

# Department of the Navy SBIR/STTR Transition Program

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NAVAIR SPR Number: 2022-767

Topic # N192-078  
Network Retention During Jamming Mission  
Metamagnetics, Inc.

## WHO

**SYSCOM:** NAVAIR

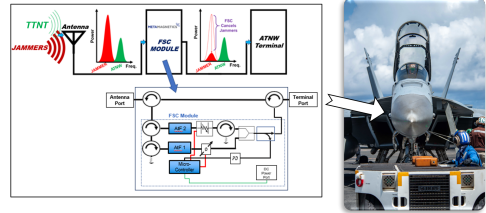
**Sponsoring Program:** PMA-234 Airborne Electronic Attack Systems

**Transition Target:** EA-18G Growler (PMA-265)

**TPOC:** (805) 989-3443

**Other Transition Opportunities:** The frequency selective canceller (FSC) module can be adapted to various applications beyond the Growler including shipside and dismounted soldier handheld receivers.

**Notes:** The FSC technology is an extension of Metamagnetics' Auto-tune Filter (AtF) technology which is being transitioned into major platforms. Metamagnetics now boasts a direct to the US Navy program through NIWC-PAC that supplies a modular bank of AtFs directly to the Navy as the central sub-system in the Real-Time Spectral Operations (RTSO) system. This transition has placed Metamagnetics products directly on 10 U.S. Navy ships, with a target of 100+ Navy surface vessels being equipped by the end of 2024.



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## WHAT

**Operational Need and Improvement:** Tactical, Targeting, Network, Technology (TTNT) is a new operational technology which operates across the 1300- 2100 MHz band being installed on the EA-18G aircraft. During a typical jamming mission, the TTNT unit (upper/lower antennas) operation will receive interference from the on-board jammer units. This interference will not allow the EA-18G to receive external TTNT units.

**Specifications Required:** A new technical approach is sought that will allow the TTNT to operate fully while in the presence of the interference. This new device will allow the TTNT unit to receive RF successfully with multiple TTNT units, and should include a tunable notch filter, nulling antenna, co-site interference reduction. A unit is less than 6in X 6in X 13in, less than 30 lbs, and the EA-18G will provide a maximum of 150W (+28Vdc). A unit must be designed in accordance with the following Military Spec/Standards/Handbook. MIL-N- 18307G (2) - SSOW 3.1.5.2; MIL-HDBK-217F (2) 28-Feb 1998 – SSOW 3.4.2; MIL-HDBK-781A 01 April 1996 – SSOW 3.4.11.

**Technology Developed:** Metamagnetics is developing a custom frequency selective canceller (FSC) module, based on their proven Auto-tune Filter (AtF) technology, to enable continuous connectivity to the network during jamming missions. The FSC module, which has already been demonstrated in a laboratory environment at these frequencies, automatically and selectivity cancels high-power interferers while minimally impacting lower-power signals of interest. The FSC module is capable of selectively rejecting a threat by >50 dB, whether it is in-band/near-band, modulated, or CW, without the need for a sense antenna or any complicated digital signal processing.

**Warfighter Value:** The canceller would allow aircrews to receive information from aircraft/ground-based signals without getting interference. It has potential to be a major disruptive interference excision technology because it 1) does not require a sense antenna, 2) supports multiple simultaneous dynamic threats, and 3) can be made on a board that is the size of a small text book.

## WHEN

**Contract Number:** N68936-22-C-0014

**Ending on:** Feb 09, 2024

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Demonstrate Matched AtFs	Low	AtFs perform across TTNT frequencies meeting system required specifications	4	4th QTR FY22
Demonstrate Engineered Phase Dispersion on FSC	Low	FSC selectively cancels high-power interferers while minimally impacting lower-power signals of interest.	4	2nd QTR FY23
Demonstrate Automatic Tuning via Feedback Control Loop	Low	FSC module will offer closed-loop tuning and be fully integrated	4	4th QTR FY23
Demonstrate Reception of TTNT under Relevant Jamming Signals	Low	FSC successfully tested with Collins Aerospace	5	2nd QTR FY23

## HOW

**Projected Business Model:** The first entry point of the FSC will be on the EA-18G Growler, where the device will be placed right in front of the MIDS terminal in the antenna receive path to protect the radio from incoming RF jamming signals. The MIDS terminal will be adapted to various applications beyond the Growler including shipside and dismounted soldier handheld receivers. In fact, TTNT has already been tested in AWACS, E-2C, F/A-18, F-15, F-16, Predator, GlobalHawk, Apache, Aircraft Carriers and more. Metamagnetics has worked diligently with ViaSat and Collins Aerospace on the Link 16 application and has setup a working relationship to collaborate on the TTNT upgrade. Metamagnetics is predicting 100 device per year in low-rate initial production (LRIP) and then 500 devices per year for indefinite delivery/indefinite quantity (IDIQ) for the TTNT opportunity. Metamagnetics will be expecting between \$1M and \$2M to transition the product, of which Metamagnetics plans to absorb most of these costs internally. This can be done for two reasons. One, the company has an established revenue stream for other Auto-tune Filters products that can be reinvested across the product line and marketing costs to be shared among the family of solutions. Two, Metamagnetics has recently received a \$3M+ MANTECH grant from the Army to establish large scale manufacturing for other Auto-tune Filter products.

**Company Objectives:** The plan is initially to work with Primes such as ViaSat and Collins Aerospace to work on terminal updates in the antenna receive path. Metamagnetics has recently expanded its original business model of selling AtF-based products nearly exclusively to primes for integration into mission systems.

**Potential Commercial Applications:** Successful development of a canceler could be used by commercial aircraft receiving communication interference; therefore, private and commercial airlines could also benefit from this technology development.

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