Department of the Navy SBIR/STTR Transition Program

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ONR Approval #43-8606-21

Topic # N182-132

EagleEye Multi-Aperture Airborne FSO Communication System

SA Photonics, Inc.

WHO

SYSCOM: ONR

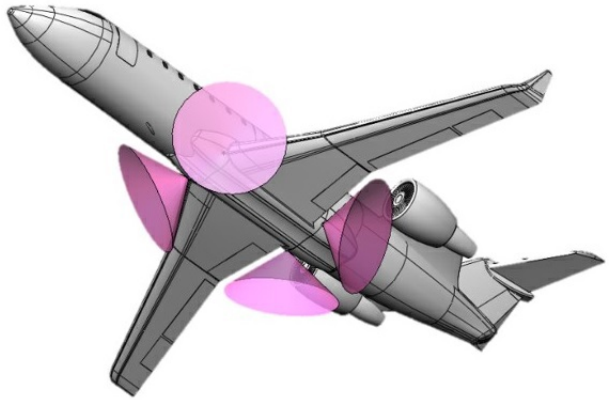
Sponsoring Program:

Transition Target:

TPOC:

Santanu Das
santanu.das@navy.mil

Other transition opportunities: SA Photonics' EagleEye™ 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.



WHAT

Operational Need and Improvement: Free space optical (FSO) communications provide fiber-optic-like data rates in low SWaP-C terminals. Their extremely narrow beamwidths, directionality, and operation in the invisible near infrared (IR) region (optical C-band) facilitate naval military communications in contested warfighting environments. USN has a need for a multi-beam, airborne-layer FSO component to expand potential Navy FSO implementations to include cooperating Carrier Strike Groups. The system should be a modular, integrated airborne multi-beam FSO relay node, capable of multiple, simultaneous beams—in one or multiple optical apertures—that can provide robust connectivity to ships.

Specifications Required: Requirements include a fully stabilized multi-beam (minimum 3 beams full-duplex) optical head that provides 360 degrees azimuth and 105 degrees elevation coverage on manned and unmanned aerial platforms. Link distance will be 50-75 km at 100 Mbps.

Technology Developed: The EagleEye™ system makes use of the architecture from SA Photonics' ongoing MultiEye™ shipboard Navy FSO program, and applies it to airborne platforms. EagleEye consists of a fully stabilized optical head, a dedicated wide field-of-view acquisition sensor, and dedicated acquisition beacon that together allow operation on airborne platforms and supports rapid, autonomous acquisition. EagleEye is compatible with MultiEye, and will enable a wide variety of ship-to-air communications needs to be met.

Warfighter Value: The primary advantages of EagleEye's communication system include its covertness, lack of RFI from any RF sources, immunity to jamming, lack of frequency allocation requirements, and high bandwidth. These benefits serve to provider safer and more reliable communications to Warfighters.

WHEN

Contract Number: N68335-20-C-0066 **Ending on:** December 2, 2021

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Critical Design Review	N/A	Detailed Design Complete	3	2nd QTR FY20
System integration & test	Low	Performance validation	4	4th QTR FY21
Outdoor Testing	Med	Successful test	5	4th QTR FY21
Airborne Testing	Med	Successful test	6	1st QTR FY22

HOW

Projected Business Model: SA Photonics intends to undergo production of the EagleEye 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/space FSO system manufacturing.

Company Objectives: The EagleEye system is positioned to be a cost-saving and performance-improving communication system not just for U.S. Navy aircraft, but with 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 airborne platforms.

Potential Commercial Applications: Eye-safe, high data rate, airborne FSO communication links also have notable dual use commercial applicability. FSO systems can flexibly operate in closer proximity and exploit longer periods of time to close links, thereby allowing near all-weather operation. Increasing use of UAVs in commercial markets may result in RF spectrum allocation conflicts and the need for ubiquitous low-cost, communications-on-demand. Additional applications may evolve into a high-altitude, balloon-to-balloon relay with hybrid optical-RF cellular networks.

Contact: Dave Pechner, Chief Technology Officer
d.pechner@saphotonics.com (408) 376-0989