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TECHNICAL ASSISTANCE AND SAFETY PROGRAMS

FISCAL YEAR 1992 PROJECT DIRECTORY

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16. Abstract

This Directory contains brief descriptions of Technical Assistance and Safety Projects initiated during Fiscal Year 1992 by the Office of Technical Assistance and Safety (TTS), Federal Transit Administration (FTA) of the U. S. Department of Transportation. Its purpose is to inform the public, and especially the transit industry, of the nature and scope of work underway to assist State and local agencies in improving services and reducing the cost of public transit.

Under the Technical Assistance and Safety Program, assistance is provided to a broad range of disciplines, including Advanced Public Transportation Systems (APTS), Clean Air, Finance, Human Resources and Productivity, Information, Regional Mobility, Safety and Security, Technology Development, Transit Accessibility, Planning and Project Development, Transit Cooperative Research, University Transportation Centers, and the National Transit Institute.

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INTRODUCTION

The *National Planning and Research Program* includes two categories of activities requiring a national focus. The first category includes activities in support of the Federal mission. Specific activities include directed research, pilot projects, and special initiatives to advance Federal mass transit policies and address transit issues of national concern. Research provides valuable guidance enabling the national transit program to reflect changing domestic conditions and budgetary priorities, laws, and regulations. Three Planning and Research Priorities Workshops have already been held by the Federal Transit Administration in order to better define the planning and research needs of the transit community. A fourth workshop is planned for March 1993.

The second category of activities requiring a national focus is support for technology development. Working closely with the Industry Advisory Panel required by the Intermodal Surface Transportation Efficiency Act of 1991, FTA will continue activities to bring about incremental improvements to existing transit systems. At the core of these developmental efforts was extensive industry consultation. The recommendations from the Industry Advisory Panel have been embodied in the framework of the technology program.

In the Panel's initial discussions, six priority areas for technology development were developed: reduce maintenance and operations costs; increase ridership, enhance safety and security, and improve access; support legislative mandates such as the Clean Air and Americans with Disabilities Acts; reduce vehicle weight and increase vehicle efficiency; transfer technology from other industries; improve information dissemination; and control capital costs.

The *National Planning and Research Program* is divided into, and managed under, eleven specific programs. Projects in each program represent (1) a mix of research, demonstrations, and studies in support of the development of innovative methods; (2) development and application of new technologies; and (3) evaluations and information dissemination. Innovative methods include those projects which deal with the operational and service concepts of providing transportation service; development and application of new technologies deals with transit hardware improvements and deployment; and evaluation and information dissemination consists of project evaluation and activities to share and disseminate information with the transit community in a timely fashion. Approximately one-third of the total program resource is allocated to each of these three areas of activity.

This Directory contains brief descriptions of Technical Assistance and Safety projects initiated during Fiscal Year 1992 by the Federal Transit Administration (FTA) of the U. S. Department of Transportation. Its purpose is to inform the public, and especially the transit industry, of the nature and scope of work underway to assist State and local agencies in improving services and reducing the cost of public transportation. Under the Technical Assistance and Safety Program, assistance is provided under a number of

programs, including *Advanced Public Transportation Systems (APTS), Clean Air, Finance, Human Resources and Productivity, Information, Regional Mobility, Safety and Security, Technology Development, Transit Accessibility, Planning and Product Development, Transit Cooperative Research, University Transportation Centers,* and *the National Transit Institute..*

Technical assistance is provided by FTA primarily in the form of information on, and sponsoring the development and introduction of, improved techniques. Information is disseminated by means of technical reports and by workshops and training courses. In addition to initiating development of new techniques, the Technical Assistance and Safety Program provides funding to help evaluate and introduce techniques and products developed by the private sector. FTA technical assistance concentrates on seeking broad applications to improve productivity, maintenance, safety, and security.

Another important role of FTA is to facilitate the flow of information on solutions and improvements which have been developed locally and which can be used by a large segment of the transit community. In this capacity, FTA assists the transit community by serving as a clearinghouse for current information on state-of-the-art and problem solving resources. FTA also sponsors various activities to expedite effective transfer of knowledge regarding new methods, initiatives, and techniques.

The current Technical Assistance and Safety Program is based on needs and problems expressed by State and local agencies through a number of channels, including conferences and workshops, such as the three workshops held in Kansas City and Washington, D. C., industry liaison boards, special user advisory groups, and general solicitations. The projects described in this volume are managed by the Associate Administrator for Technical Assistance and Safety. An alphabetical listing of project monitors is provided in Appendix D.

This directory was prepared by the Program Management Staff (TTS-5), Office of Technical Assistance and Safety, Federal Transit Administration, U. S. Department of Transportation, Washington, D. C. 20590. Copies may be obtained by contacting that office.

All media inquiries about these programs should be directed to the FTA Office of Public Affairs at the same address, or you may phone 202, 366-4043.

ADVANCED PUBLIC TRANSPORTATION SYSTEMS

The Advanced Public Transportation (APTS) program supports operational tests, evaluations, and research of advanced navigation, information, and communications technologies to improve public transit systems. FTA has created this program as part of the U. S. Department of Transportation initiative on Intelligent Vehicle-Highway Systems (IVHS). IVHS involves the integration of electronics, communications, and computer systems in vehicles and highways. Most IVHS technologies are for the automobile driver, not the transit rider. The APTS program supports the development of IVHS technologies for public transit.

In Fiscal Year 1992, most of the effort of the APTS program was in two of the six components: Technology Assessment and Operational Test. Work proceeded at lower levels of activity in the other four components: Research of Technology Adaptations, Evaluation, Technology Sharing, and Development of User Requirements and Equipment Standards.

Technology Assessment

Technology Assessment is proceeding in three areas: Navigation, Communications, and "Smart Cards." Each of these is an important area having numerous APTS applications.

There are several options for navigation or position determination systems. All are similar in function, but can best be categorized by technology, as follows:

1. Systems that rely mostly on onboard equipment, operating either by inertial navigation or dead reckoning.

2. Systems that operate on highly localized transmitters. Also called "signpost" systems, these determine location by proximity to a beacon which knows its own location. The beacons can transmit via radio, infrared, or ultrasonic signals, or by magnetic field manipulation, as in the case of inductive loops.

3. Systems that operate by using third-party transmitters. These include cellular radio and television subcarriers, as well as systems that read direction from three or more radio transmitters and triangulate to determine exact location.

4. Systems that determine position from satellites, including global positioning systems and differential GPS, which are new systems not yet widely implemented.

Technology assessments and operational tests were performed on promising navigation technologies. Recent installations were evaluated to gain insight into how technologies, management decisions, and customer information are being institutionalized.

Communications systems are crucial for the operation of APTS. Information that is collected and processed can only fulfill its purpose if it is available where and when it is required. Options for voice and data communications include cellular radio, optical and ultrasonic methods, audio signal processing, and a host of other technologies. Many of these are being or will be tried as operational tests. For example, cellular radios are the communication focus of the Bellevue Smart Commuter Project. The greater use of data communication in lieu of voice was evaluated.

User interface is a prime concern of the program. A major technological advancement that could greatly improve user interface is the "Smart Card" (a plastic card the size of a credit card containing a microchip). In its most likely transit application, the microchip would contain information on the ownership of the card and the value stored or the account to be debited. The "Smart Card" is already in use in some European cities and is being tested for paratransit operations by the Regional Transit Authority in Chicago.

The Ann Arbor Transit Authority in Michigan is testing a conventional application of "Smart Cards" in the APTS program. To further determine its applicability for operations in U. S. cities, two small business firms have been selected to assess the relative capabilities, costs, and benefits of this technology and design operational test possibilities in public transportation applications.

Operational Tests

Operational tests are already being designed in several cities. These include projects such as "Smart Bus" in Portland, Oregon, and "Smart Traveler" in Houston and several California cities. Early implementation opportunities will be identified and detailed implementation planning completed for more complex operational tests.

The "Smart Bus" concept is patterned after a European program that integrates regular, fixed-route transit, dial-a-ride minibus, and contract taxi services to provide for a more efficient and far-reaching system. It is currently under evaluation to determine its application in the United States. FTA is proceeding in a cooperative effort in Portland, Oregon, with the Tri-County Metropolitan Transportation District of Oregon to evaluate the concept.

Real-time travel and ride-sharing information is the focus of "Smart Traveler" projects. The information is used by both customers planning travel and choosing modes and by dispatchers directing service. This program is being tested in Houston, Bellevue, Washington, and the State of California. The Houston project utilizes IVHS technology to promote and encourage transit and provide ride-share information to users. The Bellevue project is designing an operational test of mobile communications and information services to increase the attractiveness and market share of ride-sharing. The California project is developing a test for audiotex and videofax information services to provide real-time ride-share matching to travelers located in both residential and business environments.

A program similar to the "Smart Traveler" is the "Mobility Manager." Its goals are to provide alternatives to single occupant auto travel and greater mobility to special population groups. It operates as a clearinghouse for several different transportation modes: bus, taxi, carpool, vanpool, and other shared ride modes, providing a single point of contact and arranging the details of the journey. Funds are collected by the "Mobility Manager," including fares, operating assistance, employer subsidies, and social service programs, then distributed to the individual service providers. The advantages of this concept are increased convenience for users and increased ridership and efficiency for service providers. FTA is currently working on potential demonstration sites for such a program.

In addition to the above projects, there were operational tests and implementation of automatic vehicle location systems, passenger information systems, "Smart Card" systems, HOV operations, etc., in many cities that will be evaluated through the program. In Anaheim, California, a concept plan and project design have been developed which will be tested for ability to provide real-time information to travelers at bus stops, transfer centers, and on transit vehicles. An automated billing service using "Smart Card" technology is expected to be tested and evaluated in St. Paul, Minnesota.

Evaluation

Since actual operational tests were only beginning in Fiscal Year 1992, the evaluation effort was modest. There are good opportunities to document local initiations, such as the application of "Smart Cards" in paratransit services in Chicago. Also, basic guidelines and procedures for the evaluation effort and procurement materials for contractors were developed.

User Requirements and Specifications

Work started on developing user requirements through interaction with the APTS Committee. A comprehensive search was initiated to identify useful specifications from related work. Research continued on state-of-the-art equipment and software systems in use.

Technology Sharing

Fiscal Year 1992 efforts in this area were covered as a by-product of work underway in technology assessment and evaluation.

Research of Technology Adaptations

There are many attractive technology developments in other industries that could have application to APTS. "Smart Cards" are just one example of such technology, and there are several adaptations (i.e., contact, proximity, and distance) that could apply. Which type of card is best and how to institutionalize the use, either in-house or through the private sector (banks), are important research issues. It is conceivable to have a cashless transit system

with user revenues handled entirely by commercial banks. A modest effort was made in Fiscal Year 1992 to investigate potential adaptations of new "Smart Card" technologies in public transportation, along with other promising adaptations, such as automatic vehicle identification.

Recent Program Accomplishments

A vehicle area network standard was developed for a variety of electronic capabilities, including electronic fare systems, communication systems, AVL systems, passenger information systems, passenger counters, etc. Currently, systems are separately wired at the factory or during installation, which increases the number of wires in the bus, thereby adding weight and maintenance complexity. The APTS program sponsored the development of a Society of Automotive Engineers standard to tie these systems together through a vehicle area network (common wiring harness).

An evaluation was conducted of the Dallas GPS AVL system for installation of a new communications system that includes AVL. The satellite-based GPS will provide the location inputs for the system. Dallas selected a GPS receiver and installed several on transit vehicles as part of the test program prior to installing 1,500 units throughout the fleet.

Phase I of two advanced fare payment media SBIR projects which investigated various forms of advanced fare payment media for transit applications was completed. These investigations focused on advanced card systems to improve the efficiency of fare collection and provide measurable benefits to both the transit provider and rider. The projects were conducted by GLH, Inc., and Echelon Industries. In-depth descriptions and analyses of all types of advanced media, including infrared, RF/microwave,contact "Smart Cards", proximity cards, and others, were completed.

The APTS program supported Houston METRO in developing "Smart Traveler" technology, which will be implemented in two travel corridors, I-10 West and I-45 North.

APTS staff contributed to the development of the DOT IVHS Strategic Plan and Report to Congress.

APTS staff participated in the review, analysis, and selection of national candidate operational test sites to test innovative applications of IVHS technology as they apply to public transportation.

The APTS program supported the California Department of Transportation in the development of the California Smart Traveler technology and in initiating the site selection process.

The APTS Program supported the Chicago Transit Authority in the development of an RFP for their Bus Service Management System.

Projects Awarded During Fiscal Year 1992

Project Title:	**Intelligent Vehicle-Highway Systems Research**		
Grantee/Contractor:	George Mason University		
Location:	Fairfax, Virginia		
Funding:	$750,000	Funding Source:	Section 26
Project Manager:	Helen M. Tann	Project Number:	VA-26-0001

Description: Northern Virginia initiatives in IVHS are being studied, along with case studies of other national efforts relevant to private sector opportunities. While the work program is currently being formulated, there is considerable interest in developing a better understanding of private sector opportunities for traveler information. For example, the use of smart kiosks and travel cards could develop in the private sector. This work is being carried out under the lead of George Mason's Institute for Policy Research.

Project Title:	**Inertial Navigation Technology Transfer**		
Grantee/Contractor:	Transit Safety Research Alliance		
City, State:	Pittsburgh, Pennsylvania		
Funding:	$997,899	Funding Source:	Section 26
Project Manager:	Irving Chambers	Project Number:	PA-26-0007

Description: The Intermodal Surface Transportation Efficiency Act of 1991 provides $1 million for an inertial navigation system demonstration project for "....the purpose of determining the safety, economic, and environmental benefits of deploying inertial navigation tracking and control systems in urban and rural transit environments."

Project Title:	**Ann Arbor Smart Card Demonstration**		
Grantee/Contractor:	Ann Arbor Transportation Authority		
Location:	Ann Arbor, Michigan		
Funding:	$350,000	Funding Source:	Section 26
	$1,500,000		Section 3
Project Managers:	Sean Ricketson	Project Number:	MI-26-0003
	Mary Campbell		MI-03-0127

Description: This project continues the development and evaluation of a mobility pass which allows the use of advanced card technology transit or parking lot use. A set of evaluation criteria is being developed and refined, as well as a set of transferrable specifications to be used to solicit bids on operational applications. Options to be considered include a personal security feature and continuous, real-time monitoring of parking lot vacancies for traveler information. Radio frequency and infrared technology are planned to be used for the mobility pass.

Project Title:	**Advanced Fare Payment Media Evaluation**		
Grantee/Contractor:	Volpe National Transportation Systems Center		
Location:	Cambridge, Massachusetts		
Funding:	$50,000	Funding Source:	Section 26
Project Manager:	Sean Ricketson	Project Number:	MA-06-0209

Description: This project is evaluating the use of advanced fare media, including smart cards and optical cards, for use in transit systems. Strengths and weaknesses of the use of cards for differing transit markets and operating conditions will be identified. Literature searches and informational surveys with transit industry representatives, organizations, and vendors will be conducted.

Project Title:	**Technical Requirements and Performance Specifications**		
Grantee/Contractor:	Volpe National Transportation Systems Center		
Location:	Cambridge, Massachusetts		
Funding:	$950,000	Funding Source:	Section 26
Project Manager:	Denis J. Symes	Project Number:	MA-26-0020

Description: VNTSC is assessing promising IVHS-type technologies available from special defense and security applications, along with those commercially available for potential application in the APTS program. The most promising technologies will be identified and technical assistance given for development of operational tests in APTS concepts. Overall systems and subsystems requirements and performance specifications will be developed for such applications as vehicle location, vehicle component monitoring, passenger counting, electronic fare collection, vehicle occupancy monitoring, computer aided dispatch, communications (trunked and spread spectrum), advanced customer displays, fleet management, geographic information systems, and variable message displays. VNTSC will form a Transit Users Technical Working Group from the APTS Committee to review work on these technology requirements and performance specifications. The capabilities of new APTS technologies will be collected through meetings with suppliers and bench testing, trade societies, etc. In coordination with the IVHS Standards and Protocol Committee, the Society of Automotive Engineers, the Institute of Electrical and Electronics Engineers, and the International Standards Organization, appropriate standards and protocols will be encouraged to advance the APTS concepts of Smart Bus and Smart Traveler. Input to APTS evaluation guidelines and site specific evaluation plans will be provided to ensure that useful feedback is obtained to guide the development of standards which assure interchange of products without inhibiting innovation.

Project Title: **Technology Assessment, Requirements, and Sharing**
Grantee/Contractor: EG&G Dynatrend; Inc.
Location: Cambridge, Massachusetts
Funding: $99,800 Funding Source: Section 26
Project Manager: Ronald E. Boenau Project Number: MA-26-0002

Description: This project conducts research and project development activities in the IVHS area for mass transportation. Specific analyses will include technology assessment, case study evaluation, an analytical study, and information dissemination. The technologies will be assessed and opportunities identified for operationally testing the most promising new applications in the transit business.

Project Title: **Project Development and Evaluation**
Grantee/Contractor: Volpe National Transportation Systems Center
Location: Cambridge, Massachusetts
Funding: $650,000 Funding Source: Section 26
Project Manager: Helen M. Tann Project Number: MA-26-0007

Description: This project provides the necessary technical support required to conduct research and demonstration activities in the IVHS area for mass transportation. The work focuses on developing thorough evaluations of APTS operational tests and select local initiatives. Also, specific analyses will include IVHS program planning and management, technology state-of-the-art studies, case study evaluations especially in support of APTS project development, and information dissemination and technical assistance. For example, state-of-the-art studies will provide normal rotation information. A special feature of these information systems is that transit schedule information and immediate ride matching can be provided.

Project Title: **Houston Smart Traveler**
Grantee/Contractor: Metropolitan Transportation Authority of Harris County
Location: Houston, Texas
Funding: $500,000 Funding Source: Section 26
Project Manager: Denis J. Symes Project Number: TX-26-0006

Description: This cooperative agreement is to support the efforts of the Texas Transportation Institute in utilizing IVHS technology to promote and encourage the use of buses, vanpools, carpools, and transitways in Houston. The project uses a design based on a previous study to refine, operationally test, design, and evaluate alternative approaches to traveler information systems and technologies. Information on buses, ride-share, and traffic will be provided to commuters. The information consists of accurate and up-to-date data on existing traffic conditions, bus routes and schedules, and carpool matches.

Project Title:	**California Smart Traveler**		
Grantee/Contractor:	California Department of Transportation		
Location:	Sacramento, California		
Funding:	$300,000	Funding Source:	Section 26
Project Manager:	Ronald E. Boenau	Project Number:	CA-26-0007

Description: This is part of a 4-phase project in which the public and private sectors jointly test an audiotex/videotex based Advanced Traveler Information System in suburban communities in California. The communication technologies of audiotex/videotex permit residential and business users to interact with remote computer systems over telephone lines to obtain timely transportation information. A special feature of these information systems is that transit schedule information and immediate ride matching can be provided.

Project Title:	**Bellevue Smart Traveler**		
Grantee/Contractor:	Municipality of Metropolitan Seattle		
Location:	Seattle, Washington		
Funding:	$100,000	Funding Source:	Section 26
Project Manager:	Ronald E. Boenau	Project Number:	WA-26-0001

Description: This cooperative agreement supports the initial planning and design of an operational test project applying the capabilities of mobile communications (for example, cellular telephones) to the growth and efficiency of carpools and vanpools serving the central business district of Bellevue, Washington, a major suburban employment center close to Seattle. The Bellevue Transportation Management Association staff, private sector commuter transportation coordinators, the City of Bellevue, Metro Transit, and leading Bellevue region mobile telecommunication companies will be mobilized to design an equipment and service package for eventual deployment to every TMA registered carpool and Metro vanpool entering the Bellevue CBD, approximately 400 vehicles daily. The project will create and document a method of deploying and paying for this package, along with a design for its operational test and evaluation.

Project Title:	**Transit Network Route Decision Aid**		
Grantee/Contractor:	University of Michigan		
Location:	Ann Arbor, Michigan		
Funding:	$50,000	Funding Source:	Section 26
Project Manager:	Sean Ricketson	Project Number:	MI-26-0001

Description: The first phase of this project is nearing completion and a comprehensive progress report has been received. Specifications for designing, implementing, and evaluating better algorithms to aid a telephone information agent in rapidly identifying useful itineraries for passengers in a mass transit system have been developed. Further research into the feasibility of possible new algorithm characteristics is needed. The areas which will be examined under this project are preferential flexibility, which would allow for a variety of optimal solution parameters; integrating expert knowledge into each iteration of an algorithm so that identical iterations are not repeated; integrating automatic vehicle location system information into algorithm construction; and accounting for the fact that transit travel times are not specific values, but are ranges of values. Also, the project will look into algorithmic solutions to increasing the number of clients that a telephone information agent can process in a given time and an examination of the hardware costs involved and possibilities for cost savings.

Project Title:	**Automatic Vehicle Location Study and Bus Traffic Signal Preemption**		
Grantee/Contractor:	Chicago Transit Authority		
Location:	Chicago, Illinois		
Funding:	$400,000	Funding Source:	Section 26
Project Manager:	Sean Ricketson	Project Number:	IL-26-0001

Description: This project is continuing the study, evaluation and implementation of automatic vehicle location (AVL) and bus traffic signal preemption technologies. It will analyze the potential impact on auto traffic and bus operations in a major selected transportation corridor in Chicago. The project will utilize information from a previous study jointly funded by FTA and CTA which investigated IVHS hardware and software products and specifications for implementation of the demonstration of this new technology. Innovative bus service restoration will be accomplished using the advanced IVHS technologies investigated including AVL and computer driven dispatching techniques. Real-time information, both onboard and wayside, will be provided.

Project Title:	**Automated Identification and Billing System**		
Grantee/Contractor:	Community Transit of Delaware County		
Location:	Folsom, Pennsylvania		
Funding:	$200,000	Funding Source:	Section 26
Project Manager:	Ronald E. Boenau	Project Number:	PA-26-0006

Description: This 15-month project will develop and evaluate an Automated Identification and Billing System. The AIBS will automate existing processes using advanced technology for the identification of passengers, the accounting and billing data collected on each passenger trip and the reporting required for coordination with various transportation suppliers as well as internal performance monitoring. Elimination of annual processes including eligibility verification and conciliation of trip information for billing purposes will result in additional system efficiency and cost savings.

CLEAN AIR

The objective of the Clean Air program is to assist the Nation's urban areas and transit authorities in complying with the Clean Air Act Amendment of 1990 and the National Energy Strategy Act through the deployment of alternative fueled engines and clean diesel engine systems (i.e., diesel engines with after treatment devices such as particulate traps or catalytic converters) in transit buses. This program is designed to meet the National Transportation Policy goal of protecting the environment and improving the quality of life, as well as supporting the National Energy Strategy goal of reducing U. S. dependence on foreign sources of energy.

Transportation has major impacts on the environment. Emissions from mobile sources is one of the greatest contributors to urban air quality problems. One-fourth of the Nation's total energy consumption, and approximately two-thirds of the petroleum used goes to fuel transportation needs. The continuing trend in the growth of vehicle miles traveled is outstripping existing vehicle emissions control technology.

The change to alternative fuels and clean diesel engine systems requires careful evaluation of their impacts on daily transit bus operations and maintenance, as well as the necessary support facility infrastructure. Documentation and evaluation of these impacts are being performed in cooperation with the Department of Energy under its Alternative Fuels Bus program. This evaluation will address the safe handling and use of alternative fuels in a transit environment and the modifications needed to transit maintenance facilities to be able to cope safely with a variety of alternative fueled buses. It will address the comparative measurement of the emissions from buses that are in revenue service that use alternative fueled engines, clean diesel systems, and current diesel engine designs.

Means to expedite the development and deployment of alternative fuel technology and clean diesel engine systems will be explored under this program, which includes FTA's alternative fuels initiative, clean diesel engine systems, and fuel cell/battery bus development programs. While current results to date indicate that buses with alternative fueled engines and clean diesel engine systems produce lower emissions than those that use current diesel engines, such buses still present operational problems with regard to service reliability and engine durability. The program will include data gathering, analyses and evaluation of low polluting engines, such as those that use methanol and ethanol, compressed natural gas (CNG), liquified natural gas (LNG), liquified petroleum gas (LPG), fuel cell battery technology, and electric propulsion, as well as on the special requirements for CNG cylinders and CNG fueling stations (fast vs. slow fueling). Means by which FTA can leverage and/or risk share the introduction of new technology will be considered. Effective education and training programs for transit management, and transit supervisors, as well as workers, concerning to environmental regulations, waste disposal, safety, etc., will be developed to ensure proper adherence to these requirements.

Recent Program Accomplishments

The Clean Air program has been instrumental in the development of six bus engines that have been certified to meet Environmental Protection Agency 1993 bus emissions standards. These include: the Cummins CNG, Detroit Diesel methanol, Detroit Diesel ethanol, Cummins and Detroit diesel particulate trap, and Detroit Diesel Series 50 diesel engine without a particulate trap engine.

The fuel cell/battery bus program has successfully completed all efforts for Phase I, proof-of-feasibility. A breadboard model of a fuel cell/battery propulsion system with a phosphoric acid fuel cell that is fueled by methanol has successfully demonstrated its technical feasibility. The expected emission results of a fleet of 200 fuel cell/battery buses would be equal to one current diesel bus.

Projects Awarded During Fiscal Year 1992

Project Title:	**Liquefied Natural Gas Cylinders**		
Grantee/Contractor:	Battelle Columbus Laboratories		
Location:	Columbus, Ohio		
Funding:	$165,000	Funding Source:	Section 26
Project Manager:	Shang Q. Hsiung	Project Number:	OH-26-0001

Description: This project is documenting the use of LNG as a vehicle fuel. The operating efficiencies in different power plants, conditions, and loads will be examined. Experience in the motor truck industry will be used to examine the dynamics and implications of containment of vessel rupture and fuel escape. The effects of fueling cycles on vacuum bottle fatigue and useful life will be studied.

Project Title:	**Fuel Cell/Battery Bus Program**		
Grantee/Contractor:	Department of Energy		
Location:	Washington, D. C.		
Funding:	$900,000	Funding Source:	Section 26
Project Manager:	Shang Q. Hsiung	Project Number:	DC-26-0001

Description: This is a joint FTA/DOE program to demonstrate the feasibility of a fuel cell/battery propulsion system for an urban transit bus. The efforts for Phase I, proof-of-feasibility, have been successfully completed. A breadboard model of the fuel cell/battery propulsion system demonstrated its technical feasibility. Expected emission results of a fleet of 200 fuel cell/battery buses would be equal to one current diesel bus. The economic feasibility, however, could not be definitively determined. Phase II efforts began recently and will lead to the development of three prototype medium-size fuel cell/battery buses and the systems design for a full-size fuel cell/battery transit bus. Two of these buses will use methanol fuel as the source for the hydrogen used in the fuel cell. One of these two will be used in Los Angeles in coordination with South Coast Air Quality Management District efforts. The other will be at Georgetown University. The third prototype will use ethanol fuel and will be demonstrated in revenue service at PACE in Chicago. Discussions are also underway with the Santa Barbara Metropolitan Transit District for the development of a prototype full-size fuel cell/battery transit bus.

Project Title: **Technical Support for the Fuel Cell/Battery Bus Program**
Grantee/Contractor: Battelle Columbus Laboratories
Location: Columbus, Ohio
Funding: $97,283 Funding Source: Section 26
Project Manager: Shang Q. Hsiung Project Number: OH-26-0001

Description: This project will provide technical support in the evaluation of the Phase II efforts of the fuel cell/battery bus program. The support efforts will include monitoring the progress of the development of the prototype fuel cell buses and the systems design for a full-size fuel cell bus. It will also include an assessment of the economic feasibility of a fuel cell bus.

Project Title: **Photovoltaic Feasibility Study**
Grantee/Contractor: Sacramento Regional Transit District
Location: Sacramento, California
Funding: $50,000 Funding Source: Section 26
Project Manager: Steven W. Sill Project Number: CA-26-0010

Description: This project will evaluate the use of photovoltaic technology in conjunction with energy storage systems as a means to reduce energy purchase demands of electric powered transit vehicles at periods of peak energy usage. Detailed computer analyses will also be performed to determine the size and locations of photovoltaically charged battery substations for incorporation into the power distribution network of light rail systems or electric trolley coach networks.

Project Title: **Sodium Sulfur Battery Bus Evaluation**
Grantee/Contractor: Santa Barbara Metropolitan Transit District
Location: Santa Barbara, California
Funding: $150,000 Funding Source: Section 26
Project Manager: Shang Q. Hsiung Project Number: CA-26-0019

Description: The objective of this project is to evaluate advanced sodium sulfur batteries as a propulsion system for transit buses. The Department of Energy will supply the sodium sulfur battery to the Santa Barbara Metropolitan Transit District to be installed in one of the District's electric buses. This project will fund the technical support needed to integrate and evaluate the use of advance sodium sulfur batteries in medium-sized electric buses. Their performance will be compared with conventional lead acid batteries in electric buses in a variety of service operations.

Project Title: **Technical Support for the Clean Air Program**
Grantee/Contractor: Battelle Columbus Laboratories
Location: Columbus, Ohio
Funding: $243,237 Funding Source: Section 26
Project Manager: Shang Q. Hsiung Project Number: OH-26-0001

Description: This project will provide continuing technical support for the Clean Air program and general support for the Office of Engineering. This support will include: preparing periodic alternative fuel data summaries of operational experiences with alternative fuels and current fuel prices; monitoring the status of alternative fuels engine development, emissions testing, and refueling technology; conducting technical analyses of the impact of proposed provisions within the National Energy Strategy Act on the transit industry; conducting technical analyses to support the evaluation of the impact of alternative fuels on transit infrastructure and planning requirements; and conducting information dissemination activities. It will also include conducting technical analyses, monitoring the status of key issues, preparing briefing materials, and participating in meetings and conferences.

Project Title: **Clean Air Program Technical Briefs**
Grantee/Contractor: National League of Cities Institute
Location: Washington, D. C.
Funding: $75,000 Funding Source: Section 26
Project Manager: Shang Q. Hsiung Project Number: DC-26-0021

Description: The objective of this project is to provide outreach activities for the Clean Air program. The outreach activities will include the development and preparation of printed materials in the form of newsletters, technical briefs, bulletins, fact sheets, etc., on the Clean Air program, implementation of the Clean Air Act Amendments of 1990, and State and local legislation relative to alternative fuels.

Project Title: **Alternative Fuels Safety Audits**
Grantee/Contractor: Volpe National Transportation Systems Center
Location: Cambridge, Massachusetts
Funding: $350,000 Funding Source: Section 23
Project Manager: Shang Q. Hsiung Project Number: MA-90-7007

Description: This project will provide continued technical support to FTA for the evaluation of health and safety impacts of the use of alternative fuels in a transit environment. This support includes: conducting on-site health and safety audits of the use of alternative fuels, including CNG and LNG; conducting a comprehensive technology assessment of CNG and LNG with regard to transit operations, maintenance, and economics; and preparing reports documenting the results.

Project Title: **San Antonio Alternative Fuels Analysis**
Grantee/Contractor: VIA Metropolitan Transit
Location: San Antonio, Texas
Funding: $68,000 Funding Source: Section 26
Project Manager: Shang Q. Hsiung Project Number: TX-26-0001

Description: This grant will provide funds to address the numerous technical, financial, and legal issues for participation of the private sector in the development of comprehensive alternative fuels programs for transit properties.

Project Title: **Technical Support for the Alternative Fuels Initiative**
Grantee/Contractor: Corpus Christi Regional Transit Authority
Location: Corpus Christi, Texas
Funding: $80,000 Funding Source: Section 26
Project Manager: Shang Q. Hsiung Project Number: TX-26-0002

Description: The Corpus Christi Regional Transit Authority, representing several properties in Texas, has determined the need to undertake a planning effort identifying opportunities for utilizing the private sector to the maximum extent feasible in the area of alternative fuels. This project will provide strategies to assist transit agencies, as well as affected public fleets, in making significant commitments to alternative fuels through various arrangements with the private sector in order to satisfy requirements of the Federal and Texas alternative fuels and clean air laws. Strategies will be developed to ensure that participating transit properties make informed decisions on selecting technology, fueling, and maintenance facility development, contracting for fuels, and related issues regarding alternative fuels.

FINANCE

Mass transportation in the United States will be faced with extensive financial demands in the 1990's. It is estimated that the replacement and rehabilitation of existing assets will cost $46 billion over the next ten years. This level of investment will be made more difficult by over $20 billion in demands for new investments as well as ever increasing operating and maintenance costs. In addition, effective responses to the Clean Air and Americans with Disabilities Acts will require new and innovative approaches to transit finance.

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 provides the national policy framework for addressing transit finance challenges of the 1990's. ISTEA strengthens the local decision making process, encourages use of sound financial principles, provides for flexible use of Federal highway and transit funding, promotes the use of innovative financing strategies, and advances opportunities for greater private sector involvement.

The goal of the Finance program is to conduct research, training, evaluations and demonstration projects in support of the provisions of ISTEA and the needs of the transit industry. The objectives of the Finance program are to: help stabilize and diversify the funding base for transit systems, stimulate public/private partnerships, and enhance the financial management capabilities of transit professionals.

To insure full coverage of these objectives, the Finance program was organized into financing techniques, financial management, and public/private partnerships elements.

The Financing Techniques element promotes innovative financing mechanisms that leverage Federal assistance, reduce the cost of capital, and involve market based revenue strategies. Some examples of successful financing techniques include certificates of participation, capital leasing, credit enhancements, advance construction financing, pooled financing, and value capture strategies.

The Financial Management element focuses on ongoing financial operations of transit agencies, including asset management, internal auditing, risk management, activity costing, financial forecasting, and financial capacity analysis.

The Public/Private Partnerships element embraces the joint development of transit and real estate projects, as well as joint financing, as an effort to equitably allocate and manage project risk, capture some of the monetary value of public investments, and provide a supportive environment for private financing.

Recent Program Accomplishments

FTA's successful promotion of innovative financing has resulted in a number of successfully implemented cross border leases and capital leases through certificates of participation. These transactions have generated dollar savings and revenue for the subject transit agencies. ISTEA also encourages consideration of innovative financing strategies.

Through joint development seminars held across the country, FTA raised the awareness of local officials of the monetary and ridership benefits, as well as opportunities for the joint development of real estate and transit capital projects.

The financial analysis and planning capabilities of transit agencies and metropolitan planning organizations were enhanced through a series of financing workshops, development of a regional model for conducting financial capacity analyses, a primer on public transit finance, and technical guidelines on transit asset management.

Through a series of workshops on state-of-the-practice on asset management and a variety of technical reports, the transit industry was provided with information to improve the management of its financial and fixed assets.

Projects Awarded During Fiscal Year 1992

Project Title:	**New Carrollton Financing Demonstration**		
Grantee/Contractor:	Prince George's County		
Location:	Upper Marlboro, Maryland		
Funding:	$144,000	Funding Source:	Section 26
Project Manager:	Gwendolyn R. Cooper	Project Number:	MD-26-0006

Description: This effort is to develop a model strategy for providing low-cost financing through credit enhancements for transit facilities. The strategy involves establishing an enterprise district around transit stations for purposes of financing all station improvements. The district will support these improvements through an *ad valorem* charge on property owners. Instead of securing bonds with, for example, parking fee revenues, revenues from the district will enable access to capital markets with much more favorable credit ratings. The study tasks are to: consider transit linkages with station real estate development; set parameters for the entire district; determine the real estate market's reaction to the district; and assess site planning, zoning, and environmental issues.

Project Title: **Cash Management Guide**
Grantee/Contractor: KPMG Peat Marwick
Location: Vienna, Virginia
Funding: $150,000 Funding Source: Section 23
Project Manager: Salvator Caruso Project Number: VA-90-7001

Description: This project will produce guidelines on the management of cash for transit agencies. Case studies will be conducted of model cash management systems. The project will address issues from collection of revenue to acquisitions. Various types of marketable securities will be identified. More appropriate ways to control revenues will be covered as well.

Project Title: **Oklahoma City Northeast Rail Transit System Joint Development Feasibility Study**
Grantee/Contractor: Central Oklahoma Transportation and Parking Authority
Location: Oklahoma City, Oklahoma
Funding: $240,000 Funding Source: Section 26
Project Manager: Ross W. Adams Project Number: OK-08-7002

Description: The City of Oklahoma and the Central Oklahoma Transportation and Parking Authority are conducting a feasibility study to investigate and develop privatization strategies for the planning, implementation, operation and maintenance of rail transit service along an existing alignment. This effort will also explore joint development usage of the Union Station Terminal in Oklahoma City.

Project Title: **Evaluation of the Honolulu Turnkey Project**
Grantee/Contractor: EG&G Dynatrend, Inc.
Location: Cambridge, Massachusetts
Funding: $148,155 Funding Source: Section 23
Project Manager: Edward L. Thomas Project Number: MA-90-7005

Description: This project will start the evaluation of a turnkey project representing an innovative public/private partnership. It will produce the study design and collect, validate, and analyze before and during data for the Honolulu project. This initial assessment will consider issues encountered thus far in areas such as the RFP process, contractor selection criteria, performance bond requirements, the role of the private sector, and the impact on capital cost. As the project proceeds, later stages will consider the effectiveness of risk management, cash flow management, master scheduling, and financial control. The benefits and costs of turnkey procurement will be compared to more traditional procurement methods.

Project Title: **Evaluation of the Houston Turnkey Project**
Grantee/Contractor: Booz-Allen & Hamilton, Inc.
Location: Bethesda, Maryland
Funding: $100,000 Funding Source: Section 26
Project Manager: Richard J. Ziller Project Number: MD-26-0001

Description: This project will start the evaluation of a turnkey procurement which contains joint development and other creative financing strategies. The evaluation will consider major issues encountered and the effectiveness of the project's cash flow management system, procurement methods, project scheduling system, and financial control systems. The project will produce the study design, and will collect, validate, and analyze before and during data for the Honolulu project and the control project. Subsequent funding will be used for data collection and analysis of after data for the selected control project. Subsequent phases will consider the effects of turnkey procurement on flow of funds, project engineering management, and financial management control systems during the final design and construction phases.

Project Title: **Technical Support for Turnkey Demonstration**
Grantee/Contractor: Booz-Allen & Hamilton, Inc.
Location: Bethesda, Maryland
Funding: $115,000 Funding Source: Section 26
Project Manager: Edward L. Thomas Project Number: MD-26-0001

Description: The contractor will assist TTS in organizing, holding, and recording a 1-day workshop with the World Bank on turnkey projects. In addition, the contractor, with the assistance of experts who have been involved in turnkey transit projects, will prepare a paper which describes typical procedures in turnkey transit system development.

Project Title: **Joint Development Demonstration Project**
Grantee/Contractor: Metropolitan Transportation Commission
Location: Oakland, California
Funding: $200,000 Funding Source: Section 26
Project Manager: Gwendolyn R. Cooper Project Number: CA-26-0015

Description: This component of the Joint Development program consists of a study that will lead to demonstration projects. A study conducted by the Bay Area Rapid Transit District in San Francisco will explain how a transit agency may spin-off its real estate component into a separate corporation. The study will examine the legal and institutional changes necessary to accomplish this, determine the benefits to the transit provider, and develop a performance plan for such a corporation.

Project Title: **Technical Support and Outreach/Information Sharing**
Grantee/Contractor: EG&G Dynatrend, Inc.
Location: Cambridge, Massachusetts
Funding: $49,778 Funding Source: Section 26
Project Manager: Edward L. Thomas Project Number: MA-26-0002

Description: Typical tasks included in this program will include: development and articulation of program and project concepts in the area of transit finance; carrying out special studies for the program; and providing assistance in support and conducting seminars, workshops, and conferences dealing with transit financing issues and assisting in information dissemination.

Project Title: **Technical Support and Outreach/Information Sharing**
Grantee/Contractor: KPMG Peat Marwick
Location: Vienna, Virginia
Funding: $100,000 Funding Source: Section 26
Project Manager: Edward L. Thomas Project Number: VA-26-0002

Description: This effort is providing technical support to TTS in the area of transit finance. The contractor will conduct special studies, assist in program and project development, and assist TTS with technical workshops, seminars, and conferences. In addition, data will be collected on the results of FTA assisted projects, seminars, and workshops. For each topic, data will be organized in the form of a brief and will contain information on issues, objectives of the undertaking, approach utilized, results, and conclusions. The briefs will also cover information on the most current creative techniques that have been demonstrated in the financing of transit capital projects and be an overview of each technique. Additionally, a catalog of "Innovative Financing Strategies" will be developed. This catalog will be disseminated nationally and will list persons to contact for detailed information.

Project Title: **Training in Transit Finance**
Grantee/Contractor: KPMG Peat Marwick
Location: Vienna, Virginia
Funding: $99,500 Funding Source: Section 26
Project Manager: Effie Stallsmith Project Number: VA-26-0002

Description: TTS has developed a training program in financial planning and management designed for transit agencies interested in financing bus operations, rehabilitation or replacement of existing assets, and modest service expansion (Course A); and for transit agencies undergoing alternatives analysis or preliminary engineering of fixed guideway systems (Course B). The three workshops planned for Fiscal Year 1992 are: a combination of these two workshops developed into one workshop for the central and midwestern areas held in the early part of 1992; a workshop for Course A was held in the eastern/southeastern areas in the spring of 1992; and Course B, to be given in the western area at a later date.

Project Title:	**Transit Insurance Data**		
Grantee/Contractor:	KPMG Peat Marwick		
Location:	Vienna, Virginia		
Funding:	$135,000	Funding Source:	Section 26
Project Manager:	Ross W. Adams	Project Number:	VA-26-0002

Description: This project will augment in-house efforts to review the status of tort reform in the transit industry. In preparation for the spring budget hearings, the in-house effort is summarizing existing studies and gathering more current data on insurance and casualty claims from a small sample of transit agencies. The project will conduct a more comprehensive study covering levels and types of insurance carried, and local and State laws affecting insurance,as well as amounts and types of successful and unsuccessful claims. The data will be organized by region, mode, and transit agency size.

Project Title:	**Transit Price Index**		
Grantee/Contractor:	Booz-Allen & Hamilton, Inc.		
Location:	Bethesda, Maryland		
Funding:	$150,000	Funding Source:	Section 23
Project Manager:	Richard J. Ziller	Project Number:	MD-90-7001

Description: This project will to create a Transit Price Index which reflects price changes in a "market basket" of transit goods. It will focus on capital goods and will be used by transit agencies for capital project planning, as well as by FTA for project oversight and for determining the accuracy of Section 3 cost effectiveness proposals. The initial stages of creating the Index include determining a representative make-up of the market-basket, including the possibility of creating a range of market baskets tailored to various modes. A managerial component of the Index will ensure regular timely updates. A proposed continuation of the project will create an Index for operational costs.

Project Title:	**Evaluating Innovative Financing Strategies**		
Grantee/Contractor:	EG&G Dynatrend, Inc.		
Location:	Cambridge, Massachusetts		
Funding:	$73,284	Funding Source:	Section 23
Project Manager:	Effie Stallsmith	Project Number:	MA-90-7005

Description: Evaluations will be conducted to determine the overall effectiveness of innovative financing techniques. The San Diego certificates of participation for buses, railcar cross-boarder leasing projects in New Jersey and San Francisco, and other model innovative financing transactions will be evaluated. The typical study design will include data collection, validation and analysis, and preparation of a final report. The final report will be available for national distribution and for use by FTA in stewarding the capital grants program.

Project Title:	**Evaluating Innovative Financing Strategies**		
Grantee/Contractor:	KPMG Peat Marwick		
Location:	Vienna, Virginia		
Funding:	$72,636	Funding Source:	Section 23
Project Manager:	Effie Stallsmith	Project Number:	VA-90-7001

Description: As part of a financial review, the contractor will compare final component costs with original component cost estimates for capital projects in Houston, Honolulu, San Francisco, Washington, Atlanta, San Diego, Los Angeles, Portland, Seattle, and other cities, as appropriate.

HUMAN RESOURCES AND PRODUCTIVITY

The Fiscal Year 1992 Human Resources and Productivity program is an ongoing effort to both meet the needs of the transit industry and respond to the challenges set forth in the National Transportation Policy.

The 1991 UMTA Conference in Orlando, along with two specialty conferences, one on labor/management cooperation and the other on the work force of the 1990's, assisted in producing a significant plan for action relating to technical and financial assistance in human resources and productivity. In addition, this year's program links its activities with ongoing efforts in FTA, the Department of Transportation, and other agencies of Government.

The transit industry is facing its greatest challenges in the 1990's relating to recruiting, developing and retaining a strong and competitive work force. Fewer people entering the work force, changing technology, and the changing nature of the work force itself, put a premium on effective human resources management combined with an increased demand for both technical and financial assistance. New task order contracts, along with an increased role by the Volpe National Transportation Systems Center, will assist FTA in analyzing industry conditions and developing comprehensive approaches in human resources and productivity in the transit industry.

The project descriptions that follow reflect both short-term industry driven priorities relating to recruiting, selecting, and training as well as to personnel development and labor/management cooperation. Other areas covered include long-term efforts to assess and analyze industry conditions and trends. Research and the introduction of new technology play an important role in FTA programs, but it is up to a competent and motivated work force to make it all work.

Recent Program Accomplishments

A typical product of the Human Resources program evolved from a recent demonstration project relating to excellence in the transit industry. A video was produced depicting a number of innovative industry practices along with a workbook detailing examples of excellence of creative operations, maintenance and service practices. The video and workbook are being distributed to the transit industry.

National conferences on topics such as labor/management cooperation, the workforce in the 1990's, and employee assistance programs promoted the Human Resources program.

Training and development were concentrated on expanding the quality and quantity of training experiences in the transit industry through the award of Statewide and regional training grants.

A report documenting the role of the Nation's community colleges in transit training and education was prepared. The Office of Technical Assistance and Safety supported the start-up of TransTech Academy, a cooperative learning program within the Washington, D. C., public school system.

Projects Awarded During Fiscal Year 1992

Project Title:	**Wheelchair Securement System**		
Grantee/Contractor:	Oregon State University		
Location:	Portland, Oregon		
Funding:	$82,543	Funding Source:	Section 26
Project Manager:	M. Marina Drancsak	Project Number:	OR-26-0003

Description: This project provides additional funding to finalize the design refinements required to make the OSU securement system marketable and demonstrable to mobility aid users and transit agencies. The OSU prototype has been successfully laboratory and field tested and assessed and attracted strong interest from transit agencies and wheelchair securement manufacturers. This extension effort will enable staff to work with mobility aid manufacturers and to develop a more adaptable securement system capable of accommodating most mobility aids currently in use on public transportation, including three-wheeled scooters. The effort will include development of technical specifications that can be used by manufacturers to incorporate these interfaces into the mobility aid design. Overall, this extension effort will enable OSU to refine and perform the following four tasks: refine the wheeled mobility aid interfaces, refine and test an integrated signal and control system, analyze and design an integrated restraint system, and dynamically test the integrated securement system.

Project Title:	**Ridership Impacts of Transit-Sensitive Site Design and Land Use**		
Grantee/Contractor:	University of California-Berkeley		
Location:	Berkeley, California		
Funding:	$83,000	Funding Source:	Section 26
Project Manager:	M. Marina Drancsak	Project Number:	CA-26-0017

Description: This project provides for the development of site design and land use planning guidelines that can be used by transit agencies, local planning agencies, and developers across the United States in creating more pedestrian-friendly and transit serviceable environments. The research effort will be documented in a final report which should be helpful to both FTA and local transit agencies in setting normative design standards that will promote development of more transit-sensitive real estate projects.

Project Title: **Development of an Advanced Travelers' Aid System for Public Transportation**
Grantee/Contractor: University of Delaware
Location: Wilmington, Delaware
Funding: $82,000 Funding Source: Section 26
Project Manager: M. Marina Drancsak Project Number: DE-26-0001

Description: This project will define and evaluate the feasibility of an ITMS, a personal travel decision-aid system that facilitates and promotes the use of public transit. The study will clarify the research direction for ITMS development for FTA and transit agencies, as well as identify research and product development direction for electronics manufacturers.

Project Title: **Transportation Services, Utilization, and Needs of Non-Urban Elderly**
Grantee/Contractor: University of Kentucky
Location: Lexington, Kentucky
Funding: $83,500 Funding Source: Section 26
Project Manager: M. Marina Drancsak Project Number: KY-26-0001

Description: This objective of this study is to determine the travel needs and patterns of the non-urban elderly population in central Kentucky. Emphasis will be placed on the prevalence and utility of formal and informal transportation systems, the extent of mode splitting, trip chaining, and individual transportation in the context of the household. The final report will document the study and will include recommendations for transit operators and managers for modifying and/or improving existing transport systems that serve the non-urban elderly population.

Project Title: **Risk Assessment in Fixed Guideway Construction**
Grantee/Contractor: Northeastern University
Location: Boston, Massachusetts
Funding: $70,999 Funding Source: Section 26
Project Manager: M. Marina Drancsak Project Number: MA-26-0022

Description: The objective of this project is to provide support to Northeastern University to develop a framework for risk analysis in the design and construction of fixed guideway transit projects. Sources of construction and financial risk will be examined and a useful model for risk assessment and allocation through the construction contract will be developed. The completed final report will document the study effort, provide recommendations, and develop guidelines for risk identification, measurement, and allocation relevant to the design and construction of fixed guideway transit projects.

Project Title:	**User-Friendly Bus Interior Design: Reducing Falls Through Improved Visual Environment**		
Grantee/Contractor:	Pennsylvania State University		
Location:	University Park, Pennsylvania		
Funding:	$83,000	Funding Source:	Section 26
Project Manager:	M. Marina Drancsak	Project Number:	PA-26-0005

Description: The objective of this grant is to provide support to the Pennsylvania State University to develop design guidelines for bus interiors that will increase rider comfort, safety, and vehicle utility levels by specifying the requirements that will allow a rider to maintain a maximum sense of balance and spatial orientation. Current ergonomic design standards and practices for bus interiors will be reviewed and evaluated by the research team for visual perception aspects. This activity will be followed by road testing of a retrofitted bus and evaluation by a jury of subjects while the bus is moving. The jury will contain a significant representation of elderly persons. This research offers a new approach to the problem of noncollision (falling) passenger injuries of people in a moving bus.

Project Title:	**Impact of Land Use Design and Transit Planning on Travel Mode and Trip Patterns: Houston Case Study**		
Grantee/Contractor:	Prairie View A&M Research Foundation		
Location:	Prairie View, Texas		
Funding:	$52,270	Funding Source:	Section 26
Project Manager:	M. Marina Drancsak	Project Number:	TX-26-0005

Description: The objective of this project is to provide support to Prairie View A&M University to employ a case study of the City of Houston and examine the different alternative land use pattern changes and impacts on travel behavior and transportation requirements. Special attention will be given to energy considerations. Guidelines will be developed that support better land use, wiser transportation investments, and effective decision making by both the public and private sectors. The Houston case study can be used to enhance the understanding of the effects of long-term policies on land use and transportation planning. A final report will be published and made available to the transit industry and the general public.

Project Title: **Analyzing Air Quality Impacts of Transit Projects**
Grantee/Contractor: University of Tennessee
Location: Knoxville, Tennessee
Funding: $71,540 Funding Source: Section 26
Project Manager: M. Marina Drancsak Project Number: TN-26-0019

Description: With the passage of the Clean Air Act Amendments of 1990, local transit agencies will need to perform an air quality analysis of every transit related project in order to get approval. The objective of this grant is to provide support to the University of Tennessee to expand the knowledge base regarding the air quality impacts of transit projects. The research aims to clearly identify transit projects that do not have significant adverse impacts on air quality as well as those that do. Transit projects will be selected and analyzed and thresholds will be established for determining when air quality analysis may or may not be needed. This research will provide a clearer understanding of the air quality impacts of transit projects as well as be useful in identifying transit projects for exemption from air quality requirements, A final report documenting the research effort will be published and made available to the transit industry and the general public.

Project Title: **Managerial Training Grant**
Grantee/Contractor: Birmingham-Jefferson County Transit Authority
Location: Birmingham, Alabama
Funding: $43,480 Funding Source: Section 26
Project Manager: Pauline A. D'Antignac Project Number: AL-26-0001

Project Title: **Managerial Training Grant**
Grantee/Contractor: Riverside Transit Agency
Location: Riverside, California
Funding: $18,300 Funding Source: Section 26
Project Manager: Pauline A. D'Antignac Project Number: CA-26-0012

Project Title: **Managerial Training Grant**
Grantee/Contractor: Regional Transportation District
Location: Denver, Colorado
Funding: $31,250 Funding Source: Section 26
Project Manager: Pauline A. D'Antignac Project Number: CO-26-0001

Project Title: **Managerial Training Grant**
Grantee/Contractor: Washington Metropolitan Area Transit Authority
Location: Washington, D. C.
Funding: $100,000 Funding Source: Section 26
Project Manager: Pauline A. D'Antignac Project Number: DC-26-0012

Project Title: **Managerial Training Grant**
Grantee/Contractor: Maryland Department of Transportation
Location: Baltimore, Maryland
Funding: $61,435 Funding Source: Section 26
Project Manager: Pauline A. D'Antignac Project Number: MD-26-0003

Project Title:	**Managerial Training Grant**		
Grantee/Contractor:	Ann Arbor Transportation Authority		
Location:	Ann Arbor, Michigan		
Funding:	$145,500	Funding Source:	Section 26
Project Manager:	Pauline A. D'Antignac	Project Number:	MI-26-0002

Project Title:	**Managerial Training Grant**		
Grantee/Contractor:	Niagara-Frontier Transportation Authority		
Location:	Buffalo, New York		
Funding:	$17,500	Funding Source:	Section 26
Project Manager:	Pauline A. D'Antignac	Project Number:	NY-26-0001

Project Title:	**Managerial Training Grant**		
Grantee/Contractor:	Erie Metropolitan Transit Authority		
Location:	Erie, Pennsylvania		
Funding:	$6,100	Funding Source:	Section 26
Project Manager:	Pauline A. D'Antignac	Project Number:	PA-26-0002

Project Title:	**Managerial Training Grant**		
Grantee/Contractor:	Port Authority of Allegheny County		
Location:	Pittsburgh, Pennsylvania		
Funding:	$61,435	Funding Source:	Section 26
Project Manager:	Pauline A. D'Antignac	Project Number:	PA-26-0003

Project Title:	**Managerial Training Grant**		
Grantee/Contractor:	Beaver County Transit Authority		
Location:	Bridgewater, Pennsylvania		
Funding:	$15,000	Funding Source:	Section 26
Project Manager:	Pauline A. D'Antignac	Project Number:	PA-26-0004

Project Title:	**Managerial Training Grant**		
Grantee/Contractor:	Fort Worth Transportation Authority		
Location:	Fort Worth, Texas		
Funding:	$100,000	Funding Source:	Section 26
Project Manager:	Pauline A. D'Antignac	Project Number:	TX-26-0003

Description: The above series of eleven single agency and Statewide managerial training grants to transit agencies are for the purpose of conducting cost effective training on a comprehensive basis for managerial, technical, and professional personnel in the transit industry. Projects emphasize Statewide and regional programs to allow a large number of agencies to participate in cooperation with State transit associations.

Project Title: **Federal Employers Liability Act Assessment**
Grantee/Contractor: National Academy of Sciences, Transportation Research Board
Location: Washington, D. C.
Funding: $100,000 Funding Source: Section 26
Project Manager: Charles T. Morison Project Number: DC-06-0667

Description: The Federal Railroad Administration and FTA will jointly fund a study of the cost effectiveness of the Federal Employers Liability Act. The National Transportation Policy states the Department's intent to repeal the Act. Before Congress acts, it intends to have the Transportation Research Board undertake a study to assess the effectiveness of the current Act and the potential impact of modification or repeal on rail labor productivity.

Project Title: **Linking Human Resource Management to Capital Development**
Grantee/Contractor: Memphis Area Transit Authority
Location: Memphis, Tennessee
Funding: $150,000 Funding Source: Section 26
Project Manager: Charles T. Morison Project Number: TN-26-0001

Description: This project will assess and document the role of human resource management in support of planning and capital programs, particularly as it effects the introduction of new technology. All too often, new technology is introduced into the transit industry through the capital program with little attention to staffing and training required to operate and maintain it. This initiative will examine current industry conditions, explore opportunities to link human resources planning with capital programs and document the potential benefits of including a human resources element in the capital development process.

Project Title: **ADA Training for Rail Operation and Maintenance**
Grantee/Contractor: Regional Transportation Authority
Location: Chicago, Illinois
Funding: $150,000 Funding Source: Section 26
Project Manager: Charles T. Morison Project Number: IL-26-0002

Description: This project will develop a model training program designed to assist the transit industry in meeting the special needs of the disabled community. The program will be developed and tested by a group of rail properties interested in complying with the Americans with Disabilities Act requirements by training and preparing their employees to meet the special needs of their patrons.

Project Title:	**National Technology Initiative**		
Grantee/Contractor:	Research and Special Programs Administration		
Location:	Washington, D. C.		
Funding:	$25,000	Funding Source:	Section 26
Project Manager:	A. M. Yen	Project Number:	DC-26-0006

Description: Federal agencies are joining together with the private sector in the National Technology Initiative (NTI). NTI will promote use by the U. S. technology industry to strengthen the domestic economy and to compete in global markets. The initiative will promote better understanding of opportunities for industry to commercialize new technology advances. It will highlight the Federal Government's investment in science and technology, much of which may have commercial potential. Conferences will be held during the year in several regions. They will parallel a successful 1991 series to promote exports. In conjunction with these conferences, Federal agencies will be accelerating their efforts to make it easier for the private sector to commercialize technology advances. Each meeting will address manufacturing excellence, mechanisms for cooperative R&D and long-term investment and financing. In addition, conferences will target technologies of interest to each region's industry. Experts at all levels from business, academia, and government agencies, including senior policy makers from the Departments of Commerce, Energy, and Transportation and the National Aeronautics and Space Administration, will explore with conference participants practical ways of making better use of our Nation's technological strengths. The conferences will feature a discussion format.

INFORMATION

The Information program represents a new FTA focus area that is a product of the Intermodal Surface Transportation Efficiency Act of 1991. It is designed to improve communication among transit operators, suppliers, consultants, and the FTA on work in progress as well as on specific products that are available to improve the technical components of mass transit.

Historically, one of the major difficulties faced by decision makers in both the public and private sectors has been dealing with the complexity of transportation issues. For example, questions such as how much to invest, when to invest, and which option is the best investment are frequently caught up in complex technical alternatives, methodologies and evaluations. The goal of the FTA Information program is to provide mechanisms to overcome such impediments in the planning and decision making processes.

The primary objectives of the Information program are to: determine the information needs of decision makers in both the private and public transportation sectors; factor these needs into the FTA set of program activities; and establish efficient and effective outreach products and procedures to disseminate information and transfer technology.

The Information program has several elements that comprise an integrated approach to providing technical information on mass transit that encompasses all of FTA's technical activities. The use of a variety of mechanisms, such as workshops, conferences, publications, and demonstration projects designed for targeted audiences, provide the means to meet the goals and objectives of the program.

There are three elements of the Information program: outreach, collection/distribution networks, and product design and development.

The outreach element addresses the market for information sharing and the transfer of technology. Outreach concentrates on the various professional organizations, trade and academic publications, and industry producers involved with the flow of transit information. They include: the Transportation Research Board, the Public/Private Transportation Network, the University Transportation Centers, the Transportation Research Information Service, the Transit Cooperative Research Program, and public transit interest organizations and associations. The FTA Information program integrates the research and technical products of these and other organizations with its own activities to develop a more comprehensive and effective information dissemination program.

Collection and distribution networks are designed to identify the primary paths by which organizations receive information and then use these established paths (whether publications, seminars, or conferences) to direct relevant information to the target groups.

The product design and development element of the Information program establishes procedures to disseminate information to decision makers, technical support staff, and practitioners.

Recent Program Accomplishments

A resource information center was established at George Mason University to develop information technology based approaches to mobility and congestion issues. The Center is developing state-of-the-art information dissemination techniques.

A working relationship was established between the American Public Transit Association and the Transportation Research Board to develop an information dissemination plan of action related to the Transit Cooperative Research program.

The Public/Private Transportation Network provided a wide spectrum of technical assistance to transportation providers based on a peer-to-peer exchange of information and experience.

An information dissemination plan for the Office of Mobility Enhancement was developed.

A series of peer-to-peer programs, workshops, and seminars were conducted.

Projects Awarded During Fiscal Year 1992

Project Title:	**Public/Private Transportation Network**		
Grantee/Contractor:	MacDorman and Associates		
Location:	McLean, Virginia		
Funding:	$720,000	Funding Source:	Section 26
Project Manager:	Stewart N. McKeown	Project Number:	VA-06-0146

Description: PPTN is a technical assistance program engaged in disseminating information about exemplary practices in the mass transportation industry through the use of practitioners who have hands-on experience. In addition, PPTN has been used to provide technical assistance to the transit industry in implementing FTA's major private sector policy initiatives. Technical assistance is provided in the areas of competitive services, suburban mobility, finance, joint development, and entrepreneurial services.

Project Title: **Technical Assistance Through the Transportation Research Board**
Grantee/Contractor: National Academy of Sciences, Transportation Research Board
Location: Washington, D. C.
Funding: $328,000 Funding Source: Section 26
Project Monitor: John S. Durham Project Number: DC-26-0003

Description: The FTA, in conjunction with other DOT modal administrations, and fifty State transportation departments, sponsors research, technical assistance, and information exchange through the Transportation Research Board of the National Academy of Sciences. Funding from sponsors, affiliates, and members allows TRB to conduct a wide range of technical activities through an extensive network of transportation professionals and experts. In particular, FTA funding supports TRB workshops and conferences, including the TRB annual meeting, publication of special and periodic reports, including *Transportation Research News*, peer-to-peer information exchange with representatives of State departments of transportation and universities, and operation of the Transportation Research Information Service, TRIS is a system of electronic bibliographic information on past and current transportation research, which is widely accessible to FTA, its clients, and other individuals and organizations worldwide.

Project Title: **FTA Transit Planning and Research Priorities Workshop**
Grantee/Contractor: Volpe National Transportation Systems Center
Location: Cambridge, Massachusetts
Funding: $50,000 Funding Source: Section 26
Project Monitor: Henry Nejako Project Number: MA-26-0016

Description: A Planning and Research Priorities Workshop was conducted in Falls Church, Virginia, in July 1992. This poject provided support services for this workshop and documentation of workshop results.

Project Title: **Technical Briefs**
Grantee/Contractor: Volpe National Transportation Systems Center
Location: Cambridge, Massachusetts
Funding: $50,000 Funding Source: Section 26
Project Manager: Helen M. Tann Project Number: MA-26-0017

Description: This project continues the effort begun at VNTSC in Fiscal Year 1991 to design, produce and disseminate technical briefs for all program elements of the Office of Technical Assistance and Safety.

Project Title:	**Technical Report Printing and Dissemination**		
Grantee/Contractor:	Office of the Secretary of Transportation		
Location:	Washington, D. C.		
Funding:	$30,000	Funding Source:	Section 26
Project Manager:	Edith M. Rodano	Project Number:	DC-26-0011

Description: This project is for the printing and dissemination of technical reports produced under all program initiatives of the Technical Assistance and Safety Program.

Project Title:	**Microcomputer Exchange Project Completion**		
Grantee/Contractor:	Capital District Transportation Authority		
Location:	Albany, New York		
Funding:	$83,634	Funding Source:	Section 26
Project Manager:	Effie Stallsmith	Project Number:	NY-06-0090

Description: The objective of this project is to support the efforts of CDTA to establish and operate a Microcomputer User Support Center for transit operators and transportation professionals. The functions of the Center are to: publish a quarterly newsletter containing information about microcomputer applications in the transit industry, advances in hardware, and availability of software to increase communication among users; serve as a clearinghouse for microcomputer software developed by members of the user group to facilitate a direct exchange of information and software; and to serve in an advisory capacity for members and/or potential members of the user group who may have questions or problems relating to microcomputer systems and software.

REGIONAL MOBILITY

The Regional Mobility program was created to be a catalyst for local action to address regional mobility problems. Mobility problems come in various forms. For example, too much traffic demand for the highway system can cause congestion, delays, accidents, suppression of latent travel demand, lost business opportunities, increased business and personal transportation costs, etc. Mobility problems also include the difficulties of persons without cars to get to jobs, stores, and medical services that are located outside of public transit service areas. In the 1990's, this typically affects low income, inner city residents who cannot access suburban job opportunities which were created in the 1980's.

The mission of the Regional Mobility program is to support and encourage regional jurisdictions and local communities to generate solutions (sometimes in partnership with private interests) in order to mitigate their mobility problems. The program reinforces its message and carries out its mission by means of technical assistance, outreach, evaluation, research, demonstration projects, and information dissemination. The goal of the program is to help communities obtain the tools they need to address and improve mobility and to do so through relatively low cost, innovative strategies, rather than through projects that require large expenditures of public capital.

The current agenda of the Regional Mobility program is subdivided into discrete program elements. Each program element represents a focus area for mobility enhancement. These are: transportation demand management, which focuses on actions to reduce single occupancy trips; innovative transportation services, which includes low cost marketing and service strategies; entrepreneurial services, which enlists the cooperation of community, neighborhood, minority and small business groups to establish transit services; and rural and specialized transportation, which addresses the personal mobility problems of people without transportation and/or those who are isolated and lack opportunity.

These program elements represent different, and often overlapping, aspects of noncapital intensive solutions to mobility problems. For example, improving mobility to a suburban office park might include staggering work hours, requiring employees to carpool in order to get a parking space, organizing a telecommuting program (transportation demand management) and employer chartering of special bus service (innovative transit services). At the same time, minibuses operated by small business concerns may provide reverse commute services from the central city (entrepreneurial services).

The Regional Mobility program addresses several of the themes contained in the National Transportation Policy. In addition, recent Federal legislative actions, such as the Clean Air Act of 1990 and the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), have mandated that the various levels of government, as well as the private sector, take actions that will reduce congestion and air pollution.

Recent Program Accomplishments

A joint FTA/FHWA program for improving operational mobility was established. This program funded 23 competitively solicited TDM projects.

With FHWA, FTA established an effort to do further research and demonstrations of congestion pricing as a means of redistributing regional travel demand.

A stronger effort was begun to evaluate regional mobility demonstration projects. These evaluations will form the data base to be disseminated as the record and findings of demonstration projects.

Nine local regional mobility seminars were held to stimulate interest in local TDM and innovative transit efforts to address regional mobility issues.

Technical workshops were conducted to assist entrepreneurs in starting new private transit services.

Assistance was provided to the Southern California Association of Governments and the Delaware Valley Regional Planning Commission in the initiation of transit subsidy voucher programs that encourage employees to ride transit to work. Thousands of such vouchers are now sold monthly in each area.

The Chicago Transit Authority was given assistance for the development and implementation of a market based fare program which resulted in increased revenue without the usual loss of ridership.

Help was provided for the initiation five new privately operated transportation services in Orlando, Detroit, Des Moines, Boston, and Rockland County, New York.

The National Center for Regional Mobility at George Mason University was established. This Center has carried out support activities, such as publishing a quarterly newsletter and developing an innovative, computer-based system to facilitate the conduct of meetings and seminars by allowing consensus decisions to be reached more quickly and efficiently.

Twelve transportation management associations (TMA's) around the country were established with assistance provided under this program. These TMA's involve the public and private sectors and have been found to be a useful entree to private sector employers, where the most effective TDM actions occur.

Projects Awarded During Fiscal Year 1992

Project Title:	**National Center for Regional Mobility**		
Grantee/Contractor:	George Mason University		
Location:	Fairfax, Virginia		
Funding:	$150,000	Funding Source:	Section 26
Project Manager:	Gwendolyn R. Cooper	Project Number:	VA-26-0003

Description: This project will further develop and refine an academic center of excellence at George Mason University to address the Nation's growing mobility needs. The continuing role of the Center will be to link academic research to real problems, involve interested groups in creative decision making processes to alleviate conflict and relieve regional congestion; educate the public as to the nature of the problem, its consequences and potential solutions; and form constructive alliances of special interest groups, the public, and government to address the central issues surrounding regional mobility.

Project Title:	**Technical Support to the Regional Mobility Program**		
Grantee/Contractor:	K. T. Analytics		
Location:	Frederick, Maryland		
Funding:	$195,700	Funding Source:	Section 26
Project Manager:	Stewart N. McKeown	Project Number:	MD-08-7003

Description: This study will provide technical support for the implementation of FTA's program initiatives under the Regional Mobility program. The following tasks outline specific activities in five general areas associated with Regional Mobility: design demonstrations in the FTA Regional Mobility program, disseminate information on the Regional Mobility program, evaluate demonstrations, prepare case studies in areas of interest, and conduct other studies as needed. It should be noted that these tasks will not be performed in sequential order. Rather, individual task orders may be formulated to address specific issues in any of the five emphasis areas and will be based on FTA's particular needs and priorities.

Project Title:	**Rural Transit Assistance Program (RTAP) National Program**		
Grantee/Contractor:	American Public Works Association		
Location:	Chicago, Illinois		
Funding:	$750,000	Funding Source:	Section 26
Project Managers:	Roger Tate Elizabeth J. Solomon	Project Number:	IL-18-X906

Description: This project will provide assistance to continue and expand the Rural Transit Assistance Program National Program (RTAP). The RTAP National Program provides funding for training, technical assistance, and research to improve the delivery of transit services in rural areas. The American Public Works Association won a competitive cooperative agreement to conduct this project over the next three years with an option of two additional years. The objectives of the RTAP National Program are to: (a) promote the delivery of safe and effective public transportation in non-urbanized areas; (b) make more effective use of public and private resources in the provision of rural transportation; (c) support the coordination of public and human service transportation; (d) foster the development of State and local capacity for addressing the training and technical assistance needs of the rural transportation community, including the development of local networks of transit professionals to facilitate peer-to-peer self help; (e) improve the quality of information and technical assistance available through the development of a national rural public transportation data base; and (f) continue the RTAP National Resource Center with a toll-free hotline and electronic bulletin board. The Resource Center is also used for the provision of information and assistance on issues relating to rural and specialized transportation.

Project Title:	**National Conference on Rural Public Transportation**		
Grantee/Contractor:	Utah Department of Transportation		
Location:	Salt Lake City, Utah		
Funding:	$45,000	Funding Source:	Section 26
Project Manager:	Elizabeth J. Solomon	Project Number:	UT-18-X907

Description: The objective of the National Conference on Rural Public Transportation is to offer plenary sessions to Federal and State governments; and public and private organizations who are involved in national rural public transportation initiatives of importance. The Conference is a biennial activity. The 11th biennial Conference will be held in Park City, Utah, September 26-29, 1993. The Conference agenda will include finance issues, matters related to the Americans with Disabilities Act, substance abuse, and training. The Conference agenda will also include the Department of Health and Human Services/Department of Transportation Joint Coordinating Council on Human Service Transportation Initiatives. Individual workshops on state-of-the-art transportation activities will also be included in the agenda. Funding for this project comes from the RTAP National Program allocation.

Project Title: **Revenue Enhancement Demonstration in Rural Areas**
Grantee/Contractor: Mississippi Department of Economic Development and Transportation
Location: Jackson, Mississippi
Funding: $60,000 Funding Source: Section 26
Project Manager: Elizabeth J. Solomon Project Number: MS-26-0001

Description: The Mississippi Department of Economic Development and Transportation will design, develop, and administer revenue enhancement and vehicle maintenance programs for its Section 18 and human services programs. An existing facility used for maintenance by a nationwide Section 18 operator will be expanded to allow contract maintenance to be provided, not only for public transportation vehicles, but for the county's service vehicles. The local Head Start program has also stated its wishes to have its vans serviced at this facility. The Region IV Head Start program will be providing funding for this project directly to the Mississippi DEDT. The potential for housing an Association on Aging nutrition site in the facility will also be explored.

Project Title: **DOT/DHSS Coordinating Council National Roundtable**
Grantee/Contractor: EG&G Dynatrend, Inc.
Location: Cambridge, Massachusetts
Funding: $63,644 Funding Source: Section 26
Project Manager: Roger Tate Project Number: MA-26-0002

Description: This project will provide technical support to FTA and to the DHHS/DOT Coordinating Council in continuing to promote coordination between general public transportation services and human service transportation programs. The specific objectives are to: identify and promote exemplary State-level coordination strategies as part of the State Program Managers meeting held in August 1992; facilitate direct communication between the DHHS/DOT Coordinating Council and selected State DHHS/DOT officials to discuss possible national efforts to promote increased State coordination activities; and replicate existing successful coordination strategies in two or three States in order to test the concept of a "peer-State" network. A national Coordination Roundtable meeting involving the DHHS/DOT Coordinating Council and DOT and DHHS officials from States with innovative and exemplary coordination programs was organized and held in August of 1992. A workshop on coordination was also conducted as part of the 1992 State Program Managers meeting.

Project Title: **National Conference on Specialized Transportation**
Grantee/Contractor: National Academy of Sciences, Transportation Research Board
Location: Washington, D. C.
Funding: $5,000 Funding Source: Section 26
Project Manager: Elizabeth J. Solomon Project Number: DC-26-0003

Description: The objective of the National Conference on Specialized Transportation is to offer plenary sessions to both Federal and State Governments as well as public and private organizations who are involved in national specialized transportation initiatives of importance. The Conference is a special Transportation Research Board activity held biennially. The 13th biennial Conference was held in Tampa in 1992. The agenda included plenary sessions focusing on policy issues, funding sources and issues, research programs in the U. S. and Canada, and discussions involving the role of national organizations and demographic trends and technology. The agenda also included individual workshops on the state-of-the-art of transportation activities. The conference agenda focused on the DHHS/DOT Joint Coordinating Council on Human Service Transportation Initiatives.

Project Title: **Volunteer Van Transportation Program**
Grantee/Contractor: Chickasaw Indian Nation
Location: Ada, Oklahoma
Funding: $50,000 Funding Source: Section 26
Project Manager: Roger Tate Project Number: OK-26-0001

Description: During Fiscal Year 1991, FTA and the Administration on Aging jointly funded a demonstration project to develop a volunteer van transportation program for Native Americans of the Chickasaw Indian Nation in the State of Oklahoma. This project will continue the demonstration of the use of a partnership between the Federal Government and a community-based Native American organization to develop and maintain a transportation program to improve the coordination of various services for older Native Americans. The project has provided funding for three lift-equipped vans, insurance, maintenance, stipends for drivers, and the transportation coordinator for the program. Operating costs will be financed by Chickasaw Indian Nation resources.

Project Title:	**Implementation of TDM Programs in Southern California**		
Grantee/Contractor:	Community Transportation Services, Inc.		
Location:	Los Angeles, California		
Funding:	$228,000	Funding Source:	Section 26
Project Manager:	Joseph M. Goodman	Project Number:	CA-26-0013

Description: This project provides for technical support contractors to assist both FTA program staff and grantees working in the area of transportation demand management (TDM). This assistance will be on a task ordering basis, as needs are identified, and will include fact finding, analyses, consultation, report preparation, and research dissemination. The preparation of technical briefs on TDM will also be included in this task.

Project Title:	**Project Evaluation of TDM/Innovative Transit Services**		
Grantee/Contractor:	Volpe National Transportation Systems Center		
Location:	Cambridge, Massachusetts		
Funding:	$200,000	Funding Source:	Section 26
Project Manager:	Joseph M. Goodman	Project Number:	MA-26-0006

Description: In nearly four years, the Regional Mobility program has seen the implementation of many transportation demand management and innovative transit service projects. This task will evaluate a selected sample of such projects and prepare reports on the project results. The evaluation report will be an independent assessment having information on data, data analysis, and impacts on the user and the related transportation system. It differs significantly from the final demonstration report that is provided by the local area, mainly documenting the implementation and general observations of accomplishments. Evaluation reports will be very useful to those who may have the responsibility to implement such projects in order meet, for instance, the requirements of the Clean Air Act.

Project Title:	**FHWA/FTA Training Course on TDM Techniques for Public Agencies**		
Grantee/Contractor:	Institute of Transportation Engineers		
Location:	Washington, D. C.		
Funding:	$80,000	Funding Source:	Section 26
Project Manager:	Joseph M. Goodman	Project Number:	DC-26-0020

Description: This project will develop a joint FHWA/FTA training course on TDM techniques for public agencies. It will package a 2-day training course using new materials, data, and findings. The training will address such topics as the Clean Air Act and the new FHWA/FTA congestion management system requirements. It will also address other issues, such as State-mandated requirements in California Regulation 15, etc.

Project Title:	**Congestion Pricing Demonstrations**		
Grantee/Contractor:	San Diego Association of Governments		
Location:	San Diego, California		
Funding:	$230,000	Funding Source:	Section 26
Project Manager:	Bert Arrillaga	Project Number:	CA-26-0020

Description: Special studies and demonstrations will be funded to determine the effectiveness and viability of congestion pricing techniques. In addition, funds will be allocated to conduct a congestion pricing seminar. Unsuccessful attempts were made by FTA to implement congestion pricing in the late 1970's. However, local interest has shown that the time is right to fund demonstration projects in this area. A demonstration is planned in San Diego to evaluate the impact of charging low HOV's (i.e., HOV-3 or HOV-2) for using the high occupancy vehicle lanes on a freeway. The extra revenues generated from the HOV fee would be funnelled into mass transit. In Houston, a demonstration is planned to encourage carpooling and vanpooling by offering a discounted fee on a toll road to high occupancy vehicles. Other projects will examine the impact on congestion and modal choice by raising parking fees for single occupant vehicles.

Project Title:	**Joint FHWA/FTA Operational Action Program for Improving Mobility**		
Grantee/Contractor:	Federal Highway Administration		
Location:	Washington, D. C.		
Funding:	$450,000	Funding Source:	Section 26
Project Manager:	Joseph M. Goodman	Project Number:	DC-26-0013

Description: This main goal of this joint FHWA/FTA is to reduce traffic congestion and promote alternatives to single occupant auto travel. Twelve projects were funded in the first cycle of this program in Fiscal Year 1991. Activities evolving out of this joint effort will be consistent with the goals of existing programs in FHWA and FTA, including the Regional Mobility program, the Intelligent Vehicle-Highway System program, and the Advanced Public Transportation System program. Particular emphasis will be placed on opportunities that contribute to implementation of IVHS operational testing and deployment phases. Improved communication is an important aspect. In addition, this program can serve as a supplement and/or transition for the Congestion Mitigation and Air Quality Improvement program, which encourages innovative immediate action solutions to congestion and air quality problems in urbanized areas.

Project Title: **Joint FHWA/FTA National Symposium on Congestion Management and Mobility**
Grantee/Contractor: Federal Highway Administration
Location: Washington, D. C.
Funding: $20,000 Funding Source: Section 26
Project Manager: John S. Durham Project Number: DC-26-0004

Description: This project allowed FTA to join with FHWA in sponsoring a National Symposium on Congestion Pricing in April 1992. This symposium was a necessary first step in establishing a framework for identifying, developing, and evaluating congestion pricing projects as part of a congestion pricing program coordinated by the two agencies. As a separate, but parallel, action, FTA provided for six papers on congestion pricing developed by various authors as resource papers for the symposium (see below).

Project Title: **Project Papers for FHWA/FTA National Symposium on Congestion Management and Mobility**
Grantee/Contractor: Robert W. Pool, Jr.
Location: Los Angeles, California
Funding: $4,600 Funding Source: Section 26
Project Manager: John S. Durham Project Number: CA-26-0002

Grantee/Contractor: Kenneth Small
Location: Chestnut Hills, Massachusetts
Funding: $5,000 Funding Source: Section 26
Project Manager: John S. Durham Project Number: MA-26-0003

Grantee/Contractor: Genevieve Giuliano
Location: Irvine, California
Funding: $5,000 Funding Source: Section 26
Project Manager: John S. Durham Project Number: CA-26-0003

Grantee/Contractor: Donald C. Shoup
Location: Los Angeles, California
Funding: $5,000 Funding Source: Section 26
Project Manager: John S. Durham Project Number: CA-26-0004

Grantee/Contractor: Steven B. Rooney
Location: Costa Mesa, California
Funding: $4,930 Funding Source: Section 26
Project Manager: John S. Durham Project Number: CA-26-0005

Grantee/Contractor:	Robert Cervero		
Location:	Berkeley, California		
Funding:	$4,981	Funding Source:	Section 26
Project Manager:	John S. Durham	Project Number:	CA-26-0006

Description: The above six projects were for development of resource papers for the National Symposium on Congestion Management and Mobility to stimulate thought focus and discussions on the subjects of Congestion Pricing, Pricing and Using the Revenues from Congestion Pricing, Market-Based vs. Command-and-Control Methods of Reducing Congestion and Emissions, The Role of Market-Oriented Pricing Policies, Issues Related to Road Pricing Technology, and Transportation Alternatives in a Congestion Pricing Environment.

Project Title:	**Technical Support for Regional Mobility Seminars**		
Grantee/Contractor:	EG&G Dynatrend, Inc.		
Location:	Cambridge, Massachusetts		
Funding:	$24,945	Funding Source:	Section 26
Project Manager:	Edward L. Thomas	Project Number:	MA-26-0002
Grantee/Contractor:	KPMG Peat Marwick		
Location:	Vienna, Virginia		
Funding:	$24,206	Funding Source:	Section 26
Project Manager:	Edward L. Thomas	Project Number:	VA-26-0002

Description: These projects will provide assistance in developing and conducting seminars, workshops, and conferences dealing with transportation demand management, innovative transit services, and research studies.

Project Title:	**Prince George's County Mobility Match**		
Grantee/Contractor:	Prince George's County		
Location:	Upper Marlboro, Maryland		
Funding:	$120,000	Funding Source:	Section 26
Project Manager:	Gwendolyn R. Cooper	Project Number:	MD-26-0005

Description: This effort will determine the feasibility and viability of developing and implementing a mobility match concept that would provide a guaranteed ride to and from work in shared vehicles for suburban commuters through a subscription program. The feasibility study will determine whether such a concept will meet the transportation needs of suburban residents in Prince George's County, Maryland. Phase II would support implementation of this concept in acquisition of vehicles needed to successfully demonstrate the mobility match program, with the goal that this program will become self-sustaining.

Project Title: **Multimodal Prototype Plan Studies**
Grantee/Contractor: Legislative Commission on Critical Transportation Choices
Location: Albany, New York
Funding: $150,000 Funding Source: Section 26
Project Manager: Edward L. Thomas Project Number: NY-26-0005

Description: The purpose of this study is to determine the most effective use of existing facilities, as well as any modifications that will lead to better containment and service. To achieve these goals, the LCCTC will survey comparable transit providers to ascertain their characteristics at the time of construction and any service population changes that have fundamentally altered the type of transit system required. Steps taken by commuter rail providers to better meet changing service population needs would also be compiled. The study will conclude with an evaluation of alternatives and recommendations for improvements to the Long Island Railroad. Increased integration of the Long Island Railroad with other transportation modes will be included in the evaluations.

Project Title: **Telecommuting Study**
Grantee/Contractor: Office of the Secretary of Transportation
Location: Washington, D. C.
Funding: $40,000 Funding Source: Section 26
Project Manager: Joseph M. Goodmam Project Number: DC-26-0007

Description: A report documenting the results of this study of telecommuting and its potential impacts on transportation has been prepared. This study will be the basis for a report to Congress and will include a workshop, review of existing studies, and performance of additional analysis, as required.

Project Title: **Charter Bus Demonstration Technical Support**
Grantee/Contractor: KPMG Peat Marwick
Location: Vienna, Virginia
Funding: $100,000 Funding Source: Section 26
Project Manager: Ross W. Adams Project Number: VA-26-0002

Description: This project will conduct a study design of data collection, validation, analysis, and evaluation of program monitoring and report preparation in the provision of charter services for the purpose of meeting the transportation needs of governmental, civic, charitable, and other community activities which otherwise would not be served in a cost-effective and efficient manner. The study design will include discussions with local agencies, business organizations, and community groups to explain the intentions of this demonstration and what activities and/or events will occur in order to minimize any concerns at the local level and to determine the availability and relevance of the study design.

Project Title: **Charter Bus Demonstration Technical Support**
Grantee/Contractor: KPMG Peat Marwick
Location: Vienna, Virginia
Funding: $50,000 Funding Source: Section 26
Project Manager: Ross W. Adams Project Number: VA-26-0002

Description: This project will assist in data collection, analysis, evaluation, program monitoring, and report preparation on provision of charter services for the purpose of meeting the transportation needs of governmental, civic, charitable, and other community activities which otherwise would not be served in a cost-effective and efficient manner. It will include discussions with local agencies, business organizations, and community groups to explain the intentions of this demonstration and requirements for program monitoring.

Project Title: **Management Audit of Public Transit System**
Grantee/Contractor: Puerto Rico Department of Transportation and Public Works
Location: San Juan, Puerto Rico
Funding: $20,000 Funding Source: Section 23
Project Manager: Elizabeth J. Solomon Project Number: PR-26-0001

Description: The Commonwealth of Puerto Rico will develop an overall management audit of the Public Transit System. This audit will focus on collecting information and conducting an analysis of passenger trips, miles, and other data pursuant to the Section 15 Uniform System of Accounts, Records and Reporting System.

Project Title: **Ridgeville Entrepreneurial Services Project**
Grantee/Contractor: City of Ridgeville
Location: Ridgeville, Alabama
Funding: $12,000 Funding Source: Section 26
Project Manager: Bert Arrillaga Project Number: AL-20-2002

Description: This program will provide the Tatiana Transportation Services, Inc., of Ridgeville with technical assistance in the refinement of a business plan and an implementation/marketing plan. These services are intended to be self-sustaining and are not expected to require Federal subsidies. The entire cost of the proposed service is to be funded through user fees, employer contributions, and community support.

Project Title: **Ridgeville Entrepreneurial Services Project**
Grantee/Contractor: City of Ridgeville
Location: Ridgeville, Alabama
Funding: $21,324 Funding Source: Section 3
Project Managers: Bert Arrillaga Project Number: AL-03-0011
Tom McCormick

Description: Tatiana Transportation Services, Inc., of Ridgeville will develop and operate a community-based transit system serving the transportation needs of local residents. The system will be an employment shuttle/circulator system in rural northeast Alabama.

Project Title: **Hartford Entrepreneurial Services Project**
Grantee/Contractor: Greater Hartford Transit District
Location: Hartford, Connecticut
Funding: $99,360 Funding Source: Section 3
Project Managers: Stewart N. McKeown Project Number: CT-03-0078
Mary Mello

Description: This is an entrepreneurial services challenge grant on behalf of a private operator, the Arrow Line, Inc., of East Hartford to lease buses for new bus service between New London and Hartford, to operate as an 18-month pilot project.

Project Title: **Entrepreneurial Services Program in Northern Virginia**
Grantee/Contractor: George Mason University
Location: Fairfax, Virginia
Funding: $80,000 Funding Source: Section 26
Project Manager: Stewart N. McKeown Project Number: VA-26-0004

Description: The objective of this project is to develop a plan for the implementation of an entrepreneurial transportation strategy to introduce a market-oriented set of services that have the potential to reduce co dependence on automobiles for internal circulation in the Tyson's Corner, Virginia, suburban activity center. The strategy utilizes revenues generated by commercial transportation services to pay the costs of providing internal circulation transportation and operating a rideshare program with a guaranteed ride home. A company providing a large volume of courier services to firms in a suburban activity center, such as Tyson's Corner has vehicles circulating within the center. A courier service in the area will provide expertise on commercial transportation service and will play a key role in the interface with company decision makers being surveyed in the study area. The George Mason University Transportation Center will provide labor for much of the data collection connected with the survey. The study will assess the feasibility of the strategy as a sound business and effective methods of transportation demand management.

Project Title: **Entrepreneurial Services Shared Ride Project**
Grantee/Contractor: Yellow Cab of Norwood
Location: Norwood, Massachusetts
Funding: $69,324 Funding Source: Section 3
Project Managers: Stewart N. McKeown Project Number: MA-03-0179
Mary Mello

Description: This project will provide for the purchase of computer hardware and software to be utilized by Yellow Cab of Norwood for the provision of a new fixed route shared-ride taxi service in the Norwood area.

Project Title:	**Entrepreneurial Services Commute Service Implementation Plan**		
Grantee/Contractor:	Lord Fairfax Planning District Commission		
Location:	Front Royal, Virginia		
Funding:	$55,000	Funding Source:	Section 3
Project Managers:	Stewart N. McKeown Florence Bicchetti	Project Number:	VA-26-0008

Description: This study will provide financial assistance through the Lord Fairfax Planning District Commission to the Brooks Transit Service of Front Royal, Virginia, for a marketing effort to promote a new private sector commuter service between Front Royal and the Route 28 Dulles Corridor. This project will include: an analysis of survey information to reveal ridership potential; development of routes and schedules; solicitation of support from employers to inform employees of the service and, possibly, obtain fare subsidies; development of a business and marketing plan; initiation of service; and the monitoring and refining of the service.

SAFETY AND SECURITY

The Safety and Security program is designed to assist the transit industry as well as State and local authorities, in providing the highest practical level of safety and security for the passengers and employees of the Nation's public transportation systems. Recognizing that safety and security are a local responsibility, the program trains transit professionals in the best contemporary safety and security programs and practices and publishes guidelines and models that can be used to design local procedures and measure actions.

Safety is defined as the elimination or control of unintentional hazards to the passengers, employees and public affected by transit operations; security is defined as protection against intentional personal injury or property loss.

The goals of the FTA Safety and Security program are to prevent and reduce accidents and incidents, and to minimize and control the effects of accidents and incidents that do occur. These goals are realized through technical assistance which supports the fundamental activities associated with operating a safety program. These activities include: training which is provided to transit professionals through the Transportation Safety Institute, an ongoing effort to spread safety and security knowledge to the working levels within the transit industry; program management support provided through Volpe National Transportation Systems Center for information dissemination; performance indicators through safety data collection on transit safety problems and safety program effectiveness; safety oversight and security enforcement through the development of technical projects, regulatory guidelines, and training; and development of drug and alcohol testing requirements to detect substance abuse by transit workers.

To achieve these goals, the Office of Safety provides technical assistance which benefits both the riding public and the mass transit industry. A safer transit environment projects a better image to the public, resulting in increased patronage and transit income, reduced costs, improved schedule performance, and enhanced working conditions.

Recent Program Accomplishments

The Transportation Safety Institute began conducting transit safety training for FTA in 1976. The training has evolved from rail-oriented safety to a full range of bus, rail, and safety courses and seminars. Through TSI, the Office of Safety has introduced the concepts of system safety to the industry. As a result of these training programs, improvements have been made in the areas of accident prevention, accident reduction, and a more secure environment for transit patrons. While the ultimate benefactor of safe and secure transit systems is the transit patron or rider, the taxpayer also receives benefit from the fact that many systems are Federally-funded and safer systems contribute to their becoming more financially stable systems.

In 1992, the National Transportation Safety Board issued a recommendation on the issue of safety oversight of the rapid rail transit industry. The recommendation was addressed to all States in which rapid transit systems operate to develop or revise, as needed, existing programs to provide for continuous and effective oversight of rapid rail transit safety.

An Advance Notice of Proposed Rulemaking published in June 1992 solicited public comments on a range of issues involved in the implementation of these requirements. Public hearings were held and the data collected has been summarized based on categories of State agencies, transit systems, and other organizations or individuals.

A workshop was held in September 1992 to explore new security concepts in managing social problems which impact transit properties and passengers, such as: intergovernmental, ethnic, and cultural conflicts; maintaining a safe and drug-free transit environment; the problem of homelessness; and how order and cleanliness contribute to a safe and civil transit environment.

Section 339 of the Department of Transportation and Related Agencies Appropriations Act of 1990 instructed FTA to conduct a thorough, independent safety review of the New York Metropolitan Transportation Authority (MTA), including the New York City Transit Authority and the Long Island and Metro-North commuter railroads. In November 1992, the investigation of the MTA and its operating elements was completed with the delivery of nine summary reports to the Federal Transit Administration. Those final reports identified numerous safety concerns at each of the agencies investigated.

The Omnibus Transportation Employee Testing Act of 1991 mandated that the Department of Transportation implement substance abuse management programs in various transportation industries for safety-sensitive employees. The Federal Transit Administration, which previously had no statutory authority to implement drug and alcohol testing, is now required by this legislation to develop such regulations which should enhance mass transit safety. Notices of proposed rulemaking on drug and alcohol testing in the mass transit industry were published in the Federal Register on December 15, 1992. It is anticipated that final rules will be published by the end of Calendar Year 1993.

A project investigated passenger safety technologies through a 2-phased study of safety and security systems at the New Jersey Transit Corporation. Phase I includes an analysis of the effectiveness and reliability of the various security systems, capital and operating costs involved, and issues concerning liability and crime prevention. Phase II will include demonstration of a new, advanced system not currently utilized by New Jersey Transit.

A computer-based safety and security bulletin board will continue to provide information on training courses, report listings, special interest group discussions, electronic mail to other users, and data file transfers via a toll-free modem number (1-800-231-2061).

Projects Awarded in Fiscal Year 1992

Project Title:	**Section 22 Safety Investigation**		
Grantee/Contractor:	Interactive Elements, Inc.		
Location:	New York, New York		
Funding:	$41,601	Funding Source:	Section 22
Project Manager:	Ronald D. Kangas	Project Number:	NY-90-A004
Grantee/Contractor:	Battelle Columbus Laboratories		
Location:	Columbus, Ohio		
Funding:	$35,000	Funding Source:	Section 22
Project Manager:	Ronald D. Kangas	Project Number:	NY-90-A001
Grantee/Contractor:	Battelle Columbus Laboratories		
Location:	Columbus, Ohio		
Funding:	$226,963	Funding Source:	Section 22
Project Manager:	Ronald D. Kangas	Project Number:	NY-90-A001
Grantee/Contractor:	Battelle Columbus Laboratories		
Location:	Columbus, Ohio		
Funding:	$169,822	Funding Source:	Section 22
Project Manager:	Ronald D. Kangas	Project Number:	NY-90-A001
Grantee/Contractor:	Booz-Allen and Hamilton, Inc.		
Location:	Bethesda, Maryland		
Funding:	$125,000	Funding Source:	Section 22
Project Manager:	Ronald D. Kangas	Project Number:	NY-90-A003
Grantee/Contractor:	Booz-Allen and Hamilton, Inc.		
Location:	Bethesda, Maryland		
Funding:	$324,992	Funding Source:	Section 22
Project Manager:	Ronald D. Kangas	Project Number:	NY-90-A003
Grantee/Contractor:	MacDorman and Associates		
Location:	McLean, Virginia		
Funding:	$1,000	Funding Source:	Section 22
Project Manager:	Ronald D. Kangas	Project Number:	NY-90-A004
Grantee/Contractor:	Interactive Elements, Inc.		
Location:	New York, New York		
Funding:	$123,349	Funding Source:	Section 22
Project Manager:	Ronald D. Kangas	Project Number:	NY-90-A004

Description: The objective of these efforts is to carry out the FTA safety investigation of the New York Metropolitan Transportation Authority and its operating elements.

Project Title:	**Section 22 Safety Conditions Report**		
Grantee/Contractor:	Technology and Management Services, Inc.		
Location:	Burlington, Massachusetts		
Funding:	$79,994	Funding Source:	Section 26
Project Manager:	Ronald D. Kangas	Project Number:	MA-26-0001

Description: The contractor will prepare a report on the Section 22 investigations for the Congress in response to the language contained in the bill. The report will contain information on the New York City Transit Authority R-46 truck problem investigated under Section 107 (predecessor to Section 22), the Southeastern Pennsylvania Transit Authority Norristown high speed line investigation, the current Metropolitan Transportation Authority et al. investigation in New York (including the Federal Railroad Administration portion), plus nationwide safety data collected under the 1990 Section 15 program.

Project Title:	**State Responsibility For Fixed Guideway System Safety**		
Grantee/Contractor:	Volpe National Transportation Systems Center		
Location:	Cambridge, Massachusetts		
Funding:	$124,988	Funding Source:	Section 26
	$75,000		Section 8
Project Manager:	Roy Field	Project Number:	MA-26-0013

Description: The FTA Act was amended by Section 28 to address State responsibility for fixed guideway system safety. As a result of this legislation, FTA issued a regulation in 1992 regarding this State safety oversight. This project involved the rulemaking initiatives to establish this regulation. A Notice of Proposed Rulemaking, preliminary regulatory evaluation, Final Rule, and final regulatory evaluation are the minimum requirements in this process.

Project Title:	**Transcribe Hearings on State Responsibility for Guideway System Safety**		
Grantee/Contractor:	Capcom, Inc.		
Location:	Washington, D. C.		
Funding:	$293	Funding Source:	Section 6
Project Manager:	Roy Field	Project Number:	DC-26-0018
Grantee/Contractor:	Heritage Reporting		
Location:	Washington, D. C.		
Funding:	$1,349	Funding Source:	Section 6
Project Manager:	Roy Field	Project Number:	DC-26-0019
Grantee/Contractor:	Sign Language		
Location:	Silver Spring, Maryland		
Funding:	$226	Funding Source:	Section 6
Project Manager:	Roy Field	Project Number:	MD-26-0009

Description: These three projects were for the purpose of providing transcripts of hearings on State responsibility for guideway system safety.

Project Title:	**Oversight Evaluation of State Safety Responsibility for Guideway System Safety**		
Grantee/Contractor:	Volpe National Transportation Systems Center		
Location:	Cambridge, Massachusetts		
Funding:	$300,000	Funding Source:	Section 23
Project Manager:	Roy Field	Project Number:	MA-90-7006

Description: This project implements the reauthorization language and the National Transportation Safety Board recommendations. Under this project, the FTA will perform evaluations of current state oversight activities for fixed guideway activities. In implementing the intent of the reauthorization legislation FTA will provide guidelines tailored to current State needs, and provide training for States on safety oversight. FTA will structure a program in accordance with experience gained in the evaluation. Guidelines will be developed for use by State and local governments that address the critical elements of an effective safety oversight program, system safety program plans, and other safety activities, such as Section 22 investigations.

Project Title:	**Transportation Safety Institute Training Courses in Transit Safety**		
Grantee/Contractor:	Federal Aviation Administration, Transportation Safety Institute		
Location:	Oklahoma City, Oklahoma		
Funding:	$400,000	Funding Source:	Section 26
	$100,000		Section 8
Project Manager:	Ronald D. Kangas	Project Number:	DC-26-0016

Description: This is sustaining support to TSI to conduct over 200 courses, including Bus and Rail System Safety, Bus Accident Prevention, Rail and Bus Accident Investigation and Train-the-Trainer. These courses comprise the core curriculum of TSI transit safety and security training, annually attended by approximately 3,500 transit industry employees.

Project Title:	**Safety Training Course Development**		
Grantee/Contractor:	Volpe National Transportation Systems Center		
Location:	Cambridge, Massachusetts		
Funding:	$125,000	Funding Source:	Section 26
Project Manager:	Judy Meade	Project Number:	MA-26-0008

Description: This funding will support much needed revisions to two courses conducted by the Transportation Safety Institute. Existing expertise at VNTSC will be utilized to complete necessary revisions to the Rail Accident Investigation course and to re-create a System Security course.

Project Title:	**Drug Regulatory Evaluations and Implementation Guidelines**		
Grantee/Contractor:	Battelle Columbus Laboratories		
Location:	Columbus, Ohio		
Funding:	$293,302	Funding Source:	Section 26
Project Manager:	Judy Meade	Project Number:	OH-26-0001

Description: Final drug and alcohol regulation evaluations will be prepared as key pieces of new rulemakings on drug and alcohol testing. Implementation guidelines for both regulations will be created.

Project Title:	**Enhanced Automated Emergency Response System**		
Grantee/Contractor:	Technology and Management Services, Inc.		
Location:	Burlington, Massachusetts		
Funding:	$200,000	Funding Source:	Section 26
Project Manager:	Roy Field	Project Number:	MA-26-0018

Description: The automated emergency response system is a microcomputer based information retrieval system that provides controllers, dispatchers, and supervisors with quick and accurate information in order to respond effectively to a transit operations emergency (fire, derailment, collision, crime, etc.). Such a system was originally implemented at Bay Area Rapid Transit District. FTA demonstrated the BART system to other transit operators after making a few modifications, and that system was identified by a number of bus and rail operators as one they would like to incorporate as part of their operations. This project will upgrade and enhance the software such that any transit operators can tailor the project to reflect their operational needs.

Project Title:	**Expert Technical Support in Safety and Security**		
Grantee/Contractor:	Volpe National Transportation Systems Center		
Location:	Cambridge, Massachusetts		
Funding:	$125,000	Funding Source:	Section 26
Project Manager:	Roy Field	Project Number:	MA-26-0010

Description: This expert technical support includes assisting the Office of Safety in their activities in training, developing safety guidelines, collecting and analyzing information, and promoting and developing technology.

Project Title:	**Safety Clearinghouse**		
Grantee/Contractor:	Volpe National Transportation Systems Center		
Location:	Cambridge, Massachusetts		
Funding:	$50,000	Funding Source:	Section 26
Project Manager:	Rhonda M. Crawley	Project Number:	MA-26-0011

Description: The safety clearinghouse will serve as a focal point for all requests for written materials and resources currently available on the subject of transit safety. The clearinghouse is a computerized system designed to respond quickly and facilitate information exchange.

Project Title: **Computerized Safety Bulletin Board**
Grantee/Contractor: Volpe National Transportation Systems Center
Location: Cambridge, Massachusetts
Funding: $50,000 Funding Source: Section 26
Project Manager: Rhonda M. Crawley Project Number: MA-26-0012

Description: This project will support ongoing maintenance of a computerized bulletin board currently in place at VNTSC. The bulletin board requires constant management to ensure timeliness and accuracy of the information, such as safety training opportunities, meetings, and current safety and security related publications, including FTA regulations.

Project Title: **Security Technology/TV Surveillance**
Grantee/Contractor: New Jersey Transit Corporation
Location: Trenton, New Jersey
Funding: $210,000 Funding Source: Section 26
Project Manager: Rhonda M. Crawley Project Number: NJ-26-0001

Description: This demonstration project, using an innovative state-of-the-art security surveillance technology system for transit vehicles, will be conducted by the New Jersey Transit Corporation. It will identify the operations and maintenance related benefits and drawbacks of using this type of system onboard a revenue service vehicle.

Project Title: **Prototype Safety Shield/Partition for Taxicabs**
Grantee/Contractor: International Taxicab and Livery Association
Location: Kensington, Maryland
Funding: $120,000 Funding Source: Section 26
Project Manager: Roger Tate Project Number: MD-26-0008

Description: The objective of this project is to support the efforts of ITLA to develop, test, and implement prototype state-of-the-art safety shields for private-for-profit taxicab transportation providers that will shield drivers from both the front and back passengers. The safety shield will not only protect the driver, but also increase passenger capacity from three to four and provide better customer service than existing safety shields. ITLA will contract for design of two to three prototype shields which will incorporate features recommended by the National Driver Safety Committee, which consists of industry experts representing major private-for-profit transportation fleets. ITLA will work with the Committee to be sure the design phase is in line with Committee objectives.

Project Title: **Performance Indicators, Section 15 Data Analysis and Report**
Grantee/Contractor: Volpe National Transportation Systems Center
Location: Cambridge, Massachusetts
Funding: $100,000 Funding Source: Section 26
Project Manager: Ronald D. Kangas Project Number: MA-26-0009

Description: This project will explore passenger safety technologies through a study of planned and potential safety and security systems at the New Jersey Transit Corporation. The study includes an analysis of the effectiveness of various security systems, capital and operating costs involved, reliability of the systems, and issues concerning liability and crime prevention.

Project Title: **Performance Indicators, Develop a Security Incident Reporting System**
Grantee/Contractor: Volpe National Transportation Systems Center
Location: Cambridge, Massachusetts
Funding: $30,000 Funding Source: Section 26
Project Manager: Ronald D. Kangas Project Number: MA-26-0014

Description: The purpose of this project is to develop a security incident reporting system using the FBI definitions as a basis. The security data may be added to the current Section 15 collection system, if appropriate.

Project Title: **Performance Indicators, Accident/Incident Reporting for Rail Transit**
Grantee/Contractor: Volpe National Transportation Systems Center
Location: Cambridge, Massachusetts
Funding: $20,000 Funding Source: Section 26
Project Manager: Ronald D. Kangas Project Number: MA-26-0015

Description: This project is aimed at developing an accident/incident reporting form for rail rapid transit systems that distinguishes between passenger and employee injuries and fatalities. In addition, the Safety Management Information System, a computer program that is used to "read" Section 15 data and produce the safety report, will be modified as required.

TECHNOLOGY DEVELOPMENT

The objective of the Technology Development program is to introduce new technology into the transit industry, and thereby assist in making the transit industry more cost-effective and its service more reliable. This program is designed to meet the goal of optimizing the use of funds for the design, maintenance, construction, reconstruction, and equipment used by U. S. transit systems, with emphasis on technology innovation.

FTA provides millions of dollars annually for the purchase and rehabilitation of advanced buses, railcar rolling stock, and fixed facilities under various grant assistance programs. The plan for Technology Development consists of projects that will result in reduced capital and operating costs and improved transit system operational performance. The program is divided into areas of: conventional rail and buses, advanced guideway systems, clean air technologies, and accessibility. The selection of particular projects will be reviewed by the Technology Advisory Committee and the Engineering group at the Planning and Research Priorities Workshop in March 1993.

The candidates for conventional rail projects are cost-saving construction methods, computer modeling of train operations, automated maintenance diagnostics, project construction management techniques, tunneling technology, maintenance management information systems, materials and material safety, low flammability/toxicity materials, seismic design consideration for mass transit facilities, subway environmental simulations, and non-destructive facilities evaluations. The candidates for advanced technology investigation are people movers/automated guideway systems, transit application of MAGLEV systems and technologies, robotics for maintenance, operations and security, and other advanced technologies.

The candidates for conventional bus projects are bus subsystems and construction techniques, automated bus diagnostic techniques, and operational improvements, such as use of AVL.

Conventional Rail

Cost Saving Construction Methods. The development of new construction materials and methods in specific areas of construction can be expanded upon to incorporate these techniques to other areas of construction. Methods, such as fiber reinforced concrete, slurry trench applications, monotube piles, advanced geotextiles, rubberized dams, and earthen walls and cribs, can lower the cost of construction projects.

Computer Modeling of Train Operations. The use of computer models for simulating train operations has had limited application at the Long Island Railroad and Metropolitan Atlanta Rapid Transit Authority. These models can be valuable tools for analyzing complex scenarios where system operation is at or nearing capacity. They can be especially useful when planning rehabilitation/construc-

tion projects of existing systems which must be undertaken without adversely affecting service levels. Presently, vendors customize computer simulations for site specific applications. An investigation will be made of the feasibility of developing a generic simulator which would benefit the entire rail transit community.

Automated Maintenance Diagnostics. Candidate areas for automated maintenance diagnostics include rail flaws and stresses, track geometry, and ride roughness. Ride quality measurements are currently used in Europe and index tests for determining which parts of the track need service. Ride quality measurements have particular potential in evaluating switches and crossovers, areas that are potential safety hazards. Increased automation of maintenance diagnostics will lead to cost savings, especially if combined with an automated maintenance management systems. Project construction management techniques construction/program management is of particular importance as a result of poor quality and other construction problems, schedule delays, and cost overruns on some Federally funded capital projects in recent years.

Construction project management is presently being developed into a highly computerized field using advance computer systems such as computer aided drawings, cost estimating and scheduling programs, as well as computerized PERT programs. As advancement in the computer industry continues, new and improved techniques must be incorporated in the project management field. In addition, implementation of quality assurance and quality control programs should be implemented on a wider basis in the transit industry. Few transit systems presently utilize quality management techniques.

Tunneling Technology. The state-of-the-art of tunneling technology has been greatly advanced in recent years with extensive projects in Europe and Japan. Incorporating and expanding these improved methods in tunnel boring machines, low-cost chemical grouts, and muck removal could help reduce construction costs.

Maintenance Management Information Systems. Some of the older transit systems, such as the Massachusetts Bay Transit Authority, Southeastern Pennsylvania Transit Authority, and the New York City Transit Authority, have no real inventory of their fixed facilities. Component elements are identified only after they have failed and caused a problem on the system. An automated maintenance management information system is essential to keep maintenance on schedule. New transit systems will also benefit in time as analysis of the data base will provide insight into system performance and warn of upcoming maintenance needs.

Materials and Material Safety. There has been significant progress in the development of new material that may be applied to transit. Some materials could be used to increase transit safety, such as fire retardant materials in stations. Another possible use of new material is in the structure of guideways and vehicles. This contains a wide variety of materials, from modifications of classical materials, from super high strength concrete or concrete with plasticizer to completely new materials, such as polymer matrix composites. There is a need both for developing the process of producing and employing these materials to a point of economic viability and demonstrating their practicality in actual transit service.

Low Flammability/Toxicity Materials. The presence of toxic combustible substances in transit system tunnels creates a hazardous condition for riders and system personnel. Investigation into, and application of, improved materials in electrical power distribution systems for transit tunnel application might eliminate this hazardous condition. Initially, an investigation of unique conductor and insulator materials to be incorporated into electrical power distribution systems will be undertaken. A prototype fabrication and testing, and eventually full-scale development, could then be conducted. This project will entail market studies of current technology as well as basic research of noncombustible materials or those capable of rendering harmless or nontoxic products of combustion.

Seismic Design Consideration for Mass Transit Facilities. The transit industry does not have specific codes or guidelines to assist the seismic design of its facilities. Even now, the design of new transit facilities often leads to the question of what seismic criteria to use. A standard approach to seismic design is essential to preserve the safety of transit users and operators along with protecting the investment in these facilities. The cost of incorporating appropriate seismic consideration at the time of construction is relatively small in comparison to subsequent seismic retrofit or facility repair/replacement due to a seismic event.

Subway Environmental Simulation. A model to aid in design of emergency ventilation for subways was developed in the mid-1970's, and modified in 1983. It was used to validate systems under construction as well as those in the design stage. Although subway fires are rare, the concerns of safety engineers have proved to be warranted in such incidents as the London Underground escalator fire of 1990. Past work should be updated and enhanced for future applications.

Non-Destructive Facilities Evaluation. Development of and standards for non-destructive facilities evaluation are needed for low-cost condition assessment of transit infrastructure. Several technologies are already in use, such as ground-penetrating radar, deck assessment by radar and thermography, impact-echo testing, and ultrasonics. FTA works with interested transit agencies in the research and testing of non-destructive facilities evaluation techniques and technologies. This work contributes to more accurate and rapid condition assessment, improved and increased frequency of structural inspections, and development of standards for evaluation. This type of research lends itself to a collaborative effort with other government agencies, such as FHWA, and construction related industries.

New Technologies

People Movers/Automated Guideway Technologies. This class of transit is characterized by fleets of driverless vehicles operating under computer control on exclusive rights-of-way above, at, or below ground level. Under certain conditions, automated guideway transit systems can return significant revenues because of minimal labor costs. To apply this technology to transit applications, innovative approaches possibly could be applied to needs of passengers, needs of owner-operators, capital cost reductions, operations and maintenance cost reductions, operational flexibility, and needs of the community.

Transit Applications of MAGLEV Systems and Technologies. Recent advancements and innovative technology in the areas of magnetic levitation and high speed train systems have dramatically increased in Europe and Japan. To date, millions of dollars have been spent on research, testing, and studies. The technology transfer of MAGLEV spin-offs and innovations will enhance the U. S. transportation network. The following study areas would benefit from current and future technology transfer: maintenance diagnostics for vehicle and guideway, suspension systems, propulsion systems, advanced automatic train control, innovative highway grade crossing protection systems, guideway logistics planning, impact of environmental concerns on advanced transportation, and safety implications of high speed transportation.

Robotics For Maintenance, Operations, and Security. A robot is a programmable, multi-functional manipulator designed to move materials, parts, tools, or special devices through programmed motions for the performance of a variety of tasks. Robotics are economical and practical when the following general characteristics are present: hazardous or uncomfortable working conditions, repetitive tasks, difficult handling, and multi-shift operations. A study should be conducted to evaluate and identify specific automation needs for robotics in the maintenance, operations, and security areas. Test and evaluation of robotics applications would confirm hypothetical benefits and economics.

Other Advanced Technologies. Other advanced technologies which may not fit precisely under one of the above categories will be considered for inclusion in the Technology Development program, as appropriate.

Bus Technologies

Improved technologies will apply to construction, maintenance and operations.

Construction

Continuing the development of improved propulsion systems will result in lower fuel costs, reduced exhaust emissions and reduced maintenance requirements. Use of radial tires will also reduce fuel consumption. Adoption of front-wheel drive will facilitate the design and construction of low-floor buses, resulting in improved accessibility.

Maintenance

Technology development will result in both improved maintenance and reduced costs by developing and adopting ADP methods. Diagnostic systems can be introduced which will avoid unnecessary repairs and will show that needed repairs have been properly performed. Improved maintenance records will have similar results. Computerized inventory of control of spares will reduce inventory costs and be a deterrent to pilferage.

Operations

Information technology will result in improved service for the public by providing wayside information. It will also provide information on passenger count and possible emergencies to dispatchers.

Recent Program Accomplishments

Four consortia have been selected for funding under the electric vehicle program and their progress will be carefully monitored.

CALSTART will develop advanced electric vehicle components and subsystems; develop, demonstrate, and evaluate components and issues concerning the necessary infrastructure support systems; and develop advanced prototypes and specifications for EV buses.

The Chesapeake Consortium will develop advanced power for electric vehicles which will be demonstrated and evaluated in ten prototype electric vehicles.

The New York State Consortium will develop and demonstrate a low-floor, full-sized bus with a hybrid electric propulsion system.

The Advanced Lead-Acid Battery Consortium will develop, demonstrate, and evaluate rapid recharge technology for lead-acid batteries, and will also examine the infrastructure issues associated with rapid recharging, the availability of electric power for opportunity charging, and develop basic battery monitoring and control systems.

Projects Awarded During Fiscal Year 1992

Project Title:	**Advanced Transportation Systems and Electric Vehicle Program**		
Grantee/Contractor:	CALSTART, Inc.		
Location:	Los Angeles, California		
Funding:	$4,000,000	Funding Source:	Section 26
Project Manager:	Shang Q. Hsiung	Project Number:	CA-26-0021

Description: This program will support the efforts of the CALSTART consortium to conduct a showcase electric vehicle program, define and develop the necessary infrastructure support systems, and foster full-scale manufacturing of advanced electric transit buses. The goals of this showcase program are to advance and "showcase" state-of-the-art electric vehicle components worldwide, leading to mass production of new electric vehicle components for automotive manufacturers. The infrastructure program objectives are to define and develop necessary infrastructure support systems and corresponding industry that will set standards for electric transportation charging equipment worldwide. The electric bus/mass transit program seeks to foster full-scale manufacturing of advanced electric transit buses through development and service testing of light- and medium-duty transit buses.

Project Title:	**Advanced Transportation Systems and Electric Vehicle Program**		
Grantee/Contractor:	Chesapeake Consortium		
Location:	Baltimore, Maryland		
Funding:	$4,000,000	Funding Source:	Section 26
Project Manager:	Shang Q. Hsiung	Project Number:	MD-26-0010

Description: This project will support efforts to develop an advanced, economically viable power train for mass production and incorporation into electric vehicles. The Chesapeake Consortium consists of the Baltimore Gas and Electric Company, Chrysler Corporation, the State of Maryland, and Westinghouse Electric Corporation. Westinghouse will serve as the program manager for the Consortium. The Consortium will develop a detailed production design for an electric vehicle power train which will have been proofed through one production unit. The design effort will ensure that it reflects consumer performance and price requirements, that the infrastructure to support widespread use of electric vehicles is defined, and that public awareness of the need and improved merits of electric vehicles is increased. Ten prototype electric vehicles will be produced and evaluated during this project.

Project Title:	**Technical Support for the Advanced Transportation Systems and Electric Vehicle Program**		
Grantee/Contractor:	Volpe National Transportation Systems Center		
Location:	Cambridge, Massachusetts		
Funding:	$450,000	Funding Source:	Section 26
Project Manager:	Shang Q. Hsiung	Project Number:	MA-26-0021

Description: This project will provide technical support for FTA's Advanced Transportation Systems and Electric Vehicle Research and Development program. This support will include: reviewing proposals submitted, assisting in the development and processing of applications from the proposals selected, preparing technical analyses and briefs, and attending project review meetings and briefings.

Project Title:	**Advanced Fare Collection Pilot Project**		
Grantee/Contractor:	Washington Metropolitan Area Transit Authority		
Location:	Washington, D. C.		
Funding:	$997,899	Funding Source:	Section 26
Project Manager:	Irving Chambers	Project Number:	DC-26-0005

Description: This is a pilot project to evaluate, develop, and test advanced fare technology systems. Several advanced fare technology systems (such as "Smart Card" technology) will be laboratory and field tested and evaluated. One or more systems will be selected for a pilot demonstration. The advanced fare system would be valid for transportation on rail and bus systems, and for payment of parking fees.

Project Title: **Bus Testing Fee Subsidy**
Grantee/Contractor: The Pennsylvania Transportation Institute of the Pennsylvania State University
Location: Altoona, Pennsylvania
Funding: $1,500,000 Funding Source: Section 31
Project Manager: Mary L. Anderson Project Number: PA-03-0226

Description: This project will provide the Pennsylvania Transportation Institute with funding to pay 80 percent of the bus testing fee for new model bus testing performed at the Bus Testing Center in compliance with bus testing regulations. PTI will be paid the bus testing fee subsidy on a monthly basis, as bus tests are performed. FTA will provide subsidies only for the standard bus testing fee as approved by the Administrator. This funding subsidy will not be used to fund other bus testing costs, such as bus shipping and transportation fees, spare parts, travel of personnel, etc.

Project Title: **Bus Testing Audit Follow-up**
Grantee/Contractor: Young, Oakes, Brown and Company
Location: Altoona, Pennsylvania
Funding: $2,400 Funding Source: Section 90
Project Manager: Mary L. Anderson Project Number: PA-90-7002

Description: This effort will review and evaluate the cost accounting system at the Pennsylvania Transportation Institute Bus Testing Center to determine the system's acceptability and conformance with cost accounting standards and also to determine if the contractor's audit report recommendations have been incorporated. In addition, a determination will be made as to whether the system is capable of supporting fee determination.

Project Title: **Technical Support for Technology Development**
Grantee/Contractor: Volpe National Transportation Systems Center
Location: Cambridge, Massachusetts
Funding: $250,000 Funding Source: Section 26
Project Manager: Jeffrey G. Mora Project Number: MA-26-0005

Description: This project will provide technical and administrative support to FTA for the conduct of the Technology Development program, including mandated projects: Advanced Fare Collection and Suspended Light Rail System Technology Pilot Projects, Low-Floor Accessible Bus and Lightweight Bus Demonstrations, and Advanced Technology Development Projects.

Project Title:	**Transit Industry Technology Development Federal Advisory Committee**		
Grantee/Contractor:	Federal Transit Administration		
Location:	Washington, D. C.		
Funding:	$5,092	Funding Source:	Section 26
Project Manager:	Jeffrey G. Mora	Project Number:	DC-06-0669
Grantee/Contractor:	Federal Transit Administration		
Location:	Washington, D. C.		
Funding:	$1,122	Funding Source:	Section 26
Project Manager:	Jeffrey G. Mora	Project Number:	DC-06-0672
Grantee/Contractor:	Federal Transit Administration		
Location:	Washington, D. C.		
Funding:	$2,160	Funding Source:	Section 26
Project Manager:	Jeffrey G. Mora	Project Number:	DC-06-0673

Description: FTA has formed a Transit Industry Technology Development (TITD) and Federal Advisory Committee (FACA), as required by the ISTEA of 1991. The FACA is assisting FTA in identifying priority areas for technology development and developing guidelines for technology selection and cost-sharing methods. These three projects were for the provision of administrative support for this effort.

Project Title:	**Tunneling Technology Support**		
Grantee/Contractor:	National Academy of Sciences		
Location:	Washington, D. C.		
Funding:	$35,000	Funding Source:	Section 26
Project Manager:	Jeffrey G. Mora	Project Number:	DC-26-0010

Description: For the past two years, FTA has provided support to the National Research Council's Geotechnical Board, part of an intergovernmental program cosponsored by various Federal agencies, such as the Corp of Engineers, Department of the Interior, Nuclear Regulatory Agency, etc. The Geotechnical Board addresses geotechnical engineering and scientific issues of national scope. The Board is responsible for oversight of the U. S. National Committee for Tunneling Technology and the U. S. National Committee for Rock Mechanics. Geotechnical and tunneling technology issues are of importance to a number of FTA grantees actively working on or planning tunnel construction or tunnel rehabilitation projects.

Project Title: **Technical Support for Bus Testing**
Grantee/Contractor: Booz-Allen and Hamilton, Inc.
Location: Bethesda, Maryland
Funding: $149,509 Funding Source: Section 23
Project Manager: Mary L. Anderson Project Number: MD-90-7001

Description: The contractor will provide FTA with technical assistance in evaluating requests that are submitted to FTA with regard to bus testing regulations, such as determinations as to whether certain proposed changes in a bus design would require the bus to be tested. The contractor will also perform studies and other analyses as requested by the FTA to resolve technical problems and issues concerning bus testing.

Project Title: **Bus On-Board and Wayside Information Displays**
Grantee/Contractor: Metropolitan Transportation Authority of Harris County
Location: Houston, Texas
Funding: $262,500 Funding Source: Section 3
Project Manager: Abdo S. Ahmed Project Number: TX-03-3500

Description: This project will demonstrate the benefits and practicality of the use of wayside electronic signs at bus stops to inform passengers of the route number and expected time of arrival of all buses that are enroute and expected to arrive at the bus stop within the next hour (or shorter period). Such electronic signs would be placed at selected major bus transfer points and bus shelters. To obtain maximum benefit, a transit system with an operating automatic vehicle monitoring system will be selected for this demonstration project. This project will also demonstrate the use of on-board electronic signs to inform passengers of the next bus stop (or the next two or three). This information can be provided visually and/or acoustically.

Project Title: **Lightweight Bus Demonstration**
Grantee/Contractor: Metropolitan Transportation Authority of Harris County
Location: Houston, Texas
Funding: $5,000,000 Funding Source: Section 36
Project Manager: Vincent R. DeMarco Project Number: TX-26-0004

Description: Up to two demonstrations projects will be conducted to evaluate lightweight, standard 40-foot buses in revenue service and determine whether such buses will work in transit environments and if they can provide a solution to the vehicle axle overload problem of heavy duty transit buses. In addition to the vehicle's axle loading and structural strength, the operating and maintenance costs will be evaluated and documented. It is anticipated that fuel economy of such buses would be improved and that maintenance cost of tires, brakes, and suspension will be reduced because of the lighter weight structure.

Project Title:	**Superconducting Magnetic Energy Storage for Rail Transit**		
Grantee/Contractor:	Bay Area Rapid Transit District		
Location:	Oakland, California		
Funding:	$350,000	Funding Source:	Section 26
Project Manager:	Jeffrey G. Mora	Project Number:	CA-26-0018

Description: BART is exploring the feasibility of using a superconducting magnetic energy storage device to improve its train power supply at selected locations along its 71-mile system where topographical conditions or long distances between substations reduce power available to its trains. This "voltage drop" problem is particularly acute during peak periods when a maximum number of trains are being operated. An improve power supply distribution system would permit BART to reduce operating headways and increase the number of trains in the peak period.

Project Title:	**Wayside Rail, Real-Time Passenger Information System**		
Grantee/Contractor:	New Jersey Transit Corporation		
Location:	Trenton, New Jersey		
Funding:	$300,000	Funding Source:	Section 26
Project Manager:	Jeffrey G. Mora	Project Number:	NJ-26-0002

Description: Communications technology is advancing rapidly. Transit operators have identified passenger information as a critical area. One specific type of system would provide real-time train status information to passengers waiting at stations. For example, the system would be automated, and would provide information on train arrivals, delays, routings, etc. This project will include a study of available technologies and a test installation to determine operational reliability, and maintenance costs.

Project Title:	**Advanced Technology Transit Bus, Low-Floor Lightweight Design**		
Grantee/Contractor:	Southern California Rapid Transit District		
Location:	Los Angeles, California		
Funding:	$3,999,689	Funding Source:	Section 26
Project Manager:	Vincent R. DeMarco	Project Number:	CA-26-0011

Description: Up to four demonstration projects will be conducted to evaluate low-floor accessible buses in revenue service at various locations in the U. S. Operating and maintenance cost will be evaluated in addition to assessing the potential of such buses to provide accessible service in a transit environment. It is anticipated that the use of lower floor buses with ramps will substantially reduce dwell times and provide less of a mobility barrier than higher floor buses that are lift equipped.

Project Title: **Moving Block Signal System**
Grantee/Contractor: Metropolitan Transportation Authority
Location: New York, New York
Funding: $400,000 Funding Source: Section 3
Project Manager: Jeffrey G. Mora Project Number: NY-26-0004

Description: BART's train control system was designed over twenty years ago and, because of its limitations, cannot easily accommodate the needed increase in the number of trains. Moving block technology offers a solution to safely increase the number of trains operating during peak periods. This project will assist with the development of moving block technology to be used by BART and other U. S. transit systems.

Project Title: **Center for Transit Technology Adaptation**
Grantee/Contractor: National Aeronautics and Space Administration
Location: Washington, D. C.
Funding: $100,000 Funding Source: Section 26
Project Manager: A. M. Yen Project Number: DC-26-0017

Description: As a major partner in the National Technology Initiative, the Department of Transportation is endeavoring to commercialize important technological developments designed to make American companies more competitive, thereby creating jobs. Six new technology transfer centers have been established throughout the United States. The objective of these centers is to make Federal technology and capabilities available to private sector companies, with focus by geographical region. This project will design a Center for Transit Technology Adaptation, using the existing Great Lakes Center as the core, and synthesize national technology capabilities for transit application. For the highest priority needs, technology transfer feasibility schemes will be designed. These schemes will enable governmental and private activities to develop and test prototype components and subsystems that could lead to commercial production.

Project Title: **Moving Block Signalization for Rail Rapid Transit**
Grantee/Contractor: Bay Area Rapid Transit District
Location: Oakland, California
Funding: $400,000 Funding Source: Section 26
Project Manager: Jeffrey G. Mora Project Number: CA-26-0014

Description: The objective of this project is to support the efforts of BART to develop an advanced automatic train control system. BART's signal/train control system currently limits the number and frequency of trains able to operate during peak periods. Its goal is to meet a 2-minute 15-second headway when the first of several extensions is completed in 1995, and a 2-minute headway when the last extension is completed in 1997. This is for the second of three phases: Phase I will survey applicable train control technologies, Phase II is the development of a system design, and Phase III will be a demonstration of the technology.

Project Title:	**Rapid Rail Vehicle Locational Monitoring**		
Grantee/Contractor:	Mass Transit Administration		
Location:	Baltimore, Maryland		
Funding:	$500,000	Funding Source:	Section 3
Project Manager:	Jeffrey G. Mora	Project Number:	MD-03-3003

Description: Rapid rail transit systems have a need for precise train locational systems for a number of reasons, such as in emergency situations (breakdowns, passenger illness, etc.). These monitoring systems can be coupled with other functions, such as car mileage recording, to assist in programmed maintenance. This project will test and evaluate current technology in train locational monitoring. The MTA has bid twice for such a system, but the bid prices were far higher than the project budget. This project will amend an existing grant to implement the project.

TRANSIT ACCESSIBILITY

The objective of the Transit Accessibility program is to address the transit industry's technology needs to implement the requirements of the Americans with Disabilities Act of 1990. On July 26, 1990, the President signed the ADA into law. The law is aimed at eliminating discrimination against individuals with disabilities and requires transit agencies to operate accessible vehicles and services.

There are problems that need to be addressed before transit can be fully accessible, as required by the ADA. Some of these problems include: transportation of persons using wheelchairs and other mobility aids, such as three-wheel scooters; allowing standees (persons with walkers and canes) on the lift; controlling the vertical gap between the railcar floor and platform; and assuring the safety of disabled riders. This program will address the needs of all persons with disabilities, including those in wheelchairs, with other mobility aids, and persons with visual, hearing, and other physical or mental impairments.

The program will focus on the technology required to overcome mobility barriers. Accessibility needs for buses, railcars, stops, and transit facilities will be addressed. Special emphasis will be placed on the problems and safety issues of securement of wheelchairs and other mobility aids, as well as standees on lifts and needs of persons with visual, hearing, and other physical or mental impairments.

An outreach program using accessibility guidelines, workshops, accessibility demonstrations, and visits will be used to assist State and local transit agencies in implementing ADA requirements. Guidance in the form of videotapes and reports will be used to train the disabled community in use of transit systems and to train operators in the provision of transit service for the disabled. A major problem with transit agencies is the lack of operator training, especially in smaller agencies with limited staff.

Technical studies and analyses will be performed to support FTA's efforts in implementing the requirements of ADA. New accessibility technology and procedures will be demonstrated and evaluated. These may include improved passenger information, bus stop accessibility, on-board information aids, and lift and securement modifications to accommodate a wider range of existing wheelchairs. Particular efforts will address the needs of the visually and hearing impaired: Emphasis will be placed on assisting the visually impaired to locate bus stops, audio and visual signage in transit stations, and evaluation of innovative communication techniques, such as talking signs. Improved graphic techniques will be demonstrated that will reduce the need for verbal communications, especially for persons with hearing and speaking impairments.

Low-floor bus technology will be evaluated. Low-floor buses with ramp access will improve accessibility and boarding/deboarding times for all passengers, especially for those using wheelchairs and walkers and those with visual impairments, arthritis, and other physical impairments.

Recent Program Accomplishments

Project ACTION (Accessible Community Transportation in Our Nation) managed 25 local demonstration projects during 1991-1992. Research areas addressed include: Identifying people with disabilities and their transportation needs, outreach and marketing, training programs for transit personnel, training for transit users with disabilities, and technology to eliminate barriers to transportation and accessibility.

Projects Awarded During Fiscal Year 1992

Project Title:	**Project ACTION**		
Grantee/Contractor:	National Easter Seal Society		
Location:	Washington, D. C.		
Funding:	$2,000,000	Funding Source:	Section 26
Project Monitor:	Roger Tate	Project Number:	DC-26-0002

Description: The National Easter Seal Society will continue its programs to identify new and innovative policy initiatives and technologies can significantly improve the effectiveness of public transportation for persons with disabilities. NESS will retain the original programmatic structure of Project ACTION while adding some significant new features and making important adjustments at the local and national levels. The local program consists of: (1) identifying persons with disabilities and their transportation needs; (2) developing outreach and marketing strategies; (3) developing training programs for transit providers; (4) developing assertive programs for people with disabilities; (5) without engaging in operations, applying appropriate technology to solve critical barriers to transportation accessibility; and (6) the new task of providing assistance to private entities which provide transportation services to the public. Since private entities represent a significant segment of transportation providers covered by the Americans with Disabilities Act, these entities are in critical need of education on the requirements of the Act and how to comply with them. An additional category will be added for projects that do not fall neatly into the areas listed above, but which are consistent with Project ACTION goals and objectives.

The national program will emphasize the following initiatives: (1) establishing a national resource center or clearinghouse for disseminating national and local Project ACTION products and materials; (2) developing a system or process for testing and evaluating different types of accessible transportation technologies; (3) identifying and implementing several major activities in the area of information resources and research; (4) designing, testing, and launching on or more pilot technical assistance projects; (5) providing training sessions on "best practices" for implementing complementary para-transit plans; (6) elevating public awareness through the media of disabled individuals accessibility to transportation; and (7) holding a "wrap-up" conference to report the results of Project ACTION demonstration projects.

The overall goal of this project is to determine new and innovative policy initiatives and technologies which can significantly improve the effectiveness of public transportation for persons with disabilities. Project ACTION will develop a format to expand research and local demonstration projects.

Project Title:	**Required ADA Technical Studies**		
Grantee/Contractor:	Booz-Allen and Hamilton, Inc.		
Location:	Bethesda, Maryland		
Funding:	$346,504	Funding Source:	Section 26
Project Manager:	Vincent R. DeMarco	Project Number:	MD-26-0001
Grantee/Contractor:	Battelle Columbus Laboratories		
Location:	Columbus, Ohio		
Funding:	$146,555	Funding Source:	Section 26
Project Manager:	Vincent R. DeMarco	Project Number:	OH-26-0001

Description: The contractors will provide technical support to FTA's activities to support the implementation of ADA. These efforts include updating the FTA 1986 wheelchair accessibility guidelines to incorporate ADA requirements, development of signage and public information requirements, preparation of a transit communications handbook, and evaluation of certain technologies, such as assistive listening devices, braille signage, and emergency communications in transit applications.

PLANNING AND PROJECT DEVELOPMENT

Public transit is a major investment in terms of capital costs, labor intensity, and peak period capacity requirements. Since 1975, over $18 billion has been invested in transit in the U. S. The transit industry's total capital asset base reached over $45 billion in 1987. The need for new major capital investments by the transit industry in vehicles, fixed guideways, stations, and other facilities is estimated to be $19 billion.

It has been over ten years since the state-of-the-art for operations planning has been advanced within FTA. The transit industry has seen the emergence of new information systems and advanced technologies that can support operations planning and also offer opportunities to address many of the issues in capital investment planning and engineering. There are numerous possibilities such as the application of microcomputer software as analysis tools, the development of new theories for the implementation of contemporary demand models, and the application of major data bases, such as geographic information and scheduling systems.

FTA believes that improved operations planning and analysis will help ensure that scarce Federal funds are used effectively in capital investments and streamlining operations. The increased use and availability of microcomputers in operations planning and analysis suggests that significant advances will be made.

The primary objective of the Planning and Project Development program is to ensure effective government investment in transit services, equipment, and facilities. In the field of operations management, the objectives are to ensure that transit services are effectively designed to maximize passenger usage and to schedule service efficiently in order to minimize the cost of operation. For capital improvements, the objective is to ensure that new projects are justified through comprehensive planning and are designed and constructed in a cost effective manner.

The Planning and Project Development program is comprised of five program elements: operations planning and analysis, multimodal planning and market analysis, fare policy and revenue management, capital planning, and procurement and engineering management. The operations planning element works to improve operation and maintenance cost estimation methods, route scheduling systems, maintenance procedures, fare analysis techniques, and marketing programs. The multimodal planning and market analysis element helps integrate the highway and transit planning processes. Research in basic markets is conducted, particularly with respect to how transportation demand management options affect multimodal travel. The fare policies and revenue management element studies techniques such as deep discounting, distance based fares, and integrated fares that will increase ridership and revenue. The capital planning element promotes improvements in demand forecasting, capital cost estimation, environmental impact assessment, environmental impact mitigation, and the use of geographic information systems. The procurement and engineering management element addresses improvements in engineering management having to do with

coordination of design, civil construction, vehicle production, and subsystem installation to reduce costs in the deployment of fixed guideway systems.

Recent Program Accomplishments

A conceptual framework for an improved Planning and Project Development program was developed.

A study of fare elasticity was conducted in order to update the preliminary research.

Considerable interest in turnkey procurement was stimulated through research and development of the turnkey demonstration program. In response to the FTA Federal Register solicitation for the turnkey demonstration program, over a hundred industry representatives participated in an August 1992 Conference. Seventeen projects were submitted for participation in the program, and eleven projects were invited to submit formal proposals. Selection of at least three projects is planned in March 1993.

The state-of-the-art in project planning and transit operations was advanced through information collected on capital and operating cost experiences of different types of transit systems and guidance on travel demand forecasting.

The project planning and development capabilities of transit agencies and metropolitan planning organizations was enhanced through a series of workshops, seminars, and conferences.

Projects Awarded During Fiscal Year 1992

Project Title:	**Fixed Guideway Capital Cost Study**		
Grantee/Contractor:	Booz-Allen and Hamilton, Inc.		
Location:	Bethesda, Maryland		
Funding:	$150,000	Funding Source:	Section 26
Project Manager:	Salvator Caruso	Project Number:	MD-26-0001

Description: This project will provide FTA with additional capital cost information for understanding national norms. Data on commuter rail and heavy rail systems will be added to a data base which contains costs of light rail transit systems, busways, and automated guideway systems. Areas which have implemented or are developing these systems will be involved.

Project Title: **Denver Transitway Study**
Grantee/Contractor: Denver Regional Council of Governments
Location: Denver, Colorado
Funding: $120,000 Funding Source: Section 26
Project Manager: Effie Stallsmith Project Number: CO-08-7001

Description: This project will develop model zoning regulations for transit mall development, establish the relationship between transit and retail and commercial office development, and determine a benefit assessment rate for funding the operating and maintenance costs of the transit mall. The project will produce a comprehensive technical report to be incorporated into the Denver Regional Transit District overall transit plan, as well as for use in other areas around the Nation that are considering transit malls.

Project Title: **Site Planning Guide**
Grantee/Contractor: Booz-Allen and Hamilton, Inc.
Location: Bethesda, Maryland
Funding: $150,000 Funding Source: Section 26
Project Manager: Edward L. Thomas Project Number: MD-26-0001

Description: The objective of this project is to bring together in one document transit traffic engineering and urban design principles for improved site planning. The contractor will develop a site planning document which will aid in incorporating transit facilities into commercial, retail, and residential development and improve transit operations in these centers. Principles will be identified for different types of activity centers. The document will illustrate transit friendly urban designs that uphold business principles of commercial, retail, and residential development. More specifically, information will be offered on the state-of-the-art in design and placement of transit facilities in commercial, retail, and residential developments. In addition, illustrations will be provided of street designs and traffic operations which facilitate more efficient transit vehicle operations. Answers will also be presented for typical questions raised about joint development of transit and real estate development facilities.

Project Title: **Fare Elasticity Study**
Grantee/Contractor: KPMG Peat Marwick
Location: Vienna, Virginia
Funding: $150,000 Funding Source: Section 26
Project Manager: Stewart N. McKeown Project Number: VA-06-0002

Description: This project will update data on previous studies and refine the data with new information on fare elasticity. There is a need to collect empirical information on fare elasticity and update studies that are quite outdated. This work would advance the state-of-the-knowledge by providing current estimates of fare elasticity that are the basis for assessing the impact of fare changes on ridership and systems revenue. Current knowledge in fare elasticity will improve the capability of modeling demand throughout the transit industry.

Project Title:	**Evaluation of Turnkey Procurement of the Detroit Downtown People Mover**		
Grantee/Contractor:	EG&G Dynatrend, Inc.		
Location:	Woburn, Massachusetts		
Funding:	$149,961	Funding Source:	Section 26
Project Manager:	Salvator Caruso	Project Number:	MA-90-7005

Description: This project will evaluate the effectiveness of the UTDC turnkey procurement for the Detroit DPM system. A study design will be developed; data will be collected, validated, and analyzed; and a final report will be prepared. The assessment will consider the effects of the procurement on flow of funds, project management control systems, financial management control systems, project accountability, subcontractor performance, and risk management.

Project Title:	**Update of Project Management Guidelines**		
Grantee/Contractor:	EG&G Dynatrend, Inc.		
Location:	Woburn, Massachusetts		
Funding:	$166,750	Funding Source:	Section 90
Project Manager:	Salvator Caruso	Project Number:	MA-90-7005

Description: This project will update the "Project Management Guidelines" to address emerging project management issues. Areas of particular interest to FTA include financial control systems, risk assessment and management, joint development, and turnkey procurement. The updated guide will describe staff expertise and management systems needed in the areas of financial and cost accounting, cash management, risk measurement and management, joint development design integration, turnkey development, contractor control, and master scheduling. For purposes of the various phases of project development, the updated guide will also specify actions to be taken in developing these improved project management systems.

Project Title:	**New Orleans Union Station Terminal**		
Grantee/Contractor:	Regional Transit Authority		
Location:	New Orleans, Louisiana		
Funding:	$200,000	Funding Source:	Section 26
Project Manager:	Effie Stallsmith	Project Number:	LA-26-0001

Description: A study will be conducted of a joint development project on the multimodal transportation related development potential of the New Orleans Union Passenger Terminal.

Project Title: **Capital Cost Verification**
Grantee/Contractor: EG&G Dynatrend, Inc.
Location: Woburn, Massachusetts
Funding: $300,000 Funding Source: Section 23
Project Manager: Salvator Caruso Project Number: MA-26-0002

Description: This project will determine the actual costs incurred in the planning, construction, and start-up implementation of selected transit capital projects in several mass transit systems throughout the country. It will compare these actual costs with the actual cost estimates. The overall goal of the project is to establish where cost variances may occur on a project to improve on the FTA's ability to review, identify, and address areas of concern for capital cost estimates. The ultimate goal is to reduce cost over-runs through development of a better system of checks and balances. This will improve productivity and reduce the cost of transit industry projects.

Project Title: **Project Management Control Systems**
Grantee/Contractor: EG&G Dynatrend, Inc.
Location: Woburn, Massachusetts
Funding: $200,000 Funding Source: Section 23
Project Manager: Salvator Caruso Project Number: MA-26-0002

Description: This project will focus on reviewing the state-of-the-art and state-of-the-practice in control systems for projects developed or under construction for a number of selected transit systems. Emphasis will be placed both on projects completed "on time" and those which experienced scheduling problems. The major objectives are to review the current state-of-the-art and state-of-the practice in project control systems and to determine the type and source of problems and delays that contributed to many of the schedule and cost overruns which were encountered.

TRANSIT COOPERATIVE RESEARCH

The Transit Cooperative Research program was established in Fiscal Year 1992 to meet the local research needs of transit operators. It is a continuing program of applied research, selected independently by representatives of the transit industry, to address the near-term needs of transit operators and suppliers. Projects selected for research in TCRP seek practical solutions to significant transit operational problems, with an emphasis on implementing the solutions in daily operational practice. These problems may involve facilities, service concepts, operations, planning, human resources, maintenance, and administrative practices.

TCRP is funded by a percentage set-aside of FTA funds in order to provide a stable funding source. Up to $88 million was authorized for the TCRP by the ISTEA through Fiscal Year 1997.

TCRP operates under an independent governing board of industry representatives, since experience has shown that the quality of research is improved by having the end user of research results closely tied to the identification of research needs. TCRP accomplishes this goal by means of an Oversight and Project Steering Committee, comprised of transit industry representatives who independently select and monitor the TCRP program and its projects.

The primary participants in TCRP are the Transit Development Corporation, which serves as the independent governing board; the Transportation Research Board, which serves as manager and secretariat for the TOPS Committee; the American Public Transit Association, which serves as a vital link to the transit community; and the Federal Transit Administration, which is the program sponsor. Other important participants in TCRP include transit professionals, State and local government officials, equipment and service suppliers, and research organizations. Each of these participants has different interests and responsibilities, yet each is an integral part of the cooperative research effort.

Through the mechanism of TCRP, transit operators and suppliers now have the resources and institutional support necessary to independently meet their research needs. The industry is responding to this new opportunity by voluntarily contributing professional time in developing new research topics, monitoring the selection and conduct of projects, serving on technical review panels; and spreading the word in professional meetings to assure that this program will be widely used throughout the industry.

Recent Program Accomplishments

In May 1992, a grant for $8.96 million was awarded to the Transportation Research Board to conduct the TCRP research agenda.

Over 250 topics were identified as a result of the first solicitation for new statements of research needs.

Thirty-two research topics were selected for funding by the TOPS Committee. Topics that were not selected under the first year's TCRP agenda may be reconsidered under the second agenda. In addition to holdover topics, nearly one hundred additional new suggestions were received.

All Administrative procedures for managing the TCRP were completed.

The manual, "TCRP Information and Instructions for Preparing Proposals," was released.

TCRP arranged to coordinate activities with the National Transit Institute for training, with the American Public Transit Association for the dissemination and implementation of research findings, and with George Mason University for the maintenance of a transit information system.

All projects in the Fiscal Year 1992 agenda were underway by December 1992. The following projects comprise the 1992 research agenda:

Operations
- o Fare Policies, Structures, and Technologies
- o Service-Delivery Systems for Rural Passenger Transportation

Service Configuration
- o Transit Operations for Individuals with Disabilities
- o Integrating Market Research into Transit Management
- o Demand Forecasting for Rural Passenger Transportation
- o Cost Effectiveness of TDM Strategies

Engineering of Vehicles and Equipment
- o Personal Mobility Aid Securement and Passenger Restraint on Transit Vehicles
- o Applicability of Low-Floor Light Rail Vehicles in North America

Maintenance
- o Innovative Maintenance Procedures for Transit Buses
- o Artificial Intelligence for Transit Diagnostics

Human Resources
- o Fitness-for-Duty Testing in the Transit Workplace
- o Innovative Labor-Management Practices
- o Total Quality Management in Public Transportation

Policy, Economics, and Finance
- o An Evaluation of the Relationships Between Transit and Urban Form
- o Measuring and Valuing Transit Benefits and Disbenefits

Special Projects
- o Dissemination Implementation of Research Findings
- o TCRP Strategic Planning Process and Strategic Plan
- o International Transit Outreach - Learning from Abroad
- o Innovations Deserving Exploratory Analysis--The IDEA Program
- o Legal Aspects of Transit and Intermodal Transportation Programs

Approved Synthesis Studies

- o Bus Route Evaluation Standards
- o Electronic On-Vehicle Passenger Information Displays (Visual and Audible)
- o Integration of Bicycles and Transit
- o Safe Operating Procedures for Alternative Fuel Vehicles
- o Waste Management at Bus Transit Maintenance and Fueling Facilities
- o Low-Floor Transit Buses
- o Bus Maintenance Facility Design Guidelines
- o Bus Passenger Safety
- o Risk Management
- o Information Systems--State of the Art Applications for Transit Properties
- o Management Information Systems

Projects Awarded During Fiscal Year 1992

Project Title: **Transit Cooperative Research Program**
Grantee/Contractor: National Academy of Sciences, Transportation Research Board
Location: Washington, D. C.
Funding: $8,961,135 Funding Source: Section 26
Project Manager: John S. Durham Project Number: DC-26-0008

Description: This project will provide for the selection and conduct of projects under the first annual agenda of the Transit Cooperative Research Program. TCRP is a continuing program of operator-oriented problem-solving research that examines priority topics of common interest to the transit industry. The objective of TCRP is to identify transit problems commonly agreed to be in need of R&D investigation, establish a priority ranking among these problems, provide greater opportunity for transit constituents to participate in problem solving research, and to improve communications and technical information transfer and exchange. TCRP will address near-term locally-oriented problems in coordination with the Federal program of transit research.

UNIVERSITY TRANSPORTATION CENTERS

Developments in transportation technology over the decades have caused the world to shrink, not in dimensions, but in terms of accessibility. Transportation has always played a major role in society. The degree of efficiency in getting goods and people from one point to another has an important role in determining the health of an economy and the general well being of the Nation.

Recognizing the need to encourage efficient movement in all transportation sectors of this Nation, the Department of Transportation established the University Transportation Centers (UTC) program in 1987. The program originally established and operated transportation centers in ten Federal regions. The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 has reauthorized the UTC Program for an additional six years and added three new Centers to the program.

The Centers have become focal points for addressing transportation issues, attracting talent, resources, and facilities for promoting individual initiatives and scientific innovation in and across transportation modes and disciplines.

In the first four years, over 313 research projects and fifteen advanced institutes were established with the help of Federal and matching funds. The UTC program has received broad support from the transportation community, including the highway and transportation departments of 23 States, 14 local authorities, universities, and large and small corporations. To date, more than 1,000 university students and 350 faculty have been involved.

The UTC program represents only one of a large number of transportation programs sponsored by both public and private organizations. However, it provides a unique opportunity for focusing education, research, and technology transfer resources in an unprecedented manner and to substantially promote, upgrade, and expand transportation education and research opportunities in America.

Mission of the UTC Program

The mission of the University Transportation Centers program is to advance U. S. technology and expertise in the many disciplines comprising transportation through the mechanisms of education, research, and technology transfer at university-level centers of excellence. In the UTC program, this can best be attained by accomplishing the goals set forth.

Goals of the UTC Program

1. Provide the interdisciplinary education to tomorrow's professionals and advance the skills of today's for all modes of transportation.

2. Address current and future transportation challenges and issues through interdisciplinary, applied, and basic transportation research covering all modes of transportation.

3. Disseminate the results of the research through carefully planned programs of technology transfer and early involvement with prospective users of the products of research.

The UTC program offers a unique opportunity to focus on the needs of a profession that must develop new and more effective methods for planning, designing, manufacturing, building, managing, operating, and maintaining our Nation's transportation system. It provides resources to:

- o attract new kinds of transportation professionals to resolve the social, economic, environmental, and technical challenges that face industry and government;

- o develop high-quality, fundamental, innovative research activities that are not currently being funded by other programs and that address critical transportation problems and issues; and

- o expand the pool of talent available to the transportation community by adding significant numbers of new professionals, including greater participation by minorities, women, persons with disabilities, and other previously under-represented groups.

Projects Awarded During Fiscal Year 1992

Project Title:	**University Transportation Centers**		
Grantee/Contractor:	Research and Special Programs Administration		
Location:	Washington, D. C.		
Funding:	$6,985,294	Funding Source:	Section 11
Project Manager:	Patricia Cass	Project Number:	DC-11-1102

University Transportation Centers

1. Region One University Transportation Center
   Contact: Thomas F. Humphrey
   Massachusetts Institute of Technology
   77 Massachusetts Avenue, Room 1-153
   Cambridge, Massachusetts 02139
   Phone: 617, 253-4978/Fax: 617, 258-5942
   Theme: Strategic Management of Transportation Systems
   Members: The Massachusetts Institute of Technology, Harvard University, University of Connecticut, University of Maine, University of Massachusetts-Amherst, University of New Hampshire, University of Rhode Island, and University of Vermont.

2. University Research Transportation Center

Contact: Robert E. Paaswell
City University of New York
New York, New York 10031
Phone: 212, 650-8050/Fax: 212, 650-8374
Theme: Regional Mobility; Urban/Suburban Accessibility
Members: The City University of New York, Cornell University, New Jersey Institute of Technology, New York University, Polytechnic University of New York, Princeton University, Rensselaer Polytechnic Institute, Rutgers State University, State University of New York, Stevens Institute of Technology, University of Puerto Rico, and University of the Virgin Islands.

3. The Mid-Atlantic Universities Transportation Center

Contact: James Miller
Pennsylvania Transportation Institute Research Office Building
The Pennsylvania State University
University Park, Pennsylvania 16802-4710
Phone: 814, 863-1909/Fax: 814, 865-3039
Theme: Advanced Technologies in Transportation and Management
Members: The Pennsylvania State University, University of Pennsylvania, University of Virginia, Virginia Polytechnic Institute and State University, and West Virginia University.

4. Southeastern Transportation Center

Contact: Gorman Gilbert
Southeastern Transportation Center
The University of North Carolina
1100 Navaho Drive
Raleigh, North Carolina 27619
Phone: 919, 878-8080/Fax: 919, 878-8130
Theme: Safety
Members: Duke University, University of Florida, University of Kentucky, University of North Carolina, North Carolina State University, University of North Carolina at Charlotte, North Carolina A&T University, North Carolina Central University, University of Tennessee, and Vanderbilt University.

5. Great Lakes Center for Truck and Transit Research

Contact: Thomas D. Gillespie
Transportation Research Institute
University of Michigan
2901 Baxter Road
Ann Arbor, Michigan 48109-2150
Phone: 313, 764-6504/Fax: 313, 936-1081
Theme: Commercial Transportation
Members: Central State University, Michigan State University, Michigan Technological University, Northwestern University, The University of Michigan, and Wayne State University.

6. Southwestern Region University Transportation Center
   Contact: Dock Burke
   Texas Transportation Institute
   Texas A&M University
   CE/TTI Building, Suite 801
   College Station, Texas 77843-3135
   Phone: 409, 862-2946/Fax: 409, 845-9761
   Theme: Mobility for Regional Development
   Members: Texas A&M University, Texas Southern University, and University of Texas at Austin.

7. Midwest Transportation Center
   Contact: Tom Maze
   Iowa State University
   194 Town Engineering Building
   Ames, Iowa 50011
   Phone: 515, 294-8100/Fax: 515, 294-8216
   Theme: Transportation Actions and Strategies to Accommodate Economic Shift
   Members: Iowa State University and the University of Iowa.

8. Mountain Plains Consortium
   Contact: Gene C. Griffin
   Transportation Institute
   North Dakota State University
   P.O. Box 5074
   Fargo, North Dakota 58105
   Phone: 701, 237-8343/Fax: 701, 241-1945
   Theme: Rural and Non-Metropolitan Transportation
   Members: Colorado State University, North Dakota State University, University of Wyoming, and Utah State University.

9. The University of California Transportation Center
   Contact: Melvin W. Webber
   University of California-Berkeley
   108 Naval Architecture Building
   Berkeley, California 94720
   Phone: 510, 643-7378/Fax: 510, 643-5456
   Theme: Improving Accessibility for All
   Members: University of California at Berkeley, University of California at Davis, University of California at Irvine, and University of California at Los Angeles.

10. Transportation Northwest (TRANSNOW)

Contact: Nancy L. Nihan
Transportation Northwest
University of Washington
135 More Hall, FX-10
Seattle, Washington 98195
Phone: 206,543-8255/Fax: 206, 543-5965
Theme: Management and Planning of Intermodal Operations
Members: Oregon State University, Portland State University, University of Alaska at Fairbanks, University of Idaho, University of Washington, and Washington State University.

11. National Center for Transportation and Industrial Productivity

Contact: Louis J. Pignataro
Center for Transportation Studies and Research
New Jersey Institute of Technology
Newark, New Jersey 07102
Phone: 201, 596-3355/Fax: 201, 5966-2316

12. National Center for Transportation Management, Research, and Development

Contact: Frank E. Enty
School of Graduate Studies
Morgan State University
Baltimore, Maryland 21239
Phone: 410, 319-3666/Fax: 410, 319-3837
Theme: Transportation: A Key to Human and Economic Development

13. Mack-Blackwell National Rural Transportation Study Center

Contact: E. Walter LeFevre
University of Arkansas
4190 Bell Engineering Center
Fayetteville, Arkansas 72701
Phone: 501, 575-7957/Fax: 501, 575-7168

For More Information: Contact the Director of the University Transportation Centers Program Center nearest you or:

Office of University Programs
Research and Special Programs Administration
Room 10309, DUR-1
U. S. Department of Transportation
400 Seventh Street, S.W.
Washington, D. C. 20590
Phone: 202, 366-5442/Fax: 202-366-3671

Ms. Ann Marie Quinn
University Transportation Centers Clearing House
The Pennsylvania State University
Research Office Building
University Park, Pennsylvania 16802-4710
Phone: 814-863-3614

NATIONAL TRANSIT INSTITUTE

The Intermodal Surface Transportation Efficiency Act established the National Transit Institute at Rutgers University to support the training and development needs of the transit industry's human resources. FTA efforts in support of education and training cover preparing college students for careers in transit through the university program while assisting the current transit work force to improve performance and increase productivity through programs sponsored by NTI.

The mission of NTI is to improve performance and increase productivity of the transit industry's human resources through the design, development, and conduct of training and education, as well as providing an industry-wide technical support and referral service.

The theme of NTI is the creation of a partnership in training between the university, the transit industry, and FTA in support of the overall goals and objectives of both the ISTEA and the National Transportation Policy.

FTA played a major role in the early development of NTI. Modeled after the National Highway Institute, NTI was established to assist the transit industry in the training and education of transit employees in the public and private sector, as well as at the Federal, State and local level. This 6-year, $3 million a year program will develop and conduct training in support of FTA and the transit industry and establish a clearinghouse and referral service in support of the industry's training and education needs.

Recent Program Accomplishments

In its first year of existence, NTI established an advisory committee representing leadership from the transit industry.

NTI made presentations at both the American Public Transit Association and Transportation Research Board conferences, developed an overall management plan describing its mission, goals, activities, and implementation plans.

A director was hired and both technical and professional staff were brought on board.

Projects Awarded During Fiscal Year 1992

Project Title:	National Transit Institute		
Grantee/Contractor:	Rutgers University		
Location:	New Brunswick, New Jersey		
Funding:	$2,993,697	Funding Source:	Section 26
Project Manager:	Charles T. Morison	Project Number:	NJ-26-2901

APPENDIX A

TECHNICAL ASSISTANCE AND SAFETY PROJECTS BY PROJECT NUMBER

APPENDIX A

TECHNICAL ASSISTANCE AND SAFETY PROJECTS BY PROJECT NUMBER

Section 3: *Grants or loans to assist States and local bodies in financing the introduction into public transportation service of new technology in the form of innovative and improved products.*

AL-03-0011 City of Ridgeville, Alabama, p.50
CT-03-0078 Greater Hartford Transit District, Connecticut, p.51
MA-03-0179 Yellow Cab of Norwood, Massachusetts, p.51
MD-03-3003 Mass Transit Administration, Baltimore, p.72
MI-03-0127 Ann Arbor Transportation Authority, Michigan, p.7
PA-03-0226 Pennsylvania Transportation Institute of the Pennsylvanis State University, Altoona, p.67
TX-03-3500 Metropolitan Transit Authority of Harris County, Houston, Texas, p.69

Section 6: *Research, development, and demonstration projects in all phases of urban mass transportation to improve mass transportation service and contribute toward meeting total urban transportation needs effectively and safety.*

DC-06-0667 National Academy of Sciences, Transportation Research Board, Washington, D. C., p.33
DC-06-0669 Federal Transit Administration, Washington, D. C., p.68
DC-06-0672 Federal Transit Administration, Washington, D. C., p.68
DC-06-0673 Federal Transit Administration, Washington, D. C., p.68
MA-06-0209 Volpe National Transportation Systems Center, Cambridge, Massachusetts, p.8
NY-06-0090 Capital District Transit Authority, Albany, New York, p.38
VA-06-0146 MacDorman and Associates, McLean, Virginia, p.36

Section 8: *Development of transportation plans and programs which are formulated on the basis of transportation needs with due consideration to comprehensive long-range land use plans, development objectives, and their probable effect on the future development of urban areas of more than fifty thousand population.*

CO-08-7001 Denver Regional Council of Governments, Colorado, p.79
MD-08-7003 K. T. Analytics, Frederick, Maryland, p.41
OK-08-7002 Central Oklahoma Transportation and Parking Authority, Oklahoma City, p.21

Section 11(b): *Grants to one or more nonprofit institutions of higher learning to establish and operate one regional transportation center in each of the ten Federal regions which comprise the Standard Federal Regional Boundary System.*

DC-11-1102 Research and Special Programs Administration, Washington, D. C., p.88

Section 18: *Funding for public transportation projects in other than urbanized areas allocated on a formula basis.*

IL-18-X906 American Public Works Association, Chicago, Illinois, p.42
UT-18-X907 Utah Department of Transportation, Salt Lake City, p.42

Section 20: *Financial assistance for national and local programs that address human resources needs as they apply to public transportation activities.*

AL-20-2002 City of Ridgeville, Alabama, p.50

Section 26: *Funds projects in five fundamental elements: a metropolitan planning organization program, a rural transit assistance program, a State program, a transit cooperative research program, and a national planning and research program.*

AL-26-0001 Birmingham-Jefferson County Transit Authority, Alabama, p.31
CA-26-0002 Robert W. Poole, Jr., Los Angeles, California, p.47
CA-26-0003 Genevieve Giuliano, Irvine, California, p.47
CA-26-0004 Donald C. Shoup, Los Angeles, California, p.47
CA-26-0005 Steven B. Rooney, Costa Mesa, California, p.47
CA-26-0006 Robert Cervero, Berkeley, California, p.48
CA-26-0007 California Department of Transportation, Sacramento, p.10
CA-26-0010 Sacramento Regional Transit District, California, p.15
CA-26-0011 Southern California Rapid Transit District, Los Angeles, p.70
CA-26-0012 Riverside Transit Agency, California, p.31
CA-26-0013 Community Transportation Services, Inc., Los Angeles, California, p.45
CA-26-0014 Bay Area Rapid Transit District, Oakland, California, p.71 CA-26-0015 Metropolitan Transportation Commission, Oakland, California, p.22
CA-26-0017 University of California-Berkeley, p.28
CA-26-0018 Bay Area Rapid Transit District, Oakland, California, p.70
CA-26-0019 Santa Barbara Metro Transit District, California, p.15
CA-26-0020 San Diego Association of Governments, California, p.46
CA-26-0021 CALSTART, Inc., Los Angeles, California, p.65
CO-26-0001 Regional Transportation District, Denver, Colorado, p.31
DC-26-0001 Department of Energy, Washington, D. C., p.14
DC-26-0002 National Easter Seal Society, Washington, D. C., p.74
DC-26-0003 National Academy of Sciences, Transportation Research Board, Washington, D. C., p.37, p.44

Section 26 (continued)

DC-26-0004	Federal Highway Administration, Washington, D. C., p.47
DC-26-0005	Washington Metropolitan Area Transit Authority, D. C., p.66
DC-26-0006	Research and Special Programs Administration, Washington, D. C., p.34
DC-26-0007	Office of the Secretary of Transportation, Washington, D. C., p.49
DC-26-0008	National Academy of Sciences, Transportation Research Board, Washington, D. C., p.85
DC-26-0010	National Academy of Sciences, Washington, D. C., p.68
DC-26-0011	Office of the Secretary of Transportation, Washington, D. C., p.38
DC-26-0012	Washington Metropolitan Area Transit Authority, D. C., p.31
DC-26-0013	Federal Highway Administration, Washington, D. C., p.46
DC-26-0016	Federal Aviation Administration, Transportation Safety Institute, Washington, D. C., p.57
DC-26-0017	National Aeronautics and Space Administration, Washington, D. C., p.71
DC-26-0018	Capcom, Inc., Washington, D. C., p.56
DC-26-0019	Heritage Reporting, Washington, D. C., p.56
DC-26-0020	Institute of Transportation Engineers, Washington, D. C., p.45
DC-26-0021	National League of Cities Institute, Washington, D. C., p.16
DE-26-0001	University of Delaware, Wilmington, p.29
IL-26-0001	Chicago Transit Authority, Illinois, p.11
IL-26-0002	Regional Transportation Authority, Chicago, Illinois, p.33
KY-26-0001	University of Kentucky, Lexington, p.29
LA-26-0001	Regional Transit Authority, New Orleans, Louisiana, p.80
MA-26-0001	Technology and Management Services, Inc., Burlington, Massachusetts, p.56
MA-26-0002	EG&G Dynatrend, Inc., Cambridge, Massachusetts, p.9, p.23, p.43, p.48
MA-26-0002	EG&G Dynatrend, Inc., Woburn, Massachusetts, p.81
MA-26-0003	Kenneth Small, Chestnut Hills, Massachusetts, p.47
MA-26-0005	Volpe National Transportation Systems Center, Cambridge, Massachusetts, p.67
MA-26-0006	Volpe National Transportation Systems Center, Cambridge, Massachusetts, p.45
MA-26-0007	Volpe National Transportation Systems Center, Cambridge, Massachusetts, p.9
MA-26-0008	Volpe National Transportation Systems Center, Cambridge, Massachusetts, p.57
MA-26-0009	Volpe National Transportation Systems Center, Cambridge, Massachusetts, p.60
MA-26-0010	Volpe National Transportation Systems Center, Cambridge, Massachusetts, p.58
MA-26-0011	Volpe National Transportation Systems Center, Cambridge, Massachusetts, p.58
MA-26-0012	Volpe National Transportation Systems Center, Cambridge, Massachusetts, p.59
MA-26-0013	Volpe National Transportation Systems Center, Cambridge, Massachusetts, p.56
MA-26-0014	Volpe National Transportation Systems Center, Cambridge, Massachusetts, p.60

Section 26 (continued)

MA-26-0015 Volpe National Transportation Systems Center, Cambridge, Massachusetts, p.60
MA-26-0016 Volpe National Transportation Systems Center, Cambridge, Massachusetts, p.37
MA-26-0017 Volpe National Transportation Systems Center, Cambridge, Massachusetts, p.37
MA-26-0018 Technology and Management Services, Inc., Burlington, Massachusetts, p.58
MA-26-0020 Volpe National Transportation Systems Center, Cambridge, Massachusetts, p.8
MA-26-0021 Volpe National Transportation Systems Center, Cambridge, Massachusetts, p.66
MA-26-0022 Northeastern University, Boston, Massachusetts, p.29
MD-26-0001 Booz-Allen and Hamilton, Inc., Bethesda, Maryland, p.22, p.75, p.78, p.79
MD-26-0003 Maryland Department of Transportation, Baltimore, p.31
MD-26-0005 Prince George's County, Upper Marlboro, Maryland, p.48
MD-26-0006 Prince George's County, Upper Marlboro, Maryland, p.20
MD-26-0008 International Taxicab and Livery Association, Kensington, Maryland, p.59
MD-26-0009 Sign Language, Silver Spring, Maryland, p.56
MD-26-0010 Chesapeake Consortium, Baltimore, p.66
MI-26-0001 University of Michigan, Ann Arbor, p.11
MI-26-0002 Ann Arbor Transportation Authority, Michigan, p.32
MI-26-0003 Ann Arbor Transportation Authority, Michigan, p.7
MS-26-0001 Mississippi Department of Economic Development and Transportation, Jackson, p.43
NJ-26-0001 New Jersey Transit Corporation, Trenton, p.59
NJ-26-0002 New Jersey Transit Corporation, Trenton, p.70
NJ-26-2901 Rutgers University, New Brunswick, New Jersey, p.93
NY-26-0001 Niagara-Frontier Transportation Authority, Buffalo, New York, p.32
NY-26-0004 Metropolitan Transportation Authority, New York, New York, p.71
NY-26-0005 Legislative Commission on Critical Transportation Choices, Albany, New York, p.49
OH-26-0001 Battelle Columbus Laboratories, Ohio, p.14, p.15, p.16, p.58, p.75
OK-26-0001 Chickasaw Indian Nation, Ada, Oklahoma, p.44
OR-26-0003 Portland State University, Oregon, p.28
PA-26-0002 Erie Metropolitan Transit Authority, Pennsylvania, p.32
PA-26-0003 Port Authority of Allegheny County, Pittsburgh, Pennsylvania, p.32
PA-26-0004 Beaver County Transit Authority, Bridgewater, Pennsylvania, p.32
PA-26-0005 Pennsylvania State University, University Park, p.30
PA-26-0006 Community Transit of Delaware County, Folsom, Pennsylvania, p.12
PA-26-0007 Transit Safety Research Alliance, Pittsburgh, Pennsylvania, p.7
PR-26-0001 Puerto Rico Department of Transportation and Public Works, San Juan, p.50
TN-26-0001 Memphis Area Transit Authority, Tennessee, p.33

Section 26 (continued)

TN-26-0019	University of Tennessee, Knoxville, p.31
TX-26-0001	VIA Metropolitan Transit, San Antonio, Texas, p.17
TX-26-0002	Corpus Christi Regional Transit Authority, Texas, p.17
TX-26-0003	Fort Worth Transportation Authority, Texas, p.32
TX-26-0004	Metropolitan Transit Authority of Harris County, Houston, Texas, p.69
TX-26-0005	Prairie View A&M Research Foundation, Texas, p.30
TX-26-0006	Metropolitan Transit Authority of Harris County, Houston, Texas, p.9
VA-06-0001	George Mason University, Fairfax, Virginia, p.7
VA-26-0002	KPMG Peat Marwick, Vienna, Virginia, p.23, p.48, p.49, p.50, p.79
VA-26-0003	George Mason University, Fairfax, Virginia, p.41
VA-26-0004	George Mason University, Fairfax, Virginia, p.51
VA-26-0008	Lord Fairfax Planning District Commission, Front Royal, Virginia, p.52
WA-26-0001	Municipality of Metropolitan Seattle, Washington, p.10

Section 9: *Funds the investigation of any facility, equipment, or manner of operation financed under the Act which the Secretary of Transportation believes creates a serious hazard of death or injury.*

MA-90-7005	EG&G Dynatrend, Cambridge, Massachusetts, p.21, p.24
MA-90-7005	EG&G Dynatrend, Woburn, Massachusetts, p.80
MA-90-7006	Volpe National Transportation Systems Center, Cambridge, Massachusetts, p.57
MA-90-7007	Volpe National Transportation Systems Center, Cambridge, Massachusetts, p.16
MD-90-7001	Booz-Allen and Hamilton, Inc., Bethesda, Maryland, p.24, p.69
NY-90-A001	Battelle Columbus Laboratories, Ohio, p.55
NY-90-A003	Booz-Allen and Hamilton, Inc., Bethesda, Maryland, p.55
NY-90-A004	MacDorman and Associates, McLean, Virginia, p.55
NY-90-A004	Interactive Elements, New York, New York, p.55
PA-90-7002	Young, Oakes, Brown and Company, Altoona, Pennsylvania, p.67
VA-90-7001	KPMG Peat Marwick, Vienna, Virginia, p.21, p.25

APPENDIX B

TECHNICAL ASSISTANCE AND SAFETY PROJECTS BY STATE

APPENDIX B

TECHNICAL ASSISTANCE AND SAFETY PROJECTS BY STATE

Alabama

AL-03-0011 City of Ridgeville, p.50
AL-20-2002 City of Ridgeville, p.50
AL-26-0001 Birmingham-Jefferson County Transit Authority, p.31

California

CA-26-0002 Robert W. Poole, Jr., Los Angeles, p.47
CA-26-0003 Genevieve Giuliano, Irvine, p.47
CA-26-0004 Donald C. Shoup, Los Angeles, p.47
CA-26-0005 Steven B. Rooney, Costa Mesa, p.47
CA-26-0006 Robert Cervero, Berkeley, p.48
CA-26-0007 California Department of Transportation, Sacramento, p.10
CA-26-0010 Sacramento Regional Transit District, p.15
CA-26-0011 Southern California Rapid Transit District, Los Angeles, p.70
CA-26-0012 Riverside Transit Agency, p.31
CA-26-0013 Community Transportation Services, Inc., Los Angeles, p.45
CA-26-0014 Bay Area Rapid Transit District, Oakland, p.71
CA-26-0015 Metropolitan Transportation Commission, Oakland, p.22
CA-26-0017 University of California-Berkeley, p.28
CA-26-0018 Bay Area Rapid Transit District, Oakland, p.70
CA-26-0019 Santa Barbara Metro Transit District, p.15
CA-26-0020 San Diego Association of Governments, p.46
CA-26-0021 CALSTART, Inc., Los Angeles, p.65

Colorado

CO-08-7001 Denver Regional Council of Governments, p.79
CO-26-0001 Regional Transportation District, Denver, p.31

Connecticut

CT-03-0078 Greater Hartford Transit District, p.51

District of Columbia

DC-06-0667 National Academy of Sciences, Transportation Research Board, p.33
DC-06-0669 Federal Transit Administration, p.68
DC-06-0672 Federal Transit Administration, p.68
DC-06-0673 Federal Transit Administration, p.68
DC-11-1102 Research and Special Projects Administration, p.88
DC-26-0001 Department of Energy, p.14
DC-26-0002 National Easter Seal Society, p.74
DC-26-0003 National Academy of Sciences, Transportation Research Board, p.37, p.44
DC-26-0004 Federal Highway Administration, p.47
DC-26-0005 Washington Metropolitan Area Transit Authority, p.66
DC-26-0006 Research and Special Programs Administration, p.34
DC-26-0007 Office of the Secretary of Transportation, p.49

District of Columbia (continued)

DC-26-0008 National Academy of Sciences, Transportation Research Board, p.85
DC-26-0010 National Academy of Sciences, p.68
DC-26-0011 Office of the Secretary of Transportation, p.38
DC-26-0012 Washington Metropolitan Area Transit Authority, p.31
DC-26-0013 Federal Highway Administration, p.46
DC-26-0016 Federal Aviation Administration, Transportation Safety Institute, p.57
DC-26-0017 National Aeronautics and Space Administration, p.71
DC-26-0018 Capcom, Inc., p.56
DC-26-0019 Heritage Reporting, p.56
DC-26-0020 Institute of Transportation Engineers, p.45
DC-26-0021 National League of Cities Institute, p.16

Delaware

DE-26-0001 University of Delaware, Wilmington, p.29

Illinois

IL-18-X906 American Public Works Association, Chicago, p.42
IL-26-0001 Chicago Transit Authority, p.11
IL-26-0002 Regional Transportation Authority, Chicago, p.33

Kentucky

KY-26-0001 University of Kentucky, Lexington, p.29

Louisiana

LA-26-0001 Regional Transit Authority, New Orleans, p.80

Massachusetts

MA-03-0179 Yellow Cab of Norwood, p.51
MA-06-0020 Volpe National Transportation Systems Center, Cambridge, p.8
MA-06-0209 Volpe National Transportation Systems Center, Cambridge, p.8
MA-26-0001 Technology and Management Services, Inc., Burlington, p.56
MA-26-0002 EG&G Dynatrend, Inc., Cambridge, p.9, p.23, p.43, p.48
MA-26-0002 EG&G Dynatrend, Inc., Woburn, p.81
MA-26-0003 Kenneth Small, Chestnut Hills, p.47
MA-26-0005 Volpe National Transportation Systems Center, Cambridge, p.67
MA-26-0006 Volpe National Transportation Systems Center, Cambridge, p.45
MA-26-0007 Volpe National Transportation Systems Center, Cambridge, p.9
MA-26-0008 Volpe National Transportation Systems Center, Cambridge, p.57
MA-26-0009 Volpe National Transportation Systems Center, Cambridge, p.60
MA-26-0010 Volpe National Transportation Systems Center, Cambridge, p.58
MA-26-0011 Volpe National Transportation Systems Center, Cambridge, p.58
MA-26-0012 Volpe National Transportation Systems Center, Cambridge, p.59
MA-26-0013 Volpe National Transportation Systems Center, Cambridge, p.56
MA-26-0014 Volpe National Transportation Systems Center, Cambridge, p.50
MA-26-0015 Volpe National Transportation Systems Center, Cambridge, p.60
MA-26-0016 Volpe National Transportation Systems Center, Cambridge, p.37
MA-26-0017 Volpe National Transportation Systems Center, Cambridge, p.37
MA-26-0018 Technology and Management Services, Inc., Burlington, p.58
MA-26-0020 Volpe National Transportation Systems Center, Cambridge, p.8
MA-26-0021 Volpe National Transportation Systems Center, Cambridge, p.66

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MA-26-0022 Northeastern University, Boston, p.29
MA-90-7005 EG&G Dynatrend, Inc., Cambridge, p.21, p.24
MA-90-7005 EG&G Dynatrend, Inc., Woburn, p.80
MA-90-7006 Volpe National Transportation Systems Center, Cambridge, p.57
MA-90-7007 Volpe National Transportation Systems Center, Cambridge, p.16

Maryland

MA-03-3003 Mass Transit Administration, Baltimore, p.72
MD-08-7003 K. T. Analytics, Frederick, p.41
MD-26-0001 Booz-Allen and Hamilton, Inc., Bethesda, p.22, p.73, p.78, p.79
MD-26-0003 Maryland Department of Transportation, Baltimore, p.31
MD-26-0005 Prince George's County, Upper Marlboro, p.48
MD-26-0006 Prince George's County, Upper Marlboro, p.20
MD-26-0008 International Taxicab and Livery Association, Kensington, p.59
MD-26-0009 Sign Language, Silver Spring, p.56
MD-26-0010 Chesapeake Consortium, Baltimore, p.66
MD-90-7001 Booz-Allen and Hamilton, Inc., Bethesda, p.24, p.69
NY-90-A003 Booz-Allen and Hamilton, Inc., Bethesda, p.55

Michigan

MI-03-0127 Ann Arbor Transportation Authority, p.7
MI-26-0001 University of Michigan, Ann Arbor, p.11
MI-26-0002 Ann Arbor Transportation Authority, p.32
MI-26-0003 Ann Arbor Transportation Authority, p.7

Mississippi

MS-26-0001 Mississippi Department of Economic Development and Transportation, Jackson, p.43

New Jersey

NJ-26-0001 New Jersey Transit Corporation, Trenton, p.59
NJ-26-0002 New Jersey Transit Corporation, Trenton, p.70
NJ-26-2901 Rutgers University, New Brunswick, p.93

New York

NY-06-0090 Capital District Transportation Authority, Albany, p.38
NY-26-0001 Niagara-Frontier Transportation Authority, Buffalo, p.32
NY-26-0004 Metropolitan Transportation Authority, New York, p.71
NY-26-0005 Legislative Commission on Critical Transportation Choices, Albany, p.49
NY-90-A004 Interactive Elements, Inc., New York, p.55

Ohio

NY-90-A001 Battelle Columbus Laboratories, p.24, p.55, p.69
OH-26-0001 Battelle Columbus Laboratories, p.14, p.15, p.16, p.58, p.75

Oklahoma

OK-08-7002 Central Oklahoma Transportation and Parking Authority, Oklahoma City, p.21
OK-26-0001 Chickasaw Indian Nation, Ada, p.44

Oregon

OR-26-0003	Oregon State University, Portland, p.28

Pennsylvania

PA-03-0226	Pennsylvania Transportation Institute of the Pennsylvania State University, Altoona, p.67
PA-26-0002	Erie Metropolitan Transit Authority, p.32
PA-26-0003	Port Authority of Allegheny County, Pittsburgh, p.32
PA-26-0004	Beaver County Transit Authority, Bridgewater, p.32
PA-26-0005	Pennsylvania State University, University Park, p.30
PA-26-0006	Community Transit of Delaware County, Folsom, p.12
PA-26-0007	Transit Safety Alliance, Pittsburgh, p.7
PA-90-7002	Young, Oakes, Brown and Company, Altoona, p.67

Puerto Rico

PR-26-0001	Puerto Rico Department of Transportation and Public Works, San Juan, p.50

Tennessee

TN-26-0001	Memphis Area Transit Authority, p.33
TN-26-0019	University of Tennessee, Knoxville, p.31

Texas

TX-03-3500	Metropolitan Transit Authority of Harris County, Houston, p.69
TX-26-0001	VIA Metropolitan Transit, San Antonio, p.17
TX-26-0002	Corpus Christi Regional Transit Authority, p.17
TX-26-0003	Fort Worth Transportation Authority, p.32
TX-26-0004	Metropolitan Transit Authority of Harris County, Houston, p.69
TX-26-0005	Prairie View A&M Research Foundation, p.30
TX-26-0006	Metropolitan Transit Authority of Harris County, Houston, p.9

Utah

UT-18-X907	Utah Department of Transportation, Salt Lake City, p.42

Virginia

NY-90-A004	MacDorman and Associates, McLean, p.55
VA-06-0146	MacDorman and Associates, McLean, p.36
VA-26-0001	George Mason University, Fairfax, p.7
VA-26-0002	KPMG Peat Marwick, Vienna, p.23, p.48, p.49, p.50, p.79
VA-26-0003	George Mason University, Fairfax, p.41
VA-26-0004	George Mason University, Fairfax, p.51
VA-26-0008	Lord Fairfax Planning District Commission, Front Royal, p.52
VA-90-7001	KPMG Peat Marwick, Vienna, p.21, p.25

Washington

WA-26-0001	Municipality of Metropolitan Seattle, p.10

APPENDIX C

TECHNICAL ASSISTANCE AND SAFETY PROJECTS BY GRANTEE/CONTRACTOR

APPENDIX C

TECHNICAL ASSISTANCE AND SAFETY PROJECTS BY GRANTEE/CONTRACTOR

APPENDIX D

OFFICE OF TECHNICAL ASSISTANCE AND SAFETY PROJECT MONITORS

APPENDIX D

OFFICE OF TECHNICAL ASSISTANCE AND SAFETY PROJECT MONITORS

Inquiries regarding projects listed herein may be directed to the project monitor at the organization shown below, c/o the Office of Technical Assistance and Safety, Federal Transit Administration, Washington, D. C. 20590.

Name	Organization	Telephone
Adams, Ross W.	Office of Mobility Enhancement	366-0253
Ahmed, Abdo S.	Office of Engineering	366-0194
Anderson, Mary L.	Office of Engineering	366-0222
Arrillaga, Bert	Service Assistance Division	366-0231
Boenau, Ronald E.	Advanced Public Transportation Systems Division	366-0195
Caruso, Salvator	Capital Development Division	366-0217
Cass, Patricia	Office of the Associate Administrator for Technical Assistance and Safety	366-0185
Chambers, Irving	Office of Engineering	366-0238
Cooper, Gwendolyn R.	Capital Development Division	366-0198
Crawley, Rhonda M.	Office of Safety	366-0196
D'Antignac, Pauline A.	Research, Rural Transportation and Information Division	366-0234
DeMarco, Vincent R.	Office of Engineering	366-0224
Drancsak, M. Marina	Research, Rural Transportation and Information Division	366-0201
Durham, John S.	Service Assistance Division	366-0255
Field, Roy	Office of Safety	366-0202
Goodman, Joseph M.	Service Assistance Division	366-0240
Hsiung, Shang Q.	Office of Engineering	366-0241
Kangas, Ronald D.	Office of Safety	366-0212
McKeown, Stewart N.	Service Assistance Division	366-0244
Meade, Judy	Office of Safety	366-0188
Mora, Jeffrey G.	Office of Engineering	366-0215
Morison, Charles T.	Office of Training, Research and Rural Transportation	366-0245
Nejako, Henry	Program Management Staff	366-0184

Ricketson, Sean	Advanced Public Transportation Systems Division	366-6678
Rodano, Edith M.	Program Management Staff	366-0191
Sill, Steven W.	Office of Engineering	366-0220
Solomon, Elizabeth J.	Research, Rural Transportation and Information Division	366-0242
Stallsmith, Effie	Capital Development Division	366-5653
Symes, Denis J.	Advanced Public Transportation Systems Division	366-0232
Tann, Helen M.	Office of Training, Research and Rural Transportation	366-0207
Tate, Roger	Research, Rural Transportation and Information Division	366-0235
Thomas, Edward L.	Capital Development Division	366-0264
Yen, A. M.	Deputy Associate Administrator for Technical Assistance	366--181
Ziller, Richard J.	Capital Development Division	366-1077

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