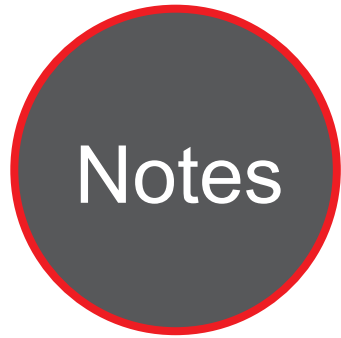




Caltrans Division of Research,
Innovation and System Information

Research



JULY 2020

Project Title:
Vehicle Infrastructure Integration
(VII)

Task Number: 3287

Start Date: November 1, 2018

Completion Date: January 31, 2021

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Connected Vehicle Application Development (CVAD)

Test bed expansion to 31 intersection and development of Transit Signal Priority (TSP) Application

WHAT IS THE NEED?

In the past, the United States Department of Transportation has provided financial and technical support to the California Department of Transportation (Caltrans) test bed site in Palo Alto, CA, for developing the Connected and Automated Vehicles (CAV) infrastructure.

Currently, the test bed site is fully operational and consists of 16 intersections. As Caltrans is preparing to achieve the deployment of at least 20 CAV upgraded intersections on the test bed to meet the Signal Phase and Timing (SPaT) challenge by January of 2021. Expanding the intersections from 16 to 31 at the test bed will provide a better setting for application developers to complete the testing and development of both the vehicle and infrastructure components as many of the CV applications require longer CV equipped corridors for applications to work properly.

WHAT ARE WE DOING?

This research entails the following tasks:

1. Expand the California CV test bed to meet the National Operations Center of Excellence's requirements for the SPaT challenge.
2. Develop, implement, and conduct field tests for Transit Signal Priority (TSP) application
3. Support the deployment of CV in California



DRISI provides solutions and knowledge that improves California's transportation system

WHAT IS OUR GOAL?

The objective of this research is to achieve a fully functional test bed with 31 intersections that will allow various private and public entities to develop CV applications.

WHAT IS THE BENEFIT?

The improved test bed will provide a platform for software engineers to develop various CAV transportation applications that will improve the throughput and safety for vehicular movements on highways, arterial, and surface streets; and ultimately help drivers in cutting travel times, saving fuel and improving safety.

WHAT IS THE PROGRESS TO DATE?

As of July 2020, the research team has made the following progress:

- Installed 2070E controller at four test bed intersections (i.e., Los Altos Ave, Del Medio Ave, San Antonio Rd, and Showers Dr). Roadside Units (RSU) purchase is on hold awaiting guidance from Federal Communications Commission (FCC).
- Initiated the purchase order of NoTraffic system to be installed at four test bed intersections (i.e., Medical Foundation Dr, Embarcadero Rd, Churchill Ave, and Serra St/Park Blvd in Palo Alto).
- Completed moving the SPaT message from serial port of the model 2070E controller to ethernet port.
- Implemented software on the server located in PATH Headquarters to remotely configure DSRC channel usage in the test bed, i.e., (current) two channels and (future) one channel. The channel management software has been tested working properly in the field.

- Start exploring RSU with dual DSRC and C-V2X radios and ensured the existing communication interface with RSU is working with both DSRC interface and C-V2X interface.
- NTCIP 1202 Version 3 that defines the NTCIP data objects between a signal controller and a remote host will be completed in the next quarter.

IMAGE

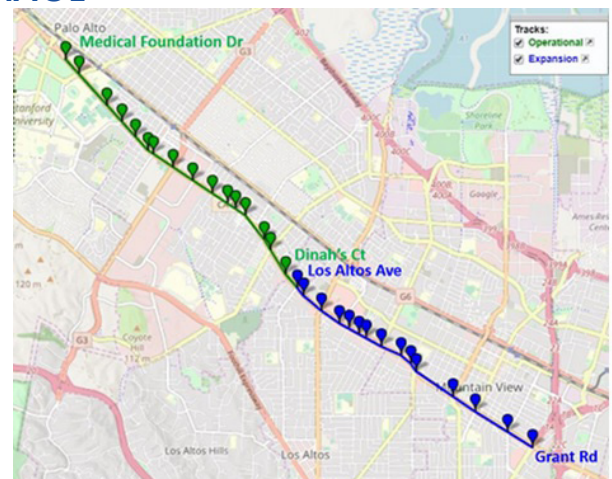


Image 1: Map showing location of all the Intersections on Palo Alto Test Bed