

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

In the Matter of)	
)	
Amendment of the Commission's Rules to Promote Aviation Safety)	WT Docket No. 19-140
)	
WiMAX Forum Petition to Adopt Service Rules for the Aeronautical Mobile Airport Communications System (AeroMACS))	RM-11793
)	
Petition of Sierra Nevada Corporation for Amendment of the Commission's Rules to Allow for Enhanced Flight Vision System Radar under Part 87)	RM-11799
)	
Petition of Aviation Spectrum Resources, Inc. for Amendment of Sections 87.173(b) and 87.263(a) of the FCC's Rules to Allow Use of the Lower 136 MHz Band by Aeronautical Enroute Stations)	RM-11818
)	
Petition of Airports Council International-North America Regarding Aeronautical Utility Mobile Stations)	RM-11832
)	
To: The Commission)	

REPLY COMMENTS OF THE BOEING COMPANY

I. INTRODUCTION

The Boeing Company ("Boeing") hereby provides reply comments in response to the Federal Communications Commission's ("FCC" or "Commission") *Notice of Proposed Rulemaking* ("*NPRM*") in the above-referenced proceedings, in which the Commission seeks comment on a number of proposals related to communications services designed to enhance

aviation safety.¹ A global leader in the design and manufacture of aircraft and aerospace systems, Boeing appreciates the Commission's commitment to aviation safety and its attention to how its rules can be adjusted and modernized to serve this objective. As Boeing explained in its opening comments,² the Commission's *NPRM* introduces a number of proposals that, if adopted, will facilitate the use of existing and emerging aviation communications technologies and ultimately enhance aviation safety. These proposals relate to Enhanced Flight Vision Systems, audio visual warning systems, Automatic Dependent Surveillance-Broadcast communications, unicom stations, aeronautical enroute stations, vehicle squitters, and emergency locator transmitter test stations.

However, as Boeing also made clear in its opening comments, the Commission's proposed implementation of service rules for the Aeronautical Mobile Airport Communications System ("AeroMACS") needs further refinement. Boeing offered five suggestions to aid the Commission's development of services rules for AeroMACS: (i) appropriately limiting the definition of AeroMACS and ensuring the rules reflect AeroMACS' limitations; (ii) adopting the *NPRM*'s proposal to authorize AeroMACS operations through an aircraft operator's existing aircraft license; (iii) ensuring that non-aircraft licensees have sufficient experience; (iv) designating a frequency coordinator with appropriate qualifications; and (v) precluding AeroMACS deployment at airports with significant flight testing activities.

AeroMACS proponents fail to dispute these common-sense suggestions to improve the service rules for AeroMACS and ensure that AeroMACS services can be operated both as intended

¹ *Amendment of the Commission's Rules to Promote Aviation Safety*, Notice of Proposed Rulemaking, WT Docket No. 19-140, RM-11793, RM-11799, RM-11818, RM-11832, FCC 19-53 (rel. June 7, 2019) ("*NPRM*").

² Comments of the Boeing Company, WT Docket No. 19-140 et al. (filed Sept. 3, 2019) ("Boeing Comments").

and without causing harmful interference to other AeroMACS operations or co-frequency flight testing operations. These proponents advocate for lenient regulatory procedures for AeroMACS operators and services that fail to appreciate the role of AeroMACS as an aviation safety service and the need for appropriately robust licensing requirements, frequency management, and service rules.

Finally, the record in this proceeding raises the importance of forward-thinking policy to accommodate the increasing spectrum demands of the unmanned aircraft systems (“UAS”) industry. To this end, the Commission should proceed expeditiously with a notice of proposed rulemaking on the Aerospace Industry Association’s Petition for Rulemaking regarding the adoption of service rules for UAS operations in the 5030-5091 MHz band.³

II. ANY NEW RULES FOR AEROMACS SHOULD INCORPORATE BOEING’S PROPOSALS AND REJECT CALLS FOR MORE LENIENT REGULATORY FRAMEWORKS.

As Boeing explained in its initial comments, although the Commission’s proposals regarding service rules for AeroMACS were well-intentioned, they could benefit substantially from further refinement to ensure that the services are operated, and the spectrum managed, by the appropriate entities. Moreover, Boeing explained, the Commission could take further steps to ensure that AeroMACS will not jeopardize existing flight testing operations that are critical to aviation safety. Consistent with this perspective, Boeing offered the five proposals summarized above to improve the *NPRM*’s proposed regulatory regime for AeroMACS.⁴

AeroMACS proponents fail to provide persuasive reasoning to deviate from the proposals put forth by Boeing and the Commission. For instance, the WiMAX Forum urges the Commission

³ See Petition to Adopt Service Rules for Unmanned Aircraft Systems (“UAS”) Command and Control in the 5030-5091 MHz Band, RM-11698 (filed Feb. 8, 2018) (“AIA Petition”).

⁴ See Boeing Comments at 7-16.

to “exercise regulatory humility,” “avoid adopting overly specific and prescriptive rules,” and “lower[] barriers to entry.”⁵ These suggestions seek to displace the Commission’s expertise as the agency charged with management of radiofrequency spectrum, and simply have no place with respect to regulation of this type of aviation safety service. Because of the importance of communications that take place on these frequencies, it is essential that licensees are well-qualified and properly vetted, and that the rules are appropriately prescriptive to ensure that AeroMACS frequencies are used correctly and within FCC-established parameters designed to avoid harmful interference to other AeroMACS users as well as other operations. The Commission recognizes this: as it explained in the *NPRM*, “AeroMACS is a safety of life service that requires strict license eligibility requirements and individualized coordination of each transmitter to ensure no interference to other AeroMACS links.”⁶

Accordingly, the Commission can comfortably reject the WiMAX Forum’s assertions that requiring individual licensing for AeroMACS users—a standard and, frankly, necessary practice for this type of aviation safety service—is “onerous and unnecessary,” and that limiting non-aircraft AeroMACS licensees to airports and airport operators—a proposal which Boeing would limit even further by requiring non-aircraft licensees to demonstrate sufficient experience with aviation safety services—“needlessly risk[s] limiting the universe of AeroMACS users.”⁷ These positions reflect a desire by AeroMACS proponents to prioritize deployment over adherence to well-founded regulatory requirements, ultimately at the expense of aviation safety. Moreover,

⁵ Comments of the WiMAX Forum, WT Docket No. 19-140, at 8-9 (filed Sept. 3, 2019) (“WiMAX Forum Comments”).

⁶ *NPRM* ¶ 37.

⁷ WiMAX Forum Comments at 9.

there is significant record support for the need for individual licensing and qualified licensees.⁸ The record also resoundingly supports Boeing’s view that the frequency coordinator for the band must possess the requisite qualifications for that role, including “demonstrated experience with users of aviation safety services as well as managing aviation safety spectrum operations with AM(R)S requirements.”⁹ The Commission therefore should adopt its proposals set forth in the *NPRM* related to individualized licensing and frequency coordination, shored up by the qualification requirements advocated by Boeing and other commenters. These measures will ensure that the entities that will use AeroMACS services and coordinate AeroMACS frequencies do so in a manner that ensures the proper operation of AeroMACS as a safety-of-life aviation service, consistent with FCC technical regulations.

Boeing also emphasized in its initial comments the need to “ensure that the deployment of AeroMACS does not unnecessarily disrupt flight testing (‘AMT’) operations,”¹⁰ and accordingly urged the Commission to refrain from enabling AeroMACS deployment at this time at airports

⁸ See, e.g., Comments of Aviation Spectrum Resources, Inc., WT. Docket No. 19-140, et al., at 7 (filed Sept. 3, 2019) (“ASRI Comments”) (Because AeroMACS is a “safety service intended largely to provide mobile service to aircraft on the ground and to other mobile assets in support of such aircraft . . . AeroMACS should not be authorized [by rule] under Part 95, but [under] a more comprehensive licensing model.”); Comments of the Aerospace and Flight Test Radio Coordination Council, Inc., WT. Docket No. 19-140, et al., at 6 (filed Sept. 3, 2019) (“AFTRCC Comments”) (explaining that “Part 87 fixed/base stations of the AM(R)S-type are licensed on a site-specific basis following frequency coordination,” and that “AFTRCC is aware of no aviation service which is licensed by rule, and for good reason: As the [*NPRM*] observes, site-based licensing minimizes the risk of interference by providing ‘individualized coordination of each transmitter’”) (quoting *NPRM* ¶ 37).

⁹ Boeing Comments at 13-14. See, e.g., ASRI Comments at 7-8 (explaining that “[t]he use of a channel-manager licensee has worked well for decades in other contexts such as the aviation industry’s management of the Aeronautical Mobile Route Service . . . by ASRI,” and that any such channel manager for AeroMACS “should be well-versed in aeronautical communications and should be representative of the users of AeroMACS service”); Comments of the Aerospace Industry Association, WT. Docket No. 19-140, at 6 (filed Sept. 3, 2019) (“AIA Comments”) (advocating for channel manager selection criteria which “focus[es] on a demonstrated familiarity with complex safety-related aviation spectrum operations, and ideally a history of managing such operations”); AFTRCC Comments at 6 (“[T]he selection criteria [for an AeroMACS channel manager] should stress a demonstrated record of expertise in the management of aviation spectrum for air carriers, general aviation, and the like, particularly aviation safety spectrum such as this.”); Comments of Collins Aerospace, WT Docket No. 19-140, at 7 (filed Sept. 3, 2019) (pointing to ASRI’s management of aeronautical enroute services as a good model for an AeroMACS coordinator).

¹⁰ Boeing Comments at 14.

with significant flight testing activity.¹¹ The WiMAX Forum seeks to minimize this concern, in so doing quoting Boeing comments stating that “[c]ertain factors potentially enhance the ability for spectrum sharing between AeroMACS and AMT flight testing in the 5091-5150 MHz band” to support the WiMAX Forum’s assertion that “AeroMACS and AMT operations may be able to use the same spectrum.”¹²

The WiMAX Forum not only cites the wrong proceeding for this statement from Boeing, but uses it completely out of context.¹³ Boeing did make this comment about “[c]ertain factors” that “potentially enhance the ability for spectrum sharing,” but did so in response to the WiMAX Forum’s Petition for Rulemaking urging the Commission to adopt AeroMACS service rules. The two “factors” Boeing addressed did not speak to the technical feasibility of the two services to share the spectrum, but rather to the relatively limited nature of flight testing operations as compared with the locations where AeroMACS might be deployed. Specifically, Boeing explained that (i) “sharing [between AeroMACS and AMT] will be necessary only at those airports where flight testing is conducted”¹⁴; and (ii) “flight test operations at these airports could likely be accommodated using a relatively limited portion of the 5091-5150 MHz band.”¹⁵ These factors in no way solve the central problem regarding AeroMACS/AMT sharing, which, as Boeing explained in those same comments, is that “the conditions for spectrum sharing between the two services are not self-evident,” and as such, “the measures that will be necessary to protect AMT flight test

¹¹ *Id.* at 15-16.

¹² *See* WiMAX Forum Comments at 21.

¹³ *See id.* at 21 & n.48 (citing Comments of the Boeing Company, ET Docket No. 12-338, at 4 (filed Feb. 25, 2013)). The correct citation for the quote is Comments of the Boeing Company, RM-11793, at 4 (filed Aug. 18, 2017) (“Boeing WiMAX Petition Comments”).

¹⁴ Boeing WiMAX Petition Comments at 4.

¹⁵ *Id.*

receivers from AeroMACS communications require further study.”¹⁶ Accordingly, Boeing asserted in those comments that “it is critical to resolve these issues before service rules are proposed or a licensing framework established for AeroMACS in the United States.”¹⁷

Boeing takes a consistent position here, pointing to the need for further testing to establish workable parameters for sharing between AeroMACS and AMT operations and urging the Commission to refrain from AeroMACS deployment at airports with significant AMT activities for that reason.¹⁸ The WiMAX Forum’s attempt to transform Boeing’s straightforward recitation of the technical constraints on AeroMACS/AMT sharing in the 5091-5150 MHz band into a “conce[ssion]”¹⁹ is of no moment. The Commission should incorporate all five of Boeing’s proposals in considering future development of AeroMACS service rules.

III. THE COMMISSION SHOULD ACT ON AIA’S PETITION FOR RULEMAKING REGARDING SPECTRUM FOR UAS.

Finally, commenter AiRXOS Inc. (“AiRXOS”) raises an important issue that should be central to the Commission’s thinking as it develops policy for aviation communications services: the need for adequate spectrum for UAS operations.²⁰ UAS have the potential to transform not only aviation but also numerous industries that will be able to benefit immensely from the ability to use unmanned aircraft to obtain vantage points and conduct activities and operations that would be expensive, dangerous, or impossible using manned aircraft or persons on foot. Boeing is at the forefront of this transformation: together with its subsidiaries, Boeing has accumulated millions of flight hours of UAS with capabilities ranging from search and rescue, disaster response, asset and

¹⁶ *Id.* at 3.

¹⁷ *Id.* at 5.

¹⁸ Boeing Comments at 15-16.

¹⁹ WiMAX Forum Comments at 21.

²⁰ Comments of AiRXOS, WT Docket No. 19-140 et al., at 2 (filed Sept. 3, 2019) (“AiRXOS Comments”).

force protection, and border security, to wildlife monitoring, agricultural assessment, communications relay, anti-piracy, and firefighting, and has played important roles in key initiatives like the Department of Transportation’s UAS Integration Pilot Program.²¹

Boeing agrees with AiRXOS that the Commission has a “significant role . . . [to] play[] in integrating UAS into our National Airspace System.”²² However, rather than develop interim regulatory requirements based on this *NPRM*, which did not tee up issues related to UAS operations, the Commission can best fulfill this role by acting on the Aerospace Industry Association’s (“AIA”) February 2018 Petition for Rulemaking.²³ As Boeing explained in its comments on the Petition, AIA has put forth sound proposals for service rules to enable UAS operations in the 5030-5091 MHz band, and Commission action consistent with the Petition “will provide UAS manufacturers, developers, and operators with the regulatory guidance necessary to continue to grow the U.S. UAS industry.”²⁴ Accordingly, the Commission should expeditiously release a notice of proposed rulemaking proposing service rules for UAS in that frequency band that are consistent with AIA’s proposal and Boeing’s comments in that proceeding.²⁵

IV. CONCLUSION

Boeing respectfully urges the Commission to consider the issues raised in these proceedings consistent with the reply comments provided herein as well as Boeing’s opening comments in response to the *NPRM*. To that end, the Commission should adopt the proposals

²¹ See Comments of Boeing, RM-11798, at 1-2 (filed May 29, 2018) (“Boeing AIA Comments”).

²² AiRXOS Comments at 2.

²³ See generally AIA Petition.

²⁴ Boeing AIA Comments at ii.

²⁵ See *id.* at 8-15 (emphasizing that (i) use of the 5030-5091 MHz band for UAS command and control operations should be limited to safety-of-life communications; (ii) the Commission should establish a frequency assignment management system for UAS use of these frequencies; and (iii) the Commission should require UAS operators to become individually licensed).

Boeing supports related to Enhanced Flight Vision Systems, audio visual warning systems, Automatic Dependent Surveillance-Broadcast communications, unicom stations, aeronautical enroute stations, vehicle squitters, and emergency locator transmitter test stations. In addition, any new service rules for AeroMACS should incorporate the five principles set forth by Boeing, which will help to ensure that AeroMACS operates as intended and does not unnecessarily disrupt critical flight testing operations. Finally, the Commission should proceed with a notice of proposed rulemaking in response to the Aerospace Industry Association's Petition for Rulemaking on UAS operations in the 5030-5091 MHz band.

Respectfully submitted,

/s/ Anna M. Gomez

Audrey L. Allison
Vice President, Global Spectrum Management
The Boeing Company
929 Long Bridge Drive
Arlington, VA 22202

Anna M. Gomez
Sara M. Baxenberg
WILEY REIN LLP
1776 K St. NW
Washington, DC 20006

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Counsel to the Boeing Company