TRANSPORTATION TECHNOLOGY & TRENDS T3 forum

Minnesota Guidestar

SRF

Connected Automated Vehicles (CAV)

T3 Forum 06.26.19

Sneak Peek into National Strategic Directions in Highway Automation

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John Corbin is also adjunct faculty at the University of Wisconsin – Milwaukee College of Engineering & Applied Science and the UW Madison College of Engineering. He previously served as the Director of Traffic Operations in Wisconsin and Iowa Departments of Transportation.

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Wayne oversees the county's transportation division and parks division. He is currently the President of the Minnesota County Engineers Association and serves on the Minnesota Guidestar Board of Directors.

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Jay is the Director of MnDOT's new Office of Connected and Automated Vehicles (CAV-X). In this role, he leads the statewide policy, research and deployment of CAV technology. Jay has 22 years experience in transportation, and holds a bachelor and master degree in civil engineering from the University of Minnesota.

U.S. Department of Transportation

Federal Highway Administration

National Perspective on Roadway Automation Readiness: Insights from the Dialogue

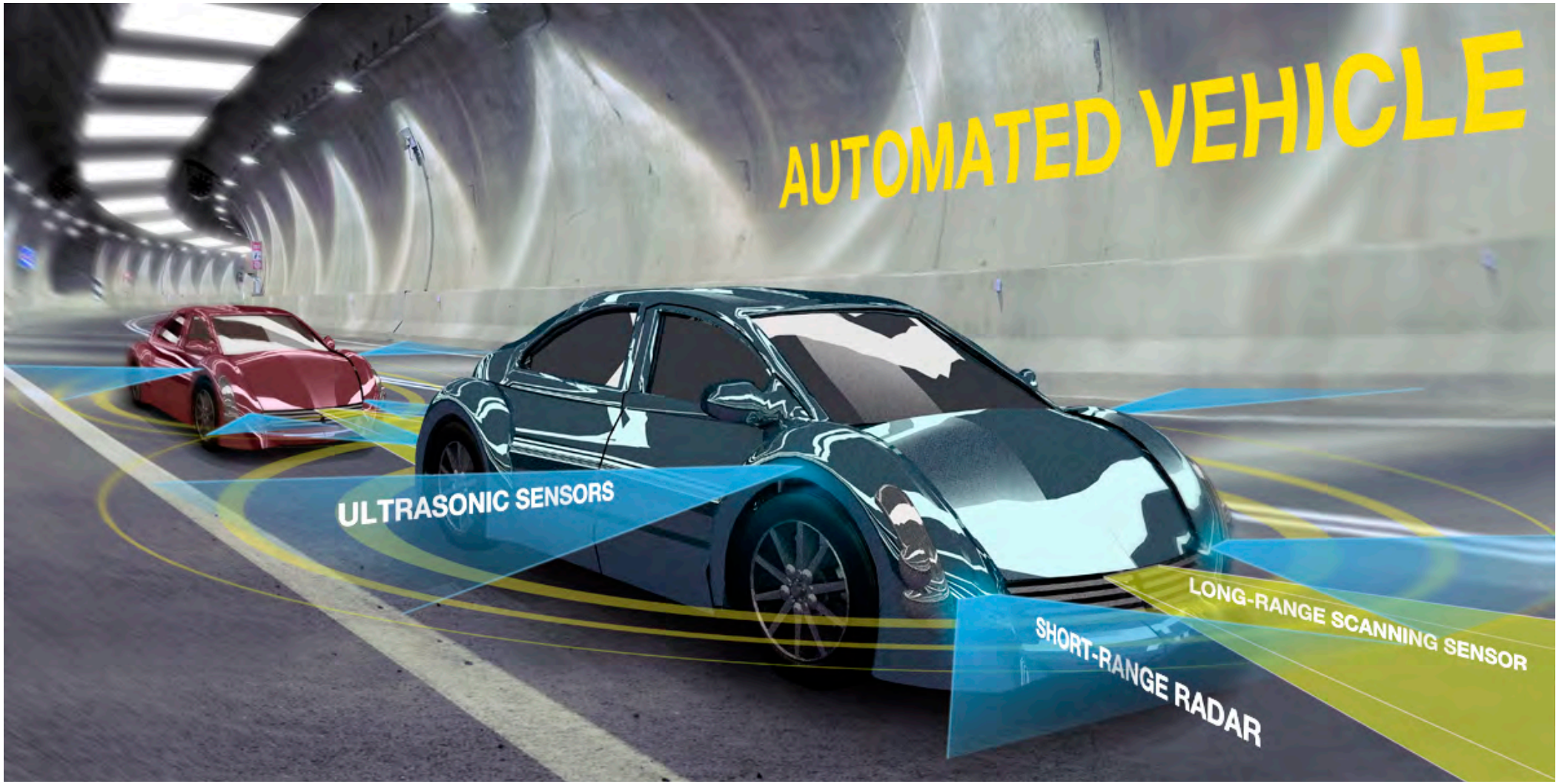
ITS Minnesota T3 Forum on Connected Automated Vehicles

Minneapolis, Minnesota
June 26, 2019

Evolving the Vehicle-Highway System

Source: U.S. DOT

Automated Vehicle Technologies



Source: U.S. DOT

National Dialogue on Highway Automation

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.

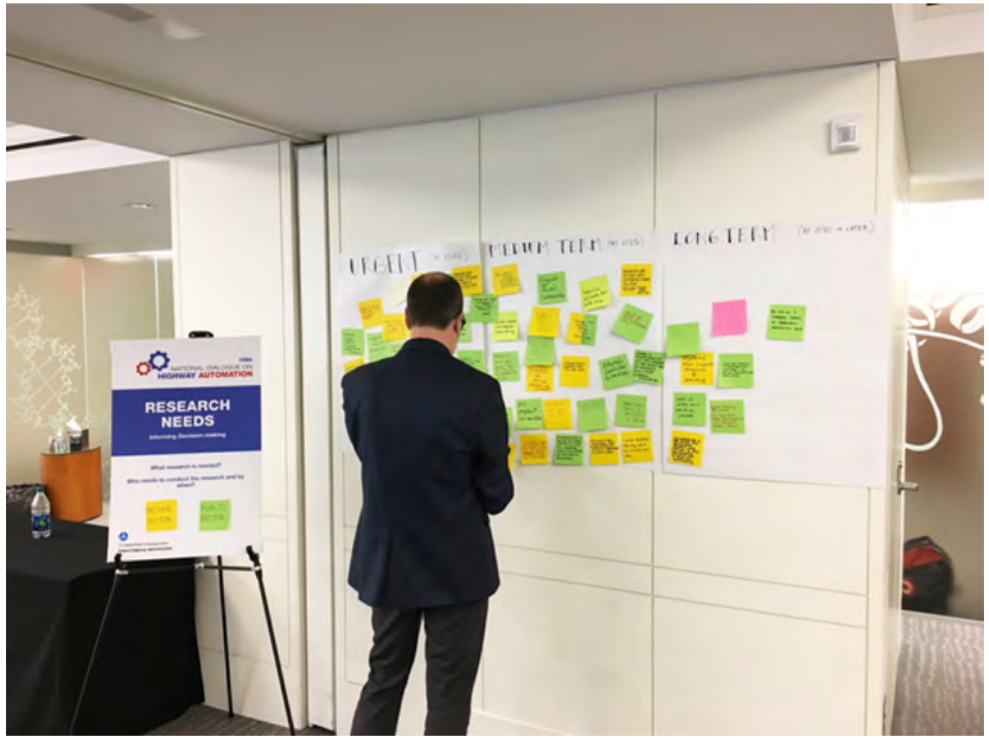


Photo Courtesy of FHWA

FHWA Released Request for Information (RFI) March 2018

Select Themes:

- Greater **Uniformity and Quality** in road markings and traffic control devices would enable automation.
- Certain **Data Elements** about the roadway environment are useful for industry, State, and local DOTs to share and could improve automation operations.
- Conducting **Pilots** and supporting pilot testing are important for facilitating learning and collaboration.
- **Uncertainty** in infrastructure investment and allocation of limited resources are key concerns for State and local agencies.
- FHWA should take a **Leadership** role in convening stakeholders to encourage **Collaboration.**

Preparing for the Future of Transportation: AV 3.0

National Dialogue 2018 Workshop Themes

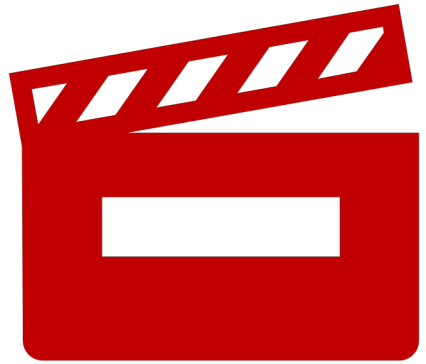
Additional Key Insights:

Photo Courtesy of FHWA

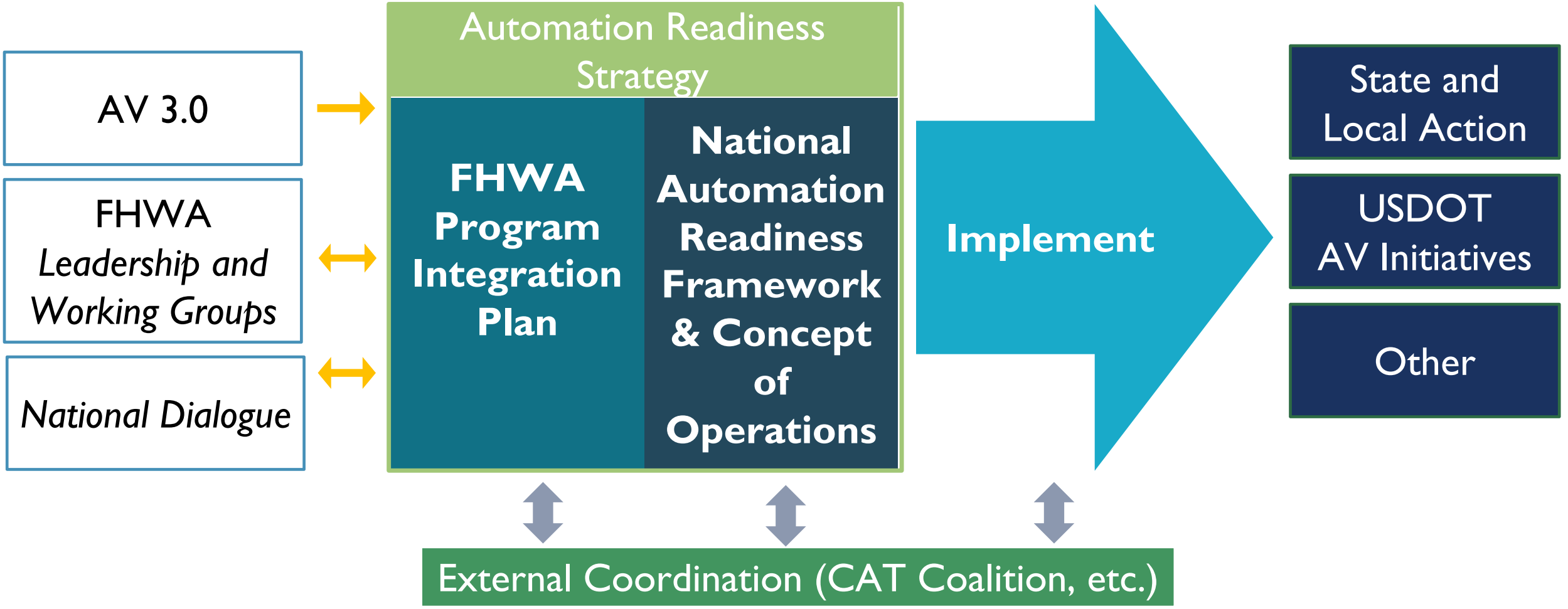
- **National vision** for automation could clarify goals and focus action.
- Coordinated communication about technology can encourage **public acceptance**.
- State and local **agencies need education**, resources, and guidance.
- Need to better understand opportunities to integrate **automated freight operations.**
- Need clear processes and practice to guide **public safety & emergency response interactions**.
- The transportation **planning process** may need to evolve.
- **Data** exchanges, standardization, and lifecycle management can accelerate integration of Av's.
- Need to update infrastructure design, structural, and operations **standards**

Action Opportunities from the Dialogue

1. Support state and local agencies to define and enable roadway automation readiness.
2. Collaboratively inform communities and stakeholders.
3. Understand and manage the uncertainty of impacts.
4. Incrementally prepare national roadway infrastructure.



FHWA Automation Readiness Strategy



Disclaimer

The Federal Highway Administration (FHWA) does not endorse any entity and the appearance of our presentation material in this template should not be interpreted as an endorsement or statement exhibiting any preference, support, etc.

For More Information

www.transportationops.org/resources-connected-and-autonomous-vehicles
https://transportationops.org/CATCoalition

Contact: HighwayAutomation@dot.gov

CAV Counties

Presentation Topics

- County Highway System
- Local Road Research Board
- Markings
- Signs
- What's next?

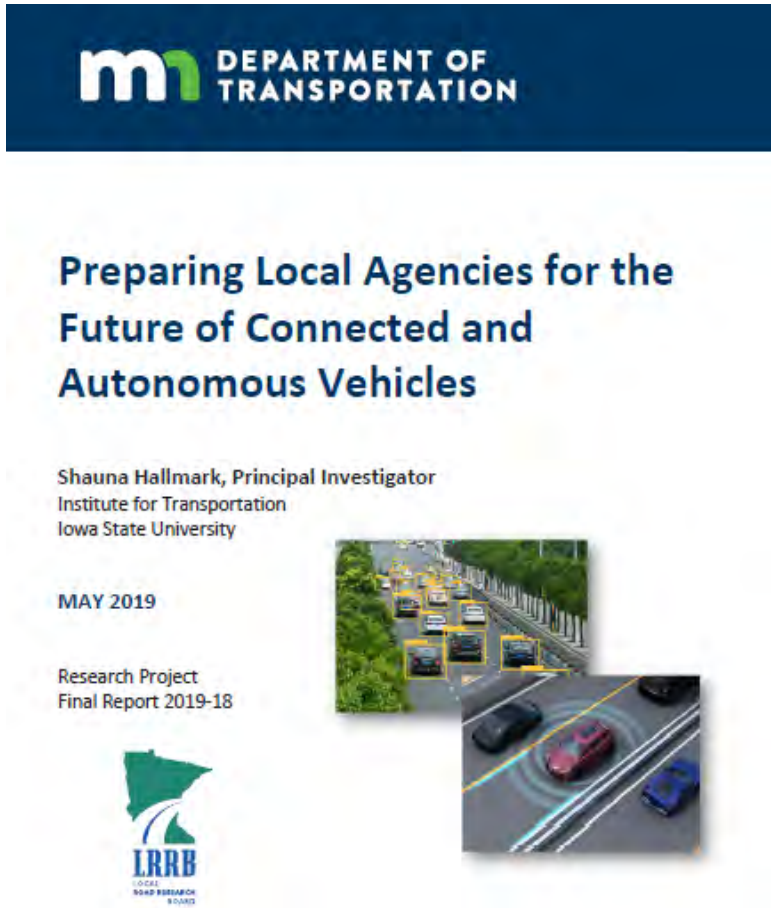
Minnesota Highway System

Roadway Type	Miles
Interstate	914
Trunk Highway	10,813
County Highways	43,530
City	22,487
Other	60,705
State Total	138,449

County Highway System

- 4x Larger than State System
- Variable Configurations
  - Two Lane Rural Roads
  - Multi Lane Suburban Arterials
  - Urban Core – Multi Modal
  - Surface Type
  - Traffic Volumes
  - Truck Routes

Local Road Research Board



Report 2019-18

- Principal Investigator: Shauna Hallmark
- Technical Liaison: Douglas Fischer
- Project Coordinator: Thomas Johnson-Kaiser

Toolbox for Local Agencies

- Prepare for CAV
- 5-10 year window
- Acknowledge rapidly changing environment
- Recommend caution on investment

Transition

- Will take time
- 270 million registered personally owned vehicles on road today
- Deployment will be gradual
  - Start with automated driver assist
  - Continue with gradually increasing assistance
- Dual existence for many years

Pavement Markings

- Top consideration for local agencies right now
- Presence – are the lanes marked?
- Conspicuity – can the lines be seen?
- Clarity – what message is being sent?

Pavement Markings

Shutterstock

Figure 3-2. Example of overlapping pavement markings

Pavement Markings

https://www.sunrisesafetyservices.com/product/permanent-3m-contrast-tape/ © 2019 Sunrise Safety Services. All Rights Reserved

Figure 3-5. High contrast markings

Signs

- CAV uses cameras – sign recognition
- Visibility – are the signs visible?
- Minimize Signs – do you have too many signs? Signs not needed?
- Standardization – use standard signs whenever possible
- Clear messages – remove conflicting signs

Signs

FHWA (left) and Shutterstock (two images on the right)

Figure 3-6. Examples of problematic signage with sign blocked (left) and damaged signs (right)

Summary

- What you can do now for CAV is basic stuff
- Good for CAV and for existing drivers
  - Especially older drivers
- Good investments to make NOW

What is next?

- County Engineers – CAV Committee
- Communication
- Data Capture and Information Sharing and Inventory
- Consistency and Standardization
  - National Committee on Uniform Traffic Control Devices (NCUTCD) Guidance

Washington County

Questions?

Automated and Connected Vehicle Technology
State of Minnesota Updates

DEPARTMENT OF TRANSPORTATION

Jay Hietpas, PE
CAV-X Director

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What is New & Policy Updates

2019 Legislative Session

AV Testing

Truck Platooning

Executive Order 19-18

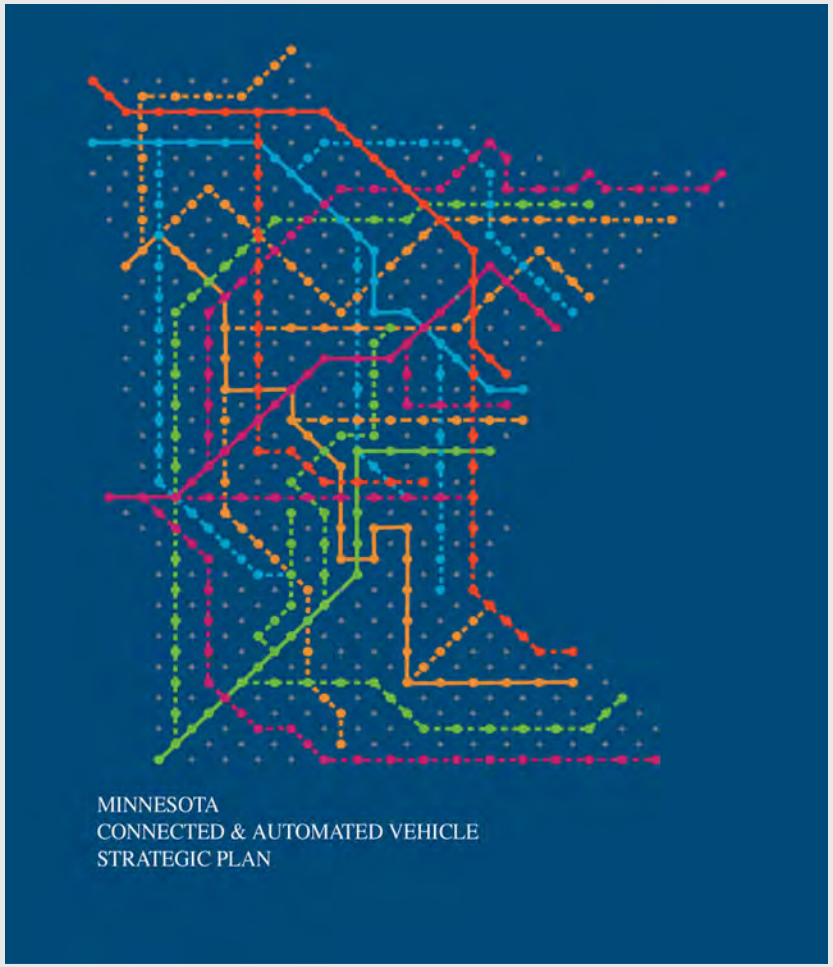
Chairs
Margaret Anderson Kelliher
Commissioner of Transportation

TBD

13 Council Members

Ex Officio Members
11 State Agencies
Met Council
MCOD
4 Legislators
MIAC
League of Cities
Assoc of MN Counties

CAV Strategic Plan: 9 Focus Areas



- Capital Investments
- Research & Development
- Partners
- Regulation
- Operations
- Strategic Staffing
- Multimodal
- Communications
- Long-Range Planning

20

Projects and Demonstrations

Minnesota CAV Challenge

32 Industry Meetings

26 Vendors

18 Proposals Submitted

7 Proposals Accepted

Two Under Contract

- AECOM / WSB
- Micro Systems / Kratos
- Ernst and Young
- First Transit
- University of Minnesota
- Iteris
- Traffic Control Corporation

Minnesota CAV Selected Contracts

AECOM
wsb

Automated Bus Consortium (ABC)

KRATOS
UNMANNED SYSTEMS DIVISION

Automated Truck Mounted Attenuator (ATMA)

AV Demonstrations

Connected Corridors – Urban

DEPARTMENT OF TRANSPORTATION

Thank you!

Jay Hietpas
Jay.Hietpas@state.mn.us

Questions?

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Round Robin Discussion