



TOPIC NUMBER: N07-070

SBIR INVESTMENT: \$2,537,146

PHASE III FUNDING: \$130,584,541

DEPARTMENT OF THE NAVY

NAVY SBIR/STTR SUCCESS STORY



DISTRIBUTED SENSOR SYSTEM INNOVATIONS

3 Phoenix, Inc. developed cost-effective distributed sensor systems, enabling reduced costs of ownership for the Navy while achieving system performance and reliability goals.

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THE CHALLENGE

The Navy's goal is to develop improved distributed sensor options for towed arrays that result in lower costs and improved performance. Options for achieving this include reducing the cost of discrete components (like telemetry and acoustic/magnetic sensors) within existing sensor technology, improving sensor manufacturing and construction methods, or by developing brand new sensor technologies that are more cost effectively scaled to higher performance applications.

THE TECHNOLOGY

3 Phoenix, acquired by Ultra Electronics in 2014, provided a radically different approach to sensor packaging, offering a quantum leap in performance, cost reduction and manufacturability improvement. The company used the SBIR program to further evolve its patented iPON/iPEN (inverted Passive Optical Network/inverted Passive Electrical Network) telemetry form factor technology to implement a thin-line Vector Sensor Towed Array (VSTA) that provided enhanced capability to the fleet.

THE TRANSITION

After completing a Phase I and two Phase II SBIR contracts with the Office of Naval Research's (ONR's) Code 32 Ocean Battlespace and Expeditionary Access, 3 Phoenix was awarded a Phase III cost plus fixed fee contract from the Naval Sea Systems Command's (NAVSEA's) PEO Submarines, PMS 415 Undersea Defensive Warfare Systems Program Office for the procurement of engineering services for deployment, integration, testing and logistic support of the Torpedo Warning System (TWS). The TWS was developed as an early warning system to detect, localize, classify, and alert on incoming threat torpedoes to provide surface ships with the ability to detect threat torpedoes and employ defensive measures. The total contract value is worth over \$127M. The company's iPON/iPEN technology can be found on a number of Navy sonar, radar and imaging applications including Unmanned Underwater Vehicles (UUVs), submarine towed arrays and a deep ocean acoustic surveillance system.

THE NAVAL BENEFIT

The Navy's testing of the fielded TWS system indicated it's capable of detecting and targeting a threat torpedo demonstrating 100% availability with no telemetry, hydrophone, or mechanical failures. To date, TWS has exhibited near 100% availability on several deployments, contractor test events and Quality Reliability Assurance (QRA) testing. Not only did the technology meet the Navy's operational needs, but it has reliability improvements over existing array technology that enhances operational availability. This technology enables telemetry canister production at reduced manufacturing costs and simplifies assembly and test procedures. The scheme is simple and does not require advanced manufacturing capabilities while the flexible and scalable architecture enables extensive Commercial Off the Shelf (COTS) equipment use.

THE FUTURE

This dual-use technology is applicable to any sensor-based array or range systems in airborne, sea, and land based applications requiring time synchronous sampling, data set fusion and dissemination. Within the DoD, many operational systems could leverage the technology including sonobuoys; platform mounted or platform deployed sensors, telemetry, and/or arrays; and bottom mounted surveillance arrays and/or mobile autonomous distributed sensors. Commercial applications include enhanced instrumentation for oceanographic and environmental data collection and monitoring for Integrated Ocean Observing (IOOS) supported by NOAA, port security and other remote sensing applications.

"THE 3 PHOENIX TELEMETRY TECHNOLOGY TRANSITIONED EARLY AND VERY SUCCESSFULLY TO EXTEND THE SERVICE LIFE OF TB-23 THIN-LINE TOWED ARRAYS. BUT PERHAPS THE GREATEST SUCCESS OF THE 3 PHOENIX SBIR EFFORT IS THAT IT MOTIVATED A SUCCESSFUL COMPETITIVE EFFORT TO ACHIEVE AN ELEGANT, TOPOLOGICALLY SIMPLE DATA PATH."

Dr. Michael Traweek, TPOC, Office of Naval Research, PMS-415 Undersea Defensive Warfare Systems