



RESEARCH NEEDS STATEMENTS ON AUTOMATED VEHICLES, SHARED MOBILITY, PANDEMICS, AND EQUITY

Submitted by the National Academies/TRB Forum on Preparing for Automated Vehicles and Shared Mobility

The mission of this [National Academies-TRB Forum](#) is to enable public, private, and research organizations to share perspectives on critical issues surrounding the deployment of automated vehicles and shared mobility. These perspectives focus on the discussion, identification, and facilitation of fact-based research needed to deploy these technologies in a manner and timeframe that informs policy to meet long-term goals.

Current events underscore the importance of addressing pandemics and equity among the highest priority goals. Research is a key to determining the degree to which the deployment of automated vehicles (AVs) and shared mobility can affect, and will be affected by, these issues.

This National Academies-TRB Forum therefore offers the following research needs statements for consideration by TRB and other transportation research organizations. These statements are collated from (1) the May 13, 2020 Forum-sponsored webinar on "[COVID-19, AVs, and Shared Mobility](#)," (2) responses from Forum participants and others to the call for research needs posted on the Forum's e-community, and (3) submissions to the [TRB Research Needs Statements Express on Transportation and Pandemics](#).

The statements are organized into the following three categories:

1. The Role of AVs and Shared Mobility in Mitigating Future Pandemics
2. AVs and Shared Mobility in a Post-COVID World
3. AVs, Shared Mobility, and Equity

1. The Role of AVs & Shared Mobility in Mitigating Future Pandemics

Accommodating Changes in Travel Behavior Using Traditional and Non-Traditional Modes During a Pandemic

Which modes proved to be more essential during the COVID-19 pandemic? How did this vary by phase of the pandemic, demographics, and other factors? What were the changes in behavior (e.g., trust in shared vehicles) and travel demand for each mode over the life cycle of the virus? Were certain travel characteristics valued for certain activities, such as managed lanes offering reliability, transit providing lifeline transportation, and bicycles providing physically-separated travel? How much of an impact did the shutdown/slowdown of public transit, micro-transit, ridehailing, etc. have on populations that do not own vehicles or have easy access to them? What combinations of traditional and non-traditional modes and services should be deployed in future pandemics to best meet the needs of essential workers and travelers, and what measures should

be taken to minimize the risks for both these travelers and those providing these services? This would be an interesting area for "twinning" studies with other regions of the globe (e.g., Europe, Asia).

The Role of Automated Vehicles and Shared Mobility in Mitigating the Impacts of Future Pandemics

How might AVs and shared mobility services help to mitigate infectious diseases? What services could AVs and shared mobility provide (e.g., freight deliveries, transportation for essential workers, reducing reliance on vehicle operators) during a pandemic, and what are the underlying business models? What state and local actions (policy, planning, infrastructure, IT/data) could take advantage of AVs and shared mobility services to mitigate the impacts of future pandemics? How might AVs and shared vehicles be designed with virus transmission in mind? Could AVs and shared vehicles exacerbate the impacts of a pandemic, and what actions can be taken to reduce these risks? What role might be played by the designation of Operational Design Domains in determining where and when automated vehicles can operate?

2. Automated Vehicles and Shared Mobility in a Post COVID World

Public Attitudes Towards Transit and Shared Mobility in a Post-COVID World

To what extent will attitudes toward "social distancing" continue after the pandemic, and what does that mean for use of conventional rail and bus mass transit services? How is that likely to affect use of ridehailing companies' pooled-ride services? How will the willingness to use shared mobility services be impacted by fears of infection, availability of a vaccine, apprehensions of using public transit, increased telecommuting, and driverless vehicles? In the longer term, what will the attitudes be regarding automated taxi services that would operate without a driver, for both individual and shared rides? Surveys of public attitudes toward these questions at several time intervals post-pandemic would be very useful to understand how enduring the effects of the pandemic are going to be. This topic area will be critical to monitor and understand across different public transit systems, land use contexts (e.g., urban, smaller urban, suburban, and rural areas), and shared mobility providers.

Roles of Government in Regulation of Shared Mobility in a Post-COVID World

How will the lessons from the pandemic impact the regulation of shared mobility? How will guidance and regulation from departments of public health fit into the planning and deployment of shared mobility (transit, ride apps, taxis, etc)? Should government consider regulations on peak hours of travel, cleanliness, health, liability, and/or other aspects of shared mobility? What role should government play in ensuring that the public knows about risks, best practices, crowding levels, etc.?

The Role of Automated Vehicles in Moving Goods in a Post-COVID World

The COVID-19 pandemic will likely lead planners, developers, operators, and the public to rethink the role and use of automated vehicles (AVs) for goods movement. How can AVs help to meet an increased demand for "no touch" transactions and deliveries to minimize human contact; provide access to needed supplies for those quarantined or sheltering in place; improve the sanitation of delivered goods or meals; and deploy small delivery vehicles on existing rights-of-

way? On a macro scale, what are the impacts and vulnerabilities of, and opportunities for, improved autonomy, embedded intelligence/machine learning, and robotic process automation in global logistics, commercial shipping, government transportation, and worldwide supply chains?

Best Practices for Data Integration in a Post-COVID World

The pandemic has highlighted how transportation, medical care, health and human services, and others are interrelated. To what extent did effective responses to COVID (and future outbreaks) rely on some level of integration between these data sets? What did we learn that can help us develop best practices for data integration and use to manage operations of the "system?"

3. Automated Vehicles, Shared Mobility, and Equity

Deploying Automated Vehicles and Shared Mobility to Promote Social Equity and Racial Justice

What are the policy, planning, design, and operational measures that need to be taken to deploy automated vehicles and shared mobility services to help achieve social equity and racial justice goals? For example, can/should operational design domains for automated vehicles be required to include low-income communities? How can a combination of automated vehicles and shared mobility services best supplement conventional transit to provide access to those living in these communities? Racial justice and social equity are related but different and both require a focus on context- and population-sensitive strategies and outreach/engagement. This effort should include collaboration with community-based organizations from the start (e.g., problem statement development, early research, analysis, final webinars/outreach, etc.).