Research Project Name: Operational Innovations for Efficiency and Accessibility of On-demand Mobility in Rural Areas
Recipient/Grant (Contract) Number: 69A3552348321
Center Name: Rural Safe Efficient Advanced Transportation (R-SEAT) Center
Research Priority: Improving Mobility of People and Goods
Principal Investigator(s): Yanshuo Sun, Ren Moses
Project Partners: Jacksonville Transportation Authority (JTA); IT Curves
Research Project Funding: $73,866 (Federal request); $36,933 (Non-Federal cost share)
Project Start and End Date: June 1, 2024 – October 31, 2025
Project Description: Unlike the fixed-route transit service, microtransit can thrive in rural and suburban areas with low demand density, because its operation is tailored to individual travel plans. Therefore, microtransit has great potential in improving mobility and accessibility for certain individuals in rural areas. Although many researchers have investigated how microtransit vehicle schedules and routes can be optimized, it is widely assumed that travel requests submitted by individual riders are accommodated independently, without exploring any coordination among riders. The proposed project aims to relax this assumption and test the hypothesis that a microtransit operator can significantly improve the operational efficiency (measured by the vehicle occupancy) by merely adjusting the requested pickup time windows through a process named *rider schedule coordination*. The following research tasks are proposed under this project: conducting a comprehensive review of individual decision-making coordination in microtransit, formulating and solving a mathematical program for schedule coordination, and deriving insights from extensive numerical studies and case studies. This project, once completed, can improve the microtransit accessibility for residents in rural communities and reduce the service delivery cost for the operator, both of which are well aligned with the center's themes.
US DOT Priorities: The proposed research project is directly related to the key themes of R-SEAT, because it seeks to address the research needs of on-demand microtransit operators, especially those providing services in rural and small urban areas. From the riders' perspective, it is expected that individuals in rural communities would gain improved access to activity centers such as school, employment, and medical opportunities, thus promoting mobility and accessibility. From the operator's perspective, due to the low demand density, the average vehicle occupancy of microtransit could be very low, which means unsatisfactory operational efficiency. The proposed rider schedule coordination method can directly improve the microtransit vehicle utilization and reduce the microtransit operating cost while serving all rider requests. The research findings from this project, once successfully deployed, can help increase economic efficiency, and stimulate transformations in microtransit.
Outputs: This project yields the following outcomes: an in-depth review of the scholarly literature on rider behavior coordination in on-demand microtransit, an efficient optimization algorithm for supporting the implementation of the proposed rider schedule negotiation approach, and some key policy insights into the real-world deployment of rider schedule negotiation in microtransit, discovered through numerical studies under this project.

The research team has submitted a final project report and prepared technical articles for peer-reviewed journals to disseminate the research findings.
Outcomes/Impacts: All five research tasks were completed in 2025. The following conference paper was presented in the 2026 TRB meeting. Lan, Z., Chen, S., and Sun, Y. Benefits of Rider Time Window Expansion in On-Demand Mobility Services, Transportation Research Board 105th Annual Meeting. Washington, D.C. January 2026 One journal paper titled "Assessing Rider Schedule Flexibility as a Lever for Microtransit Efficiency: The Annapolis, MD Case" is under review by Transportation Research Part C for publication as of April 2026.
Final Research Report: The final research report was submitted to R-SEAT.