

Raytheon Missile Systems  
Experimental STA Application  
File Number: 0484-EX-ST-2018

### **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.

The requested authorization will be used for UASs, whose operation is described in more detail below.

#### **Need for an STA:**

Recent developments of the UAS technology have led Raytheon's customers to request demonstrations of the technology early in the spring of 2018. This STA is needed to allow for testing in advance of those demonstrations to ensure that the technology is operating as required during the tests.

#### **Description of Operations:**

The radios are 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 swarm, with radio links between the UASs as well as links to a command and control center.

The radios are designed with directional antennas that helps to deliver information back to a centralized control point. This assists in the data throughput, which in turn aids in the management of the swarm of UASs operating together.

#### **Technical Synopsis:**

- Spectrum Needed: 2312-2507 MHz
- Operations: airborne, mobile operations in a limited area
- Power level: 2 W, directional antenna
- Radios are listen-before-transmit

#### **Area of Operations:**

Raytheon is seeking authorization for operations in several areas to allow for collaboration with its customers, to advance testing, and facilitate ease of demonstrations.

Tucson: indoors, for pre-flight testing, and outdoors around the plant to allow for fine-tuning of performance.

Eglin: operations will be conducted primarily from a platform situated on the Gulf of Mexico, allowing for interaction between the UAS and Navy vessels, for testing and demonstration of its capabilities. This testing will advance the improvements of these technologies by facilitating customer feedback promptly.

Point Mugu: operations will be conducted from land, but primarily over the Pacific Ocean, allowing for interaction between the UAS and Navy vessels, for testing and demonstration of its capabilities. This testing will advance the improvements of these technologies by facilitating customer feedback promptly.

San Nicholas Island: operations will be conducted from land or vessels situated in the Pacific Ocean, allowing for interaction between the UAS and Navy vessels, for testing and demonstration of its capabilities. This testing will advance the improvements of these technologies by facilitating customer feedback promptly.

**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 battery. 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 area selected for these operations is away from highly populated areas, which means that there is little likelihood of interference to other operators in the same area. Most of the spectrum in use will overlap the 2.4 GHz unlicensed, Part 15 band. The radios were selected because of their limited weight and because of their data throughput. 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.

**Stop Buzzer Point of Contact:**

Raytheon's Stop Buzzer point of contact is:

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**Conclusion:**

Raytheon is seeking an STA for testing of its UASs to increase the speed of incorporating and testing new technologies into the UAS platform. This testing will advance the development of the communications links needed for command and control, telemetry, data collection and other uses of these UASs. The areas of operations have been selected to enhance collaboration with Raytheon's customers. The time of use is limited.

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