

1. Introduction

By the instant application (“Application”), BAE Systems Information and Electronic Systems Integration Inc. (“BAE Systems”) requests that the Commission Special Temporary Authority (STA) to operate the facilities specified in the instant Application for the period of October 1, 2020 through April 1, 2021.

2. Purpose of the Operation

As a general matter, the testing conducted by BAE Systems is a critical part of the manufacture and delivery of military systems provided to the Armed Forces in support of Homeland Security as well as war efforts. This particular experiment will be conducted in support of activities under the following government contract:

Agency: Defense Advanced Research Projects Agency (DARPA)
Contract No.: N65236-20-C-8015
Contract POC: Rachel Florea 571-218-4410

This experiment will involve preliminary testing of a transportable very low frequency (VLF) transmitter system. The US Navy uses VLF signals to communicate with their submarines. This is a critical capability for the Navy, as submarines cannot use the higher frequency signals typical of other communications system. As the wavelengths at these frequencies are 10’s of km, the conventional transmitter/receiver systems use antenna facilities that are of comparable size, so they cannot be easily transported. DARPA is sponsoring research into the development of significantly smaller systems. BAE Systems’ approach is to implement a monopole antenna attached to a lifting body, specifically a hybrid helium balloon / kite system known as a Helikite™. As part of the design process, BAE Systems is developing detailed simulations of this antenna. In order to confirm the validity of these simulations, BAE Systems intends to perform a preliminary evaluation of the performance of a transmitter with an antenna with a maximum height of 100 m. The primary set of experiments will determine the values of the parameters that go into the antenna model which will be used to design a full-sized (nominally 1 km) antenna. BAE Systems will collect data from this system for a variety of antenna heights and weather conditions.

The antenna will be omnidirectional, so there is no preferred orientation.

A waiver of the Station ID requirements of 47 CFR §5.115(a) is respectfully requested.

3. Interference Mitigation

BAE Systems is well aware of its obligations under Part 5 of the Commission's rules to avoid interference to co-channel licensees in non-experimental services, and will take all steps to ensure compliance with this obligation. In addition, the following factors will help mitigate any interference issues:

- Operation will take place only at single, discrete frequencies at any point in time, with narrow bandwidths. This is inherent in the system – because the antenna is very electrically short (~1/100 of a wavelength), it will only radiate appreciably over a very small range of frequencies that will depend on precise tuning of the driving amplifier.
- Also inherent in the system is low ERP – the small antenna will result in almost all of the power being dissipated in resistive loss, instead of being radiated. This means that there is little possibility of co-channel interference, as the primary users of this spectrum are the previously mentioned Navy communications systems, which operate at much higher ERP.
- Outdoor testing will not be frequent. Testing will be sporadically planned and executed throughout the course of this license, typically for one to three days at a time at an expected frequency of several times a month. Testing will typically only occur between the hours of 8AM and 6PM EST on week days.
- Outdoor testing will not be continuous. Emissions will be active for short durations no longer than 30 minutes at a time (maximum) with an average on-time more on the order of 1 minute. During a test, emissions will be activated for these durations periodically with several minutes between emissions at a minimum, if not longer. Overall, during a full day of testing the expected total time spent emitting would be on the order of 1 to 2 hours on average.
- BAE Systems currently has authorization from the FAA to operate UAS's up to 400' AGL. As the system tether will be limited to 100 m [330'], BAE Systems will stay beneath that limit, and the company will comply with the appropriate regulations relevant to moored balloons. BAE Systems is currently working an additional Part 101 Waiver with the FAA specifically for this system. Note that multiple locations are being requested because FAA approval is uncertain at this time. Once FAA approval has been obtained, we will only use one site, preferably Merrimack, NH, for these tests.
- This application is being submitted with the full knowledge and approval of the government customer, who has asked BAE Systems to coordinate with the Navy test team so that they can handle frequency management issues, if any.

4. Stop Buzzers

The following will be available by wireless telephone and will act as the “stop buzzer” if any issues arise during testing:

PRIMARY:	David Herold, 603.718.0726
SECONDARY:	Greg Nannig, 603.718.0726
ALTERNATE:	BAE Systems Emergency Services Center, (603) 885.3842