

**WHO**

**SYSCOM:** NAVSEA

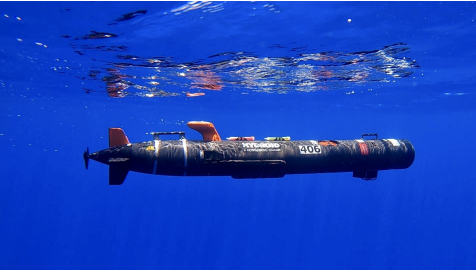
**Sponsoring Program:** Naval Undersea Warfare Center Division (Newport)

**Transition Target:** SEA073, Advanced Submarine Systems Development

**TPOC:** (401) 832-7096

**Other Transition Opportunities:** Dual use commercialization for use by the oceanographic community at large for scientific, research, and operational use.

**Notes:** The Mk18 unmanned underwater vehicle (UUV) is a common Navy oceanographic platform, based on the commercial REMUS 600. Hanna is easily integrated on this size and smaller UUV for turbulence measurements, longer duration platforms like underwater gliders, or submarines. The small, streamlined shape and durable metal housing make mounting easy. The sensor communicates using Ethernet, allowing for long cable runs and integration with almost any computer system, and has low power consumption which does not impact vehicle endurance.



<https://www.navy.mil/Resources/Photo-Gallery/igphoto/2003013132/>

**WHAT**

**Operational Need and Improvement:** Hanna provides a persistent turbulence measurement capability for the Navy and Navy researchers. This new capability will allow Navy researchers to collect turbulence data in harsher conditions and for longer periods of time than current sensing technology allows. The ability to persistently measure turbulence will aid Navy environmental prediction capabilities, allowing safer mission planning and conduct.

**Specifications Required:** A durable sensor lasting for 3 months or more without maintenance in harsh ocean conditions. The sensor should resolve the smallest scales of turbulence, equating to a frequency bandwidth of 0.25–250 Hz, and perform at speeds up to 5 kt. Acquisition software should be cross-platform and usable on small, embedded computers and larger laptops and desktops.

**Technology Developed:** Hanna features a new, optimized sensor head to maximize signal strength and minimize flow (and measurement) disturbance. The miniaturized electronics, including a motion board with low-noise accelerometers, fit in a 1.25 inch diameter housing. Numerical modeling was used throughout the design process to optimize performance.

**Warfighter Value:** Hanna represents an advanced measurement capability which does not currently exist in the Navy. By providing high-quality data in previously unsampled environments, Navy researchers and scientists can explore new capabilities which allow the Navy to maintain its operational and situational advantages in the complex ocean environment.

**WHEN**

**Contract Number:** N68335-21-C-0545

**Ending on:** Aug 11, 2022

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Design Review	Low	Design passed	2	4th QTR FY21
First Functioning Prototype	Low	Successful Data Collection	6	3rd QTR FY22
Validation Studies	Low	Comparison to ground truth data	6	3rd QTR FY23

**HOW**

**Projected Business Model:** Low-rate initial production at Areté, expanded production with a manufacturing and support partner.

**Company Objectives:** Develop partnerships for technology demonstration and building a diverse customer base within the Navy and with Navy funded researchers. Build on these demonstration projects to establish long-term operational use of the sensor on Navy vessels.

**Potential Commercial Applications:** Academic research, operational oceanographic measurements, marine carbon dioxide removal, aquaculture