

AEROSPACE

Blue Road Research has applied fiber optic sensors to a variety of aerospace programs and is a leader in the development of technology and techniques necessary to measure structural performance of composite and metal alloy airframes. Current sensor development efforts include both surface-mount and embedded measurements in advanced airframes, cryogenic fuel tanks, rocket booster fuel casings and composite patches on aging structures.



Unmanned Combat Air Vehicle

Blue Road Research is working to integrate our sensors with complete interrogation systems for both on-the-ground periodic structural integrity monitoring as well as airborne dynamic structural performance monitoring. Applications include advanced high-performance multiple use vehicles (such as the UCAV pictured above) and existing vehicles such as commercial aircraft, military aircraft, and composite missile bodies.



The Delta Clipper

EDUCATION

We highly recommend that customers attend our Fiber Optic Sensor "Hands On" Course as a rapid and cost-effective introduction to this technology. As a customer, you will receive a comprehensive look at the latest advancements in this technology, and the knowledge base Blue Road Research can provide.

Fiber Optic Sensor "Hands On" Course

Participants learn the capabilities and potential uses of this rapidly expanding technology by exploring, through hands-on experience, how fiber sensors are used in various industries. This three-day course provides an overview of the technology and makes extensive use of laboratories and demonstrations to give participants an understanding of how these devices are built and function. Mornings are devoted to classroom discussion, while afternoons are spent in the sensor laboratories using Blue Road Research educational and development kits.

Past attendees include:

- Boeing
- Corning
- Westinghouse
- Ford Motor Company
- Department of Energy
- Sandia National Laboratory
- Los Alamos National Laboratory

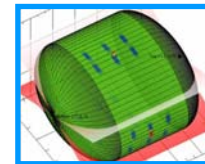
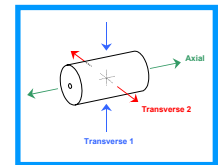
**Please call us or visit our website
for current course dates**

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Fiber Optic Sensor Solutions



CIVIL STRUCTURES

Blue Road Research is a pioneer and leader in the application of fiber optic sensors for static and dynamic measurements of bridges, highways, buildings, piers and dams. Current structural health monitoring efforts are focusing on the use of fiber Bragg grating strain sensors in performing damage detection through modal analysis on complete structures.



Horsetail Falls Bridge, Columbia Gorge, Oregon

Blue Road Research has been working closely with the Oregon Department of Transportation for several years. This work has ranged from verifying the performance of composite reinforcement of the structural members on the historic Horsetail Falls Bridge to traffic classification along the I-84 freeway using strain sensors embedded in the roadway.



Installing sensors for traffic monitoring on the Interstate 84 Freeway east of Portland, Oregon

Blue Road Research is developing its civil structures monitoring technology based on its high-speed readout techniques. These methods allow accurate real time monitoring of structural dynamics as well as quantified loading data for use in performance analyses.

Blue Road Research has pushed the state of the art in advancing and applying fiber sensor technologies since its inception in 1993. Including original work begun at McDonnell Douglas Corporation, Blue Road Research holds licenses to 15 patents and has 11 issued patents with many pending on a variety of fiber optic technologies. This patent base is especially strong for fiber grating sensors and fiber sensors based on the Sagnac interferometer.

Fiber Grating Sensor Advantages:

- ▶ Superior resistance to EMI and corrosion compared to conventional electric sensors
- ▶ Intrinsic safety in highly combustible environments
- ▶ Lighter weight and easier installation compared to conventionally wired technologies
- ▶ Customizable range and sensitivity to meet sensing demands
- ▶ Multiplexing capabilities that allow multiple sensors to be monitored on a single fiber

Blue Road Research offers consulting support services to clients for the development and implementation of fiber optics sensor technology. These services may include on-site courses and training, individual consulting support, or support by Blue Road Research engineer/scientists in a research and development program. We offer flexibility and creativity in the types of services available to our clients.

TECHNOLOGY

Fiber Bragg Gratings are a distributed resonant mirror structure written into the optical fiber core with an ultraviolet laser. The gratings reflect light at a discrete optical frequency that is intrinsically dependent on the strain state and temperature of the optical fiber.

Sagnac Interferometric Sensors use the interference between counter propagating beams in a fiber loop to sense directional dependent perturbations to path length. These sensors are more stable and less sensitive to ambient temperature and strain changes than other interferometers and make ideal candidates for intrusion monitoring systems.

PRODUCTS

Blue Road Research offers a selection of both fiber optic sensors and readout systems for strain (axial, transverse and shear), temperature, pressure and moisture measurement. High speed fiber strain sensing systems at speeds in the range of 10 kHz to 2 MHz are standard, with custom options in the 10 MHz to 20 MHz range. The sensors and systems are suitable for either laboratory experimentation or product line development.

Blue Road Research provides its customers with equipment, documentation, software and technical assistance.



Custom Sensor Workstation

Call one of our application specialists today or visit our web site at www.blueroadresearch.com