

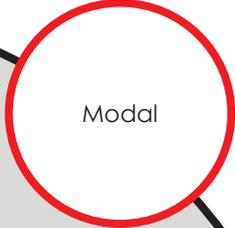


Caltrans Division of Research,
Innovation and System Information

Research



Results



Modal

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Project Title:

Development of a Deployable Integrated Dynamic Transit Operation System (IDTO) for Revolutionizing Suburb Transit Operation in California

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Development of a Deployable Integrated Dynamic Transit Operation System (IDTO) for Revolutionizing Suburb Transit Operation in California

Continue to demonstrate a fully functional IDTO prototype system that enables T-DISP and T-CONNECT services and real-time information for transit operations and travelers.

WHAT WAS THE NEED?

Transit service has been very cost ineffective and the level of service, when measured by connectivity and service frequency, has been generally undesirable in the majority of suburban regions in California. The recent development of Connected Vehicle technologies (broadly defined as communication and positioning technologies) and real-time information about the overall transportation systems (both transit and highway networks) has begun to make dynamic transit operation feasible.

Dynamic transit operations, including Dynamic Dispatch (T-DISP) and Connection Protection (T-CONNECT) can substantially improve transit service quality by providing faster, more convenient, and cost effective trips to the traveling public. T-CONNECT application scenarios are intended to improve the successful transfer between mode (from car to bus, train to bus) and between different bus routes of an individual agency.

T-CONNECT enables public transportation providers and travelers to communicate to improve the probability of successful transit transfers. T-DISP application scenarios are intended to adjust transit operation to be more responsive to travelers' demand and traffic conditions. UC Berkeley California Partners for Advanced Transportation Technologies (PATH) proposes transforming current fixed route operation into dynamically focused transit services in suburban regions across California.



DRISI provides solutions and knowledge that improves California's transportation system

WHAT WAS OUR GOAL?

The goal was to address the needs of suburban transit agencies in California and across the country. This research best serves three of Caltrans' Goals, namely Flexibility, Reliability, and Performance. For Flexibility, the Strategic Focus is to enable transit as an integral portion of solutions to congestions; for Reliability and Performance, the Strategic Focuses are operation and reliability improvements.

WHAT DID WE DO?

This proposed study is the second phase of the research on Integrated Dynamic Transit Operation (IDTO). The objectives of the proposed research were to:

1. Conduct thorough analyses on how an optimized transit schedule and IDTO will enable a completely new operation strategy for suburban transit operations. This was to offer faster and better transportation services that attract choice travelers, reduce the transit operation costs, and allow public transit to assume a greater role in the overall solution in reducing transportation congestion, increasing safety, and improving air quality.
2. Develop a deployable system that implements the full IDTO strategies and conducts full scale field operational tests of the IDTO system at the Tri-Delta serviced region.
3. Develop deployment and commercialization plans for widely deployed IDTO systems for suburban transit operations within California.

WHAT WAS THE OUTCOME?

The developed IDTO system was tested full-scale on nearly the entire bus fleet of the Tri Delta Transit Agency during the FOT period between May 2019 and March 2020. The developed IDTO Mobile App was tested on real trips of bus routes and launched on the iOS and Android platforms. The T-CONNECT connection protection services and D-RIDE on-

demand micro-transit services are implemented based on the operations of dispatchers via the Driver-Vehicle Interfaces installed in the Tri Delta Transit buses. The FOT collected a rich set of data to evaluate the benefits and impacts of IDTO.

- The IDTO system successfully acquired real-time transit operation and delivered information continuously to transit agencies, operators, and travelers. The IDTO system generated the data on estimated time of arrival based on the General Transit Feed Specification -realtime for two agencies with 28 routes and monitored the T-CONNECT and D-RIDE service for 540 trip pairs every day.
- The Driver-Vehicle Interfaces operated constantly with on average 9.6 operating hours daily, which indicates the stability and effectiveness of the operation. Operators' response rate has increased from 22.40% to 34.42%, representing the sufficient user engagement with the system.
- The T-CONNECT connection protection service and D-RIDE on-demand micro-transit service were able to reduce on average 6.24 minutes and 3.63 minutes of travel time for each traveler. Also, while T-CONNECT induces waiting times of buses at stops, the dynamic operation proved its efficiency considering the on-time performance where the buses are able to reduce the delay time by 53.75% at the downstream timepoint.

WHAT IS THE BENEFIT?

The analysis of FOT results demonstrates that IDTO provides a stable, effective, and efficient service to transit agencies and travelers and supports dynamic transit operations by establishing communications and enhancing real-time operations. The IDTO has accommodated both the traveler's trip planning and agencies' on-demand operations, which provide the opportunities to improve the transit service quality and to facilitate better operational decisions.



Moreover, the IDTO also has proven the significant benefits to travelers from reducing travel times and improving connectivity. It therefore has great potential to increase ridership and reduce operation costs.

LEARN MORE

Final Report Available soon - Early 2021 .

IMAGES

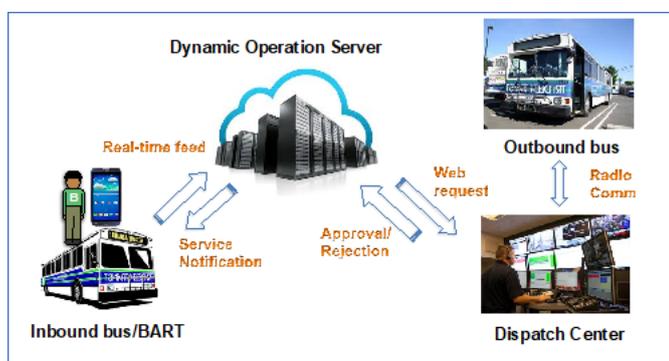


Image 1: IDTO Phase II Systems

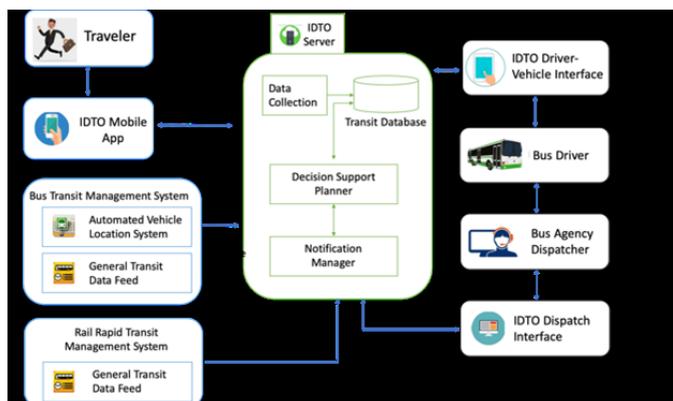


Image 2: Framework of IDTO Phase II Systems

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