TO: BOARD OF DIRECTORS

THROUGH: PHILLIP A. WASHINGTON  
CHIEF EXECUTIVE OFFICER

FROM: BRYAN PENNINGTON  
EXECUTIVE DIRECTOR, ENGINEERING & CONSTRUCTION

SUBJECT: UPDATE ON ONE CALIFORNIA CONNECTED VEHICLE PILOT PROJECT

ISSUE

Caltrans Headquarters, in partnership with Metro, Metropolitan Transportation Commission of the Bay Area, and the San Diego Association of Governments, submitted a proposal to the United States Department of Transportation Federal Highway Administration for the Connected Vehicle Pilot Deployment program. The proposal, branded as “One California”, encompasses the deployment of connected vehicle technologies in each metropolitan region that encourages economic vitality, protects our environment, and reduces congestion. USDOT will announce the Wave 1 pilot deployment sites in August 2015.

BACKGROUND

The United States Department of Transportation (USDOT) Connected Vehicle Pilot Deployment (CVPD) Program is a multi-modal initiative to enable safe, interoperable, networked wireless communication among vehicles, infrastructure, and personal communications devices. Connected vehicle research is being sponsored by the USDOT and others to leverage the capabilities of wireless technology to make surface transportation safer, smarter, and greener. The CVPD Program will encompass multiple pilot sites over time, with each site having different needs, focus, and applications. Available funding for the CVPD Program is approximately $100 million.

On March 12, 2014, the USDOT released a Request for Information for the CVPD Program to gather information from the public and private industry about connected vehicle technology and provide notice of anticipated procurements for pilot deployment concepts.
The level of interest from the California public agencies and education institutions initiated discussions between Caltrans HQ and the other regions in the State. In May 2014, Caltrans HQ, Metro, County of Los Angeles Department of Public Works (LADPW), MTC, San Diego Association of Governments (SANDAG), and PATH met to discuss the upcoming CVPD Program solicitation and potential partnership opportunities. Caltrans HQ and the regional agencies were in concurrence that a statewide submittal for the CVPD Program procurement would be a stronger approach than submitting individual regional proposals.

Caltrans HQ, Metro, MTC, and SANDAG, with support from LADPW, California PATH, and UCR, formed the partnership named “One California” to respond to Wave 1 of USDOT CVPD Program Broad Agency Announcement (BAA). For the past year, the One California Team communicated on a weekly basis as connected vehicle pilot concepts were developed for each region. Each region worked with its local agencies and stakeholders as concepts were being developed to address problems and needs. The concepts were centered on the following user-needs categories: mobility, environment, safety, and agency efficiency.

The BAA for Wave 1 of the CVPD Program was released on January 30, 2015, with approximately $40 million of funding available. Caltrans HQ was identified as the lead agency submitting the One California proposal on behalf of the State and three regions. The One California proposal is requesting $20 million in federal funding to deploy 16 connected vehicle applications statewide. The applications would address California’s freight movement inefficiencies, transit reliability and efficiency, air quality, freeway collisions, pedestrian conflicts, and traveler information. In the Los Angeles region, seven connected vehicle applications are being proposed adjacent to the Interstate 710 corridor and the Ports of Los Angeles and Long Beach, focusing on freight, transit, air quality, freeway operations, and agency data. The One California proposal was submitted to USDOT on March 25, 2015. USDOT will announce the Wave 1 pilot deployment sites in August 2015.

NEXT STEPS

Staff will provide an update to the Board in September 2015 on the announcement of the CVPD Wave 1 recipients. If One California is a recipient of federal funding, the CEO, or his designee, will execute a Memorandum of Understanding between California Department of Transportation, Metropolitan Transportation Commission, and San Diego Association of Governments for the One California Connected Vehicle Pilot Project. The CEO will also execute a funding agreement to receive $155,000 from Metropolitan Transportation Commission for staff resources, professional services, and travel during Phase 1 of the One California Connected Vehicle Pilot Project.
Executive Summary

California travelers suffer from 535,000 vehicle-hours-of-delay every day, the highest in the nation, which leads to loss of productivity, wasted fuel consumption, and adverse impacts on air quality. Incidents on the roadway—typically automobile collisions—account for approximately one-third of this delay. A reduction in the number of collisions would reduce delay, improve mobility, and further California’s aggressive improvement in air quality. With these challenges in mind, an unprecedented partnership between public sector, private sector, and academic entities proudly submitted a proposal to the FHWA for the Wave 1 Pilot Deployment of Connected Vehicles (CV). This proposal furthers the goals identified in the California Transportation Plan 2040 by creating a sustainable and interconnected transportation system that encourages economic vitality, protects precious natural resources, and promotes the health and well-being of all Californians.

The Connected Vehicle leverages new technologies that give vehicles the capability to communicate wirelessly with one another and with devices on surrounding infrastructure for purposes of improving transportation safety, mobility, and impact on the environment.

A Team Approach

The One California proposal is a bold and innovative approach to CV deployment, submitted by the California Department of Transportation (Caltrans) and combining the skills and expertise of transportation agencies from three of the most progressive regions in the United States, namely the Metropolitan Transportation Commission (MTC) of the San Francisco Bay Area, the Los Angeles County Metropolitan Transportation Authority (METRO), and the San Diego Association of Governments (SANDAG). The team defined the transportation needs and challenges affecting California’s urban regions with growing populations during stakeholder meetings held in the three deployment regions, and then examined USDOT-defined and new CV technology applicable to these needs and challenges across four categories: mobility, environment, safety, and agency efficiency.

Lending support to the team is the County of Los Angeles Department of Public Works (LADPW) and Caltrans’ academic partners at the University of California (UC), Berkeley’s Partners for Advanced Transportation Technology (CA PATH) and UC Riverside’s Bourns College of Engineering-Center for Environmental Research and Technology (CE CERT). These academic partners have worked with Caltrans for more than 25 years, performing technical research in CV-related areas, including the implementation and operation of the existing California CV Test Bed, located in Palo Alto, CA.

HISTORY OF INNOVATION

MTC Successfully deployed four Urban Partnership Program projects that remain in operation: 511 Parking Info, 511 Real-Time Transit Departure Info, 511 Enhanced Multimodal Trip Planner, and use of Clipper® Transit Fare Card for parking payment.

METRO Successfully partnered with USDOT to deploy Freight Advanced Traveler Information System (FRATIS) CV applications; deployed one of the largest wireless signal systems in the nation, and invested over $15M on signal synchronization and bus speed improvements.

SANDAG One of the first MPOs in the U.S. to include Connected Vehicles in its regional transportation plan; successfully deployed an award winning Integrated Corridor Management System on Interstate 15. (Best of ITS 2013 Award; California Transportation Foundation Operational Efficiency Award 2014)

WHY CALIFORNIA?

The Los Angeles, San Francisco Bay Area, and San Diego populations are 2nd, 5th, and 9th among Top 10 U.S. Cities

History of addressing transportation challenges with technology solutions

Leaders in technology and research

Home to the world’s most innovative technology companies
The core basis for the One California approach is the shared transportation challenges and needs affecting urban regions with growing populations, and the recognition that shared solution can be achieved through deployment of CV applications.

### MOBILITY GOALS
- Improve transit & truck reliability.
- Reduce transit & truck delay.
- Improve passenger accessibility.

### ENVIRONMENT GOALS
- Improve fuel economy.
- Reduce emissions.

### SAFETY GOALS
- Provide freeway alerts to various dilemma zones.
- Reduce conflicts between pedestrians and transit.
- Reduce freeway crashes.

### AGENCY EFFICIENCY GOALS
- Improve accuracy of traffic data and pavement data.

The One California applications suite serves as the means for making these improvements. Measurements on system performance will provide feedback on the success of these application solutions and also provide impetus for future deployment across both the state and the nation.
Transit Signal Priority
Improves transit performance by reducing control delay.

Freight Signal Priority
Signal priority for enabled trucks on select corridors.

Mobile Accessible Pedestrian Signal System
Accessible pedestrian signals.

Freight-Specific Dynamic Travel Planning and Performance
Routes around congestion.

Drayage Optimization
Provides queue lengths and wait times at port terminals.

Dynamic Transit Operations
Enables on-demand, flexible route transit.

Bus Stop Alert
Passengers can request bus pickup at designated stops.

Queue Warning
Warms of slow or stopped freeway traffic ahead.

Dynamic Speed Harmonization
Speed guidance for service vehicles to reduce fuel use.

EcoFRATIS
Freight route guidance to lower fuel use and emissions.

EcoSmart Drive
Driver guidance to lower fuel use and emissions.

Pedestrian in Signalized Crosswalk
Raises driver awareness of nearby pedestrian movements.

Reduced Speed Work Zone Warning
Warms of slow or stopped traffic in work zones.

Curve Speed Warning
Warms drivers that approach curves faster than advised.

Probe-Enabled Traffic Monitoring
Uses freight vehicles as probes to improve regional traffic data.

Probe-Based Pavement Maintenance
Uses probe vehicles to gather pavement condition data.

The One California Pilot Deployment consists of three major metropolitan region deployments. One California demonstrates an integrated and coordinated deployment like none other in the country, and can serve as a model for the creation of a permanent statewide institutional framework.
Applications to Meet the Challenges

Transportation challenges facing urban regions with growing populations fall into four user-needs categories: mobility, environmental, safety, and agency efficiency. These categorizations help identify "what" needs to be improved, while the CV applications determine "how" these improvements can be made. Subsequent system-wide performance measures will quantify the success of these application solutions.

Given the distances between the deployment regions, the One California approach demonstrates an integrated and coordinated deployment that is unique in the country. As the FHWA moves forward in ever increasing scale and breadth of CV deployment, One California can serve as a model for the creation of a permanent statewide institutional framework.

The initial deployment efforts implemented in the three regions can scale up and reach nearly 18.4 million people, approximately six percent of the U.S. population, giving the USDOT the opportunity to increase public exposure to CV technology through deployment in one state.

One California Request for Interest (RFI) to Industry

Caltrans implemented a One California CV Program RFI which drew the interest of 55 technology/application vendors and system integrators that provide products, solutions, and services that can support the pilot.

If We Build It...

The One California approach proposed a standard system architecture and common deployment framework enabling applications to be more easily shared among regions. The network architecture for back-office systems and equipment for security, applications, and data are proposed to be developed in a coordinated effort between the three regions. This interregional approach demonstrates economies of scale in the procurement of equipment, software, and professional services, which can significantly reduce costs in areas such as application development and systems engineering.

It Gets Better

Many of the applications proposed in One California address other statewide initiatives to improve air quality and reduce vehicle congestion. For example, increasing transit ridership leads to a reduction in auto traffic, thus reducing greenhouse gas (GHG) emissions and improving air quality. Because vehicles are the single largest source of GHG emissions statewide, setting vehicle miles traveled reduction targets is one of the key goals of California's Sustainable Communities and Climate Protection Act of 2008, also known as Senate Bill 375 (SB 375). Through the implementation of the One California vision, this pilot program can contribute to reducing regional GHG targets and ultimately move the State closer to its SB 375 goals.

The statewide mobility challenges include transit on-time performance, freeway congestion, and freight movement at port terminals. Safety concerns include pedestrian-transit conflicts, freeway dilemma zones, and a statewide need for increased driver awareness. Overall, the One California proposal demonstrates the scientific and technical merit of the regions, as well as the strength, commitment, and depth of their combined vision which resulted from the culmination of unprecedented planning and preparation efforts.

Caltrans
Contact information:
Greg Larson
greg.larson@dot.ca.gov
(916) 857-4369

MTC
Contact information:
Virginia Lingham
V.Lingham@mtc.ca.gov
(510) 817-5826

LA Metro
Contact information:
Ed Alegre
AlegreE@metro.net
(213) 922-7902

SANDAG
Contact information:
Peter Thompson
peter.thompson@sandag.org
(619) 699-4813

Revised 5/20/2015