

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

**FRN: 0028061091**

**Form 442 File Number: 2142-EX-ST-2018**

JB. Yan  
**Remote Sensing Center**  
**University of Alabama, Tuscaloosa, Alabama**  
**October 30<sup>th</sup>, 2019**

## Table of Contents

A. Purpose of Operation and Need for License .....	3
B. Locations of Proposed Operation.....	3
C. Technical Specifications .....	4
1. Frequency of Operation .....	4
2. Effective Radiated Power (ERP) .....	4
3. Modulation Signal Description and Emissions .....	4
4. Antenna Information.....	5
5. Equipment Utilized .....	5
6. Station Class .....	5
D. Contact Information .....	5
E. Appendix .....	5
1. Flight Test Area Coordinates .....	5

## 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 January 25 to February 09 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 January 25<sup>th</sup> to February 9<sup>th</sup>, 2019. The height of the transmitter will be between 500 and 1500 feet AG

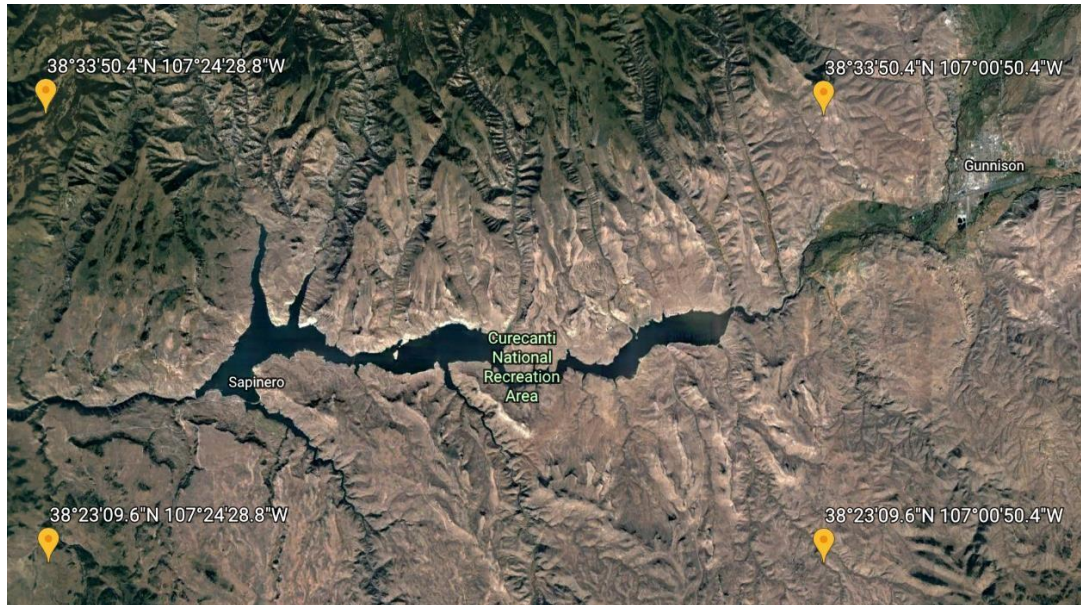


Figure 1 - Proposed Site (Blue Mesa and Surrounding Area, near Gunnison River Reservoir, CO)

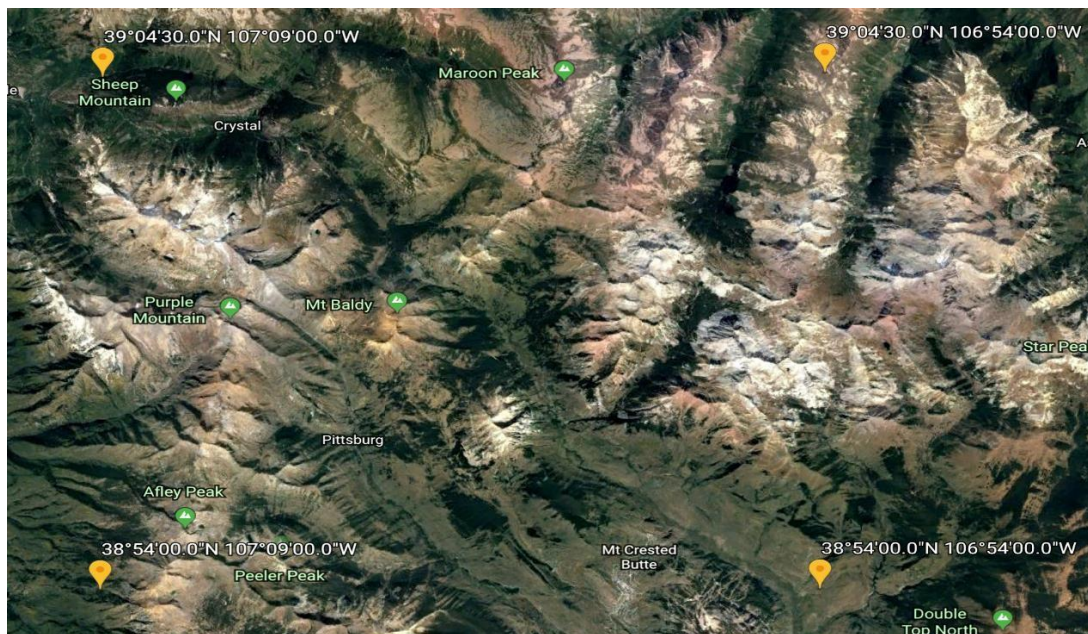


Figure 2 - Proposed Site (East River and Surrounding Area, near Gunnison River Reservoir, CO)

## 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 and receive 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.

### 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:

Dr. Stephen J. Yan  
Remote Sensing Center  
University of Alabama  
7<sup>th</sup> Avenue  
Tuscaloosa, AL 35401  
[jbyan@ua.edu](mailto:jbyan@ua.edu)

## 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

Special conditions:

Remote Sensing Center/University of Alabama will notch out the following spot frequencies:

- a. (+/- 2 MHz) 7.165 GHz, 7.225 GHz, 7.333 GHz, 7.395 GHz, 7.495 GHz, 7.585 GHz, 7.644 GHz, 7.675 GHz, 7.825 GHz
- b. (+/- 3.75 MHz) 7.440 GHz, 7.565 GHz
- c. (+/- 4 MHz) 7.735 GHz, 7.555 GHz
- d. (+/- 5 MHz) 2.730 GHz, 2.790 GHz,
- e. (+/- 8.5 MHz) 4.490 GHz, 4.790 GHz,
- f. (+/- 10 MHz) 7.130 GHz, 7.145 GHz, 7.395 GHz, 7.415 GHz, 7.605 GHz,
- g. (+/- 15 MHz) 7.565 GHz, 7.790 GHz, 7.830 GHz, 8.045 GHz, 8.125 GHz, 8.195 GHz, 8.280 GHz, 8.485 GHz,

Remote Sensing Center/University of Alabama must notch out the following band:

2.690-2.700 GHz, 2.850-2.860 GHz, 2.880-2.890 GHz, 3.947-3.966 GHz, 4.990-5.00 GHz, 10.125-10.325 GHz, 10.680-10.700 GHz, and 15.350-15.400 GHz.