a. The complete program of research and experimentation proposed including description of equipment and theory of operation.

Authority is requested to utilize the Fortem Technologies R30 radar for the radiolocation of small Uncrewed Aircraft Systems (sUAS) in support of a Massachusetts Department of Transportation (MassDOT) Aeronautics Division program aimed at detecting and tracking sUAS that pose a risk to the safety of aviation and aviation related activities within the Commonwealth of Massachusetts. The MassDOT Aeronautics Division supports operations and safety at 35 public use airports throughout the Commonwealth. To address the aviation safety challenge posed by sUAS and the budgetary challenges of outfitting all 35 small airports with fixed sUAS detection systems, MassDOT Aeronautics is working to integrate various sensors capable of detecting and tracking sUAS, including the Fortem Technologies R30 radar, into a transportable sensor suite. The goal of this program is to develop a mobile capability that can be transported to and positioned within an operating area of interest. The Conventional Experimental License would enable refinement of the integration of the Fortem R30 radar into a situational awareness software suite, integration testing, operator training, and field testing at a several field test sites and several small airports. MassDOT is working in partnership with the Volpe National Transportation Systems Center and MIT Lincoln Laboratory to develop this sUAS detection capability. MIT Lincoln Laboratory has obtained authority to operate a MIT Lincoln Laboratory owned Fortem R30 in support of software integration and integration testing under callsign WN2XAR. MassDOT Aeronautics obtained an STA, callsign WV9XMT, and a modification to the locations in that STA, callsign WW9XAN, to continue software integration, integration testing, operator training, and field testing using a MassDOT owned and operated Fortem R30 radar system. The need for continued integration, testing, and data collection drives this request to transition from an STA to a conventional experimental license. Data collected during all test site and field-testing efforts will be used to ascertain the viability of the radar for the MassDOT transportable drone detection program.

b. The specific objectives sought to be accomplished.

The MassDOT transportable sUAS sensor program involves deploying an integrated sensor suite to several field test sites to assess the effectiveness of the individual sensors and integrated sensor suite in detecting and tracking sUAS in the public use airport environments of interest to MassDOT Aeronautics. Objectives for the research and experimentation utilizing the Fortem R30 radar include:

1. Refinement of Fortem R30 integration into the MassDOT sUAS sensor suite
2. Validation of the Fortem R30 integration
3. Sensor operator training
4. Field-testing of Fortem R30 radiolocation capability as both a standalone sensor and integrated component of the MassDOT sUAS sensor suite
5. Airspace characterization at operating locations

c. How the program of experimentation has a reasonable promise of contribution to the development, extension, expansion, or utilization of the radio art, or is along lines not already investigated.

Small Uncrewed Aircraft Systems (sUAS) pose an increasing challenge to the safety of aviation and aviation related activities. Effective detection and tracking of these sUAS requires leveraging various techniques, including optical sensing, infrared sensing, passive RF sensing, and radio location, that are properly integrated into an airspace situational awareness platform. The transportability of the

MassDOT sUAS sensor suite adds complexity to the integration of the Fortem R30 into this sensor suite. This program will result in novel insight into the system architecture, system integration, and operational aspects of leveraging a radiolocation capability as part of a transportable sUAS sensor suite.