

Department of the Navy SBIR/STTR Transition Program

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Topic # N10B-T049

Expanding Helicopter Pilots' Field of View with a Wide Field of View Night Vision System (WNVS)

SA Photonics, Inc.

WHO

SYSCOM: NAVAIR

Sponsoring Program: NAVAIR 4.6

Transition Target:

TPOC:

Other transition opportunities: While designed for Navy helicopter pilots, SA Photonics' second-generation Wide Field of View Night Vision System (WNVS2) has many transition opportunities throughout Navy, USMC, Army and Air Force.

Notes: Prototype model of WNVS2 is pictured at right.



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WHAT

Operational Need and Improvement: The restricted fields of view (FOV) that are provided by night vision devices (NVDs) are an increasingly important performance limitation for rotary wing aviation. The normal human FOV spans roughly 200° laterally and 135° vertically. However, current NVDs typically provide a much smaller FOV. For example, the AN/A VS-9 provides a 40° spherical FOV. This FOV restriction limits pilot situation awareness and has been identified as a causal factor in numerous aviation mishaps. Expanding the FOV provided by aviation NVDs should improve both safety and mission effectiveness.

Specifications Required: SA Photonics' second-generation Wide Field of View Night Vision System (WNVS2) is being developed to meet the above need with the following specifications:

- (1) 60° x 40° (H x V) total FOV with 20° binocular overlap
- (2) Migration to higher resolution sensors and displays (ISIE 19 sensors and eMagin 2k x 2k OLED displays)
- (3) Selectable convergence distance
- (4) Capability to overlay external symbology on night vision imagery
- (5) Implementation of the full suite of sensor capabilities including High Dynamic Range (HDR)

Technology Developed: WNVS2 is the second-generation of SA Photonics' Wide Field of View Night Vision System developed for USN (2017). The WNVS2 design leverages lessons learned through the development of the original WNVS program and will incorporate the new 2k x 2k Intevac ISIE 19 sensors, eMagin's 2k x 2k displays, and a new prism for increased resolution and an enlarged vertical field of view. We will implement a new WNVS2 electrical architecture to support the increased resolution of the sensors and displays. The new design will also take advantage of video processing hardware developments that have been made at SA Photonics since the WNVS was developed, reducing the size of the video processing electronics. We will replace the previously used prism with our new design, which offers a reduction in see through distortion, improved angular resolution, and increased vertical field of view.

Warfighter Value: By increasing the FOV and resolution of rotorcraft night vision systems, WNVS2 is able to increase the pilots' effectiveness and situational awareness during nighttime missions. Additionally, this is a true day/night system, with no change of hardware necessary for 24-hour operation, allowing for reduced cost and extended duration missions.

WHEN

Contract Number: N68335-20-C-0139

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Critical Design Review	Low	Detailed Design Complete	4	March 2021
Complete Prism Development	Med	Procurement of final prism design	5	November 2021
System Integration and Test	Med	Successful testing	6	February 2022
System Test	Med	Successful testing	7	April 2022

HOW

Projected Business Model: As with all SA Photonics HMDs, we will produce WNVS2 in-house. The company has a history of successful small-scale production for commercialized SBIR products.

Company Objectives: SA Photonics' WNVS2 is positioned to be a performance-improving night vision HMD system not just for U.S. Navy rotary wing pilots, but military pilots across the DOD. As a result, we are excited to present the product to a range of program offices at the FST, as well as a number of prime contractors, specifically those who work with rotorcraft platform integration.

Potential Commercial Applications: In addition to USN/USMC V-22s, WNVS2 is expected to find application with various multirole, attack and reconnaissance helicopters throughout DOD. Furthermore, WNVS2 will be applicable to multirole combat fixed-wing aircraft platforms. Additionally, WNVS2 has markets with commercial helicopters, primarily those involved in search and rescue, law enforcement, and medical "Life Flight" aircraft.

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