

Raytheon Company (Missiles & Defense –
M) Experimental Application
File Number: 0803-EX-CN-2021

Exhibit: Explanation of Experiment

Raytheon Company (Missiles & Defense – M) “Raytheon” builds a variety of products for the US government, including for the US military. This application requests renewed 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.

Raytheon has future test/demonstration events for one of its UAV platforms on and over the Atlantic Ocean adjacent to the Dam Neck Naval Base in Virginia in the coming 18 months. This application seeks to extend the current STA to cover future events.

Raytheon agrees to meet all AFC and other agency requirements for scheduling and/or other stipulations for use.

Technical Synopsis:

Spectrum required: 1362 MHz, 1372 MHz, 1382 MHz

Emission designators: 20M0D1D and 20M0G1D

Time of use: six hours per day, approximately 2-3 events per year (each event lasting 2-3 days)

Elevation of UAV flights: only 3 UAVs in flight, at elevations from 10-3000 ft AMSL (Routine

AGL: 1000 feet, max AGL:4000 feet

Area of operation: W50 water area adjacent to Dam Neck Naval Base

Description of Operations:

Raytheon is taking its Coyote platform to the naval base at Dam Neck Virginia for testing and demonstration for its customer to show the way that the Coyote UAV platform can be used to operate as a swarm.

Three of the UAVs will be in flight over the W50 area of the Atlantic Ocean. There will be two control stations on vessels also on the ocean, and a number of radios will be deployed on the shoreline at the naval base to show how the radios interact with one another. The network of radios will be operated simultaneously, to demonstrate the interoperability of the units as a group. The radios will share the spectrum requested in this application.

Area of Operations

Control (Ground) Stations: These will be placed on water craft that will be operating in the W50 area off the coast of Virginia. Raytheon's program has specified that it needs to operation across the entire W50(A)(B) and (C) areas of operation. *Figure 1* below shows the entire W50 operational area. for a diagram of the area of operations. The control stations operate generally using low power, but they are capable of operating using the full ERP of 49 W, which is requested here. The full power is only in use if there is loss of link to a UAV in flight. The control stations are mobile. The radius of operations is 16 km from the center point, with operations concentrated in the area outlined in purple in Figure 1.



*Figure 2. Area of Operations Including All of W50
The Center of Operations over the water is: 36-44-41 N, 75-40-41 W, with a 16 km radius*

Airborne Operations: For the testing and demonstration required, there will be three Coyote UAVs in flight. Those will be in contact with the control stations mounted on water craft. The UAVs will fly over the designated area of ocean, at elevations from 10 to 3000 feet. The radius of operations is 16 km from the center point of the W50 area of operations. Only a limited portion of the area will be in use at a time, and operations will be limited to the parameters of W50. Because the FCC filing system is structured for center-radius data entry, this exhibit shows the actual area of operation, while the application will specify the center point and radius, which actually includes areas which will not be in use.

Time of Use:

The testing and demonstrations are scheduled events in 2022 and possibly beyond. All other times, the program will not be using these radios at this location. Program agrees to schedule/coordinate as regulatory agencies require.

The UAVs will be tested for four to six hours per day. The time of use is limited.

No Likelihood of Interference:

The radios used for these tests and demonstrations are listen-before-transmit radios. Therefore, they will move to a different frequency if they perceive other operations on the same spectrum.

The UAVs and beach radios only operate with an ERP of 6 W. The control stations have the ability to transmit up to 49 W ERP, yet as noted above, most operations will be a much lower power.

The focus of these operations is over water, and there are not expected to be other operations in the area when these tests and demonstrations are conducted, further reducing the prospect of any harmful interference.

Stop Buzzer Point of Contact:

Jim Ortega, Spectrum Manager
Raytheon
520-794-0227
James.e.ortega@raytheon.com

Conclusion:

Raytheon is seeking experimental licensing for testing and demonstrations to be conducted off-shore near the Dam Neck naval base over the W50 operational area. The tests and demonstrations are of a swarming UAV technology that requires the use of three UAVs flying over the ocean and two ground stations mounted on water craft. These operations will be limited to May and September. When the program will be at the Dam Neck Naval Base, operations will take place for approximately 6 hours per day.