Transit Bus Automation Risks, Barriers, & Mitigations

U.S. Department of Transportation
Federal Transit Administration

Introduction

In 2016, the Federal Transit Administration (FTA) studied risks and barriers to transit bus automation and developed mitigations as a part of the development of its Strategic Transit Automation Research (STAR) Plan.

- **Risks** are the potential for automated technologies, once in place, to yield negative consequences or for anticipated benefits to go unrealized.

- **Barriers** are obstacles that could prevent or significantly challenge implementation of an automation technology.

Both are challenges to the potential implementation of transit bus automation that require the development of mitigation options or strategies to overcome barriers or reduce the likelihood of a risk.

This factsheet summarizes the findings of this study. For more information, please see the full report, contained in the STAR Plan.

Risks

Four categories of risks related to transit automation were identified:

Safety and Security: Automated transit buses are at risk of potential hardware and software failures or limitations, human factor errors related to over-reliance on automated assistance or decline in driver skill, and cyber-attacks, as well as potential impedance with emergency response and communications.

Operations, Maintenance, & Cost Effectiveness: Transit agencies run the risk of accumulating unrealized costs from technology and transition expenditures, workforce retraining expenses, and increased labor costs due to the need for specialized skills, and technological obsolescence. Changes in service patterns or transit funding mechanisms could lead to additional costs. In addition, automated bus transit will compete against other modes that are moving toward automation.

Passenger Experience: Automation could negatively affect passenger experience, or fail to deliver expected benefits. This could include degradation in service reliability, slower travel speeds, reduced access and convenience, inadequate customer service, and poor ride quality.

Equity: The benefits of automation, such as improved service hours and electronic fare payment, might not be shared equally by every segment of society, and automated transit could create or worsen current disparities among users in terms of income, race, sex, disability, accessibility, geography, and other factors.

Barriers

Four major barriers related to transit bus automation were identified:

- **Opposition to Transit Bus Automation from Labor**: Potential impacts to transit employees as a result of automation may lead to opposition from labor and/or require significant expenses for workforce training.

- **Transit Agencies' Inherent Risk-Aversion**: The transit industry in the United States is generally cautious in adopting new technologies, services, and business models.

- **Financial Constraints**: Transit agencies may lack the funding to pursue automation. As a fast-moving technology, automated vehicles may not fit well into transit agencies' conventional procurement cycles and contracting approaches. Buy America regulations would also limit the range of vehicles and product available at this time.

- **Limited Product Availability in the U.S. Transit Bus Market**: Partially or fully automated transit buses may not be available for purchase—or their deployment timeline may be delayed—due to limited market size, complex operating requirements, and issues with certification.

Additional barriers spanning a wide range of institutional and legal issues were also identified, along with potential public opposition. While there are a number of potential barriers, these four major barriers were consistently identified in FTA's analysis as the most likely to occur and the most difficult to overcome.

Mitigation Options

Three categories of mitigation options were identified: research, technical assistance to transit agencies, and federal guidance.
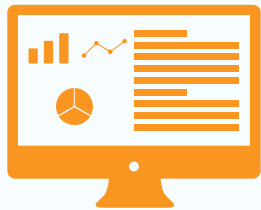
Research	**Technical Assistance**	**Federal Guidance**
Significant research across six domains and technical areas can address information gaps and reduce uncertainty that transit agencies would otherwise face when considering investment in automation.	Technical assistance to transit agencies could mitigate potential risks and barriers by providing transit agencies additional assistance as they seek to implement automated technologies.	Potential federal guidance could remove regulatory uncertainty regarding the application of existing policies to automated technologies.