

Multimodal Connected Vehicle Pilot Project Synopsis

Project Overview

The North Carolina Department of Transportation (NCDOT) Multimodal Connected Vehicle Pilot (MMCVP) aims to create a connected environment that can evaluate the impact of Connected Vehicle (CV) technology on driver and pedestrian safety. This connected environment will include an application delivering safety notifications to all users of the multimodal application: pedestrians, cyclists, transit drivers and passengers, and motorists. The CV applications will use a hybrid dedicated short-range communication (DSRC)/cellular communication system with in-vehicle and roadside CV infrastructure.

The pilot will also focus heavily on improvements to the North Carolina State University (NCSU) Wolfline bus system. To improve transit vehicle efficiency, a new Intelligent Traffic Signal System (I-SIG) will be deployed to implement Transit Signal Priority (TSP) and collect and analyze High-Resolution Data.

The project explores technologies to improve the day-to-day transportation experience for pedestrians, cyclists, motorists, and transit drivers and passengers. To properly evaluate the integration of these technologies, a small geographic area inclusive of the NCSU campus was identified as an ideal location for testing. Using the data gathered in the pilot, the project hopes to expand the successful technologies to additional areas in the region and across the state.

Project Vision and Goals

It is envisioned that this pilot will improve safety, increase mobility, and help reduce environmental impacts. The valuable data this pilot project provides will help the NCDOT to further deploy CV technology within the state, enhancing safety and mobility for all citizens while simultaneously protecting the environment.

Project Scope

The contractor shall provide a complete turnkey solution that leverages existing infrastructure to achieve the goals of the MMCVP. While existing infrastructure will be utilized where possible, certain upgrades will be required to achieve the goals of this project. All proposed solutions and upgrades should integrate easily with the existing Raleigh Signal System to minimize the overall impact of this pilot on the rest of the Signal System. The contractor will also be responsible for on-going maintenance and support for the duration of the project, which will be three years from the date of an executed agreement with the contractor. The contractor will be expected to support the evaluation of this pilot by assisting others, such as staff from the Institute for Transportation Research and Education (ITRE), in accessing and gathering data for this pilot.

Infrastructure Upgrades

The contractor shall be responsible for infrastructure upgrades including:

- Replacing 31 traffic signal controllers with 2070LX controller units running the latest version of SEPAC software.
- Replacing 4 traffic signal cabinet with a type 332 cabinet with auxiliary output file.
- Installing an additional detection system at 31 locations to facilitate high resolution data collection.
- Installing hybrid DSRC/C-V2X roadside units at 31 locations.
- Integrating cellular modems at 3 locations.

Use Cases

The following use cases will be provided and tested as part of this project:

- Signal Phase and Timing (SPaT)
- Transit Signal Priority (TSP)
- Pedestrian in Signalized Crosswalk Warning (PSCW)

- Mobile Accessible Pedestrian Signal System (PED-SIG)
- Intelligent Traffic Signal System (I-SIG)
- Red Light Violation Warning (RLVW)
- Speed Warning (SW)
- High Resolution Data (HRD)
- Automated Traffic Signal Performance Measures (ATSPM)
- Work Zone Warning (WZW)
- Connected Eco-Driving (CED)

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