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DEPARTMENT OF THE NAVY

# NAVY SBIR/STTR SUCCESS STORY



## FREQUENCY SELECTIVE LIMITERS

*New Frequency Selective Limiter Breakthrough Increases Performance Across Multiple Critical Electronics Applications*

### Metamagnetics Inc.

POC: Anton L. Geiler, Ph.D.,  
President  
781.562.0756  
Westborough, MA 01581  
[www.mtmgx.com](http://www.mtmgx.com)

## THE CHALLENGE

Modern radio frequency (RF) electronics continually push the performance envelope for power, bandwidth, linearity and efficiency. With the spectrum increasingly congested and contested, signal selectivity in clutter grows increasingly important.

## THE TECHNOLOGY

Tunable filters are used to increase the signal-to-noise ratio across the spectrum of desired frequencies. Metamagnetics' Auto-tune Filter (AtF) is an analog-based Frequency Selective Limiter (FSL) technology that automates signal differentiation based on power level. The AtF's unique analog signal processing capability, dynamic range, and resiliency enable it to limit signals above a pre-determined threshold.

## THE TRANSITION

The Office of Naval Research's (ONR's) Code 31 sponsored AtF for use in lower power electronic warfare (EW) applications. Code 31 then collaborated with ONR Code 35 to adapt AtF for use in higher-power counter-directed energy weapons (CDEW) applications. An FY13 Office of the Secretary of Defense (OSD) Rapid Innovation Fund (RIF) award, in collaboration with the Naval Research Laboratory (NRL), increased awareness of this technology and its applicability to naval systems spawning new internal research that led to successful development. Lockheed Martin (Syracuse, NY) funded advanced development via SBIR Phase III funding and is integrating the AtF into a Navy program. Metamagnetics is now pursuing Integrated Chip (IC) scale FSL applications with the Defense Advanced Research Projects Agency (DARPA) Magnetic Miniaturized and Monolithically Integrated Components (M3IC) program.

## THE NAVAL BENEFIT

FSL technology enables continuous reception of signals of interest and maintains communications links in electromagnetically congested and contested environments. It also enhances the Navy's capability to detect and respond to Naval threats. As a result of quick response time and excellent signal selectivity, FSL enables continued operations in contested environments, mitigates own-ship and own-fleet interference, and senses and communicates in the presence of directed energy weapons.

## THE FUTURE

A recent \$4.5M Army ManTech award will support Metamagnetics in maturing a more robust manufacturing process for key AtF materials enabling scale-up to meet DoD production needs and lower manufacturing costs including AtF affordability for future phased array radar systems. Metamagnetics has sold/distributed more than 200 AtF units across the DoD to date for applications involving wireless communications and sensing research and development with systems applications development to follow.

"METAMAGNETICS EXPERTISE IN RF AND MAGNETIC MATERIALS HAS HAD BROAD APPLICATIONS ACROSS OFFICE OF NAVAL RESEARCH EFFORTS IN NAVAL ELECTRONIC WARFARE, ELECTRONIC PROTECTION AND DIRECTED ENERGY AS A DIRECT RESULT OF THEIR FLEXIBILITY AND INNOVATION IN RESPONSE TO CUSTOMER PROBLEMS"

Multiple ONR Program Officers