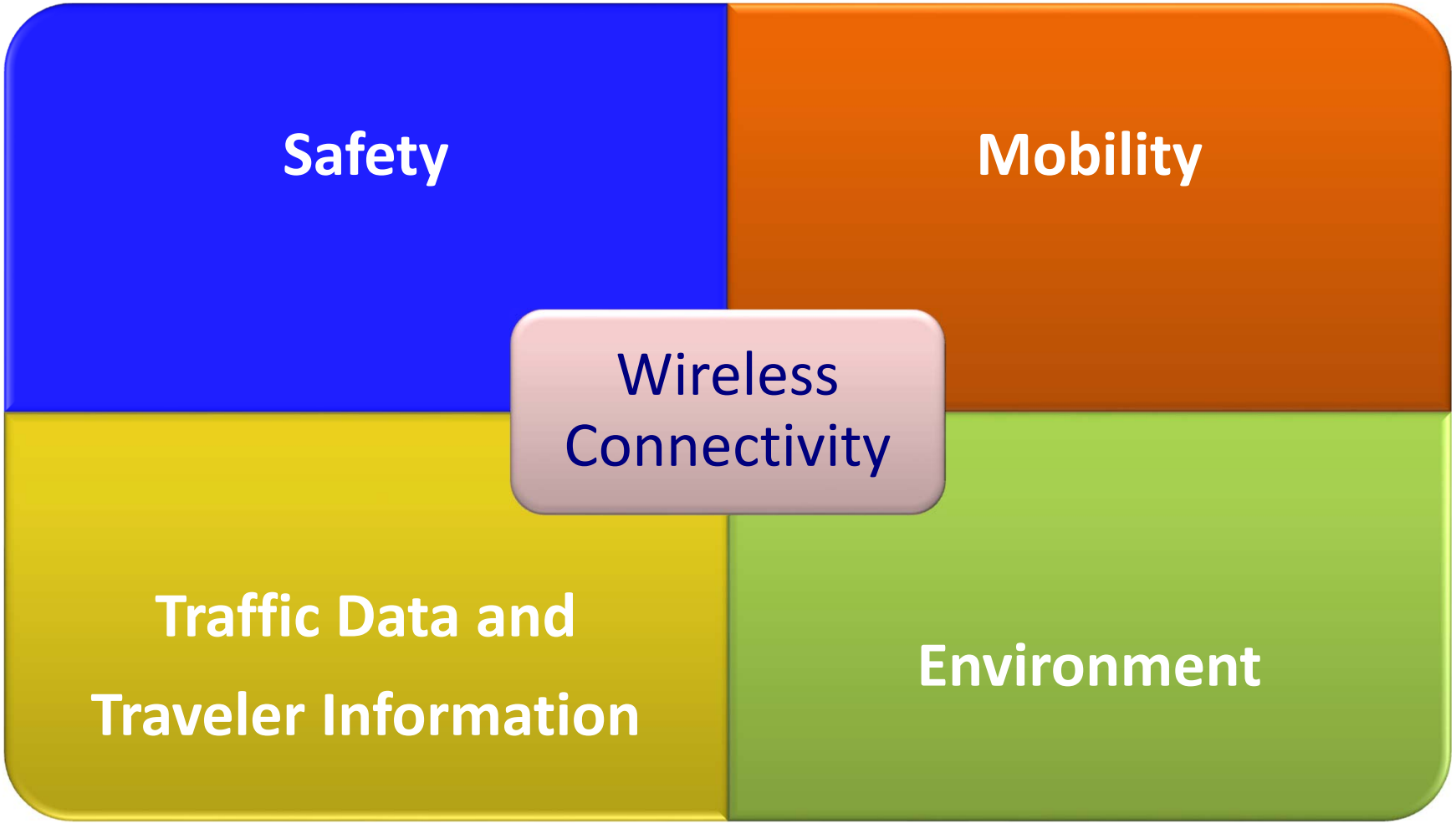
Connected Vehicle Program Update

Arterial Operations Committee Meeting
July 14, 2015

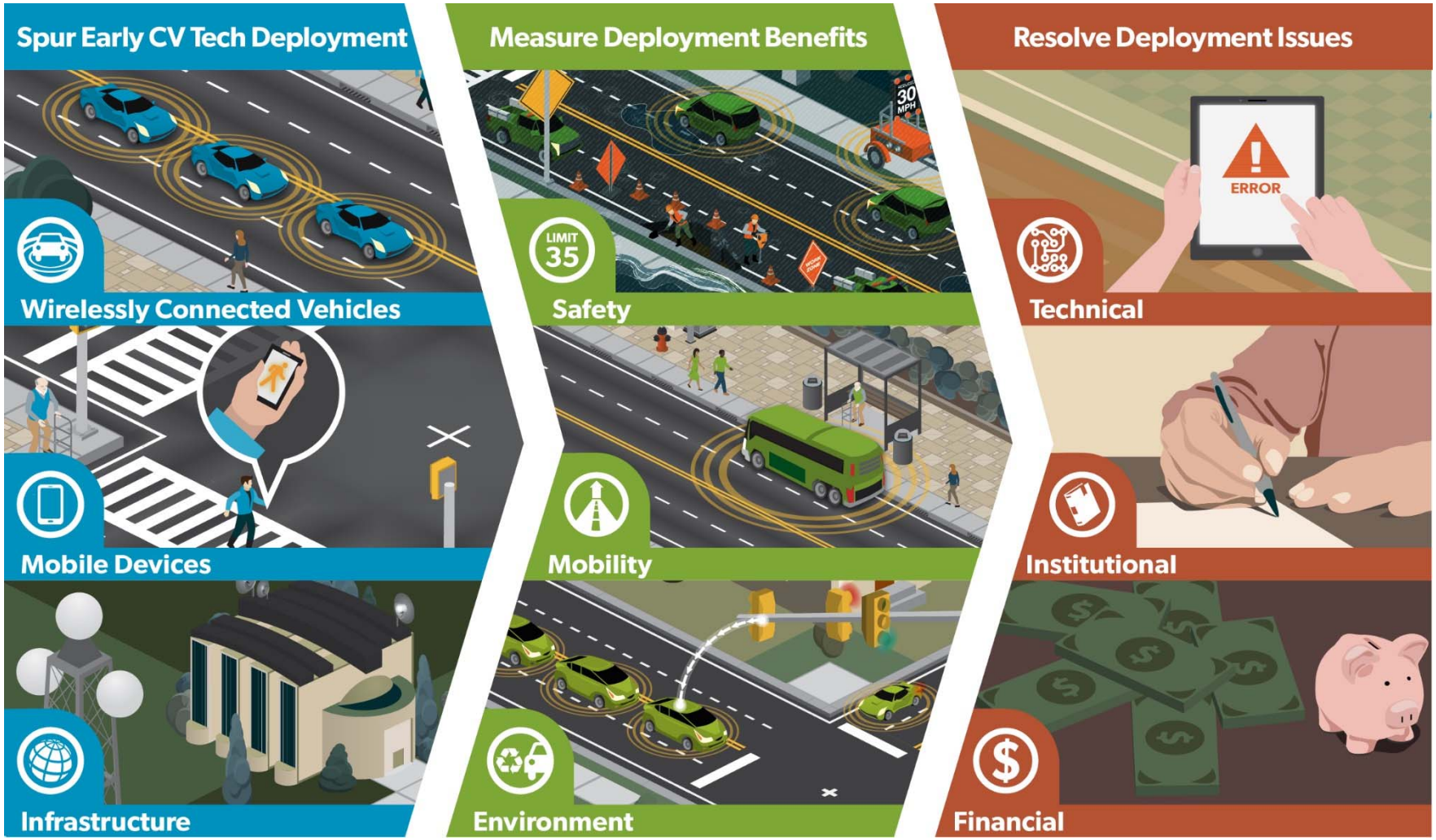
Why Invest in Connected Vehicle Technology?

To transform our transportation systems and create a future with improved:



What Does a Connected Vehicle Deployment Look Like?

What are the Program Goals and Objectives of the U.S. DOT Connected Vehicle Pilot Deployment?



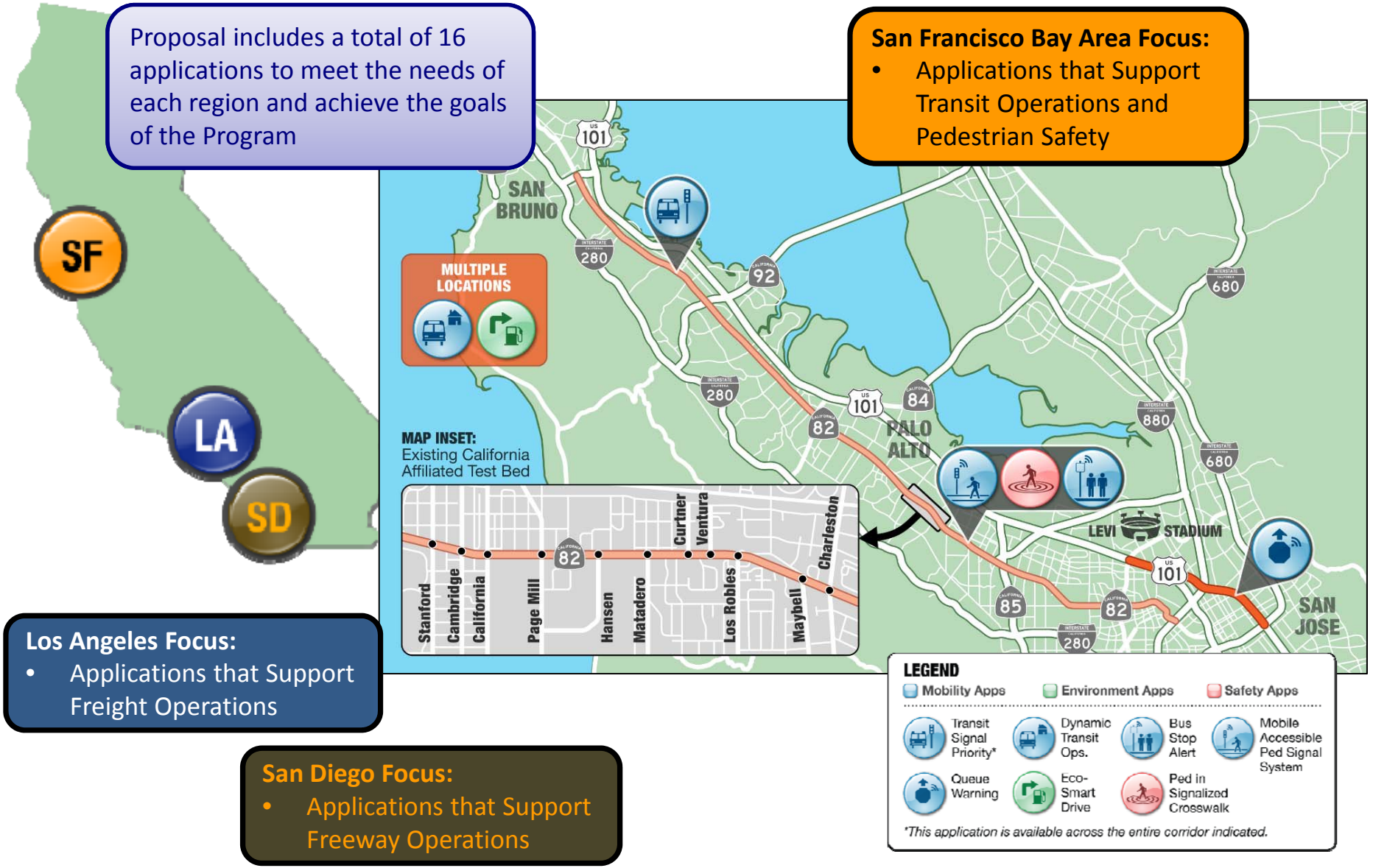
One California: A Large-Scale Statewide Connected Vehicle Pilot Deployment

- **Led by:**
  - Caltrans
- **In association with:**
  - Metropolitan Transportation Commission
  - Los Angeles County Metropolitan Transportation Authority
  - San Diego Association of Governments

One California Pilot Deployment Proposal

Proposal includes a total of 16 applications to meet the needs of each region and achieve the goals of the Program

San Francisco Bay Area Focus:
- Applications that Support Transit Operations and Pedestrian Safety

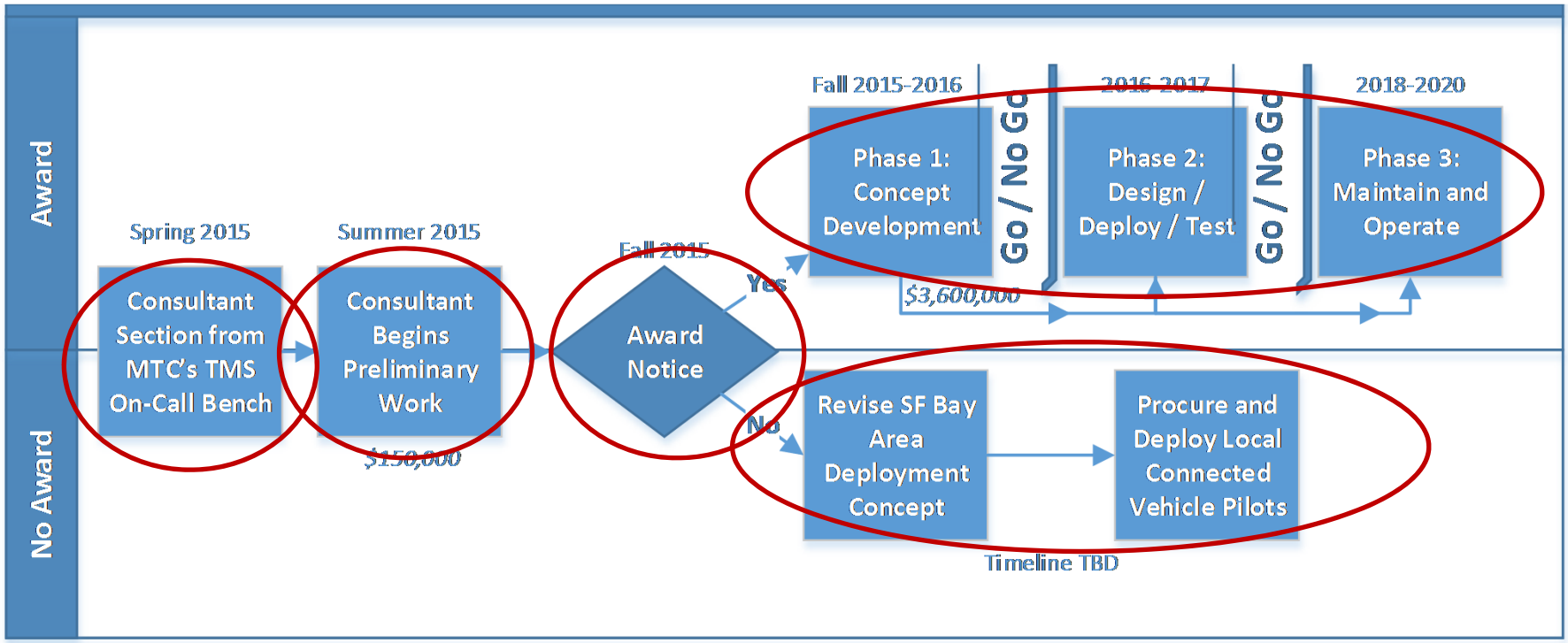


Los Angeles Focus:
- Applications that Support Freight Operations

San Diego Focus:
- Applications that Support Freeway Operations

Next Steps

- **MTC's Current Path to Connected Vehicle Deployments**



Additional Initiatives

- **Columbus Day Initiative**
- **Explore other project opportunities and other business models**
- **Continued coordination among interested stakeholders**

Questions?

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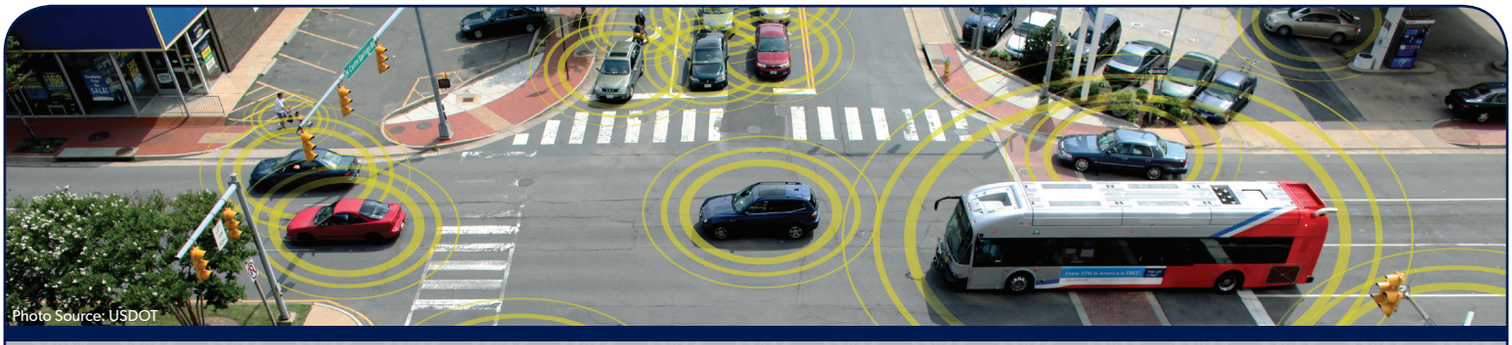
Photo Source: USDOT

HOW CONNECTED VEHICLES WORK

Connected vehicles have the potential to transform the way Americans travel through the creation of a safe, interoperable wireless communications network—a system that includes cars, buses, trucks, trains, traffic signals, smart phones, and other devices. In the past, the U.S. Department of Transportation (USDOT) has focused on helping people survive crashes. Connected vehicle technology will change that paradigm by giving people the tools to *avoid* crashes.

Why Connected Vehicle Technologies Are Needed

Connected vehicle technologies aim to tackle some of the biggest challenges in the surface transportation industry—in the areas of safety, mobility, and environment.

- **Safety:** According to the National Highway Traffic Safety Administration (NHTSA), there were 5.6 million crashes in 2013. The number of fatalities from vehicle crashes is falling but still accounted for 32,719 deaths. Connected vehicle technologies will give all drivers the tools they need to anticipate potential crashes and significantly reduce the number of lives lost each year.
- **Mobility:** According to the Texas Transportation Institute, U.S. highway users wasted 5.5 billion hours stuck in traffic in 2011. Connected vehicle mobility applications will enable system users and system operators to make smart choices that reduce travel delay.
- **Environment:** According to the Texas Transportation Institute, the total amount of wasted fuel topped 2.9 billion gallons in 2011. Connected vehicle environmental applications will give motorists the real time information they need to make "green" transportation choices.

Connected vehicles feature safety warnings that alert drivers of potentially dangerous conditions — impending collisions, icy roads and dangerous curves — before the driver is aware of them. Research from NHTSA found that connected vehicle technology has the potential to address vehicle crashes by unimpaired drivers, but more research needs to be done to understand the true effectiveness of the technology.

Connected vehicle applications provide connectivity between and among vehicles, infrastructure, and wireless devices to:

- Enable crash prevention
- Enable safety, mobility and environmental benefits
- Provide continuous real-time connectivity to all system users

Motor vehicle crashes are the leading cause of death for people ages 4, 11 through 27, according to the Centers for Disease Control.

Agencies involved in connected vehicle research:

- Federal Highway Administration (FHWA)
- Federal Motor Carrier Safety Administration (FMCSA)
- Federal Railroad Administration (FRA)
- Federal Transit Administration (FTA)
- National Highway Traffic Safety Administration (NHTSA)
- Office of the Assistant Secretary for Research and Technology

U.S. Department of Transportation

How Connected Vehicles Will Work

With connected vehicle technology, drivers will get warning messages in their vehicles when a potential crash is imminent.

A system of connected vehicles is still in development, and plenty of research still needs to be done. Safety-related systems for connected vehicle technology will likely be based on dedicated short-range communications (DSRC), a technology similar to WiFi. DSRC is fast, secure, and reliable. Non-safety applications may be based on different types of wireless technology. Cars, trucks, buses, and other vehicles will be able to "talk" to each other with in-vehicle or aftermarket devices that continuously share important safety and mobility information with each other. Connected vehicles can also use wireless communication to "talk" to traffic signals, work zones, toll booths, school zones, and other types of infrastructure. The vehicle information communicated does not identify the driver or vehicle, and technical controls have been put in place to help prevent vehicle tracking and tampering with the system.

How Connected Vehicles Will Improve Safety

Connected vehicle safety applications will enable drivers to have 360-degree awareness of hazards and situations they cannot even see. Through in-car warnings, drivers will be alerted to imminent crash situations, such as merging trucks, cars in the driver's blind side, or when a vehicle ahead brakes suddenly. By communicating with roadside infrastructure, drivers will be alerted when they are entering a school zone, if workers are on the roadside, and if an upcoming traffic light is about to change.

Pivotal work is being conducted to guarantee that these driver warnings will not be a distraction and that people will only be made aware when they are approaching danger.

The connected vehicle system will be similar in many ways to other wireless networks and will create a dynamic transportation network based on an open platform to allow for new and creative applications. Open standards allow anyone to develop new products and applications that will work in this space.

How Connected Vehicles Will Keep People Moving

Anonymous signals in vehicles will help generate new data about how, when, and where vehicles travel—information that will then be analyzed by transportation managers to help make roads safer and less congested.

The same signals could also be shared among mobile devices and roadside sensors. This exciting new data-rich environment will also be the genesis for a multitude of new mobility applications that will help to keep traffic flowing and make it easier for people to plan their travel experience. Imagine, for instance, apps that can help you find open parking spaces, locate available last-minute ride-share partners, guarantee you make your bus or train connection, or help a blind pedestrian cross the street. With an open source system for mobility applications, there will be minimal restrictions and limitless opportunities.

How Connected Vehicles Will Improve The Environment

Mitigating greenhouse gas (GHG) contributions is everyone's responsibility. In 2012, the transportation sector contributed 28 percent of the country's GHG emissions, according to the Environmental Protection Agency's Inventory of U.S. Greenhouse Gas Emissions and Sinks. Connected vehicle technologies will generate real-time data that drivers and transportation managers can use to make green transportation choices.

For example, real-time information about traffic conditions will help motorists eliminate unnecessary stops and vehicles reach optimal fuel-efficiency. Informed travelers may also be able to avoid congestion by taking alternate routes or public transit, or rescheduling their trip—any of which can make their trip more eco-friendly. By providing real-time information, travelers will have a realistic idea of when transit vehicles will arrive; they will also be able to improve bus and train connections, and this will help make public transportation more appealing to the average traveler.

The U.S. Government's Role

The USDOT's Intelligent Transportation Systems (ITS) Joint Program Office fosters the development and future deployment of connected vehicle technologies. But connected vehicle research involves all agencies within the USDOT including NHTSA, the Federal Highway Administration, the Federal Motor Carrier Safety Administration, the Federal Transit Administration, and the Federal Railroad Administration, as well as several leading auto manufacturers and academic research institutions.

NHTSA announced that it will begin taking steps to enable vehicle-to-vehicle (V2V) communication technology for light vehicles. In August 2014, NHTSA issued an Advance Notice of Proposed Rulemaking to begin implementation of V2V communications technology, as well as an accompanying research report on the technology. The report includes analysis of the USDOT's research findings in several key areas including technical feasibility, privacy and security, and preliminary estimates on costs and safety benefits. NHTSA is beginning work on a regulatory proposal that would require V2V devices in new vehicles in a future year, consistent with applicable legal requirements, Executive Orders, and guidance.

For more information about this initiative, please contact:
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FHWA-JPO-11-076

Connected Vehicle Pilot Deployment Program

The U.S. Department of Transportation (USDOT) connected vehicle program is a multi-modal initiative to enable safe, interoperable, networked wireless communications among vehicles, infrastructure, and personal communications devices.

Vision

The Connected Vehicle Pilot Deployment Program seeks to spur innovation among early adopters of connected vehicle application concepts using the best available and emerging technologies for the purpose of improving safety, mobility, and the environment.

A Dedicated Partnership: The "One California" Team

The "One California" team is led by Caltrans and supported by its regional transportation partners, the Metropolitan Transportation Commission of the San Francisco Bay Area (MTC), the Los Angeles County's Metropolitan Transportation Authority (LA Metro) and Department of Public Works (LA County DPW), and the San Diego Association of Governments (SANDAG), as well as its academic partners at UC Berkeley PATH and UC Riverside CE/CERT.

Each member organization of the team is well recognized nationally and internationally for expertise in researching and delivering a variety of emerging technologies in transportation.

One California

An Integrated Pilot Approach of Unprecedented Scale to Accelerate National Deployment

› The "One California" Connected Vehicle Pilot Deployment has the potential to be the nation's catalyst for the rollout of Connected Vehicle technologies in the U.S.

"One California" Team Approach to Address State and National Needs

With California's safety, mobility, and environmental challenges in mind, a strong partnership of public sector and academic agencies formed the "One California" team, as the first step in a new plan to apply Connected Vehicle technologies to improve the efficiency of California's surface transportation system.

› The "One California" team proposes this large-scale Connected Vehicle Pilot Deployment project to serve as the model for other regions nationwide to follow.

The "One California" proposal submitted to the FHWA on March 27, 2015 embodies the principles identified in the California Transportation Plan:

- Creating a sustainable and interconnected transportation system that encourages economic vitality,
- Protects precious natural resources,
- Promotes the health and well-being of all Californians, and
- Meets people's needs equitably.

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

"Announcement of FHWA Pilot Deployments expected September 2015"

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