



University Transportation Center for Federal Region X at the University of Washington

In this issue

Research Projects	2
Region X Focus	3
TransNews	4

TransNow & TRAC to Share Space

Transportation Northwest (TransNow) and the Washington State Transportation Center (TRAC) have been awarded 12,000 s.f. of space in the newly acquired UW Tower to collocate their transportation education and research groups. As a result, the groups can now move forward with an integrated research/teaching program that will foster interaction between the organizations and better train transportation engineers, planners, analysts and managers of the 21st century.



The next phase of planning will begin soon and is projected to continue through the end of the year. Awardees are expected to begin moving into the tower in February 2008.

TransNow Research FY07

As we enter a new grant period and a new fiscal year, TransNow and its matching partners will be supporting the following new and continuing research projects:

New Projects

Simulation of RA based Networking for Vehicular Management and Safety: This research focuses on the use of new wireless networking techniques for their potential impact in providing information for traffic management, control, and public safety goals. The premise of this work is based on the expectation that vehicles in the near future will be equipped with integrated wireless communication and positioning capabilities, enabling vehicle-to-vehicle and vehicle-to-roadside communications. Contact: Daniel J. Dailey, UW, dan@its.washington.edu

Washington State Freight System Resiliency Study: This research targets an increased understanding of the vulnerability of the state freight system to natural disasters, terrorist acts, and other freight transportation disruptions. This research will: (1) identify the most likely events and failures; (2) identify the weak points in the transportation system; (3) identify the most important elements of the transportation system in terms of the state's ability to move goods; (4) identify improvements that will best protect the freight system when faced with a transportation disruption; and (5) provide suggestions on how WSDOT investments can best improve the resiliency of the transportation system. Contact: Anne Goodchild, UW, annegood@u.washington.edu; Eric Jessup, WSU, eric_jessup@wsu.edu

Washington Freight System Performance Measure Study: This research addresses the need to develop performance measures to both assess and improve the efficacy of truck freight transportation, and in so doing recommend changes for the improvement of freeway congestion and freight system performance. This project will combine data from new technology devices, such as satellites and cellular phones, with more traditional sources of truck data, such as roadside counters and surveys, and explore the feasibility of developing a useful state level freight performance measures program. Contact: Ed McCormack, UW, edm@u.washington.edu

Green Roads - an Environmental Ratings System for Roadway Design and Construction: This research focuses on the evaluation of sustainable transportation infrastructure, the Green Roads concept, by means of addressing certain gaps in information collection that is necessary for its proper evaluation. The ultimate goal is to fully develop the concept and have it adopted as the first environmental ratings system for roadway design and construction in the U.S. Contact: Steve Muench, UW, stmuench@u.washington.edu

(continued on page 2)

TransNow Newsletters now feature a special Region X section dedicated to regional news and issues

TransNow Research FY07 *(continued from page 1)*

Ultrasonic Detection of Cross-Section Loss in Tieback Rods Due to Corrosion: This research proposes ultrasonic detection of cross-section loss in tieback rods as opposed to the common practice of excavation for visual appraisal. Ultrasonic inspection of tieback rods will provide a more comprehensive technique for detecting loss of cross-section associated with corrosion and thus improve safety and structural reliability by facilitating condition assessment of every tieback rod in a sheet piling system. The development of an effective ultrasonic technique also has the potential to save money by avoiding the costs of periodic excavation. Contact: David Pollock, WSU, dpollock@wsu.edu

Rapid Construction of Earthquake-resistant Bridges: This proposal addresses the adaptation to bridges of a column precasting technology that would ensure minimal residual seismic deformations after an earthquake. This technology would allow immediate post-earthquake use and low earthquake damage and repair costs. In addition, precasting will allow a significant reduction in on-site construction time, traffic congestion during a bridge project, and exposure of workers to hazardous conditions. This project will include the experience gained with frame buildings to solve the connection problems in bridge columns. Contact: John Stanton, UW, stanton@u.washington.edu

A Self-Adaptive Toll Rate Algorithm for High Occupancy Toll (HOT) Lane Operations: This research proposes to relieve traffic congestion in urban areas where High Occupancy Vehicle (HOV) lanes are prevalent but less frequently used. This research will provide an accurate calculation of a High Occupancy Toll (HOT) so that individuals may opt to use the HOV lane and reduce overall highway congestion. An accurate toll rate algorithm will be developed using the state-space-based optimization theory. Objectives of this control system are to maximize traffic throughput and minimize system delay by generating a toll rate based on real-time traffic. Contact: Yinhai Wang, UW, yinhai@u.washington.edu

Development of a Statewide Traffic Data System: This research targets improvements to data, data collection, and data management that will make WSDOT traffic data across the state better and more consistent. The basic problem being examined is how to obtain data from multiple data sources and databases currently supported by WSDOT, identify those data that are invalid, remove those data from further analysis, and provide a common interface that can be used by WSDOT staff to obtain roadway performance measures. Successful research will need to develop and apply consistent data quality tests, develop meta-data standards for WSDOT, and develop the purchase of software tools that can function across unlike data structures. Contact: Yinhai Wang, UW, yinhai@u.washington.edu

Continuing Projects

Improved Freight Modeling: This research addresses an emerging need by local, state and regional transportation planners, academics, and policymakers to better understand the dynamics of ocean port-to-handling facility and handling facility-to-final market freight movements as a function of the regional transportation network, land values, volumes, and value of goods moved. The final product of this research study, the development of a regional database, freight model and its methodology, will provide policy makers and transportation planners with an improved tool to understand current and future freight movements throughout the Puget Sound region. The product may serve as a guide for other freight modeling efforts, both national and international. Contact: Anne Goodchild, UW, annegood@u.washington.edu; Eric Jessup, WSU, eric_jessup@wsu.edu

Incorporation of Forward-Directivity into Seismic Hazard Analysis: This research proposes the development of a methodology for the inclusion of the effects of near-fault forward-directivity into the determination of seismic demand for a structure or a geotechnical system. The study focuses on the potential for near-fault effects associated with the Seattle and Tacoma faults in Washington State, as well as how these near-fault effects affect the transportation infrastructure in the state. Contact: Adrian Rodriguez-Marek, WSU, adrian@wsu.edu

De-Bonding Cracking in Hot Mix Asphalt Pavement: This research will identify and perform statistical and forensic analyses on pavements thought to suffer from de-bonding cracks. Cracks result when a surface HMA layer is not adequately bonded to underlying HMA layers (often through the inadequate or inappropriate use of tack coat). This project will provide an understanding of this failure phenomenon in order to improve specifications and practice for tack coat application to combat this failure, and results in pavements with lower life-cycle costs. Contact: Steve Muench, UW, stmuench@u.washington.edu

(continued on page 3)



Alaska



Idaho



Oregon



Washington

Region X May Meeting

Members of the Region X Northwest Universities Transportation Consortium (NUTC) and Region X State DOTs met on May 14 & 15 to discuss various topics ranging from the pooled fund project to upcoming transportation conferences. WSDOT representative Leni Oman led a discussion on the regional pooled fund project as a part of the Federal Highway Administration's (FHWA) Transportation Pooled Fund Program (TPF). Project membership will include state departments of transportation from Alaska, Idaho, Oregon and Washington. UTCs from the respective states would serve as affiliate members and would provide an equal amount of federal funds to match the state pooled funds set aside for UTC research projects.

The TPF project will be administrated by the state DOT Research Directors who will examine commonly shared transportation problems and determine appropriate research topics for funding. All Region X UTCs will be eligible to submit proposals. In addition to project identification, selection, and funding, subtopics such as a project oversight committee and management were also discussed.

Meeting discussions also focused on upcoming opportunities for transportation education, including distance education and pilot projects where universities could combine resources to teach and deliver shared courses. Three possible pilot projects were discussed addressing available faculty, potential students, scheduling, funding, and how students can earn credit for course completion among the different universities. The consortium also discussed plans for a national education conference focusing on transportation education that is scheduled for June 2009.

Regional News

2007 AASHTO RAC Meeting

The American Association of State Highway and Transportation Officials (AASHTO) Research Advisory Committee (RAC) held its annual meeting in Seattle August 6-9. For meeting details please contact Leni Oman, Director, Office of Research & Library Services, WSDOT, omanL@wsdot.wa.gov.

Upcoming Region X Student Conference

Portland State University will host the next annual Region X Student Conference on Friday, November 16. The conference will be held in conjunction with the ITE regional meeting. Transportation students from Region X universities are invited to attend. The event showcases presentations by students and is a great opportunity for them to meet, display their research, and learn about peer research projects.

(continued from page 2)

Traffic Simulation Laboratory: This project will create a traffic simulation facility at the University of Washington aimed at increasing access to traffic simulation software, datasets, and coursework to students throughout the Pacific Northwest. This facility will become part of TransNow's Advanced Integrated Transportation Lab and will coordinate with TRAC to serve as a repository for calibrated data sets of WSDOT roadway networks to allow quick turnaround research analyses of WSDOT operational problems. The project will also create a university simulation course for UW seniors and graduate students that can later be shared with all Region X universities. Contact: Nancy Nihan, UW, nihan@u.washington.edu; Mark Hallenbeck, UW, tracmark@u.washington.edu

Developing an Area-Wide System for Coordinated Ramp Meter Control: This research addresses the problem with current freeway ramp metering methods. The development of an area-wide ramp metering system will coordinate the previously isolated ramp meters for system-wide optimization and thereby decrease congestion on local streets surrounding freeway ramps. The Additive Increase and Multiplicative Decrease (AIMD) mechanism used for computer network congestion control is applied to calculate ramp metering rates. The effectiveness of this new ramp metering strategy will be evaluated using the VISSIM simulation tool. Contact: Yinhai Wang, UW, yinhai@u.washington.edu

Occlusion Robust Vehicle Tracking Using Motion-based Features: This research proposes an improved method of tracking vehicles for traffic data collection and operations. The development of an occlusion robust vehicle tracking algorithm using the Kanade-Lucas-Tomasi (KLT) feature tracking algorithm will improve vehicular tracking where there were previous troubles with vehicle occlusion and camera shaking. The proposed algorithm is functional on highways under even light changing conditions because most feature points tracked will not be affected by luminance change. The algorithm will also reduce camera vibrations due to relaxed requirements of the stable background. Contact: Yinhai Wang, UW, yinhai@u.washington.edu

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*Transportation Northwest
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TransNews

New Staff at TransNow

Rebekah Diana has joined the center as the new Program Assistant and Anthony Curreri has filled the position of Information Technology Specialist.

Region X Meeting

TransNow will host the next Region X meeting in Seattle, October 15 & 16. The agenda and other meeting details will be posted on the TransNow website September 5.

UTC Freight Research Conference

The second UTC-oriented Spotlight Conference entitled "Research Issues in Freight Transportation - Congestion and System Performance" will be held at TRB in Washington, DC October 22 & 23. TransNow PI, Anne Goodchild, will present her research on supply chain impacts resulting from the variability of service times at vehicle processing facilities.

TransNow Site Visit

On November 6, 2007 TransNow will host a site visit by a team from RITA (Research and Innovative Technology Administration, USDOT).

UW Engineering Open House

This summer TransNow partnered with Civil and Environmental Engineering (CEE) to provide a weekend of educational outreach at the annual UW College of Engineering Open House. This year's open house hit record attendance levels of over 10,000 local K-12 students and family members.

With the help of transportation student volunteers, faculty, and staff the TransNow center sponsored activities including a magnetic levitation car demonstration, a radar gun foot race, construction toy sand box, remote control race track, and transportation jeopardy.

Competitions were held for the best displays. The winning exhibits were: 1st Place - Timber Column Building Contest, 2nd Place - Ride an Earthquake, and 3rd Place - Racing Car: Speed and Slope.