UNITED STATES
DEPARTMENT OF TRANSPORTATION

Identifying Significant Policy and Institutional Challenges Associated with Adoption and Implementation of Vehicle-to-Vehicle (V2V) and Vehicle-to-Infrastructure (V2I) Wireless Technologies

Hosted by: American Transportation Research Institute (ATRI)

Presented by: U.S. Department of Transportation (USDOT)

February 23, 2011

Agenda

- Overview of Truck V2V/V2I Program
- Policy Activities and Roadmap
- Key Policy Issues Relating to Adoption and Deployment of Truck V2V/V2I Communications
- Q&A

TIMTC
Trucking Industry Mobility & Technology Coalition

ATRI American Transportation Research Institute

COMMERCIAL VEHICLE SAFETY ALLIANCE
CVSA

AASHTO
AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
1914

ATA
AMERICAN TRUCKING ASSOCIATIONS

U.S. Department of Transportation

The TIMTC Mission:

- To improve the knowledge base of both private and public sector stakeholders of freight transportation issues and possible technology solutions
- To ensure a working forum of industry stakeholders that can coordinate existing and planned research initiatives

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Overview of V2V/V2I Research and Opportunities for Trucking Industry

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Research and Innovative Technology Administration

Intelligent Transportation Systems (ITS) Joint Program Office (JPO)

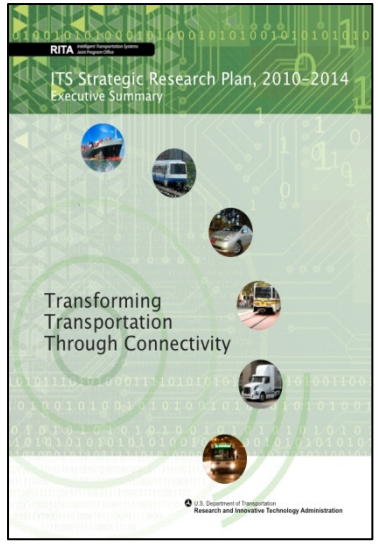
ITS Strategic Research Plan 2010-2014
A Truly Multimodal and Connected Effort

Vision

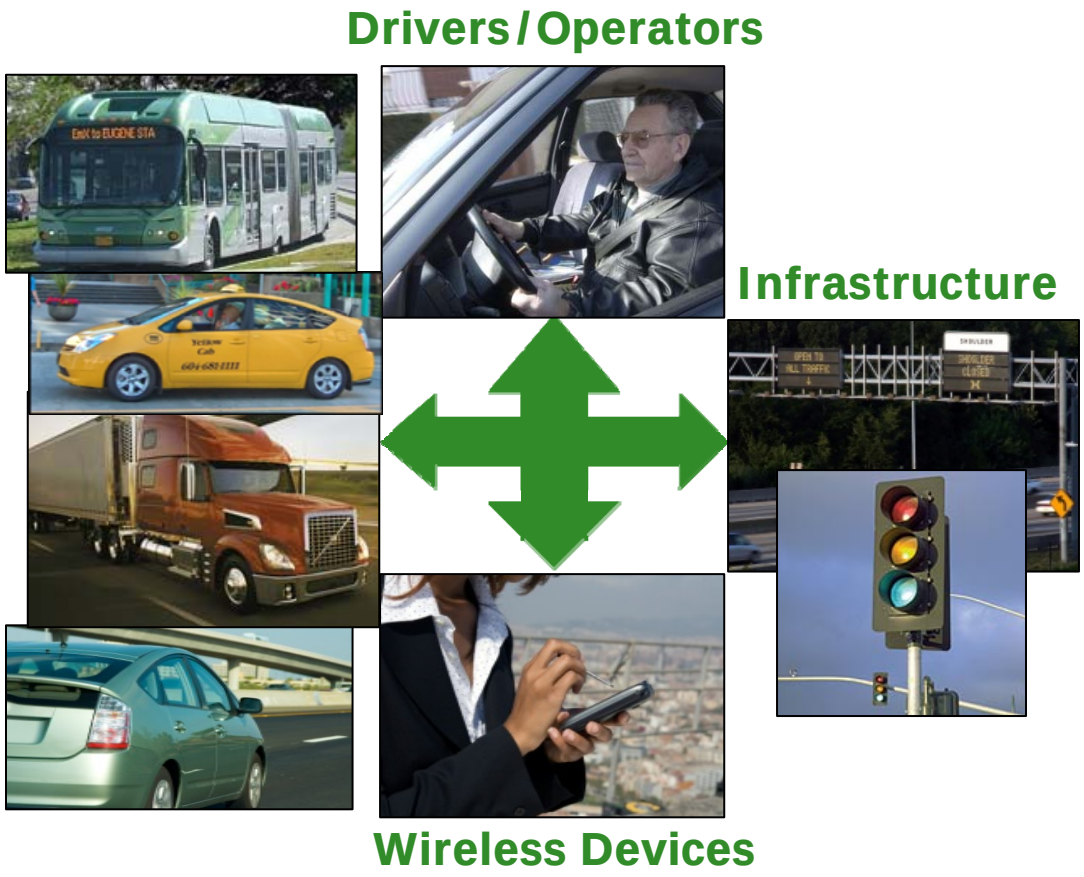
To research and facilitate a national, **multimodal surface transportation system** that features a connected transportation environment around **vehicles of all types**, the infrastructure, and portable devices to serve the public good by leveraging technology to maximize safety, mobility, and environmental performance.

Plan developed with full participation by all surface transportation modal administrations as well as with significant interaction with multi-modal stakeholders.

http://www.its.dot.gov/strategic_plan2010_2014/index.htm

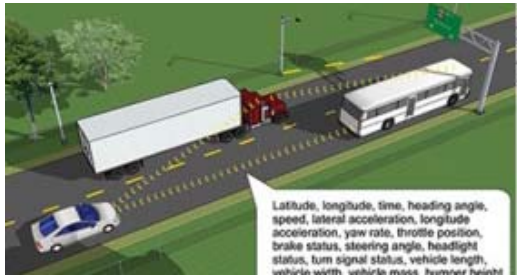


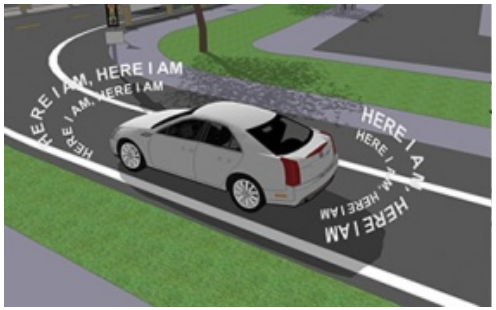
ITS Research = Multimodal and Connected



Step One – Accelerate V2V Safety

- Develop a Core Set of Applications
- Conduct Benefits Assessment
- Develop Driver Vehicle Interface (DVI) Guidelines
- Define Globally Harmonized Standards
- Assess Security Issues
- Accelerate V2V DSRC Devices
  - Basic Safety Message Broadcast Devices (Here I am)
  - Aftermarket Safety Devices
- Prepare for 2013 NHTSA Agency Decision





Step Two - Demonstrate Safety

Safety Pilot

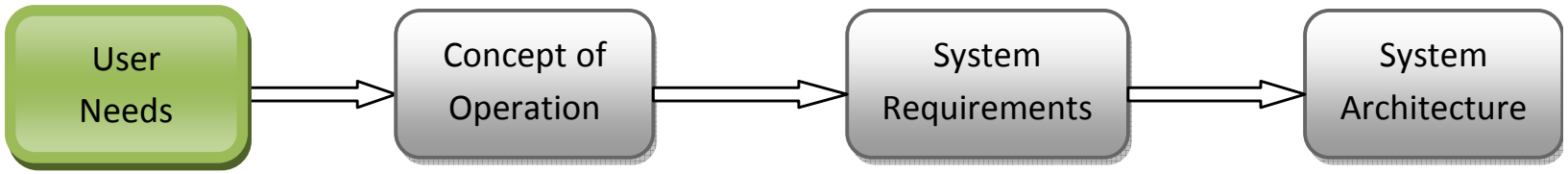
Major road test and real world implementation taking place 2011 – 2013 involving:

- Multiple vehicle types
- Fully integrated systems and aftermarket devices
- Driver Clinics

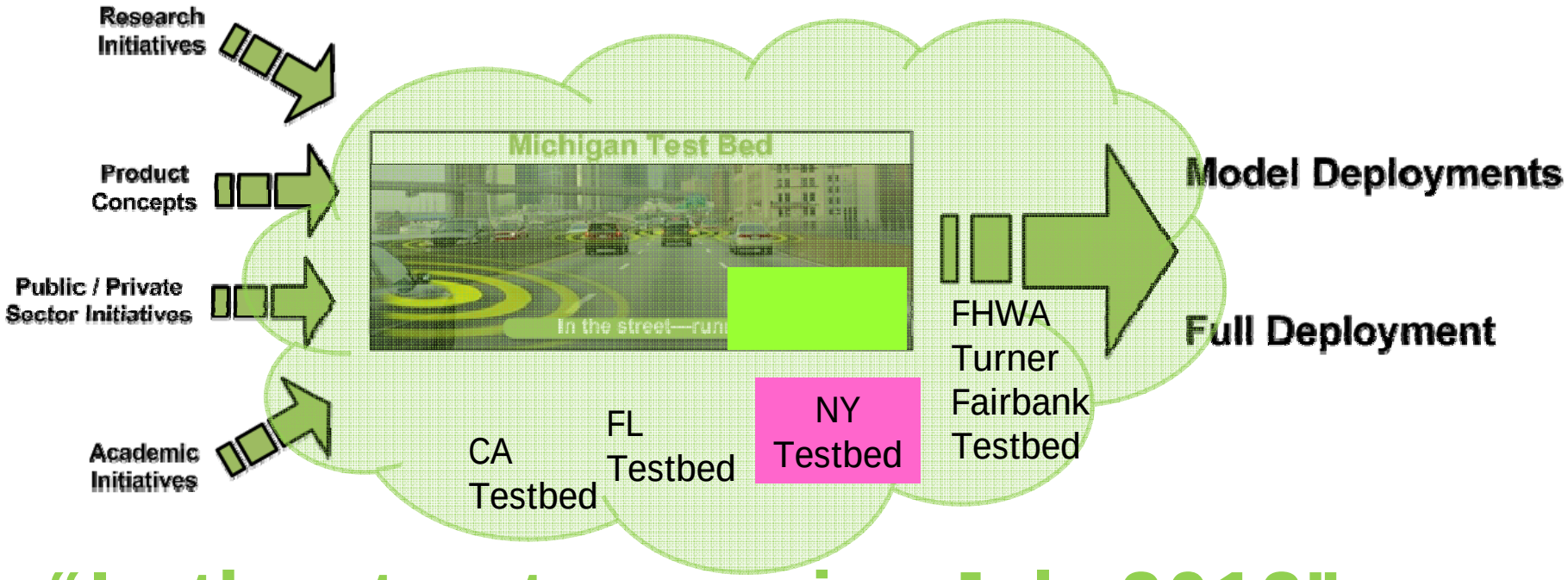
Also testing:

- Effectiveness of technology and applications
- Prototype security mechanisms
- Certification processes

Step Three – Define the System and Establish a Testing Environment



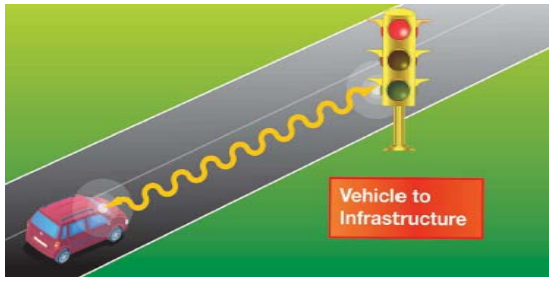
Aug./Sept. 2010 Oct. to Dec. 2010 Jan. to March 2011 Summer 2011



"In the street – running July 2012"

Step Four - Build V2I Safety, Mobility, and AERIS Data Environments and Applications

- V2I for Safety – Accelerate Signal Phase and Timing (SPAT) Based Applications, Smart Roadside, and Transit
- Prototype the Data Environment of the Future – All Vehicles as Probes and Open Data
- Prototype, Field Test and Analyze Mobility Applications
  - Use Open Source Software Approach to accelerate deployment
- Define and Test AERIS Applications



Signal Systems
Transit Management
Freight
R.E.S.C.U.E.M.E
ATIS
Speed Harmonization

AERIS

Examples of V2V/V2I Applications for Trucks

Vehicle-to-Vehicle (V2V)

- Forward Collision Warning
- Blind Spot Detection
- Lane Change Assistance
- Do Not Pass Warning
- Curve Speed Warning
- Intersection Movement Assistance

Vehicle-to-Infrastructure (V2I)

- Intersection Safety
- Run-off Road Prevention
- Low Bridge Height Warning
- Smart Roadside
  - Truck Parking
  - Wireless Roadside Inspections
  - Virtual Weigh Stations/Electronic Screening
  - Universal Truck Identification

Step Five – Build a Reference Implementation

- Reflect the System Architecture
- Utilize Harmonized International Standards
- Implement a Certification Process
- Implement a Governance Process
- Implement a Security Process

Step Six - Conduct Regional Pilots

- Multiple Implementation Areas
- Opportunity to Pilot a variety of applications per area's need (Sites choose from a suite of field tested applications)
- Seeds Implementation
- Uses Lessons Learned from Safety Pilot
- Builds on a Stakeholder Defined Architecture
- Accelerates DSRC for Safety
- Leverages Available Wireless Communications for Mobility and Environment Applications
- Leverages Private Sector Investments Occurring Now

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Definition of Policy Research

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Research and Innovative Technology Administration

Volpe National Transportation Systems Center

Why are we interested in Policy?

- Policy, institutional, economic, and societal issues present potentially significant challenges to technology adoption and use.
- By identification and analysis of issues, we can craft a research plan to develop options, and then compare options for:
  - Effectiveness
  - Costs
  - Benefits
  - Trade-offs
- End result is better clarity on policy options and their implications.

V2V/V2I Policy Roadmaps

http://www.its.dot.gov/connected_vehicle/connected_vehicle_policy.htm

- **Global Policy Roadmap**
  - Version 1.0 in 2009
  - Revisions in progress
- **Safety Policy Roadmap/ Execution Plan**
  - Completed Version 2
  - Revisions on Final Version 3 in progress
- **Mobility Policy Roadmap**
  - Version 1 will be posted for Stakeholder Comment next week
- **Truck Policy Identification**
  - Focus of Today's discussion
- **Transit Policy Identification**
  - Just starting
- **AERIS Policy Identification**
  - Just starting

Steps in developing policy options:

i. **Identification of policy issues**
ii. **Development of roadmap and execution plan**
iii. **Stakeholder comment period**
iv. **Finalization of documentation**
v. **Research execution and development of policy options with experts**
vi. **Presentation of policy options and Stakeholder input**
vii. **Finalization of policy options**

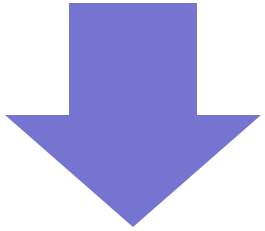
Sources of Input to Date:

- Reviewed literature on other technology adoption initiatives over past five years.
- Discussed opportunities for V2V/V2I with USDOT staff across ITS JPO, NHTSA, FMCSA, and FHWA.
- Discussed opportunities and concerns with TIMTC staff and gathered background reports.
- Participated in April 2010 CVSA workshop
- Safety Workshop in Chicago 2010

What Are Elements of a Policy Roadmap?

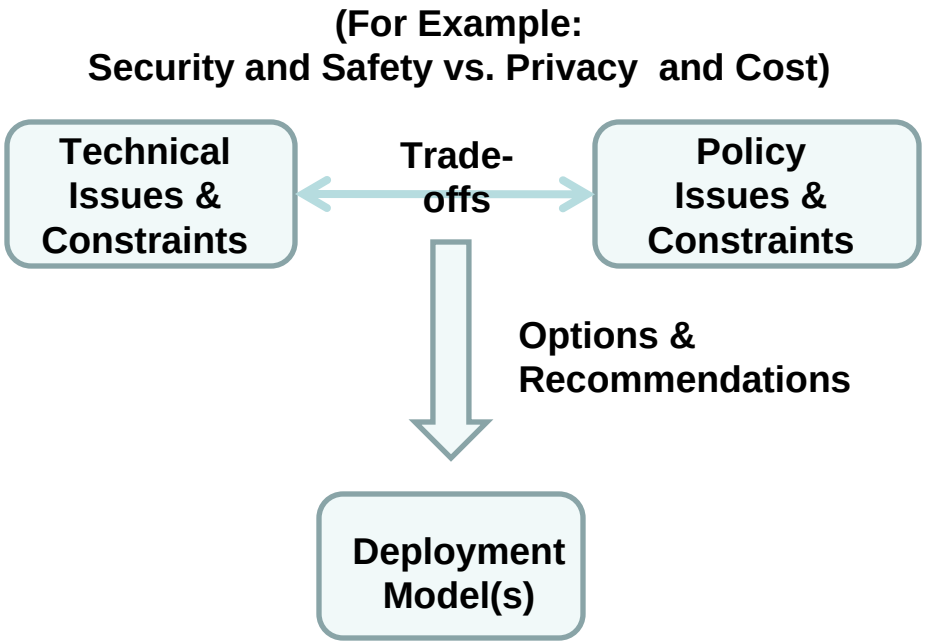
- **Definition** of major policy areas
- **Objectives in conducting research** on the policy issue
- **Milestones** for deliverables, policy options, expertise
- **Major events** (such as Safety Pilot) that define research timing

Road-mapping helps with the execution and timing of the research and allows us to present to stakeholders and ensure that we've got it right.



Leads to a policy execution plan.

Policy Research is Iterative and highlights Trade-Offs



Today's Objectives

Define the issues we've identified to date

- They are in the form of statements and questions that help scope the research

Ask you for your input, as potential adopters of this future technology

- Did we identify the right policy and institutional issues?
- Any missing?
- What is the level of importance/priority for you?
- For each policy issue we describe, are these the right assumptions/concerns? Are there others?
- Any ideas for next steps or experts we should be talking to?

Identify where research on options currently exists and determine where new research is needed

Questions on Overview or Policy Process?

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Key Policy Issues Relating to Adoption and Deployment of V2V/V2I Communications

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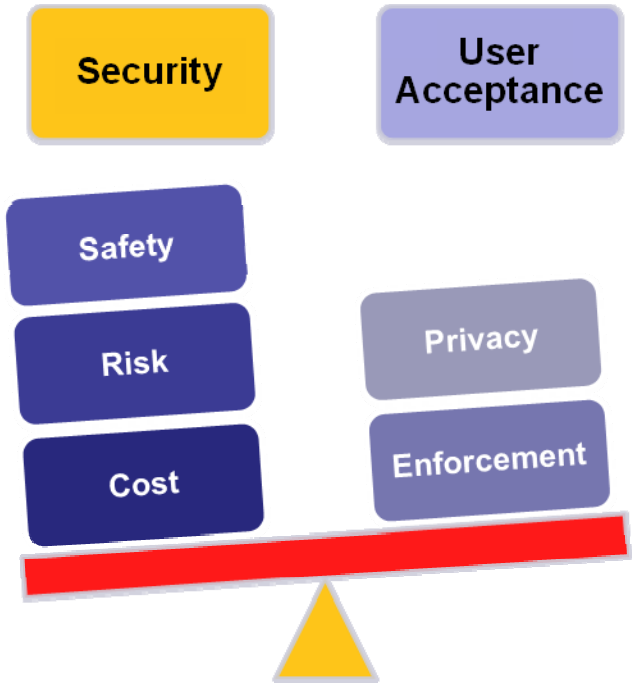
Context for Policy Discussion

- Trucking industry faces unique issues and challenges
- Trade-offs exist – need to develop sound policy options
- Stakeholder input is critical



The Trucking Industry is Unique

Diverse Industry

- Large/small carriers, owner-operators

Highly Regulated

- Hours of Service, Load and weight restrictions

Advanced technologies and systems for safety and mobility applications are already in use

- Radar, sensors, cameras

Investment decisions require analysis of impacts to business models

- Average operating ratio of 96.8 (for every dollar, 96.8 cents operating cost, 3.2 cents operating profit)

Significant policy challenges to adoption of V2V/V2I technologies

1. Data Privacy and Security
2. Risk and Liability
3. Value/Business Models
4. Governance

Privacy and Security

Overview:

- Data privacy refers to protection and appropriate use of data

- Security of a connected transportation environment is critical to the use and acceptance of a system supporting data exchange

- System security protects against threats and protect user privacy

Concerns/Issues

Privacy

- Proprietary and driver information should be kept private
- Users desire anonymity within the system
- Access and use of data should be clearly stated (support applications, enforcement)
- Resolution of conflicting privacy laws

Security

- Information sent between vehicles and roadside infrastructure should be secure
- Need to address risk of threats/attacks

Policy Research Activities

- Develop policies to ensure that messages/data are trusted between users
- Identify potential risk of attacks and violations against privacy and security
- Develop policies on rules of appropriate use of data
- Analyze tradeoffs between security and privacy

Questions and Discussion

Risks and Liability

Overview:

In a connected vehicle environment, large amounts of data is cooperatively produced and exchanged to support applications. It is unclear whether there will be increased risk and liability associated with these technologies.

This policy area identifies potential risks, liabilities, and mitigation strategies within this environment.

Risk and Liability

Risk

- Concern that greater availability of data increases risk to carriers
- Could this issue be a major challenge to adoption?

Liability

- Not always clear where liability resides in cooperative data environment
- Is this an area that existing legal and insurance industries are evaluating?

Policy Research Activities

- Develop risk inventory – identifying risks and vulnerabilities within the system
- Identify potential risk mitigation strategies
- Identify existing work conducted by industry in this area

Questions and Discussion

Value/Business Models

Overview:

There is a need for clear value added or a ‘return on investment’ – both quantitative and qualitative to support acceptance. This can include increased safety, operational cost savings, mobility, and environmental benefits.

Additionally, adoption of new technology cannot be too costly or negatively impact operations.

Concerns/Issues

Business Model Impacts

- Upfront/capital costs for technology installation
- Driver training costs
- Unclear whether benefits outweigh costs
- Integration of DSRC technologies with existing systems

Incentivizing Adoption

- Grants, tax incentives, subsidies
- Increased safety through cooperative safety applications
- Mobility benefits through better traffic information
- What are benefits without full industry adoption?

Policy Research Activities

- Identify investment options or incentives that could support adoption by the trucking community
- Develop cost-benefit model. Evaluate potential impacts to existing business models including initial capital costs and potential cost savings
- Develop fleet penetration models

Questions and Discussion

Governance

Overview:

Governance relates to ensuring consistency (of guidance, performance) across the nation. It includes system oversight and decision-making authorities, enforcement of standards and other rules of operation. Governance supports decision-making across jurisdictions.

A connected vehicle environment may potentially require new governance authorities and may impact existing governance structures.

Concerns/Issues

Governance

- Integration of new governance responsibilities with existing regulatory agencies (e.g. FMCSA).
- How would existing governance and enforcement agencies change based on adoption of new V2V/V2I system?
- How does governance help strike the fairest balance among stakeholders' interests (public/private)?

Policy Research Activities

- Research and develop effective governance options for protecting the interest of all system users
- Evaluate whether new authorities or policies are needed.

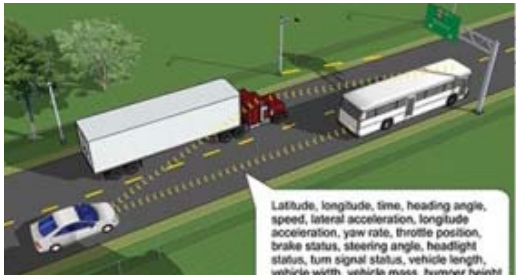
Questions and Discussion

Additional Policy Issues

- Device and Equipment Certification
  - How will new certification needs fit in with existing processes (TMC, IEEE, SAE)?
- Driver Overload and Distraction
  - Does introducing new technologies increase driver distraction?
- Enforcement
  - Can these new technologies streamline existing enforcement processes and ‘level the playing field’?

Opportunities for the Industry

- Can enhance existing technologies and their gaps:
  - Bridge hits
  - Truck parking
  - Streamlined wireless screening
  - Others
- Provides potentially transformative safety, mobility, and environmental applications.
- Potential for new business markets resulting from availability of real-time and reliable traffic information.



Final Questions and Discussion

For More Information

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