CONNECTED VEHICLE PILOT Deployment Program

ITS Joint Program Office
CONNECTED VEHICLE APPLICATIONS

- The USDOT has made a significant investment in foundational research and initial development of connected vehicle applications
  - Concepts of Operations
  - System Requirements
  - Prototype Design and Testing
  - Prototype Impacts Assessment
  - Analytics, Modeling and Simulation to Assess Potential Long-Term Impacts

- Not all CV Application efforts are in the same state of maturity, few are complete
  - But a large number of application development efforts across multiple programs will be substantively complete in late 2014
# 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
Pilot Deployment Process

- Pilot Deployment Concept Development Process
  - Identify Local Needs
  - Set Performance Goals
  - Select CV Applications That Work Together Meet Those Goals

- USDOT Sample Pilot Concepts from Hypothetical Locations
  - Hypothetical, but realistic examples of localities applying the pilot deployment concept development process
SAMPLE DEPLOYMENT CONCEPT – Downtown Sunnyside
~ Improving Congestion in an Urban Arterial Network ~

- Improve Transit Reliability
  - Connection Protection
  - Transit Signal Priority

- Improve Pedestrian Safety
  - Mobile Accessible Pedestrian Signal System
  - Pedestrian in Signalized Crosswalk Warning
  - Intersection Movement Assist

- Improve Air Quality
  - Eco-Approach and Departure at Signalized Intersections
  - Eco-Traffic Signal Timing

Synergies among applications increase benefits and reduce costs
SAMPLE DEPLOYMENT CONCEPT – Halleck Expressway
~ Improving Travel Time Reliability on an Urban Expressway~

Reduce Incident Delay
- Incident Scene Pre-Arrival Staging Guidance for Emergency Responders
- Incident Scene Work Zone Alerts for Drivers and Workers

Improve Bottleneck Throughput
- Speed Harmonization and Queue Warning
- Emergency Electronic Brake Lights and Forward Collision Warning

Manage Diversions Better
- EnableATIS
- Intelligent Signal Control

Synergies among applications increase benefits and reduce costs
SAMPLE DEPLOYMENT CONCEPT – Greypool County
~ Improving Safety and Mobility in a Rural Area ~

Increase Accessibility
- Dynamic Transit Operations

Improve Safety
- Red Light Violation Warning
- Stop Sign Gap Assist
- Left Turn Assist

Informing Drivers During Bad Weather
- Weather Response
- Traffic Information

Synergies among applications increase benefits and reduce costs

U.S. Department of Transportation
SAMPLE DEPLOYMENT CONCEPT – District 13 Operations
~ Improving the Efficiency of Road Maintenance ~

- **Improve Snow Removal**
  - Enhanced Maintenance Decision Support System

- **Improve Management of Work Zones**
  - Work Zone Traveler Information

- **Improve Situational Awareness**
  - Probe-based Pavement Maintenance

*Synergies among applications increase benefits and reduce costs*
SAMPLE DEPLOYMENT CONCEPT – I-876 Corridor
~ Improving Freight Movement in an Inter-State Corridor ~

**Improve Freight Productivity**
- Freight Advanced Traveler Information System
- Drayage Optimization
- Freight Signal Priority

**Improve Truck Safety**
- Curve Speed Warning
- Do Not Pass Warning/Lane Change Warning

**Synergies among applications increase benefits and reduce costs**
# 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>
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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 (9/23/14)
- Sample Deployment concept audio recordings for Greypool County is now available (9/22/14)
- Deployment concept audio recordings for Downtown Sunnyside and H.W. Hailck 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)

About the CV Pilots Deployment Project

The U.S. DOT (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