Department of the Navy SBIR/STTR Transition Program

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NAVAIR 2018-668

Topic # N151-011

Deep Fiber Optic Vector Sensor Array

VIP Sensors

WHO

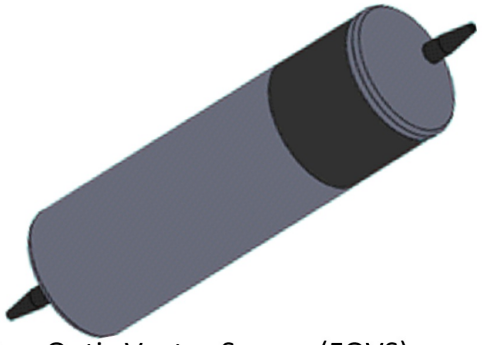
SYSCOM: NAVAIR

Sponsoring Program: PMA 264

Transition Target: Deep Long Life Passive Sonobuoy Sensor System (DLLPSSS) program

TPOC:
(301)757-3694

Other transition opportunities: Air Anti-Submarine Warfare Systems Program Office-Next Generation Airborne Passive System (NGAPS) Future Naval Capabilities (FNC) Program, Naval Research - Advanced Undersea Weapons System (PMS 495 Mine Warfare Program Office), Shallow Water Surveillance System program (PMS 485 Maritime Surveillance Systems Program Office), SURTASS Surveillance Towed Array Sensor System (PMS 485), LDUUV Large Displacement Unmanned Undersea Vehicle (PMS 406 Unmanned Maritime Vehicles Program Office).



Fiber Optic Vector Sensor (FOVS)
1.3”OD x 5.1”L

WHAT

Operational Need and Improvement: Arrays of vector velocity sensors provide major system gains over legacy arrays of omnidirectional hydrophones in bottom moored configurations. For example, gains against ambient noise can be realized, the left-right ambiguity can be eliminated, and sensitivity nulls can be steered towards an interfering source.

Specifications Required: A cost effective sensor array with a low electronic noise floor suitable for deployment in Class A sonobuoys. The array package must be less than 10 inches in height, no greater than 4.5 inches in diameter, and weigh less than 15 pounds (excluding power source).

Technology Developed: VIP Sensors has developed an innovative array with multiple Fiber Optic Vector Sensors (hydrophone, single axis, biaxial or triaxial accelerometer) and Compasses, a Readout system, and Fiber Optic Interconnecting Cable suitable for deployment in expendable Class A sonobuoys.

Warfighter Value: VIP Sensors’ innovative Fiber Optic Vector Sensors (FOVS) technology is a system of proven, reliable fiber optic sensors designed to provide major system gains over legacy arrays of omnidirectional hydrophones in bottom moored configurations in the challenging undersea environment.

WHEN

Contract Number: N68335-17-C-0128 **Ending on:** November 30, 2019

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Optical accelerometer Development and Lab Test	Low	Test results that meet sensitivity frequency response and noise requirements	TRL 4	September 2018
Optical Hydrophone Development and Lab Test	Med	Test results that meet sensitivity frequency response and noise requirements	TRL 4	September 2018
Fiber Optic Vector Sensor Prototype Lab Test	High	Test results that meet requirements	TRL 5	October 2018
Electronic Readout Development and Lab Test	Med	Demonstrate to read sensor data	TRL 5	March 2019
FOVS Array Integration and Laboratory Test	High	Over-the-side functional test	TRL 5	October 2019
Underwater System Demonstration	High	Demonstrate that the system meets requirements	TRL 6	November 2019

HOW

Projected Business Model: The business strategy combines the complementary strengths of VIP Sensors and BAE Systems to take the Phase II prototype Deep Fiber Optic Vector Sensor Array System through final development and into acquisition. VIP Sensors is providing the small, very low noise, highly sensitive low power, extrinsic fiber-optic sensors to BAE Systems who will integrate and package these sensors for in-water deployment with the remainder of the sensing subsystem. This includes processing hardware and signal processing software that will conform to open standards and will meet government specified requirements. VIP Sensors and BAE Systems have agreed in principle that the manufacturing, marketing and sales of these underwater acoustic products will be under the auspices of BAE Systems.

Company Objectives: VIP Sensors seeks opportunities to customize and deploy the FOVS technology and derivatives in various military and commercial applications to demonstrate their effectiveness.

Potential Commercial Applications: The Extrinsic Fabry-Perot Optical Sensors and the Detection System technologies will fuel the development of various multi-million dollar product lines. Besides the Deep Fiber Optic Vector Sensor Array, there are multiple applications in the test and measurement community for derivative products such as optical accelerometers, hydrophones, pressure sensors, and microphones, as well as standalone detection instruments. This basic new technology has the potential to significantly improve measurement systems across many industries that use large numbers of sensors, such as Flight Testing, Wind Tunnel Testing, Structural Testing, Structural Monitoring, and Airplane, Satellite and Ship Monitoring.

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