Pedestrian and Bicycle Information Center

Planning Multimodal Networks in a Connected and Automated Future

Stefanie Brodie, PhD Toole Design

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Housekeeping

⇨ **Submit your questions**

⇨ **Webinar archive: www.pedbikeinfo.org/webinars**

⇨ **Live transcript: https://link.ai.media/session?plink=HSRC**

⇨ **Certificates and professional development hours**

⇨ **Follow-up email later today**

⇨ **Review previous episodes and sign up for upcoming sessions**

Today's Panel

Stefanie Brodie, PhD

Toole Design

Katie Heuser

Toole Design

Darren Buck

Federal Highway Administration

PBIC Resources on Automated and Connected Vehicles

Topic Page: Automated and Connected Vehicles

Central repository for research, reports and guidance related to biking/walking and CAVs

https://www.pedbikeinfo.org/topics/automatedvehicles.cfm

PBIC Resources on Automated and Connected Vehicles

Discussion Guide for Automated & Connected Vehicles, Pedestrians, and Bicyclists

Presents ten key challenges at the center of discussions around CAVs and implications for nonmotorized road users

Establishes key definitions and lays out potential needs for both policy and research

DISCUSSION GUIDE FOR
Automated and Connected Vehicles, Pedestrians, and Bicyclists
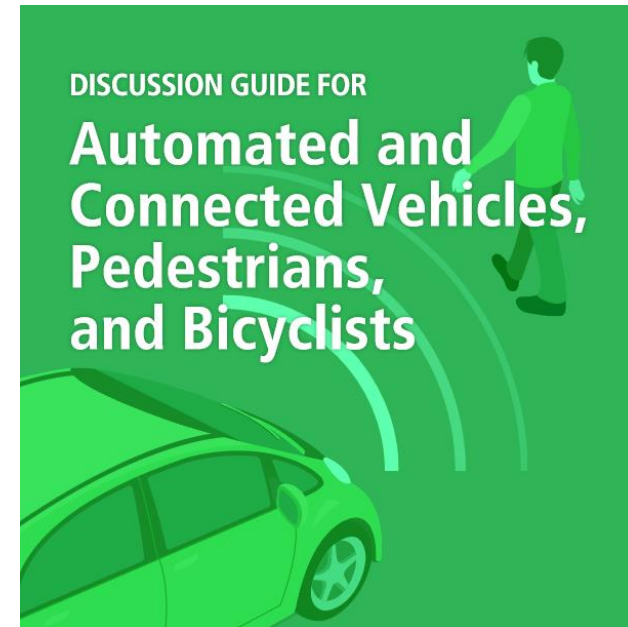
https://www.pedbikeinfo.org/resources/resources_details.cfm?id=5082

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Planning Multimodal Networks in a Connected and Automated Future

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July 12, 2021

Katie Heuser | Planner II

Stefanie Brodie, PhD | Research Practice Lead

Agenda

- What are we talking about?

- What are we doing?

- What have we found?

- What is next?

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What are we talking about?

Definitions

0	1	2	3	4	5
No Automation	**Driver Assistance**	**Partial Automation**	**Conditional Automation**	**High Automation**	**Full Automation**
Zero autonomy; the driver performs all driving tasks.	Vehicle is controlled by the driver, but some driving assist features may be included in the vehicle design.	Vehicle has combined automated functions, like acceleration and steering, but the driver must remain engaged with the driving task and monitor the environment at all times.	Driver is a necessity, but is not required to monitor the environment. The driver must be ready to take control of the vehicle at all times with notice.	The vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle.	The vehicle is capable of performing all driving functions under all conditions. The driver may have the option to control the vehicle.

Automated Vehicles (AV)

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Source: SAE International (2018)

Autonomous Vehicles

Source: US DOT

Connected Vehicles (CV)

Source: US DOT

CV/AV Technology

- **Detection:** monitoring the external environment of the vehicle, including roadway infrastructure and other road users

- **Prediction:** understanding location, speed, and trajectory of other road users and responding accordingly

- **Communication:** exchanging information on the vehicle's intentions with other road users

Multimodal Networks

What are we doing?

Project Overview

Project Overview

- Examine how planning and program development for pedestrian and bicycle networks might change with CV/AV technologies

- Explore how policy and operations can harness CV/AV technologies for the good of active transportation users

Literature Review

Interviews

Workshop

Big Questions

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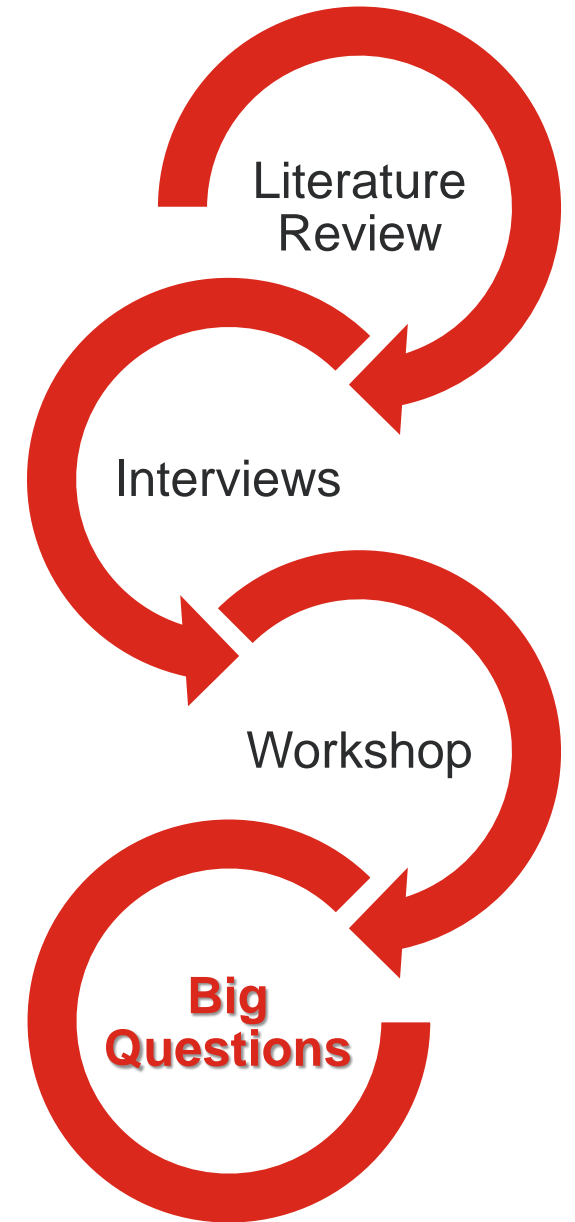
Literature Review

Goals:

Document the current state of practice for CV/AV technology and active transportation

Identify gaps and prominent issues

Outputs:

Synthesized current CV/AV technology

Developed and categorized uncertainties

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PLANNING MULTIMODAL NETWORKS IN A CONNECTED AND AUTOMATED FUTURE

Literature Review
March 9, 2020 | FINAL

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Interviews

10 interviewees

- Cities
- States
- Transit agencies
- Technology providers
- Original equipment manufacturers (OEMs)
- Third-party companies
- Research institutions

Topics

Technology

Policy

Equity

Land use Context

Transit

Interviews

Goals:

Validate findings from the literature review

Understand how different actors are responding to uncertainties

Output:

Identified 5 scenarios based on uncertainties

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Workshop

Goal:

Discuss scenarios with practitioners, researchers, and experts

Output:

Policy and regulatory considerations for FHWA to support state and local regulation of CV/AVs

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What have we found?

Uncertainties and the Big Questions

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Market Penetration

When and where will CV/AV technology be commonly deployed?

How will the public receive CV/AV technology?

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Source: US DOT

Communication and Connection

How will CV/AVs communicate with other road users?

How will CV/AVs be connected to pedestrians, bicyclists, infrastructure, and vehicles outside of their fleet?

Should cyclists and pedestrians be required to be connected?

Vehicle Occupancy

Will the future fleet be dominated by autonomous vehicles that are shared or privately-owned?

Dynamic Ridesharing

Source: US DOT
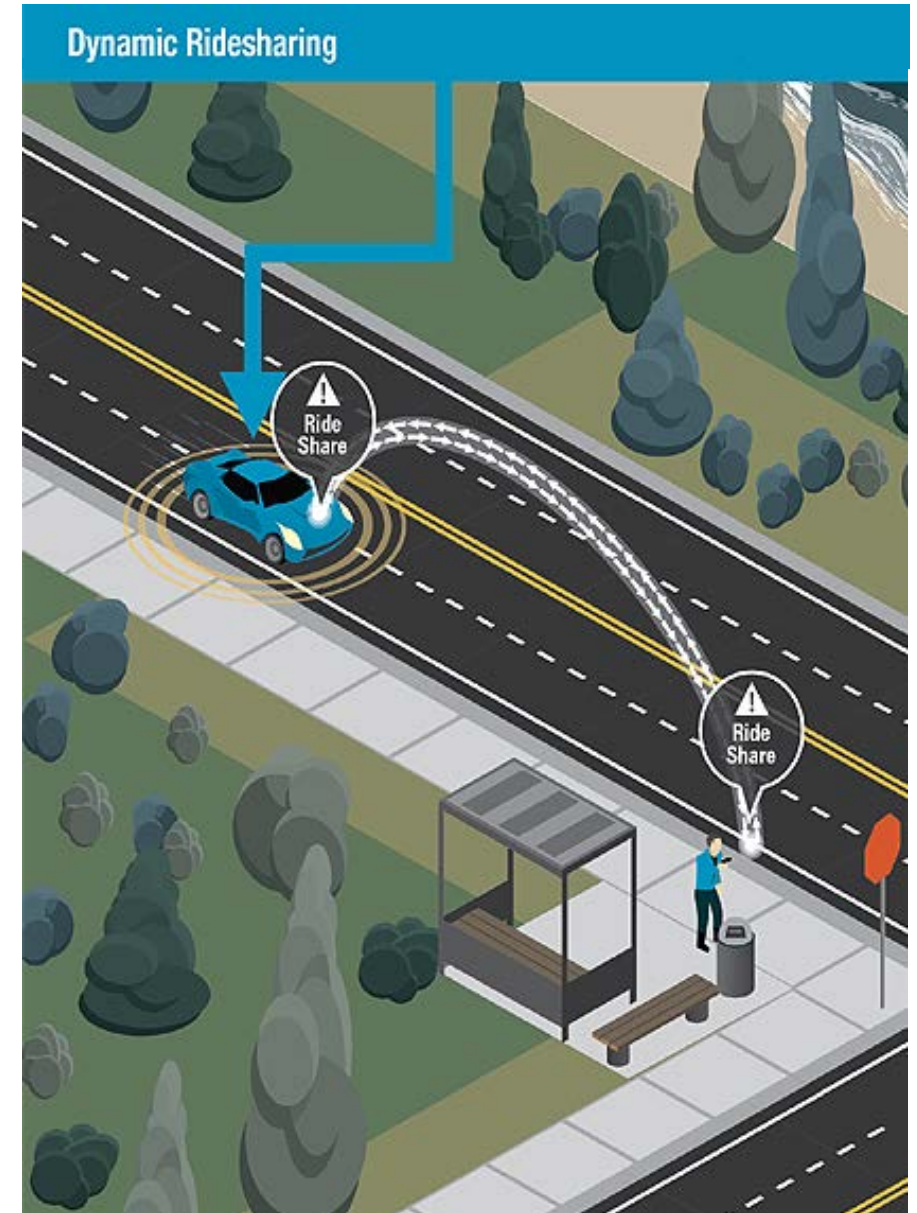
Programming and Decision Making

How will CV/AVs make decisions?

How will social and cultural norms influence programming?

*How will technology producers
address algorithmic bias?*

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Interventions and Recommendations from the Interviews

Regulation

- Testing
- Technology for interacting with vulnerable road users
- Standardize communication technology
- Cybersecurity

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What is next?

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Workshop Scenarios

	Market Penetration	Communication and Connection	Vehicle Occupancy	Programming and Decision Making
Limited connected technology				
Pedestrian and bicycle communication via cellphones				
Various levels of automation				
Extended pilot and testing period in diverse environments				
Pricing the curbside				

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Next Steps

- Workshops
  - July 2021

- Summary report
  - Early Fall 2021

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Source: US DOT

Thank You!

⇨ **Keep an eye out for follow-up email later today**

⇨ **Follow up with us:**

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⇨ **Archive at www.pedbikeinfo.org/webinars**

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