

How Can We Measure Freight System Performance?

An Urban Truck Freight Case Study

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July 15, 2009

**Western Association of Highway and Transportation Officials (WASHTO)
2009 Annual Meeting**



What Are the Freight-Dependent Industries in Washington State?

Global Gateways

The national economy and defense depend on international and national trade flows through Washington State.



Made in Washington

Regional economies rely on freight-dependent industries: manufacturing, construction, agribusiness and wood products sectors.



Delivering Goods To You

Up to 80 percent of all truck trips deliver food, fuel, retail goods and more to stores and citizens in urban areas.



What Measures Matter to Trucking Companies and Shippers in the Urban Freight System?

The Washington State Legislature funded the Truck Performance Measure Research project to test the usefulness of commercially available GPS truck tracking data to measure performance.

In hundreds of one-on-one interviews and biannual statewide surveys, the Washington State Department of Transportation (WSDOT) Freight Systems Division has documented shippers' and carriers' top two performance requirements:

- . Travel Time
- . Reliability

WSDOT and the University of Washington TransNow Center are analyzing the GPS data to assess how investments made in freight projects affect system performance.

What Are the Benefits of Measuring Performance?

The Truck Performance Research will help WSDOT:

- . Prioritize truck freight system bottlenecks by quantifying delay at each bottleneck.
- . Measure travel times and reliability between important origin-destination pairs such as: port to warehouse district, connections between manufacturing districts, and food distribution centers to the urban core.
- . Analyze urban freight network performance before and after freight projects are completed.

What Lessons Have We Learned?

It's more efficient to contract with vendors for the GPS data than get the data directly from trucking companies.

There are advantages:

- Each vendor collects data from many trucking companies.
- Technical support is available.
- We pay for the data so we don't have to rely on volunteers.

And disadvantages to working with telecom companies:

- We have to pay for the data.
- Contracts and non-disclosure agreements are required, so attorneys are involved.
- Their products are currently designed to satisfy trucking companies' needs - not the public sector's needs.

Data Collection Results: Vendor A

- Data: Receiving raw data from 25 GPS devices in trucks chosen by WSDOT; readings every 30 seconds.
- Model: WSDOT pays for the devices and service fees, and owns the data.
- Process: Annual equipment contract between WSDOT and Vendor A, with volunteer participation by Washington Trucking Assns. companies.
- Targeted: Small study area, such as in and out of a port on a selected road segment.

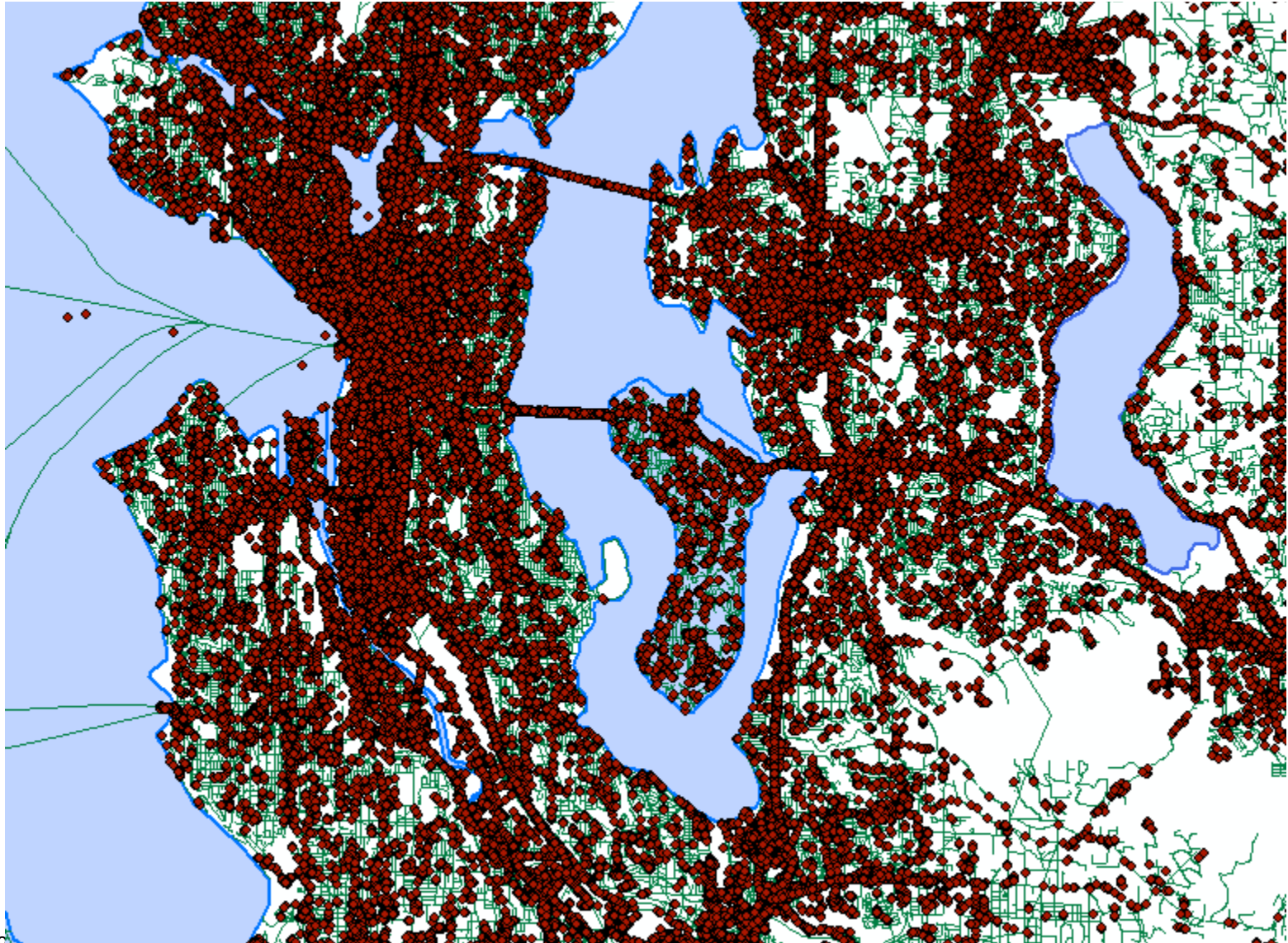
Data Collection Results: Vendor B

- Data:** Receiving raw real-time data from 60 GPS-equipped cell phones in trucks; readings are taken every half mile.
- Model:** WSDOT pays monthly charges and has access to the data.
- Process:** Washington Trucking Assns. invited their members to participate.
- Targeted:** Small study area such as in and out of a port on selected road segments.

Data Collection Results: Vendor C

- Data: Receiving real time, raw data from approximately 2,000 trucks a day. Large volumes of data with reads at starts/stops and every 15 minutes when moving.
- Model: WSDOT buys the raw GPS data and TransNow processes it.
- Process: Annual contract required a non-disclosure agreement.
- Regional: Zone-level data gives travel times. For example, between the State's major warehouse district and the Ports of Seattle or Tacoma.

One Week of Truck GPS Data from Vendor C



7/24/09

Data Collection Results: American Transportation Research Institute (ATRI)

Data: Receiving partially-processed data in periodic data dumps. Data comes from a number of telecom vendors and covers approximately 200 trucks a day in the Central Puget Sound region.

Model: ATRI and FHWA developed the program. Focus is on interstate corridors.

Process: WSDOT has a month-to-month contract and signed non-disclosure agreement with ATRI.

WSDOT Can Use the Data to Evaluate Zone-to-Zone Travel Time and Reliability

It's difficult to measure the impact of a single project in an urban setting when there are multiple route choices.

WSDOT will be able to defensibly measure current zone-to-zone network performance. For example, the AM peak-hour 95 percentile travel time for trucks from zone A to zone B may be measured at X minutes.

We can then quantify network performance after freight project construction is completed: The AM peak hour 95 percentile travel time between zones is $(X - 5)$ minutes.

Truck Freight Data Issues

Many useful measures depend on having large volumes of truck data.

GPS data doesn't give us truck types or sizes, yet.

We must be careful with privacy issues to avoid a backlash.

The vendors may assign more value to the data and increase their price. But overall, GPS technology and cellular costs are dropping.

How Else Can We Use the GPS Truck Freight Data?

We could:

- Develop truck travel speed adjustment factors for loop data by comparing GPS data for trucks and cars.
- Communicate real-time truck travel information on WSDOT's Traveler Website; one vendor's data is live.
- Verify the truck trip travel times, origins and destinations currently used in state and regional freight models.
- Provide input for air quality models and safety studies; truck braking patterns.
- When combined with truck counts, the GPS truck tracking data can give officials a picture of how high-volume freight corridors perform and focus attention on significant problems.

Questions?

For more information please contact the WSDOT Freight Systems Division at:

freight@wsdot.wa.gov or

<http://www.wsdot.wa.gov/freight/default.htm>



Washington State
Department of Transportation