Using Commercial GPS Data to Quantify Truck Performance on Rural Roads

Primary Author: Edward McCormack, University of Washington

Although trucks move the largest volume and value of freight on our nation's roadways, relatively little is known about their travel patterns and how the roadway network performs for trucks. Commercial, in-vehicle, global positioning systems (GPS) are increasingly used by trucking companies to manage their fleets. Several GPS vendors are making the output from these devices available to the research community and public sector organizations. As a result, these devices provide a new source of data that can be used to quantify travel patterns and are the only comprehensive source of wide area performance and travel data for trucks in most rural areas. Since 2007, the Washington State Department of Transportation (WSDOT), Transportation Northwest (TransNow) at the University of Washington, and the Washington Trucking Associations (WTA) have partnered on a research effort to collect and analyze GPS truck data from commercial, in-vehicle, truck fleet management systems. The University of Washington research team worked with commercial GPS vendors to obtain truck data feeds. After a protracted contracting process which resulted in mechanisms to protect truckers' privacy, the vendors now provide daily data for approximately 4,000 trucks that travel within Washington State. Since these probe trucks report their location, travel speed, and heading every 10 to 15 minutes, this feed has resulted in a large and growing database. The project team developed a series of efficient and automated processes to capture, clean, geo-locate, and format the data. The processed data is stored in an Internet accessible data warehouse. After processing, the GPS database is a unique and useful source of quantifiable performance measures for trucks on rural roads. Particular promising is the methodology the team developed to automatically identify congestion and infrastructure bottlenecks on rural roads. The bottleneck identification process uses GIS technology to segment the entire state's road network between major intersections. We than developed a process to geo-locate GPS speed data for individual trucks to these segments. Our software next sweeps all the segments and identifies those with unreliable (variable) truck travel speeds. These segments, in turn, are ranked by average truck travel speeds and the number of trucks traveling below 60 percent of the posted speed limit. WSDOT intends to use the resulting ranked bottleneck list to guide infrastructure investments.