Connected and Automated Vehicles in Minnesota

DEPARTMENT OF TRANSPORTATION

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Automated
Vehicles
Automated vehicles
Short-Range Blind-Spot Sensors
1. Leadership
Long-Range Scanning Sensors
Short-Range Blind-Spot Sensors

State as Convener and Leader

Advisory Council

- Public-private partnership
- Vision and goal setting

Interagency CAV Team

- State agency collaboration
- Coordination amongst programs

Policy Subcommittees

- Technical and policy expertise
- Develop policy and programs
- Public and private involvement

Other CAV Organizations

CAV Advisory Council

Leaders from the auto industry, tech, cybersecurity, business, transit, education, workforce development, insurance, mobility advocacy, labor, safety, active transportation, elder care and tort law set vision for how Minnesota should plan and prepare for CAV.

Interagency CAV Team

State agencies, Met Council, universities, cities, counties and tribes share technical expertise to develop programs to prepare Minnesota for CAV, including testing and deploying CAV and shared mobility technologies.

Policy & Technical Advisory Committees

Infrastructure	Vehicle Registration Driver Training & Licensing	Equity	Insurance & Liability	Traffic Regulations & Safety	Economic & Workforce Development	Accessibility	Planning and Land Use	Cyber Security & Data Privacy
Chairs: DOT & County Engineers	Chairs: Public Safety & Driving Schools	Chairs: Community Elders	Chairs Commerce & American Family Insurance	Chairs: Public Safety & MN Safety Council	Chairs: Dept. of Economic Development & Teamsters	Chairs: Council on Disability & Mobility Mania	Chairs: DOT & University of Minnesota	Chairs: MnIT, Private Cyber Security/AI Firms

Guidestar Board of Directors

Twin Cities Shared Mobility Collaborative

University of Minnesota Center for Transportation Studies

County Engineer and League of Cities CAV Committees

Statewide Vision

Vision

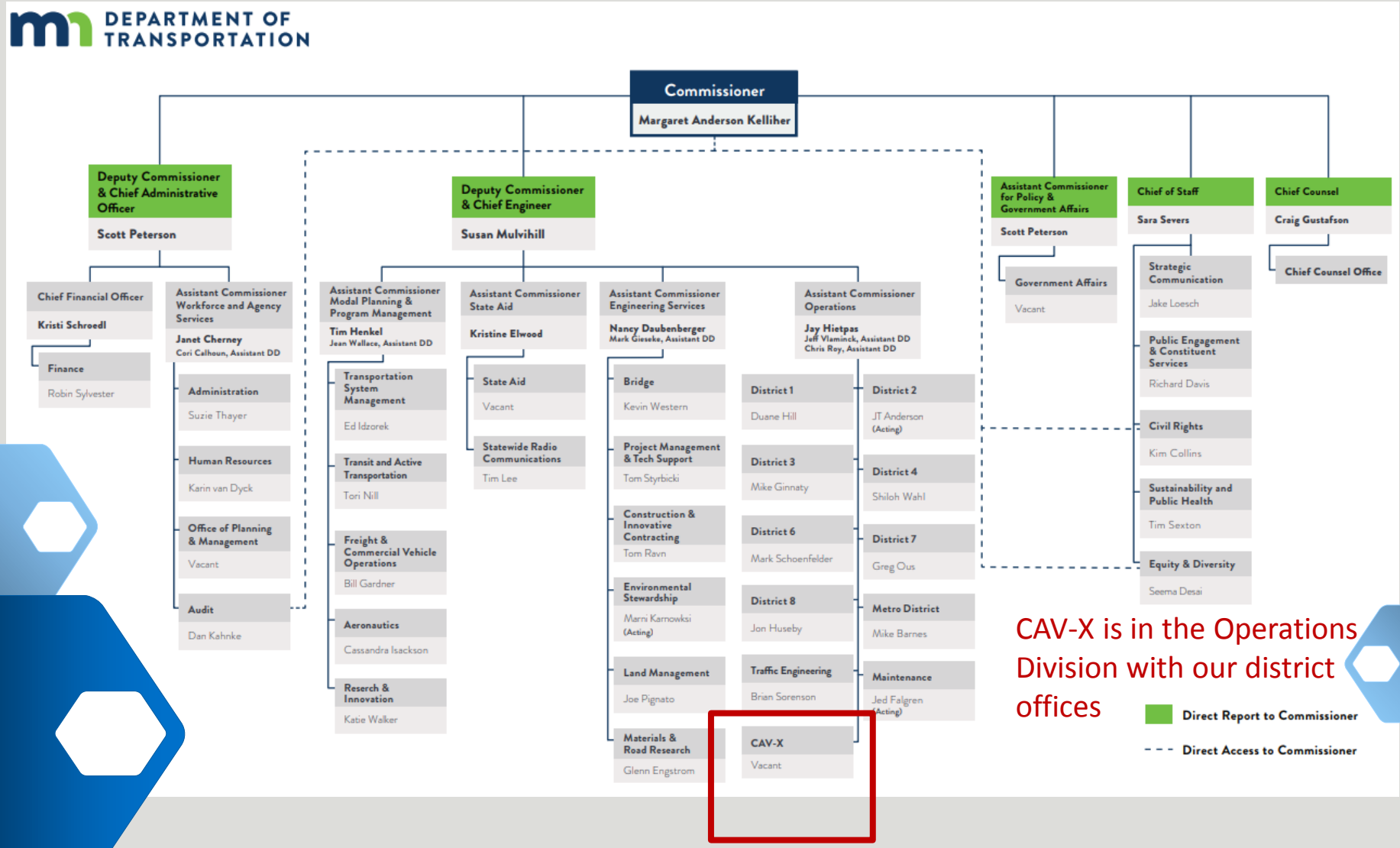
Collaboration that shapes the future of mobility and maximize the potential of transformative transportation technologies to ensure greater safety, access, equity and health for all.

Mission

Engage with government, communities, researchers, business and industry to advance policy that prepares the state for connected and automated vehicles and shared mobility.

**To be reviewed by next Advisory Council*

MnDOT CAV Structure



MnDOT CAV Coordination & Technical Areas

CAV-X

Leads Minnesota's CAV program – *Destination CAV* - and represents the state nationally.

MnDOT CAV Team

MnDOT's internal working group includes all district and technical areas shown below.

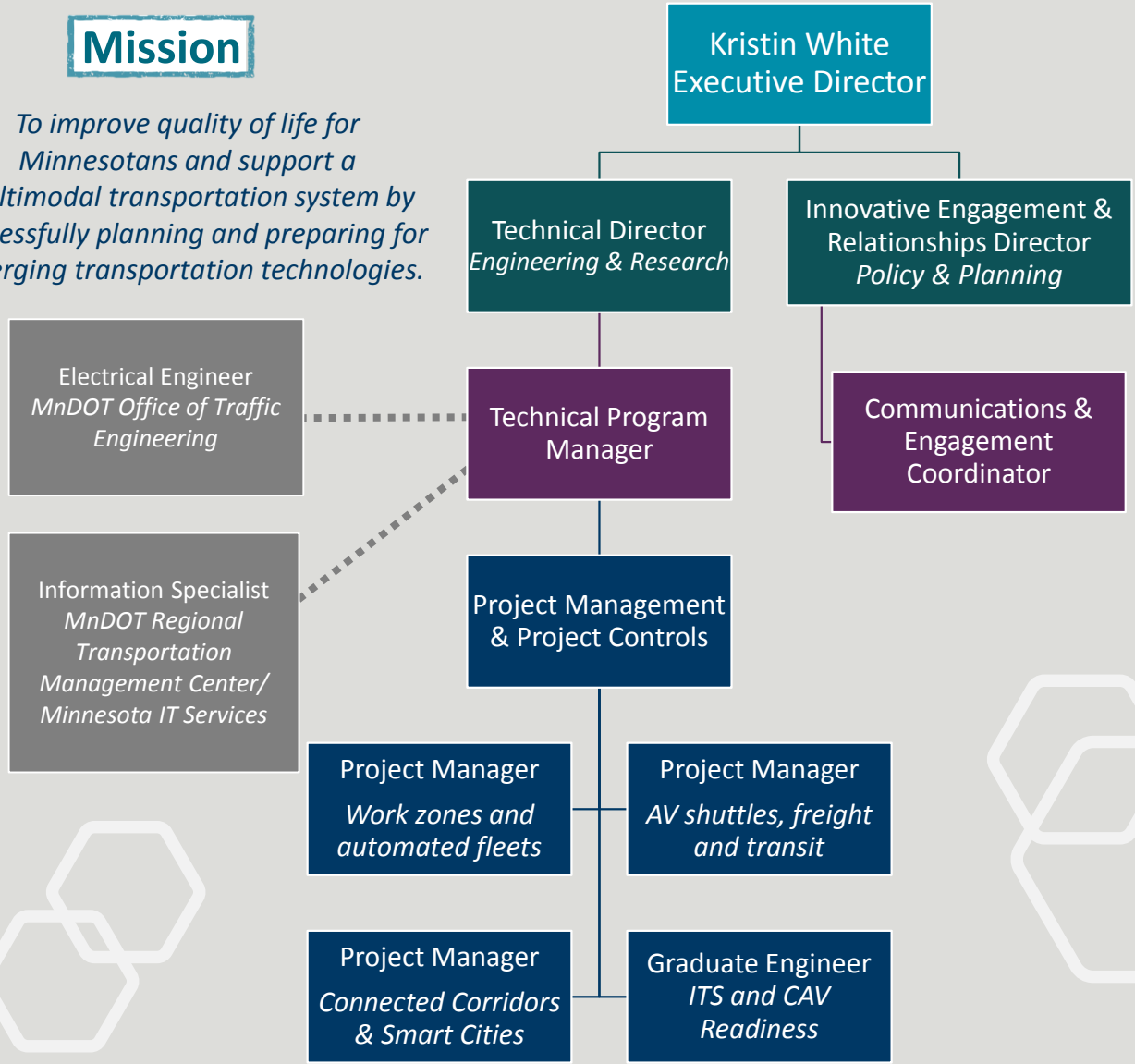
Districts & Specialty Offices

- Transit, Bike & Ped
- Legal
- Freight & Rail
- Research
- Counties and Cities
- Radio
- Finance
- Admin
- HR
- Policy & Planning
- Bridge
- Project Management
- Construction
- Environment
- District Offices
- Right of Way
- Materials and Road Research
- Government Affairs
- Communications & Marketing
- Public Engagement
- Sustainability
- Equity and Diversity

MnDOT CAV-X Office

Mission

To improve quality of life for Minnesotans and support a multimodal transportation system by successfully planning and preparing for emerging transportation technologies.

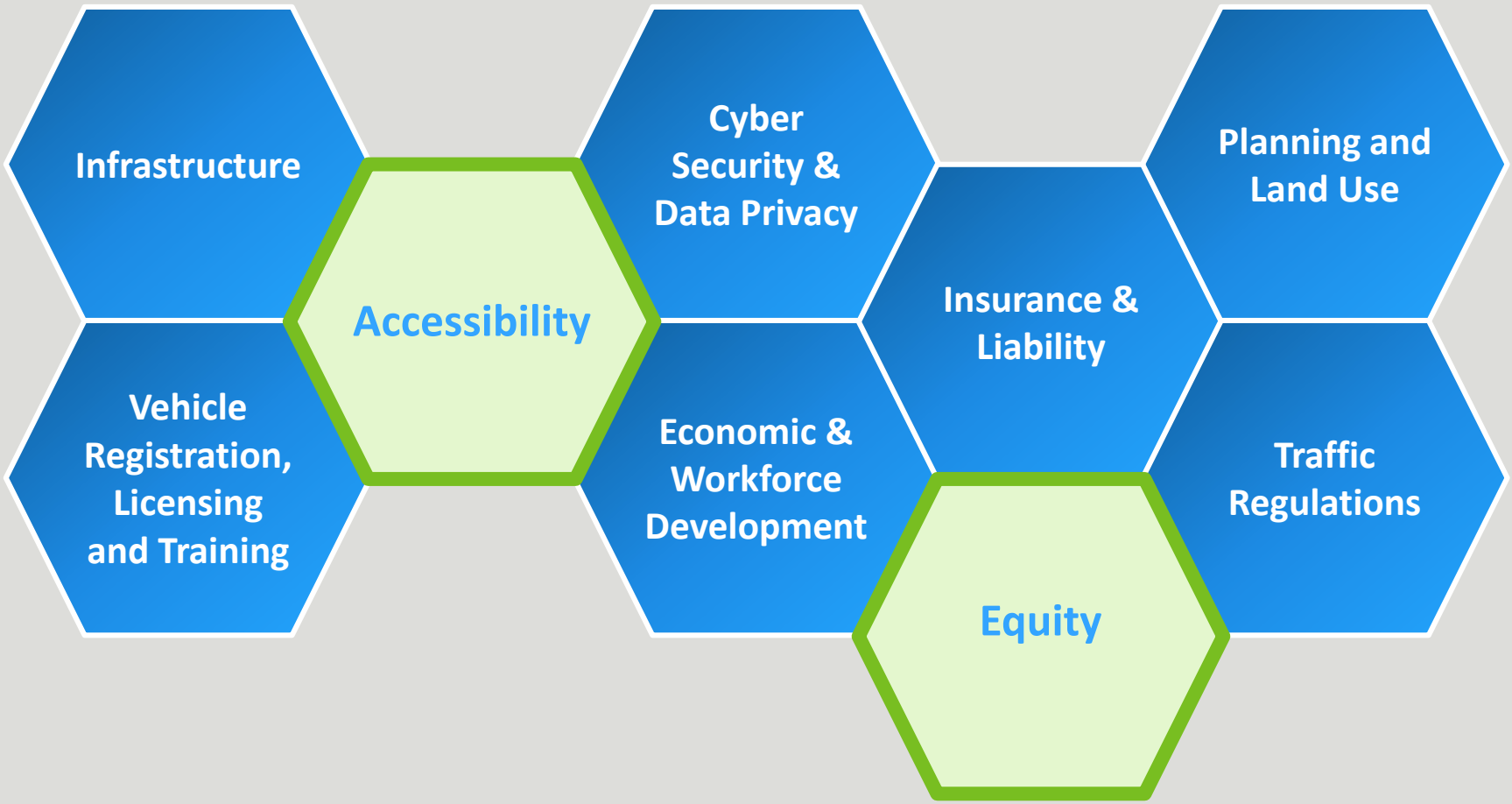


Goals

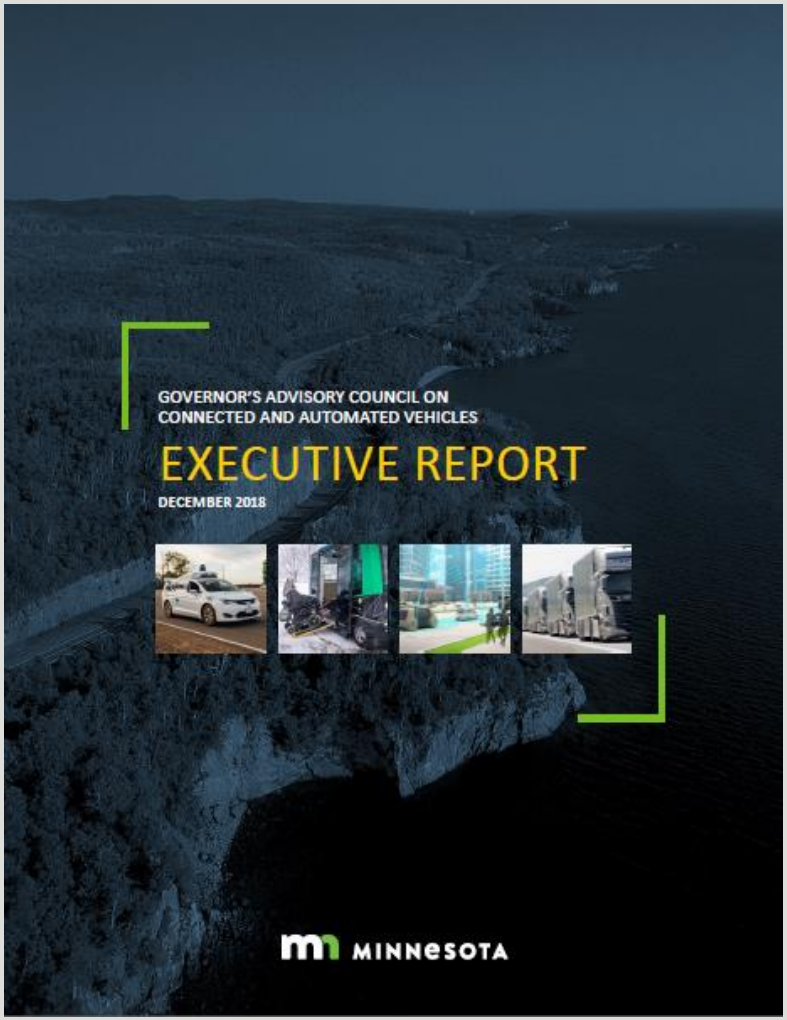
1. *Educate and engage Minnesota on emerging transportation technologies*
2. *Build relationships and partnerships with stakeholders*
3. *Accelerate policy, research, engineering and deployment of technologies that improve safety*
4. *Remain accountable to the public by effectively using state funds*

2. Policy

Policy & Technical Committees



CAV Executive Report Recommendations



"Authorize testing without human drivers"

"Invest in fiber, signals, pavement markings and smart signs"

"Prioritize safety for all users: pedestrians, cyclists, people with disabilities, transit, and others"

"Conduct pilot projects in urban, suburban, rural areas to public can see the tech and guide policy"

"Create a public engagement plan"

Automated Vehicle Legislation

02/20/19 REVISOR KRB/RC 19-0261 as introduced

SENATE
STATE OF MINNESOTA
NINETY-FIRST S

S.F. No. 2173

A bill for a

relating to motor vehicles; regulating auton
penalty; requiring a report; amending Minn

Subd. 3b. **Automated driving system.** "A
that allows a vehicle to be tested without any

Sec. 2. Minnesota Statutes 2018, section 16
read:

Subd. 29a. **Federal motor vehicle safety standards automated vehicle exemption.** "Federal motor vehicle safety standards automated vehicle exemption" means an exemption from the United States secretary of transportation from the motor vehicle safety standards under the National Traffic and Motor Vehicle Safety Act.

Sec. 3. Minnesota Statutes 2018, section 169.011, is amended by adding a subdivision to read:

Subd. 34a. **Highly automated vehicle.** "Highly automated vehicle" means a motor vehicle equipped with automated technology with the capability to function without a human operator present in the vehicle. A highly automated vehicle does not include a vehicle

A state task force wants self-driving cars on the road in Minnesota. Legislators aren't so sure

Platooning Legislation

Automated ‘platoons’ of trucks might soon be driving on Minnesota roads

02/20/19

This Document can be made available in alternative formats upon request

State of Minnesota

HOUSE OF REPRESENTATIVES

NINETY-FIRST SESSION

H. F. No. 1995

03/04/2019 Authored by Bernardy, Torkelson, Koznick and Tabke
The bill was read for the first time and referred to the Transportation Finance and Policy Division

A bill for an act

relating to transportation; authorizing vehicle platooning systems; amending Minnesota Statutes 2018, sections 169.011, by adding subdivisions; 169.18, subdivision 8; proposing coding for new law in Minnesota Statutes, chapter 169.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MINNESOTA:

Section 1. Minnesota Statutes 2018, section 169.011, is amended by adding a subdivision to read:

Subd. 54b. **Platooning system.** "Platooning system" means driver-assisted vehicle-to-vehicle technology that integrates electronic communications between and among multiple vehicles to synchronize speed, acceleration, and braking while leaving system monitoring and intervention in the control of each vehicle's human operator.

Sec. 2. Minnesota Statutes 2018, section 169.011, is amended by adding a subdivision to read:

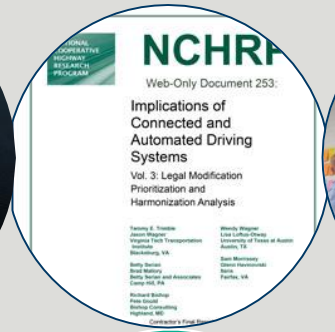
Subd. 92a. **Vehicle platoon.** "Vehicle platoon" means a group of commercial vehicles traveling in a unified manner through use of a platooning system or systems. A vehicle platoon consists of a lead vehicle and following vehicles. Notwithstanding section 169.81, a vehicle platoon may consist of up to three vehicles. A vehicle platoon is not a combination vehicle under this chapter.

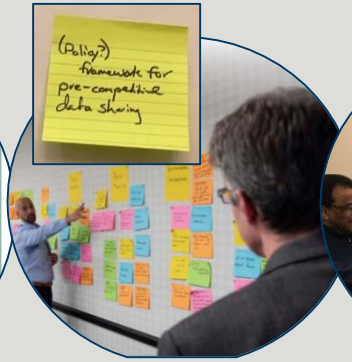
3. Planning

CAV Strategic Plan Focus Areas

- Capital Investment
- Research
- Partnerships
- Law and policy
- Operations & Maintenance
- Multimodal
- Strategic Staffing
- Communications
- Long-Range Planning

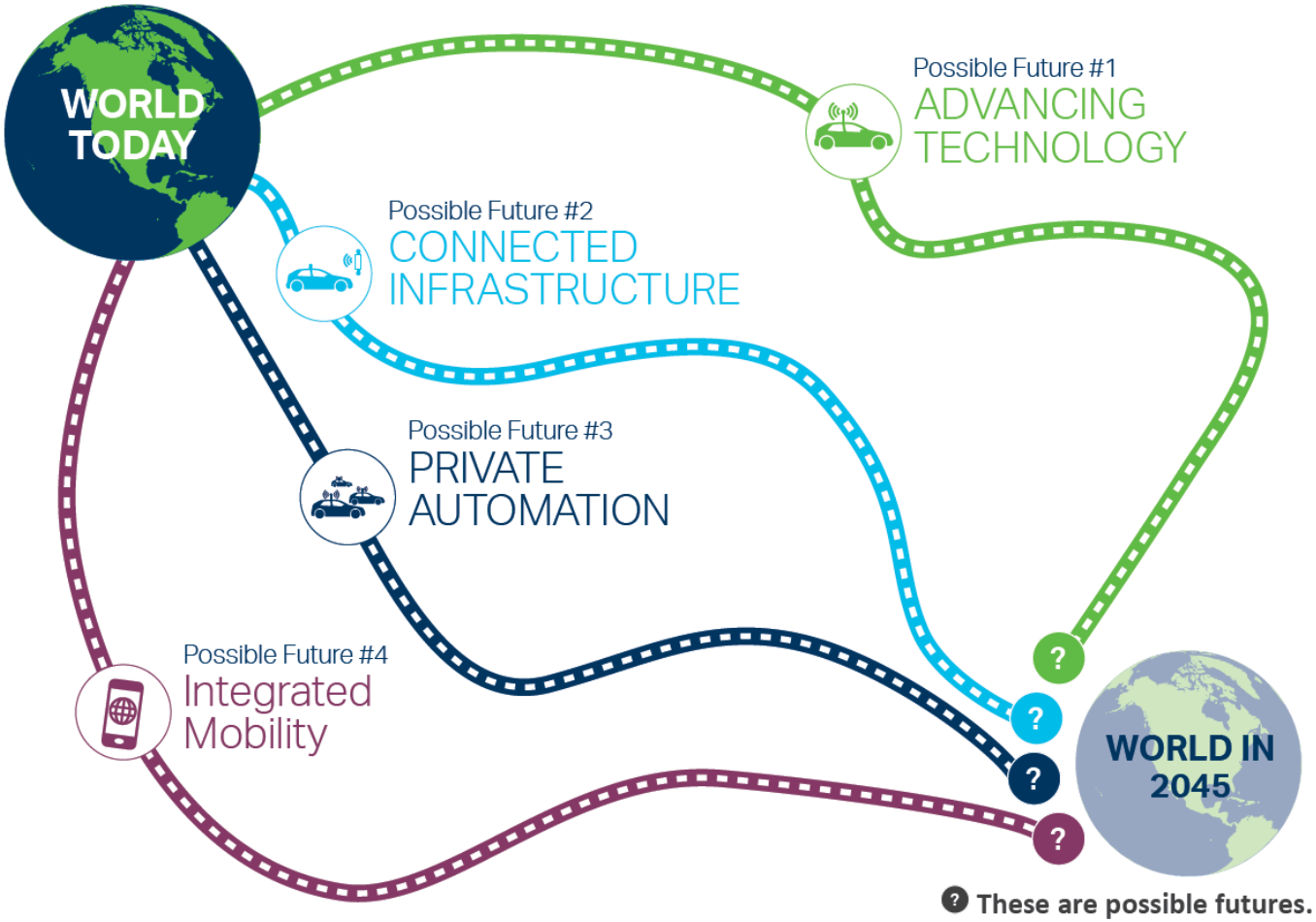
Planning Process



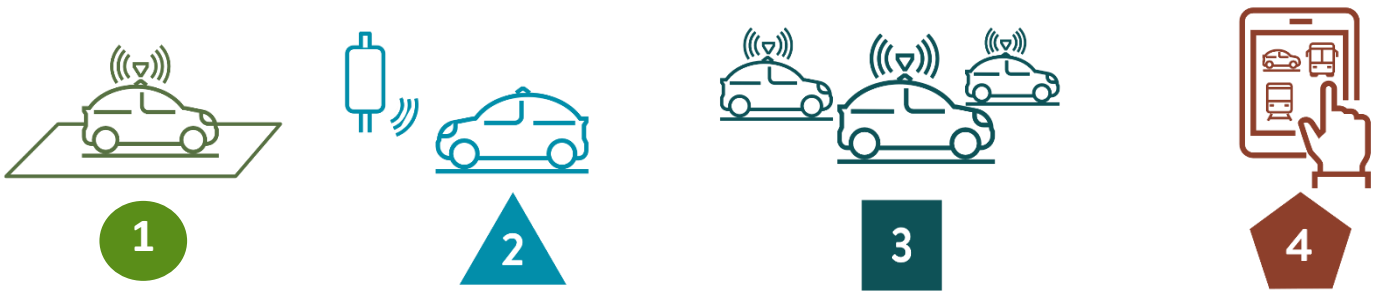


CAV Executive Report → Gap analysis → Visioning workshop → Statewide scenario planning workshops → DOT district & office meetings → CAV Strategic Plan

Scenario Planning



Key Traffic/ITS Assumptions

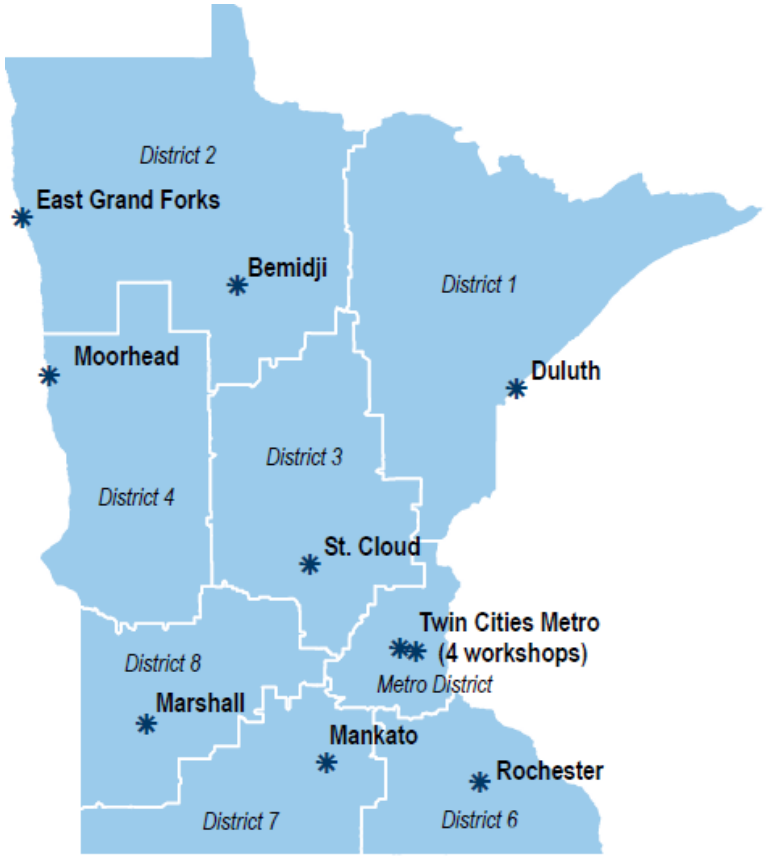


	Scenario 1	Scenario 2	Scenario 3	Scenario 4
CV	**15%** vehicles	**75%** of vehicles	**50%** of vehicles	**75%** of vehicles
AV	**15%** Level 3	**50%** Level 3	**75%** Level 4+	**75%** Level 4+
MaaS	**5-10%** of travel (up to 20% in cities)	**5-10%** of travel (up to 20% in cities)	**50%** of travel	**75%** of travel

Truck platooning common in all. Freight services highly automated in all but Scenario 1

Scenario Planning Workshop Details

- 12 workshops throughout Minnesota



- Primary audience
  - Local agency staff
  - MPO/RDO staff
  - Elected officials
  - Business
  - Advocates
  - Freight & logistics companies
  - Public

Potential Impacts and Responses

Impacts

- People Movement
- Goods Movement
- Land Use
- Environmental
- Social
- Political
- Economic
- Equity

Responses

- Type
  - Incentives
  - Restrictions
  - Investments
- Timing
  - Short/medium/long
- Responsibility
  - Public, Private, Other

Select Findings

- Opportunities
  - Safety
  - Equity
- Challenges
  - Equity
  - Implementation
- Comments similar across geographies
- Generally support continuing existing policies and strategies

Observations/Recommendations

- Use robust and targeted strategies to reach different audiences when planning for CAV (geographic, ability, etc.), because issues related to CAV may be broadly shared, but many are context sensitive.
- Address equity explicitly, but be cautious to promise benefits without having the tools to ensure they're realized.
- Work to clarify potential costs and identify who would be responsible.

MnDOT's 3-Pronged Approach to CAV

Strategic Investment

Innovation

Collaboration & Knowledge-Sharing

1

2

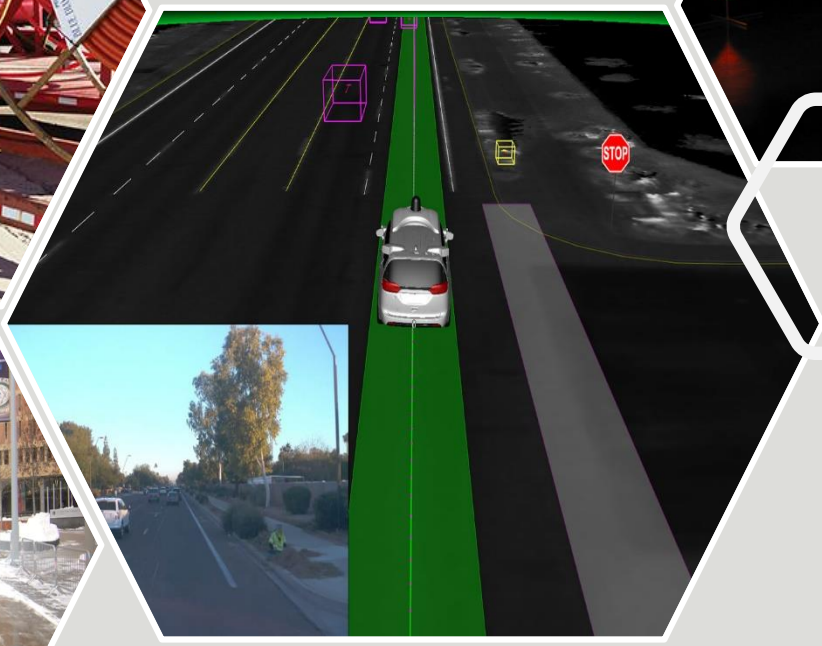
3

Implementation

	MnDOT CAV Strategic Plan Focus Areas, Strategies and Recommendations	MnDOT Lead	Initiate	Capital	Staff Effort	Strategic Plan Themes			SOP Goals		
						Strategic Investment	Innovation	Knowledge Sharing	Customer Trust	Workforce Excellence	Operational Excellence
FOCUS AREA 1: CAPITAL INVESTMENT											
▶ **Strategy 1: Assess Connected Vehicle Infrastructure Needs**											
1	Assess Communications Infrastructure and Public-Private Partnership Feasibility Study to Support CV Technologies	CAV-X	**1 Year**	**$$$**	MED	X			X		X
2	Build Traffic Signal Infrastructure for CV Readiness	Traffic Engineering	**1 Year**	$	LOW	X					X
▶ **Strategy 2: Assess and Prepare Pavements and Bridges for CAV**											
3	Continue Research Scan of Platooning Impact on Pavements and Bridges	Materials/Bridge	**1 Year**	$	LOW	X					X
4	Update Design Standards to Accommodate Platooning	Materials/Bridge	3-5 Years	**$$$**	MED	X	X				X
5	Develop Truck Platooning Network Plan	CAV-X	1-3 Years	$$	MED		X	X	X		X
▶ **Strategy 3: Develop and Implement Enhanced Pavement Marking and Signage Program**											
6	Pilot Pavement Marking to Support Automated Vehicles and Human Drivers	Traffic Engineering	1-3 Years	$$	**HIGH**		X		X		X
7	Support Industry in Researching and Advancing Signing to Support CAV	CAV-X	1-3 Years	$	LOW		X	X	X		X
▶ **Strategy 4: Develop and Implement Electric Vehicle (EV) Strategy**											
8	Develop EV Infrastructure Deployment Strategy at State Facilities	Sustainability and Public Health	1-3 Years	$	MED	X	X				X
9	Implement EV Infrastructure Deployment Strategy at State Facilities	Maintenance	1-3 Years	$$	MED	X	X		X		X
FOCUS AREA 2: RESEARCH AND DEVELOPMENT											
▶ **Strategy 5: Lead National Research and Innovation**											
10	Continue the Minnesota CAV Challenge	CAV-X	**1 Year**	**$$$**	MED		X	X	X		X
11	Leverage TRIG and LRRB to Research CAV Long-Term Impacts	CAV-X	1-3 Years	$$	LOW			X	X		X
12	Seek Research Panel Assignments Aligned with MnDOT Interests	CAV-X	1-3 Years	$	LOW			X			X
13	Further Collaborative Research with Minnesota Academic Institutions	CAV-X	3-5 Years	$$	MED			X	X		X
14	Research Data Use and Models	CAV-X	1-3 Years	$$	**HIGH**		X	X			X
15	Monitor Research on CAV Dedicated Lanes	RTMC	5+ Years	$	LOW			X			X

4. Programs

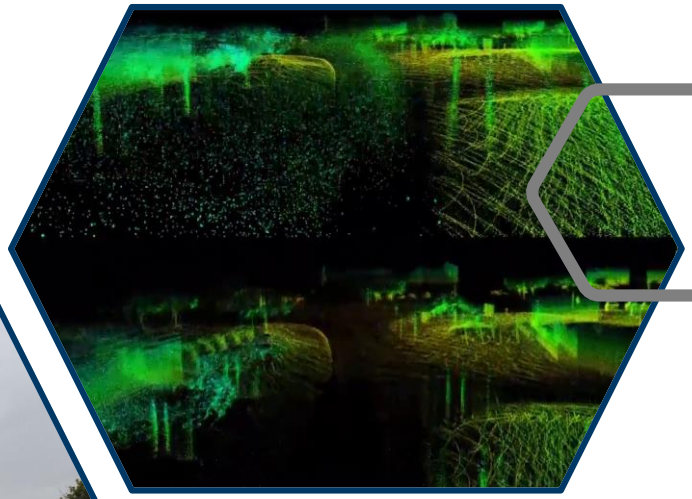
Infrastructure – Fiber, Markings, RSUs & Signs



Research – Platooning, Freight, Snow, Detection

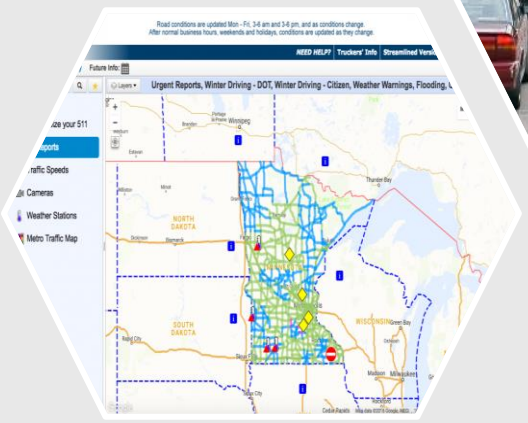
MnROAD

Safer, Smarter, Sustainable Pavements Through Innovative Research

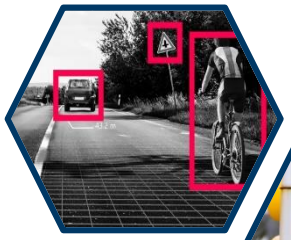


Partnerships – Minnesota CAV Challenge

Operations & Maintenance – Data, Work Zones & Crash Cushions



Multimodal – Transit, Freight, VRUs



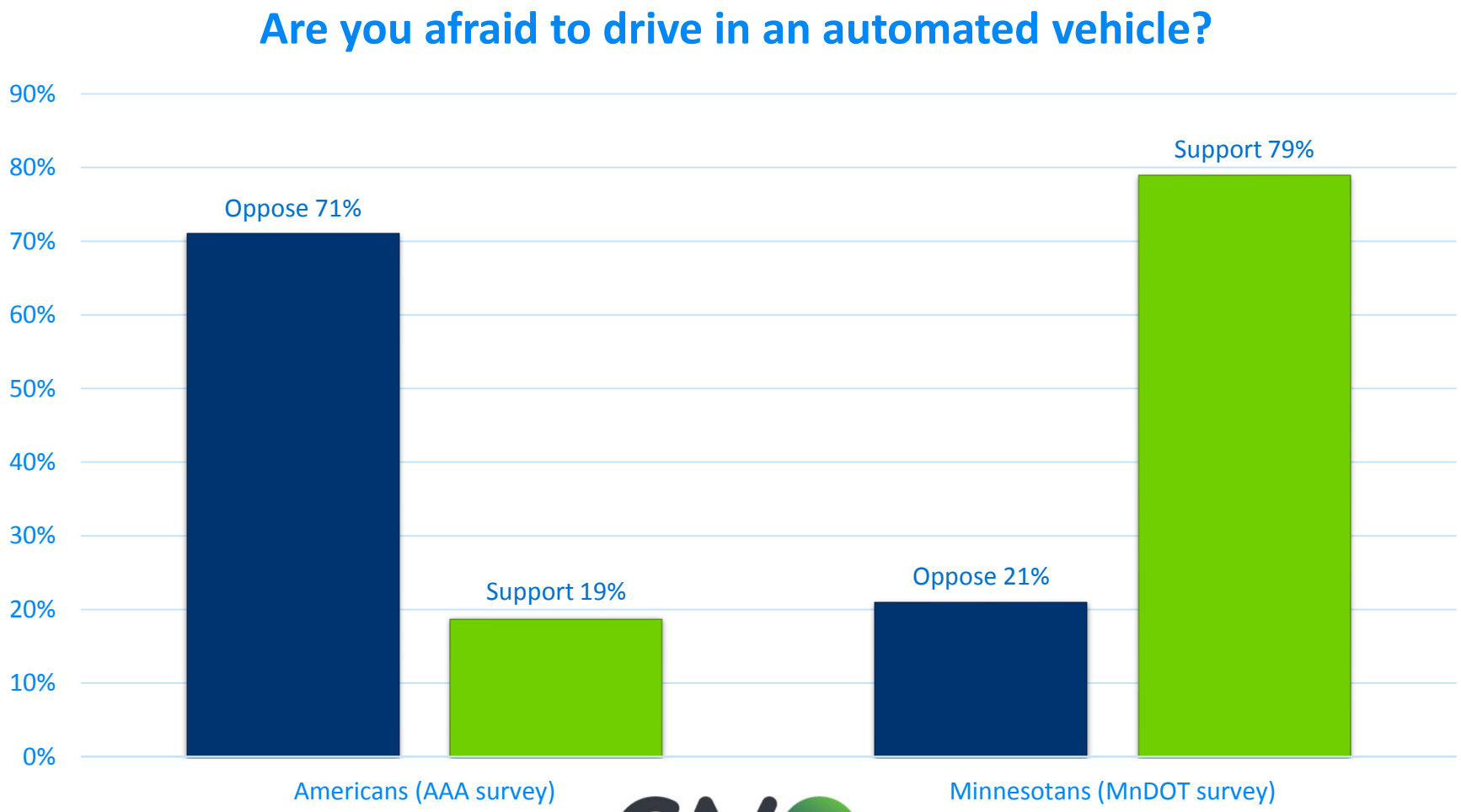
ABC Automated Bus Consortium
ACCELERATED BY AECOM

Communications & Engagement

CAV

DESTINATIONCAV

Surveys and Public Education



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MAASTO Opportunities

1. Convene quarterly MAASTO calls
2. Convene annual MAASTO CAV summits
3. Develop regional MAASTO priorities
4. Participate in DOT-led TRB Annual Meeting & Automated Vehicle Symposium sessions
5. Create regional, uniform AV deployment laws and programs
6. Develop an inter-regional model for partnerships and grants
7. Develop a regional research gap analysis where each state can fill in gaps - and avoid redundancy - in research

DESTINATIONCAV

THE FUTURE OF MOBILITY
COMES TO MINNESOTA

Thank you

DEPARTMENT OF TRANSPORTATION
mndot.gov/automated

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