

## Research Results



# Measuring Travel Time in Freight Significant Corridors

## The Problem

The U.S. freight distribution system is the largest and most complex in the world, moving several billion tons of goods to domestic and international markets. In addition, almost all sectors of the freight industry are experiencing regular growth rates of 5% or more – meaning freight movement could double in a twenty-year time frame.

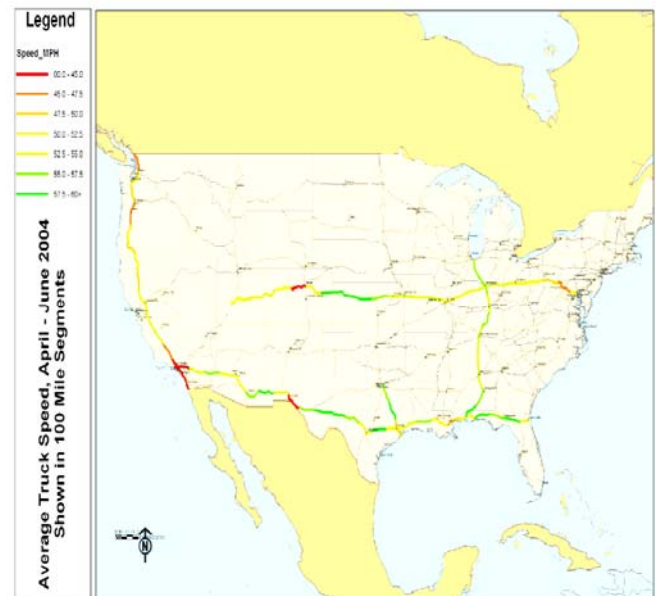
In terms of domestic freight revenue, the trucking industry is the largest sector, moving more than 81% of all goods in the U.S.<sup>1</sup> In response to this economic growth, the Federal Highway Administration (FHWA) contracted with the American Transportation Research Institute (ATRI) to develop and test a national system for monitoring freight performance measures (FPM) on key interstate corridors. ATRI recently completed the second phase of the FPM initiative using advanced data collection and processing techniques to assess the transportation system's ability to manage increasing demand for freight. This ongoing project continues to expand the FPM system in order to provide valuable information to transportation planners. This allows planners to better identify system impediments such as traffic congestion and other capacity bottlenecks. In doing so, all users of the transportation system, including the trucking industry, can benefit from improvements in efficiency and safety.

## Research Goal

The FPM initiative employs advanced vehicle tracking technologies, advanced data processing software and algorithms, and diverse mapping

capabilities. More specifically, using satellite data from a technology vendor, ATRI measured average travel rates for five freight-significant corridors (I-5, I-10, I-70, I-45, and I-65). The data were used to derive average travel rates and two additional measures, a Travel Time Index (TTI) and a Buffer Index (BI). TTI, a measure of reliability, is the ratio of observed average travel time to free flow travel time (estimated at 60 miles per hour).

Prior to the technology vendor's release of data to ATRI, it is electronically "cleansed" of identifiers to ensure anonymity.



Data is then processed through a series of customized software programs to generate measures, and plotted along a U.S. corridor map. The data can be manipulated to analyze specific

<sup>1</sup> Freight Forecast to 2015, American Trucking Associations, 2004

segments of a corridor, measure by time of day and day of week, and to view distinct unit movements.

Average travel rates for an individual vehicle are calculated when a truck has at least two known GPS positions. Additional lat/long positions allow for calculations over longer distances. Using a time-stamp that is attributed to each record of a truck's lat/long position, distance and time calculations can be incorporated into an equation that determines average vehicle travel rates. When average travel rates are determined for thousands of trucks over a period of time, stable measures develop that identify freight movement inefficiencies due to traffic conditions, infrastructure conditions, or other factors.

## FPM Phase Two Findings

During Phase Two research, it was demonstrated that:

- Measuring average travel rates for trucks using satellite position data is feasible over longer periods of time.
- Additional measures such as reliability indices are both desirable and feasible.
- The software used for data analysis must be updated on a regular basis to meet the demands for increasing levels and types of data.

Additionally, the research team concluded that:

- It is essential to incorporate legal and technical data privacy tools and techniques to protect the highly sensitive data used in this study.
- It is recommended that standards be developed for freight performance measures to ensure future data compatibility and analysis.
- Lastly, it is proposed that FPM be developed and monitored at border crossings, but additional data types and data collection tools may be needed.

If you have questions or comments specific to this project, please contact the Freight Performance Measures research team at:

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For more information about this and other ATRI studies, please visit:

[WWW.ATRI-ONLINE.ORG](http://WWW.ATRI-ONLINE.ORG)

**Washington State Average Travel Rate for Trucks  
April-June 2004, 10 Mile Segments**



Beyond the five major domestic freight corridors, the ATRI research team also studied the requirements and opportunities associated with applying the FPM system to U.S./Canadian border crossings.



*ATRI's primary mission is to conduct and support research in the transportation field, with an emphasis on the trucking industry's essential role in the U.S. and international marketplace.*