Human Factors Group Research Goes Global
Researchers in the Center for Transportation Safety’s Human Factors Group have been busy the past few months embarking on travels across the globe and conducting research at the Pecos Research and Testing Center.

The Real Smart Car: TTI’s Instrumented Vehicle  A look at CTS’s state-of-the-art Toyota Highlander.

Third Annual Motorcycle Safety Forum Held in February  Highlights of the major issues raised at the forum in Austin, Texas.

New Employees  CTS welcomes three new employees
Researchers in the Center for Transportation Safety’s Human Factors Group have been busy the past few months embarking on travels across the globe and conducting research at the Pecos Research and Testing Center.

Senior Research Scientist Sue Chrysler recently returned from a 17-day trip to Japan and Australia. She was part of a U.S. delegation with the Federal Highway Administration’s International Technology Scanning Program. The purpose of the trip was to collect information from abroad with the potential to improve roadway safety for older road users in the United States and, consequently, for all road users.

General topics of interest to the group included:

- infrastructure-based international best practices that improve safety and mobility for older road users that could be applied in the near term on U.S. roadways,
- policy approaches to improving infrastructure to better meet the needs and capabilities of older road users,
- safety research collaboration opportunities between international and U.S. transportation research centers, and
- ways to improve U.S. and international practices for long-term transportation planning for older road users.

With the number of older road users in Australia and Japan increasing as fast or faster than those in the United States, the group had an ideal opportunity to share information and learn about innovative traffic safety measures.

In Japan, the group listened to presentations from the federal research lab about topics such as sign legibility and street lighting for pedestrians. “It was really interesting to examine that, despite our language and cultural differences, they essentially perform research the same way we do,” says Chrysler.

Chrysler also notes the approach to traffic safety used in Australia. “Their philosophy is to reduce crash severity by reducing speed. To accomplish this, they are very aggressive about speed limit settings and the use of speed cameras for enforcement. They measure success not just in reducing fatalities, but in reducing severe crashes. By making the crash less severe, you have less injured people and lower societal costs.”

Australia has also made great strides with combating drunk driving. “As a society, drunk driving is not viewed as acceptable behavior at all, even among young people. They have been so aggressive with their drunk driving education in the last 15 years that it has really had a generational effect. Twenty-year-olds will go out, and it’s just common for them to say ‘who’s driving tonight?’” says Chrysler.

While in Australia, the team visited Monash University in Melbourne and Queensland University of Technology in Brisbane, both of which have transportation research centers comparable to the Texas Transportation Institute (TTI). The group toured their research centers and learned about their ongoing research projects.
facilities, which included a driving simulator, test track and instrumented vehicle. And they learned that Australia’s researchers encounter some of the same problems as their Texan colleagues.

“When we do research out at our Riverside Test Track, we worry about animals like raccoons, deer or armadillos running out on the test track. Out there they have wallabies,” Chrysler says with a laugh.

Safety Center and other TTI researchers have also been busy in West Texas, having recently completed work on a Texas Department of Transportation (TxDOT)–sponsored project. TTI Senior Research Engineer Kay Fitzpatrick is the research supervisor on the project that is looking at driver performance at high speeds.

The goal of the project is to gain a better understanding of driver performance at high speeds. Specific objectives include

- determine perception–reaction time for high speed situations,
- identify differences in driver workload at high speeds and
- determine how operating speed affects time-to-contact estimates.

The subjects drove a stretch of I-20 between Odessa and Pecos where a section has a 70 mph speed limit and another section has an 80 mph speed limit. The subjects then drove to the 9-mile circular track at the Pecos Research and Testing Center and drove up to 85 mph. “The TxDOT district in Odessa was very helpful in distributing information regarding the study, which helped us find research participants,” said Chrysler. “The on-road and test track work occurred during Spring Break week, which meant that several researchers (Dillon Funkhouser, Marcus Brewer, Jon Re, Alex Borgan, Ben Sperry and Jesse Stanley) were generous in modifying their break schedule to permit the collection of the data in a timely manner.”
The Real Smart Car: TTI’s Instrumented Vehicle

By Rick Davenport

Imagine that every action you take while driving is recorded. Video cameras capture your head and eye movements. Touching the brake pedal, accelerator and steering wheel turns into data that are fed into a main computer in your backseat. A global positioning satellite (GPS) device records how you position your car during curves, and someone in the backseat marks locations where you’ve read a traffic sign. A radar system records the distance to the car up ahead. And the head-mounted apparatus you’re wearing monitors how long you look at something and even records each blink of your eyes.

Turns out you’ve agreed to be a volunteer in a Center for Transportation Safety (CTS) and Texas Transportation Institute (TTI) study. You are driving the so-called Instrumented Vehicle, a 2006 fully loaded (and then some) Toyota Highlander. Drive out price, including all the high-tech gear: $100,000.

"With funding from CTS, TTI Administration, and the Transportation Operations Group (TOG), we were able to have this state-of-the-art, rolling data center in place in March 2007," says Susan Chrysler, manager of the Human Factors Program and CTS senior research scientist. "Since then we've completed four major studies and have five more planned over the next few months. The Instrumented Vehicle is in huge demand.”

Because of its popularity, trying to coordinate the schedule of the researcher with the available time of the vehicle has become something of an obstacle.

The research includes projects with the Harris County Toll Road Authority, the Federal Highway Administration, the National Cooperative Highway Research Program, the Texas Department of Transportation and the Southwest Region University Transportation Centers Program. Those projects evaluated things like distractions of in-vehicle entertainment devices, road sign legibility, driver behaviors on curves on rural highways and driver eye movements during use of freeway on-ramps. Over 100 volunteer research participants have driven the car to date.

"The potential research applications for the Instrumented Vehicle are limitless," says Chrysler. “Each study will help us make driving safer by knowing how motorists react during certain situations. It will also let us know which roadside safety and warning devices are the most helpful in terms of either visibility or effectiveness.”

The monumental task of installing all of the specialized equipment fell into the capable hands of Senior Research Specialist Dick Zimmer, who has been equipping vehicles with test equipment since the 1970s. "In those days, we thought we were ultra-modern. But, compared with what's available now, the gear was very primitive," Zimmer recalls. "Now, when new equipment is produced that can measure another function, it's fully compatible with the main data system and all I really have to do is build a small interface and plug it in. The results today are digital and much more accurate.” The Instrumented Vehicle is capable of monitoring up to 128 high-speed sensor channels, compared to just two analog functions 30 years ago.

"I think the key to making the road safer today is in the field of prevention," says Chrysler. "Our Instrumented Vehicle monitors driver behavior, which we must first understand in order to prevent the common errors people make.”
Full airbag package, eight-way power seat, upgraded alternator

**Dewetron DEWE 5000**
- Central computer used to synchronize signals from peripheral systems
- Custom software plug-ins used to interface with data collection equipment

**Trimble DSM 232 GPS system**
- Sub-meter accuracy
- Sample at up to 10 Hz

**Assistware SafeTRAC**
- Uses image-processing software to determine vehicle lane position from a forward-facing video camera

**Vorad Radar**
- Used to determine distance to a lead vehicle or object
- Outputs range, range rate and azimuth for multiple targets simultaneously

**Additional Instrumentation**
- Position data for brake, throttle and steering wheel
- Three-axis accelerometer data

**Collection of Video Data**
- Multiple cameras processed through quad splitter (recorded and synched with data streams by the DEWE5000)

**Arrington Research Viewpoint Eye-Tracking System**
- Available for use with the Instrumented Vehicle
- Head mounted for greater precision
- Viewpoint software allows for tracking of gaze position, duration, eye fixations, blink rate, etc.

TOTAL Unlimited Research Capabilities

Contact Sue Chrysler at (979) 862-3928 for additional information.
Motorcycle Safety Forum Addresses Disturbing Fatality Rate

By Rick Davenport

At a time when automobile deaths are on the decline in the United States, the number of motorcycle fatalities is skyrocketing. That sobering information has placed even greater emphasis on this year’s Motorcycle Safety Forum held in Austin February 13.

In his opening remarks to the 100 attendees, Center for Transportation Safety (CTS) Director John Mounce said motorcycle fatalities have increased for nine straight years and, for the first time, have outnumbered pedestrian deaths. "Rider fatalities now account for 11 percent of total fatalities (up from 5 percent in 1997) and dramatically affect the nation’s overall highway fatality rate," Mounce said. "This trend is perhaps the greatest highway safety challenge our nation faces today."

Over 100 people from all over Texas attended the meeting, which included safety advocates representing riders, trainers, law enforcement, engineers, educators, military, health professionals, and federal and state motorcycle safety organizations. This is the third CTS-sponsored Motorcycle Safety Forum in as many years, which was organized in response to the ever-increasing fatality rate. This year's forum was co-sponsored by the Texas Transportation Institute (TTI) with the Texas Department of Transportation, Texas Department of Public Safety and Brown Distributing Company as participating agencies.

The day-long forum included presentations on crash trends, rider training, share-the-road programs, funding and strategic planning. Associate Research Scientist Patricia Turner discussed the new TxDOT motorcycle safety public awareness campaign entitled "Look. Learn. Live," developed by TTI.

"This forum was the best attended and most successful Motorcycle Safety Forum we’ve had," Turner said. "We are all working together, seeking ways to reverse the growing number of motorcycle fatalities." Senior Research Scientist Quinn Brackett also spoke at the forum, presenting "Countermeasures to Reduce Motorcycle Crashes in Texas."

As a result of the increase in fatalities, a Motorcycle Safety Coalition is being formed to come up with strategies to reduce motorcycle crashes. The volunteer members are planning their first meeting.
New Staff

**James Michael Guidry (Mike)** is a research associate with the Behavioral Research Group. Mr. Guidry holds a B.F.A. in graphic design and advertising from Sam Houston State University and an A.A.S. in criminal justice from Blinn College. He is a 2nd-class petty officer (Seabee Combat Warfare Specialist) with the United States Reserve Seabees, the construction/engineering battalion of the Navy and Marine Corps. Prior to joining the Texas Transportation Institute (TTI), Mr. Guidry was with the Texas A&M University Police Department for 10 years, serving as an advanced senior security specialist. Mr. Guidry’s research interest is in the area of occupant protection. He can be reached at 979-845-9958 or j-guidry@ttimail.tamu.edu.

**Irene Rodriguez** is the state coordinator for Texas Safe Communities and works in the Behavioral Research Group. She is a national leader and resource in child passenger safety with expertise in injury prevention. Ms. Rodriguez is a National Child Passenger Safety Board Member Emeritus and served as the chair of the diversity committee. She was an advisor for the development of the NHTSA Bilingual Standardized Child Passenger Safety Training Curriculum. In collaboration with corporate entities she has developed, implemented and managed national safety education programs and media campaigns. At the state level, Ms. Rodriguez was the Texas Coordinator for Child Passenger Safety with the Texas Department of Health from 1994 to 1999. Just prior to joining the Center for Transportation Safety, Ms. Rodriguez was the director of the Middle Tennessee Child Passenger Safety Center at Meharry Medical College in Nashville, Tennessee. She can be reached at 979-458-0701 or I-rodriguez@ttimail.tamu.edu.

**Troy Walden, Ph.D.**, is an assistant research scientist with the Crash Analysis Group. Dr. Walden has worked in the area of law enforcement for over 20 years with an emphasis in traffic safety and crash investigations. Prior to joining TTI, Dr. Walden was a private consultant charged with analyzing alcohol and drug cases in criminal and civil matters. Prior to that, Dr. Walden was employed with the Texas Engineering Extension Service as the Texas state coordinator for Impaired Driving Programs. Dr. Walden also served 12 years with the College Station Police Department as a patrol officer, criminal investigator, crash reconstructionist and sergeant in the patrol division. Dr. Walden received his B.S. in criminal justice from Sam Houston State University and his M.S. and Ph.D. in educational administration and human resource development from Texas A&M University. Dr. Walden’s primary research interests are impaired driving (alcohol and other drugs) and criminal justice issues involving traffic safety. He can be reached at 979-845-9943 or T-Walden@ttimail.tamu.edu.