

MAY 2019

Project Title:
Interactive Transit Station Information System (ITSIS)

Task Number: 2521

Start Date: June 30, 2014

Completion Date: April 24, 2018

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Interactive Transit System Information System (ITSIS)

Interactive Transit Station Information System (ITSIS) is the implementation of innovative strategies incorporating Connected Vehicle technology in transit traveler information.

WHAT IS THE NEED?

Although public transit is an important means of transportation for many American travelers, it is still largely underutilized. Encouraging greater transit use is seen as part of the integrated solution to the congestion problem in metropolitan areas and has been a major objective for transportation innovations such as Integrated Corridor Management.

The real-time transit traveler information system has been one of the key innovations to enhance the user experience and encouraging mode shifts. Effective solutions have already been implemented worldwide and are providing essential core travel information to users, empowering them to make better transportation choices. While this information is typically still provided to travelers using messaging signs at fixed locations. Recently, it is becoming more common for it to be made available through the Internet and personal smart phone applications. There exists several gaps in the current implementation of real-time transit traveler information system that the research contract proposes to overcome, making it a more reliable system for travelers to use.

WHAT WAS OUR GOAL?

- To identify issues and gaps of the existing real-time traveler information communication systems.
- To develop issue-resolving concepts and approaches for an ITSIS using Dynamic Short Ranged Communications (DSRC) based Connected Vehicle technology.
- To conduct testing of a prototype ITSIS traveler information hub utilizing the existing California Connected Vehicle



Caltrans provides a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability.

Corridor located on El Camino Real in the Bay Area.

WHAT DID WE DO?

Under this project, through literature review and working with representatives of transit agencies, issues and gaps of the existing real-time traveler information communication systems have been identified. A concept of operation of ITSIS for were developed to address identified issues using Connected Vehicles technologies and an ITSIS system architecture an integrated transit information/management system designed by California PATH. Three scenarios are developed to show how ITSIS could help transit passengers on deciding and making trips, as well as facilitating dynamic operations by transit operators.

Scenario 1: Acquiring Transit Service Information
Scenario 2: Acquiring Transit Trip Information
Scenario 3: On-Demand Transit Station Operation

The scenarios 1 and 2 focus on the dissemination of transit traveler information to passengers. The scenario 3 aims to enhance transit operations by providing bus operators with real-time 'passenger waiting' information. Each scenario may include a number of use cases.

An prototype ITSIS, including a transit trip planner, the arrival time prediction algorithm and a functional user interface, was designed, developed, and field tested with surveys at two transit stops. The interactive display was mounted on shelters at the southbound station at the El Camino Real & California Ave bus stop in Palo Alto, CA and the southbound station at Santa Clara Street at 6th Street (near San Jose State University in San Jose, CA. Field data collection involves randomly invited passengers to participate in surveys.

WHAT WAS THE OUTCOME?

The outcome shows that responses distributions associated with the survey conducted at Palo Alto can be considered as consistent with that associated with the City Hall counterpart. Only the response distributions for about importance of wait-time estimates and about importance of schedule may be considered different. However, the two possible differences can possibly be explained by the observation that the Palo Alto passengers have a higher proportion of technology workers. The following was made as a thorough analysis of the surveys.

- All functions of ITSIS are important (or valuable) or very important (or very valuable) to more than 70% of the surveyed passengers, except for the map function. The current Map function of the ITSIS prototype provides a static map, which is also provided as all bus stops as a poster; the current Map function is considered as valuable or very valuable by 48.5% of the surveyed passengers. (We asked the passengers to express their opinions about the static map currently provided by the ITSIS prototype, although we did tell them the potential of the current map function for many added features.)
- 35.2% of the passengers agree or strongly agree that a system like ITSIS would make them ride buses more frequently.
- The result of this survey suggests that, compared with the result of a 2002 survey of revealed interest in bus-station information, real-time information, e.g., estimated arrival time of the next and the subsequent buses, now receives more interest than its static counterpart, such as the bus schedule and route map..

WHAT IS THE BENEFIT?

Overall, the results showed that the passengers are pleased with ITSIS and the general appreciation of the ITSIS information does not depend on the location of the bus station and the gender of the passenger. The project team recommends that a larger scale and longer duration of field testing ITSIS be conducted using real-time transit information panel products. Valley Transportation Authority is deploying these products at a few busy bus stop locations. The deployed real-time transit information panels provide most of the basic functions that ITSIS provides. It is recommended that ITSIS transit connection information be incorporated into these products and a thorough field operation test and evaluation be conducted. Future improvements based on this field operation test will support a path forward, ending with a workable and deployable ITSIS product.

IMAGES

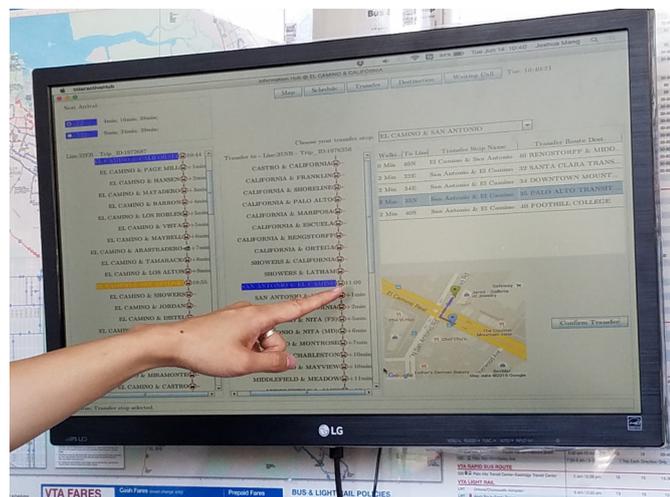


Image 1 – Prototype ITSIS System Information Hub Displaying Bus Stop Transfer Information (bus times for both arriving and transferring buses, location of bus stops, distance to walk and bus

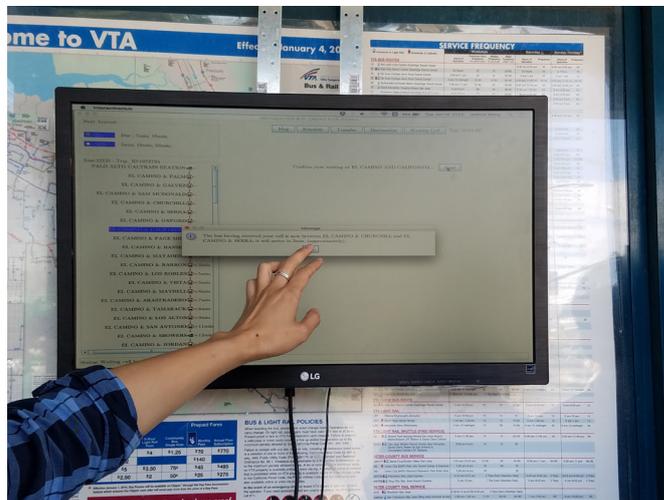


Image 2 – Prototype ITSIS System Information Hub Displaying Sending Call Waiting Message to Bus (Test Vehicle) and Acknowledgement from Bus On-Board Equipment.

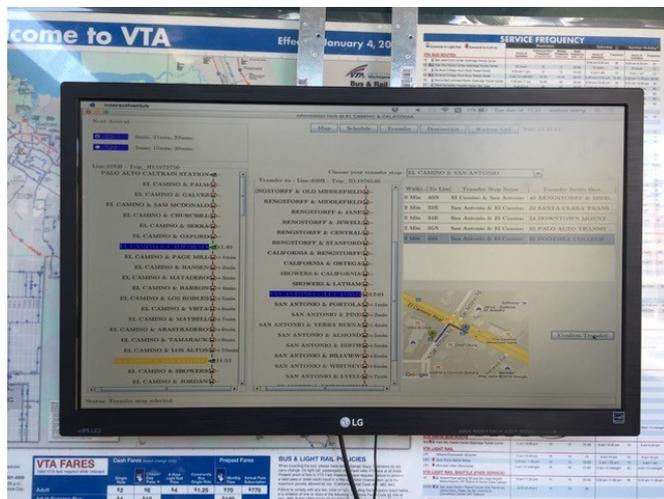


Image 3 – Prototype ITSIS System Information Hub showing the bus line information and the nearby bus stop transfer information for a traveler who is planning a trip.

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