

## **Special Temporary Authority to Test Radar Instrumentation**

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## A. Purpose of Operation and Need for License

The purpose of this application is to request authorization from the FCC for Remote Sensing Center at the University of Alabama to operate an aircraft-mounted radar system during two flight tests (2-4 hours each flight) from March 18 to March 29 of 2019, near Blue Mesa and East River in Colorado, to test and calibrate the radar system prior to deploying it later a field mission to collect Arctic sea ice data. The objective of the overall project is to collect radar survey data over Arctic sea ice from a manned airborne platform (Naval Research Laboratory (NRL) contract number NNX13AQ30A). The radar data will be used to map the snow-air and snow-ice interfaces for estimating the thickness of the snow cover over sea ice.

Pre-deployment flight tests are needed near Grand Junction, Colorado, the location where the radar systems will be installed by Remote Sensing Center on the NRL's Twin Otter aircraft. Operation of the radar during flight tests requires authorization from the FCC. We are including nominal operating parameters (frequency and power), but we can adjust these to accommodate FCC requirements.

## B. Locations of Proposed Operation

A two-week STA is requested to allow the operation of the aircraft-mounted radars during flight tests to test the radars and calibrate the systems prior to deployment. The locations of operation are outlined in Table 1.

| Proposed Location            |                                                                                                                                                                                                                                                                                                    |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Area near Grand Junction, CO | <p>Blue Mesa Reservoir and its surrounding area near Gunnison river Reservoir, Colorado, as shown in Figure 1. Coordinates are provided in section E.1</p> <p>East River and its surrounding area near Grand Junction, Colorado, as shown in Figure 2. Coordinates are provided in section E.2</p> |

Table 1 – Summary of Proposed Operation Locations

The operation will be limited to two flights, each flight lasting two to four hours, between March 18<sup>th</sup> to March 29<sup>th</sup>, 2019. The height of the transmitter will be between 500 and 1500 feet AG

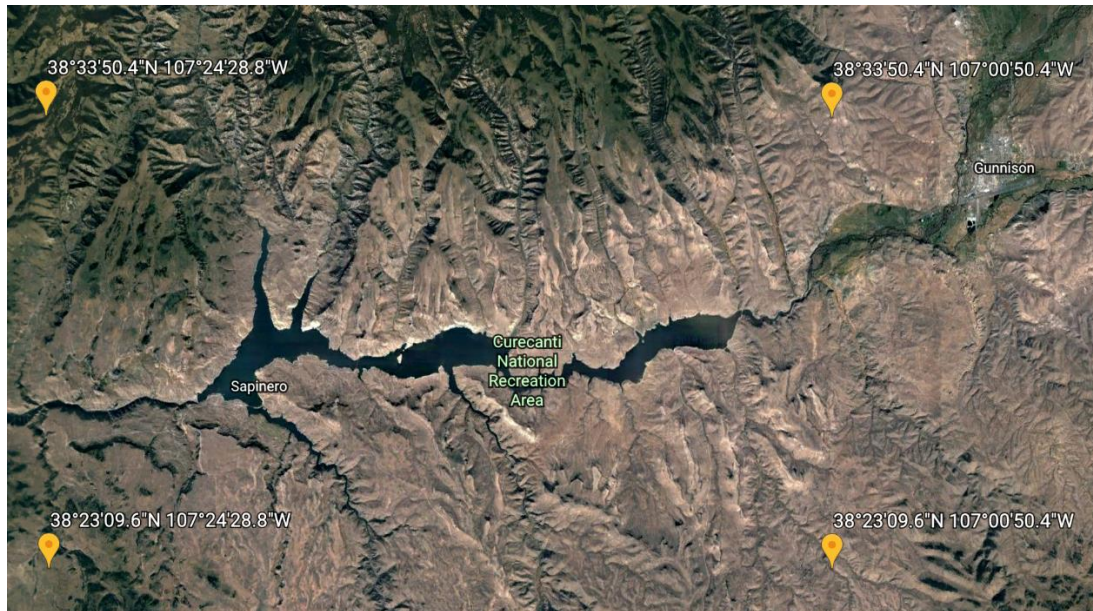


Figure 1 - Proposed Site (Blue Mesa and Surrounding Area, near Gunnison River Reservoir, CO)

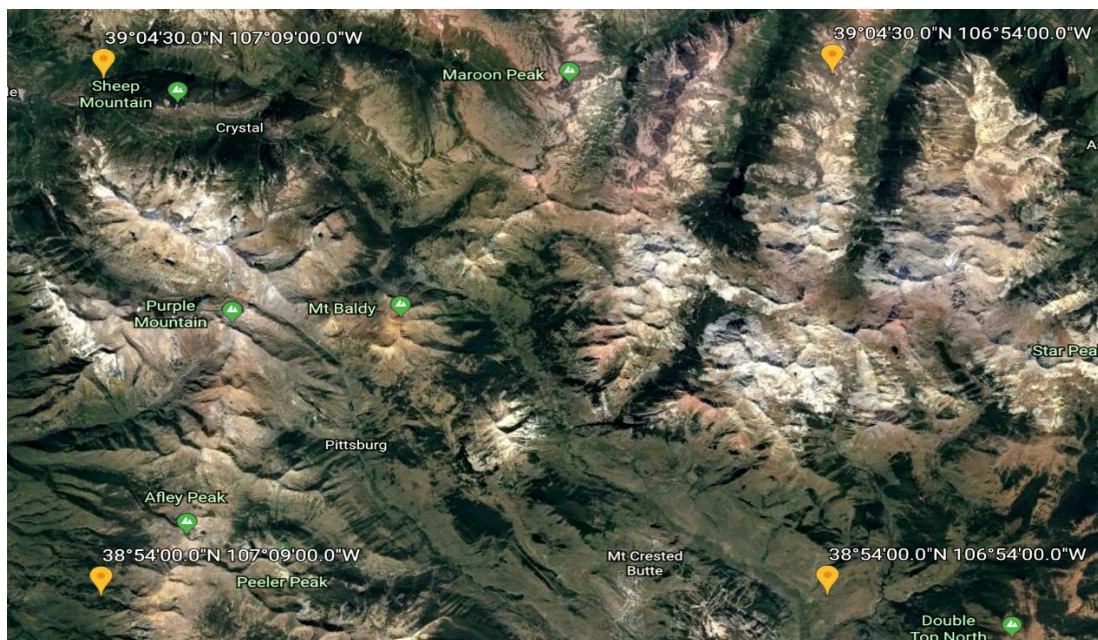


Figure 2 - Proposed Site (East River and Surrounding Area, near Gunnison River Reservoir, CO)

## C. Technical Specifications

### 1. Frequency of Operation

Remote Sensing center at University of Alabama requests authorization to operate from 2 – 18 GHz bands.

### 2. Effective Radiated Power (ERP)

The effective radiated power (ERP) will not exceed 12.5 W average for 2 – 18 GHz.

### 3. Modulation Signal Description and Emissions

The 2 – 18 GHz signal is linear Frequency Modulated radar signal with a sweep time varying between 50us to 250us, duty cycle varying 50% to 100%. These parameters can be adjusted.

### 4. Antenna Information

The transmit antenna that will be used is by Pasternack (PE9887-11) Broadband waveguide horn antenna. The antenna exhibits 6 dBi to 15.9 dBi of gain across the 1-18 GHz band, with a maximum Horizontal 3dB beamwidth of 62° and maximum 3dB vertical beamwidth of 97°. The antenna will be radiating nadir, toward the surface of the earth.

The receive antenna that will be used is a modular Vivaldi Array Panel. The antenna exhibits an average Gain of 18dB across the band (2Ghz to 18Ghz). The antenna will be pointing at nadir, toward the surface of the earth.

### 5. Equipment Utilized

Equipment used for this system is custom built at Remote Sensing center in University of Alabama. One unit will be used for each frequency band under this STA application.

### 6. Station Class

This station will be Aeronautical Mobile in the areas described in section B, with a nominal altitude of 1500 feet AGL.

## D. Contact Information

For questions about this application or in the unlikely event interference concerns should arise, please contact:

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## E. Appendix

### 1. Flight Test Area Coordinates

Blue Mesa

-107.408,38.564,0  
-107.014,38.564,0  
-107.014,38.386,0  
-107.408,38.386,0

East River

-106.9,39.075,0  
-106.9,38.9,0  
-107.15,38.9,0  
-107.15,39.075,0