

Explanation of Experiment and Need for STA

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). This effort covers the detailed planning of a technology demonstration to apply new technology in the form of tube launched UAS from a surface vessel, in-flight link up of a large number of small UAS.

In the summer of 2018, developments of the UAS technology have led Raytheon's customers to request demonstrations of the technology in conjunction with customers at the test lab in Tucson, operations near Florence, Arizona, and operations near Yuma, Arizona. The FCC granted the STA WN9XDW for that testing. This application requests authorization to continue the testing that was started under WN9XDW for the testing and demonstrations required by Raytheon's DOD customers.

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: 1.3575 – 1.3875 GHz
- Operations: airborne, mobile operations in limited areas
- Power level: 15 W
- Radios are listen-before-transmit

Area of Operations:

Raytheon is requesting authorization for operations in three locations. First, it needs to test at its laboratory facility in Tucson. These operations will be indoors on the lab bench and adjacent to the building for testing the installation and operation of the radios, primarily.

The second location is the testing range near Florence, Arizona. Raytheon has been testing the same UAS platform with another radio at this same location for some months. Those tests have been fruitful, and the customers have requested additional testing with different radios and different test criteria.

The third location is north of Yuma, Arizona. Again, these operations have been requested by Raytheon's customers so that they can work together with Raytheon on the advanced development and capability of the UAS platform.

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 flight for the duration of their flight, which depends on the life of the fuel source, normally about one hour, as the batteries have improved since the testing began. After that, the UASs need to be re-charged for another test. 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 swarming 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.

Stop Buzzer Point of Contact:

Raytheon's Stop Buzzer point of contacts are:

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Conclusion:

Raytheon is seeking an experimental license to continue 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.

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