Gaps and Opportunities in Accessibility Policy for Autonomous Vehicles

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12/9/2021
Gaps and Opportunities in Accessibility Policy for Autonomous Vehicles

• Objective
• Background Research
• Case Studies
• Future Work
Objective: Accessibility of AAV in the Context of VTA AAV Project
Objective

- 49 CFR Part 37 - Transportation Services for Individuals with Disabilities (ADA)
- 49 CFR Part 38 - Americans with Disabilities Act Accessibility Specifications for Transportation Vehicles
  - Spirit of the ADA vs. the letter of the law/regulations?
  - The key is to ensure that the accessibility concerns are addressed NOW rather than retrofitted later.
The Complete Trip

Seven trip-making stages divided into three distinct categories:

- Pre-trip concierge (Information system design)
  - Trip planning and booking
- Wayfinding and Navigation (Accessible infrastructure design)
  - Navigating to AAV pick up point
  - Waiting at AAV pick up point
  - Navigating from AAV drop off point to end destination
- Robotics and Automation (Vehicle design)
  - Boarding AAV
  - Riding AAV
  - Alighting AAV
Taxonomy of Accessibility Considerations

- Information system design
- Vehicle design
- Infrastructure design
Taxonomy of Disability Considerations

- Cognitive and/or Developmental Disability
- Auditory Impairment
- Visual Impairment
- Wheeled Mobility Devices
- Ambulatory Impairment
- Older Adults
- Extremes of Size and Weight
Summary of Background Investigation

- Wheeled mobility devices and ambulatory impairments have significant literature.
- Research on **cognitive and developmental disabilities and auditory impairment** is most sparse.
- The combinations of disability type-trip making stage where the research is most sparse:
  - Trip planning and booking stage: Auditory Impairment
  - Boarding AAV stage: Cognitive and/or developmental Disability; Auditory Impairment; Extreme Size and Weight
  - Riding AAV stage: Auditory Impairment; Visual Impairment
  - Alighting AAV stage: Cognitive and/or developmental Disability; Auditory Impairment
### Applicability of AAV Technology to On-demand Microtransit and Paratransit Services

<table>
<thead>
<tr>
<th></th>
<th>Accessible Safety Features</th>
<th>Wheel Chair Stowage / Tethering</th>
<th>Voice Controlled Systems</th>
<th>Pick Up Point Orientation</th>
<th>Drop Off Point Orientation</th>
<th>Location, weather, route info etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AAV On-Demand Microtransit</strong></td>
<td>Meets Standards</td>
<td>Meets Standards</td>
<td><strong>May Need Additional Development</strong></td>
<td>Meets Standards</td>
<td>May Need Additional Development</td>
<td>Exceeds Standards</td>
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<tr>
<td><strong>AAV Paratransit</strong></td>
<td>Meets Standards</td>
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<td>May Need Additional Development</td>
<td>Exceeds Standards</td>
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Case Studies

- **Microtransit**
  - May Mobility’s Prototype of Wheelchair-Accessible AV
  - Waymo / Custom Chrysler Pacifica
  - Volkswagen Sedric
  - Renault EZ-GO
  - Kenguru

- **Paratransit**
  - Detroit Medical Campus / Navya Shuttle Evo
  - US Army Catapult
  - JTA/Olli 2.0
AAV can potentially offer superior service to disabled passengers, providing: inclusion of video/safety analytics; ramp deployment and actuation; voice warning for securing passengers, rider/stop information; the ability for multi-lingual support.

Additional considerations include:

• Universal standard to allow for the elimination of fare boxes
• The design of vehicles must account for individuals with cognitive disabilities
• Voice control systems and drop-off orientation may need more technological development or additional service specifications through on-demand or on-call help services (Critical for Microtransit)
• Exploration of slope standards and including them in any requests for qualifications
• Ensure that vehicles are designed to accommodate roadway users (especially those with disabilities) not using or interacting with those vehicles
• Infrastructure concerns require collaboration between local agencies and transit authorities/private sector
Potential for Agency Partnerships

• Coordination to enhance and build appropriate infrastructure (curb ramps, bus stops, etc.)

• Prioritization of curb availability for accessible services and collaboratively managing pick up and drop off locations between multimodal users

• Digitization of transit trip data to encourage multimodal integration of future AAV service with existing transportation infrastructure
Thank you for joining us for:
Gaps and Opportunities in Accessibility Policy for Autonomous Vehicles

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