

Topic: N121-036

## SA Photonics

Advanced Processing Electronic Attack (EA) Digital Radio Frequency Memory (DRFM)

The Optical RF Memory (ORFM) system, an upgrade for current DRFM systems, significantly enhances the Navy's ability to thwart adversarial radar systems. ORFM uses optical computing to implement advanced high-speed digital signal processing that provides improved spectral purity and extremely wide instantaneous frequency bandwidth response with an unlimited number of simultaneous false target outputs. It is suitable for current and emerging ultra-wideband radar systems, thereby increasing current and future effectiveness. ORFM is a fully integrated fiber optic-based system; has low size, weight and power (SWaP); and utilizes only COTS optical and RF parts. The company, which specializes in the development of advanced photonics systems to solve demanding problems for military and commercial customers, envisions teaming with well-known primes, as it has on past product developments.

### Technology Category Alignment:

Broadband/Multispectral Components and Systems

Preemptive/Proactive Effects

Modular/Open/Reconfigurable Architectures

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**SYSCOM:** NAVAIR

**Contract:** N68936-13-C-0125

 Corporate Brochure: [https://navystp.com/vtm/open\\_file?type=brochure&id=N68936-13-C-0125](https://navystp.com/vtm/open_file?type=brochure&id=N68936-13-C-0125)

# Department of the Navy SBIR/STTR Transition Program

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Advanced Processing Electronic Attack (EA) Digital Radio Frequency Memory (DRFM) SA Photonics

## WHO

**SYSCOM:** NAVAIR

**Sponsoring Program:** Aerial Target & Decoy Systems Program Office (PMA 208)

**Transition Target:**

**TPOC:**  
(805)989-3572

**Other transition opportunities:** SA Photonics' Optical RF Memory (ORFM) system, an enhanced replacement for the current DRFM system, can find wide adoption as a blanket approach that would work against the multiple set of different radars and radar platforms. This applies across the DoD to a large number of programs. Because of the wideband nature of SA Photonics' approach, the customer base would be essentially any type of radar.



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## WHAT

**Operational Need and Improvement:** The Navy is seeking a new EA DRFM capability that uses advanced computing technologies to extend the instantaneous bandwidth and spectral purity of the transmitted waveform. Implementing advanced high-speed digital signal processing technologies, using optical computing for DRFM applications like SA Photonics' ORFM, eliminates the spectral impurities as well as provides extremely wide instantaneous frequency bandwidth response with an unlimited number of simultaneous false target outputs.

**Specifications Required:** This new technology will provide instantaneous ultra-wide bandwidth EA DRFM responses. Improved electronic protection system performance of fiber optic tow decoys and significant improvement in signal spectral purity over that of conventional RF DRFM systems are needed. Additionally, an improved spur-free dynamic range over the entire instantaneous bandwidth is required, while providing high precision time delay accuracy and improved amplitude accuracy.

**Technology Developed:** With its ORFM system, SA Photonics has developed a solution which overcomes the limitations of traditional DRFM systems. This ORFM covers an ultra-wide bandwidth frequency range, is a fully integrated fiber optic based system, has low size, weight and power (SWaP), and utilizes only commercial off the shelf (COTS) optical and RF parts.

**Warfighter Value:** SA Photonics' ORFM system allows for significantly enhanced abilities to thwart adversarial radar systems. It is suitable for current, new and emerging wideband and ultra-wideband radar systems, thereby increasing current and future effectiveness.

## WHEN

**Contract Number:** N68936-13-C-0125 **Ending on:** December 9, 2016

Milestone	Risk Level	Measure of Success	Ending TRL	Date
System Design	Low	Completion of system design	2	September 2014
Multi-channel wavelength switch design	Low	Completion of design	3	January 2015
Multi-channel wavelength switch fabrication	Low	Successful fabrication of switch	4	October 2015
System IT complete	Med	Completion of laboratory brassboard	5	April 2016

## HOW

**Projected Business Model:** SA Photonics intends to undergo initial production of the ORFM system onsite. The company has a history of successful small-scale production for commercialized SBIR products. We envision teaming with a prime contractor for ORFM product sales. We would look for the prime contractor to supply sales support, installation support, and maintenance support.

**Company Objectives:** The ORFM system is positioned to be a crucial advancement in adversarial radar deception. As a result, we plan to present the product to a range of program offices at the Forum for SBIR/STTR Transition (FST), as well as a number of prime contractors, specifically those who work with radar and radar defense.

**Potential Commercial Applications:** The flexibility of the ORFM system allows it to be used in a variety of commercial applications. These include satellite communications (SATCOM), RF/microwave wireless communication and optical communication equipment manufacturers. The benefits include test cost reduction and its multi-use platform.

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