



TOPIC NUMBER: N96-150

SBIR INVESTMENT: \$3,723,861

PHASE III FUNDING: \$168,683,035

DEPARTMENT OF THE NAVY

NAVY SBIR/STTR SUCCESS STORY



AN ELECTRO-OPTICAL (EO) WAVE IMAGING SYSTEM

Areté's EO wave imaging system enables extraction of operationally critical information, including bathymetry, surface currents and channel and sandbar locations, giving warfighters an essential edge in amphibious assault breaching missions.

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THE CHALLENGE

To develop an advanced autonomous capability to extract mission relevant information, including bathymetry, surface currents, and channel and sandbar locations from airborne passive multispectral imagery.

THE TECHNOLOGY

Areté's Airborne Remote Optical Spotlight System (AROSS) began its development by providing remote environmental monitoring of the near-shore ocean, using digital EO sensors installed on the Pelican aircraft. By collecting airborne high-resolution, time series image data of the water surface, Arété was able to use its innovative, physics-based algorithms to extract operationally critical information such as bathymetry, surface currents and channel and sandbar locations. Post-Phase II efforts included experiments and fleet exercises to evaluate additional mission-specific algorithms, alternative concepts of operations, and the benefits of infrared, multi-spectral, and multi-polarimetric variants of the original panchromatic system. These efforts demonstrated that AROSS was capable of providing enhanced littoral Intelligence, Surveillance, Reconnaissance (ISR) capabilities, including near-surface sea mine detection and precision localization of land targets and obstacles, allowing Marines to precisely locate and avoid threats.

THE TRANSITION

The AN/DVS-1 Coastal Battlefield Reconnaissance and Analysis (COBRA) system is a mission payload developed for the MQ-8B Fire Scout Unmanned Aircraft System (UAS) which can be hosted on the Littoral Combat Ship (LCS) or other air-capable ships. The SBIR-developed AROSS algorithms and software are integrated into the COBRA system providing advanced littoral ISR capabilities in addition to COBRA's mine-field detection mission. Following successful demonstration of the combined capabilities using the COBRA system, Arété was awarded a Phase III contract on a sole source basis to serve as prime contractor on the COBRA Block I program. Under the Low Rate Initial Production (LRIP) program, Arété delivered five (5) operational systems to the fleet. Recently, Arété was awarded Full Rate Production (FRP) delivery orders of \$28.4M and \$17.1M respectively to

produce an additional six (6) COBRA Block I systems for the U.S. Navy by FY2022. The Naval Surface Warfare Center Panama City Division (NSWCPC), Panama City, Florida, is the contracting activity.

THE NAVAL BENEFIT

Land mines continue to pose a significant threat to U.S. forces. Their detection is critical for expeditionary forces to beach safely. The COBRA system is designed to conduct unmanned aerial tactical reconnaissance in the littoral battlespace for detection and localization of mine fields and obstacles in the surf and beach zone prior to an amphibious assault. The incorporation of the AROSS algorithms and software enhances the execution of assault breaching missions by providing bathymetry and currents in littorals, estuaries, and rivers of denied areas. Additionally, the COBRA system also provides remote situational awareness to support military operations while eliminating the need for the deployment of manned assets, enhancing safety.

THE FUTURE

Areté and the U.S. Navy are continuously exploring SBIR technologies to enhance the COBRA missions including expansion into the surf zone, very shallow water, and shallow water, in addition to including nighttime detection and operations. The application of these additional SBIR technologies to the COBRA mission will aid in expanding the operational regimes and could Reducing mission planning by offering both day and night operations. These improvements could benefit commercial and military ships at risk in littoral environments from the surf zone to shallow water. This system may also be applied to other Homeland Security requirements.