Intelligent Transportation Systems Strategic Plan 2015 - 2019
ITS Deployment Opportunity Planning Discussion and Wrap Up

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Introductions/Why Are You Here Today?

- What is your role related to connected vehicles?
- What are you most interested in learning more about?
- What questions do you have that you are hoping to get answered during this session?
- Do you know what your organization is currently doing related to connected vehicles?
- We want you to leave this workshop with an understanding of what you need to be ready to deploy a connected vehicles environment and what the funding path forward looks like to get there.
The Planning Process

- Where do we/you want to go?
- How are we/you going to get there?
- What will it take?
- How did we do?
Where do we/you want to go?
...Where do we/you want to go?

- Today (Not Connected)
- Future CV Environment
Internal Stakeholders

- FRA
- FHWA
- PHMSA
- NHTSA
- MARAD

U.S. Department of Transportation
How are we/you going to get there?
Key ITS Policy Program Focus Areas

I. SECURITY POLICY
II. COMMUNICATIONS POLICY
III. DATA POLICY
IV. INTEROPERABILITY POLICY
V. DEPLOYMENT STRATEGIES and DEPLOYMENT READINESS
VI. FEDERAL ROLE IN POLICY
**Security Credential Management System**

- **Definition** A system to ensure the trusted communications between mobile devices and other mobile devices and/or roadside devices and back offices, and protect the confidentiality and integrity of data as it moves through a variety of media.

- **CV Pilots Requirements** Develop a security management operating concept to describe the underlying needs of the pilot deployment to ensure secure operations, and outline a concept that addresses these needs.

- **USDOT’s Role on SCMS** USDOT will provide a prototype national-level SCMS system. The security management operating concept must include an interface with this capability.
Certification

- Vision is to help the industry to organize and run self-sustaining certification program supporting deployment of DSRC-based services.
Program Description – Architecture provides a framework to guide planning and interoperable deployment of ITS (incl. connected vehicle) and identifies interfaces for standardization. Standards define interfaces with architectures to enable required interoperability and support efficient, non-proprietary ITS deployment. International Harmonization seeks to leverage global resources and expertise to (1) maximize commonality of ITS deployments, (2) share labor resources and (3) access best-available expertise in order to facilitate ITS deployment and open markets.

Program Goals – Enable efficient, interoperable and cost-effective ITS infrastructure, connected vehicle and automated vehicle deployments across North America.
Guidance and Rulemaking

I. V2V Rulemaking
II. V2I Guidance
III. Other Rulemaking and Guidance (What? / Why?)
- 73 miles of instrumented roadway with 27 roadside units in Ann Arbor, MI
- Over 2,800 vehicles equipped with a variety of device types
- Various V2V and V2I applications
- Testing of prototype security mechanisms and device certification processes
- 1 year of data collection to support 2013 NHTSA decision
- Transitioned to an operational environment
PILOT SITES AND DEPLOYMENT SCHEDULE

**Pilot Sites**
- ICF/WYDOT
- NYCDOT
- Tampa (THEA)

**Overall Deployment Schedule**

- **Phase 1** (up to 12 months)
  - Concept Dev.
  - In Progress

- **Phase 2** (up to 20 months)
  - Design/Deploy/Test
  - Progress Gate

- **Phase 3** (minimum 18 months)
  - Maintain/Operate Pilot
  - Progress Gate

- Routine Operations (ongoing)
  - Transition
  - Post-Pilot Operations

- Follow-On Cooperative Agreement

- **Phase 1** – Creates the foundational plan to enable further design and deployment
- **Phase 2** – Detailed design and deployment followed by testing to ensure deployment functions as intended (both technically and institutionally)
- **Phase 3** – Focus is on assessing the performance of the deployed system
- Post Pilot Operations (CV tech integrated into operational practice)
How Can This Approach Help You to Achieve a Successful CV Deployment?

- **Successful deployment begins with disciplined Concept Development and System Planning**
  - To mitigate technical, institutional, and financial risk
  - To design and deploy on schedule and within budget
  - To routinely assess safety, mobility and environmental impacts
  - To create long-term technical and financial sustainability

- **Leverage Material from the CV Pilots (on-line)**
  - Tasks and deliverables
  - Guidance and technical assistance material (e.g., on-line webinars)
  - Examples from 3 Pilot Sites
  - Available @ [http://www.its.dot.gov/pilots/index.htm](http://www.its.dot.gov/pilots/index.htm)
Details on Deployment Planning

- Deployment Planning/Project Management Approach
- Concept of Operations
- Security and Privacy
- Safety Management
- Performance Measurement
- System Requirements
- Application Deployment Plan
- Participant Training/Stakeholder Education
- Partnership Coordination/Finalization
- Deployment Outreach Planning
- Comprehensive Deployment Plan
Deployment Planning Process

Deployment Planning Approach
- Concept of Operations
- Security Management
- Safety Management
- Performance Measurement

Concept Development
- System Requirements
- Application Deployment
- Participant Training & Stakeholder Education
- Partnership Coordination
- Outreach

System Requirements

Comprehensive Deployment Plan
- Comprehensive Deployment Plan
What will it take?
Funding for ITS Deployment

- General eligibility
  - CV deployments are eligible for Federal aid funding where eligibility for ITS investments have been previously established

| National Highway Performance Program |
| Surface Transportation Block Grant Program |
| *Transportation Alternatives Set-aside* |
| *Recreational Trails Program Set-aside* |
| *Surface Transportation Block Grant Program (net of TA & Rec Trails)* |
| Congestion Mitigation & Air Quality Improvement |
| Highway Safety Improvement Program |
| Railway-Highway Crossings Program |
| Metropolitan Planning |
| National Highway Freight Program |

Mobility on Demand (MOD) Sandbox: Provides a venue through which integrated MOD concepts and solutions are demonstrated in real-world settings. FTA seeks to fund $8M for project teams to innovate, explore partnerships, develop new business models, integrate transit and MOD solutions, and investigate new, enabling technical capabilities. Proposals Due: 7/5/16 [https://www.transit.dot.gov/research-innovation/mobility-demand-mod-sandbox-program](https://www.transit.dot.gov/research-innovation/mobility-demand-mod-sandbox-program)
Transportation Investment Generating Economic Recovery (TIGER)
- Application Deadline: April 29, 2016

University Transportation Center (UTC)
- Application Deadline: May 13, 2016

FTA – Buses and Bus Facilities & Low or No Emission
- Application Deadline: May 13, 2016
FTA – Tribal Transit Program
  ▪ Application Deadline: May 13, 2016

FRA – Railroad Safety Technology for Positive Train Control (PTC)
  ▪ Application Deadline: May 19, 2016

FHWA – Surface Transportation System Funding Alternatives (SFTSA) Program
  ▪ Application Deadline: May 20, 2016
FTA – Enhanced Mobility/Rides to Wellness/Innovative Coordinated Access
  • Application Deadline: May 31, 2016

FTA – Mobility on Demand
Application Deadline: July 5, 2016

EDA – Regional Innovation Strategies (RIS) Program
  • Application Deadline: June 25, 2016
Keys to the Federal-Aid Program – Through the Planning Process
On Friday, May 27, 2016, the U.S. Department of Transportation’s (USDOT) Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) published the Final Rule on Statewide and Nonmetropolitan Transportation Planning and Metropolitan Transportation Planning in the Federal Register.

This rule implements the changes to the planning process established by the Moving Ahead for Progress in the 21st Century Act (MAP-21) and the Fixing America’s Surface Transportation Act (FAST Act).

The Notice of Proposed Rulemaking (NPRM) was published in the Federal Register on June 2, 2014.
The final rule on Statewide and Nonmetropolitan Transportation Planning and Metropolitan Transportation Planning, published May 27, implements certain planning and environmental provisions of MAP-21 and the FAST Act changes to the transportation planning process, including:

- **requiring a performance-based approach to planning**
- a new emphasis on the nonmetropolitan transportation planning process, by requiring States to have a higher level of involvement with nonmetropolitan local officials and providing a process for the creation of regional transportation planning organizations
- adding a structural change to the membership of large metropolitan planning organizations (MPOs) to include representation of transit providers
- **adding a framework for voluntary scenario planning**
- implementing new authority for integrating the planning and environmental review processes as well as programmatic mitigation plans
MAP-21 transformed the Federal-aid program by establishing new requirements for performance management and performance based planning and programming to ensure the most efficient investment of Federal transportation funds.

The FAST Act continued the performance management and performance based planning and programming requirements of MAP-21 with minor changes.

Performance management and performance based planning and programming increases the accountability and transparency of the Federal-aid program and provides for a framework to support improved investment decision making through a focus on performance outcomes for key national transportation goals.

The State DOTs and MPOs are expected to use the updated regulations to make better informed transportation planning and programming decisions.

The new performance aspects of the Federal-aid program would allow FHWA and FTA to better communicate a national performance story and more reliably assess the impacts of Federal funding investments.
Potential Benefits of ITS – Key Solution

- **Safety.** The injuries and fatalities of both vehicle occupants and vulnerable road users will be reduced and mitigated.
- **Mobility.** The information about travel conditions and options for both system users and operators will be increased and improved.
- **Environment.** The impact of vehicle travel will be reduced by promoting greener transportation choices and driver/vehicle behavior.
- **Data.** New and cost-effective data sources and collection methods will be introduced that will improve asset management, network operations, just-in-time maintenance, and incident response, among other functions.

Benefits are expected to grow over time as more vehicles, infrastructure and travelers are equipped.
Typical Planning Products and Processes

- Long-range visioning
- Metropolitan Transportation Plan
  Statewide/regional long-range transportation plan
- Transportation Improvement Program
- Short-range transportation plan
- Congestion management plan
- Asset management plan
- ITS and operations plan
- ITS Architecture
- State implementation plan
- Strategic Highway Safety Plan
- Highway Safety Improvement Program
- Transit development plan
- Transportation demand management plan
- Non-motorized (bicycle and pedestrian) plan
- Corridor studies (modal or multimodal)
- Public involvement plan
- Freight plans
- Financing plans
Both States and MPOs develop long-range transportation plans (LRTPs)

- MTPs guide decision-making and investments across all modes of surface transportation over a 20+ year horizon
- During this 20+ year horizon, emerging CV technology may revolutionize transportation, making it important that MTPs start including plans for the infrastructure, data, etc. that regions will need to support CV
- CV will also provide more comprehensive, more granular, and (in some cases) more reliable data to track performance measures in the performance-based MTP
On Friday, April 22, the Federal Highway Administration (FHWA) published in the Federal Register a Notice of Proposed Rulemaking (NPRM) to propose national performance management measure regulations to assess the performance of the National Highway System, Freight Movement on the Interstate System, and the Congestion Mitigation and Air Quality Improvement Program, as required by the Moving Ahead for Progress in the 21st Century Act (MAP-21) and the Fixing America's Surface Transportation Act ("FAST Act").
This NPRM proposes regulations that would make progress towards the following national goals:

- **Congestion reduction** - To achieve a significant reduction in congestion on the NHS.
- **System reliability** - To improve the efficiency of the surface transportation system.
- **Freight movement and economic vitality** - To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.
- **Environmental sustainability** - To enhance the performance of the transportation system while protecting and enhancing the natural environment.

In addition, this NPRM:

- Provides for greater consistency in the reporting of condition/performance;
- Proposes requirements for the establishment of targets that can be aggregated at the national level;
- Proposes reporting in a consistent manner on progress achievement; and
- Proposes a process for determining a State DOT's significant progress.
How did we do?
LESSONS LEARNED IN CV PILOTS CONCEPT DEVELOPMENT PHASE

- Stakeholder interaction early and often leads to better concepts and more buy-in
- Sites are eager to consume USDOT technical assistance
  - Deployments are complex, requiring a lot of diverse elements to come together in an integrated system (technical, security, privacy, performance measurement, institutional, financial, etc.)
- Site-to-site coordination can be useful (since not set up as competitive)
  - Cooperation on security, vendor interaction, stakeholder coordination (UPS in WY and NYC)
  - Participation in virtual roundtables
- Building in performance measurement to a deployed system requires some serious thinking in the concept development phase
- We didn’t forget a key area in Phase 1 (so far), e.g., training or safety management
- The deliverables from the sites are creating examples for others to follow
  - E.g., good lessons learned from Safety Pilot Model Demonstration (SPMD) on installation planning/training
- Concept development takes some time to conduct – prior to procuring/designing/installing equipment
- Using standards (intelligently) can help to advance sites systems engineering
Planning Stakeholders

Public Agencies

- Federal Transit Administration
- U.S. Department of Housing and Urban Development

Transportation Associations

- APTA
- AASHTO
- ACT
- Association for Commuter Transportation

Governance & Planning Associations

- National League of Cities
- NARC
- NADO
- NACo
- NAHB
- APA
- AMPO

National Association of Regional Councils
National Association of Development Organizations
National Association of Home Builders
American Planning Association


Performance Measurement

- Means of assessing the progress made towards attaining established goals
- Not just about data collection, verification, and cleaning but also about using the data to understand the system

Performance Monitoring

- Ongoing tracking of performance to assess if targets have been or likely to be met
- Enables system managers to take corrective and proactive actions to control and manage the system
- Allows system managers to understand the impacts of investments and policies

Performance Evaluation

- Systematic and objective examination of measures and outcomes to understand the impacts of investments and policies have on performance, thus improving current and future planning and investment decisions
- Conducted by an independent party who has no vested interest or stake in the project
Locations Using 5.9GHz DSRC for Connected Vehicle Deployment

- King County, WA
- San Francisco, CA
- Sunnyvale, CA / UC Berkeley
- San Jose, CA
- Salt Lake City, UT
- Las Vegas, NV
- Maricopa County, AZ
- I-70 Mountain Corridor, CO
- I-80 Corridor, WY*

- Minneapolis, MN (2)
- Ann Arbor, MI
- Ypsilanti Township, MI
- Lansing, MI
- Southeast MI
- Oakland County, MI
- Southwest MI
- Cleveland, OH
- Blacksburg, VA
- Greensville, SC
- Miami International Airport, FL
- Orlando, FL
- Tampa, FL*
- Chittenden County, VT
- Pittsburgh, PA
- Ross Township, PA
- Long Island, NY (2)
- Manhattan, NY* & Brooklyn, NY*

Legend:
- = USDOT Funded Projects
- = Non-DOT Funded Projects

* Planned deployments in 2017

Source: Volpe – The National Transportation Systems Center (USDOT)

Number of DSRC-Enabled Vehicles: 28,193
Number of DSRC-Enabled Devices (V2V and V2I): 1,117
ITS Professional Capacity Building Program

- Offers FREE training to develop the ITS workforce
- Talking Transportation Technology webinars, with online archive
- ITS Standards (48 modules)
- ITS Transit Standards (14 modules)
- eLearning courses from Consortium for ITS Education (CITE):
  - Telecommunications and Networking Fundamentals
  - Network Design and Deployment Considerations for ITS Managers
- Workshops at ITS America State chapter meetings

[Website Link: wwwpcb.its.dot.gov]
Additional Connected Vehicle Training Resources

- ITS PCB online course: CV 101 Web-based Training
- ITS PCB archived webinars:
  - CV Basics
  - National Connected Vehicle Field Infrastructure Footprint Analysis
- Connected Vehicle Reference Implementation Architecture (CVRIA)
- ITS ePrimer – Connected Vehicle Chapter

www.pcb.its.dot.gov