MEETING NOTES

Iowa Advisory Council on Automated Transportation (ATC)

Wednesday, May 24, 2023

1 pm – 3 pm CT

https://iowadrivingav.org/

Attendees – 53 people

- David Lorenzen– Systems Operations Division Director, Iowa DOT
- Richard Steiner – Gatik
- Tara Olds – Minnesota Department of Transportation, Connected & Automated Vehicle Program
- Dylan Mullenix – Des Moines Area MPO (Policy & Legislation Chair)
- Erin Mullenix – Iowa League of Cities (Infrastructure Readiness Chair)
- Ashley Nylen – Highly Automated Systems Safety Center of Excellence, USDOT
- Nicole Oneyear – Iowa Division of the Federal Highway Administration
- Kathy Anderson – Iowa Workforce Development
- Beth Townsend – Iowa Workforce Development
- Abbie Christophersen – Iowa Economic Development Authority
- Marcus Coenen – Felsburg Holt & Ullevig
- Susan deCourcy – NHSTA Region 7
- Travis Grassel – Iowa Insurance Division
- Brian Keierleber – Buchanan County
- Mark Nahra – Woodbury County
- Mark Pierson – HNTB
- Eric Porter – Iowa Communications Network
- Derek Snead – Jones County (phone)
- Mickey Shields – Iowa League of Cities
- Steven Spears – University of Iowa, School of Planning and Public Affairs
- Nickolas VanGunst – Alliant Engineering
- Ray Warner – Aureon
- Brian Willham – HR Green
- Danny Waid – Iowa County Engineers Survey Bureau
- Peter Rafferty – Cambridge Systematics
- Sven Peterson – City of Perry
- Matt Burkey – Iowa Bicycle Coalition
- Mark Wyatt – Iowa Bicycle Coalition
- John Jackels – SRF
- Ron Otto – AGC
- Omar Ahmad, Dan McGehee, Cheryl Roe – University of Iowa, Driving Safety Research Institute
- Zach Hans, Skylar Knickerbocker – Iowa State University, InTrans
- Newman Abuissa, Brenda Freshour-Johnston, Larry Grant, Josh Halterman, Benjamin Hucker, Alex Jansen, Troy Jerman, Dennis Kleen, Peggi Knight, Donna Matulac, Hossein Naraghi, Garrett Pedersen, Jim Schnoebelen, Adam Shell, Tim Simodynes, Samuel Strutz, Mark Van Dyke, Andrea White – Iowa DOT

1. **Welcome –** David Lorenzen, Systems Operations Division Director, Iowa DOT

- David welcomed everyone to the meeting on behalf of Director Marler who was unable to attend the meeting. He welcomed the following new members to the Council:
    - Brian Mulcahy – Assistant Executive Director, Des Moines International Airport
    - Kathy Anderson – Business Engagement Division Deputy Administrator, Iowa Workforce Development
    - Ashley Nylen – Senior Strategist, Surface Automation & Safety, Highly Automated Systems Safety Center of Excellence, USDOT
    - Nicole Oneyear – Highway Safety Specialist, Federal Highway Administration, Iowa Division

2. **Gatik: An Autonomous Transportation Network for the Middle Mile –** Richard Steiner, Head of Policy & Communication, Gatik *(slides omitted from meeting summary)*

- Bio
    - Rich is a government affairs and policy professional with 15 years' experience in the private and public sectors, focusing on advanced technologies. At Gatik, Rich leads the company's government affairs and public policy portfolio. Prior to Gatik, Rich worked in senior management for the Government of Ontario and led technical consultations on behalf of energy-from-waste technology companies in the UK. Rich holds a Master of Public Policy degree from King's College London, and a Bachelor of Arts degree in English & History from the University of Toronto.
- Gatik Background
    - Long haul trucking operations (e.g., Kodiak, Aurora) focus on highway driving with Class-A big rigs, heavy payloads, and high-speed operational design domain (ODD). Middle mile operations (e.g., Gatik) focus on short hauls (i.e., from distribution center to distribution center) with smaller trucks. Last mile operations (e.g., Starship, Cruise, Waymo) focus on low-speed ODD and the delivery of goods to consumers' doorsteps.
    - Gatik is the world's first autonomous trucking company to operate commercially on the middle mile. Class 3 to 7 box trucks operate on pre-defined, repeatable routes with round trips of 300 miles or less. The routes are chosen to mitigate edge cases so the vehicles may take extra turns to avoid schools, hospitals, fire stations, heavy pedestrian areas, etc. This model allows Gatik the opportunity to move to driverless vehicles faster and safer.
    - Gatik operates 45 trucks on North American roads, have completed over a half million deliveries, and have almost one million miles driven. Zero safety incidents have been reported.
    - Gatik works with more than 10 Fortune 500 customers including Wal-Mart.
- Case Studies
    - Industry-First Fully Driverless Operations - Enabling Walmart eComm Fulfillment: Fully driverless Class-4 trucks operate at posted speed limits (up to 45 mph) on a 7.1-mile public route, seven days a week, for 12 hours a day to deliver goods from dog store to retail locations. The automation sensor suite includes LiDAR, radar, cameras, global navigation satellite system (GNSS), etc. The various sensors allow for one sensor to take over when another may not be functioning optimally. The technology can see about three football fields day and night. YouTube

    - Georgia-Pacific/KBX: Fully driverless Class-6 box trucks replaced Class-8 trucks to deliver goods from distribution centers to thirty-four Sam's Clubs locations in the Dallas area 22 hours a day, seven days a week. This has increased fulfillment runs from 1-2 days per week to 2-4 days per week.
- Benefits of AVs
    - Safety as demonstrated with their 100% safety record.
    - Increased reliability with delivering goods on time.
    - Helps address driver shortage.
    - Cost savings are likely when it comes to hiring, training, and retaining drivers.
    - Improved visibility with real-time tracking of deliveries.
    - Increased sustainability is likely when combining AVs with electric vehicles. Gatik's approach to shorter haul routes allows for sufficient battery life. To assist with potential charging needs, Gatik has built in charging stations at customer depots as well as their own facilities.
- Partners
    - Isuzu (OEM partner): integrating automated driving technology from ground up which allows for OEM grade redundancies.
    - Cummins (Tier 1 supplier): integrating the automated system into the power train and developing the drive by wire capabilities.
    - Goodyear is a partner and investor: integrating smart tire technology (Goodyear Sightline) into the fleet. This technology allows for real-time data such as tire/road friction to be integrated into the automated system which can improve performance and safety (i.e., stopping distances in poor weather).
    - Ryder: this partner handles vehicle leasing and maintenance.
- Stakeholder involvement
    - Gatik hosts education and awareness sessions (demos, walk-throughs, etc.) for stakeholders at federal, state, and local levels.
- Discussion
    - Dan McGehee was interested in the data related to safety driver takeovers.
        - High level answer is most takeovers are often due to poor human drivers. Disengagements[1] over Gatik lifetime have become fewer and farther between.
        - A remote supervisor monitors the trucks whether a safety driver is on board or not. This is <u>not</u> teleoperations. The remote supervisor monitors and provides high level commands to the trucks should a situation arise. For example, if there is unexpected road work or a tree in the road, a safety driver may take control. If the situation is driver out, the vehicle would ask the remote supervisor if it could borrow the adjacent lane. The supervisor would provide guidance and the resulting course of action would be taken by the vehicle when it is safe to do so.
    - Dan McGehee - How does your system work in environmental conditions like rain, snow, slush?

[1] Disengagement occurs anytime the autonomous vehicle mode is removed or turned off during testing. This could be due to technology failure or situations requiring the test driver/operator to take manual control of the vehicle to operate safely. California DMV Disengagement Reports

        - Rain hasn't proven to be a great challenge. During the four years of driving in Canada, Gatik has identified limitations with heavy snow, freezing rain, and fog. If conditions pose a challenge to safety, they choose not to operate.
    - Adam Shell – are you ingesting any data information from government agencies, like the work zone data exchange?
        - Gatik designed their autonomous system to be able to work without V2X infrastructure. Gatik welcomes the opportunity to work with municipalities and states who are looking at connected and AV infrastructure to enhance operations. Any real-time data from authorities is helpful.
    - Adam Shell – Is Gatik part of this NHTSA AV TEST Initiative? The goal of the initiative is to provide the public with direct and easy access to information about testing of ADS-equipped vehicles, information from states regarding activity, legislation, regulations, local involvement in automation on our roadways, and information provided by companies developing and testing ADS.
        - Gatik participates in the initiative and has updates to add.
    - Brian Keierleber - What would it take to bring rock roads into situation to run your vehicles on them?
        - Richard will need to take it back and talk with others about the challenges associated with this.
    - Additional questions and conversation included topics related to safety, number of AV trucks on the road today, and how Gatik vehicles handle construction or detours. These items were noted in the presentation and video provided above.
        - For additional information on trucking industry: https://truckingresearch.org/
        - For additional information related to the reporting of safety incidents for Gatik and others: NTHSA Standing General Order

3. **Minnesota Department of Transportation (MnDOT) CAV Program –** Tara Olds, Director of Connected and Automated Vehicles, MnDOT (45 minutes)

- Bio
    - Tara is the Director of Connected and Automated Vehicles at the Minnesota Department of Transportation or MnDOT. Tara leads the department's CAV engineering, policy development, planning, and research and deployment programs. She works to create programming to advance the safe deployment of CAV technologies to promote equitable and sustainable transportation while partnering on regional and national research and policy development. Tara's background spans across engineering, construction, project management, community engagement, and traffic safety. Tara has a degree in civil engineering from the University of Iowa and Master's in Public Affairs from the University of Minnesota.
- CAV Focus
    - Greater equity, access, and mobility
    - Economic and workforce development
    - Increased safety
    - More efficient movement of people and goods
    - Improved environment

- Policy and technical areas: accessibility, infrastructure, equity, planning and land use, traffic regulations, cyber securities, economic and workforce development, vehicle registration, etc.
- CAV Partners
    - Governor's Advisory Council's goal is to help the state of Minnesota plan and prepare for emerging technology and set priorities for the state.
    - Innovation Alliance is made up of 5 committees that try to implement recommendations. This network of partners come from different cities, counties, federal agencies, industry, academia They meet regularly, share project updates & lessons learned, and identify best practices.
        - Safety
        - Data & Connectivity
        - Workforce & Labor Development
        - IR
        - Education & Communications
    - Interagency CAV Team (I-CAV) is made of representatives from Minnesota state agencies, University of Minnesota, MET council, League of Cities, and county engineers. They discuss CAV risks and opportunities that intersect across state agencies.
- Why CAV in Minnesota?
    - Challenges with rural and environmental conditions often found in the Midwest.
    - Testing facilities at MnRoad, close tracks, and connective vehicle testing
    - CAV support and expertise
    - Dedicated funding available for CAV projects through CAV challenge which allows private industry partners, public partners, researchers in academia to propose solutions to address transportation challenges using technologies.
    - Strong leadership from within the state and strong connections within and outside the state.
- How can Iowa build off what Minnesota has done? Avoid repeating what another state has done and share lessons learned.
- CAV Strategic Plan
    - Capital investment: focus on what the state should be investing in, what is the best way to invest in the infrastructure so that different types of technology to be successful today and in the future (i.e., Contrast strips are designed to assist the human drivers, but will also benefit ADAS in the future).
    - Research: build upon lessons learned and share this information nationally and internationally.
    - Partnerships: continue building public and private partnerships.
    - Regulation and Policy: continue discussing policy changes to ensure safe deployment of different CAV.
    - Operations and maintenance: How can we implement technology into our fleet? How can we improve snowplow operations?
    - Multi-modal: assess the impact of CVs and AVs on other modes of transportation.
    - Staffing: examine and understand how the workforce may change.
    - Communication: It is important to engage with the public. It is vital to understand what they understand, what they see as benefits, what they are concerned about, etc.
    - Long range planning: try to implement CAV strategic plan in all MnDOT plans. The goal of the CAV Guiding Principles is to guide stakeholders and leaders to ask the right questions when

developing policy, programs and directing investment. These principles align with American Association of State Highway and Transportation Official (AASHTO) but have a Minnesota flavor.

- Projects
    - Med City Mover Project – This was a 12-month project that ran from 2021-2022 in downtown multi-modal urban area in Rochester, MN, near the Mayo Clinic. It used two slow-moving (15 mph) electric vehicles (EV) that could hold up to 6 passengers. Passengers boarded at two different pick-up/drop-off points. The vehicles interacted with 13 traffic signals. The project used Dedicated Short-Range Communication (DSRC) for the first half and changed to Cellular Vehicle-to-Everything (C-V2X) for the second half. The C-V2X showed better results. Several lessons learned regarding the use of EVs and weather conditions.
    - Bear Tracks Project – This was a 12-month project conducted from 2022-23 in White Bear Lake, MN which utilized one slow-moving (max speed 15 mph, average speed 7-10 mph) electric Navya vehicle that could seat up to 8 passengers. The vehicle traveled in a suburban environment. Passengers boarded at one of four pick-up/drop-off points: senior living housing, low-incoming housing, YMCA, adult day center. One intersection was encountered which was connected via DSRC.
    - goMARTI Project – This is an ongoing 18-month project that started in fall of 2022 and will continue through Spring of 2024 in Grand Rapids, MN. It utilizes five gas-powered Toyota Siennas (three ADA compliant) that are outfitted with May Mobility autonomous kit. Similarly, to Uber and Lyft, a passenger uses an app to request a pick-up/drop-off location from about 70 different options. The vehicles run in a rural downtown environment. Unlike the previous two projects, these vehicles follow the route as requested by the passengers and not from A to B to C. goMARTI utilizes camera sensors and travels at roadway speeds.
    - Autonomous Truck Mounted Attenuator: CV technology is incorporated within road maintenance trucks to communicate to each other during lane closures and road maintenance. This technology has the potential to increase safety by removing the drivers from the following vehicles. The Colorado DOT has made great progress and has removed drivers. The MN state law is unclear if removing the driver is a possibility.
    - Connected Vehicle Corridors: this project looks at how MN can connect/share traffic signal data to passenger vehicles. This was tried using an app on a phone. Unfortunately, it had flaws. Not all the information provided was useful or accurate. Vehicles in the project can identify pedestrians and bicyclists if the app was being used. There is a benefit to putting technology in the hands of road users not in the vehicle.
    - Traveler info: Message boards trigger automatically to alert drivers when snowplows are ahead.
    - Community driven CAV: Work with communities to develop plans to implement CAV technology to benefit the communities. These plans help communities be more strategic when applying for funds or grants by helping them.
    - Communication guidance: This project looked at developing communication guidance and engagement with Minnesotans about CAV. Tasks included interviews with peer agencies within US and internationally, media review, statewide survey, 30 in-depth interviews,

audience analysis to understand the best way to communicate with people. CAV Messaging and Engagement Guidance Documents and toolkits are available.

- Demonstration Projects Lessons Learned
    - Pros/cons with sensors, challenges with GPS, electric batteries, successes, and challenges with DSRC and C-V2X.
    - Environment changes related to rain and snow, but also with steam coming up from manholes. The steam often was as an obstacle by the vehicles and would stop. Snowbanks as well as with snow removals at stops. Snow removal at stops is an issue that needs to be resolved for all transportation not just AV.
    - Drivers' unsafe driving behavior: Drivers around the AVs displayed unique and unsafe behaviors. This led to a project with Dr. Nichole Morris at the University of Minnesota HumanFIRST Labratory. They are examining the changes of other drivers and roadway users when encountering AVs. One takeaway so far is that when driving behavior changes and it doesn't match the existing culture, it will cause disruption.
- Messaging and Engagement
    - CAV messaging and engagement should build knowledge, develop two-way lasting relationships, and should be integrated into all transportation plans and projects. This promotes clarity, consistency, and understanding among all audiences.
    - One suggestion related to messaging guidance is to "inform, don't sell" the technology. CAV will not solve all problems, but there are a lot of benefits if done right.
    - One suggestion related to engagement guidance is to "prioritize exposure". Demonstrations are a great way to expose people however they can be expensive, so it is important to figure out how to design demonstrations in a more cost-effective way.
- Questions
    - Adam Shell - what kind of planning and prep was involved with the demonstration devices? What about best practices for traffic, vegetation?
        - There was a considerable amount of planning involved but probably not enough. The delays encountered during COVID allowed for additional conversations and planning for the Med City Mover project. EasyMile requested various infrastructure modifications: re-pavement of an intersection for a cross-section issue, installation of 4 by 5-foot signs for localization, removal of trees, and restriping of all the roads. The change for the cross-section issues was not done. Vegetation was trimmed at various times throughout project when the vehicles identified it as an obstacle. Instead of the 4 by 5-foot sign, a different solution was agreed upon.
        - A lessons learned document is currently under development.
    - Adam – what kind of interaction was there with law enforcement agencies, emergency response personnel, or incident management or crash data personnel?
        - Direct engagement with law enforcement occurred for these projects as well as with other CAV projects. EMS training was also completed in the communities for these projects, but nothing broadly is being done. Currently, Minnesota doesn't have anything in the registration process or in crash reports regarding automation level or status.

- Dylan Mullenix – May Mobility reached out to them and transit agency. On the Grand Rapids project, how did those relationships come about in Minnesota?
    - All three of the demonstration projects mentioned were funded under CAV challenges. goMARTI was developed by the community of Grand Rapids, Mobility Mania, advocacy group, Iron Range Resources and Rehabilitation, and 20 -30 partners (in kind contributions direct funding). This group came to MnDOT for funding. The project has been successful because the community identified the gap and they found May Mobility who had a solution. Tara is happy to provide pros and cons about CAV issues with anyone.

4. **Subcommittee Updates and Funding Opportunity** – Dylan Mullenix, Erin Mullenix, Adam Shell

- Policy & Legislation
    - The Policy & Legislation subcommittee met in February of 2023 and heard a presentation by Steve Miller from Insurance Office of America that focused on AV related insurance needs. Additional updates were provided from the CAT in Planning Working Group, the DEI Working Group, and the AT Policy working group were provided.

- Infrastructure Readiness & Economic Development
    - The Infrastructure Readiness and Economic Development subcommittees held a joint meeting in January of 2023. Brian Mulcahy from the Des Moines International Airport highlighted the Strengthening Mobility and Revolutionizing Transportation (SMART) Grants Program grant application that was submitted for the use of AV shuttles at the airport. Unfortunately, this application was not awarded.
    - IR tactical updates: engagement with SAE On-Road Driving Committee, pavement markings, audible attenuator, work zone data exchange, connected temporary traffic signals and FHWA emerging data in work zones.
    - Economic Development subcommittee is currently working with Iowa Workforce Development to get them involved with the labor and workforce related activities.
    - Adam highlighted an upcoming webinar Roadway Automated Driving Systems (ADS) Integration Concept of Operations for Transportation Agencies event on June 8.

- Public Safety & Enforcement
    - Adam provided the update as Col. Fulk was unable to attend.
    - The Public Safety & Enforcement subcommittee met in February of 2023 and heard a presentation by Chris Wiacek, who is the Co-Chair for the Partnership for Analytics Research in Traffic Safety (PARTS) Advanced Driver Assistive Systems (ADAS) Effectiveness Working Group, National Highway Traffic Safety Administration. The presentation highlighted the results from Real-world Effectiveness of Model Year 2015-2020 Advanced Driver Assistance Systems Final Report.
    - Tactical updates: AV Crash Data working group meeting, Iowa State Patrol representation on American Association of Motor Vehicle Administrators (AAMVA) AV subcommittee, an ADAS crash project at the University of Iowa Driving Safety Research Institute, and the Iowa Strategic Highway Safety Plan.

5. **Wrap-Up** – Adam Shell

- Announcements and Updates
    - Mid-America Association of State Transportation Officials (aka MAASTO) has scheduled a Connected & Automated Vehicle Conference in Iowa City, Iowa. This event will take place June 19-21, 2023.
- Next Meetings
    - Will be working to schedule upcoming subcommittee meetings late Summer into Fall
    - Early ideas for upcoming presentation include update from our research partners at University of Iowa and Iowa State University
- Press Clippings
    - Bi-weekly update via email
    - Sign up here: https://iowadrivingav.org/clippings.aspx
- Adjourn

IOWA ADVISORY COUNCIL ON AUTOMATED TRANSPORTATION

Council Meeting

May 24, 2023

WELCOME

Dave Lorenzen, Systems Operations Division Director- Iowa DOT

WELCOME

Council Members

- Iowa Department of Transportation
- Iowa Department of Public Safety
- Iowa Economic Development Authority
- Iowa League of Cities
- Des Moines Area MPO
- Des Moines International Airport
- Iowa Department of Public Safety
- Iowa Motor Truck Association
- Des Moines Area Community College
- Technology Association of Iowa
- Iowa Association of Business and Industry
- Associated General Contractors of Iowa
- Iowa Communications Network
- Iowa Department of Revenue
- Iowa Public Transit Association
- Iowa Bicycle Coalition
- Freight Advisory Council
- Iowa Insurance Division
- Iowa State Association of Counties
- Iowa Department of Agriculture & Land Stewardship
- Iowa Department of Natural Resources
- Driving Safety Research Institute, University of Iowa
- Institute for Transportation, Iowa State University
- American Association of Motor Vehicle Administrators
- Federal Highway Administration, Iowa Division
- Federal Motor Carrier Safety Administration
- National Highway Traffic Safety Administration
- Iowa Senate
- Iowa House of Representatives
- Highly Automated Systems Safety Center of Excellence, USDOT
- Iowa Workforce Development

MEETING AGENDA

1. **Welcome** – David Lorenzen, Systems Operations Division Director, Iowa DOT (5 minutes)
    a. New Members
        - Brian Mulcahy – Assistant Executive Director, Des Moines International Airport
        - Kathy Anderson – Business Engagement Division Deputy Administrator, Iowa Workforce Development
        - Ashley Nylen – Senior Strategist, Surface Automation & Safety, Highly Automated Systems Safety Center of Excellence, USDOT
        - Nicole Oneyear – Highway Safety Specialist, Federal Highway Administration, Iowa Division
2. **Gatik: An Autonomous Transportation Network for the Middle Mile** – Richard Steiner, Head of Policy and Communications, Gatik (45 minutes)
3. **Minnesota Department of Transportation (MNDOT) CAV Program** – Tara Olds, Director of Connected and Automated Vehicles, MNDOT (45 minutes)
4. **2023 Subcommittee Meeting Updates** – Subcommittee Chairs (20 minutes)
    a. Policy & Legislation – Dylan Mullenix
    b. Infrastructure Readiness – Erin Mullenix
    c. Economic Development – Rick Peterson
    d. Public Safety & Enforcement – Colonel Nathan Fulk
5. **Wrap-up** – Adam Shell (5 minutes)
    a. Announcements & Updates
    b. Next Meetings
    c. Adjourn

HOUSEKEEPING ITEMS

- Please mute your audio!
- If available, encourage the use of video when speaking
- Please use the chat box and raise hand features to ask questions or make a comment

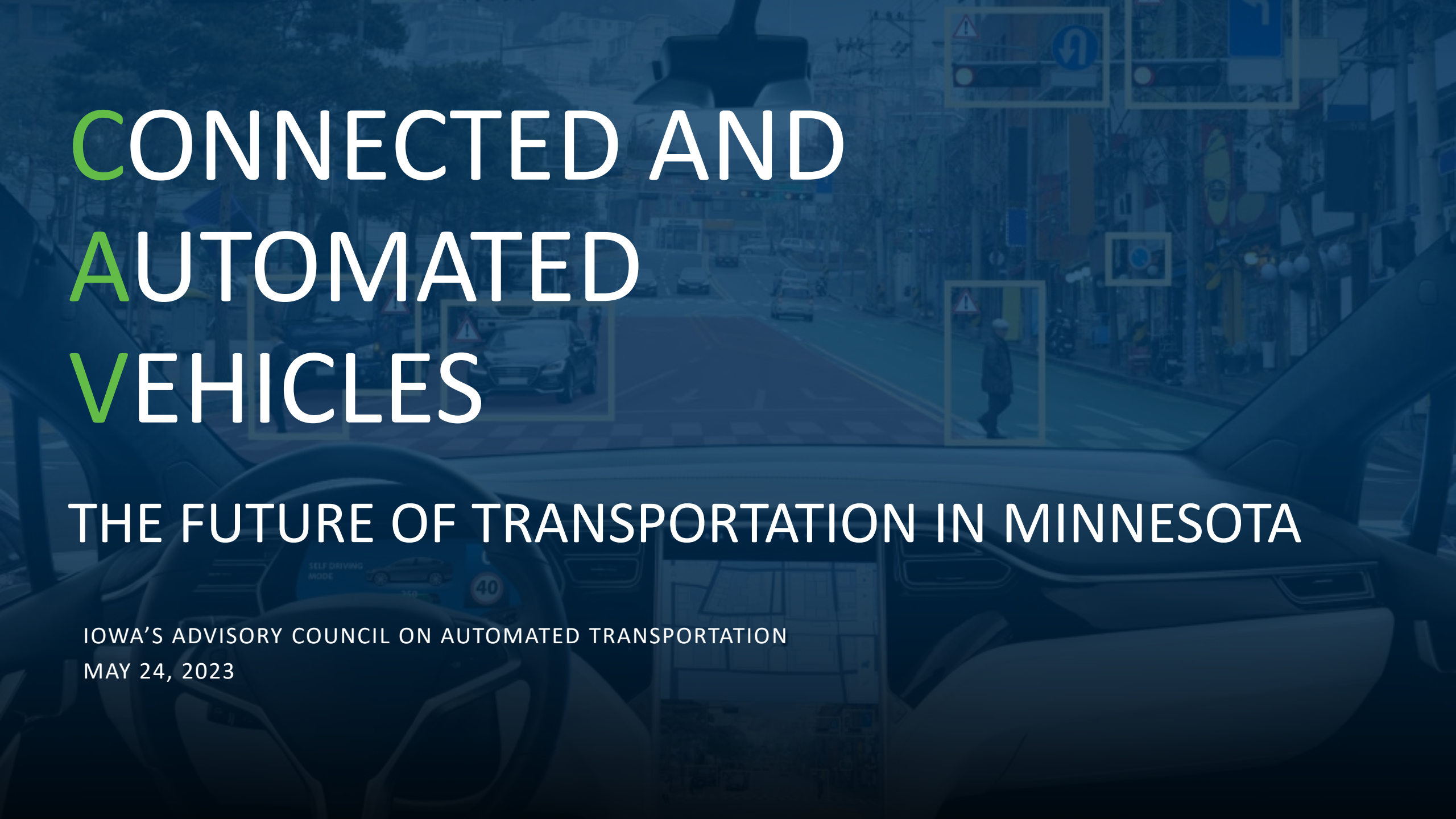
- Recorded Meeting
- Disable Virtual Private Network (VPN) connections

GATIK: AN AUTONOMOUS TRANSPORTATION NETWORK FOR THE MIDDLE MILE

Richard Steiner – Head of Policy & Communication, Gatik

MINNESOTA DEPARTMENT OF TRANSPORTATION (MNDOT) CAV PROGRAM

Tara Olds – Director of Connected and Automated Vehicles, MNDOT



CONNECTED AND AUTOMATED VEHICLES

THE FUTURE OF TRANSPORTATION IN MINNESOTA

IOWA'S ADVISORY COUNCIL ON AUTOMATED TRANSPORTATION

MAY 24, 2023

WHY CAV?

GREATER EQUITY, ACCESS AND MOBILITY

ECONOMIC AND WORKFORCE DEVELOPMENT

INCREASED SAFETY

MORE EFFICIENT MOVEMENT OF PEOPLE AND GOODS

IMPROVED ENVIRONMENT

POLICY AND TECHNICAL AREAS

MINNESOTA'S ROLE

- Destination CAV partners:
  - Governor's Advisory Council
  - Innovation Alliance
  - Interagency CAV Team (I-CAV)
- CAV Strategic Plan
- Guiding Principles
- CAV program and projects

WHY MINNESOTA?

- Winter weather
- CAV support and expertise
- Dedicated funding
- Innovation
- Testing experience
- Technology investments
- Leadership

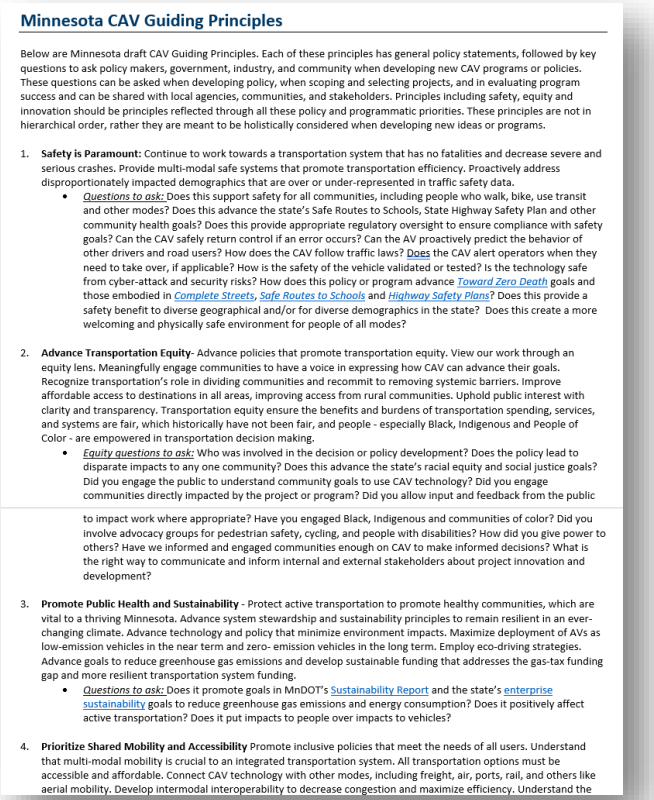
CAV STRATEGIC PLAN

- CAPITAL INVESTMENT
- RESEARCH
- PARTNERSHIPS
- REGULATION AND POLICY
- OPERATIONS AND MAINTENANCE
- MULTIMODAL
- STRATEGIC STAFFING
- COMMUNICATIONS
- LONG-RANGE PLANNING

CAV GUIDING PRINCIPLES

Goal: Guide stakeholders and leaders to ask the right questions when developing policy, programs and directing investment.

- *Safety* is paramount
- Advance transportation *equity*
- Promote *public health* and *sustainability*
- Prioritize shared *mobility* and *accessibility*
- *Innovation*
- Agile infrastructure *investment*
- *People-focused* policy
- Economic *prosperity* and *quality of life*
- System *resiliency* through data access and security



Minnesota CAV Guiding Principles

Below are Minnesota draft CAV Guiding Principles. Each of these principles has general policy statements, followed by key questions to ask policy makers, government, industry, and community when developing new CAV programs or policies. These questions can be asked when developing policy, when scoping and selecting projects, and in evaluating program success and can be shared with local agencies, communities, and stakeholders. Principles including safety, equity and innovation should be principles reflected through all these policy and programmatic priorities. These principles are not in hierarchical order, rather they are meant to be holistically considered when developing new ideas or programs.

1. **Safety is Paramount:** Continue to work towards a transportation system that has no fatalities and decrease severe and serious crashes. Provide multi-modal safe systems that promote transportation efficiency. Proactively address disproportionately impacted demographics that are over or under-represented in traffic safety data.
   - *Questions to ask:* Does this support safety for all communities, including people who walk, bike, use transit and other modes? Does this advance the state's Safe Routes to Schools, State Highway Safety Plan and other community health goals? Does this provide appropriate regulatory oversight to ensure compliance with safety goals? Can the CAV safely return control if an error occurs? Can the AV proactively predict the behavior of other drivers and road users? How does the CAV follow traffic laws? Does the CAV alert operators when they need to take over, if applicable? How is the safety of the vehicle validated or tested? Is the technology safe from cyber-attack and security risks? How does this policy or program advance *Toward Zero Death* goals and those embodied in *Complete Streets*, *Safe Routes to Schools* and *Highway Safety Plans*? Does this provide a safety benefit to diverse geographical and/or for diverse demographics in the state? Does this create a more welcoming and physically safe environment for people of all modes?

2. **Advance Transportation Equity**- Advance policies that promote transportation equity. View our work through an equity lens. Meaningfully engage communities to have a voice in expressing how CAV can advance their goals. Recognize transportation's role in dividing communities and recommit to removing systemic barriers. Improve affordable access to destinations in all areas, improving access from rural communities. Uphold public interest with clarity and transparency. Transportation equity ensure the benefits and burdens of transportation spending, services, and systems are fair, which historically have not been fair, and people - especially Black, Indigenous and People of Color - are empowered in transportation decision making.
   - *Equity questions to ask:* Who was involved in the decision or policy development? Does the policy lead to disparate impacts to any one community? Does this advance the state's racial equity and social justice goals? Did you engage the public to understand community goals to use CAV technology? Did you engage communities directly impacted by the project or program? Did you allow input and feedback from the public to impact work where appropriate? Have you engaged Black, Indigenous and communities of color? Did you involve advocacy groups for pedestrian safety, cycling, and people with disabilities? How did you give power to others? Have we informed and engaged communities enough on CAV to make informed decisions? What is the right way to communicate and inform internal and external stakeholders about project innovation and development?

3. **Promote Public Health and Sustainability** - Protect active transportation to promote healthy communities, which are vital to a thriving Minnesota. Advance system stewardship and sustainability principles to remain resilient in an ever-changing climate. Advance technology and policy that minimize environment impacts. Maximize deployment of AVs as low-emission vehicles in the near term and zero- emission vehicles in the long term. Employ eco-driving strategies. Advance goals to reduce greenhouse gas emissions and develop sustainable funding that addresses the gas-tax funding gap and more resilient transportation system funding.
   - *Questions to ask:* Does it promote goals in MnDOT's Sustainability Report and the state's enterprise sustainability goals to reduce greenhouse gas emissions and energy consumption? Does it positively affect active transportation? Does it put impacts to people over impacts to vehicles?

4. **Prioritize Shared Mobility and Accessibility** Promote inclusive policies that meet the needs of all users. Understand that multi-modal mobility is crucial to an integrated transportation system. All transportation options must be accessible and affordable. Connect CAV technology with other modes, including freight, air, ports, rail, and others like aerial mobility. Develop intermodal interoperability to decrease congestion and maximize efficiency. Understand the

CAV Policy Guiding Principles, July 2021

CAV IS ALREADY HERE

THE FUTURE OF MOBILITY IS IN MINNESOTA

DEMONSTRATION PROJECTS

Med City Mover

- Rochester, MN
- 12-month test
- Fall 2021-Fall 2022
- 2 - EasyMile vehicles
- Downtown urban
- 6 passengers
- 2 stops
- Slow moving
- Electric
- DSRC and CV-2X

Bear Tracks

- White Bear Lake, MN
- 12-month test
- Fall 2022-Fall 2023
- 1 - Navya vehicle
- Suburban
- 8 passengers
- 4 stops
- Slow moving
- Electric
- DSRC

goMARTI

- Grand Rapids, MN
- 18-month test
- Fall 2022-Spring 2024
- 5 - May Mobility Toyota Siennas
- Rural downtown
- 5 passengers
- 70+ stops
- Roadway speeds
- Gas

AUTONOMOUS MAINTENANCE

SELF-DRIVING TRUCKS WITH ‘CRASH CUSHIONS’ TO PROTECT WORKERS.

DESTINATIONCAV

DEPARTMENT OF TRANSPORTATION
DESTINATIONCAV

CONNECTED VEHICLE CORRIDORS

SMARTPHONE AND IN-VEHICLE TECHNOLOGIES CAN WARN DRIVERS AND AVOID COLLISIONS

CAV DESTINATIONCAV

DEPARTMENT OF TRANSPORTATION

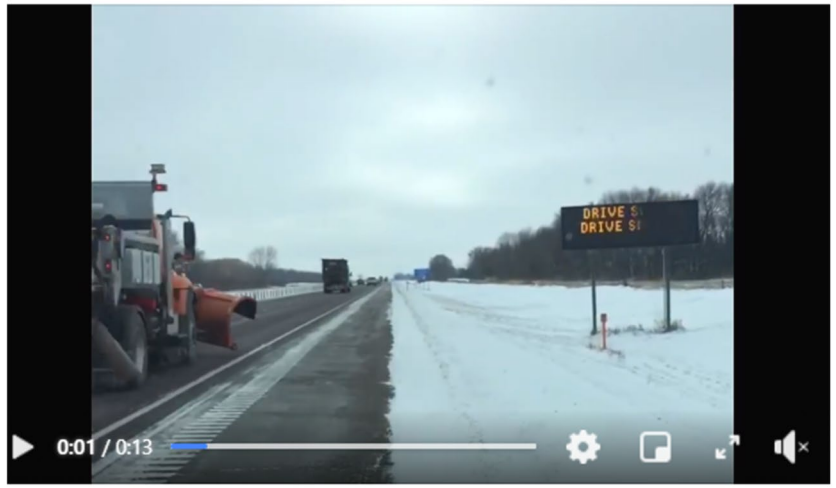
TRAVELER INFO

Minnesota Department of Transportation
January 22 ·

Our snowplows and maintenance vehicles on I-35 are testing technology to boost safety. Once they drive by a digital highway sign, it will warn motorists that a slow-moving vehicle is ahead on the road.

More details: mndot.gov/news/2021/01/22-d6-i35.html

Please note that the sign does not flicker in person. It appears to flicker in the video because of the way the camera captured the LED lights.

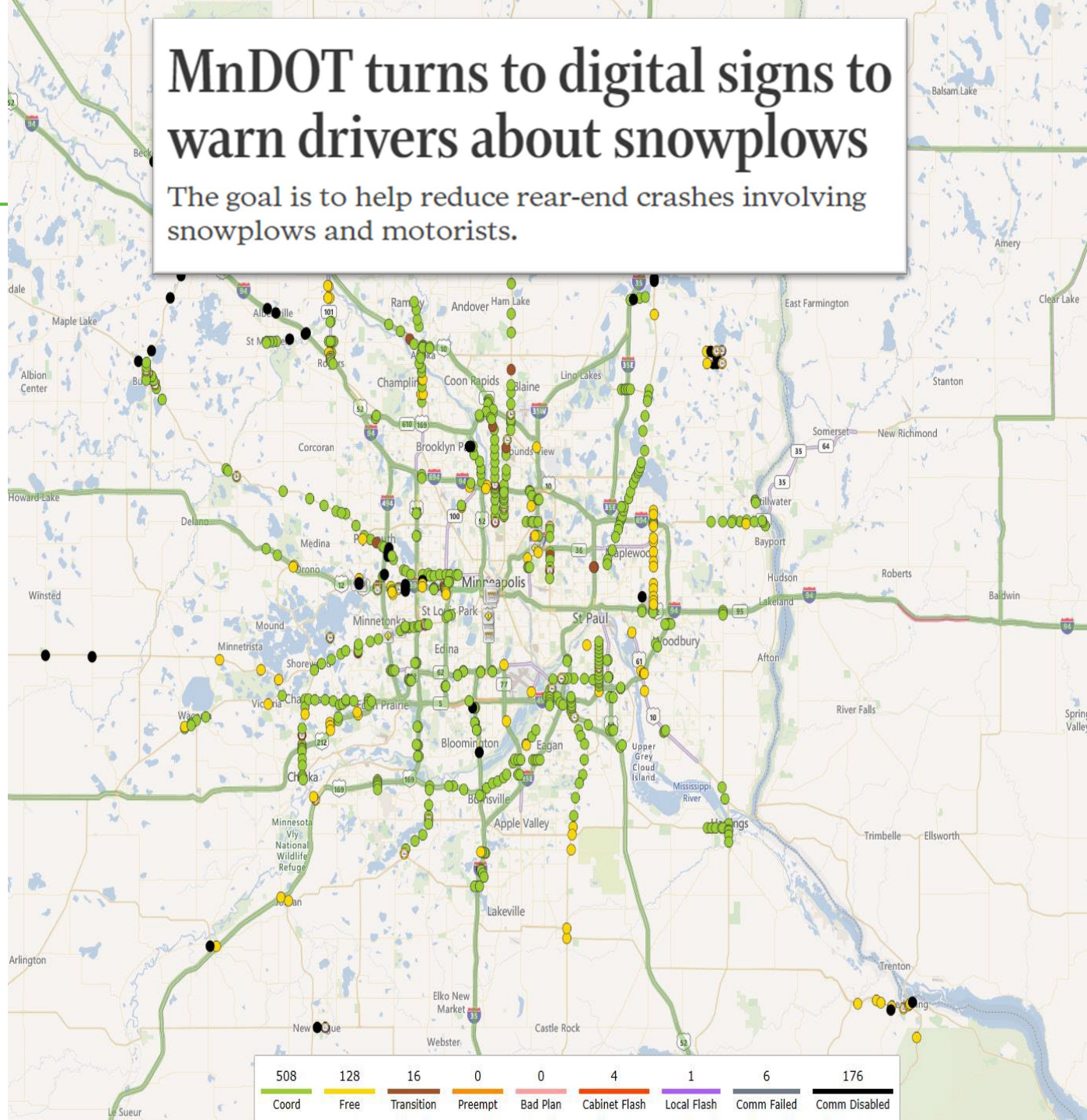


12 1 Comment

Like Comment Share

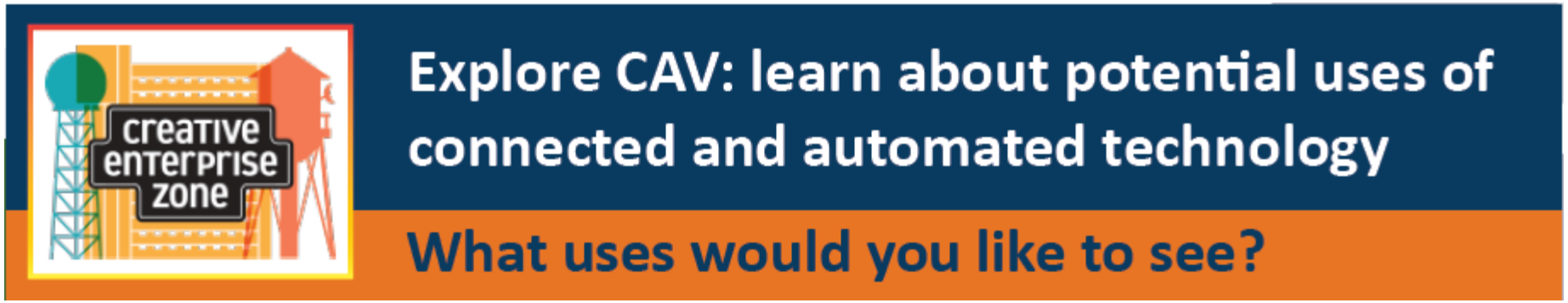
MnDOT turns to digital signs to warn drivers about snowplows

The goal is to help reduce rear-end crashes involving snowplows and motorists.



DESTINATIONCAV

COMMUNITY DRIVEN CAV



DESTINATIONCAV

DEPARTMENT OF TRANSPORTATION

QUESTIONS WE HAD FOR MINNESOTA

WHAT DO MINNESOTANS CURRENTLY THINK OF CAV?

WHAT TERMINOLOGY RESONATES WITH PEOPLE?

WHAT ARE PEOPLE EXCITED ABOUT?

WHAT ARE PEOPLE CONCERNED ABOUT?

WHAT DO PEOPLE WANT TO KNOW ABOUT CAV?

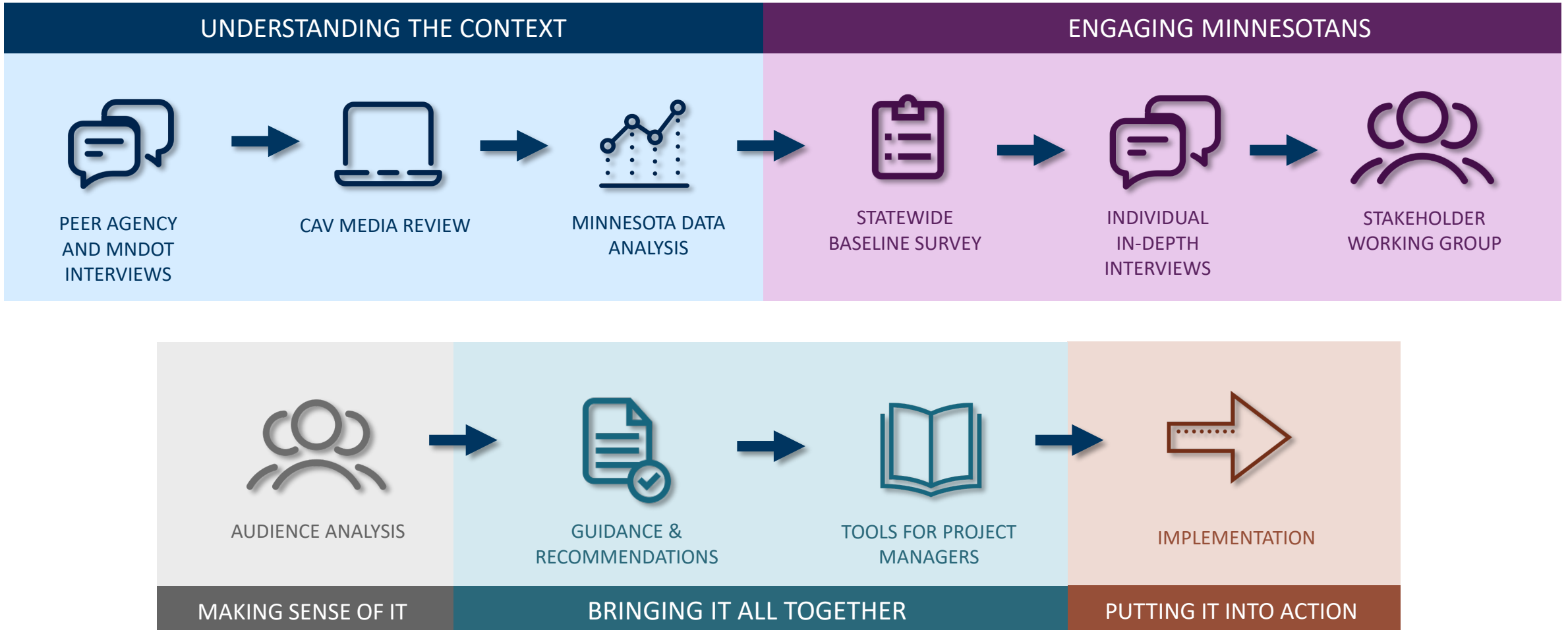
WHAT IS THE STATE'S ROLE?

HOW DO PEOPLE WANT TO BE INVOLVED?

WHAT DOES THAT MEAN FOR OUR WORK?

DEVELOPING OUR GUIDANCE

WHAT DID THE PROCESS LOOK LIKE?



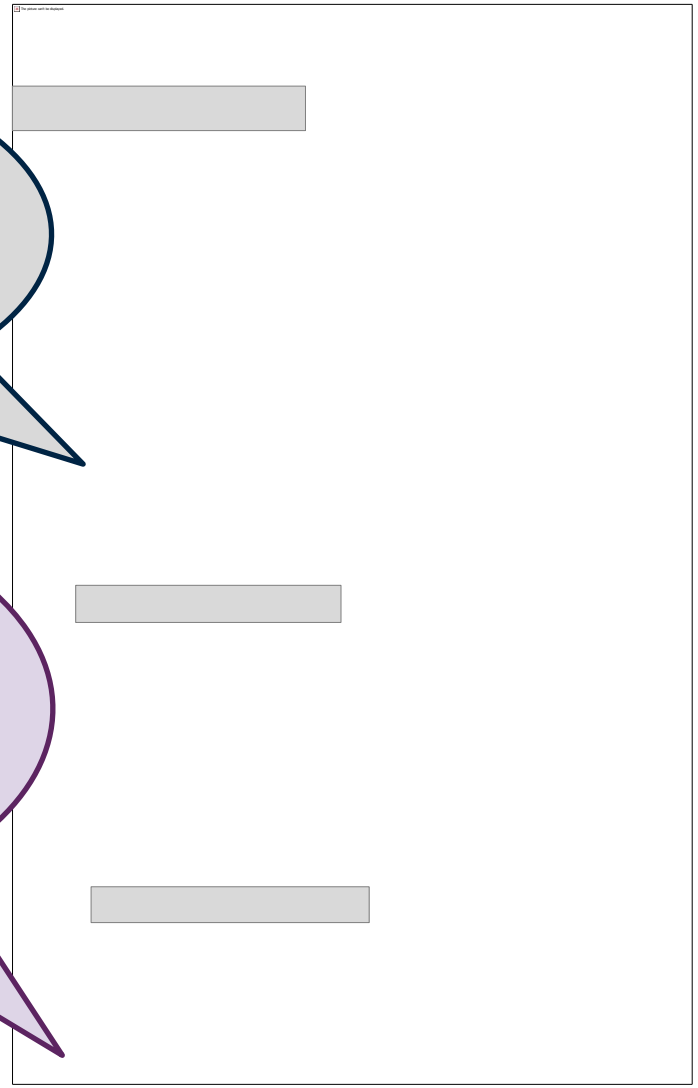
WHAT ARE WE HEARING?

"I'm excited about the future of autonomous and connected vehicles. I think they'll improve traffic and safety."

"I think humans should be in control…not a darn computer."

"I can't be excited about something that could hurt someone without any accountability."

"I don't have enough information about how this works, especially in rural/frontier Minnesota."



DESTINATIONCAV

DEPARTMENT OF TRANSPORTATION

MESSAGING AND ENGAGEMENT GOALS

1. **Build knowledge** of CAV technology throughout Minnesota so people have the information they need and can help shape the future of transportation in the state

2. Develop **two-way lasting relationships** with communities, organizations and entities to create a CAV-ready environment in Minnesota and **build trust** in Minnesota's CAV Program

3. **Integrate Minnesota's CAV messaging and engagement** into transportation plans and projects and other related communication across partners to promote clarity, consistency and understanding among all audiences

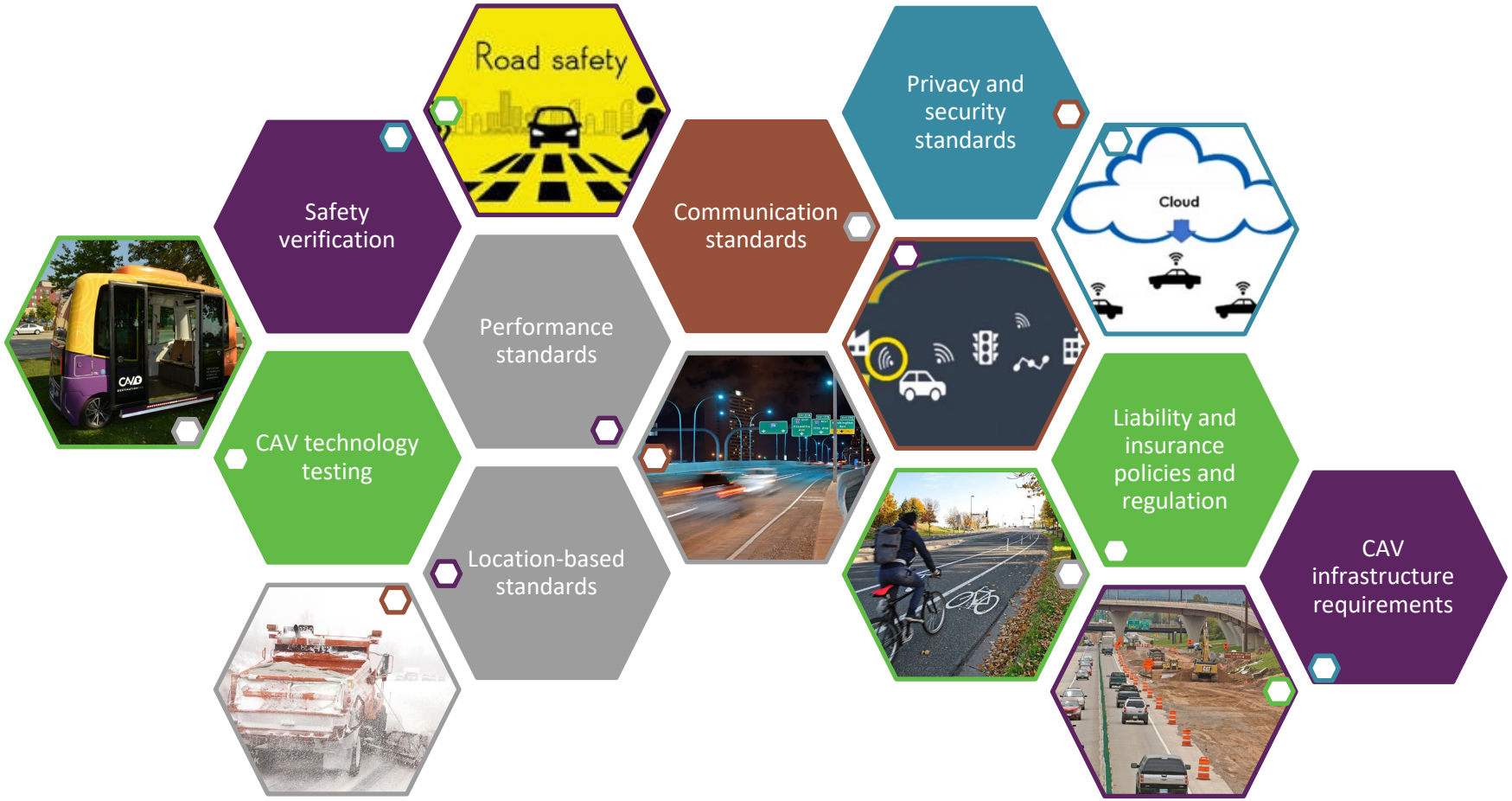
MESSAGING GUIDANCE

- Inform, don't sell
- Need to built to "CAV" terminology
- Incorporate the connected aspect of CAV technology
- Include the full range of CAV application (e.g., multi-passenger)
- Related topics: shared mobility, electrification and GHG emissions
- People's perceptions mirror the success of local projects
- Highlight the broader Minnesota CAV Program

ENGAGEMENT GUIDANCE

- Prioritize exposure to CAV via demonstrations
- Look for opportunities to engage people beyond industry partners
- Digital engagement will reach many, but not all
- Leverage Facebook and YouTube for public audiences
- Emphasize non-digital strategies, especially for rural audiences
- People want to be involved, but use tactics other than public meetings

WORK TO BE DONE



THANK YOU

MINNESOTA CONNECTED AND AUTOMATED VEHICLES PROGRAM

MNDOT.GOV/AUTOMATED

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Minnesota Department of Transportation
Tara.olds@state.mn.us

DESTINATIONCAV

DEPARTMENT OF TRANSPORTATION

2023 SUBCOMMITTEE MEETING UPDATES

Subcommittee Chairs

- Dylan Mullenix, Policy & Legislation
- Erin Mullenix, Infrastructure Readiness
- Rick Petersen, Economic Development
- Col. Nathan Fulk, Public Safety & Enforcement

POLICY & LEGISLATION
FEBRUARY 8, 2023

Dylan Mullenix, P&L Chair

- **AV Insurance – Market Report** – *Steve Miller, Innovation Lead, Insurance Office of America (IOA)*
- **P& L Work Plan & Tactical Action Updates**
  - Ensure CAT in Planning
  - Iowa ADS Registration & Titling Update
  - Federal Legislation Update - Safe Integration of Automated Driving Systems (ADS)-Equipped Commercial Motor Vehicles (CMVs)
  - State Legislation Update – House Study Bill 102

INFRASTRUCTURE READINESS & ECONOMIC DEVELOPMENT

JANUARY 23, 2023

Erin Mullenix, IR Chair & Rick Petersen, EcDev Chair

- **Strengthening Mobility and Revolutionizing Transportation (SMART) Grants Program Application, Des Moines International Airport** – *Brian Mulcahy, Assistant Executive Director, Des Moines Airport Authority*
- **IR Tactical Updates**
  - Engagement with SAE On-Road Automated Driving (ORAD) Committee
  - Pavement markings
  - Audible attenuator
  - Work Zone Data Exchange (WZDx)
  - Connected temporary traffic signals
  - FHWA Emerging data in work zones
- **Economic Development Updates**

PUBLIC SAFETY & ENFORCEMENT
FEBRUARY 15, 2023

Col. Nathan Fulk, PS&E Chair

- **Real-World ADAS Effectiveness: Results from the Partnership for Analytics Research in Traffic Safety** – *Chris Wiacek, PARTS ADAS Effectiveness Working Group Co-Chair, National Highway Traffic Safety Administration*
- **PS&E Work Plan & Tactical Action Updates**
  - November 2022 AV Discussion
  - Iowa State Patrol Membership to the AAMVA AV Subcommittee
  - University of Iowa ADAS Crash Investigation Research Project
  - Iowa Strategic Highway Safety Plan Alignment Update

WRAP-UP

- **Announcements & Updates**
  - **MAASTO Connected & Automated Vehicle Conference** (June 19 –21, 2023) Iowa City, Iowa | Registration Link: MAASTO Connected & Automated Vehicle Conference
- **Next Meetings**
  - Anticipate upcoming ATC subcommittee meetings occurring late Summer into the Fall
- **Press Clippings**
  - Bi-weekly update via email
  - Sign-up here: https://iowadrivingav.org/clippings.aspx
- **Adjourn**

THANK YOU