

Topic: N152-105

Bridger Photonics, Inc.

Metrology of Visibly Opaque, Infrared-Transparent Aerodynamic Domes, Conformal Windows, and Optical Corrector Elements

Bridger has developed a new metrology solution to improve manufacturing of high performance IR optics, such as aerodynamic domes and conformal windows. Currently available systems are unable to effectively penetrate these IR materials and have limited working distances. The SLM IM IR enables simultaneous surface and thickness profiling of IR transparent optics at higher update rates and precisions than current solutions. When coupled with a precision metrology stage, the SLM-IM-IR has the potential to decrease metrology time, a significant portion of the overall manufacturing process, by a factor of 10 or more and allow for complete profiling of complex components.

Technology Category Alignment:

EO/IR Components for sensing, transmission and communication

Materials & Manufacturing Processes

Sensors, Electronics and Photonics

Structures and Protection

Contact:

Dr. Jason Brasseur

Jay.Brasseur@bridgerphotonics.com

(406) 585-2774106

<http://bridgerphotonics.com/>

SYSCOM: NSMA

Contract: N68936-17-C-0005

 Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N68936-17-C-0005

Department of the Navy SBIR/STTR Transition Program

DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.

NAVAIR 2017-745

Topic # N152-105

Metrology of Visibly Opaque, Infrared-Transparent Aerodynamic Domes, Conformal Windows, and Optical Corrector Elements
Bridger Photonics, Inc.

WHO

SYSCOM: NSMA

Sponsoring Program:

Transition Target:

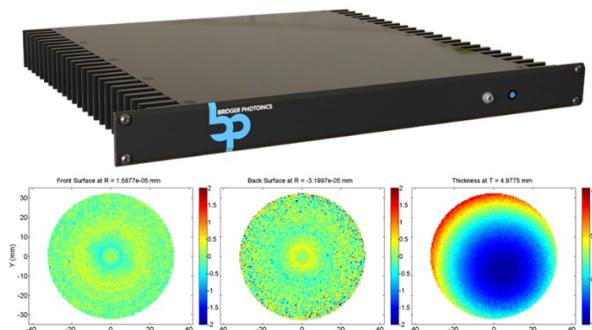
TPOC:

(760)939-7323

Other transition opportunities:

When paired with an appropriate metrology stage, the SLM-IM-IR is capable of simultaneous surface measurements for visible and IR transparent optics. This includes single point center thickness measurements, surface profiling of individual components, and positioning/alignment of multiple optics in larger assemblies.

By providing a simple and robust software interface to end users, potential partners will be able streamline integration with existing processes.



Copyright, 2017, Bridger Photonics, Inc.

WHAT

Operational Need and Improvement: The function of electro-optical sensors is greatly impacted by the window's properties. Survivability depends on material strength, hardness, and thermal properties. Targeting is limited by optical properties of the window material. Drag is reduced by aerodynamic shapes.

A new method for measuring the optical figure and transmitted wavefront error of complex aerodynamic domes, conformal windows and optical corrector elements manufactured from visibly opaque, IR transmissive materials is required to streamline and improve manufacturing by providing feedback to optics shops for optical figure correction.

Specifications Required: Demonstrated metrology of IR-transparent optics such as 5 in x 7 in aerodynamic dome

- Produce surface figure and transmitted wavefront maps
- Precision less than 0.5 microns
- Flexibility in measuring a variety of aerodynamic and conformal shapes
- Format output to provide feedback for figure correction

Technology Developed: SLM-IM-IR

- Flexible wavelength for improved material penetration
- Greater than 10 Hz Update Rate
- Less than 100 nm Precision
- Simple and robust software interface for ease of integration and feedback

Warfighter Value: The SLM-IM-IR will improve the quality and increase the throughput of complex optical components for a number of defense applications, including aerodynamic domes and conformal windows.

These improvements will directly improve the operation of the electro-optical sensors in the field.

WHEN

Contract Number: N68936-17-C-0005 **Ending on:** January 31, 2019

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Examine New Lasers to Improve System Performance	N/A	Improved Signal When Measuring IR Materials	4	March 2016
Develop Integrated Hardware and Software	N/A	In-House Prototype SLM-IM-IR Built and Tested	4	May 2016
Perform Testing and System Verification	Low	Compare Measurement Results Between Standard SLM-IM and SLM-IM-IR	4	July 2016
Construct and Install SLM-IM-IR Systems	Med	System Prototypes Delivered and Installed for Customer Testing	5	September 2017
Work with Partners to Improve Integration and Performance	Med	Performance and Integration Meet Navy and Partner Requirements	5	January 2019

HOW

Projected Business Model: Bridger Photonics will produce the SLM-IM-IR laser source and work with precision stage manufacturers on integration to provide a complete metrology system to meet the IR optics manufacturing needs of the Navy. By developing a robust and flexible interface, the SLM-IM-IR will be capable of providing active feedback during measurements, as well as offering unparalleled measurement precisions. Once this objective is complete, Bridger will expand beyond OEM sales to design, release and sell a widely marketable product based on the SLM-IM-IR core.

Company Objectives: Bridger Photonics will be interested in finding customers for the complete metrology system and discussing possible integration options with potential translation stage partners.

Potential Commercial Applications: By leveraging the new SLM-IM-IR and standard SLM-IM core technologies and the robust interface, Bridger will be able to expand the capabilities of its Thickness Metrology Station to reach a broader customer base of commercial optics manufacturers.

Contact: Dr. Jason Brasseur, Vice President and COO
Jay.Brasseur@bridgerphotonics.com 406-585-2774 x106