



## Intelligent speed adaptation: low-cost, high-benefit technology to save lives

Intelligent speed adaptation (ISA) technology can act “like a medicine that gets people to stop speeding,” said **Oliver Carsten** at the CTS Winter Luncheon on February 11.



*Oliver Carsten*

Carsten is a professor in the Institute for Transport Studies at the University of Leeds in the United Kingdom (UK).

The luncheon was sponsored by the Intelligent Transportation Systems (ITS) Institute, which is housed at CTS. The Institute’s director, **Max Donath**, introduced Carsten.

“ISA is speed management with 21<sup>st</sup> century technology,” Carsten explained. Its components include a GPS-based satellite navigation system, a digital road map with speed limits, and a human-machine interface that displays the speed limit on the dashboard (or on a cell

phone). ISA can also take control of the vehicle through a link to the drive train. Modifying the engine management system could cost as little as \$10, and the whole system might add \$100 to \$250 to vehicle cost. “It isn’t expensive at all,” he said.

Why is speed management so important? The European Union has identified rule violation—including speeding—as the major factor in injury and fatal crashes, Carsten said. Studies using actual crash data have shown that injury crashes go up with the proportionate change in speed squared; serious injury crashes with speed cubed; and fatal crashes with speed to the fourth power. “Small changes in mean speed will give you very dramatic changes in accidents,” he said.

Researchers in France conducted the first on-road experiment of ISA in 1982, and since then ISA has been studied and tested in a

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## Leaders discuss Twin Cities transitway development

Local government stakeholders came together at a January 23 workshop in Minneapolis to explore ways to accelerate transitway development in the Twin Cities metropolitan region. The workshop, focusing on finance and funding options, was sponsored by the Counties Transit Improvement Board (CTIB), the Metropolitan Council, and the University Metropolitan Consortium (UMC). CTS hosted and coordinated the workshop in support of the sponsors.

CTIB resulted from 2008 legislation allowing metro-area counties to impose a quarter-percent sales tax and a \$20 motor vehicle sales excise fee. Since its creation, the board has been working with the Metropolitan Council to develop a regional transit system; one priority is to accelerate the development of new and



*Peter McLaughlin*



*Peter Bell*

enhanced transitways.

**Peter McLaughlin**, CTIB chair and a Hennepin County commissioner, gave the opening remarks and moderated the morning sessions. He credited the counties for forging consensus on the need for transit investment. With the sales tax in place and a federal stimulus package on the way, the question “is whether we can create a new consensus to move these projects ahead better and faster,” he said. “It’s a moment to be bold.”

McLaughlin then welcomed **Peter Bell**, chair of the Metropolitan Council, who outlined the region’s financial challenges. Longer term, Bell said, Minnesota either will need to improve the performance of the MVST (motor vehicle sales tax) or will need a different funding strategy for transit. Referring to the

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## U of M researchers part of road user-charge study

A team including CTS has been selected by the National Cooperative Highway Research Program (NCHRP) to study road user charges. The study—Near-Term-Implementable Mechanisms for Collecting Road User Charges Based on Vehicle-Miles Traveled—will be conducted by ICF International, a global professional services firm; RAND Corporation, a non-profit global policy think tank; and CTS.

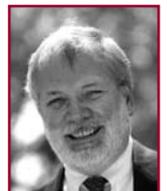
**Paul Sorensen** of RAND will serve as the principal investigator in this project. He will be advised by **Max Donath**, director of the Intelligent Transportation Systems (ITS) Institute at CTS; **Lee Munnich**, director of the State and Local Policy Program at the Humphrey Institute of Public Affairs; and **Martin Wachs** of RAND.

Motor fuel excise taxes have been the principal mechanism for raising highway revenue at the federal and state level for

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*Max Donath*



*Lee Munnich*

## Electric car technology, supporting infrastructure discussed at forum

Electric cars may be driving from the distant horizon into our immediate future.

CTS and the Center for Science, Technology and Public Policy (CSTPP) at the Humphrey Institute of Public Affairs hosted a forum in December to discuss strategies for wide-scale adoption of electric car technology and supporting infrastructure in Minnesota.

According to speaker **Jeff Miller** from the Silicon Valley firm Better Place, the technological hurdles to electric vehicles have been addressed and the challenge at hand is to build a system to accommodate them. "It's not a technology problem," he said, describing the company's global efforts to create sustainable electric car networks and reduce harmful emissions. "It's an infrastructure problem."

Better Place, founded in 2007, markets transportation as a service. Auto companies make the electric cars that plug into the Better Place electric recharge network of charging stations and battery swap stations. Energy companies provide the network's power through growing

renewable energy projects. Better Place provides the batteries to make owning an electric car affordable and convenient. The firm is working with Israel and automaker Renault-Nissan to move the country off oil in 10 years with electric vehicles and the infrastructure to support them. It also has growing global partnerships with other automakers and agreements with California, Hawaii, Denmark, and Australia.

The electric car forum, moderated by CSTPP director **Steve Kelley** and CTS associate director **Laurie McGinnis**, also featured University of Minnesota researchers presenting the latest in electric vehicle technology research. Mechanical engineering professor **David Kittelson** discussed findings from the CTS report *Transportation Policy and Technology Options to Reduce Greenhouse Gas Emissions in Minnesota*, published in July 2008.



Laurie McGinnis



David Kittelson

**Sara Mullen**, a Ph.D. candidate from the Department of Electrical Engineering and Computer Science, provided an overview of current electric vehicle technology and "smart grids" to provide the juice through an intelligent, more reliable, resilient, flexible, integrated, and secure electric power system. She explained that the use of partly or fully electric vehicles can greatly reduce GHG emissions.

In addition, state Rep. **Frank Hornstein** and state Sen. **Scott Dibble** discussed ideas for creating a public policy framework to advance goals in the coming legislative session for reducing carbon emissions from the transportation sector and achieving greater energy independence. They also outlined a strategy to attract private investment to build on the public policy in place. "We don't have a lot of money from our general fund, but we're going to move ahead," Dibble said. **CTS**

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number of European countries as well as in Australia and Japan, Carsten said.

The University of Leeds started its ISA research in 1995. One study, the UK ISA Project, included four field operational tests: two urban and two rural, both with private motorists and fleet drivers and a mix of ages and gender, Carsten said. Trials began in 2004 and ended in the middle of 2006. Vehicles were equipped with a voluntary system that limited speed to the prevailing limit. Drivers could, however, override the system by pressing a button on the steering wheel.

The results? "ISA didn't deliver a huge change in mean speed," Carsten said, but it had a "big impact" at very high speeds. "Not many people were doing 90 to 95 anymore" on 70 mph roads, he said.

Study participants gave ISA a much higher rate of usefulness than satisfaction—a result that shows up consistently in such studies, Carsten said, as users seem to think a technology is good for society but aren't sure they like it for themselves. Satisfaction ratings were actually negative when ISA was switched

on, became positive during the trials, and were the most positive after testing ended.

In a cost/benefit analysis of ISA, Leeds researchers modeled traffic growth and crash trends with and without ISA over 60 years (beginning in 2010), under two scenarios: one market driven and one authority driven. In the first, use of ISA would grow comparatively slowly, and less than 50 percent of vehicles would be ISA-equipped in 2070; the predicted crash rate would fall by 20 percent against the baseline. In contrast, an authority system requiring ISA on any new car after 2017 would give much faster market penetration, and the predicted number of crashes would decrease 50 percent from the baseline.

"These are really big reductions, larger than what the UK got with seat belts," Carsten said. "Probably no other [technology] will give such improvement." Comparing benefits (from reduced crashes, fuel, CO<sub>2</sub> emissions) to costs, the analysis found benefits were 3.4 times the costs in the market-driven scenario and 7.4 times the costs under the authority-driven scenario.

"Both scenarios are winners," Carsten said. "The harder the push for ISA and the stronger the system, the greater the benefits." He noted that the analysis did not factor in other potential benefits of ISA, such as lower costs from eliminating the need for traffic calming on urban streets or congestion reduction due to fewer crashes. "ISA can deliver much more than what's modeled here," he declared.

Auto manufacturers are starting to dabble in ISA, and some cities are moving toward implementation in taxis (London) and other fleets (Stockholm). Still, progress is slow, Carsten said. The UK has made no decision on ISA.

In closing, Carsten posed this question: What is the prospect for ISA in Minnesota and the United States? ISA initially faced resistance in the UK, and opponents warned of a "nanny state" or a "spy in the sky," he said, but popular opinion is now favorable. To advance ISA here, he urged the transportation community to make its case and educate the public, particularly through the press. "It is doable." **CTS**

## U of M, Japanese visitors discuss research collaboration

Researchers from Japan and Minnesota met at CTS on January 16 to discuss potential future collaboration. The Joint Meeting on Transportation/Land Use Models was organized by CTS and the Department of Civil Engineering at the University of Tokyo (UT).



Yingling Fan

The meeting began with a welcome from **Laurie McGinnis**, associate director of CTS, and **Takayuki Ueda** from the civil engineering department at UT. McGinnis also gave a brief presentation about CTS. The joint meeting was an outcome of her participation in a 2008 international scanning tour.

The workshop then turned to two sessions of research presentations. The first session, focusing on research

achievements, included presentations by Ueda; CTS Scholar **Yingling Fan**, assistant professor in the Humphrey Institute of Public Affairs; **Kate Ko** of the Department of Applied Economics; and **Muneta Yokomatsu** of the Disaster Prevention Research Institute at Kyoto University (and a visiting researcher in Applied Economics at the U of M and a guest associate professor at UT).

In the second session, which focused on next steps for further application, **Todd Graham** and **Dennis Farmer** of the Metropolitan Council discussed their perspectives on the future of forecasting at the Met Council.

Other U of M participants included **Linda Preisen** of CTS; **Jason Cao** of the Humphrey Institute; **Jerry Fruin**, **Rodney Smith**, and **Terry Roe** of Applied Economics; and **Henry Liu** of the Department of Civil Engineering. **CTS**



Japanese visitors discussed collaboration with U of M researchers.

## Faculty news

The first cohort of resident fellows at the University's Institute on the Environment includes two CTS Scholars: assistant professors **Carissa Schively Slotterback** of the Humphrey Institute of Public Affairs and **Julian Marshall** of the Department of Civil Engineering.



Julian Marshall

The fellows will begin their three-year appointments with the Institute in June 2009. Each resident fellow will receive flexible funding to engage in creative research and problem solving, develop new models of teaching and training, and build new networks and partnerships. The



Carissa Schively Slotterback

Institute chose a total of 20 resident fellows from a wide range of disciplines. For more information, see [www.environment.umn.edu](http://www.environment.umn.edu).

The first cohort of Institute fellows (called the "founding fellows"), selected in early 2007, included two other CTS Scholars—**Lance Neckar** of the Department of Landscape Architecture and **Elizabeth Wilson** of the Humphrey Institute of Public Affairs—as well as **Susan Galatowitsch** of Horticulture Science, who has conducted research under the CTS research program.

In other news, the Graduate School and the Office of the Provost named Marshall 1 of 11 recipients of the 2009 McKnight Land-Grant Professorships. The goal of the program is to advance the careers of the University's most promising junior faculty at a critical point in their professional lives. The award includes a research grant in each of two years, summer support, and a research leave of absence during the second year.

And in January, Neckar and Professor **David Pitt** of Landscape Architecture were named co-editors of *Landscape Journal* by the executive council of the Council of Educators in Landscape Architecture. **CTS**

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most of the past century. Despite several compelling advantages, their utility over the coming decades may be limited by a combination of structural and political factors. This has led some to suggest that fuel taxes should be replaced by a system of user fees based on vehicle-miles of travel (VMT).

The goals of the NCHRP project are to identify a range of potential options for the near-term implementation of VMT fees,

assess their relative strengths and limitations, identify one or more options offering the greatest potential, enumerate the necessary steps to institute VMT fees by 2015, and develop a strategy for phasing in a more sophisticated and flexible system for levying VMT fees over the longer term.

**Gina Baas**, assistant director of CTS, and **Stephanie Malinoff**, CTS education and outreach coordinator, will work with Sorensen and Transportation Research

Board (TRB) staff to conduct a one-day workshop with panel members and other transportation finance experts in April.

The team's goal is to produce a report that the TRB can use as a guide to decision making and as useful input to the 2009 transportation authorization process. A final draft report is due in May, and the final report by June 30, 2009. **CTS**

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stimulus package, Bell cautioned against “building out the system without looking at a way to fund operations.”

**John Adams**, co-chair of UMC, described the work of the consortium, which was established in 2006 to strengthen the University’s overall contribution to understanding metropolitan-urban-suburban issues. “This event fits our mission,” he said.

Following Adams was a taped video message from U.S. Congressman **James Oberstar**. He vowed to restructure the transit program in this year’s authorization of the federal surface transportation bill. “We’re going to develop quality-of-life factors for evaluation of transit projects, and we’re going to dramatically increase investment in transit,” he said.

The workshop then turned to presentations of transitway scenarios for the Twin Cities region by **Phil Eckhart** of Hennepin County, **Matt Smith** of Dakota County, and **Amy Vennewitz** of the Metropolitan Council. **Richard Steinmann**, senior advisor to the administrator of the Federal Transit Administration, discussed federal funding of transitways.

Next, representatives from the Denver

and Salt Lake City metropolitan areas shared successes and lessons learned from developing their transit networks. **Scott Reed**, assistant general manager of public affairs with the Denver Regional Transportation District, described the Denver area’s FasTracks plan, which calls for building 122 miles of new light rail and commuter rail and 18 miles of bus rapid transit by 2016. A key to the plan’s success is a detailed implementation schedule—specifying when individual lines will be built—supported by a financial plan, thus promoting a “sense of ownership” in the whole system, he said. Reed also suggested embracing economic growth as an argument for acceleration: Estimates are that FasTracks will create more than 10,000 jobs during peak construction and pump \$2.9 million into the Denver economy.

**Mike Allegra**, chief capital development officer for the Utah Transit Authority, said his organization is planning to add “70 miles in 7 years” of light or commuter rail, all before 2015. In a little over a decade (since the 2002



*Peter Bell, Robert Johns, and Scott Dibble*

Olympics), UTA will have gone from 0 to 150 miles of rail and from 550 to 1000 buses, he said.

The afternoon consisted of a spirited conversion circle moderated by CTS director **Robert Johns**. Several state legislators attended: Reps. **Alice Hausman**, **Frank Hornstein**, and **Melissa Hortman**, and Sen. **Scott Dibble** (Dibble is a member of the CTS Executive Committee).

To watch video of the morning presentations and view the speaker PowerPoints, please visit [www.cts.umn.edu/Events/transitways](http://www.cts.umn.edu/Events/transitways).

To learn about the University’s Transitway Impacts Research Program, please see [www.cts.umn.edu/Research/Transitways](http://www.cts.umn.edu/Research/Transitways). **CTS**

## Transport economics conference in June

CTS is hosting the International Transport Economics Conference on June 15–16, 2009, in Minneapolis.

The conference brings together researchers, practitioners, and policymakers interested in questions of transport economics. Topics include economic

questions relating to revenue and finance; congestion, pricing, and investment; production function and cost estimation; transport demand; energy and environment; safety; institutions and industrial organization; and transport and land use.

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## Upcoming events

To publicize your event, call CTS at 612-626-1077, fax 612-625-6381, or e-mail [snopl001@cts.umn.edu](mailto:snopl001@cts.umn.edu). Visit the CTS Web site—[www.cts.umn.edu](http://www.cts.umn.edu)—for more comprehensive event information.

Apr. 14–15	Spring Maintenance Training Expo, St. Cloud. See <a href="http://www.mnltap.umn.edu/Events">www.mnltap.umn.edu/Events</a> .	May 19–20	20th Annual CTS Transportation Research Conference, Sheraton Hotel, Bloomington. Contact <b>Sara Van Essendelft</b> , 612-624-3708, <a href="mailto:cceconf5@umn.edu">cceconf5@umn.edu</a> .
Apr. 22–24	Minnesota Alcohol Traffic Safety Association annual conference. See <a href="http://www.matsa.us">www.matsa.us</a> .	June 15–16	International Transport Economics Conference, Minneapolis. Contact <b>Sara Van Essendelft</b> , 612-624-3708, <a href="mailto:cceconf5@umn.edu">cceconf5@umn.edu</a> .
May 19	CTS Spring Luncheon featuring <b>Tom Vanderbilt</b> , Sheraton Hotel, Bloomington. Contact <b>Sara Van Essendelft</b> , 612-624-3708, <a href="mailto:cceconf5@umn.edu">cceconf5@umn.edu</a> .	June 18–20	First Transatlantic Network on Communications and Transport Activities Research Conference, Arlington, Virginia. See <a href="http://nectar.gmu.edu">http://nectar.gmu.edu</a> . <b>CTS</b>