

WHO

**SYSCOM:** NAVSEA

**Sponsoring Program:** PEO IWS 6.0

**Transition Target:** MQ-8 Fire Scout, MQ-25A Stingray, MQ-4C Triton, MQ-9 Reaper

**TPOC:** (202) 781-3014

**Other Transition Opportunities:** SOCOM and Army UAVs

**Notes:**



Kurt Lengfield, U.S. Navy Photograph 060117-N-4935L-002, Navy NewsStand

WHAT

**Operational Need and Improvement:** The Navy’s mission of global force projection and logistic support requires surface ships and naval aviation assets to be deployed worldwide with little supporting infrastructure for communications. Airborne units provide extended line of sight for network connectivity between surface vessels as well as contributing unique sensor capabilities. The use of unmanned aerial systems (UAS) as airborne nodes for communications will provide additional capability to ensure uninterrupted connectivity throughout the fleet, but for a variety of naval UAS platforms to easily serve in this role a scalable and affordable airborne phased array antenna is required.

**Specifications Required:** The antenna system will provide one electronically steerable beam per aperture and operate in half-duplex mode. The antenna design will be scalable to allow for integration on a variety of small airborne platforms and/or for different size options depending on the required performance [Effective Isotropic Radiated Power (EIRP) and Gain to Temperature Ratio (G/T)]. The Active Electronically Scanned Array (AESA) will be efficient and operate with air cooling.

**Technology Developed:** FIRST RF has developed an industry-leading phased array architecture that is uniquely suited to address this need. This phased array approach is based on a modular building block that combines the RF, electronic, thermal, and mechanical features of a phased array antenna into a low-cost subassembly. This active antenna module is easily manufactured and tested using standard high volume printed circuit processes. FIRST RF has had dramatic success applying this approach to X-Band for airborne radar and Ku-Band communications. Translating this technology to C-Band promises to yield a cutting-edge phased array solution for the Navy with rapid transition to the fleet.

**Warfighter Value:** This architecture will allow for aerial aircraft nodes, communications relay between ship-to-ship, ship-to-aircraft, aircraft-to-aircraft, and aircraft-to-ground entry points (GEPs). It is envisioned that MQ-8, MQ-25, MQ-4, MQ-9, and SOCOM and Army UAVs will all utilize this architecture to enable airborne LOS communication architecture for resilient communications.

WHEN

**Contract Number:** N68335-24-C-0109

**Ending on:** Nov 25, 2024

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Phase I	N/A	Component Measurements	2	1st QTR FY19
Phase I Option	N/A	Component Measurements	2	4th QTR FY19
Phase II Baseline	N/A	Prototype Fabrication	3	
Phase II Option	N/A	Prototype Test	4	4th QTR FY22
Second Phase II Baseline	N/A	Prototype Improvements, Integration, and Test	5	1st QTR FY25
Second Phase II Option	N/A	Prototype Improvements, Integration, and Demonstration	6	1st QTR FY26

HOW

**Projected Business Model:** FIRST RF is a product-oriented company developing advanced technologies for antennas and Radio Frequency (RF) systems including communications, radar, phased arrays, Point Navigation and Timing (PNT), RF compatibility, low observable antennas, Electronic Warfare (EW), and Direction Finding (DF) systems. FIRST RF will produce antennas and integrate them onto a variety of aircraft types and sizes. Radio integration will be through a prime or directly with the government.

**Company Objectives:** FIRST RF Corporation is a developer and manufacturer of Active Electronically Scanned Array (AESA) antennas. The company objective on this project is to produce, test, and deliver AESA antennas for use on aircraft to primes and government customers.

**Potential Commercial Applications:** The architecture will provide benefit for commercial wireless communications. In defense applications, the architecture may migrate to other frequency bands and target platforms.