



Caltrans Division of Research,  
Innovation and System Information

# Research



# Results



Advanced  
Research

JULY 2019

**Project Title:**

PATH Technical Support for  
Automated Vehicles

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## Early Opportunities to Apply Automation in California Managed Lanes

Identified specific opportunities to leverage California's managed lane network as early experimental and pilot deployment sites for Connected and Automated Vehicles (CAV)

### WHAT WAS THE NEED?

California has an opportunity to play a stronger role in the Connected and Automated Vehicle (CAV) domain because of a unique combination of attributes. First, California has one of the largest networks of managed lanes in the country, which has advantages when testing new connected automated vehicle (CAV) concepts. Second, California has one of the largest concentrations of Automotive Research & Development facilities in the country. Facilities include academic research institutions and Silicon Valley industrial labs. The opportunities for transportation system improvements will become more significant as higher levels of automation and connectivity are developed in the coming years. Several other states have already seen this as an opportunity to encourage local industrial development while enhancing their transportation systems and have invested in the development of testbed facilities and early deployment incentives for automated systems.

### WHAT WAS OUR GOAL?

The primary goal of the project is to identify specific opportunities to capitalize on the state's managed lane network as early experimental and deployment sites for CAVs. The managed lanes are important in this context because they provide a means of concentrating equipped vehicles near each other, with some degree of separation from other traffic, so that they can interact with each other as if they represented a larger fraction of the vehicle population than they really do. Examples of managed lanes include high occupancy vehicle (HOV) lanes, high occupancy toll (HOT) lanes and express lanes, which typically require a toll payment or HOV status to use the lane.



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knowledge that improves  
California's transportation system

## WHAT DID WE DO?

Work under this project identified the specific opportunities to capitalize on the state's managed lane network as early experimental and deployment sites for connected automated vehicles. The managed lanes are important in this context because they provide a means of concentrating equipped vehicles in close proximity to each other, with some degree of separation from other traffic, so they can interact with each other as if they represented a larger fraction of the vehicle population.

The following four tasks were completed under this project:

1. Identified and assessed managed lanes in California
2. Identified automation applications that could enhance operations at each site
3. Defined conceptual designs for connected automation at the most promising sites
4. Assessed most promising testing and early deployment opportunities

## WHAT WAS THE OUTCOME?

The outcome of the project has identified the most promising managed lane facility for early experimental and pilot deployment sites for CAVs and also pointed out the CAV technologies that can be implemented with minimal effort. The study recommends that the I-15 Express Lanes in San Diego and the I-10 Express Lanes in Los Angeles are best suited for future CAV tests. The following five applications should be considered for testing in the two California sites:

1. Highway CACC
2. V2I speed harmonization
3. Freeway merge coordination
4. Automated bus rapid transit
5. Automated barrier mover vehicle.

## WHAT IS THE BENEFIT?

The expected benefits from this study is the identification of prime managed lanes facilities where the selected CAV applications can be deployed to increased capacity, reduced congestion and achieve smoother traffic flow and also achieve some related improvements to safety.

## LEARN MORE

View the Final Report

<https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/final-reports/ca19-2910-finalreport-a11y.pdf>