

 U.S. Department of Transportation  
Office of the Assistant Secretary for Research and Technology

# Intelligent Transportation Systems & Maritime Transportation

MTSNAC Meeting

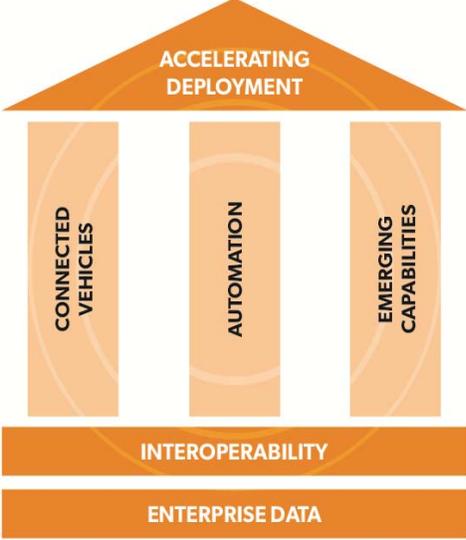
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ITS Joint Program Office,  
U.S. Department of Transportation



## Strategic Plan Program Categories

<http://its.dot.gov/strategicplan/index.html>



ACCELERATING DEPLOYMENT

CONNECTED VEHICLES

AUTOMATION

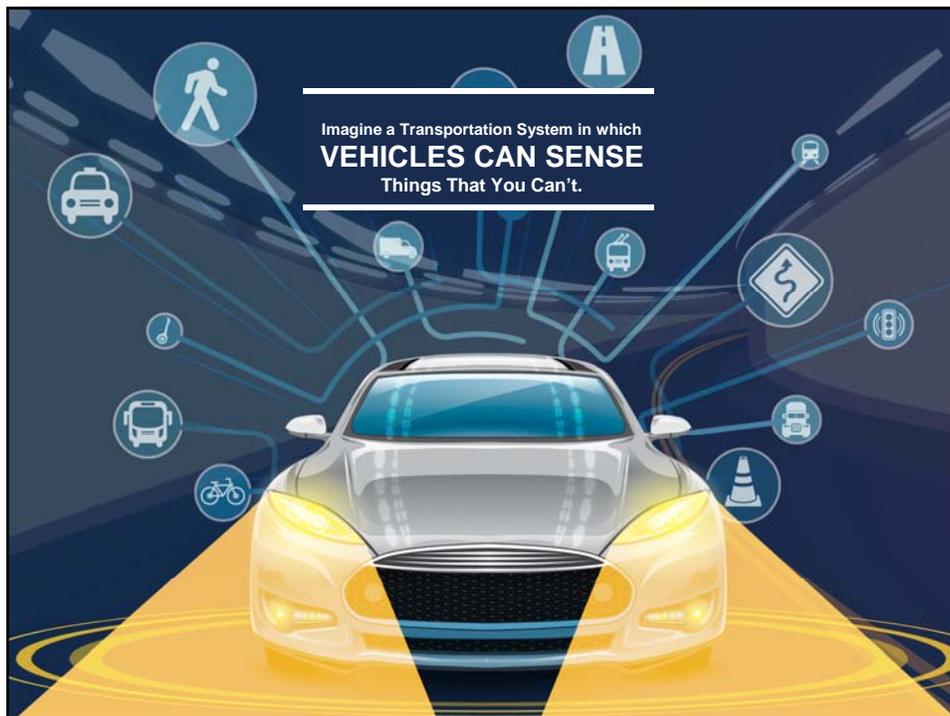
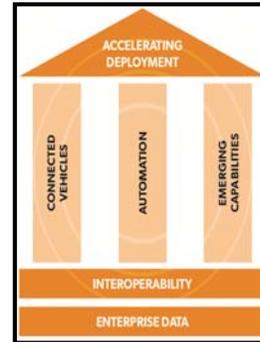
EMERGING CAPABILITIES

INTEROPERABILITY

ENTERPRISE DATA

## Strategic Plan Program Categories

- **Connected Vehicles** focuses on adoption and deployment.
- **Automation research** focuses on automated road-vehicle systems that transfer some vehicle control from the driver to the vehicle.
- **Emerging Capabilities** focuses on future generations of transportation systems.
- **Enterprise Data** focuses on operational data capture from sensors, mobile devices, and vehicles, and applying data across all modes of transport.
- **Interoperability** emphasizes effective connectivity among devices and systems.
- **Accelerating Deployment** advances ITS work from adoption to wider scale deployment in coordination with multiple disciplines and stakeholders.

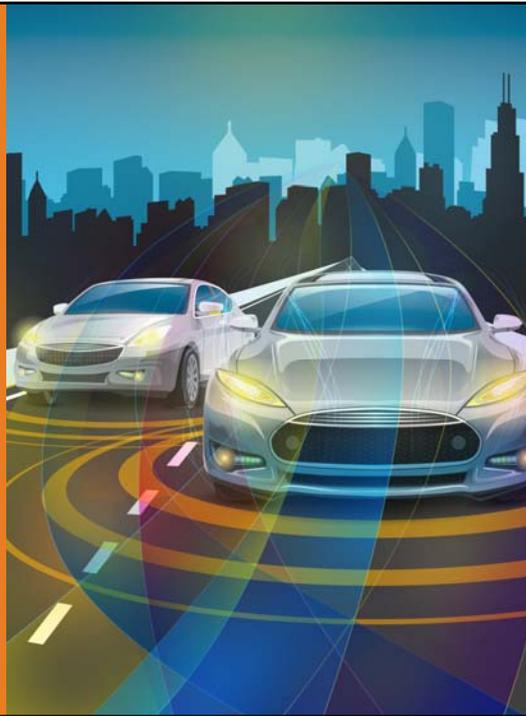


## How Connected Vehicles Work

- 1 A wireless device in a car sends basic safety messages 10 times per second
- 2 Other nearby cars and roadside equipment receive the messages
- 3 Drivers get a warning of a potential crash

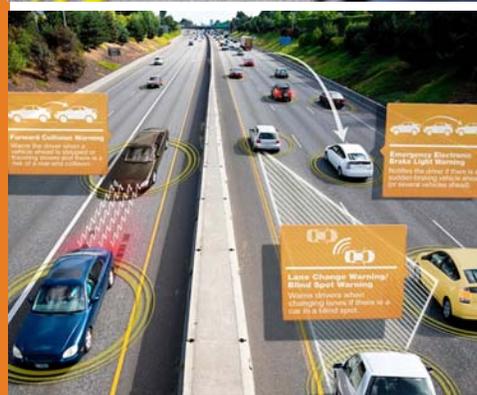
*Connected vehicles have the potential to reduce non-impaired crash scenarios by **80%**\**

\*Source: NHTSA



## Connected Vehicles *What can they do?*

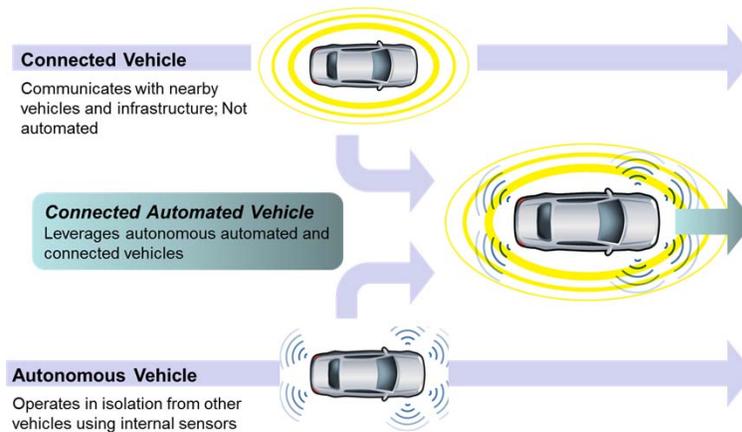
- Save lives by significantly reducing traffic accidents
- Make travel easier, more efficient, and more enjoyable
- Help curb pollution

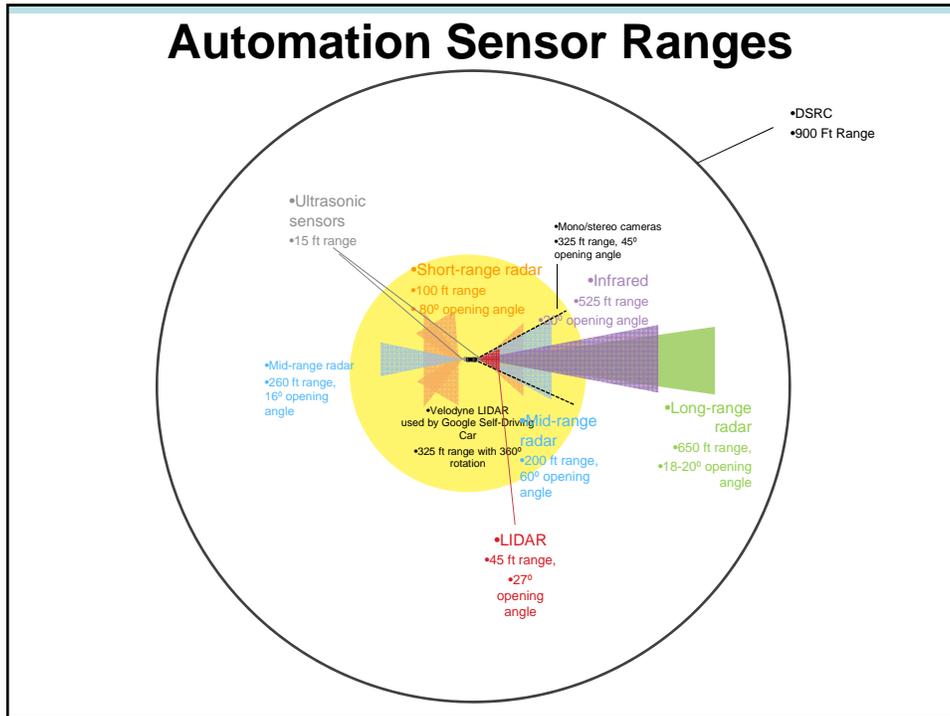


## Connected Vehicle Pilot Deployment Sites

 <p>ICF/Wyoming</p>	<ul style="list-style-type: none"> <li>▪ Reduce the number and severity of adverse weather-related incidents in the I-80 Corridor in order to improve safety and reduce incident-related delays.</li> <li>▪ Focused on the needs of commercial vehicle operators in the State of Wyoming.</li> </ul>
 <p>New York City</p>	<ul style="list-style-type: none"> <li>▪ Improve safety and mobility of travelers in New York City through connected vehicle technologies.</li> <li>▪ Vehicle to vehicle (V2V) technology installed in up to 10,000 vehicles in Midtown Manhattan, and vehicle to infrastructure (V2I) technology installed along high-accident rate arterials in Manhattan and Central Brooklyn.</li> </ul>
 <p>Tampa (THEA) Tampa Hillsborough Expressway Authority</p>	<ul style="list-style-type: none"> <li>▪ Alleviate congestion and improve safety during morning commuting hours.</li> <li>▪ Deploy a variety of connected vehicle technologies on and in the vicinity of reversible express lanes and three major arterials in downtown Tampa to solve the transportation challenges.</li> </ul>

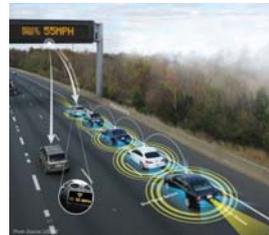
## Connectivity Unleashes the Full Potential of Automated Vehicles





## Automation Can Also Be a Tool for Solving Transportation Problems

- Improving safety
  - Reduce and mitigate crashes
- Increasing mobility and accessibility
  - Expand capacity of roadway infrastructure
  - Enhance traffic flow dynamics
  - More personal mobility options for disabled and aging population
- Reducing energy use and emissions
  - Aerodynamic “drafting”
  - Improve traffic flow dynamics



*...but connectivity is critical to achieving the greatest benefits*

## Smart Cities and Connected Vehicles

Smart Cities incorporate and expand connected transportation to ensure that connected transportation data, technologies and applications – as well as connected travelers – are fully integrated with other systems across a city, and fulfill their potential to improve safety, mobility and environmental outcomes in a complexly interdependent and multimodal world that supports a more sustainable relationship between transport and the city.

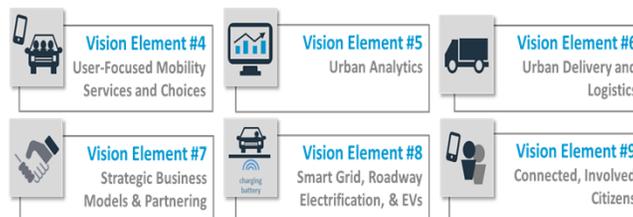


## USDOT Vision Elements

### TECHNOLOGY ELEMENTS



### INNOVATIVE APPROACHES TO URBAN TRANSPORTATION ELEMENTS



### SMART CITY ELEMENTS



## Columbus, Ohio



# Truck Platooning with Platoon Signal Priority

## Advanced Technologies and Smart Cities

Technology convergence will revolutionize transportation, dramatically improving safety and mobility while reducing costs and environmental impacts

Connected Vehicles

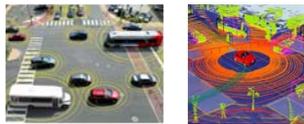
Vehicle Automation

Internet of Things

Machine Learning

Big Data

Sharing Economy



Connected-Automated Vehicles



Smart Cities

### Benefits

- Order of magnitude safety improvements
- Reduced congestion
- Reduced emissions and use of fossil fuels
- Improved access to jobs and services
- Reduced transportation costs for gov't and users
- Improved accessibility and mobility

# Freight

## Beyond Traffic 2045: How will we move freight?

### Freight Movement is Multimodal

Every mode of transportation moves freight, but trucking is the primary mode of freight travel.

**54**  
million tons  
of freight  
move across  
our nation  
every day

	2012	(in tons)	2040
 Truck	13.2 billion	+43%	18.8 billion
 Rail	2.0 billion	+37%	2.8 billion
 Waterborne	975 million	+10%	1.1 billion
 Air	15 million	+250%	53 million

## Need for Freight-Specific ITS Solutions

- Technology is not used consistently by the trucking industry
- Trucks have unique operational characteristics
- Freight terminals do not always share queue information
- Existing public resources do not always provide freight-specific information
- System effectiveness is often limited by data availability and accuracy



## Freight-Specific ITS Research

- Connected Vehicle Pilots
- Freight Advanced Traveler Information System (FRATIS)
- Smart Roadside Initiative
- Smart Truck Parking
- Automation – Including Truck Platooning



Image Source: Auburn University



## ITS MARAD Program

### Phase 1: Pre-Deployment Preparation & Analysis

- Establish a foundational understanding of current and potential ITS solutions and prepare business case.
- Work collaboratively with stakeholders to identify a candidate set of promising applications for deployment and research in Phase 2.

### Phase 2: Development & Demonstration Planning

- Begin prototype research and application development work on the high-priority ITS solutions identified in Phase 1.
- Develop preliminary procurement documents if necessary.
- Conduct outreach with stakeholders including Maritime Administration Gateway Directors
- Identify and address institutional and policy issues.

### Phase 3: Demonstrations & Assessment

- Demonstrate or deploy ITS solutions for maritime usage.
- Conduct Knowledge and technology transfer (KTT) to enable deployment to across domestic maritime facilities (e.g. ports, harbors, etc).

## FAST Act: Freight and Logistics

- The *FAST Act* will make critical investment to help improve the safe and efficient movement of freight across all modes of transportation – highway, rail, port, and pipeline.
- FAST provides \$10.8 billion over 5 years for targeted investments in the nation's transportation system that will improve the movement of freight.



Annual freight flow tonnage by National Highway System, Railroads, Inland Waterways (2010)

## Working Session on Maritime Transportation and ITS

- What are the critical challenges in port operations that could be addressed by better connectivity between ports, terminals, trucks, and the regional surface transportation system?
- Do you see other opportunities to leverage the emerging ITS applications being explored through the ITS JPO efforts I just described to you?
- Can we identify GAPS in port and local/regional surface transportation system connectivity?

# For More Information

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21