Department of the Navy SBIR/STTR Transition Program

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Topic # N191-027
Rugged ADCP
Arete Associates

WHO

SYSCOM: ONR

Sponsoring Program: ONR

Transition Target: U.S. Navy, Virginia class

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Other Transition Opportunities: The Rugged ADCP device can be implemented on any Navy platform or UUV/AUV.

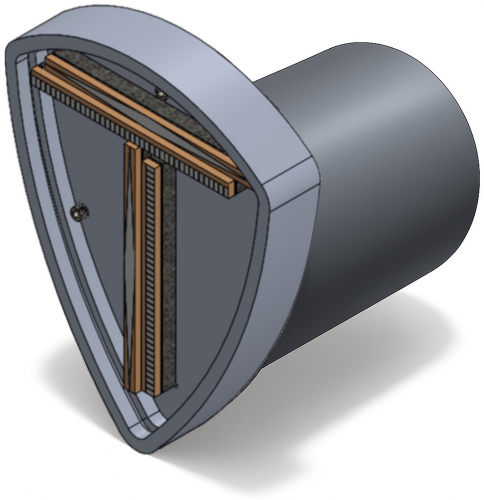

Image courtesy of Areté and MSI

Notes: The Rugged ADCP (R-ADCP) is an Acoustic Doppler Current Profiler that uses acoustic reflections of particulates in the water to map out the current speeds in a cone shape at various distances from its transducer. It was designed from the start with the intent of naval platform or UUV installation, and as a result is fully hardened for shock and to meet security standards. R-ADCP's phased array maps out not only the traditional four or five beams of the standard Janus-configuration ADCP, but also up to 40 beams in each axis. The carrier is at 300 kHz with an alternate operating frequency of 1 MHz. The shape on the right shows a transducer "shield" measuring about 9x11", with a design goal of a 7" tube diameter.

WHAT

Operational Need and Improvement: The Navy needs measurements of the ocean environment to improve the safety and effectiveness of its operations, particularly for undersea assets. Important components of the ocean to measure are local currents and sea state. Both can be measured with an Acoustic Doppler Current Profiler (ADCP), a form of active sonar which estimates the Doppler shift of scattering particles in the water. While available as COTS instruments, the Navy needs ruggedized instrumentation which survives harsh deployment conditions, provides enhanced data security, and offers flexible operation to fulfill multiple mission needs.

Specifications Required: The developed ADCP should:
1. Achieve a profile range of 100 m or more
2. Achieve the lowest single measurement standard deviation possible
3. Pass necessary shock and other qualification testing for installation on a Navy platform
4. Contain no onboard data storage

Technology Developed: Areté developed the Rugged ADCP as a bi-static system with a monolithic transmitter and a linear phased array receiver and software defined Doppler signal processing. This allows users to tune system performance based on the measurement requirements and environment, and to review results throughout the processing chain. The hardware is compact, minimizing volume, and uses advanced piezo-composite construction to provide narrow receive beams and wide bandwidths required for Doppler processing. Developed components can be used to form a larger array: Rugged ADCP is a software-defined Swiss Army knife for sonar.

Warfighter Value: The Rugged ADCP provides the Navy with advanced current measurement capabilities which can be used across the surface, underwater, and hybrid fleets. This ensures operators have access to high-quality data characterizing their operating environment. This leads to more effective operations, improving safety when maneuvering near the surface, deploying or recovering assets, or when working with other crewed or autonomous systems.

WHEN

Contract Number: N68335-24-C-0264 **Ending on:** Jul 17, 2027

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Initial design complete	Low	Manufacturable design for all hardware components is completed.	3	4th QTR FY26
Initial system performance characterization in test tank and/or test of opportunity	Low	System functions as expected. Characteristics of signals appear valid based on spectral and quality expectations.	4	1st QTR FY27
First field test in local waters	Medium	Comparison between two instruments demonstrates similar measurements and quality.	6	2nd QTR FY27
Complete device qualification	Medium	Required OQE completed and ready for review	8	3rd QTR FY27

HOW

Projected Business Model: Areté anticipates producing and selling these devices using in-house ISO-certified manufacturing capability, with internal support for field use and maintenance.

Company Objectives: Arete is open to transition partners to move Rugged ADCP toward operational use.

Potential Commercial Applications: Oil and gas, environmental research, similar to other ADCPs on the market.

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