



U.S. Department of Transportation
Federal Transit Administration



Considerations for Evaluating Automated Transit Bus Programs

Background

To support the development and deployment of automated transit bus services, the Federal Transit Administration (FTA) has created a five-year Strategic Transit Automation Research (STAR) Plan that outlines FTA's research agenda on automation technologies. As described in the plan, FTA is sponsoring research and demonstrations of transit bus automation to help agencies, stakeholders, and industry make informed decisions. This document supports these activities by offering guidance for transit agency consideration in evaluating deployments of transit bus automation technologies.

Objectives

Automated transit-bus technologies have great potential, but they can introduce uncertainties for transit agencies and the traveling public. To assess the impacts of automated transit-bus technologies and to reduce the uncertainties, the transit industry will need to evaluate early transit bus automation projects/pilots/demonstrations and share the results. Well-executed evaluations can measure such benefits as improved travel time, reliability, and throughput; enhanced mobility; and increased safety, among other benefits. This guide seeks to inform transit agency officials on how to think about and design an appropriate evaluation, while also remaining aware of the constraints faced by agencies. This guide also emphasizes important considerations agencies should take with respect to validating data, protecting sensitive information, and developing communications plans.

Findings and Conclusions

This document offers guidance for transit agency consideration in evaluating deployments of transit bus automation technologies.

Key findings from the report include the following:

- **Identify program goals and audience.** It is critical to identify transit program goals for deployment of automated transit buses. Such goals illustrate what a transit agency aims to accomplish and why the program is needed. Some goals for deploying an automated transit bus technology could include saving fuel, improving the operator's experience, and increasing transit system ridership. In addition to goals, agencies should identify the audiences who will be impacted by a project. Those impacted could include riders, persons with disabilities, motorists, agency staff, and local businesses.

- **Develop logic model.** After identifying program goals, it is helpful for agencies to develop a logic model. As described in this report, logic models summarize how a program's inputs and activities achieve intended goals. In addition to creating a logic model, agencies should also consider external factors that may affect a technology's deployment or observed outcomes. Such external factors can include changes in legislation and declines in the broader economy.
- **Choose evaluation design.** Program goals and the logic model inform the questions that an evaluation seeks to answer. Evaluation questions should be clear and specific, and the terms used in the questions should be readily defined and measurable. An evaluation design is the overall strategy used to answer evaluation questions. Case-study designs allow evaluators to explore issues in depth and are suitable for both qualitative and quantitative data gathering. However, case studies are typically limited to a small sample size. Statistical-analysis designs offer a variety of quantitative methods for identifying the ways in which a program led to its observed outcomes. However, care must be taken to explain the causal relationships (why did X lead to Y?) that inform statistical results.
- **Collect and analyze data.** Once an evaluation design is selected, evaluators should choose appropriate qualitative and quantitative methods for collecting and analyzing data. Such methods could include administering surveys and questionnaires, deploying roadside and in-vehicle sensors, examining agency records, and leading key-informant interviews and focus groups.
- **Additional considerations.** At the earliest possible stage, transit agencies should confirm with private-sector and other partners how data will be protected and shared. Such data may include commercially sensitive or personally identifiable information that cannot be publicly shared. In addition, evaluation teams should ensure that they periodically validate data collection. Data validation ensures that problems (e.g., equipment failures, delays in survey or interview administration) can be fixed early with little impact to the final results.

Benefits

This guide aims to provide information to transit agencies seeking to evaluate their deployments of automated transit buses. Evaluations of automated transit-bus technologies generate and further knowledge, and such knowledge can ease future technology deployments for a wide range of agencies. Agencies can also use rigorous evaluation results to better position themselves to advocate for public-transportation funding. Beyond transit agencies, evaluation findings can generate positive results for such stakeholders as local businesses, researchers, and the traveling public.

Project Information

FTA Report No. 0149

This research project was conducted by the John A. Volpe National Transportation Systems Center. For more information, contact FTA Project Manager Steven Mortensen at (202) 493-0459 or Steven.Mortensen@dot.gov. All research reports can be found at <https://www.transit.dot.gov/about/research-innovation>.