

BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

Petition To Adopt Service Rules for)	
Unmanned Aircraft Systems ("UAS))	RM-11798
Command and Control in the)	
5030-5091 MHz Band)	

COMMENTS OF LOCKHEED MARTIN CORPORATION

Lockheed Martin Corporation ("Lockheed Martin") hereby submits comments in support of the Petition for Rulemaking ("Petition") filed by the Aerospace Industries Association ("AIA") seeking that the Federal Communications Commission ("Commission") adopt licensing and service rules in the 5030-5091 MHz band for Control and Non-Payload Communications ("CNPC") links for command and control ("C2") operations to enable the continued development and safe implementation of Unmanned Aircraft Systems ("UAS") in the National Airspace System ("NAS").¹

Lockheed Martin is an industry leader in the design and development of unmanned aircraft and the systems architecture to support UAS operations. The Corporation's unmanned products reflect a wide variety of unmanned aircraft size and capabilities that are designed to operate across all classes of airspace in the United States, with different performance and operational characteristics. Lockheed Martin

¹ Aerospace Industries Association, *Petition for Rulemaking to Adopt Service Rules for Unmanned Aircraft Systems ("UAS") Command and Control in the 5030-5091 MHz Band* (submitted Feb. 8, 2018).

nonetheless recognizes that a crucial commonality is the safety-of-life benefits afforded by ensuring that adequate spectrum resources are implemented to support dedicated command and control frequency channels for the safe and reliable operation of larger unmanned aircraft.

To that end, Lockheed Martin strongly supports the AIA Petition and respectfully requests that the Commission codify comprehensive service rules that operationalize into the domestic regulatory framework the allocation identified by the International Telecommunication Union in 2012 for Beyond Line of Sight (“BLOS”) C2 terrestrial links in the 5030-5091 MHz band.

Discussion.

The AIA Petition makes a compelling case for the use of Minimum Operational Performance Standards (“MOPS”), as developed by RTCA’s Special Committee 228 on which Lockheed Martin serves, as the basis for integrating C-band C2 equipment into the NAS. By extension, it is reasonable that the Commission should base its own rules for terrestrial BLOS operations on the recommendations that RTCA stakeholders consented to in the development of those MOPS and in the forthcoming Minimum Aviation System Performance Standards (“MASPS”).

Lockheed Martin is furthermore optimistic about the ongoing RTCA work to develop the next phase of MOPS to identify operational requirements to utilize C-band satellite resources for C2. This proposed end-to-end communications solution – from the ground at aircraft launch through cruising altitude over long distances – will

provide regulatory certainty that is essential to the development of the industry and ensures the safe integration of approved, certified equipment into the NAS. Lockheed Martin encourages the FCC to develop at this juncture a flexible licensing and service framework that could readily be expanded to implement the next phase of the RTCA MOPS and permit uninterrupted C2 services in support of both long-endurance and long-distance flight missions.

Lockheed Martin notes that the Petition does not specify minimum operational requirements, including altitude and weight, that would make eligible a particular unmanned aircraft for operations in the C-band. It is Lockheed Martin's view that use of the C-band for C2 operations will be self-limiting, by way of the specific equipage requirements for unmanned aircraft, and that many flights utilizing C-band C2 links are likely to be conducted by operators seeking to access higher altitudes, flying aircraft capable of longer endurance missions. Lockheed Martin recognizes that a host of spectrum resources are being contemplated and developed to satisfy low-altitude urban and suburban operations. Meanwhile, it is reasonable to anticipate that operators with different flight requirements than those use cases are the likely beneficiaries of C-band C2 networks.

Accordingly, and in light of the rapid development of different communications architectures to support various operational environments, Lockheed Martin does not believe that prescriptive service rules – establishing explicit, measured endurance capabilities or weight and other aircraft dimensions – are necessary to ensure the efficient use of this C-band spectrum where dynamic frequency assignments and time-

limiting protocols for frequency reservations are a cornerstone. Furthermore, given the limited spectrum identified for C2 operations in the C-band and yet the crucial nature of these communications to maintaining safety in the NAS, Lockheed Martin concurs that use of the 5030-5091 MHz band should be limited, as allocated, to safety-of-life communications. The Commission should not consider payload or other non-safety communications operations in this valuable spectrum.

Lockheed Martin recognizes that the C-band spectrum identified encompasses only 61 MHz. It is not just prudent then, but necessary, that a highly dynamic frequency assignment mechanism be employed for assigning C2 links to operators, as the Petition describes. This solution provides a responsible approach to maximizing frequency reuse while ensuring the greatest number of operators will have access within a given geographic area to initiate flight and be assigned a dedicated C2 channel. Lockheed Martin encourages the FCC to structure any future public request seeking respondents willing to provide Frequency Assignment Manager services in such a way to ensure that considered parties have the technical and computational capabilities necessary to support the complex process of issuing potentially hundreds of frequency assignments in a given geography within a narrow timeframe. The opportunity to demonstrate and maintain trusted protocols in support of automated, dynamic frequency assignments is promising, and Lockheed Martin is encouraged by the efficiencies inherent in such a framework for maximizing future flight operations.

Finally, in conjunction with the Petition, AIA requests that footnote US444 of the Table of Allocations be modified to identify the locations at which MLS operations are

conducted and to establish a coordination mechanism to enable UAS CNPC operations near those MLS stations. Lockheed Martin supports this recommendation to enable efficient use of the spectrum at locations near where MLS is used

Conclusion.

For the foregoing reasons, Lockheed Martin respectfully requests that the Commission expeditiously issue service rules for operations in the 5030-5091 MHz band to support C-band command-and-control link operations.

Respectfully submitted,

LOCKHEED MARTIN CORPORATION

/s/ Jennifer A. Warren
Jennifer A. Warren
Vice President, Technology Policy & Regulation
Lockheed Martin Government Affairs
2121 Crystal Drive, Suite 100
Arlington, VA 22202
(703) 413-5970

May 29, 2018