FTA

FEDERAL TRANSIT ADMINISTRATION

U.S. Department of Transportation
Federal Transit Administration

REPORT SUMMARY

Integrated Corridor Management Transit Vehicle Real-Time Data Demonstration: Dallas Case Study

Background

The Integrated Corridor Management (ICM) Initiative is a U.S. Department of Transportation project designed to aid the integration of multiple transportation networks and modes located within a corridor. The ICM Initiative selected two sites for a Pioneer Demonstration, Dallas and San Diego. Within those sites, critical data gaps limiting ICM adoption were identified; one such data gap was real-time transit vehicle passenger loads. To address this data gap in Dallas, Dallas Area Rapid Transit (DART) was awarded $900,000 by the Federal Transit Administration (FTA) to install automatic passenger counter (APC) equipment that was capable of transmitting passenger load data in real-time back to the train control center (TCC) and ICM system.

Objectives

FTA sponsored this case study to better understand how this new technology is being used and what benefit it can have for transit agencies. To best focus on situations with the greatest potential impact from real-time APC data, incidents in the transit network, both planned and unplanned, were studied. It was envisioned that the APC/AVL technology, combined with closer inter-agency coordination, would result in a change in incident management, possibly with better transit load balancing or mode shift recommendations.

Findings

This report addresses issues of how APC and AVL technologies can be leveraged within DART to improve operations whether or not these operations are part of an ICM strategy.

Prior to the start of the ICM project, DART had already installed APC equipment on 48 of its Light Rail Vehicles (LRVs). The award provided funding for 20 additional LRVs to cover the entire Red line with APC equipment and communications software upgrades on all equipped LRVs for real-time transmission to the TCC. This combination of APC, improved communication technologies, and pre-existing automatic vehicle location (AVL) information allows DART to track passenger loads in real-time within the network. These data are used by the Dallas ICM Decision Support System to recommend transit strategies and at the TCC to allow controllers better insight into passenger loads on trains and situations involving overcrowding.

Following site visits and interviews before and after the demonstration, it was clear that DART controllers had changed some aspects of incident management, specifically targeting improving the customer experience, although benefits could not be maximized due to various infrastructure and policy constraints and limitations.

Despite some technical difficulties, controllers consistently articulated changes to how incidents are managed, identifying situations in which decisions about passenger offloading are made earlier, deferred until later, or made with more confidence about the outcome, based on the specifics of the situation. Moreover, controllers are more comfortable with turning back trains before the terminus to address crowding due to incidents. All such interventions remain rare, but are notably different compared to the pre-deployment period, especially as these changes are without any formal changes to policy or standard operating procedures.

DART rarely was able to add consists or add cars to existing consists. Any additions are limited to off-peak periods and are not commonly used. This additional flexibility to respond to incidents and overcrowding is limited due to a combination of existing infrastructure, policy choices of the agency, and the inherent nature of a fixed guideway transit system. LRVs and operators may not be close to the location of an incident to add capacity, nor may the LRVs and operators be co-located, and agencies rarely have large supplies of unused vehicles or staff, particularly in peak periods. Specific to DART, all rail lines converge to move through the Central Business District on a shared track, further reducing capacity to add service due to very short headways, time required to use the crossovers at either end of the area, and short platforms at some stations.

DART has traditionally had a policy of not offloading trains or skipping stops to maximize customer convenience. However, the APC data have allowed controllers to get a better sense of the trade-offs facing customers as well as capacity available on trailing trains to better trade-off delays faced by groups of customers across the system. This change likely is due partially to the growth of the DART rail system during the observation period, significantly expanding two lines, and the increasing sophistication of transit users as the system ages.

To benchmark the DART experience, particularly in light of the limitations DART faced to adding service, four additional transit agencies were surveyed that operate light and heavy rail transit. In general, these agencies faced similar constraints, although they have responded in different ways; some are more willing to express trains, for example. Infrastructure-based constraints are common, and information on projected costs were collected from agencies that have considered projects to alleviate constraints.

Benefits

New applications of technologies such as use of real-time APC data may allow transit agencies to be more flexible in how they respond to unplanned incidents by better understanding passenger load and demand across a network. Agencies can use this information to enact new strategies that were previously unavailable, impractical, or unreliable. To obtain and use real-time information, agencies may need to invest significant resources in updating equipment and software as well as training employees to use the new equipment.

Project Information

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