Early Opportunities To Apply Automation In California Managed Lanes

A study focused on enhancing transportation system to be more adaptable to vehicle automation.

WHAT IS THE NEED?

In recent years, the automotive industry has been making significant progress in developing the technologies for automating portions of the dynamic driving task, and a wide range of products have been introduced to provide “Level 1” automation, which is either adaptive cruise control or lane keeping assistance. A few manufacturers have introduced “Level 2” automation, that provides simultaneous adaptive cruise control and lane keeping assistance, and most other manufacturers will be introducing similar functions for their top-of-the-line vehicles within the next year or two. Although these systems provide improvements in driving comfort and convenience, they are unlikely to have appreciable impacts on system-level measures of transportation system performance, such as safety, efficiency, and sustainability. Achieving those more significant benefits is going to require combinations of the in-vehicle technologies, with infrastructure support and connected vehicle capabilities (vehicle-vehicle (V2V) and vehicle-infrastructure (V2I)).

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 test-bed facilities and early deployment incentives for automated systems. California has an opportunity to play a stronger role in this domain because of a unique combination of attributes:
1. California has the largest network of managed lanes: High Occupancy Vehicle (HOV), and High Occupancy Toll (HOT) in the industry;

2. California is one of the largest concentrations of automotive Research and Development in the country, between its academic research institutions and Silicon Valley industrial labs.

WHAT ARE WE DOING?

The research team will identify 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, as if they represented a larger fraction of the vehicle population.

There are four tasks under this project:

1. Identify and assess managed lanes in California.
2. Identify automation applications that could enhance operations at each site.
3. Define conceptual designs for connected automation at the most promising sites.
4. Assess most promising testing and early deployment opportunities.

WHAT IS OUR GOAL?

The end goal is to identify the specific opportunities to capitalize on the state's managed lane network, as early experimental and deployment sites for connected automated vehicles.

WHAT IS THE BENEFIT?

The benefits of this task are two folds:

1. System-level benefits including improvement in safety, vehicle efficiency, and overall system sustainability.
2. Individual-level benefits including more comfortable driving experience and overall reduction in travel time.

WHAT IS THE PROGRESS TO DATE?

Tasks 1 to 3 have been completed. The delay in completing the last task is due to the following two reasons: (1) The need to hire a new replacement for one of the researchers; and (2) Scheduling visits on managed lanes in various districts takes up time, based on the availability of the districts staff and the researchers. The project completion date is extended to August 2018, which will provide ample time to finish the project successfully.