Photo Source: USDOT

TRANSIT ASPECTS
OF THE CONNECTED VEHICLE RESEARCH PROGRAM

LIMIT 35 SAFETY MOBILITY ENVIRONMENT

What are connected vehicle technologies and what can they do for transit systems?

The U.S. Department of Transportation's (USDOT's) Connected Vehicle Research Program is examining how wireless technology can enable vehicles to communicate with each other and with the infrastructure around them. This connected vehicle technology—also known as vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications—could one day alert drivers to dangerous road conditions or impending collisions.

Connected vehicle technologies can help transit systems address safety, mobility, and environmental issues.

Transit Safety

While transit already is one of the safest modes of travel, connected vehicles will give transit operators more tools to anticipate and reduce potential crashes. Because of transit vehicles' large size and frequent stops and starts, transit operators face a unique set of safety challenges.

To address those challenges, the USDOT conducted the Transit Safety Retrofit Project (TRP), a two-year research effort to develop and demonstrate V2V and V2I applications on transit buses. TRP included three basic safety applications (Forward Collision Warning, Emergency Electronic Brake Lights, and Curve Speed Warning) and two transit-specific safety applications (Pedestrian in Signalized Crosswalk Warning and Vehicle Turning Right in Front of Bus Warning). The research examined the effectiveness of the applications at reducing crashes and the response of real-world drivers to the safety applications in their buses. The TRP was a part of the Connected Vehicle Safety Pilot Model Deployment in Ann Arbor, Michigan. This one-year pilot deployment tested nearly 3,000 cars, trucks, and transit vehicles equipped with wireless communication devices to improve safety.

The TRP final report, FHWA-JPO-14-142, is available from the National Transportation Library. In addition, the Volpe Center is conducting an independent evaluation of the TRP applications. Results will be available in early 2015.

Transit-Specific Safety Applications:

- **Vehicle Turning Right in Front of Bus Warning:**
  Warns a bus driver when another vehicle is passing on the left and turning in front of the bus, either to re-enter the right-hand lane or to complete a right turn in front of the bus, as the bus is leaving a bus stop.

- **Pedestrian in Signalized Crosswalk Warning:**
  Warns a bus driver if the bus is about to collide with a pedestrian in a crosswalk while making a turn at a signalized intersection.

Photo Source: USDOT

U.S. Department of Transportation

Transit Mobility

Connected vehicle technology can increase transit system productivity, efficiency, and accessibility. The technology can help mitigate congestion by providing travelers with better transportation information, enabling them to make informed decisions to reduce travel delays.

As part of its connected vehicle research, the USDOT is conducting the Integrated Dynamic Transit Operations (IDTO) prototype development and demonstration project, which includes three applications—Dynamic Transit Operations, Connection Protection, and Dynamic Ridesharing.

The Dynamic Transit Operations application links available transportation service resources with travelers through dynamic transit vehicle scheduling, dispatching, and routing capabilities. Travelers use their personal mobile devices to provide their destination and departure time and current location. Various modal options, real-time traffic conditions, and vehicle capacity are considered.

Connection Protection enables public transportation providers and travelers to communicate in order to improve the probability of successful transit transfers, especially between modes and agencies. Real-time and historical data are used to examine the arrival status of a transit vehicle and transmit a "hold" message. In addition, transfer requests may be initiated by transit riders.

Dynamic Ridesharing makes use of in-vehicle and handheld devices to dynamically identify and accept potential ridesharing opportunities along the travel route, allowing trip-by-trip ridesharing as opposed to preset carpooling.

Photo Source: USDOT

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Transit Environment

Transit plays a key role in connected vehicle research to improve the environment. Connected vehicle technologies will generate real-time data that drivers and transit users can use to make green transportation choices.

The USDOT's Applications for the Environment: Real-Time Information Synthesis (AERIS) program aims to create and acquire real-time transportation data, and use these data to create information that enables green transportation choices by transportation system users and operators.

What policy issues affect connected vehicles for transit?

The Connected Vehicle Research Program includes research that examines the policy and institutional issues that may affect successful deployment of connected vehicles. This multimodal policy research explores questions such as:

- Is new policy needed to launch and sustain connected vehicle technologies?

- Are the policy options acceptable to the public?

- What entities will own, fund, and govern connected vehicle systems, components, and data?

At a technical level, the policy research is examining policy analysis and options specific to the adoption of connected vehicle technology by the transit community.

The TRP independent evaluation report (produced by Volpe) number is FHWA-JPO-14-175.

For more information about this initiative, please contact:

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