“The driver of a sport-utility vehicle loaded with teenagers lost control as it sped through a dangerous curve in Apple Valley early Tuesday. The vehicle rolled and at least two passengers were critically injured...

The crash follows a pattern known by experts as the deadliest combination on the road: an inexperienced teen behind the wheel of a sport-utility vehicle, at night with a group of teenage passengers not wearing seat belts.”  
(from the Minneapolis Star Tribune, July 6, 2005)

Similar scenarios are all too familiar in most any part of the country. They illustrate the urgent need for new tools to reduce and prevent traffic fatalities. At the ITS Institute, we are doing our part.

Although our research often targets safety initiatives that help all drivers, several of our projects are focusing on specific high-risk groups. Our Intersection Decision Support work may prove most beneficial to elderly drivers, who have the most trouble determining when it is safe to pull out into faster-moving traffic. Other research is investigating the effects of sleep deprivation on drivers, such as commercial truckers, in order to prevent crashes caused by fatigue. And Professor Stephen Simon of the Law School, along with colleagues in the HumanFIRST Program and Intelligent Vehicles Laboratory, are investigating legal, technical, and behavioral approaches to reduce the incidence of teenage-driver crashes and fatalities.

I would like to focus for a moment on the issue of teen drivers, because this group has a higher fatality risk than any other driver age group on the road. Although teenagers (16–19 years old) make up less than 5 percent of all licensed drivers, they are involved in 13 percent of all fatal crashes. Approximately 6,000 teenagers are killed in motor vehicle crashes every year; this number has remained constant for over a decade, making automobile crashes the leading cause of death among this age group. New approaches to reduce teen fatalities are clearly needed.
No doubt, many factors play a role, but one critical factor is seat belt use—or rather, the lack of it. Seat belt use remains lowest among teen drivers: 36 percent among fatally injured teen drivers, and 23 percent among fatally injured passengers (1995–2000). In Minnesota, over 60 percent of teen drivers killed on the road were not wearing their seat belts. Compare this to other states and to the country as a whole, as depicted in the accompanying graph (Fig. 1). Although the percentages may not be as compelling for states with lower teen-driver fatality numbers (since their relative ranking may not be statistically significant), it is surprising and of concern how high the rates are for states with high numbers of fatalities. Keep in mind that seat belt use for all Minnesotans was 79 percent in 2003, and 82 percent in 2004.

Studies have also shown that teenage passengers are even less likely to wear their seat belt when the driver is not buckled. Teen drivers are also less likely to wear their seat belt when alcohol is involved. These low use rates clearly contribute to the high level of fatalities associated with teen crashes.

The benefit of seat belt use is well known. The National Highway Traffic Safety Administration estimates that seat belts reduce the risk of fatality by as much as 45 percent for front seat occupants of passenger vehicles.

Seat belt “minder” systems have not solved the problem. Seat belt interlocks—devices that require drivers to engage their seat belts prior to starting the vehicle—should be implemented, at the very least, for teenage drivers. All vehicles currently manufactured contain much of the belt-fastening sensor technology necessary to implement a seat belt interlock, and the costs are trivial for adding such functionality at the manufacturing stage.

We realize there are legal, policy, and societal issues with these approaches—including past resistance from the public when they were implemented. That’s why researchers such as Simon and his colleagues in other departments are exploring this topic further. The message is simple: politics and inertia do affect the deployment of technology even when positive benefit-cost ratios can readily be demonstrated. We need to do more than simply pursue the research if we want to transform our results into practice. We will keep advocating for change.

Of the many different approaches Institute research may take, the goal is always the same: to improve the safety and mobility of transportation through a focus on human-centered technology. We will continue to foster our multidisciplinary group of researchers as they explore new ideas, and reach out to students and practitioners to inform and educate them about what is discovered. You can read about all our activities within this annual report.

We of course could not make any progress if not for the vital efforts of others. These include the members of our research selection and review panels and our board; our Institute staff, researchers, and students; the Minnesota Department of Transportation; the USDOT’s University Transportation Center Program in the Research and Innovative Technology Administration (RITA); and the taxpayers and their legislative representatives. Their belief in our mission and their support of our work is deeply appreciated, and for that we extend sincere thanks.

Although teenagers make up less than 5 percent of all licensed drivers, they are involved in 13 percent of all fatal crashes.
Mission Statement

The Intelligent Transportation Systems Institute is a congressionally designated University Transportation Center (UTC) funded through the Transportation Equity Act for the 21st Century (TEA-21), the federal transportation bill passed in 1998. This funding continues the Institute’s efforts initiated under TEA-21’s predecessor, the Intermodal Surface Transportation Efficiency Act of 1991.

The Institute plans and conducts activities that further the mission of the United States Department of Transportation’s UTC program: to advance U.S. technology and expertise in the many disciplines that make up transportation through education, research, and technology transfer activities at university-based centers of excellence.

Our focus is human-centered technology that enhances the safety and mobility of road- and transit-based transportation. To that end, we direct the collective energies of researchers from multiple disciplines to advance the state of the art in the core ITS technologies of computing, sensing, communications, and control systems in order to surmount the significant transportation problems of the day.

Based on our theme, we bring together engineers and cognitive psychologists from the University with our partners—the USDOT, the Minnesota DOT, other government agencies, and private industry—to ensure that Institute-developed technologies become tools that help us understand and overcome human limitations as they relate to transportation.

Additionally, we address issues related to transportation in a northern climate, investigate technologies for improving the safety of travel in rural environments, and consider social and economic policy issues related to the deployment of core ITS technologies.

Financial Report
Expenditures for Year Six: July 1, 2004–June 30, 2005

- Administration 7%
- Education 3%
- Research 83%
- Technology Transfer/Information Services 7%
Management Structure

The ITS Institute is located on the Twin Cities campus of the University of Minnesota and is housed within the Center for Transportation Studies (CTS). Much of the Institute's successful leadership in the development and application of intelligent transportation systems and technologies results from its state and national partnerships, including those with CTS, the Minnesota Department of Transportation, private industry, and county and city engineers.

The Institute director leads the Institute's operation, implements its strategic plan, and assumes overall responsibility for its success. In this role, he directs Institute programs, personnel, and funds.

The Institute's board guides and oversees the implementation of the Institute's work. The board works with the director to ensure that the USDOT's Research and Innovative Technology Administration requirements are met, approves annual plans and budgets, and meets at least twice yearly to provide direction to, and approval of, the Institute's activities.

Institute staff and University researchers, drawing from various areas of expertise, help create and disseminate knowledge related to intelligent transportation systems through research, education, and technology transfer activities. In addition, the leadership and staff of CTS provide connections and access to an extensive transportation research and education network. The Institute's affiliation with the Center allows it to work seamlessly with CTS staff and benefit from its diverse outreach, administration, and communications capabilities.

Board members whose terms ended during the fiscal year:

Rebecca Brewster
President and Chief Operating Officer, American Transportation Research Institute

Ted Davis
Former Dean, Institute of Technology, University of Minnesota

ITS Institute Board Members (current as of June 30, 2005)

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Northland Advanced Transportation Systems Research Laboratories
The NATSRL program director is James Riehl, dean of the College of Science and Engineering. Technical support is provided by Stanley Burns, professor and head, Department of Electrical and Computer Engineering (ECE); Donald Crouch, professor and head, Department of Computer Science; Taek Mu Kwon, professor, ECE; and David Wyrick, professor and head, Department of Mechanical and Industrial Engineering. Program management of NATSRL is provided by Carol Wolosz, with Jeanne Hartwick serving as the program accountant, David Keranen as the infrastructure engineer, and Ed Fleege as the research fellow.

Faculty and research staff conducting ITS-related research for NATSRL include the following:

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