MIDWEST TRANSPORTATION CONSORTIUM

ANNUAL PROGRESS REPORT
October 2000

Submitted to:
Office of Innovation, Research & Education (DIR-1)
U.S. Department of Transportation
400 7th Street, Room 8417
Washington, D.C. 20590-0001

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From the Director

The Midwest Transportation Consortium (MTC), the University Transportation Center serving the states of Iowa, Kansas, Missouri, and Nebraska, had a very successful first year of operation. The MTC is a complex partnership involving six universities in two states. Yet, in many ways the MTC was able to operate as a close-knit team. For example, the MTC partners were able to employ videoconferencing technology to allow a series of transportation seminars to be shared at three partner universities. This seminar series has allowed students in two states to hear experts in a number of subject areas (particularly asset management) that they would not have otherwise been exposed to.

The MTC's main focus is on education and human capital. This focus is in recognition of the fact that the transportation industry, both public and private, in the region served by the MTC faces a serious shortage of well-trained human capital. For this reason, the MTC is involved in creating totally new transportation education programs at two of its member universities. The University of Northern Iowa (UNI) in Cedar Falls Iowa had no courses or students in transportation when the MTC grant began. During the first year of the grant, UNI's Geography Department took the lead in developing courses, attracting students, and getting involved as a partner in transportation activities in its service region. A similar start-up effort is now underway at Lincoln University in Jefferson City, Missouri. The MTC has also been able to strengthen and add quality to transportation education efforts at universities in the region that were already leaders in transportation.

The MTC has, in its first year, been able to build from the ground up a technology transfer and outreach program in transportation asset management. This effort has enjoyed some early successes. The MTC team has been involved in outreach to a substantial number of local government agencies in the region. More of this close involvement at the grassroots level will follow in the year 2001 and beyond.

The MTC's sponsored research project program is now also underway. Projects were sought through a regional RFP process and most are now underway. The projects represent a diverse portfolio of subjects, but are tightly focused on the transportation asset management theme. Results and products from these research efforts will be widely distributed within the region and nationally as they become available.

As noted in our strategic plan, a thread that runs through all aspects of the MTC's activities is an aggressive use of telecommunications and information technology. The MTC region encompasses four states and includes a large number of rural communities. In order to better serve the region, an indeed the nation, the MTC is using technologies such as the World Wide Web and videoconferencing to extend the reach of its educational, outreach, and research activities.

A. Year One Annual Report

Consortium Theme

The Midwest Transportation Consortium (MTC) is the University Transportation Center Program for federal region 7, which includes Iowa, Kansas, Missouri, and Nebraska. Iowa State University, through its Center for Transportation Research and Education (CTRE), is the MTC's lead institution. ISU is partnering with the University of Missouri-Columbia through UMC' s Transportation Infrastructure Center (TIC).

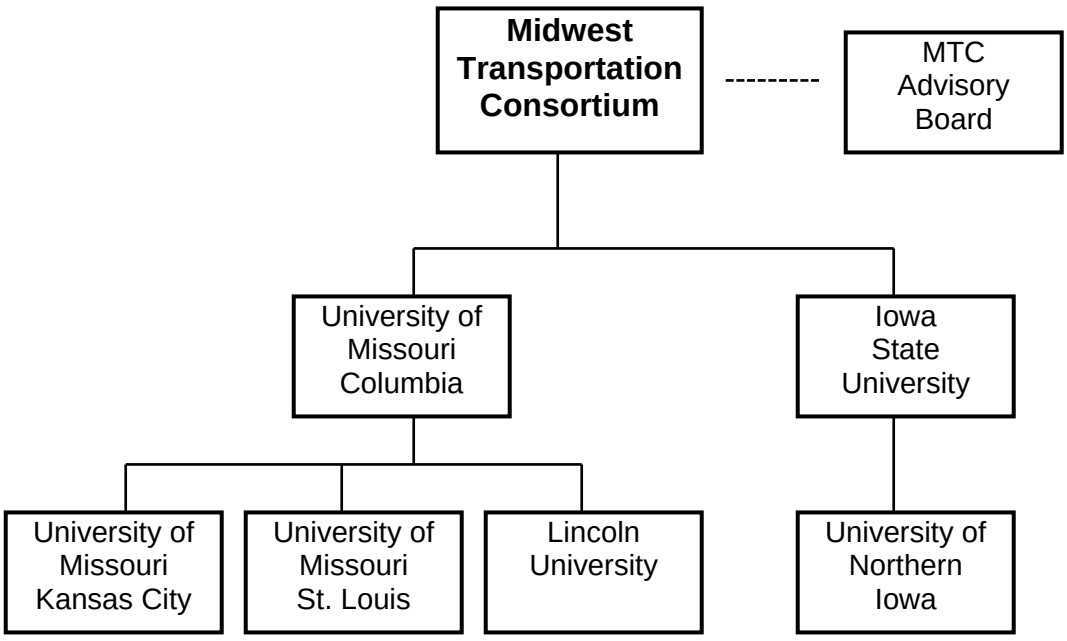
Four junior partner institutions are programmatically linked to the MTC:

- University of Northern Iowa in Cedar Falls, Iowa
- University of Missouri-Kansas City
- University of Missouri-St. Louis
- Lincoln University in Jefferson, Missouri, an Historically Black University (HBU)

The theme of the MTC is *Sustainable Transportation Asset Management Principles and Techniques*. This theme is in concert with the US DOT's strategic goals and is of significant importance to transportation professionals in the next century. The MTC is committed to building transportation research and education programs at the junior partner universities and to assuring region-wide participation in its research and technology transfer activities.

Center Organization Chart

The MTC is organized to some extent by geography. The Center Director and associated staff at Iowa State University handles most administrative duties and handles meetings and correspondence with the MTC Advisory Board and research grant principal investigators. The Center Associate Director coordinates all activities of partner institutions in the state of Missouri. An organizational chart is shown below.



The key staff listing for the MTC is indicated below. These key staff persons include the Consortium Director and Associate Director and Educational Coordinators at each partner institutions.

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Center Goals

Within the theme area of transportation asset management, the MTC has established a number of major goals. These are to build expertise, develop a national reputation, to increase the number and diversity of professionals, and to become a regional and national resource. Specific MTC goals are to:

Education

- Establish Transportation Scholars Programs at all member institutions, based on a successful program at ISU and UMC and working especially closely with Lincoln University. Have 40 students participate annually in multidisciplinary curriculum, "learning community" activities, research assistantships, seminars, and two conferences.
- Establish Virtual Transportation University to organize and promote synchronous (real-time) and asynchronous (non real-time) distance learning programs for all of Region 7.
- Increase diversity by working closely with Lincoln University and by partnering with partner university offices of minority student affairs.

Research

- Develop a body of research in the theme area performed by researchers at all universities in Region 7 in a variety of disciplines.

- Assure region-wide, quality research through a solicitation for research prospectuses from all universities in Region 7 and a two-tiered, unbiased peer review of prospectuses.
- Coordinate research with Region 7 universities and with other UTC's.

Technology Transfer and Outreach
- Provide project-level reports, manuals, software, and other research projects.
- Provide program-level, regional/national workshops, conferences, and seminars.
- Establish regional Virtual Transportation Community to provide online research briefs, threaded electronic forums, etc., to serve all universities in Region 7. (This goal is encompassed in the TREXPO web site discussed later in this report.)

Major Accomplishments During Year One
The MTC has realized early successes in both education and outreach/technology transfer. In the area of education, the MTC has augmented the ability of existing transportation programs at Iowa State University and the University of Missouri-Columbia to develop high-quality students who will become high quality transportation professionals. The MTC is allowing the University of Northern Iowa, Lincoln University and the other MTC consortium partners to develop new transportation programs from the ground up. Northern Iowa was able in Year One to begin offering transportation courses for its students. Lincoln University will begin to offer a transportation program during Year Two of the MTC grant.

Several important outreach activities related to Asset Management were also initiated this year. These include several workshops that have already been held or will be held in the region and specialized World Wide Web content. These activities will be expanded during Year Two. The MTC is already a significant player in discussions of Asset Management and the implementation of provisions of Government Accounting Standards Board Statement 34 (GASB 34) in the region.

The MTC's third major component, research, is also underway. A portfolio of projects involving principal investigators at a number of universities in three of the four MTC states have been approved and are now under contract. These projects will provide work and learning opportunities for students and build a critical mass of knowledge on asset management within Region 7. Additional research project competitions will occur subject to sufficiency of available funding.

Success stories for each major programmatic component of the MTC are provided below.

Expanding Educational Opportunities for Students
Developing the human capital needed by transportation organizations located in and around Region 7 remains the major emphasis area for the MTC. As such, MTC continues to stress improving educational opportunities for its students including work opportunities on research projects, job placement efforts, and travel to national conferences. In terms of travel a large contingent of students from several MTC member universities was able to attend the annual meeting of the Transportation Research Board (TRB) in Washington, DC in January 2000. A smaller group of students was also able to attend an ITE national conference in Nashville, Tennessee in the Fall of 2000. Two students from the University of Northern Iowa attended the American Society for Photogrammetry & Remote Sensing (ASPRS) Annual Conference in Washington, D.C., May 22-26. The conference had several presentations on an emerging area of research regarding transportation applications of remote sensing.
Students and faculty from all of the MTC member schools were able to attend the Mid-Continent Transportation Symposium in Ames, Iowa, May 15-16, 2000. This symposium was co-sponsored by the MTC and allowed for an exchange of ideas on a wide variety of transportation research topics.

Plans are being made to once again have a number of students from at least three of the MTC member schools (Iowa State, Missouri-Columbia, and Northern Iowa) attend the TRB Annual Meeting in Washington, DC in January 2001.

Development of entirely new transportation programs continues at the University of Northern Iowa and at Lincoln University. There are now four Lincoln University students enrolled in the co-op program that has been developed between that historically-Black college (HCB) with the Missouri DOT (MoDOT). Several other Lincoln University students participated in a summer internship program with MoDOT last summer. The efforts at Lincoln were facilitated by Charles Nemmers of the University of Missouri-Columbia.

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Expanding Distance Learning Offerings in the Region: Spring Transportation Seminar

Iowa State University has offered a Spring Seminar in Transportation (Transportation 691) for a number of years. The course, a 15 lecture series presented by outside speakers, is designed to bring together transportation students from a variety of disciplines and to introduce them to a variety of topics that they might not cover in other coursework. As was the case last year, this course will be offered at multiple universities in the MTC's four-state region through the use of videoconferencing technology. (We are hoping to expand the offering from three to five or even all six of the MTC partners this Spring.)

The aim of the seminar this year is to enrich and diversify the educational opportunities of students (and others) in the MTC region by presenting a variety of topics. This year, four universities (ISU, UM-Columbia, UM-St. Louis, and UNI are involved in planning the seminar and arranging for speakers. ISU and Missouri-Columbia are, as senior partners in the MTC, arranging for most of the speakers. Although all the speakers have not been arranged at this time, topics will include:

- Traffic management for the Winter Olympics in Salt Lake City, Utah
- Traffic management center and ITS in the St. Louis, Missouri region
- Support systems and information technology for infrastructure asset management
- How GASB 34 and asset management requirements effect counties and other local governments
- Contemporary business logistics practices and tools
- Supply chain management
- The current state of the trucking industry
- Rebuilding a major aviation hub—Minneapolis/St. Paul Airport
- Rebuilding a major urban freeway—Interstate 235 in Des Moines, Iowa (focusing on public involvement and traffic management)
- Mode choice and urban transit ridership estimation
- Maintaining air service at a small air carrier airport—Waterloo, Iowa
- Costs and benefits of maintaining navigation on the Upper Mississippi River

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Expanding the Use of Videoconferencing Technologies in Region 7

A videoconferencing classroom at CTRE/ISU is now being used on a regular basis to provide distance learning opportunities throughout Iowa, the MTC region, and even nationally.

An ultimate goal of the MTC is to share many more educational resources through videoconferencing technology in a "Virtual Transportation University". This summer, a number of tests were run to test the compatibility of CTRE's videoconferencing room with potential distance learning partners, including other universities in the region and the FHWA in Washington, DC. In addition, a survey and listing of

university transportation offerings via distance learning technologies (both videoconferencing and internet) was completed to establish a baseline for future "Virtual Transportation University" activities. The results of the survey indicate that very few courses in transportation are now offered in the MTC region to distance learners, although it also indicated that some programs are considering or planning such offerings.

The CTRE videoconferencing facility was financed through a combination of sources, including Iowa State University, the Iowa State University Research Park, and the Iowa DOT. The facility:

- Broadcasts via H.320 compressed videoconferencing protocol, the accepted standard for global videoconferencing. (Also will connect via H.323 Internet conferencing standards.)
- Broadcasts at up to 15 frames per second, generally giving the impression of full-motion video.
- Can be connected to:
    - More than 400 Iowa facilities, at least one in every county.
    - The Iowa Department of Transportation's video network.
    - The Iowa Communications Network (ICN) through its networking bridge.
    - Sites around the world via private videoconferencing networks such as Sprint and AT&T.
- Accommodates up to 49 people, with movable tables for flexible teaching/meeting arrangements.
- Includes special-use technologies and equipment:
    - Two video cameras and three monitors
    - Document camera and overhead projector
    - Input for IBM-compatible personal computer
    - Ethernet/local area network jack
    - Video special effects console to produce picture in picture effects
    - Room audio and microphone for stand-alone use
    - Audioconferencing (full-duplex speakerphone)
    - Large marker boards and projector screen
    - "Smart" whiteboard capabilities that allow for capture of writing on a marker board to electronic formats.

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Holding the MTC Annual Regional Student Paper Competition

The MTC will be holding its annual student paper competition in November 2000 at Iowa State University in Ames. A considerably larger number of papers (over 15) had been submitted by the deadline this year than last. Once again, papers were received from several institutions in the MTC. Papers are being reviewed again by MTC key staff and by external reviewers. The best ten papers were selected by a team of internal and external reviewers. Ten formal presentations will be given on November 16. Topics include pavement management, bridge management, traffic safety, pavement markings, human factors, and "smart growth". Cash prizes will be awarded for the best papers/presentations in several categories.

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Providing Unique Opportunities for Transportation Scholars

While many students have summer jobs in transportation, few can (or would want to) duplicate that of Mr. Joseph Turner, a senior at the University of Missouri-Columbia. The Midwest Resource Center of the FHWA entered into a contract with UM-C to provide for the scheduling and demonstration of FHWA's state of the art Retroreflectivity Van. This van collects information that feeds a Sign

Management Program. Joseph drove the van to ten Midwestern states (including the four Region 7 states), assisted in presenting the technical material, demonstrated the sophisticated equipment, ran the computers and even repaired and troubleshot the equipment. Field demonstrations were conducted on rural and urban interstates, major arteries, roads and streets. At the end of the summer, and 15.000 miles later, Mr. Turner definitely earned the title of "Transportation Engineer."

The MTC goal of introducing and involving students in transportation was certainly accomplished for Joe Turner. He submitted a paper covering this activity in the annual MTC Student Paper Competition.

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Developing Four New Asset Management-Related Courses

As a result of their membership in the Midwest Transportation Consortium, Iowa State University, Northern Iowa, Lincoln University and the University of Missouri-St. Louis have each added new Transportation Asset Management-related courses to their curriculum. Each course is described below.

- Iowa State University—MTC Director David Plazak. Several hours of asset management concepts will be incorporated into a new transportation policy planning course being offered to graduate and undergraduate students by the Department of Community and regional Planning. This course will be offered for the first time during the Fall 2001 semester.

- Lincoln University -- Assistant Professor Sherrie Koechling-Andrae. During the Spring 2001 semester, a new "Asset Management" course will be offered as part of the Public Administration Curriculum. The course will incorporate the MTC Spring Seminars as well as including information on fund accounting, asset valuation and depreciation, GASB-required statements and related topics.

- University of Missouri-St .Louis -- Dr. Ray Mundy, Director, Center for Transportation Studies. During the Spring 2001 semester, a Marketing course "Domestic Transportation" will be offered covering issues in transportation. Dr. Mundy will include the MTC Spring Seminars as part of the basis for special studies by students.

- University of Northern Iowa—Assistant Professor Tim Strauss. Transportation Geography, a new course offered by the Department of Geography, will be taught for the first time in the Fall 2000 semester. The preparation of this course is being facilitated by a Provost's Mini-Grant. The title of the Mini-Grant proposal is "Development of Material for a Transportation Geography Course Using Integrated Geographic Information Systems and Transportation Analysis Software."

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Funding the Mid-America Transportation Center 2000 Summer Internship Program

Last summer, the MTC co-sponsored The Mid-America Transportation Center's (MATC) Summer Internship Program at the University of Nebraska-Lincoln. This program provided undergraduate students the opportunity to learn more about transportation engineering careers by working for a transportation engineering consulting firm or public transportation agency located in Lincoln or Omaha, Nebraska areas. This program has been in place for five years. The MTC helped fund it on a one-year basis as a possible model for a similar program for the MTC-member schools to consider in future years.

The program helped to fulfill the educational component of the university transportation center's mission to advance U.S transportation-related expertise. The purpose of the program was to search out talented and innovative problem solvers interested in transportation and enhance their classroom learning by encouraging and supporting them in real-world transportation engineering workplaces. The 2000 program included 8 interns who worked for their sponsors for thirteen weeks during the summer and participated

in a field trip visiting transportation-related facilities in Lincoln, Nebraska and Kansas City, Missouri. A recognition luncheon was held on the last day of the internship for interns and their sponsors.

The table below includes some statistics bearing out the success of the program. Six of the ten highest standing civil engineering students in the 1999 senior class (GPAs from 3.82 to 4.0) have participated in this program.

Outreach and Technology Transfer Activities
MTC activities in outreach and technology transfer have centered around a series of workshops and web sites that are helping transportation agencies in the region cope with the complexities of asset management and related accounting requirements.

Helping Guide the Implementation of GASB 34's Infrastructure Asset Requirements in Iowa
Iowa State University/CTRE and the MTC partnered with the Iowa League of Cities, the Iowa Association of Counties, the Iowa State Auditor's Office, the Iowa County Engineers Association, Howard R. Green Company and others to offer an introductory workshop in August 2000 on Government Accounting Standards Board Statement 34 (GASB 34). GASB 34 in effect requires governments to adopt generally accepted accounting principals and to account for depreciation of infrastructure assets and is a prime motivation for the adoption of asset management systems. Government Accounting Standards Board (GASB) Statement 34 rather than asset management was the main focus of this workshop and it attracted a huge audience---over 400 persons, mainly from Iowa. The workshop was mainly aimed at government decision-makers, financial officers, and managers. However, it also attracted a large number (approximately 100) of municipal and county engineers. The second will be more technical and aimed at local government and DOT engineers.

As a result of this workshop, CTRE and the MTC have been asked to assist the Iowa County Finance Committee in the development of guidelines for counties to use in complying with GASB 34. Other partners in this effort will include the State Auditor's Office, several county auditors, several county engineers, and the Iowa County Engineers' Service Bureau.

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Holding a Regional Asset Management/GASB 34 Workshop
Iowa State University, in partnership with Lincoln University, University of Missouri-Columbia, and the Federal Highway Administration, planned a one-day workshop on the requirements of GASB 34 and how they relate to asset management systems for infrastructure. The workshop has been marketed extensively within the MTC region and in surrounding states. The workshop was to be held in Kansas City, Missouri on November 14, 2000 and early indications were that about 90 to 100 persons from throughout and outside the region would attend.

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Constructing a GASB 34 Web Site
Iowa State University has created a small, information web site on GASB 34, primarily aimed at the local governments that must comply with its infrastructure accounting provisions. The web site contains links to useful information plus a number of articles on asset management and GAS 34 prepared at MTC-member universities. It also includes an on-line training needs survey. Content from this web site has already found its way onto the official Government Accounting Standards Board (GASB) Web site.

The URL for this web site is:

http://www.ctre.iastate.edu/gasb34/index.htm

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Planning to Co-Host the 2001 AASHTO Asset Management Task Force Meeting
The MTC has agreed to work with the Midwestern Regional University Transportation Center at the University of Wisconsin-Madison to co-host the 2001 Association of State Highway and Transportation Officials (AASHTO) Access Management Task Force meeting. The two-day meeting will be held in the Fall of 2001, probably in a large metropolitan area in one of the two Centers' regions. This should give the two Centers some national exposure within the asset management community.

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Building a Transportation Research Expo (TREXPO) Web Site
The virtual transportation research community web site outlined in the MTC's strategic plan is now operational in pilot form and is being tested by faculty at Iowa State University. This web site allows faculty to enter their areas of expertise and past research efforts. It also allows consumers of research (e.g. at State DOTs) to search for expertise or past research. The goal of the web site is to facilitate better dissemination and sharing of research in Region 7 through the use of on-line database technologies, in this case Cold Fusion. This web site (which we have given a unique identity and Internet address) may be found at:
http://www.trexpo.org

The MTC will be expanding the scope of the site to other campuses in future months and then marketing it to research consumers in the region. A focus group is being held in November to identify the most pressing needs and interests of research consumers. Following the rollout, we will be adding new functions to the site such as the ability of agencies to post research RFPs and for communities of interest to have discussions on-line.

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Research Projects
The MTC is in the early stages of its research component. Projects were sought throughout the region through a Request for Proposal process that took place in the late winter and early spring of 2000. In the end, six projects were approved and funded subject to availability of adequate and eligible matching funds. All of the six selected projects focus tightly on asset management and closely related subjects. They include subjects ranging for optimizing snowplowing assets to research that will allow asset management data sources to be related in geographic information systems (GIS).

Projects were funded in three of the four MTC region states and at five different universities. One project was funded at a university that is not a member of the consortium. All six projects are described in the table below.

Approved MTC Research Projects, Year One

Project Number	Project Title	Principal Investigator(s)
MTC-2000-01	Addressing Integration Issues and Developing a Protocol for Integration of Global Positioning	Shauna Hallmark Iowa State University

	Systems Data With Linear Referenced Data in an Asset Management System	
MTC-2000-02	GIS-Base Integrated Rural and Small Urban Transit Asset Management System	Carl Kurt and Joel Lee University of Kansas
MTC-2000-03	Decision-Support System for Management of Slope Construction and Repair Activities—An Asset Management Building Block	J. Erik Loehr and Kristen Sanford Bernhardt University of Missouri-Columbia
MTC-2000-04	Roadway Asset Management System Manual for Local Governments	Ali Roohanirad, Sanley Niu, and Anil Misra University of Missouri-Kansas City
MTC-2000-05	Artificial Intelligence-Based Optimization of Management of Snow Removal	Mohammed Salim, Marc Timmerman, Tim Strauss, and Michael Emch University of Northern Iowa
MTC-2000-06	Development of a Model Asset Management Strategic Plan *	Omar Smadi and Tom Maze Iowa State University

* This research project is approved, but is not yet underway due to a lack of necessary matching funds. The MTC and CTRE are pursuing these funds at this time by re-scoping the project to better meet the asset management technical assistance needs of the Iowa Department of Transportation and its management. The re-scoped project will be focusing on the management of unique environmental, archeological, and cultural artifacts so they can be protected in conjunction with transportation improvements. The project will employ cutting-edge GIS and remote sensing technologies and will be a partnership between the Iowa DOT and Iowa State University.

Strategic Directions for the Future
The MTC is planning on concentrating its efforts in a few strategic areas during the next several years. These include:

1. Continuing to produce high-quality students for the transportation industry in the region and to offer students in the region the best-possible learning experiences.

2. Continuing to aggressively use technologies such as videoconferencing and the World Wide Web to share educational resources within the regions and to coordinate regional research efforts. Considerable focus will go into providing additional distance learning courses and workshops and on the TREXPO web site.

3. Publishing a second round RFP for focused research on asset management and related topics.

4. Offering additional regional workshops on asset management and GASB 34 as the market permits. As the MTC-funded research projects are completed, the results will be integrated into the MTC's outreach efforts in the region.

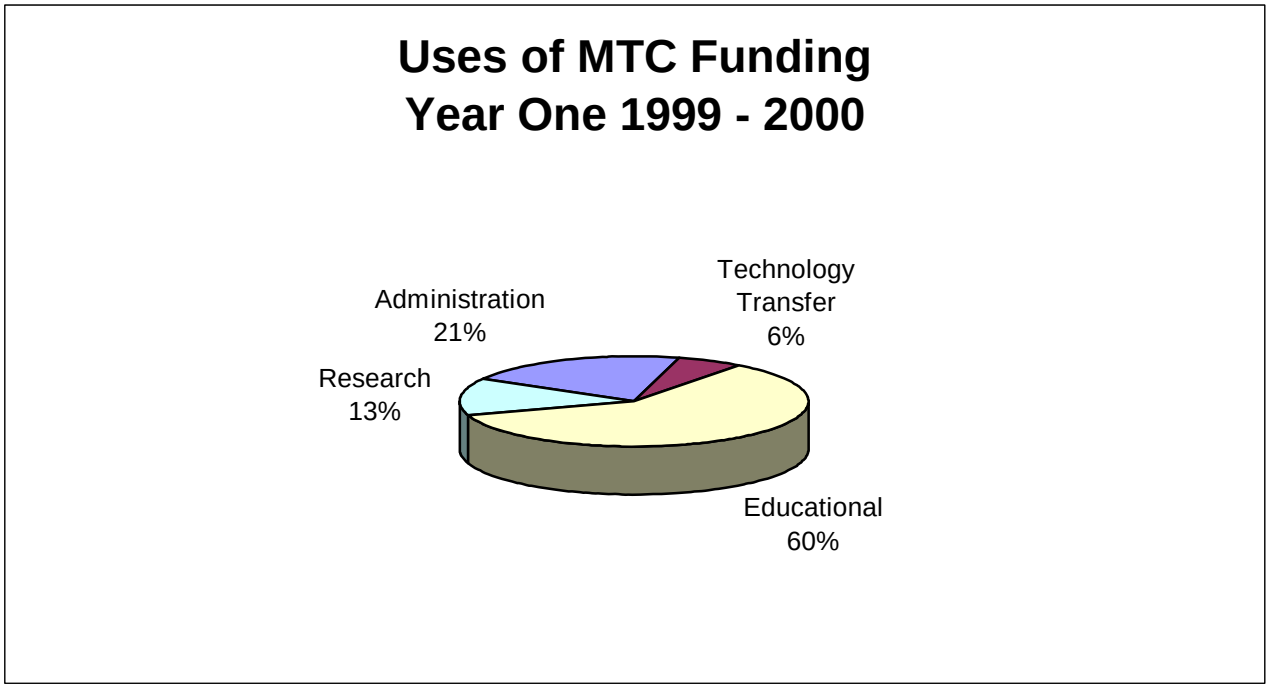
5. Being involved in providing technical assistance to transportation agencies and groups of agencies involved in implementing asset management and the infrastructure provisions of GASB 34.

Funding Sources and Expenditures
The MTC is funded primarily from two sources, the federal University Transportation Center grant and matching funds from member universities. At present, matching funds represent slightly more than 50 percent of the MTC's total budget. In future years, other sources of matching funds will become more common. These will include state DOT funds matching research projects and private funds being used for new graduate scholarship programs.

In its first year of operation, the MTC used the majority of its funding in support of its education mission, largely to provide graduate assistantships to students at its member institutions. In future years, the percentage of funds going toward education will shrink as other parts of the MTC's operation expand. However, education is the number one mission of the MTC and may be expected to make up over half of the budget each program year. During Year One, the amounts spent on research and technology transfer were relatively low. However, these percentages (particularly that for research) will grow in future years since there are now active research projects and outreach activities. Much of the technology transfer budget for Year One involved the costs of designing and developing the TREXPO web site.

Administrative expenses were a relatively high percentage of the uses of funds in Year One, however this percentage should shrink in future years. The administrative funds used in Year One reflect such start-up costs as strategic planning, design of an identity and web site for the MTC, negotiation of contracts and agreements between member universities, and one-time indirect costs associated with starting up.

Uses of MTC Funding	Administration	Technology Transfer	Educational	Research	Totals
University of Northern Iowa			$ 71,869		$ 71,869
University of Nebraska-Lincoln			$ 67,744		$ 67,744
University of Missouri	$ 74,672	$ 7,579	$ 197,978	$ 174,156	$ 454,385
Iowa State University	$ 194,511	$ 74,748	$ 436,179	$ 630	$ 706,068
Totals	$ 269,183	$ 82,327	$ 773,770	$ 174,786	$ 1,300,067
check figure	*21%*	*6%*	*60%*	*13%*	*100%*



Administration is high due to the inclusion of the strategic plan, setting up the contracts and program, the impact of one time indirect costs on the subcontracts to the other participating institutions. With research incubating, technology transfer is low; it mainly includes web site set up and other start-up program marketing and identification efforts. Research is light in year 1 as the research program is just getting off the ground. Not all the educational and research allocations have been spent.

B. Financial Status

The financial status report from Iowa State University's contracts and grants accounting office is found on the following page.

C. Performance Indicators

Table 1a. List of Undergraduate and Graduate Courses Offered as Part of a Transportation Curriculum

Iowa State University

Undergraduate: Basic Surveying, Fundamentals of Surveying I and II; Introduction to Transportation Planning; Introduction to Transportation Engineering; Bridge Design; Building Design; Urban Transportation Planning and Management; Highway Design; Transportation Economics; Transportation Carrier Management; International Transportation & Logistics; Transportation and Public Policy; Transportation & Logistics Issues; Transportation Carrier Management; Advanced Logistics Management; Transportation Seminar

Graduate: Economic Analysis of Transportation Investments; Seminar in Transportation Planning; Advanced Highway Design; Urban Transportation Planning and Management; Traffic Safety, Operations, and Maintenance; Traffic Engineering; Air and Public Transportation Facilities; Transportation Systems Analysis; Transportation Systems Development and Management Laboratory; Pavement Maintenance Management; Transportation Seminar

University of Missouri-Columbia

Undergraduate: Civil Engineering Systems Design I, II & III; Traffic Engineering; Planning and Geometric Design of Highways; Advanced Structural Steel Design; Reinforced Concrete Design; Matrix Methods of Structural Analysis; Pavement Materials and Design; Hydrology; Soil Mechanics; Foundation Engineering; Infrastructure Management; Structural Analysis

Graduate: Advanced Topics in Civil Engineering; Advanced Topics in Structural Analysis; Advanced Topics in Hydraulic Engineering; Theory of Traffic Flow; Transportation Planning and Models; Quality Management in Civil Engineering; Prestressed/Advanced Reinforced Concrete; Behavior of Reinforced Concrete Members; Pipeline Engineering

University of Northern Iowa

Undergraduate: Studies in Transportation; Regional Analysis in Planning; Geographic Information Systems I; Geographic Information Systems II

Graduate: Studies in Transportation; Regional Analysis in Planning; GIS 2

University of Missouri-St. Louis

Undergraduate: Introduction to Operations Management; Decision Support Systems; Production and Operations Management; Production and Operations Management – Logistics; Production and Operations Management – Manufacturing; Production and Operations Management – Service Systems; Quality Assurance in Business; Operations Research; Operations Research II

Graduate: Introduction to Geographic Information Systems; Quality Management; Management Science Methods; Production and Operations Management; Simulation for Managerial Decision-Making; Advanced Operations Research Topics; Seminar in Logistics and Operations Management

Table A1b. Transportation Education

		Undergraduate	Graduate	Total
1b.1	Number of Courses Offered	46	33	79
1b.2	Number of Academic Departments Offering Them	8	9	9
1b.3	Number of Students Completing Above Courses	3513	194	3707
1b.4	Number of Students involved in Transportation Research Projects	61	66	127

Table 2a. List of transportation-related advanced degrees

Iowa State University	MS Civil Engineering (Transportation emphasis) PhD Civil Engineering (Transportation emphasis) MS Transportation MS Community and Regional Planning (Transportation emphasis) MBA (Transportation and Logistics emphasis)
University of Missouri-Columbia	MS Civil Engineering PhD Civil Engineering
University of Northern Iowa	MA Geography MA Political Science

Table 2c. Performance Indicator

Identifier[1]	Citizenship		Title/Position	Is the Position Trans-related		Organization	Type of Organization	
	U.S[2]	Other		Yes	No		Description	Sector[3]
i8280	X		Transp Engr	X		Snyder Consulting	Civil Engr. Consultants	I
i6341		X	Structural Engineer		X		Engineering Consultants	I
i1088		X	Pavement Specialist	X		ISU	University	T
UN1093	X		Remote Sensing Analyst		X	Geological Survey Bureau	Iowa Dept of Natural Resources	G
mc6267		X	Transportation Engineer	X		Kuaite	Public Works	G
mc5169		X	Design Engineer	X			Geo-Tech Consultants	I
mc9460	X		PhD Student	X		UMC	Geo-Tech Engineering	A
mc9898		X	Graduate Student		X	UMC	Computer Engineering	A
mc3805	X		Design Engineer	X			Bridge Consultants	I
mc3680	X		PhD Student	X		UMC	Structural Engineering	A
mcA00S	X		Transportation Engineer	X			Transp Pl Consultants	I
mcB00S	X		Design Engineer	X		Missouri State DOT	State DOT	G
mcC99W		X	Highway Engineer	X			Construction Consultants	I

1. Do not report the graduates' name or other information that could identify individuals. Instead use some identifier that will prevent double counting of a recipient of a Masters degree who then goes on to get a Ph.D.
2. Includes graduates who are U.S. citizens or Permanent Residents when they make their first career move.
3. Sector:
   A – Advanced Degree Program
   G - Government
   I - Industry
   T - Teaching/Academic Research
   U – Unknown

Table 2d
Performance Indicator

Sector	Number
2d.1 Advanced Degree Program (A)	3
2d.2 Government (G)	2
2d.3 Industry (I)	6
2d.4 Teaching/Academic Research (T)	1
2d.5 Unknown (U)	

Table 3 **Diversity of Those Receiving Advanced Degrees**	**Transportation-Related Advanced Degrees**		**All Advanced Degrees**	
	#	**%**	**#**	**%**
3.1 Non-Hispanic White	7	54%		%
3.2 Hispanic				%
3.3 African-American				%
3.4 Asian-Pacific Islander	5	40%		%
3.5 Native American				%
3.6 Others	1	6%		%
Total	13	100%		100%
3.7 Male	11	85%		%
3.8 Female	2	15%		%
Total	13	100%		100%
3.9 U.S. citizens	7	54%		%
3.10 Non-U.S. citizens	6	46%		%
Total	13	100%		100%

Table 4. Transportation Research Selection

4.1	Number of transportation research projects conducted	86
4.2	Total budgeted costs for those projects	$6,867,156
4.3	Number of individuals listed as Principal Investigators	35

Table 5. Transportation Research Performance		
5.1	Number of peer-reviewed research reports and books published	39
5.2	Number of papers accepted for presentation at professional meetings	82
5.3	Number of external awards received for transportation research	2

Table 6. Transportation Technology Transfer and Outreach		
6.1	Number of visitors to transportation center website *(hits per year*)	170,000
6.2	Number of Peer-Reviewed Transportation Research Publications Available on Website	
6.3	Number of outreach events conducted for pre-college students	3
6.4	Number of pre-college students participating in those events	430
6.5	Number of transportation seminars, symposia, distance learning classes, etc.	24
6.6	Number of practicing professionals participating in those events	670
6.7	Number of center newsletters and other periodicals published	4
6.8	Number of issues produced	12
6.9	Total circulation	5835
6.10	Number of transportation technology products deployed (hardware only)	3