



SMART-Signal installed in California, new Minnesota sites

The SMART-Signal system, developed by civil engineering associate professor **Henry Liu** to improve traffic management on urban arterials, was recently implemented in Pasadena, California—the first installation of the system outside of Minnesota. The Minnesota Department of Transportation (MnDOT) also expects to equip nearly 100 additional intersections with the system later this year as part of a large-scale implementation project.



Henry Liu

SMART-Signal (Systematic Monitoring of Arterial Road Traffic Signals) simultaneously collects event-based high-resolution traffic data from multiple intersections and generates real-time arterial performance measures, including

queue length and travel time. System equipment is installed directly in signal controller cabinets.

Liu began work on the SMART-Signal system in 2006, and it has been installed at 20 intersections on three major arterial corridors in Minnesota. Liu's research team has included graduate students **Wenteng Ma, Xinkai Wu, Heng Hu, Jie Sun, Saif Jabari, and Jeff Zheng**. Funding and in-kind support for the SMART-Signal system has been provided by MnDOT, the ITS Institute, the Minnesota Local Road Research Board, Hennepin County, and the National Cooperative Highway Research Program.

The system was installed at six intersections on Orange Grove Boulevard in Pasadena, California, between March and April 2011.

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Symposium shares latest on mileage-based user fees

Professionals in the field of road user fees gathered in Breckenridge, Colorado, on June 13 and 14 for the 2011 Symposium on Mileage-Based User Fees (MBUF). The symposium was hosted by the University Transportation Center for Mobility (UTCM) at the Texas Transportation Institute (TTI), the Humphrey School of Public Affairs at the University of Minnesota, and CTS, with additional sponsorship from Move Colorado.

Symposium co-chairs **Ginger Goodin**, senior research engineer with TTI, and **Lee Munnich**, director of the State and Local Policy Program at the Humphrey School, gave the symposium opening and welcome. Munnich also moderated two panels, one about public and political acceptance and the other on national initiatives related to MBUF.



Lee Munnich



Ferrol Robinson

Ferrol Robinson, research fellow with the Humphrey School, moderated a panel on user perspectives that included **Ken Buckeye**, program manager for value pricing with the Office of Policy Analysis, Research and Innovation at the Minnesota Department of Transportation (MnDOT).

Other panel discussions addressed specific topics such as legislative and policy issues, potential technology applications, and institutional issues. The symposium incorporated interactive discussion sessions on logical next steps as well as the associated challenges and opportunities.

Symposium planning committee members from Minnesota were Munnich, Buckeye, Robinson, and **Gina Baas**, assistant director of education and outreach with CTS.

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Fall seminar series starts next month

CTS and the Intelligent Transportation Systems (ITS) Institute are scheduling the fall semester seminar series. The seminars are open to anyone interested in learning more about transportation research at the University of Minnesota.

Seminars will be held from 3:30 to 4:30 p.m. CST on most Thursdays between September 8 and December 8, in the Mechanical Engineering Building on the Minneapolis east bank campus.

There is no cost to attend, and registration is not required. Each seminar qualifies for one Professional Development Hour (PDH).

Seminars will be broadcast live on the Web and will be available for later viewing on the CTS site.

Seminars from the past two years are available on iTunes U. To visit the University's site, see <http://itunes.umn.edu>. CTS is featured on the University of Minnesota's iTunes U Science and Technology page.

Speakers and topics will be posted at www.cts.umn.edu/Events. You may also sign up to receive e-mail notifications or follow us on Facebook and Twitter. **CTS**

Humphrey School, Citizens League hold finance roundtable

In 2007, the Minnesota legislature and governor passed a bill requiring the Minnesota Department of Transportation (MnDOT) to conduct a research study on the feasibility and implications of implementing a mileage-based user fee (MBUF). The study includes a policy task force as well as a technology demonstration that kicked-off this past June.

To discuss the prospects for a mileage-based fee in Minnesota, the Humphrey School of Public Affairs and the Citizens League held a Rethinking Transportation Finance Roundtable on May 25 in St. Paul. The event—"Are Mileage-Based User Fees a Good Idea"—featured a presentation by **Adrian Moore**, vice president of policy at the Reason Foundation. (Moore was the keynote speaker at the 2011 CTS Transportation Research Conference on May 24.)

Bob DeBoer, director of policy development for the Citizens League, opened the roundtable, and **Ferrol Robinson**, research fellow with the Humphrey School, served as moderator.

Moore served on the bipartisan National Surface Transportation Infrastructure Financing Commission, created by Congress under the previous surface transportation funding bill. Its purpose was to study long-term funding options in light of the unsustainability of the gas tax. The commission's final report, issued in 2009, recommends the nation shift from the gas tax to a mileage-based usage fee by 2020. (For more about the report, see <http://financecommission.dot.gov>.)

A mileage fee maintains the "user pays" principle and better aligns system costs and benefits than other options such as sales or property taxes. Still, Moore said, there is a long list of obstacles to

the approach. First, it doesn't directly address the root problem: the gap between infrastructure needs and revenues. "The mechanism is just a mechanism," he said. "The difference in revenue...is almost entirely dependent on what charges the government decides to levy."

The second big issue is privacy. "It's perfectly possible to have a system that tracks your every movement, but also one that doesn't track you whatsoever," Moore said. Privacy is vitally important but easy to address, he said.

Cost is another issue. The gas tax has low collection and administration costs, and "no conceivable MBUF is as inexpensive," Moore said. Finding upfront money to implement the system is also significant.

Public perception and equity are other factors. Equity, however, "depends entirely on what fee is set" and has nothing to do with MBUF itself, Moore said. It's easy to set rates so that drivers pay the same amount they do now under the gas tax, he added.

People might even gain a better understanding of their transportation costs through an MBUF. When users pay at the pump, Moore explained, the gas tax is a vague part of the bill. But MBUF systems are more transparent. In small-scale trials, users learned how much it costs to drive—and their travel declined 8 to 10 percent. "That's massive when you extrapolate it over a metro area or state," he said, and could reduce the overall investment need for transportation.

Moore said next steps nationwide and in Minnesota should include more and larger trials to address these issues.

As part of the roundtable's reactor



Adrian Moore



Bernie Lieder



Nick Thompson

panel, Representative **Bernie Lieder**, chair of the state MBUF task force, said the biggest issue is privacy—"the fear factor." He voiced support for technology that reads odometers but that does not use GPS or other tracking tools. He also referred to University of Minnesota research exploring MBUF policy and technology (see page 3).

Other issues to consider, Lieder said, are the fee structure, which could be set to vary based on factors such as vehicle size and weight, and the collection mechanism. He also noted that many types of vehicles—milk trucks, some diesel trucks, golf carts, ATVs, and bicycles, for example—currently use transportation infrastructure but receive tax exemptions. Any vehicle that uses a road should pay "a base cost just for using it," he said.

Nick Thompson, division director of policy, safety, and strategic initiatives at MnDOT, agreed with Moore that the MBUF approach is an opportunity for greater transparency. The recent launch of the department's pilot has spurred public discussion: "The topic generates more comments from citizens than anything else we do," he noted. Thompson said a dual system—with the MBUF overlapping the gas tax—is needed, phased in incrementally.

Given political resistance to tax increases, **Adeel Lari**, director of innovative financing in the Humphrey School, advised keeping the transition to a new collection mechanism separate from the debate over the amount of revenue needed.

Jim Hovland, mayor of the City of Edina and vice chair of the MBUF task force, said policymakers need to be aware of and prepare for privacy arguments, but believes the issue can be dealt with over time. He added that he is "keenly interested in getting something to the legislature." **CTS**

A state task force is exploring the feasibility and implications of a mileage-based user fee.



eWorkPlace program announces results at celebration event

eWorkPlace Minnesota, a state-sponsored program for Twin Cities metro-area employers, is delivering at least nine dollars in benefits for every one dollar invested in encouraging teleworking, according to research from the Humphrey School of Public Affairs.

At a June 21 event celebrating the program, **Adeel Lari**, director of innovative finance at the State and Local Policy Program at the Humphrey School and the eWorkPlace program director, said the program has “exceeded expectations and demonstrated a win-win-win for employers, employees, and the community.” The event was sponsored by the Minnesota Department of Transportation (MnDOT), Humphrey School, Metro Transit, and the Citizens League.

eWorkPlace encourages employers to offer the option of either working from home or other remote locations via the Internet or other technology, or a more dramatic workplace culture shift through the adoption of a results-only work environment (ROWE) strategy. eWorkPlace addresses the telework element of the federal Urban Partnership Agreement (UPA) program, under which MnDOT and the Metropolitan Council were selected in 2007 to work toward reducing traffic congestion through a variety of methods including telework, tolling, transit, and technology and operations.

Among the findings of the Humphrey School research:

- The state’s \$3.2 million investment will yield a 9-to-1 return on investment (ROI) over the next five years. This ROI estimate does not include a whole range of benefits, such as productivity, environmental, and quality-of-life gains.

- More than 4,200 Minnesotans participated in eWorkPlace Minnesota, exceeding the original goal of 2,700 participants. eWorkPlace worked with 48 employers, including Medtronic, Turck, Valspar, Hennepin County, Ecolab, Fairview Health Services, and Aveda.
- More than three-fourths of employers report that telework is leading to greater productivity. None reported a loss of productivity. Employers also report lower costs and improved employee retention.
- Participants are saving about 7.5 million vehicle-miles traveled per year.
- Participation led to a reduction of over 8 million pounds of CO₂ emissions/year.

The June event was a chance to honor the employers participating in eWorkPlace, appreciate the effort made by project partners, exchange experience and ideas, and look forward to future opportunities for telecommuting in Minnesota. More than 90 people attended the event, which was covered by Minnesota Public Radio.

Susan Haigh, chair of the Metropolitan Council and new member of the CTS Executive Committee, gave welcoming remarks. She pointed out that eWorkPlace not only was aimed at mitigating congestion but also was a “fundamental investment” to attract a good workforce to Minnesota and develop regional economic competitiveness.

Several speakers shared their thoughts on the future of telework in the region. Representative **Frank Hornstein** praised



Susan Haigh

the multifaceted benefits of eWorkPlace and described telework as one of the few issues to bridge the partisan divide. He emphasized the importance of cultivating cooperation between the public and private sectors and called for collaborative effort from the business sector to push for teleworking legislation.

Bob DeBoer, director of policy development with the Citizens League, stated that the evaluation results from UPA were good resources for policy advocates and the general public to understand how telework could affect the direction of transportation policy. Telework might provide an innovative alternative to help solve the budget shortage for infrastructure construction and maintenance, he added.

Looking forward, Lari pointed out that the challenge of telework is mostly cultural, not technical; thus, a key lesson is to cultivate strong top-down support. He also stressed the importance of education and outreach for promoting culture change. Lari added that MnDOT is sponsoring University of Minnesota research on the “bottom line” benefits of telework, and that a federal law was passed in January to encourage telecommuting.

Ken Buckeye from MnDOT gave the closing remarks, noting that MnDOT itself was an active participant of eWorkPlace and had 67 employees enrolled in the project.

A report on eWorkPlace, *Exceeding Expectations*, is on the program website: www.eworkplace-mn.com. **CTS**

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Several University of Minnesota researchers are involved in MBUF studies:

- Munnich is the principal investigator of a current project funded by MnDOT titled “Mileage-Based User Fee Policy Examination.”
- Munnich is also the principal investigator of “Implementing Distance-Based User Fees as a Replacement for the Fuel Tax,” with co-investigators Robinson and **Zhirong (Jerry) Zhao**,

assistant professor in the Humphrey School. Funded by the Intelligent Transportation Systems (ITS) Institute at CTS, the project builds upon a National Cooperative Highway Research Program (NCHRP) study (below).

- Baas was the principal investigator for the NCHRP-sponsored project “Near-Term-Implementable Mechanisms for Collecting Road User Charges

Based on Vehicle-Miles Traveled.” Co-investigators were **Max Donath**, director of the ITS Institute, and Munnich.

- Robinson is the principal investigator of “Benefits of Distance-Based Fees for the Trucking Industry,” a project funded by MnDOT. His co-investigator is **Gerard McCullough**, associate professor of applied economics and a former CTS director. **CTS**

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It began collecting traffic data in May. The installation occurred after Pasadena DOT director **Fred Dock** contacted Liu in 2009.

After deciding that Liu's team was located too far away to be directly responsible for the system's installation, the University of Minnesota contracted with California-based technology company Iteris, Inc. Liu and his team provided system calibration and initial data monitoring, but Iteris completed the installation. Beginning in September 2011, Iteris and the City of Pasadena will be responsible for complete operations, and the U of M team will no longer maintain the system at the California sites.

According to Liu, the system is already performing well. Depending on the results at the initial six intersections, the city may

be interested in implementing the system in more areas, he said.

Expanded implementation of the SMART-Signal system in Minnesota is also expected later this year. Plans for late 2011 include installing the system at 92 additional intersections on Minnesota arterials, including State Highways 7, 55, and 65. "This will be the first time such a large-scale real-time performance monitoring system has been implemented on urban arterials in the U.S., maybe even the first in the world," Liu said.

This large-scale implementation will provide the research team with more detailed traffic data on urban arterials than has ever been available, which could lead to even more in-depth research, Liu explained. "The fundamental issues of traffic flow can be reinvestigated," he said.

"This data may allow us to confirm the old traffic model or construct a new one."

Liu also credits **Steve Misgen**, MnDOT Metro District traffic engineer, for his contributions to the work. "Steve was absolutely instrumental," Liu says. "In addition to providing funding, MnDOT gives our team access to its traffic control cabinets, which we need to visit frequently during our testing. Steve is very forward-looking and recognizes the importance of this work for improving traffic flow on arterials."

For more information on the SMART-Signal system, visit the ITS Institute website: www.its.umn.edu. **CTS**

CTS at State Fair August 25 and 26

CTS will be back at the Minnesota State Fair, this year on the event's first two days, August 25 and 26.

The exhibit will include new rounds of *Transportation Jeopardy!*—with prizes for the winners—and chances to

play Gridlock Buster, the online traffic control game from the Intelligent Transportation Systems Institute (www.its.umn.edu/GridlockBuster). The Center for Excellence in Rural Safety will showcase SafeRoadMaps.org, a crash-mapping

tool that maps every roadway fatality in the nation down to the local level.

Fair schedules and maps are posted at www.cts.umn.edu/Events. **CTS**

Upcoming events *To see other events or publicize yours, visit www.cts.umn.edu/Events.*

Sept. 7–8	Conference on Performance Measures for Transportation and Livable Communities, Austin, Tex. See http://livabilityconference.tamu.edu .	Nov. 16–17	Minnesota Toward Zero Deaths (TZD) Annual Conference, Duluth, Minn. See www.minnesotatzd.org .
Sept. 14–16	Minnesota Surveyors and Engineers Society 89th Fall Outing, Gull Lake near Brainerd, Minn. See www.msos.org or e-mail ann@msos.org .	Nov. 16–18	American Public Works Association–Minnesota Chapter Fall Workshop and Conference, Brooklyn Center, Minn. See www.cce.umn.edu/APWA-Minnesota-Chapter .
Oct. 4	ITS Minnesota Fall Forum, St. Paul, Minn. See www.itsmn.org .	Dec. 2	Freight and Logistics Annual Symposium, Minneapolis, Minn. See www.cts.umn.edu/Events/FLOGSymposium .
Oct. 5–6	Minnesota Fall Maintenance Expo, St. Cloud, Minn. See http://mnfallexpo.com .	Dec. 7	58th Annual Asphalt Conference, St. Louis Park, Minn. See www.asphaltisbest.com .
Oct. 6–7	AirTAP Fall Forum, Breezy Point, Minn. See www.airtap.umn.edu .		
Oct. 12–14	Minnesota Public Transit Conference, St. Paul. See www.mpta-transit.org/events/conference .		
Oct. 18–19	Water Resources Annual Conference, St. Paul. See www.wrc.umn.edu/waterconf/index.htm .		

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