

Department of the Navy SBIR/STTR Transition Program

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Topic # N132-089

Simultaneous multi-beam high-bandwidth conformal tactical data link antenna systems
FIRST RF CORPORATION

WHO

SYSCOM: NAVAIR

Sponsoring Program: Maritime Patrol and Reconnaissance Aircraft (PMA 290)

Transition Target: Collision Avoidance Radar for MQ-8 Fire Scout and MQ-4C Triton

TPOC:
(301)342-2637

Other transition opportunities: FIRST RF's sensor system is ideal for integration on UASs seeking to meet Federal Aviation Administration requirements for operation in domestic airspace

Notes:
High-efficiency/high-dynamic-range/low-noise Gallium Nitride (GaN) power amplifiers provide high transmit power and robust receive performance in high-RF-interference environments



<http://realitypod.com/wp-content/uploads/HLIC/75c4332dc129b738b143b85fed3c7e>
<http://wordlesstech.com/wp-content/uploads/2013/04/New-Triton-Maritime-Spy-Drone-ready-for-Takeoff-1.jpg>

WHAT

Operational Need and Improvement:

Small airborne platforms require upgrades to advanced sensors for collision avoidance. To be practical, these systems must be lightweight and affordable while managing thermal loads to meet mission-critical levels of reliability and performance

Specifications Required:

Design must be compatible with mounting on unmanned airborne C-Band assets, have built-in test (BIT) capability, offer low size, weight, and power (SWaP), provide a thermal solution minimizing cost, fully integrate a digital receiver and exciter and support high-altitude, high-grazing periscope detection and discrimination capability.

Technology Developed:

This technology is a low-cost sense-and-avoid phased array radar aperture with innovative RF packaging and radiating aperture technologies. The system design approach incorporates passive thermal management, radio frequency (RF) beamforming, integrated aperture and multi-channel coherent down-conversion in a planar modular assembly.

Warfighter Value: Greater operational flexibility with unmanned aerial systems (UASs) will provide the warfighter with improved access to intelligence, surveillance and reconnaissance (ISR) and situational awareness data products. Advanced radar hardware integration reduces the size, weight, and power (SWaP) of the sensor to enable greater range and endurance of UAS assets.

WHEN

Contract Number: N68335-15-C-0094 **Ending on:** September 30, 2015

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Concept feasibility demonstration	Low	Performance targets met	2	November 2011
Array prototype in laboratory environment	Low	Performance targets met	3	July 2012
System testing in laboratory environment	Low	Performance targets met	4	December 2013
Flight testing	Low	Performance targets met	6	November 2014

HOW

Projected Business Model:

The direct customer will be a radar subsystem integrator who will be selling the complete radar system to the platform integrator. For both the FireScout and Triton UAS, Northrop Grumman is the platform integrator and prime contractor. The NAVAIR PMA for these platforms, will be better prepared to meet operational platform requirements.

Company Objectives:

FIRST RF plans to transition this technology into a production-ready product. Efficient phased array integration approaches developed by FIRST RF will allow small platform system integrators to include advanced RF sensor technology within the SWaP constraints of tactical UASs. The First RF solution to collision-avoidance radar for MQ-8 FireScout and MQ-4C Triton will allow unprecedented flexibility for the warfighter and provide necessary capability for these systems to operate to a greater degree in restricted airspace, providing higher fidelity ISR access as well as significantly improved situational awareness information.

Potential Commercial Applications:

FIRST RF's phased array architecture is an enabling technology for advanced RF sensors on tactical UASs and other small platforms. This antenna system provides the performance of high-end electronically scanned radars at low size, weight, power, cost (SWaP-C), and thermal loads that are compatible with small platforms.

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