Department of the Navy SBIR/STTR Transition Program

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Topic # N211-089
BOLTS
Arete Associates

WHO

SYSCOM: ONR

Sponsoring Program: ONR

Transition Target: MINEnet Tactical System, NAVAIR ASW

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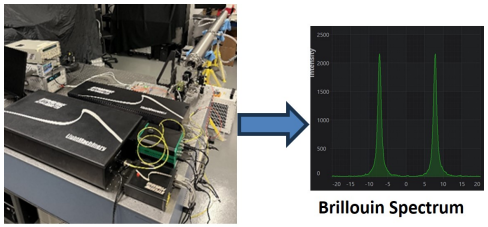
Other Transition Opportunities: NASA, NOAA



Notes: Image shows laboratory testing of BOLTS including single frequency laser, high resolution spectrometer, gated intensified camera, coupling optics, and seawater test fixture. Example spectrum data shows Brillouin scattering doublet exhibiting frequency shift that enables remote sensing of temperature, salinity, and sound speed.

WHAT

Operational Need and Improvement: Develop and demonstrate a blue/green LiDAR system that spectrally resolves the inelastic Brillouin component of backscattered light from the ocean to produce a depth profile of sound velocity to high accuracy.

Specifications Required: Measure sound speed profiles in seawater remotely along a line of sight
Day and night operation
Sound speed accuracy of at least 1.5 m/s
Along-beam resolution of 5 m or better
Total range in mesotrophic waters of at least 40 m

Technology Developed: BOLTS (Brillouin Ocean LiDAR Technology System), a high spectral resolution, range-gated LiDAR that measures the Brillouin frequency shift and linewidth simultaneously to derive ocean temperature and salinity depth profiles. Knowledge of temperature and salinity as a function of depth is used to derive sound speed depth profiles.

Warfighter Value: Improved performance of existing tactical systems for minehunting and ASW

WHEN

Contract Number: N68335-22-C-0622 **Ending on:** Feb 19, 2025

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Performance Model Developed	Low	Feasibility study document	2	3rd QTR FY22
BOLTS Detailed Design	Low	Components specified	3	1st QTR FY24
BOLTS Lab Testing	Low	Validation	4	4th QTR FY24
BOLTS Ocean Testing	Medium	Validation	5	2nd QTR FY25

HOW

Projected Business Model: Direct transition into existing U.S. Navy systems, systems that are in the developmental stages, as well as into civilian platforms that can benefit from the BOLTS technology. NASA, NOAA, and the fishery industry would be included in the target organizations for BOLTS outside the Navy. Continue to refine BOLTS technology and other technologies that Areté is currently developing for both military and civilian use.

Company Objectives: Areté has LRIP and FRP capability to successfully produce, test, and deliver BOLTS. Market BOLTS to a wide spectrum of platforms that would benefit from the technology's development. Respond to potential customer needs and adjust technology as needed, always staying within scope of the SBIR topic. Ensuring Navy requirements are met first, followed by branching out to other potential customer platforms.

Potential Commercial Applications: NASA, NOAA, and the fishery industry have interest in remotely sensing ocean temperature and salinity.

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