



TRANSPORTATION INNOVATIONS

Artificial Intelligence Laboratory

The Artificial Intelligence Laboratory specializes in applied AI research and development, particularly focusing on projects in the areas of transportation, molecular biology, and electronics manufacturing optimization.

Partners:

UIC Engineering
Illinois Department of Transportation
National Institutes of Health
National Science Foundation
United States Department
of Transportation

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Dates Active:

1991—present

(see also *Biotechnology,
Industry Partnerships*)

Assessing Effectiveness of Alternative Fuel Vehicle Fleet Replacement in Local Government

Although recent legislation and policy has encouraged the use of alternative fuel vehicles in public fleets, full scale AFV adoption is still a new phenomenon. Past studies have examined select aspects of environmental impacts and purchase behavior for specific types of AFVs, a simultaneous comparison of implementation and effectiveness of different fuel types and engine technologies within a single fleet over time has not been undertaken. This project assesses the implementation and effectiveness of an ongoing mandatory AFV fleet replacement policy in DuPage County Forest Preserve (DCFP) in Illinois, which has adopted a self mandate to entirely replace its fleet with AFVs over a 10 year time span. The project is currently supporting three manuscripts: (1) an examination of the environmental and economic costs and benefits of at the half-way point of the policy implementation; (2) an assessment of the internal knowledge development and learning processes that take place when a public agency is tasked with full scale adoption of new technology; and (3) a study of AFV end user behavior. Findings will provide policy makers with detailed dynamic understanding about the cost, benefits, gains, losses, and lessons learned during the process of fleet replacement.

Partners:

UIC Engineering
UIC Public Administration
UIC Urban Planning and Public Affairs
Institute for Environmental Science and Policy

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2004-present

(see also *Environmental Protection*)

Asset Management and Metropolitan Planning Organizations

Various agencies and stakeholders have opined that one of the major obstacles to successful implementation of asset management within organizations has been with respect to the lack of coordination and agreement on the goals of asset management. While the technology for managing assets is available, one needs to overcome the hurdles presented by the human activity system. It is in this context that this project will contribute to pushing the envelope by providing a better understanding of the human activity system as well as identifying the key barriers towards successful implementation of asset management at the regional level.

The project will include structured interviews with stakeholders from various public agencies including local metropolitan planning organizations (MPOs) as well as the various transportation entities in the region. The interviews will serve to identify the gaps in the existing data stream as well as in understanding the data needs for the region. This process, with theoretical underpinnings in public participation, will make use of Soft Systems Methodology (SSM). SSM is a qualitative approach to intervene in complex problem situations. It is a holistic and systemic approach that has been used to understand problems in the transportation context. The management of assets by an MPO is a problem situation that lends itself to being studied with this methodology.

Partners:

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University of Wisconsin-Madison
US Department of Transportation

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Dates Active:

July 2006—June 2007

Continued Collaboration Among the CTA, UIC and MIT

Begun in 2001, the multi-year collaboration between the Chicago Transit Authority (CTA), the University of Illinois at Chicago (UIC) and Massachusetts Institute of Technology (MIT) is aimed at making CTA more competitive in the new millennium. The common research agenda will focus on the development of new knowledge to support efficient, equitable and appropriate capital investment, policy and operating decisions for both bus and rail. The collaboration focuses on six areas of research: transit operations, transit facility design and construction processes, decision support for service development, future transit funding strategies and opportunities, transportation planning, and infrastructure renewal and replacement. A typical topic will be driven by student interest, the commitment of a faculty member to serve as advisor, and the identification of appropriate and interested staff members at CTA.

Partners:

UIC Urban Planning and Public Affairs
Chicago Transit Authority
Massachusetts Institute of Technology

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Dates Active:

January 2001—July 2007

(see also Urban Infrastructure Improvement)

Disruption Management Template Development

This project will produce transportation management templates for use in the event of a major transportation system disruption, which can result from vehicle crashes, hazardous material spills, terrorist attacks, or other similar events. The template will incorporate ways to: maintain traffic flows, minimize secondary incidents, reduce system congestion, and manage the demand for the system.

Partners:

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Chicago Metropolitan Agency for Planning
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Illinois Department of Transportation

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Dates Active:

January 2006–June 2008

Impact Analysis for Freight Operation Improvements

Project objective is to develop a benefit evaluation framework using the outputs from state-of-the-art simulation programs developed by the team from Northwestern University. Strategy is to facilitate coordinated planning and operations among stakeholders, a process that evaluates broad impacts of proposed projects will be needed. Such process should not only quantify both positive and negative impacts, but also determine the incidence of impacts for various parties including shippers, transporters, general public, and residents around the terminals and along the freight routes.

To answer such needs, a tool to evaluate the distributions of the impacts under alternative scenarios will be developed as a post-processor to the models developed by the teams from the Northwestern University. This tool will use the traffic data provided by the simulation model to quantify both positive and negative impacts including; travel time savings for both freight and passenger vehicles, miles of empty operation, truck and rolling stock operating costs, effect on environment (through noise, air pollution, and vibration), capital and maintenance costs for roadway and rail infrastructures, change in property values near terminals and freight routes, and accidents. The information can be used not only for outreach activities but also for long range planning at the Metropolitan Planning Organization (MPO) level to bring the freight into the mainstream of public sector transportation planning.

Partners:

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National Science Foundation
Northwestern University

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Dates Active:

September 2002–August 2004

*(see also Urban Infrastructure
Improvement)*

Job Access and Reverse Commute Project

This project is a collection of many operational and technical assistance programs targeted to the Job Access and Reverse Commute (JARC) program of the Federal Transit Administration (FTA).

Partners:

UIC Urban Planning and Public Affairs
City of Chicago
Federal Transit Administration
Illinois Department of Human Services
US Department of Transportation

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Dates Active:

May 2000–December 2008

Making the Chicago Transit Authority More Competitive as it Moves into the 21st Century

This project will provide CTA with data visualization and decision support tools and techniques made available by the Great Cities Urban Data Visualization program and the Urban Transportation Center. The collaboration will focus on four areas of research: (i) Transit Operations, (ii) Transit Facility Design and Construction Processes, (iii) Decision Support for Service Development, and (iv) Future Transit Funding Strategies and Opportunities. Specific topics within these areas of research are determined on an annual basis by a steering committee made up of CTA and URS staff and MIT/UIC faculty. The steering committee will have the important task of balancing institutional needs of CTA and the research missions of the academic partners. Specific products will be established for each student and each research topic on a project-by-project basis.

Partners:

UIC Urban Planning and Public Affairs
Chicago Transit Authority
Massachusetts Institute of Technology
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Dates Active:

January 2001–October 2005

Measuring the Benefits of Implementing Asset Management Systems and Tools

Transportation agencies have identified asset management (AM) as a concept to support cost-effective maintenance and rehabilitation decisions related to physical assets. Asset Management Systems (AMS) and tools are required to implement these AM concepts. However, agencies seem to hesitate to move forward in implementing AMS and tools because it is difficult to document whether the benefits produced by AMS or tools exceed the costs for implementation and operation. Indeed, six of seven research needs studies conducted since 2000 have identified “Measuring Benefits” as an important area of research to develop the base of support for asset management. This project will document evidence of benefits and develop a procedure for quantifying the benefits derived from implementing asset management systems and tools.

Partners:

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Dates Active:

June 2005–December 2006

(see also Urban Infrastructure Improvement)

Metropolitan Transportation Support Initiative (METSU)

The objective of the METSU project is to provide transportation research, education and technical support on urban problems specific to the Chicago region and the state of Illinois. In order to achieve its objective, the UTC has the assistance of an Advisory Board that is comprised of the top executives of transportation and planning agencies of the Chicago metropolitan region and the state of Illinois. METSU addresses the research, technical assistance, education and training within the following general categories: intelligent transportation systems; transportation safety; geographic information systems; infrastructure, database, and asset management; transportation, land use, and economic development; transit operations, planning, and demand management; regional planning; highway operations and planning; job access and reverse commute; transit and traffic planning models; and freight and intermodal transportation analysis.

METSU funds provide an avenue for technical assistance in all areas of transportation to the Chicago Area Transportation Study (CATS), IDOT departments, and other planning and transportation agencies. The educational component of the METSU program will be comprised of workshops, conferences, training courses, presentations, and seminars in addition to student education, internships, and development. The METSU project also includes provisions for the administration and information dissemination outreach efforts to public and private sector organizations.

Partners:

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Dates Active:

September 1999—present
*(see also Urban Infrastructure
Improvement)*

Outer Circumferential Land Use Study

For this project, UTC took the lead in producing a geographically-indexed socioeconomic database in accordance with the Chicago Area Transportation Study's (CATS's) specifications. UTC also explored and identified transit alternatives and opportunity sites for each proposed station area, and prepared alternative and preferred land-use development scenarios for each proposed station area.

Partners:

UIC Urban Planning and Public Affairs
Chicago Area Transportation Study (CATS)
City of Joliet
Lakota Group
Metra
Metro Transportation
S.B. Friedman & Co.
Will County Governmental League

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March 2004—December 2006

Planning Partnerships and Employment Transportation Benefits

This project addresses two main research questions: effectiveness of planning partnerships in job access and reverse commute transportation, and estimating economic benefits due to governmental investments on employment transportation. The methodology used to study the first question involves data collection by means of site visits to up to eight localities nationwide that have planning partnerships in place to develop and monitor implementation of Job Access and Reverse Commute Transportation Plans and qualitative analysis of the data collected by means of these site visits. The methodology for the second research question involves cost-benefit and cost-effectiveness analysis of employment transportation based on data already collected in twenty-three locations across the country. A longitudinal analysis of individuals who did not have access to adequate transportation during their youth will also be a part of the second research question. Statistical modeling of data collected by the Bureau of Labor Statistics will be the major methodology followed to accomplish this last research issues.

Partners:

UIC Urban Planning and Public Affairs
Federal Transit Administration
US Department of Transportation

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Dates Active:

September 2005–June 2007

Ramp High Occupancy Vehicle (HOV) Project

The objective of this study is to determine the effectiveness in terms of: reduced travel delay, value of travel time saved, fuel volume savings, fuel cost savings, reduced vehicle emissions, increased person throughput and traffic safety if this transportation demand and system improvement strategy were to be applied in the Northwest Study Area, defined as IL Route 53 and I-290 between Lake Cook Road and Austin Avenue. The study will address the potential of ramp metering and the combination of ramp metering with parallel HOV by-pass lanes and associated support strategies. The study will be conducted for both inbound and outbound traffic flows for both the AM and PM peak periods.

Partners:

UIC Urban Planning and Public Affairs
Chicago Metropolitan Agency for Planning
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Northeastern Illinois Planning Commission

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Dates Active:

December 2006–December 2007

(see also Urban Infrastructure Improvement)

Regional Transportation Authority Technical Assistance

UTC is to provide technical assistance to the RTA for three specific tasks. Under Task 1, the RTA Strategic Plan Assessment and Gap Analysis, UIC transportation planning staff will work with RTA staff and consultants to assess the RTA Regional Transportation Plan. Assistance will be provided regarding technical, planning, and outreach gaps in the strategic plan on an as-needed basis. Under Task 2, Paratransit Assessment, UIC personnel will provide support to RTA staff regarding the new paratransit operations in Pace and advise regarding possible evaluation and impact assessment. The goal of the project is to undertake a survey of the disabled community in order to obtain their input into issues affecting service design that will be used by RTA to assist in the development of a comprehensive Service Development Plan for persons with disabilities. Task 3 is an evaluation of RTAP, which was created with the purpose of assisting local governments, municipalities, and Transportation Management Associations (TMAs) with planning, technical assistance, and consultation to meet local needs. The purpose of this project is to evaluate the effectiveness of the Local Planning sub-program of RTAP by focusing on station area plans and local transit improvement projects. The benefits and outcomes of these different types of projects, as well as the performance metrics on which outcomes should be evaluated, are likely to be very different for the different projects.

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Dates Active:

June 2008
*(see also Rehabilitation
and Disability Studies, Urban
Infrastructure Improvement)*

Study on Employment Transportation Partnership and Economic Benefits

The workplan for this project includes a phased approach to evaluating the impacts of transit-based low-cost mobility solutions, focusing on FTA's Job Access and Reverse Commute (JARC) program. The workplan is targeted to continue UTC's evaluation of partnerships and to developing a "first principles" approach to evaluating the benefits of job access transit and to quantifying the impacts using hard data on key indicators. The study has two main parts: a partnership study and an economic assessment study, consisting of four subparts: cost effectiveness measures, cost benefit measures, labor economics and transit literature review and benefits synthesis, and design of workplan for larger economic impact study.

Partners:

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Community Transportation Association
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US Department of Transportation,
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Dates Active:

June 2005–June 2007

Systemwide Information for Transportation Assessment and Research

The study focuses on transportation planning issues of particular relevance to North Eastern Illinois. The study has four elements: 1) Chicago region freight study; 2) American Community Survey (ACS) Data; 3) Transferability of Household Travel Survey Data in Calibrating and Validating Travel Forecasting Models; and 4) Economic Impacts and ITS Deployment Planning

Partners:

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United States Department of Transportation
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Technology Transfer for Asset Management in Transportation

The Transportation Asset Management Today (TAMT) community of practice website serves as a resource for Asset Management practitioners, researchers, and educators, a communication tool and a venue for dissemination of information. The site was created in 2001 to support the efforts of the Federal Highway Administration (FHWA) and the American Association of State Highway and Transportation Officials (AASHTO) in response to the 2000 Strategic Plan developed by AASHTO and FHWA. The site is also part of FHWA's Knowledge Management Initiative and they serve as hosts for the site with support from FHWA. Since August 2002, the UTC has provided support for the site. This has included working with facilitators, removing rogue postings, posting new materials, responding to queries, updating the calendar, providing demonstrations, and developing case studies.

Partners:

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Federal Highway Administration (FHWA)

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August 2002–August 2007
(see also Education Innovation)

Transportation Information Clearinghouse

Our objectives are to inventory and document the region's non-public/non-traditional transportation services, and develop a plan to assimilate this information into a common database of the RTA Travel Information Center and other media developed to disseminate traveler information. In addition, the special needs of work and work related, social, family, trip chains as well as cultural barriers will be identified and addressed.

Partners:

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Dates Active:

September 2001–December 2005

Transportation Research for Low-Income Groups

The UIC project on worker accessibility explores trends and needs in the low-income labor market sector. Our objective is to identify user needs, evaluate new transit markets and also to couple empirical research in this area with transportation demand modeling and Geographic Information Systems. Current activities include: 1) evaluating the impact of transit services on low-income groups and the extent to which transit makes a difference in employment opportunities; 2) monitoring national and local trends on low-income worker accessibility; 3) exploring innovative partnership initiatives that offer cross-sectoral, holistic approach to accessibility; 4) providing assistance to FTA, state and local agencies on job access issues; and 5) exploring decision making techniques and public participatory methods to facilitate cross-sectoral planning.

Partners:

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Illinois Department of Human Services
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(see also Services for the Disadvantaged)

Upper Midwest Freight Corridor Study

The objective of this study is to establish a regional approach for improving freight transportation in the Upper Midwest based on a multi-state, multi-jurisdictional partnership of public and private sector stakeholder interests. The Upper Midwest serves as a critical corridor for domestic and international freight moving in all directions. It is projected that these freight movements will increase significantly in the future. Shifts in federal and public agency policy relative to infrastructure management and expansion, budgeting decisions and staff resource allocations have and will impact the safe and efficient movement of goods within the region. At the same time private sector interests insist on an equitable approach for all modes and allows industry to remain competitive in the region. Without proper collaboration and communication between the two sectors, and between the states and planning agencies of the region, the impacts of projected freight growth will pose an even greater challenge.

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Urban Transportation Center

UTC seeks to understand and improve urban transportation through the creation, application and dissemination of transportation knowledge while also making use of the Chicago metropolitan area.

Partners:

UIC Urban Planning and Public Affairs
Chicago Metropolitan Agency for Planning
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Chicago Transit Authority
City of Chicago
Federal Transit Administration
Illinois Department of Transportation
Illinois State Toll Highway Authority
Metra
Pace
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Dates Active:

1979—present
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Improvement)*