

Raytheon Missile Systems
Experimental License STA Application
File No: 0838-EX-ST-2016

Explanation of Experiment and Need for STA

Raytheon Missile Systems is a US defense contractor that builds a variety of products and systems for the US Department of Defense. The currently proposed testing will explore the operation of an unmanned aerial system (UAS) that is being tested and demonstrated for DOD customers.

Need for an STA:

Raytheon has product testing to complete in advance of a customer demonstration. Raytheon is seeking this STA to authorize testing of the UASs while the program staff is on board a ship on the Delaware River and Delaware Bay on route to a scheduled demonstration 45 miles east of the coast of North Carolina.

An STA is appropriate because of the temporary nature of the experimentation. These operations are expected to last just 15 days.

The purpose of this STA is to test the performance of the UASs. It is expected that Raytheon's staff and the UASs will be on board a vessel for transport to the demonstration site for about a week prior to the demonstration. We expect that the ship will depart Philadelphia in the first week of August, and return by August 15, 2016, with the demonstration taking place during that two week timeframe. Raytheon is seeking an authorization that will allow it to test its product starting on August 1, 2016 and ending on August 15, 2016. This authorization will cover operations on the inland waterways.

Description of Experiment:

Raytheon is working on the development of a small, quickly deployable UAS system that can be launched from aircraft or ships.

This proposed testing will allow Raytheon's engineers to fine tune the radio performance of the UASs while they are in transit to the demonstration. This work will include calibration, testing of the radios, and otherwise ensuring proper performance of the UASs prior to the scheduled demonstration.

After the demonstration, it is possible that there will be no testing on the return voyage since the demonstration is of a UAS product that will not be recovered at the end of the test. However, because the program is likely to carry an extra UAS, this application seeks authorization for testing on the return journey as well.

Technical Synopsis:

- Spectrum Request: 2377 MHz; as necessary, an alternate frequency between 2360 & 2395

- Area of operation: on the water from Philadelphia to the mouth of Delaware Bay
- Test Time: sporadic
- Power: 10 W output power, 0 gain, for an ERP of 10 W

Area of Operation:

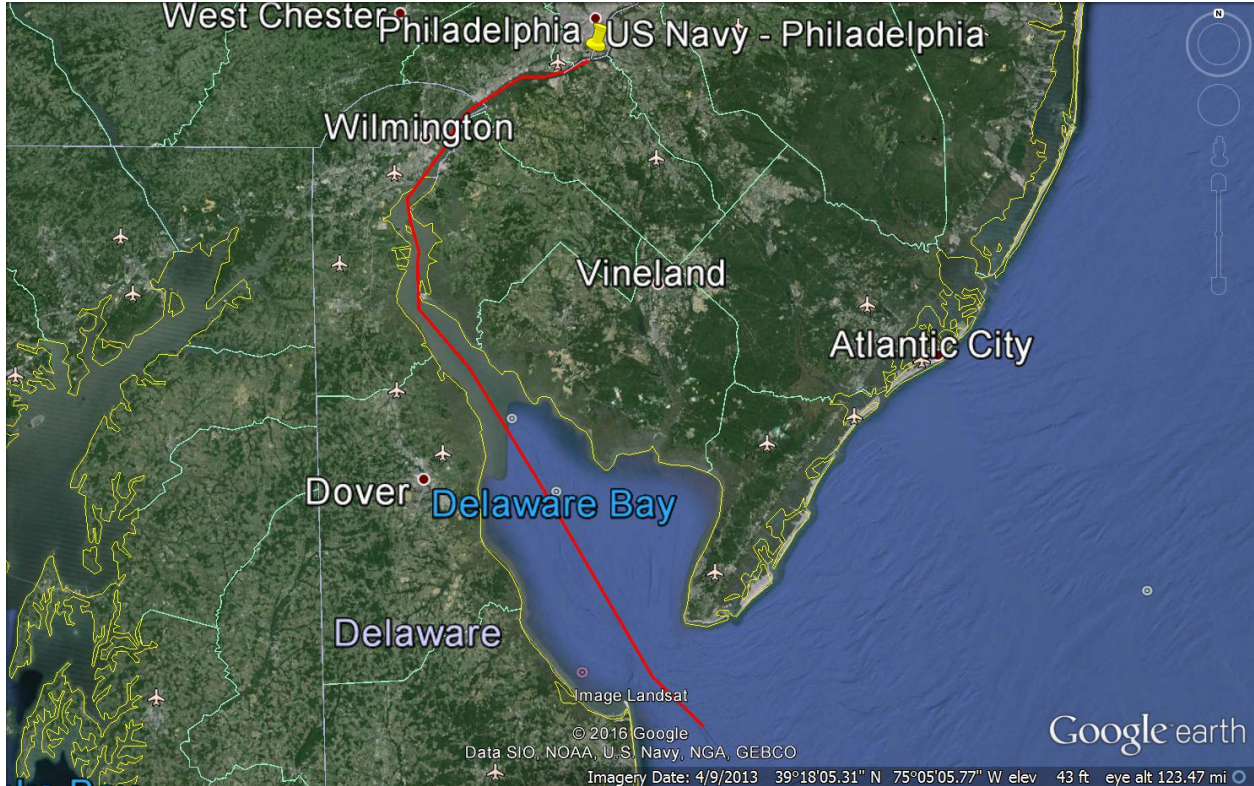


Figure 1. Proposed Area of Operations – Delaware River and Delaware Bay

Figure 1, above, illustrates the proposed area of operations. The Raytheon engineers and UASs will board the vessel in Philadelphia. They will be in transit for several days to reach the demonstration site off the coast of North Carolina. Figure 2, below, shows the demonstration site – merely for informational purposes.

This application seeks authorization for operations while the vessel is on the Delaware River or Delaware Bay, which are both inland waterways.

The engineering teams will be testing to ensure that the radios are properly charged up, calibrated, and communicate effectively. There will be no test flights from the vessel. However, the proposed operations are mobile because the vessel will be underway with the UASs aboard.

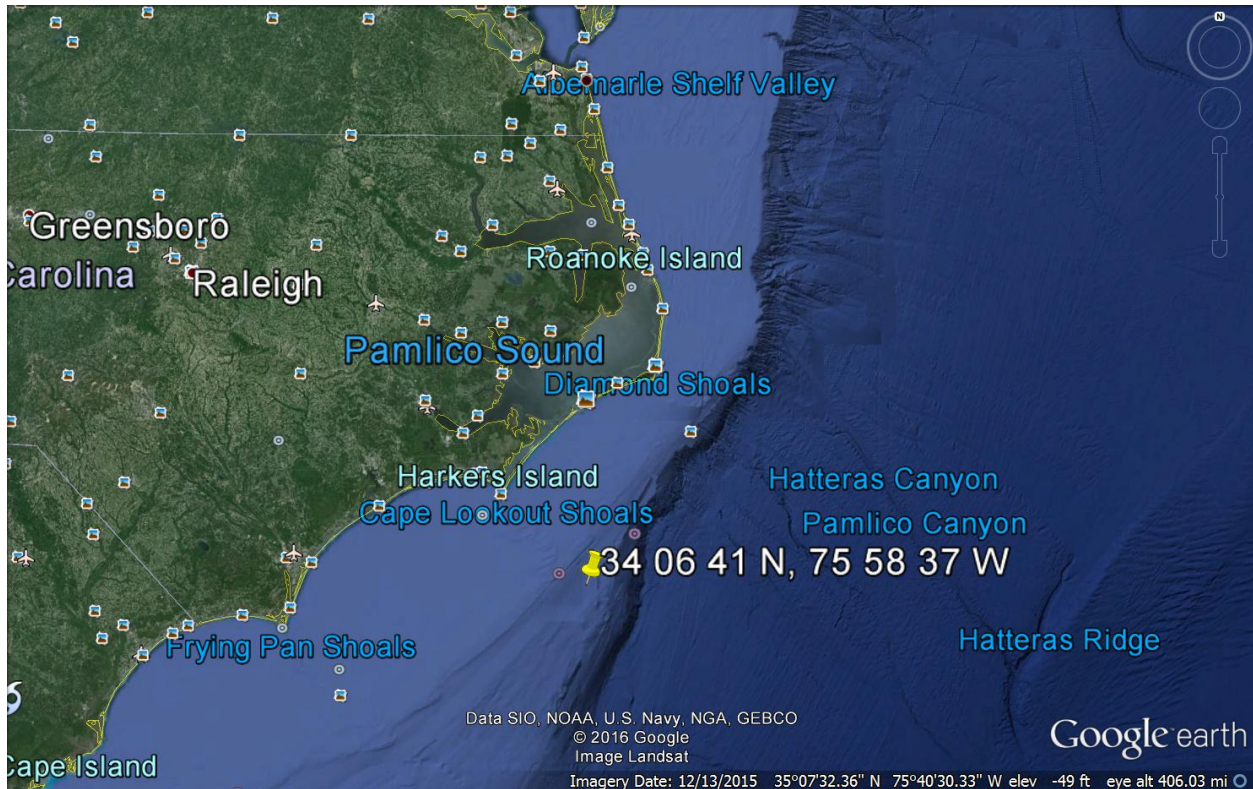


Figure 2. Demonstration Area – 45 miles off the coast of North Carolina

Characteristics of the test area:

This proposed use has minimal chance of causing interference to others for the following reasons:

- Signal level is relatively weak, at only 10 W ERP
- The UASs will be in motion, so the signal will not be in any given location for very long
- The superstructure of the ship and its on-deck equipment are all metal, and that will attenuate the signal so that there is very little signal that will leave the test area.

Time of Use:

The battery life on the UASs is about one hour, then the system will have to be recharged. The total time of use will be limited to only a few tests per day. The radio use will be sporadic at best.

The radios use a standard Wi-Fi protocol that listens before transmission, which will minimize the chance of any interference to another user of the spectrum.

Prior Coordination:

Raytheon is submitting a coordination request to AFTRCC for the use of this frequency for the testing. As soon as Raytheon has a response from AFTRCC, that will be submitted to supplement the exhibits to this experimental STA request.

Stop Buzzer Point of Contact:

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Conclusion:

Raytheon is seeking temporary authorization to operate the radios installed in its UASs while those UASs are on a vessel delivering them to an off-shore customer demonstration. The STA requests authorization for operation while vessel is in transit in the US inland waters of the Delaware River and Delaware Bay. The power levels are low. The testing will be sporadic at best. And, the proposed time for the testing is very limited.

Should there be any questions about this application, please contact Tom Fagan or Anne Cortez, alc@conspecinternational.com or 520-360-0925.