Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Review of Part 87 of the Commission's Rules	)	WT Docket No. 01-289
Concerning the Aviation Radio Service	)	

To: The Commission

FURTHER COMMENTS OF THE BOEING COMPANY

The Boeing Company ("Boeing"), by its attorneys and pursuant to Section 1.415 of the Commission's Rules, 47 C.F.R. § 1.415, hereby submits the following comments in response to the above-referenced Report and Order and Further Notice of Proposed Rulemaking ("*Order*" or "*FNPRM*").

I. THE COMMISSION SHOULD TAKE ADDITIONAL STEPS TO UPDATE ITS PART 87 RULES TO REFLECT ONGOING DEVELOPMENTS IN AVIONICS COMMUNICATIONS AND NAVIGATION SYSTEMS

Throughout this proceeding, the Commission has strived to update its rules for aeronautical communications services in order to "stay abreast of technological advances, conform to the rules governing other radio services, and [be] responsive to industry needs."[1] Concurrent with the Commission's efforts, the aviation industry has seen substantial developments in the technologies that are available for aeronautical communications and navigation services. These technologies include the use of higher

[1] *FNPRM*, ¶ 76 (*quoting Part 87 of the Commission's Rules Concerning the Aviation Radio Service*, Notice of Proposed Rule Making, 16 FCC Rcd 19005, 19027 (2001)).

frequency bands, new types of satellite networks, more spectrally efficient signal structures and data intensive broadband services.

To keep pace with these and future developments, other regulatory bodies, such as the Federal Aviation Administration ("FAA"), are drafting regulations that continue to ensure the safety and efficiency of the aviation industry, but are technologically neutral. For example, the FAA recently released a proposed Technical Standard Order ("TSO") on avionics equipment used for Aeronautical Mobile Satellite (Route) Services ("AMS(R)S") using new types of satellite communications networks, referred to in the aviation industry as Next Generation Satellite Systems ("NGSS").[2]

The FAA's proposed *NGSS TSO* refrains from identifying specific satellite technologies that are acceptable for use in providing AMS(R)S. Instead, the *NGSS TSO* includes general requirements regarding the operating capabilities, reliability and approval process for new AMS(R)S communications and navigation systems. The proposed *NGSS TSO* also requires AMS(R)S avionics to meet minimum operational performance standards ("MOPS") that were developed for new satellite systems by the aeronautical advisory body, RTCA, Inc. ("RTCA")[3]

The RTCA's MOPS for NGSS also refrain from delineating specific technical requirements for satellite-based aeronautical communications and navigation systems.

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[2] *See Avionics Supporting Next Generation Satellite Systems (NGSS)*, Proposed Technical Standard Order, TSO-C159 (June 23, 2004) ("*NGSS TSO*"). Comments on the FAA's proposed *NGSS TSO* are due July 23, 2004.

[3] RTCA is a private, not-for-profit organization that addresses requirements and technical concepts for aviation. The RTCA studies and prepares recommendations on aviation standards that are used by the FAA to develop regulations. Boeing is a member of RTCA and has positions on its Board of Directors, Program Management Committee, Free Flight Steering Committee, and many RTCA Special Committees and Working Groups.

Instead, the new MOPS provide generic requirements, which can be made applicable to satellite systems operating in any orbital configuration or frequency band through the addition of technology-specific attachments.

The Commission should adopt a similar approach with respect to revising its Part 87 rules for aeronautical communications equipment. Rather than maintain detailed rules addressing each type of satellite network configuration that may be used to provide AMS(R)S, the Commission should adopt general requirements that address spectral efficiency and interference issues. The Commission should also state in its Part 87 rules that any aeronautical communications equipment that satisfies these general requirements can be used for AMS(R)S if the equipment has been approved by the FAA pursuant to its proposed *NGSS TSO* authorization process.

The FAA's TSO authorization process is adequate to ensure that any new AMS(R)S avionics equipment that is approved for use by the aviation industry will provide a high level of reliability, availability and continuity to meet the industry's critical communications needs. The Commission can therefore recast its Part 87 rules to focus primarily on spectrum management and interference issues. Using such an approach, the Commission can enhance the safety and efficiency of the aviation industry by ensuring that new, critically needed, aeronautical communications and navigation systems are placed into operation as rapidly as possible, without compromising the safety and efficiency of the aviation industry.

II. THE COMMISSION SHOULD REVISE PART 87 TO AUTHORIZE THE PROVISION OF AMS(R)S IN ANY SPECTRUM ALLOCATED TO THE MOBILE-SATELLITE SERVICE

The *FNPRM* confirms the Commission's long held policy that AMS(R)S is a type of Aeronautical Mobile Satellite Service ("AMSS"), which can be provided in any MSS allocation.[4] The *Order*, however, fails to adopt conforming changes to Part 87 of the Commission's rules that would harmonize those rules with the Commission's policies. Rather, Part 87 remains inconsistent with the Commission's policies by limiting AMS(R)S above one gigahertz to the 1545-1559 and 1646.5-1660.5 MHz bands ("L-band").

The *FNPRM* requests comment on whether Part 87 should be amended to permit AMS(R)S in additional MSS allocations, such as the 2000-2020 MHz ("2 GHz MSS") band.[5] In addition, the *Order* raises questions about whether any need exists for the Commission to adopt regulatory provisions requiring priority and preemptive access for AMS(R)S in the 1610-1626.5 MHz ("Big Leo MSS") and 5000-5150 MHz bands.

As the Commission appears to acknowledge, no reason exists to add priority and preemptive regulatory requirements to any MSS allocation.[6] Instead, Part 87 should be amended to indicate that AMS(R)S can be provided in any MSS allocation using a satellite network that has satisfied the FAA's *NGSS TSO* authorization process.

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[4] *See FNPRM*, ¶ 83.

[5] *See id.*

[6] *See id.*, ¶¶ 15-16 & 83 n.298.

As discussed in the previous section, the FAA's *NGSS TSO* requires that networks and equipment used for AMS(R)S comply, *inter alia*, with the MOPS contained in RTCA/DO-262. These MOPS,[7] along with other RTCA requirements,[8] clearly indicate that AMS(R)S systems must have the technical capability to provide priority and preemptive access for safety communications. The requirements include having in place mechanisms that can preempt network resources as necessary. The MOPS create a regulatory obligation, enforceable by the FAA, which is applicable to any satellite system providing AMS(R)S in the bands covered by the MOPS.[9] Therefore, no need exists for the Commission to adopt "duplicative" regulations addressing priority and preemptive access for emergency AMS(R)S communications in MSS spectrum allocations.[10]

As the Commission acknowledges, other means also exist to ensure emergency AMS(R)S communications are given inter-network priority and preemptive access to satellite system resources. For example, airlines and/or air traffic management

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[7] *See Minimum Operational Performance Standards for Avionics Supporting Next Generation Satellite Systems (NGSS)*, RTCA/DO-262 (Dec. 14, 2000) and Change No. 1 to RTCA/DO-262, § 1.5.4 (Nov. 28, 2001) (requiring that new satellite systems include a mechanism for priority, precedence and preemption for AMS(R)S).

[8] *See Minimum Operational Performance Standards for Aeronautical Mobile Satellite Services (AMSS)*, RTCA/DO-210D Change 2, at 1.5.4 (Nov. 28, 2001) (requiring that new satellite systems include a mechanism for priority, precedence and preemption for AMS(R)S); *Guidance on Aeronautical Mobile Satellite Service (AMSS) End-to-End System Performance*, RTCA/DO-215A, § 1.6.5 (Feb. 21, 1995) (same).

[9] In addition, Articles S44 and S45 of the ITU Radio Regulations mandate that a satellite operator carrying aeronautical communications must provide intra-network priorities for AMSS safety and distress communications. Article S45.4 envisions that, in carrying out this requirement, a network operator may need to preempt low-priority transmissions to make capacity available for priority communications.

[10] *FNPRM*, ¶ 76.

authorities can enter into contractual arrangements with satellite operators obligating them to provide AMS(R)S with the appropriate inter-network priority and preemptive access.[11] In addition, satellite network operators can use technical solutions, such as CDMA-based signal modulation schemes, to ensure that network capacity is always available for emergency AMS(R)S communications, making priority and preemptive access protocols unnecessary.

Notwithstanding the foregoing, the *Order* refrains from putting this issue to rest, in part because of a separate Commission proceeding regarding the appropriate regulatory framework for preexisting AMS(R)S allocations in the L-band.[12] In that proceeding, which has since been concluded, the Commission adopted domestically a decision made by the 1997 World Radiocommunication Conference ("WRC-97") to eliminate international AMS(R)S allocations in portions of the L-band and replace them with generic MSS allocations.[13] In addressing this issue, the Commission also retained

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[11] *See FNPRM*, ¶ 15; *see also Establishment of Policies and Service Rules for the Mobile Satellite Service in the 2 GHz Band*, Report and Order, 15 FCC Rcd 16127, ¶ 64 (2000) (concluding that an MSS licensee "can enter into contracts with members of the aviation community to provide AMS(R)S in the generic MSS allocation, with appropriate intra-network priority and preemption, without the need for any priority and preemption provision in the U.S. Table of Allocations").

[12] *See FNPRM*, ¶ 16.

[13] *See Amendment of Parts 2, 25, and 87 of the Commission's Rules to Implement Decisions from World Radiocommunication Conferences Concerning Frequency Bands Between 28 MHz and 36 GHz and to Otherwise Update the Rules in this Frequency Range; Amendment of Parts 2 and 25 of the Commission's Rules to Allocate Spectrum For Government and Non-Government Use in the Radionavigation-Satellite Service*, Report and Order, FCC 03-269, ¶ 20 (Nov. 4, 2003).

existing regulatory provisions in the U.S. Table of Frequency Allocations giving AMS(R)S priority and preemptive access in relevant portions of the L-band.[14]

The Commission's resolution of this issue with respect to the L-band, however, is irrelevant to the separate question of whether special priority and preemption regulatory provisions are needed for MSS spectrum allocations outside the L-band. AMS(R)S regulatory provisions may be appropriate in the L-band to ensure that the aviation industry has long-term access to those legacy AMS(R)S allocations.[15] In contrast, such a spectrum reservation is unnecessary for other MSS allocations that have never been used for AMS(R)S communications.

Instead, the Commission should eliminate ambiguity for satellite operators and the aviation industry by stating clearly that the Commission's regulations permit the provision of AMS(R)S in all MSS spectrum bands without the addition of FCC regulatory requirements mandating inter-network priority and preemptive access for emergency AMS(R)S communications. Once the Commission resolves this issue, the aviation industry and air traffic authorities can use the FAA's *NGSS TSO* process to move forward with new types of AMS(R)S communications and navigation services that can greatly increase the resources available to flight crews and air traffic management, further enhancing the safety and reliability of the air transport system.

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[14] *See id.*

[15] As the Commission has acknowledged, the priority and preemption rights that currently exist in the L-band may also be appropriate because of the historical coordination difficulties that exist between MSS networks in the L-band. *See Establishing Rules and Policies for the use of Spectrum for Mobile Satellite Services in the Upper and Lower L-band*, FCC 02-24, ¶¶ 8-9 (Feb. 7, 2002). These historical coordination difficulties do not exist with respect to other MSS spectrum allocations.

III. THE COMMISSION SHOULD ALSO REVISE PART 87 TO REFLECT OTHER TECHNICAL ADVANCEMENTS IN THE AVAILABILITY OF AMS(R)S FOR THE AVIATION INDUSTRY

The *FNPRM* proposes additional changes in its Part 87 rules for AMS(R)S to accommodate changes in technology and operating systems. Rather than modify the Part 87 rules to accommodate these changes, the Commission should amend its rules to make them technologically neutral and avoid favoring some technologies over others.

For example, the *FNPRM* request comment on whether the Part 87 rules should be modified to accommodate new types of emissions and signal modulation structures.[16] The *FNPRM* appears to acknowledge that CDMA-based systems can be used to enhance the provision of AMS(R)S, but the *FNPRM* limits its discussion to aeronautical communications services operating in the VHF spectrum band.[17]

In its initial comments in this proceeding, Boeing proposed that CDMA-based systems be permitted in all spectrum bands used for AMS(R)S, particularly higher bands where a new generation of MSS networks is being introduced.[18] As Boeing explained in its comments, CDMA-based systems provide advantages for networks that must afford priority and preemptive rights to critical messages because CDMA networks allocate communications channel capacity based on available signal power, rather than available frequencies. As a consequence, rather than preempt lower priority signals, a CDMA-based network can, in the vast majority of cases, permit a high priority communication to

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[16] *See id.*, ¶¶ 77-79.

[17] *See id.*, ¶ 79.

[18] *See Comments of The Boeing Company*, WT Docket No. 01-289, at 7 (March 14, 2002).

operate at greater than normal power levels, thereby providing additional margins to ensure signal reliability. Such an approach ensures that high priority messages get through, without interrupting lower priority messages. The Commission should therefore modify the Part 87 rules to permit new signal modulation and emission structures in all MSS spectrum allocates used for AMS(R)S.

The *FNPRM* also seeks comment on whether the Commission should broaden its Part 87 Rules to enable use of non-geostationary satellite orbit ("NGSO") networks for the provision of AMS(R)S.[19] The current rules include technical requirements that effectively preclude the use of NGSO networks.

The *FNPRM* does not suggest any technical or spectrum management basis for continuing to maintain such limitations. Furthermore, the Commission acknowledges that both the RTCA and the International Civil Aviation Organization ("ICAO") have been working on this issue,[20] which has resulted in the development of the above discussed MOPS for NGSS. The Commission should therefore eliminate the technically restrictive provisions within Part 87 that foreclose the use of NGSO networks.

Finally, the Commission should modify or eliminate various other technologically restrictive regulatory requirements in its Part 87 regulations.[21] Alternatively, the Commission could adopt a blanket rule indicating that a satellite network can be used to

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[19] *See FNPRM*, ¶ 80.

[20] *See id.*

[21] For example, as Boeing indicated in its initial comments, the Commission should amend Section 87.131 (maximum power and emissions), Section 87.133(a)(7) (frequency tolerance), Section 87.137 (bandwidth), Section 87.141(j) (transmission rates), and Section 87.145(d) (Doppler effect compensation).

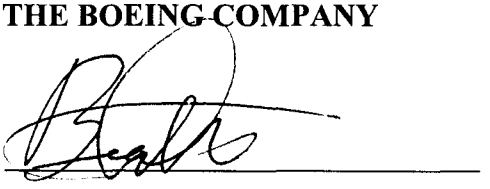
provide AMS(R)S if it meets the current Part 87 requirements, *or* if it has been certified for AMS(R)S pursuant to the FAA's *NGSS TSO* process. Such an approach would further the public interest by ensuring that new AMS(R)S services are made available to the aviation industry as expeditiously as possible.

VI. CONCLUSION

As set forth above, the Commission should update its rules for the Aviation Radio Service to reflect ongoing technological advances that can enhance the AMS(R)S available to the aviation industry and thereby promote further safety and efficiency in this country's air transport system.

Respectfully submitted,

THE BOEING COMPANY

By: 

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