

# **Annual Report**

## **University Transportation Centers Program**

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Fiscal Year 1999

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Prepared for  
**University Transportation Centers Program, U.S. Department of Transportation**

Prepared by

The logo for the National Institute for Advanced Transportation Technology (NIATT) features the acronym "NIATT" in a bold, italicized, sans-serif font. A thick, black, curved line sweeps over the top of the letters, starting from the left and ending with a small upward-pointing arrowhead on the right.

**National Institute for Advanced Transportation Technology  
University of Idaho**

Michael Kyte, Director  
Judith C. Breedlove, Management Assistant  
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**October 1999**

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## **INTRODUCTION**

The National Institute for Advanced Transportation Technology (NIATT) was established in 1991 as part of the Intermodal Surface Transportation Efficiency Act. Since 1991, NIATT has grown both in size and scope. NIATT was granted institute status by the University of Idaho (UI) in July 1998 in recognition of its university-wide, multidisciplinary activities. In 1998, NIATT was funded through the University Transportation Centers (UTC) Program, along with thirty-two other university transportation centers. This report describes the results of the first year's funding from the UTC program.

### **Institute Theme**

Our theme is transportation technology. We develop, evaluate, and market technology products. We define a technology product to be hardware or software deployed to improve our nation's transportation system. We define hardware as systems or components for traffic control devices, vehicles, and infrastructure.

### **Scope**

Four centers operate as part of our transportation institute. Each has a unique mission related to transportation, while still supporting our overall theme and mission:

- Technology Transfer Center
- Center for Infrastructure Technology
- Center for Traffic Operations and Control
- Center for Clean Vehicle Technology

The UTC program funds the work of two of the centers, the Center for Traffic Operations and Control and the Center for Clean Vehicle Technology.

### *Technology Transfer Center*

The mission of the Technology Transfer (T2) Center is to provide leadership that supports and enhances the overall effectiveness of local transportation agencies through communication, consultation, technical support and training programs. The T2 Center's activities focus on active, progressive, and cost-effective transfer of highway technology and technical assistance. Funding for the center comes from the Local Technical Assistance Program (LTAP) of the Federal Highway Administration. The center's primary customers are Idaho's small cities, counties, and highway districts.

### *Center for Infrastructure Technology*

The mission of the Center for Infrastructure Technology is to develop, test, and evaluate technologies that can be used to improve the highway infrastructure in the state of Idaho, the Pacific Northwest, and the nation. The activities of this center focus on infrastructure components that include pavements, bridges, and construction materials, as well as planning methods, design practices, and software development. Funding for this center comes primarily from the State Planning and Research Program (SPR) of the Idaho Transportation Department (ITD). This center's primary customer is ITD.

### *Center for Traffic Operations and Control*

The mission of the Center for Traffic Operations and Control is to develop, test, and evaluate technology products supporting advanced traffic control systems. The activities of this center focus on a traffic control system testbed that includes five components: traffic detection, control, surveillance, simulation, and optimization. Funding for the work of this center comes from the University Transportation Center (UTC) grant. The main customer for the work of this center is local government agencies and practicing engineers in small to medium-sized cities (up to a population of approximately 150,000).

### *Center for Clean Vehicle Technology*

The mission of the Center for Clean Vehicle Technology is to develop, test, and evaluate technologies to reduce the impact that vehicles have on the environment. This includes

technologies for the new generation of vehicles,<sup>1</sup> as well as for recreational vehicles to be used in environmentally sensitive areas such as national parks.

This center's activities include developing technology testbeds consisting of electric and hybrid electric vehicles, models of alternative vehicles, and software models for vehicle performance. The testbeds will be used to demonstrate innovative designs, materials, fuels, drive trains, and power sources. Funding for the activities of this center comes from the UTC grant. Center projects will also develop partnerships that contribute technologies, collaborative funding, and/or expertise. The main customers of this center include federal and state funding agencies and industrial partners. Federal agencies include the Department of Transportation (DOT) and the Department of Energy (DOE) Office of Transportation Technology. Other partners include regional transit authorities and engine manufacturers.

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<sup>1</sup> This is supportive of the federal government's Partnership for a New Generation Vehicle (PNGV).

## **SUCCESS STORIES: THE FIRST RESULTS OF THE UTC INVESTMENT**

We can enthusiastically report on seven areas of success as a result of our first year of funding through the UTC program:

- We conducted a strategic planning process that has given us a guide for focusing our work, investing the UTC funds, and reviewing the quality of our program. A major part of this effort has been to establish two peer review panels composed of national and regional transportation technology experts. These experts will work with us on all phases of project selection, quality control, and product review.
- We established new institute faculty and staff support positions, made possible by increased funding from the University of Idaho and the state of Idaho. This increased funding was made possible by the UTC investment.
- We instituted educational programs that: develop leadership and mentoring skills for our students and faculty, provide internet-based learning materials to university students, and provide hands-on science experience to junior high school students preparing for careers in transportation.
- We won a national electric vehicle competition and we secured a position in the Department of Energy's FutureTruck program, both the result of technology innovations developed through UTC funding.
- We developed an important new traffic systems control hardware interface that supports the Federal Highway Administration's ITS program.
- We established new outreach materials and programs, to encourage practicing professionals to use our technology.
- We involved a total of 68 graduate and undergraduate students in our research, offered seven internships, and awarded \$1000 to our Outstanding Student of the Year.

## **Strategic Planning Process: A Guide for Focus, Investment, and Evaluation**

### *Priorities and Project Selection*

We initiated a strategic planning process for the UTC program soon after the passage of the TEA-21 legislation in May 1998. Since NIATT has been in existence since 1991, our first step was to revisit the institute's stated mission and to re-evaluate its relevance to the UTC program goals. With this purpose in mind, fifteen NIATT faculty and staff participated in a strategic planning workshop in Moscow on June 8 and 9, 1998. We made the following strategic decisions, which were formalized in the document titled *DECISION 21*.<sup>2</sup>

- UTC funds will be invested in two areas: the Center for Traffic Operations and Control and the Center for Clean Vehicle Technology.
- Since its most important external partner is the Idaho Transportation Department, NIATT will continue to work with the department in infrastructure support research. Primary funding will come from ITD's State Planning and Research (SPR) program.
- Education and training, software tools development, and environmental protection will be considered support efforts for the two UTC-funded focus areas.
- The Technology Transfer Center will expand its work in two ways: delivering training programs to a wider audience of transportation engineers and technicians, and delivering training in the products developed by NIATT research teams.

One of our early decisions concerned the importance of building teams within NIATT, with faculty cooperating on research, rather than competing among themselves for project funding. We established a project selection process that incorporates the concepts of team building, cooperation, and peer review in new and innovative ways. We determined that the primary means of project identification and selection would be through a partnership with federal and state agencies responsible for establishing national and state priorities

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<sup>2</sup> *Decision 21: A Set of Strategic Decisions for the National Center for Advanced Transportation Technology*. University of Idaho, 13 July 1998.

for transportation. We would identify priorities and supporting research problem statements through discussions with federal and state program managers, matching their problem statements with the capabilities of NIATT's research teams.

To determine which federal and state priorities could best be addressed by NIATT, we examined our past successes and the interests and capabilities of our faculty and students. We chose specific goals or initiatives, as articulated in government planning documents,<sup>3</sup> for which NIATT researchers had the best opportunity to provide significant contributions. We then translated these goals or initiatives into three priority focus areas:

- Traffic control system technologies essential to the national intelligent transportation system infrastructure
- Technologies supporting the development of new generation vehicles
- Capacity building for transportation engineering professionals working in both vehicle and traffic control technology industries

### *Peer Review Panels*

Our external peer review process provides valuable ongoing dialogue between NIATT research teams and the peer reviewers. Unlike the standard peer review process, ours intimately involves outside reviewers in every phase of a project: initial project selection, project conduct and final product review. We established two peer review panels, one to help guide the work of the Center for Traffic Operations and Control and the other to help guide the work of the Center for Clean Vehicle Technology. The members of the panels are listed in Table 1. NIATT Peer Review Panel members represent universities, government agencies at all levels, and industry. The panels met twice during the past year. Individual meetings were held in November 1998 (Center for Traffic Operations

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<sup>3</sup> DOT's "United States Department of Transportation's Strategic Plan for Fiscal Years 1997 to 2002" <http://www.dot.gov/hot/dotplan.html>; planning document of the National Science and Technology Council <http://www.volpe.dot.gov/pubs/nstc/>; *Transportation Science and Technology Strategy* (National Science and Technology Council, September 1997); U.S. Department of Energy's *Strategic Plan*, (DOE/PO-0053, September 1997); ITD's *Idaho Transportation Plan: Action for Today with a Vision for the Future* (Idaho Transportation Department, Transportation Planning Division, May 1995).`

and Control panel) and in January 1999 (Center for Clean Vehicle Technology panel). The panels met jointly in April/May 1999.



*Traffic Operations and Control Panel members (l to r) Jim Pline (Pline Engineering), Bill Kloos (Portland Bureau of Traffic Management), Charles Wallace (University of Florida), and George List (Rensselaer Polytechnic Institute) discuss the roles and organizational structure of the peer review panel.*

The peer review panels accepted the following responsibilities:

- Review and provide feedback on the NIATT program. This includes reviewing NIATT's proposals and development projects during the four-year UTC grant period, our research, education and technology transfer components, and our strategic plan and its implementation.
- Review the quality, relevance, and usefulness of the technology products and research results, and provide guidance on implementation approaches.
- Review research progress and discuss potential program improvements through regular on-site meetings and other communications.
- Make personal investments in the growth and development of our research and technology programs, and in NIATT students and faculty. This personal investment by panel members will encourage a higher level of commitment to the success of our program.

Both peer review panels have provided detailed reviews of the Strategic Plan and NIATT priorities. The document *Program Plan Priorities and Evaluation - FY2000*<sup>4</sup> describes the results of the joint peer review panel meeting held in April/May 1999.

The document includes:

- seventeen priority action items for NIATT during FY2000,
- a listing of program plan items originally identified in the Strategic Plan that are considered low priority by the peer review panel members and that we should consider eliminating from the Strategic Plan, and
- evaluation tools that should be used to assess NIATT's program performance.

#### *Peer Review Panel Major Recommendations*

The peer review panel for the Center for Traffic Operations and Control recommended that NIATT focus on the needs of small urban and rural communities, a recommendation we have adopted. To help assess the needs of this group, NIATT is collaborating with the Advanced Traffic Analysis Center at North Dakota State University. Together, we are designing a survey that will be administered in FY2000 to traffic engineers practicing in small urban and rural communities.

The peer review panel for the Center for Clean Vehicle Technology recommended continued participation in student electric vehicle competitions. They also recommended continued research in vehicle technologies that help reduce the environmental impacts of vehicles, especially those to be used in national parks and pristine areas.

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<sup>4</sup> *Program Plan Priorities and Evaluation - FY2000: Assessment of Strategic Plan by NIATT Peer Panels.* University of Idaho, 1 June, 1999.

**Table 1. NIATT Peer Review Panel Members**

<b>Center for Traffic Operations and Control</b>	<b>Center for Clean Vehicle Technology</b>
Raj Ghaman Federal Highway Administration Washington, DC	Basil Barna Idaho National Engineering and Environmental Laboratory Boise, ID
Wayne Kittelson Kittelson & Associates Portland, OR	William Burnett Aqualytics, Incorporated Sandpoint, ID
William Kloos Bureau of Traffic Management City of Portland	Donald Durkee Federal Transit Administration Washington, DC
Greg M. Laranan Idaho Transportation Department Boise, ID	Gerry D. Galinato Idaho Department of Water Resources Boise, ID
Jim Larsen Ada County Highway District Boise, ID	Thomas D. Gillespie University of Michigan Ann Arbor, MI
George List Rensselaer Polytechnic Institute Troy, NY	Senator James McClure McCall, ID
Phil Nicholes Eagle Traffic Control Systems Austin, TX	Pat Moseley International Lead Zinc Research Organization, Inc. Research Triangle Park, NC
Jim Pline Pline Engineering Boise, ID	William Siegel Federal Transit Administration Washington, DC
William Reilly Catalina Engineering Tucson, AZ	Ro Sullivan Department of Energy Washington, DC
Carlton Robinson Transportation Engineering Consultant Bethesda, MD	Harry Townes Montana State University Bozeman, MT
Stan Teply University of Alberta Edmonton, Alberta	David E. Walrath University of Wyoming Laramie, WY
Charles Wallace University of Florida Gainesville, FL	Jerry Whitehead Western Trailers Boise, ID

## **Institute Financial Support: A Base for Support and Growth**

The award of the UTC funds stimulated and strengthened Idaho's investment in NIATT's transportation research and technology development.

### *University Support*

In FY99, the university significantly increased its financial support to NIATT to \$100,000 annually. This operating support, along with the existing funding commitment for two full-time state supported positions,<sup>5</sup> provided the means by which NIATT could build the strong infrastructure needed to support its growing research programs. Three new positions were established and filled this year: an account technician to provide grant and budget support, a technical writer to develop and review grant applications, prepare external communications, and prepare final project reports, and a computer software design engineer to develop the tools needed for our research projects and to support our growing computer network.

### *New Transportation Faculty Position*

Because of the significance of the UTC program investment, the University of Idaho was awarded a new faculty research position in traffic operations and control as part of the Governor's Research Initiative and the university's Advantage Idaho. These programs, both designed to enhance research at the University of Idaho and throughout the state, resulted from the collective support of the governor, the state legislature, and University of Idaho President Robert Hoover. This new faculty position, created to support NIATT's work in traffic signal systems technology, will be filled during the FY2000 academic year.

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<sup>5</sup> NIATT director and NIATT management assistant.

## **Education Success Stories**

We are committed to providing a strong education component for undergraduate students, graduate students, high school students and transportation professionals. Our first year of UTC funding has provided success stories for each group. We involved 21 graduate students and 47 undergraduate students in our projects. We awarded seven internships to undergraduates, in order to give them exciting opportunities to work with both faculty and graduate students. We also selected an Outstanding Student of the Year.

### *Idaho Engineering Works*

We are using Idaho Engineering Works (IEWorks) to develop leadership and mentoring skills for our graduate students, undergraduate students, and faculty. IEWorks is an innovative model designed to enhance the graduate research experience, the undergraduate capstone design experience, and the abilities of faculty members to guide research-based design projects.

The IEWorks focus is unique. On college campuses throughout the country, one typically finds centers or groups focusing on a particular technical area (i.e., transportation). Instead, IEWorks expands the student's focus to include commitment: commitment to the development of oneself, commitment to the development of others, and commitment to leaving IEWorks and NIATT better than when one arrived. The model of Idaho Engineering Works has been integrated into the work of both the Center for Traffic Operations and Control and the Center for Clean Vehicle Technology. We plan to improve the model in subsequent years, in the expectation that it can be duplicated at other universities or organizations.

### *Engineering Design Exposition*

NIATT was one of three major sponsors of this year's Engineering Design Exposition. The Design Expo is a showcase for senior design capstone projects, and this year attracted nearly 200 exhibits and over 2000 visitors, including local high school students.

Jack Lemley, University of Idaho graduate and CEO of the Channel-Tunnel project was the keynote speaker. Ten NIATT-sponsored design projects were entered in the Design Expo (see Table Table 2.)



*Mechanical Engineering Senior Design Students Nick Peck and Josh Larsen show off their all-terrain wheelchair*

*Table 2. NIATT Design Projects*

<b>Design Project</b>	<b>Student Design Team</b>
Electric vehicle	Advanced Vehicle Concepts Team
Vehicle structural design software	Robert Sachjten, ME graduate student Edwin Odom, faculty sponsor
Vehicle simulation software	David Alexander, ME graduate student Don Blacketter, faculty sponsor
Yanmar diesel to aqualytic fuel conversion	Eric Clarke, ME undergraduate student Andron Morton, ME graduate student Steve Beyerlein, faculty sponsor
Conversion of Idaho Department of Water Resources field truck to aqualytic fuel	Dave Reiche, ME graduate student Genoveva Torrez, ME graduate student Steve Beyerlein, faculty sponsor Judi Steciak, faculty sponsor
Trailer structural optimization software	Kris Carlquist, ME graduate student Don Blacketter, faculty advisor

Design Project	Student Design Team
Traffic controller interface device	Darin McKee, EE undergraduate team leader Ying Zhou, EE graduate student Zhen Li, CE graduate student Richard Wells, faculty sponsor
Traffic tracker data collection software	Steve Dahl, CE undergraduate student Phil Matheson, CS undergraduate student Michael Kyte, faculty sponsor
Automated plan sheet design software	Phil Matheson, CS undergraduate student Barry Klas, CS undergraduate student Michael Kyte, faculty sponsor
Traffic controller software interface	Paul Coffelt, CE graduate student Zaher Khatib, faculty sponsor

### *Internet-Based Laboratory Materials*

NIATT led a multi-university effort to develop internet-based laboratory materials for the junior level introductory course in transportation engineering. This course, offered as part of most civil engineering curricula, is most civil engineering students' first formal exposure to transportation. The lab manual includes extensive material on the following topics: Bus Service Planning, Capacity and LOS Analysis, Geometric Design, Parking Lot Design, Roadway Design, Signal Timing Design, Traffic Flow Theory, and Travel Demand Forecasting.

## Transportation Engineering

### Online Lab Manual

**Getting Started:**

- About the Manual
- Site Navigation
- Learning More
- Recommended Settings
- Acknowledgements

**Feedback:**

- Help us Improve



**Chapters:**

- Bus Service Planning
- Capacity & LOS Analysis
- Geometric Design
- Parking Lot Design
- Roadway Design
- Signal Timing Design
- Traffic Flow Theory
- Travel Demand Forecasting

*Lab Manual Home Page*

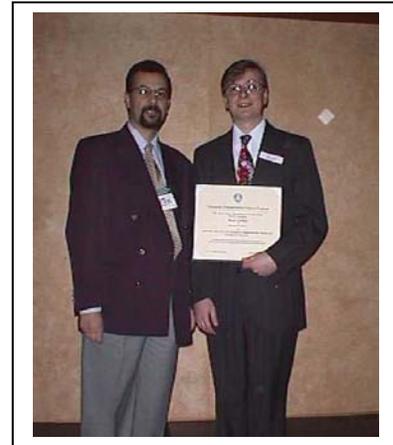
The lab manual project was jointly funded by NIATT and TransNow, the University of Washington's regional transportation center, and included researchers from University of Idaho, Oregon State University and Portland State University. A final version of the lab materials is scheduled for posting on the Internet in the fall of 1999. After a year of review and use by faculty and students from throughout the U.S., additions and modifications will be made to the materials.

### *UTC Program Outstanding Student of the Year*

Paul Coffelt, was selected by NIATT as our Outstanding Student of the Year. He was awarded \$1000, plus an all-expense-paid trip to Washington D.C. to attend the Transportation Research Board's annual winter meeting.

Coffelt received his BS and MS degrees in Civil Engineering, graduating in 1998. His graduate studies included a NIATT research project writing interface software for signal controllers and optimization software.

As president of the ITE's UI student chapter, Coffelt also directed the construction of the club's intersection model for NIATT's Technology Transfer Center.

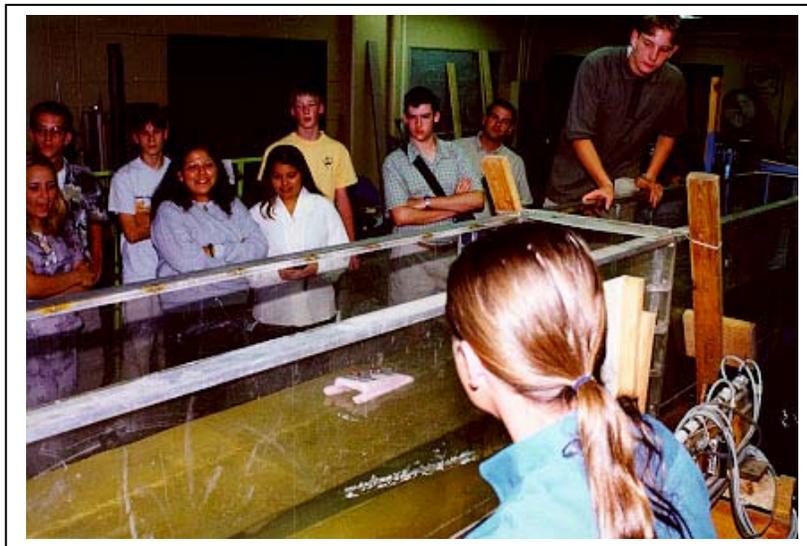


**Dr. Zaher Khatib, Asst. Professor, CE (left) congratulates Paul Coffelt**

### *Science Camp: Science, Math, and Transportation for Junior High School Students*

Science Camp, sponsored by NIATT since 1996, provides junior high school students the opportunity to learn science in a hands-on environment. The camp participants are a diverse group that includes approximately fifty percent women and twenty-five percent from minority populations (including Hispanic and Native American students). Students are selected based upon their interest in science and their academic potential. We see the camp as a long-term recruitment tool for engineers, specifically transportation engineers.

Science Camp has been held for several years on the Boise State University campus. This year, UTC funds helped to expand Science Camp to a second location in North Idaho, on the University of Idaho campus. As in previous years, the camp had a strong focus on a transportation technology. Typically, this has been accomplished through a multi-day design project. This year the students designed, tested and built miniature electric boats. The students were presented with important concepts, such as power and energy consumption. They had to integrate these concepts, and then apply them to their design project.



*Science Camp Students Test their Design Projects*

### *Traffic Models Working Group*

NIATT has established a traffic models working group as an innovative way to train practitioners to use advanced traffic simulation models such as CORSIM. The group was formed to help meet the training needs of Idaho Transportation Department traffic engineers, and meets bi-monthly to learn how to apply new traffic simulation models to problems of current interest.

## **Clean Vehicle Technology Success Stories: Technologies for a New Generation Vehicle**

### *Electric Vehicle and Future Truck*

One of the highlights of the vehicle technology program this past year was winning the prestigious Arizona Electrics Race in Phoenix, Arizona, in March 1999. The NIATT-sponsored 1985 Z-28 Camaro competed in the open all-electrics division. This stock vehicle was converted to electric operation, and uses a 150-kilowatt, 3-phase AC induction motor and 31 - 12-volt Optima Red Top lead acid batteries. The vehicle recorded an average lap speed of 56 miles per hour on the flat road course, with top speeds on straight sections of the course reaching 90 miles per hour. Twenty-eight undergraduate and graduate student team members participated in the project.

Thanks in part to this win, we have been awarded the opportunity to compete in the next Department of Energy Future Truck Competition. We will receive a year-2000 Chevrolet Suburban (4x4) truck that we will convert to a hybrid-electric vehicle. This project will be partially funded by DOE. We will also raise additional funds to help defray costs.



*UI Electric Race Car Wins Arizona Electrics Race*

### *Water Alcohol Research*

One of our major thrusts in vehicle technology this year has been the development of catalytic igniters for clean-burning/flexible fueled engines. These engines are being developed to run on fuel that is a mixture of approximately 50 percent water and 50 percent alcohol. We are currently testing two demonstration vehicles. One vehicle, a 12-passenger van used by Valley Transit in the Lewiston/Moscow area, transports senior citizens and hospital patients. The other vehicle, a 4x4 truck, is used by the Idaho Department of Water Resources when checking their irrigation canals. Both vehicles will be used for one year, with intermittent testing on both emissions and performance.

A complementary project includes the collection of data from flow reactor studies, conducting comprehensive engine tests, modeling in-cylinder catalytic ignition, characterization of catalyst surface degradation, and developing new high temperature materials. We have recently received a NASA EPSCoR grant that will fund the development of proposals for additional work in this area.

### *Vehicle Performance Modeling*

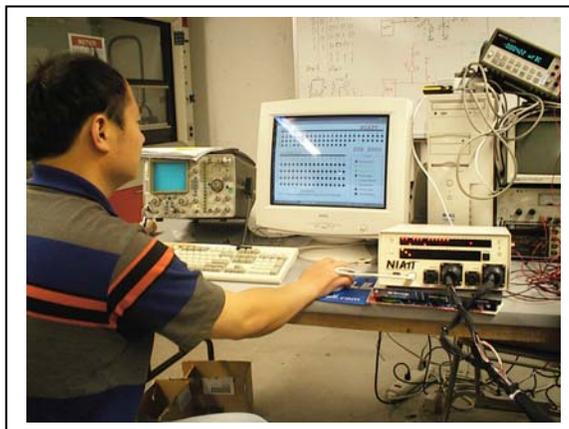
We have also been successful in developing programs and algorithms used in modeling vehicle systems and their subsequent performance. Our work has included models for evaluating and predicting the performance of electric and hybrid-electric vehicles, optimization of semi-truck trailers, and the design of lightweight vehicles.

## **Traffic Operations and Control Success Stories: Technologies for Advanced Traffic Control Systems**

### *Controller Interface Device: Hardware-in-the-Loop Simulation*

The Federal Highway Administration's Traffic Research Laboratory provides a cornerstone for the DOT's Intelligent Transportation Systems (ITS) research and development program. FHWA has developed a ten-year program that will produce key ITS technologies identified as part of the national ITS architecture. One of the major components of this program is hardware-in-the-loop simulation using FHWA's flagship simulation model, TSIS/CORSIM. While CORSIM includes a state-of-the-art traffic simulator, the actuated controller is generic, with none of the features available in today's controller hardware.

A team of NIATT researchers, led by electrical engineering professor Rick Wells, has developed a prototype controller interface device (CID) that provides real-time linkage between CORSIM and both 170 and NEMA traffic controllers. A first breadboard prototype micro-controller was developed by a team of senior electrical engineering students and exhibited at the Engineering Design Exposition. The second generation laboratory prototype CID was exhibited at the international meeting of the Institute of Transportation Engineers in August 1999. The interdisciplinary team members represented civil, electrical, mechanical, and computer engineering.

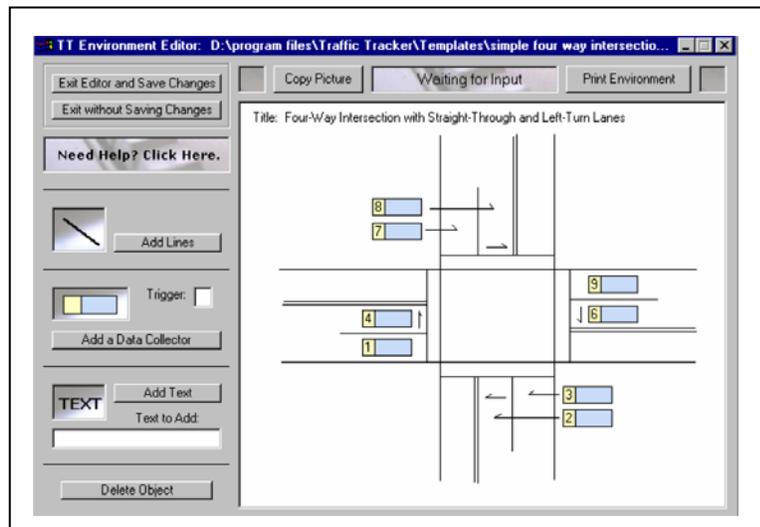


***NIATT's Controller Interface Device Links CORSIM to a Traffic Controller***

### *Computer Assisted Data Collection*

The Idaho Transportation Department identified a need for a more effective means of collecting traffic data. A new project was initiated to focus on methods of data collection that could be used by small urban and rural communities. The project, using both computer assisted and video-based traffic data collection methods, has resulted in one finished product, with two more currently under development.

The first program to be completed, Traffic Tracker-PC, is a windows-based PC program designed to provide traffic engineers with a means of collecting traffic data in the field with a laptop computer. The user can collect flow rate, turning movement, speed, gap, and delay data in a format that can be easily transferred to a spreadsheet. A version of Traffic Tracker for the PalmPilot is also under development. In addition, the project is developing tools that will provide for more efficient collection of video-based traffic data.



*Traffic Tracker Data Entry Screen*

## Outreach Materials and Programs

### Newsletters

NIATT now publishes two newsletters to regularly communicate with both internal and external team members and partners. The *FOCUS*, published bi-monthly, features people who work on NIATT projects. The *TECH BRIEF* (see below), published in alternate months, describes a current project of interest that is either in progress or that has recently been completed.

... developing, evaluating and marketing technology products to improve our transportation system

NIATT

TECH  
BRIEF

A Publication of the  
National Institute  
for Advanced  
Transportation  
Technology

University of Idaho

September 1999

### NIATT DEVELOPS REVOLUTIONARY TIME-AND-MONEY-SAVING SOFTWARE FOR ITD HIGHWAY DESIGNERS

Powerful CADD programs such as MicroStation have greatly reduced the amount of time that highway designers spend creating road designs. However, designers are still doing some aspects of road design the old fashioned way, such as manually entering every single pay item into the design plan for a road construction project. This is an extremely slow process, and errors occur frequently. Errors can mean disagreements with contractors over bid items, contract change orders, lost time, and increased costs.

Over the past five years, NIATT has worked with Idaho Transportation Department engineers to develop AutoPayItem, a software tool that dramatically increases the number of pay items a designer can enter per hour, and virtually eliminates pay item data entry errors.

#### How AutoPayItem Works

##### Pay Item Master List

The program incorporates ITD's Master List of pay items. The designer can search the master list by item number, by name, or by simply scrolling through an alphabetical list. The designer selects the pay item, enters specific information such as quantity, and the program will place the pay item directly on the design plan. This approach reduces entry errors and saves the designer a tremendous amount of time. *Continued on next page*

API's Search Pay Item Screen

Number	Name	Units
604-015A	200 mm IRR PIPE	m
Qty	Start Sta	End Sta/Out
0.000000		
All Description		
Create Bid Item		
Master Bid Item List		
Number	Name	Units
604-035A	100 mm IRR PIPE	m
604-010A	150 mm IRR PIPE	m
604-015A	200 mm IRR PIPE	m
604-030A	250 mm IRR PIPE	m
604-025A	300 mm IRR PIPE	m
604-030A	375 mm IRR PIPE	m
604-035A	450 mm IRR PIPE	m
604-040A	525 mm IRR PIPE	m
604-045A	600 mm IRR PIPE	m
604-050A	675 mm IRR PIPE	m
Search by: NUMBER    Search for: 1004		
<input type="checkbox"/> Draw Capsule Only    Create    Close		

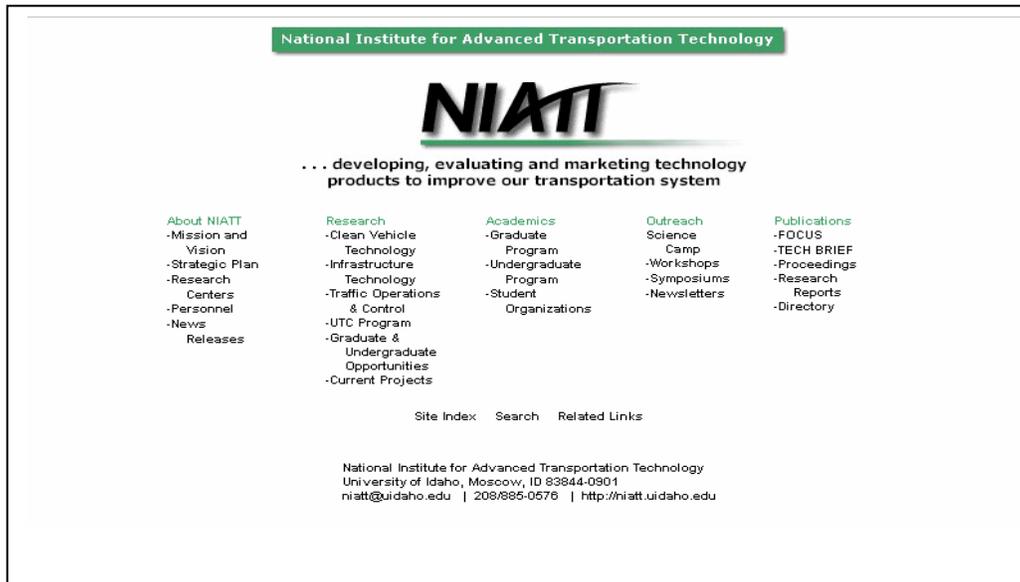
NIATT TECH BRIEF

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## Website

We have also completely redesigned the NIATT website, to reflect our new structure, and to more effectively communicate our goals, research focus, and academic opportunities.



*NIATT Website Home Page*

The NIATT website includes general information about our institute, descriptions of our research projects, academic opportunities, outreach activities and publications, and our personnel directory. Final research reports will be posted as they are completed.

## T2 Center Short Courses

We have expanded the role of our Technology Transfer Center by offering a wider variety of short courses to transportation professionals in Idaho. This year, we conducted two such courses, one in highway capacity and the other in traffic impact analysis.

## ORGANIZATION AND FINANCE

### Center Faculty and Staff

We have assembled a staff that has been given clear responsibilities in their roles of carrying out and managing the UTC grant. The administrative structure of the institute supports the work of the four centers and includes seven key positions. Each position has a clear and distinct role in supporting the work of the institute.

- *Michael Kyte*, institute director, is responsible for the overall direction of the institute, including oversight of the peer review process and the successful completion of all UTC-funded projects.
- *Donald Blackketter*, director for the Center for Clean Vehicle Technology, is responsible for the management and direction of the center.
- *Gene Calvert*, director of the Idaho Technology Transfer Center, is responsible for the management and direction of the T2 program.
- *Judith Breedlove*, management assistant, is responsible for the day-to-day operations of the institute including management of the institute's support staff. She is also responsible for the assessment of the UTC program grant.
- *Jane Estocin-Klaiber*, account technician, is responsible for grant and budget management including all UTC-funded projects.
- *Melissa Lines*, technical writer, is responsible for the preparation and review of all grant applications, technical reports, and external communications.
- *Ruthie Fisher*, senior secretary for the Idaho Technology Transfer Center, is responsible for support services for the T2 Center.
- *Barry Klas*, software design engineer, is responsible for computer systems support and software development.

## Research Projects

Table 3 lists the research projects funded during FY 1999 as part of the UTC program funding.

*Table 3. UTC- Funded Projects*

Project Number	Project Title	Principal Investigator
KLK201	Development of controller interface device for hardware-in-the-loop simulation	Richard Wells
KLK203	Development of video-based and other automated traffic data collection methods	Michael Kyte
KLK204	Development of Internet-based laboratory materials	Michael Kyte
KLK302	Advanced vehicle concepts team electric vehicle design and fabrication	Don Blackketter; Steve Beyerlein
KLK305	Vehicle performance simulation	Don Blackketter
KLK315	Spark ignition engine conversion to aqualytic fuel	Steve Beyerlein
KLK316	Diesel engine conversion to aqualytic fuel	Steve Beyerlein
KLK317	Reactor studies of water-alcohol mixtures	Judi Steciak
KLK321	Structural design software for lightweight vehicles	Edwin Odom Don Blackketter
KLK330	Lead acid battery development	Dean Edwards
KLK331	High performance auxiliary power units	Dean Edwards Steve Beyerlein

## Funding Sources and Expenditures

The sources of funding for the UTC program include U.S. DOT funding, University of Idaho funding, and a gift from Western Trailers of Boise, Idaho.

The federal share of the expenses noted in Table 4 comes from U.S. DOT funding. The local (matching) share comes from University of Idaho funding to NIATT, supplemented by a gift from Western Trailers of Boise, ID.

Table 4. Funding Sources and Expenditures

