

Topic: N151-053

Bodkin Design & Engineering LLC

Coastal Battlefield Reconnaissance and Analysis (COBRA) Multi-Spectral Illuminator

The Navy has added mine-detecting capability, called Coastal Battlefield Reconnaissance & Analysis (COBRA), to its MQ-8B Fire Scout UAV. Bodkin Design & Engineering (BD&E) has developed a gimbaled, multispectral, small Size, Weight & Power (SWaP) illumination source to be evaluated in conjunction with the COBRA camera to demonstrate its ability to meet COBRA program requirements for Night Time Detection to enhance 24-hour surveillance capability. This illumination source utilizes flashlamp technology that can be used with any multispectral or broadband sensor. BD&E is an innovative engineering company with a 25+ year history of designing successful electro-optical systems for government & commercial applications. Our goal is for our illumination technology to become the COBRA program illuminator system of choice for Night Time Detection. We seek teaming arrangements with government organizations and primes to test and validate system capabilities and integrate the technology.

Technology Category Alignment:

Advanced Electronic Protection Techniques and Technology

EO/IR Components for sensing, transmission and communication

Unmanned Ground and Sea Vehicles

Electro-Optical/Infrared (EO/IR)

Sensors, Electronics and Photonics

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SYSCOM: NAVSEA

Contract: N00024-17-C-4034

 Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N00024-17-C-4034

Department of the Navy SBIR/STTR Transition Program

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NAVSEA #2018-0562

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WHO

SYSCOM: NAVSEA

Sponsoring Program: PMS 495, Mine Warfare Program Office

Transition Target: Coastal Battlefield Reconnaissance and Analysis (COBRA) BLOCK II

TPOC:

(850)234-4994

Other transition opportunities: Multi-spectral imaging capabilities and the associated illumination will be utilized to expand current terrestrial sensing to be operational 24 hours a day. This technology developed for the Navy can also find application in Army mine-detection programs.

The illuminator can be matched to any airborne or shipborne surveillance equipment, providing maximum range with minimal power. It can also serve to improve sustainability by using common hardware with the COBRA system.

Commercial applications include farm and crop monitoring, geological mapping, terrestrial imaging, ocean sensing and research, as well as numerous law enforcement applications.

The stabilized gimbal developed under this contract has applications in commercial cinematography for both lighting and filming outdoor scenes.



Image Courtesy PEO (PMS 495). Used by permission.

WHAT

Operational Need and Improvement: This technology was developed for the AN/DVS-1 Coastal Battlefield Reconnaissance & Analysis (COBRA) airborne payload, which will be carried on the MQ-8 Fire Scout UAS (PE 0305231N/MQ-8 UAV) operating from a Littoral Combat Ship (LCS) as part of the Mine Countermeasures (MCM) mission package (MP) under PMS 495 to allow 24-hour operation.

Specifications Required: The Navy required a small form factor, light weight, low power, and medium repetition rate broadband illuminator, robust enough to be integrated onto MQ-8 Fire Scout. Additionally, the illuminator needs to supply the required light levels in a short duration to minimize image blur.

Technology Developed: A robust, low SWaP, UAV compatible, long-range searchlight illuminator operating on a stabilized gimbal, which provides the ability to scan and illuminate targets at ranges greater than 1km.

BROADBAND LIGHT SOURCE-Illumination from UV to NIR for various types of surveillance equipment. High radiance in the peak sensitivity bands of the sensors. Permits nighttime operation.
FOCUSED BEAM-Illumination matched to field-of-view of the telescope. Reduces power consumption.
STABILIZED GIMBALS-Eliminate fluctuation in image brightness due to platform wobble
SCANNING GIMBALS-Precisely track imaging telescope to provide light in field-of-view of telescope
FLASH ILLUMINATION-Very bright, reduces power requirement, freezes motion

Warfighter Value: The multispectral illuminator developed by Bodkin Design & Engineering will increase survivability by permitting nighttime operations. It will also reduce operational costs by allowing the sensor to be used 24 hours a day, which will reduce deployment time.

WHEN Contract Number: N00024-17-C-4034 **Ending on:** September 15, 2019

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Develop & characterize water-cooled Flash lamp	N/A	Meet or exceed COBRA requirements for Night Time Detection Performance	3	October 2017
Develop fast/large/high-stability gimbal	N/A	Obtain data verifying that the BD&E gimbal mitigates platform wobble, reduces fluctuation in image brightness and reduces image blur.	4	January 2018
Mate system to COBRA scanner	Med	Co-boresight camera and lamp; Demonstrate stabilized and synchronized tracking; Achieve high-fidelity imagery during tower testing	5	January 2019
Conduct Flight test & collect data	Low	Demonstrate sufficient illumination for nighttime operation of the COBRA system	6	September 2019

HOW

Projected Business Model: We propose to follow the same successful strategy that we have used in our previous SBIR programs. Under that approach, we designed, developed and patented a unique uncooled infrared camera system. We presented the camera to the market place and demonstrated the viability of the patented technology. Finally, the product line and patent were sold to BAE, who could more effectively market the technology. They continue to produce products under that patent today.

Company Objectives: Our goal is for our illumination technology to become the technology of choice for nighttime target illumination/detection and identification. This technology is intended to be inserted into the COBRA BLOCK II (RFI Sol. No. N00024-16-R-6312). Under that solicitation a 5 year CPIF contract was anticipated for award in 2017 (past). We are teaming with Areté as the integrator. We are both currently funded under SBIR research funds.

BD&E is a product development and engineering firm. Our forte is innovation. We help all of our client companies to more successfully satisfy their markets. We have successfully teamed in the past with primary manufacturers to bring our innovations into the marketplace.

Potential Commercial Applications: BD&E developed a HyperPixel hyperspectral camera under a previous Air Force SBIR. This staring imager has found many applications in agriculture, especially when deployed on UAVs. One of the problems in using this or any system in the field, however, is the variability of natural light. The small Size, Weight and Power of the illumination source developed under this contract is an ideal solution to this problem.

This UAV-deployed stabilized gimbal will also find use in the Cinematography industry. We can use the gimbal with our other imaging instruments to increase our value-added offering.

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