Intelligent Transportation Systems (ITS) Annual U.S. State of the Industry Review

Transportation Research Board Annual Meeting

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State of the U.S. DOT ITS Program

- Strong and getting stronger!
- More cross modal—rail and maritime
- Cars, trucks, buses, fleets, and vehicles of all kinds
- Commitment to dedicated short range communications (DSRC)
- Increased outreach and involvement of stakeholders: states, public, private, OEMs, suppliers and after-market
- Broadening of participation of public and private sectors and universities
- First ITS Fellow
- International cooperation and standards harmonization
- April 11, 2011

U.S. and Global Problems

Safety*

- 33,808 fatalities in 2009
- 2.2 million injuries
- 5.5 million crashes
- Leading cause of death for ages 4 to 34

Accessibility and Mobility**

- 4.8 billion hours of travel delay (34 hours per auto commuter)
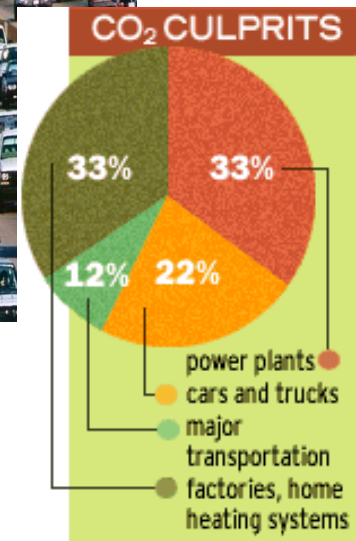- $115 billion cost of urban congestion

Environment**

- Transportation contributes 28% of U.S. GHG emissions and energy consumption
- 3.9 billion gallons of wasted fuel

All statistics annual basis for U.S.
*National Highway Traffic Safety Administration, U.S. DOT, 2009
**Texas Transportation Institute, 2010

CO2 CULPRITS

33% 33%

12% 22%

power plants
cars and trucks
major transportation
factories, home heating systems

Vision for the Future: Connectivity

- Multi-modal surface transportation system—with connectivity as its central core.

- Vehicles (cars, trucks, buses, fleets of all kinds) ←→ Infrastructure ←→ Mobile Devices

- Leveraging technology to maximize safety, mobility and the environment—enabled through wireless communications—in all modes.

- First priority is safety: crash and injury prevention.

- Foster technological advances across borders—for benefit of all international partners.

- Open platform for vehicle-to-vehicle (V2V) and vehicle-to-Infrastructure (V2I) communications is the major driving technology.
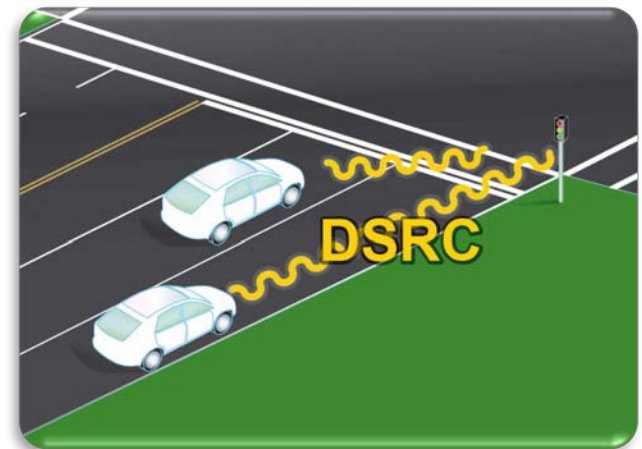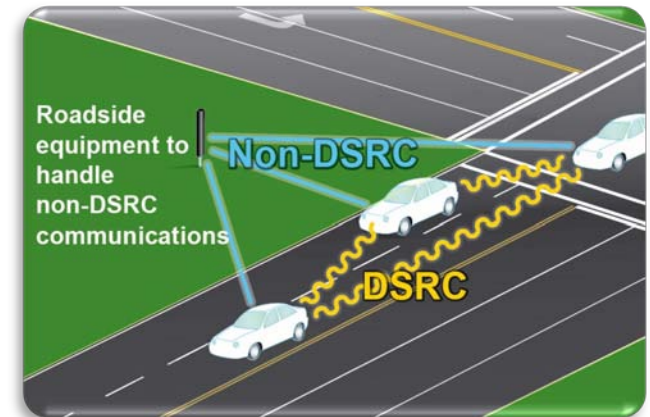
Achieving the Vision: ITS Strategic Research

Vision: National, multi-modal surface transportation system that features a connected transportation environment among vehicles (cars, trucks, buses, fleets of all kinds), the infrastructure, and mobile devices to serve the public good by leveraging technology to maximize safety, mobility and environmental performance.

Goal: Safety
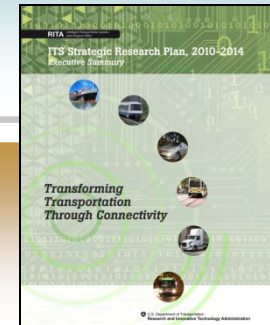Connectivity achieved through dedicated short range communications (DSRC).
Vehicle to Vehicle (V2V) Communications for Safety
Vehicle to Infrastructure (V2I) Communications for Safety

Goal: Mobility/Accessibility/Reliability
Real-Time Data Capture and Management
Dynamic Mobility Applications including Weather
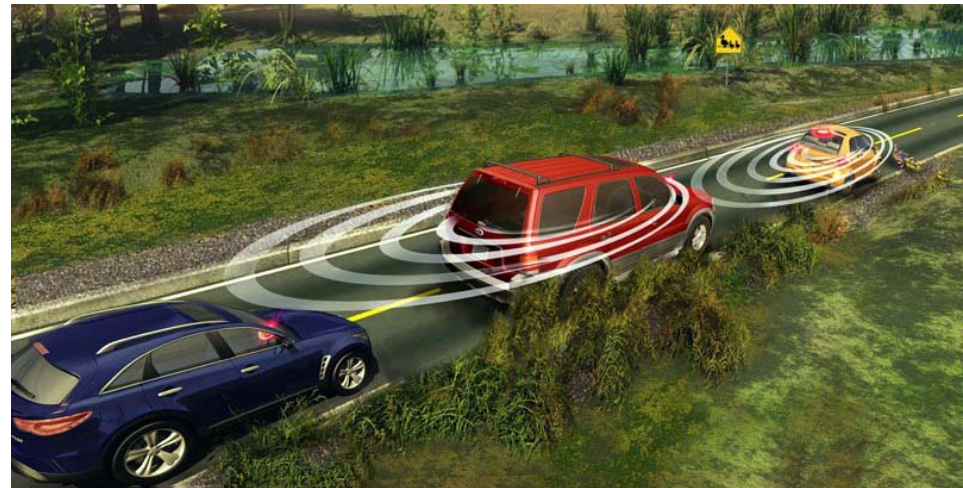
Goal: Environment
Applications for the Environment: Real-Time Information Synthesis (AERIS)
Real-time, environmental data from all sources will be integrated and available for use in multimodal transportation management and performance improvement and will contribute to better environmental practices.

Opportunity for Transformational Safety: V2V and V2I

- **Greater situational awareness**
  - Vehicles can "see" nearby vehicles and know roadway conditions that are not visible
- **Reduce or even eliminate crashes through:**
  - Driver advisories
  - Driver warnings
  - Vehicle control

V2V+V2I have the potential to address 80% of the vehicle target crashes involving unimpaired drivers[*]

Work Zone Notification

Intersection Collision Avoidance

*National Highway Traffic Safety Administration, October 2010, DOT HS 811 381

V2V and V2I Safety Research

- 2010 Selected Major Accomplishments:
  - Initiated new architecture and concept of operations development
  - Awarded 8 contracts for "Here I Am" devices
  - Initiated development of equipped heavy truck (in addition to light vehicles)
  - Initiated human factors research
  - Initiated V2I safety applications concept of operations

- 2011 Selected Planned Accomplishments:
  - Safety Pilot - award contracts for:
    - Aftermarket safety device development,
    - Safety Pilot test conductor
    - Roadside Equipment development
  - Establish Qualified Products List for "Here I Am Devices"
  - Develop transit and truck (Smart Roadside) V2I applications concepts of operations

Safety Pilot

- Major road test and real world implementation taking place 2011 – 2013 involving:
  - Multiple vehicle types
  - Fully integrated and retrofit systems and aftermarket devices
  - Back end systems and processes, including prototype security mechanisms
- Goals
  - Test prototype systems and applications in a real world environment
  - Provide data for additional safety, mobility and environmental applications development
  - Establish benefits data in support of NHTSA 2013 Agency Decision on V2V communications for safety
  - Create public awareness & determine user acceptance

Mobility Program

**Real-time Data Capture and Management**

Mobility Applications
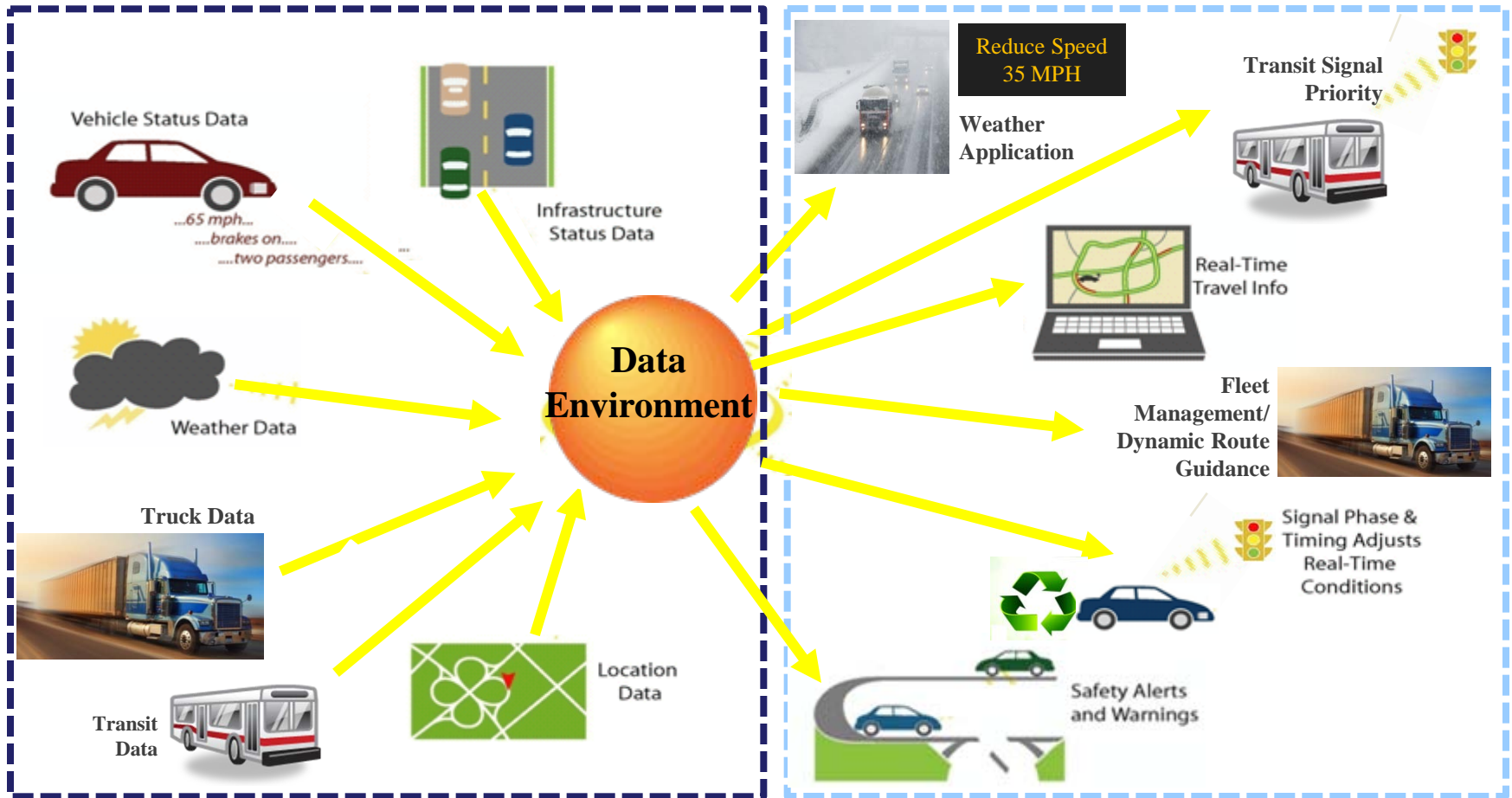
Mobility Program

- 2010 Selected Major Accomplishments:
  - Data capture innovation scan underway
  - Data capture portal established
  - High priority applications and development approach identified
  - Open Source Application Development Portal under development

- 2011 Selected Planned Accomplishments:
  - Collect test data sets
  - Begin applications development

High Priority Mobility Applications
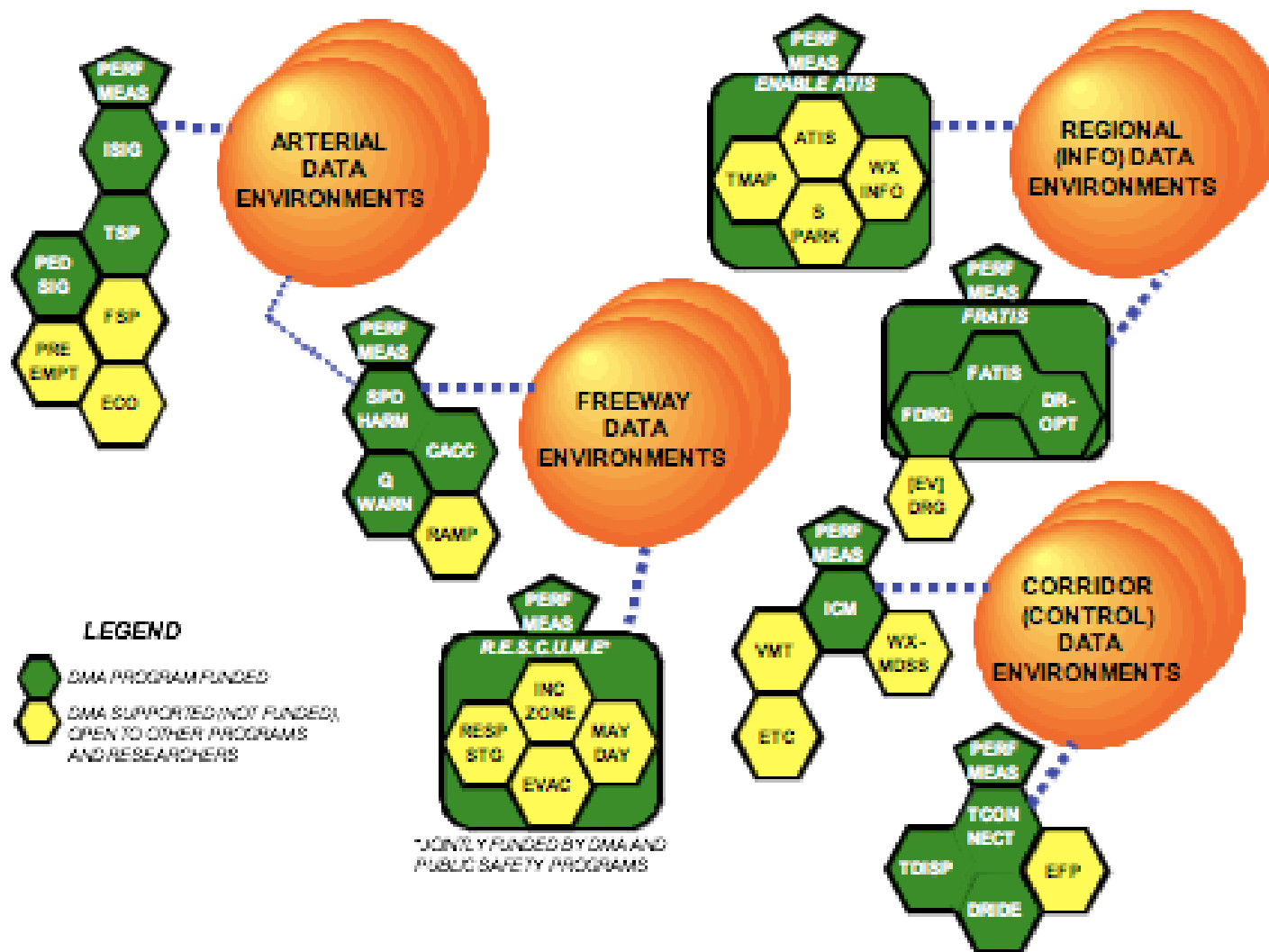
Environmental Program

Applications for the Environment: Real-Time Information Synthesis (AERIS)

- 2010 Major Accomplishments:
- 7 awards to further innovative applications and concepts building on existing outside research
  - 2011 Planned Accomplishments:
- Complete State of the Practice Scans:
  - Research of ITS and the Environment
  - Evaluation Techniques for ITS and the Environment
  - Activity-Based Travel Models
  - Environmental Models
  - Data Acquisition Technologies
- Develop Research and Analysis Framework
- Start analytics and modeling research

AERIS

Other 2010 Accomplishments

- International Cooperation & Standards Harmonization
    - Initiated Memoranda of Cooperation with Japan and Canada
    - Furthered work with European Commission to identify V2V and V2I standards for harmonization
- V2V and V2I Michigan Test Bed Upgrades (Test Bed 2.0)
- Launched Travel Management Coordination Centers in Paducah, KY and Aiken, SC under Mobility Services for All Americans (two more launches coming in 2011!)
- Integrated Vehicle Based Safety Systems (IVBSS) Field Operational Test Completed
- Connected Vehicle Technology Challenge
- New ITS JPO Web Site: **www.its.dot.gov**
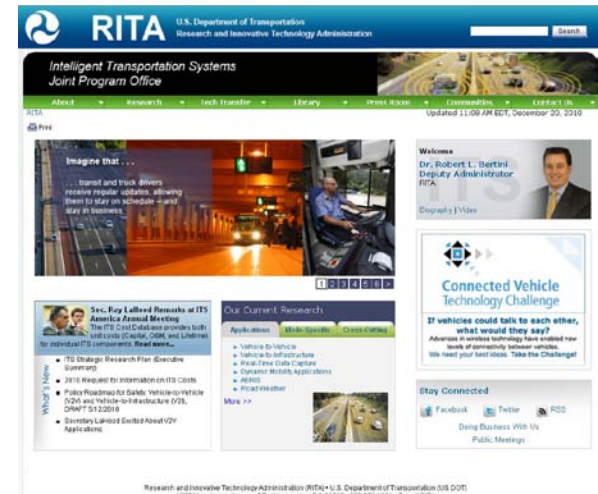
In 2011 Stay Tuned for…

- ITS Deployment Video Challenge
- ITS Standards Strategic Plan
- V2V and V2I Test Bed 3.0
- ITS Deployment Tracking Survey 2010
- ITS Professional Capacity Building (PCB) Strategic Plan
- Public Workshops: Environment - Spring; Safety - Summer
- Procurement Opportunities:
  - Safety Pilot –
    - Aftermarket Safety Device development
    - Safety Pilot Test Conductor
   - Roadside Equipment development
  - Data Manager (Mobility Program)

ITS Professional Capacity Building

Reached 2,500 transportation professionals in 2010

- **Workforce Development a Priority for DOT**
- **PCB Strategic Plan Development**
  - http://itspcbplan.ideascale.com/
- **ITS Standards Training**
  - 18 Modules under development
- **Continuing Education**
  - T3s:Talking Transportation & Technology
  - Peer-to-Peer (P2P) Technical Assistance Program
  - Classroom based Training
  - Web based Training
- **Workshops and Presentations**
- **Embedding technology transfer in research process**

ITS PCB Preview

- Develop ITS Primer / Wiki format
- Develop 1-2 targeted courses piloting the use of Web 2.0 technologies
- Host UTC Workshop – Objective: obtain university partner(s)
- Explore ITS professional certification
- Continue standards course development
  - Pilot courses held for 18 modules
  - Additional 18 modules under development
- Evaluate, update, retire current courses
- Develop prototype ITS PCB knowledge portal for one stop shopping of training resources
- Material describing benefits of ITS, synthesized for decision maker
- Adapt test bed usage for training purposes

WIKIPEDIA
The Free Encyclopedia

Ask the expert
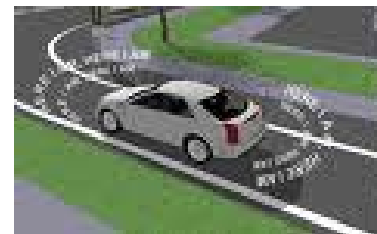
Accelerating Innovation

- U.S. DOT is striving to accelerate deployment and innovation in partnership with stakeholders and implementers
- Mainstreaming ITS technologies that have known benefits
- Performance measurement and rigorous evaluation
- Collaboration among transportation agencies and industry
- Charismatic leadership
- It's the people—workforce development

For More Information…

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