

WHO

SYSCOM: NAVAIR

Sponsoring Program:

Naval Air Systems Command

Transition Target: PMA 299

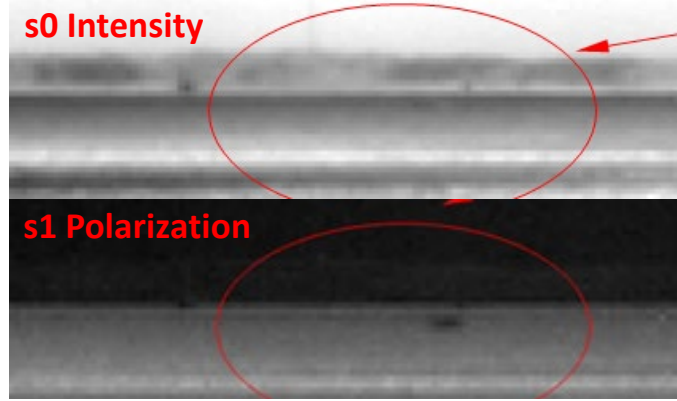
(Rotary) H-60 Helicopter Program and the SEAHAWK

TPOC: (301)342-3378

Other transition opportunities:

- Navy's Agility office (NavalX)
- Army's PEO – (PM TS), requirement for Persistent EOIR w/SWIR for the Ground Based Operational Surveillance (Expeditionary) (G-BOSS(E)).
- USSOCOM's requirement for Next Generation Identification and Awareness Initiative

(NGIA) integrates multiple domain sensors to derive high-fidelity information on identities, locations, and actions. USCG Aviation Logistics Center seeks improvements to the current EOIR Sensor System on the MH-60 and MH-65 platforms. The USCG desires high definition (HD) cameras in future systems and this Hydra Multispectral Zoom system offers 100% improvement over traditional intensity cameras alone. The current system provides a platform interface with outputs for a color camera, low light camera and infrared camera that have matched and large field of view and zoom. The video outputs are ideal for aircraft displays and recording.



WHAT

Operational Need and Improvement: Current Electro-Optical systems have been designed for ground - based operations, and do not consider the effect of high reflection from ship wakes. The Navy needs an improved Electro-Optical/Infrared (EO/IR) imaging system for detection, recognition, and identification of small, fast, agile boats.

Specifications Required: Fixed- and rotary-wing compatible, Visible to Long Wave Infra Red (LWIR), 360 degrees azimuth, multiple fields of view, image acquisition at range, able to be ruggedized to withstand airborne use.

Feature	Advantage	Benefit
Polarization (Visible to SWIR)	Reveals detail like Geometry through weather/spray. Discriminates at range.	Threat identification via detailed images day/night.
SWIR	Sees through wake and spray-Day. Increases range	Enables recognition.
MWIR & LWIR	Sees through wake and spray-Night. Increases range.	Acquisition at range and track.

Technology Developed: The Multi-Spectral Imaging Polarimetric system (MSIP) named Hydra is a three-camera system covering the Visible, Short Wave InfraRed, Mid Wave InfraRed, sensor bands. Polarization sensing and zoom capability was added to two of these wavebands for enhanced performance Day and Night at long range. The sensor is the optimal combination of spectral and polarization multi-mode sensing for the highest probability of detection. The Hydra system penetrates the spray.

Warfighter Value: The Hydra system is an EOIR state of the art imaging system capable of detecting, recognizing, identifying, and tracking fast-moving boats while either partially or completely obscured by highly reflective water wakes. Hydra is a novel sensor that enables early discrimination and track in time to meet the threat by adding polarization detection mode to standard Infrared intensity detection methods. Unresolved targets are acquired at long range in mist, spray and glint cluttered background.

WHEN

Contract Number: N68335-20-C-0133 **Ending on:** December 1, 2021

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Complete Sensor Design	Med	successful simulations	3-4	August 2020
Acquire Custom Camera Cores	Med	build and acceptance testing	4-5	October 2020
Build Software & Firmware for Sensor Control	Med	successful simulations and	4-5	March 2021
Assemble and Test Final Sensor	Med	analysis of lab and field testing	6	September 2021

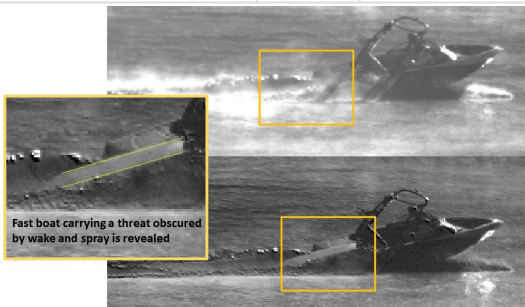
HOW

Projected Business Model: Two sensor products are delivered during this effort:

1. A Day/Night Full Multi-Spectral Hydra system with Day/Night Visible –Short Wave InfraRed-Mid Wave InfraRed and Polarization capability with acquisition and track software, real time field calibration and a mature interface.
2. Short Wave InfraRed (SWIR) to a sister instrument with the lowest SWAP-C. Develop the unit for testing on helicopter, SeaHAWK and Apache, platforms.
3. License the design and intellectual property to Prime Contractors using a subcontract vehicle integrate the sensor with their support, at their site into larger platforms.

Company Objectives: Integrate our novel multispectral and polarization technology and sensors onto platforms for use by the warfighter in the field. Demonstrate the value of our technology by enabling mission success through clear metrics. We bridge technology gaps. We team, subcontract and license our intellectual property. As a prime we offer the speed and agility unavailable at large primes with similar expertise. Lower time to develop yields lower costs for customers and follow-on business. We develop systems and intellectual property to obtain revenue through sell and licenses.

Potential Commercial Applications: Oil and Gas pipeline inspection/leak detection in industrial settings. Border/Asset Security along unprotected waterways (damns, water intakes, power generations, locks, ports) where threats can enter by water and there is a visualization gap at the water surface that radars cannot manage. UAS detection in clouds and among clutter like tree lines and buildings.



Hydra's Multi Spectral Sensor Fusion at range enables situation awareness for Fast Inshore Attack Craft – here one is carrying a threat

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