Topic: N181-012

Boston Engineering Corporation

Low Cost Persistent Environmental Measurement System

Boston Engineering's free-floating Proteus profiler conducts daily programmable profiles down to 1,000 ft. and is the device to collect data – including turbidity measurements – to enhance anti-submarine warfare operations. Launched by hand (vessels of opportunity) or via launch tube (aircraft), Proteus provides optical irradiance (flux density) measurements for aerial ASW assets to increase precision through improved system calibration. Proteus provides a lower cost-per-data set and a lower overall deployment cost than competing solutions. Development benefited from Boston Engineering's sonde/profiler patent library – including a low-cost variable buoyancy system – and sharing components with its MASED profiler. Proteus expands Boston Engineering's portfolio of game-changing robotics, unmanned systems, and special equipment for challenging environments. Boston Engineering is interested in teammates and prime contractors for licensing, integration, and procurement of systems.

Technology Category Alignment:

Battlespace Environments
Sensors
Ground and Sea Platforms

Contact:
David Shane
dshane@boston-engineering.com
(781) 314-0760
https://www.boston-engineering.com/
SYSCOM: NAVAIR
Contract: N68335-19-C-0621

Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N68335-19-C-0621

Department of the Navy SBIR/STTR Transition Program

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NAVAIR 2020-720

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WHO

SYSCOM: NAVAIR

Sponsoring Program: PMA 264 Air Anti-Submarine Warfare

Transition Target: Upcoming Air-ASW Program of Record

TPOC:
(301)342-2034

Other transition opportunities:
NAVAIR PMA 290

Notes: Proteus design during the Phase II, inclusive of CTD, radiometer, and communications components on the top cap

Image courtesy of Boston Engineering Corporation

WHAT

Operational Need and Improvement: Accurate, year-round ocean data collection is critical for air-anti submarine warfare (ASW) operations. Currently, ships are deployed to make profile measurements or short-duration expendable buoys are deployed by aircraft to make a single measurement. An air-launched, persistent, low-cost ocean measurement device that collects oceanographic data through the water column, would improve the Navy's maritime capability, and allow for a database to be constructed for reference during operations and to generate predictions of evolving ocean phenomenon.

Specifications Required: This air-dropped system provides key Navy measurements of temperature, pressure, salinity, acoustic background noise, and diffuse attenuation coefficient. The system needs to profile down to 1000 ft., and needs to be persistent (on the scale of many months). The device must be deployed via existing A-Size launchers on aerial platforms, survive deployment from common sonobuoy launch altitudes and speeds, and provide feedback via satellite communications to ensure worldwide coverage. To ensure competitiveness with other data collection methods, a cost point of tens of dollars per profile provides significant benefit to operators.

Technology Developed: The Proteus device was developed by expanding existing low-cost, multi- profile sensor technology to match persistence requirements of NAVAIR and the air-ASW mission. Our low-cost, multi-profile variable buoyancy system (VBS) was scaled to match requirements, and our team has selected the preferred sensor suite to achieve daily operations beyond 300 days. Current cost estimates are expected to achieve the target cost-per-profile metric with design for manufacturing processes, modular system design, and use of our low-cost VBS system.

Warfighter Value: When deployed as an individual sensor or as a part of a sensing field, Proteus can provide oceanographic and air-ASW related data at a significant cost reduction compared to currently deployed systems. By maintaining persistence, it allows a data collection device to be pre-positioned ahead of the moment of need. Additionally, cost savings are multiplied by deployment via flights of opportunity instead of targeted, mission-specific aircraft efforts.

WHEN

Contract Number: N68335-19-C-0621 **Ending on:** September 29, 2022

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Benchtop Feasibility	Low	Baseline profiling software	4	October 2019
Initial Prototypes Tested	Low	Tested VBS, Software, and Overall Device Operation in Shallow Water Testing	5	February 2021
If Option Exercised, Refined Prototypes Tested in Gulf of Mexico	Med	Device Deployment to Target Depth, CTD & Radiometer Data, Data Backhaul	6	June 2022
If Option Exercised, Final Prototypes for NAVAIR Testing	Med	Ready for NAVAIR Testing	6/7	September 2022

HOW

Projected Business Model: Boston Engineering Corporation is actively looking to commercialize this (and other) multi-profile maritime distributed sensor technology either directly to the DoD or with support of a prime associated with air-ASW mission. Boston Engineering has the capability to support manufacturing of small lots and has ongoing connections with contract manufacturers to support larger quantity requests. Boston Engineering expects to reach field-worthy prototypes within 12 months of the end of Phase II work with particular focus on shelf life and device TRL maturity within a potential Phase II.5, and limited rate initial production six months after the start of Phase III. Full production should begin within 12 months after limited rate production begins, and we estimate the business will be profitable within 1 year of full production.

Company Objectives: Boston Engineering's company objective is to transition Proteus to support PMA-264 and PMA-290. More broadly, Boston Engineering's efforts with other maritime distributed sensors position the team to be an industry leader in low-cost, multiple-profile, maritime data collection. This technology portfolio has received buy-in from Massachusetts commercialization grants and other DoD funding in this subject area. Boston Engineering continues to look for sponsors, teammates, testing facilities, and other support to decrease transition risk and decrease barriers for Navy adoption.

Potential Commercial Applications: The commercial fishing industry could use this tool to increase profitability by tracking ocean conditions favorable to the type of fish to be netted. The fish farming industry and the climate and weather prediction industry could use this tool to track evolving ocean conditions, a key factor for their risk analyses. The oil and gas industry could use this to help calibrate sensors as they conduct exploration activities and help monitor the underwater environment near high value offshore platforms.

Contact: David Shane, PM / Business Development
dshane@boston-engineering.com 781-314-0760