Transportation Research Board Annual Meeting
State of ITS Industry

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Presentation Overview

- Our Transportation Challenges

- USDOT Multimodal Collaboration

- ITS Over the Past 20 Years

- 2013 Deployment Tracking Report

- ITS JPO Success Stories

- ITS JPO – Current Key Programs

- Where We're Headed – the ITS Strategic Plan

  - Connected Vehicles

  - Automation

  - Emerging Capabilities

  - Enterprise Data

  - Interoperability

  - Accelerating Deployment

Today's Transportation Challenges

Safety
- 33,561 highway deaths in 2012
- 5.615 million crashes in 2012
- Leading cause of death for ages 4, 11-27

Mobility
- 5.5 billion hours of travel delay
- $121 billion cost of urban congestion

Environment
- 2.9 billion gallons of wasted fuel
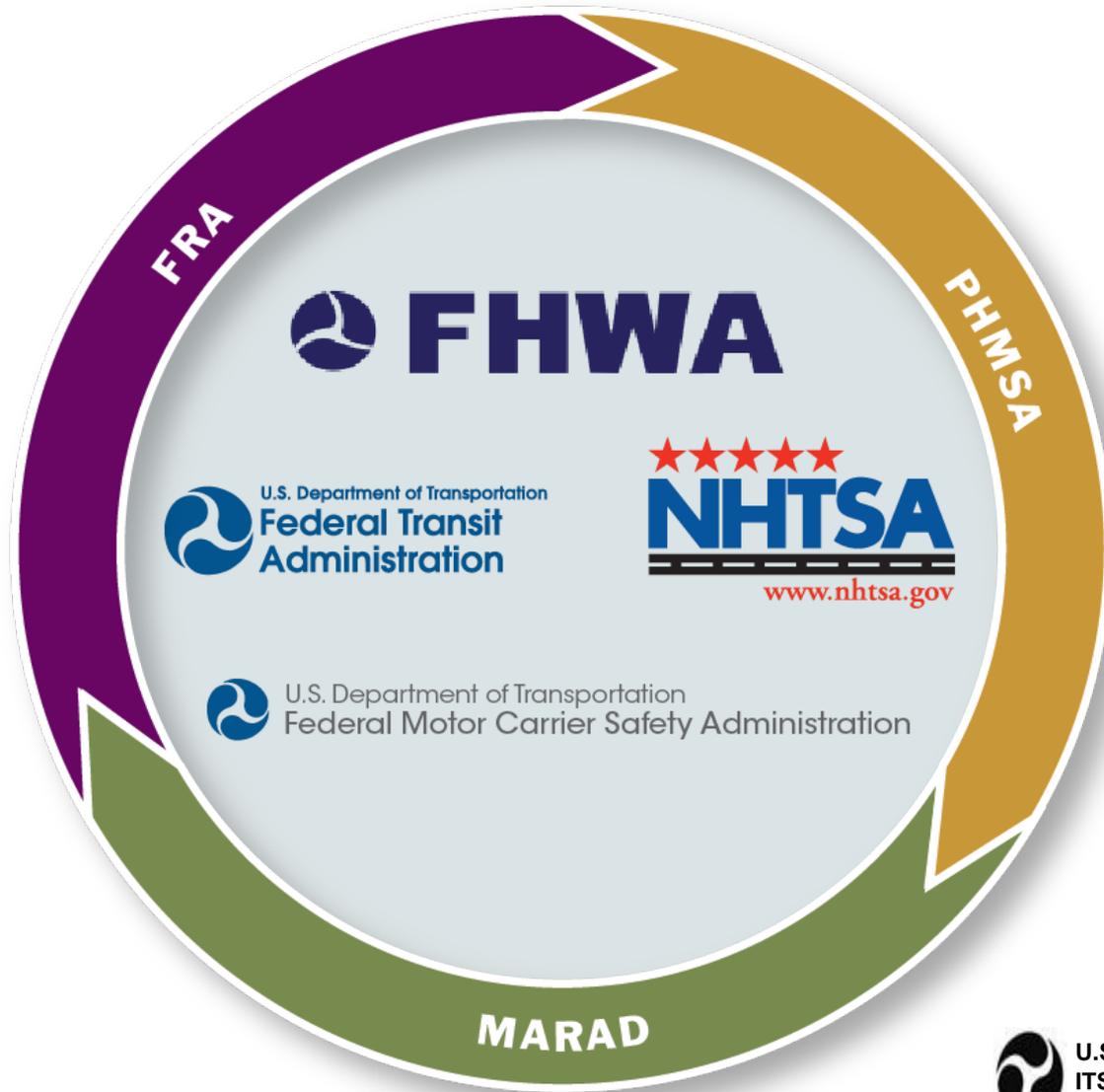- 56 billion lbs of additional CO_2

Data Sources:
- Traffic Safety Facts: 2012 Data, National Highway Traffic Safety Administration (Nov 2013)
- 2011 Annual Urban Mobility Report, Texas Transportation Institute (Feb 2013)

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USDOT Modal Collaboration and Partnership

ITS Deployment Over the Last 20 Years

- $18 billion in ITS deployment by top 75 metro areas*

- Over $3 billion in federal funds dedicated to ITS research and deployment since 1992**

- 80,000 deployed ITS assets

  - ITS Asset Viewer: http://itsdeployment.ornl.gov/itsassets/

- $48 billion U.S. ITS end-use products and services market – ITS America

Source: Thinkstock.com

*National Deployment Estimate of Metropolitan ITS Infrastructure (2010 Update)

** Five Year ITS Program Plan, 2006

2013 Deployment Tracking Report Released

- Nationwide survey of state and local transportation and emergency management agencies conducted nearly every year since 1997

- Helps guide federal ITS research and program management, provide useful market insights for policy makers, and assess the cost and operational impact of ITS at the national scale

- Highlights trends in the adoption of ITS technologies including:

  - **Evidence of waning, mature, or nascent ITS technologies** and whether some markets for the technologies seemed more mature, or in the early phases of adoption

  - Evidence of **new technologies replacing existing or old technologies**

  - The **direction the market may be moving** with certain types of ITS technologies

  - Technology markets where **interventions** may have had (or have the potential to have) an effect on ITS adoption

2013 Deployment Tracking Report Findings

- A high percentage of freeway, arterial, transit and toll agencies plan to expand or deploy new technologies in the near term.

- Freeway agencies are moving from loop detectors to radar and probe sensors, particularly Blue Tooth systems. Arterial agencies are also expanding use of Blue Tooth and radar.

- Barriers to adoption of Adaptive Signal Systems are falling, with more arterial agencies reporting intentions to deploy this technology in the next 3 years.

- In 2013, use of Twitter, apps for Smartphone and Facebook is well established for freeway agencies and rapidly growing on arterials.

- The deployment of technologies to track and dispatch transit vehicles has made it possible to improve customer service by providing travelers with real-time information on schedule adherence, with more than 25% of transit agencies using social media to distribute real-time information.

- One fourth of agencies report being part of an integrated corridor. However, interagency coordination between freeway, arterial and transit agencies is not completely realized and interagency agreements tend to be informal in nature.

- Familiarity with the DSRC standard is high for freeway and toll agencies but much lower for arterial and transit agencies. Current and planned use of the standard is reported by only a handful of agencies, typically in safety and mobility applications.

History – ITS JPO Research Success Stories

- Clarus
- Congestion Initiative
- Cooperative Intersection Collision Avoidance Systems (CICAS)
- Electronic Freight Management (EFM)
- Electronic Toll Collection (EZ-Pass)
- Integrated Vehicle-Based Safety Systems (IVBSS)
- ITS Asset Viewer
- ITS Knowledge Resources (Benefits, Costs, and Lessons Learned)
- ITS Professional Capacity Building

- ITS Standards
- Metropolitan Model Deployment Initiative
- Mobility Services for All Americans
- National 511 Program
- National ITS Architecture
- Next Gen 9-1-1
- Operation Time Saver/ Deployment Tracking
- Road Weather Management
- Transit Fare Collection
- Traveler Information
- Work Zone Management Systems

ITS JPO – Current Key Programs

The ITS JPO programs span a broad array of subject matter expert research:

- Connected Vehicles
  - Vehicle to Vehicle (V2V)
  - Vehicle to Infrastructure (V2I)
  - V2X (pedestrians, motorcycles, cell phones etc.)
- Dynamic Mobility Applications
- Eco-Lanes/ Eco Traffic Signals
- Data System, Management, and Use
- ITS Standards and Architecture
- Federal, State, and Local ITS Training
- Integrated Corridor Management (ICM)
- Automated Vehicle and Infrastructure Research
- Human Factors

Photo Source: USDOT/ ThinkStock

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ITS Strategic Plan 2015-2019

The Strategic Planning Process: Reflecting Stakeholder Input

WE HAVE HEARD YOU...

Over **700 stakeholders** representing states and localities from across the country participated in development of the 2015–2019 ITS Strategic Plan

AUTOMATION was a recurring topic of interest, being discussed by over **100 stakeholders**

285 different **organizations** contributed inputs to the ITS Strategic Plan 2015–2019

INTEROPERABILITY as an ITS program focus was raised over **200 times**

Over **100** inputs regarding **ENTERPRISE DATA** were received

Over **75%** of stakeholders agreed that technology developers (**EMERGING CAPABILITIES**, not currently associated with CVs) will have an impact on the future of the CV environment.

Nearly **100%** of stakeholders that participated in the surveys indicated they were satisfied with the current level of emphasis on **CV** research

Over **55%** of participating stakeholders claimed they are currently ready for and would be receptive to new CV or similar technology, such as what has been described under **ACCELERATING DEPLOYMENT**.

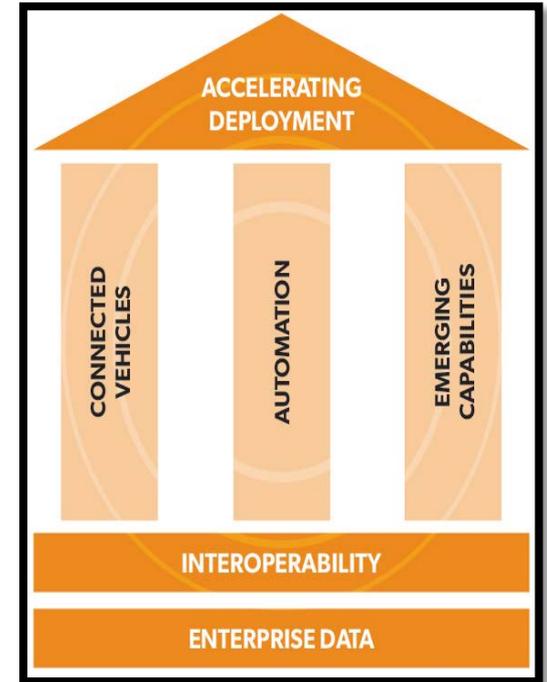Data collection efforts yielded **845** unique ITS **Stakeholder** responses

Strategic Priorities

- Two Strategic Priorities reflect a sense of where the bulk of transportation research and innovation is heading. These priorities are not exclusive of other technologies or research areas.

  - ***Realizing Connected Vehicle Implementation –*** Builds on the substantial progress made in recent years around design, testing, and planning for connected vehicles to be deployed across the nation.

  - ***Advancing Automation –*** Shapes the ITS Program around research, development, and adoption of automation related technologies as they emerge.
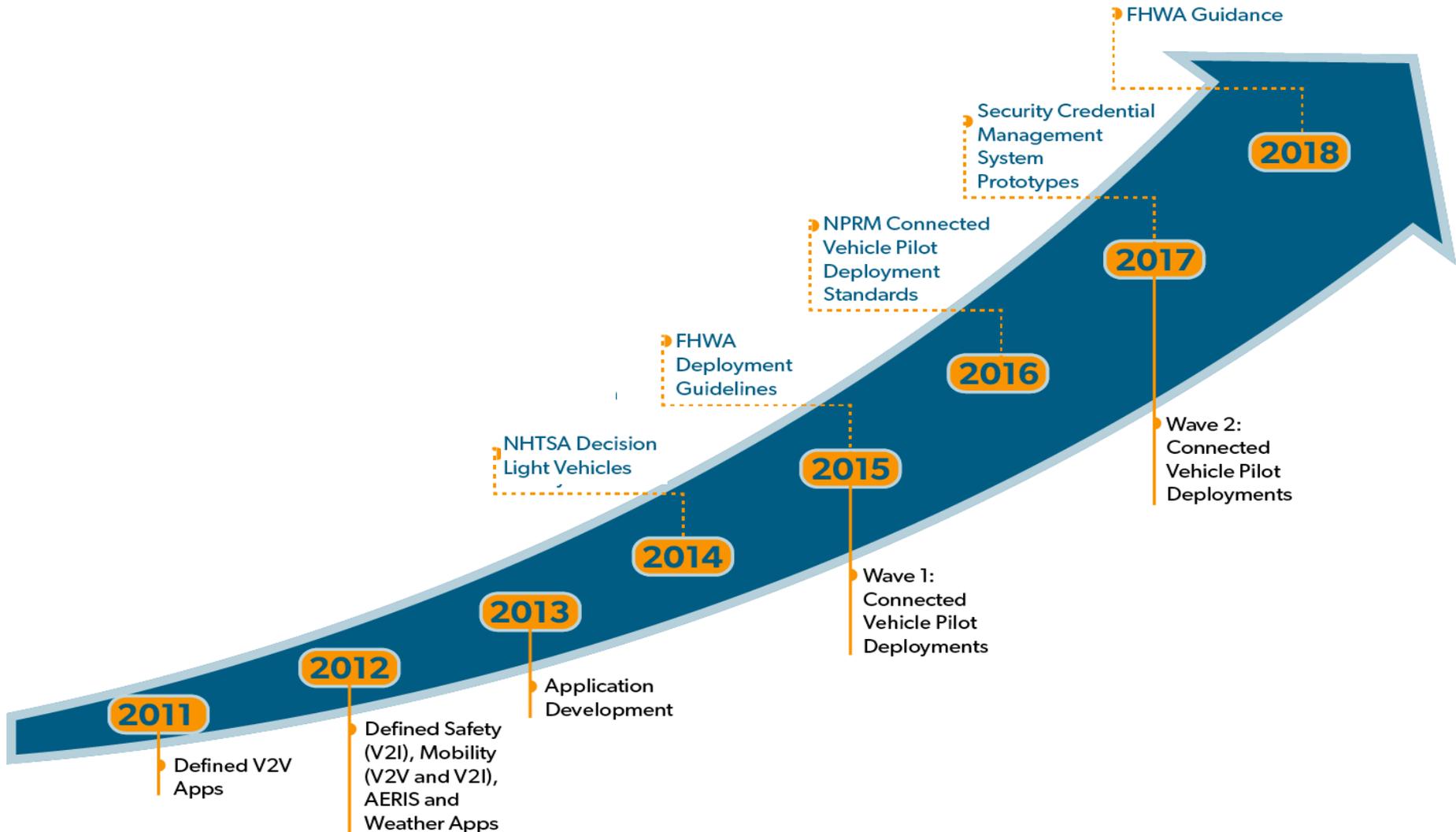
Program Categories

- **Connected Vehicles** program category will be primarily focused on adoption and eventual deployment of the system.

- **Automation research** will focus on topics related to automated road-vehicle systems and related technologies that transfer some amount of vehicle control from the driver to the vehicle.

- **Emerging Capabilities** will focus on future generations of transportation systems.

- **Enterprise Data** programs will continue existing efforts in operational data capture from stationary sensors, mobile devices, and connected vehicles, and expand into research activities involving the development of mechanisms for housing, sharing, analyzing, transporting, and applying those data for improved safety and mobility across all modes of travel.

- **Interoperability** focuses on how to ensure effective connectivity among devices and systems.

- **Accelerating Deployment** advances the work from adoption to wider scale deployment in coordination with several other DOT agencies.

ACCELERATING DEPLOYMENT

CONNECTED VEHICLES

AUTOMATION

EMERGING CAPABILITIES

INTEROPERABILITY

ENTERPRISE DATA

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Program Category: Connected Vehicles

FHWA Guidance

Security Credential Management System Prototypes

NPRM Connected Vehicle Pilot Deployment Standards

2018

FHWA Deployment Guidelines

2017

2016

Wave 2: Connected Vehicle Pilot Deployments

NHTSA Decision Light Vehicles

2015

2014

Wave 1: Connected Vehicle Pilot Deployments

2013

2012

Application Development

2011

Defined V2V Apps

Defined Safety (V2I), Mobility (V2V and V2I), AERIS and Weather Apps

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NHTSA Decision on V2V for Light Vehicles

- NHTSA's light vehicle decision was announced by Secretary Fox on February 3, 2014

  □ NHTSA to begin working on a regulatory proposal to require V2V devices in new light vehicles in a future year

  □ Enables collision warnings to drivers to avert crashes

  □ Research driven by research data and model deployment of nearly 2,800 equipped vehicles in Ann Arbor, Michigan

  □ Security and privacy protections built into system design

    - No exchange or recording of personal information

    - No tracking of vehicle movements

  □ Plan to finish NHTSA research and support their rulemaking

2015 FHWA Guidance Will Help Communities Prepare for Connected Vehicles

Help develop the FHWA's 2015 Guidance for Connected Vehicles. Add your comment.

- The FHWA is developing policy positions, guidance, guidelines, whitepapers, and practitioner tools to promote the smooth deployment of V2I technology by transportation system owners/ operators.

- The FHWA will issue initial guidance in late 2015. This initial guidance is intended to assist in planning for future investments and deployment of V2I systems.

- The guidance does not impose any new requirements on local governments.

- This work will be harmonized with related efforts by other USDOT modal agencies.

- Subsequent guidance updates will also incorporate ITS research findings.

Overview of the FHWA Guidance

- *It is not a requirement* to implement infrastructure.

- It is a tool kit for local communities to implement infrastructure and supporting systems for connected vehicles.

- It identifies high-priority applications that local communities should consider installing, including:

  o V2I safety applications (crash warnings at traffic signals, etc.)

  o Dynamic mobility applications

  o Road-weather applications

  o Environmental applications

- It is based on DOT research and ITS JPO-funded AASHTO analysis of infrastructure needs and deployment approaches.

Connected Vehicle Pilot Deployment Program

- **CV Pilot Program Goals**

- **Proposed Program Schedule**

  - Summer-Fall 2014 - Regional Pre-Deployment Workshops/Webinars

  - Early 2015 - Solicitation for Wave 1 Pilot Deployment Concepts

  - Early 2017 - Solicitation for Wave 2 Pilot Deployment Concepts

 - September 2020 - Pilot Deployments Complete

- **Resources**

  - ITS JPO Website:
    http://www.its.dot.gov/

  - CV Pilots Program Website:
    http://www.its.dot.gov/pilots

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5.9 GHz Spectrum Sharing

- **Federal Communication Commission (FCC) Notice of Proposed Rulemaking**: The FCC is seeking to open up additional spectrum for unlicensed Wi-Fi devices within the 5.9 GHz band, which serves as the platform for connected vehicle technology.

- **5.9 GHz Spectrum:** The connected vehicle environment that is being researched is based on reliable access to the 5.9 GHz wireless spectrum.
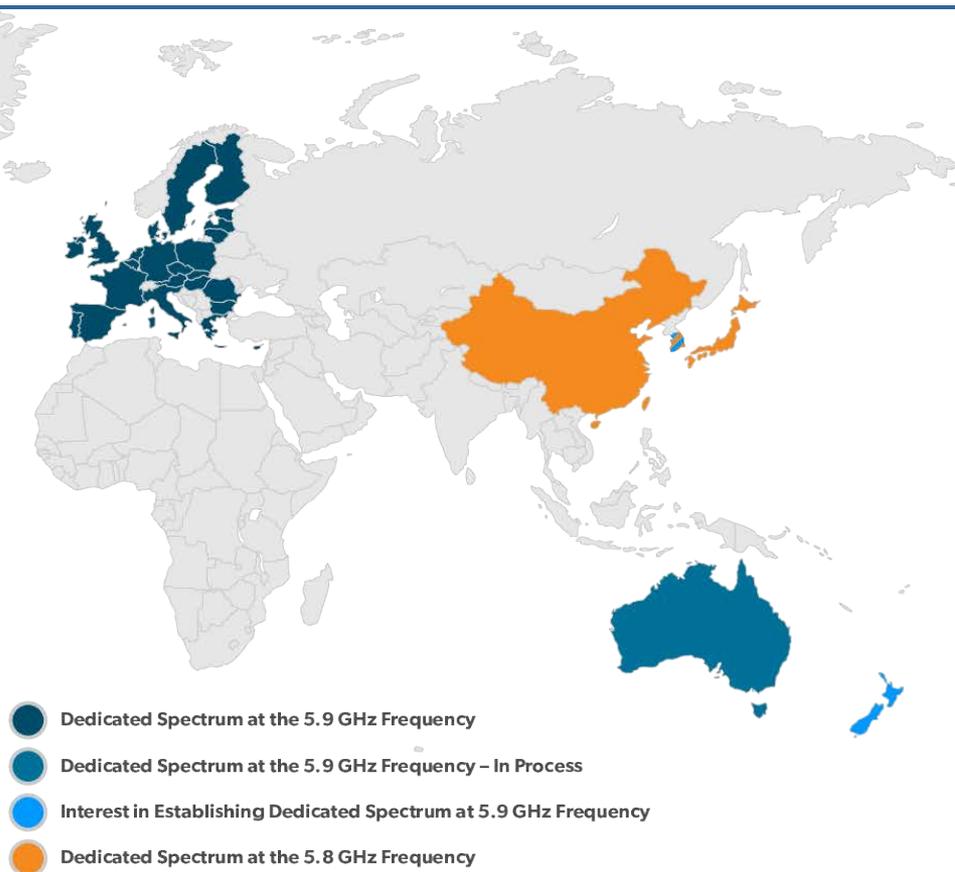
- **Spectrum Sharing:** Any changes to the 5.9 GHz spectrum may jeopardize crash avoidance capabilities.

Dedicated Spectrum at the 5.9 GHz Frequency

Dedicated Spectrum at the 5.9 GHz Frequency – In Process

Interest in Establishing Dedicated Spectrum at 5.9 GHz Frequency

Dedicated Spectrum at the 5.8 GHz Frequency

Program Category: Automation

Automated vehicles are those in which at least some aspect of a safety-critical control function (e.g., steering, throttle, or braking) occurs without direct driver input.

Photo Source: USDOT

USDOT Automation Program Goal

The USDOT automation program will position industry and public agencies for the wide-scale deployment of partially automated vehicle systems that improve safety and mobility and reduce environmental impacts.
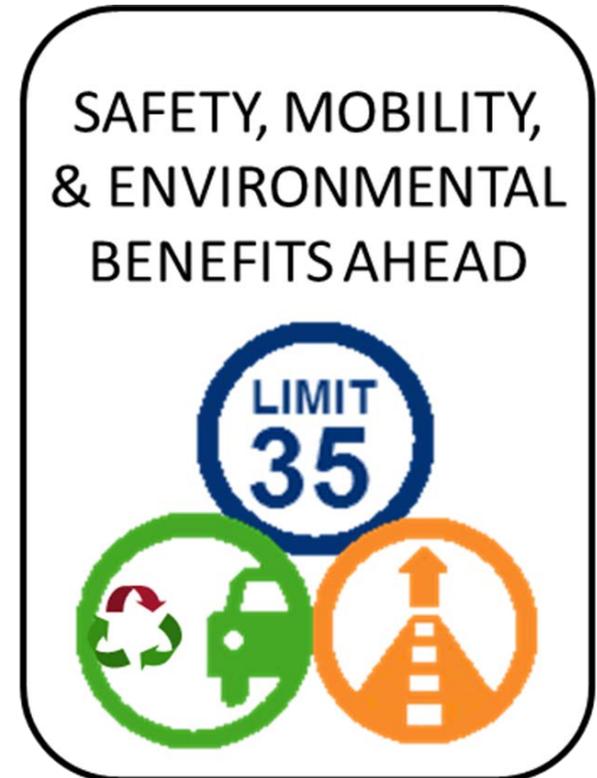
Benefits of Automated Vehicles

Automated vehicles have the potential to transform our nation's surface transportation system.

Potential benefits include:

- Crash avoidance
- Reduced congestion
- Reduced energy consumption and vehicle emissions
- Improved efficiency and accessibility

SAFETY, MOBILITY, & ENVIRONMENTAL BENEFITS AHEAD

LIMIT 35

USDOT Automation Program: Research

Enabling Technologies
- Foundational research for other tracks

Safety Assurance
- Design standards
- Guidance for safe operation

Application Development
- Demonstrated prototype applications
- Guidance for state and local agencies

Testing & Evaluation
- Objective testing procedures
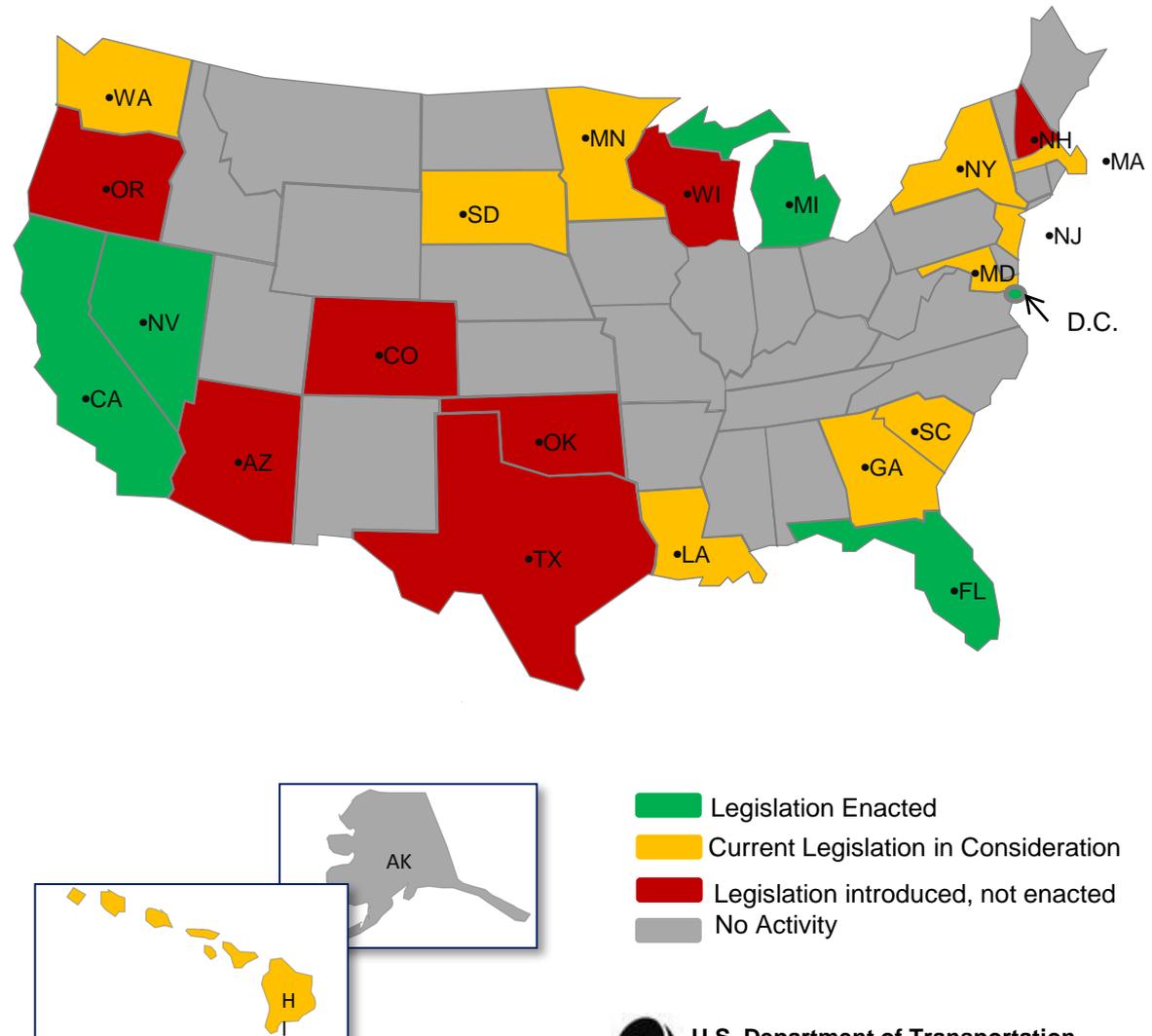- Validated benefit estimates

Policy & Planning
- Clarification of Federal role in automation
- Options for addressing policy needs and challenges

Ongoing State Legislative Activity in the U.S.

Growing 'Patchwork' of State Regulations

- OEMs to comply with differing state regulations

- Drivers to comply with differing licensing and vehicle operating requirements

- Is there a need for national consistency and standards?

Legend:
- 🟩 Legislation Enacted
- 🟨 Current Legislation in Consideration
- 🟥 Legislation introduced, not enacted
- ⬜ No Activity

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Program Category: Emerging Capabilities

- We want to explore and encourage promising emerging capabilities. Our focus is on research that will enable future generations of transportation systems.

Program Category: Enterprise Data

We want to facilitate transportation information sharing as part of a Connected City:

- Connected data systems
- Connected cities – sharing and using data to improve operations
- Decision support systems to perform real-time analytics

Program Category: Interoperability

- The USDOT will continue to focus on interoperability to ensure effective connectivity among devices and systems.

- Interoperability will be more critical than ever before with the implementation of connected vehicle systems and the introduction of automated transportation systems as system interdependencies increase, not only in number but also in complexity.

- This focus area includes the development of **architectures** and **standards** to increase the ability of distinct technologies to work together and help transportation agencies and users communicate and share information more seamlessly.

Program Category: Accelerating Deployment

- Providing technical assistance, adoption, and deployment support will continue to be important aspects of all of our research efforts.

- We will advance efforts from adoption to wider-scale deployment in coordination with other DOT agencies.

- We can help provide information and resources to help deployment decision makers utilize the billions of dollars that are available for deployment of ITS capabilities.

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