

Raytheon Missile Systems  
Experimental License Application  
File Number: 0802-EX-CN-2017

### **Explanation of Experiment**

Raytheon Missile Systems (Raytheon) builds a variety of innovative technologies for the US government, including the Department of Defense and the various military services. Raytheon has been working on development of an advanced RF technology that uses one of its proprietary UAS platforms to search for, detect, and deliver reports that are needed by the customer. Initial testing and customer demonstrations have shown the promise of this technology. At this point, Raytheon needs to continue field testing to incorporate some refinements into the system.

This application seeks authorization for testing off the coast of Kauai, with a control point on the island. The application extends operations that were authorized under WL9XGP, because the initial testing conducted using the STA proved highly productive. This testing will allow Raytheon to advance the development of the product much more rapidly. Raytheon is working with a federal government customer for this testing. The contract number is: N00014-15-C-0047. The government point of contact is:

Maurice Joy  
(703)-465-8404  
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### **Technical Synopsis**

- Spectrum Requested: 350-355 MHz, preferably 351 MHz
- Area of Operation: 30 km radius around center location, primarily over open ocean
- Test Time: approximately 2-3 one hour tests per day
- Low power use: Transmitter operates at 1 W, the ERP for the mobile unit is only 1 W.
- Government Contract number: N00014-15-C-0047

### **Description of Experiment**

Raytheon is testing the operation of its UAS system incorporating data links that allow for the transmission of tracking information back to a command station.

The proposed testing requires the use of a frequency between 350 and 355 MHz, preferably 351 MHz. The goal is to test the performance of the UAS and radios to deliver timely data for operational purposes of the DOD customer.

The radio selected is ideal for this use because it is a size and weight, less than an ounce, that can easily be accommodated by the UASs in use for this testing. The UASs are small, light, and quickly deployable, which makes them of great interest to the government customers. A larger, heavier radio would exceed the capabilities of the UAS to transport the radio. This provides incredible performance in a small package.

### Spectrum Availability

Raytheon worked with the Chairman of the MAG to pinpoint the exact frequency available for this testing. This application seeks to continue to use the same frequency that is already on the STA. Raytheon is developing the technology for DOD customers, and it needs to build the system using radios that the DOD will be able to use successfully for this testing.

### Power Levels and Antenna Gain

Raytheon has limited the power level of its proposed operations to only 1 Watt ERP for the mobile unit and for the command and control ground station. Both the ground station and the UAS have omni-directional antennas to optimize operations over the ocean. This will give the UAS maneuverability, even as it is in constant communication with the ground station.

### Limited Time of Use

The UASs will only be in use for up to 3 hours per day, which limits the amount of time that the spectrum will be in use. The radios will be in use full time during the flight testing.

### Area of Operation

The proposed operations are expected to take place over the Pacific Ocean off the coast of Kauai. Figure 1 below shows the approximate area of operation.

### Stop Buzzer Point of Contact

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### Conclusion

Raytheon continues to work on the development of its UAS systems. This testing uses a Microhard radio to deliver high speed data in real time. The testing is being conducted under a contract with one of Raytheon's DOD customers. The customer saw this technology at demonstrations late in 2016 and early 2017, and the customer has set up testing and demonstrations that are scheduled to continue for the foreseeable future. Raytheon has designed its experimentation to minimize the spectrum and power needed for these operations.

Should there be any questions about this application, please contact Bart Turner or Anne Cortez at [alc@conspecinternational.com](mailto:alc@conspecinternational.com) or 520-344-8525.

Figure 1. Image of Test Area

