

Raytheon Missile Systems
Experimental License Application
File Number: 1006-EX-CN-2020

Explanation of Experiment

Raytheon Missile Systems builds a variety of products for the US government, including for the US military. This application requests authorization for the use of radios that will be used in a developing line of UASs that will deliver advanced functionality to the Department of Defense.

An effort has been initiated by the Office of Naval Research to demonstrate the rapid launch, formation and control of Unmanned Air Systems (UAS).

Raytheon has been asked to place some staff at the facility of a subcontractor to work on the UAS system. So, it is the applicant because its staff will be operating the radios.

The proposed testing builds on work that was started under STA WQ9XXX. Since that STA was granted, Raytheon has learned that an additional frequency and some added power are needed for these operations. So, this application seeks the broader parameters to meet the programmatic requirements.

Description of Operations:

This application seeks authorization to test with a radio that is installed on a series of readily deployable UASs. Those UASs are small, without the ability to carry heavy radios. The goal of the new system is to allow the UASs to operate in a variety of configurations, with radio links between the UASs as well as links to a command and control center.

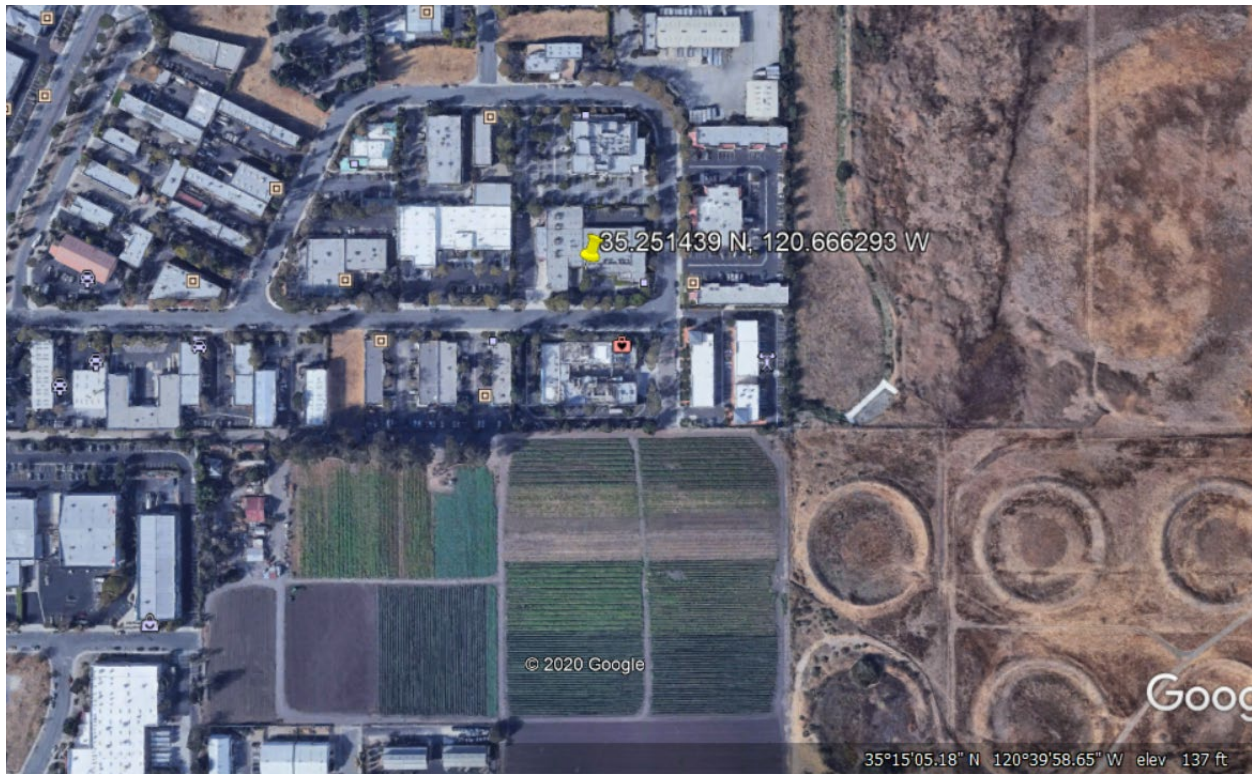
These radios are designed with low gain antennas, which are being tested to determine how well they control the group of UASs in flight and how effectively they deliver information back to a centralized control point. This assists in the data throughput, which in turn aids in the management of the UASs operating together.

Technical Synopsis:

- Spectrum Needed: 1377, 1382, and 1387 GHz, with 20 MHz wide emissions
- Operations: airborne, mobile operations very limited area
- Power level: 15 W
- Radios are listen-before-transmit
- Ground control maximum ERP: 49 W, primarily will not exceed 8.7 W

Area of Operations:

Raytheon is requesting authorization for operations at a subcontractor site in San Luis Obispo, California. The image below shows the location of the site.



Most of the operations will be conducted indoors on the lab bench. Only occasionally will the UAV be taken outside for a brief test flight.

Limited Time of Use:

Testing is to be conducted workdays, between 8 am and 5 pm. However, because the systems tested are UASs, the aircraft are only in operation for the duration of their flight, the time of use is far less than the full workday. The typical flight is about an hour, and it is expected that they will flight test only about twice a week. The radio systems will be in use for flight preparation, on the ground, and flight duration. So, the spectrum use is expected to be intermittent during testing days.

No likelihood of interference to other operations:

The radios are designed to be listen-before-transmit, which minimizes any potential for interference to other radio operations.

These radios offer advanced development of UAS technology at a low cost. Further development may lead to the development of different radios that are similarly small, lightweight, and require little power, intended to offer broadband transmission of information, with the ability to send information back and forth to the command and control center and to exchange information among the swarm of UASs. The power levels are limited to just enough power to permit the required communications. This application seeks authorization to test the ground control signal, which has a maximum ERP of 49 W. However, it will primarily be operated at only 8.7 W ERP. The higher

power is tested only occasionally, because it has to be shown to work if this platform is used in the field.

Stop Buzzer Point of Contact:

Raytheon's Stop Buzzer point of contact is:

Jim Ortega, Spectrum Manager
Raytheon Missile Systems
520-794-0227 (office)
james.e.ortega@raytheon.com

Conclusion:

Raytheon is seeking an experimental license for testing its UASs. This testing will advance the development of the communications links needed for command and control of the UASs operating as a group as well as ensure that the telemetry data needed from the UASs can be effectively transmitted back to the control station. The time of use is limited.

For additional information, please contact Anne Cortez, 520-360-0925 or alc@conspecinternational.com.