UNIVERSITY TRANSPORTATION CENTER
(UTC)
STRATEGIC PLAN
for
University of Delaware
University Transportation Center
(UDUTC)

U.S. Department of Transportation
Research and Special Programs Administration
May 2007
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I. Program Overview

The University of Delaware has been designated a Tier II University Transportation Center. Strategically located astride major national transportation corridors, Delaware is a critical part of the national transportation network in terms of both freight and passenger transportation. Specifically, the I-95 corridor, the Northeast Rail corridor, and the Port of Wilmington are facilities of national significance. The University of Delaware University Transportation Center (UDUTC) will focus on the resiliency of transportation corridors.

We will draw on our strategic location in a region with all transportation modes that support economic development and improved quality of life and on corridors that are of national significance as a testbed for our work. Our region is representative of many others with significant issues related to congestion, safety, aging infrastructure, and the competing demands of transporting individual travelers and freight while protecting the environment.

Our theme and research emphasis also supports the crosscutting concerns identified in the report of the National Highway Research and Technology Partnership, *Highway Research and Technology: The Need for Greater Investment*, and the mission of the Federal Transit Administration’s National Research and Technology Program to “Deliver Solutions that Improve Public Transportation.”

A. Glossary

Uncommon words and acronyms used throughout this plan are listed in Table 1.

Table 1. Glossary of Words and Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE</td>
<td>Department of Civil and Environmental Engineering</td>
</tr>
<tr>
<td>CHAD</td>
<td>Center for Historic Architecture and Design</td>
</tr>
<tr>
<td>CHEP</td>
<td>College of Human Services, Education, and Public Policy</td>
</tr>
<tr>
<td>CIBrE</td>
<td>Center for Innovative Bridge Engineering</td>
</tr>
<tr>
<td>CMES</td>
<td>College of Marine and Earth Studies</td>
</tr>
<tr>
<td>COE</td>
<td>College of Engineering</td>
</tr>
<tr>
<td>DCT</td>
<td>Delaware Center for Transportation</td>
</tr>
<tr>
<td>DeIDOT</td>
<td>Delaware Department of Transportation</td>
</tr>
<tr>
<td>DRC</td>
<td>Disaster Research Center</td>
</tr>
<tr>
<td>DTC</td>
<td>Delaware Transit Corporation</td>
</tr>
<tr>
<td>FAME</td>
<td>Forum to Advance Minorities in Engineering</td>
</tr>
<tr>
<td>FHWA</td>
<td>Federal Highway Administration</td>
</tr>
<tr>
<td>HBCU</td>
<td>Historically Black Colleges and Universities</td>
</tr>
<tr>
<td>HSI</td>
<td>Hispanic Serving Institutions</td>
</tr>
<tr>
<td>IPA</td>
<td>Institute for Public Administration</td>
</tr>
<tr>
<td>LSAMP</td>
<td>Louis Stokes Alliance for Minority Participation</td>
</tr>
<tr>
<td>LTAP</td>
<td>Local Technical Assistance Program</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-Government Organization</td>
</tr>
</tbody>
</table>
B. Center Theme

The theme of this Center is resiliency of transportation corridors. The overall goal of the center is to support research, education, and technology transfer that will improve our ability to plan, design, construct, manage, and maintain an advanced transportation infrastructure.

Focusing on highway and rail transportation (both passenger—transit and long distance—and freight) corridors, the UDUTC will address problems of national importance as well as those which are specific to Delaware but have the potential for results that are transferable to other parts of the country. Advanced research will focus on the use of data to better understand and improve the resiliency of transportation corridors to both short- and long-term pressures and the development of tools to support the integrated management of corridors.

Resiliency is defined as a system’s ability to absorb, respond to, and recover from internal and external pressures and disturbances that impact the performance of the system in both the short and long term. That is, resiliency is a measure of the persistence and sustainability of systems and their ability to maintain the same relationships among populations or changing state variables, including land use patterns, environmental changes, unexpected events, and the ecology of transportation corridors.

Over the past 50 years, the settlement pattern of the United States has increasingly been organized around major intra-national transportation corridors. The first such corridor, from Boston to Washington (BOSWASH), was identified by geographer Jean Gottman in his seminal work *Megalopolis* in 1961. Spurred by the completion of the federal interstate system, population growth, and migration to coastal margins, other major corridors have emerged, including CHIPITTS (Chicago to Pittsburgh), SANSAN (San Francisco to San Diego), and, most recently, resulting from increased truck traffic, the NAFTA corridor running diagonally from Mexico to Detroit and to Canada. Some of these corridors, such as BOSWASH, parallel earlier nineteenth-century railroad corridors, which historian John Stilgoe called “metropolitan corridors.”
Located centrally in the BOSWASH corridor, which now extends to Norfolk, Virginia, the UDUTC will take the regional transportation corridor as the organizing concept for its research and focus specifically on this megapolitan corridor, which we will call BOSTFOLK. This corridor is not only multi-modal but also multi-generational in land transportation systems. It is the oldest corridor in the United States, beginning with rail in the 1850s, and is a museum of every transportation innovation of the last century. As such, the BOSTFOLK corridor is perfect for infrastructure analysis.

Our research will concentrate on four areas that emphasize the cross-cutting issues and concerns identified in *Highway Research and Technology: The Need for Greater Investment*, build on the expertise of faculty, reflect the interests of our local partners (DelDOT, DTC, WILMAPCO, and the City of Wilmington), and are relevant to other corridors and the national significance of the BOSWASH corridor. These research areas, as they relate to our theme, are inherently interdisciplinary and involve exploratory research that is not easily funded by existing programs focused on the short-term needs of local, state, and regional agencies. The four areas are outlined and described below:

- **Planning**—Understanding and anticipating the relationships among transportation, land use, and economic development in corridors is essential to resiliency. We need to develop planning approaches that are based on understanding the dynamics of transportation systems and corridors in terms of a model of resiliency. In short, the concept of resiliency makes special demands on the conventional planning processes, and we must recognize and accommodate this. Also, the long history of transportation improvements/systems in the BOSTFOLK corridor offers an opportunity to study the historic resiliency of systems with long functional/engineering lives as a basis for understanding and modeling contemporary and future behavior/resiliency.

- **Ecology and the Environment**—Corridors not only transport people and goods but also facilitate the spread of invasive species, concentrate air quality issues, and impose external pressures on the environment. Also, corridors not only break up ecological zones and habitats but create their own linear ecological environments, which are poorly understood. Linking planning, design, operating, and maintenance strategies to enhance the ecological and environmental quality of transportation corridors is a challenging problem.

- **Infrastructure Renewal**—Planning for and executing infrastructure renewal projects and strategies are key to the proper functioning of transportation corridors. Asset management strategies, innovative repair and replacement techniques, and new materials and contracting practices require additional research to be effective for corridor applications.

- **Operations and Management**—Intelligent Transportation Systems (ITS) have had a significant impact on the operation and management of our transportation systems, particularly corridors. However, in the areas of congestion mitigation and management and emergency preparedness and response, corridors play a unique role as critical links and bottlenecks to
mobility and accessibility. Research on how to better leverage our knowledge of the corridor is key to preparedness and response to unanticipated events.

Our research builds on advances in technology and national trends including the following:

- the explosion in the volume of relevant transportation-related data over the past two decades including both sensor and survey data,
- the need for new planning tools and techniques, and
- the increasing emphasis on performance measurement.

Our research will also recognize global changes and national needs and constraints. These include increasing emphasis on security, fiscal issues, population shifts such as migration to coastal areas, an aging population, an “unaware” public, interest in the pedestrian, development patterns inconsistent with public transit resources and service areas, and emphasis on the global economy.

The relationships among the research areas and key elements of RITA’s Transportation Research, Development and Technology Strategic Plan, FHWA’s Highway Research and Technology: The Need for Greater Investment, FTA’s Strategic Research Plan are summarized in
To illustrate the nature of our research, consider opportunities to enhance the effectiveness of rail transportation corridors. The research would include data acquisition and analysis, debate, and policy development to determine what makes a successful rail corridor, such as the Northeast Corridor. Proposed activities would include (1) cutting-edge research and policy papers focusing on critical issues such as rail infrastructure needs, rail financing policies, planning the future of rail technology and multi-modal transportation networks, human capital needs, and examination of rail ownership and rights-of-way issues; and (2) survey methodology such as polling, interviews, and focus groups to determine positive characteristics that attract rail riders. Complementary activities in the form of technical assistance to rail-related governmental and non-profit agencies and new University of Delaware academic programs related to rail transportation planning and policy would also be considered.

Our theme draws on the University of Delaware’s comparative advantage with a unique constellation of interdisciplinary research centers including the Disaster Research Center (DRC), the Delaware Center for Transportation (DCT), the Center for Historic Architecture and Design (CHAD), and the Center for Innovative Bridge Engineering (CIBrE). Our research also leverages ongoing and recently completed work in these centers.
<table>
<thead>
<tr>
<th>Research Area</th>
<th>DOT Strategic Goals</th>
<th>RITA’s <em>Transportation Research and Technology Strategic Plan</em></th>
<th>FHWA’s <em>Highway Research and Technology</em></th>
<th>FTA’s Strategic Research Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning</td>
<td>Reduced Congestion, Global Connectivity</td>
<td>Emerging Research Priorities: System Resilience and Global Logistics</td>
<td>Cross cutting concern – We will develop projects that are consistent with FHWA’s interest in improving understanding of the interactions between transportation and society, focusing on data drive processes, and better understanding tradeoffs in multimodal corridor planning. As our projects are required to be multidisciplinary, these elements will be addressed in all projects.</td>
<td>Increase Transit Ridership: Identify best practices and technologies, identify solutions to providing public transportation to targeted populations, identify cost effective solutions for rural areas</td>
</tr>
<tr>
<td>Ecology and the Environment</td>
<td>Environmental Stewardship</td>
<td>Strategies: Understand and mitigate transportation impacts</td>
<td>The Environmental Challenge – We will work to better understand the relationships among transportation corridors, human health, ecology and the natural environment. Cross cutting concern – all projects funded by the center will address some aspect of the environment.</td>
<td>Protect the Environment and Promote Energy Independence: energy efficiency and vehicle emissions</td>
</tr>
<tr>
<td>Infrastructure Renewal</td>
<td>Global Connectivity, Security, Preparedness and Response.</td>
<td>Strategies: Reduce vulnerability and improve system preparedness and recovery.</td>
<td>The Deteriorating Infrastructure Challenge -- We will work in all three areas identified to address this challenge: asset management, pavements and structures</td>
<td>Improve Capital Operating Efficiencies: transit infrastructure maintenance</td>
</tr>
<tr>
<td>Operation and Management</td>
<td>Safety, Reduced Congestion</td>
<td>Emerging Research Priorities: Application of Enhanced Safety Data and Knowledge, Congestion Reduction Policy Research and Technologies</td>
<td>The Congestion Challenge -- We will address operations and mobility research through work on efficiency and congestion, freight transportation, and improved transit.</td>
<td>Improve Capital Operating Efficiencies: operating control strategies, operating efficiencies</td>
</tr>
</tbody>
</table>
C. Center Director’s Summary

Transportation systems are inherently complex, and decisions relating to individual elements, facilities, and modes influence other parts of the system. Improving the resiliency of transportation corridors is critical to the efficient provision and operation of transportation services. Our vision is to develop tools based on data and information that improve the resiliency of our transportation corridors in all functional areas—planning, design, construction, operation, management, and maintenance. These tools will draw on new data sources such as sensors as well as historical data from legacy systems, reflect the spatial relationships among facilities, and use new technologies to extract information from data to be exploited in improving design, construction, maintenance, and operations.

At the end of the grant, the UTC will have established a reputation as the “go-to place” for data collection and analysis tools, decision support, policy development, and evaluation to enhance the resiliency of transportation corridors for surface passenger and freight transportation. These tools, techniques and technologies will include all aspects of project development and delivery including analysis of the impacts of transportation projects. The center will have enhanced existing partnerships with local, regional, and state agencies and initiated new partnerships with local and regional agencies and authorities in other areas. As our ability to collect data will continue to outstrip our ability to analyze it, the tools developed by the center will serve as a foundation for research in the application and enhancement of these tools. The broadened base of research funding will sustain the center beyond the contract period of the grant.

II. Program Activities

A. Research Selection

Research Selection Goal: an objective process for selecting and reviewing research that balances the multiple objectives of the program.

1. Baseline Measures.

During the academic year, approximately 17 transportation research projects were funded at the University of Delaware. These projects, supported primarily by DelDOT and FHWA, were budgeted at $1,171,092.

2. Research Selection Program Outcome.

The proposed research selection process will (1) address issues of national and regional importance, consistent with US DOT’s strategic plan and the current research and development plan; (2) build on the research strengths of the UD transportation research community; and (3) reflect the needs of our partner organizations. Most importantly, it will focus on areas that are difficult to fund through the current research program—primarily advanced research, exploratory
research, and interdisciplinary research that involves two or more investigators with different interests or backgrounds.

3. Planned Activities.
The center’s research selection program has two elements. At the strategic level, an annual “all-hands” one-day research retreat will address directions, strategic initiatives, and opportunities to leverage research and develop partnerships. Initially, the retreat will include UD students, staff and faculty and our project selection committee. As our process evolves we may also include other partners. The retreat will provide an opportunity to bring together the UD transportation research community to discuss new directions in the context of the theme of the UDUTC. It will build on the showcase of research and annual conference hosted by the Delaware Center for Transportation (DCT) to communicate our research products to the larger research audience and exchange information on existing projects. An initial retreat was held on August 25, 2006, to develop the center’s theme and scope out preliminary research directions. These were further refined by a subcommittee including representatives from FHWA and DelDOT. The research areas and directions are described in more detail in Section I of the strategic plan. Appendix B includes a list of participants and the agenda.

At the operational level, the annual project selection process is a well-defined approach for soliciting, reviewing, and selecting research projects that are in line with the strategic directions for the UTC. This process is separate and distinct from the process used to select the DCT Annual Program, which focuses on research supported by DelDOT and addresses research needs specific to that agency.

Proposal submission and review will be on an annual cycle. However, guidelines for preparing proposals, key areas, and evaluation criteria will be available on the UTC website year-round. “Requests for proposals” will be distributed by email to all departments on campus. Proposals will be accepted and reviewed according to the following schedule:

- January 1 – reminders to prepare proposals emailed.
- February 15 – proposal deadline.
- March 15 – external reviews completed.
- April 1 – proposals reviewed by research selection committee.
- April 15 – principal investigators notified of outcomes.
- September 1 – funding cycle begins.
- Spring of the following year – PIs participate in the DCT Research Showcase.
- September 1 of the following year – final reports submitted for review.
- October 1 of the following year – review comments returned to PI.
- November 1 of the following year – final report submitted and posted to UTC website.
The Project Selection Committee will consist of the following representatives:

- UTC Director
- Faculty representative from the College of Engineering
- Faculty representative from the School of Urban Affairs and Public Policy in the College of Human Services, Education and Public Policy
- Faculty representative from another college
- FHWA representative (Division Office)
- FTA representative
- FHWA program specialist
- DelDOT representative (Director of Planning)
- Graduate student representative

The faculty and student representatives on the project selection committee will be selected by the UTC director in consultation with the DCT Executive Committee. Conflicts of interest should be avoided by not appointing faculty or student representatives submitting proposals to the committee. If it is not possible to identify interested and knowledgeable faculty or student members who have not submitted proposals, the faculty or student members should not review and/or make recommendations regarding proposals in which they are included. They will excuse themselves during any discussion of their proposals.

External reviewers will be identified by the Project Selection Committee on the basis of expertise and interest in the proposed topic. Examples of external reviewers include researchers from other universities, and from federal, state and local agency, as well as stakeholders in the outcomes of the research such as representatives from state and local agencies or the private sector. For each project, there will be three external reviewers. For advanced research projects, two reviewers will be from academia, and one will be from another agency or relevant public or private sector entity. For applied research projects, only one reviewer will be from academia. For example, a project on understanding and tracking the relationships between corridor infrastructure improvements and changes in land use might use Professor John Adams from University of Minnesota, Professor Debbie Niemeier from University of California at Davis, and Ms Theresa Gardner from DelDOT as reviewers.

External reviewers will be given the RFP, the proposal, a description of the criteria for project selection, and a scoring sheet. The scoring sheet will be developed by the Project Selection Committee prior to the project selection process. Each member of the Project Selection Committee will use the scoring sheet and project selection criteria to rate each project.

The criteria for project selection are as follows:
• Does the proposal present a sound research plan that will produce quality research?
• Is the proposal interdisciplinary in terms of the content and the members of the research team?
• Is the proposal consistent with the UTC theme of Resiliency of Transportation Corridors, and does it address at least one of the targeted areas for research?
• Is the proposal realistic in terms of whether the investigators are qualified to complete the work, and is the scope consistent with the proposed timeline and budget?
• Does the proposal relate to research areas of national importance as identified in Highway Research and Technology: The Need for Greater Investment, the programs of the National Research and Technology Program of the Federal Transit Administration, the U.S. Department of Transportation Research, Development, and Technology Plan, and U.S. DOT’s strategic plan as it evolves?
• If appropriate, does the proposal reflect the needs of partner organizations?

Both the external reviewers and the Project Selection Committee will be asked to rate proposals according to the extent to which they satisfy these criteria. The Project Selection Committee will give preference to advanced research while recognizing the need to balance both basic and applied research. Consistent with the RITA’s definition of advanced research, we believe that advanced research can be both basic and applied. For example, advanced basic research may build on our understanding of the interactions between transportation and land use to advance our understanding of how transportation corridors can be more resilient to changes in land use. In contrast, advanced applied research may explore the application of these concepts to a specific corridor. In addition, careful consideration will also be given to other avenues to leverage funds involving discussion and dialogue with our partners, particularly DelDOT and FHWA. The Project Selection Committee will also ensure that diversity of modes, disciplines, and areas of relevance to the UTC theme is represented among the projects selected for funding.

4. Performance Indicators.
The UTC is an organizational entity within DCT. DCT maintains a database of transportation projects submitted, reviewed, and funded by the center. Therefore, UTC projects (including budgets) can be catalogued and benchmarked against other transportation-related projects ongoing at UD.

B. Research Performance
Research Performance Goal: an ongoing program of basic and applied research, the products of which are judged by peers or other experts in the field to advance the body of knowledge in transportation.
1. Baseline Measures.
Six research reports were published by DCT in the 2005-2006 academic year. Approximately 16 papers were published in journals and presented at conferences.

2. Research Performance Program Outcome.
Our objective is to disseminate our research products through a variety of channels to enhance the visibility of the center, ensure the application of the products, and promote communication with other researchers and potential users. We expect to increase the number of publications we produce by the number of projects that we are able to fund. That is, each project will produce at least one report and one publication in the form of a journal article, book chapter, or paper in a refereed conference proceeding.

3. Planned Activities.
The UDUTC will undertake a variety of activities that will ensure communication beyond the University and our local partners. Specifically these include the following:

- **External review of proposals**—The external review of the UDUTC proposals by academicians and practitioners will provide a different perspective on the research and create an opportunity for external input including the identification of related research in other organizations.

- **Project advisory groups**—Project advisory groups will comprise of experts and stakeholders who are able to provide advice to principal investigators, provide links to organizations and projects that may serve as case studies, review progress and final reports, and facilitate opportunities to disseminate research results. For example, a project advisory group may include a representative from DelDOT, a representative from FHWA, and a representative from an academic institute with interests and expertise relevant to the project. Project advisory groups will be developed by the Associate Director in consultation with the principal investigators, and the group will typically meet via conference call at the beginning, mid-point, and end of the project.

- **Required reports for each project**—Quarterly reports will be required for each project in addition to a final report that is then reviewed by the project advisory group. The principal investigators are expected to respond to the reviewer comments within two months of receipt of the comments. Funding will be withdrawn for projects with non-responsive investigators.

- **Student reports and theses**—The center will maintain a library of student reports and theses related to the project. The library will include both paper and electronic copies of the documents.

- **Presentations at conferences and meetings**—The center will disseminate information about opportunities for presentations at conferences and meetings (through email and the website) and provide nominal travel funding to support the participation of student, faculty, and staff researchers.
in conferences. This includes participation in the Transportation Research Board Annual Meeting and other related conferences and meetings.

- **Presentation of research results in an on-campus seminar or conference**—Participants will be required to present the results of their research in either a UTC, DCT, or departmental seminar or conference. Announcements of such presentations will be circulated to other researchers.

- **Participation in the annual DCT research showcase**—The annual DCT research showcase is a half day event where investigators including student researchers “showcase” their research in a poster session. Representatives from state and local agencies, FHWA and interested private sector companies are invited to view the posters and discuss the research with the participants. All researchers will participate in the annual research showcase, which provides an opportunity for agency representatives and peers to learn about the UDUTC research projects and for practitioners, researchers, and students to interact.

- **Journal papers and conference proceedings**—The UDUTC will track peer-reviewed papers in journals and conference proceedings.

4. **Performance Indicators.**

Faculty and graduate students participating in the UDUTC will be asked to submit information on advisory group meetings, reports, papers, and theses to the director each year. Information on presentations at conferences, meetings, and seminars will be submitted on an ongoing basis and collected by the Associate Director. The Associate Director will also note participation of UDUTC researchers in the annual DCT showcase.

**C. Education**

**Education Goal:** a multidisciplinary program of course work and experiential learning that reinforces the transportation theme of the Center

1. **Baseline Measures.**

A total of 37 transportation courses (14 undergraduate and 23 graduate) were offered during 2005-2006. The combined enrollment in these courses was 1,160 students (299 undergraduate and 861 graduate).

2. **Education Program Outcome.**

The proposed education program focuses on (1) providing a foundation in transportation for undergraduates through the Department of Civil and Environmental Engineering; (2) offering undergraduate research experiences; (3) enhancing knowledge, data analysis, and modeling tools for transportation graduate students in civil engineering, urban planning and policy, and marine studies; and (4) developing the intellectual community for graduate students interested in transportation in these and other disciplines. This will be accomplished through
formal educational programs, activities such as guest speakers and field trips, and participation in conferences and workshops.

3. **Planned Activities.**

**Undergraduate Transportation Program**

The University of Delaware currently offers a variety of undergraduate courses in transportation, mainly through the Department of Civil and Environmental Engineering. Undergraduates in CEE are required to take CIEG351 Transportation Engineering and CIEG451 Transportation Laboratory. The Transportation Engineering course is inherently interdisciplinary, as it covers traditional areas of transportation facility design and traffic engineering but presents them in the context of community values or context sensitive solutions, fiscal constraints, and national and local policy issues (for example, congestion, energy, and environment). CIEG451 is taught in the recently renovated ITS laboratory, which includes state-of-the-art software and access to real-time video and sensor data from DelDOT.

Undergraduates also have some exposure to transportation issues in CIEG125 Introduction to Civil Engineering, and the capstone project in CIEG461 Senior Design includes transportation as one of four integral components, or disciplines. Furthermore, the seniors are required to design a bridge as the structural element of the capstone course. Undergraduate students also have access to a wide variety of electives (including graduate classes in Urban Affairs and Public Policy), and typically about 20–25% of the undergraduate class would describe themselves as “concentrating” on transportation. While we do not plan to expand these extensive course offerings, we will work with the undergraduate classes to make sure they understand the options and the subsequent career opportunities and opportunities for graduate study.

UD’s Alfred Lerner College of Business and Economics also teaches a logistics course to Operations Management students. We will work with the business college to develop a closer relationship with these students.

**Undergraduate Research Experiences**

While several students undertake research in transportation engineering as undergraduates, and the Center for Innovative Bridge Engineering has conducted a very successful summer Research Experience for Undergraduates (REU) program funded by NSF for the past five years, there are currently no formalized programs for undergraduate research in transportation. Our plan is to leverage ongoing activities including the REU program. Specifically, we will use the NSF-REU program as a model for a process by which undergraduate researchers apply and are matched with faculty and graduate students to work on specific projects. The summer program will include guest speakers, discussion of research tools and techniques, sessions on report and paper writing and oral presentations, and field trips to transportation facilities in and around the BOSWASH corridor. Where appropriate, these activities will be shared with ongoing activities on the UD campus, including the annual Summer Undergraduate Research Symposium, which
will provide an opportunity for the students to present their work. Students from other universities will be invited to participate in the summer program. The Science and Engineering Scholars Program (http://www.udel.edu/UR/sceghnd.html#progdes) offers another mechanism for leveraging existing programs for UD students. The program provides support for rising juniors to conduct research in the summer and requires cost sharing from the college, the home department, and the faculty member. We will widely advertise these opportunities each spring. We anticipate funding three to four students each summer.

We will also develop a mini research program for undergraduates for the Winter Session. This month-long program will provide an opportunity for UD students to explore a transportation topic that may serve as the basis for an independent study, a proposal for the Engineering Scholars program, or an application to the UDUTC summer research program. The students will also participate in the TRB annual meeting in Washington DC. We anticipate funding two to three students each winter.

Research topics will be developed to be consistent with the center theme and the research directions outlined in the section on “Research Selection.”

Graduate Program
Through the UDUTC, we will build and strengthen existing graduate programs. Masters and PhD degrees are awarded in the Department of Civil and Environmental Engineering, the School of Urban Affairs and Public Policy, and the College of Marine and Earth Studies. Most importantly, the UDUTC and DCT will become the intellectual home for graduate research in transportation. Regular seminars, access to the transportation library at DCT (which includes a complete collection of TRB publications), and access to specialized software tools in the ITS Lab all serve as opportunities to bring researchers together. Meeting spaces in both the ITS lab and DCT are available for research and student group activities. When appropriate, UDUTC students will be given office space in close proximity to the center and to affiliated faculty.

The existing graduate programs include three tracks. The first track, systems, includes core courses in systems, statistics, decision analysis, and operations research. The alternative track in civil and environmental engineering, bridge engineering, includes structures and analysis courses focused on bridges. The third track, policy analysis and planning, includes courses in policy analysis, decision making, urban planning, and transportation systems. Electives round out each track. All three tracks have a significant interdisciplinary element in both coursework and research.

The major change to these programs is the addition of a new graduate course in transportation systems. This course will be offered by faculty affiliated with the UDUTC and will be required of all students affiliated with the center. The course will cover the key elements of transportation systems analysis, policy, and economics and is intended to ensure that graduate students have a common vocabulary, a
common understanding of transportation problems, and an awareness of the tools and data available to support research in transportation.

Research is an integral part of the graduate programs offered in transportation, and students involved in UTC programs will be involved in research that supports the national strategy for surface transportation research as outlined in the section on “Research Selection.”

**Outstanding Student of the Year**
Each year, the UDUTC will select an outstanding student. The student of the year will be awarded $1000 as well as travel costs to attend the awards ceremony in Washington, D.C. during the TRB Annual Meeting. The student will be selected by the Project Selection Committee according to criteria that include:

- Maintaining a strong GPA average
- Taking the majority of his or her classes in transportation-related areas
- Being an active participant on a UDUTC research project
- Contributing to the intellectual community at UD by participating in and organizing student activities or being actively involved in one or more national organizations.

4. **Performance Indicators.**
Data on degree programs, courses offered, and number of graduate students participating in the graduate programs must be assembled from a variety of sources. Degree programs are identified with academic years, and new degree programs are relatively rare. We anticipate that the existing six graduate degree programs in Civil Engineering, Urban Affairs and Public Policy, and Marine Studies will remain in place over the course of the grant.

We will track the number of courses offered using the DCT online catalogue of transportation-related courses (http://www.ce.udel.edu/dct/education/education_files/2006FallCatalog.pdf), which is updated twice a year, and we will extract the number of students enrolled in each class from the University’s database of course availability. The Associate Director will be responsible for tracking this information.

**D. Human Resources**

Human Resources Goal: an increased number of students, faculty, and staff who are attracted to and substantively involved in the undergraduate, graduate, and professional programs of the Center.

**Baseline Measures.**
Six graduate programs that offer the opportunity to specialize in transportation are currently offered. These programs include both a master’s and a doctorate in Civil Engineering, Urban Affairs and Public Policy, and Marine Studies. These programs
enrolled 32 graduate students—25 master’s students and 7 doctoral candidates. In 2005-2006, these programs graduated 16 masters and 2 doctorates.

1. Human Resources Program Outcome.
To support the human resources goal of the UDUTC, the center will be involved in awareness building, education, and outreach activities for all ages and backgrounds. We will have a modest effort to introduce transportation issues and improve awareness in K-12 education and the general public. We will actively involve undergraduates in the UDUTC’s activities and introduce the importance and relevance of transportation in required freshman- and junior-level classes. We will maintain a critical mass of students and faculty involved in transportation and provide opportunities for interaction and collaboration. Finally, we will have a diverse group of graduates from various transportation-related fields placed in academia, consulting, NGO’s, government, and other transportation organizations at various levels in the organizations. While many will be at entry-level positions, they should be poised to move up in the organization or elsewhere to become influential decision makers and academics. Most importantly, our graduates will be the best recruiters for our program.

2. Planned Activities.
Our K-12 educational programs and our goal of building awareness of transportation issues among the general public will be introduced through ongoing T² and Engineering Outreach programs. Specifically, we will develop materials for the summer day camp and for campus tour groups.

Our recruiting efforts include

- Undergraduate research program (summer and winter session activities)
- Hosting visits from prospective graduate students
- Distributing flyers to and visiting schools focusing on minorities or offering only undergraduate curricula
- Promoting Center visibility
- Conducting a career evening including a panel discussion by practicing transportation professionals in cooperation with the FHWA Office of Professional and Corporate Development

Our retention efforts will include

- Graduate student scholarships that support students at critical points in their educational process. These critical points are typically the beginning or end of a program when a student is trying to identify a faculty member and/or project to work with, or when they are writing a dissertation. We anticipate supporting two students per year in this mode. The students will be selected by the project selection committee based on their interest in transportation issues related to the theme of the center, and faculty recommendations.
• Support for travel to conferences and meetings, such as the TRB Annual meeting and the Annual Interuniversity Symposium on Infrastructure Management (AISIM)

• Identification of internship opportunities and liaison with potential employers to ensure a productive intern and a valuable internship experience

Our Outreach efforts will include

• Brown bag lunches
• Distinguished speakers

3. Performance Indicators.
Collecting data on the number of graduates in each of the degree programs will require personal interaction with the home departments and colleges of enrolled and graduating students. The Associate Director will be responsible for collecting and maintaining this data.

E. Diversity

Diversity goal: students, faculty, and staff who reflect the growing diversity of the U.S. workforce and are substantively involved in the undergraduate, graduate, and professional programs of the Center.

1. Baseline Measures.
Not required.

2. Diversity Program Outcome.
The University of Delaware Commitment to Diversity Statement states: The University is committed to creating an educational community that is intellectually, culturally, and socially diverse, and enriched by the contributions and full participation of people from many different backgrounds.

Consistent with UD’s commitment to diversity, the participants in the center’s leadership, education, research, and outreach activities will closely reflect the diversity—in terms of background, race, age, and gender—of society as a whole.

3. Planned Activities.
As diverse perspectives are critical to responding effectively to transportation problems and to develop a rich learning environment, we take this challenge very seriously. While we are proud that we already have women and minority faculty involved in transportation at UD and have been very successful in attracting and retaining women graduate students, there is much to be done to ensure “representativeness” in all UTC programs.

This means that we have to pay attention to both recruiting and retention. Our recruiting efforts include outreach to Historically Black Colleges and Universities (HBCU) and Hispanic Serving Institutions (HSI) through direct mailings and campus
visits and the use of networks such as the Women in Engineering Program Advocates Network (WEPAN) and the Society of Women Engineers (SWE). The other part of the equation, retention, will be integral to our program. During orientation and seminars throughout the academic year, we will explicitly discuss the roles of advisors and advisees and the impact of diversity on our research, and we will provide opportunities for both formal and informal information exchange and support good advisement through ongoing collaboration.

We will also work with the various colleges and schools to identify, recruit, and retain minority undergraduate and graduate students. For example, Michael L. Vaughan, Senior Assistant Dean in the College of Engineering and Campus Co-PI for the Greater Philadelphia Louis Stokes Alliance for Minority Participation (LSAMP), is liaison to a number of programs serving underrepresented students. The School of Urban Affairs and Public Policy has more than 50% women and significant minority involvement in their graduate program. In partnership with the SUAPP faculty, we aim to involve more of these students in transportation activities.

The UDUTC will capitalize on the University’s involvement in the National GEM Consortium, the Louis Stokes Alliance for Minority Participation (LSAMP), and the McNair Scholars Program. Where possible, the UDUTC will offer research assistantships each year to broaden the pool of underrepresented students involved in center activities.

The UDUTC will partner with the Resources to Insure Successful Engineers (RISE) Program at UD to provide undergraduate research experiences for underrepresented students. This will include identification, recruitment, retention, and educational support for such underrepresented students. The key features of the RISE educational support program include personal development workshops, close participant monitoring and communication with sponsors/parents, tutoring, and personalized guidance in the selection of career and/or graduate school transition. Through companion efforts like the Forum to Advance Minorities in Engineering / Uninitiates’ Introduction to Engineering Program (UNITE)/ MERIT/ University of Delaware (FAME/UNITE/MERIT/UD) 5-week summer residential program for 11th and 12th grade high school underrepresented students and through extensive recruitment efforts that include working closely with pre-engineering and engineering technology students at Delaware State University and Delaware Technical and Community College, the RISE Program has been successful in recruiting underrepresented students to study engineering at the University of Delaware.

4. **Performance Indicators.**

Not required.

**F. Technology Transfer**

Technology Transfer Goal: availability of research results to potential users in a form that can be directly implemented, utilized or otherwise applied.
1. Baseline Measures.
The Technology Transfer ($T^2$) Center, Delaware Center for Transportation (DCT), Center for Innovative Bridge Engineering (CIBrE), and Institute for Public Administration (IPA) offered 26 outreach or technology transfer programs that included 1,721 participants in 2005-2006.

2. Technology Transfer Program Outcome.
Our technology transfer program will build on the activities of the $T^2$ Center, an operating unit under DCT. This will include building and enhancing existing activities, as well as undertaking complementary activities or new activities for the $T^2$ Center that build on the research products of the UTC. The technology transfer program will ensure easy access to research products and educational opportunities offered as part of the UDUTC and widespread awareness of the products locally, regionally, and nationally. We will use a variety of media, activities, and venues to accomplish this vision.

3. Planned Activities.
Specific efforts that build on ongoing activities associated with DCT and the $T^2$ Center include

- **UTC Internet home page**—The UDUTC’s homepage will be hosted from the DCT homepage (http://www.ce.udel.edu/dct/).
- **Newsletter**—The DCT newsletter is produced twice a year. Additional pages will be devoted to the research, students, outreach, and educational activities of the UDUTC. The newsletter currently has a circulation of 1600 nationally as well as being available on DCT’s website. The $T^2$ Center Newsletter is also produced twice a year, and supplementary material will be added focusing on implementation issues related to UTC projects.
- **Annual Research Showcase**—DCT researchers and, where appropriate, DelDOT project program managers present posters describing their research. The showcase provides an opportunity for display of research products and discussion between the researchers and the users of the research.
- **Brown-bag lunches and workshops**—These events, involving academicians and practitioners, provide an opportunity to discuss research issues and advances in various fields. We anticipate holding about four of these per year. Half would be on-campus and half would be off-campus at DelDOT or one of the MPOs. In either cases, both the practitioner and academic community would be invited to participate.
- **Student involvement in research and projects**—Student involvement in research projects and class projects with real transportation clients is facilitated by the $T^2$ Center and provides an important link among the research, classroom learning, and practice. For example, students may be involved in developing community inventories related to risk assessments.

The UDUTC will require that the results of each research project be presented at an on-campus seminar, symposium or conference. Regularly scheduled UDUTC, DCT
and department seminars, as well as DCT conferences, provide appropriate venues for this activity. These presentations will also be promoted by the UDUTC.

New activities that the UTC and T² Center will work on include

- Research briefs to encourage the exchange of information and draw practitioners to seek additional information.
- PowerPoint presentations that can be downloaded from the website to provide easy access to a clear, concise explanation of a project.
- Pilot projects and demonstrations to emphasize implementation and provide resources that go beyond the scope of the original project.
- UD researcher visits to DelDOT and other agencies to develop better working relationships.
- Annual forum to promote discourse on corridor planning and policy issues. Few opportunities exist for open discussion of transportation issues. The forum would be a day long event that begins with a keynote speaker on a particular topic and a panel discussion. Participants would then work in breakout groups to address issues relevant to our theme and fueled by the keynote speaker’s remarks and the panel discussion. The group would reassemble to discuss strategies for moving forward. Outcomes may include policy papers, and proposed research projects.
- Expansion of our outreach efforts beyond our local partners. We believe it is appropriate to being with partners that we know but it is important to expand beyond our comfort zone. We will welcome input form our project selection committee and advisory council.

Individual faculty will continue to participate in advisory roles in government and professional committees. These committees may be advisory or exploratory. In all cases, UDUTC faculty are eager to contribute their expertise as needed.

4. Performance Indicators.

The Associate Director will work with the T² Center Program Coordinator to maintain this data. Much of the data is already collected as part of the T² Center reporting that includes the number of participants in training sessions, short courses, and seminars.
III. Management Approach

This section of the Strategic Plan sets forth the Center Director’s management plan for meeting all the requirements of the grant and managing the personnel and activities of the Center. We describe the mechanisms for accomplishing, supporting, tracking, and evaluating the activities described in the previous sections. This includes institutional resources.

A. Institutional Resources

The University of Delaware is a state-assisted, privately governed institution that has been accorded land grant, sea grant, urban grant, and space grant status. With a combined undergraduate and graduate student population of over 20,000, UD has outstanding library, computing, and conference facilities; laboratories; and research support, as outlined and described briefly below:

- **Library**—The UD Library is a depository library for U.S. government publications, a patent depository for U.S. patents, and a repository for State of Delaware publications. The UD Library is an innovator in identifying, acquiring, and making accessible a broad range of electronic library resources.

- **Computing**—Delaware was an early adopter of the web for campus business, and the university has consistently been named among the top 10 of “America’s Most Wired Colleges” in *Yahoo! Internet Life Magazine*. Computing resources on campus for faculty, staff, and students are outstanding.

- **Conferences**—Most of the conference activity on the Newark Campus takes place at Clayton Hall, the largest, most complete facility in the state. Additional facilities range from traditional classrooms to the multi-purpose sports/convocation center, and from the Blue and Gold Club, which features fine dining, to the specialized facilities of the two ice skating centers. The Marriott Courtyard at the University of Delaware is a full-service hotel on the Newark campus catering to conference attendees. In addition to accommodations, the hotel meeting spaces complement UD’s other facilities.

- **Laboratories**—UD has state-of-the-art laboratories in all of its science and engineering departments. Facilities are continually upgraded to ensure that the latest technology is incorporated into the University’s research and education programs.

- **Research Administration**—The Office of the Vice Provost for Research (OVPR) facilitates and supports the university community in all areas of sponsored research. OVPR also supports intellectual property, technology transfer, and economic development activities at the University. The office serves as a portal for external entities to interface with the University in matters that relate to its research mission.
The UTC will be an operational unit under the Delaware Center for Transportation (DCT), which in turn is an operational unit under the Department of Civil and Environmental Engineering (CEE) at the University of Delaware. The UTC will be housed adjacent to DCT in CEE.

As such, the UDUTC will share some of DCT’s and CEE’s staff and facilities to ensure adequate support and leverage resources. Specifically, this will free up administrative resources for project and student support as well as outreach activities. The sources for and description of these resources are summarized in Table 3. As such, DCT has been restructured from the model shown in Figure 1 to the structure shown in Figure 2. By maintaining a separate director, programs focused on students, and research related to our theme, UTC will be clearly distinguishable from DCT.

DCT also operates the ITS Laboratory, a state-of-the-art research and educational facility. The lab is utilized for the management of information and communication and the development of control strategies. Recent updates include access to a variety of asset management related software and tools.

We will also draw on existing resources in terms of the graduate admissions process in CEE and existing infrastructure such as MyCourses@UD and other university-wide web resources for courses and projects. Our strong track record in funded projects is an indicator of our ability to leverage the base funding for the UTC. Finally, we will capitalize on our existing links to industry and international partners.

**Table 3. UTC Resources**

<table>
<thead>
<tr>
<th>Resources Available to UTC</th>
<th>Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Staff</strong></td>
<td>Director</td>
<td>CEE</td>
</tr>
<tr>
<td></td>
<td>Associate Director</td>
<td>CIBrE</td>
</tr>
<tr>
<td></td>
<td>T² Program Coordinator</td>
<td>DCT</td>
</tr>
<tr>
<td></td>
<td>Administrative Assistant</td>
<td>CEE</td>
</tr>
<tr>
<td><strong>Offices</strong></td>
<td>Faculty and support</td>
<td>DCT and CEE</td>
</tr>
<tr>
<td></td>
<td>Graduate student</td>
<td>CEE</td>
</tr>
<tr>
<td><strong>Laboratories</strong></td>
<td>Pavement Lab</td>
<td>CEE</td>
</tr>
<tr>
<td></td>
<td>Bridge Lab</td>
<td>CEE</td>
</tr>
<tr>
<td><strong>Teaching facilities</strong></td>
<td>ITS Lab</td>
<td>DCT</td>
</tr>
<tr>
<td></td>
<td>eCALC - two computer laboratories for teaching.</td>
<td>College of Engineering</td>
</tr>
<tr>
<td><strong>Library Facilities</strong></td>
<td>Main library</td>
<td>University</td>
</tr>
<tr>
<td></td>
<td>DCT library</td>
<td>DCT</td>
</tr>
<tr>
<td><strong>Computing Support Services</strong></td>
<td>Technical support</td>
<td>College of Engineering/CEE</td>
</tr>
<tr>
<td><strong>Research administration</strong></td>
<td>Contract processing, tracking of grants, graduation administration, etc.</td>
<td>UD, CEE</td>
</tr>
<tr>
<td><strong>Conference services</strong></td>
<td>State-of-the-art conference facility including meeting rooms and hotel</td>
<td>UD</td>
</tr>
</tbody>
</table>
B. Center Director

The Center Director, Sue McNeil, will be responsible for implementing the Center’s Strategic Plan and ensuring compliance with all other UTC Program requirements. Her resume is included in Appendix C. The Center director will report to the Director of the DCT. As the director of an established center in the College of Engineering, the DCT director reports to the Chair of CEE and sits on the Dean’s Advisory Council of the College of Engineering.

The UTC Director will establish an advisory committee to assist in setting direction and evaluating the center. The advisory committee will meet monthly to ensure effective communication. The advisory committee will consist of

- The Director of DCT
- One faculty member from Civil and Environmental Engineering
- Two faculty members from other academic Units on campus
- The UTC Associate Director
- The DCT T² Program Coordinator
- A graduate student representative

The UTC Director will work with

- The Associate Director and the Project Selection Committee to develop the research programs.
- The DCT T² Program Coordinator to develop outreach programs.
- Students and faculty across the university to develop a research program consistent with the vision outlined in Part I.
- Faculty, teaching units, and the DCT staff to enhance the UD educational program in transportation.
- Our external partners in local, regional, state, and federal agencies, consultants, and non-profits to develop applied research projects, implementation plans, and training as appropriate.
- The DCT director to coordinate research with ongoing and proposed transportation research programs, education, and outreach.

Ultimately, the responsibility for these programs lies with the UDUTC Director.

The Director will oversee the UDUTC’s funds, personnel, and programs. The Director will also represent the center at meetings with stakeholders, conferences, and workshops, including the business meetings of the Council of University Transportation Centers (CUTC) and at meetings with the DOT. Finally, the Director will serve as a liaison to other strategic partners and participants in the Mid-Atlantic University Transportation Center (MAUTC).
The Director will commit 11% of her time to the center. Approximately 24% will be supported by the UTC, and the remainder will be in the form of cost sharing.

C. Center Faculty and Staff

The Associate Director will spend 40% time on Center activities. Diane Kukich, currently Research Administrator in CIBrE, will assume this role.

The Associate Director, who will report to the UTC Director, will

- Supervise the Administrative Assistant in budget and contract management.
- Ensure compliance with all federal and state reporting requirements related to the University Transportation Centers program.
- Coordinate training and education activities in concert with campus faculty for graduate and undergraduate students.
- Create an educational agenda focused on regional and State DOT personnel across the region.
- Identify programs and deliver or present educational materials for students and practitioners, including the promotion of transportation careers at the K-12 level.
- Develop retention strategies in concert with campus faculty to encourage students to remain in transportation programs.
- Collaborate with the T² Center Program Coordinator to create processes to transfer research to practice, including, but not limited to, symposia, publications, websites, and conferences.
- Monitor and work to continuously improve the Center’s activities and programs.

Other related duties include the following:

- Assist the Director of the UTC in accomplishing its mission as outlined in its strategic plan and in further developing the Center’s research, education, and outreach programs in transportation infrastructure management.
- Coordinate the initiation of new and ongoing research activities of the Center.
- Coordinate the proposal review process.
- Coordinate the project advisory committees.
- Serve as liaison with Center sponsors to identify research topics related to the Center’s theme.
- Develop research work plans, conduct independent and collaborative research, write interim and final reports, and prepare and deliver presentations on research results.
- Serve as a peer reviewer of research problem statements, proposals, and reports.
• Represent the Center within the University to academic departments and other research centers and outside the University to government, the private sector, academic partners, and other universities.
• Develop relationships with private and public sector transportation organizations toward expanding the Center's research, education, and outreach programs.
• Provide presentations in transportation research and practice seminars.
• Cooperate with the staff in the College of Engineering Outreach Program and the T² Center on development and delivery of short courses, workshops, peer exchanges, and seminars.
• Oversee the day-to-day operations of the UTC and be responsible for meeting all federal obligations and requirements associated with the grant.
• Monitor the Center’s activities and programs and identify and implement strategies for continuous improvement.
• Coordinate visits of prospective students.

D. Multiparty Arrangements

The Delaware UTC focuses the majority of its activities at the University of Delaware. However, the University Transportation Centers at Morgan State University and UD are strategic partners in the Mid Atlantic University Transportation Center (MAUTC), led by the Pennsylvania State University. As strategic partners, Morgan State University and the University of Delaware do not directly receive any funding from MAUTC but participate in MAUTC activities and collaborate on research and outreach activities. Other opportunities to be pursued include collaboration in ongoing and new research projects, student and faculty exchange programs, student-focused field trips, seminars and distinguished speakers, distance education, and the delivery of specialized courses.
Figure 1. DCT Projects
E. Matching Funds

UDUTC has commitments of matching funds from DelDOT and the Department of Civil and Environmental Engineering. The University also waives tuition for students supported on grants, and these tuition waivers serve as a source of matching funds.

We anticipate the DelDOT match to be in the forms of support for outreach activities through the T² center and research projects.

Additional funds will be sought from other strategic partners. Over the course of the grant, other sources of match will be developed.
IV. Budget Details
The attached budget details the center’s budget for the first year of operation.

A. Grant Year
The grant year is 10/01/2006 to 09/30/2007. The grant year matches the academic year to the extent that reporting will be on the basis of an academic year.

B. Salaries
The percent of effort is included for each staff member.

C. Scholarships
UDUTC will award two fellowships. These fellowships require the students to participate in the activities of the center and conduct research in transportation; however, the fellowships will not directly support specific projects.

D. Equipment
UDUTC is not anticipating the purchase of any equipment with a unit acquisition cost exceeding $5,000. If this changes, written permission will be obtained from DOT, per section III.3 of the General Provisions, prior to the purchase of any permanent equipment.

E. Expendable Property Supplies and Services
Expendable property supplies and services are required to support the operation of the center.

F. Foreign Travel
UDUTC is not anticipating using funds for foreign travel. If this changes, written permission will be obtained from RITA.

G. Other Direct Costs
Other direct costs include honoraria and travel costs for speakers, conferences, an award for a student of the year, and publications.

H. Facilities and Administrative Costs
Facilities and administrative (F&A) costs are based on audited university rates.
University Transportation Center (UTC) Budget Plan

Name of Grantee: University of Delaware    Grant Year: 10/01/2006 to 09/30/2007
<table>
<thead>
<tr>
<th>Categories</th>
<th>Budgeted Amount</th>
<th>Explanatory Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center Director Salary</td>
<td>$21,155</td>
<td>11% of the Director’s effort is being committed to this project. $5,000 for administration of the Center is requested from UTC. The University will commit one month effort of the Directors Academic salary representing 1/9th of the base in the amount of 16,155 plus fringes and overhead as cost sharing.</td>
</tr>
<tr>
<td>Faculty Salaries</td>
<td>$45,000</td>
<td>The faculty salaries is being requested to support nine faculty projects. The percent of effort will be indicated after the awards are made to the Principal Investigators. We anticipate five projects will be supported with RITA funds and four with cost sharing.</td>
</tr>
<tr>
<td>Administrative Staff Salaries</td>
<td>$32,500</td>
<td>The Center will support 40% effort of a Research Administrator and an 20% effort Administrative Assistant. The day to day operations and management of the Center will be managed by these positions under the direction of the Center Director.</td>
</tr>
<tr>
<td>Other Staff Salaries</td>
<td>$20,000</td>
<td>As part of the cost sharing, the staff of the T2 center will assist with outreach and dissemination.</td>
</tr>
<tr>
<td>Grad Student Salaries</td>
<td>$223,200</td>
<td>Two Graduate fellowships will be supported by the Center. One Graduate Research Assistant will be allocated to each of the nine projects that will be awarded.</td>
</tr>
<tr>
<td>UG Students</td>
<td>$10,000</td>
<td>We are also requesting funds for Undergraduate Research</td>
</tr>
<tr>
<td>Staff Benefits</td>
<td>$54,221</td>
<td>Fringe Benefits are charged to faculty/professional, staff, graduate student salaries at the rates of 34%, 52% and 4% respectively. The University’s agency is ONR.</td>
</tr>
<tr>
<td><strong>Total Salary and Benefits</strong></td>
<td><strong>$406,076</strong></td>
<td></td>
</tr>
<tr>
<td>Scholarships/ Tuition</td>
<td>$151,750</td>
<td>University provides tuition for funded grad students. Amount is based on current rate of 4 in-state and 7 out-of-state graduate students for one academic year each. Tuition is part of the match</td>
</tr>
<tr>
<td>Permanent Equipment</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>Expendable Property, Supplies and Services</td>
<td>$28,725</td>
<td>Computers for Fellows and miscellaneous supplies and expenses</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------</td>
<td>-----------------------------------------------------------------</td>
</tr>
<tr>
<td>Domestic Travel</td>
<td>$17,000</td>
<td>The travel budget includes the cost of administrative travel for students, travel to and from conferences to present papers etc.</td>
</tr>
<tr>
<td>Foreign Travel</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>Other Direct Costs (Specify)</td>
<td>$11,108</td>
<td>$2,500 for speakers, $4,200 for conferences, $4,408 for publications and student of the year.</td>
</tr>
<tr>
<td><strong>Total Direct Costs</strong></td>
<td>$614,659</td>
<td></td>
</tr>
<tr>
<td>F&amp;A 53%</td>
<td>$245,342</td>
<td>UD charges 53% of Modified Total Direct Costs (MTDC) Consisting of all cost with the exception of equipment (defined as an article of nonexpendable tangible personal property having a useful life of more than one year and an acquisition cost of $5,000 or more per unit.), capital expenditures, charges for tuition remission, rental costs of offsite facilities, scholarships, fellowships as well as the portion of each subgrant and subcontract exceeding $25,000.</td>
</tr>
<tr>
<td><strong>Total Costs</strong></td>
<td>$860,000</td>
<td></td>
</tr>
<tr>
<td>Federal Share</td>
<td>$430,000</td>
<td></td>
</tr>
</tbody>
</table>
V. Appendix — Baseline Measures for University of Delaware UTC

The following baseline measures are based on the 2005-2006 academic year.

A. Research Selection

<table>
<thead>
<tr>
<th>Transportation Research Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Number of transportation research projects selected for funding</td>
</tr>
<tr>
<td>1.a Number of projects that you consider to be:</td>
</tr>
<tr>
<td>basic research</td>
</tr>
<tr>
<td>advanced research</td>
</tr>
<tr>
<td>applied research</td>
</tr>
<tr>
<td>(Project may be included in more than one category if applicable)</td>
</tr>
<tr>
<td>2. Total budget costs for the projects reported in 1 above</td>
</tr>
</tbody>
</table>

B. Research Performance

Provide the following information about transportation research performance at the institution[s] comprising your Center for the most recently completed academic year:

<table>
<thead>
<tr>
<th>Transportation Research Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Number of transportation research reports published</td>
</tr>
<tr>
<td>4. Number of transportation research papers presented at academic/professional meetings</td>
</tr>
</tbody>
</table>
### C. Education

<table>
<thead>
<tr>
<th>Transportation Education</th>
<th>Undergrad</th>
<th>Graduate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Number of courses offered that you consider to be part of a transportation curriculum.</td>
<td>14</td>
<td>23</td>
<td>37</td>
</tr>
<tr>
<td>6. Number of students participating in transportation research projects.</td>
<td>299</td>
<td>861</td>
<td>1160</td>
</tr>
</tbody>
</table>

### D. Human Resources

<table>
<thead>
<tr>
<th>Human Resources</th>
<th>Transportation-Related Degree Programs</th>
<th>Masters</th>
<th>Doctorate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Number of advanced degree programs offered that you consider to be transportation related.</td>
<td></td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>8. Number of students enrolled in those transportation-related advanced degree programs.</td>
<td></td>
<td>25</td>
<td>7</td>
<td>32</td>
</tr>
<tr>
<td>9. Number of students who received degrees through those transportation-related advanced degree programs.</td>
<td></td>
<td>16</td>
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</table>
### E. Technology Transfer

<table>
<thead>
<tr>
<th>Transportation Technology Transfer and Outreach</th>
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<tbody>
<tr>
<td>10. Number of transportation seminars, symposia, distance learning classes, etc. conducted for transportation professionals.</td>
</tr>
<tr>
<td>11. Number of transportation professionals participating in those events.</td>
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</tbody>
</table>
## VI. Appendix — Strategic Plan Development

### A. Retreat Participants

#### University of Delaware

<table>
<thead>
<tr>
<th>Affiliation</th>
<th>Name</th>
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</thead>
<tbody>
<tr>
<td>Civil and Environmental Engineering</td>
<td>Attoh-Okine, Nii</td>
</tr>
<tr>
<td>Civil and Environmental Engineering</td>
<td>Chajes, Michael</td>
</tr>
<tr>
<td>Civil and Environmental Engineering</td>
<td>Faghri, Arde</td>
</tr>
<tr>
<td>Civil and Environmental Engineering</td>
<td>McNeil, Sue</td>
</tr>
<tr>
<td>Civil and Environmental Engineering</td>
<td>Meehan, Chris</td>
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<td>Civil and Environmental Engineering</td>
<td>Mertz, Dennis</td>
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<tr>
<td>Civil and Environmental Engineering</td>
<td>McConnell, Jennifer</td>
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<tr>
<td>College of Agriculture and Natural Resources</td>
<td>Barton, Sue</td>
</tr>
<tr>
<td>College of Business and Economics</td>
<td>Kher, Hemant</td>
</tr>
<tr>
<td>College of Human Services, Education and Public Policy</td>
<td>Dworsky, Bernie</td>
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<td>College of Human Services, Education and Public Policy</td>
<td>O’Donnell, Ed</td>
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<td>College of Human Services, Education and Public Policy</td>
<td>Warren, Bob</td>
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<tr>
<td>College of Human Services, Education and Public Policy</td>
<td>Klepner, Larry</td>
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<td>DCT, LTAP</td>
<td>Taylor, Wanda</td>
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#### Industry and Government

<table>
<thead>
<tr>
<th>Affiliation</th>
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<tbody>
<tr>
<td>City of Wilmington</td>
<td>Blankenship, Dave</td>
</tr>
<tr>
<td>DART</td>
<td>Dennis, Cathy</td>
</tr>
<tr>
<td>DelDOT</td>
<td>Faust, Trish</td>
</tr>
<tr>
<td>DelDOT</td>
<td>Kling, Wayne</td>
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<td>DelDOT</td>
<td>La Combe, Daniel</td>
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<td>DelDOT</td>
<td>Reeb, Ralph</td>
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<tr>
<td>Dover MPO</td>
<td>Wiczoreck, Juanita</td>
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<tr>
<td>Edwards and Kelcey</td>
<td>Rybinski, Holly</td>
</tr>
<tr>
<td>FHWA Division Office</td>
<td>Samick, Rosemary</td>
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<tr>
<td>RKK Engineers</td>
<td>Harbeson, Ray</td>
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<tr>
<td>TMA</td>
<td>Roy, Roger</td>
</tr>
<tr>
<td>Wilmapco</td>
<td>Blevins, Dan</td>
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</table>
B. Agenda

University Transportation Center – University of Delaware
10 am - 3:00 pm, Friday, August 25
Room 115A, Pencader Hall

Objectives:
To develop the key inputs to the UTC Strategic Plan that documents the research, educational and technology transfer initiatives of the center, establishes the research theme, and sets key strategies including the selection of research projects.

Participants:
Industrial and government partners, and UD research team

Schedule:

10:00 am Welcome and Introductions

10:15 am Background on DCT and the UTC Grant and Purpose of the Retreat (Arde Faghri and Larry Klepner)

10:15 am Overview of our Grant Guidelines and Strategic Plan Requirements (Sue McNeil)
  Background and benchmarks
  Proposed management structure
  Related efforts (DCT, CANR, CIBrE, CHEP, CMES, Business School, Geography)

11:15 am Role of Industrial and Government Partners (Sue McNeil and participants)
  Brief summaries from partners outlining interest in area and current activities
  Discussion of opportunities for interaction

11:45 noon Discussion of potential themes (Sue McNeil)

12:30 pm Lunch

1:15 pm Research focus/activities (Sue McNeil)

1:45 pm Research selection strategies – models used by other UTCs (Sue McNeil)

2:00 pm New educational activities (Sue McNeil)
<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
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<tbody>
<tr>
<td>2:30 pm</td>
<td>New Technology Transfer activities (Sue McNeil)</td>
</tr>
<tr>
<td>2:45 pm</td>
<td>Next steps</td>
</tr>
<tr>
<td>3:00 pm</td>
<td>Adjourn</td>
</tr>
</tbody>
</table>
C. Director’s Resume

SUE MCNEIL
Professor
Department of Civil and Environment Engineering
University of Delaware
Telephone:  302 831 6578
Fax: 302 831 3640
E-Mail: mcneil@ce.udel.edu
Address:
301 W Dupont Hall
Newark, De 19716

Sue McNeil is Professor of Civil and Environmental Engineering and Urban Planning and Public Affairs at University of Delaware. She was formerly the Director of the Urban Transportation Center and Professor in the College of Urban Planning and Public Affairs and the Department of Civil and Materials Engineering at University of Illinois at Chicago. Prior to joining UIC, she was a Professor of Civil & Environmental Engineering and Engineering & Public Policy at Carnegie Mellon University. Her research and teaching interests focus on transportation infrastructure management with emphasis on the application of advanced technologies, economic analysis, analytical methods, and computer applications. Dr McNeil served as a member of the Executive Committee of the Transportation Research Board from 2004-2007 and the Board on Infrastructure and the Constructed Environment since 2002. She chairs the Transportation Research Board Committee on Asset Management. She also chaired (1988-1993) the ASCE Urban Transportation Division Committee on Transportation Facilities Management and is a founding Associate Editor for the ASCE Journal of Infrastructure Systems. She is a registered professional engineer.

Education

<table>
<thead>
<tr>
<th>Degrees</th>
<th>Field</th>
<th>Institution and Date Awarded</th>
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<tbody>
<tr>
<td>Ph.D</td>
<td>Civil Engineering</td>
<td>Carnegie-Mellon University - Dec 1983, Pittsburgh</td>
</tr>
<tr>
<td>M.S.</td>
<td>Civil Engineering</td>
<td>Carnegie-Mellon University - May 1981, Pittsburgh</td>
</tr>
<tr>
<td>B.E.(Hons I)</td>
<td>Civil Engineering</td>
<td>University of Newcastle - Dec 1977, Australia</td>
</tr>
<tr>
<td>B.Sc.</td>
<td>Mathematics</td>
<td>University of Newcastle - Dec 1975, N.S.W.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Australia</td>
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Academic Positions Held:

<table>
<thead>
<tr>
<th>2005 – present</th>
<th>Professor</th>
<th>Civil and Environmental Engineering</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Urban Planning and Public Affairs</td>
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<tr>
<td></td>
<td></td>
<td>University of Delaware</td>
</tr>
<tr>
<td>2000 – 2005</td>
<td>Director</td>
<td>Urban Transportation Center</td>
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<tr>
<td></td>
<td>Professor</td>
<td>Urban Planning and Policy</td>
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<tr>
<td></td>
<td></td>
<td>University of Illinois at Chicago</td>
</tr>
<tr>
<td>1999 – 2000</td>
<td>Braun Intertec</td>
<td>Department of Civil Engineering</td>
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UTC Strategic Plan

University of Delaware

<table>
<thead>
<tr>
<th>Year</th>
<th>Position</th>
<th>Institution</th>
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</thead>
<tbody>
<tr>
<td>1994 - 2000</td>
<td>Visiting Professor</td>
<td>University of Minnesota</td>
</tr>
<tr>
<td>1990 - 1994</td>
<td>Assoc. Professor</td>
<td>Department of Civil and Environmental Engineering &amp; Engineering Public Policy</td>
</tr>
<tr>
<td>1988 - 1990</td>
<td>Asst Professor</td>
<td>Department of Civil Engineering, Carnegie-Mellon University</td>
</tr>
<tr>
<td>1985 - 1988</td>
<td>Asst Professor</td>
<td>Department of Civil Engineering, Massachusetts Institute of Technology</td>
</tr>
<tr>
<td>1984 - 1985</td>
<td>Visiting Lecturer</td>
<td>Department of Civil Engineering, Princeton University</td>
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<tr>
<td>1981 - 1981</td>
<td>Instructor</td>
<td>Department of Civil Engineering, Carnegie-Mellon University</td>
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Recent Teaching Experience
Introduction to Civil Engineering, Transportation Engineering, Disaster Engineering, Civil Infrastructure Systems

Selected Recent Publications


