Raytheon Missile Systems
Experimental STA Application
File Number: 1164-EX-ST-2015

## Explanation of Experiment and Need for STA

### Background:

Raytheon Missile Systems is a US defense contractor that builds missile systems and other technologies that it sells to the US government and select US allies. In the course of its technology development, Raytheon is required to test the operation of its systems to ensure that they are functioning properly. This application seeks authorization for testing the use of a new data link being integrated into one of Raytheon's missile systems prior to an upcoming test at a government range.

### Need for an STA:

This request seeks authorization for testing for two weeks – **October 30, 2015 to November 12,** 2015, to determine the functioning of the new data link being integrated into the missile system. The test/demonstration period should provide sufficient time for testing the operation of the datalink and trouble-shooting the link if necessary. Because of the short-term nature of the testing, an STA is appropriate.

### Explanation of Experiment:

Raytheon has developed a new data link that it is integrating into one of its missile systems in advance of a scheduled test later this year. The data link will be used to transmit advanced information while the missile is in flight. The proposed testing and demonstration to be conducted under this STA will involve putting the data link onto a dummy missile which will be flown in a racetrack pattern around the commercial airport in **Loveland, Colorado**. These flights will allow Raytheon's engineers to test the operation of the datalink and to fine tune its performance, or troubleshoot any problems, prior to the schedule live test of the system later this year at a government test range.

### Technical Synopsis:

- Spectrum requested: 1.805 GHz
- Power level requested: 2 Watts, 2 Watts ERP
- Radius of operations: 10 kilometers around **Loveland, Colorado** commercial airport
- Time of Use: Limited to occasional flight times across several days during license period

### Location of testing:

All testing will be conducted within a 10 kilometer radius around the commercial airport in **Loveland, Colorado**. The aircraft to be used for the testing does not have a pressurized cabin, so the maximum altitude for the flight will be under 10,000 feet.

The other end of the data link will be situated on the ground at the **Loveland** airport. The ground control will use a Yagi antenna that has 12.3 dBi of gain. The ground control station has been designed to track the aircraft in motion, so that it will always be aiming at the aircraft in flight. They will also test from the aircraft on the ground to the control station, since flight time is very expensive.

**Time of Use:**

The proposed testing is set to take place between October **30** and **November 12,** 2015. Testing will be limited to daytime operations, during the workweek.

Raytheon expects that if all goes well, it will conclude its work in two days of testing. To ensure that it has a window of operations in case there are any unexpected engineering issues, it has requested a **two week** window for these operations. This will also allow for coordinating testing, as needed.

The time of use is expected to be very limited, even during the proposed operational period. Flights will be conducted flying within the allowed radius. The dummy missile will transmit sample information to a ground control station. Then, the engineers will evaluate the performance of the system to ensure that everything is functioning properly. The flight times will be limited, because as noted above flight time is very expensive.

**Power Levels Low:**

Raytheon is limiting its operations to a limited radius of merely 10 kilometers and operating the radios at a limited power level – only 2 watts, with no antenna gain. This should limit the potential for any interference to other spectrum licensees in the area.

By designing the system with a ground control station with 12.3 dBi of gain, the airborne transmitter will use the least power possible. The ground control station will use its antenna gain and tracking capabilities to maximize the data throughput and minimize any chances of interference to other operators.

**Stop Buzzer Point of Contact:**

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**Conclusion:**

Raytheon is seeking authorization for a two week period to test a new data link being integrated into one of its missile systems. The testing is to be conducted in advance of a scheduled missile test later this year. The purpose of the testing is to ensure the proper functioning of the data link prior to its use during that live test. The time of use is very limited, the area of operations is very limited, and the proposed power level is as low as possible.

Should there be any questions about this application, please contact Thomas J. Fagan, Spectrum Manager, Raytheon Missile Systems or Anne Linton Cortez, Counsel, WFS, 520-344-8525 or alc@conspecinternational.com.