Topic: AF05-313

Sensing Strategies, Inc.

High Energy Laser Locator System

Sensing Strategies, Inc. has developed a remote sensing system to detect, locate (at standoff distances), threat lasers used to harass, target or damage a U.S. asset. As the laser technology on a modern battlefield increases, so does the warfighter need for situational awareness to identify the source, analyze it and apply the correct response based on the signature associated with the threat. SSI has designed, fabricated and tested a high energy laser locator sensor (HELLOCS) using established algorithms for rapid threat identification. HELLOCS can be integrated onboard ships or aircraft depending on engagement scenario. Modeling, simulation and testing have led to deployment strategies for effective implementation. As the system matures through transition, SSI will team with hardware developers and collaborators to deliver field deployable systems.

Technology Category Alignment:

Preemptive/Proactive Effects
Electro-Optical/Infrared (EO/IR)
Broadband/Multispectral Components and Systems
EO/IR Components for sensing, transmission and communication
Test, Evaluation, Validation, and Verification

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SYSCOM: ONR
Contract: N00014-16-C-1002

Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N00014-16-C-1002

Department of the Navy SBIR/STTR Transition Program

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Sensing Strategies, Inc.

WHO

SYSCOM: ONR

Sponsoring Program: ONR

Transition Target: NAVSEA

TPOC:
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Other transition opportunities: The HELLOCS system is very flexible and can be integrated on aviation and ship-based platforms. It can provide additional assurance to own-ship laser beam operations verifying proper pointing and safe operations. It can also provide utility to test ranges for safety purposes by verifying potentially hazardous lasers are operated within a test plan's pointing restrictions. With modifications it can be used by the DOT or DHS to identify and locate lasers used around airports to harass planes during approach and takeoff.

WHAT

Operational Need and Improvement: High energy lasers (HELS) are becoming more prevalent in defensive and offensive applications. Currently there is not an effective way to accurately monitor or detect scattered reflections from laser illuminated targets or light scattered by particulates in the atmosphere over a large area during lasing operations. Lasers are used in many applications on ground, sea and air platforms to track or counter most anything - drones, munitions, sensors and or other targets. It is more important now than ever that US forces have better situational awareness of when HEL weapons are used and from where. This information will assist in mission planning and countering the impact that HELs have on operations. The SSI project has demonstrated a remote standoff detection capability based on observables associated with the laser operation. The next step under a Phase III program will be to build sensors compatible with specific platforms and to develop a data dissemination strategy and concept of operations.

Specifications Required: Specifications vary but are normally based on the threat analysis to determine what type of energy laser was deployed in the area of operations. An electro-optic sensor, as designed by SSI, has the appropriate field of view, sensitivity and resolution to carry of this function.

Technology Developed: A camera based sensor suite has been designed to accomplish the remote-sensing mission, with real-time processing capability to identify the presence of threat signals and determine the source of their emanation. The integration and communication architecture will depend on the platform selected for deploying the sensor.

Warfighter Value: Even though there are some weapon systems capable of laser detection, there is no standalone system with off axis or reflection monitoring sensors to identify the presence of laser weapons. Having a system capable of detecting and locating the source of the projection provides additional situational awareness with specific data to assist the warfighter plan his mitigation strategies.

WHEN

Contract Number: N00014-16-C-1002 **Ending on:** January 31, 2019

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Laboratory testing and algorithm development	Low	Initial tests of sensing and signal processing	4	August 2017
Prototype subassembly field test	Med	Verify remote sensing functionality and performance predictions	5	November 2017
Prototype HELLOCS system test	Med	Verify system capability to locate source	6	April 2018
Algorithm refinement and final test	Med	Check improvements to system algorithms and operation	6	September 2018

HOW

Projected Business Model: Our plan is to be a tier 1 supplier of OEM sensors and algorithms that an integrator could use for an aircraft or ship installation. We have collaborators and partners capable of providing mil-spec fabrication techniques and quality management. SSI will manage and test sensors developed for integration to verify their performance. We will also carry out product improvements as needed to address emerging threats or the introduction of sensors to new platforms.

Company Objectives: SSI's objective is to design, build and deliver novels sensors capable of solving challenging remote sensing problems. We combine scientific expertise for modeling scenarios with practical hardware development experience. With these two skills, we can rapidly identify technical solutions that meet well-defined measurement requirements. By defining the physics limitations to collection and monitoring problems and identifying technologies and deployment strategies that satisfy the mission requirements, SSI maintains a very high rate of repeat customer business.

Potential Commercial Applications: The HELLOCS system, though developed for high energy laser detection, can be modified to detect lower power visible lasers at night and provide law enforcement with real-time data to aid in locating, capturing and prosecuting perpetrators. A variant of the same technology could be used under controlled test conditions for pollution monitoring at smoke stacks or characterizing atmospheric visibility.

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