

Department of the Navy SBIR/STTR Transition Program

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NAVAIR 2020-863

Topic # N182-112

Advanced Signal Processing and Coordination Applied to Electronic Support

Measures

Metamagnetics, Inc.

WHO

SYSCOM: NAVAIR

Sponsoring Program: PMA 299 (ASW) H-60 Helicopter Program

Transition Target: Naval airborne platforms that use the AN/ZLQ-1 ESM like the MQ-4C Triton Unmanned Aerial System (UAS)

TPOC:
(301)342-3482

Other transition opportunities: Other military platforms that have broadband ESM or ELINT capabilities that operate in high power signal environments

Notes: The initial transition platform and systems testing will be the MQ-4C Triton. Metamagnetics is modifying their Auto-tune Filter technology, which has already transitioned successfully to other Navy Airborne Systems like AOEW, to help meet the new performance needs required for this effort.



U.S. Navy photo courtesy of Northrop Grumman by Chad Slattery/Released) 130521-O-ZZ999-110

WHAT

Operational Need and Improvement: Navy airborne Electronic Support Systems (ESM) must operate in contested electromagnetic environments characterized by both co-site interference and jamming. Airborne systems are particularly sensitive to co-site interference due to lack of available space on the aircraft. Digital solutions won't work because the receivers are overwhelmed by the sheer power coming into the front end.

This calls for a device which can handle extremely high power levels, but also keep the ESM operational when the interference is present.

Specifications Required: The device will have receiver front end protection from high power onboard emitters. High power signals will be attenuated to a predefined level without effecting low level signals in the bandwidth.

Technology Developed: Metamagnetics is developing a wide band, self-adapting, high-power handling, and low size, weight, and power (SWaP) interference mitigation capability based on its Auto-tune Filter (AtF) technology. An AtF passively attenuates signals above a designed power threshold without effecting signals of interest (other than minor insertion loss). This prevents high power interfering signals from jamming and/or damaging the ESM, while allowing the ESM to remain operational.

Warfighter Value: Simultaneous transmit and receive (STAR), communications while jamming, and higher transmit powers will be allowed from nearby antennas on aircraft.

WHEN

Contract Number: N68335-20-C-0164

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Phase I Proof of Concept Prototype	N/A	Covers interfering emissions within the 2-18 GHz band and meets maximum output power level	3	February 2019
Performance specifications for Azure Summit Switchblade ESM system	N/A	Agreement with Azure Summit and Navy	N/A	August 2020
Prototype unit manufactured and tested	Med	Meets size, weight, and electrical specifications	5	December 2021
Test prototype unit in representative signal and environment conditions	Med	Successfully mitigates specific interference and still receiving signals of interest	6	March 2021

HOW

Projected Business Model: Metamagnetics will directly manufacture and sell the parts to either the warfighter directly through bolt-on retrofits, or to the primes with surface mount parts that can be directly integrated into their designs.

Company Objectives: Create a robust RF interference mitigation subsystem that can protect such a wide range of frequencies for airborne SWaP constrained ESM systems.

Potential Commercial Applications: Some examples include 5G communications, radios for emergency responders, and commercial and industrial drones near urban environments.

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