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CTS Research E-News brings you the latest research project milestones, published reports, and seminar coverage.

In this issue:**Transportation and the Environment**

- ◆ [Researcher announces ethanol findings](#)
- ◆ [Greenhouse gas seminars highlight health effects, policy options](#)

Intelligent Transportation Systems

- ◆ [Research explores privacy, legal implications of emerging ITS technologies](#)
- ◆ [Driving simulation used to evaluate traveler information systems](#)

Transportation Infrastructure

- ◆ [Research produces guidelines for asphalt pavement rehabilitation](#)

Transit, Bicycling, and Walking

- ◆ [TCRP research publications available online](#)

Upcoming Events

- ◆ [MnROAD Open House, Toward Zero Deaths Conference](#)

Transportation and the Environment

Researcher announces ethanol findings



The results of a 13-month study led by **David Kittelson**, a professor in the [Department of Mechanical Engineering](#), show that E20—a blend of fuel containing 80 percent gasoline and 20 percent ethanol—has no negative impact on the drivability and maintenance of late-model cars and trucks.

“The study did not reveal any difference that might be associated with the use of E20 on normal on-road vehicles,” said Kittelson, a lead investigator in the [Reducing Greenhouse Gas Emissions \(GHG\) in Minnesota study](#). This should prove helpful for the state’s interest in changing fuel regulations.”

The more commonly used fuel blend of ethanol and gasoline in the United States is E10, which contains 10 percent ethanol and 90 percent gasoline. Minnesota has requested a waiver to allow E20 to be used in the state.

Results of the study will now be presented to the [U.S. Environmental Protection Agency](#) to officially determine E20’s suitability for on-road vehicles. The [Minnesota Department of Agriculture](#), the [Council of Great Lakes Governors](#), the [Minnesota Corn Growers Association](#), and the [Renewable Fuels Association](#) sponsored the study. Work was done in collaboration with the [Minnesota Pollution Control Agency](#) and the [Minnesota Department of Commerce](#). The University of Minnesota’s [Fleet Services](#) provided all cars for the study.

[Information on the study](#) is available on the CTS Web site. A final research report will be published by CTS following review and approval by federal sponsors.

Greenhouse gas seminars highlight health effects, policy options

The Greenhouse Gas Study held its third seminar on April 16, and a final seminar presentation at the [CTS Spring Luncheon](#) during the annual [CTS Transportation Research Conference](#). The study is investigating public policy and technology options for reducing greenhouse gases emitted from the transportation sector in Minnesota. CTS received an appropriation from the legislature last summer to conduct the study.

Mark Jacobson, a professor of civil and environmental engineering at [Stanford University](#), reported on the connection between global warming and increased pollution-related deaths. He advocated combining different types of renewable power to create a sizeable pool of safe energy for the world to draw from. For example, he predicted using wind-battery and electric vehicles could cut U.S. CO₂ levels 25.5 percent, and solar-battery electric vehicles could reduce levels another 23.4 percent. He estimated that the use of battery-electric and hydrogen-fuel-cell vehicles powered by clean renewables would eliminate 10,000 to 20,000 U.S. air pollution deaths each year.

Stephen Schneider, a member of the Intergovernmental Panel on Climate Change, Melvin and Joan Lane Professor for Interdisciplinary Environmental Studies, professor of biological sciences, and senior fellow in the [Woods Institute for the Environment](#) at Stanford University,

delivered a wide-ranging view of the transportation policy impacts of current climate change research at the Spring Luncheon. Schneider has been deeply involved in both climate research and policy analysis. In-depth coverage of his keynote presentation will appear in the July issue of the [CTS Report](#).

Intelligent Transportation Systems

Research explores privacy, legal implications of emerging ITS technologies

By Frank Douma, Hubert Humphrey Institute of Public Affairs, University of Minnesota



Frank Douma and graduate student Jordan Deckenbach

Intelligent transportation systems (ITS) technologies can provide planners and engineers with new tools that produce a safer and more efficient transportation system. However, because many of these technologies rely on the ability to track and record the movements of individual citizens, scholars and legal advocates have begun to raise privacy concerns. Under the auspices of the [TechPlan Program](#), a research program at the Humphrey Institute of Public Affairs' [State and Local Policy Program \(SLPP\)](#) funded by the [Intelligent Transportation Systems Institute](#), SLPP Assistant Director [Frank Douma](#) is investigating the implications of privacy law in regards to emerging ITS technologies. The research thus far has shown that while privacy protections for citizens on the open road are quite sparse, the rapid development of these technologies may require a reconsideration of parts of the legal framework for privacy in America.

A key finding has been that privacy protections, to date, largely do not extend to the transportation system. As Chief Justice Rehnquist stated in his majority opinion in *United States v. Knotts*, "A person traveling in an automobile on public thoroughfares has no reasonable expectation of privacy in his movements from one place to another." However, as this decision was handed down more

than 25 years ago, new technologies have emerged that make surveillance easier, cheaper and more pervasive, to the point that one may logically ask whether the Supreme Court would still arrive at the same decision if one of these technologies were challenged.

The United States currently does not have a comprehensive legal framework for privacy, but instead relies on a nebulous web of state and federal constitutional provisions and statutes. The major issue in examining ITS is whether the ability of surveillance technologies to track and record where a specific vehicle has been in the past, as well as project where it may go in the future, begins to impinge upon some of these protections.

Most broadly, the United States Supreme Court has declared that a right to privacy exists when there is an expectation of privacy and when society is ready to accept that expectation of privacy as reasonable. Though current jurisprudence and statutory regulations do not directly attempt to regulate ITS technology designs, a number of state legislatures and courts have begun to write and interpret laws concerning data practices, vicarious criminal liability, and privacy tort actions in ways that may affect the use of ITS. As it is unlikely that these legal issues are going to subside, a consideration by ITS engineers and planners of the legal implications of ITS design and use is helpful.

Read the rest of the article online in the [ITS Institute Sensor newsletter](#).

Driving simulation used to evaluate traveler information systems



As the popularity of traveler information systems using the national 511 telephone number increases, University of Minnesota researchers have recognized the need for a better understanding of how using this new technology affects driving performance. Following up on earlier research that examined the effects of normal cell phone use while driving, [HumanFIRST Program](#) researchers [Michael Rakauskas](#) and [Nic Ward](#) turned their attention to Minnesota's interactive voice response 511 system. Their goal was to understand how use of Minnesota's 511 system could affect driver performance and mental effort.

This study built on work already carried out by the same research team on the effects of cell phone use while driving. In their final report, Rakauskas and Ward note that interactive voice response (IVR) systems have been the subject of much less scientific research than have cell phones themselves. The research was supported by the Minnesota Department of Transportation through the [Minnesota Guidestar](#) program.

The researchers began by conducting detailed usage and usability evaluations of the Minnesota 511 (MN511) system, in order to determine what types of information users are requesting. This evaluation led the researchers to identify several potential shortcomings in the design, and to develop an alternative set of menus for MN511 that addressed these concerns.

The two sets of menus were then evaluated in a simulated driving scenario using the HumanFIRST Program's immersive driving simulator, in which participants responded to simple questions aloud and used both sets of menus on successive runs through a simulated driving course. Participants showed evidence of compensating for the additional mental workload imposed by using the 511 service while driving by delaying their reactions to traffic events presented during the simulation.

While the research did not uncover measurable differences in driving performance attributable to the design of the menus, the researchers report that more study participants expressed a preference for the revised menus. Additionally, some evidence suggests that drivers were better able to recognize information found using the revised menus.

[Driving Performance During 511 Information Retrieval: Cell Phone 2](#) (Mn/DOT 2007-48) is available from the CTS Web site.

Transportation Infrastructure

Research produces guidelines for asphalt pavement rehabilitation

Cold-In-Place Recycling or Full Depth Reclamation? What about Mill-and-Overlay? Determining the best approach to rehabilitating asphalt pavement can be a rough road for transportation agencies, and the stakes are high—road users need smooth, safe pavements, and taxpayers demand that maintenance costs be kept to a minimum. A team of civil engineering researchers including professor [Joseph Labuz](#), associate



professor **Bojan Guzina**, professor **Gene Skok** (now retired), graduate student **Thomas Westover**, and Minnesota Department of Transportation research staff members **Erland Lukanen** and **Shongtao Dai** have evaluated several options and present their best practice guidelines in a new report.

Rehabilitation data on more than 120 pavement rehabilitation projects were evaluated in the study, with interviews, surveys, and site visits among the methods used to gather additional insights from [Minnesota Department of Transportation](#) (Mn/DOT) district offices and county engineering staffs. Organizing this data in a database enabled the researchers to identify the best descriptors of pavement surface condition, and to develop a decision process for selecting the most appropriate pavement rehabilitation method. The decision procedure takes into account pavement geometrics, pavement conditions, and an evaluation of structural adequacy.

The project's final research report documents the methods used to develop these guidelines, and presents other tools such as a checklist that guides engineers through the decision procedure. The report also includes a chapter documenting the results of implementing the new procedures during pavement rehabilitation projects in several Mn/DOT districts and counties.

The study was sponsored by the [Minnesota Local Road Research Board](#).

[Pavement Rehabilitation Selection](#) (Mn/DOT 2008-06) is available from the CTS Web site.

Transit, Bicycling, and Walking

TCRP research publications available online

The federal Transit Cooperative Research Program (TCRP), administered by the Transportation Research Board, provides practical transit research to address technical and operational issues. TCRP emphasizes putting research results into the hands of organizations and individuals that can use them to solve problems.

Recent TCRP publications include:

- ◆ [AVL Systems for Bus Transit: Update](#) (TCRP Synthesis 73)
 - ◆ [Emergency Preparedness, Response, and Recovery in the Transit Industry](#) (TCRP Research Results Digest 87)
 - ◆ [Privacy Issues with the Use of Smart Cards](#) (TCRP Legal Research Digest 25)
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Upcoming Events

July 30

[TERRA Innovation Series: MnROAD Open House](#), Monticello, Minnesota. Contact Stephanie Malinoff, malinoff@cts.umn.edu, 612-624-8398.

October 7-8

[Toward Zero Deaths Conference](#), Rochester, Minnesota.
