

Topic: N171-089

SA Photonics, Inc.

MultiEye™ Free-Space Optical Communication System

MultiEye™ is a cost-saving and performance-improving free space optical (FSO) communication system being developed for ONR. It features faster, more secure communications with increased bandwidth, low probability of detection and low probability of interception. The device provides simultaneous high data rate communication between multiple Navy ships and aircraft. MultiEye™ utilizes SA Photonics' field proven technology for atmospheric on-the-move FSO systems, and consists of a multi-beam shipboard FSO terminal as well as individual terminals for aircraft and rotorcraft. The company, which specializes in the development of advanced photonics systems to solve demanding problems for military and commercial customers, envisions its own small-scale production as well as teaming with well-known primes, as it has on past product developments.

Technology Category Alignment:

EO/IR Components for sensing, transmission and communication

Fixed Wing Vehicles (includes UAS)

Networks and Communications

Design and Integration

Mobility

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SYSCOM: ONR

Contract: N68335-18-C-0660

 Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N68335-18-C-0660

Department of the Navy SBIR/STTR Transition Program

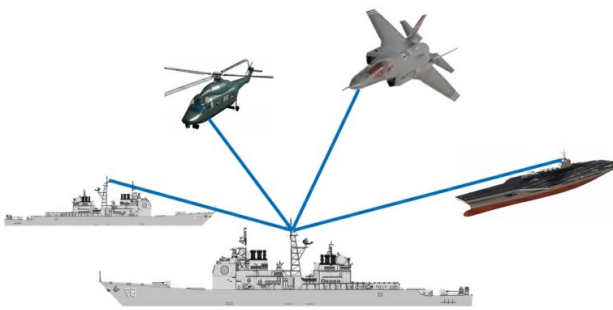
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ONR Approval #

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MultiEye™ Free-Space Optical Communication System
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WHO

SYSCOM: ONR
Sponsoring Program: USMC MRC-142 program and the Navy Digital Wideband Transmission System (DWTS)
Transition Target:
TPOC:
Dr. Santanu Das
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Other transition opportunities: SA Photonics' MultiEye™ Free-Space Optical (FSO) Communication System provides benefits to a wide range of platforms across the DoD. As FSO communication is becoming more of a critical need, this technology will allow for enhanced operation in all terrestrial, air, and space applications.



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WHAT

Operational Need and Improvement: Point-to-point free-space optical (FSO) communication systems have been demonstrated and are commercially available. Additionally, the technology to develop such systems continue to evolve, such that low cost, compact FSO systems are now a possibility. FSO systems have many desirable attributes for Navy vessels and aircraft, especially their ability to operate without RF emissions, their immunity to RF interference and jamming, and the inherent low probability of interference/detection. However, to achieve widespread use in naval applications, a more advanced communication network is required, with the ability to simultaneously communicate between multiple ships and aircraft.

Specifications Required: The final MultiEye system is expected to meet Navy's requirement of an integrated beam director and laser source(s) with multiple access technologies into a terminal that supports 2 to 3 simultaneous bi-directional laser links. A data rate of 100 Mbps and link distance beyond line of sight is expected, with a 100° field of view.

Technology Developed: SA Photonics has developed the MultiEye™ FSO communication system, which utilizes our existing technology from multiple Navy and Air Force programs to provide simultaneous high data rate communication between multiple Navy ships and aircraft. MultiEye utilizes SA Photonics' field-proven technology for atmospheric FSO systems, including signal processing techniques to overcome atmospheric fading and high bandwidth, optimized PAT control systems to support operation on moving and airborne platforms, and our patented optics design that is almost entirely fiber-optic based and is very robust to shock and vibration. MultiEye consists of a multi-beam shipboard FSO terminal as well as individual terminals for aircraft and rotorcraft, creating a mesh network using point-to-point optical links.

Warfighter Value: MultiEye provides communications between ships and other Navy assets with increased bandwidth while being difficult to deny and exploit. While other FSO systems exist in point-to-point applications, MultiEye brings multiple simultaneous communication links to ships, helicopters and aircraft, allowing significantly enhanced communication in the battlefield. This multi-beam transmit/receive ability allows for overall decreased cost with enhanced capability.

WHEN

Contract Number: N68335-18-C-0660 Ending on: September 28, 2020

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Critical Design Review	N/A	Detailed Design Complete	3	4th QTR FY19
Electronic chassis integration & test	Low	Performance validation	4	3rd QTR FY20
Optical head integration & test	Low	Performance validation	4	3rd QTR FY20
Outdoor test	Med	Successful test	5	4th QTR FY20
Chesapeake Bay testing	Med	Successful test	6	1st QTR FY21

HOW

Projected Business Model: SA Photonics intends to undergo production of the MultiEye engineering model, qual units, and flight terminals using our in-house manufacturing capability. The company has a history of successful small-scale production for commercialized SBIR products. For larger quantity manufacturing, we would work with our contract-manufacturing partner currently used for our commercial terrestrial FSO system manufacturing.

Company Objectives: SA Photonics' MultiEye system is positioned to be a cost-saving and performance-improving communication system not just for U.S. Navy assets, but military communications across the DoD. As a result, we are excited to present the product to a range of program offices at the FST, as well as a number of prime contractors, specifically those who work with FSO communications.

Potential Commercial Applications: The primary application is with Naval ships, as a ship-to-ship communication platform. Additionally, we anticipate the Navy to use the technology to communicate with shore-based platforms, as well as USMC and other deployed units on land. We also anticipate MultiEye's use with airplanes acting as an intermediary, dramatically increasing the radius of communication. Among non-military applications, MultiEye could see adoption on airborne platforms for internet delivery, either via licensing or direct partnering.

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