



Special Temporary Authority to Test Radar Instrumentation

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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
E. Contact Information	5

A. Purpose of Operation and Need for License

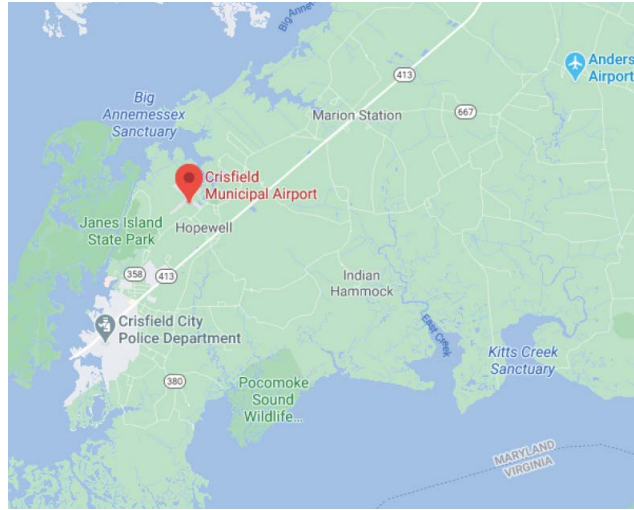
The purpose of this experiment is to test the performance of an ultra-wideband radar system when operated on board the Vanilla Unmanned VA001 aircraft (<https://vanillaunmanned.com/>). The radar system will transmit a waveform in the S and C bands, with its antennas looking towards the nadir direction. This flight will be a test flight to ascertain if the complete system is working prior to a full deployment in Alaska in April 2021. This work is funded through a grant from NASA to study sea ice in the Arctic. A concurrent request is being filed with the FAA for the platform by the owners of the Vanilla, Platform Aerospace.



B. Locations of Proposed Operation

Proposed Locations: Measurements will be conducted at approximate location of 38-01-05.4000N 075-49-36.7000W Crisfield-Somerset County Airport Crisfield, Maryland, USA. The Vanilla will fly one to two 30 minute to 1-hour flight tests to test the radar. These flights will take place under the University of Maryland FAA COA. Radar will be tested over the airstrip at the airport.

Dates: Final dates to be determined due to schedule impacts of COVID-19. We are requesting a window of January to end of April 2021.



General area proposed for test flights

C. Technical Specifications

1. Frequency of Operation

CRISIS requests authorization to operate in the 2-8 GHz bands.

2. Effective Radiated Power (ERP)

The effective radiated power (ERP) will not exceed 100 W (ERP in Watts units); 20 dBw (ERP in dBw units)

3. Modulation Signal Description and Emissions

The system is a frequency modulated continuous wave radar that emits a 2-8 GHz chirp. The chirp duration is 200 μ s and the pulse repetition frequency is 5 kHz. The primary emission designator is 6G00G3N.

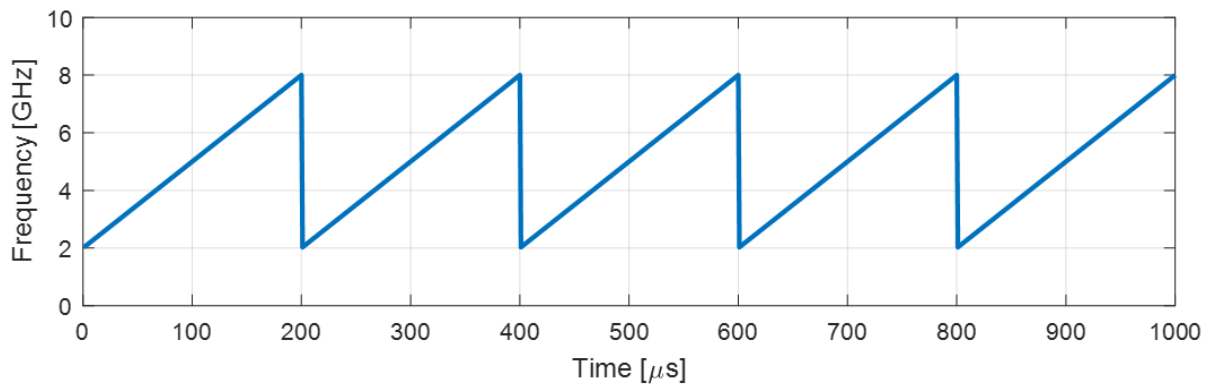


Fig. 1 – Modulation Signal (Ramp) for the Snow Radar

The FMCW Radar sweeps +/- 3GHz from the Carrier (5 GHz). The sweep duration is 200 microseconds. The repetition rate is 5 kHz.

$B_d = 3 \text{ GHz}$

$B_n = 2 B_d = 6 \text{ GHz}$

4. Antenna Information

The antenna used are directive horn antennas Model 3115 by ETS- Lindgren and mounted on the wings of the UAV with a gain of 20 dBi. The Antennas are nadir pointing with a beamwidth (along track and cross track) of 50 degrees and 50 degrees.

5. Equipment Utilized

The Radar equipment used for this system is custom built at the Center for Remote Sensing of Ice Sheets at the University of Kansas.

6. Station Class

This station will be Aeronautical Mobile in the area described in section B with a nominal altitude of 500-2000 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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