Portable Travel Time Displays & ICM with Parallel Routes

Identifying Portable Travel Time Deployment Sites
November 30, 2016

Departments of Transportation (DOT) have found that displaying travel time messages on Dynamic Message Signs (DMS) can be an effective mechanism for informing travelers about expected delays along their route. This information provides the traveler with information to determine whether they continue along their route or consider an alternate route (if available). Deploying a DMS is a costly investment for a DOT and after the deployment it may be found that the anticipated impact on traffic is not recognized. Therefore, the ENTERPRISE members were interested in exploring a project to deploy portable DMS at locations where it is anticipated travelers may divert to another parallel route based on travel times posted to determine if the selected location will have an impact on traffic. The purpose of this document is to provide overall background information on the project and assist agencies in participating in this project by identifying a location(s) for a portable travel time deployment site in order to summarize results (e.g. benefits, lessons learned) based on multiple locations.

What do we know about travelers' reactions to web and roadside travel time displays?

ENTERPRISE completed a project in 2012 "Impacts of Traveler Information on the Overall Network" to understand the impacts that travel time message displays (web and roadside) have on the network. The project conducted on-line surveys that were linked from Minnesota DOT and Washington State DOT traveler information websites to gather feedback from travelers on their use of travel time information displayed on the web and on the roadside. In addition, historical travel time displays on DMS together with related traffic volume data (from locations downstream of the DMS) from Minnesota and Washington networks were analyzed. Both the survey and data analysis revealed that when roadside signs display travel times higher than typical, there is a direct correlation to the number of travelers that divert to alternate routes. The survey responses verified these findings. In addition, from the two metropolitan areas (Minneapolis/St. Paul, Minnesota and Seattle, Washington) studied, the thresholds for when travelers diverted based on travel time messages on DMS were approximately double the typical travel times. These results confirmed that travel time displays have an impact on traffic, however the project did not go into a next phase to understand what locations are conducive to travel time displays being effective at diverting traffic.

What is the ENTERPRISE Portable Travel Time Displays and ICM with Parallel Routes Project?

In 2016, ENTERPRISE began a project to develop a concept for a Portable Travel Time Display (PTTD) System that could be deployed in locations to display travel times (along the primary route and possibly along an alternate route). The overall intent of this portable system is to enable Departments of Transportation to test travel time displays and assess whether the impacts will be similar to those found in the earlier ENTERPRISE research noted above.

If a PTTD system is successfully developed, it could be a tool that DOTs deploy for limited periods of time (1-3 months) in locations and assess the impact on the network in order to decide if a permanent deployment of a travel time display system is warranted, before moving the portable system to new sites for further assessment.

While the concept is simple, there are many unknowns, for example:

- How long would a portable system need to be operated in order to predict the impacts of a permanent travel time display system?
- What confidence would DOTs have in the results of a portable system?
- Beyond the quantitative benefits (e.g. reduced travel times along primary route as travelers divert to alternate routes) are there qualitative benefits recognized by travelers and transportation professionals?
- What are the institutional challenges associated with DMS displays that potentially create diversions onto local routes operated by other jurisdictions?

The overall goal of this ENTERPRISE project is to deploy multiple portable travel time display systems, and analyze the results of several deployments to assess the benefits and usefulness of this tool.

What is a Portable Travel Time Display System?

The concept of a Portable Travel Time Display system is equipment that can be positioned to monitor travel times (or speeds) along a primary route, and display this travel time to travelers upstream of a possible diversion point. Optionally, the system could also monitor the travel time (or speed) along the alternate route as well, providing travelers with information about both options. The data collection method may be physical infrastructure (e.g. Bluetooth readers) or data acquired through 3rd Party Data Providers. The display mechanism for the travel times is most likely to be a portable DMS.

The concept for a Portable Travel Time Display system is to be operated for three periods in order to assess the impacts, as follows:

- Period 1 will include data collection and retention to understand the current traffic patterns, with no information dissemination to travelers. A minimum of one week is required for Period 1, but as much as one month would be an ideal timeframe.

- Period 2 will include data collection and processing in conjunction with information dissemination to travelers, together with the same data collection and retention performed in Period 1 to understand the traffic pattern changes with information dissemination to travelers.

- Period 3 will include data collection and retention to understand the traffic patterns with no information dissemination to travelers to assess if the traffic pattern changes remain in effect after discontinuing the information dissemination.

What has been completed so far?

The first phase of the ENTERPRISE project conducted the initial stages of a systems engineering analysis. A Concept of Operations and Requirements document was developed that included:

- Challenges Regarding Urban and Rural Corridor Management
- Current Situation, Challenges and Needs
    - Current Tools for Traffic Data Collection and Information Dissemination
    - Transitional Technologies Expected to Impact Corridor Management
    - Challenges/Issues and Needs to be addressed by PTTD Systems
- Project Objectives
    - Objectives related to Assessing the Likely Impacts of a Permanent System
    - Objective related to Temporary Deployments in Rural or Urban Environments
- Operational Concepts
- Portable Travel Time Dissemination Requirements

The Portable Travel Time Displays and ICM with Parallel Routes Concept of Operations and Requirements document was completed by ENTERPRISE in August 2016.

How can we become involved?

ENTERPRISE has approved the second phase of the PTTD effort to use the Concept of Operations and Requirements developed to deploy PTTD systems. However, to finalize the funding available for deployments, locations for deployment of the PTTD systems need to be identified. The purpose of this document is request your participation in submitting and suggesting locations to serve as a deployment(s) of a PTTD system.

What would be expected to participate in the project?

Expectations of the PTTD sites are as follows:

- **Identify a location to test the PTTD system.** The location should include a primary route and at least one alternate route to reach approximately the same destination. Details about the site selection are included in the Concept of Operations and Requirements document.

- **Deploy equipment and systems to operate the PTTD system.** It would be the responsibility of the agency participating to locate the equipment and system needed to monitor speed or travel times, display the speed or travel times on a DMS display, and record volume on the primary route. Again, details about the needed systems is included in the Concept of Operations and Requirements document. In many situations, existing detection could provide the speed/travel time data. Existing permanent DMS upstream of a diversion point could be used, or portable DMS could be rented for the deployment by the agency.

- **Participate in the overall ENTERPRISE project.** As a Pooled Fund, ENTERPRISE projects do not typically deploy equipment, but rather serve as a central overall evaluation support to the project. In this project, the role of ENTERPRISE provided contractors will be to work with each member agency deploying a portable system to evaluate the data collected and synthesize data from multiple sites to draw any conclusions about lessons learned.

What are the next steps to explore our involvement?

To help you determine participation in this project, and ultimately to enable you to suggest a location for deployment, please answer the following questions.

1. Location.
    a. Is the candidate route 20 miles or less in length (although longer distances are acceptable)?
    b. Does the location include a primary route that is recognized to encounter congestion during non-recurring events such as incidents, weather, or other events?
    c. Does the location include an alternate route that travelers may use to reach a location near the destination of the primary route (or to rejoin the primary route)?

    If you answered yes to 1a, 1b and 1c move to Question 2. Otherwise consider a different location.

2. Data Collection.
    a. Is there any data collection of speed or travel time on this route now?
        i. *Yes, move to Question 3*
        ii. *No, move to Question 2b*
    b. Would you have the capability to procure or deploy data collection for at least the duration of this project (up to 4 months)?
        i. *If no, consider a different location*
        ii. *If yes, move to Question 3*

3. Display Systems.
    a. Is there currently a DMS located within a few miles upstream of the divergent point?
        i. *Yes, move to Question 4*
        ii. *No, move to Question 3b*
    b. Would you have the capability to procure or deploy a portable DMS to a location upstream of the divergent point?
        i. *If no, consider a different location*
        ii. *If yes, move to Question 4*

4. Alternate Route.
    a. Is the alternate route you identified under the same jurisdiction as the primary route?
        i. *Yes, consider submitting your location for a PTTD deployment*
        ii. *No, move to Question 4b*
    b. Do you feel the relationship with the other jurisdiction would support your deployment of this system and be willing to participate in occasional meetings to discuss this project and the results?
        i. *If no, consider a different location.*
        ii. *If yes, consider submitting your location for a PTTD deployment*

Contact

For additional information regarding the ENTERPRISE PTTD project or to submit locations to consider for deployment of a PTTD system, please contact Roy Hulli, Ministry of Transportation Ontario at Roy.Hulli@ontario.ca or Dean Deeter, Athey Creek Consultants, at deeter@acconsultants.org.