Quarterly Progress Report:
Project Number and Title: Thrusts #1 Distributed Fiber Optic Sensing System for Bridge Monitoring
Research Area: Thrust #1
PI: Xingwei Wang, Electrical and Computer Engineering Department, University of Massachusetts Lowell.
Co-PI(s): TzuYang Yu, Civil Engineering Department, University of Massachusetts Lowell
Reporting Period: 07/01/2020 – 09/30/2020
Submission Date: 9/30/2020

Overview: (Please answer each question individually)

Currently we have already installed sensors at the bottom of a bridge located in New Hampshire. The next step in the research is to continue monitoring the data and check the performance of the sensors. Permission was requested and granted to perform field test. We returned to Salmon Falls River Bridge to collect more data in the current weather conditions at the end of September. The results will be presented on the next quarterly report. In addition, during the quarantine time, progress was made regarding journal paper preparation. As of now, two journal papers are under preparation. The drafts have been circulated to all parties involved in the installation and data analysis to collect their feedback. Papers will be submitted once permission is obtained.


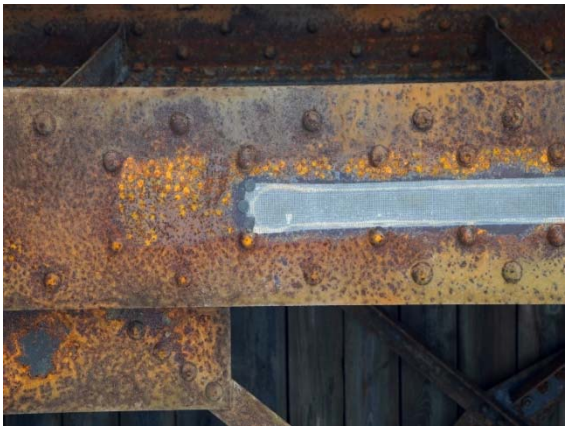


Figure 1 Salmon Fall Bridge field test

Table 1: Task Progress			
Task Number	**Start Date**	**End Date**	**% Complete**
Task 1: Sensor development	1/1/2019	6/30/2019	100%

Task 2: Signal processing and sensor characterization	1/1/2019	12/30/2019	100%
Task 3: Preliminary field test on the bridge	6/1/2029	12/30/2020	80%
Overall Project:	1/1/2019	12/30/2020	80%

Table 2: Budget Progress

Project Budget	Spend – Project to Date	% Project to Date*
total cost of $132,045.50 ($57,251 from Federal Share and $74,794.50 from cost share).	Still pending on ORA to work on the separation of the project accounts	

In this quarter, our research findings were presented to TIDC annual conference and the Vtrans poster symposium. These webinars and conference presentations covered different approaches used in fiber optic sensing technology. Our team also participated in different webinars to enhance our knowledge and learn about other approaches used in Structural Health Monitoring. This event fostered our collaborations with other groups.

Table 3: Presentations at Conferences, Workshops, Seminars, and Other Events

Title	Presenter	Type	Location	Date(s)
Structural health monitoring of a bridge using fiber optic sensing textile	UMASS Lowell	TIDC annual conference	Zoom	08/12/2020
Fiber Optic sensing technology for structural health monitoring of Bridges	UMASS Lowell	Vtrans Symposium	Zoom	09/09/2020

Table 4: Publications and Submitted Papers and Reports

Type	Title	Citation	Date	Status
Journal	Structural Health Monitoring of a Bridge Using Fiber Optics Sensing Textile	Not available	TBD	In review by Co-Authors
Letter	Embedded Optical Fiber in Textile for Distributed Brillouin Sensors	Not available	TBD	In review by Co-Authors

Participants and Collaborators:

Table 5: Active Principal Investigators, faculty, administrators, and Management Team Members

Individual Name	Email Address	Department	Role in Research
Xingwei Wang	Xingwei_wang@uml.edu	Electrical and Computer Engineering	PI
TzuYang Yu	Tzuyang_yu@uml.edu	Civil Engineering	Co-PI

Table 6: Student Participants during the reporting period				
Student Name	**Email Address**	**Class**	**Major**	**Role in research**
Andres Biondi		PhD.	ECE	Signal analysis
Rui Wu		PhD	ECE	Signal analysis
Lidan Cao		PhD.	ECE	

Use the table below to list any students who worked on this project and graduated during this reporting period.

Table 7: Student Graduates			
Student Name	**Role in Research**	**Degree**	**Graduation Date**
N/A			

Table 8: Research Project Collaborators during the reporting period						
Organization	**Location**	**Contribution to the Project**				
		Financial Support	**In-Kind Support**	**Facilities**	**Collaborative Research**	**Personnel Exchanges**
Saint-Gobain	Northborough MA		x			

Saint-Gobain has been involved in the New Hampshire Bridge selection process by facilitating contact with bridge owners' companies. In addition, part of the data in this report has been collected in conjunction with Saint-Gobain. Authorization has been granted for the used in this report.

Table 9: Other Collaborators			
Collaborator Name and Title	**Contact Information**	**Organization and Department**	**Contribution to Research**
Dr. Dongsheng Li, President	222 Pitkin St, Suite 109 East Hartford, CT 06108	Advanced Manufacturing LLC	Technical Champion

Other information

Number of active industrial partners involved in this research project

- 1
  Saint Gobain

Number of technologies deployed in transportation applications through pilot or demonstration studies because of this research project.

- The senor has been deployed and tested on a railway bridge in New Hampshire

Number of active State DOT partners involved in the research project.

- NH DOT, we are working with NH DOT to arrange presentation and discuss more field test plans.

Changes:

None.

Planned Activities:

Over the coming months the research is focused on continuing monitoring the sensors installed in New Hampshire. In addition, we will continue developing the temperature compensation process and improving the signal analysis mechanism.