U.S. Department of Transportation

Federal Highway Administration

Integrating Technology Innovations into Our Roadway System

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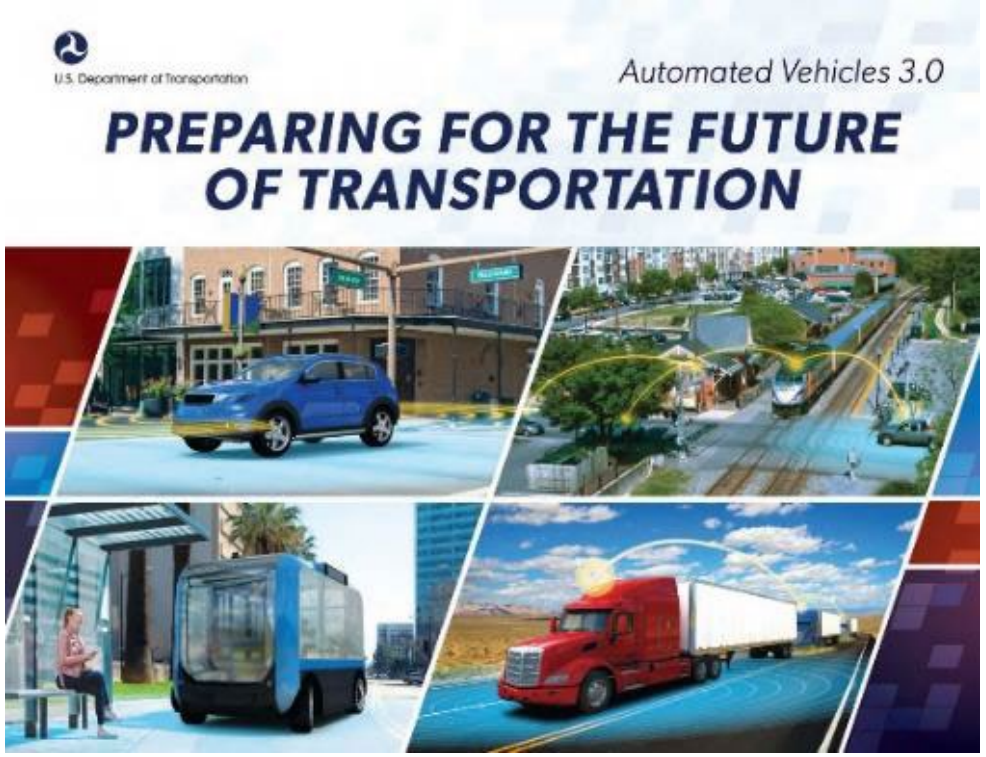
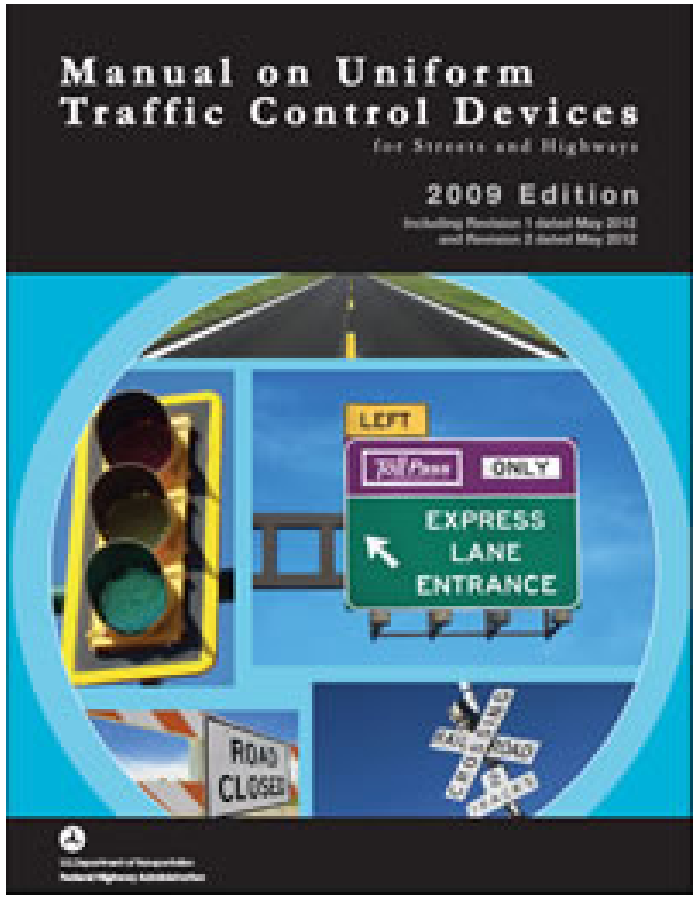
AV 3.0 – Considerations for Infrastructure Owners and Operators (IOO)

1. Support safe testing and operations of automated vehicles on public roadways.
2. Learn from testing and pilots to support highway system readiness.
3. Build organizational capacity to prepare for automated vehicles in communities.
4. Identify data needs and opportunities to exchange data.
5. Collaborate with stakeholders to review the Uniform Vehicle Code (UVC).
6. Support scenario development and transportation planning for automation.



AV 3.0 – FHWA's Authorities Over Traffic Control Devices

1. Quality and uniformity of road markings, signage, and other traffic control devices support both human drivers and automated vehicles.
2. The Manual on Uniform Traffic Control Devices (MUTCD) is recognized as the national standard for all traffic control devices installed on any street, highway, bikeway, or private road open to public travel.
3. FHWA will pursue an update to the 2009 MUTCD that will take into consideration these new technologies and other needs.



2018 National Dialogue Workshops

Key objectives

1. Assess national issues and priorities.
2. Develop guidance, best practices, standards.
3. Support necessary research.
4. Adapt programs and policies.
5. Create a national community or coalition.

Source: FHWA

National Dialogue Workshop Insights

Need For:

- National vision
- Coordinated communication
- Education, resources, and guidance
- Integration of automated freight operations
- Public safety and emergency response interactions
- Planning process evolution
- Data exchanges, standardization, and lifecycle management

  Infrastructure design, structural, and operations standards

Source: FHWA

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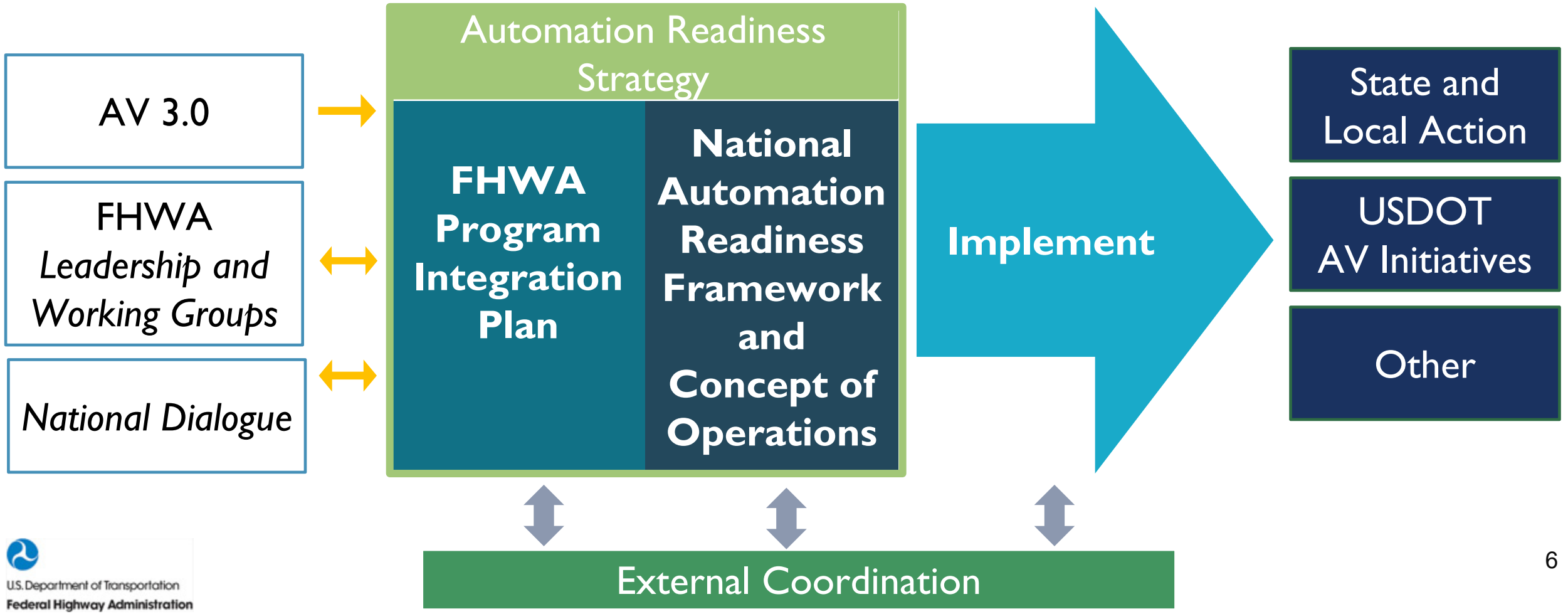
FHWA Automation Readiness Strategy



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FHWA Automation Readiness Strategy (Cont.)

FHWA Program Integration Plan

- Translate the Dialogue internally
- Align existing FHWA programs
- Synchronize with Research Roadmap
- Evolve organizational roles
- Develop organizational knowledge
- Document recurrent internal plan
- Sustain internal-facing process

National Automation Readiness Framework and "Concept of Operations"

- Engage stakeholders post-dialogue
- Define facets of "readiness"
- Enable national strategy and vision
- Establish Operational Design Domain (ODD)-based roadway systems interfaces
- Introduce a system and organizational strategic planning tool
- Build national community

Impacts of AV on Highway Infrastructure

Purpose: Evaluate the interaction of vehicle automation and road infrastructure.

Goal: Develop documentation and inform stakeholders about AV-related infrastructure needs.

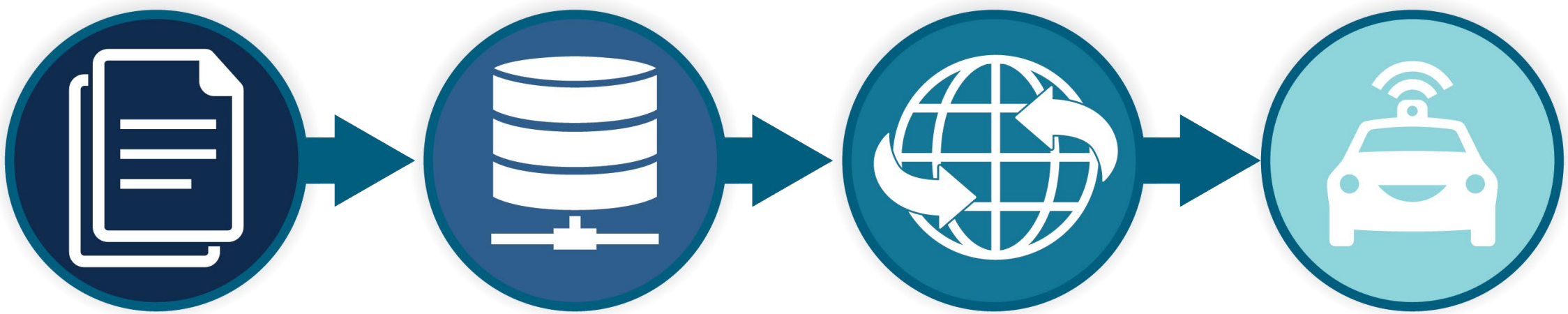
Objectives: Assess and understand:

- The demands and potential impacts of AVs on our current infrastructure assets, and
- The potential needs and impacts of AVs on the future design of new infrastructure.

Highway Infrastructure Categories

Traffic Control Devices	Pavements and Structures	TSMO and ITS Infrastructure	Multimodal Infrastructure
Barriers	Asset Management	ITS Roadway Equipment	Bike and Ped Infrastructure
Channelizing Posts	Condition and Performance	Parking Management Systems	American Disabilities Act Accessibility
Pavement Markings	Design	Transportation Management Centers	Multimodal Traffic Control Devices
Traffic Signs	Innovative Technologies	Digital Infrastructure	Curb Design and Management
Traffic Signals	Maintenance		Parking
Work Zones	Materials		

ADS Operational Behavior and Traffic Regulation Information Exchange Project Overview



Traffic Regulations from various jurisdictions

Convert to traffic regulation database

Exchange traffic regulation data

Automated Driving System (ADS)

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Cooperative Automation Research Mobility Applications

CARMA℠

Safely improve the operational efficiency and maximize capacity of our Nation's urban and rural roadways

Reduce fuel consumption at intersections by 20 percent.

Save Fuel by 10 percent.

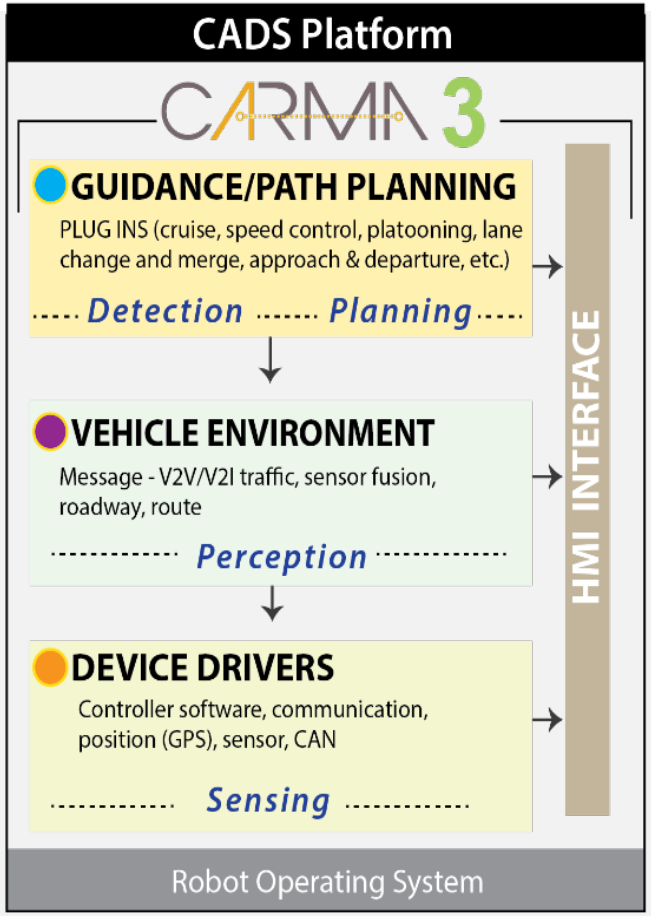
Increase capacity of existing lanes.

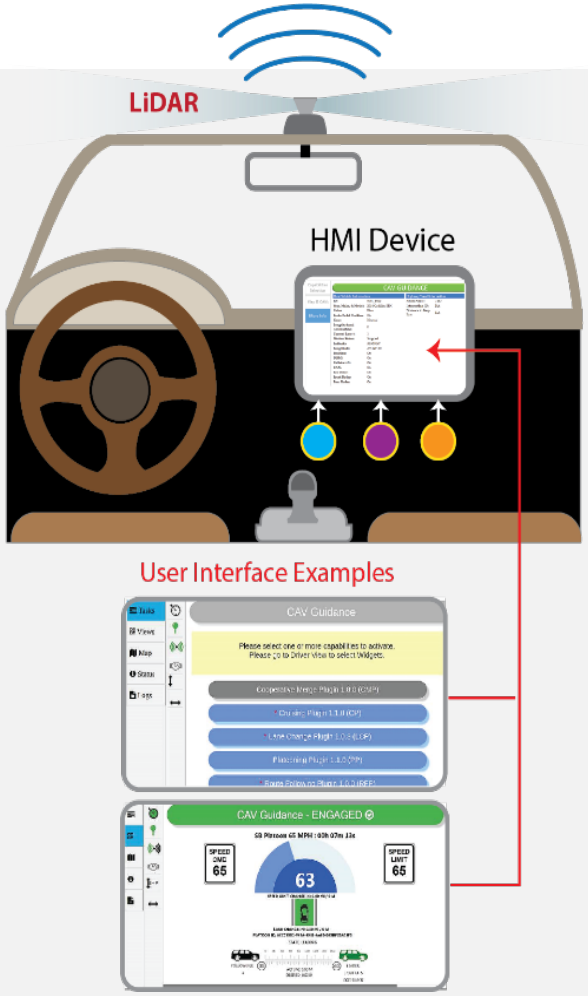
Source: FHWA

CARMA Platform

An open source platform that enables collaboration with the stakeholder community.

- Vehicle-to-Vehicle
- Laser Imaging, Detection, and Ranging
- Controller Area Network
- Human Machine Interface
- Vehicle-to-Infrastructure
- Global Positioning System
- Cooperative Automation Driving Systems





Source: FHWA.

V2X Hub

- Open-source software platform.
- CAV deployers can implement custom code.
- Accessible across different organizations and disciplines.
- Enables integration with existing systems.
- Available plugins include emergency vehicle preemption and performance measures.

FHWA Truck Platooning Research

- Human Factors Issues Related to Truck Platooning.
- Truck Platooning Early Deployment Assessment.
- Truck Platooning Impacts on Bridges.

Source: FHWA.

For More Information

FHWA https://ops.fhwa.dot.gov/automationdialogue/

AASHTO www.transportationops.org/resources-connected-and-autonomous-vehicles

https://transportationops.org/CATCoalition

Contact: HighwayAutomation@dot.gov

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