

# AN OPEN DIALOGUE ON THE DRAFT FOCUS AND THEMES FOR THE NEXT ITS STRATEGIC RESEARCH PLAN

ENGAGING STAKEHOLDERS IN THEIR DISCUSSION AND  
DEVELOPMENT

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Final Report — December 2012

publication number RITA-JPO-13-032



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U.S. Department of Transportation  
Research and Innovative Technology Administration



**Technical Report Documentation Page**

1. Report No. FHWA-JPO-13-032		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle An Open Dialogue on the Draft Focus and Themes for the Next ITS Strategic Research Plan – Engaging Stakeholders in Their Discussion and Development				5. Report Date October 2012	
				6. Performing Organization Code	
7. Author(s) <b>James Pol</b>				8. Performing Organization Report No.	
9. Performing Organization Name And Address U.S. Department of Transportation Research and Innovative Technology Administration Intelligent Transportation Systems Joint Program Office, HOIT-1 1200 New Jersey Ave., S.E. Washington, D.C. 20590				10. Work Unit No. (TRAIS)	
				11. Contract or Grant No.	
12. Sponsoring Agency Name and Address				13. Type of Report and Period Covered	
				14. Sponsoring Agency Code	
15. Supplementary Notes					
16. Abstract The purpose of this document is to identify the focus and themes for the next installment of the <i>ITS Strategic Research Plan</i> and to invite stakeholders to participate in their discussion.  The goal of presenting themes is to enable continuity of the current research programs while establishing new or redefined goals and objectives to meet emerging research needs.  The themes fall into three broad categories:  <ul style="list-style-type: none"> <li>• <b>Maturing Connected Vehicle Systems</b> – Focuses on what is needed to accelerate the maturity of vehicle-based communications with surrounding systems</li> <li>• <b>Piloting and Deployment Readiness</b> – Focuses on the security, policy, business opportunities, capabilities, pilots, and incentives needed to support vehicle-to-infrastructure (V2I) and vehicle-to-infrastructure (V2I) implementation</li> <li>• <b>Integrating with the Broader Environment</b> – Focuses on the integration and decision support capabilities to enable V2V and V2I interaction with other governmental services and public utilities.</li> </ul>					
17. Key Words Intelligent transportation systems (ITS), vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), V2X, ITS stakeholders, ITS deployment, ITS strategic plan			18. Distribution Statement		
19. Security Classif. (of this report)		20. Security Classif. (of this page)		21. No. of Pages 13	22. Price

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# EXECUTIVE SUMMARY

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The U.S. Department of Transportation (USDOT) *ITS Strategic Research Plan—2010-2014* established a focused research agenda to prepare the next generation of intelligent transportation system (ITS) technologies for widespread deployment throughout the nation. Throughout the enactment of that research agenda, the USDOT ITS Program has pursued active and consistent engagement with a broad stakeholder community.

As we look toward the next 4 years and building on the progress of the current plan, the USDOT aims to continue to engage stakeholders in our ITS research efforts. Thus, the purpose of this document is to identify the focus and themes for the next installment of the *ITS Strategic Research Plan* and to invite stakeholders to participate in their discussion.

The goal of presenting themes is to enable continuity of the current research programs while establishing new or redefined goals and objectives to meet emerging research needs.

The themes fall into three broad categories:

- **Maturing Connected Vehicle Systems** – Focuses on what is needed to accelerate the maturity of vehicle-based communications with surrounding systems
- **Piloting and Deployment Readiness** – Focuses on the security, policy, business opportunities, capabilities, pilots, and incentives needed to support vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) implementation
- **Integrating with the Broader Environment** – Focuses on the integration and decision support capabilities to enable V2V and V2I (collectively termed V2X) interaction with other governmental services and public utilities.

This document presents an opportunity for stakeholders to share their perspectives and be a part of the process of developing our next research agenda.

# CHAPTER 1: INTRODUCTION

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In 2010, the U.S. Department of Transportation (USDOT) established a focused research agenda to prepare the next generation of intelligent transportation system (ITS) technologies for widespread deployment throughout the nation. That agenda was documented in the *ITS Strategic Research Plan—2010-2014*. Since the establishment of the research agenda, research and development efforts have advanced notably, solidifying the path toward a new connected vehicle environment.

Throughout the enactment of the current research agenda, the USDOT ITS Program has pursued active and consistent engagement with a broad stakeholder community. As we look toward the next 4 years and building on the progress of the current plan, the USDOT aims to continue to engage stakeholders in our ITS research efforts. Thus, the purpose of this document is to identify the focus and themes for the next installment of the *ITS Strategic Research Plan* and to invite stakeholders to participate in their discussion. This document presents an opportunity for stakeholders to share their perspectives and be a part of the process of developing our next research agenda.

The following sections present the USDOT's draft mission, vision, and goals for the ITS Program for the coming 4-year time period, 2015 to 2019.

## Draft Mission Statement

The USDOT's ITS Program conducts research and development that advances cutting-edge ITS technology implementation across all surface modes.

## Draft Vision Statement for the ITS Strategic Research Plan

The vision for the ITS Program for 2015 to 2019 is to improve safety, mobility, and environmental sustainability through connected vehicles and to enable a transportation system that leverages and builds upon the capabilities of connected vehicles and infrastructure.

## Draft Goals

The ITS Program has the following goals:

1. Support national readiness to implement connected vehicles
2. Improve safety, mobility, and environmental sustainability through connected vehicles



3. Guide transportation institutions towards adaptation to the connected vehicle environment
4. Enable transportation services that focus on individual traveler needs for seamless multimodal travel
5. Leverage emerging technology that may have an impact on transportation services.

The remainder of this document presents for stakeholder engagement and discussion the potential themes on which to base the bodies of work for the next stage of the USDOT's ITS Program.

The USDOT's focused multimodal partnership and collaboration with a broad stakeholder community have contributed to the progress and advancements of our current research agenda. We look forward to the stakeholder community's continued feedback and comments in helping to bring the promise of a connected vehicle environment closer to reality.

Visit [www.its.dot.gov](http://www.its.dot.gov) for more information.

# CHAPTER 2: THEMES

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## Purpose of Themes

The themes described in this discussion paper represent a starting point for creating the next ITS Strategic Plan and an opportunity to seek input from stakeholders.

The goal of presenting themes is to enable continuity of the current research programs while establishing new or redefined goals and objectives to meet emerging research needs.

The themes do not represent a new work plan. Indeed, many items in the current portfolio of research programs may progress into the next plan. However, the themes provide an opportunity to leverage lessons learned to date to make critical refinements that will lead the research program to greater success.

The discussion of these themes with internal and external stakeholders will provide a view into what the next research plan priorities should be.

The themes fall into three broad categories:

- **Maturing Connected Vehicle Systems** – Focuses on what is needed to accelerate the maturity of vehicle-based communications with surrounding systems
- **Piloting and Deployment Readiness** – Focuses on the security, policy, business opportunities, capabilities, pilots, and incentives needed to support vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) implementation
- **Integrating with the Broader Environment** – Focuses on the integration and decision support capabilities to enable V2V and V2I (collectively termed V2X) interaction with other governmental services and public utilities.

## Criticality of Current 2013 and 2014 Milestones

**These themes depend on the completion of the work necessary to support the 2013 and 2014 milestones from the current research program.** Discussion of these themes does not obviate or otherwise interrupt the focus on achieving the 2013 and 2014 milestones.

## Definition of Time Periods

The themes are organized by time period reflecting the primary focus of research efforts. However, research may start before or extend beyond the specified time horizons.

The intent of defining the time periods is to establish a balance between prioritized needs for conducting the research, the effort demands placed on all the Departmental staff, and the maturity of preceding research to support the more advanced research.

## Near-Term Research Themes (2012-2014)

### Maturing Connected Vehicle Systems

The themes for the 2012-2014 time period include:

- **Retrofit** – Understand the opportunity to accelerate the deployment of V2V communications and further promote the Qualified Product Lists.
- **Distracted Driving** – Ensure that the in-vehicle components of the V2V safety products continue to adhere to protection against distracted driving principles.
- **Vehicle-to-Pedestrian and Vehicle-to-Motorcycle** – Address the needs for incorporating on-board and nomadic devices enabling the pedestrian, bicycle, and motorcycle communities in the connected vehicle space.
- **Revised Basic Safety Message (BSM)** – Incorporate capability to handle longer vehicles and articulated vehicles more effectively.
- **Combination Vehicles** – Research ways to identify required attributes of towed unit(s) in combination vehicles participating in a connected vehicle environment.

### Piloting and Deployment Readiness

The themes for the 2012-2014 time period include:

- **State and Local Implementation Issues** – Understand the barriers and opportunities for public agencies to make investments on connected vehicle implementation. Understand the scope of potential infrastructure investments. Place special focus on planning grants, pilots, and incentives that encourage technology adoption.
- **Multimodal Integration** – Continue the integration of the connected vehicle environment with public vehicle fleet, truck, and transit operations and according to recent updates to the National ITS Architecture.
- **Signal Phase and Timing (SPaT) Applications** – Develop consistent applications for vehicle-to-signal communications and signal-to-vehicle communications that advance reliability for intersection application.
- **Architecture and Standards** – Develop a connected vehicle reference implementation architecture to support both development and maintenance of a prioritized connected

vehicle standardization plan and to support design and development of pilot implementations. Support specific high-priority standards development requirements identified in the standardization plan.

- **Early-Stage Applications** – Engage the solutions developer community to create applications that leverage a flexible connected vehicle communications environment.
- **Regional Pilots** – Create real-world environments, urban and rural, in which public- and private-sector cooperation in implementation can educate the deployment community on the opportunities for replicating deployment.
- **Public Acceptance Issues** – Develop an understanding of how the public views connected vehicle technology and its benefits on a personal level. Describe the value of connected vehicles to users in the context of partial deployment.
- **Performance Measures** – Leverage the focus of Moving Ahead for Progress in the 21st Century (MAP-21) on performance measures and define alignment opportunities for legacy ITS and connected vehicle data.
- **Private Sector Roadside Investments** – Explore public-private partnerships that open up highway right-of-way to the private sector for V2I infrastructure investments.

## Integrating with the Broader Environment

The themes for the 2012-2014 time period include:

- **Electric Vehicle (EV) Fleets** – Understand the information-sharing specifications necessary for supporting the expansion of EV fleets.

## Mid-Term Research Themes (2015 - 2016)

### Maturing Connected Vehicle Systems

The themes for the 2015-2016 time period include:

- **Vehicle-Focus Standards** – Craft the set of standards that support vehicle communications for all vehicle and other device (pedestrian/bicycle) types after production begins and that support a low-vehicle penetration environment.
- **On-board Driver Enhancements** – Establish solutions that support the intermediate stage between connected vehicles and automated vehicles.
- **Secured Vehicles** – Ensure implementation of a secure connected vehicle environment with the capability to perform system-wide upgrades to counter evolving threats.

## Piloting and Deployment Readiness

The themes for the 2015-2016 time period include:

- **Business Model Development** – Establish the value proposition and seek mechanisms for public-private coordinated investment in connected vehicles, including resource sharing.
- **Data Exchange Facilitation** – Coordinate, internationally and domestically, information-sharing specifications, architecture, and standards necessary for enhanced data sharing across the public and private sectors.
- **Multimodal Operations** – Establish new levels of coordinated operations that extend beyond the achievements of Integrated Corridor Management, including urban and rural environments.
- **Truck Route Optimization** – Examine optimized truck route optimization for cross-urban and inter-urban freight movements. Address the geometric challenges trucks face on many non-limited-access routes that could function as alternate routes and identify railroad crossings that pose safety hazards.
- **Expanded Regional Pilots** – Demonstrate data management capabilities to support multimodal operations and data fusion, including crowd-sourced information.

## Integrating with the Broader Environment

The themes for the 2015-2016 time period include:

- **Decision Support Systems** – Develop the intelligent logic needed at transportation management centers to produce greater value in the connected vehicle environment.
- **Data Fusion/Modeling/Standards** – Extend the value of legacy ITS tools to continue providing support during the connected vehicle transitional stage.
- **EV Fleets** – Support the deployed EV fleets by leveraging increased information needs via longer connect times (i.e., recharging provides longer connectivity to high-speed/high-volume data communications).

## Long-Term Research Themes (2017 – 2019)

### Maturing Connected Vehicle Systems

The themes for the 2017-2019 time period include:

- **Automated Vehicle** – Define how an automated vehicle fleet can be introduced with limited or no impact to current infrastructure and other legacy transportation assets.

- **Vehicle Automation Enablers** – Define enabling technologies and redundancies required to progress toward control intervention and vehicle automation in a connected vehicle environment.
- **Automation Risk Factors** – Research risk profile changes with increased vehicle automation in traffic and liability implications for stakeholders.

## **Integrating With the Broader Environment**

The themes for the 2017-2019 time period include:

- **Digital Society** – Advance coordination of public infrastructure assets with transportation assets to enable operation of alternatively powered vehicles through data integration with the private sector, other state department of transportation agencies, and other public agencies.
- **Always Connected Users** – Accommodate the transportation information needs of always-connected users and augmented-reality applications.
- **Redefining Roadway Planning, Geometry, Modeling, and Operations** – Assess the opportunity to redefine current transportation infrastructure assets due to changed requirements from the presence of automated vehicles.

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FHWA-JPO-13-032



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