

Calhoun Analytics, LLC
Application for Experimental Special Temporary Authority
ELS File No. [0839-EX-CN-2021]

NARRATIVE STATEMENT

Pursuant to Section 5.3(d) and (f) and Section 5.61 of the Federal Communications Commission's ("FCC") rules, 47 C.F.R. §§ 5.3(d), (f), 5.61, Calhoun Analytics, LLC (dba CAL Analytics, LLC). hereby respectfully requests a special temporary authority ("STA") from October 15, 2021 to September, 2022 to operate in the 24.45-24.65 GHz band based on an existing commercial radar manufactured by Echodyne Corp. for the purpose of performing research related to low-altitude surveillance systems.

Grant of authority to test at the proposed locations will enable the company to develop and evaluate a machine-learning based classification system.

In support of this request, the following is shown:

A. Description of Government Project:

The project is part of a United States Air Force (USAF) AFWERX Phase II SBIR contract. This research project is comprised of CAL Analytics, Ohio State University (OSU), and Lighthouse Avionics, and is focused on the development of real-time, machine learning-based classification technologies with support from USAF AFRL/RYP and AFRL/DO. With their support we will develop a real-time prototype and integrate our machine learning-based low-altitude airspace classification technologies with the SkyVision GBDAA system. This research and development (R&D), resulting in a real-time, low-altitude machine-learning based classification system, will allow us to further branch out into the commercial marketplace in the areas of UTM, AAM, defense and commercial security. This is supported in our discussions with two leading UTM ecosystem corridors including the Ohio Department of Transportation (ODOT) UTM ecosystem built around the US33 Smart Corridor.

B. Description of Research Project:

Low-altitude surveillance coverage is critical for UTM and UAM/AAM operations to act as the 'eyes' of the UAS to 'See and Avoid' other aircraft. However, low-altitude surveillance coverage is incredibly challenging and rife with problem areas. Specifically, low-altitude surveillance sensors have line-of-sight to moving objects on the ground which can result in nuisance tracks propagated to a UTM or UAM/AAM system. This includes vehicles on roads and highways, trains, moving objects such as windmills or windfarms, and slow-moving clutter such as wind-blown vegetation or trees. Also, weather can wreak havoc on a sensor's false alarm / false track rate, depending on the sensor's operating frequency.

Our research effort is focused on demonstrating the feasibility of Low-Altitude airspace classification technologies built upon machine learning. Our initial research has shown that classification technologies built upon machine learning greatly reduce the number of nuisance tracks within these ecosystems while achieving high probability of correct classification (PoCC) on aircraft targets. Classification technology built upon machine learning techniques will significantly reduce the amount of time required to develop, integrate, and test key classification technology that is critical for UTM and AAM, that this technology is extensible to reduce the timeliness and cost of key Classification technology updates for critical Air Force programs and missions.

C. Location of Proposed Operation:

CAL Analytics proposes to test the radars only on a ground platform within a specified area of operation. By this application, CAL Analytics seeks authority to conduct tests at the following locations:

Location	Coordinates (NAD83)	Radius of Operation
Springfield, OH	39° 50' 25" -83° 50' 25"	5 km, altitudes up to 1500m AGL

Note that the requested locations in Springfield-Beckly Municipal Airport. This is the location of Ohio/USAF SkyVision ground-based detect and avoid (GBDAA) system. Coordination of this installation is being worked with the airport manager Seth Timmerman.

C. Technical Specifications:

1. Frequencies Desired

CAL Analytics 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 3.2W, and a peak maximum effective radiated power of 246W.

Operations will be conducted to comply with rules relating to human exposure to radiation.

3. Modulation and Emissions

The Echodyne radar will be operated using linear FM modulation. The primary emission designator is FXN. 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.

5. Equipment To Be Used

Echodyne MESA-SSR radars. It expects that it will be able to conduct its testing with a maximum of 1 unit.

D. Protection Against Causing Interference:

As noted above, CAL Analytics has requested authority to operate in the 24.45-24.65 GHz band. It has conducted a search of the Commission’s Universal Licensing System (“ULS”) database 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, CAL Analytics will take immediate action to address the interference, including if necessary discontinuing its testing operations. The company has designated Dr. Sean Calhoun, whose contact information is provided below, to act as the “stop buzzer” for this purpose.

In summary, the analysis conducted by CAL Analytics indicates the proposed operation should not interfere with any licensed operation.

E. Restrictions on Operation:

CAL Analytics recognizes that the operation of any equipment under experimental authority must not cause harmful interference to authorized facilities. Should interference occur, CAL Analytics will take immediate steps to resolve the interference, including if necessary arranging for the discontinuance of operation.

In addition, CAL Analytics will advise entities using the equipment that permission to operate has been granted under experimental authority issued to CAL Analytics, that such operation is strictly temporary, and that the equipment may not cause harmful interference. Entities will also be advised in accordance with Section 2.803 of the Commission’s rules, 47 C.F.R. §2.803, that any unapproved devices have not been authorized as required by the rules of the FCC.

F. Public Interest:

Grant of an authorization will permit CAL Analytics to develop innovative surveillance classification technology that will enhance public safety.

G. Contact Information:

For questions about this application, company, testing or to suspend testing, please contact:

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