Celebrating
10 Years of Service
to the
Transportation Community
Message
From
The Executive Director

2008 has been a year of celebration and change. First, we are celebrating ten years of service to the transportation community. Since UTCA was founded in 1999, we have seen tremendous accomplishments:

- UTCA researchers completed 206 research projects. 59 projects are ongoing.
- UTCA published 172 final research reports, which are posted on the Center website.
- Approximately 82 copies of the first Annual Report were distributed. 1,042 copies of this 2008 Annual Report will be distributed.
- At least 327 undergraduate students and 316 graduate students worked on research projects.
- 100 master’s degrees and seven doctoral degrees in transportation engineering were awarded on our three campuses.

This year, we celebrated the service and dedication of two remarkable individuals. Dr. Daniel Turner, Founding Executive Director of UTCA, stepped down in January 2008 to devote more time to research, teaching, and service to the university and community. Mr. Don Vaughn, the organization’s first and only Advisory Board Chair, rotated off the Board in August 2008. Both men provided strong leadership during UTCA’s first decade.

To replace Mr. Vaughn, we welcomed Mr. Steve Ostaseski as the new Advisory Board Chair. Mr. Ostaseski is a principal planner with the Regional Planning Commission of Greater Birmingham and has served on our Board for several years. Additionally, Dr. Houssam A. Toutanji was introduced to the Board as the new UTCA Associate Director at The University of Alabama in Huntsville. We are delighted to have these knowledgeable men join UTCA in these new positions.

We look forward to another ten years of service to the transportation community.

Sincerely,

Jay K. Lindly
Mission and Theme

The University Transportation Center for Alabama (UTCA) was created by a resolution of the Board of Trustees of The University of Alabama System (UA System) and began operation on March 15, 1999. The Transportation Equity Act for the 21st Century (TEA-21), Public Law 105-178, provided initial funding and established the UTCA as a “university transportation center” (UTC) under the US Department of Transportation’s Research and Innovative Technology Administration (RITA). The UTCA now operates as a Title III UTC under the 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU).

The UTCA conducts transportation education, research, and technology transfer activities throughout the state and region. All faculty and staff members from The University of Alabama (UA), The University of Alabama at Birmingham (UAB), and The University of Alabama in Huntsville (UAH) are eligible to conduct projects in all of these areas.

Mission

The UTCA mission contributes to the overall mission of the US Department of Transportation (USDOT). Specifically, the UTCA seeks to advance technology and expertise in the multiple disciplines that comprise transportation through the mechanisms of education, research, and technology transfer while serving as a university-based center of excellence (2006 UTCA Strategic Plan, p. 12).

Theme

The UTCA theme – Management and Safety of Transportation Systems – reflects the transportation needs of Alabama and the expertise of The University of Alabama System faculty. In allocating UTCA funding, the Executive Committee and Advisory Board give priority to programs and projects that closely follow this theme. In 2006 the Executive Committee narrowed and sharpened the focus of the UTCA research program to emphasize the topic of congestion. Several management research projects now focus on maximizing traffic management and minimizing congestion. Similarly, safety research projects may now highlight infrastructure sustainability.
The UTCA headquarters is located in Shelby Hall on The University of Alabama campus. Each campus (UA, UAB, and UAH) has a branch office operating under the direction of an Associate Director. The Executive Director and Associate Directors form the Executive Committee which provides guidance and direction for Center activities. Faculty members engaged in UTCA projects work in their own offices on their own campuses.

The following six individuals are continuously assigned to the UTCA, all on a part-time basis. Researchers from the three campuses are engaged for only the life of a particular project.

Dr. Michael Hardin
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mhardin@cba.ua.edu

Dr. Fouad Fouad
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Dr. Houssam Toutanji
Assoc. Director, UAH
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Mrs. Connie Harris; Administrative Secretary, UA; charris@eng.ua.edu

Dr. Janet Lynn Norton; Editorial Assistant, UA; jnorton@eng.ua.edu
The UTCA has a strong Advisory Board. Members include representatives from public and private transportation-related fields and organizations. The Advisory Board takes an active role in guiding operations and establishing the direction of growth for the Center, particularly in the areas of research and technology transfer. Its members initiate the Annual Research Plan, review proposals, and evaluate the UTCA’s annual accomplishments and progress.

**Chair:**
Mr. Steve Ostaseski
Regional Planning Commission for Greater Birmingham
Birmingham, AL

**Vice-Chairman:**
Mr. Mark Bartlett
Division Administrator
Federal Highway Administration
Montgomery, AL

**Academic Research:**
Dr. Brian Smith
Center for Transportation Studies
University of Virginia
Charlottesville, VA

**City Engineer:**
Mr. Joe Robinson
City of Tuscaloosa (AL) Engineer
Tuscaloosa, AL

**County Engineer:**
Mr. Randy Cole
Shelby County (AL) Engineer
Columbiana, AL

**Municipal Planning Organizations:**
Mr. James Moore
Transportation Planner
City of Huntsville (AL)
Huntsville, AL

**Highway Representative (Design):**
Mr. Don Arkle
Assistant Chief Engineer for Policy and Planning
Alabama Department of Transportation
Montgomery, AL

**Highway Representative (Geotechnical & Materials):**
Mr. Larry Lockett
Bureau Chief, Materials & Tests
Alabama Department of Transportation
Montgomery, AL

**Highway Representative (Maintenance):**
Mr. George Conner
State Maintenance Engineer
Alabama Department of Transportation
Montgomery, AL

**Transportation Engineering:**
Mr. James Brown
Gonzalez-Strength & Associates, Inc.
Birmingham, AL

**Logistics/Commercial Vehicles:**
Mr. George Overstreet
Owner, Clarke Leasing Company, Inc.
Thomasville, AL

**Construction Industry:**
Mr. Billy Norrell
Executive Director
Alabama Road Builders Association
Montgomery, AL

**FHWA Representatives:**
Mr. Grant Zammit
Traffic Management/System Operations Specialist
FHWA Resource Center
Atlanta, GA

Mr. Eddie Curtis
Traffic Management Specialist
Office of Transportation Management
FHWA Resource Center
Atlanta, GA
The UTCA Advisory Board held its annual meeting on Friday, August 29, 2008, in Room L210 of Shelby Hall on The University of Alabama (UA) campus.

Dr. Jay K. Lindly, Executive Director, called the meeting to order at 11:00 AM. He welcomed Board members and introduced Mr. Steve Ostaseski as the new Advisory Board Chair. Steve is a principal planner with the Regional Planning Commission of Greater Birmingham.

This meeting marked two milestones. First, Dr. Daniel Shelton Turner, Founding Executive Director, stepped down in January in order to devote more time to research, teaching, and service to the university and community. Secondly, Mr. Don Vaughn, the organization’s first and only Advisory Board Chair, rotated off the Board this year. Mr. Vaughn is Chief Engineer and Deputy Director of the Alabama Department of Transportation (ALDOT). Both men received plaques for their distinguished service to UTCA.

After a review of the state of UTCA and a summary of research projects in progress, Mr. Ostaseski and Dr. Lindly reviewed the 2008 Annual Research Plan with Board members. They asked for concepts and projects that could be used to update the current Plan. The Board discussed many possible research topics including managed lanes, oversize/overweight (OS/OW) vehicles, infrastructure sustainability, transit-oriented development, and traffic control devices, to name a few. The 2009 Annual Research Plan was drafted during this work session. It can be downloaded from the Center’s website at http://utca.eng.ua.edu.

Dr. Houssam A. Toutanji is the new UTCA Associate Director at The University of Alabama in Huntsville. He is Professor and Chair of the Department of Civil and Environmental Engineering at UAH. Dr. Toutanji was introduced to the Advisory Board at its 2008 Annual Meeting.

Dr. Toutanji’s research interests include smart materials and structures, structural retrofitting and repair, durability and long-term performance of advanced composites, high strength concrete, nondestructive testing, and self-consolidating concrete. Dr. Toutanji has completed eight research projects for UTCA and/or ALDOT.
Overview of Research Program

UTCA will utilize an objective process for selecting and reviewing research that balances the multiple objectives of the program (2006 Strategic Plan, p. 12).

Research Project Selection

The UTCA continues to encourage all faculty and staff in The UA System to compete for project funding. The Advisory Board and Executive Committee create an Annual Research Plan to define research topics of highest importance. Peer experts review proposals and recommend projects for funding.

A large number of faculty members have participated in this process, as illustrated in TABLE 3-1 and TABLE 3-2. The degree of participation has exceeded the initial goals of the Executive Committee and has produced a large network of interdisciplinary transportation experts.

UTCA will have an ongoing program of basic and applied research, the products of which are judged by peers or other experts in the field, to advance the body of knowledge in transportation (2006 Strategic Plan, p. 16).

<table>
<thead>
<tr>
<th>TABLE 3-1. Principal Investigators</th>
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<tbody>
<tr>
<td>Grant Year</td>
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<td>Different PIs</td>
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<td>New PIs</td>
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<tr>
<th>TABLE 3-2. Research Selection (UTC Funds)</th>
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<tr>
<td>Grant Year</td>
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<tr>
<td>Proposals</td>
</tr>
<tr>
<td>Projects Funded by UTCA</td>
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</table>
The UTCA funded seven projects with 2008 UTC monies. An additional three projects were funded by external agencies. These projects are briefly described in the following pages. Externally-funded projects are identified by a “4” as the third digit in the UTCA project numbering system.

**Project #07404 – Work Zone Lane Closure Analysis Model**, Dr. Robert Batson, Principal Investigator, UA. Maintaining, rehabilitating, and expanding Alabama roads is becoming more difficult and more expensive, especially since much of this work must be undertaken while traffic continues to use the road. The purpose of this project is to enhance ALDOT’s technical tools for analyzing work zones to provide better decision data (volumes of traffic affected, travel speed, average delay, queue length, etc.) to allow selection of optimum alternatives for future rehabilitation and construction.

**Project #08103 - Transit Modeling and Mitigating Traffic Congestion**, Dr. Sharif Melouk, Principal Investigator, UA. The main goal of this research effort is to evaluate, analyze, and recommend congestion mitigation strategies to transportation system designers and decision-makers. This goal will be achieved by developing a decision support tool that is based on simulation optimization. The proposed simulation optimization method will incorporate optimization techniques in the form of meta-heuristics with existing and/or new traffic simulation models. This tool will help identify congestion points and potential mitigation strategies to alleviate the congestion. Furthermore, this tool will be used to evaluate the impact of transit alternatives on traffic congestion by incorporating their cost, safety, and effectiveness for alleviating congestion. To test the validity and the applicability of this method, a specific traffic congestion scenario will be identified in Mobile, AL, the planned test site for this research.

**Project #08111 - Advanced Transportation Institute**, Dr. Daniel Turner, Principal Investigator, UA. The objective of the Advanced Transportation Institute is to introduce junior and senior high school students, with preference to traditionally underrepresented groups in engineering disciplines, to transportation careers. UTCA and the Alabama Department of Transportation (ALDOT) Personnel Bureau co-sponsor the Institute. The agenda for the week-long program includes presentations on transportation careers; how to select and enter a university; how to obtain scholarships; and additional presentations on planning, design, construction, maintenance, traffic engineering, and bridge design.

**Project #08112 - Transit Evacuation Planning: Two Case Studies**, Dr. Daniel Turner, Principal Investigator, UA. This project addresses the transit emergency evacuation of individuals without personal vehicles or the means to acquire them during coastal extreme events. It will be a joint effort of the University Transportation Center for Alabama (UTCA) and the Center for Transportation Policy Studies (CTPS) at the University of North Carolina in Charlotte and will use Mobile, AL and Wilmington, NC as simultaneous case studies. The result will be detailed plans for both cities that include time tables, procedures for pre-identification of the evacuating population, communication, coordination, collection of evacuees, staging, medical attention, efficient passenger loading, optimum flow of buses for line haul to destinations, and similar issues.

**Project #08204 - Expanding Portable B-WIM Technology**, Dr. Wilbur Hitchcock, Principal Investigator, UAB. Bridge Weigh-in-Motion (B-WIM) systems support law enforcement and transportation planners in the management of oversized and overweight commercial vehicles. However, the current technology can limit the practical use of B-WIM to a small range of bridge sizes and structural design types, and there is need to improve the overall accuracy and reliability of B-WIM technology.
The project will test the SiWIM system on two additional bridge structures of differing primary girder type and will explore beyond the current state of technology to recommend concepts and potential additional sensor technology configurations which could significantly contribute to more reliable and versatile B-WIM systems.

**Project #08206 - Implementing Active Traffic Management Strategies in the United States**, Mr. Andrew Sullivan, Principal Investigator, UAB. Congestion management includes strategies such as variable message signs, HOV lanes, toll lanes, and network surveillance. These strategies, however, have largely been deployed so that they function independently and are often implemented only on preset schedules or manually in response to an incident. Active Traffic Management utilizes many of these same strategies but does so in concert to maximize the efficiency of transportation facilities during all periods of the day and during both recurrent and non-recurrent congestion. It stresses automation to dynamically deploy strategies to quickly optimize performance and enhance throughput and safety. The project attempts to build on the initial research performed by an FHWA scanning team and develop practical guidelines for implementing Active Traffic Management strategies in the United States.

**Project #08301 - Transportation Engineering Summer Institute: Phase IX**, Dr. Kathleen Leonard, Principal Investigator, UAH. The objective of the Gearing Up for Transportation Engineering Program (GUTEP) is to introduce middle school students from the Huntsville, AL area to transportation engineering concepts and careers. During this summer’s week-long event on the UAH campus, participants learned basic concepts of materials, structures, safety, and other transportation engineering topics by engaging in a variety of hands-on experiments. Field trips were also an important component of the program. Engineers from the UAH faculty, the Society of Women Engineers, NASA’s Marshall Space Flight Center, and the National Society of Black Engineers served as instructors. By providing fun learning experiences in an academic setting, program planners hoped to encourage under-represented students to consider a career in transportation engineering.

**Project #08303 - Student Funding to Attend TRB’s Annual Meeting**, Dr. Michael Anderson, Principal Investigator, UAH. Faculty representatives from each campus of The University of Alabama System selected students to present their research at a student awards luncheon held on The UAB campus. These students received travel funds to attend the Annual Meeting of the Transportation Research Board in Washington, DC.

**Project #08401 - Driver Reaction at Railroad Crossings**, Dr. Jay Lindly, Principal Investigator, UA. A congressional earmark has provided funds to install and assess an extended crossing gate at a highway/rail grade crossing for three years. The crossing gate will be installed on a crossing in Troy, AL. The objective of the study is to document the reaction of drivers to the new gate. The study will include a 90-day ‘before’ and a 90-day ‘after’ study of driver behavior at the crossing and a three-year study to monitor crashes/near misses observed by railroad personnel at the crossings.

**Project #08402 - Evaluation of Public Private Partnership Proposals**, Dr. Jay Lindly, Principal Investigator, UA. Alabama Governor Riley has called ALDOT to move towards Public-Private Partnerships (P3) whenever possible to improve roadway infrastructure. It is expected that ALDOT will be authorized soon to conduct P3 projects. The research set forth in this proposal will help ALDOT identify possible alternatives and decide whether to approve or disapprove existing P3 proposals.
Sources of Revenue for New Projects in 2008

As shown in TABLE 3-3, the UTCA received most of its revenue for new projects funded in 2008 from RITA’s University Transportation Centers Program. The Alabama Department of Transportation (ALDOT) was also an important source of revenue.

As a result of recent Congressional reauthorization of transportation programs, UTCs are no longer required to provide University Matching Funds. However, UTCA anticipates that ALDOT funds will continue to be instrumental in supplementing UTC support.

FIGURE 3-1 illustrates the relative roles of these funding sources.

Table 3-3. 2008 Revenue Sources and Expenditures for New Projects ($1000)

<table>
<thead>
<tr>
<th>REVENUE SOURCES</th>
<th>$</th>
<th>%</th>
</tr>
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<tbody>
<tr>
<td>RITA - UTC</td>
<td>591</td>
<td>65</td>
</tr>
<tr>
<td>University Matching</td>
<td>17</td>
<td>2</td>
</tr>
<tr>
<td>ALDOT - SPR</td>
<td>173</td>
<td>19</td>
</tr>
<tr>
<td>ALDOT - Non-SPR</td>
<td>125</td>
<td>14</td>
</tr>
<tr>
<td>TOTAL</td>
<td>906</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXPENDITURES</th>
<th>$</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration</td>
<td>164</td>
<td>15</td>
</tr>
<tr>
<td>Bridges</td>
<td>150</td>
<td>14</td>
</tr>
<tr>
<td>Education</td>
<td>105</td>
<td>10</td>
</tr>
<tr>
<td>Management</td>
<td>526</td>
<td>49</td>
</tr>
<tr>
<td>Safety</td>
<td>125</td>
<td>12</td>
</tr>
<tr>
<td>Technology Transfer</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,070</td>
<td>100</td>
</tr>
</tbody>
</table>

Expenditures for New Projects in 2008

TABLE 3-3 shows categories of UTCA expenditures in 2008. Roughly 15% of expenditures were related to the administration of UTCA. The remaining 85% was spent on projects. Management was by far the largest category of expenditures for new projects funded in 2008. Bridge projects represented 14% of expenditures, while education-related projects consumed 10% of the budget. Safety-related projects accounted for 12% of 2008 expenditures.

FIGURE 3-2 illustrates the breakdown of expenditures. The UTCA emphasis on management and safety is reflected in the statistic that together they account for 61% of all expenditures.

Even though no projects focusing exclusively on technology transfer were funded in 2008, UTCA faculty were active in a number of technology transfer activities. (See Section 4 of this Annual Report for specific examples.)

FIGURE 3-2. UTCA expenditures for new projects funded in 2008.
Overview of Technology Transfer Program

The UTCA will provide readily-available research results to potential users in a form that can be directly implemented, utilized, or otherwise applied (2006 Strategic Plan, p. 23).

UTCA and UAB-UTC Collaborate on Projects

The US Department of Transportation established a University Transportation Center (UTC) at The University of Alabama at Birmingham (UAB) in 2006. This UTC is the first UTC to be established at a School of Medicine within a high-profile research university. The theme for the UAB-UTC is Traffic Safety and Injury Control. The UAB-UTC addresses medically-related issues such as reducing the morbidity and mortality rates associated with motor vehicle crash-related injuries occurring in medically underserved, rural areas. Dr. Russ Fine is the founding Director of the UAB-UTC, and Dr. Jay Goldman and Ms. Andrea Underhill are Associate Directors.

On May 14, 2008 Dr. Fine, Dr. Goldman, and Ms. Underhill visited the UTCA headquarters in Tuscaloosa and were welcomed by UTCA Executive Director Dr. Jay Lindly and Dr. Daniel Turner, Professor in the Department of Civil, Construction, and Environmental Engineering. The purpose of this meeting was to identify common transportation education, research, and technology transfer projects.

One common area of interest was the impact of older/restricted drivers on highway safety. This is one of the five main areas addressed by the current Strategic Highway Safety Plan for Alabama. During the meeting, the two UTCs agreed to co-sponsor a seminar on older/restricted drivers scheduled at the 36th Annual Meeting of the Alabama Section of the Institute of Transportation Engineers (ALSITE) June 4-6, 2008 in Gulf Shores, AL.

The impact of older/restricted drivers on highway safety could also be the topic of a series of informational workshops that could be delivered throughout the state. These workshops could focus on driver assessments, licensing policies, legislative options, and law enforcement intervention. The two UTCs agreed to explore co-presenting such a series.

The two UTCs discussed several ways to work together on educational projects. For example, the UAB-UTC may wish to join the UTCA’s existing program of sponsoring student attendance at the Annual Meeting of the Transportation Research Board. Additionally, the two Centers may agree to share seminars electronically between the two campuses.

This meeting highlighted the problems, needs, and available resources at these two university transportation centers. The two Centers agreed to work closely together in the future and look forward to collaboratively addressing important transportation issues in the state.
Enhancing the Safety and Mobility of the Older Driver

The 36th Annual Meeting of the Alabama Section Institute of Transportation Engineers (ALSITE) was held June 4-6, 2008 in Gulf Shores, AL. The University Transportation Center for Alabama (UTCA) and The University of Alabama at Birmingham-University Transportation Center (UAB-UTC) sponsored an entire session devoted to meeting the transportation challenges of older drivers.

Dr. Karlene Ball, Professor of Psychology at The University of Alabama at Birmingham (UAB) and Director of the UAB Edward R. Roybal Center for Research in Applied Gerontology, was one of the session’s featured speakers. Her presentation – Enhancing the Safety and Mobility of the Older Driver – addressed several unique concerns faced by older drivers.

According to Dr. Ball, the number of licensed drivers in the United States over the age of 65 increased by 17% during the 1990s. In 2004 there were over 28 million drivers aged 65 and older, and demographic studies suggest the number of older drivers will continue to increase substantially. As the number of older drivers on the road has increased, so has their involvement in motor vehicle crashes. Over the past 30 years, the rate of motor vehicle crashes involving drivers 70 years of age and older has increased 33%. Older drivers are more likely to be at fault when involved in crashes and are more susceptible to injuries and fatalities from such crashes.

Many studies have identified risk factors for increased crash involvement among older drivers:

- Poor vision
- Decreased speed of processing as measured by the Useful Field of View Test (UFOV)
- Dementia-related cognitive impairments
- Decreased physical functionality due to natural aging or conditions such as diabetes and cardiovascular disease
- Adverse reactions from medications used to treat various disorders

Studies have also shown that older male drivers are at particular risk for crash involvement. Declines in cognitive abilities, speed of processing in particular, are often the strongest independent predictors of crash involvement among older drivers. Similarly, impairments in these abilities have been associated with driving cessation.

Cognitive training techniques can enhance the cognitive performance of older adults. This enhancement translates to improved performance of essential activities of daily living as well as improved health-related quality of life.

Of particular interest is research on cognitive speed of processing training. Such training results in improved scores on the Useful Field of View Test. This finding is meaningful, given the relationship of UFOV performance and crash involvement. Accordingly, Roenker and colleagues (Roenker, et al. 2003) demonstrated that among older drivers with speed of processing difficulties, cognitive speed of processing training not only enhanced UFOV performance, but also translated to improved on-road driving safety.

As the number of older drivers continues to rise, improving their on-road driving safety must remain a transportation research priority.

References

The expansion of freight shipments on the nation’s highways has led to a substantial increase in road traffic congestion. Of particular concern is the increase in the number, size, and weight of commercial vehicles. Members of the 2006 Commercial Motor Vehicle Size and Weight Enforcement (VSW) Scan Tour recognized the potential use of the Bridge Weigh-in-Motion (B-WIM) systems in the management of oversize/overweight (OS/OW) commercial vehicles in the United States. A B-WIM system is analogous to using radar to detect speeders on the highway. With the installation of sensors under the deck of a bridge, the existing bridge becomes a platform weight scale to detect overweight vehicles. UTCA and ALDOT jointly sponsored a first B-WIM research project in 2007 that evaluated the requirements, benefits, and limitations of the B-WIM system. Additionally, a field demonstration was performed on an Alabama bridge. This was the first installation and demonstration of B-WIM technology in the United States.

In 2008 UTCA began a second B-WIM project designed to improve the overall accuracy and reliability of B-WIM technology. In this project researchers will test the B-WIM system on two additional bridge structures of differing primary girder type. The team will recommend additional sensor technology configurations which could significantly contribute to more reliable and versatile B-WIM systems.

The University Transportation Center for Alabama (UTCA) and the Alabama Department of Transportation (ALDOT) co-funded the two projects to investigate commercially available B-WIM technology developed by CESTEL, a Slovenian company. Dr. Wilbur Hitchcock, Professor of Civil, Construction, and Environmental Engineering at The University of Alabama at Birmingham was the principal investigator on both projects.

“We are privileged. . .,” said Dr. Hitchcock, “to be on the leading edge of this technology in the United States.”

As part of these UTCA/ALDOT-funded projects, an international workshop on B-WIM technology was organized and hosted by researchers at The University of Alabama at Birmingham on August 11 and 12, 2008. Experts from Ireland, France, the Netherlands, Slovenia, Canada, and the United States met to review the state-of-practice of B-WIM technology, discuss benefits and challenges related to the implementation of B-WIM systems, and identify future research, collaboration, and deployment opportunities.
Every year representatives from the Transportation Research Board (TRB) visit state departments of transportation (DOTs) to identify problems these groups are facing and to investigate how TRB can assist in solving those problems. These visits often include meetings with universities, transit organizations, and industry leaders that work with DOTs.

Mr. Stephen F. Maher, TRB’s Engineer of Design, performed TRB’s 2008 Alabama Field Visit. On Tuesday, April 15th, he met with Mr. Jeffery Brown and Ms. Ivy Harris of ALDOT’s Research and Development Bureau.

The next day Mr. Maher, Mr. Brown, and Ms. Harris visited the UTCA headquarters in Tuscaloosa and were welcomed by UTCA Executive Director Dr. Jay Lindly and Dr. Daniel Turner, Professor in the Department of Civil, Construction, and Environmental Engineering. During the meeting that followed, Dr. Lindly began by describing the UTCA and reviewing several research projects the UTCA conducted in collaboration with ALDOT.

UTCA had invited directors from two other UA centers that perform research for ALDOT to attend the meeting. Dr. David Hale, Associate Professor in the Department of Management Information Systems and Director of the Aging Infrastructure Systems Center of Excellence (AISCE), described research projects the AISCE had completed with ALDOT such as the **UTCA Project #05404 – Executive Bridge Maintenance Management System: A Web Portal.**

In this project researchers designed and deployed a state-wide bridge reporting system for ALDOT that extended the capabilities and user community for the existing Alabama Bridge Information Management System (ABIMS). The improvements greatly enhance ALDOT’s ability to identify bridge maintenance needs.

The CARE Research and Development Laboratory (CRDL) at The University of Alabama also provides valuable research assistance to ALDOT. Dr. Allen Parrish, CRDL Director and Professor in the Department of Computer Science, gave a brief overview of the history and mission of his center. The original product of CRDL was CARE (Critical Analysis Reporting Environment), a data analysis software system that has been applied primarily in the field of traffic safety.

CRDL has expanded to support ALDOT and traffic safety through the use of GIS technology. The CRDL is able to identify locations associated with large numbers of traffic crashes, particularly crashes involving injuries or fatalities. Using this data, ALDOT can modify hazardous road conditions in those areas.

Even though each organization at the meeting pursues unique research interests, they all support and extend the work of the Alabama Department of Transportation. This collaboration is essential to successfully meet the transportation challenges of the future.
On Tuesday, December 11, 2008, Executive Director Dr. Jay K. Lindly welcomed members of the USDOT/RITA Site Visit Team to Center headquarters. The Site Visit Team included Dr. Curtis Tompkins, Director of the University Transportation Centers (UTCs) Program; Ms. Amy Stearns, University Programs Specialist; and Ms. Denise Dunn, Program Coordinator/Analyst.

Following introductions and the approval of the agenda, Dr. Lindly provided an overview of the Center’s operations. This overview included the history, mission, theme, organizational structure, and Advisory Board of UTCA.

The next segment of the meeting focused on research selection and performance. First, Dr. Fouad H. Fouad, UTCA Associate Director at the UAB campus, explained the research project award process. Then, Dr. Houssam Toutanji, UTCA Associate Director at the UAH campus, discussed several ways faculty share their research findings with the transportation community.

After a short break, Dr. Lindly and Dr. Michael Hardin, UTCA Associate Director at the UA campus, highlighted UTCA’s accomplishments in education, human resources, and diversity. Ms. Mary Beth Wilkes, a senior civil engineering student at The University of Alabama, shared her experiences as student director of the 2008 Advanced Transportation Institute. (See page 23 for an article on this successful summer outreach program.)

The first afternoon session focused on administrative procedures. First, UTCA Editorial Assistant Dr. Janet Lynn Norton spoke about the Center’s publications and website. UTCA Administrative Secretary Ms. Connie Harris then outlined procedures for fulfilling the daily, on-going financial responsibilities of the Center. Finally, Ms. Tammy Hudson, Associate Director of Contract and Grant Accounting in UA’s Office of
Sponsored Programs, and Senior Financial Analyst Ms. Kara Gibson led a detailed discussion of UTCA funding and budgeting procedures at the university level.

Following the afternoon break, Dr. Daniel S. Turner led the discussion of UA Project #07407 – Pilot Study: School Bus Seat Belts, which particularly interested the RITA Site Visit Team. As Dr. Turner, founding Executive Director of UTCA explained, “The purpose of this project is to conduct a pilot study to assess the impact of lap/shoulder seat belts on a limited number of Alabama school buses. The Alabama State Department of Education purchased 12 school buses equipped with various types of three-point seat belts. The buses were also equipped with four ceiling mounted video cameras to gather data on seat belt use.”

UA transportation engineering graduate student Ms. Elsa Tedla next led a tour of the two UTCA lab facilities. (See page 22 for an article on Ms. Tedla, UTCA’s 2008 Student of the Year.) The group first toured the Transportation Modeling and Simulation Lab, where attendees saw students working with digital images from the School Bus Seat Belts project.

Later, the group toured the UTCA ITS lab, where undergraduate and graduate students can monitor and evaluate traffic flow from a variety of intersections using direct video feed from the City of Tuscaloosa Department of Transportation.

Before the close of the meeting, the RITA Site Visit Team talked with Mr. Jeffery Brown, Research and Development Engineer from the Alabama Department of Transportation (ALDOT). Mr. Brown described the extremely positive and productive relationship ALDOT and UTCA have developed and shared his thoughts on the reasons for this long-standing partnership. Joining Mr. Brown from the ALDOT Central Office in Montgomery, AL was Ms. Michelle Owens, Assistant Research and Development Engineer.

In conclusion, Dr. Lindly thanked participants for an enjoyable, informative meeting. UTCA staff, EXCOM, students, and friends were delighted to have shared their past accomplishments and plans for the future with the RITA Site Visit Team.
Seminars and Short Courses

The UTCA faculty conducted five seminars and short courses this year with 95 transportation professionals in attendance. The following descriptions illustrate that practitioners are receiving the benefits of UTCA research projects and new transportation courses.

Anderson, M. Transportation Modeling. Attended by representatives from the Alabama Department of Transportation (ALDOT) and transportation planners from Alabama’s Metropolitan Planning Organizations (MPOs), Montgomery, AL, February 7-8, 2008. (20 participants)

Anderson, M. Transportation Modeling. Attended by representatives from ALDOT and transportation planners from Alabama’s MPOs, Montgomery, AL, May 15-16, 2008. (20 participants)

Anderson, M. Transportation Modeling. Attended by representatives from ALDOT and transportation planners from Alabama’s MPOs, Montgomery, AL, August 14-15, 2008. (20 participants)

Anderson, M. Transportation Modeling. Attended by representatives from ALDOT and transportation planners from Alabama’s MPOs, Montgomery, AL, November 6-7, 2008. (20 participants)


Papers Presented

During 2008 the UTCA faculty reported presenting 22 papers at 19 different meetings including three international meetings. The wide range of meetings provided good exposure for the UTCA faculty and their research.


Ball, K. Enhancing the Safety and Mobility of the Older Driver. Presented at the 36th Annual Meeting of the Alabama Section of the Institute of Transportation Engineers/Deep South Section of the Institute of Transportation Engineers (ALSITE/DSITE), Gulf Shores, AL, June 2008.

Dulek, R. Professional Development: A Language for Leaders. Presented at the 36th Annual Meeting of the Alabama Section of the Institute of Transportation Engineers/Deep South Section of the Institute of Transportation Engineers (ALSITE/DSITE), Gulf Shores, AL, June 2008.


Sisiopiku, V. P. Traffic Management Strategies for Hurricane Evacuations in the Southeastern United States. Presented at the 2008 Tennessee Section of the Institute of Transportation Engineers/Alabama Section of the Institute of Transportation Engineers (TSITE/ALSITE) Fall Joint Meeting, Chattanooga, TN, October 2008.

Sisiopiku, V. P. The University of Alabama at Birmingham School of Engineering Projects. Presented at the Spring 2008 Meeting of the Alabama Section of the Institute of Transportation Engineers (ALSITE), Birmingham, AL, March 2008.

Sisiopiku, V. P., and O. Cavusoglu. Operational and Economic Impacts from Managed Lanes Implementation in Birmingham. Presented at the Institute of Transportation Engineers (ITE) 2008 Annual Meeting and Exhibit, Anaheim, CA, August 2008.


Faculty members reported that 12 papers were published in refereed journals and conference proceedings in 2008. These papers were based on the results of UTCA research projects. Specific details of each paper are provided in the following section.


Final Reports

Since its beginning in 1999 the UTCA has published 172 final reports. All of these reports are available on the Center’s website at http://utca.eng.ua.edu.
3rd Annual Student Awards Luncheon Celebrated the Achievements of Transportation Students

Students from the three campuses of The University of Alabama System are engaged in a variety of transportation-related research activities. A UTCA project (#08303) headed by Dr. Mike Anderson of The University of Alabama in Huntsville helped identify deserving transportation students and provided a forum in which they could present their research. First, students were invited to present abstracts of their research to a panel of representatives from each campus, and then winners were selected.

These students were invited to present their research at the 3rd Annual Student Awards Luncheon on December 5, 2008. This award luncheon, held at The University of Alabama at Birmingham (UAB), was organized and hosted by the Institute of Transportation Engineers (ITE) Student Chapter at UAB. Three students from each campus – UA, UAB, and UAH – presented technical papers to showcase their research activities. The following students made presentations: Ozge Cavusoglu (UAB), Walter Ellenburg (UAH), Germin Fadel (UAH), Saravanan Gurupackiam (UA), Mang Han (UAH), Tahmina Khan (UAH), Menasse Kumlachew (UA), Michael Shinouda (UAH), and Moses Tefe (UA). All presenters received monetary awards allowing them to attend the 88th Annual Meeting of the Transportation Research Board in Washington, DC in January 2009.

FIGURE 5-1. Student presenters at annual awards luncheon.
Student of the Year

The University Transportation Center for Alabama is proud to recognize Ms. Elsa Tedla as its 2008 Student of the Year. Ms. Tedla, a native of Ethiopia, earned a bachelor’s degree in civil engineering in 2002 from Jimma University in Ethiopia. In 2003 she traveled to the United States for advanced study and has since become a naturalized citizen. Elsa is currently pursuing a master’s degree in civil engineering at The University of Alabama.

Ms. Tedla was selected 2008 Student of the Year largely for her work on Project #07407 - School Bus Seat Belts: A Pilot Study, a project sponsored by the Alabama State Department of Education. Elsa has been in charge of reviewing confidential digital images from participating school systems to determine appropriate seat belt usage. Her work includes training undergraduate students, working with school bus transportation directors in 10 different school systems, coping with three different “video” capture systems, and supervising image review efforts.

The formal presentation of the Student of the Year award occurred in Washington, DC during the Transportation Research Board’s Annual Meeting. Accompanying Ms. Tedla to the awards banquet were her husband, Mr. Menasse Kumlachew; Dr. Daniel S. Turner, UTCA’s Founding Executive Director; and Dr. Jay K. Lindly, UTCA’s current Executive Director.

ITE Student Chapter at UAB

The Institute of Transportation Engineers (ITE) Student Chapter at The University of Alabama in Birmingham (UAB) continues to grow under the guidance of Dr. Virginia Sisiopiku. 2008-2009 officers are Mr. Sujit G. Rath (President), Mrs. Germin E Fadel (Vice-President), Ms. Ozge Cavusoglu (Secretary), and Mr. Santosh Chitikesi (Treasurer).

Over the past year the ITE Student Chapter organized and participated in field trips, conferences, guest speaker presentations, fundraisers, and paper and poster sessions. For example, members attended the 2008 Spring Meeting of ALSITE on March 12th in Birmingham, AL. Several members of the Student Chapter also attended the SDITE conference at Charleston, SC from March 30th to April 2nd. The UAB ITE Student Chapter was selected by the ALSITE to represent the state of Alabama at the Traffic Bowl Competition during the event.

On October 21st, the ITE Student Chapter at UAB organized a field trip to the Tuscaloosa DOT to observe a Traffic Management Center in action and learn about Intelligent Transportation Systems applications in support of traffic management. Students from all three UA System campuses were invited to participate.

Additionally, the Chapter organized and hosted the 3rd Annual Student Awards Luncheon at UAB on December 5, 2008. (See page 21 for highlights from this event.)
2008 Advanced Transportation Institute a Success

The University Transportation Center for Alabama’s (UTCA) 2008 Advanced Transportation Institute (ATI) was held in June for rising high school juniors and seniors from the west-central region of Alabama. This Institute was funded by UTCA Project #08111 and organized by Dr. Dan Turner (UA). Since its inception in 1999, the UTCA has funded seven ATIs in an effort to recruit minority students to careers in transportation engineering. As in preceding years, the Alabama Department of Transportation (ALDOT) co-sponsored this week-long event held in ALDOT’s headquarters in Montgomery, AL.

The Institute curriculum featured presentations by ALDOT professionals and university faculty. Activities and presentations were designed to prepare students for university life and transportation careers. Students learned about university admission procedures and transportation career opportunities. Other presentations during the week focused on transportation planning, design, construction, maintenance, and safety.

The highlight of the week was a series of design competitions. The passenger container design, informally known as the egg drop competition, was a student favorite. Following a presentation on passenger safety, students were asked to design a container that would protect an “egg” passenger during a simulated accident. Working in teams with specific materials, students designed containers that would protect a raw egg as it fell to the ground from one of ALDOT’s bucket trucks. In previous years some students reached the full capacity of the truck (50’) without breaking their egg.

Prior to the Institute, only 42% of the students were considering a career in engineering/transportation. After the Institute, 84% were considering careers in engineering/transportation; 17% of these students were strongly considering careers in engineering/transportation. As one student concluded, “This past week I learned about a lot of interesting and helpful things that would help me decide on what to do for the rest of my future after I finish school. All week we learned more and more about engineering and took many field trips. I really had a lot of fun and would love to do it again!”

In 2008 a second session of ATI was held at ALDOT’s 5th Division offices in Tuscaloosa (ATI-5th Division-08). Session leaders were members of the Tuscaloosa Junior Chapter of the National Society of Black Engineers. Participants were local upper elementary and middle school students. This session lasted three days and, like its Montgomery counterpart, featured “hands-on” competitions, presentations, and a field trip. ATI-5th Division-08 was a success, and another session is planned for 2009.
For the past nine years over 240 middle school students from the Huntsville area have enjoyed the Summer Gearing Up for Transportation Engineering Programs (GUTEP). The 2008 GUTEP events were funded by UTCA Project #08301 and organized by Dr. Kathleen Leonard (UAH). During this summer’s week-long event, participants learned basic concepts of materials, structures, safety, and other transportation engineering topics by engaging in a variety of hands-on experiments. Engineers from The University of Alabama in Huntsville (UAH) faculty, the Society of Women Engineers (SWE), NASA’s Marshall Space Flight Center, and the National Society of Black Engineers served as instructors.

Field trips were an important component of the program. During these outings, students saw real-world applications of the concepts they learned in the classroom. Seeing this connection between theory and practice reinforced the importance of transportation engineers to our community. For example, following a classroom session on public transportation, students were asked to use the city’s public transit system to travel from the UAH campus to the downtown Huntsville traffic operations center and the railroad depot museum.

An additional event sponsored by this UTCA project was the Civil Engineering (CE) Bridge Competition. High school students participating in this outreach program were introduced to civil engineering design concepts during the UAH High School Open House. Over 60 students from local high schools participated in the CE Bridge Competition. Students designed bridges using the West Point bridge program and then built their trusses using Popsicle sticks and hot glue. Winners of the individual competition received t-shirts, and the best classes were treated to pizza parties.

By providing fun learning experiences in an academic setting, program planners hoped to encourage under-represented students to consider careers in transportation engineering. Recent survey results suggest these summer programs have influenced many students to pursue careers in engineering or other scientific/technical fields. Specifically, this year a survey of past participants from the 2002, 2003, and 2004 GUTEP sessions was conducted to determine the impact of this program in north Alabama. Even though the return rate on the surveys was low, some general conclusions about the program can be made. For example, 100% of the respondents planned to attend college; 62% were currently enrolled, and the remaining 38% were still in high school. Seventy-six percent of the respondents planned to study engineering or another scientific/technical field. The majority of past participants did not have any relatives or acquaintances who were engineers, and 81% reported that the UAH summer program helped them make their decision to attend college.
Transportation faculty members have instituted a rotating two-year program of courses shared between the three campuses. Each campus teaches its required undergraduate classes, and each semester there are one or two other transportation courses offered via IITS (Intercampus Interactive Television System). This ensures that undergraduates can be exposed to three or four transportation electives during their junior and senior years and that graduate students have a continuous choice of courses in their specialty areas.

Each individual campus cannot offer such a variety of courses. The IITS arrangement promotes unity and spirit among transportation students and also provides students access to transportation expertise on the other two UA System campuses.

Typically in an IITS course, students from all three campuses meet jointly at least once a semester. This meeting is usually in the form of a field trip, a design session, or a professional conference.

### TABLE 5-1. Multi-Campus Courses Since 2005

<table>
<thead>
<tr>
<th>Term</th>
<th>Faculty</th>
<th>Campus</th>
<th>Course</th>
<th>Delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP 05</td>
<td>Turner</td>
<td>UA</td>
<td>Geometric Design of Roadways</td>
<td>IITS</td>
</tr>
<tr>
<td>SP 05</td>
<td>Anderson</td>
<td>UAH</td>
<td>Traffic Engineering Operations &amp; Design</td>
<td>IITS</td>
</tr>
<tr>
<td>SP 05</td>
<td>Sisiopiku</td>
<td>UAB</td>
<td>Non-Motorized Transp. Design &amp; Planning</td>
<td>IITS</td>
</tr>
<tr>
<td>FA 05</td>
<td>Anderson</td>
<td>UAH</td>
<td>Urban Transp. Planning</td>
<td>IITS</td>
</tr>
<tr>
<td>FA 05</td>
<td>Lindly</td>
<td>UA</td>
<td>Pavement Rehabilitation</td>
<td>IITS</td>
</tr>
<tr>
<td>SP 06</td>
<td>Turner</td>
<td>UA</td>
<td>Transp. Safety &amp; Security</td>
<td>IITS</td>
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<td>FA 06</td>
<td>Anderson</td>
<td>UAH</td>
<td>Urban Transp. Planning</td>
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<tr>
<td>FA 06</td>
<td>Sisiopiku</td>
<td>UAB</td>
<td>Intelligent Transp. Systems</td>
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<td>SP 07</td>
<td>Sisiopiku</td>
<td>UAB</td>
<td>Non-Motorized Transp. Design &amp; Planning</td>
<td>IITS</td>
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<td>FA 07</td>
<td>Sisiopiku</td>
<td>UAB</td>
<td>Traffic Flow Theory</td>
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<td>SP 08</td>
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</tr>
</tbody>
</table>

Since its inception in 1999, UTCA has promoted student participation in transportation research projects. At least 237 undergraduate and 316 graduate students have worked on research projects funded by UTCA.
EXHIBIT A: Performance Indicators for University Transportation Centers

The following Performance Indicators will be reported to RITA as part of the reporting requirements that all UTCs must perform. Where Baseline Measures are cited, they come from UTCA’s Title III Center Strategic Plan accepted by RITA on February 15, 2007.

Research Selection

1. Number of transportation research projects selected for funding using your UTC grant funding (Federal and/or match). 7
   1a. Number of those projects that you consider to be: basic research 0, advanced research 2, and applied research 5. Projects may be included in more than one category if applicable.

2. Total budgeted costs for the projects reported in #1 above. $608,094.00

Research Performance

3. Number of reports issued that resulted from transportation research projects funded by the UTC grant. 16

4. Number of transportation research papers presented at academic/professional meetings that resulted from projects funded by the UTC grant. 22

Education

5. Cumulative number of transportation-related courses that have been added since the beginning of the grant to the number of courses you reported in Baseline Measure 1 in your UTC Strategic Plan. Include courses added to the university course catalog whether or not they were conducted during a particular grant year.
   Undergraduate: 0  Graduate: 0

6. Number of students participating in transportation research projects. Count individual students (one student participating in two research projects counts as one student).
   Undergraduate: 15  Graduate: 25

Human Resources

7. Cumulative number of transportation-related advanced degree programs that have been added since the beginning of the grant to the number of degree programs you reported in Baseline Measure 3 in your UTC Strategic Plan.
   Undergraduate: 0  Graduate: 0

8. Number of students enrolled in transportation-related advanced degree programs (the baseline programs and any added since the beginning of the grant).
   Master’s Level: 15  Doctoral Level: 8

9. Number of students who received degrees through the baseline and any added transportation-related advanced degree programs.
   Master’s Level: 10  Doctoral Level: 0

Technology Transfer

10. Number of transportation seminars, symposia, distance learning, classes, etc. conducted by your UTC for transportation professionals. 5

11. Number of transportation professionals participating in those events. 95
Scenes from Shelby Hall