

**Advanced
Research****MAY 2025****Project Title:**

Future Mobility Research Center

Task Number: 4260**Start Date:** January 12, 2024**Completion Date:** December 31, 2026**Task Manager:**Sajedur Rahman
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Future Mobility Research Center (FMRC) Contract

To identify and execute a diversified portfolio of multi-disciplinary transportation research projects with collaboration among California Partners for Advanced Transportation Technology (PATH) staff, UC Berkeley faculty, and post graduate research students.

WHAT IS THE NEED?

The California Department of Transportation (Caltrans) needs an academic partner to assist in the task of understanding, considering, and utilizing Intelligent Transportation System (ITS) technologies that may be exceptionally beneficial to California's travelers. California PATH Research Center is a critical component in the statewide ITS Research Program focusing on improving mobility and safety with advanced ideas, technologies, and a deployment emphasis. It provides Caltrans the tools needed to meet its Safety and System Performance goals by conducting leading-edge research, evaluating and conducting controlled experiments and field operational tests, and developing public/private/academic partnerships, using the expertise of a knowledgeable and experienced staff in ITS research.

WHAT ARE WE DOING?

In partnership with Caltrans staff, the PATH research team will assist the Department in the following research focus areas:

Transportation Safety Research Program: focuses on investigations of driving behavior, efficient means to investigate crashes and identify solutions, collision avoidance systems, safety and mobility applications for connected vehicle (CV) and automated vehicle (AV) systems, safety performance of highway networks and managed lanes and provide for increased safety and mobility by focusing on the communications technologies, which is the basic premise and promise of Connected Vehicles.

Traffic Operations Research Program: focuses on advancing the state-of-the-art in traffic management and traveler



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

information systems and producing results that can be implemented in the field. Ongoing research projects fall in the following major categories: CV/AV test-bed development and deployment, integration of traffic signals and ramp meters, integrated corridor management (ICM), variable speed limits and coordinated ramp metering for freeway traffic control, traffic surveillance, methodologies for data processing, analysis and performance measurement, development and application of modeling tools, and formulation and testing of advanced operational strategies for intersections, arterials, freeways and corridors.

Mobility and Multi-Modal Applications Program: encompasses a wide variety of activities including the integration of vehicular and infrastructure technologies that improve safety and mobility including passenger, transit, and heavy vehicles. PATH research team will work closely with transit and traffic operation agencies to address real world problems in Bus Rapid Transit (BRT), adaptive transit signal priority, seamless connection among different transport modes, transit safety, connected transportation, and automated vehicle activities.

CV/AV Applications Development Program: focuses on a variety of applications development activities, including truck platooning, cooperative adaptive cruise control, Eco-Driving, connected automation, adaptive traffic signals based on CV/AV data, signal preemption, intelligent signals and pedestrian assistance are few to mention.

WHAT IS OUR GOAL?

To develop solutions to the problems of California's surface transportation systems through cutting edge research by harnessing the knowledge of transportation researchers, working in conjunction with experts in the fields of information technology, electrical engineering, civil engineering, mechanical engineering, economics, transportation policy, and behavioral studies.

WHAT IS THE BENEFIT?

PATH Research Center is beneficial for the success and growth of the Department's multi-disciplinary, multi-campus research program involved in ITS research by providing research management services. Working closely with Caltrans staff, PATH will identify potential synergistic ventures between State and National level research programs, solicit and secure external funding from a variety of sources to leverage the core research support funded by Caltrans, provide outreach, and serve as a liaison between Caltrans and other federal and state agencies nationwide.

WHAT IS THE PROGRESS TO DATE?

The PATH research team Primarily completed task 1-4 with several sub-tasks still work in progress.

Enhance Safety and Equity (Vision Zero):

The PATH team has completed the report on the Federally-Funded Work Zone Data Exchange (WZDx) Activities in December 2024. The report included the (1) analysis of the work zone crash and fatalities; (2) Work Zone Data Initiative Framework; (3) Work Zone Data Exchange (WZDx) Specification and Standardization; (4) Federally funded pilot projects; (5) current and pending work zone projects from PATH; and (6) summary of future work zone related research ideas.

Enhance Sustainability and Efficiency / Climate Action:

- Eco-Driving Demonstration: Delivered via a field demonstration at the American Center for Mobility. Submitted a report that recorded the simulation analysis results of PATH's eco-driving algorithm. Preliminary draft of Digital Transportation Infrastructure (DTI) Roadmap written.
- El-Camino Real (ECR) Data Dashboard: New framework and design completed and deployed locally and on Amazon web Services (AWS) cloud service. Updated an existing data-exporting Application Programming



Interface (API) within the I-210 Aimsun Next microsimulation model to include estimates of fuel consumption from gasoline-powered vehicles and electricity consumption from electric vehicles. Developed Excel spreadsheets to help compile and visualize simulation results. Communicated with Transport Simulation Systems (TSS), the developer of the model, to help address some issues with the tracking of Vehicle Miles Traveled (VMT).

Workshops and Partnership Building:

This task will seek to leverage research performed under this contract, as well as other research collaborations between PATH and Caltrans, in two keyways. First, it seeks to ensure that the research broadly benefits Caltrans, especially divisions beyond DRISI (e.g., traffic operations and the office of sustainability). Second, it seeks to help build larger partnerships between PATH, Caltrans, and other entities in both the public and private sector, especially around laying the groundwork for large, deployment-focused projects and funding from non-Caltrans sources.