



Special Temporary Authority to Test Radar Instrumentation

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Table of Contents

A. Purpose of Operation and Need for License	3
B. Previously Approved Experimental Special Temporary Authorizations (STA)	3
C. Locations of Proposed Operation	4
D. Technical Specifications	6
1. Frequency of Operation	6
2. Effective Radiated Power (ERP)	6
3. Modulation Signal Description and Emissions	6
4. Antenna Information	7
5. Equipment Utilized.....	7
6. Station Class	7
E. Contact Information	7
F. Appendix.....	7
1. Arctic Management Area Coordinates.....	7



A. Purpose of Operation and Need for License

The purpose of this application is to request authorization from the FCC for CReSIS (Center for Remote Sensing of Ice Sheets) at the University of Kansas to operate aircraft-mounted radar systems during 5 to 10 flights (8 hours each flight) between March 14th and April 4th, 2016, around the Fairbanks area in Alaska.

The primary objectives of the project are to perform radar measurements as a part of NASA's OIB (Operation ICE Bridge) program over the Arctic and Antarctic sea ice and ice sheets (NASA contract number NNX13AD53A). The radar data are to be used to determine ice thickness and to map both near surface and deep internal layers of ice sheets, as well as to map the snow-air and snow-ice interfaces for estimating the thickness of snow over sea ice.

Some of the Arctic sea ice data collection requires that the radar operate within 200 nautical miles (nm) of the U.S. coastline, requiring authorization from the FCC.

B. Previously Approved Experimental Special Temporary Authorizations (STA)

CReSIS/KU has been granted the following experimental Special Temporary Authorizations to operate in the same geographic region in the past:

Experimental Special Temporary Authorization, Call Sign: WF9XMV

File number: 0520-EX-ST-2012

- Effective date range: Dec. 14, 2012 to May 14, 2013
- Geographic region: Arctic Management Area (same polygon as being requested in the current STA)
- Frequency Information:

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance
2-8 GHz	MO	6G00F3X	1W (ERP)	+/- 0.005%
12-18 GHz	MO	6G00F3X	2.51 W (ERP)	+/- 0.00166667%

- Special conditions (relevant to this geographic region):
 - 2700-2900 MHz must be notched
 - Future operations outside of these areas will require further notching of other frequency bands used by FAA.
 - This radio system shall not be used for functional development beyond the scope of this ice sheet testing.

Experimental Special Temporary Authorization, Call Sign: WG9XGN

File number: 0025-EX-ST-2013

- Effective date range: March 1, 2013 to April 13, 2013
- Geographic region: Arctic Management Area (same polygon as being requested in the current STA)
- Frequency Information:

Frequency	Station Class	Emission Designator	Authorized Power	Frequency Tolerance
180-210 MHz	MO	30M0Q3N	9048 W (ERP)	none listed

- Special conditions (relevant to this geographic region):
 - Operation is subject to prior coordination with the Society of Broadcast Engineers, Inc.



(SBE); ATTN: Executive Director; 9102 North Meridian Street, Suite 305; Indianapolis, IN 46260; telephone, (866) 632-4222; Fax, (317) 846-9120; e-mail, executivedir@sbe.org; information, www.sbe.org

Additional granted permits will be attached with the submitted application.

C. Locations of Proposed Operation

Aa STA is requested to allow the collection of ice data using aircraft-mounted ultra wideband radar and for the calibration and testing of the radar. The height of the transmitter will be at a nominal flight altitude of 1500 feet AGL. The locations of operation are outlined in Table 1.

Table 1 – Summary of Proposed Operation Locations

The area of operation is located along the Fairbanks area in Figure 1 and Figure 2. The operation will be limited to between 5 and 10 flights (8 hours each) between March 14th and April 4th, 2016. The exact locations are listed in Appendix 1.

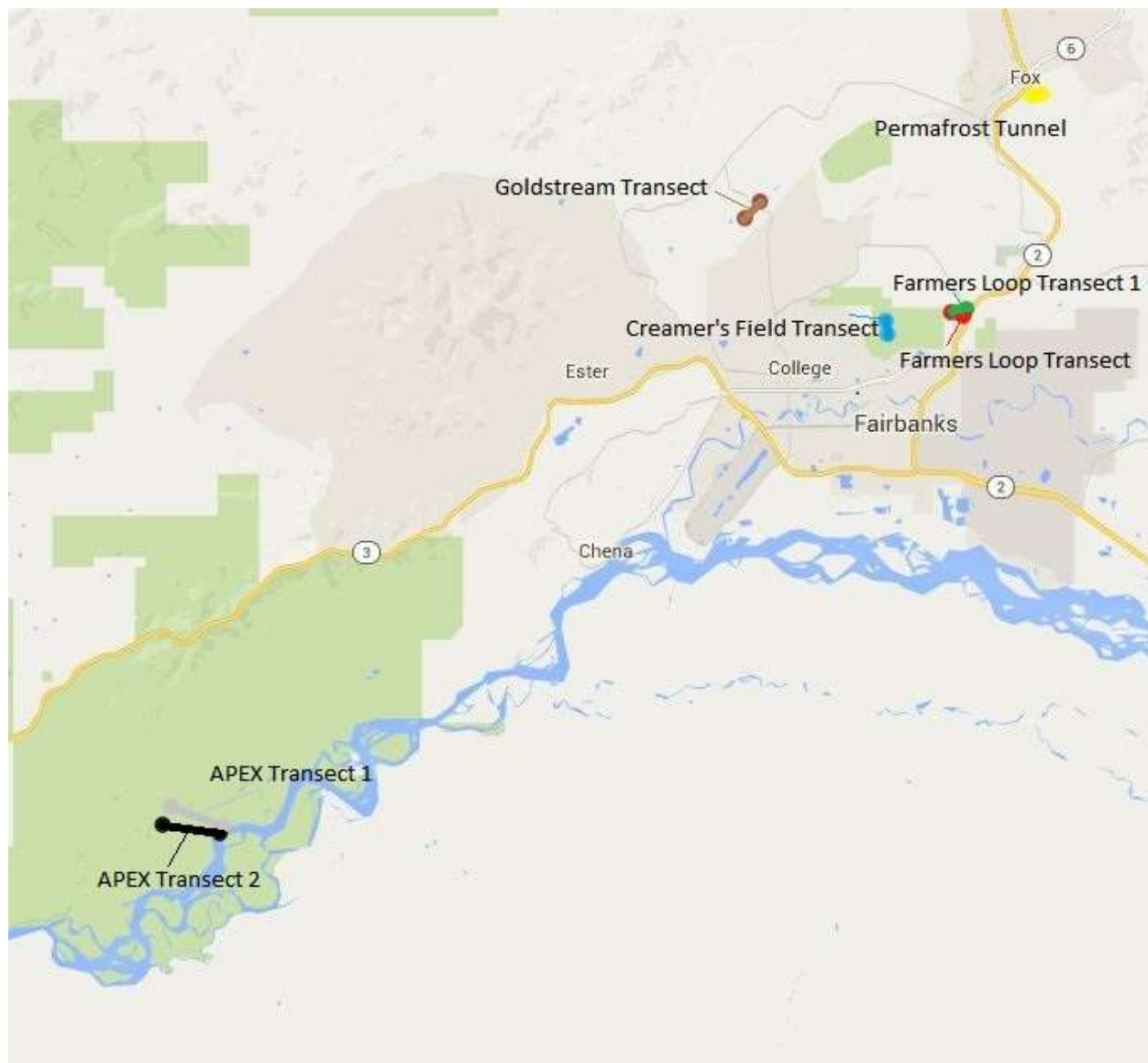


Figure 1



Figure 2

D. Technical Specifications

1. Frequency of Operation

CRISIS requests authorization to operate from 12 – 18 GHz, 2 – 8 GHz, and 150 – 450 MHz bands.

2. Effective Radiated Power (ERP)

The effective radiated power (ERP) will not exceed 12 W peak for 12 – 18 GHz.

The effective radiated power (ERP) will not exceed 1 W peak for 2 – 8 GHz.

The effective radiated power (ERP) will not exceed 500 W peak for 150 – 450 MHz.

3. Modulation Signal Description and Emissions

For 12 – 18 GHz, and 2 – 8 GHz, the signal is an FMCW (frequency modulated continuous wave) radar signal with a pulse width of 250 μ s, duty cycle of 100%, and a pulse repetition frequency of 4 kHz. The primary emission designator is 6G00F3X for 12 – 18 GHz and 2 – 8 GHz.



For 165 – 215 MHz, the signal is a linear FM pulse. Each pulse will be 10 μ s with a pulse repetition frequency of 12 kHz (nominal operation). The emission designator for this signal is 30M0Q3N.

4. Antenna Information

12 – 18 GHz: The antenna used is a Pasternak PE9854/SF-20 horn antenna. The antenna exhibits 20 dBi of gain with a 18.8° azimuth beam width and 18.9° elevation beam width. The antenna will be radiating nadir, toward the surface of the earth.

2 – 8 GHz: The antenna used is an ETS Lindgren 3115 Horn antenna. The antenna exhibits 10 dBi of gain with a 45° Az/EI beam width. The antenna will be radiating nadir, toward the surface of the earth.

150 – 450 MHz: The transmit antenna is a 7-element element dipole array. This configuration produces approximately 11 dB of gain. The beam width is 17 degrees in the cross track direction and 50 degrees in the long track direction. The antenna is pointed nadir, toward the surface of the earth.

5. Equipment Utilized

Equipment used for these systems are custom built at CReSIS. 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 C, with a nominal altitude of 1500 feet AGL.

E. Contact Information

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

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F. Appendix

1. Arctic Management Area Coordinates

Below is all the coordinates that make up the Management Area. Please see above picture for a more general idea.

<u>Longitude</u>	<u>Latitude</u>
147.676564	64.874183
147.674451	64.876615
147.620595	64.950475
147.738443	64.867706
147.843414	64.91364
148.324856	64.703444
148.332238	64.696997
147.686686	64.875447
147.682315	64.875447
147.612249	64.951111
147.740336	64.872094
147.855491	64.907882
148.282027	64.696031
148.285081	64.693645
147.664627	64.878024
147.810552	64.920975
148.270807	64.712587
147.562126	64.956315
147.829145	64.750589
147.685569	64.878036
147.875825	64.920264
148.35526	64.712404
147.628433	64.956158
148.337793	64.662924
147.670025	64.870982
147.830949	64.897495
148.268748	64.669931
147.561782	64.937886
147.807228	64.733651
147.685703	64.870848
147.884583	64.897303
148.354007	64.669678
147.627699	64.937434
148.318457	64.63568