

ANNUAL REPORT

2010 – 2011

With Added Notes for 2011-2012

University Transportation Center

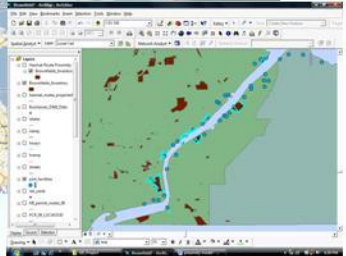
Economic Development – Research – Education – Technology Transfer



The 5th International Supply Chain-Management Symposium and Workshop

Building Dynamic Capabilities Across the Supply Chain: Challenges In the Age of Complexity and Globalization

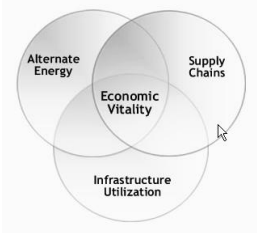
March 8-10, 2012 Tokyo, Japan



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DIRECTOR'S MESSAGE



A Roman philosopher once said "Every new beginning comes from some other beginning's end." This quotation sums up perfectly where the University of Toledo Tier II UTC finds itself. This annual report celebrates the completion of the work we began in 2006. It also marks a new beginning for our UTC. We have advanced the prominence of our Tier II UTC to Tier I UTC status. The University of Toledo UTC is a now member of a 10 university Tier I consortium led by the University of Wisconsin–Madison.

The U.S. Department of Transportation has awarded a \$3.5 million grant to the National Center for Freight and Infrastructure Research and Education (CFIRE). The grant will fund research, outreach and education on multimodal freight systems and will allow CFIRE to continue its innovative freight research as a Tier I University Transportation Center (UTC).

The CFIRE consortium is a collaborative arranged into northern and southern "hubs." The northern hub includes the University of Wisconsin–Madison, University of Wisconsin–Milwaukee, University of Wisconsin–Superior, University of Illinois–Chicago, University of Toledo, and Michigan Technological University. The southern hub includes the University of Memphis, Vanderbilt University, University of Alabama–Huntsville, and University of Southern Mississippi.

The CFIRE consortium encompasses a geographical area that serves the majority of freight traffic in the United States. Consortium members offer a wide range of expertise in truck, rail, waterway, air and multimodal freight planning, management, and operations. Additionally, they have a deep history of conducting successful research, education, outreach and technology transfer in support of the freight community. Partner institutions have collaborative relationships with state departments of transportation, metropolitan planning organizations and local municipalities, as well as with shippers and carriers across all modes.

While this new beginning as a Tier I UTC is significant, our Tier II accomplishments were exceptional. Through inter-departmental teamwork, stakeholder cooperation and communication, and extraordinary support from UT President Dr. Lloyd Jacobs and his executive management team, the UT-UTC had a significant positive impact on the regional economy and multi-modal transportation system. Numbers are not the only measure of success, but our numbers tell a remarkable story.

The UT UTC has sponsored 27 research awards valued at over \$2.3 million dollars. The research awards were diverse and multi-disciplined in nature with 12 individual Principal Investigators from 7 different academic departments. In addition to this UTC sponsored research we have been awarded several ODOT and regional stakeholder sponsored projects valued at nearly \$2 million dollars. Some significant projects our UTC has played a principal role in include:

- Leadership role in the research, planning, and funding procurement for the first intermodal project in the City of Toledo.
- Leadership role in the installation and research, principal for first ODOT "Solar Highway" installation project.
- Research leader for ODOT on "Ice Prevention or Removal on the Veteran's Glass City Skyway Cables."

- Project leader in obtaining and implementing \$5 million of ODOT safety funds for improving the roadways to UT's gateway.
- Designated as a Center of Excellence in Transportation and Logistics by the Ohio Board of Regents.
- Member of ODOT research team advising Ohio as it considers ways to use funds from the Ohio Turnpike to cope with shrinking resources to maintain and expand Ohio's highways.
- Member of ODOT research team studying Ohio's freight system.

In closing, I would like to thank everyone that provided support and guidance. Achievements of this significance are a team effort. It would be impossible to individually recognize every team member. However, I must recognize one indispensable member of the team, Assistant Director Christine Lonsway. Ms. Lonsway has provided the glue that made much of what the team accomplished possible.



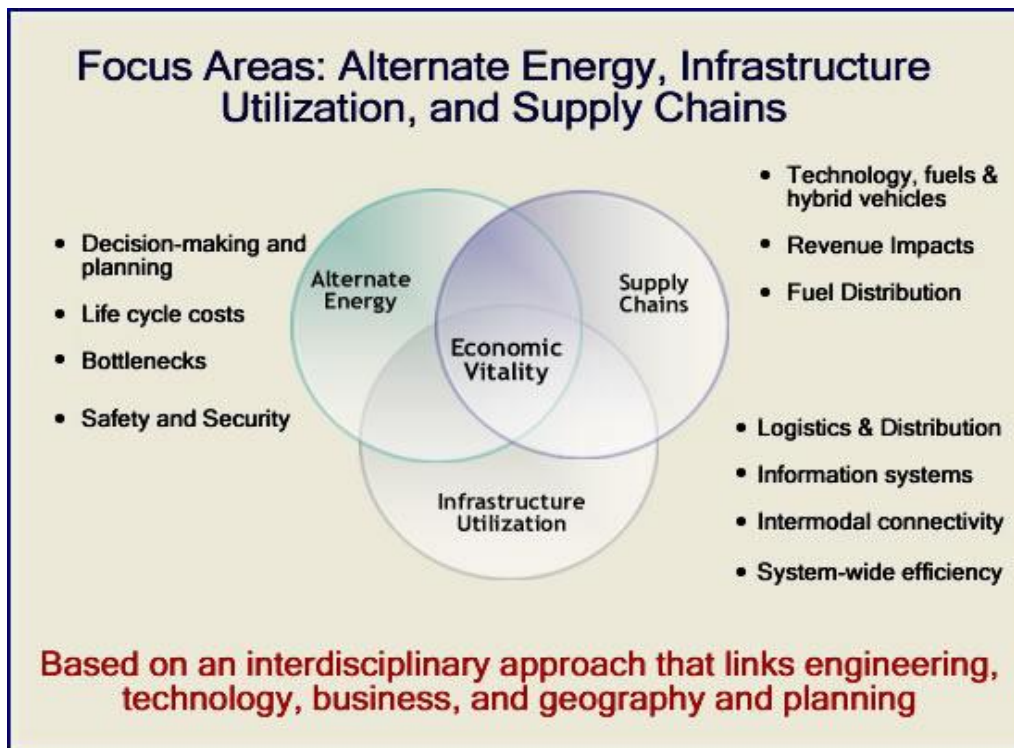
Richard S. Martinko, P.E.
Director
University Transportation Center &
Intermodal Transportation Institute



CENTER THEME

The theme of The University of Toledo University Transportation Center is *Transportation for Economic Security and Development: Alternate Energy, Infrastructure Utilization, and Supply Chains*. Safe, secure, and efficient transportation systems are essential to the economic viability, quality of life, and strength of our nation. If the U.S. economy is to reach new heights, the transportation system must be capable of moving people and goods safely, quickly, and efficiently. This Center focuses on three critical elements in the transportation system: alternate energy for transportation, infrastructure utilization, and supply chain management.

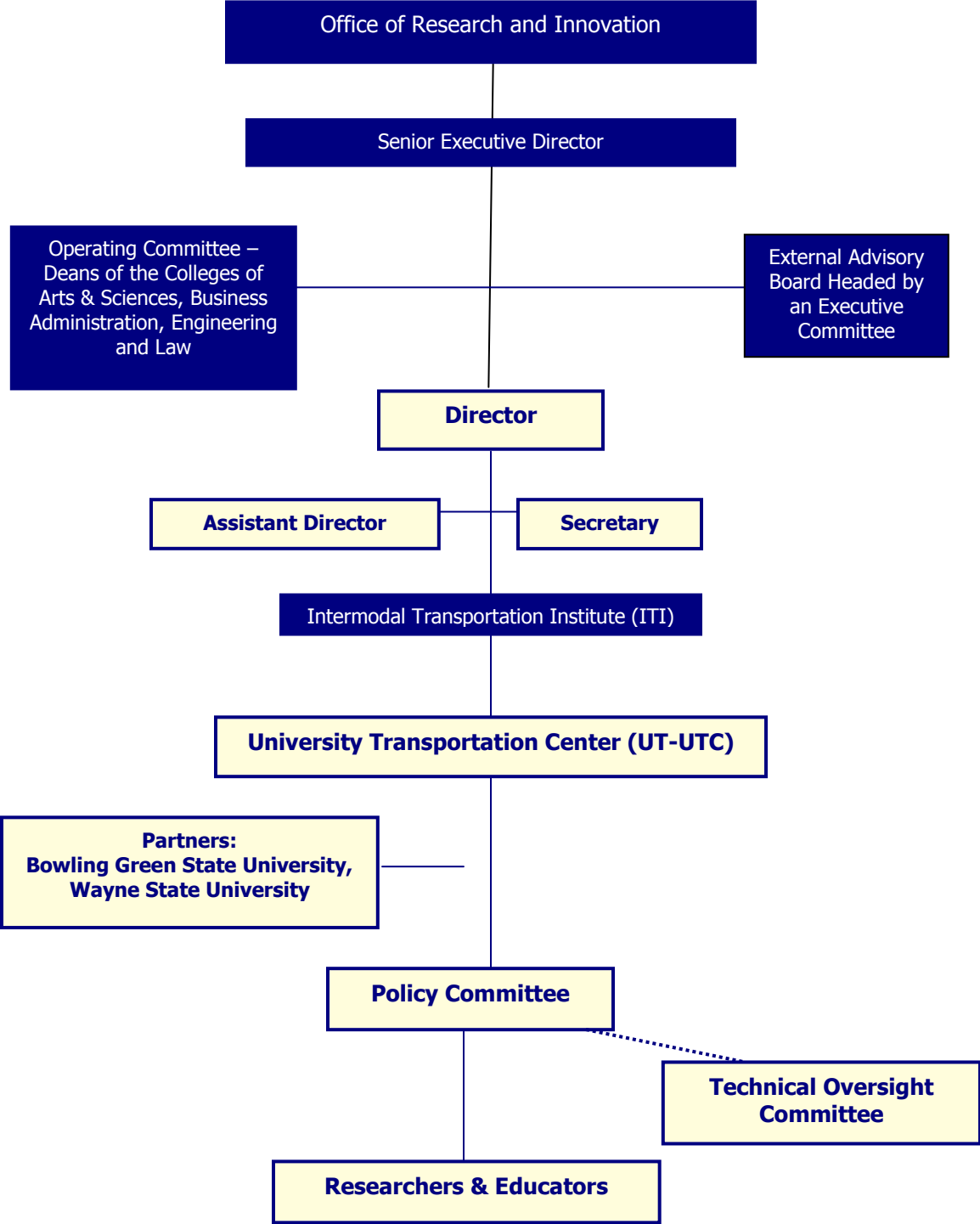
Figure 1: Overview of University of Toledo UT-UTC



The vision of the UT-UTC is to develop technology-enabled intermodal transportation systems and supply chains that promote economic development and quality of life. It will provide research, education and training, and planning and technical assistance in developing and maintaining technology enabled, efficient, secure, and environmentally sound transportation systems, supply chains, and logistic processes. It will emphasize technology transfer to stimulate economic growth and vitality. The UTC will facilitate the application and integration of public and private sector ideas, foster cooperation among the academic partners, and educate current and future leads who have diverse backgrounds and innovative perspectives. This UTC will work with other organizations and institutions to create, pool, and disseminate knowledge that is critical to the long-term success of the U.S. economy. The UTC will provide benefits to state DOTs, departments of development, and transportation planning agencies. To ensure this, stakeholders will be involved in advisory groups, which will help to focus efforts and achieve success as defined by customers and not by researchers. This vision is based on the notion that excellence in research, education, and technology transfer depends on problem statements that are designed with broad stakeholder participation.

MANAGEMENT STRUCTURE AND PRINCIPAL CENTER STAFF

Organization Chart



Institutional Resources

The UT-UTC is a consortium that is led by The University of Toledo with its partners, Bowling Green State University in Bowling Green, Ohio and Wayne State University in Detroit, Michigan. The consortium allows for a pooling of institutional resources that allow for a concentrated effort in addressing the critical problems facing our transportation system in the areas of alternate energy, infrastructure utilization, and supply chains. In this way, more can be accomplished in the areas of research, education, and technology transfer than working independently. These universities possess strong faculty and research facilities, have diverse interdisciplinary educational programs, and ample numbers of graduate students to make a positive difference in the transportation area.

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MEMBER UNIVERSITIES

The University of Toledo – Lead University

The University of Toledo (UT) is a Carnegie Doctoral/Research-Extensive, state-supported university with an enrollment of approximately 23,000 undergraduate, graduate and professional students and more than 1,300 full time and part-time faculty members. The University of Toledo, a student-centered public metropolitan research university, integrates learning, discovery and engagement, enabling students to achieve their highest potential in an environment that embraces and celebrates human diversity, respect for individuals and freedom of expression. The University strives for excellence in its service to all constituents, and commits itself to the intellectual, cultural and economic development of our community, state, nation and the world.



UT offers more than 230 undergraduate, graduate and professional programs in the colleges of Arts and Sciences, Adult and Lifelong Learning, Business Administration, Education, Engineering, Gateway Programs, Graduate Studies, Health Science and Human Service, Honors, Law, Medicine, Nursing, Online Learning, and Pharmacy. For more about UT: <http://www.utoledo.edu/>

Bowling Green State University – Partner

Bowling Green State University (BGSU) has a total enrollment of 23,500 students which includes 20,500 undergraduates; 7000 students live on the Bowling Green campus. Colleges include Arts & Sciences, Business Administration, Education & Human Development, Health and Human Services, and Musical Arts in addition to the Graduate College and the College of Technology.



The 2009-10 edition of U.S. News and World Report's "America's Best Colleges" cites the University for excellence in undergraduate education in three categories—a strong commitment to teaching, first-year experience programs and learning communities. Reflecting its strong emphasis on teaching, BGSU is ranked 11th with eight others among 80 institutions that have a focus on undergraduates in the "national universities" group. Rated by their peers, the 80 were singled out for their "unusual commitment to undergraduate teaching" and for "emphasizing that aspect of academic life." For more about BGSU: <http://www.bgsu.edu/>

Wayne State University - Partner

Founded in 1868, Wayne State University is a nationally recognized metropolitan research institution offering more than 400 academic programs through 13 schools and colleges to nearly 32,000 students. Wayne State's main campus in Midtown Detroit comprises 100 buildings over 203 acres; its six extension centers offer higher education to people throughout Southeast Michigan.



Wayne State is dedicated to preparing students to excel by combining the academic excellence of a major research university with the practical experience of an institution that by its history, location and diversity represents a microcosm of the world we live in. Reflecting its location and the excellent international reputation of its graduate schools, particularly in the sciences, Wayne State boasts the most diverse student body among Michigan's public universities. Its students represent 49 U.S. states and more than 70 countries. For more about WSU: <http://wayne.edu/>

EDUCATION, RESEARCH AND TECHNOLOGY TRANSFER ACTIVITIES FY 2010

THE 2011 YEAR IN REVIEW

- Two research projects housed in the UT-UTC were funded by the Ohio Department of Transportation totaling \$381,097 in SPR monies with total project budgets of \$727,978 including match. The projects include:
 - Veteran's Glass City Skyway Solar Array Field Demonstration
 - Ice Prevention or Removal on the Veteran's Glass City Skyway Cables
- Total budgets for UT-UTC research projects, including economic development related projects, reached \$2,319,589 with \$409,088 in new projects funded in fiscal year 2011. All research projects, including ODOT funded projects, equaled \$3,047,567.
- Fourteen final reports on UT-UTC funded research projects have been posted and disseminated; six more are due the end of August, six the end of December and one the end of March 2012 completing reports on the 27 research projects funded in the five years of the UT-UTC grant.
- UT-UTC support for education projects reached \$260,067 including match.
- Relationships with primary/secondary schools continued with two more projects completed by the Alternate Energy Team at the Toledo Technology Academy and continued support of valuable field trips at the Maritime Academy of Toledo.
- The fifth Student-of-the-Year was recognized in Washington at the CUTC banquet in January 2011.
- The University of Toledo researchers continued affiliations and partnerships with the Great Lakes Maritime Research Institute, CFIRE, and the Michigan-Ohio UTC.
- The ITI/UTC was designated by the Ohio Board of Regents a Center of Excellence in Transportation and Logistics in July 2010.
- The ITI/UTC was a major sponsor at the Ohio Conference on Freight 2010 which was held on The University of Toledo Health Science Campus.

2012 Update

- Total projects in the life of the UT-UTC equaled \$3,758,854 including ODOT funded projects and matching funds.
- The number of research projects funded and completed with UTC monies equaled 27 with 12 individual Principal Investigators from 7 different academic departments.

Veterans' Glass City Skyway Solar Array Field Demonstration (Through 2012)



The pylon in the center of the Veterans' Glass City Skyway bridge over the Maumee River in Toledo, Ohio will be lighted with electricity from solar arrays in the highway right of way



Solar arrays in the I-280 interchange at the north end of the VGCS bridge. Xunlight panels are mounted on a membrane on the overpass embankment ; First Solar panels are mounted on frames as shown in the foreground.

The "Veterans' Glass City Skyway Solar Array Performance Evaluation" project, funded by the Ohio Department of Transportation, was designed to determine the viability and possible benefits of using the land in a highway right of way for the generation of electricity from a solar array. In urban areas where open space is scarce but energy needs are greatest, there are significant amounts of land along highways that are otherwise unused. These areas also have ready access to the grid without traveling a significant distance. The Veterans' Glass City Skyway carries I-280 across the Maumee River in Toledo, Ohio. This showcase cable-stay bridge features a glass pylon in the center which at night has programmed color displays. The solar generated electricity offsets the power consumed by lighting the pylon and part of the roadway. Congresswoman Marcy Kaptur who provided the funding for the 100 kilowatt solar installation has nicknamed the bridge the "Solar Skyway."

Two solar arrays were installed at the north east quadrant at the end of the bridge. Two Northwest Ohio solar panel manufacturers have installations, First Solar and Xunlight; both companies have ties to the University of Toledo. The First Solar array at 65.205 kW has 966 Cadmium Telluride (CdTe) 67.5W modules on frames. The Xunlight installation at 52.272 kW has 198 laminated amorphous Silicon (a-Si) 264W modules that are attached to a TPO membrane on the north embankment. The \$1.5 million installation of the solar arrays was managed by Advanced Distributed Generation (ADG), a Toledo company closely associated with The University of Toledo.

The site work was begun in June 2010 and the installation was completed by the end of the year including the interface with the electrical connection for the bridge's lighting system. The 100 kW peak utility grid tied system was designed to generate on average 280 kW per day and 102,200 kWh per year. The power generation can be viewed in real time at the Building Dashboard by Lucid <http://www.buildingdashboard.com/clients/odot/> . Kiosks showing the web site have been located in the College of Engineering Building and at the rest area on I-75 south of Bowling Green, Ohio

The associated \$500,000 research project was directed by Dr. Thomas Stuart in the University of Toledo Department of Electrical Engineering. The research was intended to provide an analysis of the design and performance of a data acquisition system for solar arrays located near a heavily traveled freeway. The objective was to use the analysis to assist users such as the Ohio Department of Transportation (ODOT) in the design of future solar array installations, and also study the effects of atmospheric conditions on solar efficiency and energy output. To provide suitable data, the layout, location, and sizing must be well defined and the instrumentation must meet certain accuracy specifications. The research objectives of the study included:

- Kilowatt hours (KWh) predicted and actually generated by the solar arrays per month
- Solar insolation per month for each array (differing tilt angles)
- Efficiency per month for each array
- Solar Renewable Energy Credits (SREC)
- Savings in the Toledo Edison billing
- Minimum cost Estimate for future solar arrays
- Payback period based on a minimum cost First Solar array
- Hardware issues with the data acquisition system
- Solar module and racking assessment
- Issues due to proximity to the freeway
- Study solar energy storage feasibility

Power generation began January 26, 2011. A data acquisition system was provided through a third party vendor. Using the data collected from the system, graphs and tables were constructed in order to display averages, comparisons, and correlations for efficiency, output energy, and isolation. The system was also used to find any problems with the instruments and the solar modules.



Building at the array site to house instrumentation for the solar research project.

The electric bills were analyzed to determine the savings from the solar generation and to determine if the array was connected to the proper electric load size for maximum savings. Solar Renewable Energy Certificates (SREC) were also researched and it was established that they had the potential as the highest present revenue source for the site.

A minimum cost assessment was done to determine the payback period for future installations with similar parameters using system data and estimations including cost energy cost inflation, SREC price degradation, and solar module degradation.

The findings of the dirty module test to check if dirt was collecting on the modules causing energy losses because they were too close to the highway proved there was no effect on array performance.

The glint/glare study, conducted to see if glint or glare was affecting motorists driving on I-280, did not show any observable effect on motorists.

The results of the research provide a good indication of what should and should not be included in future installations of this type and it also uncovered a wide range of operational considerations.

In the report "Alternative Uses of Highway Right-of-Way" prepared by the U.S. Department of Transportation's Research and Innovative Technology Administration John A. Volpe National Transportation Systems Center (Volpe Center) for the Federal Highway Administration (FHWA) Office of Real Estate Services (HEPR), January 2012, page 21, the following statement was made:

In the eastern U.S., Ohio DOT has partnered with the University of Toledo to deploy a solar array within the highway ROW to offset the electricity demand and operating costs associated with a 196-foot light-emitting diode (LED) lighted structure on the Veteran's Glass City Skyway bridge near Toledo, Ohio. The 100kW test array, which consists of both rigid and flexible solar panels (see Figure 7) [*sic*] made in Ohio, will be used to help Ohio DOT evaluate, select, and procure equipment for future permanent solar installations within the highway ROW, as well as to identify problems that are unique to alternative energy projects implemented in such a manner.

See http://www.oregon.gov/ODOT/HWY/OIPP/docs/AltUses_FinalReport.pdf for the full report.

The Ohio Department of Transportation report on the project will be completed the end of August 2012.

Ice Prevention or Removal on the Veterans' Glass City Skyway Cables (Including Project Amendment January 2012)



Ice on the stay cables of the VGCS bridge.

The Veterans' Glass City Skyway (VGCS) is a cable stayed bridge carrying I-280 over the Maumee River in Toledo, Ohio. After the bridge was opened in 2007, it was found that ice formed in curved sheets on the cable stay sheaths and fell up to 250 feet into the roadway below. Because of the sail like form, the sheets were sometimes able to fly across several lanes of traffic. This presented a hazard to the traveling public.

In 2010, the Ohio Department of Transportation awarded the research project "Ice Prevention or Removal on the Veterans' Glass City Skyway Cables" to the University of Toledo UTC headed by PI Dr. Doug Nims of the Department of Civil Engineering. The goal of the project was to broadly define and cost several viable long term solutions for the ice falling into the roadway.



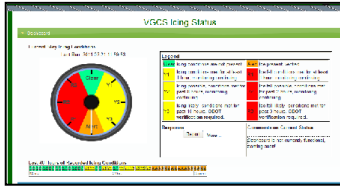
Director Martinko, far left, and PI Douglas Nims, with hand on a stay, discussing possible solutions during the site visit of the project meeting for the Veterans' Glass City Skyway bridge icing project.

The cable stays on the bridge are unique: they are made of stainless steel with a brushed finish, have a large diameter but do not have the usual helical spiral. The bridge also has a center pylon with glass on all four sides of the top 196 feet which houses 384 light emitting diodes. Ice also forms on the pylon. Because of the unusual configuration, the need for a quick response, and the specialized nature of the icing knowledge required, it was concluded that the only way to address the problem was with a group of experts from different sources. Dr. Nims assembled a team consisting of members from The US Army Cold Regions Research and Engineering Laboratory, NASA Glenn Icing Branch, ODOT personnel who designed and implemented the existing strain measurement system on the bridge

and experts on green technology. During the first year the team completed the following tasks:

- A background study including weather conditions for past icing incidents
- An assessment of the state-of-the-art
- Assembly of a data base of existing anti/deicing solutions
- An assessment of available technologies to determine what might be the most promising among the identified solutions
- An evaluation of the most promising technologies to select a small set of those that are potentially viable

The winter of 2010/2011 provided a significant icing event. On February 20th ice started accumulating on the bridge resulting in a fall on February 24th which was severe enough to cause it to be closed. As the team gathered the data from the icing event, they developed the icing dashboard which was used by ODOT District 2 office as a decision guide for dealing with potential or active icing incidents.



Icing Dashboard concept

There were no icing incidents in the winter of 2011/2012, however the monitoring system continued to collect bridge and weather data.

At the beginning of 2012, an addendum was added to the original project to fund the collection of additional data to resolve uncertainties in the information required to develop a cost estimate of anti/deicing technologies, to develop a recommendation on viable solutions including cost estimates and implementation strategy, to make further improvements in the icing dashboard, and to continue long term structural

monitoring. The work accomplished on this modification will enable ODOT to choose an active or administrative ice management strategy for the VGCS.

(The majority of this article was provided by Dr. Nims.)

ODOT Funded Projects in FY2012

Title	PI	Start Date	End Date	Amount	Funder
Development of Transportation Asset Management Decision Support Tools	Chou	1/15/2012	1/14/2014	\$ 150,000	ODOT
Ohio Turnpike Project - Phase One ¹	Martinko	3/9/2012	12/31/2012	\$ 25,800	ODOT - UT Sub to KPMG
Ohio Statewide Freight Plan ²	Lindquist	3/27/2012	6/30/2012	\$ 26,433	ODOT - UT Sub to Parsons Brinckerhoff
Acoustic Monitoring of the Main Cables of the Anthony Wayne Bridge	Nims	4/25/2012	4/24/2013	\$ 14,000	ODOT - UT Sub to Mistras through Arcadis
Evaluation of Support Inspection Program	Nims	5/1/2012	8/31/2013	\$ 169,107	ODOT - UT Sub to Mistras
Structures Research Services	Nims	May-12	May-14		ODOT - UT Sub to Ohio University
Analysis of Non-Destructive Testing Methods of Post Tensioned Bridge Members	Nims	7/1/2012	2/28/2013	\$ 134,397	ODOT - UT Sub to URS Corporation
Anthony Wayne Bridge Main Cable Long Term Health Monitoring - Student Project ³	Nims	7/1/2012	11/31/13	\$ 38,027	ODOT
Total				\$ 557,764	

1 - Ohio Turnpike Alternatives Analysis

Phase one of the project is limited to an assessment of options available to the State of Ohio, including a range that includes maintaining status quo, potential changes in governance, or implementing a public-private partnership (P3)/concession lease. Phase one also includes assisting the State with researching current state and federal regulations related to the use of rest areas. Activities related to this scope of work focuses on the Strategic/Commercial Advisory, Financial Advisory, and Technical Advisory related activities. Rich Martinko, Director of the UT-UTC, will act as a consultant to the team on ODOT operations.

2 - Statewide Freight Study

The purpose of the freight study is to understand to the greatest extent possible how Ohio's freight infrastructure is being utilized. The study will identify and analyze modal freight volumes, commodities, and origins/destinations. The final report will equip the Department with the tools necessary to:

- Prioritize future strategic investments in Ohio freight infrastructure.
- Guide future economic development activities to make the most efficient use of the existing freight infrastructure.

More specifically, the final report will provide input to a future update of the Ohio Statewide Transportation Plan and provide data and trend analysis for ongoing statewide and regional freight initiatives.

UT will develop an economic profile of Ohio in the context of key economic drivers of growth and their relevance to Ohio's movement of goods.

3 – Anthony Wayne Bridge Main Cable Long Term health Monitoring Student Project

The main cables of the Anthony Wayne Bridge, an 80+ year old suspension bridge in Toledo, Ohio, are currently being monitored acoustically for wire breaks. This provides an estimate of the health of the entire volume of the cables and identifies locations where invasive inspection will be most advantageous. After the acoustic monitoring and invasive inspection, it is likely the bridge will be rehabilitated. The overall goal of this project is to recommend a viable system for long term continuous monitoring of the health of the main suspension cables. The students will also receive training on the monitoring systems from the leading firms in this technology.

PRESTRESSING STRAND PROJECT GETS OPPORTUNITY FOR REAL WORLD TESTING THROUGH ODOT



The UTC projects "Magnetic Sensor for Nondestructive Evaluation of Deteriorated Prestressing Strand," Phases I and II, showed promising results for determining the condition of embedded prestressing strands in aging concrete bridges by the Induced Magnetic Field (IMF) technique they developed which utilizes an electromagnet to magnetize the hidden strand and then measure the amount of corrosion. This nondestructive evaluation (NDE) technique had shown promise in the laboratory, but a field test would provide information about real world

applications. PI Doug Nims, Associate Professor of Civil Engineering at UT, and Co-PI Vijay Devabhaktuni, Assistant Professor of Electrical Engineering at UT, got the opportunity on a bridge to be replaced in Fayette County, Ohio.

The Ohio University project, funded by the Ohio Department of Transportation is the first known of its kind on a prestressed box beam bridge. It was performed in August 2010. First the testing method was performed followed by a dissection of the beams in the areas tested. This allowed for an assessment of the accuracy of the technology and an evaluation of the practicality of the testing method used.

Overall the technology performed reasonably well in predicting corrosion but it was concluded more tests must be conducted on a variety of beams. PI Nims suggests testing be performed on numerous beams that have been extracted from aged bridges to form a data base of the results and prove the reliability of magnetic detection.



IMF sensing equipment, electromagnet with Hall sensors on pole face

As a result of the work on the UT-UTC funded projects "Magnetic Sensor for Nondestructive Evaluation of Deteriorated Prestressing Strand, Phases I and II" and on this project a paper was published in Research in Nondestructive Evaluation, [Volume 23, Issue 1](#), 2012, titled "A New Magnetic Sensor Concept for Nondestructive Evaluation of Deteriorated Prestressing Strand." The lead on this paper was Bertrand Fernandes who also wrote his masters' thesis on this topic. A copy of the paper can be accessed at <http://www.tandfonline.com/eprint/6ipwRRG9mA MtfQZXFKFP/full>

UT-UTC STUDENT-OF-THE-YEAR Mike Titus



Mike Titus, Student of the Year 2010, with guest Jenna Slattery holding his certificate after the CUTC awards Banquet in Washington, D.C.

Mike Titus, a masters student in Civil Engineering at UT, was named the Student of the Year 2010. He attended the Council of University Transportation Centers annual banquet in Washington, D.C. in January 2011 where he received his award. Along with fees and expenses for attending the Transportation Research Board conference, he received a check for \$1,000.

Mike's primary transportation area of experience/study is on a project involving the magnetic inspection of embedded prestressing strands in box girder bridges with advanced corrosion. (See the preceding article for more information on this project.)

In the nomination for the award written by Dr. Douglas Nims of the Department of Civil Engineering and Principal Investigator on the bridge projects wrote: "Mr. Titus played a key role in the planning and execution of the first field test of a magnetic prestressing strand inspection system on a adjacent prestressed box girder bridge. "Mike is bright, inquisitive and has a good grasp of the behavior of the bridge and the characteristics of the test system. These characteristics plus hard work enabled Mike to make key contributions to the success of this inspection. He carried out lab experiments to design the system and ready the system for field deployment, was important in designing the field test fixtures, and helped establish the test procedures. He, also, lead the dissection of the bridge to validate the magnetic inspection results." Mike was a coauthor of the ASCE Journal of Bridge Engineering article "A Field Test of Magnetic Methods for Corrosion Detection in Prestressing Strands in Adjacent Box-Beam Bridges."

Mike demonstrated leadership and commitment by serving on the Civil Engineering Student Advisory Board, mentoring middle school students participating in the 2010 West Point Bridge Design Competition and by excelling at helping students for which he received the Civil Engineering Outstanding Teaching Assistant Award.

After graduation, Mike worked for the RJ Runge Company as a project engineer; as of January 2012, he joined the Engineer-In-Training program with the Ohio Department of Transportation.

STUDENT-OF-THE-YEARS 2006 – 2009 What are they doing now?

Guy Schafer – SOY 2006

Guy is currently working for Sanoh America. Sanoh is a Japanese owned company specializing in steel and nylon tubes for the automotive industry. They primarily supply the Japanese OEM's (Honda, Toyota, Mazda, Nissan, Mitsubishi, and Subaru) with plants in North and South America, Asia, and Europe.

He is working as the Logistics and Customs Manager with duties for daily operations and strategic planning related tasks. He coordinates domestic and international shipments across a variety of modes, and provides customs documentation for both components and equipment. On the strategic side, he is working on process improvement and cost reduction within their transportation/logistics network. This includes the standardization of processes and forms that are being utilized at the company's different facilities.

Now a veteran transportation professional, he offered this transportation related wisdom: "The transportation industry can be very competitive; be flexible and willing to learn things that may be outside of your specific field or area of expertise. The broader your range of knowledge, the more marketable and less expendable you become."

Samir Dhar – SOY 2007

Samir is working on his Ph.D. in SISS (Spatially Integrated Social Science) with a focus in freight forecasting and modeling after receiving an MBA in Information Technology (IT) and an MA in Geography and Planning with a focus in Freight Transportation, all at The University of Toledo. He intends to remain in academia teaching and doing research.

Sarah Schafer – SOY 2008

Sarah Schafer graduated with a Master of Arts degree in Geography with a concentration in transportation, GIS, and location allocation at the University of Toledo. She is currently pursuing a Ph.D. in Manufacturing and Technology Management from the College of Business and Innovation, also at the University of Toledo. She plans to continue research in the health care supply chain area and will seek a faculty position upon completion of the program.

Walter Anderson – SOY 2009

Walter continues his studies at The University of Toledo as he pursues his Ph.D. in biomedical engineering working with nitinol, a smart material for spinal implants.

UT-UTC CONTINUES SUPPORT OF THE UT SOLAR CAR TEAM



UT Solar Car Team Wins Award at Ohio UTC Student Research Conference

Four members of the UT Solar Car Team, Sean Sheppard, Zach Linkous, Ethan Matthews and Sherry Ackerman, represented the University of Toledo UTC at the Ohio UTC Student Research Conference held November 2010 by the Ohio Transportation Consortium at the University of Akron. The group participated in the poster session and also made a formal presentation. They were awarded the "Best in Conference" undergraduate presentation as evaluated by faculty in attendance. Along with the award they received \$200 plus a certificate and acknowledgement on the OTC web site.

Team is reorganized in 2012

Although the Team did not reach their goal of having a car ready for the 2012 North American Challenge solar car race, they

moved ahead with the mechanical team building the chassis and mechanicals and the motor team working on a distinctive design. In the spring of 2012, the motor group separated from the Team and the mechanical team became the focus of future efforts. A trip to Ann Arbor to view the cars participating in the American Solar Challenge 2012, meet the team members and get advice is planned for July 16th.

Additional leadership provided by an outside mentor from a private company has helped the new group concentrate on getting a rolling electric car charged by solar operating by the end of the year. The emphasis will be on understanding the technology of an electric vehicle as well as solar and how these technologies are put to use. The team is also establishing stronger contacts in the College of Engineering, especially the Engineering Technology Department. With an emphasis on applied hands-on engineering, the department and the Team are a perfect match.

FSAE ROCKET MOTORSPORTS SPONSORED BY THE ITI/UTC RACES ON E85

The UT-UTC continued sponsorship of the Formula Society of Automotive Engineers (FSAE) team, Rocket Motorsports, for the May 15, 2011 race at the Michigan International Speedway. Running car #30, they placed 17th in the overall tally. Again the car ran on E85.

Most major universities in the U.S. as well as teams from Europe, Australia, South America and Asia come to compete in the Michigan event. The UT group again hosted the team from the Technical University of Munich which had a second place finish.

Read more about Rocket Motorsports at <http://www.eng.utoledo.edu/~sae/>

2012 Update

Although the UT-UTC was unable to sponsor the FSAE Rocket Motorsports group in FY2012, they continued on racing car #62 in the May event at the Michigan Speedway and achieved an 11th place finish overall with an 8th place in the endurance category. For the third year they hosted the team from Munich which came in fourth. The UT team intends to join the Munich team in 2013 racing in Germany.



THE MARITIME ACADEMY OF TOLEDO STUDENTS EXPAND LEARNING ON UT-UTC FUNDED FIELD TRIPS



2010-2011 Field Trips

In support of the UTC mission of educating transportation professional of the future, the UTC at The University of Toledo is assisting the students of The Maritime Academy of Toledo in getting real world experience by supporting field trips.

The Maritime Academy of Toledo is a publically funded, tuition-free charter school for grades 5 through 12 in Toledo, Ohio focusing on a maritime related education.

They have become the first State of Ohio approved

Maritime Career Tech Education Program.

During the academic year 2011, the supported field trips included two trips on Miller Boat Line where the students were able to shadow actual crew members and even help with tasks on two different ferries as they carried passengers to the Catawba Islands in Lake Erie. Each student kept a logbook detailing what they learned and accomplished. This helped the students better understand first hand what becoming a crew member involves.

Other trips included attending and participating in a career professional expo, college visits, a science field trip and visits to Owens Community College to learn about basic electricity, diesel fundamentals and basic hydraulics plus an opportunity to look at the labs for each area.

November 2011 Field Trip to the Great Lakes Maritime Academy



Cadets on the ship's port stern rail

On November 11, 2011, the Director of Maritime Studies and the Principal of the Maritime Academy of Toledo accompanied 10 cadets for a visit to the Great Lakes Maritime Academy (GLMA) in Traverse City, Michigan. The trip was designed to help the cadets better understand and explore opportunities to further their maritime education after high school. GLMA representatives had visited the Toledo Academy twice before and piqued the interest of the students.

After the five+ hour drive and lunch, the cadets were guided by GLMA Director of Admissions, John Berck, on a three hour tour of the building,

the navigation and engineering rooms, navigational simulators, the engine labs workshop and finally the school's training vessel, the M/V State of Michigan where they saw how GLMA cadets live, train and work aboard. The trip ended back in Toledo that evening.

ALTERNATE ENERGY TEAMS FUNDED FOR TOLEDO TECHNOLOGY ACADEMY HIGH SCHOOL STUDENTS

The Toledo Technology Academy (TTA) is a four-year Toledo Public Schools high school. It is a College Tech Prep School that provides high-level academics and a manufacturing engineering technology curriculum. Many students from surrounding suburban school districts as well as private schools attend TTA as their preferred educational choice.

The Alternative Energies Team (AET) is an extracurricular program that involves approximately 20% of the student body. The AET has investigated bio-fuels, solar energy, wind energy and hydrocarbons. They have developed projects using alternative energies to power test vehicles. The team has converted or built go-karts that are powered by propane, electricity, and E-85. They have produced a hybrid vehicle for the Toledo Zoo that is powered by electricity and propane. Students have presented their karts at car shows and other public functions where they have explained the energy efficiency of hybrid vehicles and the different fuel source options for vehicles to the public. The TTA go-karts have been pace cars for several Junior Achievement Gran Prix races bringing attention to the different energy sources available.

Auto Electrolyzer Senior Engineering Design Project



Automated Hydrogen refueling

The senior engineering design and development objective of the project was to automate the electrolysis of water to produce hydrogen and to fill metal hydride cylinders with that hydrogen. The goal was to produce an automated system that can be left unattended because the electrolysis of water by wind or solar generated power takes extended periods of time to produce the volume of hydrogen needed for vehicle propulsion. The hydrogen cylinders from this project were used in the fuel cell go-kart to test the feasibility of the process. The electricity for the electrolysis during the project came from line voltage for expediency, however the system can easily be converted to solar or wind generated power.



Hydrogen fuel cell/ electric hybrid

Fuel Cell Go Kart Project

An ongoing goal of the AET is to explore alternate energies for transportation. The goal for this project was to produce a hydrogen fuel cell – battery hybrid vehicle which operates with a 1 kilowatt fuel cell. The hybrid was undertaken because sufficient fuel cells to solely power a vehicle would require more cells than the project budget would allow.

Students learned the energy content of different fuels, the inefficiencies of energy conversion, the obstacles to alternative energies, difficulties in developing alternate energy infrastructures, and problem solving strategies. Energy conversion and efficiency is an integral part of the manufacturing engineering technology curriculum at TTA.

STUDENTS TRAFFIC STUDY LEADS TO ENGINEERING SENIOR DESIGN PROJECT



UT students taking traffic counts for data to be used in an application for Safety Program funding from the Ohio Department of Transportation.

In April 2010 Mannik & Smith Group, Inc., a northwest Ohio full service consulting firm, came to the UT-UTC for help in conducting a traffic count of Dorr Street which is the southern boundary of The University of Toledo Main Campus. In a three year crash period from 2006-2008, it had been determined the area was the 19th highest crash HotSpot Non-Freeway section in the State of Ohio by the Ohio Department of Transportation. The intersection at the southwest corner of campus was ranked #1 in the City of Toledo as having the highest frequency of crashes in that timeframe. These rankings made the section of Dorr Street a priority to improve safety. The traffic count was done in preparation of a Safety Program Funding application to ODOT by the City.



The safety study was completed in September 2010 with full funding of \$4,408,200 awarded to improve the Dorr Street Corridor with detailed design scheduled in 2011. During the 2012 academic year, four students (Andrew Beat, Daniel Flum, Jared Post and Erik Ward) took the Dorr Street reconstruction as the subject of their senior design project. Their objectives were to reduce accident ratings, improve traffic flow and keep the area student friendly. They presented their findings and recommendations to the UT facilities administration for reference and use in working with the student community in their "complete streets" initiative which focuses on designing roadways to enable safe, attractive, and comfortable access and travel for all users including pedestrians, bicyclists, motorists and public transport users of all ages and abilities.

NETWORK OF SCHOLARS HOLDS 5TH SYMPOSIUM IN TOKYO 2012



The UT-UTC funded project "Global Supply Chain Management/Transportation: Building a Global Network of Scholars and Educators" has held four symposiums and workshops since 2007 in four different countries: The University of Toledo, Ohio (USA) in 2007, Pusan National University (Korea) in 2008, PSG Institute of Management (India) in 2009 and the IE Business School (Spain) in 2010. The fifth symposium was held in Tokyo in 2012.

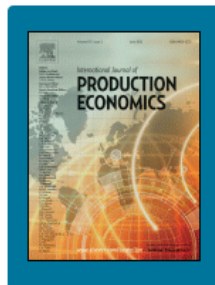
From March 8-10, The University of Toledo faculty (Mark Vonderembse, Paul Hong, Monideepa Tarafdar, Udayan Nandkelyor, Sachin Modi, David Dobrzykowski) and two doctoral students (Ryan Skiver and Vincent Whitelock) attended the 5th Conference on International Supply Chain Management in Tokyo, Japan. Financial support from the UT-UTC was integral in making the conference successful. Following are the objectives which were met.

First, initially there was a concern about the safety issues of having this international conference in Tokyo, Japan since the serious natural disaster and nuclear reactor accidents in Fukushima took several months to resolve. However, with the cooperation of the Japanese government and the University of Tokyo, the issues were adequately addressed and the international conference in Tokyo occurred as planned. The University of Tokyo organizers, headed by Professor Takahiro Fujimoto, took care of all the logistics and organizational aspects. The University of Toledo's team (headed by Professor Paul Hong) worked primarily on getting all the manuscripts from the presenters and arranging special issues with four journals.

Second, institutional support was provided from various universities. Over 300 conferees attendated the sessions. Major support from institutions included the University of Tokyo, The University of Toledo, Zhejiang University, Kyungpook National University, Hanyang University, and the PSG Institute of Management of India.

Third, the conference brought together top notch speakers and an international network of researchers. Two key note speakers were Professor R.W. Grubbström, Editor-in-Chief of the *International Journal of Production Economics*, and Professor Gunasekaran, Editor-in-Chief of *Benchmarking: An International Journal* and seven other refereed journals. They spoke on the key trends of operations and global supply chain management in turbulent times. Researchers from USA, Japan, Korea, China, UK, Germany, and India attended the conference and made it both highly interactive and dynamic with key panel sessions and industry presentations by Toyota executives on supply chain disruptions caused by the 2011 natural disasters in Japan

Fourth, in addition to conference proceedings, four special refereed journal issues resulted from the conference. Guest editors were appointed from the network of researchers and the journals will feature selected articles from the conference. The journals include *International Journal of Business Information Systems (IJBIS)*, *International Journal of Business Innovation Research (IJBIR)*, *International Journal of Productivity and Quality Management (IJPQM)* and *International Journal of Production Economics (IJPE)*.



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Special issue on Building Supply Chain System Capabilities in the Age of Global Complexity: Emerging Theories and Practices



Guest Editors:

Angappa Gunasekaran (University of Massachusetts - Dartmouth, USA)

Paul Hong (University of Toledo, USA)

Takahiro Fujimoto (University of Tokyo, Japan)

Introduction: Firms around the world are experiencing opportunities and challenges with increasing measures. These global complexity requirements include global financial crisis started in USA, recent natural disasters in Japan, and expanding market opportunities in emerging markets. It is critical to explore

emerging theories and practices for building supply chain capabilities. Scholars and practitioners are invited to submit papers for inclusion in the special issue of *International Journal of Production Economics (IJPE)*. Topics of interests in management and business include, but are not limited to, the following issues:

- Exploring relevant theory building for global complexity
- Emerging SCM practices in the context of disruptive natural disasters and turbulent environments
- Emerging procurement practices in the expanding global market
- Procurement system capabilities for increasing complexity requirements
- Global purchasing networks for competitiveness
- Implementation of green supply chains and procurement system effectiveness
- Global complexity performance measures and metrics
- Information system capabilities for complexity requirements
- Global information system networks and/or proximity networks
- Implementation of green supply chains and information system effectiveness
- Economic models for information systems
- Effective data mining, data warehousing and information logistics
- Knowledge management and strategic information systems

Articles should clearly bring out the problem associated with emerging theories and practices of building supply chain system capabilities in the age of global complexity. Innovative and high quality conceptual, analytical and simulation models, and empirical and case studies addressing the issues of building supply chain system capabilities in the age of global complexity and related topics are welcome.

Publication Schedule:

Manuscript Submission 31 May 2012

Reviewer reports 30 September 2012

Revised paper submission 31 December 2012

Final manuscript submission to publisher 31 March 2013

Fifth, future plans were announced at the end of the conference: The University of Toledo (USA) and Zhejiang University (China) will host the sixth conference in 2013 and the seventh conference in 2014 respectively.

This article was adapted from information provided by Dr. Paul Hong.

HIGHWAY H₂O WORKSHOP HELD ON GREAT LAKES MARITIME INFORMATION DELIVERY SYSTEM



On September 19, 2011 the University of Toledo hosted a bi-national workshop on the *Great Lakes Maritime Information Delivery System (GLMIDS)* for members of Highway H₂O. The UT-UTC was among the funders for the development of GLMIDS.

Participants included port directors, industry representatives and academics from the U.S. and Canada. The day began with welcoming remarks from Bruce Hodgson, Director of Highway H₂O, and Dr. Peter Lindquist, Associate Professor of Geography and Planning and the Principal Investigator for the GLMIDS project. Dr. Lindquist continued with an overview of the system discussing contents of the information clearinghouse,

database, and the *Midwest FreightView* resource. Participants were then provided with a "hands on" introduction to data resources and query applications in the *Midwest FreightView* and the newly developed prototype version of *Midwest FreightView II*. The workshop concluded in the afternoon with participants' feedback.



Essentially, GLMIDS was developed as a comprehensive data repository and information clearinghouse for the transportation industry in the Great Lakes region. The system is used to facilitate the acquisition, storage, management, analysis and exchange of data between analysts and stakeholders to draw the links between freight movements and economic development. This web-based information delivery system was developed and hosted by the Geographic Information Science and Applied Geographics (GISAG) Center at the University of Toledo. Access to a wealth of Great Lakes shipping and industry information and links to other information resources (firms,

agencies, universities, etc.) is available through the clearinghouse at <http://www.maritime.utoledo.edu>. In addition, the site features an internet-based GIS data viewer called *Midwest FreightView*. Main elements of the system include a centralized data repository for highway, rail, and vessel movements; port and terminal functions; commodity flows; economic activity; and economic impacts. Users can access the system to query and map a variety of datasets pertinent to shipping, transportation and commodity flows in the Great Lakes region. Other features of the site include prepared maps, tables,

graphics, and text for stakeholder information and use as well as a data exchange supporting user inquiries and to furnish information on demand.

Upon conclusion of morning discussions, participants entered the GISAG Center for practical hands on experience with the system. After brief demonstrations by three graduate students, participants tried each of the following web-based resources:

- Great Lakes Maritime Information Clearinghouse
- Original *Midwest FreightView*
- Updated and improved *Midwest FreightView II*
- Maritime Data Query Builder
- Midwest Freight Analyst
- Lucas County Brownfield Data Viewer

The final session of the day was geared toward questions and answers and allowed participants to provide valuable feedback of GLMIDS to the project team. Overall, the participants appreciated the system and saw its value as a decision support system for policy and decision makers and other stakeholders to draw the link between shipping and commodity flows in the Great Lakes region and their impacts on regional economic vitality and growth.

This article was supplied by Dr. Peter Lindquist and his team.

Final Research Reports

(All UT-UTC funded project reports are complete as of June 30, 2012 and can be accessed at <http://www.utoledo.edu/research/ututc/projects.html>)

Alternate Energy Projects

[Reducing Noise and Vibration of Hydraulic Hybrid and Plug-In Hybrid Electric Vehicles UTUTC-AE-1\)](#)

[Reducing Noise and Vibration of Hydraulic Hybrid and Plug-In Hybrid Electric Vehicles-Phase II \(UTUTC-AE-2\)](#)

[Reducing Noise and Vibration of Hydraulic Hybrid and Plug-In Hybrid Electric Vehicles - Phase III \(UTUTC-AE-4\)](#)

[Reducing Noise and Vibration of Hydraulic Hybrid and Plug-In Hybrid Electric Vehicles - Phase IV: Experimental Evaluation of Control of an MR Mount \(UTUTC-AE-5\)](#)

Infrastructure Utilization Projects

[Developing and Testing a Framework for Alternative Ownership, Tenure and Governance Strategies for the Proposed Detroit-Windsor River Crossing \(UTUTC-IU-1\)](#)

[Regional Freight Information Resources for Market Opportunities in the Great Lakes Maritime Transportation System \(UTUTC-IU-2\)](#)

[Value of ITS Information for Congestion Avoidance in Inter-Modal Transportation Systems \(UTUTC-IU-4\)](#)

[A Novel Image Database Analysis System for Maintenance of Transportation Facility \(UTUTC-IU-5\)](#)

[Regional Freight Information Resources in the Great Lakes Maritime Transportation System Phase II \(UTUTC-IU-6\)](#)

[Travel Behavior of U.S. Domestic Airline Passengers and Its Impacts on Infrastructure Utilization \(UTUTC-IU-7\)](#)

[Developing and Testing a Framework for Alternate Ownership, Tenure and Governance Strategies for the Proposed Detroit-Windsor River Crossing - Phase II \(UTUTC-IU-9\)](#)

[Value Of ITS Information For Congestion Avoidance In Inter-Modal Transportation Systems, Phase II \(UTUTC-IU-10\)](#)

[Magnetic Sensor for Nondestructive Evaluation of Deteriorated Prestressing Strand \(UTUTC-IU-12\)](#)

[Transportation Informatics: An Image Analysis System for Managing Transportation Facilities \(Phase II of "A Novel Image Database System for Maintenance of Transportation Facility"\) \(UTUTC-IU-14\)](#)

[Magnetic Sensor for Nondestructive Evaluation of Deteriorated Prestressing Strand - Phase II \(UTUTC-IU-15\)](#)

[A Data Library Management System for Midwest FreightView and its Data Repository \(UTUTC-IU-16\)](#)

[Value Of ITS Information For Congestion Avoidance In Inter-Modal Transportation Systems, Phase III \(UTUTC-IU-17\)](#)

[Strengthening of Bridge Columns Subjected to an Impact Lateral Load Caused by Vehicle Collision \(UTUTC-IU-18\)](#)

[A GIS Connection Between Brownfield Sites, Transportation and Economic Development \(UTUTC-IU-19\)](#)

[Developing Competitive Supplier Diversity Strategies for Utilizing Minority Owned Trucking Firms in Northwest Ohio Under Affirmative Actions \(UTUTC-IU-20\)](#)

[Evaluation of Ohio-Michigan Regional Airports for Air Cargo Transportation: Freight Forwarders Perspective \(UTUTC-IU-21\)](#)

[The Use of Sustainable Materials for Quick Repair of Aging Bridges \(UTUTC-IU-22\)](#)

Infrastructure Utilization / Economic Development Projects

[Commodity Flow for the Toledo Region \(UTUTC-IU-11\)](#)

[Norfolk Southern Airline Yard Intermodal Project \(UTUTC-IU-13\)](#)

Supply Chain Management Projects

[Combined Truck Routing and Driver Scheduling Problems Under Hours-of-Service Regulations \(UTUTC-SC-1\)](#)

[Global Supply Chain Management/Transportation: Building a Global Network of Scholars and Educators \(UTUTC-SC-2\)](#)

[High Speed Transportation Corridor: A Conceptual Framework \(UTUTC-SC-7\)](#)

[Global Supply Chain Management/Transportation Building a Global Network of Scholars and Educators -II \(UTUTC-SC-8\)](#)

[Combined Truck Routing and Driver Scheduling Problems Under Hours-of-Service Regulations - Phase II \(UTUTC-SC-9\)](#)

ITI/UT-UTC Hosts The Ohio Transportation Safety Awareness Seminar



In November, the Ohio Department of Homeland Security Office of Protection and Security held their Ohio Transportation Safety Awareness Seminar at the Dana Conference Center on the Health Science Campus of The University of Toledo. The seminar was open to those involved in all forms of intermodal transportation. All attendees had to sign a non-disclosure agreement prior to the event. They were presented with a certificate of attendance at the end of the program.

Co-sponsored by the Intermodal Transportation Institute/UT University Transportation Center along with the Ohio Trucking Association, 185 transportation leaders from both the public and private sector attended. From ABC-WTVG news, Deputy

Director of Ohio Homeland Security offered: "About 90 percent of the infrastructure in the United States and in Ohio is owned and operated by the private sector. So this conference brings the two sectors together to talk about how to keep safe; how we can partner together."

The seminar focused on protection, crime and terrorism prevention, and best practices surrounding Ohio's transportation industry. In their update of the event on their web site, Ohio Department of Public Safety states: "The highlight of the event was the simulated attack scenario presented by the 13-member Air Force Institute of Technology team from Wright Patterson Air Force Base. The AFIT students provided an excellent presentation that was both insightful and interactive which served to educate seminar attendees on threats the transportation industry faces every day. An outstanding panel of experts assembled from our federal, state, local and private partners also provided an overview of what measures are in place to mitigate such attacks or threats. The feedback and support from the seminar has been extremely positive."

Duplicate of article in UT-UTC Update newsletter of spring 2011.

Editorial Cites UT Role in Intermodal

In the editorial "Collegial university" appearing in *The Blade* on December 12, 2010 discussing developments at The University of Toledo, acknowledgement was given to the increased role of the University in economic development and specifically intermodal transportation. Of UT President Dr. Jacobs it states: "Under his leadership, UT has become a vital economic engine for northwest Ohio – a leader in the region's burgeoning health-care, alternative-energy, and intermodal-transportation industries."

This accolade is a result of the activities of the Intermodal Transportation Institute and the University Transportation Center positioning its focus and activities on using transportation as an economic development tool for the city, state and region.

Duplicate of article in UT-UTC Update newsletter of spring 2011.

ASSOCIATED RESEARCH PARTNERSHIPS & AFFILIATIONS

Partnerships in the UTC - CFIRE



In a continuation of work started by the ITI, The University of Toledo participates as a partner in the UTC at the University of Wisconsin-Madison, the National Center for Freight & Infrastructure Research & Education – CFIRE. See more about CFIRE at <http://www.wistrans.org/cfire/>

Update 2012:

UT Partners with University of Wisconsin – Madison in new Tier I UTC

The U.S. Department of Transportation awarded a \$3.5 million grant to the National Center for Freight and Infrastructure Research and Education (CFIRE), a consortium led by the **University of Wisconsin–Madison**. The grant will fund research, outreach and education on multimodal freight systems and will allow CFIRE to continue its innovative freight research as a Tier I University Transportation Center (UTC).

The CFIRE consortium is a collaborative partnership among 10 universities arranged into northern and southern “hubs.” Led by UW-Madison, the northern hub includes the University of Wisconsin–Milwaukee, University of Wisconsin–Superior, University of Illinois–Chicago, **University of Toledo**, and Michigan Technological University. The University of Memphis will lead the southern hub, which also includes Vanderbilt University, University of Alabama–Huntsville, and University of Southern Mississippi.

From “US DOT awards \$3.5 million to CFIRE to expand freight research” by [Steve Wagner](#), January 19, 2012 – CFIRE web site

Partnership in the Michigan-Ohio UTC



The University of Toledo is also a partner in the Michigan-Ohio University Transportation Center led by the University of Detroit – Mercy. Along with the other partners (Bowling Green State University, Wayne State University, and Grand Valley State University) UT participates in projects which share the same basic theme as the UT-UTC. The Director and the Vice President, Research Development both sit on the policy committee of the MIOH-UTC. See more about the MIOH-UTC at <http://mioh-utc.udmercy.edu/>

UT an Affiliate University at GLMRI



The University of Toledo is an affiliate university in the Great Lakes Maritime Research Institute, a coalition of the University of Wisconsin-Superior and the University of Minnesota-Duluth. See more about GLMRI at

Update 2012:

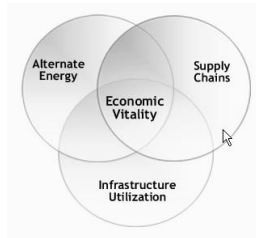


UT Partners with the Mineta Transportation Institute in new UTC

A consortium of 9 universities led by the Mineta Transportation institute has won a \$3.49-million grant from the U.S. Dept. of Transportation to fund transportation research, workforce development, technology transfer, and education.

The two-year, \$3.49-million grant was awarded to a newly formed consortium of nine well-established, university-based research centers. The new organization, led by San Jose State University's Mineta Transportation Institute, will be known as the National Transit Research Consortium (NTRC). The other eight consortium partners include Rutgers University in New Brunswick NJ; Howard University in Washington DC; **University of Detroit Mercy in Detroit MI**; Grand Valley State University in Allendale MI; Bowling Green State University in Bowling Green OH; **University of Toledo** in Toledo OH; University of Nevada, Las Vegas in Las Vegas NV; and Pennsylvania State University in State College PA.

From "MTI leads nine-university consortium to \$3.4-million win for research in US Department of Transportation competition" on the Mineta Transportation Institute web site



RESEARCH PROJECT STATUS LIST

New Projects for 2010 – 2011, Final Reports Updated to 2012

Reducing Noise and Vibration of Hydraulic Hybrid and Plug-In Hybrid Electric Vehicles Phase IV: Experimental Evaluation of Control of an MR Mount

Focus Area: Alternate Energy

Principal Investigator:

Mohammad Elahinia

Assistant Professor

Industrial and Manufacturing Engineering Department

The University of Toledo

Project Dates: 08/01/2010 – 06/30/2011; No Cost Extension to 12/31/2011

Project Award: FY2011

Final Report: <http://www.utoledo.edu/research/ututc/docs/Elahinia%20Final%20Report%2002-2012.pdf>

A GIS Connection Between Brownfield Sites, Transportation and Economic Development

Focus Area: Infrastructure Utilization

Principal Investigator:

Dr. Peter Lindquist

Associate Professor

Department of Geography and Planning

The University of Toledo

Project Dates: 07/01/2010 to 06/30/2011; No Cost Extension to 08/31/2011

Project Year: FY2011

Final Report: http://www.utoledo.edu/research/ututc/docs/UTUTC_Brownfields_FINAL.pdf

Developing Competitive Supplier Diversity Strategies for Utilizing Minority Owned Trucking Firms in Northwest Ohio Under Affirmative Actions

Focus Area: Infrastructure Utilization

Principal Investigator:

Dr. Hokey Min

James R. Good Chair in Supply Chain Strategy

Department of Management

College of Business Administration

Bowling Green State University, Bowling Green, Ohio

Project Dates: 07-01-2010 – 06/30/2011; No cost extension to 12/31/2011

Project Year: FY 2011

Final Report: http://www.utoledo.edu/research/ututc/docs/Minority%20Trucking_Final%20Report.pdf

Evaluation of Ohio-Michigan Regional Airports for Air Cargo Transportation: Freight Forwarders Perspective

Focus Area: Infrastructure Utilization

Principal Investigator:

Alper E. Murat, Ph.D.

Assistant Professor

Department of Industrial and Manufacturing Engineering

Wayne State University

Project Dates: 09/01/2010 – 06/30/2011; No Cost Extension to 08/31/2011

Project Year: FY 2011

Final Report: <http://www.utoledo.edu/research/ututc/docs/Murat%20OH-MI%20Airports%20Final.pdf>

The Use of Sustainable Materials for Quick Repair of Aging Bridges

Focus Area: Infrastructure Utilization

Principal Investigator:

Dr. Azadeh Parvin

Associate Professor

Department of Civil Engineering

The University of Toledo

Project Dates: 07/01/2010 – 06/30/2011; No Cost Extension to 12/31/2011

Project Year: FY 2011

Final Report: http://www.utoledo.edu/research/ututc/docs/Parvin%20IU-22_Final_Report.pdf

Ongoing Projects as of June 30, 2011, Final Reports Updated to 2012

Global Supply Chain Management/Transportation Building a Global Network of Scholars and Educators – II

Focus Area: Supply Chains

Principal Investigator:

Paul Hong, Ph.D.

Professor, Information Operations and Technology Management Department

The College of Business Administration, The University of Toledo

Project Dates: 08/01/2008 – 06/30/2010; No cost extension to 3/31/2012

Project Awarded: FY2009

Final Report: <http://www.utoledo.edu/research/ututc/docs/UTUTC-SC-8%20Final%20Hong.pdf>

Transportation Informatics: An Image Analysis System for Managing Transportation Facilities (Phase II of "A Novel Image Database System for Maintenance of Transportation Facility")

Focus Area: Infrastructure Utilization

Principal Investigator:

Eddie Y. Chou, Ph.D., P.E.

Professor and Director of Infrastructure Systems Research Laboratory

Department of Civil Engineering

The University of Toledo

Project Dates: 07/01/2009 to 06/30/2010; No cost extension to 12/31/2011

Project Awarded: FY2010

Final Report: <http://www.utoledo.edu/research/ututc/docs/Chou%202012%20Final.pdf>

Completed Projects as of June 30, 2011

Reducing Noise and Vibration of Hydraulic Hybrid and Plug-In Hybrid Electric Vehicles - Phase III

Focus Area: Alternate Energy

Principal Investigator:

Mohammad Elahinia

Assistant Professor

Industrial and Manufacturing Engineering Department

The University of Toledo

Project Dates: 08/01/2009 – 07/31/2010; No cost extension to 06/30/2011

Project Awarded: FY2010

Final Report: <http://www.utoledo.edu/research/ututc/docs/UTUTC%20Elahinia%20III%20Final.pdf>

Magnetic Sensor for Nondestructive Evaluation of Deteriorated Prestressing Strand - Phase II

Focus Area: Infrastructure Utilization

Principal Investigator:

Douglas K. Nims, Ph.D., P.E.

Associate Professor, Civil Engineering

College of Engineering

University of Toledo

Project Dates: 07/01/2009 to 06/30/2010; No cost extension to 06/30/2011

Project Awarded: FY2010

Final Report: <http://www.utoledo.edu/research/ututc/docs/UTUTC%20Deteriorated%20Strand%20II%20Final.pdf>

Strengthening of Bridge Columns Subjected to an Impact Lateral Load Caused by Vehicle Collision

Focus Area: Infrastructure Utilization

Principal Investigator:

Dr. Azadeh Parvin
Associate Professor
Department of Civil Engineering
The University of Toledo

Project Dates: 01/01/2010 – 12/31/2010; No cost extension to 06/30/2011

Project Awarded: FY2010

Final Report: http://www.utoledo.edu/research/ututc/docs/Parvin%20IU-18_%20Final_Report.pdf

Value Of ITS Information For Congestion Avoidance In Inter-Modal Transportation Systems, Phase III

Focus Area: Infrastructure Utilization

Principal Investigator:

Alper E. Murat, Ph.D.
Assistant Professor
Department of Industrial and Manufacturing Engineering
Wayne State University

Project Dates: 08/15/2009 – 08/15/2010; No cost extension to 06/30/2011

Project Awarded: FY2010

Final report: <http://www.utoledo.edu/research/ututc/docs/UTUTC-IU-17%20Final%20Murat.pdf>

A Data Library Management System for Midwest Freight View and its Data Repository

Focus Area: Infrastructure Utilization

Principal Investigator:

Dr. Peter Lindquist
Associate Professor
Department of Geography and Planning
The University of Toledo

Project Dates: 07/01/2009 to 06/30/2010; extended to 12/31/2010

Project Awarded: FY2010

Final Report: http://www.utoledo.edu/research/ututc/docs/UTC_Data_Library_Final_Report_.pdf

Combined Truck Routing and Driver Scheduling Problems Under Hours-of-Service Regulations - Phase II

Focus Area: Supply Chains

Principal Investigator:

Dr. Hokey Min
James R. Good Chair in Supply Chain Strategy
Bowling Green State University, Bowling Green, Ohio

Project Dates: 07-01-2009 – 06/30/2010; No cost extension to 06/30/2011

Project Awarded: FY2010

Final Report: http://www.utoledo.edu/research/ututc/docs/UTUTC%20HOS_II_Final.pdf

A Novel Image Database Analysis System for Maintenance of Transportation Facility

Focus Area: Infrastructure Utilization

Principal Investigator – Changed to:

Eddie Y. Chou, Ph.D., P.E.

Professor and Director of Infrastructure Systems Research Laboratory

Department of Civil Engineering, The University of Toledo

Project Dates: 05/01/2008 – 04/30/2009; extended to 4/30/2010

Project Awarded: FY2008

Final Report: http://www.utoledo.edu/research/ututc/docs/UT-UTC-IU-5_Final_Report_6-201.pdf

Developing and Testing a Framework for Alternate Ownership, Tenure and Governance Strategies for the Proposed Detroit-Windsor River Crossing-Phase II

Focus Area: Infrastructure Utilization

Principal Investigator:

Snehamay Khasnabis, Ph.D., P.E.

Professor, Civil and Environmental Engineering

College of Engineering, Wayne State University

Project Dates: 08/01/2008 – 07/31/2009; extended to 12/31/2009

Project Awarded: FY2009

Final Report: http://www.utoledo.edu/research/ututc/docs/UTUTC-IU-9_FinalReport.pdf

Magnetic Sensor for Nondestructive Evaluation of Deteriorated Prestressing Strand

Focus Area: Infrastructure Utilization

Principal Investigator:

Douglas K. Nims, Ph.D., P.E.

Associate Professor, Civil Engineering

University of Toledo

Project Dates: 01/01/2009 – 06/30/2009; extended to 12/31/2009

Project awarded: FY2009

Final Report: <http://www.utoledo.edu/research/ututc/docs/UTUTC%20Detriorated%20Strand%20I%20Final.pdf>

Regional Freight Information Resources in the Great Lakes Maritime Transportation System – Phase II

Focus Area: Infrastructure Utilization

Principal Investigator:

Peter Lindquist, Ph.D.

Associate Professor and Chair, Department of Geography and Planning

The University of Toledo

Project Dates: 05/01/2008 – 04/30/2009; extended to 9/30/2009

Project Awarded: FY2008

Final Report: http://www.utoledo.edu/research/ututc/docs/UTCLindquist_Phase_II_Final.pdf

Reducing Noise and Vibration of Hydraulic Hybrid and Plug-In Hybrid Electric Vehicles-Phase II

Focus Area: Alternate Energy

Principal Investigator:

Mohammad Elahinia, Ph.D.

Assistant Professor, Industrial and Manufacturing Engineering Department

The University of Toledo

Project Dates: 08/01/2008 – 07/31/2009; extended to 12/31/2009

Project Awarded: FY2009

Final Report: http://www.utoledo.edu/research/ututc/docs/UTUTC-AE-2_Final_Report.pdf

Value of ITS Information for Congestion Avoidance in Inter-Modal Transportation Systems, Phase II

Focus Area: Infrastructure Utilization

Principal Investigator:

Alper E. Murat, Ph.D.

Assistant Professor, Department of Industrial and Manufacturing Engineering

Wayne State University

Project Dates: 08/15/2008 – 08/15/2009; extended to 12/31/2009

Project Awarded: FY2009

Final Report: http://www.utoledo.edu/research/ututc/docs/UT-UTC-IU-10_Final_Report.pdf

High Speed Transportation Corridor: A Conceptual Framework

Focus Area: Supply Chains

Principal Investigator:

Udayan Nandkeolyar, Ph.D.

Associate Professor, Information Operations Technology Management

College of Business Administration, The University of Toledo

Project Dates: 05/01/2008 – 05/01/2009; extended to 6/30/2009

Project Awarded: FY2008

Final Report: http://www.utoledo.edu/research/ututc/docs/UTUTC-SC-7_Final_Report.pdf

Combined Truck Routing and Driver Scheduling Problems Under Hours-of-Service Regulations

Focus Area: Supply Chains

Principal Investigator:

Hokey Min, Ph.D.

James R. Good Chair in Supply Chain Strategy,

Department of Management, College of Business Administration

Bowling Green State University

Project Dates: 07/01/2007 – 02/28/2009; extended to 5/31/2009

Project Awarded: FY2007

Final Report: http://www.utoledo.edu/research/ututc/docs/UTUTC-HOS_Project_Final_Report.pdf

Travel Behavior of U.S. Domestic Airline Passengers and Its Impacts on Infrastructure Utilization

Focus Area: Infrastructure Utilization

Principal Investigator:

Bhuiyan M. Alam, Ph.D., M.ASCE

Assistant Professor, Department of Geography and Planning

The University of Toledo

Project Dates: 05/12/2008 – 05/11/2009

Project Awarded: FY 2008

Final Report: http://www.utoledo.edu/research/ututc/docs/Final_Report_-_Travel_Behavior.pdf

Value of ITS Information for Congestion Avoidance in Inter-Modal Transportation Systems

Focus Area: Infrastructure Utilization

Principal Investigator:

Alper E. Murat, Ph.D.

Assistant Professor, Department of Industrial & Manufacturing Engineering

Wayne State University

Project Dates: 08/14/2007 – 08/14/2008; extended to 12/31/2008

Project Awarded: FY 2008

Final Report: http://www.utoledo.edu/research/ututc/docs/UT-UTC-IU-4_Final_Report_Murat.pdf

Reducing Noise and Vibration of Hydraulic Hybrid and Plug-In Hybrid Electric Vehicles

Focus Area: Alternate Energy

Principal Investigator:

Mohammad Elahinia, Ph.D.

Assistant Professor, Department of Industrial and Manufacturing Engineering

The University of Toledo

Project Dates: 08/01/2007 – 07/31/2008; extended to 12/31/2008

Project Awarded: FY 2007

Final Report: http://www.utoledo.edu/research/ututc/docs/UTUTC-AE-1_Phase_I_Final_Report.pdf

Global Supply Chain Management/Transportation: Building a Global Network of Scholars and Educators

Focus Area: Supply Chains

Principal Investigator:

Subba Rao, Ph.D.

Professor, Information Operations Technology Management Department

College of Business Administration, The University of Toledo

Project Dates: 05/08/2007 – 12/31/2007; extended to 12/31/2008

Project Awarded: FY 2007

Final Report: http://www.utoledo.edu/research/ututc/docs/UTUTC-SC-2_Final_Report_Revise.pdf

Developing and Testing a Framework for Alternative Ownership, Tenure and Governance Strategies for the Proposed Detroit-Windsor River Crossing

Focus Area: Infrastructure Utilization

Principal Investigator:

Snehamay Khasnabis, Ph.D., P.E.
Professor, Civil and Environmental Engineering
Wayne State University

Project Dates: 06/15/2007 – 09/30/2008; extended to 11/15/2008

Project Awarded: FY 2007

Final Report: http://www.utoledo.edu/research/ututc/docs/UTUTC-IU-1_Final_Report1.pdf

Regional Freight Information Resources for Market Opportunities in the Great Lakes Maritime Transportation System

Focus Area: Infrastructure Utilization

Principal Investigator:

Peter S. Lindquist, Ph.D.
Associate Professor and Chair, Department of Geography and Planning
The University of Toledo

Project Dates: 05/03/2007 – 06/30/2008; extended to 08/31/2008

Project Awarded: FY 007

Final Report: <http://www.utoledo.edu/research/ututc/researchprojects/UTUTC-IU-2.html>

Discontinued Projects

An Analysis of the Status and Impacts of Public Private Partnerships of the Indiana Toll Road

Focus Area: Infrastructure Utilization

Principal Investigator:

Hiroyuki Iseki, Ph.D.
Assistant Professor, Department of Geography and Planning
The University of Toledo

Project Dates: 08/16/2008 – 08/15/2009

Project Awarded: FY 2008

Note: The PI left the University before the work on the project was begun. Although the project had been funded it was cancelled.

PUBLICATIONS, PRESENTATIONS, THESES, DISSERTATIONS

Publications

Book Chapters

Motlagh, A., Abuhaiba, M. **Elahinia, M. H.**, and Olson, W., "Hydraulic Hybrid Vehicles in Environmentally Conscious Transportation," 2007, John Wiley and Sons, Hoboken, NJ, 2008. ISBN: 978-0-471-79369-4

Journal Publications

Published

Min, Hokey, "The Impact of Hours-of-Service Regulations on Transportation Productivity and Safety: A Summary of Findings from the Literature." *Journal of Transportation Management*, Vol. 21, No. 2, (2009): 49-64.

Melachroudis, Emanuel and **Min, Hokey**, "A Tabu Search Heuristic for Solving the Multi-Depot, Multi-Vehicle, Double-Request Dial-A-Ride Problem Faced by the Health-Care Organization." *International Journal of Operational Research*, in press.

Melachroudis, Emanuel, **Min, Hokey**, and Shah, Vidit D. "Combined Truck Routing and Driver Scheduling Problems under Hours of Service Regulations." *International Journal of Operations and Quantitative Management*, March 2011, 17(1):1-19.

Nguyen, T. M. and **Elahinia, M. H.**, "Vibration Isolation for Hydraulic Hybrid Vehicles," *Journal of Shock and Vibration*, February 2008, 15(2):193-204.

Ciocanel, C., **Elahinia, M. H.**, Molyet, K., and Naganathan, N., "Design, Analysis, and Control of a Magnetorheological Fluid Based Torque Transfer Device," *International Journal of Fluid Power*, November 2008, 9(3):19-24.

Mohaghegh-Motlagh, A. and **Elahinia, M. H.**, "Dynamic Force Profile in Hydraulic Hybrid Vehicles: A Numerical Investigation," *Vehicle System Dynamics*, July 2009:1744-5159.

Schroeder, C., **Elahinia, M. H.**, and Schumack, M. "Integrating Education and Research: Development of a Hydraulic Hybrid Vehicle Laboratory," *International Journal of Engineering Education*, December 2008, 24(6): 1217-1228.

Roh, James J., **Hong, Paul**, and Park, Youngsoo. *Organizational Culture and Supply Chain Strategy: A Framework for Effective Information Flows.* *Journal of Enterprise Information Management*, Vol. 21, No. 4, 2008, pp. 361-376.

Hong, Paul, Kwon, He-Boong and Roh, James. Implementation of Strategic Green Orientation: An Empirical Study of Manufacturing Firms, *European Journal of Innovation Management*, Vol. 12 No. 4, 2009, pp. 512-532.

Park, Youngwon, Koichi, Ogawa, Hirohumi, Tatsumoto, and **Hong, Paul**. "The Impact of Product Architecture on Supply Chain Integration: A Case Study of NOKIA and Texas Instruments," *International Journal of Services and Operations Management*. Vol. 5, No. 6, 2009, pp. 787-798.

Kang, Mingu, Wu, Xiaobo, and **Hong, Paul**. "Strategic Outsourcing for Sustainable Competitive Advantages: Case Studies of Multi-National Corporations (MNCs) in China," *Strategic Outsourcing: An International Journal*. Vol. 2, 2009, No. 3 pp. 240-256.

Hong, Paul, Dobrzykowski, David D. and Vonderembse, M. "Effective integration of e-technologies and lean practices: supply chain performance in product and service focused firms," *Benchmarking: An International Journal*. Vol. 17, No. 4, pp. 561-592, 2010.

Tomino, Takahiro., Park, Youngwon., **Hong, Paul**., and Roh, James. "Market Flexible Customizing System (MFCS) of Japanese vehicle manufacturers: An Analysis of Toyota, Nissan and Mitsubishi," *International Journal of Production Economics*. Vol. 118, No. 2. pp. 375-386. 2009.

Hong, Paul, Tran, Oahn and Park, Kiyun Park. "Electronic commerce applications for supply chain integration and competitive capabilities: An empirical study," *Benchmarking: An International Journal*. Vol 17, No. 4, 2010, pp. 539-560.

Lindquist, Peter, A Dock Information System for the great Lakes: Part 1, *Port Technology International*, 48:36-41. 2010 (with S. Dhar)

Lindquist, Peter, A Dock Information System for the Great Lakes: Part 2, *Port Technology International*, 49:36-41. 2011 (With S Dhar and S. Schafer)

Accepted/In Review

Nguyen, T. M., Ciocanel, C., and **Elahinia, M. H.**, "A squeeze-flow mode magnetorheological mount: design, modeling, and experimental evaluation," *Journal of Vibration & Acoustics – Transactions of the ASME*, Accepted for publication.

Wang, S., **Elahinia, M.**, and Nguyen, T., "Displacement and Force Control and a Mixed Mode MR Mount" *Journal of Shock and Vibration*, in review.

Hong, Paul. Editorial: Emerging Issues in Services Operations Management *International Journal of Services Operations* (Accepted for Publication; In Press)

Dobrzykowski, D., Tran, Oahn and **Hong, Paul**. "Insights into integration approaches in service and product-focused firms for supply chain redesign". *International Journal of Services Operations Management* (Accepted for Publication, 2010; In Press)

Hong, Paul and Vonderembse, Mark. Emerging Global Logistics: "A Case of Korea Express". *International Journal of Logistics and Systems Management* (Accepted for Publication, September 10, 2009; In Press).

Park, Youngwon, **Hong, Paul.**, and Hwang, Woosang, "Suppliers Support of Manufacturers for Supply Chain Integration : A Case study of Korean Hyundai-Kia firms". *International Journal of Logistics and Systems Management* (Accepted for Publication, September 10, 2009; In Press)

Junichi Tomita, Youngwon Park , **Hong, Paul.** "Supply Chain Management of Glass Industry: From a Viewpoint of Product Architecture". *International Journal of Services and Operations Management* (Accepted for Publication August 10, 2009; In Press) .

Tomino, Takahiro, **Hong, Paul** and Park, Youngwon. "An Effective Integration of Manufacturing and Marketing System for Long Production Cycle: A Case Study of Toyota Motor Company", *International Journal of Logistics and Systems Management* (Accepted for Publication, November 2009; In Press).

Conference Publications and Presentations

Melachrinoudis, Emanuel and **Min, Hokey**, "Truck Routing and Driver Scheduling under Hours of Service Regulations." Presented at the 24th European Conference on Operational Research (EURO), Lisbon, Portugal (July14, 2010).

Ciocanel, C., Nguyen, T., **Elahinia, M.** and Naganathan, N. G., "On the Design of a Combined Squeeze-Flow Mode Magnetorheological Fluid Mount," SPIE Smart Structures and Materials, March 14-22, 2007, San Diego, California.

Mohaghegh Motlagh, A., **Elahinia, M. H.**, Abuhaiba, M., and Olson, W., "Application of Smart Materials for Noise and Vibration of Hydraulic Systems," ASME DETC/CIE, September 4-7, 2007, Las Vegas, Nevada.

Nguyen, T., Ciocanel, C. Schroeder, C. and **Elahinia M.**, "On the Design and Control of a Squeeze-Flow Mode Magnetorheological Fluid Mount," ASME DETC/CIE, September 4-7, 2007, Las Vegas, Nevada.

Nguyen, T., Ciocanel, C., and **Elahinia M.**, "Performance of an Adaptive Magnetorheological Fluid Mount," ASME International Mechanical Engineering Congress, November 11-15, 2007, Seattle, Washington.

Nguyen, T. M., Ciocanel, C., Schroeder, C., and **Elahinia, M. H.**, "Performance of a Mixed Mode MR Mount," 10th Cansmart Meeting International Workshop on Smart Materials and Structures, October 10-11, 2007, Montreal, Quebec, Canada.

Ciocanel, C., Nguyen, T., and **Elahinia, M.**, "Design and modeling of a mixed mode magnetorheological (MR) fluid mount," SPIE Smart Structures and Materials, March 9-13, 2008, San Diego, California.

Ciocanel, C., Nguyen, T., M., and **Elahinia, M. H.**, "An Adaptive Magneto-hydraulic Vibration Isolator," 3rd International Conference, Advanced Concepts in Mechanical Engineering, Iasi, Romania, 5 - 6 June 2008.

Nguyen, T., Ciocanel, C. and **Elahinia M.**, "Parameter optimization in designing an MR mount," 15th International Congress on Sound and Vibration, 6-10 July 2008, Daejeon, Korea.

Nguyen, T., Ciocanel, C. and **Elahinia, M. H.**, "Theoretical and experimental development of a semi-active mount," ASME International Mechanical Engineering Congress, October 31 - November 6, 2008, Boston, Massachusetts.

Nguyen, T. M., Ciocanel, C. and **Elahinia, M.**, "Analytical modeling and experimental validation of a magnetorheological mount" Proceedings of SPIE Smart Structures and Materials, March 8-12, 2009, San Diego, California.

Nguyen, T., Ciocanel, C. and **Elahinia, M. H.**, "A Magnetorheological Mount for Hydraulic Hybrid Vehicles," SMASIS09 ASME Conference on Smart Materials, Adaptive Structures and Intelligent Systems September 20 - September 24, 2009, Oxnard, California.

Wang, S., The, N., Anderson, W., Ciocanel, C. and **Elahinia, M.**, "Skyhook Control of a Mixed Mode Magnetorheological Fluid Mount," ASME International Design Engineering Technical Conferences (IDETC), August 15-18, 2010, Montreal.

Anderson, W., Wang S., Nguyen, T., Ciocanel, C. and **Elahinia, M.**, "Comparison of a hydraulic engine mount to a magnetorheological engine mount," SAE Commercial Vehicle Engineering Congress, October 5-8, 2010, Rosemont, Illinois.

Lindquist, Peter, The Great Lakes Maritime Information Delivery System: A Resource for Intermodal Freight Transportation Planning and Analysis in the Upper Midwest, *TRB 89th Annual Meeting Compendium of Papers, January 2010. (With S.E. Schafer)*

Conference Papers presented at the 3rd Symposium and Workshop in Global Supply Chains by UT faculty and UT Ph.D. students (Coimbatore, PSG Institute of Management, India)(January 7-9, 2010) (16)

Udayan Nandkeolyar¹ and Oanh T.K. Tran². "High Speed Transportation Corridor: A Conceptual Framework", Information Operations and Technology Management. ^{1,2}University of Toledo, USA.

James A. Pope¹ and Dieter Bartmann², "Securing Data Biometrically", ¹University of Toledo, USA, ²Universität Regensburg, Germany.

Sufian Qrunfleh¹, Monideepa Tarafdar² and **T. S. Ragu-Nathan**³. "Alignment of Supply Chain Management Practices and the Usage of Information Systems: Impact on Supply Chain Performance and Firm performance". ^{1, 2, 3}University of Toledo, USA.

Paul Hong¹, He-Boong Kwon² and James Jungbae Roh³, "Effective Environmental Business Practices for Successful Outcomes: An Empirical Study of Manufacturing Firms", ¹University of Toledo, USA, ²Concord University, USA and ³Pennsylvania State University Brandywine Campus, USA.

David D. Dobrzykowski¹, Oanh T.K. Tran², & **Paul C. Hong**³, "Supply Chain Redesign for Green Innovation Products: A Complementarity Approach between Absorptive Capacity and Value Co-creation", ^{1,2,3} The University of Toledo, USA.

Conference Papers presented at the 4th Symposium and Workshop in Global Supply Chains by UT faculty and UT Ph.D. students (Madrid, Spain, September 22-24, 2010)

David M. Nelson¹, **Mark Vonderembse**² and **S. Subba Rao**³, "Life Cycle Evaluation Strategies of Biodiesel Fuel Along the Supply Chain in Public Transport", ^{1,2,3}The University of Toledo, USA.

Gyewan Moon¹, **Paul Hong**², Jongheon Kim³, Choongshin Park⁴, "Effective Implementation of Communities of Practices (CoP) in Knowledge Habitus: A Case Illustration", ^{1,3} Kyungpook National University, Korea, ²University of Toledo, USA, ⁴Samsung Electronics, Korea.

Junichi Tomita¹, Youngwon Park², **Paul Hong**³ "Supply Chain Management of Glass Industry: From a Viewpoint of Product Architecture". College of Business Administration, ¹University of Toyko University, Japan, ²Waseda Institute for Advanced Study, Waseda University, Japan and ³University of Toledo, USA.

Takahiro Tomino¹, **Paul Hong**², Youngwon Park³. "Market Adaptive Production System of Japanese Vehicle Manufacturers: With Special Focus on Long Production Cycle". ¹School of Commerce, Meiji University, University of Toledo, USA and ³ Waseda Institute for Advanced Study.

Mingu Kang¹, Xiaobo Wu², **Paul Hong**³ and Youngwon Park⁴, "High-Tech SMEs and Global Production Network: A Case Study of Chinese IC Design Companies", ^{1,2}Zhejiang University, China, ³University of Toledo, USA, ⁴Waseda University, Japan.

Soon W. Hong¹, Cheng-Li Huang² and **Paul Hong**³, "TQM Practices and Innovation Performance: A Comparative Study of South Korea and Taiwan", ¹Youngdong University, South Korea, ²Tamkang University, Taiwan, ³University of Toledo, USA.

Takashi Shimizu¹, Youngwon Park², **Paul Hong**³. "Supply Chain Risk Management and Organizational decision-making: A Case Study of Japanese Major Automotive Firm", ¹University of Tokyo, Japan, ²University of Tokyo, Japan ³University of Toledo, USA.

Youngwon Park¹, **Paul Hong**² and Woosang Hwang³, "Suppliers Support of Manufacturers for Supply Chain Integration: A Case Study of Korean Hyundai-Kia Firms", ¹ Waseda University, Japan, ^{2,3} University of Toledo, USA.

Youngsoo Park¹ and **Paul Hong**², "Coordinating Mass Customization for Rapidly Emerging Markets: A Human Resource Perspective", ^{1,2}University of Toledo, USA.

Takahiro Tomino¹, Youngwon Park², **Paul Hong**, "Build To Order System in Japanese Vehicle Manufacturers: Comparative Studies of Nissan, Toyota and Honda". ¹ Meiji University, Japan. ² The University of Tokyo, Japan, ³University of Toledo, USA - Best Research Paper Award 4th International Symposium and Workshop in Global Supply Chains.

Greg Rawski¹ and **Paul Hong**², "Sustainability Practices of Manufacturing Firms: An International Comparative Study", ¹ University of Evansville, USA and ² University of Toledo, USA.

Jehon Oh¹, Youngwon Park², **Paul Hong**³, "Global Production System of Korean Firms: Comparative Studies of Hyundai-Kia Motor Company and LG Electronics", ¹Meiji University, Japan. ²University of Tokyo, Japan, ³ University of Toledo, USA.

Kun Liao¹, Thomas Sharkey², T.S. Ragu-Nathan³, and **Mark Vonderembse**⁴, "Trust-Driven Joint Operational Activities to Achieve Mass Customization: A Comparative Study of U.S., Chinese and Japanese Companies", ¹Central Washington University, USA. ^{2, 3, 4}University of Toledo, USA.

Paul Hong¹ and Seungchul Kim¹, "Business Network Excellence for Sustainable Competitive Advantage in Turbulent Environment: Case of Korean Firms", ¹ Hanyang University, Korea ² University of Toledo, USA.

Paul Hong¹, James Roh², "Collaborative Supplier Selection and Concurrent Product Design in the Context of Strategic Green Orientation: An Empirical Study", ¹ University of Toledo, and ² Rowan University, USA.

Se Youn Youn¹, Ma Ga Yang², **Paul Hong**³, "Four Types of Green Supply Chain Management from Contingency Theory Perspective", ¹ Hongik University, Korea and University of Toledo, USA., ² and ³ University of Toledo, USA.

Soon W Hong¹, **Paul Hong**², James Roh³, "A review of benchmarking practices: case for a new research area" ¹ Youngdong University, Korea, ² University of Toledo, USA, ³ Rowan University, USA.

Tchai Jitpaiboon¹, **Mark Vonderembse**², T.S., Ragu-Nathan³ The influence of top management support and information Technology utilization on supply chain integration. ¹ Ball State University, USA. ² and ³ University of Toledo, USA.

Hassan HassabElaby¹, Woosang Hwang², **Mark Vonderembse**³, "The impact of ERP implementations on organizational capabilities and performance", ¹ and ² and ³. University of Toledo, USA.

Dong Kyoou Yoo¹, **Mark Vonderembse**², T. S. Ragu-Nathan³, "Knowledge management, cognitive empowerment, perspective, and innovation: A conceptual framework", ¹ Virginia State University, USA, ² and ³ University of Toledo, USA.

Fernandes, B., Wade, J., **Nims, D.**, and Devabhaktuni, V. (2010). "Development of a Sensor for Nondestructive Inspection of Deteriorated Prestressing Strands in Prestressed Concrete Bridges," *NDE/NDT for Highways and Bridges: Structural Materials Technology Conference*, ASNT, New York City, NY, 162-170.

Theses and Dissertations

James Wade, M.S. Thesis, "Magnetic Sensor for Nondestructive Evaluation of Deteriorated Prestressing Strand", Spring 2010. Awarded outstanding M.S. thesis in the Department of Civil Engineering.

Bertrand Fernandes, M.S. Thesis, "Nondestructive Evaluation of Deteriorated Prestressing Strands Using Magnetic Field Induction", Spring 2010. Awarded outstanding M.S. thesis in the Department of Electrical Engineering and computer Science.

Amin Mohaghegh Motlagh, M.S. Candidate, "Modeling of a Bent-Axis Pump/Motor in Hydraulic Hybrid Vehicles to determine Reaction Force Components Leading to Vibration," July 2008; currently Ph.D. student Mechanical Engineering, University of Pittsburg.

Walter Anderson, M.S. Candidate, "Parametric Investigation Toward Achieving an Optimal Magnetorheological Mount," April 2010; University of Toledo UTC Student of the Year for 2009. Currently a Ph.D. student in the MIME Department University of Toledo.

The Nguyen, Ph.D. Student, "A novel semi-active magnetorheological mount for vibration isolation," July 2009. Currently a Visiting Assistant Professor at The University of Minnesota - Duluth.

2012 Update to Publications, Presentations, Theses, Dissertations

"Building Network Capabilities in Turbulent Competitive Environments: Practices of Global Firms from Korea and Japan" by Youngwon Park and **Paul Hong**. CRC Press (Taylor & Francis Company), 2011. ISBN: 978-1-4398-5068-8.

Fernandes, B., Titus, M., **Nims, D., Devabhaktuni, V.**, "A Field Test of Magnetic Methods for Corrosion Detection in Prestressing Strands in Adjacent Box Beam Bridges." *Journal of Bridge Engineering*, 31 January 2012.

J. Kumpf, A Hellmicki, **D. K. Nims**, V. Hunt, and S. Agrawal. "Automated Ice Interference and Monitoring on the Veterans' Glass City Skyway Bridge," *Journal of Bridge Engineering*, 5 January 2012.

Farshid Azadian, **Alper E. Murat**, and Ratna Babu Chinnam. "Dynamic routing of time Sensitive Air Cargo using Real-Time Information," Transportation Research part E (TRE), *Logistics and Transportation Review*, Vol. 48, Issue 1, 2012, pp 355-372. **Note: Farshid Azadian**, a doctoral student at Wayne State University supported by UTC grants for work in ITS, was offered in spring 2012 a tenure track assistant professor position at the School of Business at Embry-Riddle Aeronautical University (ERAU). ERAU is a private university specializing in aviation and aerospace engineering and was considered "The Harvard of the Sky" by Time Magazine.

Parvin, A., and Granata, P., "Numerical Study of Structural Joints Reinforced with Composite Fabrics", the Sixth International Conference of Computer Methods in Composite Materials, under review.

Park, Youngwon, **Hong, Paul**, and Roh, James. "Supply chain lessons from the 2011 natural disasters in Japan," *Business Horizons*, January 3, 2012

Youn, Sunhee, Yang, Mark, and **Hong, Paul.**, "Integrative leadership for Effective Supply Chain Implementation: An Empirical Study." *International Journal of Production Economics*, April 27, 2012.

Hong, Paul, and Hwang, Woosang. "Operational capabilities and performance toward global supply chain: an overview of Korean manufacturing and service firms." *International Journal of Logistics Systems and Management*, Vol. 8, No. 2, 2011, pp. 183-197.

Roh, James, **Min, Hockey**, and **Hong, Paul** (2011) "A Coordination Theory Approach to Restructuring the Global Supply Chain." *International Journal of Production Research*. Vol. 49, No. 15, 1 August 2011, 4517-4541.

Dobrzykowski, D., Tran, Oahn, and **Hong, Paul** (2011) "Insights into integration approaches in service and product-focused firms for supply chain redesign." *International Journal of Services Operations Management*. Vol. 8. No. 3. Pp. 390-403.

Park, Youngwon, **Hong, Paul**, and Hwang, Woosang (2011). "Building supply chain capabilities: a case study of Korean Hyundai-Kia Motor Company." *International Journal of Logistics and Systems Management*. Vol. 9, No. 2, pp. 238-250.

Bertrand Fernandes, Ph.D. defense, July 31, 2012: "Development of a Magnetic Field Sensor System for Nondestructive Evaluation of Reinforcing Steel in Prestressed Concrete Bridge Members."

On-Going Projects

Veteran's Glass City Skyway Solar Array Field Demonstration

Source Organization: Ohio Department of Transportation

Principal Investigators:

Project Management Coordinator

Richard S. Martinko, P.E.

Director, Intermodal Transportation Institute & University Transportation Center
The University of Toledo

PI Research

Thomas Stuart, Ph.D., P.E.

Professor, Department of Electrical Engineering
The University of Toledo

PI Construction

John Witte, BSME

Partner and President, Operations and Construction Manager
Advanced Distributed Generation, LLC, Toledo, Ohio

Project Dates: Start Date – March 7, 2010; End Date – March 7, 2012

Abstract:

http://www.utoledo.edu/research/ututc/researchprojects/ODOT_VGCS_Solar_Project.html

Ice Prevention or Removal on the Veteran's Glass City Skyway Cables

Source Organization: Ohio Department of Transportation

Principal Investigator:

Douglas K. Nims, Ph.D., P.E.

Associate Professor, Civil Engineering
The University of Toledo

Project Dates: Start Date – 2010/3/7; End Date – 2011/1/7

Request for modification for additional phase received from ODOT on June 30, 2011 following submission and acceptance of final report.

Abstract: http://www.utoledo.edu/research/ututc/researchprojects/ODOT_Icing_Project.html

ECONOMIC DEVELOPMENT PROJECT LIST

Completed Projects

Commodity Flow for the Toledo Region

Note: This project was funded with nonfederal matching funds. As stated in the abstract, the project is a direct extension of UT-UTC funded projects.

Principal Investigator:

Dr. Peter Lindquist
Associate Professor and Chair
Department of Geography and Planning
The University of Toledo
Toledo, OH 43606

Project Dates: 08/01/2008 – 06/30/2009; extended to 9/30/2009

Project Awarded: FY 2009

Final Report:

The results of this project were incorporated in the Norfolk Southern Airline Yard Intermodal Project final report *Airline Junction - Evaluating the Economic Impacts of Expanded Truck-Rail Intermodal Capacity in Northwest Ohio:*

<http://www.utoledo.edu/research/ututc/researchprojects/UTUTC-IU-11.html>

Norfolk Southern Airline Yard Intermodal Project

The project is a joint effort of The University of Toledo UTC and the City of Toledo.

Principal Investigator:

Richard S. Martinko, P.E.
Director, Intermodal Transportation Institute & University Transportation Center
The University of Toledo
Toledo, OH 43606

Project Dates: 01/01/2009 – 06/30/2009; extended to 12/31/2009

Project Awarded: FY 2009

Final Report: <http://www.utoledo.edu/research/ututc/researchprojects/UTUTC-IU-13.html>

UNIVERSITY EDUCATION PROJECT LIST

Completed Projects

Incorporating Intermodal Transportation into the Spatially Integrated Social Sciences

Principal Investigator:

Peter S. Lindquist, Ph.D.
Associate Professor and Chair Department of Geography and Planning
The University of Toledo

Co-Principal Investigators:

Hiroyuki Iseki
Assistant Professor, Department of Geography and Planning
The University of Toledo

Project Dates: 05/03/2007 – 06/30/2009; extended to 08/31/2009

Project Awarded: FY 2007

Final Report: http://www.utoledo.edu/research/ututc/docs/UTUTC_SISS_FinalReport.pdf

Development of a Secondary Level Education Program in Transportation, Logistics, and Supply Chain Management

Principal Investigator:

Doug Greiner
Department of Applied Organizational Technology
College of Business Administration, The University of Toledo

Project Dates: 05/05/2008 – 04/30/2009

Project Awarded: FY 2008

Final report: Pending

Web site: http://www.utoledo.edu/research/ututc/docs/UTUTC-SC-6_Final_Report.pdf

Develop a Plan for Cooperative Education in Supply Chain Management at the Undergraduate Level

Principal Investigator:

Mark Vonderembse, Ph.D.
Professor, Information Operations and Technology Management Department
College of Business Administration, The University of Toledo

Project Dates: 09/01/2007 – 08/31/2008

Project Awarded: FY 2007

Final Report: <http://www.utoledo.edu/research/ututc/docs/Coop-Final-Report.pdf>

Discontinued Projects

Developing a Certificate Program in Transportation, Logistics, and Supply Chain Management

Principal Investigator:

Mark A. Vonderembse
Professor, Department of Information Operations and Technology Management
College of Business Administration
The University of Toledo

Project Dates: 05/05/2008 – 12/31/2008; extended to 12/31/2009

Project Awarded: FY 2008

Global Supply Chain Management/Transportation Efficiency Systems Graduate Degree Program

Principal Investigator:

Subba Rao, Ph.D.
Professor, Information Operations Technology Management Department
College of Business Administration, The University of Toledo

Project Dates: 05/08/2007 – 12/31/2007

Project Awarded: FY 2007

EDUCATION: K-12 & STUDENT ORGANIZATION SUPPORT

On-Going Projects:

[UT Solar Car Team](#) Student Organization

Finished K-12 Projects:

[Transportation Funding for the Maritime Academy of Toledo Field Trips](#)

[Toledo Technology Academy - Fuel Cell Go Kart](#)

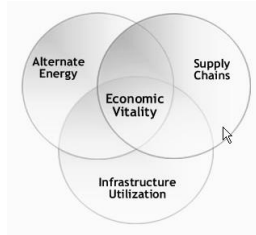
[Toledo Technology Academy - Auto Electrolyzer](#)

[Toledo Technology Academy - Tribrid Vehicle Project](#)

[Toledo Technology Academy - Biodiesel Project](#)

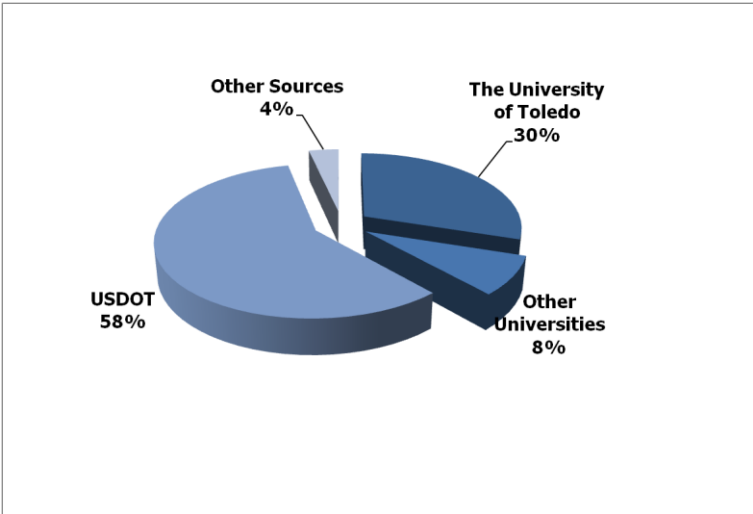
SUPPORTING U.S. DOT PRIORITIES

Meeting US Department of Transportation Priorities					
	Safety	Livable Communities	State of Good Repair	Economic Competitiveness	Environmental Sustainability
UT-UTC Projects and Activities:					
A Data Library Management System for Midwest FreightView and its Data Repository				✓	
Strengthening of Bridge Columns Subjected to an Impact Lateral Load Caused by Vehicle Collision	✓		✓		
Combined Truck Routing and Driver Scheduling Problems Under Hours-of-Service Regulations - Phase I & II	✓				
Regional Freight Information Resources for Market Opportunities in the Great Lakes Maritime Transportation System - Phase I & II				✓	
Global Supply Chain Management/Transportation Building a Global Network of Scholars and Educators - Phase I, II, III				✓	
Reducing Noise and Vibration of Hydraulic Hybrid and Plug-In Hybrid Electric Vehicles - Phase I, II, III & IV	✓	✓			✓
Developing and Testing a Framework for Alternative Ownership, Tenure and Governance Strategies for the Proposed Detroit-Windsor River Crossing - Phase I & II	✓			✓	
Value of ITS Information for Congestion Avoidance in Inter-Modal Transportation Systems - Phase I & II & III	✓	✓			
A Novel Image Database Analysis System for Maintenance of Transportation Facility - Phases I & II	✓	✓	✓		
Magnetic Sensor for Nondestructive Evaluation of Deteriorated Prestressing Strand - Phases I & II	✓	✓	✓		
Travel Behavior of U.S. Domestic Airline Passengers and its Impacts on Infrastructure Utilization		✓			
High Speed Transportation Corridor: A Conceptual Framework	✓	✓		✓	✓
A GIS Connection Between Brownfield Sites, Transportation and Economic Development				✓	
Developing Competitive Supplier Diversity Strategies for Utilizing Minority Owned Trucking Firms in Northwest Ohio Under Affirmative Actions				✓	
Evaluation of Ohio-Michigan Regional Airports for Air Cargo Transportation: Freight Forwarders Perspective				✓	
The Use of Sustainable Materials for Quick Repair of Aging Bridges			✓		
Studies directly related to transportation economic development projects and activities					
Commodity Flow for the Toledo Region				✓	
Norfolk Southern Airline Yard Intermodal Project/Airline Junction Economic Impact Study				✓	
Ohio Department of Transportation SPR Projects with the UT-UTC:					
Veteran's Glass City Skyway Solar Array Field Demonstration	✓	✓		✓	✓
Ice Prevention or Removal on the Veteran's Glass City Skyway Cables	✓	✓	✓		
Intermodal Transportation Institute Research:					
Biodiesel Fuel Study		✓			✓

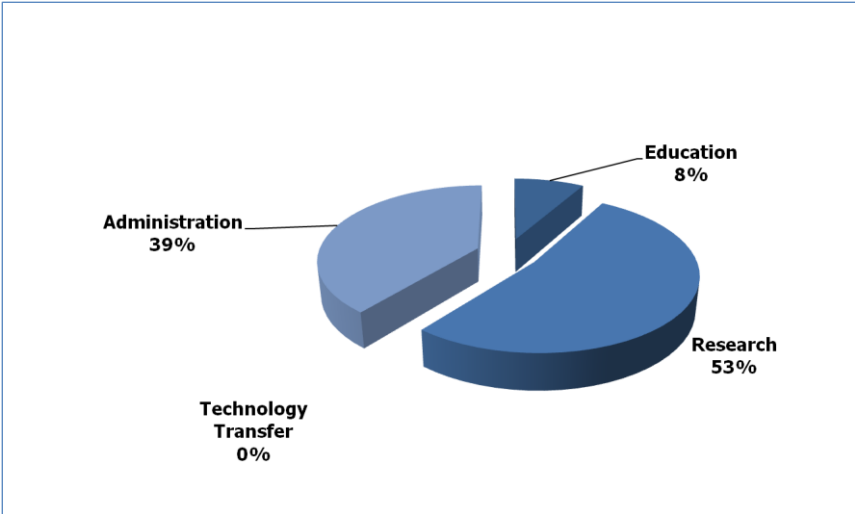


FUNDING SOURCES AND EXPENDITURES

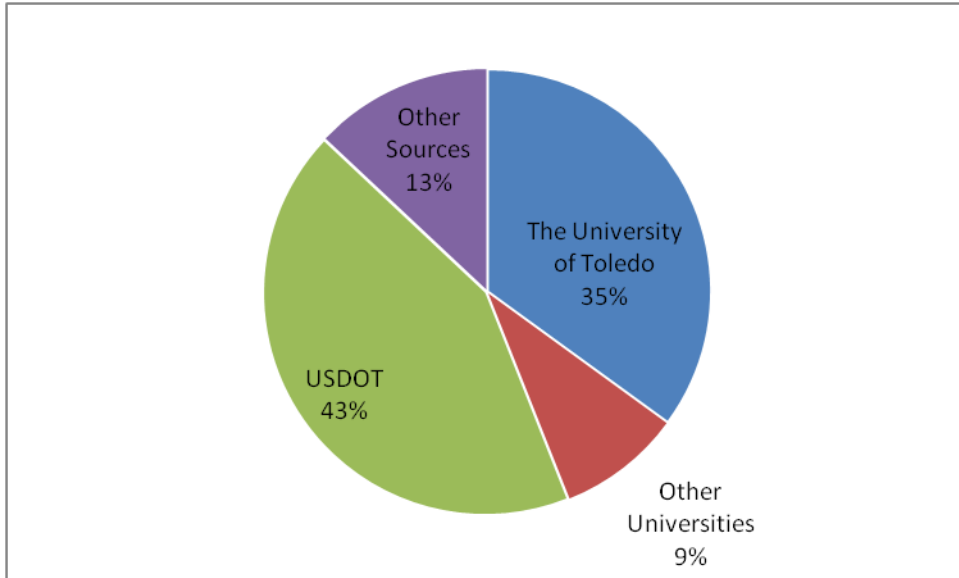
FY 2010-2011 Funding Sources



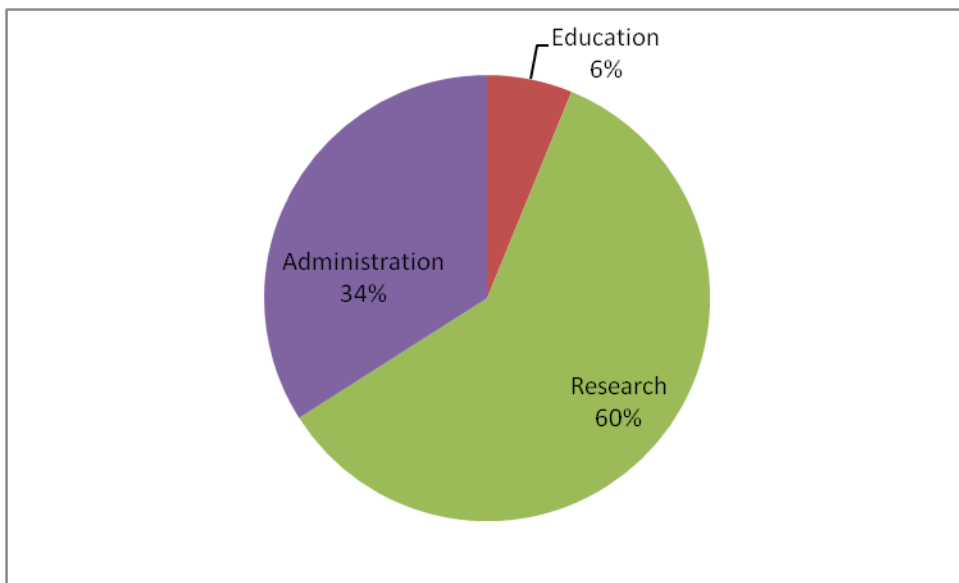
FY 2010-2011 Expenditures



Five Year Funding Sources



Five Year Expenditures



The University of Toledo University Transportation Center
The University of Toledo
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Toledo, OH 43606-3390
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