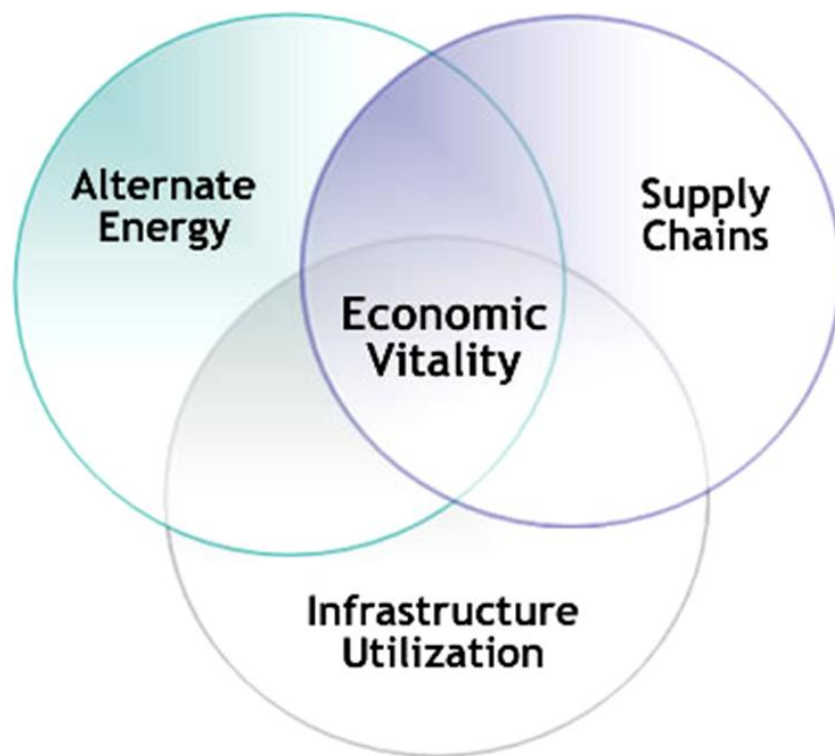




The University of Toledo

University Transportation Center

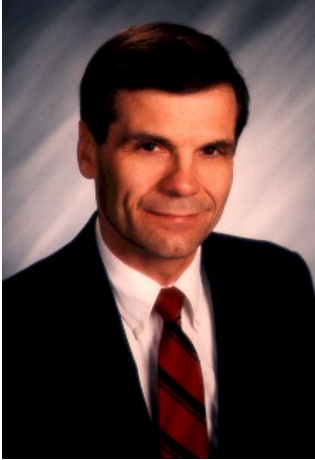


Annual Report 2006-2007

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Director's Message



In January 2002 I began a professional journey which finishes with this first year of activities of The University of Toledo University Transportation Center. In August of 2007, I will step down as director of the UT-UTC to return to research, teaching, and other developing projects with significant promise.

In preparing for turning over the directorship of the UT-UTC to the capable hands of Rich Martinko, allow me to thank my wife for her continuing support and for many late nights, early mornings, and weekends spent working. Dean Tom Gutteridge's support was essential to the development of the UT-UTC. Dr. Frank Calzonetti, UT's Vice President for Research Development, Jim Hartung, Tony Reams, Tom Kovacic, and Ed Nagle have been strong community supporters since the beginning. Christine Lonsway, Assistant Director

of the UT-UTC and Gloria Cook, our secretary, have made substantial contributions to our success.

Before the UTC came the establishment of the Intermodal Transportation Institute (ITI), the home of the UT-UTC. UT's Intermodal Transportation Institute, which began in January of 2000, is an interdisciplinary research and education center that focuses on developing technology enabled intermodal transportation systems and supply chains that promote economic development and quality of life.

The ITI and the UT-UTC are closely linked to the community through outreach and partnership, and they support the local, regional, national, and international communities through research, education, and economic development. The ITI and UTC report directly to the Office of Research, and are supported by the Colleges of Arts and Sciences, Business Administration, Engineering, and Law. This structure facilitates interdisciplinary programs and projects. The ITI with its close ties to key public and private sector leaders, provides the UTC with access to important partners that supply relevant ideas, advice on project creation and evaluation, and cost share.

The approval of the strategic plan for the operation of the UT-UTC in November 2006 was the culmination of many years of work. In the first year we funded eight projects that define the Center's commitment to economic development and the education of the next generation of transportation professionals. We held a workshop on the development of market opportunities on the Great Lakes which included new perspectives in short sea shipping. I personally lead the organization of a global Research and Education Panel as part of the International Cargo Handling Coordination Association (ICHCA). In June, I made a presentation in Casablanca, Morocco as part of the efforts to recruit new members to the Panel; the previous December one of our faculty members gathered participants in Korea and Japan. We now have universities from more than 20 countries who have committed to participate in a collaborative network that will focus on supply chain management and transportation efficiency. In November, we hosted the ICHCA board members, distinguished transportation professionals from Europe, the Canary Islands and Australia, here in Toledo. After their meeting, they participated in our Great Lakes workshop.

I have enjoyed building the Intermodal Transportation Institute and the University Transportation Center at The University of Toledo and working with the many people who have made these successes possible. Through my tenure as ITI director, I have been involved in the Upper Midwest Freight Corridor Study – Phase II, a project of the Mid-West UTC at the University of Wisconsin-Madison. I am also part of the Regional Freight Information Resources projects at the Great Lakes Maritime Research Institute. I will continue as the PI for a \$1.48 million Biodiesel Fuel Study funded by the US DOT involving the City of Toledo and the Toledo Area Regional Transit Authority. And, in the fall I will be working on a UT-UTC project to develop a co-operative education program for College of Business students in Supply Chain Management.

To all of you I have met and with whom I have worked, it has been both professionally and personally rewarding. Perhaps our paths will cross again as we continue our efforts to improve the vitally important transportation systems which are so critical to all of our lives.



Mark A. Vonderembse, Ph.D.
Director
University Transportation Center &
Intermodal Transportation Institute
Professor, College of Business Administration

Ohio Department of Transportation Administrator Selected to Head the University Transportation Center

Richard S. Martinko, former assistant director of highway management of the Ohio Department of Transportation, will take over in August as the director of the UT University Transportation Center.

A 1974 UT graduate in civil engineering who was named UT's Outstanding Civil Engineering Alumnus in 2002, Rich is a native of Campbell, Ohio, near Youngstown. He was selected following a nationwide search that included ads placed in academic, business, trade and major newspapers, including The Wall Street Journal, The Blade and Chicago Tribune, according to Dr. Frank Calzonetti, vice president for research development.



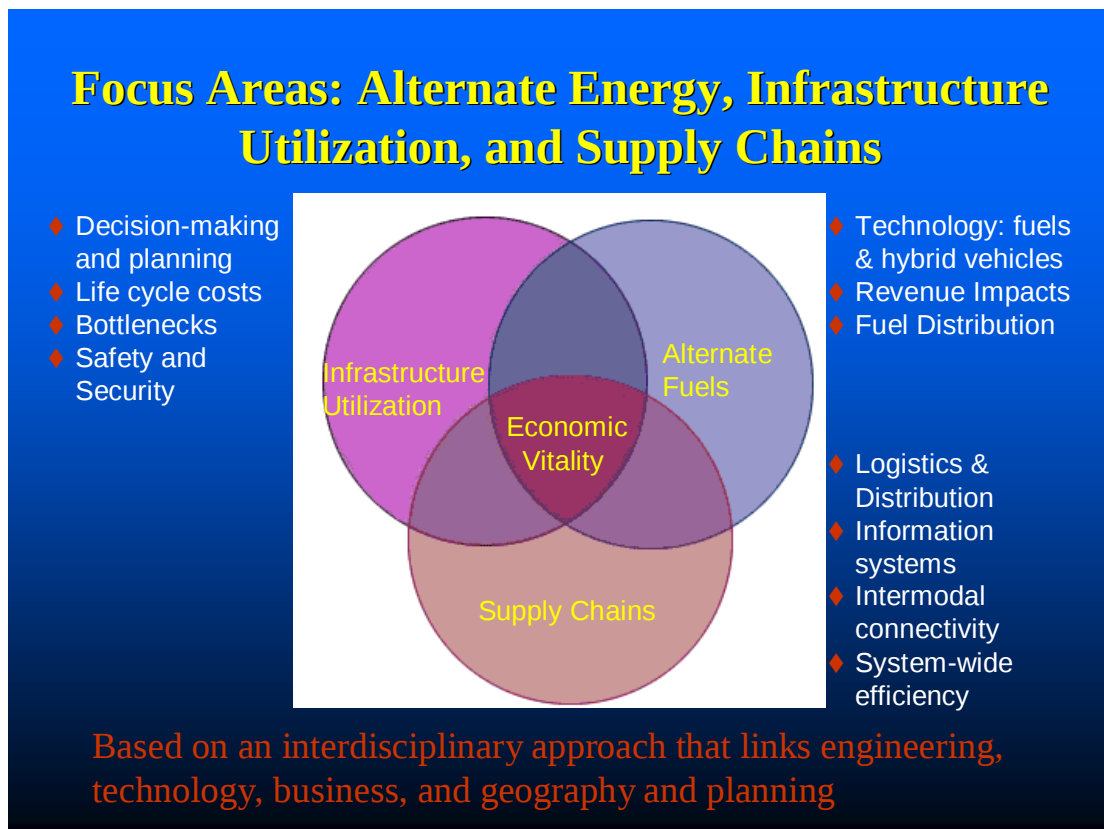
"Martinko's extensive experience in leadership positions at the Ohio Department of Transportation, his business connections and his direct supervision of major transportation projects, including leading ODOT's largest public works project, the Maumee River Crossing, excited the search committee members and the leadership of the Intermodal Transportation Institute and UT-UTC," Calzonetti said.

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. See Figure 1.

There is synergy between infrastructure utilization and supply chain management. One of the major problems in getting supply chains to work well is to streamline the flow of goods from suppliers to manufacturers and from manufacturers to wholesalers and retailers, and one of the largest obstacles in doing this is bottlenecks. So the application of information systems and transportation technology, as well as the development of intermodal solutions, are ways to improve infrastructure utilization and increase supply chain efficiency. The area of alternate energy is critical to transportation, and the University of Toledo is committed to alternate energy. In addition to our efforts as part of the UTC, there are significant efforts currently underway in the Department of Physics and the College of Engineering. UT currently has substantial support for alternate energy from the State of Ohio.

Figure 1: Overview of University of Toledo UT-UTC

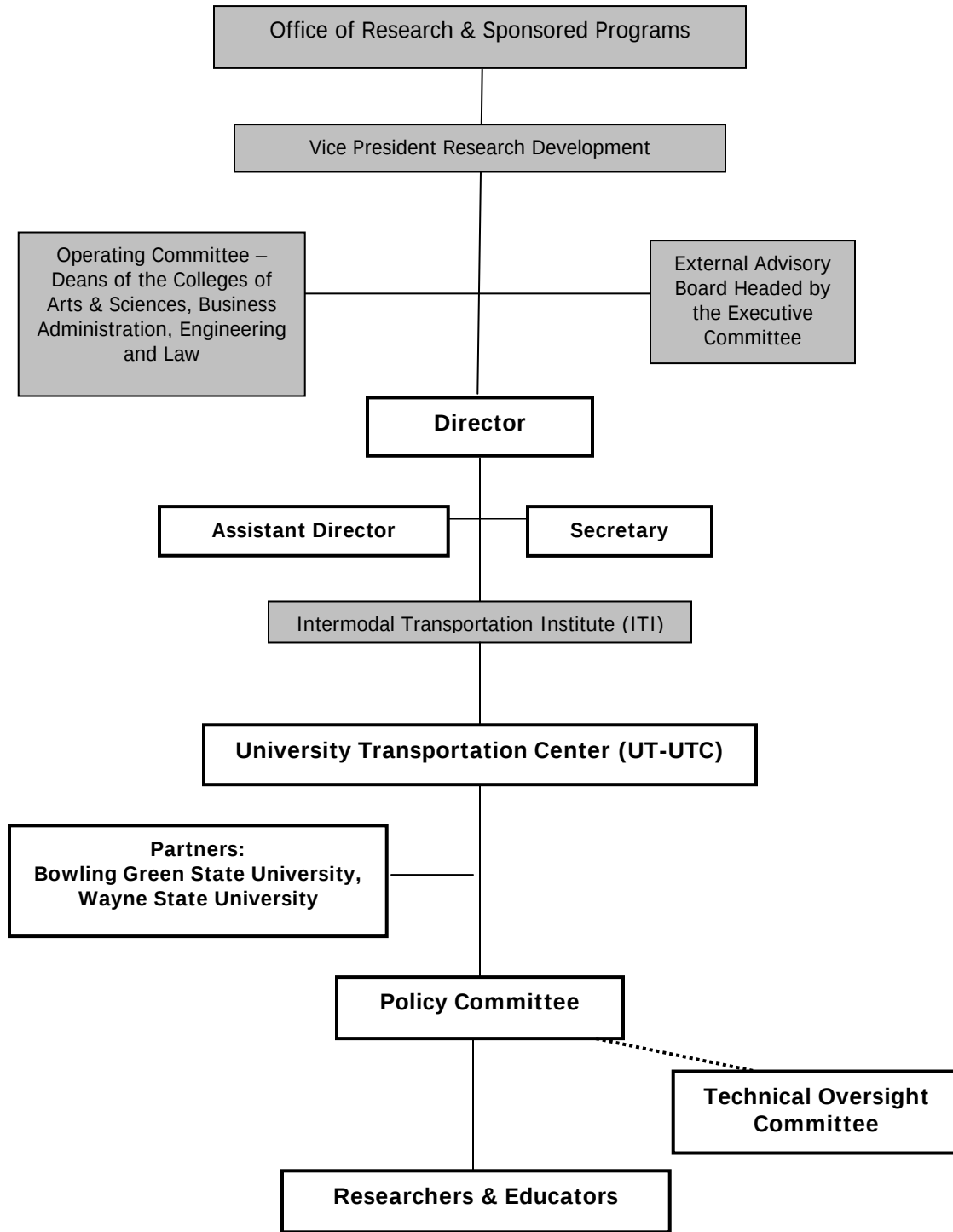


By 2020, the amount of freight moving across the various modes of transportation is expected to increase by 80 percent. A comparable increase in transportation infrastructure is not a viable option because it is capital-intensive and requires the commitment of valuable land that could be used for agriculture, recreation, and economic development. To respond effectively, ideas and methods are needed that (1) increase the utilization of existing assets through the application of information technology and innovative management practices and (2) identify innovative solutions to bottlenecks in the transportation system. Through information gathering, data mining, analysis, and assessment, it is possible to improve the management and planning that lead to increased infrastructure utilization and availability.

The efforts of the UTC focus on the transportation, logistics, and distribution aspects of the supply chain as well as intermodal connectivity and system-wide efficiency. This multidisciplinary approach, integrating information technology and management practice with transportation, will provide new opportunities for educational programs in transportation and supply chain management.

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.

Center Director

The Director of the Center is responsible for administering the Center's programs, coordinating activities among the consortium of universities, managing and controlling the Center's budget, and ensuring the effective use of Center resources. The Center Director is responsible for implementing the Center's strategic plan and ensuring compliance with all other UTC program requirements. The Director is ultimately responsible for assuring that:

- Research, education, and technology transfer activities at the Center are being performed well.
- Activities are completed on time.
- Deliverables and reporting requirements are completed to a high standard.
- Problems and conflict are resolved.
- Planning for Center growth is conducted.

The Director works with other centers and national transportation institutes and organizations as well as with public and private agencies to develop activities that increase student and faculty diversity. Finally, the Director actively pursues new opportunities to expand the education, research and technology transfer initiatives. The Director works closely with the Policy Committee and the Technical Oversight Committee to ensure that the views of stakeholders are well represented.

The Assistant Director helps the Director administer the Center in fulfilling reporting requirements, developing communications via web links and newsletters, playing a major role in economic development, assisting with relationships with the regional MPOs and with the state DOTs, and other duties as identified by the Director. The secretary provides support for the Director and Assistant Director as needed.

Multiparty Arrangements

UT has established a consortium or partnership arrangement with BGSU and WSU as well as public and private sector organizations and government agencies. With the combined expertise, the consortium allows the Center to address a variety of projects that are beneficial to many stakeholders. By organizing this consortium, significant collaborative efforts can be undertaken which will enhance the research, education, and technology transfer activities across all of the universities.

The consortium acts as an integrated whole. The Policy Committee defines the scope of the projects so they satisfy the goals of the Center and are within its theme. Once these project areas are defined, the Policy Committee works with the Center Director and staff as well as the Technical Committee to recruit faculty from the affiliated universities who will develop detailed proposals including the budget request. The Technical Oversight Committee, which has representatives from all three universities, evaluates the proposals and makes recommendations to the Policy Committee regarding feasibility, technical rigor, and budget adequacy. The Technical Oversight Committee may engage outside reviewers to evaluate proposals when the proposals are outside of the expertise of the members. The Policy Committee selects the projects to be completed and allocates funds to those projects.

Policy Committee

Chairman – **Jim Hartung**

Representing UTC staff and faculty from partner universities

Mark Vonderembse - Director, Intermodal Transportation Institute and University Transportation Center, The University of Toledo

Christine Lonsway – Assistant Director, Intermodal Transportation Institute and University Transportation Center, The University of Toledo

Heinz Bulmahn – Vice Provost for Research, Dean of the Graduate College, Bowling Green State University

Snehamay Khasnabis – Associate Dean of Research and Professor of Civil Engineering, Wayne State University

Representing Carriers and Shippers

Christopher Kaiser – Truckload Operations, Thyssen Krupp/TKX Logistics

Tom Kovacic – Executive Director, Transportation Advocacy Group of Northwest Ohio

Edwin Nagle – President/CEO, Nagle Companies, Inc.

Representing public agencies that engage in transportation-related activities

Jim Hartung – President/CEO, Toledo-Lucas County Port Authority; Chairman, Intermodal Transportation Institute Executive Committee

Anthony Reams – President, Toledo Metropolitan Area Council of Governments

Lee Springer – Director, International Business Development, Regional Growth Partnership

Representing academic research officers

Frank Calzonetti – Vice President Research Development and Professor of Geography, The University of Toledo

Representing a state agency

Dave Dysard – District Deputy Director, Ohio Department of Transportation, District 2

Representing the US Department of Transportation

Vacant

Representing the Michigan-Ohio UTC

Leo Hanifin – Director, Michigan-Ohio University Transportation Center and Dean College of Engineering and Science, University of Detroit - Mercy

Technical Oversight Committee

Alternate Energy:

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

Simon Ng, Ph.D. – Professor, Chemical Engineering,
College of Engineering, Wayne State University

Infrastructure Utilization:

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

Mumtaz Usmen, Ph.D. – Chair, Civil and Environmental Engineering,
College of Engineering, Wayne State University

Supply Chains:

Paul Hong, Ph.D. – Associate Professor, Information Operations Technology Management,
College of Business Administration, The University of Toledo

Hokey Min, Ph.D. – James R. Good Chair in Global Supply Chain Strategy, Department of
Management, College of Business Administration, Bowling Green State University

Ken Chelst, Ph.D. – Chair, Industrial and Manufacturing Engineering,
College of Engineering, Wayne State University

Center Staff

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Assistant Director – Christine Lonsway

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Secretary – Gloria Cook

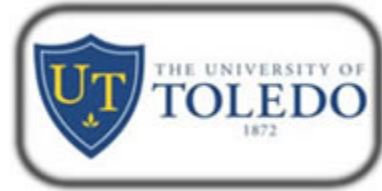
Gloria.Cook@utoledo.edu

419.530.5221 Fax 419.530.7246

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 19,200 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 250 programs of study in eight colleges: Arts & Sciences, Business Administration, Education, Engineering, Health and Human Services, Law, Pharmacy, and University College. July 1, 2006, UT merged with the Medical University of Ohio, which has approximately 2,000 students enrolled in the School of Medicine, and programs in nursing, allied health, and basic science. The combined institutions have more than \$60 million in research funding.

In January 2002, UT started the Intermodal Transportation Institute (ITI). The ITI is an interdisciplinary research, education, and outreach center. The vision for the ITI is to develop technology-enabled intermodal transportation systems and supply chains that promote economic development and quality of life. Its purpose is to work cooperatively with public and private sector partners in the fields of transportation, logistics, and supply chains to develop and implement ideas that increase safety, mobility, and access. The ITI actively seeks ways to work with its partners by providing research capabilities, educational programs, and planning and technical assistance. The ITI fosters collaborative efforts among faculty, staff, and students that contribute to learning and success, and it provides a convenient way for those outside UT to access University resources. The link between the University and the external community is an integral part of the ITI as demonstrated by the Advisory Board, which contains more than 40 representatives from outside UT.

The ITI's purpose is strongly linked to the mission, goals, and objectives of UT, which embrace learning, discovery, and engagement and which focus heavily on building relationships with external constituents. The ITI engages the community through outreach and partnership, and it supports the local, regional, national, and international communities through research, education, and economic development. The ITI is currently working with organizations to investigate new transportation-related concepts and technologies and to assess current infrastructure capacity across the Midwest. It offers the potential for sustained external funding, and it provides a vehicle to use resources from across the university in collaboration with government and private sector partners.

The ITI reports directly to the Office of Research and is supported by the Colleges of Arts and Sciences, Business Administration, Engineering, and Law. This structure facilitates interdisciplinary programs and projects and simplifies outreach and engagement with the

community. The University of Toledo has undergraduate programs in Transportation Planning in Civil Engineering, in GIS and Transportation in Geography and Planning, and in Supply Chain Management in the College of Business Administration. The Civil Engineering Department has Masters and Ph.D. degrees in Transportation Planning. The Geography and Planning Department offers a Masters degree in GIS and Transportation. The College of Business currently has a Masters degree and a Doctoral degree in Manufacturing Management that are being revised to include offerings in Supply Chain Management. There is active and on-going research in transportation planning and infrastructure utilization, supply chain management, and alternate energy; there are related programs in fuel cell design and development as well as hydrogen generation.

Bowling Green State University - Partner

Bowling Green State University (BGSU) has a total enrollment of 20,300 students which includes 17,300 undergraduates. In 2005, BGSU achieved record overall enrollment as well as a record number of students with ACT scores of at least 30. With more than 200 undergraduate majors and programs, BGSU has been recognized by *U.S. News & World Report* for its first year programs and residential living/learning communities. Integral to campus life are the core values: respect, cooperation, intellectual and spiritual growth, creative imaginings, and pride in a job well done.



BGSU offers an outstanding educational experience. At BGSU, academic learning is paired with a campus wide commitment to values exploration which prepares graduates to be critical thinkers, skilled communicators, and ethical leaders in all areas of study. This vision uniquely distinguishes BGSU as a public university with a unified purpose.

The Supply Chain Management specialization, in the AACSB accredited College of Business Administration, is currently ranked 16th among U.S. schools according to the *U.S. News and World Report (2008)*. Seven full-time faculty members teach and do research in supply chain management. Beginning in Fall 2006, Dr. Hokey Min joined the faculty as the James R. Good Chair in Global Supply Chain Strategy. Dr. Min has developed an international reputation for his research in transportation and logistics.

In 2000, the College of Business Administration established the Supply Chain Management Institute (SCMI); Dr. Amelia Carr is the Director. The mission of the SCMI is to support excellence in supply chain education and practice by forging collaborative partnerships with supply chain professionals. Currently there are 15 member companies in the SCMI: BP, Bechtel Power Corporation, Bendix, Deere & Company, Eli Lilly, Emerson Climate Control, HP, GlaxoSmithKline, Honda of America Manufacturing, Lowes, Marathon, Nordson Corporation, Owens Corning, Parker Hannifin, and SAIC.

In 1993, the College of Technology established the Electric Vehicle Institute with the mission to develop and promote advanced electric propulsion technology and transfer the technologies to appropriate corporations and public agencies for production and implementation.

Wayne State University - Partner

Wayne State University (WSU) is an urban university located in the heart of the City of Detroit, Michigan. The mission of the University, supported by the taxpayers of Michigan, is to “discover, examine, transmit and apply knowledge that contributes to the positive development and well-being of individuals, organizations and society.” Through its research, teaching, and services, it endeavors to engage in a wide range of activities with the local communities. WSU's current enrollment of approximately 30,000 students includes more than 12,000 graduate students.



The College of Engineering offers programs leading to the Bachelor's, Master's, and Doctoral degrees in various branches of engineering. The College has been offering graduate programs (both at the Master's and Ph.D. level) in Transportation, housed in the department of Civil Engineering, for more than 30 years. A full breadth of transportation courses including traffic operation, highway safety, highway design, highway bridges, pavements, planning, and economics is offered through the Department. Students have the option of taking courses in their minor cognate from various other departments including Urban Planning, Business, Industrial Engineering, Mathematics and Education. Graduates of WSU are employed in the transportation sector in various parts of the country including universities, state DOT's, USDOT, TRB, local and county governments and private corporations.

Transportation research in the Department of Civil Engineering has been supported by various agencies including the USDOT, MDOT, National Research Council, Michigan Office of Highway Safety Planning and others. The amount of research funding in transportation during the last five years exceeds \$4 million. Faculty members regularly publish their work along with their graduate students in refereed journals including those of the American Society of Civil Engineering, Transportation Research Board and the Institute of Transportation Engineers. They also actively participate in professional societies/committee activities, and present their research findings at national and international conferences. Research projects conducted under the transportation program encompass such diverse areas as traffic engineering and control, transit asset management, highway safety, transit planning and operations, transportation economics, transit privatization, use of advanced technology (ITS) and social/economical and environmental impact of transit. The Department currently (Fall 2007) has five full-time faculty members in Transportation.

There are two other programs in the College of Engineering that are involved in Transportation. These are Bio-Engineering focusing on automotive safety and the Center for Automotive Research (CAR) focusing on automotive engines and alternative fuels. The College also has a new graduate (Masters' and Certificate) program in the area of Alternative Energy Technology (AET). The program is not housed in any particular department, rather it is offered under the larger umbrella of the College and faculty members from all departments participate in various aspects of the program that include among other things: curriculum development, course offerings, student mentoring, etc.

The College of Engineering at Wayne State University has been a participant of the UTC program in the past. It was a part of the consortium of The Great Lakes Center for Truck and Transit Research (GLCTTR) at the University of Michigan – Ann Arbor, the UTC in Region V during 1988-1999. As part of this program, WSU conducted research on the structural and safety

implications of seat belts in transit vehicles, ways to improve the operation of wheelchair lifts on transit buses, procedures to assess benefits and disbenefits of traffic signal preemption, performance assessment of transit agencies, and incorporation of IVHS (later named ITS) in transit research. Many of these research projects were jointly supported by the Michigan Department of Transportation. A total of four faculty members and a number of graduate students participated in the research program. The above program resulted in a total of 15 journal publications (Transportation Research Record, American Society of Civil Engineers Transportation Engineering Journal). Additionally, a large number of papers were presented in national and international conferences with papers published in conference proceedings.

Wayne State University also received funds from the Midwest Regional University Transportation Center (MRUTC), University of Wisconsin – Madison, established under the UTC program in Region V during 1999-2005. Research conducted under this program has resulted in two journal papers, two in Conference Proceedings, and four national presentations.

Partnership in the Michigan-Ohio UTC at the University of Detroit – Mercy

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) the UT participates in projects which share the same basic theme as the UT-UTC. Several joint projects are already underway. The Director and the Vice President, Research Development both sit on the policy committee of the MI-OH UTC.



OVERVIEW OF EDUCATION, RESEARCH, AND TECHNOLOGY TRANSFER PROGRAMS

Education

As more complex transportation problems loom in the 21st Century, the education of sophisticated transportation professionals is demanded. This first year, the UTC at The University of Toledo has focused on building programs within the university setting. A project was funded to develop an International Collaborative Masters Program in Global Supply Chain Management. Another Masters degree project to develop an MS in supply chain management/transportation is being done in collaboration with the Michigan-Ohio UTC at the University of Detroit – Mercy. At the baccalaureate level, another funded project will support the development of a cooperative program in supply chain management and, it is hoped, serve as a template for similar programs elsewhere.

A project was also funded that will expand the role of intermodal transportation in a newly proposed spatially integrated social science Ph.D. program to be administered jointly among the Departments of Geography and Planning, Economics, Political Science and Public Administration, and Sociology and Anthropology at The University of Toledo. The program will also develop seminars in transportation and urban form. Specific areas of transportation research and teaching will include: 1) Transportation and urban form; 2) Transportation, Public Administration and Policy; 3) Transportation Analysis and Quantitative Methods; 4) Intermodal Transportation—Passenger and Freight; 5) Infrastructure Utilization and Planning; and 6) Transportation and the Environment.

An education project in alternate energy was funded by the Michigan-Ohio UTC at the University of Detroit-Mercy in which The University of Toledo is a partner. The grant will fund the building of a hydraulic test stand which will be used to evaluate the components of hydraulic hybrid vehicles. This experimental setup will enable faculty at The University of Toledo and the University of Detroit - Mercy to teach concepts related to hybrid vehicles in a hands-on environment.

Research

The Center theme of economic development through research in transportation is especially valid considering the location of Toledo, Ohio: I-75 and I-80/90 intersect offering unique opportunities in distribution and logistics; 100 local freight carriers have long made Northwest Ohio a major center for the trucking industry; the Toledo Express Airport ranks among the busiest air-cargo hubs in the country; four major freight railroads move through the region making Toledo one of the top ten rail hubs in the U.S.; the Port of Toledo is one of the most diverse and productive ports on the Great Lakes/St. Lawrence Seaway system. Promoting the conviction that better understanding through transportation research will foster economic development in the region, the UTC funded projects this first year that will do the following:

- Build a data base of freight information resources for the identification of market opportunities for a Great Lakes maritime transportation system.
- Develop a framework for revealing the implications of alternative types of ownership and governance of a new Detroit-Windsor river crossing.

- Develop an intelligent support system in creating optimal truck routes and schedules under the hours-of service rules in the trucking industry.
- Build a global network of transportation scholars that will provide benefits from the synergies of their interaction.

In alternate energy research projects, the UT-UTC funded one project, a project was funded through the Michigan-Ohio UTC and the ITI continued work on a major study funded by the U.S. Department of Transportation. A grant was awarded for work that will result in the improvement of the noise and vibration characteristics of hybrid vehicles with alternative propulsion systems. An additional alternate energy project was funded by the Michigan-Ohio UTC at the University of Detroit-Mercy in which The University of Toledo is a partner. The research will investigate the factors associated with biodiesel oxidative stability, including natural and synthetic antioxidants, storage and processing conditions.

The Intermodal Transportation Institute, which houses the UT-UTC, is the lead on a \$1.48 million U.S. Department of Transportation (Transit Authority) "Biodiesel Fuel Study" which focuses on the impact of using a mixture of renewable biofuel and diesel fuel on operating costs as well as engine emissions, performance, and expected life. On-road testing is being done with City of Toledo and Toledo Area Regional Transit Authority vehicles. The study will also examine the economic and financial impacts of these alternatives on operations.

The ITI continues work on the Mississippi Valley AASHTO Freight Coalition, which is now being lead by the National Center for Freight and Infrastructure Research and Education (C-FIRE) at the University of Wisconsin-Madison. This is an extension of the Midwest Regional Freight Corridor Study in which The University of Toledo Geographic Information Science and Applied Geography Research Center (GISAG) and the ITI participated.

Technology Transfer

Technology transfer is at the heart of developing a more effective transportation system on the Great Lakes. The conference "Great Lakes: From Data to Markets to Shipping Opportunities" held by the UTC in the fall of 2006 was attended by maritime and other transportation professionals from around the country. This was the second in a series begun with the Great Lakes Maritime Data Workshop held in Detroit June 2006 as part of the development of the Great Lakes Maritime Research Institute (GLMRI) project "Expanding Regional Freight Information Resources of the Upper Midwest: The Great Lakes Maritime Information Delivery System." The third in this series, continuing the focus on developing shipping opportunities, will be held in Toledo, October 2007.

Also in the fall of 2006, the ITI hosted a dialogue lead by Ernie Wittwer, project leader for the Upper Midwest Freight Corridor Study Phase II, as part of an expansion of the project to the next phase. In conjunction with the Mississippi Valley region of the American Association of State Highway and Transportation Officials (AASHTO), Ernie was asked by the state DOTs to meet with shippers and carriers in the ten states of an expanded study to discuss the transportation needs of Ohio and the nation. This meeting attended by public and private sector transportation practitioners emphasized a global vision to solving existing and impending problems.

The director of the UT-UTC, Mark Vonderembse, has spearheaded the organization of the International Cargo Handling Coordination Association (ICHCA) Research and Education Panel. Expressions of interest, cooperative arrangements and letters of commitment have been

received from a dozen universities in Australia, Singapore, India, Japan, Korea, Hong Kong, Spain and Canada; discussions are being held with several others. In October 2007, as part of the development of this panel, the "International Symposium and Workshop on Global Supply Chain, Intermodal Transportation and Logistics" will be held in Toledo. Dr. Vonderembse made a presentation at the ICHCA Canarias/Africa Regional Chapter meeting in Casablanca, Morocco in June 2007 as part of the recruiting effort. In December 2006, Dr. Paul Hong, a faculty member of the Information Operations Transportation Management Department of the College of Business Administration, traveled to Korea and Japan to gather participants for the panel during the Asia Academy of Management meeting in Tokyo.

The UT-UTC took a leadership role in the coordination and organization of a Brazil/USA webinar on renewable fuels. Initiated by FHWA and RITA within the US Department of Transportation, seven universities participated in Team USA. On June 18, 2007 the webinar "Renewable/Alternative Fuels in the Transportation Sector" was held with seven presenters from the U.S. along with the University of Sao Paulo and the Brazilian Ministry of Mines and Energy. The goal of the webinar was to build cooperation in the future and identify collaborative efforts among the participants. The presentation from the universities in the U.S. can be viewed at http://research.utoledo.edu/brazil_webinar.html.

EDUCATION

Student-of-the-Year Guy Schafer



Guy Schafer being congratulated for being named the Student-of-the-Year for the UT-UTC at the CUTC award banquet in Washington, DC

Guy Schafer, a graduate student in the department of Geography and Planning was named the Student-of-the-Year by the newly formed University of Toledo University Transportation Center and was recognized at the annual awards dinner of the Council of University Transportation Centers in Washington, DC on January 20th. The award is given to a student who has demonstrated technical merit and accomplishments in research, superior academic performance and displayed professionalism and leadership in transportation related work.

In addition to a \$1000 cash award, Guy received funding for his expenses and registration to attend the annual Transportation Research Board conference in Washington which began the day after the awards dinner. Support for his wife to join him at the dinner was also included.

Guy Schaefer was born in Toledo, Ohio and remained in the area graduating from a suburban high school. He received a BA in Visual Communications from the University of Toledo in 1999. From 1998 to 2005 he worked in the transportation and logistics industry including employment at National Logistics Management where his duties included coordinating shipments and routing for Ford, General Motors and Daimler-Chrysler. In 2005, he returned to the University as a graduate assistant working toward a Masters in Transportation Planning/GIS in the Department of Geography and Planning. His research has included work on the Upper Midwest Freight Corridor Study, work with the Great Lakes Maritime Research Institute and a study commissioned by a local port authority of air freight in the mid-west including imports and exports from Europe, Asia and South America. Guy was selected as Student of the Year for the University of Toledo UTC because of the integral role he played in the successful completion of the Corridor Study and the combination of industry perspective and academic rigor he brings to his research.

In May, immediately after the end of the spring semester, Guy started his new job at Ohio Module Manufacturing Co. LLC (OMMC), a division of Hyundai Mobis, in the materials department. Within a few months he was already involved in transportation changes that saved the company significant transportation costs. OMMC is part of an innovative co-located manufacturing project with the Chrysler Group in the City of Toledo. The suppliers – Hyundai Mobis, the Kuka Group and Durr Industries – are partners in the development, construction and daily operations at the Toledo manufacturing complex. OMMC will house a rolling chassis module which will include power train and drive train components, as well as wheels and tires for Jeep Wranglers.

Those of us at the UT-UTC are pleased that this outstanding transportation professional has remained in our region and is contributing to an exciting new automotive related endeavor.

Research

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

The UT-UTC has established a strong relationship with the International Cargo Handling Coordination Association International (ICHCA) through its willingness to head the formation of an International Research and Education Panel. Director Mark Vonderembse is the chairman of this Panel. The UT-UTC, along with its industry advisory board, has identified global supply chain and transportation as critical to the long-term competitiveness of the US. To address this, the UT-UTC is attempting to build educational and research relationships with high-quality universities around the world which will form the panel within ICHCA.

In June, Dr. Vonderembse gave a presentation at the ICHCA Canarias/Africa Regional Chapter meeting in Casablanca, Morocco in which he explained the concept of the Global Network of Scholars in an effort to recruit members.



Asia Academy of Management Meeting at Waseda University, Tokyo (Dec 21, 2006). From left to right (clockwise): Prof. Chung-Ming Lau (President of the Asia Academy of Management, Chinese University of Hong Kong), Prof. Paul Hong (University of Toledo), Takashi Hikino (Kyoto University, Japan) Prof. Shige Makino (Chinese University of Hong Kong)

In December 2006, Dr. Paul Hong, Associate Professor of Information Operations Technology Management at The University of Toledo, traveled to Kyungpook University in Korea to meet with professors to discuss supply chain management practices and participation in the panel. He also attended the 2006 Asia Academy of Management conference in Tokyo followed by meetings with researchers at Tokyo University. They discussed future engagement with Asian scholars to promote joint research in global supply chain management involving China, Japan and Korea. Several universities have signed letters of commitment as a result of this trip.

The Core Concept

Research on global supply chain management/transportation efficiency systems is critical for promoting economic cooperation and

improving global living standards. Global supply chain management integrates information, material and cash flow processes across all functions including sourcing, operations, return and recycling, and logistics and planning – for all partners. Supply chain system professionals are the agents of change for e-business, manufacturing, high-tech, service and consulting companies. This is the core philosophy for building an international network of scholars.

The International Research and Education Panel is affiliated with the International Cargo Handling Coordination Association (ICHCA) International Limited and the International Manufacturing Strategic Survey (IMSS). This group acts as a collaborative network of universities that focus on supply chain management and transportation efficiency and will address all aspects of supply chain management from transportation, to cargo handling, to shipping, etc. The International Panel will engage in research collaborations to understand and resolve issues that are critical to businesses and would develop education and training programs for

professionals in these fields. This program is international in scope and interdisciplinary in approach because it brings together the many disciplines (engineering, technology, business, economics, and trade and commerce) that support the movement of goods around the globe.

Project Objectives

The objectives are (1) to engage in an international network of research collaboration to identify, analyze, and solve complex transportation and supply chain problems, and communicate those solutions toward their successful implementation, and (2) to develop education and training programs that meet the needs of transportation, logistics, and supply chain professionals around the world. The research and educational programs will be guided by the close association with ICHCA and its members who will act as an advisory board for this network of universities.

These efforts will create an international organization that is capable of defining and completing research and publications that are relevant to global supply chain managers. They will also be able to develop educational programs at the associate, undergraduate, masters, and Ph.D. levels to prepare a new workforce for an environment of expanding global trade, and training and updating the skills of workers and managers already working in their fields.

It is critical to fully develop membership in the Research and Educational Panel of ICHCA. Vision, mission, and objectives must be agreed on; a charter for the organization written; and some initial projects designed that will allow it to be successful. It is also essential to identify existing organizations to partner with and to develop a plan to support the vision described earlier.

Participating Universities

In addition to the universities listed below, conversations are taking place with several others. The following universities have expressed interest in the International Research and Education Panel:

- Australian Maritime College
- Queensland University of Technology
- PSG Institute of Management (India)
- Singapore Polytechnic
- University of Technology, Sydney

The following universities have signed a letter of commitment to participate in the panel:

Politecnico di Milano - Gianluca Spina: Professor in the Department of Management, Economics, and Industrial Engineering at Politecnico di Milano, Italy. He is also the Business School Director and International Manufacturing Strategy Survey (IMSS) Coordinator

McMaster University, Canada - Paul K. Bates: Dean of the College of Business Administration, McMaster University, Canada

Tokyo University, Japan - Note: On December 22, 2006, Paul Hong (The University of Toledo) met all three scholars below and they affirmed their desire to engage in continuous collaborative research with The University of Toledo.

Youngwon Park: Researcher at the Manufacturing Management Research Center at the University of Tokyo, Japan.

Takeshi Hiromatsu: Professor at the University of Tokyo and Director of Advanced Social and International Studies.

Takahiro Fujimoto: Professor in the Department of Economics at Tokyo University and Executive Director of the Manufacturing Management Research Center at the University of Tokyo, Japan.

Sookmyung Women's University, Korea - Byung-Kyu Sohn: Professor and Global SCM Coordinator at Sookmyung University, Korea.

Kyungpook University, Korea - Gyewan Moon: Associate Professor and Director of the Innovation Center at Kyungpook University

City University of Hong Kong - Hongyi Sun: Associate Professor of Mechanical Engineering and Engineering Management at the City University of Hong Kong.



From Left to right: (December 22, 2006) Prof. Takahiro Fujimoto, Prof. Paul Hong and Dr. Ezra Park at the Manufacturing Research Center, University of Tokyo, Japan

Technology Transfer

International Symposium and Workshop on Global Supply Chain, Intermodal Transportation and Logistics



The UT-UTC funded a project in global supply chain management/transportation to build a global network of scholars and educators. As part of this project, the UTC and the Intermodal Transportation Institute (ITI) at the University of Toledo in collaboration with the International Cargo Handling Association (ICHCA) are holding the International Symposium and Workshop on Global Supply Chain, Intermodal Transportation, and Logistics Management on October 25th and 26th 2007 at the University.

Information about the symposium and workshop can be found at www.business.utoledo.edu/scm.

ICHCA, headquartered in London, has more than 1,000 members in 80 countries. It is dedicated to the promotion of safety and efficiency in handling and moving goods by all modes of transport across both national and international supply chains.

The objectives of the gathering include:

- To involve world-class researchers and practitioners to share best practices; explore, identify, analyze, and solve complex transportation, cargo handling and supply chain problems; and to communicate these solutions toward their successful implementation.
- To establish a global network of universities and centers of learning that work cooperatively with ICHCA International Limited to address critical worldwide needs in transportation, logistics, and supply chain management.
- To work toward creation of an International Research Center in Global Supply Chains, Transportation and Logistics

Call for Papers — Prospective authors and presenters, both academicians and practitioners, have been invited to contribute to this international symposium and workshop. Potential areas of focus include but are not limited to:

Global Supply Chains:	Transportation:	Logistics & Cargo Handling:
• Bilateral and Multilateral Country Issues • Global Supply Chain Security • Designing and Managing the Global Supply Chain • Information Technologies and Electronic Commerce • Dispersed design capabilities of products for global demands • Global trends in product disposal, remanufacturing and recycling.	• Transportation Systems Planning • Transportation & Transshipment Modeling and Optimization • Simulation Modeling • International Finance • Managerial Accounting • Trading Blocs and United Nations Organizations. • Economics and Public Policy	• Safety and security issues in international transportation and handling of cargo • Emerging Technologies of Cargo Handling and Transportation • Short Sea Shipping • Planning for small and medium sized enterprises in Logistics, Cargo handling and supply chain management

The intended outcomes from the symposium and workshop include:

- Publication of proceedings, working papers, and journal articles.
- Research publications on emerging trends in Intermodal Transportation, Logistics and Supply Chain Management and use benchmarking to leverage their businesses.
- Planning annual conferences starting in 2008 on research, education, and outreach of the Center on Global Supply Chains, Intermodal Transportation and Logistics.
- Creation of a core group to plan, coordinate and implement activities for the Research Center for the 2008 and beyond.
- Development of education and training programs for transportation, logistics, and supply chain professionals around the world.
- Showcasing best practices in Intermodal Transportation, Logistics and Supply Chain Management.

The steering committee is composed of:

- Subba Rao (University of Toledo, USA)
- Mark Vonderembse (University of Toledo, USA)
- Paul Hong (University of Toledo, USA)
- Taj Shahram (University of Detroit-Mercy, USA),
- Hockey Min (Bowling Green State University, USA),
- Nanda Gopal (PSG Institute of Management, India)
- Tobias Schoenherr (Eastern Michigan University, USA)
- Gyewan Moon (Kyunpook University, Korea)
- Ezra Youngwon Park (University of Tokyo, Japan)

Sponsors of the event include the College of Business Administration, the University Transportation Center, the International Business Institute and the Intermodal Transportation Institute at The University of Toledo, the Toledo-Lucas County Port Authority, the Great Lakes Maritime Research Institute and the University of Detroit-Mercy.



University Transportation Center
Intermodal Transportation Institute
International Business Institute
College of Business Administration



Transportation on the Great Lakes

Ship and Port Design for Short Sea Shipping on the Great Lakes

Short Sea Shipping is the ability to move freight by water as an alternative to overland hauling via rail or truck. Shipping routes on the Great Lakes and along the coast of the U.S. are substantially underutilized. This is an opportunity to move freight off congested highways and rail corridors onto water.

To help relieve growing congestion on the highways and rail lines around the Great Lakes, the ITI is working with public and private sector organizations as well as unions to identify and develop new technologies in ship and port design that could expand shipping on the Lakes. Efforts are currently underway involving the International Cargo Handling Coordination Association (ICHCA) to address this need.

Great Lakes: from Data to Markets to Shipping Opportunities

An all day workshop entitled “Great Lakes: from Data to Markets to Shipping Opportunities” was held at the University of Toledo, Toledo Ohio on November 7, 2006. This event was sponsored by the University's Intermodal Transportation Institute and University Transportation Center (ITI/UT-UTC); the Geographic Information Science and Applied Geography Research Center (GISAG) of the Geography and Planning Department; The Great Lakes Maritime Research Institute (GLMRI), a consortium of the University of Wisconsin-Superior Transportation & Logistics Research Center and the University of Minnesota Duluth College of Science & Engineering and Labovitz School of Business and Economics; The Toledo-Lucas County Port Authority, and the International Cargo Handling and Coordination Association International.

The purpose of the workshop was to examine ways to use the Great Lakes as an important transportation link. The states and Canadian provinces surrounding the Great Lakes face a growing demand for transportation. Many vital highway and rail corridors are congested and are projected to get much worse; demand for freight movement will expand substantially by 2020 (50% or more); and there is a lack of funds and support to increase highway capacity. The Great Lakes offers a low cost, low congestion, low emission alternative to truck and rail movements.

The proposed project focuses on economic development of the Great Lake's marine transportation system. It examines technology alternatives for moving container and trailer freight on the Great Lakes in ways that are coordinated and compatible with other modes of transportation. Understanding the shipping technology that is currently available globally is an important initial step in selecting vessels to provide shipping services that meet customers' needs (technical requirements and economic feasibility). If existing vessels are not appropriate, then their designs can be modified or new vessels can be created. This project is complementary with current efforts to understand the movement of freight in the Great Lakes region across all modes of transportation. Identifying market opportunities for shifting freight movements onto the waterways and developing vessels that are well suited to the task should increase regional transportation efficiency.

The workshop attempted to evaluate the market opportunities for short sea shipping by commodity type. What commodities are currently moving by highway and rail that could move via ship at lower costs? What new opportunities are possible? How can we more fully participate in international trade? The workshop identified the need to develop a plan and methodology for analyzing the origin to destination of freight flows in the Great Lakes region for the purposes of establishing scheduled shipping in order to compete for time sensitive cargo. This would apply to bulk cargo, containers, and trailers on ships. The effort must evaluate the economic viability of establishing transshipment facilities for expanding international trade including the possibilities of containers, and it must review and summarize the new technologies for vessel design and propulsion systems that could improve the operating cost and delivery time for cargo on the Great Lakes. Finally, this effort must work with existing agencies to bring the Great Lakes ports together to develop a shared plan for expanding commerce on the Great Lakes.

Those attending the workshop included representatives from the American Great Lakes Ports Association; the Army Corps of Engineers - Waterborne Commerce Statistics Center; the Detroit/Wayne County Port Authority; the Great Lakes Commission; ICHCA Board Members; the International Joint Commission, Council of the Great Lakes; the Lake Carriers' Association; the Toledo-Lucas County Port Authority; the US Maritime Administration; Nagle Companies (trucking and logistics); the Toledo Metropolitan Area Council of Governments; the Toledo Trucking Association; the US Corps of Engineers, Navigation Planning Center; the US Saint Lawrence Seaway Development Corporation; the National Oceanic & Atmospheric Administration, Office of Coast Survey - Navigation Service Division; and others.

The program included a progress report on the Great Lakes Database by Dr. Peter Lindquist, Chair of UT's Department of Geography and Planning; a presentation titled "Developing a Marketing Plan" by Dr. Mark Vonderembse, Director of UT's ITI and UTC; and an overview of shipping technology by David Bendall, Deputy Chairman of ICHCA International and founder of



MariTrade, a company specializing in services to the shipping industry. He presented pictures of large catamaran vessels used in Australian passenger and freight movement which are fast in transit, fast turnaround in port, offer flexibility and versatility in deck layout, shallow draft, minimal crew numbers and are reliable and economical to operate. After the presentations, the group separated into two sections for further discussions on the data and on market development. The presentations can be viewed at <http://research.utoledo.edu/ITI/ITI.htm>.

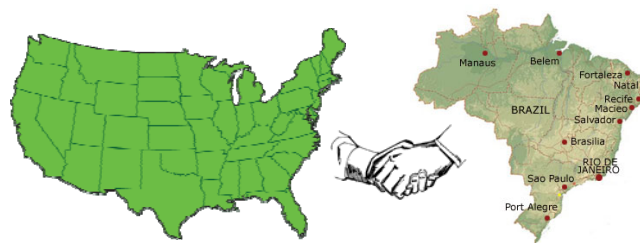
This was the second in a series following the Great Lakes Data Workshop which was held in Detroit, Michigan June 2006. A third workshop is being planned for the fall of 2007, again in Toledo. For additional information or to be notified of the next workshop, email ITI@utoledo.edu.

USA/Brazil Webinar: "Renewable/Alternative Fuels in the Transportation Sector"

The UT-UTC took a leadership role in the coordination and organization of a Brazil/USA webinar on renewable fuels. Initiated by the US Department of Transportation, universities across the nation participated in Team USA. On June 18, 2007 the webinar "Renewable/Alternative Fuels in the Transportation Sector" was held with seven presenters from the U.S. along with the University of Sao Paulo and the Brazilian Ministry of Mines and Energy. The goal of the webinar was to build cooperation in the future and identify collaborative efforts among the participants. The presentation from the universities in the U.S. can be viewed at http://research.utoledo.edu/brazil_webinar.html.

Webinar Participants

- Michael Avery, Federal Highway Administration
- William Chernicoff, U.S. DOT RITA (moderator)
- John Sheffield – University Transportation Center, University of Missouri-Rolla
- Monica Mazurek – Center for Advanced Infrastructure & Transportation (CAIT), Rutgers University
- David Shonnard – Materials in Sustainable Transportation Infrastructure, Michigan Technology University
- Mark Vonderembse – Intermodal Transportation Institute, The University of Toledo
- Aaron Singer-Englar – Sustainable Transportation Energy Pathways (STEPS) Program, University of California-Davis
- Alan Dybing – Upper Great Plains Transportation Institute, North Dakota State University
- Bill Chernicoff - Research & Innovative Technology Administration, U.S. Department of Transportation
- Marlon Arraes Leal, Federal Ministry of Mines and Energy
- José Eduardo Holler Branco, Researcher-Leader of the Federal University of Sao Paulo



Team USA Participants*

University/Organization	Name	Title
University of Arkansas	R.E. "Buddy" Babcock	Department of Chemical Engineering
University of Delaware	Sue McNeil	Director, Delaware Center for Transportation
University of Delaware	Ajay Prasad	Professor, Department of Mechanical Engineering
Georgia Institute of Technology	Elena Harari	PhD Student/Research Assistant, Technology Policy and Assessment Center (TPAC), School of Public Policy
Georgia Institute of Technology	Michael Meyer	Director
Georgia Institute of Technology	Valerie Thomas	Associate Professor, School of Industrial and Systems Engineering
Michigan Local Technical Assistance Program	Fernando de Melo e Silva	Civil Engineer
Michigan Tech University	Elizabeth A. (Beth) Hoy	Coordinator, MiSTI (Materials in Sustainable Transportation Infrastructure) University Transportation Center
Michigan Tech University	David Shonnard, Ph.D.	Department of Chemical Engineering
Michigan Tech University	Jane (Qiong) Zhang, Ph.D.	Senior Research Engineer, Sustainable Futures Institute
University of Missouri-Rolla	John W. Sheffield, Ph.D.	Professor of Mechanical and Aerospace Engineering and Interim Associate Director, University Transportation Center Subject Editor, International Journal of Hydrogen Energy
North Dakota State University	Mark Berwick	Associate Research Fellow, Upper Great Plains Transportation Institute
North Dakota State University	Alan Dybing	Associate Research Fellow, Upper Great Plains Transportation Institute
North Dakota State University	Mark Lofgren	Associate Research Fellow, Upper Great Plains Transportation Institute
University of Rhode Island	Deborah Rosen	Executive Director, University of Rhode Island Transportation Center
Rutgers University	Ali Maher	Director, Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey	Monica Mazurek, Ph.D.	Assistant Professor, Department of Civil and Environmental Engineering and Center for Advanced Infrastructure & Transportation (CAIT) School of Engineering
South Carolina State University	Reinhardt Brown	Interim Executive Director, James. E. Clyburn University Transportation Center
The Texas A&M University System	Melissa Tooley	University Transportation Center for Mobility - Gilchrist, Texas Transportation Institute
The University of Toledo	Christine Lonsway	Assistant Director, University Transportation Center
The University of Toledo	Mark Vonderembse	Director, Intermodal Transportation Institute & University Transportation Center
University of California-Davis	Yueyue Fan	Assistant Professor in Civil and Environmental Engineering, Institute of Transportation Studies
University of California-Davis	Joan Ogden	Associate Professor ESP, Co-Director Hydrogen Pathways Program, Institute of Transportation Studies
University of California-Davis	Aaron Singer-Englar	Assistant Program Manager, Sustainable Transportation Energy Pathways (STEPS) Program, Institute of Transportation Studies
University of California-Davis	Daniel Sperling	Director, Institute of Transportation Studies, Professor of Transportation Engineering and Environmental Policy
University of California-Davis	Anthony Eggert	Energy Policy Adviser, Institute of Transportation Studies
U.S. Department of Transportation	Mike Avery	Western Hemisphere Team Leader, Office of International Programs Federal Highway Administration
U.S. Department of Transportation	Kyle Gracey	Office of the Secretary of Transportation (OST)
U.S. Department of Transportation	Daphne Speaks	Transportation Specialist, USDOT/FHWA/Office of Policy Office of International Programs, Western Hemisphere Program
U.S. Department of Transportation	Bill Chericoff	Hydrogen Engineer, Research & Innovative Technology Administration
U.S. Department of Transportation Research & Innovative Technology Administration	Robin Kline	University Programs Specialist

Team Brazil Participants*

Name	JobTitle	Affiliation
Professor Amaral		
Jose´ Vicente Caixeta-Filho		Departamento de Economia, Administração e Sociologia - ESALQ/USP
Helaine Carrer	Depto Ciências Biológicas, ESALQ-USP	University of São Paulo, Brazil
Marcio de Castro Silva Filho	Depto Genética, ESALQ-USP	University of São Paulo, Brazil
Ricardo Gomide		Ministry of Mines and Energy Brasília
José Eduardo Holler Branco	Líder de Projetos do Grupo ESALQ-LOG	ESALQ-LOG
Suzana Kahn Ribeiro		Federal University of Rio de Janeiro
Marlon Leal		Ministry of Mines and Energy Brasília
Raul Machado-Neto	Center for Agricultural and Environmental Biotech, School of Environmental and Biological Sciences	Rutgers University
Amir Mattar Valente	Supervisor/Professor	LABTRANS
Sylvia Muylaert		Federal University of Rio de Janeiro
GlauCIA Souza	Instituto de Química - Departamento de Bioquímica	University of São Paulo, Brazil
Ismael Ulyssea Neto	Professor, Civil Engineering - UFSC	LABTRANS
Ursula Vieira	Researcher	LABTRANS
Valter Zanela Tani	Researcher	LABTRANS

*Every effort has been made to get names, universities/organizations and titles correct but in the flurry of email communication, errors may have been made. Apologies are extended to anyone who is incorrectly or inadequately represented in the Team USA or Team Brazil lists.

The International Cargo Handling Coordination Association (ICHCA) Participation

International Cargo Organization Board Meets in Toledo & London



Jim Hartung, International Chairman, (behind) at the ICHCA dinner in London with Mike Compton, Chairman International Safety Panel and Richard Marks, Director.

The International Cargo Handling Coordination Association (ICHCA) International Ltd. met in Toledo, Ohio in November for a quarterly meeting of their board of directors. Jim Hartung, International Chairman of ICHCA is also the Chairman of the Executive Committee of the Intermodal Transportation Institute, the umbrella organization of which the UT-UTC is a part. Included at the meeting were officials from London, Australia, the Canary Islands and Japan. After being hosted by University President Lloyd Jacobs at a dinner following their meeting, the group attended the Great Lakes Workshop the next day where David Bendall, Deputy Chairman of ICHCA International and founder of MariTrade, a company specializing in services to the shipping industry, gave an overview of new ideas in short sea shipping technology. UT-UTC Director, Mark Vonderembse, attended the meeting in Toledo and the following quarterly meeting in London.

The International Cargo Handling and Coordination Association (ICHCA) International Ltd. is an international membership organization of more than 1000 transportation professionals from 80 countries who are dedicated to the promotion of new technologies and best practices for the efficient handling and movement of people and goods by coordinating all modes of transportation. Headquartered in London, ICHCA has chapters in Australia, Japan, the Canary Islands/Africa and the USA.

ITI Heads Reorganization of ICHCA North America Chapter

The ITI/UT-UTC has been asked to participate in the development and rebirth of ICHCA USA. As a first step, this new direction will expand ICHCA USA to include all of North America. Given the remarkable growth in trade and the reduction of trade barriers, in particular NAFTA, this is a logical next step. For the Great Lakes region, this expansion is especially important because of the level of commerce with Canada. The reorganization will begin by working initially within the Great Lakes region. As part of the process, a development team has been formed to formalize the new direction and plan programs. A membership drive will seek to renew the involvement of



old members and welcome new participants into the organization. The chapter has been renamed ICHCA North America reflecting the broader vision. The ITI is the secretariat of the chapter.

ITI and the UT-UTC Build the ICHCA Research and Education Panel

ICHCA International Limited (IIL) and the Intermodal Transportation Institute have agreed to work together to develop a global network of universities that focuses on enhancing global supply chain performance. This affiliation of universities will function as a panel of IIL and will cooperate to define focus areas for investigation and education within the broad area of global supply chain management. Director Vonderembse is the chairman of the panel.

In 2006, the first and second meetings of the ICHCA panel were held in Singapore. At the ICHCA Biennial Conference, the second Singapore meeting, seven additional universities were identified and were be asked to participate in the ICHCA Panel. Since that time, 2006 activities have included recruiting trips by faculty to Korea and Japan sponsored by the UT-UTC and the Director's presentation in Casablanca at the Canarias/Africa Regional Chapter meeting. An international symposium and workshop titled "Global Supply Chain Management/Transportation: Building a Global Network of Scholars and Educators" will be held at The University of Toledo in October 2007. This event is part of a UT-UTC funded project. See additional articles on this topic are presented on pages 17 - 21.

UT-UTC ASSOCIATED RESEARCH ACTIVITIES

The Upper Midwest Freight Corridor Study

Phase II of the Upper Midwest Freight Study (Illinois, Indiana, Iowa, Ohio, Michigan, Minnesota, and Wisconsin) was concluded in October 2006. The results were presented to the CEOs for the state DOTs at the Mississippi Valley AASHTO meeting. Based on this work, it was agreed to add three states to the project (Missouri, Kansas, and Kentucky). They also signed a Memorandum of Understanding to work together to identify regional transportation problems and needs and to work together toward resolutions.

The University of Toledo Intermodal Transportation Institute was a participant in both Phase I and Phase II of this study with ITI director Mark Vonderembse serving as a co-project manager of the research team for Phase II. The ITI and the Ohio Department of Transportation were both sponsors of the project. UT currently houses all of the data for the Upper Midwest States and will continue to play an important role.

The future work will be done with the expanded participants as the Mississippi AASTO Valley Freight Coalition. The project is being led by the National Center for Freight and Infrastructure Research and Education (C-FIRE) at the University of Wisconsin – Madison. Both the ITI and ODOT remain as sponsors. This project continues to evolve in response to stakeholder needs.

The final report of the Freight Corridor study can be found at http://www.mississippivalleyfreight.org/Upper_Midwest.htm. Both ITI director Mark Vonderembse and Peter Lindquist of the Department of Geography and Planning were report authors. Volume II of the report includes a paper by Dr. Vonderembse titled “Trade Between China and the Upper Midwest States” and by Dr. Lindquist titled “Information Resources for Supporting the Regional Freight Agenda in the Upper Midwest.”





The Intermodal Transportation Institute worked to develop “Regional Freight Information Resources for the Upper Midwest: The Great Lakes Maritime Information Delivery System.” Phase I established a transportation information system that enables using market analysis to determine opportunities for moving freight on the Great Lakes. The project extended from January 2006 to August 2006. Funding has been received for work in Phase II which focuses on expanding regional freight information resources for the Upper Midwest with the implementation of the Great Lakes Maritime Information Delivery System. The Online Information Clearinghouse can be accessed at www.maritime.utoledo.edu.

To link this study to the “real world,” an advisory board composed of Great Lakes maritime and shipping experts has been established to provide input into the research agenda. Members of the board include the Maritime Administration, the St. Lawrence Seaway Development Corporation, the U.S. Coast Guard, the Lake Carriers Association, the Great Lakes Commission, the American Association of Great Lakes Port Authorities, The Society of Naval Architects and Marine Engineers, and the Army Corps of Engineers.



The goal of the GLMRI is to help, maintain, and promote maritime transportation on the Great Lakes. Initial research focuses on the economics and development of the Great Lakes marine transportation system, the economics of port development in the Great Lakes, security issues, intermodal transportation opportunities, and marine transportation and port environmental issues. GLMRI has established research affiliations with the University of Findlay in Findlay, Ohio; the Great Lakes Maritime Academy in Traverse City, Michigan; the Michigan Technological University in Houghton, Michigan; the University of Michigan in Ann Arbor; Purdue University and Purdue University North Central in Indiana; Rochester Institute of Technology in New York; the University of Wisconsin-Madison's Midwest Regional University Transportation Center and The University of Toledo.

The final report “Expanding Regional Freight Information Resources for the Upper Midwest: The Great Lakes Maritime Information Delivery System” was written by Peter S. Lindquist of the Department of Geography and Planning and Mark A. Vonderembse, the director of the Intermodal Transportation Institute and University Transportation Center at The University of Toledo. The executive summary of that report follows. The complete report can be accessed at <http://www.glmri.org/research.html>

Expanding Regional Freight Information Resources for the Upper Midwest: The Great Lakes Maritime Information Delivery System Executive Summary

This project marked the beginning of a long term endeavor to develop and manage a comprehensive data repository and information clearinghouse for the maritime industry in the Great Lakes. The system is envisioned to facilitate the acquisition, storage, management, analysis and exchange of data between analysts and decisionmakers within the industry. This system will thus serve as a resource for public policy decisions and for drawing the necessary link between maritime freight movements, economic viability, and environmental quality throughout the Great Lakes and St. Lawrence Seaway. As such, the system will serve as a central focus for diverse interests within the industry to support the promotion of sustainable maritime transportation in the region.

This project was originally proposed to focus on expanding an existing detailed GISbased multimodal regional freight data reporting system named **Midwest FreightView** (MWFV). However, this approach was modified significantly over the course of the project based on interactions with representatives of the maritime industry in the Great Lakes Region. Stakeholders in the region attending the June 9 Great Lakes Data Workshop in Detroit rejected MWFV as the only component of the information delivery system in favor of a more diversified approach that incorporated webbased dissemination of prepared information in the form of maps, reports, tables and graphics. While the core of the data repository would still reside in the comprehensive MWFV GIS, the main user interface and information delivery system would be located on a more "user friendly" web page. The project team thus responded by amending the design of the system to meet the needs of our partners in the industry and will be unveiling the new web page for the system in November, 2006.

The main objective originally envisioned for MWFV was to generate and maintain a long term Database and data distribution system that would be available for state transportation agencies, regional planning agencies, port authorities and economic development organizations, as well as other interested decision makers and stakeholders within the region. This objective still remains as an important component of the work completed in the first phase of this project. Much of the data acquired in the first phase of this project came from existing sources—both commercial and government. The data are currently being stored on designated server space in the central repository at the GISAG Center at The University of Toledo and are undergoing incorporation into MWFV. Specific data assembled into this centralized data repository currently include the following:

1. Intrastate Employment patterns for each commodity type by SIC, NAICS, (Demographics Plus, Inc. *Business Counts Database*);
2. Population and Socioeconomic data representing Market Demand within the region
3. Port Locations—U.S. (BTS National Transportation Atlas);
4. Dock Locations (Army Corps of Engineers) and attributes;
5. Waterway Network—Great Lakes and Inland Waterways (Army Corps of Engineers)
6. Port Operations Data such as Tonnages, Commodities transshipped (Lake Carriers Assn.), Vessels Serviced, Equipment, etc.
7. Baseline 2002 commodity flows through the Saint Lawrence Seaway and Great Lakes System obtained from the FHWA Freight Analysis Framework estimated from 2002 Commodity Flow Survey Data. This data set provided the research team with a skeleton framework upon which to add subsequent flow data.

Other data dealing with dock locations and related operational attributes were manually entered into the database. This process was the most labor intensive and time consuming of the data assembly tasks. Most of this information has been compiled for docks on the American side of the Great Lakes. The corresponding information for the Canadian side of the Great Lakes is in its final stages of compilation. Dock identification codes were standardized within the database and documented.

The data listed above will reside in the data reporting system built on a **Citrix Metaframe** installation. Currently a specialized **ArcView GIS** application provides the user interface. Users can access MWFV with a web browser and Internet connection; all operations are carried out on the Toledo Server—the user's computers simply act as a terminal. The site is thus able to accommodate a wide range of users that extends between casual browsers and "basic mappers" to more experience GIS and database users.

The most recent activities undertaken have been to start compiling information on the various types of commodities transported on the Great Lakes, with an emphasis on observing the origins and destinations of these commodities, flow routes, tonnages, etc. In addition, the project team will investigate the acquisition of AIS data to track vessel movements. Implementation of this technology will be actively pursued in the next phase of the project.

In addition to the data assembly operations, the project team set about to design a more generalized information delivery system following our discussions with industry representatives at the June 9 Great Lakes Maritime Data Workshop in Detroit. Workshop participants readily agreed that the data delivery system must serve as an accurate, current, comprehensive and user driven data resource that will be used to inform public policy decision makers as to

the value and utility of the Great Lakes Maritime Transportation System (GL MTS). Of particular importance in reporting to public officials are:

- Jobs
- Economic impact of Great Lakes shipping
- Safety issues associated with diverting freight traffic to GL MTS
- Environmental impacts/benefits compared to other modes
- Shipper savings associated with GL MTS
- Congestion effects of other modes in comparison to GL MTS
- Competition effects of Maritime Transportation and rate increases in other modes
- Shift in intermodal connections and transshipment costs (e.g., "full cost" studies –pavement damage, fuel savings, crashes, etc.,
- The value of shipping to states, cities regions, etc.

Workshop participants discussed additional data needs for regional stakeholders that require data to facilitate projections and forecasts for freight movements under alternative scenarios involving alternative modes or intermodal movements. Regulatory impacts were also emphasized in the discussion along with improved coordination of public investments over the entire system to benefit all stakeholders within the region despite their location or jurisdiction.

Workshop participants also effectively argued that any system that requires a significant amount of training and practice would not be used as heavily as a more "user friendly" system consisting of prepared graphs, maps, bullet points, tables, and other features such as prepackaged reports in basic standard formats such as Annual Reports, Executive Summaries, and reports of studies completed by analysts who used data from the repository. The project team responded to this point by proposing to develop a system that offers a variety of products and functions among varying degrees of expertise required by users. These include:

- A detailed data repository for vessel movements, port functions, commodity flows, economic activities and environmental impacts, etc.
- A GIS data viewer for advanced users to view and analyze a variety of data
- An information delivery site for maps, tables, graphics, text and other features
- A data exchange to support user inquiries and furnish information on demand.
- Assemble data and report information among different Geographic areas of impacts and jurisdictions (e.g., states and provinces, congressional districts, cities, counties, ports, etc.)
- Establish a communication link within the system (e.g., email access) for regional stakeholders to request specific information to be posted on the site. This function was agreed upon as essential if the information delivery was to be successful
- Establish a system for data exchange to analysts in maritime industry agencies and organizations; also develop a site in the system for analysts within the region to publish the results of their analysis—particularly with regard to public policy issues of interest to the Great Lakes Maritime Industry
- Begin to develop a library function in the form of a data clearinghouse that reviews and summarizes data from diverse sources both public and commercial and provide links for users to branch to from the site. The result of which is to provide the Great Lakes Maritime Industry with a comprehensive centralized resource for data and information. An example of such a link would be for taxes, fees, and other costs; however, this component would not represent a core function of the data resource. It was further suggested that the site become a gateway to maritime agencies (e.g., Coast Guard, USACE, etc.)

All of these functions have been adopted into the design of the prototype information delivery site and can be accessed at www.maritime.utoledo.edu.

One of the objectives of this project that was discussed at the June 9 meeting concerns the long term viability of this information delivery resource. Eventually this data repository and delivery system must be able to sustain itself financially as other members of the maritime industry in this region. To this end, the project team has begun to explore the establishment of a **Great Lakes Maritime Exchange** (GLMX) in the form of a nonprofit **501(c)(6)** organization that would be financed through subscription fees by its partners in the industry. This exchange could partner with MISNA (Maritime Information Services of North America), an umbrella organization of maritime exchanges in the United States and British Columbia. The principal investigator on the project team was invited to the MISNA National Meeting in Portland, Oregon in September, 2006 to gather more information on maritime exchange activities in North America. This approach shows significant promise.

The vision for the Great Lakes Maritime Information Delivery System Project evolved over the course of the project to produce a multidimensional system that will support a wider array of functions that include data storage, delivery of prepared documents, GIS functionality, and a clearinghouse for information over the entire industry. The project team will solicit feedback and suggestions for continuous improvement of the information delivery system; communication with the industry will be a major objective as this resource evolves in the coming years.

Biodiesel Fuel Study

The Intermodal Transportation Institute at The University of Toledo is the lead on a U.S. Department of Transportation (Transit Authority) funded “Biodiesel Study” which focuses on the impact of using a mixture of renewable biofuel and diesel fuel on operating costs as well as engine emissions, performance, and expected life in a subset of the local transit authority bus



fleet and City of Toledo vehicles. It will also examine the economic and financial impacts of these alternatives on operations. Unique aspects of the project include 1) its large scale signified by the use of new vehicles to set an effective benchmark, 2) the collection of extensive emission (in-bus, tail pipe) and engine wear data, 3) the examination of the impact of technology and economies of scale on large scale production. The buses began to use biodiesel in the Spring of 2006; preliminary results for pollution levels were achieved by

June 2006. This project is funded at \$1.48 million (UT's share \$575,605). It began in July 2005 and will continue through June 2008.

Progress Report June 30, 2007 Summary

With the vision and leadership of Congresswoman Marcy Kaptur, the Toledo Area Regional Transit Authority (TARTA) and the Intermodal Transportation Institute (ITI) at the University of Toledo developed a long-term, large-scale comprehensive research project to understand and assess the impacts of using a mixture of renewable biodiesel (B-20: 20% biofuel and 80% ultra-low sulfur diesel) compared to ultra-low sulfur diesel. The following make this study unique.

1. The first study that does on-road testing of ultra-low sulfur diesel and first attempt to investigate the impact of using B-20 made with ultra-low sulfur diesel.
2. The testing is exhaustive including nearly 60 vehicles over a three year period and involves more than 5 million miles of operation.
3. With three years of data, it is possible to estimate and compare the life cycle costs of using ultra-low sulfur (ULS) diesel fuel versus B-20 made with ULS diesel.
4. In addition to tail pipe emission testing, this study examines in-bus air quality.
5. The first study that examines the use of hydrogen gas as an additive to B-20.

Use of B-20

1. Switching costs from diesel to B-20 for TARTA and the City of Toledo were minimal.
2. There were no unexpected problems in the continuing use of B-20. Initially, both the City of Toledo and TARTA experienced the need to change fuel filters more frequently as B-20 helped to clean the fuel tank and lines.
3. Drivers at TARTA and the City of Toledo felt that the engines ran smoother and quieter, that there was less exhaust smell, and that there was no loss of power with B-20 compared to ULS diesel. They perceived no down side to the use of B-20.

4. Mechanics at TARTA saw no difference in the performance of B-20 compared to ULS diesel. Mechanics at the City of Toledo felt that the vehicles using B-20 ran smoother and quieter and had less odor than similar vehicles using ULS diesel.

Performance and Costs

1. The City of Toledo experienced an increase in miles per gallon (MPG) when using B-20 compared to ULS diesel, between 5.5% and 11.0%.
2. TARTA experienced mixed results. For the Bluebird buses, MPG was higher for the buses using B-20 compared to buses using ULS. This is true for stop-and-go as well as over the road routes. For the Thomas buses, the opposite is true. This seems to indicate that engine type/manufacture makes a difference in MPG.
3. The City of Toledo experienced no significant difference in engine related maintenance costs while TARTA had mixed results with much lower engine related maintenance costs in the Thomas buses that used B-20. The opposite was true for the Bluebird buses.
4. There was no difference in engine wear between the B-20 and ULS diesel vehicles.

Environmental Impact

1. Overall, there are no significant differences in tailpipe emissions between B-20 and ULS diesel. However, there are significant improvements for both B-20 and ULS diesel compared to low sulfur diesel.
2. There is no difference in indoor air pollution when B-20 is compared to ULS diesel.
3. To reduce emissions, lower idling revolutions/minute and increase engine temperature.

Hydrogen Enhancement

Projecting a ten percent fuel savings to a fleet of 173 buses, and using the 2006 TARTA usage patterns, the annual savings of fuel purchased at \$2.20 per gallon will be \$233,100 and represents an annual reduction of 1.17 thousand tons of carbon dioxide. (The dollars saved are gross estimates and do not include the cost to retrofit the engines.)

Perspectives

1. TARTA and the City of Toledo are encouraged by the potential fuel savings from B-20
2. TARTA is pleased by the positive impact of B-20 use on emissions. (Emission and air quality testing on the City of Toledo vehicles begins in the second year.)
3. TARTA is purchasing 35 new Bluebird buses and is planning to use biodiesel in all.
4. The City of Toledo is expanding the use of biodiesel in its fleet.

New Activities Planned For Year 2

1. Identify the type of bus routes to determine if there is a relationship between the route (stop-and-go or over the road) and fuel economy.
2. Investigate the differences in fuel economy between vehicles with different engines: Thomas buses versus the Bluebird buses, and TARTA buses and City of Toledo vehicles.
3. Conduct detailed analysis of maintenance costs to determine if there is a relationship between the type of fuel used and engine related maintenance.

4. Expand the number of City of Toledo vehicles in the program so side-by-side comparisons can be done.
5. Conduct in-vehicle testing of air quality for the City of Toledo vehicles.
6. Perform tailpipe testing for buses on specific routes.
7. Investigate different levels of biodiesel from B-5 up to B-100.
8. Assess particulates in the exhaust stream.
9. Investigate the possibility of using additives in ULS diesel and in B-20 to determine if there are differences in fuel economy and emissions.
10. For the hydrogen boost project, conduct additional testing on the rolling dynamometer, tail pipe emissions, and fuel economy.

Policy Consideration for Discussion

1. The results from the first year could support a policy to require the use of a small amount of biofuel in all diesel fuel (2 to 5%), depending on availability and achieving consistent high quality fuel. Minnesota has a similar requirement that could be investigated.
2. Widespread use of biodiesel requires standards and testing to achieve a consistent, high quality. If Northwest Ohio is to become a center for this activity, it is essential that research and facilities to support this testing be created in our region.
3. With tight budgets in both public and private sector organizations, it is necessary to find ways to offset the extra cost for biodiesel. Alternatives should be examined.
4. It may be reasonable to argue that these incentives will be more than offset by the economic impact of using and paying for fuel grown by farmers in this country rather than shipping our dollars abroad for imported oil. Economic impacts can be assessed.



INTERMODAL TRANSPORTATION INSTITUTE
THE UNIVERSITY OF TOLEDO



BIODIESEL
PARTNERS *for*
RENEWABLE
ENERGY
Harvesting Energy Independence in Ohio

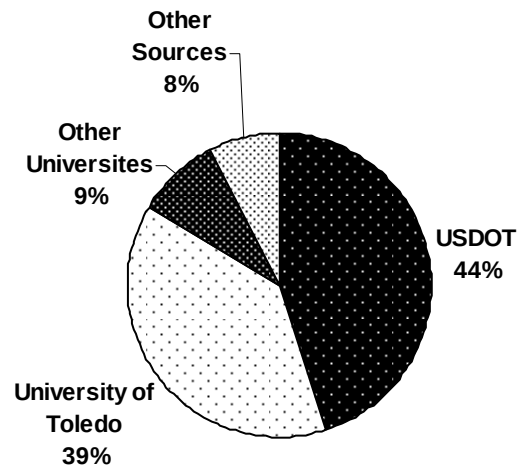


SUPPORTING DOT PRIORITIES

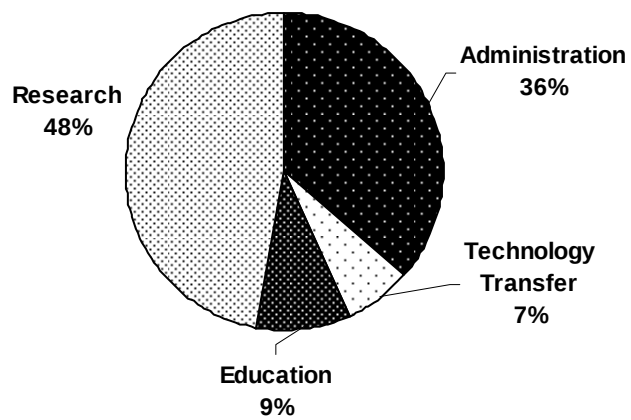
	US Department of Transportation Priorities				
	Safety	Reduced Congestion	Global Connectivity	Environmental Stewardship - Energy Efficiency & Alternative Fuels	Security, Preparedness & Response
UT-UTC Funded Projects:					
Combined Truck Routing and Driver Scheduling Problems Under Hours-of-Service Regulations	✓				
Regional Freight Information Resources for Market Opportunities in the Great Lakes Maritime Transportation System		✓			
Global Supply Chain Management/Transportation Building a Global Network of Scholars and Educators			✓		✓
Reducing Noise and Vibration of Hydraulic Hybrid and Plug-In Hybrid Electric Vehicles				✓	
Developing and Testing a Framework for Alternative Ownership, Tenure and Governance Strategies for the Proposed Detroit-Windsor River Crossing		✓			✓
UT-UTC Tech Transfer and Activities:					
Great Lakes: From Data to Markets to Shipping Opportunities		✓		✓	
Brazil Alternate Energy Webinar			✓	✓	
ICHCA International Research & Education Panel			✓		
Projects with MIOH-UTC:					
Oxidative Stability of Biodiesel Fuels				✓	
Education Modules to Teach Hydraulic Hybrid Vehicles Technologies				✓	
Intermodal Transportation Institute Activities:					
Upper Midwest Freight Corridor Study - Phase II	✓	✓			
Biodiesel Fuel Study				✓	
Expanding Regional Freight Information Resources for the Upper Midwest - Phases I & II	✓	✓			
Independent Technical Review of the Great Lakes		✓			
ICHCA North America Secretariat			✓		

FUNDING SOURCES AND EXPENDITURES

FY 2006-2007 Funding Sources



FY 2006-2007 Expenditures



Funded Projects - Research

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

Focus: Supply Chains

Abstract: Since driver fatigue has known to be the primary cause of serious truck crashes, the Federal Motor Carrier Safety Administration (FMCSA) has attempted to implement new hours-of-service (HOS) regulations that aimed to promote safer driving environments. The new HOS regulations effective in January 4th of 2004, however, may lead to substantial cost increases for the trucking industry which will in turn hurt shippers and ultimate customers. For instance, motor carriers may need to hire additional 84,000 drivers to comply with new HOS rules requiring that drivers be placed out-of-service until they accumulated enough off-duty time. In particular, off-duty break required to refresh driving hours was increased to 10 consecutive hours from the old rule of eight cumulative hours. A chronic shortage of truck drivers would further aggravate the additional driver recruitment problem. In addition, due to potential loading/unloading delays and stiffer fines/penalties resultant from new HOS rules, motor carriers such as Schneider National estimated that trucking productivity would decline by 4-19% (WERC Sheet, 2004). To better cope with the challenges of declining trucking productivity, this project develops an intelligent decision support system that aided logistics executives and transportation planners in creating optimal truck routes and schedules under HOS rules.

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Project Dates: 07.01.2007 – 11.30.2008

Project Year: Year 1

UT-UTC Designation: UTUTC-SC-1

Funding:

UT-UTC Grant Amount	\$41,000
Match Amount	\$41,029
Total Project Budget	\$82,029

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

Focus: Alternate Energy

Abstract: The University of Toledo University Transportation Center (UT-UTC) has identified hybrid vehicles as one of the three areas of the research. The activities proposed in this research proposal are directed towards the noise, vibration, and harshness (NVH) solutions for hybrid vehicles. The soaring fuel prices require imperious steps in developing alternate propulsion technologies. The design and development of hybrid vehicles is a critical issue for an economy dependent on an efficient, fast, and secure transportation system. To date, better fuel economy has been mainly achieved by combining two propulsion sources (hybridization) and/or by developing better managing algorithms for the internal combustion engines. Examples for the hybridization are the plug-in hybrid electric and the hydraulic-hybrid vehicles. An example of managing internal combustion engines is the cylinder on demand as a solution that Honda has recently introduced. One common problem with these solutions is excessive noise and vibration that is caused by switching between the propulsion sources and propulsion modes. To mitigate this problem there is a need to develop vibration isolation devices that can provide isolation over a wide range of frequencies. This proposal seeks to study the NVH problem of the hybrid vehicles and to introduce isolation mounts to overcome these issues.

Hydraulic and elastomeric mounts are generally used to dynamically isolating engines and power trains from the chassis, while statically holding these elements together. Hydraulic mounts overcome some of the drawback of the elastomeric mounts. The stiffness and damping of the hydraulic mounts vary with frequency and amplitude of vibration. It is possible to design a hydraulic mount that has a significantly larger static stiffness, compared to an elastomeric mount, and has a much smaller dynamic stiffness at a specific frequency. To achieve low vibration transmissibility, the mount can be tuned to the primary frequency of the vibration source. On the other hand, to isolate the high frequency vibration of the engine the mount should have low stiffness and low damping, which is not possible to achieve.

This proposal proposes to develop a semi-active mount, which will be realized by improving the existing hydraulic mounts through adding a magnetorheological (MR) fluid element. In response to magnetic fields, MR fluids change their viscosity, which can be harnessed in a variable stiffness and damping mount. The resulting mount will provide shock and vibration isolation over a wide range of frequencies. This extended isolation frequency range will be achieved through the variable dynamic stiffness of the MR portion of the mount. This solution will make it possible to improve the noise and vibration characteristic of hybrid vehicles with alternative propulsion systems.

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Project Dates: 08.01.2007 – 07.31.2008

Project Year: Year 1

UT-UTC Designation: UTUTC-AE-1

Funding:

UT-UTC Grant Amount	\$50,000
Match Amount	\$52,948
Total Project Budget	\$102,947

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

Focus: Infrastructure Utilization

Abstract: The United States and Canada share the largest trading relationship in the world, and currently account for approximately \$200 billion of annual surface trade between Southwestern Ontario and Southeastern Michigan. This figure is expected to reach \$300 billion by the year 2030. The Central Business Districts of the cities of Detroit and Windsor are currently connected by a bridge and a tunnel, both built during the late 1920s, that constitute the vital trade corridor between the two countries. The Ambassador Bridge (a four lane facility) is privately owned and operated, while the Detroit-Windsor Tunnel is a two-lane facility jointly owned by the two cities and operated by a private corporation.

During the last few years, a number of studies have been undertaken by the Michigan Department of Transportation and the Ontario Ministry of Transportation to investigate the need, location and type of a proposed third river crossing connecting the cities of Detroit and Windsor. These studies appear to indicate a strong need for such a river crossing, even though its exact location, access and type (tunnel, bridge, etc) are yet to be determined. Nor has any decision been made on the Ownership, Tenure and Governance (OTG) of the proposed crossing.

The purpose of this study is to develop an analytic framework that can be used to test alternative OTG scenarios for the proposed river crossing, including public, private and various joint ownership scenarios. The proposed framework will, among other things, incorporate the concept of “investment decision under uncertainty.” The estimates of the project costs and benefits (particularly those beyond the immediate future) are likely to be characterized by significant variances. The risks and uncertainties associated with these estimates will be incorporated in the proposed framework. The framework developed will be tested with data that may be available from different published reports and from the Michigan Department of Transportation.

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Project Dates: 06.15.2007 – 06.14.2008

Project Year: Year 1

UT-UTC Designation: UTUTC-IU-1

Funding:

UT-UTC Grant Amount	\$41,010
Match Amount	\$41,090
Total Project Budget	\$82,100

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

Focus: Infrastructure Utilization

Abstract: The purpose of this proposed project is to extend the Great Lakes Maritime Information Delivery System to include data for market opportunities for shippers and carriers for diverting freight to the Great Lakes Maritime Transportation System (GL MTS). The Great Lakes Maritime Information Delivery System is a comprehensive data repository and information clearinghouse for the maritime industry in the Great Lakes and Seaway. The main objective for the system is to promote sustainable maritime transportation in the region by serving as an information resource for public policy decision making and for drawing the link between maritime freight movements, economic viability, and environmental quality throughout the region. The system is designed to be a diversified web-based information delivery site that houses a detailed data repository consisting of 1) vessel movements and commodity flows, 2) port and dock functions, 3) regional economic activity, 4) regional population/socioeconomic patterns, and 5) environmental impacts. To date, the development of the system has concentrated on developing an information base that emphasizes regional economic impact of the GL MTS, linking the GL MTS to the wider regional intermodal freight system, safety, environmental impacts/benefits, shipper savings, rate comparisons, and congestion effects of other modes compared to GL MTS. The project proposed here will enable users to retrieve data concerning such factors as Tonnages, Value of Cargo, Scheduled Service, Ship Technologies, Dock and Port Facilities, Intermodal Connections and Transshipment Costs. As a result, data will be made available for developing market plans that can identify key decision makers and market segments that can be served by the GL MTS, tonnages and cargo values associated with those markets, scheduled service and frequency of service that can be established, and ship technologies that can be used to optimize flows through the system.

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Project Dates: 05.03.2007 – 06.30.2008

Project Year: Year 1

UT-UTC Designation: UTUTC-IU-2

Funding:

UT-UTC Grant Amount	\$26,283
Match Amount	\$27,322
Total Project Budget	\$53,605

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

Focus: Supply Chains

Abstract: Research on Global Supply Chain Management/Transportation Efficiency Systems is critical to US competitiveness. Global Supply chain management integrates global information, material and, cash flow processes across all functions including sourcing, operations, return and recycling, and logistics and planning – for all partners. Supply chain system professionals are the agents of change for e-business, manufacturing, high-tech, service and consulting companies. Transportation system analysis and planning stress the conceptual and quantitative approaches to the analysis of transportation and related systems. The objectives are (1) to engage in international network of research collaboration to identify, analyze, and solve complex transportation and supply chain problems and to communicate those solutions to achieve successful implementation and (2) to develop education and training programs that meet the needs of transportation, logistics, and supply chain professionals around the world.

The planned activities are with researchers and educators from Africa, Asia, Australia, Europe, North America, and South America. The development of these programs depends on leveraging the diverse collaborative work that has been established with International Cargo Handling and Coordination Association (ICHCA) International Ltd, International Manufacturing Strategic Survey (IMSS), Supply Chain Symposium, and MIOH UTC, and University of Toledo Manufacturing Management Alumni network.

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Project Dates: 05.08.2007 – 12.31.2007

Project Year: Year 1

UT-UTC Designation: UTUTC-SC-2

Funding:

UT-UTC Grant Amount	\$49,994
Match Amount	\$57,809
Total Project Budget	\$107,803

Funded Projects - Education

Incorporating Intermodal Transportation into the Spatially Integrated Social Sciences

Focus: Infrastructure Utilization

Abstract: The purpose of this proposal is to request development funds to expand the role of intermodal transportation in the newly proposed Spatially Integrated Social Science Ph.D. Program to be administered jointly between the Departments of Geography and Planning, Economics, Political Science and Public Administration, and Sociology and Anthropology at The University of Toledo. The particular transportation-related areas of interest that the SISS program that complement the UT UTC will be in the areas of Transportation for National Security, Transportation and Regional Economic Development, Infrastructure Utilization, and the spatial dimensions of Supply Chains. Each of these topics readily lend themselves to the faculty expertise, the available geospatial technology, and the regional economic needs of northwest Ohio. Furthermore, the SISS faculty will focus on the movement of people among all modes of the transportation system and in the conflicts that arise between the movement of freight and the movement of passengers. Specific areas of transportation research and teaching will include: 1) Transportation and urban form; 2) Transportation, Public Administration and Policy; 3) Transportation Analysis and Quantitative Methods; 4) Intermodal Transportation—Passenger and Freight; 5) Infrastructure Utilization and Planning; and 6) Transportation and the Environment. It is anticipated that transportation and all of its spatial dimensions will play a pivotal role in this program and will attract students with an interest in combining an analytical approach to studying transportation, but from a perspective that appreciates the contribution of diverse social science disciplines to understanding this important spatial process.

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Project Dates: 05.03.2007 – 06.30.2008

Project Year: Year 1

UT-UTC Designation: UTUTC-IU-3

Funding:

UT-UTC Grant Amount	\$8,706
Match Amount	\$8,706
Total Project Budget	\$17,412

Global Supply Chain Management/Transportation Efficiency Systems Graduate Degree Program

Focus: Supply Chains

Abstract: Global Supply Chain Management/Transportation Efficiency Systems graduate degree program covers areas in global supply chain management and transportation efficiency. Global Supply chain management integrates global information, material and cash flow processes across all functions including sourcing, operations, return or recycling and logistics and planning – for both all partners. Supply chain system professional are the agents of change for e-business, manufacturing, high-tech, service and consulting companies. Transportation system analysis and planning stress the conceptual and quantitative approaches to the analysis of transportation and related systems. Our objective is to prepare students to identify, analyze, solve complex transportation, supply chain problems, and communicate those solutions towards their successful implementation.

The program could be very flexible which students with engineering/science/business backgrounds could take. There will be a core and a set of electives leading to two distinct specialties in two focused areas. Students must meet certain requirements such as having engineering/science background to take specialized courses in transportation. We could also identify some of the courses for undergraduate who want to get a concentration or double major.

This proposal is being submitted to leverage the collaborative work on developing a Masters program with the University of Detroit Mercy – MIOH UTC and to further develop an International Collaborative Masters Program in Global Supply Chain Management with help from ICHCA International Ltd.

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Project Dates: 05.08.2007 – 12.31.2007

Project Year: Year 1

UT-UTC Designation: UTUTC-SC-3

Funding:

UT-UTC Grant Amount	\$15,811
Match Amount	\$17,005
Total Project Budget	\$32,816

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

Focus: Supply Chains

Abstract: Cooperative education enables undergraduate students to work in the environment that they will face when they graduate. It integrates hands-on business experience with academic training. It provides students with an understanding of how concepts and ideas that are discussed in the classroom are used in the business world. It also provides motivation and a willingness to learn that is difficult to establish without this experience.

This project will lay the foundation for developing a cooperative education program for the Supply Chain Management Area of Specialization within the Bachelors of Business Administration at the University of Toledo. The purposes of this effort are to enhance the students' experiences thereby making them more marketable and to increase enrollment.

It will develop goals and objectives for the program, outline a curriculum, develop an organizational structure that enables students to graduate in a timely manner, and make a recommendation for successful implementation. During this process, the PI will meet with appropriate managers and staff in the College of Engineering at the University of Toledo, where a mandatory cooperative education program exists, as well as other universities that currently have cooperative education programs in Business Administration including the University of Cincinnati and with business organizations to determine their willingness to participate in the program.

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Project Year: Year 1

UT-UTC Designation: UTUTC-SC-4

Funding:

UT-UTC Grant Amount	\$5,000
Match Amount	\$18,144
Total Project Budget	\$23,144