



Fiber Optic Sensors from Luna Innovations Help Monitor Structural Integrity of New Composite Bridge

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Sensors Provide a Sustainable Solution for Aging Infrastructure

ROANOKE, Va.--(BUSINESS WIRE)--Aug. 5, 2020-- Luna Innovations Incorporated (NASDAQ: LUNA) has partnered with researchers at the University of Tennessee (UT) and the Institute for Advanced Composites Manufacturing Innovation (IACMI) to equip a new fiber-reinforced polymer composite material (FRP) bridge deck with integrated, high-density fiber optic sensors. The sensors will be used to monitor the composite deck system over time to give critical performance and safety data, thus providing a sustainable solution for aging infrastructures such as bridges and tunnels.

The Morgan County demonstration bridge in north central Tennessee will replace a damaged, decades-old concrete bridge. County officials are partnering with private industry and researchers on a bridge that can be installed faster and at a lower cost than traditional methods. Luna's fiber optic sensors will form the key element of a structural health monitoring framework for the bridge, allowing engineers to ensure that the bridge operates safely and within established performance parameters for many years to come.

"Luna's sensing solutions deliver data and insight not available with conventional data acquisition and monitoring systems," said Scott Graeff, President and Chief Executive Officer of Luna. "We strive to enhance the safety of people and structures by leveraging our expertise in fiber optic-based technology and the information it provides. The Morgan County demonstration bridge is a great example of how Luna is enabling the future with fiber by providing advanced sensing solutions that address our nation's aging infrastructure."

Due to the use of technologically advanced composites, the bridge deck system has a 100-year lifespan and a low-maintenance design. The system is equipped with Luna's high-definition and high-speed fiber optic sensors for real-time monitoring of the composite deck system while in service. The sensors are easy to install during the manufacturing process and become part of the structural components, thus creating "smart" infrastructure and enabling the constituent building materials to report their structural health from within. A single 10-meter sensor can provide strain from mechanical loading or thermal/hygroscopic loading from thousands of locations simultaneously with exceptional precision. In addition, wireless technology developed at UT will be utilized for monitoring the response of the bridge system and traffic counts remotely via cloud computing.

FRP materials will be used to create a durable, sustainable, cost-effective lightweight bridge structure. By using composite materials, the bridge replacement project will require less equipment and less time for on-site preparation and on-site installation. Quicker completion can result in significant savings to safely meet transportation needs for this rural community.

"Lack of durability data is one of the major barriers of the adoption of novel and advance materials including carbon, basalt, or glass fiber reinforced polymeric composites in civil infrastructure," said Dayakar Penumadu, the Fred N. Peebles Professor in the Tickle College of Engineering and Characterization Fellow for Materials and Processing group for IACMI.

Penumadu added, "this is a major obstacle for integrating new materials and structures quickly and thus require successful demonstration as being done through this IACMI project. Bridge decks are the most damage prone elements and we are integrating smart sensors distributed throughout the composite bridge deck that will provide us valuable performance data with time for years to come."

High-definition fiber optic sensing is ideally suited to monitor and characterize composite structures. Using Luna's ODISI measurement system, a single 10-meter sensor can provide strain from mechanical loading or thermal/hygroscopic loading from thousands of points simultaneously with exceptional precision. In addition, fiber Bragg grating (FBG) sensors combined with Luna's high-speed HYPERION interrogator can capture dynamic phenomena and additional bridge response data. Together, these systems will deliver the durability and performance data needed to facilitate the integration of new, advanced materials in civil infrastructure.

The installation of the composites bridge deck is expected to be completed late 2020 or in early 2021. Luna Innovations is one of the private industry partners on this project that have committed to designing, fabricating, shipping, installing and monitoring the 16-by-25-foot bridge deck, all at no cost to Morgan County.

About Luna

Luna Innovations Incorporated (www.lunainc.com) is a leader in optical technology, providing unique capabilities in high-performance, fiber optic-based, test products for the telecommunications industry and distributed fiber optic-based sensing for the aerospace and automotive industries. Luna is organized into two business segments, which work closely together to turn ideas into products: Lightwave and Luna Labs. Luna's business model is designed to accelerate the process of bringing new and innovative technologies to market.

Forward-Looking Statements

The statements in this release that are not historical facts constitute "forward-looking statements" made pursuant to the safe harbor provision of the Private Securities Litigation Reform Act of 1995 that involve risks and uncertainties. These statements include Luna's expectations regarding its technical and product capabilities and their long-term strategic value. Management cautions the reader that these forward-looking statements are only predictions and are subject to a number of both known and unknown risks and uncertainties, and actual results, performance, and/or achievements of Luna may differ materially from the future results, performance, and/or achievements expressed or implied by these forward-looking statements as a result of a number of factors. These factors include, without limitation, technological and strategic challenges and those risks and uncertainties set forth in Luna's Form 10-Q for the quarter ended March 31, 2020, and Luna's other periodic reports and filings with the Securities and Exchange

Commission ("SEC"). Such filings are available on the SEC's website at www.sec.gov and on Luna's website at www.lunainc.com. The statements made in this release are based on information available to Luna as of the date of this release and Luna undertakes no obligation to update any of the forward-looking statements after the date of this release.

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