

**Phoenix Air Unmanned (PAU)/L3Harris Corporation
Application for Special Temporary Authorization**

NARRATIVE STATEMENT

Pursuant to Section 5.3 (d and j) and Section 5.61 of the Federal Communications Commission's ("FCC") regulations, Phoenix Air Unmanned, LLC (PAU) in collaboration with L3Harris Corporation (L3Harris) hereby respectfully requests a Special Temporary Authorization ("STA") from 1 May 2020 to 1 November 2020 to operate in the 24.45-24.65 GHz band to test the Echoguard radar developed by Echodyne Corporation. Operational and engineering data will be collected during field testing in relation to an ongoing unmanned aircraft systems (UAS) research project.

Echodyne Corporation's EchoGuard radar is a high performance ultra-low cost, size, weight, and power electronically scanning ground-based radar. This requested STA is to enable PAU and L3Harris to operate and validate performance of the radar in specific ground-based radio-navigation scenarios, while flying UAS along ~3,000 miles of Xcel Energy transmission line infrastructure. This testing is a temporary, non-recurring service where a regular authorization is not appropriate as it is associated with a joint test initiative between Xcel Energy and the Federal Aviation Administration (FAA) under a limited FAA 14 CFR Part 107 waiver. The EchoGuard radar will be utilized on a temporary basis at each of the identified locations for a limited period-of-time.

In support of this request, the following summary is provided.

A. Purpose of Operation and Need for Special Temporary Authorization:

Xcel Energy teamed with L3Harris and PAU will operate under FAA 14 CFR Part 107 waiver #107W-2019-00055B to fly a small UAS at low altitude (below 250 ft) in remote/non-urban areas, in uncontrolled airspace (Class G) along ~2500 miles of transmission line (represents <1% of Xcel Energy's critical infrastructure). This is part of the ongoing testing being conducted between Xcel Energy and the FAA to facilitate use of UAS in the National Airspace System in support of safe and reliable operation of the national electrical grid (FAA Partnership for Safety Plan MOU #2016-PSP-0921). Initial shorter transmission line segment testing (e.g., 50 miles) was accomplished, and this next level of testing will provide real-world technical and operational data across multiple geographic locations. Each sub-area has geographic and operating environment differences providing a variety of UAS utility line inspection and radar performance testing opportunities.

The Echodyne EchoGuard radar will be installed as a transportable fixed station (FX) on a PAU operations vehicle that is planned to be parked at/near each submitted location that is also associated with a UAS take-off/landing zone (LZ). The radar and other equipment will be turned on and operated during the UAS flight operations at each LZ estimated for ~2 hours. The radar will be oriented down the transmission line to detect possible manned aircraft in vicinity. Based partially on this data, the UAS pilot may navigate the UAS to remain well clear of the manned aircraft. The radar will be shut-off while the operations vehicle drives to the next LZ to redeploy. The ~3,000 miles are planned to be flown over a 6-month period (1 May-1 Nov 2020), with the radar typically being operated at each location one time for ~2 hours over the 6-month period.

The point of contact within the FAA Spectrum Management Office is Don Nellis (donald.nellis@faa.gov), and he is aware of this multiple location STA for transmit authorization of the Echodyne Echoguard ground radar for the FAA-Xcel Energy project.

B. Technical Specifications:

1. Frequencies Desired

PAU/L3Harris requests authorization to operate in the 24.45-24.65 GHz band.

2. Effective Radiated Power

The units to be deployed operate at a peak maximum transmitter power output of 4W, and a peak maximum effective radiated power of 486W.

PAU/L3Harris will reduce the actual powers to the minimum power needed for successful operation, based on set-up and testing. Operations will be conducted to comply with rules relating to human exposure to radiation.

3. Modulation and Emissions

The radar uses linear FM modulation. The primary emission designator is 190MFXN. Other emission modes may be utilized, but in no event will the emissions extend beyond the frequency bands requested.

4. Antenna Information

No antennas will be mounted in a fashion that will require approval under FAA and FCC rules and regulations. The radar will be mounted on top of a mobile operations vehicle at <6 meters above ground.

5. Equipment To Be Used

The tests will be conducted with two Echodyne EchoGuard (formerly MESA-SSR) ground radar units.

C. Protection Against Causing Interference:

As noted above, PAU/L3Harris has requested authority to operate in the 24.45-24.65 GHz band. A search of the Commission's Universal Licensing System database was conducted and determined that there are no licensed operations in that spectrum.

In the event that it receives a complaint of harmful interference resulting from the proposed operation, PAU/L3Harris will take immediate action to address the interference, including if necessary discontinuing operations. PAU/L3Harris has designated William Wheeler, whose contact information is provided below, to act as the "Stop Buzzer" for this purpose.

Furthermore, the length of the test period is short, extending only from 1 May 2020 to 1 November 2020. During that period, the proposed operations are limited in scope.

PAU/L3Harris will typically transmit at each location one time for ~2 hours over the 6-month period

In summary, the proposed operation should not interfere with any licensed operation.

D. Restrictions on Operation:

PAU/L3Harris recognizes that the operation of any equipment must not cause harmful interference to authorized facilities. Should interference occur, PAU/L3Harris will take immediate steps to resolve the interference, including if necessary discontinuance of operation.

In addition, PAU/L3Harris will advise entities using the equipment that permission to operate has been granted under temporary authority, that such operation is strictly temporary, and that the equipment may not cause harmful interference.

E. Public Interest:

Grant of an authorization will permit PAU/L3Harris in cooperation with Xcel Energy and the FAA to develop an innovative approach to conducting critical infrastructure inspections with UAS in the National Airspace System in support of safe and reliable operation of the national electrical grid.

F. Contact Information:

For questions, please contact:

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In the unlikely event interference concerns should arise during the period of authorization requested by this application, please contact the company's "Stop Buzzer" identified below:

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