

Customer Frequency Assignment Request Sheet

The following information supplemental information for the Experimental License request to the FCC

ADMINISTRATIVE DATA

CLASSIFICATION (IF CLASSIFIED PROVIDE ONLY UNCLASSIFIED DATA): **Unclassified**

PROGRAM NAME: Small Form Factor (SFF)

GOVT. ORGANIZATION/PROGRAM OFFICE REQUESTING SUPPORT: AFLCMC, HNAG

POINT OF CONTACT (POC)/ PHONE NO.: Capt. Shaun Perry 781-225-2029
(MILITARY MEMBER OR GOVT. SERVICE EMPLOYEE)

CONTRACTOR (IF APPLICABLE): Cubic Defense Applications, Inc.

CONTRACT NUMBER (IF APPLICABLE): Prime N00019-19-C-0010

CONTRACTOR POC/ PHONE NR. (IF APPLICABLE): Rob Setz / 858-266-8263

START DATE: Aug 1, 2020 **END DATE:** Nov 31, 2020 **USAGE:** Daily
(YY/DD/MM) (YY/DD/MM) (IE; DAILY, WEEKLY, ETC.)

NOTE: There will be some dry run efforts and a final demonstration effort performed. During the ground dry runs, all transmitters and receivers will be at ground level. The flight dry run and the flight demonstration will be very similar with the airborne radio flying towards Catalina and both ground radios being at the San Diego location indicated below.

TRANSMITTER #1 INFORMATION (LIST ADDITIONAL LOCATIONS ON SEPARATE SHEET)

Frequency (s) in MHz: 2200-2500 MHz band, at 1 MHz steps. **Emission /Bandwidth:** 56.05 MHz at -3 db

Equipment (name): Cubic SFF Airborne Terminal
(NOMENCLATURE)

Transmit Power: 30 W
(IN WATTS)

Antenna Type (name): Omni (3" Blade)

Antenna Gain: 4-5 dBi
(IN DB)

Antenna Orientation Vertical

Antenna Polarization: Linear Vertical

If it's a Radar, what is the Pulse Repetition Rate (Pulses Per Second) N/A
Pulse Width or Pulse Duration (in microseconds) N/A

Type Testing: **Ground** ☐ **Air** ☒ **Indicate Flight Level** 1000-20000 ft
(CHECK ALL THAT APPLY) (SPECIFY IN FEET)

Antenna Height (ABOVE GROUND, SPECIFY IN FEET.): Aircraft mounted. See Flight Level, above.

Site Elevation (ABOVE MEAN SEA LEVEL, SPECIFY IN FEET): Aircraft mounted. See Flight Level, above.

Operating State: CA **Operating Location (City or Base):** San Diego

Latitude and Longitude of Antenna: Around the greater San Diego Area

Operating Radius from antenna/ground coordinates: < 120 miles (MILES IF APPLICABLE)

Mode(s) of Operation: VOICE (DATA)
(CIRCLE ALL THAT APPLY) SECURE VOICE SECURE DATA

Pulse Repetition Rate: N/A **Pulse Duration:** N/A
(IF APPLICABLE) (MICROSECONDS)

List DD 1494 number (if known): N/A **Has 1494 been submitted:** (Yes) (No)

RECEIVER #1 INFORMATION (LIST ADDITIONAL LOCATIONS ON SEPARATE SHEET)

Equipment (name): Cubic SFF JTAC Ground Terminal **Antenna Type (name):** Omni-multiband
(NOMENCLATURE)

Antenna Gain: 2 dBi **Antenna Height** (ABOVE GROUND, SPECIFY IN FEET): 3-50 ft
(IN DB)

Site Elevation (ABOVE MEAN SEA LEVEL, SPECIFY IN FEET): Rx MSL is 466' (top of roof), ground is 424'

Operating State: CA **Operating Location (City or Base):** San Diego

Latitude and Longitude of Antenna: Latitude is 32 degrees 49 minutes 16 seconds N (32.82111), Longitude is 117 degrees 7 minutes 46 seconds W (117.12944)

STOP BUZZER POC/PROCEDURES:

Rob Setz (619-540-9917)
or Spencer Scribner (619-576-2938)

Provide description of operations (CONTINUE ON ADDITIONAL SHEETS IF NECESSARY. PROVIDE DIAGRAM IF AVAILABLE):

The SFF flight demo will be conducted in San Diego using Fregata's Cessna S550 airplane. The Airborne Terminal aboard the Cessna S550 includes an SFF radio and power amplifier that will transmit at a 30W power level in the 2200-2500 MHz frequency band. The Airborne Terminal uses an Omni antenna located underneath the airplane with a gain of 3-4dB in L-Band (Rx) and 4-5dB in S-Band (Tx). The JTAC Ground Terminal on the ground includes an SFF radio only that transmits at a 2.3W power level in the 1755-1850 MHz band. The JTAC Ground Terminal uses a multiband Omni antenna with a gain of 3dB in S-Band (Rx) and 2dB in L-Band (Tx). Flights will occur in the greater San Diego area, with operations occurring from MYF, probably looping between GIL and OCN with extension to SXC. The specific flight plan is still under development and can be provided later if needed. Transmitters and Receivers #1 and #2 and Receiver #3 will be used for this effort.

SIGNATURE OF REQUESTOR, DATE

Transmitter #2 INFORMATION (LIST ADDITIONAL LOCATIONS ON SEPARATE SHEET)

Frequency (s) in MHz: 1755-1850 MHz band, at 1 MHz steps. **Emission /Bandwidth:** 56.05 MHz at -3 db

Equipment (name): Cubic SFF JTAC Ground Terminal **Transmit Power:** 2.3 W
(NOMENCLATURE) (IN WATTS)

Antenna Type (name): Omni-multiband Antenna Gain: 2 dBi
(IN DB)

Antenna Orientation Vertical Antenna Polarization: Vertical

If it's a Radar, what is the Pulse Repetition Rate (Pulses Per Second) N/A
Pulse Width or Pulse Duration (in microseconds) N/A

Type Testing: Ground X Air _____ Indicate Flight Level NA
(CHECK ALL THAT APPLY) (SPECIFY IN FEET)

Site Elevation (ABOVE MEAN SEA LEVEL, SPECIFY IN FEET): Tx MSL is 466' (top of roof), ground level is 424'

Operating State: CA Operating Location (City or Base): San Diego

Latitude and Longitude of Antenna: Latitude is 32 degrees 49 minutes 16 seconds N (32.82111), Longitude is 117 degrees 7 minutes 46 seconds W (117.12944)

List DD 1494 number (if known): N/A Has 1494 been submitted: Yes (No)
(CIRCLE ONE)

Receiver #2 INFORMATION (LIST ADDITIONAL LOCATIONS ON SEPARATE SHEET)

Equipment (name): Cubic SFF Airborne Terminal Antenna Type(name): Omni (3" Blade)
(NOMENCLATURE)

Antenna Gain: 3-4 dBi (IN DB)

Antenna Orientation: Vertical

Antenna Polarization: Linear Vertical

Type Testing: Ground _____ Air X Indicate Flight Level 1000-20000 ft
(CHECK ALL THAT APPLY) (SPECIFY IN FEET)

Antenna Height (ABOVE GROUND, SPECIFY IN FEET.): Aircraft mounted. See Flight Level, above.

Site Elevation (ABOVE MEAN SEA LEVEL, SPECIFY IN FEET): Aircraft mounted. See Flight Level, above.

Operating State: CA Operating Location (City or Base): San Diego

Latitude and Longitude of Antenna: Around the greater San Diego Area

Operating Radius from antenna/ground coordinates: < 120 miles (MILES IF APPLICABLE)

Transmitter #3 INFORMATION (LIST ADDITIONAL LOCATIONS ON SEPARATE SHEET)

Frequency (s) in MHz: N/A

Emission /Bandwidth: N/A

Equipment (name): _____
(NOMENCLATURE)

Transmit Power: N/A
(IN WATTS)

Antenna Type (name): _____

Antenna Gain: N/A
(IN DB)

Antenna Orientation _____

Antenna Polarization: N/A

If it's a Radar, what is the Pulse Repetition Rate (Pulses Per Second) N/A
Pulse Width or Pulse Duration (in microseconds) N/A

Type Testing: Ground Air Indicate Flight Level NA
(CHECK ALL THAT APPLY) (SPECIFY IN FEET)

Site Elevation (ABOVE MEAN SEA LEVEL, SPECIFY IN FEET): N/A

Operating State: Operating Location (City or Base): N/A

RECEIVER #3 INFORMATION (LIST ADDITIONAL LOCATIONS ON SEPARATE SHEET)

Equipment (name): Cubic SFF Dismount Ground Terminal Antenna Type (name): Omni
(NOMENCLATURE)

Antenna Gain: 2 dBi Antenna Height 3-50 ft
(IN DB) (ABOVE GROUND, SPECIFY IN FEET)

Site Elevation (ABOVE MEAN SEA LEVEL, SPECIFY IN FEET): Rx MSL is 424' (ground level)

Operating State: CA Operating Location (City or Base): San Diego

Latitude and Longitude of Antenna: Latitude is 32 degrees 49 minutes 16 seconds N (32.82111), Longitude is 117 degrees 7 minutes 46 seconds W (117.12944)

Provide description of operations (CONTINUE ON ADDITIONAL SHEETS IF NECESSARY. PROVIDE DIAGRAM IF AVAILABLE):

Receiver #3 (Dismount Ground Terminal) will just be operated as a Rx only terminal and will be operational during the same time that the other transmitters/receivers are operating. The antenna will be located on the ground in the same area as the JTAC ground terminal. The Dismount Ground Terminal receives with a 2dB omni antenna in the 2200-2500 MHz frequency band.

Flight operation CONOPs:

The SFF Flight Demonstration will be taking place in San Diego. The Aircraft will take off and land at the Montgomery Field. The ground terminals and supporting equipment will be set up on Cubic's Building-8 roof top. Aircraft speeds will range between 130-150 knots.

The flight path is planned to include the following:

- Take-off after link acquisition.
- Head toward Gillespie, climbing to 11,000' feet, then loiter at ~11,000' between Gillespie and Oceanside while monitoring link quality.
- Climb towards ~17,000' heading towards Catalina. Loiter every ~10km to monitor link quality.
- Return and Land

