

## MEETING SUMMARY

### Iowa Advisory Council on Automated Transportation (ATC)

Tuesday, September 21, 2021

1 – 3 pm CT



<https://iowadrivingav.org/>

#### Action Items:

- Adam Shell – Update the ATC charter and post to the ATC website (completed)

#### Attendees – 79 people

1. Scott Marler (ATC Chair) – Director, Iowa DOT
2. Colonel Nathan Fulk (Public Safety & Enforcement Chair) – Iowa State Patrol
3. Dylan Mullenix (Policy & Legislation Chair) – Des Moines Area MPO
4. Erin Mullenix (Infrastructure Readiness Chair) – Iowa League of Cities
5. Andrea Henry (Communications, Outreach, & Education Chair) – Iowa DOT
6. Peggi Knight (Research, Development, Testing, & Evaluation Chair) – Iowa DOT
7. Mike Blank – Nuro
8. Todd Coffelt – Iowa Department of Natural Resources
9. Terry Bergen – Linn County
10. Todd Szymkowski, Peter Rafferty – Gannett Fleming
11. Mike Lauer, Randy Goddard – Iowa Communications Network
12. Meredith Mitts – AAA The Auto Club Group
13. Mike Ralston – Iowa Association of Business and Industry
14. Mike Carberry – Green State Solutions
15. Mickey Shields – Iowa League of Cities
16. Shirley McGuire – Federal Motor Carrier Safety Administration
17. Mark Wyatt – Iowa Bicycle Coalition
18. Stephan Bayens, Catherine Lucas – Iowa Department of Public Safety
19. Jill Lippincott, MK Anderson – Iowa Economic Development Authority
20. John Gibson – Iowa Division of the FHWA
21. Erin Cole – Clinton Regional Development Corporation
22. Eric Bakker – Chief of Staff to Iowa Senate Minority Leader
23. Diva Ham, Sean Conlin, Lisa Tomlinson – OBI Creative
24. Derek Snead – Jones County Engineer
25. Andrew McGuire – Keokuk County Engineer
26. Mark Nahra – Woodbury County Engineer
27. Rob Denson – Des Moines Area Community College
28. Susan DeCourcy – National Highway Traffic Safety Administration
29. John Davis – City of Des Moines
30. Colin Tadlock – Iowa Department of Agriculture and Land Stewardship
31. Colin Hurd – Raven Autonomy
32. Ron Otto – Associated General Contractors of Iowa
33. Travis Grassel, Chance McElhaney – Iowa Insurance Division
34. Carl Lingen – Iowa Public Transit Association
35. R. Todd Ashby – Des Moines Area MPO

36. Omar Ahmad, Jacob Heiden, Dan McGehee – University of Iowa, National Advanced Driving Simulator
37. Jonathan Wood, Zach Hans, Neal Hawkins, Skylar Knickerbocker, Theresa Litteral – Iowa State University, InTrans
38. Stephanie DeJohn, Steven Stonehocker, Madeline Schmitt, Ryan Ridout, Josh Halterman, Craig Markley, Tom Bruun, Clayton Burke, Ashley Hochberger, Mitchell Dillavou, Joe Drahos, Susan Fenton, Steve Gent, Kelli Huser, Alex Jansen, Dennis Kleen, Andy Lewis, Dave Lorenzen, Donna Matulac, Milly Ortiz-Pagan, Garrett Pedersen, Jim Schnoebelen, Adam Shell, Sara Siedsma, Tim Simodynes, Sam Sturtz, Andrea White, Daniel Yeh, Mark Van Dyke – Iowa DOT

## 1. Welcome – Scott Marler, Iowa DOT Director (ATC Chair)

- Director Marler welcomed attendees to the meeting and introduced the agenda. He previewed the roundtable breakout discussions that will help shape the long-range transportation planning in Iowa.
- Adam Shell welcomed new council members including Rob Denson from Des Moines Area Community College, Mike Ralston from Iowa Association of Business and Industry, Carl Lingen of the Iowa Public Transit Association, Mark Wyatt of the Iowa Bicycle Coalition, and Todd Coffelt of the Iowa Department of Natural Resources. These new agencies along with existing members are listed in the membership of the [ATC Charter](#) that was updated in October 2021.

## 2. Introduction to Nuro – Mike Blank, Nuro

- Mike Blank is the Regional Policy Lead at Nuro. [Nuro](#) is a robotics company building and deploying fully autonomous on-road vehicles and a last-mile delivery service. In his role, Mike works with state and local officials and industry stakeholders to shape policies that better everyday lives through robotics.
- What is Nuro?
  - Nuro’s mission is to accelerate the benefits of robotics for everyday life. Nuro has two autonomous vehicles on the road today. The Prius Vehicle is “regular” driving with a safety driver inside. This vehicle is used for mapping, software testing, and automated vehicle (AV) deliveries when the company first begins activity in an area. The R2 is the other vehicle that is autonomous with no occupants in certain conditions. R2 can detect emergency vehicles using cameras and audio sensors to detect the lights and sirens. Nuro also has LEIPs with state so first responders know how to interact with their vehicles. The vehicle will pull over by itself as quickly and as safely as possible when needed.
  - Nuro produces a vehicle called the [R2](#). It’s Nuro’s second generation zero-occupant vehicle fitted with a range of cameras and sensors enabling a 360-degree view. The vehicle body takes up less road space and is better designed to protect pedestrians. R2 features curbside delivery doors so customers can retrieve goods without stepping into traffic. This vehicle is designed for on-road

and isn't meant for sidewalks. It can travel up to 25 mph and weighs around 2500 lbs. The R2 has a total length of 108 inches, overall width of 43 inches, and height of 73 inches to the top of the lidar.

- On-road testing and deployments

- Testing and delivery operations are occurring on public roads in California, Arizona, and Texas. Adverse weather can negatively affect AV performance, but weather can be dependent on a community's location. Nuro takes a go-slow approach to deployment to ensure safety and thoughtful advancement of technologies. Initial deployments occurred in locations with favorable weather.
- Nuro received a federal exemption from the National Highway Safety Administration (NHTSA) for its Federal Motor Vehicle Safety Standard (FMVSS). Some states still have vehicle equipment standards, and Nuro works with states to fit the needed requirements. It was recommended states should work to update those requirements for zero-occupant vehicles. NHTSA issued an order that requires vehicles with an automated driving system (ADS) to report any incidents with a certain time frame. That information is public, and Nuro hasn't filed any reports yet. Nuro hasn't been involved in anything that has been deemed their fault.

- Partners

- Nuro is flexible to meet the needs of their partners. Their partners include leading brands like Domino's, CVS Pharmacy, FedEx, Kroger, Walmart, and Chipotle. Nuro provides delivery options for grocery, food, retail, local services, prescriptions, and new products that don't exist today. Their partnership with Domino's in Houston allowed customers to choose the AV delivery option if desired and available. All of Nuro's services will be available through their partners' websites and apps and not through Nuro's website.
- Nuro works closely with city leaders before launching in any market to understand the stakeholders and needs unique to each city. They engage in open, early, and frequent communication to understand how Nuro can help with city priorities. They work to address differences between driverless and zero-occupant vehicles, and they educate on their approach to safety and work with law enforcement on Law Enforcement Interaction Plans (LEIP).

- Why a New Delivery Service?

- Nuro offers a new type of delivery service. The US largely shops in similar patterns to 50 years ago; while ecommerce is a new option, a majority (89%) of commerce is local. Commuting (24%) and shopping & running errands (43%) make up 67% of Americans' daily trips. Americans waste 75 million hours every day traveling to and from stores & errands. At-home delivery service will allow Americans to spend more time on other priorities, and at-home delivery has accelerated recently due to COVID-19.

- Community Impacts
  - Communities can be positively impacted by Nuro’s delivery solution. Zero-occupant automated vehicles have the potential to improve road safety. Local economies can be revitalized with new jobs replacing trips to the store, maintaining delivery vehicles, and manufacturing of vehicles domestically. Nuro also provides a sustainable solution for cities as it’s zero-emission, sized smaller allowing more room for all users, and will reduce the total number of trips needed. Zero-occupant AVs can address food deserts by expanding access to essential goods.
  - Nuro has the ability to capture road data (e.g. potholes, work zones, etc.) and share with states and local communities. They have found that some state/communities are interested in that information while others are not.
  - Nuro also considers regulations, population, and weather when deploying. Building public trust is also a big factor in deployment. Most places and people have unfamiliarity with AVs, and Nuro works closely with communities to educate and to ensure careful considerations for their needs.

### **3. Iowa Automated Driving Systems Rulemaking Update – Sara Siedsma, Iowa DOT**

- Sara is a Compliance Officer for the Iowa Department of Transportation motor vehicle division. She’s been leading the Iowa rulemaking efforts tied to the [Iowa Automated Driving Systems framework legislation](#).
- Automated Driving Systems (ADS) rulemaking
  - The final Automated Driving Systems (ADS) rulemaking was adopted and filed on September 8, 2021 and has been published by the [Iowa Administrative Rules Review Committee](#). This occurred following presentations and the public feedback & hearing. The final rulemaking removed the need for a testing process for AVs and instead uses an exemption process. The rulemaking is effective October 13, 2021.

### **4. Subcommittee & Working Group Updates – Adam Shell, Iowa DOT**

- Adam Shell is the Automated Vehicle Program Manager with the Iowa DOT. He provided updates what ATC subcommittees have been doing since the full council last met in March 2021.
- Infrastructure Readiness
  - The subcommittee met in May and heard a presentation from FirstNet at AT&T. They shared an overview of the wireless spectrum and how wireless companies can support AVs in the future. In relation to the AT Readiness tactic, information was shared on the recent Manual on Uniform Traffic Control Devices updates and how Iowa is using pavement markings to prepare for the needs of AVs.
- Economic Development

- The subcommittee met in May as well and included a presentation from the Minnesota Connected and Automated Vehicle Advisory Council discussing how Minnesota and local stakeholders are addressing labor & workforce development AV needs. Jill Lippincott of the Iowa Economic Development Authority presented on the labor and market analysis of Iowa.
- Policy & Legislation
  - The subcommittee met in June. The meeting included a presentation from the FedEx on their personal delivery device solution Roxo. It was a timely update given the recent PDD legislation in Iowa.
- Public Safety & Enforcement
  - The subcommittee met in June and featured a presentation from the automated trucking company TuSimple. An update was provided on the AV Crash Data Working group including individuals from Iowa DOT and Iowa State Patrol.
- Communication, Outreach, & Education
  - The working group updated the ATC Charter. Updates included expanded membership and small language edits in the organization and responsibilities sections. The charter was shared with council members before September's ATC meeting for feedback.

**5. Iowa DOT Director's Roundtable Breakout Discussions: Input for [Iowa in Motion](#) (2050 State Long-Range Transportation Plan update)**

- This roundtable session was designed to explore the connection between the future of transportation in Iowa and automated vehicles. The ATC is comprised of multidisciplinary stakeholders across Iowa, and the council's input is important in developing Iowa's strategies for the long-range transportation plan.
- Iowa in Motion (2050 State Long-Range Plan update)
  - The Iowa DOT is updating the multi-modal long-range transportation referred to as [Iowa in Motion](#). Iowa is required to have such a plan by both federal and state code. The plan is updated every five years to account for changing demographics, land use, travel behaviors, technology, funding, and more.
  - Iowa is a producer state, and everyday more than a half a million head of livestock are moved on Iowa roads. Our products reach final destinations across the world through roads, barges, air, and more. Trucking is vital to the movement of Iowa goods to the end user. These ATC roundtable discussions will help inform the Iowa DOT about the needs of their customers and how to strategically invest in the future of safe, efficient, and equitable transportation specifically in terms of emerging technologies and in relation to the designated ATC subcommittee topic area.
  - The plan provides a long-range vision and objectives that will frame that vision. It's a decision-making framework to guide investment. The planning horizon is

through 2050, but this meeting's discussion will focus on only the next 5-10 years. The plan covers the needs and strategic investments for all users and all modes of transportation.

- The Iowa DOT has been working on enhancements to the plan such as clearly defined system objectives, rightsizing policy guidance, infrastructure resiliency, accessibility & equity, and clarifying the plan's role in project development. Top priorities identified by transportation stakeholders include funding, resiliency, workforce, technology, and asset management.
- The update is expected to be adopted by the Iowa Transportation Commission in May of 2022. A draft will be open to public for a comment period around the start of 2022, allowing stakeholders final input on the drafted plan. Stakeholders are being actively involved in the process before the draft is completed, including these breakout sessions at the ATC meeting.

### **5a. Infrastructure Readiness Breakout Discussion**

This roundtable session was focused on the Infrastructure Readiness (IR) topic area and was led by Erin Mullenix, IR subcommittee chair. IR tactics identified in the Iowa AT Vision include assess and advance AT readiness, implement pilot program, improve pavement marking, build out fiber backbone, and define data systems architecture.

***What aspects of emerging technology should the Iowa DOT consider over the next 5-10 years that they may not be already adequately considering?***

#### Digital and Physical infrastructure

Communications readiness is important for AVs. Cyber-security is crucial with all communications and especially with AVs, both as it relates to privacy concerns and data redundancy needs. The state of Iowa is working to [create universal broadband access for Iowans](#). How will this statewide initiative affect communications throughout the transportation system, especially with the rapid advancement of AVs. Physical and digital infrastructure will be important for AVs, and broadband could help with responses to emergencies. Iowans can use this technology for better and faster communications when needed, like extreme weather, mapping, work zones, etc. What is the DOTs role in supporting the broadband infrastructure? How can Iowa coordinate broadband efforts with all stakeholders? Can Iowa coordinate our data for the needs of original equipment manufacturers and AVs?

#### Electrification

As alternative fuel options (electric) vehicles become available, Iowa will need to build out infrastructure to support an environment for these vehicles. Electric vehicles may be better suited to transport communities in short trips in urban environments (shuttles). Urbanization trends in Iowa show the population is moving to cities in the next 5-10 years and beyond

through 2050. What is the DOT's role in supporting these vehicles on the for all Iowa travelers, in a highway, urban and rural environments?

#### Planning

Slow and steady rollout of advanced driver assistance system can help improve safety on roads. It will be important for drivers to understand these technologies, especially in instances where geometrical road designs may cause some issues with the systems. Stakeholders should consider road designs, roadway features, and other road factors (work zones, weather, etc.) to ensure safe deployment of AVs. How will AVs operate in rural environments with the lack of traffic control devices? Combines have solved this issue in fields through GPS, but this isn't a direct correlation to AVs. Rural residents, especially the aging population, can benefit from the deployment of AVs. Other populations in Iowa will benefit from AVs, and AVs could address equity and accessibility issues.

***How do you expect Iowa's transportation system to be impacted (positively or negatively) by emerging-technology related trends in the area of Infrastructure Readiness?***

#### Planning

Iowa has a transportation system designed for the cars we currently have. The cars of the future will need new physical and digital infrastructure for mixed fleets (AVs, traditional vehicles) and multi-modal users. Advancing AVs has the potential to reduce the severity of crashes over time so making an investment in this technology could have positive health and mobility benefits for a community. A big question is who will pay for the needed infrastructure improvements, especially while most governments and municipalities are focused on maintaining existing system. If a group pays for part of the system, does that mean they are liable if the technology fails, and a crash occurs.

***In order to effectively address identified issues and potential impacts of emerging technologies over the next 5-10 years, what actions should the Iowa DOT take?***

The IR group did not have time to address this question.

### **5b. Economic Development Breakout Discussion**

This roundtable session was focused on the Economic Development (EcDev) topic area and was led by Jill Lippincott of the Iowa Economic Development Authority. EcDev tactics identified in the Iowa AT Vision include engage with Iowa businesses, assess AV/AT-related Iowa workforce, and engage with Iowa community colleges.

***What aspects of emerging technology should the Iowa DOT consider over the next 5-10 years that they may not be already adequately considering?***

Funding

There have been successful examples in other states of public private partnerships to fund automated vehicle development and deployments. Public trust for automated vehicles can grow when people see the AVs in action and across jurisdictions. Iowa doesn't control the traffic signals in the state; signals are controlled by local municipalities. Investments should be made so CAVs can work across jurisdictions and not independently in silos. Local municipalities will need financial assistance to enable CAVs. Can Iowa find any companies with shared goals to support this investment? Iowa should think big and engage national leaders, along with state and local stakeholders.

***How do you expect Iowa's transportation system to be impacted (positively or negatively) by emerging-technology related trends in the area of Economic Development?***

Recruitment

Iowa is at the crossroads of the country with two major, freight-moving interstates (I-80 & I-380). Iowa has the opportunity to pitch AVs – opportunities, jobs, training - as a reason to come to Iowa. Iowa has been ahead of the curve in planning for AVs with policy and workforce discussions.

Efficiency

Safety aside, transportation technology is positive. Trucking companies have driver shortages, and AVs will help enable efficient movement of goods. Iowa's transportation system is already set up (in some respects) to help advance AVs, with many warehouses nearby interstates. Manufacturers will benefit with the management of inventory coming in and going out. Iowa should still consider how the AV environment will work in rural capacity to ensure efficient, safe operations on all roads.

***In order to effectively address identified issues and potential impacts of emerging technologies over the next 5-10 years, what actions should the Iowa DOT take?***

Workforce

Iowa needs to support a talent pipeline for automated vehicles. New programs, recruitment initiatives, and upskilling current workforce will be needed to train professionals and paraprofessionals. Iowa should support an environment that assists Iowa business in advancing AVs and the future workforce of Iowa.



## 5c. Public Safety & Enforcement Breakout Discussion

This roundtable session was focused on the Public Safety & Enforcement (PS&E) topic area and was led by Col. Nathan Fulk, PS&E subcommittee chair. PS&E tactics identified in the Iowa AT Vision include capture AV crash data, explore vehicle automation indicators, develop following distance guidelines, address vulnerable road user safety, inform Traffic Incident Management and safety community, Operation Design Domain compliance, and Law Enforcement Protocol and Law Enforcement Interaction Plan development.

***What aspects of emerging technology should the Iowa DOT consider over the next 5-10 years that they may not be already adequately considering?***

### Safe deployment

Iowa needs to be prepared to monitor and evaluate AV deployment in all driving environments of all use cases of automation. Each environment will have its own unique ODD requirements and data needs. It will be crucial to consider safety in construction zones and in areas with bikes, pedestrians, and unexpected users. AVs should be able to respond to the users of the system and not just the highway features. Iowa is looking into ways for a systemic safety analysis and can explore intersection evaluation. Iowa has explored critical transportation areas to monitor and evaluate freight mobility with the potential of automated diversion plans.

***How do you expect Iowa's transportation system to be impacted (positively or negatively) by emerging-technology related trends in the area of Public Safety & Enforcement?***

### Safe Deployment

The advancement of AVs can reduce crashes in the long-term. There are short-term challenges with the misuse and misunderstanding of the current technology on roads. Iowa has had crashes where drivers have relied too much on their ADAS system, and the system failed leading to the crash with a roadside vehicle.

### Education

Public education and communications components of automated vehicles will be important for safety. Drivers will need to know how to use these technologies. Other road users will need to understand how to interact with these vehicles. This public education piece is a critical piece that should be considered early in the process.

***In order to effectively address identified issues and potential impacts of emerging technologies over the next 5-10 years, what actions should the Iowa DOT take?***

### Planning

Multiagency, multidisciplinary stakeholders should coordinate and collaborate to ensure that Iowa is on the same page. Iowa can address mobility issues for the aging, the under-represented, and other underserved populations with AVs, but their needs must be considered

when planning for deployment. Public education campaigns can be designed around these mobility benefits early on so Iowans understand the benefits of and support the advancement of AVs.

#### **5d. Policy & Legislation Breakout Discussion**

This roundtable session was focused on the Policy & Legislation (P&L) topic area and was led by Dylan Mullenix, P&L subcommittee chair. P&L tactics identified in the Iowa AT Vision include monitor legislation, implement pilot program, ensure CAT in planning, bolster state leadership, modify administrative rules, and improve equity & accessibility.

***What aspects of emerging technology should the Iowa DOT consider over the next 5-10 years that they may not be already adequately considering?***

##### Planning

Digital infrastructure is a crucial piece of supporting automated driving systems. High-definition mapping is needed and will need to be sustained and continuously updated. It's important that the mapping environment includes the entire state and not just urban environments. Iowa should have someone dedicated to tracking and monitoring federal safety standards to ensure we are keeping up with the new needs of AVs. The digital infrastructure in Iowa should also consider agricultural equipment needs to support an environment for vehicles and all road users.

##### Administration

Environmental justice, accessibility, and liability questions need to be considered as AVs are developed and deployed. Public education and feedback will be important pieces of the process. AVs have the potential to advance sustainable technologies and improve mobility options. Liability concerns must be addressed, especially as these questions might hinder groups and municipalities from making investments in the AV environment if they are liable. States once again should monitor minimum standard guidance for safe deployment.

***How do you expect Iowa's transportation system to be impacted (positively or negatively) by emerging-technology related trends in the area of Policy & Legislation?***

##### Administration

Iowa should continue to carefully consider and lead on appropriate administrative rules for AVs. What balance is needed to be flexible with regulations yet still proactively addressing safety implications? If a state or municipality is too flexible with the technology, crashes can occur leading to more mistrust of AVs and slower advancement of AVs (e.g., Uber crash in Tempe, AZ). Piloting and deployments need to be monitored carefully, and municipalities must keep up with AV needs to ensure these deployments are safe.

## Data

Data is crucial for advancing AVs, and data is especially important when monitoring the impacts of AVs (whether testing or deployed). Transportation network companies like Lyft and Uber aren't receptive to data sharing. Planning could greatly benefit with increased data, but it will depend on what the companies are willing to share and what they are required to share. An open and transparent data environment is important for the public to understand what and how AVs work, and open data will allow for smoother, safer deployment if companies and municipalities can work cooperatively.

***In order to effectively address identified issues and potential impacts of emerging technologies over the next 5-10 years, what actions should the Iowa DOT take?***

## Education

Iowa should use language that the general public can understand when communicating with the public. There is a need for transparent info in the plan and in other public education campaigns.

## Planning

Iowa should examine possible overlaps and/or conflicts between digital infrastructure and AVs, drones, micro-mobility solutions, and other future technologies. Agriculture equipment also needs to be considered as it's an important part of Iowa's economy and transportation system.

## **6. Wrap-up**

- Upcoming Events
- Next Meetings
- Adjourn



# IOWA ADVISORY COUNCIL ON AUTOMATED TRANSPORTATION

Council Meeting  
*September 21, 2021*

# 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





# MEETING AGENDA

1. Welcome - Scott Marler, Iowa DOT Director (ATC Chair)
2. Introduction to Nuro – Mike Blank, Nuro
3. Iowa ADS Rulemaking Update – Sara Siedsma, Iowa DOT
4. Subcommittee & Working Group Updates – Adam Shell, Iowa DOT
5. Iowa DOT Director's Roundtable Breakout Discussions: Input for Iowa in Motion (2050 State Long-Range Transportation Plan update)
6. Wrap-up

# WELCOME AND INTRODUCTIONS

Scott Marler, Iowa DOT  
Director (ATC Chair)



## Automated drive

Destination: 50° 43' 50.34" N - 6° 10' 55.294" E  
Arrival: 08:55 pm - Distance 783 miles

TCP/IP: 192.56.327.684.1  
SYNC: **enabled** | Sensors: **active** | Cameras: **active**

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# WELCOME & INTRODUCTIONS

## Council Members

- Iowa Department of Transportation
- Iowa Department of Public Safety
- Iowa Economic Development Authority
- Iowa League of Cities
- Des Moines Area MPO
- 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**
- National Advanced Driving Simulator, University of Iowa
- Institute for Transportation, Iowa State University
- Federal Highway Administration, Iowa Division
- Federal Motor Carrier Safety Administration
- National Highway Traffic Safety Administration
- Iowa Senate

*New agency members are in bold*





# INTRODUCTION TO NURO

Mike Blank, Regional Policy Lead, Nuro



# Nuro Introduction

**Mike Blank**

Regional Policy Lead

[mblank@nuro.ai](mailto:mblank@nuro.ai)

# Content.

01 Intro to Nuro

02 Why a New Delivery Service

03 Community Impacts



**Nuro's mission is to  
accelerate the benefits of  
robotics for everyday life.**

# R2: Nuro's second generation zero-occupant vehicle

## Narrow Width

The vehicle body takes up less road space, making it safer for those around us

## Pedestrian-Protecting Front End

Specially designed panel at the vehicle's front absorbs energy, better protecting pedestrians

## 360° View

Embedded sensor placement creates redundant, simultaneous views in all directions

## Curbside Delivery Doors

Customers can retrieve goods without stepping into traffic



01. 360° overlapping cameras
02. Thermal imaging camera
03. Lidar
04. Short & long range radar
05. Ultrasonics
06. Emergency vehicle audio detection
07. Redundant braking and control systems
08. Automotive lighting and signals
09. Touch screen for customer access or law enforcement interaction
10. Sound generator for pedestrian safety

## VEHICLE SPECIFICATIONS

Max Speed:	25mph
Battery Size:	31 kWh
Charge Speed:	L2, 6.6kWh/hr
Gross Vehicle Weight:	1150kg
Payload:	190kg
Carrying Capacity:	22.38 ft3

# Our autonomous vehicle fleet is on the road today

Prius Vehicle



'Regular' driving

Autonomous with safety driver

Mapping

Software testing

AV Deliveries

Nuro R2



Autonomous with no occupants

Testing & Delivery Operations on public roads in CA, AZ, & TX



WHERE ARE WE NOW?

# Partnerships with leading brands



More partners  
to be announced...



Nuro Proprietary and Confidential



# Close collaboration with city leaders

Before we launch in any market, we work closely to understand the players and needs unique to each city:

- Engage in open, early, and frequent communication
- Understand city priorities (e.g., food deserts) and how Nuro can help
- Address differences between driverless and zero-occupant vehicles
- Explain our approach to safety
- Demos for law enforcement and training on Law Enforcement Interaction Plan



**Nuro featured in Scottsdale Mayor Lane's State of the City address as making a positive impact on the community**

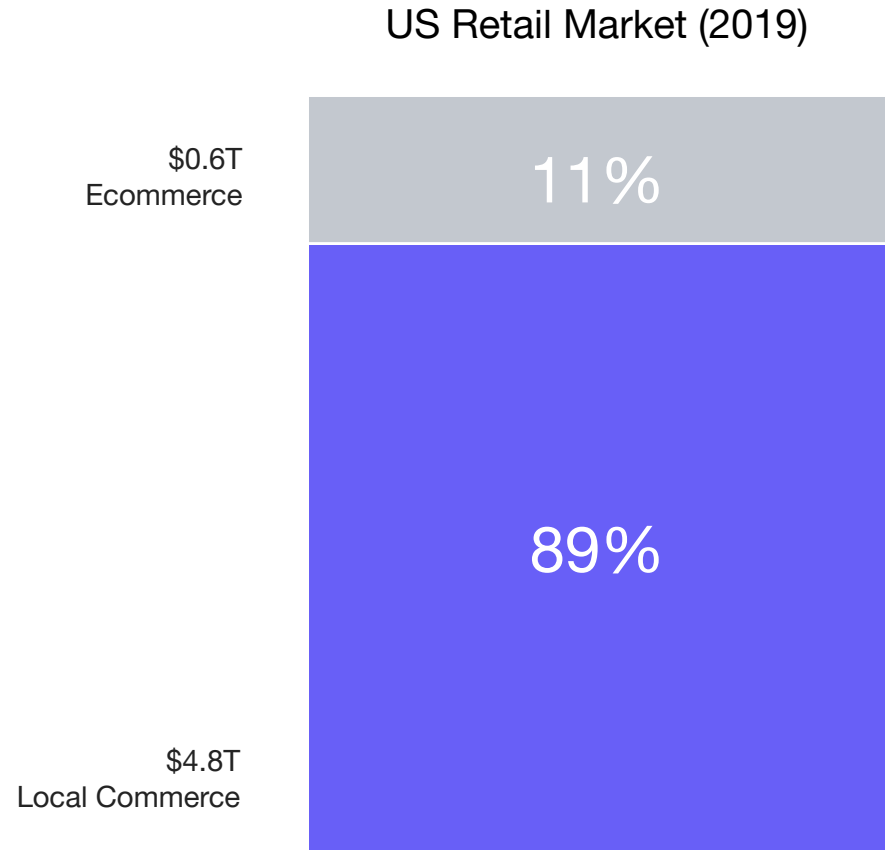


**Nuro meets with local Police Departments prior to operating on public roads**



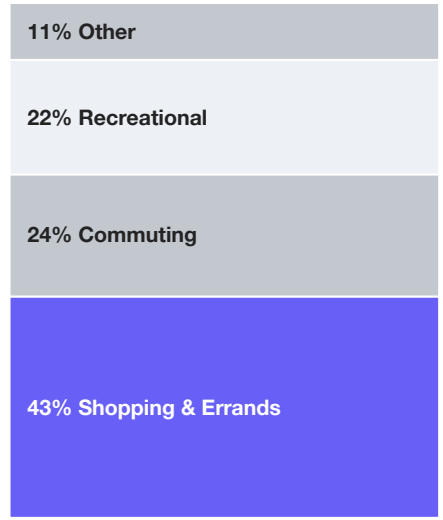
# **Why a New Delivery Service?**

# We Largely Shop the Same Way We Did 50 Years Ago...



# We spend a lot of time running errands

% of daily trips taken by Americans



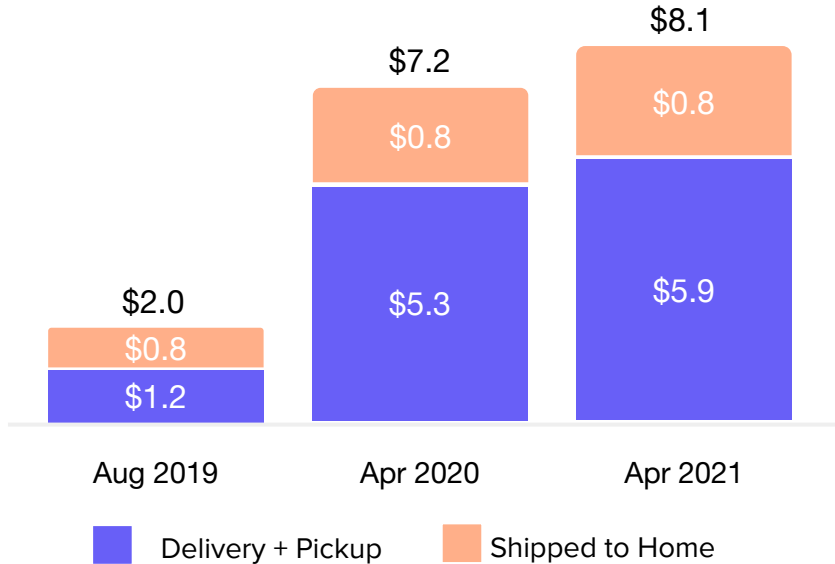
Commuting is only 24% of total trips vs 43% for shopping/errands

75 million hours wasted every day on just traveling to/from stores & errands

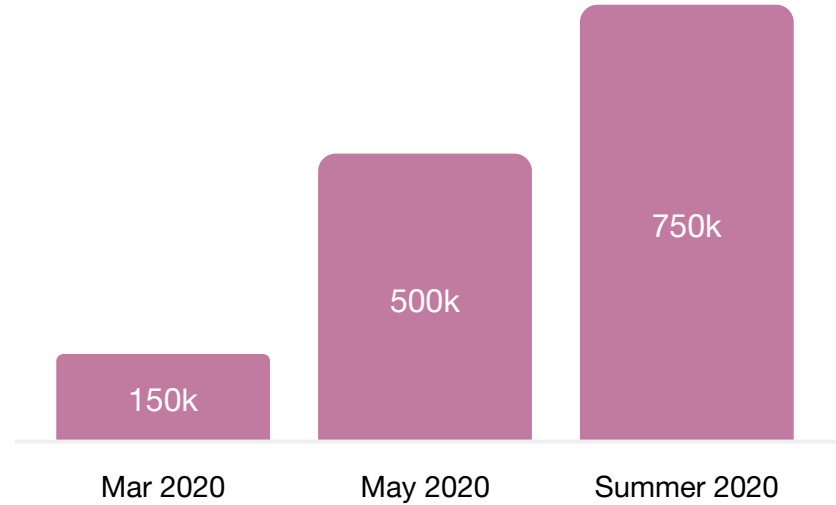


# COVID-19 further accelerated these trends

### US Online Grocery Sales (\$B)



### Instacart Shoppers



Sources: Brick Meets Click April 2021 Online Grocery Scorecard, Bloomberg (6-May-2020).



**Grocery**



**Food**



**Retail**



**Local  
Services**



**Prescription  
s**

**+  
New products  
& services  
that don't  
exist today**

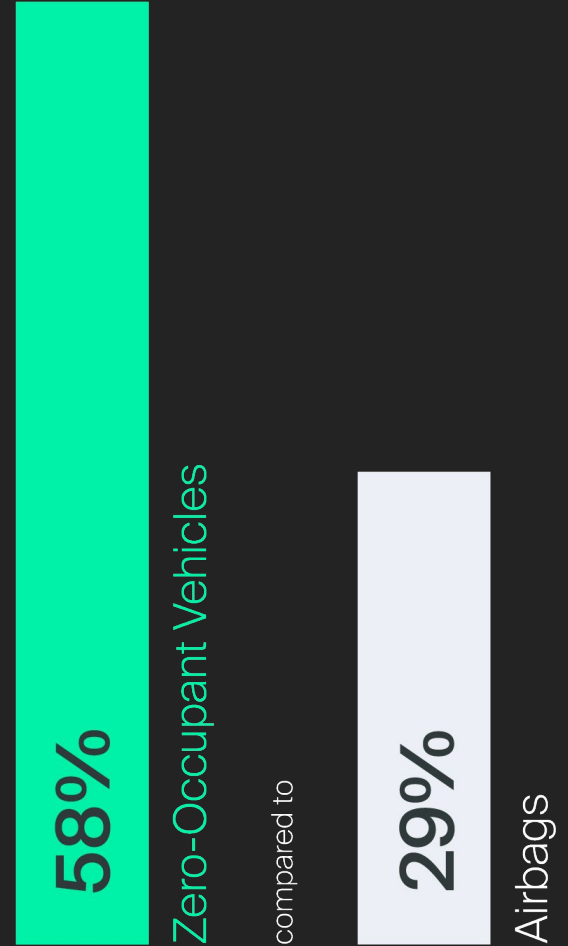
# **Community Impacts**

# Improved road safety

Human drivers had the highest fatal crash tally since 2007 last year. Zero-occupant AVs can help reduce road injuries



Source: "[Estimating the Crash Consequences of Occupantless Vehicles](#)," VTTI (2021)  
Nuro Proprietary and Confidential



# Revitalizing local commerce and creating jobs

**Creating jobs** to replace the trips we take to the store ourselves

**New kinds of work** maintaining and overseeing robots

**Domestic manufacturing**

**3.4M** jobs created, 2025-35

**\$4.1T** total economic impact





# Sustainable communities

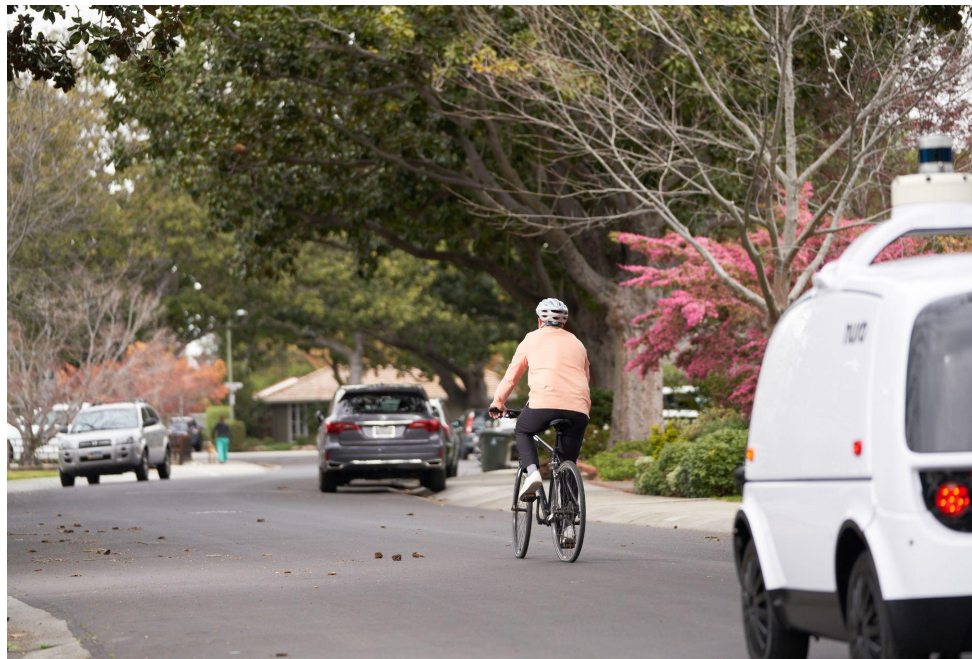
**Zero-emission** vehicles

**More room on the road** for all users

**Batched trips**

**407M** tons of CO2 avoided, 2025-35

**8K** tons of PM2.5 avoided



# Expanding access to essential goods



Low Income Food Desert Population

New York State Total Population





# Updating State Vehicle Equipment Requirements

## Machine vision

- Mirrors
- Windshield wipers
- Defroster

## Machine control

- High-beam indicator light
- Use of hazards





**Nuro**

[www.nuro.ai](http://www.nuro.ai)

**Mike Blank**

Regional Policy Lead

mblank@nuro.ai



# IOWA AUTOMATED DRIVING SYSTEMS RULEMAKING UPDATE

Sara Siedsma, Compliance Officer, Iowa DOT

# IOWA AUTOMATED DRIVING SYSTEMS (ADS) RULEMAKING

- Senate File 302 (2019 Session) – [ADS Framework Bill](#)
- Motor Vehicles Operated by an Automated Driving System – Chapter 380, Iowa Administrative Rules
- Rulemaking Activities Summary
  - Iowa Administrative Rules Review Committee (ARRC) Presentation – May 19, 2021
  - Public Feedback & Hearing – June 11, 2021 (Alliance for Automotive Innovation, National Association of Mutual Insurance Companies)
  - Iowa Transportation Commission Workshop Presentation and Adoption – August 9 & 10, 2021
  - Final adopted and filed rulemaking – [Published by the Iowa ARRC](#): September 8, 2021
  - Rulemaking Effective: October 13, 2021



# SUBCOMMITTEE & WORKING GROUP UPDATES

Adam Shell

Automated Transportation Program Manager,  
Traffic Operations Bureau, Iowa DOT

# SUBCOMMITTEE & WORKING GROUP UPDATES

## Subcommittee

### *Infrastructure Readiness – May 25<sup>th</sup>, 2021*

- FirstNet/AT&T – Wireless Spectrum Overview
- AT Readiness Updates (e.g. [MUTCD](#), Pavement Markings)

### *Economic Development – May 25<sup>th</sup>, 2021*

- MN CAV Advisory Council – Labor & Workforce Development Committee
- AT Labor Market Analysis & Open Discussion

### *Policy & Legislation – June 2<sup>nd</sup>, 2021*

- Roxo™ the FedEx SameDay Bot (Personal Delivery Device)
- Ensuring CAT in Planning

### *Public Safety & Enforcement – June 9<sup>th</sup>, 2021*

- TuSimple (Automated Trucking Company)
- AV Crash Data Working Group (Announced)

## Working Groups

### *Communication, Outreach, & Education*

- ATC Charter Update



## FedEx Roxo



<https://www.tusimple.com/>

CHARTER

IOWA'S ADVISORY COUNCIL ON AUTOMATED TRANSPORTATION



IOWADOT

Iowa Advisory Council on Automated Transportation  
Iowa Department of Transportation

September 2021



**IOWA DOT DIRECTOR'S**  
**ROUNDTABLE:**  
**INPUT FOR IOWA IN MOTION**  
**(2050 STATE LONG-RANGE**  
**TRANSPORTATION PLAN**  
**UPDATE)**



# IOWA DOT DIRECTOR'S ROUNDTABLE BREAKOUT DISCUSSIONS

## Agenda

- **Overview of today's conversation** – Scott Marler, Iowa DOT Director (ATC Chair)
- **Long-range transportation plan overview** – Garrett Pedersen, Iowa DOT Planning Team Leader
- **Breakout Sessions by ATC Subcommittee** – Facilitated by ATC Subcommittee Leadership
  - Infrastructure Readiness
  - Economic Development
  - Public Safety & Enforcement
  - Policy & Legislation
- **Breakout Session Report Outs** – Updates by the breakout session facilitators

# IOWA DOT DIRECTOR'S ROUNDTABLE: INPUT FOR IOWA IN MOTION

## LONG-RANGE TRANSPORTATION PLAN OVERVIEW

Garrett Pedersen – Planning Team Leader, Systems  
Planning Bureau, Iowa DOT



## What are we doing and why?

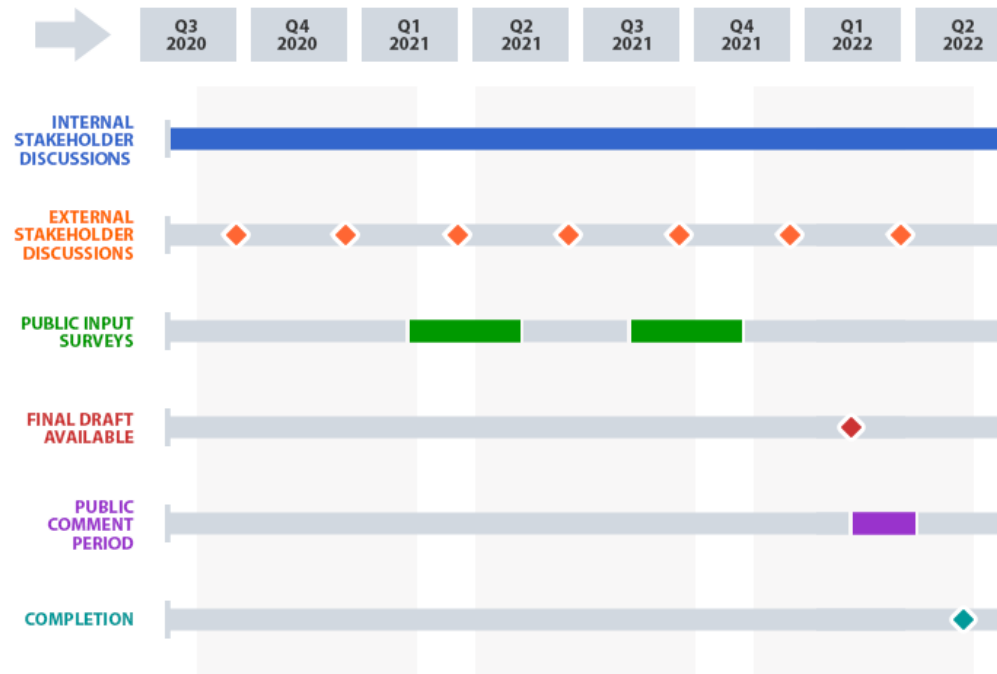
- Updating Iowa's state long-range transportation plan, *Iowa In Motion*
- Iowa is required to have such a plan by both federal and state code
- Update every 5 years to account for changing demographics, land use, travel behaviors, technology, funding constraints, etc.

## What is the plan?

- Provides long-range vision, policies, decision-making framework to guide investment
- Planning horizon of 2050
- Covers all modes of transportation: aviation, bike/ped, highway, public transit, rail, water
- Identifies existing/emerging needs and recommends strategies to address them

# What is the timeline?

- Plan update “due” to be adopted by the Iowa Transportation Commission May 2022



## Enhancements to the plan

- Clearly defined system objectives
- Rightsizing policy guidance (e.g., Consideration of Emerging Technology)
- Infrastructure resiliency
- Accessibility and equity
- Clarify plan's role in project development

# Demographic trends

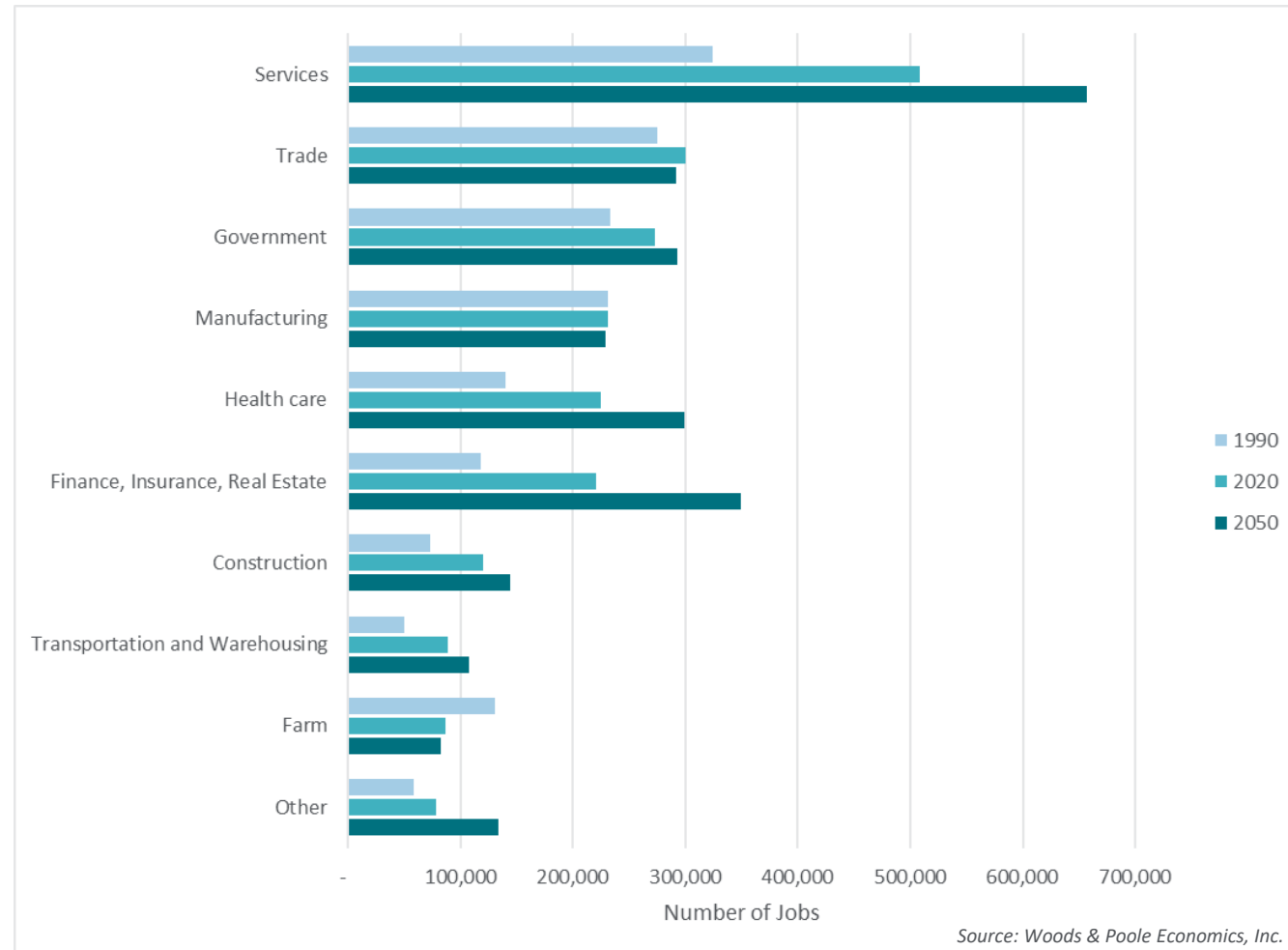
		WHERE WE'VE BEEN 1990	WHERE WE ARE 2020	WHERE WE'RE HEADED 2050
<b><i>Growing slowly</i></b>	Population	2.8 million	3.2 million	3.4 million
	<b><i>Aging</i></b>			
	Median age	34.1	38.5	40.2
	Percent 65+	15.4%	18.0%	20.7%
<b><i>Diversifying</i></b>	Percent minority	4.0%	14.4%	26.4%
	<b><i>Urbanizing</i></b>			
	Percent living in the ten largest counties	45.4%	52.7%	57.4%



# Economic trends

*Steady job  
growth  
continues*

*Uneven  
growth  
across  
employment  
sectors*



# Top priorities identified by transportation stakeholders

Rank	Topic	Planning issue
1	Funding	There are concerns with the highway trust fund's long-term solvency; additional long-term funding sources are needed.
2	Resiliency	We need to increase system resiliency and proactively plan for extreme weather events.
3	Workforce	We need to plan for and react to teleworking changes at both an organizational level and a transportation system level.
4	Technology	We need to plan for connected and automated vehicles, including human-technology interactions, safety, and related infrastructure needs.
5	Asset management	Aging infrastructure is a concern, and we need alternative and innovative methods of funding and addressing stewardship needs.



Thank you for your time and attention.



[Garrett.Pedersen@iowadot.us](mailto:Garrett.Pedersen@iowadot.us)

# IOWA DOT DIRECTOR'S ROUNDTABLE: INPUT FOR IOWA IN MOTION

BREAKOUT SESSION - FACILITATED DISCUSSION

ATC Subcommittee Leaders



# IOWA DOT DIRECTOR'S ROUNDTABLE: INPUT FOR IOWA IN MOTION

BREAKOUT SESSION REPORT OUTS

ATC Subcommittee Leaders





## WRAP-UP

- Upcoming Events
- Next Meetings
- Adjourn



**THANK YOU**