NCHRP 03-101

Costs and Benefits of Public Sector Connected Vehicle Deployment

Chicago
September 28, 2012
Project Objective

CONNECTED VEHICLES
(V2V & V2I)

EVALUATE & DOCUMENT
AGENCY & SOCIETAL
BENEFITS & COSTS

Why?

Help State/Local DOTs w/ CV deployment decisions
**Project Objective**

**Why?**
Help State/Local DOTs w/ CV deployment decisions

**How?**
- Assess DOT business practice impacts
- Focus on direct impacts of CV applications
- Use USDOT estimates for costs
- Quantify the costs and benefits

**What?**
CV Deployment Plan Template

**CONNECTED VEHICLES**
(V2V & V2I)

**EVALUATE & DOCUMENT**
AGENCY & SOCIETAL BENEFITS & COSTS
4 Tasks w/ 12 Subtasks

**TASK 1** Project Management

- Identify Connected Vehicle (CV) Applications
- Select Case Study Sites
- Conduct Structured Interviews
- Document Impacts on DOTs
- Prepare Deployment Plan Template

**TASK 2** Conduct Transportation Analysis

- ID CV Cost Benefit Analysis (CBA) Needs
- Document Cost Benefit Assumptions
- Conduct Cost Benefit Analysis

**TASK 3** Cost Benefit Analysis

- Report on DOT Impacts
- USDOT CV Deploy Plan Guidance
- Final Report
- Perform Outreach

**TASK 4** Outreach & Final Report

- Guidance “tool” to help DOTs make CV deployment decisions

TO BE COMPLETED BY 30MAR2013
Task 2a – Identify CV Applications

25 Core CV Applications

- 11 apps could **improve safety**
- 7 apps could **enhance mobility**
- 3 apps could **supply better data**
- 2 apps could **lower costs**
  - Pothole Detection
  - Pavement Condition Monitor
- 2 apps could **increase revenue**
  - VMT-Based User Fees
  - HOT Lanes
Task 2b – Select Case Study Sites

Model Deployment ≠ Real World Deployment

Pick sites that exemplify key concepts related to CV deployments

Virginia
- Emphasizes a benefit-driven approach addressing a specific mobility challenge

Maricopa County
- Emphasizes how to lower effective cost by leveraging planned deployments
Task 2c - Conduct DOT Interviews

Gathering info of impacts to DOT Operations and costs-benefits

- Deployment strategies
- Estimated deployment costs
- Impacts on DOT operations
  - Direct and indirect
- Data to support estimates of safety and mobility impacts
Task 2d – Document DOT Impacts

Direct Benefit-Cost Impacts
- Equipment maintenance
- Traffic data collection
- Roadside signage
- Pavement monitoring

Indirect Benefit-Cost Impacts resulting from
- Decreased crashes
- Increased mobility
Task 2e – Structure Deploy Plan Template

- Planning the geographic deployment
- Planning the application deployment – Leveraging synergies between applications
- Estimate/present costs & benefits

Structured framework & building into it
Task 3a – ID CV CBA Needs

Cost Categories
- System costs
- Apps costs

Benefit Categories
- Impacts on DOT operations
- Safety impacts
- Mobility impacts
- Environmental impacts
Task 3b – Doc CV CBA Assumptions

- Time horizons
- Discount rates
- Vehicle device market penetration
- Safety impacts
- Etc.

Describe Impacts if Assumptions Change
Task 3c – Conduct CV CBA

- Task 1: Project Management
- Task 2: Conduct Trans Analysis
  2a
  2b
  2c
  2d
  2e
- Task 3: Cost Benefit Analysis
  3a
  3b
  3c
- Task 4: Outreach & Final Report
  4a
  4b
  4c
  4d

Financial Metrics

- Infrastructure Costs
- Application Costs

DOT Operations
Safety
Mobility
Environmental
Task 4a – Report on DOT Impacts

Preliminary Summary Findings
Task 4b – Final CV Deploy Plan Template

- How to identify and bundle applications
- How to sequence deployments over time and geographically
- How to estimate deployment costs
- How to estimate deployment benefits
Task 4c – Final Report

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2012 AASHTO Annual Meeting Pittsburgh, PA

CV CBA FINDINGS BRIEF

Outreach & Coordination w/ USDOT & Stakeholders

CV CBA FINAL REPORT
**Task 4d – Outreach**

Support Executive-level Decision Making

- Concise outreach materials
- Discuss CV impacts to the DOT

DOT
- Interviews

Case Studies
- Potential Applications
- Benefits

Deployment Strategies
- Costs

Needs