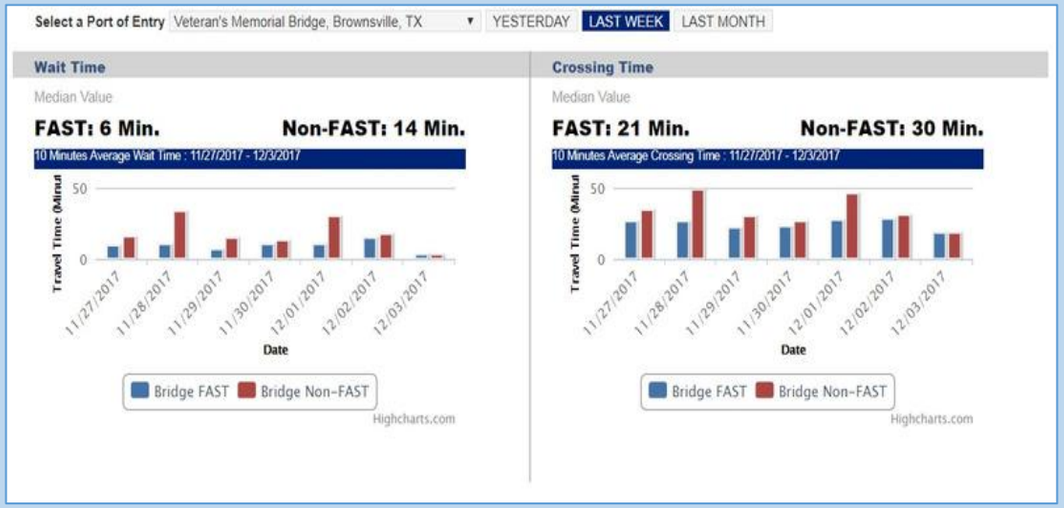
Border Crossing Information System

CASE STUDY

Automated performance measurement for Texas' border crossings.

Freight Challenges	Congestion, Last Mile Access
Data Sources Used	Administrative Records, Wireless Address Matching
Analytical Approaches	Speed, Re-Identification



BCIS Historical Data Visualization

Source: Border Crossing Information System. [Online]. Available: http://bcis.tamu.edu/index.aspx

WHAT ARE THE FREIGHT CHALLENGES?

Border crossings facilitate significant freight flows. For example, in 2016, the Laredo, TX port of entry handled more than 160,000 trucks per month (Bureau of Transportation Statistics, 2017). The high truck and passenger traffic volumes associated with border crossings means that they are frequently congested. Furthermore, some border crossings are not directly connected to limited access freeways, which means they also generate "last mile" surface street congestion.

WHAT WAS THE GOAL OF THE PROJECT?

Texas' Border Crossing Information System (BCIS) was created to automatically monitor the performance of border crossings by measuring time spent waiting to cross the border. Measuring wait time and identifying possible peak travel times in advance helps border authorities plan ahead for operations considerations like staffing. It also helps shippers plan crossing times more accurately.

WHAT DATA SOURCES WERE USED?

Data on crossing time is collected by observing trucks equipped with Radio-Frequency Identification (RFID) tags. Additional observations of crossing time come from administrative records, such as recorded observations of crossing time from border staff.

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RFID Antennae Installation
Source:Border Crossing Information System. [Online]. Available: http://bcis.tamu.edu/index.aspx

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WHAT ANALYTICAL APPROACHES WERE APPLIED?

A RFID antenna within each truck has a unique identifying number or address. At multiple points along the entry lanes to the border, radio transmitters along the roadway broadcast a query to the RFID antennae. When queried, these antennae can then broadcast their unique wireless address to a roadside receiver. The BCIS system records observations of specific RFID numbers as trucks pass through the border. Crossing time and speed are calculated by comparing the difference in times and locations between each observation of an RFID address along the crossing's entry lanes. These calculations of crossing time are archived, and used to calculate more complex measures such as travel time reliability. The picture at left shows installation of RFID antennae on the US side of the border.

WHAT WERE THE RESULTS?

The BCIS demonstrates that RFID technologies can be used to generate estimates of travel time along a corridor, and that records of these RFID-derived times can be used to calculate more complex measures such as travel time reliability. The system also provides an example of the value of public-facing performance dashboards, which can be used by public decision makers to easily analyze performance trends over time and adjust plans and policies such as staffing plans at border facilities. This public-facing performance information is also valuable for shippers and carriers, who can use the information to change their border crossing schedules to travel at less-congested times, or plan trips and schedules to account for peak crossing times.

HOW WERE THE RESULTS VISUALIZED OR COMMUNICATED?

The BCIS maintains a website that publishes real-time information on crossing times as well as a long-term performance dashboard. This website aids in both real-time trip planning and identification of longer-term trends in border crossing times. A sample of the dashboard's historical data is shown on the previous page.