

Department of the Navy SBIR/STTR Transition Program

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NAVAIR 2019-878

Topic # N07-036

Modulated Underwater Laser Imaging System - Discretionary PII Effort
SA Photonics, Inc.

WHO

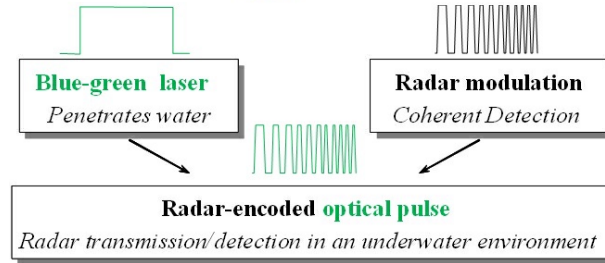
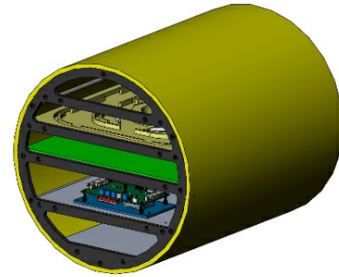
SYSCOM: NAVAIR

Sponsoring Program: Electro-Optics and Special Mission Sensors Division

Transition Target:

TPOC:
(301)342-2021

Other transition opportunities: The laser technology developed here will have opportunities to transition in other underwater platforms, most notably communication. Free-space optical communication systems would benefit from this laser technology's enhancements, allowing higher data rates over further distances.



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WHAT

Operational Need and Improvement: Detection and identification of underwater objects is an essential capability for maintaining the security and safety of Naval and U.S. military assets. Detection of mines and sensors in littoral waters is becoming increasingly more important as our Navy becomes engaged in operations around the globe. An improved method of imaging through turbid water is needed to see mines at a further distance and with better resolution so that the mines may not only be detected, but imaged and identified. The Navy is evaluating using swarms of automated underwater vehicles (AUVs) and unmanned surface vehicles (USVs) as reconnaissance assets to detect enemy mines and AUVs. All of these assets need a better way to image potential threats in littoral water, which is much more turbid than water in the open ocean.

Specifications Required: An enhanced version of SA Photonics' Modulated Imaging Lidar Optical Source (MILOS) is required that can be integrated into a Remus 600 AUV. The specification requirements include a spatial resolution of 1 cm, nominal altitude of 4 m and a scan angle of 70 degrees.

Technology Developed: In a prior Phase II contract, SA Photonics developed our MILOS laser source and a high speed dual-channel digitizing receiver. This program combines these two components and a new polygon scanning subsystem, and integrates the whole Modulated Underwater Laser Imaging System (MULIS), tests it, and packages it within the confines of the REMUS 600 AUV.

Warfighter Value: Ship damage from mines is much more likely than from air and missile threats. Since World War II, U.S. Navy ships have been sunk or damaged by mines seven times more often than by missile or air attack. Furthermore, threats from mines are expected to increase with the proliferation of enemy AUVs. This system, which utilizes past SA Photonics technology to image in turbid littoral waters, provides tremendous value via its integration into an AUV. This provides significantly enhanced mine detection coverage while also providing direct protection against harmful AUVs.

WHEN

Contract Number: N68335-19-C-0165 **Ending on:** February 22, 2021

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Preliminary Design Review	Low	Successful test	4	October 2019
Critical Design Review	Med	Successful test	5	March 2020
System Integration Complete	Med	Successful integration	5	October 2020
Remus 600 Integration	Med	Successful integration test	6	January 2021
Open Water Test	High	Validated system performance in open water testing	7	February 2021

HOW

Projected Business Model: SA Photonics intends to undergo initial production of the MULIS components onsite. The company has a history of successful small-scale production for commercialized SBIR products. We envision teaming with prime contractor Kongsberg (Remus 600) for final MULIS sales. We would look for the prime contractor to supply sales support, installation support, and maintenance support.

Company Objectives: SA Photonics' MULIS is positioned to be a performance-improving mine detection tool for Navy ships. 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 lidar imaging and underwater laser communications.

Potential Commercial Applications: The primary application is with REMUS 600 AUVs, both with the U.S. Navy and other foreign allied navies. Among civilian applications, we expect the MULIS system to have commercialization potential in the oil and gas industry, academic research studies, and search & recovery. Specifically, MULIS can help with emergency response, fisheries research and habitat mapping, climate change and under-ice studies, water quality research, marine archaeology, seabed investigation, asset location, and much more.

Contact: Dave Pechner, Chief Technology Officer
d.pechner@saphotonics.com (408) 560-3500 x115