MEETING NOTES

Iowa Advisory Council on Automated Transportation (ATC)

Policy & Legislation (P&L) Subcommittee Meeting

Wednesday, June 2, 2021

1-2 pm CT

Action Items:

- Adam Shell to share Personal Delivery Devices (PDD) resource following results of joint survey from ITS America and AASHTO
- Following completion by working group, Dylan Mullenix to share white paper supporting CAT in planning with P&L subcommittee and other stakeholders

1. Welcome and introductions – Dylan Mullenix, Policy & Legislation Subcommittee Chair
    a. Attendees – 31 attendees
        - Dylan Mullenix – Des Moines Area MPO (Policy & Legislation Chair)
        - Robert Yeager – FedEx
        - Commissioner Stephan Bayans – Iowa Department of Public Safety
        - Colonel Nathan Fulk – Iowa State Patrol
        - Carl Lingen, Terry Bergen – Iowa Public Transit Association
        - Eric Bakker – Iowa Senate
        - Mark Wyatt – Iowa Bicycle Coalition
        - Travis Grassel – Iowa Insurance Division
        - Neal Hawkins, Skyler Knickerbocker – Iowa State University, Center for Transportation Research and Education
        - Dan McGehee, Omar Ahmad, Jacob Heiden – University of Iowa, National Advanced Driving Simulator
        - Adam Shell, Dave Lorenzen, Andy Lewis, Peggi Knight, Troy Jerman, Daniel Yeh, Sara Siedsma, Garrett Pedersen, Milly Ortiz-Pagan, Mindi Nguyen, Kelli Huser, Kristin Haar, Melissa Gillett, Brenda Freshour-Johnston, Susan Fenton, Joe Drahos, Mikel Derby – Iowa DOT
    b. New membership - Mark Wyatt (Iowa Bicycle Coalition) and Carl Lingen & Terry Bergen (Iowa Public Transit Association)

2. Roxo™ the FedEx SameDay Bot
    a. Robert Yeager is the Ethics & Lobbying Compliance Manager with FedEx Corporation, Government and Industry Affairs. FedEx is a fifty-year old multinational transportation logistics company. Their 600,000+ employees move on average 18 million packages per day to 220 countries across the world.
    b. Personal delivery devices (PDDs) are at the forefront of automated technology. PDDs will have many roles and functions in the future including on-demand or urgently needed products. The evolution and advancement of e-commerce has driven the need for PDDs, and they can provide sustainable transportation for "last-mile" deliveries in congested areas with touchless delivery.
    c. Roxo is FedEx's PDD solution designed to provide deliveries for retail stores to local consumers nearby (usually within three miles). This PDD is created to make reliable, autonomous last-mile deliveries that produce zero-emissions. It's designed and built through collaboration with DEKA Research & Development, Corp. Roxo uses iBot electric wheelchair base, which can negotiate through rough terrain, traversing steps and steep inclines. PDD capabilities can vary across companies and needs, and Roxo is just one example currently being tested.
    d. Roxo's safety and specs: The bot weight is 450 pounds, with approximately 100 pounds of cargo capacity. Some key features include driving at variable speeds while ensuring local speed limits

compliance, navigating congestion on road and sidewalks using sensors for 360-degree scanning, negotiating curves, among others. In addition to the technology on Roxo, remote operators can see surroundings at all times through Roxo's cameras, intervene, and take over control if needed. It uses turn signals, lights, and signaling screens to clearly communicate intent to nearby pedestrians, cyclists, and vehicles. Roxos are currently connected through cell towers. While human teams are constantly monitoring operation, several fully autonomous deliveries have been made.

e. PDDs offer solutions for transportation companies, individuals, and communities. For transportation companies, PDDs can increase delivery efficiency by making "last-mile" deliveries from business directly to consumers. For customers, communities, and industry, PDDs encourage environmental stewardship through sustainable transportation. They alleviate congestion; in residential spaces, these devices will make lightweight, ecommerce deliveries. PDDs will also enhance employment opportunities for engineers and specialist with new technologies needing design and support.
f. Roxo can currently operate in states across the US. Legislation that permits PDDs to operate has been passed in Iowa, as well as Arizona, North Carolina, Oklahoma, Pennsylvania, Tennessee, Texas, Utah, Virginia, Indiana, and Maryland. FedEx hopes to work with legislation and emerging technologies to deploy solutions for stakeholders. Stakeholders include municipal governments, city officials, and citizens. Current public perception of Roxo is favorable, based on community surveys from testing sites.
g. Roxo debuted in February 2019. Limited beta on-road trials were completed in 2019 and 2020 in Manchester, NH, Memphis, Plano, and Frisco. FedEx On-Demand Experience was integrated in Roxo and staged deliveries during full beta testing in Manchester in September 2020. Customer trials started in February 2021 focusing on validating use cases and operational model with 9 initial retailers. Initial retail customers will be prioritized first once fully commercialized, but detailed route marking for new locations will be needed beforehand.
h. Outreach occurs in communities before Roxo is rolled out including press coverage, announcements, and operators walking behind Roxo that can discuss what's happening when people stop and ask questions.
i. Roxo has dealt with inclement weather before, and potential concerns have been brought to development team. Initial testing occurred in places with favorable weather, but testing has also taken place in Manchester, NH so it has operated in ice and snow. Fog is a tough weather condition that limits range and visibility. The final Roxo design will involve a lot more winterizing and waterproofing.
j. Roxo can interact with persons with visual impairments. The development team is currently debating a proper solution internally. Roxo can signal, but there is a need to balance neighborhood annoyance from loud noises versus the need to notify pedestrians. Roxo may have different protocol depending on who Roxo interacts with (visually impaired, elderly, persons with a cane, etc.). Roxo can even distinguish animals on leashes. ADA compliance team will help determine best solution.

3. Work Plan & Tactical Actions Updates
    a. State ADS Rulemaking and PDD Legislation – Sara Siedsma, Iowa DOT
        - Automated Driving Systems (ADS) rulemaking has been published as an intended action. The next step is presenting the rules to the administrative rules committee: Public Notice of Proposed Rules for a Motor Vehicle Operated by an ADS
        - Iowa has adopted Personal Delivery Devices (PDD) legislation this session: House File 304. The bill was signed by the Governor on May 20, 2021. The bill states PDDs can operate at no more than 550 pounds, the PDD can operate in pedestrian areas and on roads less than 40 mph, and local cities and counties can limit the use of PDDs in jurisdictions. PDDs are excluded from the definition of a vehicle, and they aren't subject to registration and other vehicle-specific laws. Iowa DOT formed an interna PDD working group including Traffic Operations, Traffic & Safety, and Systems Planning bureaus. Intelligent Transportation Society of America (ITS America) and American Association of

State Highway and Transportation Officials (AASHTO) are jointly working on a survey with a PDD track to assess deployment efforts for states and communities.
- Daniel Yeh with Iowa DOT serves on the American Association of Motor Vehicle Administrators (AAMVA) Automated Vehicles Subcommittee. AAMVA released the Automated Delivery Vehicles and Devices Whitepaper in May 2021. A primary finding is that there is a clear distinction between PDDs (operating in pedestrian and bike environments) and automated vehicles (specifically operating in roads and highways).

b. Federal Rulemaking & Legislation – Adam Shell, Iowa DOT
- Endless Frontier Act 2021 is being developed by the Senate Commerce Committee, authorizing $100 billion for basic and advanced technology research in the next five years. While it didn't advance, it's worth noting the AV amendments included to see what could be coming in the future.
- Noteworthy rulemaking is still occurring federally as it relates to AVs: National Standards for Traffic Control Devices; the Manual on Uniform Traffic Control Devices (MUTCD) for Streets & Highways - Revision and Use of the 5.850-5.925 GHz Band.
- Surface Transportation Reauthorization Act of 2021 advanced through the Senate Committee on Environment and Public Works with unanimous support and would replace the Fixing America's Surface Transportation (FAST) Act. $303.5 billion over five years to support highways, roads, and bridges. Senate Committee on Environment and Public Works. To replace the Fixing America's Surface Transportation (FAST) Act. Notable amendments to address the 5.9 GHz band technology transition (Dedicated Short-Range Communications (DSRC) to Connected-Vehicle-to-Everything (C-V2X))

c. Ensuring CAT in Planning – Dylan Mullenix (Chair) & Garrett Pedersen (Iowa DOT)
- Working group has formed to support the AT Vision tactic of *Ensuring Cooperative Automated Transportation (CAT) in Planning*. This group is developing a white-paper resource to support CAT including manageable and actionable planning considerations, identification of strategic considerations when prioritize and allocating resources, identification of related planning tools, identification of related functional areas. The group may also explore PDD ordinance needs, opportunities, and best practices.[1] Membership consists of consultants, MPOs, Iowa DOT, and Transit.

d. Improve Equity & Accessibility – Mindi Nguyen (Iowa DOT)
- U.S. Access Board organized *Inclusive Design of Autonomous Vehicles: A Public Dialogue*. This four-part series of virtual meetings focused on making AVs accessible to passengers with mobility disabilities and passengers with sensory and cognitive disabilities. Stakeholders need to have these conversations now to prepare for these needs of the future. The webinars are available online with topical presentation and open dialogue for Q&A and comments.

4. Open Discussion – All subcommittee members

5. Information and key upcoming dates
   a. Public Safety & Enforcement Meeting - Wednesday, June 9th, 10-11AM
   b. AT Council Meeting - Late July or Early August 2021

[1] An opportunity that crosscuts and aligns with the *Address Vulnerable Road User (VRU) Safety* tactic within the Public Safety & Enforcement subcommittee

ATC SUBCOMMITTEE MEETING

Policy & Legislation

June 2, 2021

MEETING AGENDA

1. Welcome – Dylan Mullenix, Des Moines Area MPO (P&L Subcommittee Chair)
2. Roxo™ the FedEx SameDay Bot – Robert Yeager, Ethics and Compliance Manager for FedEx Government and Industry Affairs
3. Work Plan & Tactical Actions Updates
    a. State ADS Rulemaking and PDD Legislation – Sara Siedsma
    b. Federal Rulemaking & Legislation Update – Adam Shell
    c. Ensuring CAT in Planning – Dylan Mullenix & Garrett Pedersen
    d. Improve Equity & Accessibility – Mindi Nguyen
4. Open Discussion – All subcommittee members
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WELCOME AND INTRODUCTIONS

Dylan Mullenix –

Policy & Legislation Subcommittee Chair

ROXO™ THE FEDEX SAMEDAY BOT

Robert Yeager

Ethics and Compliance Manager for FedEx Government and Industry Affairs

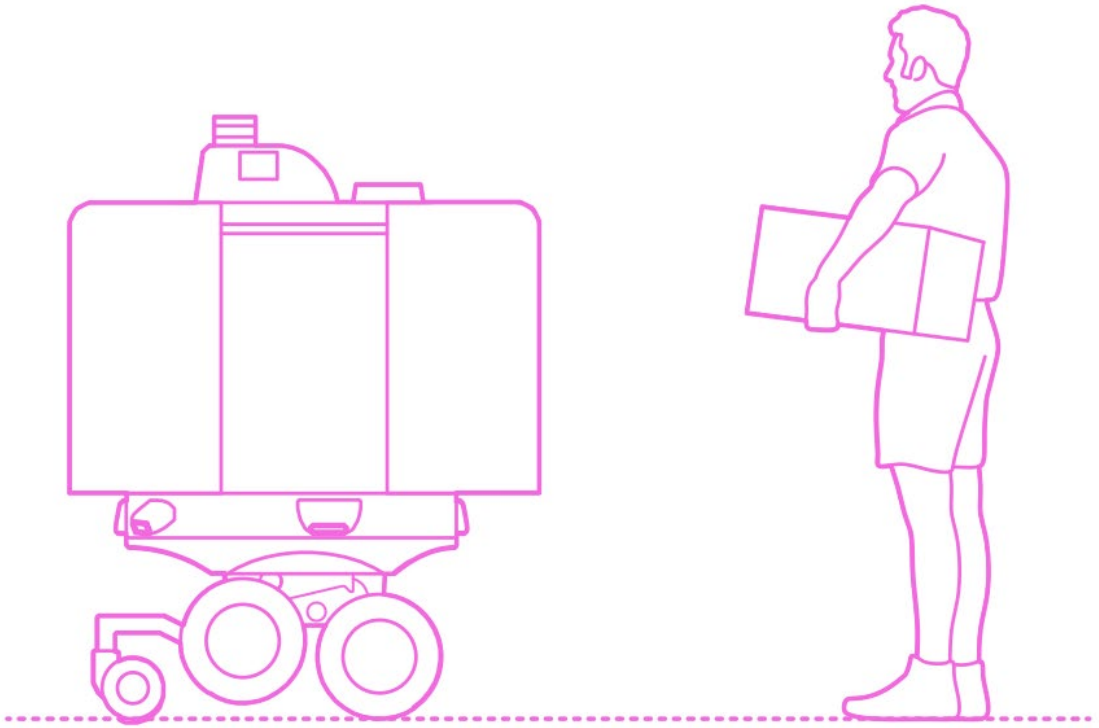
Roxo™, the FedEx SameDay Bot

Rob Yeager
FedEx Corporation

The Role of the Personal Delivery Device (PDD)

PDDs will have many roles and functions in the future, including:

- On-demand or urgently needed products
- E-Commerce driven
- “Last-Mile” delivery
- Driverless delivery
- Delivery through congestion
- Touchless delivery



About Roxo

- A personal delivery device (PDD) created to make reliable, autonomous last-mile deliveries
- Designed and built through collaboration with DEKA Research & Development, Corp.
    - Uses the iBot electric wheelchair base, which can negotiate rough terrain, traversing steps, and steep inclines
- A sustainable solution for last-mile deliveries that produces zero-emissions

Safety & Specs

Bot Weight: 450 lbs

Bot Dimensions:

51.5” height

39” length

29” width

Cargo Capacity:

100 lbs

Power:

Zero Emission Lithium Ion Battery

Remote operators have the ability to see surroundings through Roxo’s cameras, intervene, and take over control if needed

Uses turn signals, lights, and signaling screen to clearly communicate intent to nearby pedestrians, cyclists, and vehicles.

360-degree sensors

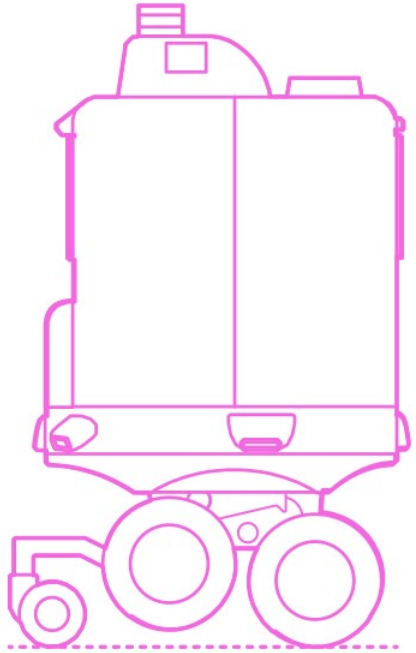
What can PDDs Bring to the Table?

For Transportation Companies

- Increase delivery efficiency – PDDs are intended to make “last-mile” deliveries from business direct to consumers.

For customers, the community at large, and for industry

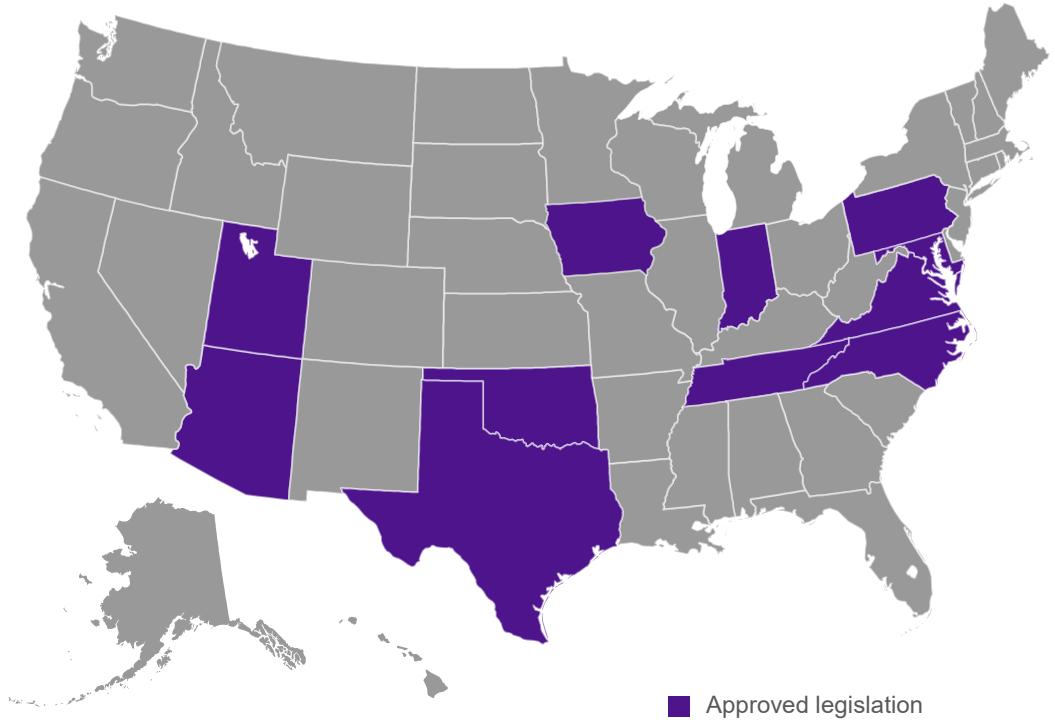
- Encourages environmental stewardship -- Helps Shipping companies reach their goals of carbon neutrality, using battery power and creating zero emissions.
- Alleviate congestion – in residential space, these devices will be positioned to make lightweight, e-commerce deliveries.
- Enhanced employment opportunities -- with the new technologies and support functions PDDs represents, future engineers and other specialists will be needed.



Where Roxo Can Operate

Legislation that permits personal delivery devices, like Roxo, to operate has been passed in:

- Arizona
- North Carolina
- Oklahoma
- Pennsylvania
- Tennessee
- Texas
- Utah
- Virginia
- Indiana
- Maryland
- Iowa



Roxo is also permitted to operate in Manchester, New Hampshire, where DEKA is headquartered, for testing purposes.

Roxo™, the FedEx SameDay Bot Snapshot

For more info about Roxo, visit fedex.com/thefuture

Recent Highlights

Roxo completes 1st delivery

Roxo made its first customer delivery in February in Plano, Texas. The shipment met the customer use case and delivery time requirements

Generation 3 debuts

The updated sleek design includes improved autonomy functionality and expanded signaling for clear communication with public

Go-to-Market efforts

Globally, initial testing efforts are focused on Dubai and Japan

Path to Commercialization

1. **Roxo Debuts** — Roxo was revealed in February 2019 on the Jimmy Fallon Show
2. **On Road Trials (Limited Beta)** — Autonomous trials completed in 2019 & 2020 in Manchester, Memphis, Plano & Frisco
3. **Manchester Trials (Full Beta)** — FedEx On Demand experience integrated and staged deliveries completed in September 2020
4. **Customer Trials (PoC)** — Started in February 2021, trials focus on validating use cases & operational model with 9 initial retailers

5. **Commercialization** — Initial retail customers prioritized first

Roxo™ Meet the Development Team

Questions?

POLICY & LEGISLATION WORK PLAN & TACTICAL ACTIONS UPDATES

State ADS Rulemaking and PDD Legislation Update – Sara Siedsma

Federal Rulemaking & Legislation Update – Adam Shell

Ensuring CAT in Planning – Dylan Mullenix & Garrett Pedersen

Improve Equity & Accessibility – Mindi Nguyen

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STATE RULEMAKING & LEGISLATION UPDATE

Automated Driving Systems (ADS) Rulemaking

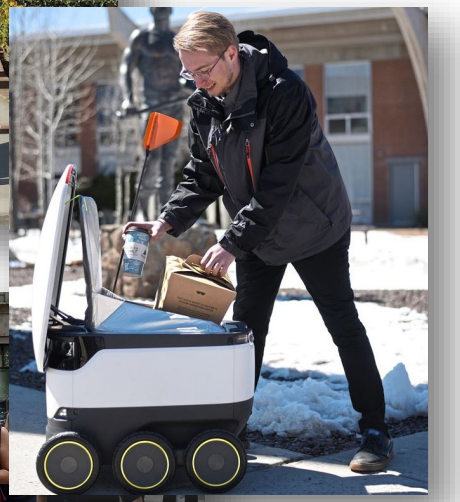
- Public Notice of Proposed Rules for a Motor Vehicle Operated by an ADS: https://www.legis.iowa.gov/docs/aco/arc/5621C.pdf

Personal Delivery Devices (PDD) Legislation

- House File 304 - https://www.legis.iowa.gov/legislation/BillBook?ga=89&ba=HF304
- Signed May 20th, 2021
- Iowa DOT Internal PDD Working Group
  - Bureaus include Traffic Operations, Traffic & Safety, & Systems Planning

Amazon Scout

Starship Robot



FedEx Roxo

POLICY & LEGISLATION WORK PLAN & TACTICAL ACTIONS UPDATES

State ADS Rulemaking and PDD Legislation – Sara Siedsma

Federal Rulemaking & Legislation – Adam Shell

Ensuring CAT in Planning – Dylan Mullenix & Garrett Pedersen

Improve Equity & Accessibility – Mindi Nguyen

FEDERAL RULEMAKING & LEGISLATION UPDATE

- Endless Frontier Act 2021
  - Included an AV Amendment (didn't advance in mid-May 2021)
- Rulemaking
  - National Standards for Traffic Control Devices; MUTCD for Streets & Highways – Revision (Link)
  - Use of the 5.850-5.925 GHz Band (Link)
- Surface Transportation Reauthorization Act of 2021
  - Senate Committee on Environment and Public Works (EPW)
  - To replace the Fixing Americas Surface Transportation (FAST) Act
  - Notable Amendments to address the 5.9 Ghz band Technology Transition (DSRC to C-V2X)

POLICY & LEGISLATION WORK PLAN & TACTICAL ACTIONS UPDATES

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ENSURING CAT IN PLANNING

Purpose & Overview

- Working group to support this AT Vision Tactic
- Development of a white-paper resource to support CAT including:
  - Manageable and actionable planning considerations
  - Identify strategic considerations when prioritizing and allocating resources for investment
  - Identification of related planning tools (e.g., comprehensive plans, land use/zoning, screening tools)
  - Identification of related functional areas (e.g., policy, planning, engineering, public works, public safety)
- Explore PDD Ordinance Needs & Opportunities

Membership

Consultant
- Brian Willham (Snyder Associates)
- Maddie Atkins (Snyder Associates)
- Marcus Coenen (Snyder Associates)
- John Peterson (Peterson Planning Strategies)
- Rose Schroder (Bolton & Menk)

MPO
- Dylan Mullenix (Des Moines Area MPO) – (Co-lead)
- Kent Ralston (MPO of Johnson County)

Iowa DOT
- Adam Shell
- Garrett Pedersen (Co-lead)

Transit
- Tony Filippini (Des Moines Area Regional Transit)

POLICY & LEGISLATION WORK PLAN & TACTICAL ACTIONS UPDATES

State ADS Rulemaking and PDD Legislation – Sara Siedsma

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IMPROVE EQUITY & ACCESSIBILITY

U.S. Access Board: Inclusive Design of Autonomous Vehicles: A Public Dialogue

- Four-part series of virtual meetings on making AVs accessible to passengers with disabilities

- Each session ended with an open dialogue for Q&A and comment

IMPROVE EQUITY & ACCESSIBILITY

Accessibility for Passengers with Mobility Disabilities: Part 1

Highlights

- Discussions around technical solutioning, specific to studies, research and data on AV vehicle height, ramp slope ("not all ramps are created equal"), step-in clearance, entry/exit work
- Current ADA vehicle requirements vs. Proposed ADA requirements
- New challenges like how underfloor batteries constrain entry-exit solutions with recommendations for how to work around those challenges (vehicle height, entry/exit, and ramp slope)

IMPROVE EQUITY & ACCESSIBILITY

Accessibility for Passengers with Mobility Disabilities: Part 2

Highlights

- Maneuvering and securements in vehicles and continued discussion of entering/exiting AVs
- Technical criteria and recommendations– walking surfaces, passenger access route, maneuvering through the vehicle, securement location size, vehicle design and layout, and means of securement
- Robotic Research – Robotics Company with over 20 years of experience in unmanned systems
  - Paratransit Transportation with automated wheelchair accessibility
  - Technology to operate AVs without human interaction while maintaining safety of system and surroundings
- Wheelchair Transportation Safety and best practices – current vs. proposed (AVs)

IMPROVE EQUITY & ACCESSIBILITY

Accessibility for Passengers with Sensory and Cognitive Disabilities: Part 1

Highlights

- Rutgers & Princeton partnered to expand research on designing & deploying AVs to accommodate diverse needs of persons with disabilities through qualitative methods (focus groups and interviews)
    - (4) Focus groups of total 21 participants rode a AV shuttle and then provided feedback including opportunities and concerns (vehicle accessibility critical (how to schedule and communicate/interface and safety)
        - Comfort and design, availability and cost
- Open Design Challenges on AVs for Blind and Low Vision people
- AVs from a Deaf/Heard of Hearing Perspective & Concerns about Communication/Interfacing

IMPROVE EQUITY & ACCESSIBILITY

Accessibility for Passengers with Sensory and Cognitive Disabilities: Part 2

Highlights

- Discussions of communication accessibility in hailing and interacting with autonomous vehicles for passengers with hearing, visual, or cognitive disabilities
- Challenges navigating to/from the curb (landscaping, shrubs blockage, moving through crowds, etc.)
- Benefits of AI assistance in learning user preferences (privacy, data retention concerns, human trust)

OPEN DISCUSSION

INFORMATION AND KEY UPCOMING DATES

- Public Safety & Enforcement Subcommittee Meeting – Wed., June 9th, 10-11AM
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THANK YOU