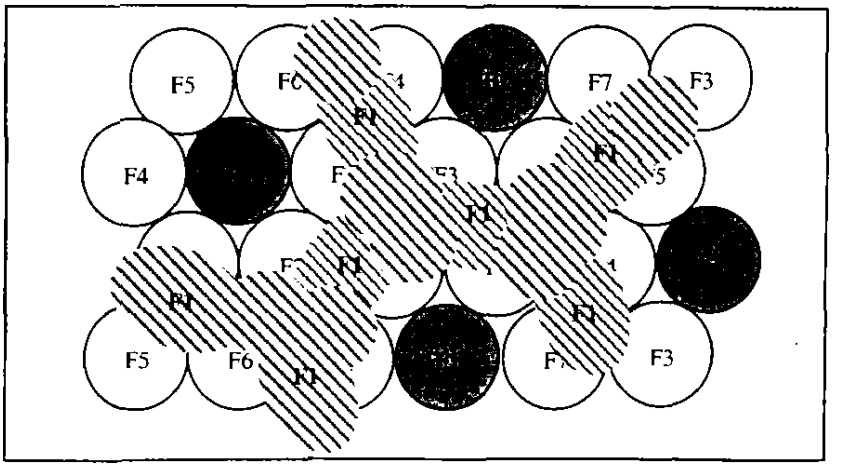


This diagram demonstrates frequency reuse. Here, a spot-beam operating on frequency F1 is surrounded by spot-beams operating on one of six other frequencies (F2 to R). The distance between spot-beams operating on F1 is sufficient to prevent communications in one F1 beam from causing significant amounts of interference into the closest other spot beam that operates on the same F1 frequency. Because a total of seven frequencies are used in this example, the figure shows a "seven-fold" frequency reuse plan. Frequency reuse plans involving different numbers of frequencies are possible.

9. In the context of MSS, deploying this type of frequency reuse plan leaves areas on the surface of the Earth in which the MSS system is not using a specific MSS frequency, such as frequency F1 as shown in the diagram. The idea behind MSV's ATC is that a terrestrially based communication can occur on frequency F1 in those areas in which the satellite is not using frequency F1 provided that sufficient discrimination exists between the terrestrial transmitters and the MSS satellite beams that use the same frequency. Figure 2 demonstrates a sample frequency reuse plan for a geostationary MSS ATC system.[18]

[18] This sample MSS ATC diagram is based on the proposal of MSV For additional information on MSV's proposal, *see* MSV Jan 10, 2002 *Ex Parte* Lerter at 18-19

Figure 2: Example of Possible Additional Frequency Reuse through ATC



After deployment of MSS ATC, a spot-beam operating on frequency F1 is surrounded by spot-beams operating on one of six other frequencies (F2 to F7) and terrestrial cells also operating on F1. The distance between spot-beams operating on F1 and the terrestrial cells, which **also** operate on F1, is sufficient to prevent harmful interference from occurring in the F1 **MSS** beams.

10. ATC implementation for the non-geostationary orbit (NGSO) MSS systems. such as that of Globalstar and ICO tend to be more complex both because the NGSO satellites move with respect to the Earth's surface and because multiple MSS satellites may be visible at one time. Like the GSO systems, however, the NGSO use multi-beam antennas and assign selected **MSS** frequencies to selected satellite antenna coverage beams.

11. Globalstar, for example. would assign separate frequencies to MSS and ATC operations varying the assignments on a timed basis.[19] The ATC services that are planned for urban areas would cause co-frequency MSS services to be unavailable in areas of the United States where the satellite beam coverage included a co-frequency ATC city. These restricted frequency **MSS** areas **would** vary as the satellites move in orbit and as the coverage areas change. Globalstar also indicates that by assigning some frequencies to ATC in selected cities while assigning different frequencies to the MSS operations would reduce the loss of MSS coverage area. They also indicate that MSS operators could reserve some spectrum for MSS-only operations.

12. JCO, an NGSO MSS service provider. plans to control the amount of bandwidth assigned to both the MSS system and the ATC based upon traffic load." According to ICO, this concept allows reuse of the **MSS** spectrum by the ATC in urban areas, while still allowing the satellite to utilize the same spectrum to provide service in rural areas.

13. While MSS ATC systems could operate on unused frequencies within a satellite beam, MSS ATC operators will choose in some cases *to* operate on some frequencies that are being used within the satellite beam. As a conceptual matter, MSS ATC will generally operate by using certain **MSS** channels or spectrum on a terrestrial basis over a limited geographic area, such as an urban marker. Since the satellite signal generally would be very weak as compared to signals from nearby terrestrial base stations

[19] *See* Globalstar Supplemental Comments at 5

[20] ICO **Mar** 8. 2002 *Ex Parte* Letter, **App.** B at 2-3

on the same channel, the channel can be used to provide terrestrial service in place of the satellite service in this geographic area. In areas away from the terrestrial base station (perhaps 20 kilometers or more). the signal from the MSS satellite would be much greater than the signal from the terrestrial transmitter on the same channel, and the user would receive the signal from the MSS satellite. There might be a zone on some channels where neither the terrestrial or satellite signal is able to overcome the interference from the other signal. although satellite signals on other channels still would be available for use.

14. The principal proponents of MSS ATC – MSV, ICO and Globalstar – ask that we permit them to re-use their assigned MSS frequencies to operate terrestrial base stations for the purpose of extending their communications services to urban areas and in buildings where the satellite signal is attenuated. They intend that the terrestrial services offered would be ancillary in nature with MSS remaining their primary service offering." They state that ATC will allow them to more efficiently and dynamically use the spectrum resources assigned to their systems and add that permitting ATC in urban areas will increase their customer base so that they can offer lower-cost services generally." They also contend that a larger customer base will result in economies of scale that will reduce handset manufacturing costs, permitting production of more affordable handsets. They state that if they are permitted to offer ancillary terrestrial services to overcome technical difficulties in penetrating urban areas, they will have a better opportunity for successful development of commercial **MSS** systems that will serve rural and unserved markets and will be able to use their licensed satellite spectrum more efficiently. In the *Flexibility* ***Norice,*** we incorporated by reference both the ICO and MSV proposals."

B. Flexibility Notice

15. In the *Flexibility* ***Norice,*** we stated that the potential long-term benefits of **MSS** merit consideration of approaches to achieve flexibility in the delivery of communications by MSS operators." We asked whether and how we might bring flexibility to MSS spectrum either by: (1) permitting *2* GHz and L-band MSS operators to provide service in areas where the MSS signals are attenuated by integrating terrestrial operations with their networks using assigned **MSS** frequencies, as has been proposed by two operators, or ***(2)*** opening up portions of the *2* GHz and L-bands for any operator to provide a terrestrial service that could either be offered in conjunction with **MSS** or as an alternative mobile service." In addition, we sought comment on whether we should consider permitting terrestrial operations in the Big LEO bands due to the similarity between these systems and *2* GHz MSS operations."

16. On March 6. 2002, we asked for additional technical discussion concerning **a** way to implement the alternative proposal discussed in the *Flexibility* ***Norice.*** which would open portions of the

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[21] *MSV Application at* 6-9; ICO Mar 8, 2002 *Ex Parte* Letter at I. 6-10

[22] *MSV Application at* 12-13; ICO Mar. 8,2002 *Ex Parte* Letter at 11-13

[23] *Flexibility Notice*, 16 FCC Rcd at 15534, ¶ 5 & n 7

[24] *Id.* at 15533, ¶ 2.

[25] *Id.* at 15533, ¶ 3.

[26] *Id.* at 15533, ¶ 4.

MSS bands for any operator to provide a terrestrial service." We sought comment concerning whether, from a purely technical point of view, MSS operations in the 2 GHz MSS, L- and Big LEO bands could be "severed" from terrestrial operations in each band. Specifically, we asked commenters to elaborate on their earlier discussion of whether it would be "technically feasible for one operator to provide terrestrial services and another operator to provide satellite services in the same MSS band."[28]

C. Other Proceedings

17. We note that we do not reach decisions here on issues raised in the *Flexibility Notice* concerning the relocation of incumbents from the 2 GHz MSS bands." Specifically, in the *Flexibility Norice.* we sought comment on the implications of permitting ATCs for existing broadcast auxiliary service (BAS) and fixed service (FS) relocation programs established to implement MSS in the 2 GHz band." We recognize that our decisions here will require us to revisit our existing BAS and FS relocation policies; however, we will consider possible revisions to our current relocation procedures based on the outcome of other proceedings involving our overall spectrum-management plan in the 2 GHz frequencies,[31] and our actions today are not intended to prejudice the outcome of those proceedings.

111. DISCUSSION

18. Below, we consider the MSS ATC proposals and alternative approaches as proposed in the *Flexibility Norice* and in the record, and conclude that permitting ATC in the MSS bands serves the public

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[27] *Commission Staff Invires Technical Commenr on the Cenain Proposals to Permit Flexibility in the Delivery of Communications by Mobile Satellite Service Providers in rhe 2 GHz Band, The L-Band. And The 1.6/2.4 GH: Band,* IB Docket No. 01-185, Public Notice, 17 FCC Rcd 3418 (2002) (*Severability Norice).* The responses to the Severability *Norice* shall be referred to as "Supplemental Comments" throughout this Order.

[28] *Severability Notice,* 17 FCC Rcd at 4419.

[29] *See Amendment* of *Section 2.106 of rhe Commission's Rules to Allocate Spectrum ai 2 GHz for Use by the Mobile-Sarellire Service.* ET Docket No. *95-*18, First Report and Order and Further Notice of Proposed Rule Making, 12 FCC Rcd 7388 (1997), *aff'd on recon.*, Memorandum Opinion and Order and Third Notice of Proposed Rule Making and Order, 13 FCC Rcd 23949 (1998), *further proceedings,* Second Report and Order and Second Memorandum Opinion and Order, 15 FCC Rcd 12315 (2000), *further recon. pending* (2 *GH; Allocarion and Relocarion Proceeding).*

[30] *Flexibility Norice,* 16 FCC Rcd at 15560-62, ¶¶ 72-76. BAS providers maintain that we should suspend and restructure the BAS relocation scheme if we permit introduction of ATCs. See Meredith Corporation Reply at 1-4; NAB Reply at 1-10, 16; 2 GHz Broadcast Group at 1-6; SBE Comments at 3-5; SBE Reply at 4. 5. ICO urges us to leave in place relocation policies for FS users. ICO Comments at 51: ICO Reply ar 13-15.

[31] *See AWS Third Report arid Order,* FCC 03-16 (reallocating up to 30 megaherrz of spectrum from the 2 GHz MSS bands for terrestrial services); *Amendmeni of Parr 2 of the Commission's Rules to Allocare Spectrum Below 3 GHz for Mobile and Fixed Services to Suppon the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems*, ET Docket No. 00-258, Memorandum Opinion and Order and Further Notice of Proposed Rulemaking, 16 FCC Rcd 16043, 16057-58, ¶¶ 32-34 (2001) (*Advanced Services Further Notice*) (seeking comment on changes that would have to be made in the 2 *GHz Allocation and Relocation Proceeding* should the Commission reallocate some portion of the 2 GHz MSS band for other uses, including advanced wireless services); *Improving Public Safety Communications in the 800 MHz Band*, WT Docket No. 02-55. Notice of Proposed Rule Making, 17 FCC Rcd 4873, 4904, ¶ 56 (2002) (*800MHz Notice*) (seeking comment on relocating BAS and FS incumbent, should the Commission use portions of the 2 GHz MSS band as replacement spectrum for displaced 800 MHz licensees. in an over311 effort to improve public safety communications).

interest. MSS licensees in each of the three bands at issue in this proceeding are either operating or building satellite systems under authority that the Commission has granted to them. We find that MSS licensees may achieve greater efficiencies in their use of assigned spectrum through MSS ATC and that there would be operational and other benefits that would serve the public interest. We further find that it would be inadvisable or impracticable to adopt other alternatives that would either compromise the operations of MSS licensees or require us to take away the authority that has been granted to MSS licensees. Therefore, we conclude below that the public interest is best served by permitting MSS licensees flexibility to improve MSS by having the option of deploying MSS ATC to improve spectrum efficiency and achieve other public-interest goals, particularly given that our technical analyses demonstrate that we cannot grant to a third party the right to use licensed MSS spectrum for terrestrial use without impacting the rights of the existing satellite licensees. In addition, we discuss the conditions we impose on MSS operators that wish to integrate ATCs into their networks." We then address technical issues related to each band in which we permit ATC. Finally. we consider certain statutory, allocation and licensing issues.

A. MSS ATC Primary Proposal

1. Proposed ATC Use of the Frequency Spectrum

19. Proponents of ATC state that allowing additional MSS flexibility will increase efficiency within spectrum already allocated *for* MSS, though in some cases ihey differ on the precise methods by which they would achieve these gains. First, according to these parties, ATC would allow satellite operators to serve new customers that they cannot currently reach.[33] Second, these parties claim ATC would permit satellite operators to divert some communications traffic from the satellite to the terrestrially-based system. which would free existing satellite capacity for other potential users.[34] Third, these parties note ATC would allow an operator to reuse spectrum several more limes within relatively small geographic areas than previously possible.[35] Because ATC must operate within bands already allocated to MSS. these parties argue that ATC reuse of the MSS spectrum represents an efficiency gain.[36]

20. Some commenters dispute the anticipated gains in spectrum efficiency that the proponents envision in the MSS bands from ATC.[37] As explained in greater detail below, we do not agree with these

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[32] MSS ATC may not commence operation without a grant of authority pursuant to the licensing and service rules we adopt today. which, among other things, require the MSS ATC applicant to demonstrate that it provides substantial satellite service to the public and that it will operate MSS ATC only in the spectrum segments we authorized for ATC operations. *See. e.g., infra* App. B (adopting 47 C.F.R. § 25.143(j), which requires licensing prior to operation)

[33] Constellation Comments at 5, 10; MCHI Comments at 8-11; ICO Comments at 23; MSV Comments at 15-17.

[34] Constellation Comments at 5, 10; MCHI Comments at 8-11

[35] *See, e.g.*, Lord Comments at 9: Globalstar Bondholders Comments at 27.

[36] Constellation Comments at iii, 5; MCHI Comments at ii, 2, 10-11; ICO Comments at iii, 23-25, 31-36; MSV Comments at i, 16-20; Globalstar Comments at vi. *17-28*

[37] Voicestream Reply at 3 (noting that both the ATC and 'alternate' proposals would "improve spectrum efficiency").

claims.[38] MSS ATC proponents do not seek additional spectrum, but rather greater authority to use spectrum previously licensed for their use in satellite systems in additional ways. As such. the potential efficiency gains of ATC – whether obtained through increased frequency reuse within a satellite beam or through improved MSS reception in urban areas – are real. Indeed, granting MSS operators the ability to provide more and better services to both existing and potentially new subscribers with the same amount of spectrum necessarily improves the efficiency with which they can use the spectrum and. we believe, may ultimately provide a service that *is* more valuable to consumers. Thus, we find that authorizing ATC will provide MSS operators with the possibility of achieving greater efficiencies within **MSS** spectrum than possible today by stand-alone MSS space stations or divided control of the MSS space and Found segments.[39]

21. Using frequency-reuse techniques. MSS ATC has the potential to transmit more information to more individual users within a given amount of spectrum than MSS alone. While the exact configuration of each MSS ATC will vary depending on the MSS licensee's system parameters, MSS ATC, in essence, allows licensees the flexibility to achieve greater use of their licensed satellite spectrum than possible under our current **MSS** service rules. Because terrestrial channels can be re-used many more times over a much smaller area than the satellite use of the same channel, the **MSS** licensee can achieve higher frequency re-use by deploying MSS ATC than by a satellite-only system. MSS ATC will generally operate by using certain **MSS** channels or spectrum on a terrestrial basis over a limited geographic area, such as an urban market. that currently may not receive satellite signals due to terrain obstacles or other blockages. In areas away from the terrestrial base station, of course, the signal from the MSS satellite would remain much greater than the signal from the terrestrial transmitter on the same channel. and the user would continue to receive the signal from the MSS satellite. In areas near the terrestrial base station, an MSS ATC subscriber would communicate with the terrestrial base station in a manner that would not interfere with satellite channels that might penetrate the urban terrain.[40] In either case, the MSS licensee would make more efficient use of its licensed satellite spectrum by incorporating greater frequency reuse into its system.

22. Our conclusions about the benefits of permitting MSS the flexibility to provide ATC remain *true* even if fewer **MSS** licensees exist in the future than exist today. The question is not whether terrestrial services represent a more efficient use of spectrum than satellite services, but rather whether allowing **MSS** licensees to improve the efficiency of their licensed systems better serves the public interest than the status quo."[41] We conclude that permitting MSS licensees to enhance spectrum efficiency

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[38] ***See*** *infra* § III(C) (6). In any case, we also conclude that granting terrestrial rights in **MSS** spectrum to non-MSS operators is not possible without undermining the authority already granted to MSS licensees. **See** *infra* § III(B).

[39] For a comparison of ATC versus other delivery methods. ***see*** § III(B) *infra*.

[40] In theory. there could be a zone on some channels where neither the terrestrial. nor satellite signal is able to overcome the interference from the other signal: however. satellite-coverase rules adopted today require that subscribers must be able to obtain MSS satellite service even in areas near the terrestrial base stations. provided that terrain does not block the satellite signal. Moreover. satellite systems often use different frequencies in different parts of their coverage areas to avoid self-interference. MSS operators have indicated that they will **deploy** their ATC on frequencies that arc not being used by the satellite in that geographic area: thus. no interference zone would occur in these situations.

[41] *Report of Gregory L. Rosston, Ph.D.*, Stanford University, Stanford Institute for Economic Policy Research, Deputy Director. ICO Reply Comments. App. A at A-3 ("If consumer welfare is enhanced by grunting spectrum flexibility. it is irrational to withhold that flexibility solely to prevent an existing licensee from benefiting").

through ATC represents a superior choice to continuing with the regulatory status quo.

2. Operational Benefits

23. The record demonstrates that the integration of an ATC into authorized and existing MSS systems would have several benefits. First. MSS ATC will use more intensive and more efficient frequency reuse techniques to allow MSS licensees to conduct terrestrial mobile operations. By filling gaps in the MSS coverage area and increasing MSS network capacity, MSS ATC should not only permit customers in underserved or unserved terrestrial markets to use ATC-enabled MSS handsets when in urban areas or inside buildings, but also allow MSS operators to develop new and innovative service offerings that satellite-only MSS systems cannot offer today.[42] MSS operators may choose to deploy a variety of new services through ATC-enabled MSS systems, including ubiquitous digital telecommunications and broadband services. interoperable nationwide public-safety systems, and other services that take advantage of the unique coverage and capacity characteristics of ATC-enabled MSS.[43] While the market will ultimately determine the precise mix of new offerings, we expect, at a minimum, that the expanded coverage and improved efficiency resulting from MSS ATC may enhance competition in some of the important niche markets that MSS serves. including the maritime, aeronautical, commercial-transportation and public-safety markets that rely on MSS for service to more remote and underserved locations.[44]

24. Second, for various reasons, improved coverage in urban areas should significantly expand the consumer marker that MSS is capable of serving.[45] This larger consumer market would, in turn, allow providers to order larger production volumes, which further reduce the costs of producing phones.[46]

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[42] By "handset," we refer in this Order to all types of communications terminals operated by an individual user and capable of transmitting voice. data. or both. In other words. the terms "phone," "handset" and "terminal" are used interchangeably to refer to end-user devices.

[41] *See, e.g.*, MSV Comments at 9-10; I C 0 Comments at 21; Globalstar Bondholders Reply at 12

[44] *See* MSV Comments at 5-11; MSV Reply at 3; Globalstar Comments at 2-4; Globalstar Bondholder Comments at 12-15; I C 0 Comments at 7; Loral Comments at 3-5.

[45] *See, e.g.*, Globalstar Bondholders Reply at 17 ("ATC authority will allow users to purchase smaller. less expensive phones. . . [and] will expand dramatically the subscriber market and thus will further drive down the price of phones through economies of scale."); ICO Comments at 19-21 ("ATC . . . will solve the market size and product investment problems. . . by making MSS more attractive to 'traditional' MSS market segments, and by creating brand new markets based on seamless service offerings – offerings that simply cannot be provided either by an MSS network that fails to provide reliable service in dense urban areas or by a terrestrial operator that can only offer limited geographic coverage."); MSV Comments at 11-14 ("A market exists for the truly continent-wide service that MSV proposes to offer with its integrated satellite and terrestrial system . . . . The inability of MSS carriers to provide service in urban and indoor environments has prevented MSS providers from developing a critical mass of customers."); Constellation Comments at 8 ("Allowing MSS systems to extend their services into urban areas will have a positive impact on the telecommunications marker. . . . [T]he new service capabiliries unique to integrated satellite/terrestrial system architecture . . . will allow a more rapid rollout of new advanced or specialized services on a nationwide basis.").

[46] *See. e.g* . Globalstar Bondholders Reply at 17. Globalstar distinguishes between *dual-mode* MSS ATC handsets and *dual-band* CMRS-MSS handsets. Globalstar claims that dual-mode MSS ATC will be smaller and cheaper than dual-band CMRS-MSS handsets because the dual-mode MSS ATC handsets only need to operate in one frequency band whereas the dual-hand CMRS-MSS handsets must operate in two frequency bands. *See id.* ("CMRS-MSS (continued. .)

25. Third. an integrated MSS ATC would permit operators to offer all services over a single telephone number.'" According to Globalstar. consumers who use existing phones that are capable of operating on either terrestrial *CMRS* or MSS networks requires consumers to use two numbers – one for their MSS mode and a second number for the terrestrial mode.[48] The customer may also receive two separate bills, one from each service provider."' An integrated MSS ATC, however. would eliminate the complications and disincentives for customers that dual networks create, which arise from using two different frequency bands and from having two different vendors to achieve integrated, ubiquitous mobile coverage.

26. Fourth, an integrated MSS ATC likely would eliminate operational complications and associated transaction costs MSS operators may incur in separately negotiating terrestrial roaming agreements in limited geographic areas across the footprint of their satellites.[50] While parties opposing ATC assert that **MSS** providers could enter alternative arrangements with terrestrial service providers."[51] **MSS** operators contend that such arrangements may be unlikely to occur in practice.[52] Under both the present system and our alternative proposal to permit a third-party operator to conduct terrestrial operations in the licensed MSS bands, an **MSS** licensee that wishes to offer an integrated satellite and

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phones are larger and more expensive than single·band MSS-ATC phones will he. This is due in large part to the small production runs and redundant circuitry needed lor CMRS-MSS phones to receive different terrestrial and satellite frequencies. In contrast. MSS-ATC phones will require only a single circuit and thus will be smaller and less expensive **to** produce than CMRS-MSS phones. Thus. ATC authoriry will **allow** users to purchase smaller. less expensive phones. In addition, ATC authority will expand dramatically the addressable subscriber market and thus further will drive down the price of the phones through economies of scale."). While we recognize that not all **MSS** providers may decide **to** include all MSS and ATC functions within a single handset. the option of doing ***so*** offers significant potential benefits.

[47] Globalstar Bondholders Reply at 16.

[48] Moreover. if a customer receives a call from a terrestrially based network while using the satellite phone. the phone cannot notify the customer of the incoming call. Globalstar Bondholders Reply at 16 (citing Globalstar Comments at **14;** Globalstar Bondholders Comments **at** 35); Globalstar Bondholders Supplemental Comments at **3.** We note that technological and logistical limitations. rather than any express regulatory barrier in our rules, appear to he the principal reasons preventing the use of a single telephone number within a satellite-terrestrial handset.

[49] Globalstar Bondholders Feb. 8, 2002 *Ex* ***Pane*** Letter at 6; Globalstar Bondholders Supplemental Comments at 3.

[50] Globalstar Bondholders Supplemenral Comments at 3 (identifying difficulties in roaming and Joint marketing efforts).

[51] Stratos Comments at 10-11 ("The economies of scale favor using already existing terrestrial service providers and their substantial investment, as opposed to expending new resources to create new terrestrial mobile networks that use MSS spectrum."); Inmarsat Comments at 26 (asserting that MSS providers could enter into contractual agreements with CMRS providers who operate in other bands to "to create a more robust service, and to provide in-building service and coverage of areas where MSS signals may he blocked by buildings or terrain").

[52] Globalstar Comments at 15. 33. 35-36; Globalstar Supplemenral Comments at 5 (claiming "there is absolutely no chance rhai two different operators of **two** *separate* mobile *systems* could successfully" coordinate with multiple terrestrial carriers); Celsat Supplemental Comments at 3 (arguing that it is "highly unrealistic for the Commission to expect MSS and terrestrial competitors can jointly coordinate these complex **systems** without substantial cost measured in terms of inefficient operations. huge administrarivr expenses and constant friction."); ICO Comments 31-4, 30. 31; ICO Reply at 6; Constellation Comments at 20; Constellation Reply at 5; Constellation Supplemental Comments at 6 (noting that "[c]oordination would nor he practical berween each MSS licensee and potentially hundreds of different terrestrial licensees.").

terrestrial service at retail to a consumer must negotiate separate terrestrial roaming contracts with terrestrial licensees that would cover various portions of the MSS licensees' footprint.[53] Given the presence of more than one terrestrial competitor in most regions, the **MSS** operator benefits from operating in as few additional bands as possible." For a roaming agreement to be valuable to an **MSS** operator, therefore, the **MSS** licensee would prefer to enter agreements with those terrestrial licensees within. or relatively near, the same set of frequency bands throughout the **MSS** operators' geographically dispersed service area." An existing MSS operator is concerned that terrestrial licensees in the desired terrestrial roaming band may have an incentive to hold out roaming privileges from the satellite licensee to derive as much value as possible from their rights to the terrestrial spectrum within their licensed geographic area.[56] Existing operators also are concerned that terrestrial and satellite licensees have little incentive to negotiate due to the high transaction costs associated with assuring coverage of such a widely dispersed geographic coverage area, and due to what may be viewed as the limited roaming revenues to be derived from the current MSS customer base.[57]

27. While roaming agreements may or may not be feasible, we are unconvinced that their availability should be a basis for not permitting ATC. Some MSS operators indeed may decide that reliance upon roaming agreements with existing terrestrial providers is preferable to building out their own ancillary terrestrial facilities. Nothing in the action we take today would preclude this option. By granting ATC, however, we give **MSS** operators another choice. Integrated ATC could permit an MSS operator to achieve network efficiencies by deploying the most efficient architecture for a particular geographic and market environment.[58] As Boeing has observed, moreover. these benefits would not be confined to users of the MSS systems' terrestrial components. Instead, the integrated nature of ATC will "permit MSS subscribers, rural and maritime, to benefit from larger market economies of scale for equipment. service offerings and geographic coverage."" These additional capabilities reflect how a grant of terrestrial rights to MSS licensees results in more efficient use of spectrum and benefits not only MSS licensees but also consumers. Urban penetration capability, lower-priced phones, unified numbering. unified billing, and reduced transaction costs could reasonably be expected to result in lower retail prices and greater consumer demand for MSS. In addition. granting **MSS** licensees the option of deploying ATC has the potential. among other things. to encourage innovation in mobile telecommunications, broadband services and interoperable public-safety systems.

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[51] ***See.*** *e.g.*, Globalstar Comments at 15; Constellation Comments at 20; Celsat Supplemental Comments at 3; Constellation Supplemental Comments at 6; ICO Supplemental Comments at 1-2.

[54] The fewer bands an MSS handset is required to use. the less expensive and complex the handset is to produce. See, *e.g.*, Globalstar Comments at 20, *22;* **MSV** Comments at **IO.** 14-15: Celsat Comments at *5:* ICO Comments at 32-36, Constellation Comments at 10, 19, 34-35; Globalstar Bondholders Reply at 16-17, 42; Globalstar Supplemental Comments at **3: MSV** Supplemental Comments at 6.

[55] ***See.*** *e.g.*, Globalstar Bondholders Reply at 17

[56] *See, e.g* , Globalstar Comments at 35: Globalstar Bondholders Reply at 17-18.

[57] ***See.*** *e.g.*, Globalstar Comments at 10 n.11, 20: ICO Comments at 22

[58] ICO Comments at 23: accord *Report* of ***Gregon L.*** *Rosston, Ph.D.*, Stanford University. Stanford Institute for Economic Policy Research, Deputy Director. ICO Reply Comments, App. **A** at A.6.

[59] Boeing Reply at 4

3. Protecting the Public

28. MSS systems have the ability to offer instant global communications for civilians. public-safety organizations. and the military in areas where terrestrial facilities do not exist or do not function.[60] These services also permit law-enforcement, aid agencies and the public to communicate from remote locations on the land, on the sea or in the air through a single telephone number.[61] MSS operators point out the industry's role protecting the public, including the industry's vital role in ensuring reliable communications to protect the welfare of our nation and the lives of its citizens.[62]

29. We believe that ATC-enabled MSS systems may provide additional communications options and, therefore, offer our nation greater protection in times of crisis or disaster than traditional MSS systems alone.[63] By offering ubiquitous coverage with instant, nationwide interoperability, ATC-enhanced MSS may make the public, law enforcement and public-safery organizations easier to reach in the field, regardless of location. Accordingly, MSS ATC may enhance the nation's overall ability to maintain critical telecommunications infrastructure in times of crisis or disaster.[64]

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[60] ***See,*** *e.g.*, Globalstar Comments at 6; MSV Comments at 10-11; ICO Comments at iii. 2, 7, 13, 20-21; Stratos Comments at i, 2; Globalstar Bondholders Reply at vii, 5: MSV Supplemental Comments at 2.

[61] The Commission has repeatedly noted the ability of MSS systems to protect public safety. ***See.*** *e.g., Amendment of Section 2.106* of ***rhe*** *Commission's* ***Rules*** ro *Allocate Spectrum* ***ar*** *2 GHz for Use by* ***rhe*** *Mobile-Satellite* ***Service.*** Notice of Proposed Rulemaking, 10 FCC Rcd 3230. ¶ 7 (1995) ("MSS can provide nationwide public safety coverage, . . . [and] MSS could satisfy important requirements that cannot be economically satisfied by other means.'); *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. 11681¶ 12 (1996) ("MSS can . . . meet rural public safety needs and provide emergency communications to any area in times **of** emergencies and natural disasters."). If a crisis does occur. MSS systems allow military, law-enforcement. aid and relief agencies to overcome incompatibilities in the various units' communications systems. ***See*** Globalstar Reply at 6.

[62] MSV Comments at 10 ("Motient currently provides service to hundreds of federal. state. and local governmental agencies, including critical public safety organizations like the Federal Emergency Management Agency, U.S. Coast Guard, and local tire and police departments."); MSV Reply at 9-11 (describing the public safety. industrial, and maritime uses **of** the MSS services that Motient provides using its U.S.-licensed geostationary L-band satellite): Globalstar Reply at 5 ("MSS systems make communications available in emergency situations where terrestrial phone service **is** not available, either because there is no phone service at the site of the emergency or because the impact **of** the emergency disrupted existing terrestrial phone service"); ICO Comments at 13-15 (describing the **MSS** role in providing service in response to the terrorist events of September 11, 2001 as well as in other disasters such as earthquakes, hurricanes, tornadoes. cyclones, floods. forest tires. and refugee migrations) (citations omitted); Globalstar Bondholders at 9-12 (describing the "unparalleled functionality, flexibility, and availability to emergency. law enforcement. and public safety personnel" through Globalstar's MSS services) (citations omitted).

[63] Globalstar Comments at 6 (noting that "[e]mergencies can occur anywhere. inside buildings, on city streets. and in wilderness areas ...[and] increasing the usability of MSS phones in more locations through ATC makes MSS a better service for public safety and emergency response organizations."); MSV Comments at 10 (MSS ATC may provide opportunities to establish thr type of reliable. ubiquitous. interoperable communications network for which Federal, state and local public-protection organizations have been searching); ICO Comments at iii ("A revitalized MSS industry is virtually the only economically and technically efficient **way** to bring broadband service to rural Americans, and will arm public safety, military. maritime. and recreational users with primary redundant communications services that are even more essential in today's environment.").

[64] MSS ATC may also alleviate "clogged wireline and terrestrial networks during a man-made or natural disaster." Globalstar Bondholders Comments at 8: *accord* Loral Comments at 2 ("MSS can play a unique and crucial public (continued. ...)

4. Strengthening Competition

30. MSS operators already possess licenses to use the spectrum allocated for MSS. Our actions today do not grant additional spectrum, but rather grant MSS licensees the ability to modify their licenses to offer a new terrestrial service that is ancillary to MSS.[65] The Commission has granted regulatory flexibility to terrestrial and space-station spectrum licensees after finding that flexibility can promote competition and innovation without consuming additional spectrum resources.[66] The record demonstrates that a similar type of regulatory flexibility is warranted here because it is infeasible as a practical matter for a terrestrial service to share the MSS licensees' spectrum in the same place at the same time without unacceptably risking harmful interference to the existing and planned operations of MSS incumbents and compromising the operations of the MSS licensees.

31. Our decision to grant MSS ATC rests on a sound principle of spectrum management: namely. that the Commission should permit incumbents the option of deploying more efficient, more cost-effective uses of spectrum when granting the additional rights lo third parties is impracticable or infeasible. In general, we will grant the rights to incumbents when granting rights to third parties would create an unacceptable risk of harmful interference that impinges on the expectations of Commission licensees. Indeed, as we explain below. authorizing third-party use of the MSS spectrum would impinge on the authority the Commission previously granted the MSS licensees. Significantly, moreover, we do not permit MSS licensees to provide any type of service that the allocation permits, but rather permit the incumbents to deploy MSS ATC subject to several conditions designed in part to ensure the allocation

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safety role by providing a critical alternative for communications when traditional landline and terrestrial wireless systems are not functioning or are overwhelmed."); Globalstar Bondholders Reply at 9-10 n.23 ("the inimitable importance of the MSS industry to homeland security is a sufficient public interest justification to warrant strengthening the MSS industry through a grant of ATC authority.").

[65] *Flexibility Notice*. 16 FCC Rcd at 15533, ¶ 2.

[66] See *Amendment of the Commission's* Ruler *to Permit Flexible Service Offerings in rlie Commercial Mobile Radio Services.* WT Docket No. 96-6, First Report and Order and Further Notice of Proposed Rule Making. 11 FCC Rcd 8965 (1996) (CMRS *Flexibifin Report and Order)* (granting terrestrial CMRS carriers authority to provide fixed services in mobile service bands); *Amendment of Parts 21 and 74 to Enable Multipoint Distribution Service and Instructional Television Fixed Service Licensees to Engage in Fixed Two-Way Transmissions.* MM Docket No. 97-217, Report and Order, 13 FCC Rcd 19112 (1998) (allowing Multipoint Distribution Service (MDS) and Instructional Television Fixed Service (ITFS) licensees to deploy two-way systems), *recon.,* 14 FCC Rcd 12764 (1999), *further recon.*, 15 FCC Rcd 14566 (2000); *Amendment of Pan 2 of rlie Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support rlie Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems*, ET Docket No. 00-258, First Report and Order and Memorandum Opinion and Order. 16 FCC Rcd 17222 (2001) *(Advanced Services First* Reporr *and Order)* (adding a mobile allocation to the 2500-2690 MHz band); *Establishment of Rifles arid Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band*, IB Docket No. 95-91, GEN Docker No. 90-357, Report and Order. Memorandum Opinion and Order, and Further Notice of Proposed Rulemaking, 12 FCC Rcd 5754. 5810-12, ¶¶ 138-142 (1997) (considering whether and how to permit Satellite Digital Audio Radio Service (SDARS) licensees to use in-band. ground-based repeaters to fill gaps in their satellite coverage): *see also XM Rndio. Inc.*, Order and Authorization. 16 FCC Rcd 16781 (Int'l Bur. 2001) (granting special temporary authority for SDARS licensee to use terrestrial repeaters). *Sirius Satellite Radio, Inc.*, Order and Authorization, I6 FCC Rcd 16773 (Int'l Bur 2001) (same).

remains first and foremost a satellite service."

32. While sound spectrum management principles support grant of MSS ATC. granting additional flexibility in the provision of MSS to the public also has the advantage of reinforcing the potential public-interest benefits of MSS itself. For example, the Commission has recognized the potential of MSS to provide ubiquitous service to consumers. ATC will enhance this benefit by making MSS networks more commercially available through truly nationwide coverage.[68] ATC also may create a "self-reinforcing spiral" of increased subscription, reduced handset-production and per-minute prices, and greater cash flow.[69] According to the Globalstar Bondholders, for example, the increased economies of scale that come with providing services to urban customers via ATC will allow MSS operators to serve a broader subscriber base.[70] We find that permitting ATC will allow MSS operators the opportunity to take advantage of a number of network. spectrum and economic efficiencies that may help defray the substantial capital costs required to create and operate a satellite system.[71] These efficiencies could, in turn, reduce the marginal cost of serving subscribers and permit MSS operators to serve more customers.[72] By taking advantage of potential integration of services, MSS operators may also obtain economies of scale: larger customer bases could provide the opportunity to support larger production volumes and. therefore, lower costs for handsets and other equipment.[73] Also. integrating terrestrial services into MSS may reduce the transaction costs of administering separately owned satellite and terrestrial systems.[74]

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[67] Accordingly. the regulatory flexibility to provide ATC in MSS spectrum differs markedly from a "flexible-use" allocation, where a licensee could provide whatever services are allocated for the hand without restriction. condition or limitation on the overall mix of service offerings they provide.

[68] ICO Comments at 5-15: MSV Comments at 9-10; Loral Comments at 1-4; Globalstar Bondholders Comments at iv-v, 3-4, 7-22; MCHI Comments at 6-8; MSV Reply at 6.

[69] *See. e.g.*. MSV Reply at 9 ("the viability that accompanies spectrum flexibility is the result of additional revenue and added efficiency from the critical mass of subscribers that are possible with terrestrial operations").

[70] *See* Globalstar Bondholders Comments at v. During the course of this proceeding. the Official Creditors Committee of Globalstar. L.P. (Globalstar Creditors) began to represent the interests of the Unofficial Bonholders Committee of Globalstar, L.P. (Globalstar Bondholders) as well as other Globalstar creditors. *See* Letter from Tom Davidson. Counsel for the Official Creditors Committee of Globalstar, L.P. to Michael K. Powell, Federal Communications Commission. IB Docket No. 01-185. 1 & n.1 (March 22,2002). Because the Globalstar Creditors and the Globalstar Bondholders share a substantial identity of interest, *id.* (endorsing the positions that the Globalstar Bondholders had taken in this proceeding as of March 22, 2002), we will refer to both entities as the Globalstar Bondholders unless context indicates otherwise.

[71] Of course, the authority to conduct in-band terrestrial operations in licensed satellite spectrum also brings with it new attendant costs, including the potentially considerable expense of constructing terrestrial towers and other. ATC-related infrastructure.

[12] These efficiencies constitute "economies of scope." which are defined as the savings from providing two or more services on an integrated basis compared to the sum of the costs of providing each on a stand-alone basis. *See* Graham Bannock. *et al*. *Penguin Dictionary of Economics* 130 (Penguin Books, 5th ed.. 1992).

[73] Globalstar Comments at 16; ICO Comments at 19-20: Constellation Comments at 10; Globalstar Bondholders Reply at 17.

[71] Transaction costs are "those costs other than price which are incurred in trading goods and services. These costs can be substantial. particularly in markets where the p o d being traded is heterogeneous and complex." David W. (continued....)

33. The opponents of ATC, however, raise several policy objections to granting additional flexibility to **MSS** licensees. Nearly all of the arguments that flexibility in the provision of **MSS** will cause anticompetitive harm rest on the assumption that ATC-enabled **MSS** will prove more profitable than **MSS** alone.[75] These commenters speculate that **MSS** licensees offering ATC will focus primarily on terrestrial services and allow their satellite component to degrade.[76] According to AT&T Wireless. terrestrial services would independently produce the vast majority of **MSS** providers' profits, while the satellite operations would draw little or no revenue and generate most of the system's costs." According to AT&T Wireless. such an imbalance would provide strong economic incentives for **MSS** providers to supplant MSS with terrestrial service as their primary or even sole service.[78] Indeed, AT&T Wireless expresses skepticism that additional flexibility will work in reviving what are portrayed as struggling **MSS** providers[79] and adds that. even if ATC succeeds in ensuring the survival of a few **MSS** providers,'' ATC would eventually "hasten the demise of MSS itself by reducing or eliminating **MSS** providers' incentives to provide satellite service through the introduction of the opportunity to move from the difficult **MSS** market to the far more lucrative terrestrial wireless market."" Although most opponents agree that authorizing flexibility will increase the revenues of the **MSS** licensees **by** allowing **MSS** licensees to capture high-revenue, urban users that **MSS** generally cannot now reach. some commenters remain skeptical that **MSS** licensees will actually reinvest their new-found revenues in comparatively less profitable **MSS** space stations."

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Pearce. *MIT Dictionary* of Modern *Economics* 432 (MIT Press. 4th ed., 1997). In the case of "severed' satellite and terrestrial systems. the costs include contract negotiation and enforcement, possibly with many terrestrial providers. as well as the costs involved in resolving what are likely to be many complex issues about coordination and interference.

[75] ***See.*** *e.g.*, Stratos at 2-3, 7-9; Iridium Comments at 8; AT&T Wireless Comments at 5-6; Verizon Wireless Reply at 8.

[76] ***See, e.g.***, Voicestream Reply at 22 (claiming the availability of satellite services could be eviscerared): Stratos Comments at 2-3, 7-9 (arguing that terrestrial use will overwhelm the MSS bands); Iridium Comments at 4, 8 (it is in ICO`s long-term interest to spend a few billion dollars constructing. launching and operating a minimalist MSS constellation in order to gain free access to $30-$40 billion worth of nationwide spectrum).

[77] AT&T Wireless Comments at 5: AT&T Wireless Reply at 5-8

[78] AT&T Wireless Comments ar 5; AT&T Wireless Reply at 5-8.

[79] AT&T Wireless Comments at 2

[80] *See, e.g.,* AT&T Wireless Comments at 16 (stating that "there is no reason to believe that . . . subsidizing MSS providers. . . would actually sustain MSS operations in the long run."): CTlA Comments at **12** ("it is unlikely that MSS licensees would realize sufficient revenues from providing service in highly competitive urban wireless markets to cross-subsidirc service in rural areas" due io the highly competirive market for terrestrial wireless services).

[81] AT&T Wireless Reply at 4; **see** *also* CTIA Comments at **12** (asserting that aurhorizing MSS flexibility may "actually harm coverage in rural markets'' as MSS operators invest disproportionaiely in their terrestrial component of their networks).

[82] *See. e.g.*., Voicestream Reply at 13 ("Common sense suggests that MSS licensees would reinvest in the profitable [terrestrial] enterprise to generate yet additional profits." rather than the unprofitable MSS enterprise); Iridium Comments at 2, 8 (asserting that grant of ICO's ATC proposal would result "in the de facto reallocation of [MSS] spectrum for terrestrial use, by ICO and its affiliate Nextel" and that "[a]s a practical matter, the ICO satellite system (continued....)

34. We recognize these parties' economic assumptions, but do not find their arguments to oppose the grant of ATC persuasive. As an initial matter. ATC cannot be provided without continued provision of MSS under the terms specified in this decision and can only be provided in the MSS licensees' authorized frequency bands. If an **MSS** licensee using ATC were to disregard the rules and conditions adopted in this Order, we would cancel its ATC authorization and, if circumstances warrant. cancel its MSS license as well. We also have the authority to impose monetary forfeitures and other penalties. ATC authority wholly depends on **MSS** licensees' fulfillment of their construction, launch and operation requirements. and the continuing provision of substantial satellite service to the public.[83] Therefore, an MSS licensee that allowed its MSS offering to degrade could lose its **MSS** license, the fundamental prerequisite for offering the very type of terrestrial authority that some ATC opponents view as so uniquely profitable.[84]

35. While we are committed to ensuring MSS licensees observe our **MSS** ATC service rules by using a variety of enforcement mechanisms, up to and including license cancellation. we do not believe that our active intervention to ensure substantial satellite service consistent with the **MSS** ATC service rules adopted in this Order will prove necessary. As at least one economic expert has stated on the record, "the significant upfront and sunk costs of satellite systems increase the likelihood that the licensees would continue to operate their satellite systems."[85] Unlike marginal costs, sunk costs cannot be avoided by discontinuing or degrading service. In addition. **MSS** licensees, most of which have limited customer bases and capitalization, would appear unwise to abandon satellite services merely for the opportunity to compete only in the market for terrestrial mobile services where much larger, better financed competitors already engage in "competitive, intense [and] aggressive" price competition.[86] Indeed, the competitive nature of terrestrial CMRS suggests that. even if **MSS** licensees were under no obligation to maintain their MSS systems. providing ubiquitous MSS would help distinguish their service offerings from larger, more established terrestrial CMRS incumbents. Finally, some commenters claim that, over the longer term, additional investment in satellite infrastructure might not occur because the money spent on construction, launch and operation could be more profitably invested elsewhere." We disagree. Capital will be available for investment in satellite infrastructure regardless of the opportunities

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will be ancillary to the Nextel terrestrial network, regulatory constraints notwithstanding"):*Boeing* Comments at 7 ("[p]ermitting MSS operators to offer ancillary terrestrial services opens the door to potential abuse. . . . As the terrestrial component grows. an effect could be that the MSS component of the service would provide less and less of the over311 system capacity. essentially vacating the spectrum to the terrestrial component.");Cingular/Verizon **Joint** Comments at 15-16 (asserting that terrestrial wireless service would not be ancillary to MSS).

[83] See. *e.g.*, **47** C.F.R.§§ 25.143(e)(3). 25.161

[84] *See, e.g.*, Constellation Comments at 29 ("If it is shown that an MSS system has degraded and the operator has made no plans to restore the system to its full coverage capabilities, the Commission can revoke the authorization for ancillary terrestrial operations.").

[85] **See** *Report of Gregory L. Rosston, Ph.D.*, Stanford University, Stanford Institute for Economic Policy Research, Deputy Director. ICO Reply Comments, App. A. at A-8: Constellation Comments at **29** ("MSS operators have every commercial incentive to maintain high service availability"); Celsat Reply at I I ("MSS providers will have no economic incentive to convert their 2 GHz MSS sysrems into terrestrial-only systems.").

[86] *Implementation of Section 6002(b) of* rlie *Omnibus Budget Reconciliation* Acr of *1993,* Seventh Report, FCC 02-179, 17 FCC Rcd 12985. 13012 (2002) (*Seventh CMRS Competition Report*).

[87] ***See.*** *e.g.*, CTIA Comments at 12; CTIA Reply at 7: AT&T Wireless Comments at 3, 9-13; AT&T Wireless Reply at 13-17;Cingular/Verizon Comments at 16-23;Cingular/Verizon Reply at 17-22.

available elsewhere as long as that capital can earn the market rate of return." For these reasons, we believe that ATC, instead of acting as a deterrent to satellite investment, will increase the likelihood that MSS operators will provide efficient satellite service to consumers.[89]

36. Despite the views of some commenters, moreover, the projected but unknown relative volume of traffic on one system component or another is not a decisive factor in our analysis of the public interest benefits of MSS ATC. We recognize that. even with a satellite constellation operating at full capacity, terrestrial operations can reuse communications channels more intensively than satellite operations because terrestrial cells can be much smaller than the geographic area covered by satellite spot beams.[90] As a result. even though ATC is restricted to portions of the spectrum that is available to MSS, larger traffic volumes can be supported by MSS combined with ATC than by MSS alone due to higher frequency reuse in the MSS ATC system. If a preponderance of terrestrial traffic were to occur on an integrated MSS ATC system, however. it could simply reflect various factors, such as higher population densities in urban areas or differences between satellite and terrestrial technologies, and the concentration of users need not imply that provision of satellite service is being degraded or diminished.

37. We also disagree with assertions that MSS ATC will allow MSS licensees to competitively harm terrestrial or satellite incumbents.[91] At the outset, the possibility that a Commission action might harm a competitor does not render the action contrary to the public interest. On the contrary, where, as here, the ostensible harm comes from increased competition. the public will benefit by receiving additional competitive choices in the marketplace. Some commenters, however, portray ATC as an anti-competitive subsidy to ailing MSS providers that would distort the market because MSS operators would not be required to acquire terrestrial mobile rights at auction." Some commenters suggest that. as a result, MSS operators would have an unfair or anti-competitive advantage in the provision of satellite or terrestrial services. Other patties appear to argue that ATC-enabled MSS could be used as a financial resource to act anti-competitively with respect to wireless incumbents.[93] At least two ATC proponents,

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[88] In other words. relative rates of return between investments in different types of infrastructure are not directly relevant to our analysis and, in any case. would he highly speculative.

[89] ICO enthusiastically endorses ATC in part to help financially "holster an important telecommunications service at a critical point in its development." ICO Reply at 5; see *also, e.g.,* Constellation Comments at 3. 7, 9-10 (asserting that, hy offering more competitive services in urban areas. MSS operators will improve their finances and increase investor confidence).

[90] These small terrestrial cells in which frequencies are reused are sometimes referred to as pico-cells

[91] ***See.*** *e.g.,* Boeinp Comments at 12-13; Boeing Reply at 7-8; lnmarsat Comments at 12-30; lnmarsat Reply at 7-25; Aviation Industries Parties Comments at 5-6. 8-11: AT&T Wireless Comments at *2:* AT&T Wireless Reply at 9-11: Iridium Comments at 2.

[92] *See, e.g.,* AT&T Wireless at 4: see *also* Voicestream Reply at 2. 14 (asserting thai authorizing ATC without conducting auctions or imposing additional fees would give MSS licensees a competitive advantage that "would distort competition in the mobile telecommunications sector"); P&FF Comments at 13-14 ("Competitors of potential MSS systems are legitimately concerned that a decision to grant permission for ATC systems would allow MSS/ATC providers to compete unfairly for the same customers" because MSS/ATC would not he required to pay for terrestrial rights at auction): see *also* MSTV/NAB Comments at 16 (asserting that it would be "grossly unfair" to authorize ATC when. unlike many terrestrial wireless operators, MSS providers did not purchase spectrum at auction).

[93] ***See.*** *e.g.,* Voicestream Reply at 14 ("MSS licensees obviously would have an enormous cost advantage if they could.. be excused by the Commission from paying any [auction] lees "): P&FF Comments at 14 ("It is at least (continued....)

however, respond that "[t]here will be no subsidy."[94] Motient and TMI, for example, assert that they will create new value by offering a more attractive retail offering: an affordable. nationwide, high-speed communications service with greater reliability. more extensive coverage and more features than is currently available to urban, suburban or rural consumers.[95]

38. The arguments that ATC will be used as an anti-competitive subsidy in the provision of MSS are unconvincing. These concerns appear to be based on the idea that **MSS** operators would have an unfair competitive advantage over wireless incumbents because the wireless incumbents obtained some of their licenses through auctions whereas the MSS incumbents will have received ATC authority without bidding in an auction. Commenters allege that. if the Commission were not to accept applications for ATC that might produce mutually exclusivity, which might, in turn, result in an auction. the MSS incumbents will have the incentive and ability to distort the competitive market in CMRS. These comments involve two separate arguments: **(1)** that receiving ATC authority pursuant to this proceeding gives MSS licensees an incentive to set prices below levels that would be established if ATC flexibility were obtained by payment (i.e., in an auction); and **(2)** that the potential financial benefits of obtaining ATC authority without payment facilitates MSS licenses' ability to engage in predatory pricing against terrestrial wireless incumbents.

39. First, we do not believe that allowing MSS licensees the right to obtain ATC without bidding in an auction creates an incentive to price below competitive levels. As a preliminary matter. terrestrial CMRS and MSS ATC are expected to have different prices, coverage, product acceptance and distribution; therefore, the two services appear, at best. to be imperfect substitutes for one another that would be operating in predominately different market segments. Even if the two services were perfect substitutes, however. permitting greater flexibility in the delivery of MSS services would not confer an unfair advantage on the MSS licensees. While PCS licensees and some cellular licensees obtained licenses through auctions, other cellular licensees did not obtain their licenses through auctions but purchased them in secondary markets. and some cellular licenses were originally obtained through a license lottery or by other means that did not require payment. There is no evidence to show that those who did not purchase licenses in an auction obtained subscribers by charging lower prices than those who obtained their licenses through an auction. According to a Commission study:

> [the] telecommunications experience in the U.S. has . . . been consistent with the theory that historic costs don't alter pricing. For example, within a given market, the prices charged by cellular operators who obtained their licenses via comparative hearings of lotteries are not lower than the prices of those firms that purchased their cellular licenses in the secondary market, or firms that obtained PCS licenses in an auction. Similarly. where a U.S. cellular license has been bought at a significant cost from a pany that

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theoretically possible that firms. . .use the MSS/ATC route as a means [for] acquiring the necessary spectrum at greatly reduced cost, thereby placing them **at** a competitive advantage over CMRS providers").

[94] MSV Reply **at** 9.

[95] ***Id.*** Proponents envision different types of new services. For example. ICO envisions new, comprehensive "telematics" services that will provide motorists with location information not only on open roads. but also in parking garages and urban canyons. ICO Comments at 21. Similarly, Constellation asserts that integrated ATC will allow MSS to offer "true nationwide commercial transportation tracking services on a single platform. eliminating the need for commercial vehicles to carry multiple transceivers for multiple networks." Constellation Comments **at** 8.

obtained it at no cost, we have not observed any increase in consumer prices.[96]

Based on these considerations, we find that MSS licensees do not have an incentive to forgo recovery of the value of spectrum and price below competitive levels merely because the spectrum was obtained without an auction.[97] Pricing that does not include recovery of the market value of an asset such as spectrum represents a loss (compared to the price that could be sustained in the marketplace) that MSS operators would have to bear regardless of how much. if anything, they spent on acquiring the asset initially.[98] MSS operators would be no more likely to sacrifice any possible commercial advantage generated by ATC than any other commercial advantage that they might possess.[99]

40. Second. we find that, even if the two services were perfect substitutes, the potential financial benefits of obtaining ATC flexibility by grant rather than payment would not facilitate MSS licensees' ability to engage in predatory pricing against wireless incumbents and that MSS operators would face market discipline if they attempted to do so. Predation is a rare phenomenon in the modern U.S. economy, in pan because there is a very high risk that such behavior will be unsuccessful.[100] As the Supreme Coun explained in *Matsushita Electric Industrial* Co. *v. Zenith Radio Corp:*

> [T]he success of such (predatory] schemes is inherently uncertain: the short-run loss is definite. bur the long-run gain depends on successfully neutralizing the competition. Moreover. it is not enough simply to achieve monopoly power, as monopoly pricing may breed quick entry by new competitors eager to share in excess profits. The success of any predatory scheme depends on maintaining monopoly power for long enough both to

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[96] *See* Evan Kwerel &Walt Strack, *Auctioning Spectrum Rights* 4 (FCC, Feb. *20.* 2001), *available at* <http://wireless.fcc.gov/auctions/data/papersAndStudies/aucspec.pdf> (last visited. Dec. *27.* 2002).

[97] Indeed. the D.C. Circuit recently characterized arguments that reduced acquisition costs for an asset would lead to anti-competitive practices as "a foolish notion that should not be entenained by anyone who has had even a single undergraduate course in economics." *Fresno Mobile Radio, Inc. v. FCC.* 165 F.3d 965,969 (D.C. Cir. 1999) (citing Armen A. Alchian & William R. Allen. *Exchange & Production 222* (3rd ed. 1983)("[O]nce [an item] is acquired, [its cost is] irrelevant to any future decision."). The D.C. Circuit added that "a moment's reflection would bring one to the realization that the use to which an asset is put is based not upon the historical price paid for it, but upon what it will return to its owner in the future. Would anyone be less interested in earning a return on money he had inherited than on money he had worked for? Of course not!" *Fresno v. FCC.* 165 F.3d at 969.

[98] As an illustration of why MSS operators would set the price of their terrestrial services at an identical level whether they obtain ATC authority by a grant or by payment. suppose that an MSS operator obtains ATC authority by payment. Further suppose that such an MSS operator correctly calculates that he would maximize the profits of his firm by setting a price p for ATC services that undercuts the price charged by terrestrial incumbents by a certain amount. The exact same pricep would be profit-maximizing even if the MSS operator obtains ATC authority by grant because the costs of providing ATC service – in particular the value of the additional spectrum resources made available by ATC– are the same under either a payment or grant scenario Thus. an MSS operator that obtains ATC authority by grant would have no incentive to make price cuts beyond those that would be made by an MSS operator that obtains ATC authority by payment.

[99] For instance. the market value of the spectrum is reflected in the stock price. which is the market value of the firm To the degree that prices fail to reflect the full value of the specirum. earnings will decline and so will the market value of ihe firm.

[100] *See, e.g.*, Ronald L. Koller, *The Myth of Predatory Pricing*, Antitrust Law and Economics Review 3: 105-23, (1971); John E Kwoka, Jr *et al.*, ed., *The Antitrust Revolution* 151 (Harper Collins College Publisher.\, N.Y., 1994)

> recoup the predators' losses and to harvest some additional gain ... For this reason, there is consensus among commentators that predatory pricing schemes are rarely tried, and even more rarely successful."[101]

In addition to the high odds against predation actually being successful under any circumstances, we believe that several specific circumstances of the wireless industry make predatory activity on the pan of MSS operators highly unlikely. The first circumstance involves the imperfect substitutability between terrestrial services and MSS ATC. Only a limited portion of customers desiring terrestrial service are likely to be interested in supplementary MSS services. which suggests that the two services will not be competing in the same market segment. With different anticipated prices. coverage, product acceptance and distribution, the two services appear to be imperfect substitutes as far as customers are concerned; therefore, predatory pricing, which generally requires extensive and direct competition. would be highly unlikely under these circumstances.

41. The second circumstance involves the fact that MSS operators are not dominant incumbents in the terrestrial wireless marketplace. Alleged predators are almost always dominant incumbents in the market in which predation is alleged because firms in such a position have the greatest incentive and ability to engage in predatory behavior."[102] MSS operators. therefore, do not fit the economic profile of likely predators. As indicated above, MSS ATC is unlikely to compete directly with terrestrial **CMRS** for the same customer base except for those consumers requiring the enhanced services. and thus is not expected to be dominant in the same market segment. Also, wireless cellular and PCS have already built out systems and provide service to large portions of the **U.S.** population. An MSS operator with **ATC** authority would be unlikely to prove able to take large numbers of subscribers away from the wireless operators even at predatory price levels. Also. MSS operators face structural disadvantages that terrestrial wireless operators do not. Due to our requirement that MSS operators provide substantial satellite service as a precondition for providing terrestrial services. any MSS operator choosing to provide terrestrial service must raise hundreds of millions of dollars before providing service to its first terrestrial subscriber.[103] By contrast, terrestrial operators can construct their networks incrementally city-by-city,

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[101] *Matsushita Electric Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574, 589 (1986) (citing Robert Bork, *The Antitrust Paradox*, 149-155 (1978)). The Commission dismissed similar arguments in *Applications of Voicestream Wireless Corporation, Powertel, Inc, Transferors, and Deutsche Telekom AG, Transferee*, 16 FCC Rcd 9799, 9829, ¶ 89 (2001) (noting that "[i]f the [applicants] were to attempt to engage in predatory pricing. it is highly unlikely that it would be able to maintain such an artificially low price for a sufficiently long period of time to drive competitors out of business."); *see also Brooke Group Ltd. v. Brown & Williamson Tobacco Corp.*, 509 U.S. 209, 224 (1993) ("Without [recoupment], predatory pricing produces lower aggregate prices in the market. and consumer welfare is enhanced. . . . [U]nsuccessful predation is, in general. a boon to consumers.").

[102] *Kwoka et al., supra*, at 151 (identifying the predator as the dominant firm in each theory of rational predation discussed). For examples of alleged predation by dominant firms, *see, e.g., Standard Oil Co. of New Jersey v. United States*, 221 U.S. 1 (1911); *United States v. Aluminum Co. of Am.*, 148 F.2d 416 (1945); *Am. Tobacco Co. v. United States*, 328 U.S. 781 (1946); *Matsushita Elec. Indus. Corp. v. Zenith Radio Corp.*, 475 U.S. 574 (1986); *United States v. AMR Corp.*, 140 F. Supp. 2d 1141 (2001). For a discursion of an unusual instance in which a non-dominant firm was alleged tn engage in predatory behavior, *see Kwoka et al., supra*, at 260; *Brook Group, Ltd. v. Brown & Williamson Tobacco Corp.*, 61 U.S.L.W. 4699 (1993).

[103] Based on industry reports. filings with the Securities and Exchange Commission and agency experience, Commission Staff estimates that MSS licensees have spent at least $2.8 to $4.4 billion to construct and launch NGSO MSS systems and at least $1.7 billion to construct and launch a GSO MSS system. *See, e.g., Form 10-K, Globalstar Telecommunications Linirrcd and Globalstar, L.P.*, Dec. 31, 2001, at 32; John M. Bensche, *Revisiting Valuation on the Big LEO Satellite Systems*, Lehman Brothers, 11 (May 29, 1998). Due to inflation. increased (continued....)

with expansion funded. in part. by revenues from existing subscribers.[104] This difference exposes MSS providers to substantial risk that the economy or the mobile satellite communications market could change dramatically between the time an MSS provider forms its business plan and years later when the MSS provider actually commences service.[105]

42. Based on the reasoning above, MSS licensees are highly unlikely to try to use additional flexibility in the provision of MSS lo act anti-competitively in the market and are very likely to fail if they tried. Even in the unlikely event that such anti-competitive conduct did occur, it can be resolved through regulatory and judicial remedies. We. therefore. do not find persuasive claims that financial advantages caused by permitting ATC will be used to cut prices below competitive levels.

43. A few commenters argue that granting additional flexibility will, at least in the *2* GHz MSS band, "most likely result in the monopolization of the . . . band and the *de facto* reallocation of that spectrum for terrestrial use by ICO and its affiliate. Nextel Communications."[106] According to these commenters, common ownership in both ICO and Nextel will cause these companies to act in concert and, as a result. exploit competitive advantages that other stand-alone **MSS** providers cannot match."[107] Some commenters speculate that, as a result of these presumed synergies between Nextel and ICO. investors will not fund new **MSS** entrants and ICO will "monopolize" perhaps 50 megahertz or more of highly valuable nationwide spectrum for its existing terrestrial network.[108]

44. We do not believe that our primary proposal will specially benefit ICO or Nextel **by,** for example, providing them unique opportunities that other companies would not also enjoy. ICO and Nextel are separate corporations, neither under the control of the other and each with limited overlapping ownership. Although some investors may own both ICO and Nextel stock. the corporate officers and management have fiduciary responsibilities to their own stockholders, many of whom may not own stock

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capital costs, rising insurance fees and other expenses. future MSS systems are likely to cost as much or more than the incumbent systems did.

[104] Globalstar Comments at v.

[105] The United States' economic downturn and the dramatic growth and extension of terrestrial mobile networks. due in large pari io economies of scale. could not have been adequately forecast when the Commission began ils Big LEO allocation proceeding nearly a decade ago.

[106] Iridium Comments at 2-3; *accord* Voicestream Reply at 15 ("IC0 would have an enormous (and completely artificial) advantage in the new market that the Commission would be establishing (terrestrial-satellite vs. satellite-only)" because "ICO's affiliate, Nextel. already owns and operates a nationwide terrestrial network. and to provide its terrestrial services, . . . ICO/Nextel would only need to add radios (tuned to MSS spectrum) to existing cell sites.").

[107] Iridium Comments at *2 (claiming* that "[w]ithout an existing terrestrial infrastructure and customer base (such as is possessed by Nextel) or a business plan targeting a separate market niche (and supported by deep corporate 'pockets'), it is all hut inconceivable that funding will be available for new MSS entrants"); *id.* at 3 (claiming that no rational investor "would seek to compete against Nextel's entrenched position in this market.").

[108] *See. e.g.*, Voicestream Reply at 16 ("in authorizing MSS ATC, the Commission would effectively allow ICO/Nextel to monopolize the satellite market"); Iridium Comments at 2-3.

in both companies.[109] Therefore, ICO and Nextel would be required to independently consider their corporate interests regarding the joint provision of ATC services. Moreover. with respect to the 2 GHz band. whether through our case-by-case review of consolidation transactions or through our ability to open new processing rounds or reallocate spectrum if 2 GHz MSS licensees fail to meet their milestones. we do not intend to allow monopolization of the band. Even if ICO and Nextel currently intended to capitalize on their business strengths and cooperate in offering **MSS ATC,** nothing would prevent other ***CMRS*** and **MSS** operators from also doing so. For instance, nothing prohibits MSS providers from affiliating with terrestrial providers, through stock ownership, joint ventures. or other means, if a business relationship proves advantageous in the provision of integrated mobile services and as long as such arrangements comply with our rules and policies governing transfers of control."[110] Nor is there any bar on other MSS providers obtaining adequate funding if their business plans appear sound to lenders. Accordingly, we are not persuaded by Voicestream's claim that every MSS licensee except ICO "would be required to build terrestrial networks from scratch."[111] In any case, adopting *a* generally applicable policy that produces benefits for one class of similarly situated licensees where that is not the intent of the policy is not, without more, improper, arbitrary or otherwise contrary to the law or public interest.

45. Finally, some commenters also challenge the premise that the Commission has allocated the proper amount of spectrum for MSS use.[112] The Commission, however, has allocated MSS spectrum to achieve multiple objectives, including encouraging service to rural areas and enhancing public protection."[113] While, concurrent with adoption of this Order. the Commission has reduced the amount of MSS spectrum through reclaiming the spectrum of MSS providers that do not meet their milestones"[114] and

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[109] According to ICO, Nextel remains a publicly traded corporation, and any arrangement between ICO and Nextel regarding ATC would require approval by Nextel's independent board members due to overlapping ownership interests among principals of the companies. ICO Reply at 7 n.28.

[110] By analogy, we note that significant cross-ownership has emerged between satellite radio broadcasters and terrestrial audio radio broadcasters. SDARS, which provides radio broadcasts without locally originated programming to consumers via satellite, appears in many respects to compete directly with segments of the terrestrially based broadcast market. and one **of** the larger shareholders of the **SDARS** provider XM Radio is Clear Channel Communications Inc., which owns approximately 1.170 terrestrial radio outlets across the country. Brian Steinberg. *XM Satellite Radio's* Ads *Generate Some Heavy Static*, Wall St. J. (Feb. 1, 2002).

[111] Voicestream Reply at 15. In any case, we note that any entrepreneur seeking to take first advantage of a business opporlunily remains subject to considerable risk. no matter how promising the opportunity may appear Initially. Success by "first movers" may well pave the way for others to follow – a process that promotes competition and serves the public interest. As an additional safeguard. of course, the Commission's regulatory process, the various agencies responsible for antitrust enforcement and the threat of civil penalties should offer ample protection against what we believe to be the remote and speculative possibility of monopolization.

[112] ***See,*** *e.g.*, TDS Comments at 12 ("it would make more sense . . . to. . . reallocate [the MSS spectrum] through suctions" to existing terrestrial wireless carriers): CTIA Comments at 14 ("If anything, there is too much spectrum allocated for MSS today").

[113] ***See*** discussion *supra* **at** § IV(A)

[114] The Commission's rules provide for cancellation of a space station license when the licensee fails to meet a milestone. *See* 47 C.F.R. § 25.160. We use a "fairly bright line test" to determine whether an extension is warranted and grant extensions "only when delay in implementation is due to circumstances beyond the control of the licensee." *See, e.g., Amendment of the Commission's Space Station Licensing Rules and Policies*, Notice of Proposed Rulemaking and First Report and Order. 17 FCC Rcd 3847,3883. ¶ 105 & n.141 (2002) (citations omitted). We recently sought comment on how we might strengthen even these requirements. *Id.* at ¶¶ 104- I06

through reallocating MSS expansion spectrum,[115] a wholesale revision of our spectrum-management priorities is not warranted here. MSS continues to have the potential to provide ubiquitous. high-quality voice and data telecommunications services to the American public.[116] Indeed, the Commission has held that MSS services "will . . . complement wireless service offerings through expanded geographic coverage"'' and has found that satellites "may offer cost advantages over wireline access in rural and remote areas. where sparsely populated areas cannot provide the economies of scale to justify the deployment costs of wireline networks."[118] The Commission has also found that these advantages may prove particularly relevant to the maritime and aeronautical markets, for which MSS is an important. and sometimes the only. transmission path.[119] In each of these areas, more flexible rules for MSS may serve to enhance the benefits MSS offers to the public by improving the efficiency with which these services are delivered. Of course, nothing in our decision today limits our continuing spectrum-management obligation to ensure that the spectrum is used efficiently and effectively.

B. Alternative Proposals

46. In our *Flexibility* ***Norice.*** as an alternative to MSS ATC, we requested comment on the possibility of making some MSS spectrum available for use by any entity to provide terrestrial services. either in conjunction with MSS systems or on their own.[120] In the *Severability* ***Norice,*** we sought supplemental comment on whether "it is technically feasible for one operator to provide terrestrial services and another operator to provide satellite services in the same MSS band."'' Under this approach, portions of the spectrum currently designated for 2 GHz MSS and L-band systems would be made available for use by terrestrial operations, separated from the MSS operations in the bands. and could be assigned by auction. Iridium proposes that we create a secondary terrestrial service (STS)

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[115] ***See AWS Third Report ond Order,*** FCC 03-16. ET Docket No. 00-258 at ¶ 3

[116] ***See 2 GHz*** *MSS* ***Rules Order.*** 15 FCC Rcd at 16144-46, ¶¶ 32-34; ***Establishment of Policies and Service Rules for rhe*** *Mobile* ***Sorellire Service in rlie 2 GHz Bond,*** IB Docker No. 99-81. Notice **of** Proposed Rulemaking, 14 FCC Rcd 4843.4846. ¶ 4 (1999)(*2 GHz MSS Rules* ***Norice): Amendment of the Commission's Rules*** *to Establish New* ***Personal Communications*** *Services*. Memorandum Opinion and Order, 9 FCC Rcd 4957, 4995-96, ¶¶ 94-97 (1994); ***see*** *also. e.g.*. TMI Oct. 7.2002 ***Ex Parte*** Letter Attach. I at 5 ("TheFCC has repeatedly – 1997. 1998,2000 and 2001 – found that the current spectrum allocation for MSS best serves the public interest") (cirationsomitted).

[111] *2* ***GHz*** *MSS* ***Rules Norice,*** 14 FCC Rcd at 4843. ¶ 2

[118] ***Extending Wireless*** *Telecommunications Services* ***ro Tribal Lands***, Report and Order and Further Notice of Proposed Rule Making, 15 FCC Rcd 11794.11799, ¶ 13 (2000) ***(Tribal Lands Report)***.

[119] ***Establishing Rules and Policies for*** *rhe* ***Use*** *of Spectrum for Mobile Satellite* ***Services in rlie Upper ond Lower L-Bond.*** Report and Order. 17 FCC Rcd 2704, 2708, ¶ 11 (2002)("MSS systems are particularly well suited for providing mobile communication services to areas that are not being adequately served by terrestrial radio facilities"); ***Mobile Satellite Services*** *Subsidiary*, Memorandum Opinion and Order. 17 FCC 12894, 12895, ¶ 4 (2002)(noting "the importance of safety-relatedcommunications [provided **by** MSS for] the integrity of maritime safety and distress communications"); ***Vistar Data*** *Communications*, Order and Authorization. 17 FCC 12899. 12901, ¶ 8 (2002) (same).

[120] *Flexibility* ***Norice.*** 16 FCC Rcd ai 15548, ¶ 37.

[121] *Severability Notice*, 17 FCC Rcd at 4419.

allocation across all MSS bands with frequency blocks available to all through competitive bidding."'

1. Same-Band, Separate-Operator Sharing

47. Almost all commenters argue that an approach that does not require sharing between non-related parties would better serve the public interest than same-band, separate-operator sharing. While severed operations might theoretically be possible with an extremely limited number of users,[123] MSS ATC proponents maintain that it is not. as a practical matter, advisable for one operator to provide terrestrial services and another operator to provide satellite services in the same MSS band. over the same geographic areas, due to the high likelihood of interference."' These parties note that same-hand operation by separately owned and operated terrestrial and satellite licensees would likely require network exclusion zones that would restrict traffic over large territories,[125] diminish spectrum efficiency and network capacity for both satellite and terrestrial-based systems,[126] and increase the likelihood of interference to both satellite and terrestrial users.[127] For example, Globalstar argues that the only feasible method to manage MSS ATC interference is to offer terrestrial service in selected locations on selected channels, reusing the channels outside the relatively small boundaries of the terrestrial service area.[128] Globalstar adds that, for operators that use CDMA coding, severing the MSS hands into terrestrial and satellite components would increase the likelihood of interference to a number of important services immediately adjacent to MSS. including radio astronomy, Global Positioning System (GPS), the Global Navigation Satellite System (GLONASS) and Instructional Television Fixed Service (ITFS).[129] Celsat argues that it is unrealistic to expect that MSS and terrestrial competitors can jointly coordinate these complex systems without substantial cost measured in terms of inefficient operations, large administrative expenses and constant friction between the forced joint venturers.'"

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[122] Iridium Comments at 5-8 &Supplemental Comments at 2-4.

[123] *See infra* § III(D)

[124] **See.** *e.g.*, ICO Supplemental Comments at 11-19; Globalstar Supplemental Comments at 4-7; MSV Supplemental Comments at 6-9.

[125] ***See.*** *e.g.*, Constellation Supplemental Comments at 3.

[126] *See* ICO Supplemental Comments at 11; Celsat Supplemental Comments at **4;** Globalstar Supplemental Comments at 6.

[127] For example, Inmarsat, which has claimed that integrated MSS ATC operations would cause unacceptable interference to existing MSS systems. asserts that separately owned and operated satellite and terrestrial operations in the MSS spectrum "would exacerbate an already unacceptable interference threat into the Inmarsat system caused by proposed integrated terrestrial operations." ***See*** Inmarsat Supplemental Comments at 3.

[128] Globalstar Supplemental Comments at 5. According to Globalstar, terrestrial and satellite services require complex coordination "on the fly" between the satellite and terrestrial modes and, through dynamic frequency assignment, a single operator could offer both satellite and terrestrial services in certain locations while maintaining universal satellite coverage. Furthermore. according to Globalstar. there is no chance that two different operators of two separate mobile systems could successfully accomplish such coordination.

[129] Globalstar March 13, 2002 *Ex Parte* Letter Attach. 1 at 10 (noting that CDMA MSS operators "require all of the licensed spectrum in order to coordinate with these services")

[130] Celsat Supplemental Comments at 3.

48. Other commenters dispute these statements. AT&T Wireless, for example, states that spectrum is currently authorized for co-frequency use by independent, disparate users (including satellite and terrestrial) in a wide variety of contexts. conrradicting the MSS operators' contention that the provision of different services by unaffiliated providers would be unworkable.[131] Meanwhile. other commenters, such as Cingular/Sprint. take an equally dim view of same-band sharing regardless of whether a single MSS operator administers spectrum-sharing within a unitary network or whether the MSS licensee coordinates spectrum sharing with one or more separately owned and operated networks. Accordingly, Cingular/Sprint contend that "the central question before the Commission is not the technical feasibility of having a separate ATC operator. but the practical feasibility of doing any spectrum sharing between satellite and terrestrial networks."'" According to Cingular/Sprint, the sharing of the MSS band between satellite and terrestrial operations. while technically possible, is not practically viable.'" Based on a technical study performed by Telcordia Technologies (Telcordia Study). Cingular/Sprint conclude that the MSS satellite uplink can tolerate only a small number of active ATC co-channel headsets because of the total EIRP radiated into the sky by the ATC terminals within the MSS beam and argue that "it is technically feasible for separate-operators to share the MSS band in the provision of satellite and terrestrial services. and there would be no loss of spectral efficiency if two different firms as opposed to one firm operated the satellire and terrestrial systems."'"

49. We conclude that same-band. separate operator sharing is impractical and ill-advised. As a preliminary matter, we find that references to sharing arrangements in other bands, while illustrative that sharing may be possible, particularly where both services operate in limited geographic areas on a fixed basis, do not address how parties to this proceeding can overcome the technical hurdles to workable sharing arrangements between two mobile services. The feasibility of any given satellite-terrestrial sharing arrangement in any given frequency band depends upon inter-related factors including: propagation characteristics of the frequency band, mobility of the communication end points, geographic separation between users, anticipated operating power, protection of adjacent spectrum users from interference, extent of system deployment across territory. and other particulars. Because of these

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[131] *See* Letter from Douglas I. Brandon, Vice President. AT&T Wireless. to William F. Caton, Acting Secretary. Federal Communications Commission at 3 & n.5 (filed April I. *2002)* (AT&T Wireless Apr. 12002 *Ex* Pane Letter) (citing *Amendment of Pans 2 arid 25 of the Commission's Rules to Permit Operation of NGSO FSS Systems Co-Frequency with* GSO *arid Terrestrial Systems in the Ku-Band Frequency Range*. ET Docket No. 98-206, First Report and Order and Further Notice of Proposed Rule Making. 16 FCC Rcd 4096, 4218 ¶ 326 (2000) (citing, *inter alia*, *Amendment to Pans 1, 2, 87 and 101 of the Commission's Rules to License Fixed Services at 24 GHz*, WT Docket No. 99-327, Report and Order, 15 FCC Rcd 16934(2000); *Amendment of the Commission's Rules Regarding rlre 37.0-38.6 GHz and 38.6-40.0 GHz Bands*, ET Docket No. 95-183. Report and Order and Second Notice Proposed Rule Making. 12 FCC Rcd 18600. 18636 (1997)).

[132] Cingular/Sprint May 13, 2002 *Ex* Pone Letter 31 *2*

[133] *Id.* at 15. Cingular/Sprint provide a technical study performed by Telcordia Technologies (Telcordia Study) to support their claim that ATC and dynamic frequency assignment would be less spectrum efficient than providing MSS and terrestrial services by separate operators in the same frequency band. The study investigates prospects for sharing spectrum between the MSS and ATC by analyzing the four interference paths between the MSS system and the ATC system: ATC base station to MSS downlink, MSS terminal to ATC base station, MSS satellite to ATC terminal and ATC terminal to MSS uplink. According to Telcordia, interference paths along three of the paths is generally confined to the areas near the ATC base station. and thus is easier to manage. Telcordia concludes that the most difficult sharing situation occurs between ATC handheld transmitters and MSS satellite receivers because the power from the ATC transmitter will reduce the capacity of the MSS systems.

[134] *Id.*, Attach. A at 2

variables. each proposed satellite-terrestrial band-sharing arrangement is different. Satellite and terrestrial licensees. for example. might prove able to coordinate geographically discrete. fixed, point-to-point operations in the higher frequency bands where rain fade. atmospheric absorption and other factors limit the distance that frequency transmissions can travel.[135] But the same parties might experience great difficulty in coordinating ubiquitous, mobile, multipoint-to-multipoint operations in the lower frequency range such as 1-3GHz.

50. Accordingly, the various proceedings that AT&T Wireless cites in support of same-band, separate-operator sharing are inapposite to the present case.[136] In the *MVDDS* ***Order,*** for example, the Commission concluded, after several years of study, that sharing is possible between geostationary DBS satellites, which provided links to fixed eanh stations, and MVDDS systems, which employ highly directional fixed antennas. Yet the mere existence of other sharing arrangements in other bands by other operators with other system geometries, other deployment patterns. other terminal types and other power levels – without more – says nothing about whether and how parties to this proceeding might overcome the particular technical hurdles to workable sharing arrangements applicable to this case. The potential for sharing between stationary services that use highly directional fixed antennas in the bands around 12 GHz has little, if any. relevance to the prospects for sharing among two or more highly sensitive mobile systems that rely on omni-directional antennas in the bands below 3 GHz, which has far more favorable propagation characteristics than the 12 GHz band.

51. AT&T Wireless also cites the *Government Transfer Band* ***Order*** as support for the proposition that the Commission has authorized same-band sharing between terrestrial and satellite services."' In that decision. however, the Commission actually rejected same-band sharing between terrestrial fixed services and **fixed** satellite services (FSS) and, after **a** limited transition period, adopted a permanent freeze on any additional co-primary FSS earth stations in the band.[138] Indeed, many **of** the

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[135] By way of example, we would generally not expect satellite transmissions from a single, geostationary orbit satellire directly over the United States to a single, fixed earth station in New York generally to interfere with terrestrial transmissions from a fixed location in Virginia **io** another fixed location **in** Maryland. particularly in bands in the 40 GHz range.

[136] **See** AT&T Wireless Apr. 1, 2002 *Ex Parte* Letter at 3 & n.5 (citations omitted).

[137] *Id.* at **n.5** (citing ***Amendment*** *of the Commission's Rules with* ***Regard*** *to the 3650-3700* ***MH;*** Gor't ***Transfer*** *Band*, ET Docker No, 98-237; *The 4.9* ***GHz Band, Transferred from Federal*** *Gov't* ***Use.*** WT Docket No. 00-32, First Report and Order and Second Notice of Proposed Rulemaking, 15 FCC Rcd 20488, 20498, ¶ 20 **n.64** (2000) (*3.7/4.9* ***GHz Government Transfer Bond Order)).***

[138] *3.7/4.9* ***GH: Government Transfer Band Order***, 15 FCC Rcd at 20497-20501, ¶¶ 18-29. In declining to permit same-band. co-primary terrestrial and satellite operations, the Commission held that:

> [1]n this band. allowing FSS on an unrestrained co-primary basis would impede any potential widespread use of the band for terrestrial services. Due to the weak signals that are received in the **FSS.** coordination with higher-powered terrestrial operations would result in potentially large geoprophic areas where terrestrial services could not operate to avoid interference **to** FSS. The size and shape of these "exclusion zones" may be different for each FSS earth **station** site because factors such as shielding. antenna orientation and terrain elevation will vary from site to site. These coordination requirements and the presence of exclusion zones would significantly increase transaction costs and create a disincentive for deployment of new terrestrial operations. Thus. we find that unrestrained deployment of FSS earth stations could hinder or greatly inhibit the opportunities for terrestrial operations in the band.

(continued. .)

same considerations that led the Commission to reject same-band, separate-operator sharing in the *Government Transfer Bond Order* – onerous coordination requirements. large and variable exclusion zones, high transaction costs and disincentives for investment – persuade us to decline to adopt the alternative, same-band. separate-operator sharing proposal posed in our *Flexibility Notice.*

52. MSS ATC represents a more efficient alternative than same-band, separate-operator sharing. Even if MSS ATC were not the more efficient alternative in the abstract, we do not make decisions in a vacuum. Ultimately. we must decide whether or not to authorize MSS ATC in light of the license-rights of the MSS incumbents and, in most cases, within the context of already operational MSS services. While we agree with those commenters that suggest it may be theoretically possible for two different firms to own and operate the satellite and terrestrial portions of a single system, we believe that. in reality. no two operators are likely to succeed in organizing themselves to manage the highly complex coordination process required between both the MSS and the terrestrial component at the same time in the same band in the same region. To optimally balance the frequency usage of the terrestrial and satellite portions of the system, the ATC ponion must be operated in a manner that controls the ATC terminal-to-MSS uplink interference while still providing ATC service. For NGSO MSS systems, this coordination most likely would need to be accomplished on a dynamic basis to accommodate the motion of the satellite constellation. And, for L-band MSS systems. this coordination must include the ability to permit emergency preemptive, priority message traffic.[139] While it may be an operational challenge for a single operator to assign effectively channels between the satellite and terrestrial operations. multiple operators would find achieving efficiently this type of coordination much more difficult.

53. We disagree with the Cingular/Sprint conclusion that there would not be a loss of spectral efficiency if non-affiliated system operators operated separate MSS and terrestrial systems in the same band. We do agree with Cingular/Sprint that the greater potential for interference exists from the ATC mobile terminals to the MSS receivers. Indeed, we place several technical limitations on ATC systems to avoid ATC interference to MSS systems in the allocation. We also agree that power control must be taken into account when considering the aggregate uplink power of the ATC network.[140] The added power control will reduce the effect of ATC terminals on the MSS satellite receiver and result in minimal MSS capacity loss. We apply certain other limitations on ATC to protect MSS systems from receiving interference (e.g., limitations on the number of base stations permitted to transmit on a given channel in the L-band) and it is questionable whether a limitation on base station deployment, for example to reduce interference to MSS, would provide a gain in spectrum efficiency for a non-affiliated terrestrial network.

54. Our experience in other bands and the technical analysis below supports the MSS ATC

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Id. at 20497, ¶ 18. Furthermore. the Commission limited any mobile operations in the band to base stations. because, unlike mobile terminals, base stations operate from fixed locations that may facilitate sharing in certain circumstances.

[139] *See infra* § III(D)(2)(a)(iv).

[140] Cingular/Sprint, for example, indicate that power control must be taken into account when calculating the interference because "the interference into the MSS uplink is the sum of contributions from multiple ATC terminals." Cingular/Sprint May 13, 2002 *Ex Parte* Letter. Attach. A (Telcordia Study) at 20. The Telcordia Study, however, includes only the 'range compensation' factor that accounts for the difference between the transmit power of a terminal at the cell boundary and the average terminal power within the ATC cell. The ATC terminals near the cell boundary will he commanded, by the power control system. to transmit at a higher power level (because of the greater distance from rhe terminal to the base station) than the users near the base station itself. The result is that the 'average' ATC terminal will transmit a power somewhat less than it is maximally capable of. In our analysis, we also consider additional margin to compensate tor structural attenuation. *See infra* §§ III(D)(1)& III(D)(2).