

## **Explanation of Experiment and Need for STA**

### **Overview:**

Raytheon Missile Systems (Raytheon) is working to develop advanced unmanned aerial systems (UAS) technologies that could be of use to the US Department of Defense. In its development of the technologies, it has the need to test aerial systems that could be adapted to deliver high performance surveillance and carry Raytheon's products, including ordinance.

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

Raytheon has been in discussions with a foreign firm that has developed an advanced aircraft that Raytheon needs to test to see if the product could be adapted into the Raytheon UAS program. The product demonstration is expected to take less than 1.5 days, and it is currently scheduled to take place on one or two days between November 1, 2012 and November 16, 2012, at the time that is available for all the engineers to be present to review the technology. Because the nature of the proposed demonstration is of short duration – less than 1.5 days during a 2 week period – and because this is strictly a temporary use of the spectrum to review technology, an STA is appropriate.

Because the technology demonstration is of an airframe that will be brought from Europe, it has not yet been possible to pin down an exact date. For that reason, Raytheon is seeking a two week window in which to conduct the short, intermittent tests, which will allow for any delays in customs clearance for the air frame. However, because it is difficult to schedule all of the engineers and executives to be present at the demonstration, so that they can evaluate the technology and its potential to address advanced UAS development, Raytheon is urging the FCC to give expedited consideration to this STA request so that it can confirm the test dates and times.

### **Requested Spectrum:**

Raytheon is seeking authorization to test the airframe at a remote ranch in southeastern Arizona. The location is unique because it sits in a canyon. The surrounding mountains, which reach an altitude of 8,000 ft., shield the area from other radio operations in southeastern Arizona.

- Frequencies requested: 225.6160 MHz, power level: 2 W  
226.2528 MHz, power level: 2 W  
226.7136 MHz, power level: 2 W  
226.9940 MHz, power level: 2 W  
4500-4900 MHz, power level: 100 mW
- Location: Latitude: 31.494381 N  
Longitude: 110.570551 W

- Site Elevation: 1555 m
- Nature of Operations: ground and airborne operations
- Altitude, airborne operation: up to 400 feet above ground level, no higher
- Expected radius: 2.5 km around center location
- Time of use: intermittent, less than 1 hr at a time during testing period

### **Description of Spectrum Use:**

Raytheon is requesting authorization to use 225.6160, 226.2528, 226.7136, and 226.9940 MHz and the band from 4500-4900 MHz for this demonstration. The 225 to 226 MHz frequencies are used for command and control of the airframe. The transmitter is at a fixed location on the ground, and a licensed pilot on the ground uses specialized software to send flight instructions to the airframe to put it through a test flight using that channel. The power level is low and the operation will be short in nature.

The 4500-4900 MHz frequency band is used on the airframe to send video, telemetry, and other information back to the control station. Because of the high volume of information captured on the UAS, the amount of bandwidth requested to transmit that information in real-time is great. This data link is an essential component of the demonstration, to determine whether the information resources on the airframe can deliver the high-definition, highly reliable information required by the controller to ensure effective operation of the UAS prior to deployment of any ordinance.

Time of Use Is Very Limited: During the proposed demonstration, it is expected that Raytheon's licensed test pilot will control the airframe in several tests across as much as a day of testing. Each flight is anticipated to last less than one hour, which will be followed by evaluation and discussion of the information learned during the demonstration. Altogether, Raytheon anticipates that there would be no more than four (4) hours of spectrum use across the whole demonstration period, with that use being intermittent. Out of an abundance of caution, and because schedules can shift, Raytheon has presented this as a demonstration that might take place over a day and a half, but it is more likely that the entire demonstration will be completed in less than half of a day.

### **Stop Buzzer Point of Contact:**

To ensure that any operations authorized under this requested STA will not cause harmful interference to nearby licensed operations, Raytheon is providing a stop buzzer point of contact who has the authority to shut down the demonstrations immediately, if needed.

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**Conclusion:**

Raytheon is seeking to demonstrate the use of an innovative airframe that it could incorporate into its UAS development program, to advance the technologies that it is developing for use by the US Department of Defense and Department of Homeland Security. To demonstrate the airframe, Raytheon needs temporary authorization to use the requested spectrum, at a remote and isolated location in southeastern Arizona. The proposed demonstration is expected to last at most 1.5 days during a two week period at the beginning of November. The spectrum use will be intermittent, at low altitude, and at minimum power levels to accomplish the demonstration safely.

For additional information or if there are any questions about this request, please contact Thomas J. Fagan, Spectrum Manager, Raytheon Missile Systems, or Anne E. Cortez, Esq., WFS, [alc@conspecinternational.com](mailto:alc@conspecinternational.com) or 520-344-8525.