



# CONNECTED VEHICLE PILOT Deployment Program



Cory Krause and Denise Masi

# TODAY'S AGENDA

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- Cory Krause  
*Pathways Civil Engineer, FHWA Office of Operations Research & Development*
  - Connected Vehicle Pilot Deployment Program Overview
    - Program Goals
    - Release of CV Pilots Synopsis
  
- Denise Masi  
*Fellow, Noblis, Inc.*
  - CO-PILOT Cost Estimator
    - Overview and Features
    - Tool Demonstration
  
- Stakeholder Q&A



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# Connected Vehicle Pilot Deployment Program Overview

# PROGRAM GOALS





# GENERAL PROGRAM INFORMATION

- *Needs-Driven Focus*
  - Related to system performance – mobility, safety, public agency efficiency and reduced environmental impacts
  - Needs identified by relevant stakeholders
  - Needs represented in performance measures and performance targets
  - Identify applications addressing these needs
  - The ability to capture and analyze observed data to monitor performance over time
  - Support data needs associated with an independent evaluation effort
  
- *Phases of the Pilot Deployment Effort*
  - **Phase 1: Concept Development – up to 12 months**
  - Phase 2: Design/Build/Test – up to 20 months
  - Phase 3: Maintain and Operate – 18 months





# PHASE 1 CONTRACT SCOPE

- Objective

- To fully develop an innovative and synergistic connected vehicle pilot deployment concept, to build partnerships among stakeholders, and to prepare a comprehensive pilot deployment plan that reduces technical, institutional and financial risk

- Delineation of Work

- Solicitation

- Will be issued on or before January 30, 2015
- Synopsis:  
<https://www.fbo.gov/>
- Solicitation Number:  
DTFH6115R00003

Task	Description
1	Program Management
2	Pilot Deployment Concept of Operations (ConOps)
3	Security Management Operating Concept
4	Safety Management Plan
5	Performance Measurement and Evaluation Support Plan
6	Pilot Deployment System Requirements
7	Application Deployment Plan
8	Human Use Approval
9	Participant Training and Stakeholder Education Plan
10	Partnership Coordination and Finalization
11	Outreach Plan
12	Comprehensive Pilot Deployment Plan
13	Deployment Readiness Summary





# ESTIMATED PILOTS DEPLOYMENT BUDGETS

- Based on our research, pilot deployments (Phases 1-3), varied in range and effort as follows:
  - Smaller focused deployments: \$2-\$5 million in federal funds
  - Medium-sized deployments: \$5-\$12 million in federal funds
  - Larger deployments: \$12-\$20 million in federal funds
  
- USDOT developed a **cost estimation tool** to facilitate the development of cost estimates based on the pilot deployment effort ranging from \$2 million to \$20 million in federal funds.



# FURTHER INFORMATION



- CV Pilots Website
  - <http://www.its.dot.gov/pilots>

- Program Contact  
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CV Pilots Program Manager  
ITS Joint Program Office  
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- Solicitation Contact  
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### Connected Vehicles CV Pilots Deployment Project

#### Latest News & Updates

- U.S. Department of Transportation Releases Synopsis of Connected Vehicles Pilot Deployment Program
- The CO-PILOT cost estimation tool is now live and ready to support the development of your Connected Vehicle pilot deployment cost estimate!
- The CV Pilots Webinar Part 6: CO-PILOT Cost Estimator is now open for registration
- Webinar Part 5 recording is now available - December 12, 2014 Webinar Series Part 5: Connected Vehicle Devices and Qualified Product List (QPL) (12/17/14)
- The presentation material of the USDOT Connected Vehicles Pilot Deployment Program Webinar Series Part 5 is available now (12/12/14)
- The Connected Vehicle Reference Implementation Architecture (CVRIA) training course is now available on the CVRIA website

More news »

#### 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

#### CV Pilots Portal

- CV Pilots FAQs
- CV Applications
- Deployment Concepts

#### Featured Links

- CO-PILOT Cost Estimation Tool
- Active Transportation and Demand Management (ATDM)
- Connected Vehicle Reference Implementation Architecture (CVRIA) and SET-IT
- Connected Vehicle Test Beds
- Open Source Application Development Portal (OSADP)
- Research Data Exchange (RDE)



# CO-PILOT Cost Estimator



# CO-PILOT Cost Estimator Overview

- High-level Cost Estimation Planning Tool
  - To facilitate the development of cost estimates for the Connected Vehicle Pilot Deployments.
  - Allows users to generate deployment cost estimates for 56 applications

## CONNECTED VEHICLE APPLICATIONS

V2I Safety	Environment	Mobility
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)	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	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
V2V Safety	Road Weather	Smart Roadside
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)	Motorist Advisories and Warnings (MAW) Enhanced MDSS Vehicle Data Translator (VDT) Weather Response Traffic Information (WxTINFO)	Wireless Inspection Smart Truck Parking
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		



# FEATURES OF CO-PILOT Cost ESTIMATOR

- CO-PILOT breaks down each CV application into associated Building Blocks and Cost Components
  - Building Blocks: locations or entities requiring components for an application, e.g., Intersections
- CO-PILOT includes default costs and required quantities for each component
  - Average costs and quantities for each component can be modified
  - Quantities take into account the overlap between application components at a Building Block, depending on user selections
- CO-PILOT uses a simulation approach to account for uncertainty in both unit and overall costs
- CO-PILOT output includes graphical depictions of cost distributions and detailed spreadsheet output



HOME COST ESTIMATION HELP



Interested in learning more about the CV Pilots Deployment Project? Visit <http://www.itd.dot.gov/pilots/> for more information

## ABOUT OUR TOOL

The Cost Overview for Planning Ideas & Logical Organization Tool (CO-PILOT) is a high-level tool supporting stakeholders considering connected vehicle pilot deployments. These pilot deployments will combine connected vehicle and mobile device technologies innovations to **Improve Traveler Mobility and System Productivity** while **Reducing Environmental Impacts and Enhancing Safety**.

The CO-PILOT allows stakeholders to **Easily Estimate Costs of your Proposed Pilot Deployments**. This initial tool allows cost estimation for 56 applications in the Vehicle to Infrastructure Safety, Vehicle to Vehicle Safety, Agency Data, Environment, Road Weather, Mobility, and Smart Roadside application groups.

### [Start Using The Tool](#)

#### HAVE YOUR ESTIMATED COST IN 4 EASY STEPS:

- 1 Choose the Application you plan to incorporate in your pilot deployment and select building blocks.
- 2 Assign the Applications to building blocks.
- 3 Review/modify the average unit cost estimates.
- 4 Export your final estimated report.

#### HAVE QUESTIONS?

Visit our [Help](#) section for additional information or email us with technical support questions at [co-pilot@nobtis.org](mailto:co-pilot@nobtis.org)



**DISCLAIMER:**CO-PILOT is intended for high-level, preliminary planning purposes to support Connected Vehicle Pilot Deployment cost estimation. Outputs are intended to support long-range budget planning and do not replace detailed cost proposals required for Concept Development (Phase 1), Design/Build/Test (Phase 2), or Maintain and Operate (Phase 3).





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# Tool Demonstration



# Stakeholder Q&A