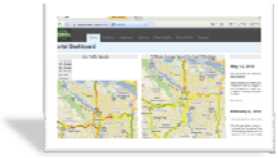
**Portland OR Regional Transportation Archive Listing**

# PORTAL 2.0

## Towards a Next-Generation Archived Data User Service



FHWA Travel Model Improvement Program

June 16, 2010

Dr. Kristin Tufte

Portland State University

Deena Platman

Metro

## Presentation overview

- Setting the stage for a regional data archive
- PORTAL – the back story
- PORTAL 101
- PORTAL in the real world

ITS

# Portland OR metro region

**1,400,000** urban area residents living
**65,600** businesses
**33,229** acres of parks and natural areas
**3,210** miles of roadway
**2,686** signalized intersections
**830** miles of rivers and streams
**66** miles of light rail track
**25** cities
**3** counties
**1** region

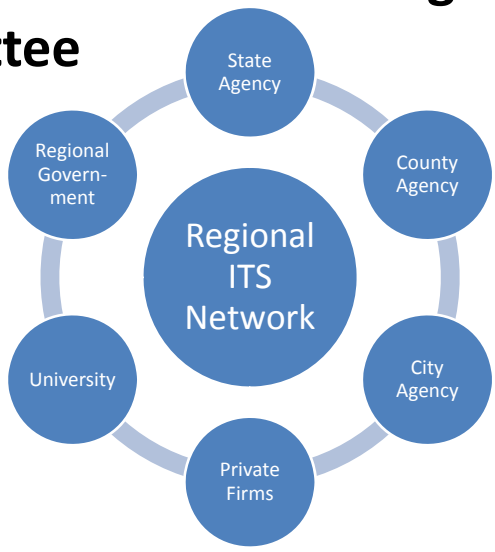
# Regional data archive: why now?

- Building a performance-based long-range transportation plan
- Increased focus on better management of transportation system
- Beyond level-of-service decision-making

## Key benefits of a centralized transportation data archive

- Transportation data is more accessible
- Sharing data in a central location saves money
- Provides critical data to support transportation planning, operations and investment decisions

## A Regional Approach: TransPort ITS Coordinating Committee

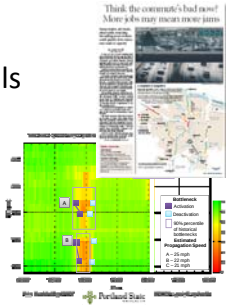


# Funding PORTAL 2.0

- $6 million in dedicated funding for system management and operations
- $100 K per year to fund PORTAL enhancements

# PORTAL 1.0 Background

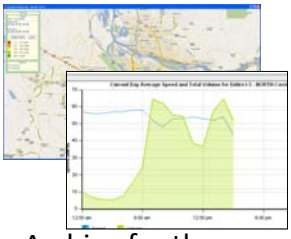
- PORTAL established 2004
  - Simple web interface, single data source
- Now - 2010
  - 1 TB data; large web site
  - Data: freeway, transit, weather, incident, freight, traffic counts
- Uses
  - Local transportation professionals
  - Regional Transportation Plan
  - Local news media
  - Research projects
- Initial Goals Achieved



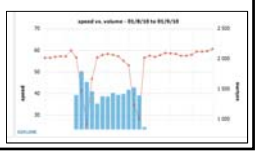
# PORTAL 1.0 Funding

- Developed with CAREER grant from National Science Foundation to Dr. Robert L. Bertini, PORTAL founder, on leave at US DOT
- Additional financial support from NSF, FHWA
- Large investment in developing regional transportation archive
- Approx $1 million in external funding (NSF, FHWA)

# PORTAL 2.0 Next-Generation ADUS



- Objectives
  - Official Transportation Data Archive for the Portland-Vancouver Metropolitan Region
  - Produce tools and performance measures useful to local transportation professionals
  - Explore new, innovative uses of data
- Funding
  - TransPort MTIP (OR), RTC (WA), OTREC, NSF, FHWA
- Updated Interface
- Data Quality Enhancements



# What's in the PORTAL Database?

Loop Detector Data
20 s count, lane occupancy, speed from
500 detectors (1.2 mi spacing)

Incident Data
140,000 since 1999


Bus Data
1 year stop level data
140,000,000 rows

VMS Data
19 VMS since 1999

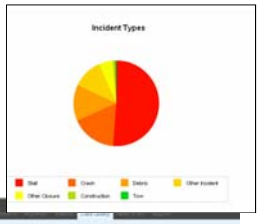
WIM Data
22 stations since 2005
30,026,606 trucks

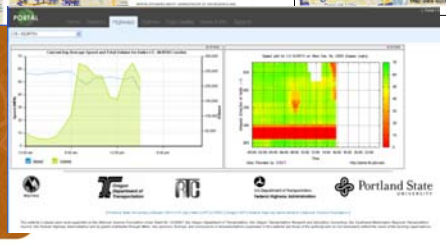
Crash Data
All state-reported crashes since 1999 - ~580,000

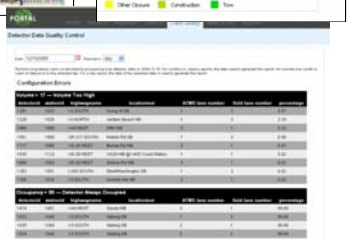
Data Archive: About 1 TB - 7.1 Million Detector Intervals

# PORTAL 2.0 Web Site

- Graphical display of archived data
- Performance, Traffic Counts, Freight Data, …

# Performance Measures Used


- Volume
- Speed
- Occupancy

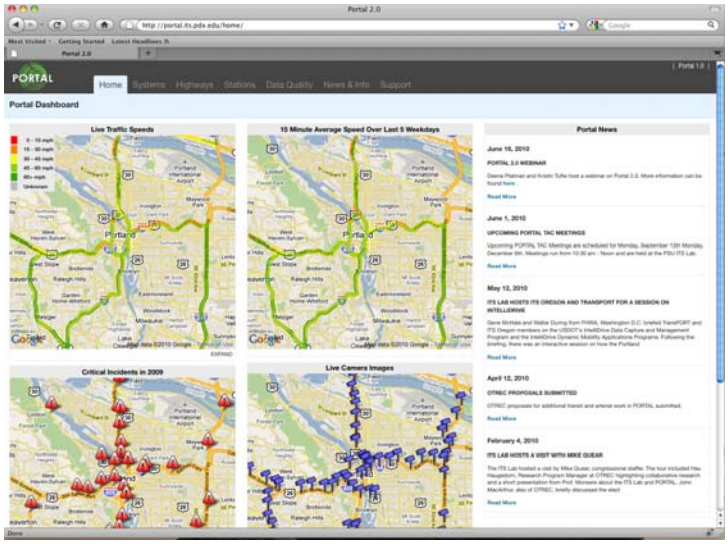
- *Vehicle Miles Traveled*
- *Vehicle Hours Traveled*
- *Travel Time*
- *Delay*

- Initial Green PORTAL work: emissions, energy consumption

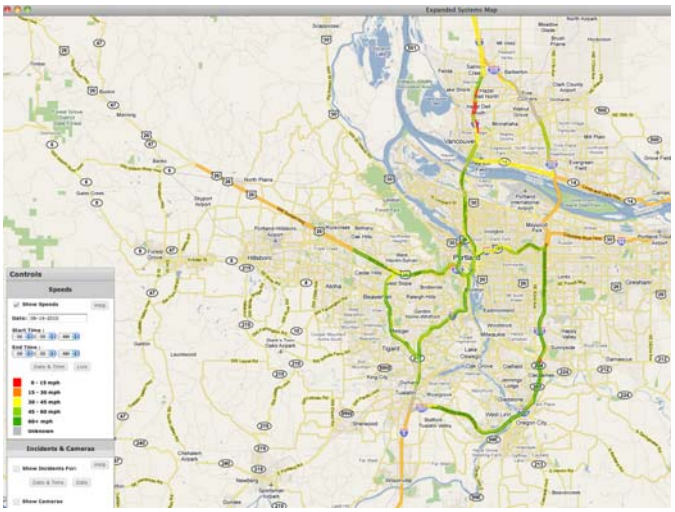
# PORTAL 2.0 Interface

- Wide variety of users; different needs and interests
  - Analysis or understanding of a current event (traffic managers)
  - Trending and forecast information (planners)
  - In-depth analysis (researchers)
- Design Principles
  - Intuitive, interactive, user-driven graphical interface
  - User-driven selections and advanced options
  - Good set of defaults

# Tour of PORTAL 2.0




# Expanded Systems Map



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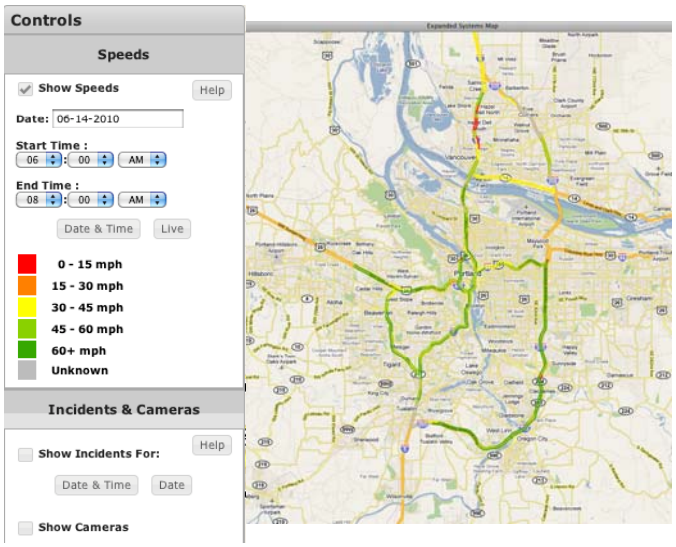
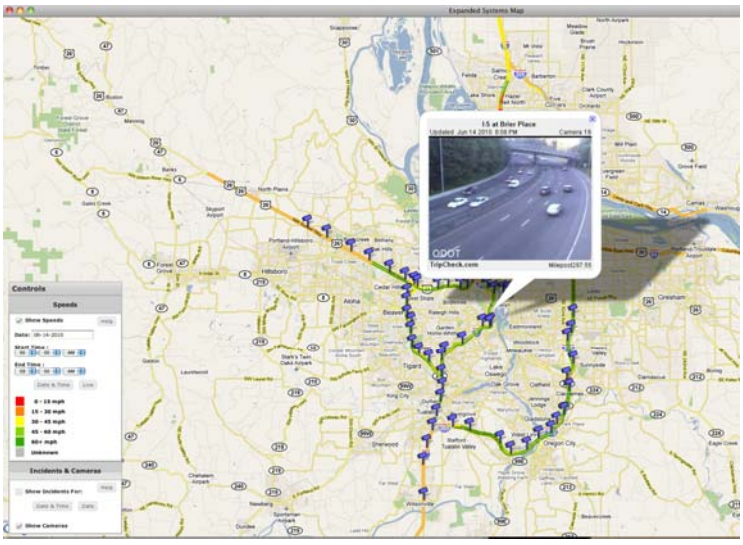
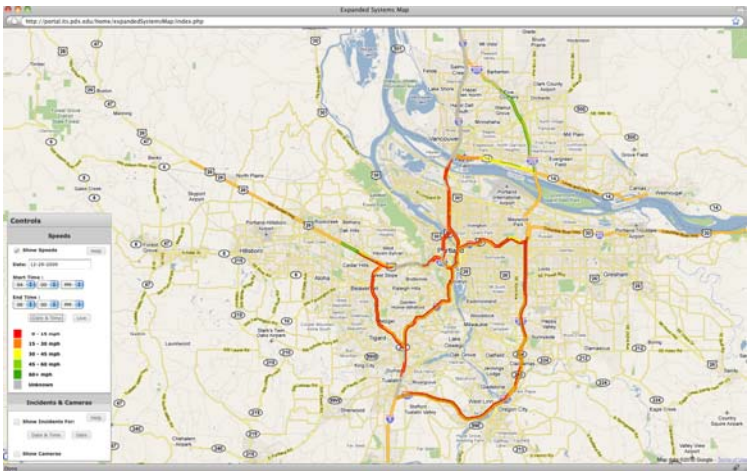


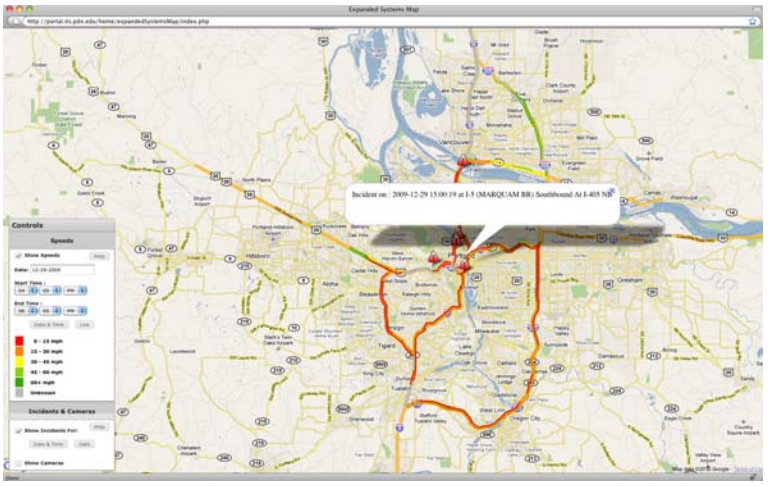

# Live Speeds & Cameras



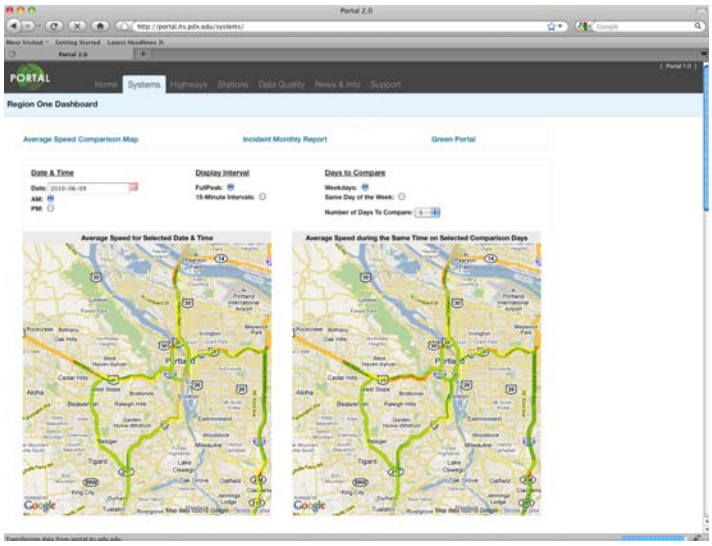
# December 29, 2009 4-6PM



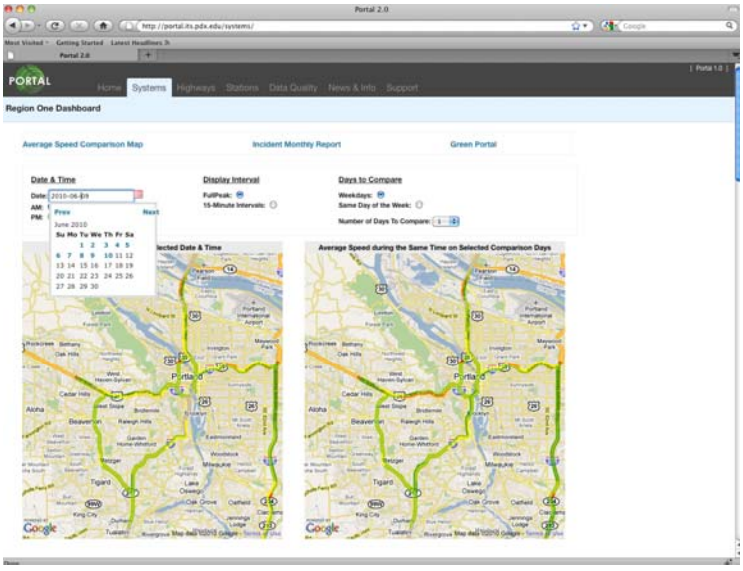
# Dec 29, 2009 - Incidents



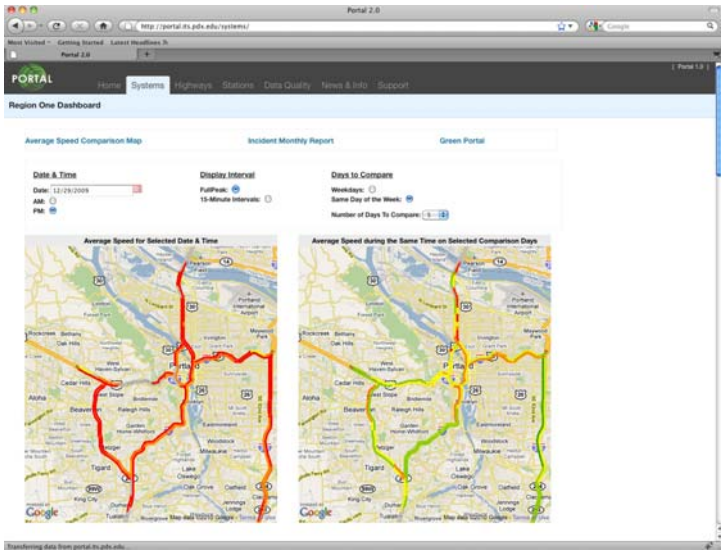
# PORTAL 2.0 – Systems Page



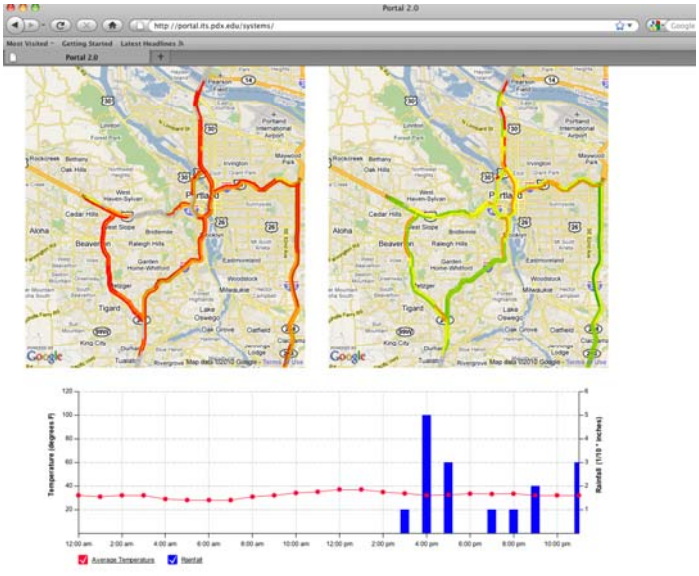

# Systems Page – Date Selection



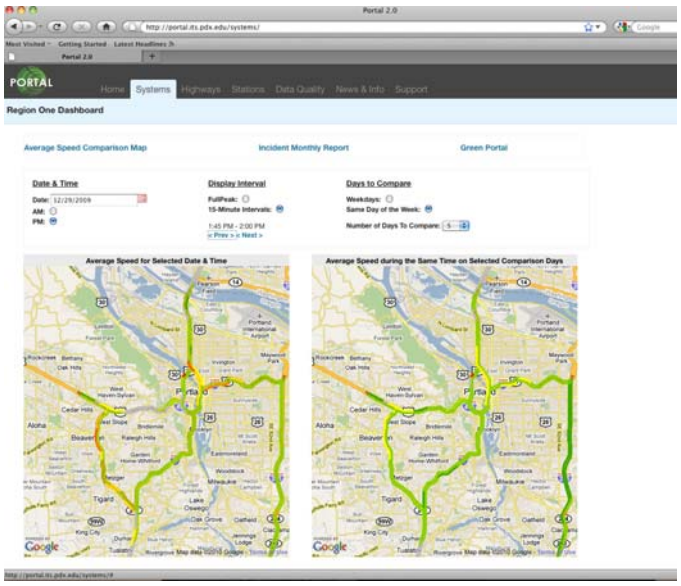
# Dec 29, 2010 - Comparison



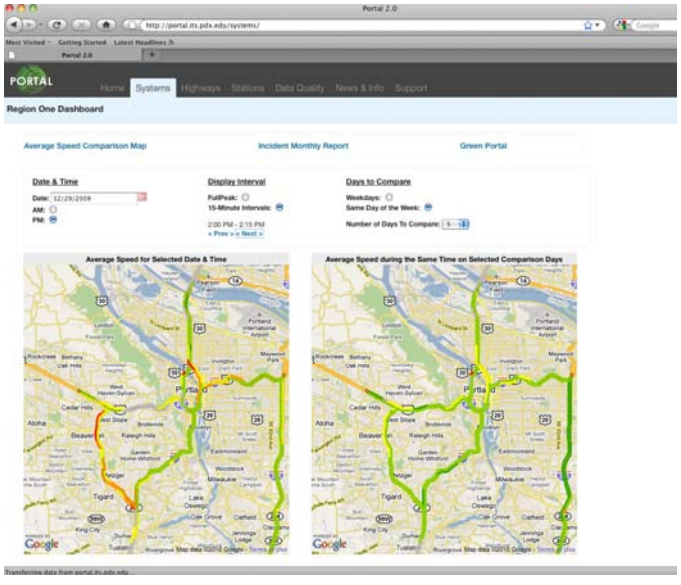

# Weather



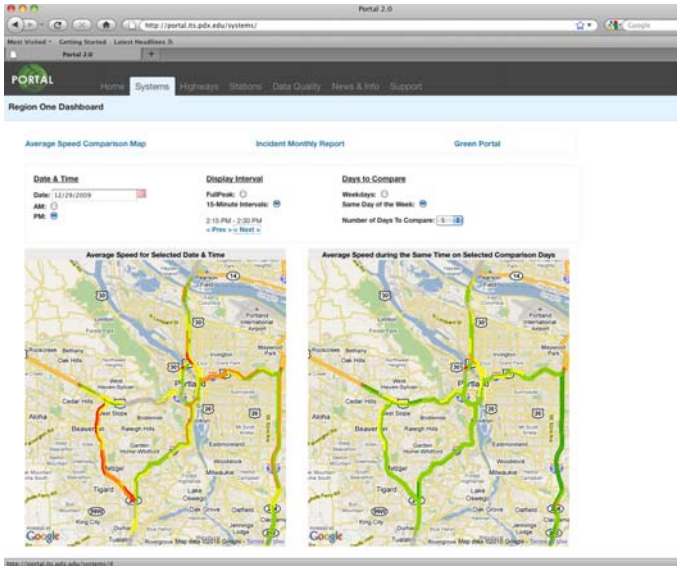
# Dec 29, 2009 1:45PM-2:00PM



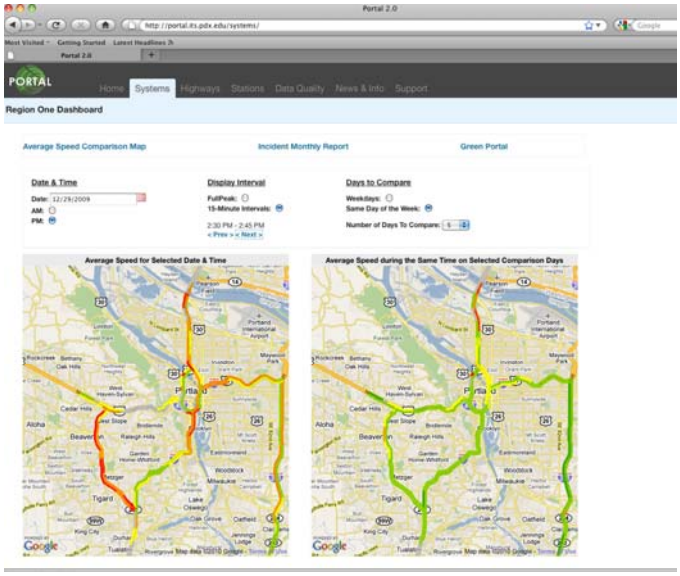

# Dec 29, 2009 2:00PM-2:15PM



# Dec 29, 2009 2:15PM-2:30PM




# Dec 29, 2009 2:30PM-2:45PM



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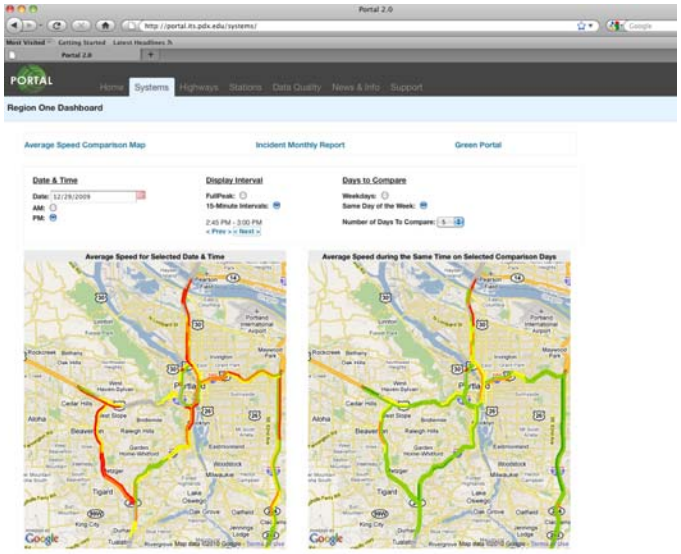
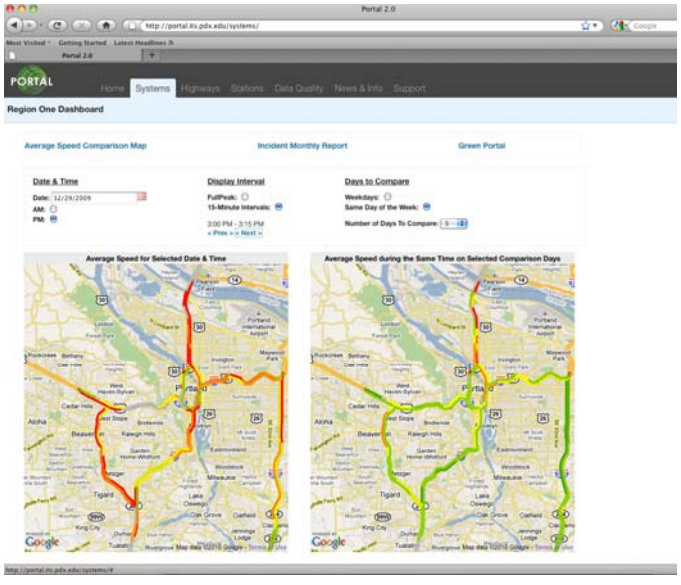
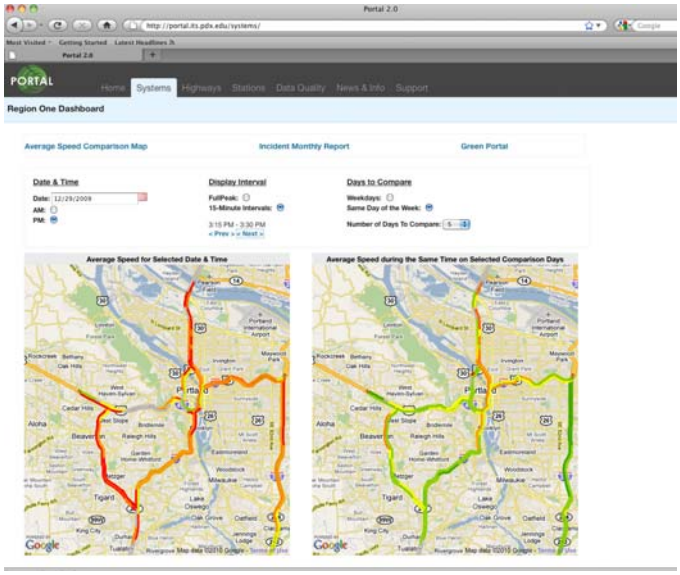



# Dec 29, 2009 3:00PM-3:15PM



# Dec 29, 2009 3:15PM-3:30PM

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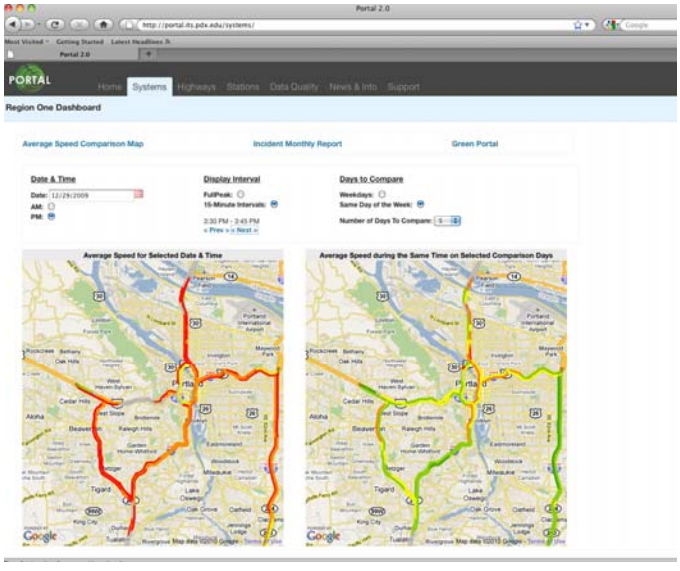

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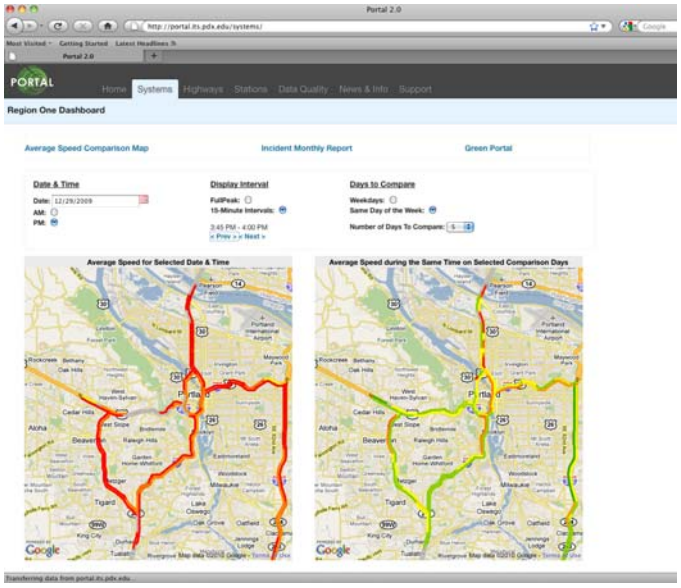
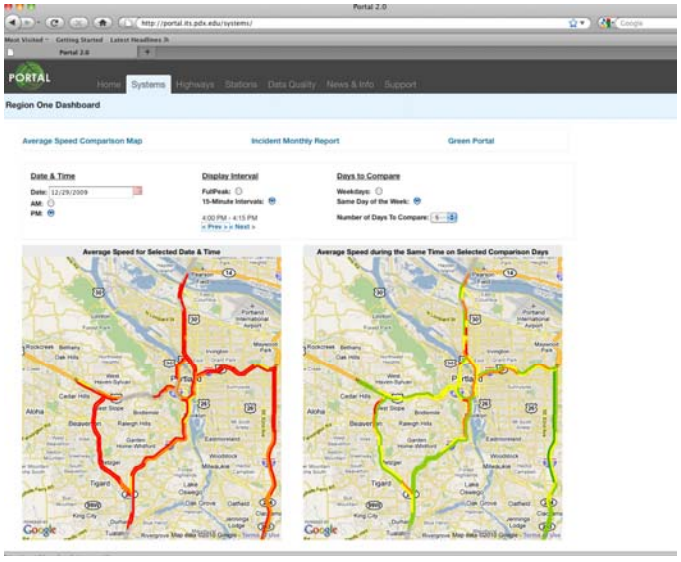
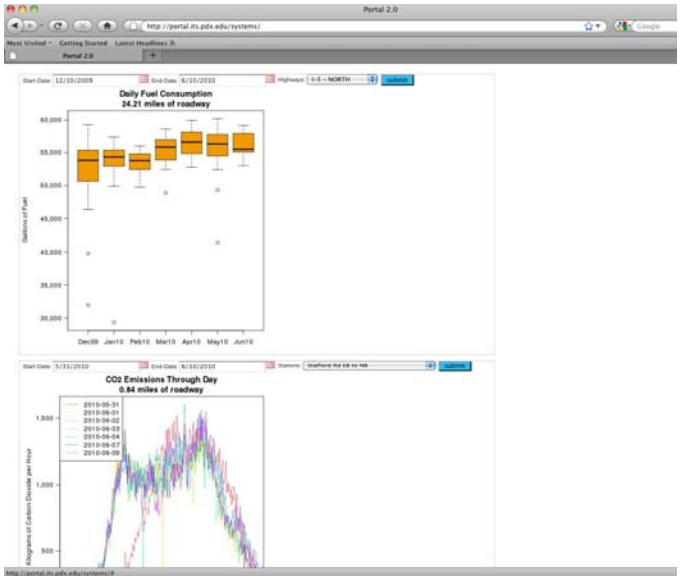


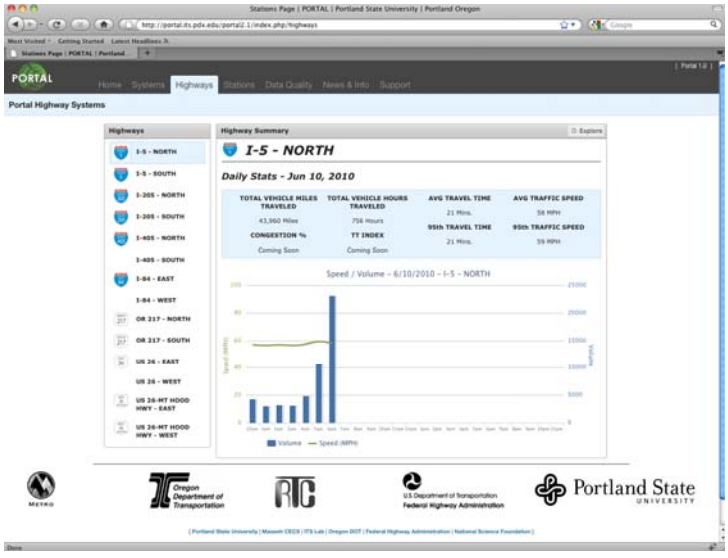

# Dec 29, 2009 4:00PM-4:15PM



# Sustainability Metrics

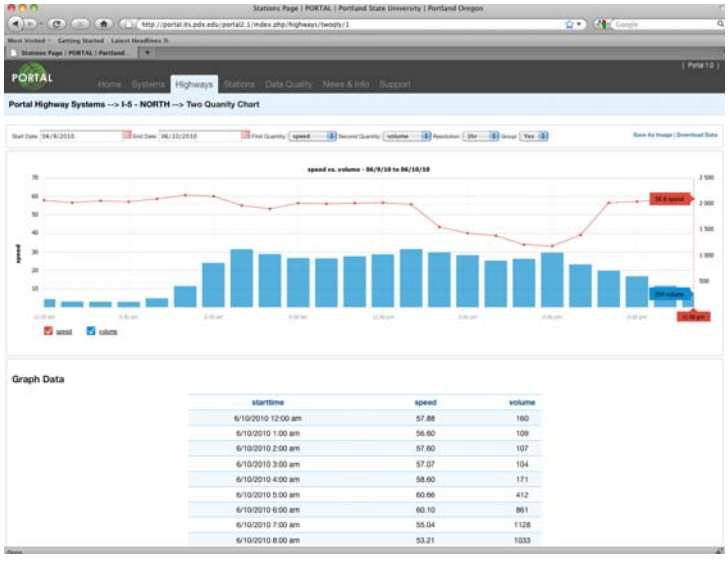



# Highways Page



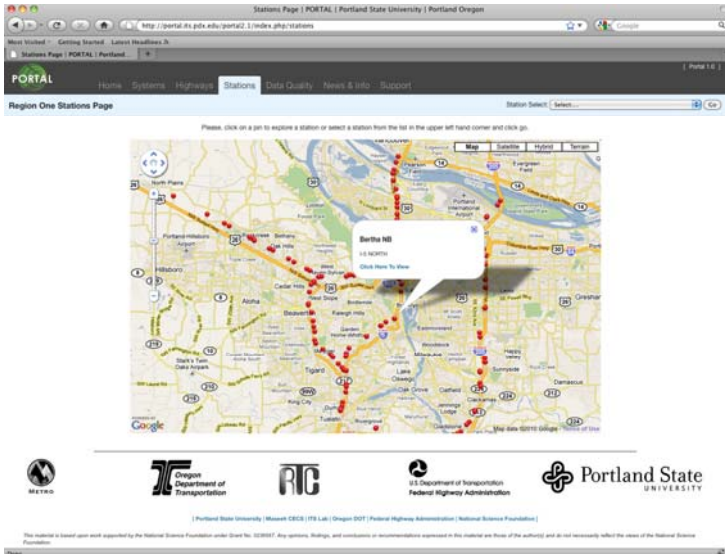
# Highways - Expanded


# Highways – Two Quantity

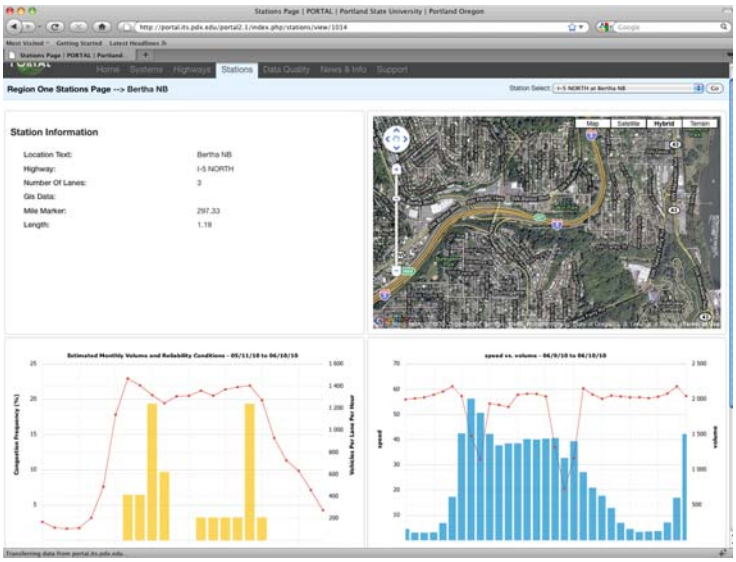


# Highways – Speed Contour

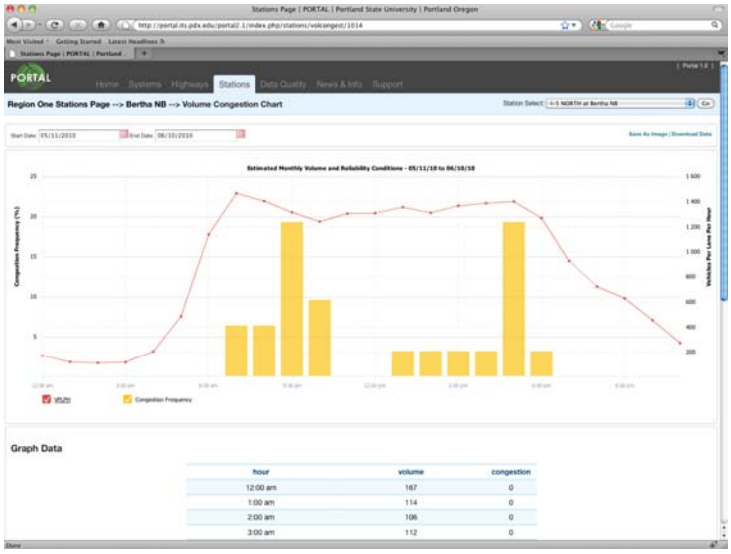

# Stations Page - Map



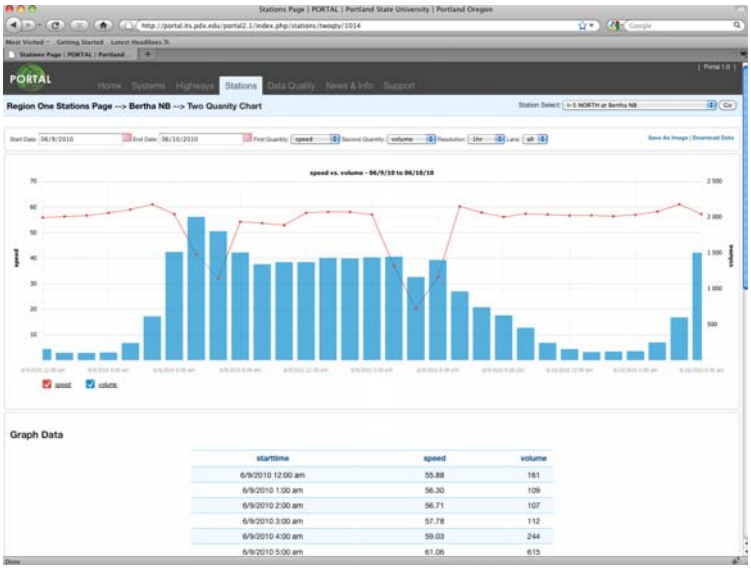
# Stations - Expanded



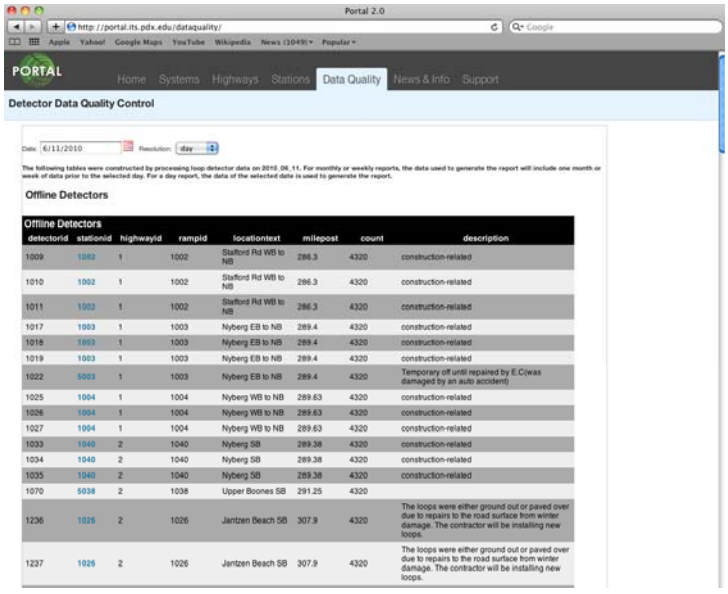

# Stations – Volume/Congestion



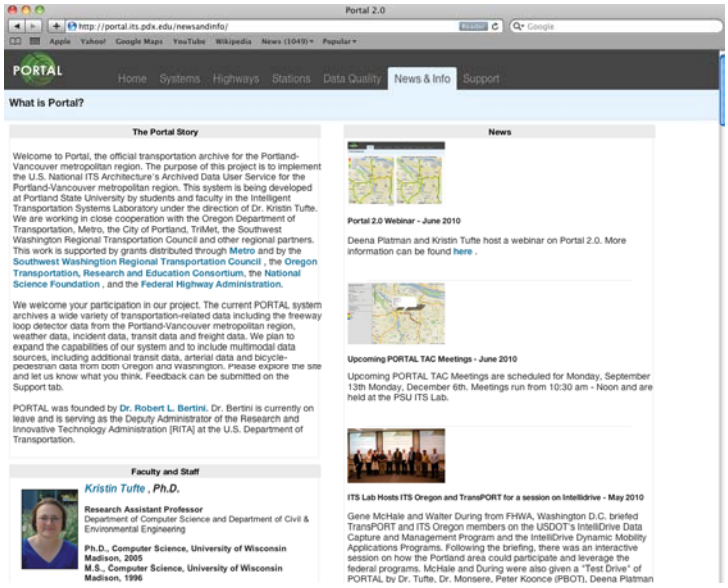
# Stations – Two Quantity



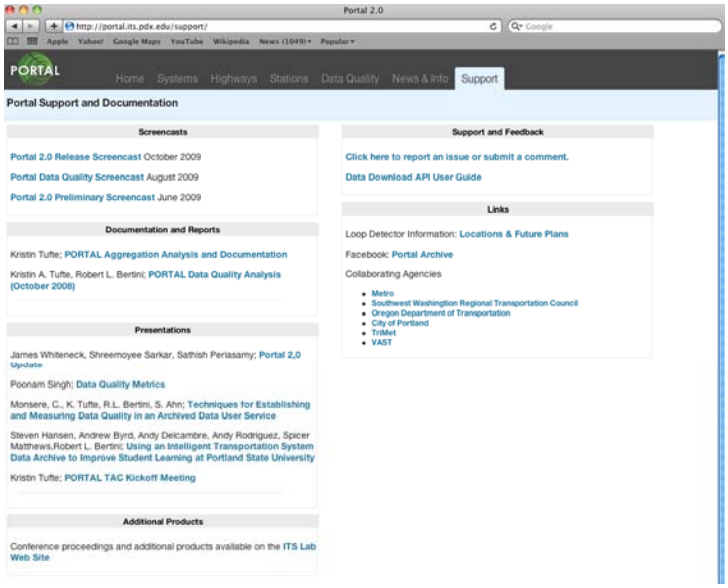

# Data Quality



# News & Info

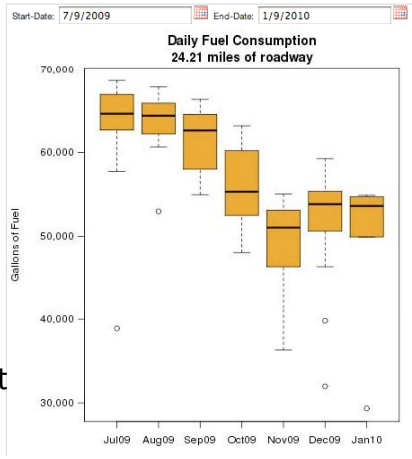



# Support



# Custom APIs-R

- R graphics from ITS Lab projects semi-automatically integrated into PORTAL 2.0
- R is the primary ITS Lab graphics tool
- "Static" plots become dynamic
- Capitalize on the great work done by ITS Lab researchers




I-5 NB – Jul 09 – Jan 10

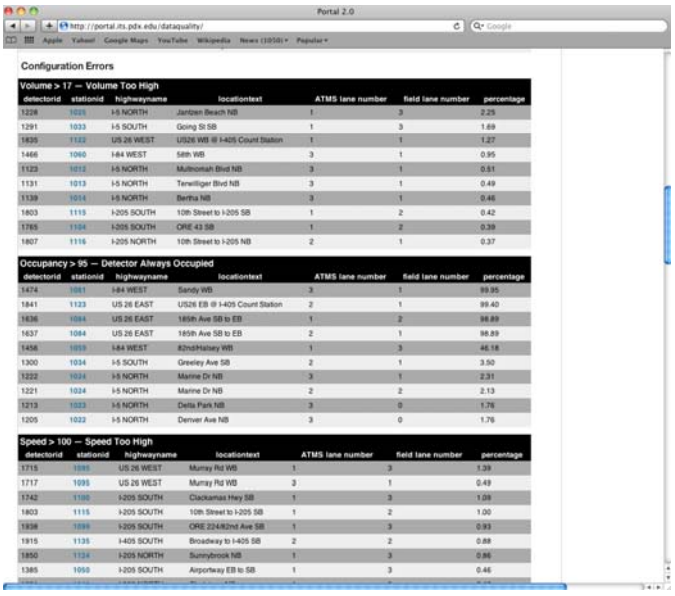
R program courtesy Alex Bigazzi

# Data Quality

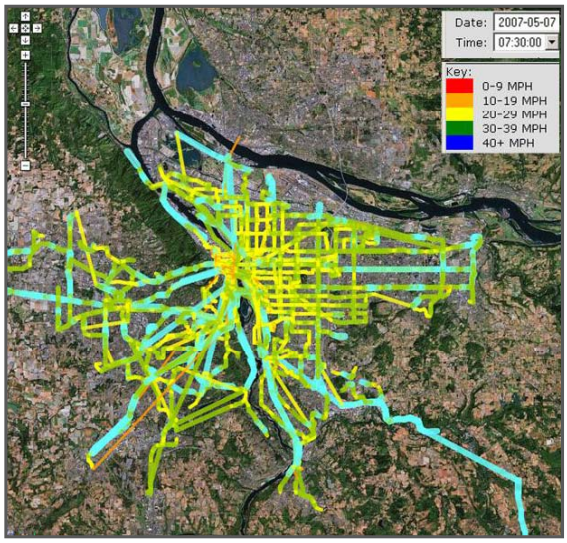
- Goal: Efficient use of maintenance resources
  - Prioritize detectors to be visited
- Field Visits
  - Correlate anomalies observed in the data with issues in the field
- Web site
  - Detectors not producing data
  - Detectors with data failing pre-set criteria (i.e. 20-sec vol > 17, speed > 100 mph, etc. ) at a high rate
  - Offline detectors (construction, damage, etc.)

# Field Visits – Low Occupancy

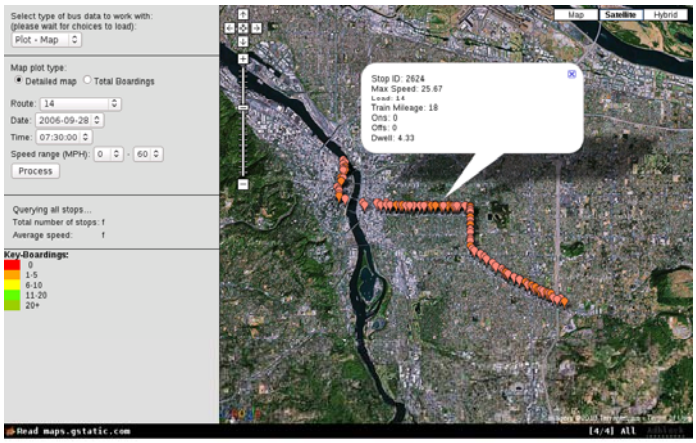

# Data Quality – Web Site



# Speed Map from Transit AVL




# Transit Data - Boardings

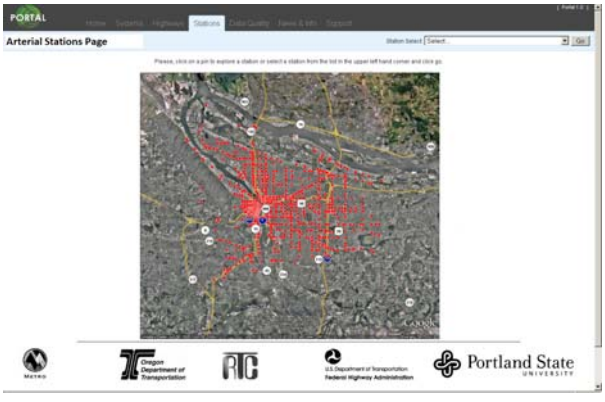


# Arterial Data Fusion

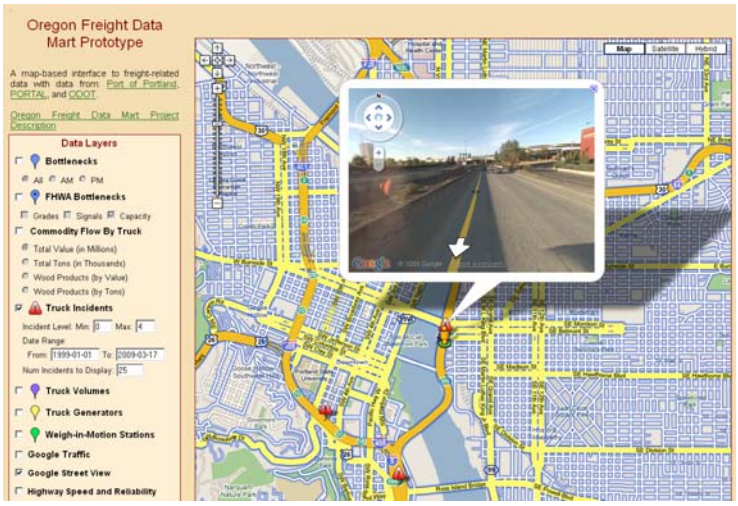
- Create framework to fuse into one complete picture for archiving
  - Transit Bus AVL Data
  - Matched Vehicle Probe Data (i.e. Bluetooth)
  - Adaptive Signal System Data
- Report
  - Speeds
  - Travel times
  - Performance measures

# Arterial Data Access

- Access to City of Portland signal system data
- Obtaining data from Bluetooth collection
- Data will be archived in PORTAL



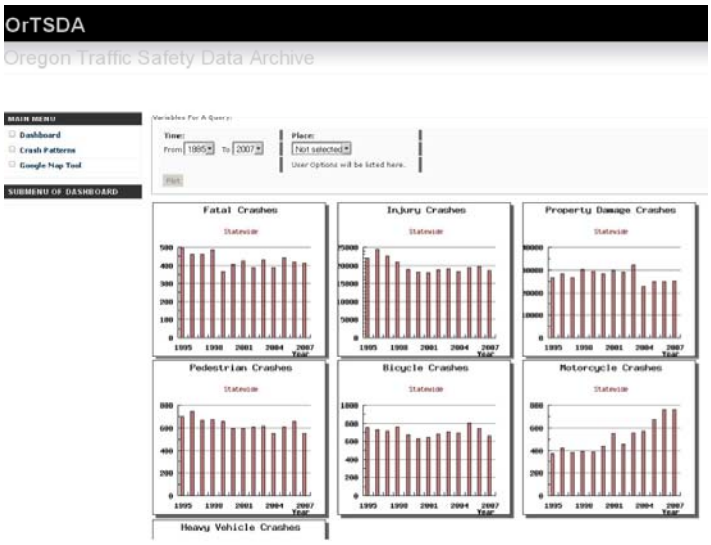
# Oregon Freight Data Mart



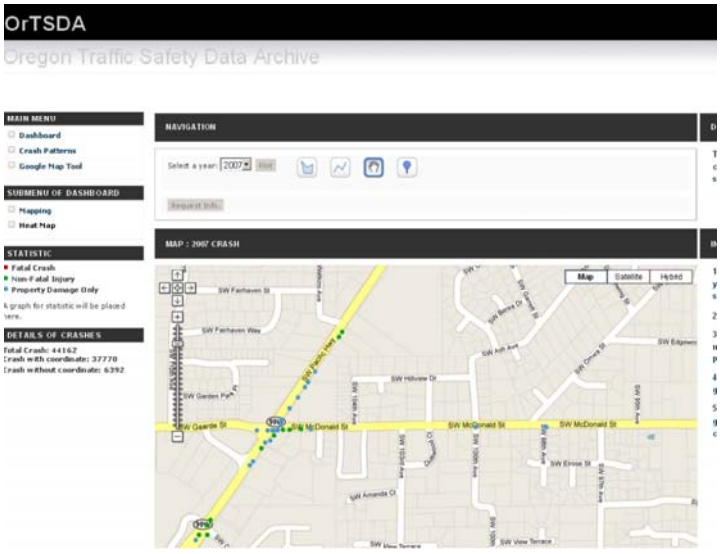

# Oregon Traffic Safety Data Archive

- Make data accessible
- Help "casual user"
- Make things quicker for advanced users
- Provide open-source tools for analysis and exploration
- Once we figure something out, let's keep it!

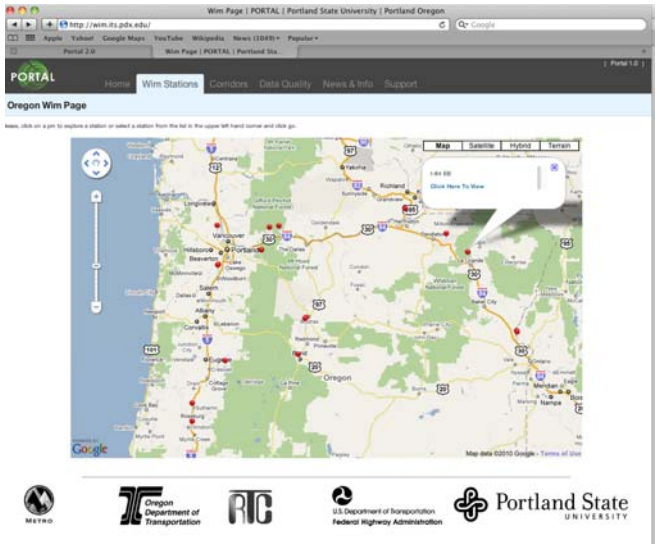
# OrTSDA



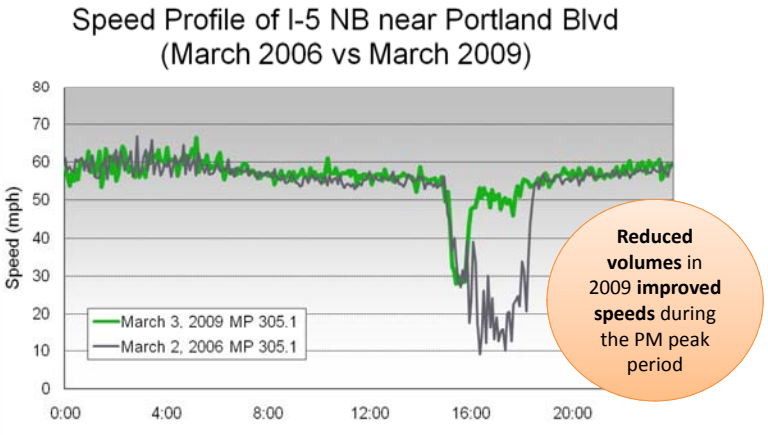

# OrTSDA - Mapping



# WIM Data Archive

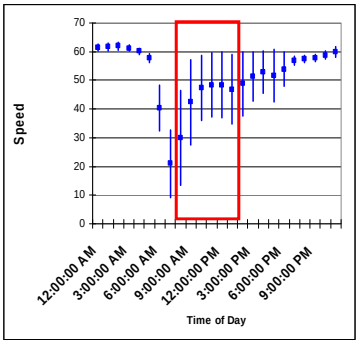



# PORTAL compares data across time

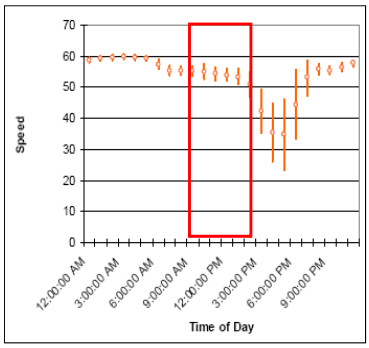


# PORTAL measures reliability

**I-5 SB at Marine Drive (2006)**




**I-84 EB at 60th (2006)**

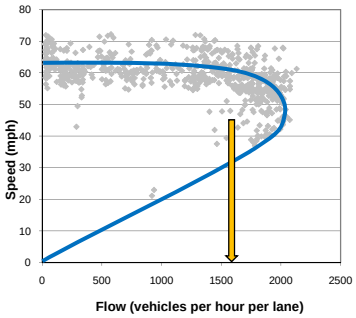



The longer the vertical bar the more variability in travel speed.

# PORTAL compares design performance

Interchange spacing = 0.15 miles

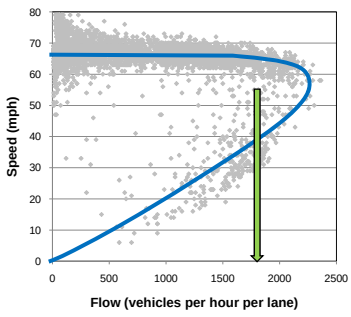
Speed/Volume Relationship
**ORE 217 at Denney Road**




Max flow = 2000

Interchange spacing = 2 miles

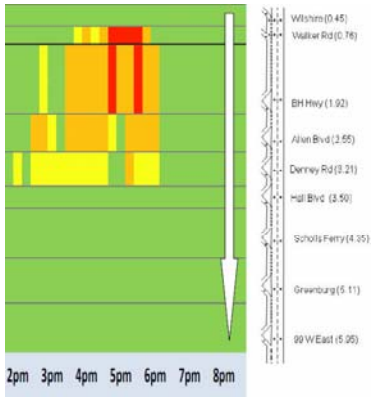
Speed Volume Relationship
**I-205 NB Stafford Road**



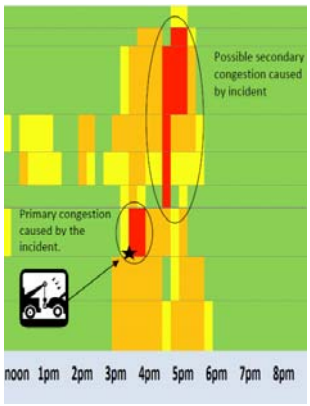

Max flow = 2250

# PORTAL measures traffic incident impacts

No incident (total delay cost $7,000)

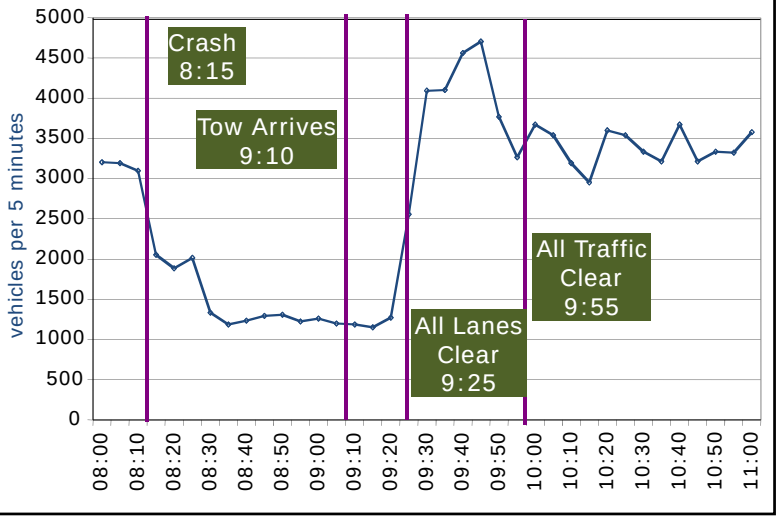



With Incident
(total delay and incident cost $58,000)

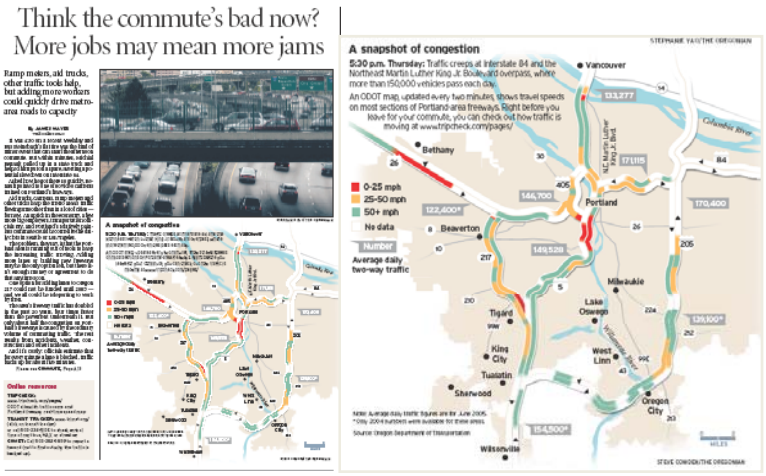



# PORTAL monitors performance

**Data measures incident response time, clearance time, and return to normal travel conditions.**



# PORTAL informs the traveling public


Think the commute's bad now? More jobs may mean more jams

Ramp meters, aid trucks, other traffic tools help, but adding more workers could quickly drive metro-area roads to capacity

A snapshot of congestion

5:30 p.m. Thursday: Traffic creeps at Interstate 84 and the Northeast Martin Luther King Jr. Blvd. overpass, where more than 150,000 vehicles pass each day.

An ODOT map, updated every two minutes, shows travel speeds on most sections of Portland-area freeways. Right before you leave for your commute, you can check out how traffic is moving at www.tripcheck.com/pages/

0-25 mph
25-50 mph
50+ mph
No data

Number
Average daily two-way traffic

Vancouver
Bethany
Beaverton
Portland
Tigard
Lake Oswego
Milwaukie
King City
Tualatin
Sherwood
West Linn
Oregon City
Wilsonville

# Learn more!

To see PORTAL in action, go to [www.portal.its.pdx.edu](http://www.portal.its.pdx.edu)

Thank you!

Kristin Tufte Portland State University

Deena Platman Metro