

# **Unmanned Surface Vehicle (USV) Request to change WJ9XED to an Experimental License**

## **1. Purpose of Operation**

Raytheon will Participate in Demonstration of the Unmanned Surface Vehicle

Location: Raytheon Integrated Defense Systems (IDS) Expeditionary Warfare Center (EWC),

8650 Balboa Ave. San Diego CA. 92123, San Diego County, state of California.

Integration laboratory coordinates are; 32.821510 North Latitude, 117.141349 West Longitude, and the surrounding area, also San Diego off shore and coastal areas, San Diego Bay and Mission Bay coastal waterways.

Frequency Stop: 4.680 Type: GHz

Emission Bandwidth: 6 Mhz Emission: COFDM using; BPSK, QPSK and 16QAM modulations

Supplementary Details:

Intended Use: Integration testing of a Maritime Unmanned Surface Vehicle (USV) mission equipment. Description of Requirement: demonstrate reliable RF communications between

Unmanned Surface Vehicle (USV) and Base Station.

Comments:

A radius of operation of 10,000 meters around above listed coordinates is desired for integration and testing purposes.

It should be noted that a small public airfield, Montgomery Field is located 500 meters to the south of the EWC integration lab location.

Point of Contacts

Requester Name: Mr. Daniel Salazar, (858) 522-4087, Daniel.Salazar@raytheon.com

Requester Organization: Raytheon Company

- \_ Files Number: 0294-EX-PL-2016
- \_\_ Class of Station: FIXED/ Mobile
- \_\_ Station Location: FIXED/ Mobile
- \_\_ Effective Date: 5/23/2016
- \_\_ Expiration Date: 5/22/2017

## 2. Experimental Explanations

Raytheon will conduct developmental testing and evaluation on the Unmanned Surface Vehicle (USV). Additional Information:

Program / Project Name: Qirsh Unmanned Surface Vehicle (USV)

Security Classification; Unclassified, Raytheon Company Proprietary

Equipment Transmitter: NETNode-MIMOR-440500, Manufacturer; Cobham Tactical Communications Ltd

Number of Equipment: 2 transceivers and 8 antenna units

Radar Tunability: N/A

Power: 2 Watts

Antenna Type: Gain: 9 dBi

Antenna part number; OA9-4.6V/1701

Elevation, 25 ft: Antenna Distance: 50 ft

Feed Point Height: 22 ft Orientation: Vertical and horizontal pairs Polarization:

Beam Width: \_\_\_\_\_TBD\_\_\_\_\_

Receiver: NETNode-MIMOR-440500 Sensitivity, - 98 dBm

Antenna Type: Gain: 9 dBi

Feed Point Height: 22 ft Orientation: Vertical and horizontal pairs Polarization:

Beam Width: \_\_\_\_TBD\_\_\_\_\_ Elevation 25 ft

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Receiver: NETNode-MIMOR-440500 Sensitivity, - 98 dBm

Antenna Type: Gain: 9 dBi

Feed Point Height: 22 ft Orientation: Vertical and horizontal pairs Polarization:

Beam Width: \_\_\_\_TBD\_\_\_\_\_ Elevation 25 ft

Figure 1: The 4400-4940 MHz Channel Plan

| 4400 - 4940 MHz CHANNEL PLAN |  |  |  |  |  |  |  |  |  |  |  |  |  |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Lower Band                   |  |  |  |  |  |  |  |  |  |  |  |  |  | Upper Band               |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4,400 GHz                    |  |  |  |  |  |  |  |  |  |  |  |  |  | 4,700 GHz                |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4,670 GHz                    |  |  |  |  |  |  |  |  |  |  |  |  |  | 4,670 GHz                |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4,640 GHz                    |  |  |  |  |  |  |  |  |  |  |  |  |  | 4,940 GHz                |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4 GHz Channel Bandwidths     |  |  |  |  |  |  |  |  |  |  |  |  |  | 4 GHz Channel Bandwidths |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 40.00 MHz (A)                |  |  |  |  |  |  |  |  |  |  |  |  |  | 40.00 MHz (A)            |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 30.00 MHz (B)                |  |  |  |  |  |  |  |  |  |  |  |  |  | 30.00 MHz (B)            |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 20.00 MHz (C)                |  |  |  |  |  |  |  |  |  |  |  |  |  | 20.00 MHz (C)            |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 10.00 MHz (D)                |  |  |  |  |  |  |  |  |  |  |  |  |  | 10.00 MHz (D)            |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5.00 MHz (E)                 |  |  |  |  |  |  |  |  |  |  |  |  |  | 5.00 MHz (E)             |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2.50 MHz (F)                 |  |  |  |  |  |  |  |  |  |  |  |  |  | 2.50 MHz (F)             |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1.25 MHz (G)                 |  |  |  |  |  |  |  |  |  |  |  |  |  | 1.25 MHz (G)             |  |  |  |  |  |  |  |  |  |  |  |  |  |
| One-Way Applications         |  |  |  |  |  |  |  |  |  |  |  |  |  | One-Way Applications     |  |  |  |  |  |  |  |  |  |  |  |  |  |

CENTER FREQUENCIES OF THE UNPAIRED OR SINGLE CHANNELS

Table 8: The Center Frequencies for the Unpaired or Single Channels in the 4400-4940 MHz Channel Plan

| 5 MHz Channels (First Priority E-Channels) |              |              |
|--------------------------------------------|--------------|--------------|
| E49 (4642.5)                               | E53 (4662.5) | E57 (4682.5) |
| E50 (4647.5)                               | E54(4667.5)  | E58 (4687.5) |
| E51 (4652.5)                               | E55 (4672.5) | E59 (4692.5) |
| E52 (4657.5)                               | E56 (4677.5) | E60 (4697.5) |