Program Progress Performance Report
for University Transportation Centers

Prepared for the USDOT Research and Innovative Technology Administration (RITA)

Project title: Pacific Northwest Transportation Consortium (PacTrans): Using Technological Advances to Develop Data-driven, Sustainable Solutions for the Diverse Transportation Needs of the Pacific Northwest

RITA Sponsor Award Number: DTRT12-G-UTC10

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Report #3, PPPR reporting on third six months (January 1, 2013 – June 30, 2013)
1. **Accomplishments**

- **What are the major goals and objectives of the program?**

  PacTrans focuses on using technological advances to develop data-driven, sustainable solutions for the diverse transportation needs of the Pacific Northwest. Major goals and objectives of PacTrans include: serving as Region 10’s research engine, applied technology showcase, workforce development, base, educational leader, information center, and collaboration platform.

- **What was accomplished under these goals?**

  During the six-month period (from Jan. 1 – June 30, 2013), the following was accomplished:

  - PacTrans funded research, education, and outreach projects progressed well.
  
  - The PacTrans Seminar Series, which launched in Fall 2012, held two seminars on the UW campus, which attracted many students, faculty, staff, and transportation professionals in the Pacific NW region who engage in transportation research and practice. The PacTrans Seminar talks were broadcast over the Internet in real time to provide remote audiences an opportunity to listen and ask questions. The two speakers were Carnegie Mellon University professor and Green Design Institute Co-Director Chris Hendrickson on February 27th and Region 9 UTC (at UC Berkeley) Director Robert Cervero on April 19th.
  
  - Each consortium partner also hosted their own academic exchange events with PacTrans supports. The University of Washington, for example, invited eight recognized professionals from research institutes, industry, and transportation agencies to visit the UW campus and shared their research findings and success stories with faculty and students.
  
  - PacTrans played an active role during the 2013 TRB Annual Meeting by hosting a Region 10 UTC reception, delivering 38 technical presentations (or posters), and actively supporting UTC related activities.
  
  - The PacTrans Board of Directors identified critical regional transportation issues that merit further research. They also worked with public and private collaborators to develop new research statements for research in Year Two and beyond.
  
  - A conference committee has been set up to plan the Region 10 Transportation Conference, scheduled to take place on the Seattle UW campus October 18th. The committee has already identified a keynote speaker for the event who has a long-standing reputation in safety and sustainability: Prof. Kumares Sinha, a member of the National Academy of Engineering, Purdue Univ.
  
  - A student committee consisting of graduate students from the PacTrans consortium universities and Portland State University has been set up to plan the Region 10 Student Transportation Conference, scheduled to take place on the Seattle UW campus on October 19th, 2013.
- The UI Clean Snowmobile Team has led numerous tours of their garage and laboratory facilities for many visitors that include K-12 student groups and Boeing researchers. The team also presented at the University of Idaho Engineering Expo in April, where they achieved an Excellence in Technical Presentation award.

- The UI Clean Snowmobile Team also competed in the SAE Clean Snowmobile Challenge in March 2013 in Houghton, Michigan. The team placed third overall, and received ten awards and trophies including Best Design, Best Value, Best Ride, Best Written Design Paper, and the BASF Innovation Award. The two student graduate mentors have accepted job offers with Arctic Cat and Polaris. The award-winning design paper was submitted to SAE for publication as a refereed technical paper. The team was awarded its second patent, for a bolt-in rear snowmobile drive system.

- PacTrans also contributed significantly to the success of the following academic events:
  - 2013 National Student Steel Bridge Competition (hosted by UW students)
  - AutoUI (PacTrans associate director Linda Boyle served as program chair)
  - 2013 Bicycle Urbanism Symposium (organized by the UW's College of Built Environments)

  - **What opportunities for training and professional development have the program provided?**

The vast majority of research projects involve graduate students, which also provide many opportunities to work with state and local transportation agencies. By involving students, PacTrans provide students an invaluable opportunity to develop skills they need to be successful in their future careers in academia, industry, and government. The intern program between PacTrans and WSDOT continued to offer great training opportunities for undergraduate students. PacTrans worked with regional industry (e.g. Transpo) and transportation agency partners (e.g. Seattle DOT) to initiate many new intern positions for graduate students. Additionally, starting this summer, PacTrans initiated a new internship program for promising young high school students. The driving force behind this program is to introduce young people to transportation engineering before university by getting them involved in research projects.

  - **How have the results been disseminated? If so, in what way/s?**

As of this writing, several outcomes of Region 10 UTC funded research projects have been showcased in invited talks, conference presentations, and archival publications. PacTrans promotes research outcomes through social media, such as the PacTrans website and Twitter. PacTrans has a strong outreach program to local and state transportation agencies and private partners in the region, through which PacTrans research outcomes are presented and demonstrated. Worth mentioning is the May 8, 2013 selection of UW Associate Professor Steve Muench’s Greenroads Team rating system (which assesses the sustainability of new, reconstructed, and rehabilitated roads and was previously funded by the Region 10 UTC) as a White House Champion of Change. Associate Professor Muench’s work makes a strong contribution to the body of Region 10 transportation research. In May 2013, PacTrans was invited to present Digital Roadway Interactive Visualization and Evaluation Network (DRIVE Net) data processing applications at the USDOT Transportation Data Palooza. (Additional details on dissemination of research results are provided in Section 2 “Products.”)
What do you plan to do during the next reporting period to accomplish the goals and objectives?

- PacTrans will continue to follow its implementation plan to ensure that all PacTrans funded research, education, and outreach activities move forward as scheduled.

- The PacTrans Region 10 Transportation Conference and Student Conference to be held in October 2013 will be a very important opportunity for PacTrans researchers to share research accomplishments, showcase new technologies, and form up new collaborations.

- We are currently planning several public talks as part of the PacTrans seminar series for Fall 2013 and Winter 2014. As with all PacTrans seminars, the talks will be open to the PacTrans university community as well as the entire Pacific NW transportation community. For those who cannot attend in person, we will continue to make the talk available as a webinar through GoTo Meeting.

- We will continue to enhance the PacTrans website to include additional information about our projects and research findings, and future research opportunities.

2. Products (for the reporting period of January 1 – June 30, 2013)

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<th>Products (for the reporting period of Jan. 1, 2013 – June 30, 2013)</th>
<th>PacTrans Total</th>
<th>UW</th>
<th>WSU</th>
<th>UI</th>
<th>OSU</th>
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<tr>
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<tr>
<td>Other products: data or databases, physical collections, audio or video products, software or NetWare, models, educational aids or curricula, instruments, or equipment</td>
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<td>1</td>
<td>1</td>
<td>0</td>
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**Peer reviewed journal articles (PacTrans members are in bold)**


30. Pan, H. X., Q. Shen, and T. Zhao. Travel and Car Ownership of Residents near New Suburban Metro Stations in Shanghai. Accepted for publication by the Transportation Research Record, No. X, pp. X-X.
33. Pitera, K., **L. N. Boyle**, and A. Goodchild. Economic analysis of onboard monitoring systems in commercial vehicles. Accepted for publication by the Transportation Research Record.


44. Wang, T. and C. Chen. Impact of fuel price on vehicle miles traveled (VMT): does the poor respond in the same way as the rich? Accepted for publication in Transportation.


**Book chapters and other edited manuscripts (PacTrans members are in bold)**


**Conference papers (PacTrans members are in bold)**


**Conference presentations (PacTrans members are in bold)**


10. Haraldsson, O. Precast Concrete Bridge Columns Made with Unbonded Pre-Tensioning and Hybrid Fiber Reinforced Concrete for Improved Seismic Resistance. 3/13 10th International Conference on Urban Earthquake Engineering, 2013.


Invited Lectures (PacTrans members are in bold)


7. Moudon, A. Istanbul Technical University, Department of City and Regional Planning, two invited lectures on “Urban Morphology” and “The US City in History”, Istanbul, Turkey, March 2013.

8. Moudon, A. University of Washington, ARCH 500, Studio on open space in Tacoma, WA. Presentation on street design, Seattle, WA, April 2013.


Inventions, patent applications

1. University of Idaho KLK844 Patent- A bolt-in rear drive system for a snowmobile

Other products (PacTrans members are in bold)


3. Participant and Collaborating Organizations: Who has been involved?

- What individuals have worked on the program?

- PacTrans Director, Yinhai Wang, Ph.D., professor of Civil and Environmental Engineering at the University of Washington (UW), devotes 50 percent of his time directing PacTrans. Dr. Wang has overall responsibility for program management, oversight of PacTrans operations, including the Research Committee, the Education and Workforce Development Committee, and the Outreach and Technology Transfer Committee, and Student Leadership Council. He is the regional and national leadership for PacTrans, and the contact person for management relationships with USDOT Research and Innovative Administration (RITA) and other USDOT organizations.

- PacTrans Associate Director in Research, Linda Ng Boyle, Ph.D., associate professor with joint appointments in Industrial and Systems Engineering, and Civil and Environmental Engineering at the UW spends 15 percent of her time managing the research program for PacTrans and coordinates the research collaboration across the five partner institutions.

- PacTrans Associate Director in Education and Workforce Development, Anne Vernez-Moudon, Dr. es SC, Professor of Architecture, Landscape Architecture, and Urban Design and Planning, Adjunct Professor of Epidemiology and in Civil and Environmental Engineering, devotes 10 percent of her time leading the Education and Workforce Development Committee. She is involved in curriculum
changes, professional training program development, and educational enhancements among the partner institutions.

- PacTrans Associate Director in Outreach, Mark Hallenbeck is also the Director of the Washington State Transportation Center (TRAC) office located at the UW. Mr. Hallenbeck works closely with Associate Director Anne Vernez-Moudon on organizing student seminars, internships and fellowship programs.

- PacTrans Associate Director in Oregon State University (OSU), Chris Bell, Ph.D., professor of Civil and Environmental Engineering at OSU, devotes 10 percent of his time to managing and organizing the education, outreach, and research activities within OSU. He coordinates all results and outcomes with the UW on a regular basis.

- PacTrans Associate Director in the University of Alaska Fairbanks (UAF), Billy Connor, Director of the Alaska University Transportation Center (AUTC), devotes 10 percent of his time to managing and organizing the education, outreach, and research activities within UAF. He coordinates all results and outcomes with the UW on a regular basis.

- PacTrans Associate Director in University of Idaho (UI), Karen Den Braven, Ph.D., professor of Mechanical Engineering at UI, devotes 10 percent of her time to managing and organizing the education, outreach, and research activities within UI. She coordinates all results and outcomes with the UW on a regular basis.

- PacTrans Associate Director in Washington State University (WSU), Dave McLean, Ph.D., professor of Civil and Environmental Engineering at WSU, devotes 10 percent of his time to managing and organizing the education, outreach, and research activities within WSU. He coordinates all results and outcomes with the UW on a regular basis.

- Center staff at the UW includes full-time Assistant Director, Ms. Meghan MacKrell, who devotes 100 percent of her time to the day-to-day operations in support of the PacTrans mission. Her responsibilities include project management, grant management, social media and outreach, and managing the PacTrans operations team. PacTrans also has a second full-time Fiscal Specialist, Ms. Eva Lu, who devotes 100% of her time to fiscal matters of the center and projects. Additionally, PacTrans has a number of grad students who help out on various projects.

- The Student Leadership Council, composed of graduate students at all Consortium partner universities, is an active part of the PacTrans management structure. The Student Leadership Council facilitates student and center communications and plans their own activities. For example, one important student event already on the PacTrans schedule is the Region 10 Student Conference, set to be held on the UW campus in October 2013. Leaders of the three UTCs in this region – PacTrans, the National Institution for Transportation and Communities (NITC), and Transportation for Livability by Integrating Vehicles and the Environment (TranLIVE) – will all assist in the sponsorship of this conference.
What other organizations have been involved as partners?

- The state transportation agencies in Alaska, Idaho, Oregon, and Washington have all been extensively involved in PacTrans in terms of research, outreach, and technology transfer activities. Their research office directors are members of our PacTrans External Advisory Board (EAB), which provides strategic oversight to the PacTrans Board of Directors. In addition to the state DOTs, many other public transportation agencies and private companies are also actively involved in PacTrans activities.

- The PacTrans EAB provides strategic guidance to the PacTrans Board of Directors. In addition to state DOT members on the PacTrans EAB, membership includes a representative from Toyota Corporate, Port of Portland, the Puget Sound Regional Council (PSRC), as well as a representative from Idaho industry, Western Trailers.

- On February 27, 2013, PacTrans invited Carnegie Mellon University and Green Design Institute Co-Director Chris Hendrickson to give the talk “Electric Vehicles and Life Cycle Assessment” as part of the ongoing PacTrans Seminar Series. On April 19, 2013, PacTrans invited Region 9 UTC (at UC Berkeley) Director Robert Cervero to give the talk “Sustainable Mobility, Place-making, and Economic Competitiveness: Striking a Balance.” Both seminars were well-attended by UW students and faculty, as well as by members of private industry and the Seattle DOT.

- PacTrans also collaborates with Portland State University’s UTC (NITC) and University of Idaho’s TranLIVE on various Region 10 events.

Have other collaborators or contacts been involved?

- The Spring 2013 CEE 500 Transportation and Construction Seminar, a graduate course taught by PacTrans Director Yinhai Wang, invited the following eight transportation professionals from private industry and local and state agencies:
  - April 5: Mr. Bruce Haldors from Transpo Group “What Transportation Can Be: Innovative and Comprehensive Transportation Solutions”
  - April 12: Mr. Shuming Yan from WSDOT “Exploring Toll Financing at WSDOT SR 167 Extension Comprehensive Tolling Study”
  - May 3: Mr. Peter Koonce from Portland Bureau of Transportation “Innovations in Multimodal Traffic Signals: Implementing the best from Delft Denmark in Portland”
  - May 10: Mr. Erik Saganic from Puget Sound Clean Air Agency “Puget Sound Transportation Pollution Policy and Research”
  - May 17: Mr. Joe Story from DKS “Forecasting Variability in Travel Demand: Context, Research and Applications for the Future”
  - May 24: Prof. Heng Wei from Univ. of Cincinnati “Integrated Transportation Conformity Analysis”
May 31: Mr. Michael Williams from Sound Transit “Sound Transit Projects and Plans for a Potential Public Vote”
June 7: Mr. Stevan Gorcester from Transportation Improvement Board “LEAN Business Processes at the Washington State Transportation Improvement Board”

4. Impact

- What is the impact on the development of the principal discipline(s) of the program?

The impact to our transportation program has been quite substantial and reaches across our education program, our collaboration with others in the region, and the research we can do on a regional level, which has outcomes of national importance.

We are now able to provide our students fellowship and travel support, which allow our consortium institutions to attract high-caliber students and showcase them at various workshops, seminars, and conferences. We have also been able to foster better collaborations with our state and local agencies, thus strengthening the regional ties. The interaction among amazing students and local industries has also helped us continually improve our education curriculum at the undergraduate and graduate level. We are currently working on an education project to provide transportation material to those who may not have the opportunities to be a part of a larger institution, and develop senior design projects that connect local industry with future workers.

- What is the impact on other disciplines?

The transportation research projects that PacTrans has been involved in reaches out to many other disciplines. Among the five institutions, the research, outreach, and education work has impacted those in the Colleges of Engineering, Economics, Built Environment, Public Health, and Liberal Arts & Sciences.

- What is the impact on transportation workforce development?

PacTrans is making solid progress in transportation workforce development. While continuing an award-winning intern program with WSDOT, PacTrans is developing new intern programs for students with public and private partners. Additionally, within the last two academic quarters, several new courses have been added to the curriculum in the Dept. of Civil and Environmental Engineering at the UW. For example, King County DOT traffic engineer Kevin Chang’s geometric design course and CH2M Hill transportation engineer Tony Woody’s simulation course offer students knowledge critical for their future work. Also, discussions are ongoing with Seattle City Traffic Engineer Dongho Chang, on re-establishing Transpeed, a short-term transportation training program for working professionals. Moreover, the online “Sustainable Transportation” master’s program, which started last year, has already attracted nearly 40 transportation professionals to the program.
• What is the impact on physical, institutional, and information resources at the university or other partner institutions?

PacTrans has funded seven regional projects and fifteen small projects. These projects add new physical, institutional, and information resources and facilitate cross sharing of existing resources. For example, of the seven regional projects, the OSU-led “Educating Teenage Drivers in the Pacific Northwest Regarding the Dangers of Distracted Driving” project involves outreach on the dangers of distracted driving to thousands of high school students across the region. All consortium institutions are involved in this project and their state-of-the-art driving simulators are simultaneously utilized in this project. The WSU-led “Digital Dissemination Platform of Transportation Engineering Educational Materials Founded in Adoption Research” project focuses on improving the synergy between higher education and workforce development efforts through evaluation of online curriculum and the testing of new online materials for working professionals taking courses at PacTrans consortium universities.

• What is the impact on technology transfer?

PacTrans emphasizes technology transfer and involves relevant parties early in those funded projects with a technology development component. Its regional transportation conference scheduled in October 2013 will offer a great platform for researchers and practitioners to talk about potential technologies for transfer. Also, the PacTrans STAR Lab maintains the state of the practice hardware currently utilized by WSDOT and other local transportation agencies. These hardware and software applications utilized in UW transportation courses and research are helpful for researchers to target the right problems for technology development.

• What is the impact on society beyond science and technology?

Transportation ties to everyone’s daily life. We strongly believe that transportation improvement will directly benefit people’s quality of life and environmental conservation. Also, our work is contributing to a greater understanding and appreciation of the importance of collaboration between the public and private spheres around transportation issues in not only the Pacific Northwest, but across the U.S. and abroad.

5. Changes/Problems

Due to a career change, Washington State University Associate Director David McLean resigned his position on the PacTrans Board of Directors in June 2013. He was replaced by Dr. Ken Casavant, Professor in the School of Economic Sciences at Washington State University.

6. Special Reporting Requirements

None.