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CALTRANS DIVISION OF RESEARCH,
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Advanced
Research

MAY 2023

Project Title:
Guidance on Road Side Units
Placement for Future
Deployment of Connected and
Automated Vehicle Applications

Task Number: 4081

Start Date: June 1, 2023

Completion Date: May 31, 2025

Task Manager:
Jose Camacho Jr.
Transportation Engineer (Electrical)
jose.camacho.jr@dot.ca.gov

Guidance on Road Side Units Placement for Future Deployment of Connected and Automated Vehicle Applications

Planning tool to provide California Department of Transportation District Engineers guidance on road side units placement for Connected and Automated Vehicle Applications

WHAT IS THE NEED?

To facilitate future deployment of Connected and Automated Vehicle (CAV) applications, it is critical to upgrade existing road infrastructure with road side units (RSU) to enable Vehicle-to-Everything (V2X) communications for various CAV applications. When a freeway or an arterial network is selected, the current approach, like in the California Connected Vehicle Testbed, is to install RSUs at all road intersections. However, this approach is not cost-effective for network-level deployment due to limited budgets to install and maintain RSU facilities and low penetration rates of CAVs on surface roads. Therefore, it is crucial to develop a generalized tool that can guide California Department of Transportation (Caltrans) District Engineers at the planning stage to pick the right locations to install RSUs for selected CAV applications with cost effectiveness.

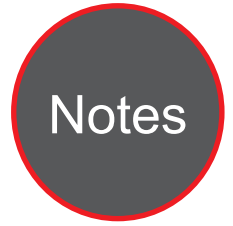
WHAT ARE WE DOING?

This task will take care of the following activities.

1. Conduct a literature review on existing CAV applications. Generate a list of CAV applications to be implemented in this project in consultation with the project panel.
2. Implement the selected CAV applications in the integrate microsimulation platform in the Aimsun program.
3. Generate subnetworks, networks and design simulation scenarios from the I-210 corridor in consultation with the project panel.
4. Conduct simulations, summarize simulation results, and develop the sketch-level planning tool.
5. Document all findings in a final report and provide a workshop to Caltrans engineers on how to use the sketch-level planning tool.



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WHAT IS OUR GOAL?

The end goal of this task is to have a fully functional planning tool to provide Caltrans Districts Engineers guidance on RSU placement for CAV applications.

WHAT IS THE BENEFIT?

The sketch-level planning tool can help Caltrans Engineers identify the best locations in a targeted project area to install RSUs to achieve desired performance for selected CAV applications. In the long run, this sketch-level planning tool can be further enhanced with more CAV applications, more test networks and scenarios, and more interactive features to provide Caltrans better guidance on the installation of RSUs at the network scale.

WHAT IS THE PROGRESS TO DATE?

The contract will begin June 1, 2023. A kick-off meeting will be scheduled within the first two weeks.