CONNECTED VEHICLE PILOT
Deployment Program

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TODAY’S AGENDA

- Connected Vehicle Pilot Deployment Program Overview
- Mobile Devices, Carry-In Devices, Integrated Devices and Roadside Equipment / Units
- The USDOT Qualified Product List (QPL)
- Stakeholder Q&A
Connected Vehicle Pilot Deployment Program Overview
PROGRAM GOALS

Spur Early CV Tech Deployment

Measure Deployment Benefits

Resolve Deployment Issues

Wirelessly Connected Vehicles

Safety

Technical

Mobile Devices

Mobility

Institutional

Infrastructure

Environment

Financial
# Connected Vehicle Applications

## V2I Safety
- Red Light Violation Warning
- Curve Speed Warning
- Stop Sign Gap Assist
- Spot Weather Impact Warning
- Reduced Speed/Work Zone Warning
- Pedestrian in Signalized Crosswalk Warning (Transit)

## V2V Safety
- Emergency Electronic Brake Lights (EEBL)
- Forward Collision Warning (FCW)
- Intersection Movement Assist (IMA)
- Left Turn Assist (LTA)
- Blind Spot/Lane Change Warning (BSW/LCW)
- Do Not Pass Warning (DNPW)
- Vehicle Turning Right in Front of Bus Warning (Transit)

## Agency Data
- Probe-based Pavement Maintenance
- Probe-enabled Traffic Monitoring
- Vehicle Classification-based Traffic Studies
- CV-enabled Turning Movement & Intersection Analysis
- CV-enabled Origin-Destination Studies
- Work Zone Traveler Information

## Environment
- Eco-Approach and Departure at Signalized Intersections
- Eco-Traffic Signal Timing
- Eco-Traffic Signal Priority
- Connected Eco-Driving
- Wireless Inductive/Resonance Charging
- Eco-Lanes Management
- Eco-Speed Harmonization
- Eco-Cooperative Adaptive Cruise Control
- Eco-Traveler Information
- Eco-Ramp Metering
- Low Emissions Zone Management
- AFV Charging / Fueling Information
- Eco-Smart Parking
- Dynamic Eco-Routing (light vehicle, transit, freight)
- Eco-ICM Decision Support System

## Road Weather
- Motorist Advisories and Warnings (MAW)
- Enhanced MDSS
- Vehicle Data Translator (VDT)
- Weather Response Traffic Information (WxTINFO)

## Mobility
- Advanced Traveler Information System
- Intelligent Traffic Signal System (I-SIG)
- Signal Priority (transit, freight)
- Mobile Accessible Pedestrian Signal System (PED-SIG)
- Emergency Vehicle Preemption (PREEMPT)
- Dynamic Speed Harmonization (SPD-HARM)
- Queue Warning (Q-WARN)
- Cooperative Adaptive Cruise Control (CACC)
- Incident Scene Pre-Arrival Staging Guidance for Emergency Responders (RESP-STG)
- Incident Scene Work Zone Alerts for Drivers and Workers (INC-ZONE)
- Emergency Communications and Evacuation (EVAC)
- Connection Protection (T-CONNECT)
- Dynamic Transit Operations (T-DISP)
- Dynamic Ridesharing (D-RIDE)
- Freight-Specific Dynamic Travel Planning and Performance
- Drayage Optimization

## Smart Roadside
- Wireless Inspection
- Smart Truck Parking
CV PILOTS DEPLOYMENT SCHEDULE AND RESOURCES

- Proposed CV Pilots Deployment Schedule

<table>
<thead>
<tr>
<th>Schedule Item</th>
<th>Date</th>
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<tbody>
<tr>
<td>Regional Pre-Deployment Workshop/Webinar Series</td>
<td>Summer-Fall 2014</td>
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<tr>
<td>Solicitation for Wave 1 Pilot Deployment Concepts</td>
<td>Early 2015</td>
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<tr>
<td>Wave 1 Pilot Deployments Award(s)</td>
<td>September 2015</td>
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<tr>
<td>Concept Development Phase (6-9 months)</td>
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<tr>
<td>Design/Build/Test Phase (10-14 months)</td>
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<tr>
<td>Operate and Maintain Phase (18 months)</td>
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<tr>
<td>Solicitation for Wave 2 Pilot Deployment Concepts</td>
<td>Early 2017</td>
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<tr>
<td>Wave 2 Pilot Deployments Award(s)</td>
<td>September 2017</td>
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<tr>
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<tr>
<td>Pilot Deployments Complete</td>
<td>September 2020</td>
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- Resources
  - ITS JPO Website: [http://www.its.dot.gov/](http://www.its.dot.gov/)
  - CV Pilots Program Website: [http://www.its.dot.gov/pilots](http://www.its.dot.gov/pilots)
CV PILOTS WEBSITE

http://www.its.dot.gov/pilots

Connected Vehicles
CV Pilots Deployment Project

Latest News & Updates

- Sample Deployment concept audio recordings for District 13 Operations is now available (3/23/14)
- Sample Deployment concept audio recordings for Greypool County is now available (9/22/14)
- Deployment concept audio recordings for Downtown Sunnyside and H.W. Hallock Expressway are now available (9/18/14)
- CV Pilots FAQs (Updated September 16, 2014)
- The USDOT Connected Vehicles Pilot Deployment Program Webinar Series Part 2: Communications and Role of DSRC is open for registration
- The presentation material of the USDOT Connected Vehicles Pilot Deployment Program Webinar Series Part 1 is available now
- The Descriptions of the Connected Vehicle Applications are available now
- Summary of Responses to the Connected Vehicle Pilot Deployment Program's Request for Information (RFI)

More news →

About the CV Pilots Deployment Project

The U.S. DOT connected vehicle research program is a multimodal initiative that aims to enable safe, interoperable networked wireless communications among vehicles, infrastructure, and personal communications devices. Connected vehicle research is sponsored by the DOT and others to leverage the potentially transformative capabilities of wireless technology to make surface transportation safer, smarter, and greener. Research has resulted in a considerable body of work supporting pilot deployments, including concepts of operations and prototyping for more than two dozen applications. Concurrent Federal research efforts developed critical cross-cutting technologies and other enabling capabilities required to integrate and deploy applications.

Based on the successful results of the connected vehicle research program, and the recent decision by NHTSA to pursue vehicle to vehicle communications safety technology for light vehicles, a robust connected vehicle pilots program is envisioned as a mechanism to spur the implementation of connected vehicle technology. These pilots will serve as initial implementations of connected vehicle...
Devices Potentially Deployed as a Part of CV Pilots
TYPES AND DEFINITIONS OF DEVICES

- **In-Car Devices**
  - **Carry-in devices**: portable devices potentially brought in and connected to vehicles but not generally utilized outside of vehicles
  - **Mobile devices**: portable devices with built-in communications capabilities, such as smart phones, can be used outside vehicles and may or may not necessarily be connected to vehicles
  - **Integrated devices**: devices built into vehicles, not portable, including aftermarket/retrofit integrated devices and OEM integrated devices

- **Roadside Equipment**
  - The Connected Vehicle roadside devices that are used to send messages to, and receive messages from, nearby vehicles
CV PILOT DEPLOYMENT REQUIREMENTS

- **In-Car Devices**
  - Integrated or carry-in devices for connected vehicles capable of generating an SAE J2735 Basic Safety Message (BSM)

- **Roadside Units (RSU)**
  - The USDOT is currently examining equipment from multiple vendors. V4.0 is recommended but V3 is also acceptable.
  - Once it is confirmed that the devices meet the latest (V4) specification, we expect to make this list available to stakeholders.

- **Security**
  - Security Credential Management System (SCMS) is required for Safety Applications

- **Privacy**
  - Users cannot be tracked along their journey or identified without appropriate authorization
Mobile and Integrated Devices on Mobility Applications
  - Connection Protection (T-CONNECT) Application
Utilization of Devices on Applications

Urban Sunnyside Scenarios – 2

- Mobile/Carry-in/Integrated Devices on Safety Applications
  - Pedestrian in Signalized Crosswalk Warning
Utilization of Devices on Applications
Greypool County Scenarios – 1

- Mobile/Carry-in/Integrated Devices on Safety Applications
  - Stop Sign Gap Assist

[Diagram showing traffic and devices with labels for mobile/carry-in/integrated device and integrated device]
Utilization of Devices on Applications

Greypool County Scenarios – 2

- Mobile/Carry-in/Integrated Devices on Mobility Applications
  - Dynamic Transit Operations (T-DISP)
Mobile/Carry-in/Integrated Devices on Mobility Applications
- Weather Response Traffic Information (WxTINFO)
**Key Findings at the CV Pilots Workshop**

- **Challenges:**
  - Driver distraction with any/all in-vehicle devices – need to be integrated
  - Text to speech/voice recognition is important
  - For safety applications – Mobile and carry-in devices are more difficult
  - Carry-in devices will fade away

- **Most Appropriate Role:**
  - Smart phone can be gateway to making any vehicle a connected vehicle
  - Vehicle can act as probes and give drivers information to make smart decisions
Discussions on the USDOT Qualified Product List
US DOT GUIDELINES & CERTIFICATIONS

- **FHWA Guidelines**
  - Currently under development
  - Scheduled to be released in Summer / Fall 2015

- **RSU Specifications**

- **Certification**
  - USDOT intends to enter into a Cooperative Agreement with one or more facilities for certification
  - Four layer approach to certification
SAFETY PILOTS QUALIFIED PRODUCTS LIST


Safeguard Pilots

The U.S. Department of Transportation, Intelligent Transportation Systems Joint Program Office Selects Firms to Provide Roadside Equipment for the Connected Vehicle Safety Pilot Model Deployment and Other Test Bed Installations

The following firms passed the U.S. DOT's acceptance criteria for placement on the research qualified products list (RQPL):

- Ariba Systems
- Conda Wireless/Cisco Systems
- Kaonun Tracitom, Inc.
- Savari Networks
- Industrial Technology Research Institute

Product testing for the RSEs was conducted from February 20 through March 2, 2012. In addition to other factors such as cost and timing, devices were evaluated based on the following standards:

The selection of firms is still ongoing, and others will likely be added to the list. Only those firms listed on the RQPL will be considered as suppliers for the model deployment.

The model deployment will test connected vehicle technology in a real-world, multimodal operating environment over the course of a year. The data will ultimately help the National Highway Traffic Safety Administration make a decision in 2013 on the future of the technology.

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Resources

- RSE Evaluation Report [PDF 1.40MB]

Additional ITS Resources on the Federal Highway Administration Office of Operations Website
UPCOMING EVENTS

- Connected Vehicle Test Bed - Virtual PlugFest
  - Every Wednesday from 11 AM to 2 PM (EST)
  - For details: [http://www.its.dot.gov/testbed/testbed_affiliated.htm](http://www.its.dot.gov/testbed/testbed_affiliated.htm)

- Next CV Pilot Webinar
  - Early January 2015 (January 7 – 9)

- Solicitation for Wave 1 Pilot Deployment Concepts
  - Early 2015
Stakeholder Q&A