



**XXIVth WORLD
ROAD CONGRESS**
Mexico City 2011

CONNECTED VEHICLE RESEARCH IN THE UNITED STATES

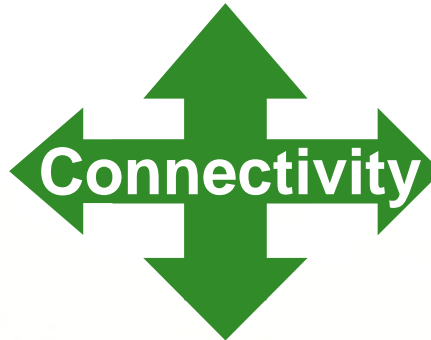
Shelley Row

- Intelligent Transportation Systems Joint Program Office, Research and Innovative Technology Administration, USDOT
- Director
- Shelley.Row@dot.gov



ITS RESEARCH = MULTIMODAL AND CONNECTED

Drivers/Operators



Vehicles and Fleets



Infrastructure

Wireless Devices

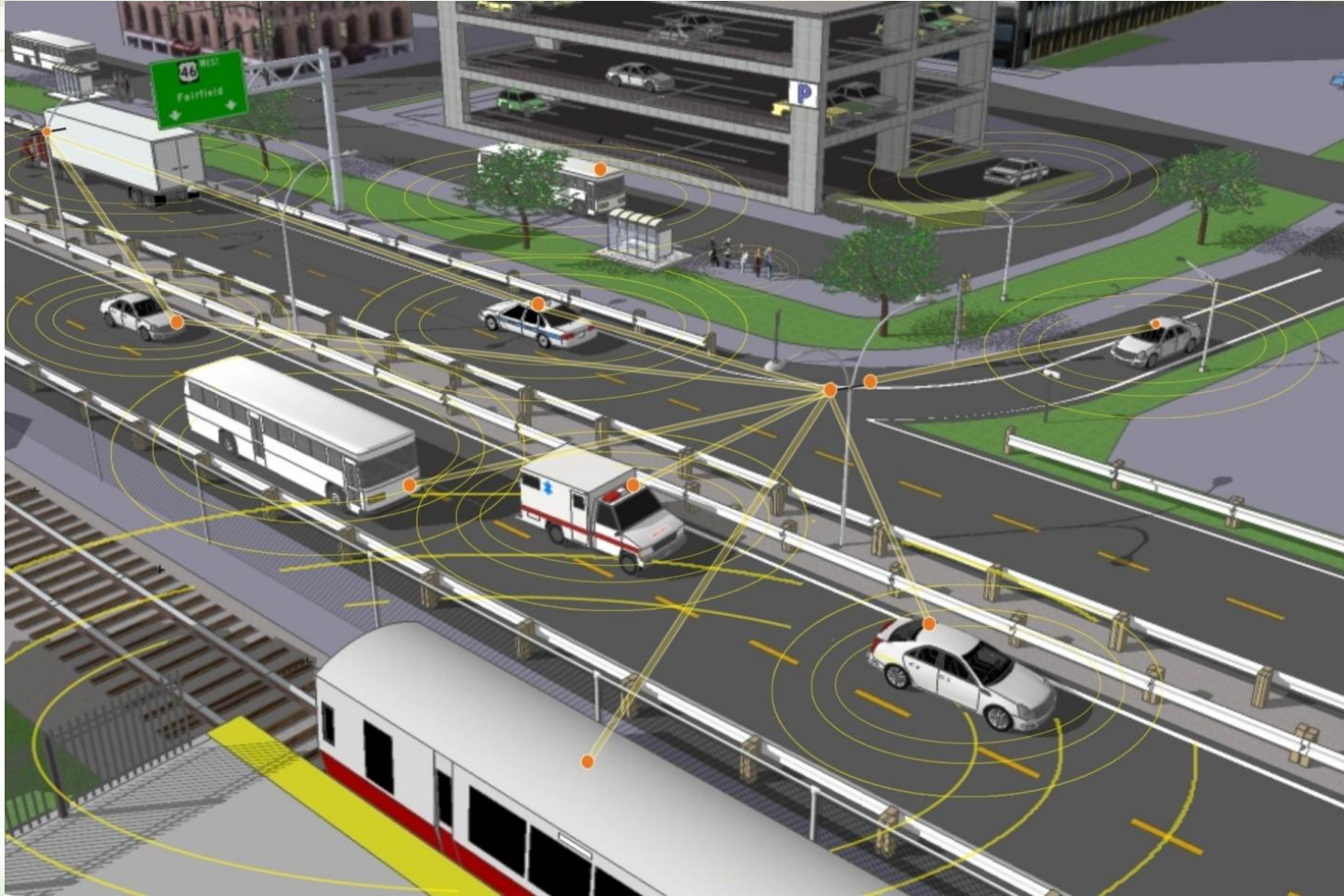


WHAT IS THE CONNECTED VEHICLE PROGRAM

- Vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) wireless communications for:
 - **Crash prevention**
 - **Improved mobility**
 - **Environmental sustainability**
- Connected vehicle capability addresses over 80% of unimpaired crash scenarios
- Encompasses autos, buses, and trucks



CONNECTED TRANSPORTATION



ITS RESEARCH PROGRAM COMPONENTS

Applications

Safety			Mobility		Environment	
V2V	V2I	Safety Pilot	Real Time Data Capture & Management	Dynamic Mobility Applications	AERIS	Road Weather Applications

Technology

Harmonization of International Standards & Architecture

Human Factors

Systems Engineering

Certification

Test Environments

Policy

Deployment Scenarios

Financing & Investment Models

Operations & Governance

Institutional Issues



KEY PROGRAM OBJECTIVES

- 2013 Decision on Vehicle Communications for Safety (light vehicles)
- 2014 Decision on Vehicle Communications for Safety (heavy vehicles)
- 2015 Infrastructure Implementation Guidance



NHTSA AGENCY DECISION

- Possible decision options include:
 - **Rulemaking** on minimum performance requirements for vehicle communications for safety on new vehicles
 - Inclusion in NHTSA's **New Car Assessment Program** to give car makers credit for voluntary inclusion of safety capability in new vehicles
 - **More research** required



NHTSA AGENCY DECISION (CONT.)

- **Data will determine NHTSA's action for the 2013 decision point:**
 - Simulation and modeling efforts based upon previous field operational tests
 - Data collection from V2V test track testing
 - Empirical data obtained from **Safety Pilot**
 - Driver clinics (user acceptance)
 - Model deployment activities (safety effectiveness)
- **A key factor for the NHTSA decision will be the need for, and timing of, necessary infrastructure for communication security (still undefined)**



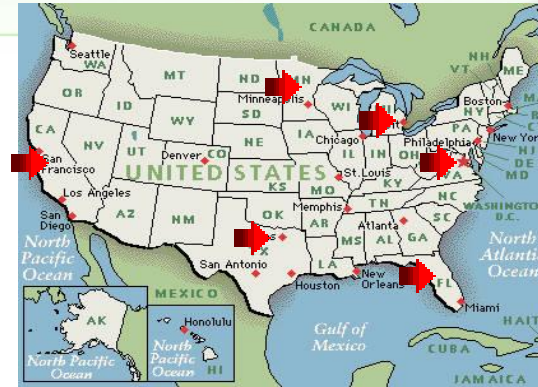
SAFETY PILOT OBJECTIVES

- **Generate empirical data for supporting 2013 and 2014 decisions**
- Show **capability of V2V and V2I applications** in a real-world operating environment using multiple vehicle types
- Determine **driver acceptance** of vehicle-based safety warning systems



SAFETY PILOT SITES

- **Driver clinics**
 - Assess user acceptance



Six Driver Clinic Sites

- **Large-scale model deployment**
 - Obtain empirical safety data for estimating safety benefits



One Model Deployment Site



Connected Vehicle Safety Program Partners and Contractors

Vehicle Manufacturers



USDOT



Academia



Public Agencies



Industry



Associations/Standards Developers



USER ACCEPTANCE -- DRIVER CLINICS

- 6 locations across the U.S. beginning in August 2011
- 100 drivers per location
- Experience crash warnings
 - Forward Crash Warning
 - Emergency Brake Light
 - Blind Spot Warning
 - Lane Change Warning
 - Intersection Assist
 - Do Not Pass Warning

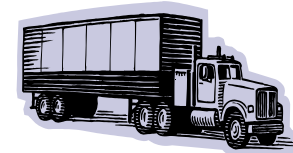


MODEL DEPLOYMENT

- Major road test and real-world implementation taking place from 2011 thru 2013, involving:
 - Approximately 3,000 vehicles
 - Multiple vehicle types
 - Fully integrated systems and aftermarket devices
 - Roadside infrastructure
 - System-wide interoperability testing
- Also to test
 - Prototype security mechanisms
 - Device certification processes



Integrated Vehicles



Integrated Trucks



Aftermarket Devices



Basic Safety Devices



Roadside Infrastructure



AFTERMARKET SAFETY DEVICES

- Devices that transmit and receive the Basic Safety Message
 - Driver interface for safety warnings
 - No integration with vehicle
- 4 vendors currently underway
- Applications include:
 - CICAS-V (red light warning) (V2I)
 - Curve overspeed warning (V2I)
 - Emergency electronic brake light (V2V)
 - Forward collision warning (V2V)
- Qualified Products List (QPL) projected for March 2012
- ***Safety devices must comply with NHTSA driver interface criteria before being released to drivers for model deployment***



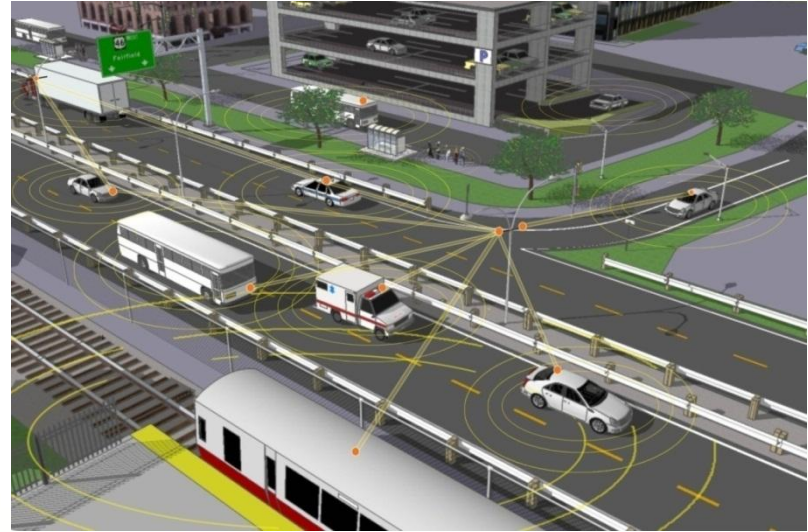
BASIC COMMUNICATION DEVICES

- Devices that only transmit the Basic Safety Message
 - No driver interface
- Initial procurement resulted in 8 awards
 - 6 vendors made it to acceptance testing
 - No vendors fully complied with the tests
 - Specification was considered by the U.S. DOT as still weak
 - U.S. DOT updated specification and issued 2nd procurement
- 2nd procurement resulted in 4 awards
 - Currently underway
- QPL estimated to be established later this year



ROADSIDE EQUIPMENT FOR SAFETY

- Transmission and receipt of V2I messages
 - Interfaces with signal controller (at intersections)
 - Supports other dangerous road segment applications
- Applications supported
 - CICAS-V (red-light warning)
 - Curve overspeed warning
 - Collection of probe data transmissions
 - Other (tbd)
- 4 vendors currently underway
- QPL projected for January 2012



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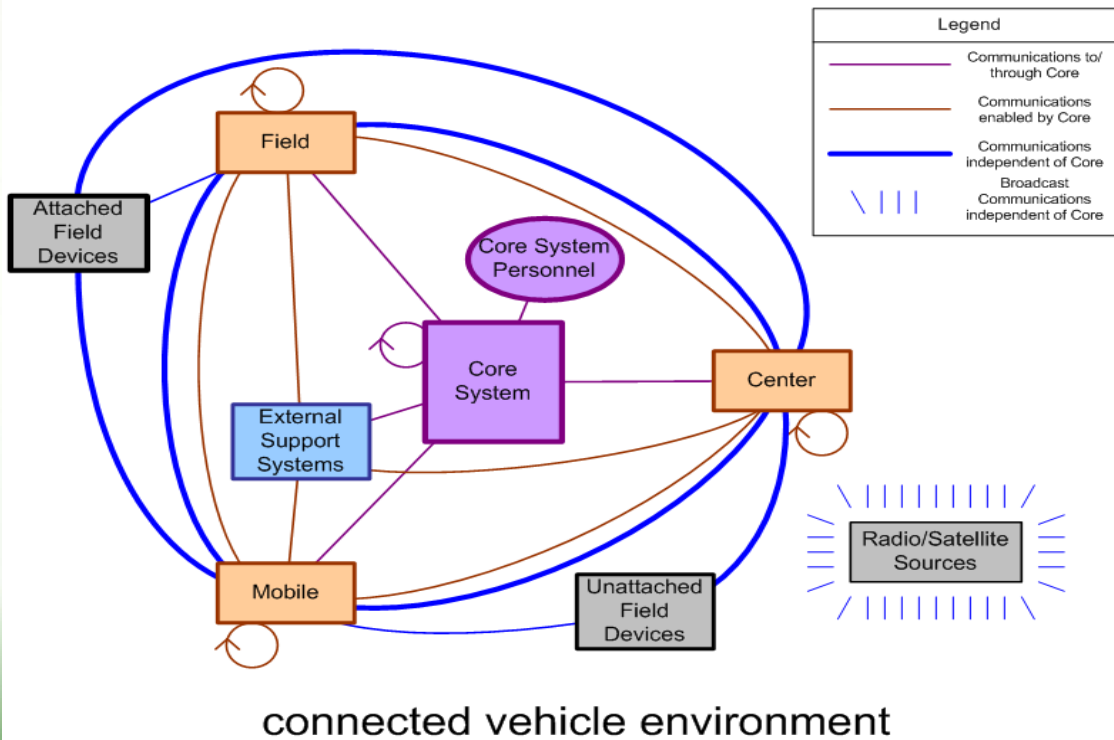
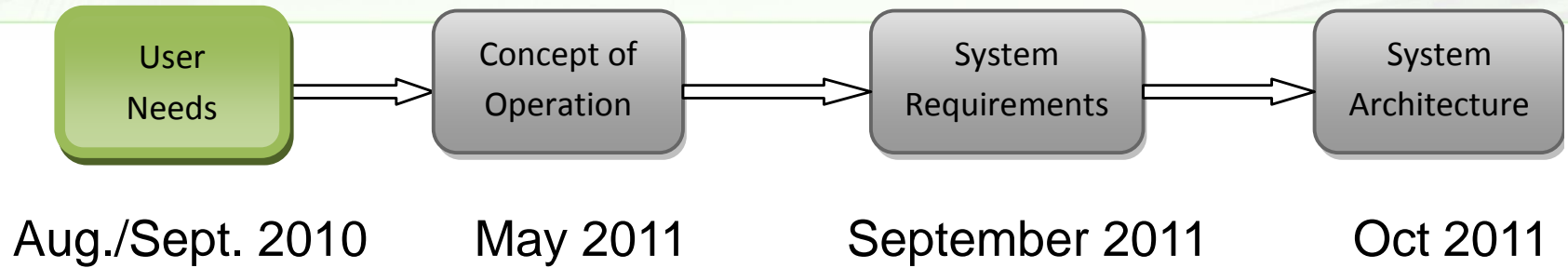
Financing & Investment Models

Operations & Governance

Institutional Issues



DEFINE THE SYSTEM AND ESTABLISH A TESTING ENVIRONMENT



Open Workshops
June 2011 (DC)
Sept. (San Jose, CA)



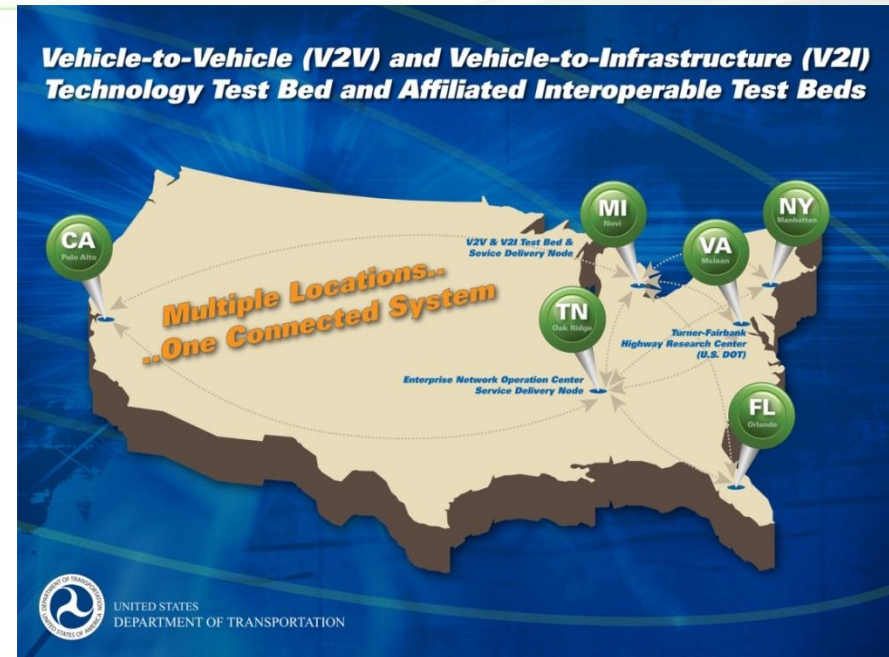
BUILD A REFERENCE IMPLEMENTATION

2011

- Test bed is up and running. Interoperable equipment in California, Florida, New York, Michigan, and Virginia, and network operations in Tennessee

2012 to 2013

- Reflect the system architecture
- Utilize harmonized international standards
- Implement a certification process
- Implement a governance process
- Implement a security process



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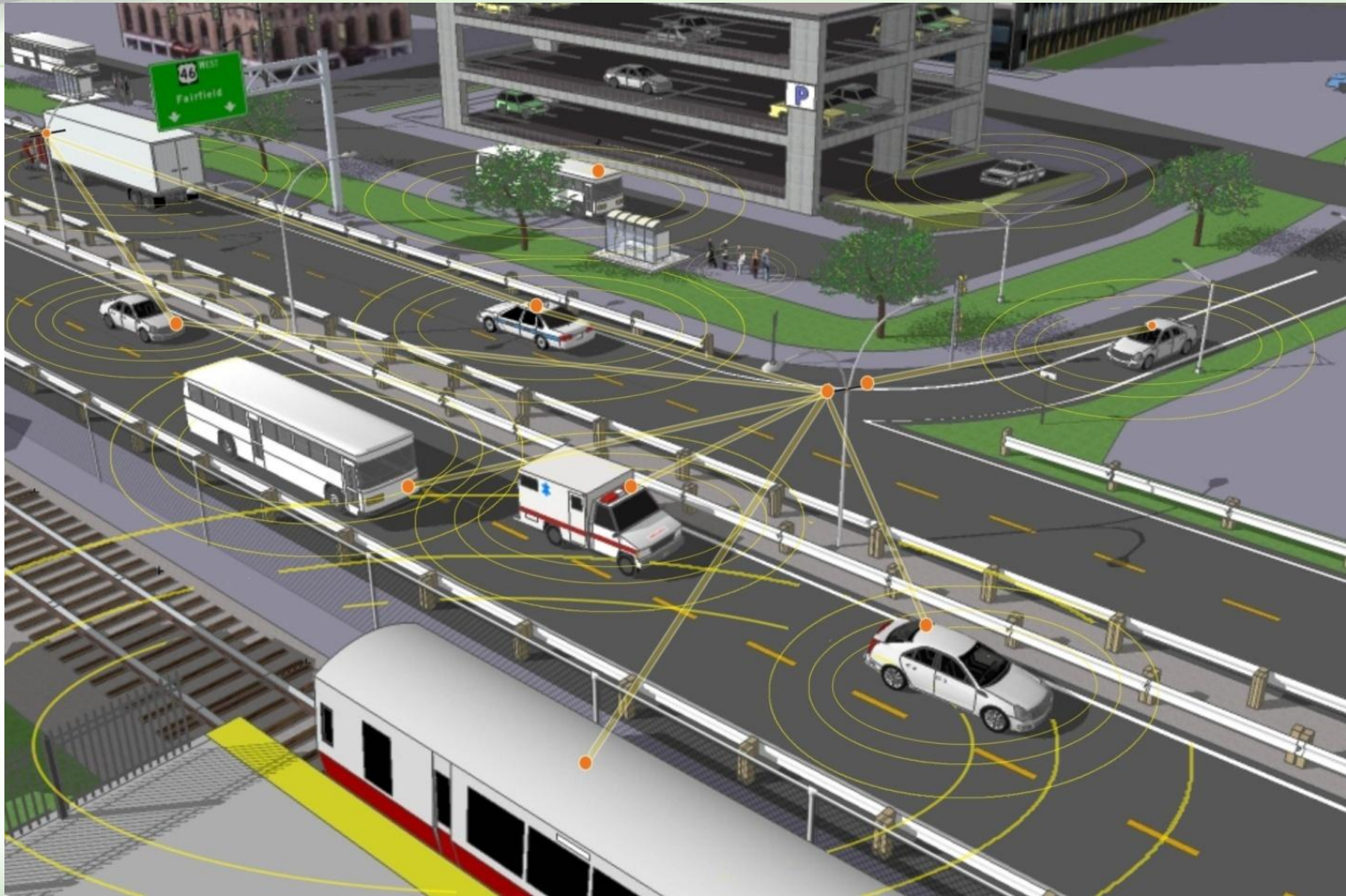
DEPLOYMENT SCENARIOS

V2V Security Network

- Options:
 - **DSRC for security:** Estimated at 40,000 RSEs; not necessarily owned/operated by Federal/State/local governments
 - **Cellular or WiFi:** Infrastructure exists; must address privacy
 - **No infrastructure:** Unlikely to meet our needs but worthy of consideration
- All require a sustainable funding stream and governance structure
- V2I could be implemented in spot locations



CONNECTED TRANSPORTATION



FOR MORE INFORMATION

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

Intelligent Transportation Systems
Joint Program Office

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ITS VIDEO CHALLENGE

Grab your camera and share with us the story of your community's ITS deployment!

Find the official rules and award information [here](#).

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Shelley J. Row, P.E., PTOE
Director
ITS Joint Program Office

Biography 

Procurement Opportunities

As we implement the ITS Research Strategic Plan, open procurements may become available through a variety of solicitations. [More >>](#)

Public Meetings

 [View >>](#)

RITA Administrator Peter Appel Welcomes Shelley Row Back to the ITS JPO in an Open Letter to Stakeholders

U.S. Department of Transportation and RITA welcomes back Shelley Row. [Read more...](#)

Spotlight

- ITS JPO hosts Public Meeting and Webinar to Discuss New AERIS Applications 6/1/11
- U.S. DOT Seeks Comments on National ITS Architecture 5/24/11
- Dale Thompson Joins the Team at ITS JPO 5/24/11

[More News>>](#)

Our Current Research

Applications Mode-Specific Cross-Cutting

- Vehicle-to-Vehicle Safety
- Vehicle-to-Infrastructure Safety
- Real-Time Data Capture
- Dynamic Mobility Applications
- Environment
- Road Weather

[More >>](#)

ITS Video Challenge

Grab your camera and share the story of your community's ITS deployment.

[>> Official Rules](#)

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