

## Semi-Annual 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:** Apr 1, 2019 to September 30, 2019

**Date:** September 30, 2019

### Overview:

*Provide overview and summary of activities performed during previous two months....*

The project team is working with MaineDOT and the City of Bangor on a pilot application of connected vehicle technology on the UMaine Campus. MaineDOT has completed their bidding process, and their vendor, TADCO, will be installing DSRC equipment at the Steam plant lot pedestrian crosswalk at the end of October 2019.

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 a good candidate to have a DSRC installed on 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. A search for a student to complete the strategic investment research is underway.

*Provide context as to how these activities are helping achieve the overarching goal 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 a crosswalk in Orono 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 and freight applications.

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

A search for an undergrad student to support research in year 2 is underway.

*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)...*

Not applicable at this stage in the project.

*Encouraged to add figures that may be useful (especially for semi-annual reporting by the project manager and management team)...*

## **Semi-Annual Progress Report**

Not applicable at this stage in the project.



### **Participants and Collaborators:**

*List all individuals who have worked on the project.*

- Jonathan Rubin
- Kathryn Ballingall
- Nicholas Alvarez

*List all students who have participated in the project. (Include name, class standing, major, role in the research)*

- Nicholas Alvarez, Double Major in Economics and Mathematics, assistant researcher

*What organizations have been involved as partners on this project?*

- MaineDOT
- Maine Bureau of Motor Vehicles

*Have other collaborators or contacts been involved? If so, who and how?*

- Preliminary discussion of research collaboration on cybersecurity with the University of Connecticut
- Potential collaboration on data management software for connected vehicles with Georgia Tech.

### **Changes:**

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

- Project tasks are proceeding well, and the literature review is well underway and is evolving with the project scope in response to new developments at MaineDOT.

*Discuss and changes in approach and the reasons for the change...*

- Project approach has changed since the March 2019 progress report. The scope of potential applications will now focus on connected vehicle (V2I) technology and applications, not just for bridges, but will also include traffic signal and pedestrian crosswalk enabled with DSRC technology.

### **Planned Activities:**

*Description of future activities over the coming months.*

- Implementation of the pilot project of DSRC units on transit vehicles near the UMaine Campus in Orono.
- Develop new partnerships for data and cybersecurity implications of connected vehicle systems, and potentially for the use of V2I for road salt management.
- Completion of literature review and commencing the strategic investment report.