CENTER OF EXCELLENCE
on New Mobility and Automated Vehicles

Municipal Workshop Summary

October 3, 2024 Washington DC

Introduction

The Center of Excellence on New Mobility and Automated Vehicles held a workshop on New Mobility and Automated Vehicles on October 3, 2024 in Washington DC and online via Zoom. A group of professionals gathered to discuss innovative mobility solutions, with roughly 35 attending in person and 20 joining via Zoom due to municipal travel budget constraints. The attendees included local government employees tasked with implementing these new strategies, federal government employees involved in policy and oversight, and consultants who bridge the gap between state and local governments. The conversation also benefited from the expertise of transportation innovation specialists from nonprofits and think tanks.

Program Summary

The workshop began with a welcome and introduction by Professor Jiaqi Ma, Director of the Mobility COE, followed by a conversation on federal policy between Kristin White, Acting Administrator of the FHWA, and Kate Burns, Executive Director of MetroLab Network. Attendees had the opportunity to introduce themselves and briefly share their experiences with new mobility and automated vehicles.

The workshop had three goals:

1. Communicate the what, when, why, and how to get involved with Mobility COE activities and research projects
2. Convening the conveners, establishing a community of practice
3. Better understand the needs of local governments with respect to research around the identified priority areas of the Mobility COE.

Juan Matute (UCLA), Kate Burns and Stefania di Mauro-Nava (MetroLab Network) produced this workshop summary and next steps based on conversations recorded at the workshop which were transcribed and summarized by Otter.AI, an AI-based meeting assistant tool.

The workshop featured two panel discussions. The first panel discussion, a retrospective on city experiences with micromobility, transportation network companies, and other forms of new mobility, was organized by the National Association of City Transportation Officials (NACTO). This panel included representatives from Austin, TX, Seattle, WA, Washington, DC, and Alexandria, VA. A second presentation led by Michael Schnuerle, Director of Open Source Operations from the Open Mobility Foundation (OMF), presented forthcoming work on data communications between cities and connected, automated vehicles. Following this presentation, attendees held a facilitated, forward-looking roundtable discussion on what cities expect from automated vehicle deployments.

Lessons Learned

Federal Policy and Funding Programs

Kristen White, the Acting Federal Highway Administrator, highlighted the mission and strategic goals of the Federal Highway Administration (FHWA) under the Biden administration. The FHWA's overarching mission is to deliver a world-class transportation system that is safe, efficient, sustainable, and equitable for all people. This is supported by six strategic goals: safety, economic strengths & global competitiveness, equity, climate sustainability, transformation & innovation, and organizational excellence.

Acting Administrator White emphasized the importance of taking a systems-level, human-centered approach to implementing innovative mobility projects and technologies. She provided examples of FHWA-funded initiatives that are focused on addressing the needs of disadvantaged communities, such as a project in rural Minnesota providing autonomous vehicle services for Disabled residents, and a project in Maricopa County, Arizona, to improve transit and emergency response in an underserved area.

Acting Administrator White outlined several key formula funding programs administered through state DOTs and MPOs that can support innovative mobility projects, including the Carbon Reduction Program (CRP), Congestion Mitigation and Air Quality (CMAQ) Program, Highway Safety Improvement Program (HSIP), and Surface Transportation Block Grant (STBG) Program. She encouraged participants to build stronger relationships with their state and local FHWA division offices to better access and leverage these funding sources.

New Mobility Experiences in Cities

Local governments are often the first to have on-the-ground experience with new mobility technologies, but they often lack the data they would need to systematically understand the

impacts of these new services. Participants saw a need for data, in a standardized format, in order to make informed regulatory, operational, planning, and budgeting decisions. Participants saw local regulatory authority as key to both local control of the impacts of new mobility service and also to requiring new mobility service companies to provide data to the local government. Local regulatory authority is a political decision, typically either granted or preempted by actions of the State government.

In absence of local regulatory authority, voluntary data sharing can inform identification of shared interests between cities and new mobility providers. Data sharing is essential to shared knowledge creation, and participants' city access to early data is likely crucial to developing trust between a city and new mobility providers. Trust and understanding are a foundation for moving forward on areas of shared interest like safety, curb management, and real-time communications in emergency situations, during major events, and in operational design domain edge cases.

Without voluntary data sharing from mobility providers, local governments have used data from hospitals, community surveys, requests for services (311 systems) in addition to anecdotal communications from staff, elected officials, and constituents to understand the impacts of new mobility services.

When micromobility launched in the mid 2010s, the early introduction created difficult challenges for cities. Companies were not oriented toward a city's perspective or shared approaches to problem solving. Cities were also on the front lines of handling complaints about user behavior or device parking. Micromobility companies were well-funded at the time, especially compared to municipalities. This resource gap created differences in approach and responsiveness. Eventually, companies learned, through either corporate maturity or threat of legal actions by cities and users, that municipal partnerships were essential to their corporate sustainability.

Micromobility data collection and sharing have emerged as crucial components of successful city-company partnerships for micromobility programs. Cities have found that requiring companies to share usage data through the Open Mobility Foundation's Mobility Data Specification (MDS) format helps in better planning and management of these services. For example, a city can create an exclusion zone or issue guidance for pickups and dropoffs around a major event. However, challenges remain in ensuring data privacy and representativeness.

Participants reported that they now have closer partnerships and better relationships with micromobility companies. In Alexandria, Virginia, 311 municipal customer service system complaints about bikeshare/scooter share are now routed directly to the micromobility company. Alexandria, Virginia also issues permits based on a company's responsiveness to these customer service requests and compliance with city regulations, creating a performance incentive for the companies.

New mobility options can improve social equity in some contexts. Participants saw that new mobility fills gaps in transit service. A Washington, DC representative asserted that

publicly-owned bike share is essential to micromobility affordability, as the competition of an affordable public bike share option means private micromobility providers must compete on price.

With automated vehicles, Austin noted better relationships with companies who are based locally because they are able to interact with engineers and business people, not just government affairs professionals who act as liaisons but are sometimes unable to explain technologies or make decisions.

Cities participating in the workshop also noted the importance of having multiple vendors to encourage competition and provide better accessibility. Overall, the participant cities have learned that flexibility, ongoing evaluation, and adaptation of policies are key to managing the rapidly evolving micromobility landscape.

Cities still need data on pick-up and drop-off demand and curb space utilization so that they can make informed, long-term planning and financial decisions about the use of curb space and municipally-owned off-street parking facilities. With information about how use of the curb is changing, cities can provide additional curb space and monetize curb zones as demand for short-term curb use increases and demand for longer-term off-street parking, a municipal revenue source for some cities, diminishes as a result of new mobility and automated vehicles.

Edge Cases: Emergencies and Major Events

While cities note improvements in working with micromobility companies in 2024 versus at their launch six or seven years ago, major events, emergencies and other edge cases can stress a productive working relationship between cities and all mobility providers. Spontaneous events like protests, fires, and police activity can become more complicated by the presence of micromobility devices, both in active use for mobility or passive presence.

Additionally, scheduled major events like concerts or sporting events create demands for pickup and dropoff that far exceed baseline conditions. Seattle’s lack of coordination with mobility companies during major city events caused difficulties that impacted safety and transportation system operations, resulting in a negative experience for new mobility operators, users, and everyone else. Washington, DC’s transportation system has a high number of unscheduled security-related events that affect mobility providers.

Cities see real-time, two-way data sharing as a solution to the challenges brought about by edge cases such as emergencies and major events. Real-time communication between humans and real-time human decision-making can help drivers and other mobility system users navigate the scenes of emergencies and special events.

According to participants, automated vehicles are still developing capabilities for human-like response to anomalous situations. When passenger-serving automated vehicles first launched

in the Phoenix, Arizona area, first responders encountered the vehicles in emergency situations, whether or not these situations were initiated by or initially involved an automated vehicle. As such, local public safety officials had the first experiences interacting with automated vehicles in emergency situations. Phoenix area departments have advised other police and fire departments on an emerging set of best practices and transfer lessons learned for interactions between responders and remotely-operated or automated vehicles or devices.

However, further introduction of automated or remotely-operated vehicles and devices will necessitate scalable solutions for communications in emergency situations, during special events, and in unforeseen edge cases. Two-way real-time data communications provide a scalable solution for the sharing of critical information.

Seattle is working on a project with the Open Mobility Foundation to use the Mobility Data Specification (MDS) to communicate with autonomous vehicles and enhance emergency response. They are implementing a system that translates real-time 911 data into MDS format. This allows them to create geofenced slow zones or no-drive zones around emergency incidents, which are then published to AV operators in real-time.

The system works as follows:

1. As a 911 operator enters data into a computer-aided dispatch system (CAD), relevant information about how the incident may impact transportation networks is automatically translated into MDS format.
2. Based on the severity and category of the call, geofenced areas are created to instruct mobility providers to avoid the area.
3. This information is made available publicly in real time via the city's MDS-Policy data feed.
4. Cities recommend that AV companies monitor this data feed for updates.

This approach allows the city to proactively inform AV operators about areas to avoid during emergencies, even before the AVs' sensors might detect the issue. It provides crucial situational awareness that the AVs might not have otherwise.

Safety Benefits and Impacts

As city governments include frontline public safety personnel like police officers, firefighters, and traffic services officers, the local layer of government is highly-attuned to residents' immediate public safety concerns. Thus, transportation professionals working for local governments will often prioritize safety concerns first when considering local responses to new mobility and automated vehicles.

Workshop participants saw safety benefits and disadvantages from new mobility and automated vehicles.

Participants acknowledged that people feel unsafe walking or taking transit at night and that micromobility and ridehail provide alternatives for mobility users who seek to balance safety, convenience, and cost. Participants also acknowledged that automated vehicles provide an option for people who feel unsafe or uncomfortable using transportation network companies/ridehail vehicles due to driver behavior.

However, the uncertainty over automated vehicle safety compounded by a lack of systematic data on automated vehicle operations within a city creates a perceived risk too high for some cities to willingly accept. Participants cite a lack of federal or state safety standards for automated vehicles, or an objective test that an automated vehicle must perform to assess its real-world safety performance. Participants also cite unclear enforcement procedures for observed violations. The combined lack of trust and safety assurances has some cities, like San Francisco, seeking a greater level of caution from state and federal regulators.

Participants cite the absence of a trusted statewide or federal certification system for automated vehicle safety and a lack systematic information on the safety impacts of new mobility and automated vehicles as a primary impediment to local trust and safety. Participants recognized the need for more comprehensive federal involvement in AV safety regulation, standardization of testing procedures, and facilitation of data sharing and best practices across different levels of government and industry.

City governments operate municipalities, which facilitate often complex interactions of people and infrastructure for social and economic purposes. City governments and staff are experts in operating cities, but not experts in robotics. According to some participants in the workshop, automated vehicle companies are seeking to re-frame traffic safety as a robotics problem rather than a city operations problem. This fundamental attack on the role of the city government in local self-determination over traffic safety creates further strain between city staff and automated vehicle companies.

The State of Texas has uniform statewide automated vehicle regulations and preempts cities from regulating automated vehicles. While the City of Austin has no authority to regulate operations or compel data sharing, the city does collect crowdsourced data on automated vehicle incidents from its 311 services system to understand incidents like crashes, near misses, safety concerns, and adverse traffic impacts.

The Open Mobility Foundation (OMF) is working on MDS 2.1, which will include data fields for crashes, near-misses, emergency stopping, and other incident data related to autonomous vehicles. This data standard could be a foundation for future data sharing, whether via regulation or voluntary agreement.

According to workshop participants, cities need trustworthy local data on the safety impacts of new mobility and automated vehicles to dispel constituent concerns. If the rate of observed safety incidents is low (e.g. micromobility crashes, automated vehicle faults), but some incidents

are highly-publicized, then this could create a public information asymmetry that could be most easily resolved through sharing data with cities.

While much of the discussion centered around the impacts of new mobility and automated vehicles, participants were interested in the use of new technologies for public safety purposes. Some of these technologies like image recognition and radar, have been further developed for mobility applications. Because Washington, DC is effectively a combined city-state department of transportation, it has pioneered automated safety enforcement using cameras. Nearby Alexandria, VA sought research and translational information that may convince the public of the safety benefits of automated and camera-based traffic enforcement. Current enforcement regimes rely on a low probability of a high fine to deter traffic offenses. High fines are seen as unjust and scaling personnel to increase the rate of enforcement to offense is expensive, so the current regime is not politically or economically scalable. Moving toward a regime of automated enforcement can rely on a high probability of a low fine to deter traffic offenses, something seen as more politically and economically viable.

Conclusions

New Mobility, Same Story?

The introduction of new mobility services into a city may follow a pattern that cities and companies can learn from. When an early-stage company needs to demonstrate revenue potential, they may launch without first seeking permission or approvals from the local government. This sudden incursion of a new mobility service that is not interested in developing a working relationship with local officials is jarring to those involved. However, over time, companies and local governments realize that neither has an interest in creating safety hazards, impeding transportation operations, or adversely impacting neighborhoods.

Participants described this cycle as an initial “hill of dissatisfaction” followed by an “equilibrium”, created by shared experience and shared goals. If cities and new mobility providers share an understanding of this cycle, future deployments may stabilize sooner as providers and cities negotiate a working relationship or even partnership. Local regulatory authority can accelerate this cycle, as was the case with how local permitting of micromobility and use of the Mobility Data Specification led to a shared understanding of operations and efficient and effective options for local governments to control their use. Without a local regulatory nexus to compel cooperation, the process may be slower and less effective. For example, though transportation network companies/ridehail service providers and cities share an interest in having functional transportation system operations during special events, data sharing and coordination are limited in other contexts.

Relations Between New Mobility Companies and Local Governments

Workshop participants noted that while their primary touch point with a company was often a government affairs professional, these interactions do not resolve issues as effectively as direct conversations with engineers or company leadership.

Discussion: As urban operators with an orientation towards public safety, city leaders are accustomed to dealing with socio-political perceptions of crime based on social media and news media reports versus observed data. As more automated vehicles and companies deploy in cities and safety incidents are publicized (or even politicized) in the news media, cities expect that their residents will trust the city government more than the automated vehicle companies. Automated vehicle companies who believe their safety record exceeds the public's perception based on social media and news media coverage may then see a shared interest in sharing operations data.

Additionally, workshop participants noted that automated vehicles likely collect data that is helpful to the city operations. However, cities do not currently receive this data in a manner that would be necessary for the city to take action at scale, such as standardized data format that could pre-populate requests for city services (311) systems with requests, such as repairing a traffic sign.

Intergovernmental Relations

City participants noted that there was often a disconnect in understanding between the federal, state, and local levels. Participants cited a lack of an urban-focused transportation research agenda as a root cause of this disconnect, with those who control research agendas failing to recognize the unique perspective and knowledge needs that cities have.

As such, the federal government should not assume that the states will accurately or adequately identify city knowledge needs unless cities are directly and actively involved in the process to create those research agendas. While cities prioritize safety, accessibility, and equity, states often focus on system efficiency, fiscal responsibility, and homogeneity. This difference in priorities can contribute to the disconnect in understanding knowledge needs. City participants sought a more proactive federal engagement on city-specific challenges and research needs.

Next steps

For the COE Partners

COE partners can facilitate a community of practice of cities at the front lines of the introduction and operations of new mobility and automated vehicles, as well as those who wish to understand issues faced by cities. The COE partners can do this through the National Association of City Transportation Officials (NACTO) and Open Mobility Foundation (OMF), each of which participated in the workshop. In particular, the OMF may have needs for research and academic expertise on the data standards work they conduct.

COE partners should also develop and maintain awareness of cities' research needs. According to participants, the research teams of greatest interest related to automated vehicle introduction were:

- Safety and efficiency
- Land use and urban design
- Equity and accessibility
- Public transit integration
- Infrastructure requirements
- Economic impacts
- Data sharing and privacy
- Environmental sustainability

Participants also noted specific questions of interest:

1. How will AVs impact urban sprawl and land use patterns? Participants were interested in understanding if AVs would encourage people to live farther from city centers, potentially increasing urban sprawl.
2. What are the best use cases for AVs in urban environments? There was interest in identifying optimal applications for AVs, such as car sharing for multi-family homes or medical transport in underserved areas.
3. How can cities effectively regulate and enforce AV operations? What is the role of cities versus state DOTs versus the federal government, and how is information shared between these governmental jurisdictions?
4. What are the equity implications of AV deployment? There was a focus on understanding how AVs might impact different communities and how to ensure equitable access.
5. How will AVs interact with existing transportation modes, particularly public transit?
6. What infrastructure changes are necessary to support widespread AV adoption? Participants wanted to investigate the specific infrastructure needs for AV operations.
7. How can data from AVs be effectively collected, shared, and utilized to improve urban planning and operations? There was interest in developing standardized data sharing practices and understanding privacy implications.
8. What are the potential impacts of AVs on municipal budgets and real estate values? Participants were curious about the economic implications of AV adoption.

9. How can cities evaluate the success of AV pilot programs? There was interest in developing metrics and methodologies for assessing AV pilot projects.
10. What are the safety implications of AVs in dense urban areas? Researchers wanted to explore how AVs would perform in complex urban environments with multiple road users.

For Future Research

Data Collection, Analysis, and Sharing

To make informed policy, regulatory, and investment decisions, cities need systematic data on the use of mobility services within their jurisdictions. This data can be collected by cities, such as through mounted cameras and video recognition systems, or shared directly from the mobility service providers.

A data standard such as the mobility data specification allows for the development of an ecosystem of analytical and publishing tools that cities and others can use. The Open Mobility Foundation's Mobility Data Specification provides such a standard.

However, researchers should consider the role of universities and third parties to collect and share data in a way that protects privacy, competitive interests, and is not subject to public records requests or disclosures under transparency laws.

To generate interest in sharing mobility data, researchers can develop frameworks and analytical methods for tools that would fulfill specific needs. One hypothetical tool could be used for curb management including automated pickup and dropoff coordination, something like an air traffic control for busy curbs. Another could be used to optimize pricing incentives for desired mobility behaviors, such as a credit for trips starting or ending at light rail stations.

Researchers can also develop data collection and sharing tools that can be used by local government practitioners working in a community of practice. This includes information about local public safety interactions with new mobility and their procedures for such interactions. Researchers can also identify, share, and maintain information on local-specific regulations, fee structures, or other policies that directly impact new mobility and automated vehicles.

Local Guidance from Early Experiences

Benefits from researchers facilitating knowledge sharing between local governments are access to data and the ability to promote supplemental surveys or focus groups. The data and interviews can be a foundation for future guidance on city policy levers for new mobility, which would be a research product that translates lessons learned on strategic approach, economic interests and revenue models, relationships and partnerships, and safety mitigations from cities with early experience to those cities that experience successive waves of new mobility adoption.