FTA Transit Bus Automation Research Roadmap

Scope and Approach
The Federal Transit Administration (FTA) Office of Research, Demonstration and Innovation is working with the John A. Volpe National Transportation Systems Center (Volpe) to develop a five-year Transit Automation Research Roadmap.

The research focus is on transit bus operations, with “bus” defined broadly to consider a range of passenger capacities, including both traditional and novel vehicle designs.

Preliminary Findings
- Potential benefits include avoiding collisions, lowering operational costs, improving service frequency and flexibility, and enabling new service models.
- Bus transit automation R&D in the United States lags behind that of Europe and Asia and behind domestic automation R&D for light-duty and commercial vehicles.
- Safety and security, operational issues, cost-effectiveness, passenger experience, and equity are key risk categories for transit automation.
- Transit agencies face many potential barriers to automation (legal, financial, and institutional), in addition to technical challenges.
- Initial modeling results show a generally favorable business case for investment in advanced driver assistance systems (ADAS) on transit buses. However, ADAS capabilities are not yet widely available in the bus market, and the return on investment will vary based on specific characteristics of the transit service.
- Fully driverless shuttle vehicles and ADA paratransit offer potentially significant cost savings, but only in scenarios without an onboard attendant.

Draft Research Needs

Safety and Security
- Human Factors, including the response of bus operators, transit riders, and other road users to automated vehicle functions and their impacts on safety functionality
- Standards for automated vehicle functions
- Cybersecurity implications of connected and automated vehicles

Impact Assessment and Business Case
- Operational Impacts, including the effects on vehicle performance, run times, and scheduling
- Cost-Effectiveness and the internal agency business case for investing in automation capabilities
- Product Availability in the unique U.S. transit bus market
- Operational Models and service characteristics
- User Acceptance from drivers, passengers, and other road users
- Development, Testing, Demonstration, and Evaluation of high priority use cases

Policy Research
- Law, Regulation, Liability, and Insurance, including unresolved legal and institutional issues related to novel technologies and services
- Labor Relations and Human Resources, including both new skilled labor needs and the potential for job loss
- Accessibility questions related to fully driverless vehicles
- Equity, including socioeconomic, geographic, and modal considerations

Passenger Experience
- Travel Times and Reliability, including transit automation impacts on vehicle speeds, run times, and service reliability
- Customer Service, including automation of non-driving tasks
- Ride Quality, including impacts on standing and unrestrained vehicle occupants

Next Steps
- Roadmap Workshop (early fall 2017)
- Review of Federal, State, and Local Policies (underway)
- Transferability of Light-Duty and Heavy-Duty Automation Technologies to Transit Applications (underway)
- Knowledge Transfer to Key Stakeholders and Audiences (fall 2017)

Low-Speed Automated Shuttle Deployment Information-Sharing Working Group; and documenting findings.

Preliminary Findings
- The marketplace is evolving rapidly as new manufacturers and existing automakers alike work to develop innovative technologies and mobility systems.
- Most projects are passenger-oriented and test technology feasibility and basic user acceptance, though some deployers are interested in freight applications.
- All known demonstrations and pilots have used onboard operators.

Next Steps
- Continue engaging with manufacturers, fleet operators, and communities interested in deployments.
- Document findings to inform future DOT research and activity in this area.

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