



Florida Department of Transportation Research

Transit Boardings Estimation and Simulation Tool (TBEST) Calibration for Guideway and BRT Modes

BDK85 977-40

As demand for public transportation grows, planning tools used by Florida Department of Transportation (FDOT) and other transit agencies must evolve to effectively predict changing patterns of ridership. A key tool for this purpose is the Transit Boardings Estimation and Simulation Tool (TBEST), which is a state-of-the-art comprehensive software package and ridership forecasting model, mainly used as a short-term transit service planning tool.

In this project, University of South Florida researchers extended TBEST's forecasting capabilities for fixed-route bus transit to include light rail transit (LRT) and bus rapid transit (BRT). In general, this task required two steps: (1) implementation of appropriate equations and data structures in the TBEST software, and (2) calibration of the software to Florida communities and to the measured experience of LRT and BRT in attracting riders. However, there is no LRT in Florida, and BRT systems in Florida are too new to have robust before-and-after data, so researchers needed to adopt other strategies to produce new modeling capabilities in TBEST.

For BRT, the researchers identified rider-attracting features in BRT services across the country; the services ranged from "dressed up" bus service to highly distinctive services on dedicated guideways – practically becoming light rail on rubber tires. They also found that, even where BRT systems existed, the data desired to effectively model those systems was not available. In addition, BRT systems are in their infancy in the U.S., and a dedicated ridership and the positive public perception that drives it are still developing.

The researchers separated BRT features into groups: features whose impacts can be captured by standard service variables; and features dependent on perception or service quality. The modeling system they built included a scaling factor to provide the flexibility to comprehend the wide variety of real systems. At this stage of BRT



The MetroRapid bus rapid transit (BRT) is under construction in Tampa. Distinctive stops are an important feature in attracting riders to BRT.

implementation, modeling must depend more on fitting and judgment; later, as better data become available, the model allows a shift to more rigorous, data-driven statistical calibration.

Although similar to BRT, LRT involves infrastructure issues that BRT does not, and the range of features has important differences. Though LRT has been deployed in some areas for decades, the total number of systems is only around two dozen, and data from those systems are limited. Parameters must often be borrowed from systems with similar contexts, if available. To calibrate the LRT component for TBEST, the researchers took the novel approach of using other forecasting tools to build a model ridership, with the advantage of drawing on rider behaviors validated in the other forecasting tools.

To increase mobility for Florida's residents and visitors, to reduce crowding on roadway systems, and to reduce pollution and greenhouse gases, increased and more diverse transit services must be an important part of Florida's ever more populous communities and crowded roadway systems. With the forecasting tools developed in this project, transit agencies can more confidently plan their first steps to adding light rail and bus rapid transit to their multimodal mix.