



- 1) Licensing requirements that include certification of remote pilot licenses;
- 2) Protection of AEROMACS at 5000-5030 MHz and 5091-5150 MHz;
- 3) Limits on the scope of operation to data and information sent to/from the Pilot Station and the UA for control of the UA and other safety-critical functions;
- 4) Allowance of both Line-of-Sight (LOS) and Beyond-Line-of-Sight (BLOS) operations;
- 5) Use of Regional Economic Area Groups for spectrum licensing;
- 6) Spectrum block size;
- 7) Transmitter power and emission limits in the 5030-5091 MHz band that conform to the requirements in RTCA DO-362 § 2.2.1.6;
- 8) That the frequency accuracy of a 5030-5091 MHz CNPC transmitter, or of the local oscillator of a 5030-5091 MHz CNPC receiver, should not vary more than 0.2 parts per million (ppm) from the intended value, as stipulated in RTCA DO-362 § 2.2.1.4;
- 9) Emission limits for Aeronautical Stations and Aircraft Stations indicated in Section 87.139(c) of the Commission's rules applicable to such stations which are capable of operating in the 5030-5091 MHz band to support UAS CNPC links, in addition to the emission limits imposed by RTCA DO-362 § 2.2.1.6.32; and
- 10) Protection of radio astronomy operations through coordination of UAS usage within the National Radio Quiet Zone, and reminding UAS users that applicants for airborne assignments take all practicable steps to protect radio astronomy observations in adjacent bands.

**I. IN THE 5030-5091 MHZ BAND, FAA REMOTE PILOT CERTIFICATIONS SHOULD BE REQUIRED AND SCOPE OF SERVICES LIMITED.**

The Commission should require that parties seeking a 5030-5091 MHz band spectrum license certify they have the requisite FAA remote pilot certification, or, in the case of organizations, to certify that they will utilize only individuals with such qualifications for their UAS operations in the band. Even though UAS operators would in any case be subject to applicable FAA regulations, including regulations requiring the relevant FAA pilot certifications, by ensuring licensees have the requisite remote pilot certification, there would be no instances of licenses being granted without appropriate personnel certified to make use of the license.

NTIA currently does not see a path forward for alternative licensing approaches that do not require an operator license predicated on remote pilot certification. This necessary safety step is required to ensure there are no unauthorized use or misunderstandings in the case where a license is granted and yet the licensee does not meet the FAA requirements to operate the UAS.

The scope of services in the 5030-5091 MHz band should be limited to aeronautical mobile (route) service (AM(R)S) communications “data and information sent to/from the Pilot Station and the UA for control of the UA and other safety-critical functions. It does not include any messages sent to achieve mission (payload) objectives.”<sup>4</sup> This will limit UAS use to essential services and is the easiest way to exclude payload communications. This will also allow for implementation of altitude limits to ensure safe operation of UAS in the NAS. The Commission additionally should authorize appropriate spectrum block sizes to enable equitable access in the 5030-5091 MHz band for UAS operations. NTIA also believes that protection of

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<sup>4</sup> See RTCA DO-377 Minimum Aviation System Performance Standards for C2 Link Systems Supporting Operations of Unmanned Aircraft Systems in U.S. Airspace.

AEROMACS at 5000-5030 MHz and 5091-5150 MHz is vital and should be addressed in final service rules.

## **II. BEYOND RADIO-LINE-OF-SIGHT (BLOS) UAS OPERATIONS**

NTIA recommends that the following UAS Communication, Navigation, and Surveillance (CNS) functions be accounted for when considering spectrum access mechanisms for UAS:<sup>5</sup>

- Aircraft can operate at all altitudes and UAS can fly much closer to obstacles than traditionally larger, manned aircraft. This means long-range communications at higher altitudes and also extremely low altitudes are required.
- UAS mission types may range from automated activities confined to a small unrestricted area that can be under supervision of a pilot within visual Line-of-Sight, to long-range operations requiring direct control by remote pilot in controlled airspace.
- Maintaining Positioning, Navigation, and Timing (PNT) functions is critical for existing airspace users, and UAS will need such functions to an even greater extent, especially for autonomous flight.

If these considerations are accounted for, UAS operations in the 5030-5091 MHz band should be allowed for both Line-of-Sight and Beyond-Line-of-Sight (BLOS) operations. This will allow for safe operation of flights and continued support BLOS. Network infrastructure necessary for BLOS operations would be certified as part of the network and require certified

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<sup>5</sup> See CSMAC Report of Unmanned Aircraft Spectrum Subcommittee, pp. 5-6.

remote pilot operators. Regional Economic Area Groups would likely best support such UAS use.

Respectfully submitted,



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