

Quarterly Progress Report:

Project Number and Title: 4.1 Connected Vehicles Applications to Improve Infrastructure Safety and Durability

Research Area: Thrust 4 Connectivity for Enhanced Asset and Performance Management

PI: Jonathan Rubin, University of Maine

Co-PI(s): Kathryn Ballingall, University of Maine

Reporting Period: October 1, 2019 to December 31, 2019

Date: January 10, 2020

Overview: (Please answer each question individually)

*Provide **BRIEF** overview and summary of activities performed during the reporting period.*

The project team is working with MaineDOT on a pilot application of connected vehicle technology on the UMaine Campus. MaineDOT and their vendor, TADCO, has installed a roadside unit that can communicate with connected vehicles at the steam plant lot pedestrian crosswalk at the end of October 2019. Final power connections are holding up the start of the pilot.

The DSRC pilot project will install a road-side and an in-vehicle Dedicated Short-Range Communication (DSRC) unit that will communicate with each other to relay a warning message on a dedicated band (5.9 GHz). The Old Town bus route passes by the steam plant lot crosswalk and would therefore be will a good candidate to have a DSCR installed a transit vehicle. The transit vehicle will pass by the roadside unit multiple times a day and will generate significant data for analysis.

The objective of the pilot is to gain knowledge about the requirements for the installation and maintenance of the system, and to learn how to use the data generated by connected vehicle systems. The content, format and frequency of data generated will help determine the potential applications of future DSRC systems across the state.

The project team is also continuing to update the research report to include new research and developments in the field of connected vehicle applications. An undergrad student has started to support research for strategic investment analysis.

Provide context as to how these activities are helping achieve the overarching goal(s) of the project...

Collaboration with Maine DOT staff and Bangor Community Connector is vital to properly identifying the project concept and the needs of stakeholders. They will also help identify the most useful applications of connected vehicle technologies, and the data and infrastructure required to implement these applications.

Describe any accomplishments achieved under the project goals...

The connected vehicle pilot project at the crosswalk in Orono, ME is a significant advancement towards the project goals, as it will provide the team with data on the costs and benefits of a CV application. We will continue to work with Maine DOT to identify other applications for connected vehicle applications based on the potential benefits and cost of investing in these systems. Potential applications include curve speed warning systems on highway ramps, road weather management systems, transit and freight priority signal applications.

Complete the following tables to document the work toward each task and budget (add rows/remove rows as needed)...

Table 1: Task Progress			
Task Number	Start Date	End Date	Percent Complete
Task 1	October 1, 2018	February 1, 2020	90%
Task 2	October 1, 2018	February 1, 2020	90%

Task 4	October 1, 2018	September 30, 2020	60%
Task 5	September 1, 2019	September 1, 2020	20%
Task 6	December 1, 2019	June 1, 2020	5%
Task 7	September 1, 2019	August 1, 2020	25%

Table 2: Budget Progress		
Entire Project Budget	Spend Amount	Spend Percentage to Date
\$ 126,847	\$85,631	67.5%

Describe any opportunities for training/professional development that have been provided...

The project team now includes an undergrad economics student to support research in year 2.

Describe any activities involving the dissemination of research results (be sure to include outputs, outcomes, and the ways in which the outcomes/outputs have had an impact during the reporting period. Please use the tables below for any Publications and Presentations in addition to the description of any other technology transfer efforts that took place during the reporting period.)... Use the tables below to complete information about conferences, workshops, publications, etc. **List all other outputs, outcomes, and impacts after the tables** (i.e. patent applications, technologies, techniques, licenses issued, and/or website addresses used to disseminate research findings).

Table 3: Presentations at Conferences, Workshops, Seminars, and Other Events				
Title	Event	Type	Location	Date(s)
N/A				

Table 4: Publications and Submitted Papers and Reports				
Type	Title	Citation	Date	Status
N/A				

Participants and Collaborators:

Use the table below to list all individuals who have worked on the project.

Table 5: Active Principal Investigators, faculty, administrators, and Management Team Members			
Individual Name	Email Address	Department	Role in Research
Jonathan Rubin	rubinj@maine.edu	MCSPC	Principal Investigator
Kathryn Ballingall	kathryn.ballingall@maine.edu	MCSPC	Co-PI

Use the table below to list all students who have participated in the project.

Table 6: Student Participants during the reporting period				
Student Name	Email Address	Class	Major	Role in research
Nicholas Alvarez		Undergrad	Double Major in Economics and Mathematics	Assistant Researcher
Sheldon Green		Undergrad	Major in Financial Economics	Assistant Researcher

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
Nicholas Alvarez		Double Major in Economics and Mathematics	June 2019

Use the table below to list organizations have been involved as partners on this project and their contribution to the project.

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
Maine Department of Transportation	Augusta, ME		DSRC In-vehicle unit			

List all other outputs, outcomes, and impacts here (i.e. patent applications, technologies, techniques, licenses issued, and/or website addresses used to disseminate research findings). Please be sure to provide detailed information about each item as with the tables above.

N/A

Have other collaborators or contacts been involved? If so, who and how? (This would include collaborations with others within the lead or partner universities; especially interdepartmental or interdisciplinary collaborations.

No new collaborators have been added.

Changes:

Discuss any actual or anticipated problems or delays and actions or plans to resolve them...

The installation and operation of the DSRC unit is still underway. There are issues with the power supply to the roadside unit, and we are working with the DOT to resolve this and get the pilot data collection started.

Planned Activities:

Description of future activities over the coming months.

The project team plans to continue to collaborate with our DOT partners to ensure that the DSRC pilot of the pedestrian crossing at the University of Maine campus in Orono is operational and collecting data. The team is continuing to meet with DOT to identify future research and collaborators that will increase knowledge and capacity for the use of connected vehicle technology and applications in the state of Maine and New England. A draft report of findings will be discussed with DOT, as well as future recommendations for investment in connected vehicle technology.