

DRISI

CALTRANS DIVISION OF RESEARCH,
INNOVATION AND SYSTEM INFORMATION

Research Notes

Modal

APRIL 2024

Project Title:
Measurement and Prediction of
Transit System Performance Using
Probe Data Generated through
DSRC and non-DSRC Technologies

Task Number: 3514

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Measurement and Prediction of Transit System Performance Using Probe Data Generated through DSRC and non-DSRC Technologies

Develops a suite of data protocols to readily transform dedicated short-range communications (DSRC) data from city buses into measurements of transit performance.

WHAT IS THE NEED?

The Caltrans Strategic Management Plan targets a doubling of transit, a reduction of statewide per capita vehicle miles traveled, and a reduction of greenhouse gasses and particulate matter emissions. Rapidly emerging information and communication technologies present effective means to measure current transit system performances against expected objectives.

There is a need to develop software and protocols to collect and analyze the transit data generated by these new technologies to ensure the benefits of these infrastructure investments are realized for the public.

WHAT ARE WE DOING?

This project will create a standardized set of procedures that transit agencies can readily implement to collect, analyze, and display the data generated by on-vehicle communication technologies. Specifically, this project will:

1. Identify the probe data to be transmitted
2. Specify the transmission protocols
3. Structure the collection of the data
4. Integrate those data with relevant general transit feed specification (GTFS) data
5. Determine the fundamental metrics to be calculated to analyze:
 - a) Dwell time at stops
 - b) Transit time between stops
6. Determine the application of these metrics to report performance at:



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knowledge that improves
California's transportation system

- a) The route level
- b) The run level
- c) The segment level
7. Create the code to generate an easy-to-use “dashboard” to readily assess transit performance through these metrics
8. Incorporate sufficient detail to understand the impact of:
 - a) Boarding/Alighting flows including ramp deployment
 - b) Traffic conditions including signal prioritization
 - c) Weather conditions based on vehicle sensors
 - d) Bus driver behaviors.

WHAT IS OUR GOAL?

This task order develops a suite of data protocols to readily transform DSRC data from city buses into measurements of transit performance.

WHAT IS THE BENEFIT?

The proposed project carried out via this task order aligns with two Caltrans priorities:

- Modality – this research will leverage transit by measuring their performance.
- Innovation – this research is embracing the dedicated short-range communications data and other real-time data to help Caltrans solve major planning issues.

WHAT IS THE PROGRESS TO DATE?

The researchers continued to refine the method to impute stop arrival and departure times from the GTFS “Vehicle Position” variable feeds. They made one key change which was to derive speed from local travel conditions to remove reliance on external (i.e. outside of the GTFS environment) data sources.

The final products have been delayed while the research team does some additional troubleshooting on the stop time estimation algorithm that drives the core metrics, and they will be using the imputed data to complete the draft sections for Caltrans review.