

Special Temporary Authority to Test Radar Instrumentation

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Naval Research Laboratory

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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 the Naval Research Laboratory (NRL) to operate an aircraft-mounted radar system during nine (9) research survey flights (5 hours each flight) from March 15-31, 2014, off the northern coast of Alaska over sea ice. 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 and to map internal layering.

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

B. Locations of Proposed Operation

A 6-Month STA is requested to allow the collection of sea ice data using aircraft-mounted ultra-wideband radar and for the calibration and testing of the radar. The locations of operation are outlined in Table 1.

Table 1 – Summary of Proposed Operation Locations

Proposed Location	
Alaska sea ice survey area	Within two hundred nautical miles off the Northern Coast of Alaska as shown in Figure 1. Corner coordinates of the survey area are provided in section E.1

The area of operation is located along the northern coast of Alaska as shown in Figure 1. The operation will be limited to 9 flights (5 hours each) from March 15-31, 2014. The height of the transmitter will be from 1500 to 2400 feet AGL, with a nominal flight altitude of 1500 feet AGL.

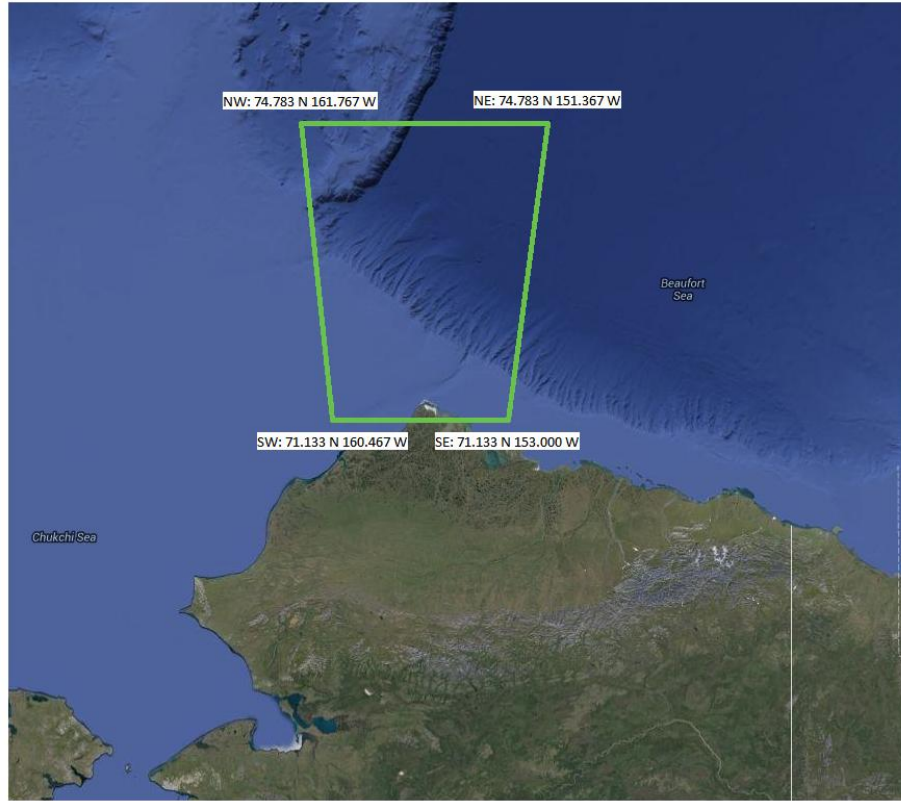


Figure 1 - Proposed Site off the Northern Coast of Alaska

C. Technical Specifications

1. Frequency of Operation

NRL requests authorization to operate from 12 – 18 GHz and 2 – 8 GHz bands.

2. Effective Radiated Power (ERP)

The effective radiated power (ERP) will not exceed 2.51 W peak for 12 – 18 GHz.

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

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.

4. Antenna Information

The transmit antenna that will be used is a Q-Par Angus Ltd. WBHDP0.9-18S dual polarized horn antenna. The antenna exhibits 4.5 to 13.4 dBi of gain across the 2-18 GHz band, with a half-power beamwidth ranging from 110°-40° (azimuth and elevation) in the 2-6 GHz range and 30° across the 6-18 GHz range. The antenna will be radiating nadir, toward the surface of the earth.

The receive antenna that will be used is an A-Info LB-SJ-20180 broadband dual polarization horn antenna. The antenna exhibits 15 dB of gain across the band, with a half power beamwidth between 80°-10°. The antenna will be pointing at nadir, toward the surface of the earth.

5. Equipment Utilized

The experimental radar systems are custom built at the Center for Remote Sensing of Ice Sheets (CReSIS) at the University of Kansas. One unit will be used for each frequency band under this STA application. The antennas are commercially available. CReSIS is providing the radar systems to the NRL to operate on a manned aircraft to collect radar data over sea ice as part of an NRL-funded research grant with CReSIS (NRL contract number NNX13AQ30A).

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. Alaska Sea Ice Survey Area Corner Coordinates

74.783, -161.767
74.783, -151.367
71.133, -153.000
71.133, -160.467