



UNITED STATES
DEPARTMENT OF TRANSPORTATION

Road Vehicle Automation: *Development of a US DOT Multimodal Program Plan*

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The Problems!!

Safety

- 32,367 highway deaths in 2011
- 5.3 million crashes/year
- Leading cause of death for ages 4, 11-27



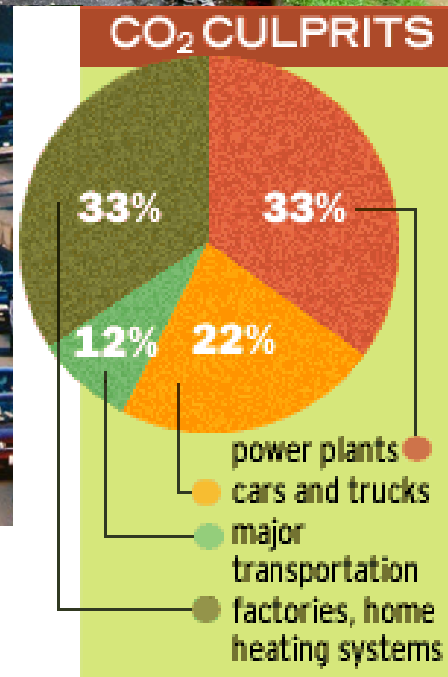
Mobility

- 4.8 billion hours of travel delay
- \$101 billion cost of urban congestion



Environmental

- 1.9 billion gallons of wasted fuel
- Cars and trucks generate 22% of all CO₂ emissions



Benefits of Vehicle Automation

Vehicle automation has the potential to address major problems impacting the US transportation system

Safety

- Prevent crashes
- Reduce severity of crashes

Mobility

- Reduce individual delay
- Improve personal mobility
- Improve network operations

Environmental

- Reduce fuel consumption
- Reduce emissions

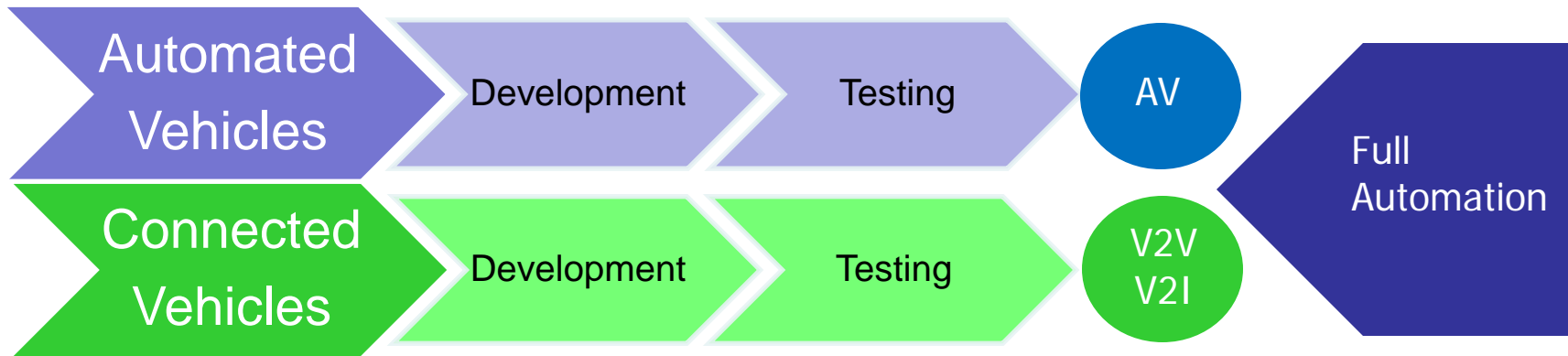


Current State of the Industry

- Enabling Technologies – Many Developed/Validated
 - Examples include: Radar, Steer-by-wire, GPS
 - Components of automation systems
- Automation Systems – At Various Levels of Development
 - Currently: Adaptive Cruise Control, Lane Departure Prevention, Crash Imminent Braking
 - Under Development: Emergency Stop Assist, Lane Change Assist
- Government's Role
 - Accelerate societal benefits
 - Minimize societal risk



Vision



- Vehicle Automation Development
 - Can proceed independently of connectivity to a point
 - Greatly enhanced with connectivity to other vehicles and infrastructure
- Benefits of Connectivity
 - Increases availability, speed, and reliability of information
 - Enables coordination of automated traffic streams

The full potential benefits of road vehicle automation can only be achieved through a connected environment.



Vehicle Automation Program Plan

Project Goal

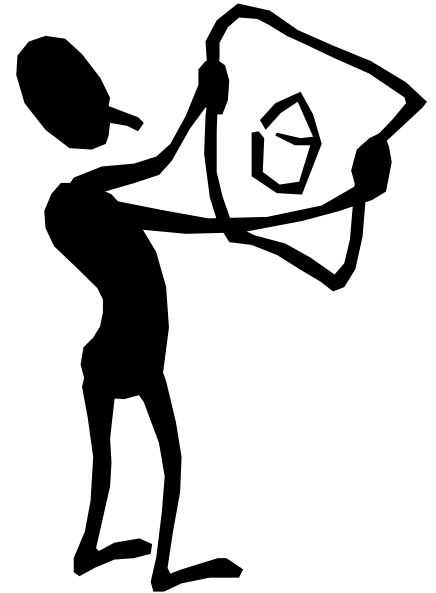
- Develop a multi-modal research plan to focus on accelerating public benefits and reducing public risk

Project Scope

- Define Automation Levels, Identify Benefit Opportunities and Identify Prototype Use Cases
- Research and Analysis of Issues and Challenges
- Development of Multimodal Automated Vehicle Program Plan

■ Project Schedule

- Preliminary draft by summer 2013

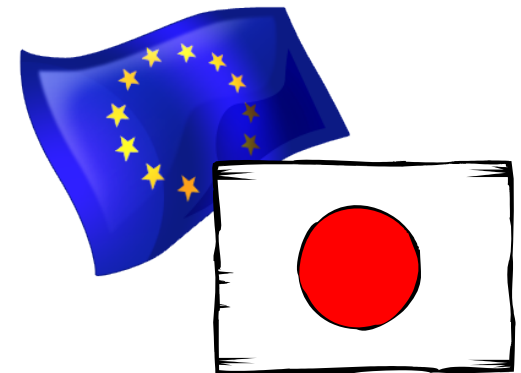


Process for Developing Program Plan

- Collaboration within US DOT
 - ITS JPO, FHWA, FTA, NHTSA, FMCSA, Volpe
- Collaboration with external stakeholders
 - International groups
 - Vehicle manufacturers and suppliers
 - State and local government agencies
 - Standards organizations
 - Advocacy groups
 - Academia / Independent Research Organizations



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Extensive outreach efforts taking place over the next few months to obtain stakeholder input.



Foundation – Automation Levels

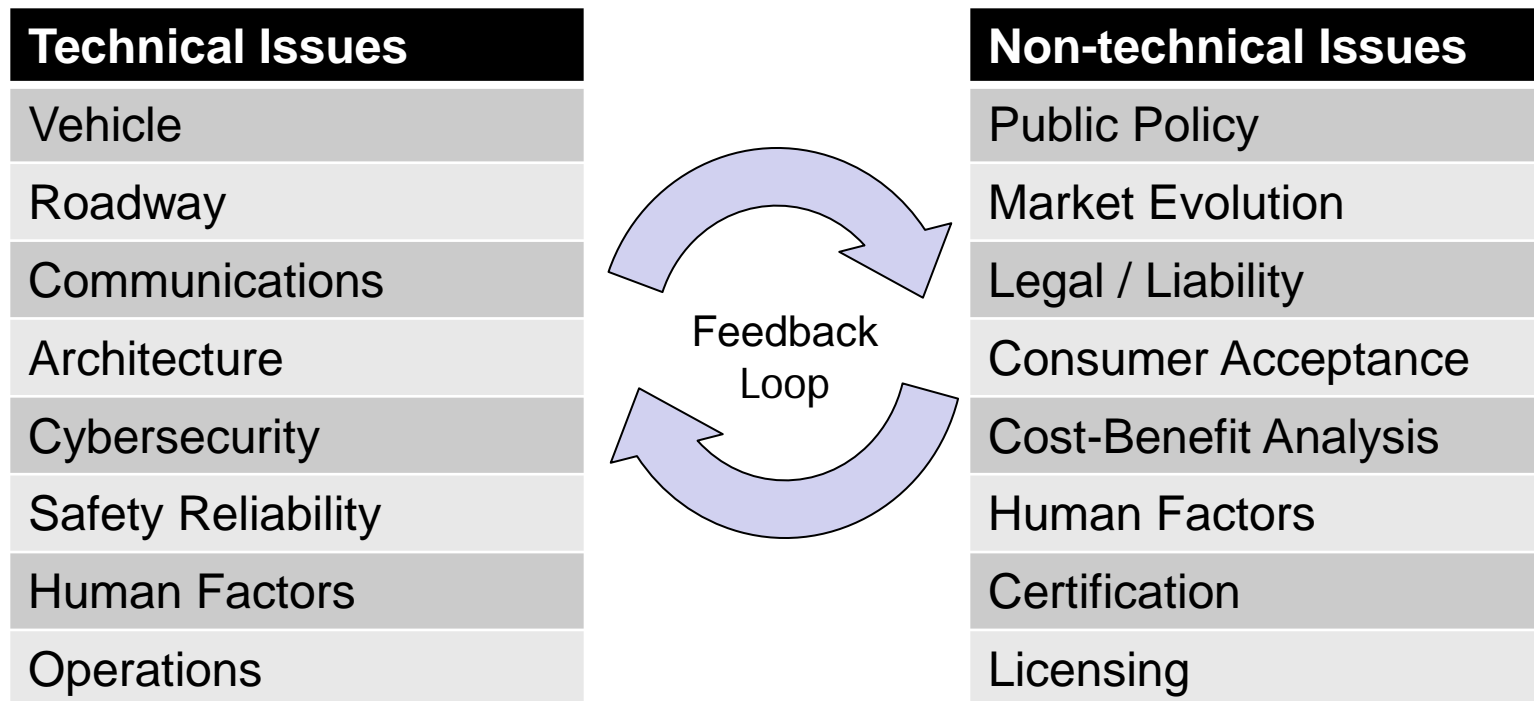
- Automation at the vehicle and infrastructure level is necessary to achieve full potential of the system
- Automation level increases with vehicle & infrastructure level
- Foundation for describing the operational scenarios

			Infrastructure Levels		
			No Communication	All Communication	Control
			IL1	IL2	IL3
Driver / Vehicle Levels	Full	VL4			
	Conditional	VL3			
	Monitored	VL2			
	Assisted	VL1			
	Non-Automated	VL0			



Research into Issues and Challenges

- Categorization of Issues and Challenges
 - Identified during TRB 2012 Summer Working Meeting
 - Divided into Technical and Non-technical categories



Structure of Program Plan

- Describe Vision and Long-term Objectives of Program
- Identify Operational Scenarios & Use Cases
 - Platooning
 - Intersection Management
 - Emergency Stop Assistant
 - Speed Harmonization
 - First/Last Mile
 - Off-Road Applications
- Characterize Cross-Cutting Issues
 - Technical
 - Non-technical
- Develop Recommendations for Future Research Efforts
 - Classify into near-term and mid-term research opportunities
 - Prioritize based on all available information and perceived value of research



Next Steps

- Stakeholder Interviews – Spring 2013
- Preliminary Draft – Summer 2013
- Additional Stakeholder Feedback – Summer/Fall 2013
- ITS Strategic Planning Process for 2015-2019
 - Vehicle Automation Program Plan will provide input into process



Conclusion

Vehicle & infrastructure automation, along with connectivity is the next major step in developing a safer, more efficient surface transportation system.

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