

0-7125: Expand Applications for Texas Connected Freight Corridors

Background

The Texas Connected Freight Corridors (TCFC) system is a connected vehicle (CV) environment that seeks to improve safety and mobility for the Texas Triangle, which consists of the Austin, Dallas/Fort Worth, Houston, San Antonio, and Laredo metropolitan regions, as seen in Figure 1.

Through a private and public stakeholder process, 12 applications were prioritized to identify the top applications to deploy given the available funding within the TCFC project. The objective of this project was to expand the initial TCFC system by considering additional CV applications for inclusion and consideration.

What the Researchers Did

The research investigated 12 technologies listed in the Texas Department of Transportation (TxDOT) Freight Network Technology and Operations Plan (FNTOP). As part of the review, the research team attempted to conduct semi-structured interviews with private-sector automated trucking firms to better gauge interest in expanding the number of applications and geographic extent of the TCFC system. However, only one of the eight automated trucking firms responded to the interview questions.

Following the initial investigation, three applications were selected for further assessment:

- Truck Parking Availability System (TPAS).
- High-Resolution Advanced Freight Traveler Information Systems (HRAFTIS).
- Binational Traffic Operations Center (TOC).

Finally, the research team developed implementation frameworks for the TPAS and HRAFTIS.

What They Found

The private-sector company responded that it would rely primarily on its systems, indicating the TCFC system would augment the current systems. The

company showed the most interest in applications that could accommodate automated trucking and were favorable in expanding the TCFC westward on I-10 and I-20 where considerable automated trucking currently operates.

The FNTOP, released in December 2020, identified and evaluated 12 strategies, advanced 10 of the 12 strategies, and selected six for the concept-of-operations development. Some strategies or components thereof are already underway through other TxDOT initiatives. The research team noted examples of deployment, whether in Texas or elsewhere.

For further analysis, the research team selected TPAS because it ranked high within the FNTOP. In addition, TPAS incorporates existing projects such as the I-10 Corridor Coalition Truck Parking System and the TxDOT Connected Work Zone Project.

The research team also selected the HRAFTIS application because of the relative ease of enhancing an existing TCFC application with greater capabilities.

The FNTOP deferred the Binational TOC strategy for further development as part of the TCFC initiative. But the Binational TOC is currently under investigation as part of other initiatives at TxDOT, such as the statewide TOC strategy.

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The research team assessed each application based on its practicality, benefit/cost factors, relationship with CV adoption rate, and level of innovation.

Using the Federal Highway Administration Tool for Operations Benefits/Cost (TOPS-BC) sketch-planning-level decision support tool, the research team calculated the benefit-cost ratio for the three applications. The benefit-cost ratio for TPAS ranged from 2.8:1 for small capacity truck parking facilities to 4.1:1 for large facilities. The benefit-cost ratio varies from 3.6:1 to 8.3:1 for the three HRAFTIS scenarios and 0.2:1 to 4.7:1 for the Binational TOC.

Research gaps remain to better understand each application, and federal grant programs exist to capture funding for implementation.

What This Means

The TCFC system is being developed to improve safety and mobility for freight and fleet vehicles along some of Texas's most heavily traveled corridors. Although only focused on a few applications as part of the project, the TCFC system offers the opportunity to incorporate additional applications. This project considered potential applications to expand the initial TCFC system by reviewing existing CV efforts and pursuits, surveying key stakeholders, assessing the effectiveness and financial feasibility, and outlining the next steps for procurement and implementation. Researchers recommend TxDOT pursue grant funding opportunities to support the expansion of the TCFC system and use the implementation framework for TPAS and HRAFTIS applications.



Figure 1. Texas Connected Freight Corridors System Physical Boundaries.

For More Information

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