

Topic: N15A-T014

SA Photonics, Inc.

Aircraft Carrier-based Precision Ship-Relative Navigation Guidance for Aircraft Landing under Emissions Control Conditions

SA Photonics has developed a concept for our Multiple Optical Beam Landing System (MOBLS™) to provide autonomous landing of aircraft in RF-denied environments. MOBLS™ utilizes multiple, redundant methods to determine the real-time location and bearing of the aircraft relative to the carrier-based landing strip. By having built in redundant modalities, MOBLS™ provides highly reliable landing information. MOBLS™ is entirely based on optical signals, providing landing operation and high data rate communications between the aircraft and carrier in RF- and GPS-denied environments. MOBLS™ also operates entirely without operator intervention. Our goal is to transition this technology via well-known primes into military fleets.

### Technology Category Alignment:

Air Platforms

Human/Autonomous System Interaction and Collaboration

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**SYSCOM:** ONR

**Contract:** N68335-17-C-0043

 Corporate Brochure: [https://navystp.com/vtm/open\\_file?type=brochure&id=N68335-17-C-0043](https://navystp.com/vtm/open_file?type=brochure&id=N68335-17-C-0043)

# Department of the Navy SBIR/STTR Transition Program

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SA Photonics, Inc.

## WHO

**SYSCOM:** ONR

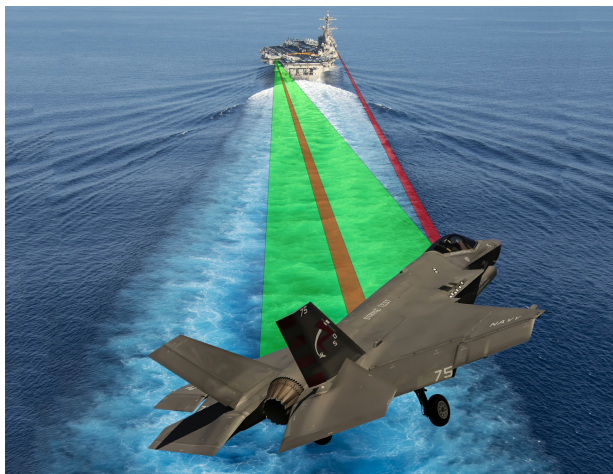
**Sponsoring Program:** Seabased Automated Landing Recovery System (SALRS)

**Transition Target:** PMA 276

**TPOC:**

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**Other transition opportunities:** SA Photonics' Multi-Beam Optical Landing System (MOBLS) can find adoption among many aircraft landing platforms, not just with aircraft carriers, but also military airfields and commercial airports. A portable system could be developed to support remote airfield applications. MOBLS can be used on a wide range of aircraft, including manned and unmanned winged aircraft, as well as rotorcraft. This includes other aircraft within the Navy and Marine Corps, as well as with Air Force and Army fleets.



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OX430-041 July 22, 2017)

## WHAT

**Operational Need and Improvement:** The Navy is seeking a ship-based landing guidance system that can provide continuous, high integrity, navigation-quality range and bearing data for a fixed wing aircraft during landing approach to an aircraft carrier. Based entirely on optical signals, SA Photonics' MOBLS delivers autonomous landing operation and high data rate communications between the aircraft and carrier in RF- and GPS-denied environments, to provide a capability that does not currently exist.

**Specifications Required:** This new technology will enable aircraft within a range of six nautical miles and ten degrees of the final approach path to safely land without the need of GPS or RF systems. The system is designed to operate in all lighting conditions, from sun aligned with the approach path, to complete darkness. MOBLS is designed to operate in rain and has a large loss margin to enable operation through expected fog conditions. MOBLS provides ship-relative navigation and exceeds the minimum accuracy requirement of 1/10 degree in azimuth and elevation, and 1 percent of range.

**Technology Developed:** With its MOBLS platform, SA Photonics has developed a solution by leveraging its technologies designed and developed on its field-proven Free Space Optical (FSO) systems. MOBLS provides two independent FSO communication links to support simultaneous aircraft landing and aircraft approach at link distances beyond 6 nm. The autonomous system utilizes multiple, redundant methods to determine the real-time location and bearing of the aircraft relative to the carrier-based landing strip, and operates in all conditions including bright sunlight and dense fog.

**Warfighter Value:** SA Photonics' MOBLS platform allows for significantly enhanced autonomous landing of fixed wing aircraft at sea. This mission- and safety-critical capability greatly reduces pilot workload on approach and landing for manned sea-landings, and vastly improves existing methods for unmanned vehicles.

## WHEN

**Contract Number:** N68335-17-C-0043 **Ending on:** February 20, 2019

Milestone	Risk Level	Measure of Success	Ending TRL	Date
System Requirement/Concept Review	Low	Review complete	3/4	August 2017
Critical Design Review	Low	Review complete	4	February 2018
Lab Test	Low	Successful test	5	August 2018
Field Test	Med	Successful test	6	December 2018
Airborne Test	High	Successful test	7	October 2019

## HOW

**Projected Business Model:** SA Photonics intends to undergo initial production of MOBLS at its headquarters in Los Gatos, California. The company has a history of successful small-scale production from commercialized SBIR products. We envision teaming with a prime contractor for MOBLS product sales. We would look to the prime contractor to supply sales, installation and maintenance support.

**Company Objectives:** The MOBLS platform is poised to have a significant impact in aircraft landing, both at sea and on land. 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 manned and unmanned aircraft.

**Potential Commercial Applications:** MOBLS has potential for use as a low cost navigation guidance system for civil aircraft landing at land-based airports, including both fixed-wing and rotorcraft. The primary benefit is increased safety for passengers, with landings in all conditions.

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