

August 1, 2022

The Honorable Pete Buttigieg
Secretary
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

RE: Docket No. FTA-2022-0012; Request for Information

Dear Secretary Buttigieg,

As the nation's leading advocate for the technological modernization of our transportation system, focused on advancing research and deployment of intelligent transportation technology, the Intelligent Transportation Society of America (ITS America) is grateful for the opportunity to comment on the U.S. Department of Transportation's (USDOT) Transit Automation Research Request for Comment.

ITS America was founded in 1991 as an advisory council to USDOT on technology innovation and emerging transportation technologies. ITS America is the only organization in the country that represents all sectors – public, private, academic, and nonprofit – to advance transportation technology. Our membership includes state and city departments of transportation, transit agencies, metropolitan planning organizations, automotive manufacturers, technology companies, engineering firms, automotive suppliers, insurance companies, and research and academic universities. Our vision is a better future transformed by intelligent mobility: one that is safer, greener, and smarter. We advance a world in which we promote the nation's Vision Zero goals to eliminate fatalities and serious injuries on our roadways; a world that is more sustainable, resilient, and adaptable to climate change; and a world in which communities have equal and affordable access to transportation and critical services to advance equity. Our vision aligns directly with the DOT's goals to advance safety, climate, and equity.

ITS America recognizes that a major technology innovation area in surface transportation is the development and commercialization of automated driving assist systems (ADAS) and automated driving systems (ADS) in transit, and that there is a great deal of work yet to be done in this space, especially related to the application of ADAS/ADS in transit bus operations.

ITS America submits the following comments as suggested input and feedback to the Federal Transit Administration (FTA) on the second iteration of the Strategic Transit Automation Research (STAR) Plan. ITS America's responses to the questions posed in the request for comments are below.

General

FTA's 2018 guidance cites outdated information (with specificity) about lidar sensing costs and performance (e.g., the guidance cites a 2005 report that definitively states lidar sensors fail or detect ghost objects when objects scatter the light, but advancements in perception software now filter such interference and scattering). The 2018 guidance also includes sections about other sensing technologies that have since been further developed. As FTA moves to update its resources, ITS America urges a concurrent update to any market and/or performance analysis of sensing technologies used in bus automation to reflect the current performance and use of such advanced technologies.

Additionally, as far as domestic manufacturing is concerned, it is notable that many technology providers have moved their manufacturing offshore due to supply constraints related to the supply chain crisis (if needed, ITS

America can provide more information about this upon request). FTA, with its strict Buy America rules, will continue to see slow or stifled deployment of advanced technologies unless the USDOT considers exercising more flexibility to enable innovation into the transit fleet.

Finally, automation, including in both automotive and digital infrastructure, is widely recognized as safety-enhancing, including by the National Highway Traffic Safety Administration (NHTSA) and the Department (e.g., pedestrian automatic emergency braking). ITS America urges FTA to consider that advancements in bus automation will enhance safety for vulnerable road users and this value-add should be reflected in any new resource.

Priority Areas

1. What topics should be a priority for FTA’s transit bus automation research and demonstrations over the next five years? What specific activities or products should be a priority for FTA within these areas?

Digital infrastructure is the operating system for the future of mobility. Our [work in this space](#) has highlighted the ways in which digital infrastructure advances safety, sustainability, and equity and also focused on how embracing these new technologies can enable increased **traffic flow efficiency and reduced congestion** and improve **pedestrian and vulnerable road user safety** in the transit ecosystem. These two general areas could benefit from more transit automation research and demonstration efforts.

ADA and accessibility should also be a priority for this body of research. Automated transit must serve all users. Some questions that could be asked or explored include: (1) How do we enable ADA compliant access to and from vehicles, as well as securement on the vehicle? (2) How do we ensure ADA compliance on automated transit from day to day when there are constantly changing factors in corridor design and in the environment? (3) How do we establish ADA related guidance or standards for automated transit?

Equity must also be central to this research. Transit automation research needs to address topics such as digital access and literacy, underserved communities, unbanked and underbanked communities, and continuity and distribution of service.

Research must also aim to explore the dynamics of new **fare collection systems** and how revenue collection works across those various systems for an automated vehicle. Additionally, newer types of digital fare payment (e.g., open and contactless fare payment, integrated fare payment, gateless fare payment) systems may present new challenges and questions surrounding unbanked and underbanked communities, individuals without access to digital devices, and digital literacy.

Another critical area that deserves attention is the **user experience**. Past research efforts have focused more on the technology moving the vehicle than the experience of the individual using the service. Automated transit technologies must be developed to focus on the needs of the end user and incorporate concepts from human-centered design principles, which use empathetic inquiry in the research and development process.

Integration into an existing, hybrid environment with both automated and human-driven vehicles will be critical. Platooning, for example, is an automation-related technology that has not been fully evaluated. Some questions might include: (1) How can platooning augment transit? (2) How might platooning work (or not) in different types of transit corridors? In addition to platooning, FTA should consider looking at automated merging of transit vehicles with other vehicles that are automated and non-automated in the roadway and curb space.

The **workforce implications** of transit automation should be raised as a high priority, and FTA should take the lead in this space. There is a need for robust research and demonstration efforts in this space, all of which should be channeled into a long-term goal of a formalized automated transit workforce training program.

Finally, FTA should consider, develop a plan for, and communicate when and **how this research will be fed back into the product pipeline**. Transit agencies and stakeholders are eager to know when this research will augment and deliver technology on the street.

2. **For any priority areas identified, are there activities that stakeholders have undertaken? What were the challenges? Are there specific areas where FTA engagement may be needed?**

N/A

Enabling Research

3. **What specific research questions should be addressed by FTA-supported foundational research within the next five years? Possible topic areas for research include, but are not limited to, cybersecurity, equity, standards, and workforce training.**

Workforce training and pipeline issues should be prioritized for the advancement of transit automation. Some of the existing workforce development challenges relate to the increasing amount of technology that transit agencies are deploying into their systems. Transit agencies need the information and insight to hire for skills to bridge that gap - not just looking at automation, but also ensuring we have a workforce that can operate and maintain the myriad technologies that transit agencies will adopt between now and a future time when automation is standard in agencies of all sizes.

Other workforce challenges stem from the overwhelming impact of the pandemic, the spike in transit operator assaults, and the resulting challenges with recruiting and retaining operators. In addition, the transit industry is facing a retirement crisis, often referred to as the 'Silver Tsunami,' in which a huge number of transit workers will retire in the next 5-10 years.

Specific research questions include: (1) How can the transit industry address the significant pipeline, training, placement, and retention issues faced by transit agencies across the country? (2) How can the transit industry think differently about the workforce needs in the near and far-term? (3) How can the transit industry develop a pipeline that will adequately service the transit agencies of the future (e.g., 10 years out) and today? (4) What kind of new jobs will transit agencies need to fill and retain for a hybrid or automated transit system? (5) What skillsets should transit agencies develop in their workforces and hire for today to ensure individuals in the transit workforce are qualified to work in the industry in five or 10 years?

Integrated Demonstrations

4. **Are these demonstration areas still needed? What additional or alternative demonstration areas are a priority?**

The demonstration areas identified in the current STAR Plan (Transit Bus ADAS ; Automated Shuttle; Maintenance, Yard, and Parking Operations; Mobility-on-Demand (MOD) Service; and Automated Bus Rapid Transit) are still very relevant to the conversation and necessary for the advancement of transit automation. In addition, FTA should add Advanced Air Mobility (AAM)/Urban Air Mobility (UAM) to this list, looking at the possibilities of UAM/AAM one day interfacing with and/or being a part of the transit ecosystem. ITS America defines AAM as an air transportation system that moves people and cargo using new aircraft designs that are

integrated into existing airspace operations, as well as operated in local, regional, intraregional, rural, and urban environments. Additionally, ITS America views UAM as a subset of AAM, defined as an aviation system using highly-automated aircraft that will operate and transport cargo at lower altitudes within urban and suburban corridors.

5. What are the biggest successes or challenges to deploying ADAS or ADS technologies for transit?

The biggest challenge to the deployment of ADS in transit is the lack of a federal framework for its testing and deployment, which would create regulatory certainty and give companies an incentive to invest in ADS. The biggest challenge to the successful deployment of ADAS is ensuring the technologies perform as intended in realistic driving conditions, including low light and congested environments and conditions.

Strategic Partnerships

6. What ADAS/ADS technologies proven in other transportation applications would be useful and applicable to transit use cases? Please be specific and include examples where possible.

Ultimately, ITS America views ADAS technologies as tools that improve vehicle safety and performance, and transit vehicles are no exception. Transit buses and shuttles often navigate congested corridors in complex driving conditions, and ADAS technologies can provide much-needed assistance. FTA should consider applying similar ADAS standards to on-road transit vehicles that are applied through the New Car Assessment Program (NCAP), namely encouraging the utilization of tools such as forward collision warning, lane departure warning, crash imminent braking, and dynamic break support, as well as technologies currently being considered for inclusion in NCAP (blind spot detection technologies, lane keeping technologies, and pedestrian automatic braking solutions). Each of these tools are designed to improve driver performance and will provide safety benefits to passengers and nearby road users alike.

Stakeholder Engagement and Knowledge Transfer

7. Are FTA's methods of stakeholder engagement sufficient? What other methods should FTA consider?

Public comment, listening sessions, webinars, and community workshops are critical for meaningful stakeholder engagement, but these should be expanded to include other key stakeholder and community voices that are often overlooked. ITS America can serve in this capacity to help convene, inform, and engage stakeholders, summarize feedback, update websites and guidance, and advise and inform and advance FTA's research agenda.

On an issue as impactful and far reaching as transit automation, FTA should truly invest in engaging, listening, and collaborating with all actors and participants in the mobility ecosystem, including private companies, state, local and tribal governments, planning agencies, researchers, nonprofits, technical experts, communities, practitioners, and other stakeholders.

FTA should continue to coordinate these efforts across the modal administrations and peer agencies, including the Departments of Labor, Energy, Commerce, Homeland Security, and others.

FTA must also ensure that diversity, equity, and inclusion are central to its research and demonstration efforts, which will help the agency better understand the barriers and benefits of transit automation for all user communities. It should seek out women, people of color, diverse sector researchers, human service transportation providers, users with disabilities, and other individuals not commonly included in discussions about automation. Engaging with this broader, more far-reaching group will help FTA to better achieve diversity of thought on the topic of transit automation.

FTA should conduct workshops with transit agencies and stakeholders of different sizes and focus areas to reflect the broad spectrum of needs at agencies across the nation. For example, FTA could conduct a workshop with the largest agencies that have high ridership and a diversity of mobility options in the region and another with rural agencies that tend to provide more human service transportation and NEMT. Transit needs vary significantly based on communities, regions, perspectives, and the transportation challenges each community faces. Understanding the ways transit automation will look in different communities relies on listening to varying perspectives. While requests for comment and other federal register engagement efforts are mechanisms to solicit official comments, other mediums of engagement offer different opportunities for participants to provide more constructive, candid, and open feedback or to participate in an ongoing dialogue.

Finally, FTA should develop a national plan to scale AV transit with key timelines over the next 5-10 years and thorough engagement from stakeholders. This effort should include resources and support for public and community engagement to help plan for these pilots and deployments, to create pilots by and with communities (utilizing the tenets of co-creation), and ultimately, focus on building public trust and understanding of the tech.

Workforce

- 8. What activities have agencies undertaken to understand and prepare for the impacts of automation on their workforce? Please be specific and include examples where possible.**

N/A

- 9. What types of new skills, training, and resources may be required for transit workforce development and transition?**

Although many transit agencies are piloting automated technology, we should expect a significant amount of time between these pilot programs and regular deployment of automated transit. A multitude of other transit technologies are also being adopted today that will require new skillsets. Open and contactless payment systems will require revenue collection employees to have new skills. Zero-emissions buses will require maintenance crews with new skillsets. Near-term pipeline challenges inhibit transit agencies from full functionality today, with technologies they have already adopted. As automation deploys beyond low-speed shuttle pilots, new needs will arise. There will be a need for transit maintenance and operations workers with skills specific to automated vehicles. There will also, in most cases, still be a need for pilots/operators to oversee the movement and operation of an automated transit vehicle and respond in an emergency. The skillsets that transit agencies must develop, train for, and retain are changing. Transit agencies must account for this near-term transition to becoming technology forward as well as the transitions that will take place with the use of automated transit vehicles.

Additionally, FTA needs a national AV workforce training program, and ITS America suggests that a finite percentage of funds be set aside for workforce development assessments and training programs to upskill and reskill workers.

- 10. What specific areas of workforce related research should FTA consider?**

Research should address the significant pipeline, training, placement, and retention issues faced by transit agencies across the country; the transit workforce needs in the near and far-term; the ways transit agencies can take action to fill the positions and develop the technical skills needed now as well as those needed in the future; and the types of new jobs transit agencies will need to fill and retain for a hybrid or automated transit system.

11. What types of resources could FTA provide to help agencies and their workers adopt transit bus automation?

FTA should ensure some of the critical infrastructure, equity, and workforce related questions are addressed in research and that those findings are made available and communicated widely. Additionally, significant pipeline issues exist related to technology and outside factors. Anything FTA could do to augment or support additional training programs that could upskill the transit workforce for today and tomorrow would be welcome. Finally, FTA should develop a plan and communicate when and how their research and demonstration efforts will come full circle, feeding back into the product pipeline. Stakeholders are eager to know when this technology will be available to them and how these research efforts will bring it to fruition.

ITS America looks forward to working with the Federal Transit Administration on the development of transit automation moving forward.

Sincerely,



Laura Chace
President & CEO