Department of Transportation's

INTELLIGENT TRANSPORTATION SYSTEMS (ITS) PROJECTS BOOK

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I. INTRODUCTION

I. INTRODUCTION

Intelligent Transportation Systems (ITS), formerly Intelligent Vehicle-Highway Systems (IVHS), provide the tools to help us address current surface transportation problems, as well as anticipate and address future demands through an intermodal, strategic approach to transportation. ITS applies current and emerging technologies in such fields as information processing, communications, control, and electronics to surface transportation needs. While ITS technologies alone cannot solve our transportation problems, they can enable us to rethink our approach to solutions, and make current activities more efficient and cost-effective. Effectively integrated and deployed, ITS technologies offer many benefits, including more efficient use of our infrastructure and energy resources, and significant improvements in safety, mobility, accessibility, and productivity.

To achieve national deployment of ITS technologies, the U.S. Department of Transportation (U.S. DOT) launched a multi-faceted ITS Program involving research and limited field trials of promising technologies and systems. The program is now entering a phase marked by two distinct horizons:

Near Term. For the next five years, U.S. DOT will focus on facilitating the appropriately integrated, national deployment of ITS solutions for systems that many jurisdictions are already beginning to deploy. Our efforts will focus on achieving integration within two distinct systems and one, currently more loosely defined, framework described below:

- **Metropolitan Travel Management ITS Infrastructure** - a system of integrated ITS infrastructure elements focused on managing traffic and transit systems for greater efficiency and safety and providing more information and travel options for the customer.

- **Commercial Vehicle Information Systems and Networks** - a system of information systems and communication networks focused on streamlining the commercial vehicle regulatory process and enhancing its effectiveness.

- **Rural ITS Infrastructure** - a framework of seven ITS service groupings ranging from highway maintenance and operations, and enhanced weather information, to rural transit management and tourism services. ITS technologies are proving highly effective in these applications which are predominantly (though not exclusively) targeted to the unique geography and circumstances of rural transportation. Unlike the first two systems, a distinct system architecture has not yet emerged in the testing and development process. Moreover, some of the applications are still in development.

Private sector investment and market development of many ITS products are predicated on the existence of a critical mass of this basic ITS infrastructure.

The national challenge is to ensure an appropriate degree of interoperability in the deployment of the infrastructure with open, as opposed to proprietary, architecture and standards. The department is pursuing six strategies to meet this challenge:

- **Showcasing the benefits of integration in model deployments**
- **Facilitating the development of standards**
- **Providing training**
- **Offering guidance and technology transfer**
- **Pursuing incentive funding in proposed legislation**
- **Establishing criteria for consistency with the national architecture and standards.**

Long Term. Efforts focused on long term needs involve supporting the research, development, and testing of more sophisticated technologies that show promise of deployability over the next 5 to 20 years. Over the past five years, this part of the program has included research advancing *crash avoidance technology, automated highway systems, fleet management, human factors, and the next generation of traffic management techniques.* In the coming years, much if not all, of the vehicle technology will be integrated into a single *Intelligent Vehicle Initiative*, focused primarily, but not exclusively, on accelerating the development and deployment of driver assisted technologies to decrease the number of fatalities and crashes. Operational tests will shift from many of the travel management and commercial vehicle operations technologies that are now moving to deployment, to in-vehicle technologies and rural applications.

This report describes ITS projects, tests, and studies initiated through September 30, 1997, that have been partially or totally financed from Federal ITS funds. However, the Completed Projects sections, which are located at the end of each chapter, include projects that were actually finished as of September 30, 1997, plus those projects anticipated to be completed by the end of December, 1997. The purpose of this report is not to account for all Federal funds made available for ITS activities, but rather to describe all major projects, tests, and studies for each ITS program area.

Throughout this report, U.S. DOT administrations are identified as follows: FHWA -- Federal Highway Administration (within FHWA, the Office of Motor Carriers [OMC] is the proponent for Commercial Vehicle Operations projects and the Turner-Fairbank Highway Research Center [TFHRC] is the focal point for research), FRA -- Federal Railroad Administration, FTA -- Federal Transit Administration, and NHTSA -- National Highway Traffic Safety Administration. Although these organizations may not be listed as partners in some of the projects, it is understood at least one administration is involved in each partnership arrangement.

II. TRAVEL MANAGEMENT

II. TRAVEL MANAGEMENT

Projects that seek to improve Travel Management capabilities address the traffic, traveler information, and public transportation advances that together form critical components of an integrated ITS. Especially in metropolitan areas (although just as applicable in rural areas), many of these capabilities are being planned, designed, and currently deployed. Using today's technology, deployment of ITS components is showing significant benefits, and early efforts at integrating them into a coordinated system hold the promise of more benefits.

In 1995, U.S. DOT and ITS America jointly identified a core set of ITS infrastructure that would share a reasonably common architecture to allow consistent market evolution of ITS technologies. This set of integrated components, the ITS infrastructure, includes traffic signal control, freeway and incident management, transit management, regional multimodal traveler information systems, electronic fare payment, electronic toll collection, railroad grade crossing, and emergency management services. Together these components deliver safety, congestion reduction, security, and productivity benefits. The components when integrated on a common communication structure provide an intelligent transportation infrastructure which allows easy information access across agency and organizational lines. This integration substantially enhances individual functions and creates a set of public and private services - several with revenue potential. The ITS infrastructure in a region becomes a foundation for evolution of the ultimate ITS vision.

On January 10, 1996, Secretary of Transportation Federico Pena announced a major Intelligent Transportation Systems (ITS) deployment goal, called Operation TimeSaver, to reduce the travel time of Americans by at least 15 percent through deployment of a complete ITS infrastructure across the United States focused on 75 of the nation's largest metropolitan areas. To support this goal, the U.S. DOT initiated the Model Deployment Program. Four sites were selected which will become deployment showcases of a fully integrated, metropolitan-area Intelligent Transportation Infrastructure. These model deployments will demonstrate the benefits of integrated transportation management systems that feature a strong regional, multimodal traveler information services component.

The Research and Development, Operational Test, and Integrated Programs described in the following sections are contributing to an expanded set of tools and techniques to improve our capability to provide integrated ITS user services. For purposes of this listing, the projects are separated into the "traditional" components of Advanced Traffic Management Systems (ATMS), Advanced Traveler Information Systems (ATIS), Advanced Public Transportation Systems (APTS), and Advanced Rural Transportation Systems (ARTS); along with Integrated Programs, Priority Corridors Program and Model Deployment Initiative projects. In many cases, projects include elements of one or more of these components, such as traffic control projects which include major traveler information aspects and/or linkages to transit properties, or transit management-oriented projects that include enhanced customer information. For these projects, we have chosen the most appropriate component in which to list a particular project, and the "description" entry includes discussion of multiple objectives.

A. Advanced Traffic Management Systems (ATMS)

U.S. DOT has a long, valued history of providing advanced concepts, technologies, and technical assistance to states and localities that seek to improve efficiency in traffic management. With the

additional resources and attention provided through the ITS program, these capabilities have been significantly expanded to allow us to move from simple interconnection and computerized signal control to a fully-integrated, dynamically adaptive, region-wide approach that will allow metropolitan areas to proactively manage freeway ramps and arterial roadways. With advanced sensors providing a more comprehensive view of network performance, advanced analysis, control options, and advanced communications will enable multiple jurisdictions to manage their systems and coordinate these various management actions more effectively. Ultimately, the key goal of this focus area is to provide full "real-time" control capabilities which adapt to traffic movement, anticipating when and where traffic will be moving, so that signal and freeway control systems can provide optimum service. In an integrated environment, this traffic information will be shared among jurisdictions as well as with transit properties.

Achieving this vision will require successful completion of several key research and development efforts, testing of sensor technologies, control systems, and the integration of these systems in addition to continued support for widespread deployment of what U.S. DOT has identified as a core ITS travel management infrastructure in metropolitan regions across the United States. The Research and Development, Operational Test, and Deployment-oriented projects that follow support this vision. Deployment-related projects are listed under "Other Projects."

B. Advanced Traveler Information Systems (ATIS)

With current implementation of transportation management systems that often include variable-message signs and highway-advisory radio, it is sometimes difficult to separate traveler information from management systems. However, one of the unique advances being provided by the ITS program is new ways to collect and distribute expanded information for both "pre-trip" and "en-route" travelers. In many cases, these ATIS systems are multi-modal, including both roadway and transit system performance information. This allows travelers to make informed choices based on up-to-date, relevant data. In addition, these capabilities can support personal and public-agency efforts to reduce demand and increase vehicle occupancy.

One of the key characteristics of many ATIS-related projects is inclusion of private sector companies interested in marketing traveler information in some manner. The creation of public/private sector partnerships within these projects is especially valuable, and eventual success of these partnerships is a key goal of the overall ITS Program.

C. Advanced Public Transportation Systems (APTS)

The ITS program for Public Transit encompasses a number of technologies aimed at increasing the use, operational efficiency and cost effectiveness of public transit agencies. The scope of these operations nationally includes approximately 6,000 agencies operating more than 100,000 vehicles. These operations support approximately 9 billion trips annually.

The APTS applications have been developed principally to support the needs addressed in three elements of the metropolitan area intelligent transportation infrastructure: Transit Management, Traveler Information and Electronic Payment. The applications which correspond to these elements are Fleet Management, Transit Traveler Information and Electronic Fare Payment Systems. Fleet Management Systems are aimed principally at improving the operations and productivity of transit

agencies as well as the safety of their passengers. Transit Traveler Information utilizes several technologies for the dissemination of transit information to make public transportation easier to use as well as encourage its use. Finally, Electronic Fare Payment Systems embrace technology aimed at the utilization of "Smart Cards" for transit, parking, and other potential uses to make transit more convenient for the traveling public. In addition to these three applications, other APTS components provide intermodation by supporting other elements of the infrastructure.

The tests described in the Advanced Public Transportation Systems section encompass all the technologies defined above. These tests are designed to evaluate different technologies in terms of their effectiveness in improving transit operations and evaluating the public utility and acceptance of a variety of techniques to encourage use of transit.

Besides operational tests, there have been a significant number of full deployments of transit ITS technologies. This has occurred principally in Fleet Management Systems, based upon early field results and the Federal Transit Administration's Research and Development program.

There now are several companies that have transit fleet management products that predominantly use Global Positioning System (GPS) data to perform automatic vehicle location integrated with a computer-aided dispatch system to manage, in real-time, fleets of buses and paratransit vehicles. There are more than 25 transit agencies that have, or are in the process of deploying these fleet management systems. The reasons for this activity are the major benefits to be derived in improved passenger safety, reduced operating costs, and improved customer service through better schedule adherence. Some operational tests are built on the deployment of this automatic vehicle location to facilitate other facets of transit operations, such as transit traveler information or linkages to traffic management centers and other infrastructure components.

Another important activity in many transit properties, including several operational tests, is to test new ways of giving the traveling public transit information. Transit operators are well aware that the traditional printed schedule is difficult to read and a disincentive to the use of public transit. A wide variety of techniques are being tested to determine how to communicate to the public and to increase the number of people using transit. These technologies span a broad range of approaches because one technique will not serve all segments of the riding public.

Transit is in the forefront in the use of the new technology called "Smart Cards." These devices resemble credit cards, but feature a microprocessor imbedded in the card that is used as an electronic purse. A customer may add money to the card at various outlets, and as each purchase/use is registered, the value is deducted from the card. Variations on this application are being used in operational tests in a number of cities. Many of these applications have begun operation and are expected to produce significant benefits in passenger convenience, reduced fare handling costs, reduced fare evasion, and increased ridership.

D. Integrated Programs

Effective implementation of travel management improvements through use of ITS cannot be fully achieved by implementing stand-alone projects. Especially in metropolitan areas, an integrated program of linked, complementary projects covering areas such as traffic control, freeway and incident

management, transit management, and traveler information is necessary to maximize benefits while minimizing costs. To date, several of these integrated programs have been supported with Federal ITS funds, as described in this chapter under "Integrated Programs."

E. Priority Corridors Program

The Intermodal Surface Transportation Efficiency Act of 1991 established criteria for the ITS (then IVHS) Corridors; and U.S. DOT followed with designation of four corridors, which are:

- the I-95 Corridor (including Connecticut, Delaware, the District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Virginia);
- the Midwest Corridor (Gary, Indiana, to Milwaukee, Wisconsin);
- Houston, Texas; and
- Southern California.

As described in the following sections, the organizations carrying forward the program within each of these four areas have developed business planning processes and have initiated extensive programs of projects. The programs in these four areas are building toward integrated transportation management and traveler information systems, and incorporate a wide range of ITS technologies and services. In addition, the institutional relationships that have been developed and strengthened through the initiation of the Corridors Program has led to enhanced working relationships among traffic, transit, and other entities across jurisdictional boundaries.

F. Model Deployment Initiatives

To support moving ahead with greatly expanded deployment of ITS using regular Federal-aid and other state/local funding, the U.S. DOT initiated the Model Deployment Program. The metropolitan area Model Deployment Initiatives are intended to support integrated transportation management systems, and feature a strong, regional, multimodal traveler information services component. These model deployment sites will demonstrate and showcase the measurable benefits resulting from the application of an integrated, region-wide approach to transportation management and the provision of traveler information services. The model deployment sites will provide improved transportation management and increased levels of service to the traveling public, businesses, and commercial carriers through the integration of the traditional functions of traffic signal control; transit, freeway, and incident management; emergency services management; regional, multimodal traveler information services; and electronic toll and fare payment. In addition to introducing the public to the benefits of ITS products and services, the sites will serve as "showcases" for key local decision makers across the U.S., and will support peer-to-peer interaction and seminars focused on the benefits of ITS infrastructure investments by both the public and private sectors. The model deployment sites also will provide a setting for conducting rigorous evaluations of the benefits of an integrated metropolitan area ITS infrastructure.

Advanced Traffic Management Systems (ATMS)
(Research & Development)

ATMS RESEARCH ANALYSIS DATABASE SYSTEM

Description:

The objective of this effort is to develop a means of integrating disparate traffic engineering tools through the use of a common data dictionary and database system. The set of software tools that could use this system include ATMS research software and traffic engineering analysis tools. This effort will concentrate on developing the data dictionary, building a database designed around that dictionary, and modifying a small number of existing programs to use that database system.

The proposed system, the ATMS Research Analysis Database System (ATMS RADS), will provide a standard data dictionary to be used for storage and retrieval of data used by ATMS and traffic engineering software. This project will also use a proof-of-concept development to demonstrate that this standard data dictionary and database system are useful to a variety of existing programs.

Project Location **:** Rome, New York

Contractor(s) : USAF Rome Laboratory

Start Date: March 1997

End Date**:** October 1998

Estimated Total ITS Funds: $500,000

Estimated Total Project Cost: $500,000

Contacts**:**

Gene McHale	FHWA - TFHRC, HSR-10	(703) 285-2973	Ext.

BETA TESTING OF SOFTWARE

Description: This activity will allow practitioners to assess the integrity and applicability of newly modified or developed FHWA software. This will allow FHWA to better match user needs, thereby reducing the time needed to bring traffic engineering software to the market-ready stage.

Project Location **:** Gainesville, Florida

Contractor(s) : University of Florida

Start Date: September 1994

End Date**:** December 1998

Estimated Total ITS Funds: $521,221

Estimated Total Project Cost: $551,650

Contacts**:**

Henry Lieu	FHWA - TFHRC, HSR-10	(703) 285-2410	Ext.

DATABASES FOR ASSESSMENT OF OPERATIONAL TESTS AND TRAFFIC MODELS

Description: This study involves defining data required for the validation and verification of traffic models. This study will also include the collection and storage of traffic data from different sites strategically selected around the country and the subsequent maintenance of the databases. Additionally, issues will be addressed including type of storage needed (central vs. distributed), hardware and software platforms, and user interfaces (pre - and post-processing activities). Some of this data will be obtained from existing data sources or on-going ITS field operational tests. Special emphasis will be placed on data collection from the RT-TRACS field testing. The verification and validation techniques and database management system will be applied to FHWA's TRAF family of models.

Project Location **:** Colorado Springs, Colorado

Contractor(s) : Kaman Sciences Corporation

Start Date: June 1995

End Date**:** August 1999

Estimated Total ITS Funds: $1,630,896

Estimated Total Project Cost: $1,630,896

Contacts**:**

Gene McHale	FHWA - TFHRC, HSR-10	(703) 285-2973	Ext.

DEPLOYMENT ISSUES OF SURVEILLANCE SYSTEMS FOR ITS

Description:

The focus of this research is on the deployment of sensors to support the data needs of Advanced Traffic Management Systems (ATMS). Research endeavors include identification of issues practitioners must address in developing a strategy for deploying surveillance systems which will meet the needs of ATMS. Identification of issues will be followed by development of various test strategies. These strategies will, in turn, be analyzed and evaluated to determine the appropriateness of various strategy parameters such as types of sensors, combinations of sensors, sensor placement, cost, performance, accuracy of data, and support of ATMS functions. Finally, trade-off analyses will be conducted to assess impacts associated with the various strategies.

The investigation will result in the development of a guidance document that identifies and describes surveillance deployment issues, possible surveillance deployment strategies, trade-offs between strategies, sensors, data, cost, and service, and how these factors may relate to various situations. The intent of this research is not to present or prescribe an optimal surveillance strategy, but to generate information needed by transportation professionals to analyze their specific situations and make informed decisions taking into account various surveillance options and the trade-off those options entail.

Project Location **:** McLean, Virginia

Contractor(s) : Booz Allen & Hamilton

Start Date: September 1997

End Date**:** September 1999

Estimated Total ITS Funds: $800,000

Estimated Total Project Cost: $800,000

Contacts**:**

John Harding	FHWA - TFHRC, HSR-10	(703) 285-2091	Ext.

DYNAMIC TRAFFIC ASSIGNMENT AND SYNTHETIC ORIGIN AND DESTINATION MATRICES

Description:

This study will develop a deployable Real-Time Dynamic Traffic Assignment (DTA) system. The system shall be able to serve as an effective integrator between ATMS and ATIS and shall be deployable in real time in a large and congested network in which recurrent and non-recurrent congestion may occur. A DTA system should have the following broad functional capabilities:

- Estimate and predict traffic network states;
- Provide route guidance to vehicles;
- Offer departure time and mode choice (e.g., transit vs. auto) advisory to travelers;
- Interface to traffic control systems.

A real-time DTA system will perform the above functions in real-time by making the best use of the information collected from surveillance systems and other information sources including ATIS.

This is a cost-sharing project collaborated with Oak Ridge National Laboratory (ORNL). The project is to be conducted in two phases. Phase I work focuses on the design, development, functional testing, and laboratory testing of the DTA system. Phase II work will address computational and system integration issues for real - time operations in a traffic management center and perform experimental field tests.

Two parallel Phase I research contracts were awarded to Massachusetts Institute of Technology and the University of Texas at Austin through ORNL in October, 1995. Both Phase I projects will be completed by May 1998.

ORNL provides technical management support to the FHWA with the design, development, and testing of the DTA system.

Project Location **:** Oak Ridge, Tennessee.

Contractor(s) : Department of Energy and Oak Ridge National Laboratory

Start Date: August 1994

End Date**:** June 2003

Estimated Total ITS Funds: $5,250,000

Estimated Total Project Cost: $6,250,000

Contacts**:**

Henry Lieu	FHWA - TFHRC, HSR-10	(703) 285-2410	Ext.

EVALUATION OF REAL-TIME TRAFFIC ADAPTIVE SIGNAL CONTROL PROTOTYPES

Description: This study focuses on the evaluation of five real-time traffic adaptive signal control prototypes previously developed. The evaluation consists of three phases: conceptual evaluation, laboratory evaluation, and field evaluation. The conceptual evaluation established the validity of the prototypes' overall concept. The laboratory evaluation will test each prototype in a simulated environment against an optimal baseline case study. Various scenarios will be evaluated including a high type arterial, a small grid network, a complex grid network, and a cluster network. The field evaluation will implement and evaluate a promising prototype strategy within the overall RT-TRACS system.

Project Location **:** Colorado Springs, Colorado

Contractor(s) : Kaman Sciences Corporation

Start Date: January 1995

End Date**:** December 1998

Estimated Total ITS Funds: $1,796,400

Estimated Total Project Cost: $1,796,400

Contacts**:**

Deborah Curtis	FHWA - TFHRC, HSR-10	(703) 285-2542	Ext.

FUEL CONSUMPTION AND EMISSION VALUES FOR TRAFFIC MODELS

Description: The Oak Ridge National Laboratory (ORNL) is developing a database of on-road fuel consumption and emissions for eight late model vehicles, as a function of vehicle speed and acceleration. These vehicle "maps" are being developed for use in simulation models that evaluate strategies to enhance roadway design, traffic control, and ITS concepts. The maps will permit simulation models to calculate the energy and emission impacts of highway traffic improvements.

Project Location **:** Oak Ridge, Tennessee

Contractor(s) : Oak Ridge National Laboratory

Start Date: June 1993

End Date**:** May 1998

Estimated Total ITS Funds: $1,300,000

Estimated Total Project Cost: $1,300,000

Contacts**:**

Aladdin Barkawi	FHWA - TFHRC, HSR-10	(703) 285-2093	Ext.

HUMAN FACTORS COMPUTER - AIDED DESIGN TOOL FOR TRAFFIC MANAGEMENT CENTERS

Description:

The effective design and modification of traffic management centers will benefit from easily accessed design tools and information which facilitate a human factored design. The Computer - Aided Design Support System (CADDS) tool developed in this project will include human factors guidelines for the design of traffic management centers, access to TMC research specific to operator issues and other tools which assist the designer in achieving optimal usability of TMC equipment. Efficient tool access will be achieved via rapid retrieval and tool centralization. CADDS will provide appropriate tools (e.g., design guidelines) and information at the appropriate design steps and phases without extensive searching through large volumes of data.

Project Location **:** Atlanta, Georgia

Contractor(s) : Georgia Tech Research Corporation-Georgia Institute of Technology

Start Date: September 1996

End Date**:** November 1999

Estimated Total ITS Funds: $2,473,492

Estimated Total Project Cost: $2,473,492

Contacts**:**

Nazemeh Sobhi	FHWA-TFHRC, HSR-30	(703) 285-2907	Ext.

HUMAN FACTORS IN ADVANCED TRAFFIC MANAGEMENT SYSTEMS (ATMS) DESIGN EVOLUTION

Description:

The goal of this study is to investigate and define the human factors issues involved in a fully functional, state-of-the-art Advanced Traffic Management System (ATMS). Products of this effort will include the development of a Human Factors Handbook for Traffic Management Center (TMC) Designers, a human-centered engineering analysis of an advanced traffic management center, a database of TMC human factors research and a stand-alone human factors research TMC simulator.

Products from the requirements analysis include second generation scenarios and systems objectives, definition of system functions, allocation of functions, operator performance requirements, task analysis and human factors design guidance. The Comparable Systems Analysis has been published by FHWA. The First Edition Human Factors Handbook of Traffic Management System Design has been published. The human factors studies in the experimental program have begun and are in various stages of completion.

Project Location **:** Atlanta, Georgia

Contractor(s) : Georgia Tech Research Institute - Georgia Institute of Technology

Start Date: September 1992

End Date**:** May 1998

Estimated Total ITS Funds: $5,368,297

Estimated Total Project Cost: $5,368,297

Contacts**:**

Nazemeh Sobhi	FHWA - TFHRC, HSR-30	(703) 285-2907	Ext.

INTEGRATION OF TRAFFIC OPERATIONS AND TRAFFIC DATA COLLECTIONS

Description: This research will establish a process and methodology for the integrated collection of traffic data. This research is expected to result in increased awareness of organizational objectives and increased cooperation between traffic engineering/operations staff and the traffic data collection efforts of the transportation planning programs at both the local and State levels. Georgia DOT and Washington State DOT have been scheduled to conduct this study.

Project Location **:** Atlanta, Georgia

Contractor(s) : Georgia DOT and Washington State DOT

Start Date: July 1993

End Date**:** March 1998

Estimated Total ITS Funds: $495,000

Estimated Total Project Cost: $495,000

Contacts**:**

Bill Grush	FHWA Headquarters, HPM-30	(202) 366-5052	Ext.

NETWORK-WIDE OPTIMIZATION OF MODELS

Description: The objective of this contract is to develop a computer package which will allow users to: (1) coordinate the signal timing and ramp metering functions, (2) develop metering rates for metered freeway on-ramps, and (3) optimize signal timing at isolated intersections, on arterials, and in closed networks. In addition, a Windows-based user interface based on a graphical user interface utilizing point-and-click technology will be developed for this package.

Project Location **:** Rockville, Maryland

Contractor(s) : PB Farradyne, Inc.

Start Date: November 1992

End Date**:** January 1998

Estimated Total ITS Funds: $1,655,000

Estimated Total Project Cost: $1,655,000

Contacts**:**

Michelle Thomas	FHWA - TFHRC, HSR-10	(703) 285-2027	Ext.

REAL-TIME TRAFFIC ADAPTIVE SIGNAL CONTROL FOR ITS

Description: This study, to develop a prototype real-time, traffic adaptive signal control system suitable for use in an ITS environment by 1997, is the first of three studies which will eventually develop five prototypes for laboratory evaluation, from which one will be selected for further development and field evaluation by 1997. This study encompasses the first stage of a long term effort. A single, major contract was awarded to a consortium composed of State and local DOT's, private industry, and academia.

Project Location **:** Rockville, Maryland

Contractor(s) : PB Farradyne, Inc.

Start Date: June 1992

End Date**:** June 1998

Estimated Total ITS Funds: $4,832,537

Estimated Total Project Cost: $4,832,537

Contacts**:**

Deborah Curtis	FHWA - TFHRC, HSR-10	(703) 285-2542	Ext.

TRAFFIC SURVEILLANCE AND DETECTION TECHNOLOGY DEVELOPMENT

Description:

This funding will be used to identify and develop new detection technologies and surveillance concepts. With the rapid advances in industry technology, new options for detection need to be made available for use by traffic management centers. As ITS-class Dynamic Traffic Assignment, Real-Time Traffic-Adaptive Control, and Incident Detection systems are developed, new measures of effectiveness (such as queue lengths) may be required inputs to these modules. This study will identify potential means of obtaining this data directly from the field using new surveillance and detection capabilities that are more accurate and cost-effective than those which are currently available. This project is conducted in two phases. The first phase being conducted is an effort to adapt various sensor technologies for use in transportation detection applications. The second phase is an effort to conduct extensive testing to determine the relationships between the data the sensor can provide and the performance of ATMS functions alone and integrated. In order to identify performance relationships between function/sensor combinations, part of phase two will investigate the integration of data from these advance sensors with various ATMS functions.

Project Location **:** Pasadena, California

Contractor(s) : Jet Propulsion Laboratory (JPL)

Start Date: September 1994

End Date**:** September 1998

Estimated Total ITS Funds: $7,240,000

Estimated Total Project Cost: $7,240,000

Contacts**:**

John Harding	FHWA - TFHRC, HSR-10	(703) 285-2091	Ext.

TRANSLINK RESEARCH AND DEVELOPMENT PROGRAM

Description: This project, conducted under the auspices of ITS Research Centers of Excellence program, is designed to facilitate the integration of "real-time" ITS system monitoring capabilities into existing and future transportation management systems. Areas of emphasis for TRANSLINK research include linkages between ITS subsystems such as advanced traffic management systems and transit management systems. There will be specific focus on railroad subsystem integration and police vehicle subsystem integration with enforcement/response center systems. There will also be research emphasis on transportation center automation.

Project Location **:** College Station, Texas

Contractor(s) : Texas A & M, Metropolitan Transit Authority of Harris Co., Texas DOT

Start Date: March 1996

End Date**:** September 1998

Estimated Total ITS Funds: $1,200,000

Estimated Total Project Cost: $1,200,000

Contacts**:**

David Gibson	FHWA - TFHRC, HSR-10	(703) 385-2407	Ext.

TRANSPORTATION MANAGEMENT CENTER INTEGRATION ISSUES

Description:

This research and development effort will support the development and implementation of integrated Transportation Management Systems. Issues concerning the integration of systems across jurisdictional and geographic boundaries, and their relationships to system configuration, functionality, and requirements will be investigated. This effort will culminate in the development of processes which facilitate traffic management entities' ability to develop operational concepts and implementation plans supported by decision-aid tools.

The results of this effort will support jurisdictions in their development of integrated Transportation Management Center concept of operations and implementation plans according to their specific needs regardless of whether a jurisdiction has or has not deployed ITS. The procedures and tools will enable jurisdictions to create their own system visions, plan for the system implementation, and consider various operational, functional, and organizational options. The procedures and tools are not intended to duplicate any existing efforts, but with the assistance of a structured approach, to identify the various information and resources available that jurisdictions can use concerning the development of integrated ITS operations.

Project Location **:** Oak Ridge, Tennessee

Contractor(s) : Oak Ridge National Laboratory

Start Date: September 1996

End Date**:** September 2001

Estimated Total ITS Funds: $940,000

Estimated Total Project Cost: $940,000

Contacts**:**

John Harding	FHWA - TFHRC, HSR-10	(703) 285-2091	Ext.

Advanced Traffic Management Systems (ATMS) (Operational Tests)

FAST-TRAC

Description:

FAST-TRAC (Faster and Safer Travel through Traffic Routing and Advanced Controls) will combine Advanced Traffic Management Systems (ATMS) and Advanced Traveler Information Systems (ATIS) technologies in Oakland County, Michigan. SCATS, the Australian adaptive real-time traffic control system is being installed throughout Oakland County, Michigan. Traffic detection for real-time traffic control is being provided through the Autoscope video image processing technology. For the ATIS portion of the test, vehicles were equipped with the Siemens Ali-Scout route guidance system and other drive information systems (Quick-Scout and TetraStar/PathMaster). Infrared beacons installed at critical locations in the network provided for a continuous exchange of real-time traffic and route guidance information. A Traffic Operations Center has been established, not only as the heart of FAST-TRAC operations, but also as the focus for systems integration.

Project Location **:** Oakland County, Michigan

Partner(s) : Michigan DOT, Siemens Automotive, General Motors, Ford, Chrysler, Road Commission for Oakland County, County of Oakland, AWA Traffic System - America, and University of Michigan

Start Date: June 1992

End Date**:** June 2000

Estimated Total ITS Funds: $56,410,000

Estimated Total Project Cost: $70,512,500

Contacts**:**

Dave Helman	FHWA Headquarters, HTV-3	(202) 366-8042	Ext.
William Brownell	FHWA Region 5, HES-05	(708) 283-3549	Ext.
Morrie Hoevel	FHWA Michigan Division, HDA-MI	(517) 377-1880	Ext. 32
Beata Lamparski	Road Commission for Oakland County	(248) 858-7250	Ext. 3139

INTEGRATED RAMP METERING/ADAPTIVE SIGNAL CONTROL

Description: This project will evaluate the operational effects of balancing traffic flow between I-5/I-405 and the parallel arterial streets. The project will also demonstrate the effectiveness of collaborative action on the part of transportation management agencies to optimize their strategies to improve traffic flow. The project will integrate an existing centrally-controlled freeway ramp meter system with an arterial signal system consisting of existing signal controllers, the new Advanced Traffic Controller, and an adaptive control algorithm (OPAC).

Project Location **:** Irvine (Orange County), California

Partner(s) : California DOT (CalTrans), City of Irvine, Farradyne Systems, and University of California - Irvine

Start Date: September 1993

End Date**:** July 1998

Estimated Total ITS Funds: $2,617,000

Estimated Total Project Cost: $3,271,250

Contacts**:**

Frank Cechini	FHWA California Division, HTA-CA	(916) 498-5005	Ext.

MONTGOMERY COUNTY ADVANCED TRANSPORTATION MANAGEMENT SYSTEM

Description: This project will enhance Montgomery County's Advanced Transportation Management System to provide integrated transit and traffic capabilities. The system will include an automatic vehicle location-equipped bus fleet, intelligent in-vehicle units, two-way communications, real time graphics, relational database, monitoring, and control software, transit priority and system information dissemination. Through use of this enhanced information and control capability, the County's Advanced Transportation Management System will be able to more effectively manage transportation.

Project Location **:** Montgomery County, Maryland

Partner(s) : Montgomery County Office of Traffic, Montgomery County Transit, Maryland State Highway Administration, Orbital Sciences Corporation, Automatic Signal/Eagle Signal, RGA Inc.

Start Date: July 1994

End Date**:** September 1998

Estimated Total ITS Funds: $1,060,000

Estimated Total Project Cost: $1,860,000

Contacts**:**

W. Raymond Keng	FTA Headquarters, TRI-11	(202) 366-6667	Ext.
Tom Jacobs	FHWA Maryland Division, HB-MD	(410) 962-4342	Ext. 129
Emil Wolanin	Montgomery County	(301) 217-2208	Ext.

NORTH SEATTLE ADVANCED TRAFFIC MANAGEMENT SYSTEM

Description: This project will explore methods for adjacent traffic signal systems to share loop detector and operational data to improve operations across boundaries and between adjacent systems. Jurisdictional issues which often prevent coordinating adjacent systems will be addressed during this project. Data will be obtained from several systems in the I-5 corridor north of Seattle by a single microcomputer connected with street or central master controllers belonging to the various jurisdictions within the corridor. The microcomputer will compile the volume, occupancy and operations data and transmit it back to the participating control systems. Each system will then use the data to improve its traffic management capabilities.

Project Location **:** North Seattle, Washington

Partner(s) : Washington State DOT

Start Date: July 1993

End Date**:** June 1998

Estimated Total ITS Funds: $3,500,000

Estimated Total Project Cost: $4,375,000

Contacts**:**

Ed Fischer	FHWA Region 10, HEO-010	(503) 326-2071	Ext.
Mike Morrow	FHWA Washington Division, HPM-WA	(206) 753-9551	Ext.
Dave Berg	Washington State DOT	(206) 440-4485	Ext.

SAN ANTONIO TRANSGUIDE

Description:

The Texas DOT installed a state-of-the-technology advanced traffic management system (TransGuide) in San Antonio. The Phase 1 project resulted in a three story control center and twenty-five miles of the one hundred ninety mile proposed ATMS. TransGuide provides:

- Complete digital communication network (voice, data, and video);
- Communication standard "SONET";
- Fully redundant fiber optic network;
- Fault tolerant computer system;
- Software developed to "POSIX" standards;
- Fully developed Central Control facility with a test-bed development
- computer;
- Field equipment consisting of changeable message signs, lane control
- signals, loop detectors, and surveillance cameras;
- Incident detection goal of 2 minutes; and
- System response goal of under 1 minute after detection.

This Operational Test will document the San Antonio TransGuide system design rationale and goals, evaluate the system's success in meeting the design goals, and evaluate the digital communication network for cost effectiveness and benefits versus "traditional" transportation data communication systems. An additional element of this Operational Test is the on-line evaluation and comparison of several incident detection algorithms.

A $150,000 Before-and-After study for Phase 2 on Loop 410 was added to the project in 1996, extending the completion date for a year.

Project Location **:** San Antonio, Texas

Partner(s) : Texas DOT, AlliedSignal Technical Services Corporation, Southwest Research Institute (SWRI), and Texas Transportation Institute (TTI)

Start Date: August 1993

End Date**:** November 1998

Estimated Total ITS Funds: $1,049,654

Estimated Total Project Cost: $1,485,966

Contacts**:**

Jerry Jones	FHWA Region 6, HNG-06	(817) 978-4358	Ext.
Mark Olson	FHWA Texas Division, HTA-TX	(512) 916-5966	Ext.
Pat Irwin	Texas DOT	(210) 731-5249	Ext.
Gene Schroeder	Texas DOT - TRF (Austin)	(512) 416-3309	Ext.

SATELLITE COMMUNICATIONS FEASIBILITY

Description:

This project will evaluate the use of Very Small Aperture Terminal (VSAT) satellite as the communications medium for four stationary closed-circuit television (CCTV) cameras and a mobile CCTV camera and communication platform. Specific objectives of the project are to: (1) develop and evaluate the feasibility of remote switching of multiple cameras through a single satellite channel, (2) develop and evaluate the feasibility of a mobile CCTV camera and communication platform, (3) determine the impact of weather conditions and other factors that degrade the VSAT signal integrity, (4) determine the limitation of VSAT for video surveillance by examining image clarity, pan-tilt-zoom controls and other factors associated with day-to-day CCTV freeway surveillance, (5) test the security of VSAT remote equipment with respect to vandalism and theft, and (6) compare VSAT video quality with other communications medium including leased T-1 service and direct fiber optic cable.

Project Location **:** I-95 in Philadelphia, Pennsylvania

Partner(s) : Pennsylvania DOT

Start Date: October 1992

End Date**:** June 1998

Estimated Total ITS Funds: $2,200,000

Estimated Total Project Cost: $2,800,000

Contacts**:**

Steve Clinger	FHWA Region 3, HEO-03	(410) 962-0077	Ext. 3055
Carmine Fiscina	FHWA/FTA Philadelphia Metropolitan Office	(215) 656-7111	Ext.
Doug May	Pennsylvania DOT	(610) 768-3053	Ext.

SCOOT ADAPTIVE TRAFFIC CONTROL SYSTEM

Description: This operational test will implement SCOOT in an area of the City of Anaheim's traffic signal system so that it can be evaluated for its effectiveness as an adaptive signal timing control package. SCOOT automates the data collection process and then automatically optimizes traffic signal timing based on real-time traffic conditions. The test will also include the installation and evaluation of Video Traffic Detection System (VTDS) cameras in conjunction with the SCOOT system. The VTDS cameras will potentially provide a way to adjust the traffic count locations so that optimal data collection sites for the SCOOT system can be identified.

Project Location **:** Anaheim, California

Partner(s) : City of Anaheim, California DOT (CalTrans), Odetics, PATH, CalPoly University, and University of Southern California

Start Date: September 1993

End Date**:** June 1998

Estimated Total ITS Funds: $1,153,927

Estimated Total Project Cost: $2,438,427

Contacts**:**

Frank Cechini	FHWA California Division, HTA-CA	(916) 498-5005	Ext.
Jim Paral	City of Anaheim	(714) 254-5183	Ext.

SPREAD SPECTRUM RADIO TRAFFIC INTERCONNECT

Description: This operational test will evaluate the use of spread spectrum radio to provide communications interconnect for a portion of the Los Angeles ATSAC signal system. The radios will be tested in a network of signals to determine their ability to work in a variety of geographies and their ability to provide for large-scale, once-per-second communications, and to determine the cost-effectiveness of using this technology.

Project Location **:** Los Angeles, California

Partner(s) : City of Los Angeles, Hughes Aircraft, JHK & Associates, California DOT (CalTrans), University of Southern California, and PATH

Start Date: July 1994

End Date**:** June 1998

Estimated Total ITS Funds: $2,629,075

Estimated Total Project Cost: $3,866,685

Contacts**:**

Frank Cechini	FHWA California Division, HTA-CA	(916) 498-5005	Ext.

Advanced Traffic Management Systems (ATMS)
(Other Projects)

BRONX/NORTHERN MANHATTAN ATMS

Description: This Demonstration Project will implement a traffic management system consisting of variable message signs, highway advisory radio/citizens band radio, advanced traffic controllers, enhanced operation center computer systems, and monitoring systems including CCTV, vehicle detection and innovative detection systems to provide traffic management and travel information services. In addition, the traffic management system will provide critical condition information to users in the I-95 Corridor and to the public through a 1-800 number accessed by cellular and regular phone service.

Project Location **:** New York, New York

Partner(s) : New York State DOT

Start Date: July 1995

End Date**:** March 1998

Estimated Total ITS Funds: $4,650,000

Estimated Total Project Cost: $5,812,500

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Arthur O'Connor	FHWA/FTA NYC Metro Office	(212) 466-3856	Ext.
Paul Cuerdon	New York State DOT	(518) 457-1232	Ext.

BROOKLYN-BRONX-QUEENS SIGNALIZATION

Description: This project supports the development, installation and evaluation of new, advanced traffic controllers (ATC) for integration into the signal system for New York City's five boroughs. The project will develop controller prototypes, field test hardware and software, and evaluate system performance before installing additional ATCs at various locations around the City.

Project Location **:** Brooklyn and Bronx, New York

Partner(s) : New York State DOT and New York City DOT

Start Date: July 1995

End Date**:** October 1998

Estimated Total ITS Funds: $3,750,000

Estimated Total Project Cost: $8,125,500

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Arthur O'Connor	FHWA/FTA NYC Metro Office	(212) 466-3856	Ext.
Paul Cuerdon	New York City DOT	(518) 457-1232	Ext.

BUFFALO/NIAGARA FALLS ATMS

Description: This project provides for a variety of travel management enhancements to include: installation of a road weather information system and variable message signs; establishment of a weather advisory for a local bridge; an enhanced traffic operation center computer system; and freeway management capability in the Buffalo area.

Project Location **:** Buffalo, New York

Partner(s) : New York State DOT

Start Date: May 1995

End Date**:** March 1998

Estimated Total ITS Funds: $2,000,000

Estimated Total Project Cost: $2,500,000

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Jerry Zell	FHWA New York Division, HTS-NY	(518) 431-4125	Ext. 228
Roderic Sechrist	NYSDOT Region 5, Buffalo	(716) 847-3669	Ext.

CARAT

Description: The Congestion Avoidance and Reduction for Automobiles and Trucks (CARAT) project is a long-range, comprehensive implementation of a congestion management project for freeways and connected arterials in the Charlotte urban area. The ITS project is focusing on the design/build/warrant (D/B/W) procurement process of the CARAT project.

Project Location **:** Charlotte, North Carolina

Partner(s) : North Carolina DOT, City of Charlotte, University of North Carolina System

Start Date: June 1992

End Date**:** April 1999

Estimated Total ITS Funds: $10,990,000

Estimated Total Project Cost: $15,237,500

Contacts**:**

Mark Doctor	FHWA Region 4, HES-04	(404) 562-3685	Ext.
Max Tate	FHWA North Carolina Division, HDA-NC	(919) 856-4354	Ext.
Roberto Canales	North Carolina DOT	(919) 250-4159	Ext.

DETROIT, MICHIGAN AREAWIDE DEPLOYMENT OF ATMS/ATIS

Description:

The Michigan DOT has recently completed a comprehensive ATMS/ATIS Early Deployment Plan for expansion of the existing 32.5 miles of instrumented freeway coverage to 250 miles in Metropolitan Detroit. The deployment to be undertaken in Phase One will expand system coverage by 150 miles, and will provide the Michigan Intelligent Transportation Systems (MITS) Center in Detroit with the capability to monitor traffic and congestion through the use of mainline traffic detectors (loops and machine vision), ramp metering and video surveillance. Traveler information will be provided via highway advisory radios and changeable message signs. The implementation of the ATMS/ATIS system will provide the Michigan DOT the means to detect and verify incidents on selected corridors in a timely manner, to provide traffic operations personnel sufficient data to respond to incidents and to disseminate traffic and congestion information to motorists so they can plan or modify their travel plans. Additionally, the system will have the capability to manage mainline work zones, calculate mainline volume demand and predict traffic flow patterns for special events, planned work/constructions zones, and other special events. The corridors proposed for deployment include selected segments of Interstates 75, 94, 96 and 696, and the M-10 and M-39 freeways.

Project Location **:** Detroit, Michigan metropolitan area

Partner(s) : Michigan DOT, Road Commission for Oakland County

Start Date: June 1994

End Date**:** January 1998

Estimated Total ITS Funds: $3,000,000

Estimated Total Project Cost: $33,389,353

Contacts**:**

William Brownell	FHWA Region 5, HES-05	(708) 283-3549	Ext.
Morrie Hoevel	FHWA Michigan Division	(517) 377-1880	Ext. 32
Dr. Kunwar Rajendra	Michigan DOT	(517) 373-2247	Ext.

FAIRBORN, OHIO ADVANCED TRAFFIC MANAGEMENT SYSTEM

Description: The purpose of this project is to improve mobility on public roadways in the vicinity of a university multipurpose arena during special events. The consultant will also evaluate the effectiveness of Advanced Traveler Information System (ATIS) technologies when integrated with traditional traffic engineering improvements.

Project Location **:** Fairborn, Ohio

Partner(s) : Ohio DOT, Miami Valley Regional Planning Commission (MVRPC), City of Fairborn, City of Beavercreek, and Wright State University.

Start Date: December 1997

End Date**:** February 2000

Estimated Total ITS Funds: $1,000,000

Estimated Total Project Cost: $1,000,000

Contacts**:**

William Brownell	FHWA Region 5, HES-05	(708) 283-3549	Ext.
James Buckson	FHWA Ohio Division, HDA-OH	(614) 469-6896	Ext.
George Saylor	Ohio DOT	(614) 752-8099	Ext.
Anne Hassoun	MVRPC	(937) 233-6323	Ext.

I-87 CELLULAR TELEPHONE DEMONSTRATION

Description: This project will provide "Caller ID" for calls received by the New York State Police 911 system.

Project Location **:** New York

Partner(s) : New York State DOT and New York State Police

Start Date: September 1991

End Date**:** September 1998

Estimated Total ITS Funds: $50,000

Estimated Total Project Cost: $50,000

Contacts**:**

Al Alonzi	FHWA Region , HPP-01	(518) 431-4224	Ext. 236
Mike Schauer	FHWA New York Division, HDT-NY	(518) 431-4125	Ext.
Ed Roberts	New York State DOT	(518) 457-1232	Ext.

I-287 SURVEILLANCE SYSTEM

Description: This project will deploy CCTV as well as the necessary hardware, software, and communication systems.

Project Location **:** New York

Partner(s) : New York State Thruway Authority (NYSTA)

Start Date: February 1993

End Date**:** December 1998

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext.
Mike Schauer	FHWA New York Division, HTD-NY	(518) 431-4125	Ext.
Barry Solomon	NYSTA	(518) 471-4352	Ext.

INGLEWOOD, CALIFORNIA ATMS PROJECT

Description: The Inglewood, California, ATMS project builds upon existing transportation resources and encompasses the installation of a sophisticated traffic control center that controls traffic signals, conducts traffic surveillance using closed circuit TV, and provides up to the minute information on traffic to travelers through kiosks, changeable message signs, cable TV and the Internet. The project will reduce travel time in the area 20-30% before and after NBA basketball games, NHL hockey games, concerts, and other special events at the Forum, Hollywood Park Racetrack and Casino.

Project Location **:** Inglewood, California

Partner(s) : California DOT; City of Inglewood, CA

Start Date: September 1997

End Date**:** December 1999

Estimated Total ITS Funds: $1,000,000

Estimated Total Project Cost: $1,000,000

Contacts**:**

Dale Thompson	FHWA Headquarters, HTV-3	(202) 366-0640	Ext.
Sylvia Grijalva	FHWA-LA Metro Office	(213) 202-3955	Ext.
John West	CALTRANS	(916) 654-8877	Ext.

INTEGRATED CORRIDOR MANAGEMENT

Description: This project is being conducted by the New Jersey DOT in cooperation with the Pennsylvania DOT and the Delaware Valley Regional Planning Commission. Project components include a multi-jurisdictional clearinghouse for regional traffic information, similar to the TRANSCOM operation in Northern NJ/NY, and a study of the overall traffic and incident management needs in southern New Jersey and the Philadelphia metropolitan area.

Project Location **:** Southern New Jersey and Philadelphia Metropolitan Area

Partner(s) : New Jersey DOT

Start Date: August 1992

End Date**:** December 1998

Estimated Total ITS Funds: $6,000,000

Estimated Total Project Cost: $7,500,000

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Breck Jeffers	FHWA New Jersey Division, HTC-NJ	(609) 637-4231	Ext.
Kurt Aufschneider	New Jersey DOT	(609) 866-4980	Ext.

INTELLIGENT CORRIDOR SYSTEM

Description: The Southeast Florida Intelligent Corridor System (ICS) will integrate the elements of Advanced Traffic Management Systems (ATMS), Advanced Traveler Information Systems (ATIS), Advanced Public Transportation Systems (APTS), Commercial Vehicle Operations (CVO), and Advanced Vehicle Control and Safety Systems (AVCSS). The extensive intermodal aspects of the I-95 corridor within Palm Beach, Broward, and Dade Counties are a priority in the development of the ICS. Initial early implementation activities will be centered around the ATMS function. Park-and-Ride lots, High Occupancy Vehicle (HOV) lanes, commuter rail, heavy rail, bus, and connections to airport cruise port, and seaport facilities are all present in the corridor. The overall goal of the project will be to provide real-time information to assist I-95 corridor travelers with guidance and mode decisions prior to and during a trip. Phase I of the project (completed in December 1994) provided a design report and a preliminary engineering and operational analysis. Phase II is to perform final design to deploy ITS technologies to provide real-time intermodal information on the I-95 corridor.

Project Location **:** Miami - Ft.Lauderdale, Florida

Partner(s) : Federal Highway Administration (FHWA), Florida DOT

Start Date: July 1992

End Date**:** May 1998

Estimated Total ITS Funds: $6,180,000

Estimated Total Project Cost: $7,725,000

Contacts**:**

Mark Doctor	FHWA Region 4, HES-04	(404) 562-3685	Ext.
Grant Zammit	FHWA Florida Division, HDA-FL	(850) 942-9693	Ext.
Maisar Khaled	FHWA Florida Division, HDA-FL	(850) 942-9596	Ext.
Rory Santana	Florida DOT	(305) 470-5335	Ext.

JOHNSON CITY, TN

Description: Phase I of the Johnson City Med/Tech Corridor ITS Project uses advanced computer and communications technology to more effectively manage parking and travel within a city dominated by an institutional corridor. Phase II of the Johnson City ITS Project will expand upon the parking management technologies tested in Phase I to develop a broadly-deployed ITS system incorporating automated traffic signal control technologies, Advanced Transit Management Systems, and dissemination of transportation information via the Internet. The technologies used for travel management will be designed to conform to the national ITS architecture for modular addition of ITS services. Specific objectives to be achieved in Phase II include: use of GIS to support interactive control of Johnson City MONARC traffic signal control system and to optimize traffic signal timing for real-time response to traffic loads; specify, design, and install Automatiac Vehicle Location system, computer-aided dispatch, and automated paratransit scheduling to optimize transit and paratransit operations; develop an Internet site for public access for ATIS and for public participation in the transportation planning process; and promote public awareness and use of ITS products.

Project Location **:** Johnson City, Tennessee

Partner(s) : Tennessee DOT, City of Johnson City, and Raytheon (Phase I)

Start Date: July 1994

End Date**:** January 1998

Estimated Total ITS Funds: $3,730,000

Estimated Total Project Cost: $4,662,500

Contacts**:**

Mark Doctor	FHWA Region 4, HES-04	(404) 562-3685	Ext.
Leigh Ann Tribble	FHWA Tennessee Division, HDA-TN	(615) 736-7107	Ext.
Tom Hiltner	City of Johnson City	(423) 434-6271	Ext.

KANSAS CITY - INTELLIGENT TRANSPORTATION SYSTEM DEPLOYMENT

Description: Implementation of Phase I of the Kansas City ITS Strategic Deployment Plan which includes a freeway incident management system along 77 kilometers of Interstate highways in both Missouri and Kansas.

Project Location **:** Kansas City Metropolitan Area

Partner(s) : Kansas DOT, Missouri DOT

Start Date: July 1997

End Date**:** September 1998

Estimated Total ITS Funds: $2,500,000

Estimated Total Project Cost: $3,125,000

Contacts**:**

Bruce Baldwin	FHWA Region 7, HEO-07	(826) 276-2741	Ext.
Bob Thomas	FHWA Missouri Division, HDA-MO	(573) 636-7104	Ext.
Sabin Yanez	Missouri DOT	(816) 889-6450	Ext.
Matt Volz	Kansas DOT	(413) 296-6356	Ext.

LOWER HUDSON VALLEY

Description: This project will provide for the creation of a Traffic Operations Center which will be jointly staffed by the New York State Department of Transportation, the New York State Thruway Authority, and the County of Westchester. This project provides for $1.875 million (total) to create this multiagency center within the Interstate 287 corridor known as the Cross Westchester Expressway.

Project Location **:** Westchester County, New York

Partner(s) : New York State DOT

Start Date: July 1995

End Date**:** September 1999

Estimated Total ITS Funds: $1,500,000

Estimated Total Project Cost: $4,988,000

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Mike Schauer	FHWA New York Division, HTD-NY	(518) 431-4125	Ext. 236
Ed Roberts	New York State DOT	(518) 457-1232	Ext.

MAGIC (METROPOLITAN AREA GUIDANCE INFORMATION & CONTROL)

Description: Deployment of MAGIC (Metropolitan Area Guidance Information & Control) system will divert motorists from congested or emergency/incident locations to alternative routes. The system will be implemented in three construction phases.

Project Location **:** Northern New Jersey

Partner(s) : New Jersey DOT

Start Date: January 1992

End Date**:** May 1998

Estimated Total ITS Funds: $10,280,000

Estimated Total Project Cost: $106,280,000

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Breck Jeffers	FHWA New Jersey Division, HTC-NJ	(609) 637-4231	Ext.
Bob Dibartolo	New Jersey DOT	(609) 530-2551	Ext.

MOBILE, ALABAMA FOG DETECTION SYSTEM

Description: This project will expand the fog detection and tunnel management system into a full incident management system on the seven-mile Bay Bridge and other segments of I - 10 through Mobile, Alabama.

Project Location **:** Mobile, Alabama

Partner(s) : Alabama DOT

Start Date: September 1996

End Date**:** April 1999

Estimated Total ITS Funds: $3,000,000

Estimated Total Project Cost: $3,750,000

Contacts**:**

Mark Doctor	FHWA Region 4, HES-04	(404) 562-3685	Ext.
Don Jones	FHWA Alabama Division, HDA-AL	(334) 223-7394	Ext.

MONTGOMERY ADVANCED TRAFFIC MANAGEMENT SYSTEM

Description: Development of an Advanced Traffic Management System for the City of Montgomery. It will include the installation of 12 miles of fiber optic cable along the southern and eastern by-passes that will inter-connect all traffic signals along that corridor. It will also install cameras at major intersections and cameras and changeable message signs on I-65 and I-85.

Project Location **:** Montgomery, Alabama

Partner(s) : City of Montgomery/Alabama DOT/FHWA

Start Date: August 1997

End Date**:** December 1998

Estimated Total ITS Funds: $1,000,000

Estimated Total Project Cost: $1,000,000

Contacts**:**

Mark Doctor	FHWA Region 4, HES-04	(404) 562-3685	Ext.
Don Jones	FHWA Alabama Division, HDA-AL	(334) 223-7394	Ext.

NASHVILLE, TENNESSEE TRAFFIC AND PARKING GUIDANCE SYSTEM

Description: This comprehensive parking and traffic management system will utilize: traffic sensors, signals, electronic and static signs, communications devices, data processing hardware and software, and data display equipment. Implementation of this planned system will make parking facilities in Nashville easier to use and less disruptive for traffic both in the CBD and approaching routes into and out of the area.

Project Location **:** Nashville, TN

Partner(s) : Tennessee DOT and Nashville Dept. of Public Works

Start Date: August 1997

End Date**:** April 1999

Estimated Total ITS Funds: $1,000,000

Estimated Total Project Cost: $1,250,000

Contacts**:**

Mark Doctor	FHWA Region 4, HES-04	(404) 562-3685	Ext.
Leigh Ann Tribble	FHWA Tennessee Division, HDA-TN	(615) 736-7107	Ext.
Mark Macy	Nashville Dept of Public Works	(615) 862-8760	Ext.

NEW JERSEY ELECTRONIC TOLL AND TRAFFIC MANAGEMENT

Description: A single Electronic Toll and Traffic Management (ETTM) system is to be deployed region-wide permitting use of a single "electronic tag" on vehicles on any toll facility throughout the region.

Project Location **:** Major New Jersey toll roads

Partner(s) : New Jersey DOT, South Jersey Transportation Authority, New Jersey Highway Authority, and New Jersey Turnpike Authority

Start Date: January 1992

End Date**:** December 1998

Estimated Total ITS Funds: $35,000,000

Estimated Total Project Cost: $43,000,000

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Breck Jeffers	FHWA New Jersey Division, HTC-NJ	(609) 637-4231	Ext.
Dominick Critelli	New Jersey DOT	(609) 530-2462	Ext.

NEW JERSEY POLICE COMMUNICATION CENTER

Description: The purpose of this project is to establish a prototype law enforcement communications/patrol center on a site adjacent to the New Jersey Turnpike. The center will be capable of receiving traffic information and real-time VMS displays from the Turnpike's existing Automated Traffic Surveillance and Control System. The center will have the capability of disseminating this information to patrol vehicles via mobile data terminals (MDTs). The goals and objectives of this project include enhanced traffic management capability, improved response to incidents, improved efficiency of enforcement functions and improvement of the institutional relationship between State Police and traffic operations personnel.

Project Location **:** New Jersey

Partner(s) : New Jersey Turnpike Authority and New Jersey DOT

Start Date: September 1993

End Date**:** January 1998

Estimated Total ITS Funds: $3,500,000

Estimated Total Project Cost: $5,053,238

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Breck Jeffers	FHWA New Jersey Division, HTC-NJ	(609) 637-4231	Ext.
Dale Jones	New Jersey Turnpike Authority	(908) 247-0900	Ext.

NEW JERSEY SIGNAL COMPUTERIZATION

Description: Deployment of a coordinated computerized signal system on Route 18, Route 73, and Route 1, utilizing advanced traffic control software and video surveillance.

Project Location **:** New Jersey

Partner(s) : New Jersey DOT

Start Date: January 1992

End Date**:** December 1998

Estimated Total ITS Funds: $13,000,000

Estimated Total Project Cost: $39,000,000

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Roy Gustavason	New Jersey DOT	(609) 530-2604	Ext.
Dave Powell	FHWA New Jersey Division, DET-NJ	(609) 637-4207	Ext.

NEW JERSEY TURNPIKE PROJECT

Description: This project supports the expansion of the New Jersey Turnpike Automatic Traffic Surveillance and Control System. The project will install and evaluate additional closed circuit television locations, variable message signs and a weather surveillance subsystem.

Project Location **:** New Jersey

Partner(s) : New Jersey DOT and New Jersey Turnpike Authority

Start Date: July 1995

End Date**:** December 1999

Estimated Total ITS Funds: $2,625,000

Estimated Total Project Cost: $11,200,000

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Breck Jeffers	FHWA New Jersey Division, HTC-NJ	(609) 637-4231	Ext.
Diane Scaccetti	New Jersey Turnpike Authority	(908) 247-0900	Ext. 5011

NEW YORK THRUWAY AUTHORITY ALBANY TRAFFIC OPERATIONS CENTER

Description: The New York State Thruway will develop and implement integrated transportation workstations. Initial installations will be at Thruway headquarters in Albany. These workstations will tie together highway advisory radio, variable message signs, closed circuit television, and computer-aided dispatching technologies throughout New York State.

Project Location **:** Albany, New York

Partner(s) : New York State Thruway Authority

Start Date: July 1996

End Date**:** August 1998

Estimated Total ITS Funds: $1,500,000

Estimated Total Project Cost: $1,875,000

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Michael Schauer	FHWA New York Division, HTD-NY	(518) 431-4125	Ext. 236
Paul Cuerdon	New York State DOT	(518) 457-1232	Ext.
Don Hubicki	New York State Thruway Authority	(518) 436-2756	Ext.

NEW YORK THRUWAY ELECTRONIC TOLL COLLECTION AND TRAFFIC MANAGEMENT

Description:

As part of the E-Z-PASS Interagency Group (a coalition of seven toll authorities in New York, New Jersey, Delaware, and Pennsylvania), the New York State Thruway Authority (NYSTA) is deploying Electronic Toll Collection and Traffic Management (ETTM) on its facilities. NYSTA's aggressive ETTM program will result in applying the Automatic Vehicle Identification (AVI) technology to the 63 toll plazas of the Thruway's 641-mile system by the end of 1996. The proposed distributed system will accommodate both commercial vehicles and commuter traffic with read-write technology. The NYSTA is also creating a multi-agency automated billing system for seamless customer service on other E-Z PASS systems.

Project Location **:** New York Thruway

Partner(s) : New York State Thruway Authority

Start Date: April 1994

End Date**:** September 1998

Estimated Total ITS Funds: $14,650,000

Estimated Total Project Cost: $35,850,000

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Mike Schauer	FHWA New York Division, HTD-NY	(518) 431-4125	Ext. 236
Barry Solomon	New York State Thruway Authority	(518) 471-4352	Ext.

NORTHERN VIRGINIA TRAFFIC SIGNAL MANAGEMENT SYSTEM

Description: This project will implement a computerized traffic signal system in the Virginia DOT Northern Virginia District and initially include about 800 signals in Fairfax, Prince William, and Loudoun Counties. The system is a computer-based, networked, central system operating on a multi-tasking environment. Communication to the signals will be by leased digital telephone lines. The system will provide information management, reporting and analysis of data, inventory control, maintenance logging, real-time graphics display, location designs, and cabinet wiring diagrams. The system will have the ability to upload and download all timing settings, operations parameters, and status information from the central control room or remote access locations. Five remote access workstations will be provided. The Real-Time Traffic Adaptive Control System is being field tested on a 16-signal corridor as part of the project.

Project Location **:** Fairfax County, Virginia

Partner(s) : Virginia DOT

Start Date: July 1993

End Date**:** April 1998

Estimated Total ITS Funds: $5,250,000

Estimated Total Project Cost: $24,000,000

Contacts**:**

Pam Marston	FHWA Region 3, HEO-03	(410) 962-0077	Ext. 3054
Tom Jennings	FHWA Virginia Division, HDA-VA	(804) 281-5107	Ext.
Ken Wester	Virginia DOT - Richmond	(703) 383-2457	Ext.

ROCHESTER, NEW YORK CONGESTION MANAGEMENT

Description: The purpose of this project is to provide integration of existing Road Weather Information System and highway maintenance functions with new traffic mangement and traveler information functions such as variable message signs and highway advisory radio.

Project Location **:** Rochester, New York

Partner(s) : New York State DOT

Start Date: August 1997

End Date**:** June 1999

Estimated Total ITS Funds: $1,500,000

Estimated Total Project Cost: $1,875,000

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4225	Ext. 228
Jerry Zell	FHWA New York Division, HTD-NY	(518) 431-4125	Ext. 228
Dave Goehring	NYSDOT	(716) 272-3481	Ext.

SALT LAKE CITY INTERIM TRAFFIC OPERATIONS CENTER

Description: This project consists of the development of an interim Traffic Operations Center (TOC) which will be located at the site where the planned Salt Lake City Traffic Control Center will ultimately be located. The interim TOC will support the operation of the Utah DOT, Salt Lake County and Salt Lake City signal systems and the freeway management system to facilitate travel during the reconstruction of I-15 in the Salt Lake City area. The I-15 reconstruction project is to include installation of the ultimate Utah DOT freeway management system for the area.

Project Location **:** Salt Lake City, Utah

Partner(s) : Utah DOT, Salt Lake City, Salt Lake County

Start Date: October 1996

End Date**:** January 1999

Estimated Total ITS Funds: $1,500,000

Estimated Total Project Cost: $1,875,000

Contacts**:**

Eva Sniezek	FHWA Region 8, HPD - 08	(303) 969-5772	Ext. 341
Martin Knopp	FHWA Utah Division, HPM-UT1	(801) 963-0078	Ext. 236
Dave Kinnecom	Utah DOT	(801) 965-4910	Ext.

SALT LAKE VALLEY ATMS SYSTEMS INTEGRATION

Description:

This project will integrate the various physical components and develop other support systems for the Salt Lake Valley Advanced Traffic Management System (ATMS) operation, a fully functional system between the Utah DOT, Salt Lake City and Salt Lake County. The system integrator is responsible for the overall implementation and operation of all the various system components which are being deployed for the ATMS. The field equipment, communication facilities and control centers are being implemented by four different ATMS projects. The ATMS will provide integrated, multi-agency, multi-modal traffic management capabilities to support the safe and timely movement of people and goods in the region. The system will support network surveillance, surface street control, freeway control, HOV lane management, traffic information dissemination, regional traffic control, and incident management.

The system integrator will coordinate the work of this project with the efforts of the consultants and contractors for the other four projects which are being implemented for the other portions of the ATMS. This will ensure operational compatibility among the various field elements, central control centers and corresponding elements. The project will implement a traffic signal system to provide central monitoring and control capabilities within the Salt Lake Area. The project will use the 2070 controller firmware to provide local processing of freeway detectors and ramp meter control. The Salt Lake County control center will use Georgia DOT software.

Project Location **:** Salt Lake Valley, Utah

Partner(s) : Utah DOT, Salt Lake City, Salt Lake County

Start Date: September 1997

End Date**:** December 2000

Estimated Total ITS Funds: $5,000,000

Estimated Total Project Cost: $6,250,000

Contacts**:**

Eva Sniezek	FHWA Region 8, HPD-08	(303) 969-5772	Ext. 341
Martin Knopp	FHWA Utah Division, HPM-UT (2)	(801) 963-0078	Ext. 236
Dave Kinnecom	Utah DOT	(801) 965-4910	Ext.

SMART CORRIDOR

Description: The SMART Corridor is a joint operational project located along 12.3 miles of the Santa Monica freeway corridor in Los Angeles. The objectives of the Smart Corridor are to provide congestion relief, reduce accidents, reduce fuel consumption, and improve air quality. This will be accomplished using advanced technologies to advise travelers of current conditions and alternate routes (using communication systems such as Highway Advisory Radio (HAR), Changeable Message Signs (CMS), kiosks, and teletext), improving emergency response, and providing coordinated inter-agency traffic management. The freeway systems will be operated by the State and the arterial streets by the City, with coordination provided via voice communications and electronic data sharing.

Project Location **:** Los Angeles, California

Partner(s) : Los Angeles County Transportation Commission, California DOT (CalTrans), and the City of Los Angeles

Start Date: July 1991

End Date**:** December 1999

Estimated Total ITS Funds: $1,100,000

Estimated Total Project Cost: $50,000,000

Contacts**:**

Frank Cechini	FHWA California Division, HTA-CA	(916) 498-5005	Ext.

SUTTER COUNTY, CALIFORNIA

Description: This project will produce an evaluation of deployment of state-of-the-art traffic signal pre-emption equipment, call boxes, automated vehicle location on transit vehicles and emergency vehicle vision enhancement in Sutter County.

Project Location **:** Sutter County, California

Partner(s) : Sutter County Department of Public Works

Start Date: April 1996

End Date**:** June 1998

Estimated Total ITS Funds: $1,750,000

Estimated Total Project Cost: $2,400,000

Contacts**:**

Frank Cechini	FHWA California Division, HTA-CA	(916) 498-5005	Ext.
Robert Barrett	Sutter County Department of Public Works	(916) 741-7450	Ext.

SYRACUSE CONGESTION MANAGEMENT SYSTEM

Description: This project supports the implementation and evaluation of a central computerized signal system in the city of Syracuse.

Project Location **:** Syracuse, New York

Partner(s) : New York State DOT

Start Date: June 1996

End Date**:** June 1998

Estimated Total ITS Funds: $3,000,000

Estimated Total Project Cost: $6,165,175

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Mike Schauer	FHWA New York Division, HTD-NY	(518) 431-4125	Ext. 236
Ed Roberts	New York State DOT	(518) 457-1232	Ext.

Advanced Traveler Information Systems (ATIS)
(Research & Development)

ANALYSIS OF TRAVELERS' PREFERENCES FOR ROUTING

Description:

One strategy for using the roadway effectively is to provide traffic status information to assist travelers' route planning and scheduling. This expanded knowledge of options for departure time and route choice and rerouting will create a more effective use of the roadway infrastructure.

It is important for message providers to know which kinds of message content and format are sufficiently convincing to influence traveler decision making. One purpose of this project is to identify factors which influence decision criteria for departure times, routing and rerouting decisions particularly in commuting situations.

Empirically derived results bearing on these issues will be provided in at least two forms. One form will be a human factors handbook which furnishes guidance for the design and transmission of messages primarily for Advanced Traveler Information Systems. Empirical results will also be used in the development of realistic estimates of driver behavior needed for traffic models.

Project Location **:** Maryland

Contractor(s) : Westat Corporation

Start Date: May 1995

End Date**:** September 1999

Estimated Total ITS Funds: $1,116,538

Estimated Total Project Cost: $1,116,538

Contacts**:**

Nazemeh Sobhi	FHWA-TFHRC, HSR-30	(703) 285-2907	Ext.

WASHINGTON METROPOLITAN TRAVELER INFORMATION SERVICES PROJECT: REGIONAL IMPACTS MODELING

Description: This project will measure the region-wide benefits of deploying the Washington Metropolitan Traveler Information Services Project. It will also create a model methodology for benefit estimation.

Project Location **:** Washington, DC Metropolitan Area

Contractor(s) : Virginia DOT/George Mason University

Start Date: April 1997

End Date**:** December 2002

Estimated Total ITS Funds: $500,000

Estimated Total Project Cost: $500,000

Contacts**:**

Pam Marston	FHWA Region 3, HEO-03	(410) 962-0077	Ext. 3054
Jim Robinson	Virginia DOT-Richmond	(804) 786-6877	Ext.
Roger Stough	George Mason University	(703) 993-2268	Ext.

Advanced Traveler Information Systems (ATIS)
(Operational Tests)

DENVER, COLORADO HOGBACK MULTI-MODAL TRANSFER CENTER

Description: This project proposes to provide a multi-modal transfer center on I-70 near the western edge of the metro area for travelers bound for the rural recreational areas west of Denver, as well as downtown Denver. Electronic methods will be used to provide real-time or near real-time information to a Kiosk for the travelers' use. The project goals/objectives are to: (1) provide a convenient, attractive, secure, and "user-friendly" parking facility for increased parking by transit users, car-poolers, and recreational users; and (2) to test Advanced Public Transportation Systems and Advanced Traveler Information Systems in a specially-designed information kiosk within 18 months of Regional Transportation District's (RTD) implementation of the Passenger Information Display System which will utilize AVL/GPS technology. The project test has been delayed to coordinate implementation with other related regional traveler information initiatives in the area and the development of the RTD system.

Project Location **:** Denver, Colorado

Partner(s) : Transportation Management Solutions and Jefferson County, Colorado

Start Date: May 1993

End Date**:** February 2000

Estimated Total ITS Funds: $300,000

Estimated Total Project Cost: $600,000

Contacts**:**

Eva Sniezek	FHWA Region 8, HPD-08	(303) 969-5775	Ext. 341
Scott Sands	FHWA Colorado Division, HFO-CO	(303) 969-6730	Ext. 362
Joe Temple	Colorado DOT	(303) 757-9771	Ext.

DIRECT

Description:

DIRECT (Driver Information Radio using Experimental Communication Technologies) is an Operational Field Test that will deploy and evaluate several alternative low-cost methods of communicating advisory information to motorists. These include use of the Radio Broadcast Data System (RBDS) FM subcarrier (SCA), Automatic Highway Advisory Radio (AHAR), Low Power Highway Advisory Radio (HAR), and cellular phones. The Michigan Intelligent Transportation Systems (MITS) Center will collect traffic information from various sources, fuse the information and provide traffic advisory updates to travelers on an exception basis. Initial experimental testing will involve 30 specially-equipped vehicles; subsequent testing will involve additional volunteer vehicles using conventional equipment (HAR and cellular phones).

Project Location **:** Along sections of I-75 and I-94 in the Detroit, Michigan area

Partner(s) : Michigan DOT, General Motors, Ford, Chrysler, Delco, Ericsson/GE, AAA of Michigan, Ameritech, Orbacom, Metro Networks, University of Michigan, Capstone Consulting, ERIM

Start Date: January 1994

End Date**:** April 1998

Estimated Total ITS Funds: $2,500,000

Estimated Total Project Cost: $4,500,000

Contacts**:**

Dave Helman	FHWA Headquarters, HTV-3	(202) 366-8042	Ext.
William Brownell	FHWA Region 5, HES-05	(708) 283-3549	Ext.
Morrie Hoevel	FHWA Michigan Division, HDA-MI	(517) 377-1880	Ext. 32
Thomas Mullin	Michigan DOT	(313) 256-9800	Ext.

RAILROAD CROSSING VEHICLE PROXIMITY ALERT SYSTEM

Description: The Vehicle Proximity Alert System (VPAS) is designed to warn drivers of priority vehicles (emergency vehicles, school buses, hazardous material haulers) about the presence of approaching trains at highway-rail grade crossings. This alert will be via an in-vehicle warning (audio/visual). Phase I of the VPAS project involved the testing and evaluation of several selected prototype systems for system performance. This was accomplished at the Federal Railroad Administration (FRA) test track facilities in Colorado. Successful systems will move to Phase II which will involve placement of the systems on a revenue service line for field operation evaluation under various environmental, physical, and operational conditions.

Project Location **:** Phase I: Pueblo, Colorado; Phase II - Testing: TBD

Partner(s) : Smart Stops Unlimited., Inc., E.A.R.S., Dynamic Vehicle Safety Systems and the Federal Railroad Administration

Start Date: June 1995

End Date**:** December 1998

Estimated Total ITS Funds: $1,000,000

Estimated Total Project Cost: $1,000,000

Contacts**:**

Joseph Lasek	FHWA Headquarters, HHS-10	(202) 366-2174	Ext.
James Smailes	FRA Headquarters, RDV-11	(202) 632-3260	Ext.

RAILROAD HIGHWAY CROSSING - LONG ISLAND, NY

Description: This project will support the development of a prototype integrated uniform warning system for use at railroad/highway grade crossings.

Project Location **:** Long Island, New York

Partner(s) : New York State DOT

Start Date: April 1996

End Date**:** December 1999

Estimated Total ITS Funds: $5,875,000

Estimated Total Project Cost: $9,531,250

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Mike Schauer	FHWA New York Division, HTD-NY	(518) 431-4125	Ext. 236
Jeff English	New York State DOT	(518) 457-5521	Ext.

SEATTLE WIDE-AREA INFORMATION FOR TRAVELERS (SWIFT)

Description: This project will test the delivery of traveler information via three devices: the Seiko Receptor Message Watch, an in-vehicle FM subcarrier radio, and a portable, personal computer. This project will also expand service formerly available under the Bellevue Smart Traveler project.

Project Location **:** Seattle, Washington

Partner(s) : Washington State DOT, Seiko Communications Systems, IBM Corporation, Delco, Etak, Metro Traffic, King County (Washington) Metro Transit, and University of Washington

Start Date: August 1994

End Date**:** March 1998

Estimated Total ITS Funds: $4,527,000

Estimated Total Project Cost: $7,200,000

Contacts**:**

Ed Fisher	FHWA Region 10, HEO-010	(503) 326-2071	Ext.
Larry Senn	Washington State DOT	(206) 543-6741	Ext.

TRAVINFO

Description: The TravInfo project will implement a comprehensive, region-wide traveler information system, capable of supplying transportation information to a broad array of devices and users. TravInfo includes the development and operation of a multi-modal transportation information center that will integrate transportation information from a wide variety of sources and make the information available to the general public, public agencies and commercial (value-added) vendors. TravInfo will pursue an "open-access" architecture for all aspects of the system to provide for future growth and facilitate the transfer of technology.

Project Location **:** San Francisco Bay Area, California

Partner(s) : California DOT (CalTrans), Bay Area Ad Hoc ITS Committee, PATH, and Metro Transportation Commission

Start Date: April 1993

End Date**:** December 1998

Estimated Total ITS Funds: $5,072,000

Estimated Total Project Cost: $7,347,000

Contacts**:**

Melanie Crotty	Metro Transportation Commission	(510) 464-7708	Ext.

TRILOGY

Description: The Trilogy project is part of the Minnesota statewide ITS program, Guidestar. Trilogy will provide traveler information through different communications techniques: the Radio Broadcast Data System-Traffic Message Channel (RBDS-TMC), and a high-speed FM subcarrier. The primary objective of Trilogy is to test and compare a range of user devices and evaluate the potential improvement in efficiency of the existing transportation network. These devices will provide end users with area and route-specific en-route advisories on the highway operating conditions in the Twin Cities Metropolitan Area.

Project Location **:** Twin Cities Metropolitan Area

Partner(s) : Minnesota DOT, AB Volvo, DCI, Seiko Communications Systems, and Indikta Displays

Start Date: July 1994

End Date**:** April 1998

Estimated Total ITS Funds: $2,776,000

Estimated Total Project Cost: $4,080,000

Contacts**:**

William Brownell	FHWA Region 5, HES-05	(708) 283-3549	Ext.
Jim McCarthy	FHWA Minnesota Division, HDA-MN	(612) 291-6112	Ext.
Gary Hallgren	Minnesota DOT - Metro Division	(612) 341-7500	Ext.

Advanced Traveler Information Systems (ATIS)
(Other Projects)

ADVANCE CORRIDOR TRANSPORTATION INFORMATION CENTER

Description:

ADVANCE (Advanced Driver and Vehicle Advisory Navigation Concept) was an operational test designed to evaluate the performance of a large scale in-vehicle navigation and dynamic route guidance system. Vehicles used in this project served as probes providing real-time traffic information to a Traffic Information Center (TIC). Upon completion of the operational test, the ADVANCE Steering Committee concurred in the further development and modification of the ADVANCE TIC (application phase of ADVANCE) so it can serve as a prototype Corridor Transportation Information Center (C-TIC) for information dissemination efforts for the Gary-Chicago-Milwaukee (GCM) ITS Priority Corridor. The C-TIC development includes initiatives to integrate the IDOT Traffic Systems Center/Communications Center and the WisDOT MONITOR travel time and lane closure information system, automate *999 and integrate incident information from several sources. A prototype of the Illinois State Toll Highway Authority I-PASS advanced traffic management system has been developed to provide travel time information for I-355 as part of the C-TIC effort and expansion of this system to the entire tollway network is currently underway. The deployment of the prototype C-TIC will be completed in June 1998. The prototype C-TIC will gradually evolve into the multimodal traveler information system through interconnection with communication hubs for Indiana DOT, Illinois DOT, Illinois transit, and Wisconsin DOT.

Project Location **:** Northeastern Illinois

Partner(s) : Indiana DOT, Illinois DOT, Wisconsin DOT, Illinois State Toll Highway Authority

Start Date: January 1997

End Date**:** June 1998

Estimated Total ITS Funds: $6,000,000

Estimated Total Project Cost: $7,500,000

Contacts**:**

Dave Helman	FHWA Headquarters, HTV-3	(202) 366-8042	Ext.
Bill Brownell	FHWA Region 5, HES-05	(708) 283 3549	Ext.
Pete Olson	FHWA Illinois Division, HDA-IL	(217) 492-4634	Ext.
Joe Ligas	Illinois DOT	(847) 705-4800	Ext.

PENNSYLVANIA TURNPIKE TRAVELER INFORMATION SYSTEM

Description: This project will provide for the development and partial deployment of a traveler information system for the Pennsylvania Turnpike. Components to be deployed include highway advisory radio systems, variable message signs, closed circuit television, and a central computer control system capable of controlling all new as well as existing equipment. The project will include retrofitting existing equipment as necessary to enable integration with the central computer control system.

Project Location **:** Pennsylvania

Partner(s) : Pennsylvania DOT/Pennsylvania Turnpike Commission

Start Date: September 1997

End Date**:** June 1999

Estimated Total ITS Funds: $3,000,000

Estimated Total Project Cost: $3,750,000

Contacts**:**

Steve Clinger	FHWA Region 3, HEO-03	(410) 962-0077	Ext. 3055
Mike Castellano	FHWA Pennsylvania Division, HPC-PA	(717) 221-4517	Ext.
Tim Scanlon	Pennsylvania Turnpike Commission	(717) 939-9551	Ext. 5590

WASHINGTON, D.C. - PARTNERS IN MOTION (TRAVELER INFORMATION PROJECT)

Description: This project will implement a regional traveler information system which will become the source for a broad range of information about transportation conditions in the region. The brainchild of a coalition of public transportation agencies throughout the region, the Regional Traveler Information Project will offer the traveling public less wasted time and less travel-related stress than what they currently experience. It will also enable public transportation agencies to share information among themselves more effectively which, in turn, can help them better coordinate their operations.

Project Location **:** Washington, DC Metropolitan Area

Partner(s) : Virginia DOT, Maryland SHA, District of Columbia DPW, Federal Highway Administration, Federal Transit Administration, Maryland Mass Transit Administration, Montgomery County DPW&T, Prince George's County DPW&T, Metropolitan Washington Airports Authority, Metropolitan Washington COG, Washington Metropolitan Area Transit Authority, Maryland-National Capital Park and Planning Commission, City of Alexandria DPW, City of Fairfax, Arlington County DPW, Dulles Area Transportation Association, Northern Virginia Transportation Commission, Fairfax County Office of Transportation, Potomac Rappahannock Transportation Commission, Loudon County Department of Planning, National Park Service, Tysons Transportation Association, Virginia Department of Rail & Public Transportation, Prince William County DPW&T, and Virginia Railway Express

Start Date: September 1996

End Date**:** December 2002

Estimated Total ITS Funds: $7,000,000

Estimated Total Project Cost: $12,500,000

Contacts**:**

Chung Eng	FHWA Headquarters, HTV-3	(202) 366-8043	Ext.
Ron Boenau	FTA Headquarters, TRI-11	(202) 366-0195	Ext.
Pam Marston	FHWA Region 3, HEO-03	(410) 962-0077	Ext. 3054
Jim Robinson	Virginia DOT - Richmond	(804) 786-6677	Ext.
Glenn McLaughlin	Maryland SHA	(410) 787-5872	Ext.

Advanced Public Transportation Systems (APTS)
(Research & Development)

APTS TECHNOLOGY RESEARCH

Description: Under this project, various new technologies will be evaluated for their potential benefit to transit and studies will be performed to support and facilitate the application of the technologies to public transportation. Studies to be performed will address transit system architecture requirements, human factors issues, frequency spectrum requirements and allocations, multi-modal fare/toll payment smart cards, automatic vehicle monitoring and management system implementations, and map and spatial database requirements. This technical support will include research and technical assistance to transit authorities implementing APTS technologies.

Project Location **:** Cambridge, Massachusetts

Contractor(s) : Volpe National Transportation Systems Center

Start Date: March 1995

End Date**:** October 1998

Estimated Total ITS Funds: $885,000

Estimated Total Project Cost: $885,000

Contacts**:**

Denis Symes	FTA TRI-11	(202) 366-0915	Ext.
Robert S. Ow	Volpe National Transportation Systems Center	(617) 494-2411	Ext.

TRANSIT COMPUTER TOOLS

Description: This project evaluated computer reservation, dispatching, and billing services for small urban and rural transit operations. Additionally, it identified user records, compared products, and operational inputs and assessed combinations of hardware and software, and investigated procurement guidelines.

Project Location **:** Raleigh, NC

Contractor(s) : North Carolina State University

Start Date: September 1996

End Date**:** February 1998

Estimated Total ITS Funds: $100,000

Estimated Total Project Cost: $100,000

Contacts**:**

Sean Ricketson	FTA Headquarters, TRI-11	(202) 366-6678	Ext.
John Stone	North Carolina State University	(919) 515-7732	Ext.

Advanced Public Transportation Systems (APTS)
(Operational Tests)

ANN ARBOR SMART INTERMODAL

Description: This project will support the Ann Arbor Transportation Authority's (AATA) conduct of an operational test of the Smart Bus concept. Included are an on-board bus communication and navigation system, a central control system, and a "Smart Card" fare collection system. The on-board system monitors actual performance in regard to route, location, speed and status of mechanical systems. It will allow control of on-board electronics, such as the fare collection system, destination sign and enunciator. The on-board system will also enable buses to interact with traffic signal preemption devices and to communicate with the central control system. The central control system will then integrate the data from the bus fleet for coordinated supervision, and will also provide real-time transit information to the public. The "Smart Card" fare system will provide a dual farecard/parking pass to encourage auto drivers to ride transit by providing them with an easy, cost-saving method for fare payment.

Project Location **:** Ann Arbor Transit Authority, Michigan

Partner(s) : City of Ann Arbor and University of Michigan

Start Date: January 1994

End Date**:** February 1998

Estimated Total ITS Funds: $303,000

Estimated Total Project Cost: $2,442,500

Contacts**:**

Sean Ricketson	FTA Headquarters, TRI-11	(202) 366-6678	Ext.
Bill Hiller	Ann Arbor Transportation Authority (AATA)	(313) 973-6500	Ext.

BLACKSBURG RURAL TRAVELER INFORMATION SYSTEM

Description: This project will operationally test a rural transit traveler information system that will make the transit system easier to use and more reliable for the user. Based upon a system-wide AVL, a real-time traveler information system will be provided through kiosks, wayside stops, and an existing "electronic village". Blacksburg Transit (town of Blacksburg, VA) operates twenty-seven buses on eight fixed-routes. Daily ridership is 8,500 during the academic year. The transit system covers 642,000 miles annually, which includes a five-vehicle demand-responsive system.

Project Location **:** Blacksburg, Virginia

Partner(s) : Town of Blacksburg, Virginia

Start Date: July 1996

End Date**:** January 1998

Estimated Total ITS Funds: $240,000

Estimated Total Project Cost: $477,024

Contacts**:**

Ron Boenau	FTA Headquarters, TRI-11	(202) 366-6656	Ext.
Mike Connelly	Blacksburg Transit	(540) 961-1185	Ext.

CHICAGO SMART INTERMODAL SYSTEM

Description: The Chicago Transit Authority (CTA) is deploying their Bus Emergency Communications System (BECS) and Bus Service Management System (BSMS). The BECS is a comprehensive communications base designed to support more effective delivery of bus service. New two-way voice and data radio system, and location capabilities are the main features of BECS. Under the BSMS, CTA is installing additional hardware and software modules to support Computer-Aided Dispatch (CAD) software, transit priority movements at five signalized intersections, electronic traveler information way-side signs at two major bus stops, and enhanced data reporting system. Modules are being installed only on buses assigned to the 77th street garage.

Project Location **:** Chicago, Illinois

Partner(s) : City of Chicago Department of Public Works and Department of Streets and Sanitation

Start Date: July 1994

End Date**:** December 1998

Estimated Total ITS Funds: $490,000

Estimated Total Project Cost: $3,640,000

Contacts**:**

W. Raymond Keng	FTA Headquarters, TRI-11	(202) 366-6667	Ext.
David Phillips	Chicago Transit Authority	(312) 733-7000	Ext. 8005

DALLAS AREA RAPID TRANSIT PERSONALIZED PUBLIC TRANSIT

Description: Dallas Area Rapid Transit (DART) is testing flexible-route buses on a regional cross-town route in the Dallas metropolitan area to determine if flexible service can increase ridership. By integrating DART's existing Automatic Vehicle Location (AVL) system and an off-the-shelf Computer Aided Dispatch (CAD) software, slack in a bus' schedule can be calculated. If there is sufficient slack, a fixed-route bus may deviate and pick up off-route passengers at a designated location. DART's Geographical Information System (GIS) is used to identify the exact location of the off-route passenger pick-up point. The maximum route deviation is one mile.

Project Location **:** Dallas, Texas

Partner(s) : Dallas Area Rapid Transit (DART), University of Texas at Arlington, and Texas Southern University

Start Date: September 1994

End Date**:** August 2000

Estimated Total ITS Funds: $391,560

Estimated Total Project Cost: $391,560

Contacts**:**

W. Raymond Keng	FTA Headquarters, TRI-11	(202) 366-6667	Ext.
Koorosh Olyai	DART	(214) 749-2866	Ext.

DELAWARE COUNTY RIDETRACKING

Description: This project will develop and evaluate an automated identification and billing system (AIBS) for paratransit service. The AIBS automates existing processes using advanced technology for the identification of passengers, the accounting and billing data collected on each passenger trip, the reporting required for coordination with various transportation suppliers and internal performance monitoring. Elimination of manual processes, including eligibility verification and reconciliation of trip information for billing purposes, will result in system efficiency and cost saving.

Project Location **:** Delaware County, Pennsylvania

Partner(s) : EG&G Dynatrend

Start Date: June 1994

End Date**:** March 1998

Estimated Total ITS Funds: $200,000

Estimated Total Project Cost: $200,000

Contacts**:**

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DENVER, COLORADO RAPID TRANSIT DISTRICT (RTD) PASSENGER INFORMATION DISPLAY SYSTEM

Description: This project is utilizing the data gathered from the Automatic Vehicle Locator (AVL) system, currently being installed on all RTD buses, to provide information to video monitors at selected locations throughout the District and at selected Ecopass companies regarding estimated bus departures for waiting bus passengers.

The memorandum of understanding between RTD-CDOT-Transportation Management Solutions-FHWA has been developed. The project was approved with limited funding as compared to the original proposal, therefore considerable negotiations have been necessary to clearly redefine the project. At this time all activity on the project has been suspended due to difficulties. RTD is currently looking for a new contractor to provide the AVL system.

Project Location **:** Denver, Colorado

Partner(s) : Colorado DOT, Transportation Management Solutions, and Denver RTD

Start Date: September 1993

End Date**:** March 1998

Estimated Total ITS Funds: $8,000,000

Estimated Total Project Cost: $10,500,000

Contacts**:**

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HOUSTON SMART COMMUTER

Description:

In the I-45 North Corridor, Metro is trying to entice travelers from Single Occupancy Vehicles (SOV) into buses by providing real-time transit and traffic information through personal digital asistants. Seven hundred test and 700 control subjects are participating in the project. Metro is evaluating the test every six months.

In the I-10 West Corridor, Metro is trying to entice travelers from SOV into car and vanpools by providing a ridesharing service. During the first six months of testing, telephone operators assist in matching drivers and riders. After this phase, the project is evaluated. If successful, Metro plans on installing an automated ridesharing service.

Project Location **:** Houston, Texas

Partner(s) : Texas DOT, Houston Metro

Start Date: February 1993

End Date**:** **I-45:** March 1998
I-10: April 2000

Estimated Total ITS Funds: $2,500,000

Estimated Total Project Cost: $5,000,000

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LYNX PASSENGER TRAVEL PLANNING SYSTEM

Description: This cooperative agreement is to support the efforts of the Central Florida Regional Transportation Authority (LYNX) to develop a transit component for their Passenger Travel Planning System. The project will develop a traveler planning center and install electronic bus stop displays and a vehicle location system, integrated with an existing signal pre-emption system. Electronic emitters will be installed in transit buses and will be read by existing electronic detectors at signalized intersections. The vehicle data will be relayed from the intersection to the Transportation Management Center, and to the transit operator, who will provide next-bus information to customers through bus stop displays. Vehicle data will also be used to monitor transit fleet performance and improve service.

Project Location **:** Central Florida

Partner(s) : Central Florida Regional Transportation Authority

Start Date: January 1996

End Date**:** September 1998

Estimated Total ITS Funds: $240,000

Estimated Total Project Cost: $300,000

Contacts**:**

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MIAMI REAL-TIME PASSENGER INFORMATION SYSTEM

Description: This project will support the efforts of the Metro-Dade Transit Agency (MDTA) to provide customers with an automated trip planning capability, including real-time on-line route and schedule information. Informational kiosks will be established at major rail and bus transfer points. In consultation with the FTA, a post-implementation evaluation will be accomplished.

Project Location **:** Metropolitan DADE County, Florida

Partner(s) : Metro-Dade Transit Agency (MDTA)

Start Date: July 1995

End Date**:** July 1999

Estimated Total ITS Funds: *** $400,000

Estimated Total Project Cost: $400,000

Contacts**:**

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* Federal Funds are FTA vs. ITS Funds

NEW YORK CITY METROPOLITAN TRANSPORTATION AUTHORITY TRAVEL INFORMATION SYSTEM

Description:

The Travel Information System will supplement a pilot project for a GPS-based bus locating system. This bus locating system will involve approximately 200 buses that will be assigned in the CBD of Manhattan. These will include North/South and East/West destinations. This proposed program will outfit 250 major bus stops with travel information devices. The three types of information devices will be dispersed as follows:

* 50 interactive kiosks will be installed at major bus stop points. This may include numerous transfer points between railway routes, subway routes and other bus routes. Highly visible and tourist areas will be utilized for two reasons: 1) maximum usage of the kiosk and 2) provide vital information to the tourist who is unfamiliar with the transit system.

* 100 video monitors will be mounted at major bus stops with transfer points to the other bus routes or subway lines. Voice announcements will also be available for the visually impaired. These monitors will be mounted in vandal-proof housings. Some storefront window locations (i.e., banks, department stores) will be made available.

* 100 variable message signs will be installed at high volume bus stops (i.e., near schools, hospitals and shopping centers).

* 50 vehicles will be equipped with message displays/interactive stations and appropriate voice announcements for the visually impaired.

Project Location **:** New York Metro Area

Partner(s) : Westinghouse, Rockwell, and Luminator

Start Date: September 1994

End Date**:** September 1998

Estimated Total ITS Funds: $3,000,000

Estimated Total Project Cost: $5,029,460

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NORTHERN VIRGINIA REGIONAL FARE SYSTEM

Description: This project supports the efforts of the Northern Virginia Transportation Commission to design a Regional Fare System. The system will integrate the fare collection operations of separate commuter rail, bus, and rail-commuter operators. The project is in concert with the Washington Metropolitan Area Transportation Authority's decision to implement the recently demonstrated "Go Card" throughout Washington, DC's Metrorail system. Building on this successful demonstration, this project will show how advanced fare systems can be used to facilitate the integration of fare systems of different transit operators. With passenger transfer rates (between the participating operators) of 30 - 40%, this site is well suited to demonstrate the benefits and passenger convenience of a seamless transportation system.

Project Location **:** Northern Virginia

Partner(s) : Northern Virginia Transportation Commission, Washington Metropolitan Area Transportation Authority

Start Date: June 1997

End Date**:** May 1999

Estimated Total ITS Funds: $200,000

Estimated Total Project Cost: $4,000,000

Contacts**:**

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SMART FLEXROUTE INTEGRATED REAL-TIME ENHANCEMENT SYSTEM (SAFIRES)

Description:

The Potomac and Rappahannock Transportation Commission (known as OmniRide - A ride for All Reasons) is conducting an operations test to evaluate an integrated smart vehicle service that includes route-deviation, fixed route, and demand responsive service types. The test site is a suburban-to-rural environment in the Prince William area of Virginia, located twenty-five miles south of Washington, D.C.

Using Intelligent Transportation Systems (ITS) technologies including a global positioning satellite-based (GPS) automated vehicle location (AVL) system, real-time scheduling software, geographic information system (GIS) mapping, and digital communication through mobile data terminals (MDT), the test will integrate route deviation, commuter rail and bus, feeder bus, and human service transportation in a low density environment.

Small, multi-purpose vehicles will switch between service types on an as-needed basis, allowing the best vehicle to respond to each request in real-time using the integrated computerized dispatching software developed for the operational test. ITS technologies will also greatly simplify section 15 reporting and tracking human service ridership and agency charges. It is hypothesized that this system will provide greater effectiveness and efficiency in serving the public transportation needs of the community than would be the case in a non-ITS enhanced environment.

Route deviation (up to 3/4 mile) will enable the service to reach a far larger market and negate the need for complementary paratransit services required of fixed route systems. The test, expected to involve up to 50 ITS enhanced vehicles and a dispatching center, is scheduled to last 30 months. It is anticipated that full deployment of ITS technologies will begin in early 1996.

Project Location **:** Northern Virginia

Partner(s) : Potomac-Rappahannock Transportation Commission (PRTC), Northern Virginia Planning District Commission (NVPDC), Virginia Department of Rail and Public Transportation (VDRPT), GMSI, Inc., Trapeze Software, Inc., and SG Associates

Start Date: January 1994

End Date**:** May 1998

Estimated Total ITS Funds: $1,214,460

Estimated Total Project Cost: $5,134,071

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SUBURBAN MOBILITY AUTHORITY FOR REGIONAL TRANSPORTATION (SMART) PROJECT

Description: Project activities will provide for a Dispatch System with automated reservations, scheduling and dispatch for paratransit operation, and an Automatic Vehicle Location (AVL) system to allow tracking the fleet. These capabilities will eventually be extended to affiliated agencies. The project will also establish an 800 number, interfaced with the dispatch system with potential to refer customers to regional paratransit services. The project will also develop interfaces with other ITS initiatives in the region, including FAST-TRAC and Michigan DOT's Metropolitan Transportation Center. The project will also provide for innovative Traveler Information Services, to tie other uses together.

Project Location **:** Detroit, Michigan

Partner(s) : Michigan DOT and Suburban (Detroit) Mobility Authority for Regional Transportation (SMART)

Start Date: February 1994

End Date**:** April 1999

Estimated Total ITS Funds: $12,000,000

Estimated Total Project Cost: $15,000,000

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WILMINGTON, DELAWARE SMART DART

Description: This project will operationally test smart card technology in a transit application in Wilmington, Delaware. A smart card fare collection system will be developed for the Wilmington bus fleet. An Employee Commute Option (ECO) program will be created that allows employers to provide transit benefits through the smart card system which facilitates the administration of transit benefits. The ECO program was developed as a response to the Clean Air Act of 1992, and the program will allow participating employers to qualify for tax credits based on the level of employee participation in the program. The smart card will be issued by a local bank as part of a larger pilot program testing an open-system stored-value bank card

Project Location **:** Wilmington, Delaware

Partner(s) : Delaware DOT and Electronic Payment Services

Start Date: July 1994

End Date**:** May 1999

Estimated Total ITS Funds: $1,191,424

Estimated Total Project Cost: $2,179,155

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WINSTON-SALEM MOBILITY MANAGEMENT - PHASE II

Description: This project supports the efforts of the city of Winston-Salem, NC, to operationally test the mobility management concept by extending the mobility management service throughout the paratransit fleet of nineteen (19) vehicles, and begins to link the service to the 58-vehicle fixed-route operations. Mobility management services and system specifications are being defined for the coordination of paratransit and fixed-route transit. Hardware and software is being obtained and installed for operational testing. An evaluation of the test will be conducted with results documented. A six-month evaluation of Phase-I (limited paratransit mobility management) revealed an increase of 32% in operating service hours, ridership increases of 18%, and a decrease in unit per hour cost of 13%.

Project Location **:** Winston-Salem, North Carolina

Partner(s) : Winston-Salem Transit Authority (WSTA), City of Winston-Salem, North Carolina DOT, and North Carolina State University's Institute for Transportation Research and Education

Start Date: June 1996

End Date**:** August 1999

Estimated Total ITS Funds: *** $240,000

Estimated Total Project Cost: $300,000

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* Federal Funds are FTA vs. ITS Funds

Integrated Programs

MINNESOTA GUIDESTAR PROGRAM

Description:

Minnesota Guidestar provides overall direction to the Minnesota Department of Transportation's ITS program by providing a focus for strategic planning, project identification, project initiation, project management, and evaluation. Minnesota Guidestar also provides coordination with other State and local agencies in Minnesota, such as the University of Minnesota, which have an interest and role in ITS.

In addition to the national ITS operational field tests described elsewhere (Evaluating Environmental Impacts Using LIDAR, Advanced Rural Transportation Information and Coordination, Genesis, Travlink, and Trilogy), the Minnesota Guidestar program manages a number of locally important operational field tests and a large ITS research program jointly with the University of Minnesota, Center for Transportation Studies, Intelligent Transportation Systems Institute. Some of these projects are described below, and others are under development.

INTEGRATED CORRIDOR TRAFFIC MANAGEMENT (ICTM) - This project is evaluating the ability of multiple agencies to manage freeways and arterials in a heavily traveled corridor as a "seamless" system using real-time adaptive control systems covering street signal systems and the freeway ramp metering system. Installation of the first phase equipment is underway, with subsequent phases of work initiated in early 1996. Full operation of the test started in 1997.

POLARIS - The Polaris project will produce a statewide ITS architecture defining an integrated system of ITS technologies for providing user services in Minnesota. The project began in July, 1995, and was completed in December, 1996.

DURING INCIDENTS VEHICLES EXIT TO REDUCE TRAVEL TIME (DIVERT) - This project will provide traffic guidance and control during freeway incidents, by managing traffic through coordinated signal timing plans along designated streets in downtown St. Paul. The diverted traffic added to the streets is accommodated in a planned fashion, as opposed to traffic randomly entering downtown St. Paul. The test phase of the project began in January, 1995.

PORTABLE TRAFFIC MANAGEMENT SYSTEMS (PTMS) - This project used a portable electronic traffic management system including changeable message signs, CCTV, portable signal systems, cellular and spread-spectrum radio communications, and a lap-top commuter monitor and control system to manage traffic associated with several sporting events and the Minnesota State Fair. The PTMS has resulted in a package of devices which can be deployed in fairly short notice to manage traffic where no existing surveillance and control systems. The evaluation report was completed in July, 1995.

ADAPTIVE URBAN SIGNAL CONTROL AND INTEGRATION (AUSCI) - The objective of this project is to implement an adaptive signal control algorithm for the existing traffic control system in Minneapolis, and also integrate with the existing ramp metering systems along I-394 and I-94. This project is in the design phase.

SMARTDARTS - The SmartDARTS Project will measure the benefits of a combination of advanced technologies within a paratransit environment. Objectives of the project include: improved responsiveness; increased capacity; and increased cost effectiveness. The test

portion of the project began in July, 1995.

IN-VEHICLE SIGNING SYSTEM FOR SCHOOL BUSES AT RAIL-HIGHWAY CROSSINGS - This project will bring together key parties to develop the infrastructure, system electronics and in-vehicle units for the first in-vehicle signing system. This will serve to increase safety by: removing uncertainty about driving conditions; assessing the driver in the decision making process; and easing the overall driving task in general. The project was completed in May, 1997.

MAYDAY PLUS - This project will demonstrate significant, measured reductions in the times taken to reach victims of rural motor vehicle accidents through enriching the information made available to emergency service providers, thereby reducing

ST. PAUL ADVANCED PARKING INFORMATION SYSTEM - The Advanced Parking Information System is designed to provide motorists with real-time information regarding the status of parking facilities plus directions for the best routes to open parking facilities using automated variable message signs and static signs. Testing of the system began in January, 1996.

Project Location **:** Statewide throughout Minnesota

Partner(s) : Minnesota DOT is lead and other partners include: Federal, State and local agencies and private companies interested in the evaluation and deployment of ITS user services and technologies.

Start Date: January 1991

End Date**:** On-going

Estimated Total ITS Funds: $24,000,000

Estimated Total Project Cost: $56,000,000

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SOUTHERN STATE PARKWAY

Description:

This program is closely aligned with the INFORM project, which is now operating within Long Island. It is expected that surveillance, control and traveler information techniques will expand on those currently used in INFORM to take advantage of state-of-the-art hardware/software systems. The State has initiated the program with an investigation into how this work should be coordinated with INFORM, along with opportunities to tie the management system into facilities which approach the I-95 corridor at the western end of Long Island.

Two specific projects are also being conducted as part of this program. The Traffic Flow and Visualization Control (TFVC) project will investigate a video-based vehicle detection, visualization and management system which employs leading edge technology developed in the military. Through the user of advanced video data processing, neural network analysis and intelligent command and control technologies, the traffic adaptive system will identify and alert the system operator to real-time traffic conditions such as recurring congestion, non-recurring incidents, and other traffic problems normally associated with freeway operations. Once the system has been successfully demonstrated in the laboratory, the system will be field tested at thirty locations along the Long Island Expressway as part of the INFORM corridor. This program is being handled as an element in the Southern State Parkway program through an interagency agreement with the U.S. Air Force. One of the national labs, Rome Laboratory, is being utilized as the project manager.

A second project developed a traffic congestion forecasting model for the INFORM System. This project supported the development of a computerized traffic forecasting model by the Brookhaven National Laboratory. The model is called ATOP for Advanced Traffic Occupancy Prediction. The model will eventually take on-line traffic data from INFORM system roadway sensors on Long Island and make projections as to future traffic patterns using the following routines:

- Statistical forecasting of traffic flow and occupancy using long and short term information
- Estimation of the relationships between traffic flow and occupancy
- Statistical detection and classification of anomalies and their impact on highway capacity
- Adaptive correction and updating to control prediction errors

The final report titled "Traffic Congestion Forecasting Model for the INFORM System," is available from the National Technical Information Service and ITS America.

Project Location **:** Long Island, New York

Partner(s) : New York State Department of Transportation, USAF Rome Laboratory, Brookhaven National Laboratory

Start Date: September 1993

End Date**:** December 1999

Estimated Total ITS Funds: $13,420,000

Estimated Total Project Cost: $31,212,500

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TRANSCOM CONGESTION MANAGEMENT PROGRAM

Description:

TRANSCOM (Transportation Operations Coordinating Committee) is a consortium of 15 transportation and public safety agencies in the New York, New Jersey and Connecticut area whose goal is to improve inter-agency response to traffic incidents. A number of project initiatives have been undertaken to support this goal, and to advance the use of ITS-related technologies in the metropolitan area, and others are under development. These include:

- Region wide initiatives for coordinated deployment and operation of variable message signs, highway advisory radio, and enhanced traffic monitoring including closed-circuit television.
- Development of an "ITS Regional Implementation Strategy," a program for coordinated implementation of ITS throughout this complex, multi-jurisdictional metropolitan area.
- An enhanced traffic advisory/diversion system at the intersection of the New Jersey Turnpike and Garden State Parkway; which will focus on alternate routing for New Jersey Transit buses.
- Expansion of traffic monitoring along the I-287 Tappan Zee Bridge corridor.

Operational tests being conducted under this program (TRANSMIT, Alternate Bus Routing) are described elsewhere in this document.

Project Location **:** New York, New Jersey

Partner(s) : New York State DOT, New Jersey DOT, TRANSCOM and other member agencies

Start Date: January 1990

End Date**:** On-going

Estimated Total ITS Funds: $17,325,000

Estimated Total Project Cost: $21,700,000

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Priority Corridors Program

HOUSTON ITS PRIORITY CORRIDOR

Description:

The Houston partnership has been working together over a number of years to develop transportation management and ITS initiatives in Houston. A fully developed, truly multimodal transportation management system serving needs such as provision of traveler information, public transportation and ridesharing, and commercial vehicle-oriented elements is envisioned. Early efforts focused on the on-going "Smart Commuter" project, and current initiatives will further enhance effective utilization of Houston's extensive network of HOV lanes, park and ride lots, transit centers, and intermodal facilities. With I-45 / I-10 as key core elements, the Priority Corridor planning process is covering all major transportation elements, with a potential highlight being creation of an ITS showcase focus within the northwest quadrant surrounding the US 290 freeway facility. Anticipated completion dates for these projects are included below where appropriate.

The "Smart Commuter" project, discussed separately in this publication, is being coordinated with other efforts in the Corridor. A number of additional projects have been approved or submitted for approval as part of the Houston Priority Corridor Immediate Action Program (FY93-95):

EVALUATION OF ASTRODOME AREA CCTV LEASE - The objective is to install closed circuit television on freeways and arterials that serve the Astrodome area to monitor traffic operations during special events as well as normal travel times. To accelerate the installation, the project has leased the video system from a private vendor and uses leased fiber optic cables to transmit the video (February 1995 through August 2000).

DEVELOPMENT OF CORRIDOR PROGRAM PLAN - The Plan is envisioned as a living document which will be annually reviewed and updated based upon both experience with deployed projects and evolving state-of-the-art ITS (July 1995 with annual updates).

AVI FOR TRAFFIC CONDITIONS AND INCIDENT DETECTION (PHASE 4) -This project will expand the installation of AVI to include High Occupancy Vehicle (HOV) lane access points from the Park and Ride and transit terminal facilities for shuttle bus operations and arterial streets that can serve as alternate routes to the freeway system. In addition, the freeway AVI system will be augmented with sample stations to test the application of AVI as an incident detection system.

CHANGEABLE LANE ASSIGNMENT SYSTEM ON U.S. 290 FRONTAGE ROADS -This project will design, install, and evaluate eleven dynamic lane assignment control systems that can alter the left turn lane assignments at intersections based on time-of-day traffic demands (February 1996).

PUBLIC INFORMATION AND PROGRAM ADMINISTRATION - The Program Administration office is responsible for the management, coordination, and technical administration of the Priority Corridor Program.

MONITOR/WARNING SYSTEMS FOR FREEWAY TO FREEWAY CONNECTIONS - The objective of this project is to implement a system which identifies unsafe speed conditions, which vary by vehicle size and weight, and initiates warning devices to prevent accidents

by these vehicles.

REAL-TIME INFORMATION KIOSKS - This project will deploy and test the use of real-time kiosks at activity centers to enhance the travel decision-making process of commuters and travelers. The focus is on providing improved information to transit and roadway system users to help them select the best travel mode, travel route, and time of travel.

RAILROAD GRADE CROSSING MONITORING SYSTEM - The objective of this project is to examine how information systems and traffic control systems can be used to monitor the movements of trains to adjust traffic patterns and advise emergency vehicles accordingly in the corridor to reduce delays at railroad grade crossings.

AVL FOR INCIDENT MANAGEMENT - The application of a fleet management system is essential for coordinated and effective operation of the Motorist Assistance Program (MAP). Quick response and effective dispatching of these units can reduce the time for emergency response and the time needed to restore normal traffic operations. The objective is to increase the effectiveness of incident management by implementing an AVL system which identifies MAP vehicles and their locations on a real-time basis.

IN-VEHICLE NAVIGATION/INFORMATION APPLICATIONS - The objective of this project is to provide current information on travel conditions to travelers at all stages of their trip. Decision points for alternate routes exist at several points in the corridor - two of which are within the Houston Intercontinental Airport. The scope is limited at this time to simple map information, selection of the best route, and an update of travel conditions on selected freeways and at critical decision locations.

ENVIRONMENTAL CONDITIONS MONITORING SYSTEMS - The Houston area is subject to unpredictable and severe weather conditions that can result in extensive roadway flooding during periods of intensive rainfall. The objective of this project is to investigate the potential to integrate weather and roadway flooding information into the Advanced Traveler Information System (ATIS).

CHANGEABLE LANE ASSIGNMENT SYSTEM AT SELECTED INTERSECTIONS - This project expands the deployment strategy to include traffic responsive operation between the traffic signal control system and the Changeable Lane Assignment System (CLAS) at two or three arterial street intersections in Harris County.

INTEGRATED CORRIDOR ATMS/ATIS - The concept and objective of the integrated corridor is to focus appropriate ITS technologies into coordinated management systems for future deployment as part of the Priority Corridor program. The core infrastructure developed in the Integrated Corridor will provide the ability to monitor traffic conditions, operate traffic control systems, and communicate current operational conditions to travelers.

WASHBURN TUNNEL ATMS/ATIS - This project will implement automatic incident detection and closure systems for the tunnel and develop traveler information services to advise travelers of conditions at the tunnel. An integrated, area-wide traffic management

and traveler information system is proposed.

TRAFFIC MANAGEMENT AND TRAVELER INFORMATION FOR CRITICAL ROADWAY LINKS - This project will focus ITS on critical roadway system links where incidents and construction can have a severe impact on the traveling public. Each targeted critical link severe as an evacuation route for hurricane evacuation.

ITS TECHNOLOGY FOR DATA COLLECTION AND TRANSPORTATION PLANNING - This project will develop a system to facilitate use of the database at Houston TranStar for planning purposes. Vehicles may also be equipped with GPS, AVL, and AVI on-board technology to collect real-time traffic data for incorporation into a GPS.

INTEGRATING TRANSIT INFORMATION SYSTEM INTO TRANSTAR – This project will integrate real-time transit information into TranStar.

PROGRAM ADMINISTRATION - Continuing support for years 3 - 5 of the Houston Priority Corridor program.

EN-ROUTE TRANSIT INFORMATION SYSTEM - This project will provide an infrastructure capable of identifying a moving transit vehicle by a roadside transponder and using the vehicle's identity to trigger an appropriate bi-directional exchange of transit rider information and vehicle data with the roadside device.

ITS ENHANCED INCIDENT MANAGEMENT - This project includes Total Station Accident Investigation Surveying Devices, Development of Incident Management Command Vehicle, Laptop Computers with CAD software for officers, and Live Video Transmission to Dispatch Centers.

AUTOMATIC TRAFFIC MANAGEMENT IN FLOOD PRONE AREAS – Existing and new water level detectors will be integrated into TranStar.

DISSEMINATION OF INFORMATION - Focus on the distribution of the following information in a variety of formats: Freeway Travel Speed Map, Travel Speed Map Text information, and Flood Control Map.

COORDINATED RAMP METERING AND INTERSECTION TRAFFIC SIGNAL CONTROL - This project would deploy and evaluate concepts and strategies for inter-relating traffic signal and ramp metering signal operations. Operational concepts would include routine operating conditions and incident management conditions.

CONDITION RESPONSIVE UPTOWN TRAVELER INFORMATION SYSTEM -This joint public/private sector project will develop improved way-finding systems to enhance the mobility and convenience of traveling for workers, shoppers, and visitors. Technologies may include static signing, CCTV surveillance, variable message signing, kiosks, cellular phone hotline, HAR, and INTERNET information.

AUTOMATED INCIDENT MANAGEMENT STRATEGIES AND SUPPORT SYSTEMS - This project will pre-plan "response scenarios" for freeway incidents which would take advantage of the integrated transportation management systems at TranStar.

INTEGRATION OF PRIORITY CORRIDOR PROJECTS INTO TRANSTAR - Houston's "Principal Integrator" will be responsible for the overall development of TranStar computer systems and will coordinate system integration and deployment to insure that all systems can function within the standards, guidelines, and established architecture.

Project Location **:** The Houston Metropolitan area in Harris County, Texas

Partner(s) : The Texas DOT, Houston METRO, The City of Houston, and Harris County have formed a partnership, named TranStar, to guide transportation management and ITS activities.

Start Date: January 1993

End Date**:** On-going

Estimated Total ITS Funds: $13,562,000

Estimated Total Project Cost: $17,002,000

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I-95 NORTHEAST CORRIDOR

Description:

Testing, showcasing, and deployment of a variety of ITS services in the Corridor. The Coalition completed development of an initial "Business Plan" in May 1993. Updated in mid-1995, and again in mid-996, this plan, which is complemented by a Strategic Plan, is the cornerstone of the Coalition's program management. A number of feasibility, operational testing, and deployment activities are underway as listed below (project completion dates in parentheses). Current information on Coalition activities can be found on web site at http//www.i95coalition.org

Information Exchange Network - This project will interconnect the corridor agencies into single, dedicated information exchange network for improved communication (December 1996 with on-going support).

Incident Management - This project will develop uniform incident management techniques throughout the Corridor, including coordinated multi-agency response (December 1996).

Surveillance Requirements/Technology - This project has developed a plan for implementation of a cost-effective, seamless, Corridor-wide surveillance system with state-of-the-art technologies. This system will serve as a platform for development, testing, and deployment of advanced technologies, and for integrating private sector initiatives with government operated systems (August 1995).

Commercial Vehicle Operations - This project will develop a Corridor CVO program that coordinates on-going agency, State, Federal, Motor Carrier, and private sector CVO initiatives. An operational test of an automated traveler information system for commercial vehicles will also be developed (December 1996).

Public/Private Sector Outreach - This Project will determine the barriers and opportunities for private sector participation in Coalition activities and develop uniform policies and procedures as necessary to promote public/private partnering (on-going).

User Needs and Marketability - This project is surveying the needs of Corridor travelers and determining whether or not a commercial market exists for ATIS services in the Corridor (July 1996).

Traveler Information Services - This project ultimately seeks to provide improved traveler information services in the Corridor through a variety of dissemination methods. A feasibility study was completed in December 1995. An operational test in this area got underway in 1997.

Coordinated VMS/HAR Strategies - The ultimate goal of this project is to provide real-time and consistent traveler information throughout the Corridor using variable message signs (VMS) and highway advisory radio (HAR) as dissemination media. A needs definition and feasibility study was completed in July 1995, and an operational test to evaluate the technical and cost effectiveness of operating HAR stations in a coordinate fashion has been initiated (June 1997).

Technology Exchange and Training - The objectives of this project are to upgrade overall

skill levels of agency staff; use staff skills and knowledge to train others; disseminate up-to-date technical information; and act as a showcase for software, hardware, and program elements (on-going).

Intermodal Outreach and Information Exchange - This project seeks to expand Coalition membership to attract additional intermodal members and improve technical and institutional coordination between members representing the various modes (June 1996).

Corridor-Wide AVI/ETTM Strategy - This project will develop a long term strategy for achieving ETTM compatibility in the Corridor (February 1997).

Regional Information and Coordination Centers - This project will study the feasibility and develop recommendations regarding regional coordination of Coalition activities. (April1997).

Long Range Strategic Plan - This project developed the Coalition's first Strategic Plan (June 1995).

Rural Mayday/800 Call-In System - This project will test the feasibility of using cellular phones or in-vehicle devices to expedite reporting of incidents and emergencies in rural areas (April 1997).

Long Term Financing - This project will identify a stable and predictable source of funding to support Coalition activities that is capable of addressing Federal and Coalition member requirements, while allowing flexibility to address changing Coalition needs (February 1997).

NTCIP for VMS - This operational test will evaluate the National Transportation Communications for ITS Protocol (NTCIP) for use with VMS (completion date TBD).

Open-Ended ITS Operational Tests - This effort will provide the Coalition with a series of ITS operational test projects to advance the overall mission of the Coalition. The operational test projects may relate to any of the primary ITS user services, other than those included under the category of Advanced Vehicle Control and Safety Systems (completion dateTBD).

CVO ATIS (Truckdesk) - This project will test the feasibility of enhancing motor carrier safety and operational efficiency by providing information to improve carrier routing and dispatching. (December 1998).

CVO Roadside Safety - This project will test an information exchange system designed to help motor carrier enforcement officials focus roadside inspections and enforcement on high-risk motor carriers (December 1998).

CVO Electronic Registration - This project will test an information system designed to help State agencies streamline credentials administration (December 1998).

CVO Electronic Clearance - This project will test mainline electronic screening and

clearance of commercial vehicles by mobile enforcement units (December 1998).

CVO Safety Management - This project will develop a prototype of a comprehensive, performance-based motor carrier safety management program that will reduce highway accidents and incidents in the I-95 Corridor (December 1998).

Automated Highway Systems Support - The Coalition is working with the National Automated Highway System Consortium (NAHSC) to determine a site for a case study of AHS in the I-95 Corridor. Possible applications include: transit and HOV, commercial trucking, and mixed vehicle classes on congested urban, intercity, and rural highways. This effort will support the NAHSC in establishing the viability of AHS as a highway enhancement for the future (completion date TBD).

Corridor coalition activities also involve consultant support services, use of volunteer support staff from member agencies, and a number of immediate deployment action projects.

Project Location **:** Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont and Virginia

Partner(s) : Coalition Members: The Departments of Transportation in Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, New York City, Pennsylvania, Rhode Island, Vermont, and Virginia. Also members are the Delaware River & Bay Authority, Delaware River Port Authority, Delaware Turnpike Administration, Maine Turnpike Authority, Maryland Transportation Authority, Massachusetts Turnpike Authority, New York State Thruway, New York Metropolitan Transportation Authority, New Jersey Highway Authority, New Jersey Turnpike Authority, Pennsylvania Turnpike Commission, Port Authority of New York & New Jersey, South Jersey Transportation Authority, and Triborough Bridge & Tunnel Authority. In addition, other agencies in the transportation community in the Northeast participate as affiliate members.

Start Date: May 1993

End Date**:** On-going

Estimated Total ITS Funds: $36,426,000

Estimated Total Project Cost: $51,235,435

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MIDWEST (GARY-CHICAGO-MILWAUKEE) ITS PRIORITY CORRIDOR

Description:

The States of Indiana, Illinois, and Wisconsin have formed a coalition to apply ITS in the Priority Corridor connecting Gary, Chicago, and Milwaukee (i.e. the "GCM Corridor"). Multi-state agreements have been signed and the coalition is working closely with the US DOT and local, multi-modal organizations operating transportation systems in the corridor. An Executive and Technical Committee structure has been established to involve appropriate management and technical level representatives.

Using I-80, I-90, and I-94 as a backbone, the corridor has been broadly defined to encompass the 16 contiguous urbanized counties in the three States. The corridor extends over some 130 miles and covers more than 2,500 square miles. All major freeways, tollways, arterials, transit systems, airports, ports and intermodal facilities are being identified as part of the corridor planning process.

The coalition's consultant team, in its efforts to develop a Corridor Program Plan (CPP), used focus groups, surveys, interviews, and worked closely with the Technical Committee to identify the transportation problems or "user needs" in the corridor, along with potential ITS remedies through a variety of multi-modal ITS "User Services". The initial CPP was approved by the Executive Committee in June, 1995, and was updated in July, 1997. It presents near-term (1-2 year) and longer-term (3-20 year) projects for the implementation, management and evaluation of a multi-state, multi-modal ITS corridor program. The CPP identifies 10 program areas:

- Multi-Modal Traveler Information System
- Integrated Transit System
- Incident Management Programs
- GCM Technical and Planning Support
- Traffic Management Systems
- Commercial Vehicle Operations
- Traffic Signal Integration
- Vehicle Transponder Systems
- Advanced Incident Reporting and Mayday Security
- Private/Public Partnerships.

In accordance with the CPP, the GCM Priority Corridor is currently implementing Year-1 projects. Efforts are underway to update the CPP to identify future Year-3 and Year-4 projects.

Some projects currently underway include:

Development of Regional Strategic Plans, Corridor Strategic Plan and Corridor Architecture

On-Board Vehicle Warning System for Railroad Grade Crossings pilot test

Expansion and Enhancements of the Indiana Hoosier Helpers Program - this effort includes the hiring and training of new staff members, expansion of coverage to 24 hours/day, and purchasing of additional patrol vehicles. An expert system is being

developed to extend the wireless communication system installed under the Borman Expressway project to support the transmission of closed-circuit video, data, and location information directly from incident scenes. This expert system will be capable of identification and notification of the proper emergency response agencies.

Equipment Upgrade of the Illinois Emergency Traffic Patrol - the current emergency traffic patrol fleet is being equipped with quick-tow devices which enable operators to safely and expeditiously relocate disabled vehicles to a safe location off of the highway system without having to exit the patrol vehicle. This will significantly decrease both the exposure of the operator to dangerous roadway conditions and the time required to clear minor accidents.

Wisconsin Integrated Corridor Operations Study and Operational Test

The GCM Priority Corridor is currently developing a Public Information Center. This center will serve as a centralized source of information for all GCM Corridor initiatives. The center will include a 800-telephone voice mail information line to serve public inquiries.

Project Location **:** Lake, Porter, and Laporte counties in Indiana; McHenry, Lake, Kane, Cook, Dupage, and Will counties in Illinois; and Washington, Ozaukee, Waukesha, Milwaukee, Walworth, Racine, and Kenosha in Wisconsin.

Partner(s) : Chicago Area Transportation Study, Illinois DOT, Indiana DOT, Illinois State Toll Highway Authority, Milwaukee County Public Works, Northern Indiana Commuter Transportation District, Northwest Indiana Regional Planning Committee, Regional Transportation Authority, Southeast Wisconsin Regional Planning Committee, Wisconsin DOT, Argonne National Laboratory, Chicago Transit Authority, City of Chicago DOT, City of Milwaukee, Marquette University, Metra, and Milwaukee County Transit and Pace

Start Date: January 1993

End Date**:** On-going

Estimated Total ITS Funds: $18,690,000

Estimated Total Project Cost: $23,362,499

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SOUTHERN CALIFORNIA CORRIDOR

Description:

Transportation agencies within the Southern California Priority Corridor have organized into four coalitions generally bounded by the jurisdictions of the California Department of Transportation (CalTrans) Districts 7, 8, 11, and 12. These coalitions are called Regional ITS Coordinating Teams. Each team provides representatives to the Corridor Steering Committee. The teams work at the management level to form plans, strategies and project lists to present to their respective constituents and parent organizations; set priorities and facilitate and possibly endorse publicly funded ITS projects within the region. Membership generally represents CalTrans district, city, county, Metropolitan Planning Organization, transit agency, Highway Patrol, and Air Quality Management District.

The Corridor Steering Committee is the forum to address corridor-wide user services, functional requirements, architecture and standards to ensure compatibility as deployments progress and merge at regional boundaries. The Committee provides an interactive point of contact for other California and ITS planning efforts.

Three major categories of activity are in progress in the Southern California Corridor. Operational tests, strategic deployment and planning, and a major demonstration of an intermodal transportation management and information system known as "Showcase".

Projects encompassed by the Southern California Corridor include:

- Integrated Ramp Metering/Adaptive Signal Control
- SCOOT Adaptive Traffic Control System
- Mobile Communications System
- Smart Call Box
- Spread Spectrum Radio Traffic Interconnect
- SMART Corridor
- Los Angeles Smart Traveler
- Ontario Smart Vehicle (ATHENA) - Phase I Demonstration will develop a preliminary design for a demonstration of door-to-door shared rides using 100 vans equipped with "Smart Technology" and will evaluate technologies and interfaces, leading to a procurement to implement the actual demonstration.

Strategic Planning - A strategic deployment planning study in the broadly defined S. California Priority Corridor will evaluate and plan what technologies will be programmed for deployment, and define an architecture that is consistent with the national architecture. The planning study began in 1995 and was completed in mid-1997.

"Showcase" Intermodal Transportation Management and Information System (ITMIS) and Early Start Projects - The Intermodal Transportation Management and Information System (ITMIS) project will deploy an intermodal transportation management and information system to optimize and coordinate freeway and street operations with public and private transportation systems within the corridor. Cooperative effort will be established in areas such as system management, transportation demand management, transportation provision and fleet management.

Traveltip, the first ITMIS project being developed and deployed under the Showcase initiative, was funded in fiscal year 1995 and will provide for an interregional multimodal advanced traveler information system in the Orange County region. The project will deploy technology used to improve traffic and transit operations, and provide information to transportation managers, travelers, and third party users to enhance decisions on transportation management, route selection, and mode choice. Traveltip is basically a smaller version of what is envisioned for the entire corridor.

Within the Showcase concept, early start projects are also being identified and developed in addition to the main effort of developing a corridor wide ITMIS. Four projects for the San Diego area have been identified and funded in fiscal year 1995 through the Showcase Early Start Program. These projects are: 1.) Transit Management Information System (Phase I), 2.) Emergency Computer Assisted Dispatch, 3.) Jack Murphy Stadium Traveler and Traffic Information System, 4) San Diego Intermodal Transportation Management and Information System (Phase I).

Project Location **:** Southern California: This area lies within major urbanized and adjacent non-urbanized areas of Ventura, Los Angeles, San Bernadino, Riverside, and San Diego Counties and all of Orange County.

Partner(s) : Steering Committee: Caltrans Headquarters New Technology, CalTrans District 7, Caltrans District 8, CalTrans District 11, CalTrans District 12, Southern California Association of Governments, San Diego Association of Governments, San Bernardino Association of Governments, Orange County Transportation Authority, City of San Diego, California Highway Patrol, and the South Coast Air Quality Management District

Start Date: January 1993

End Date**:** On-going

Estimated Total ITS Funds: $21,655,846

Estimated Total Project Cost: $110,000,000

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Model Deployment Initiatives

NEW YORK-NEW JERSEY-CONNECTICUT (TRANSCOM) ITS INFRASTRUCTURE MODEL DEPLOYMENT

Description: The New York City metropolitan area Model Deployment will showcase ITS infrastructure to millions of local commuters, commercial vehicle operators, and other travelers. TRANSCOM, the lead organization, is a consortium of fourteen transportation and public safety agencies from throughout the region. The widely dispersed public agencies will implement a Regional Transportation Management System connecting member agencies through a "virtual" Transportation Management Center. A contractor will operate a Multimodal Traveler Information System that will include personalized information to the public for a fee, eventually becoming self-supporting.

Project Location **:** New York City metropolitan area, NY/NJ/CT

Partner(s) : TRANSCOM, New York State Department of Transportation, and the Northeast Consultants

Start Date: October 1996

End Date**:** December 1999

Estimated Total ITS Funds: $10,610,000

Estimated Total Project Cost: $15,067,648

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PHOENIX, ARIZONA AZTECH MODEL DEPLOYMENT INITIATIVE

Description:

The Phoenix AZTech Model Deployment Initiative will integrate the Trailmaster Freeway Management System, seven local area city Traffic Signal Operations (TOCs) along identified priority corridors, City of Phoenix Public Transit Department management and dispatching system, Maricopa County Emergency Management System, Sky Harbor International Airport management/information system and electronic fare systems associated with the City of Phoenix Public Transit Department and Sky Harbor International airport for a truly regional, multimodal transportation management system. This will be accomplished by adding hardware to and modifying software within local TOCs to accommodate interoperability and extending the communications from Trailmaster to the local TOCs. In addition, the corridors will be instrumented with additional sensors and incident detection (CCTVs) to support the measurement of traffic volume, flow rate and the rapid detection and clearance of incidents.

As part of the Model Deployment Initiative, the City of Phoenix Public Transit will instrument their transit vehicles with Automatic Vehicle Location (AVL) so that these vehicles can be used as traffic probes and to monitor schedule adherence.

The Model Deployment Initiative will develop a traveler information system to collect, fuse, package and deliver multimodal traveler information to the public via a variety of mechanisms. Jurisdictional ITS linkages utilizing the Arizona DOT (ADOT) communications network will provide sharing of corridor status, travel times, hazard information and corridor closure information among state, county and city systems. The AZTech Integrated Regional Traveler Information Center will be established at the ADOT TOC and will be developed by TRW.

ETAK, with its partner Metro Networks, Inc., will manage AZTech, and will promote business development of fee paying clients. Distribution channels include dial-up telephone (free), public kiosk (free), INTERNET (free, except for access fee paid by users), for-fee cellular, for-fee paging, and for-fee interactive cable TV. The public will receive the benefit of for-fee distribution of traveler information via Metro Networks traffic center to broadcast TV, cable TV, and radio stations. For those broadcast TV and radio stations desiring standard traveler information only available from public sources, it will be made available through existing ADOT interface to broadcast stations. Traveler information will include corridor, public transit, and airport information, as well as electronic Yellow Pages supplied by commercial clients.

Evaluation, training, public relations, education and outreach will also be carried out under Model Deployment Initiative efforts.

The Phoenix AZTech Model Deployment Initiative will be operational by July 1998. A year of data collection will follow to evaluate the benefits of an integrated metropolitan area ITS infrastructure. The final evaluation report will be available in December 1999.

Project Location **:** Phoenix, Arizona

Partner(s) :

Arizona Department of Transportation, Maricopa County, Cities of Phoenix, Tucson, Chandler, Glendale, Mesa, Scottsdale and Tempe; Regional Public Transit Authority, Phoenix Transit Department, Maricopa Association of Governments, Pima Association of Governments, Arizona State University, Sky Harbor International Airport, TRW Transportation Systems, Scientific Atlanta, Inc., and the Etak Team (which may include the following companies: Metro Networks, CUE Paging Corp., Differential Corrections, Inc., SEIKO Communications, Inc., SkyTel, Hewlett Packard, Fastline, Clarion, Delco Electronics, Volvo, IT Network, and ATT)

Start Date: October 1996

***End Date*:** December 1999

Estimated Total ITS Funds: $7,520,000

Estimated Total Project Cost: $18,450,000

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SAN ANTONIO, TEXAS TRANSGUIDE METROPOLITAN MODEL DEPLOYMENT

Description:

The San Antonio, Texas metropolitan area Model Deployment builds on the successful TransGuide Operations Center, where the Texas Department of Transportation, the city traffic operations, transit dispatch, police traffic dispatch and police/fire/emergency dispatch are all co-located. The fully integrated TransGuide Model Deployment will cover nearly 200 miles of freeways and the majority of streets within the San Antonio metropolitan area. 78,000 vehicles will be equipped with Intelligent Vehicle Tags. These tags will allow the equipped vehicles to serve as roving "traffic probes," reporting on current travel times throughout the metropolitan area. Real-time, multi-modal traveler information will be provided to the traveling public through TransGuide TV 54, an in-vehicle route guidance system, kiosks, the INTERNET, and highway advisory radio. The TransGuide communications system will support video teleconferencing between local trauma centers and EMS units, providing physicians with the opportunity to see the patient and directly monitor vital statistics at the accident scene and en-route to the hospital.

The San Antonio Model Deployment will be fully operational by September 1998. A year of data collection will follow to evaluate the benefits of a fully integrated metropolitan area ITS infrastructure. The final evaluation report will be available by September 2000.

Project Location **:** San Antonio, Texas

Partner(s) : Texas Department of Transportation, VIA Metropolitan Transit Authority, City of San Antonio Department of Public Works, City of San Antonio Police Department, City of San Antonio Fire Department, Alpine Electronics Research of America, Amtech Systems Corporation, Southwest Research Institute, Navigation Technologies, Scientific Atlanta, Factura, Zexel USA, and H.B. Zachry

Start Date: October 1996

End Date**:** September 2000

Estimated Total ITS Funds: $7,144,000

Estimated Total Project Cost: $13,954,500

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SEATTLE, WASHINGTON SMART TREK MODEL DEPLOYMENT

Description:

The Seattle, Washington Smart Trek Model Deployment Initiative will showcase the implementation of the ITS infrastructure to commuters both around the world and especially to the Seattle area residents. The traveling public and local officials will see and experience the benefits of a 21st century transportation system in a real-life setting. The Seattle Smart Trek Model Deployment project will provide intermodal transportation management and integrated, real-time highway and transit information services for the entire Seattle metropolitan area.

The Seattle Model Deployment Initiative was operational in December 1997. A year of data collection will follow to evaluate the benefits of an integrated metropolitan area ITS infrastructure. The final evaluation report will be available December 1999.

Project Location **:** Seattle, Washington

Partner(s) :

Smart Trek is a coalition of public and private partners joining together to develop this model deployment initiative. The partners include: Bartizan American Communications, Battelle Pacific Northwest Laboratories, Boeing Company, City of Bellevue Transportation Department, David Evans and Associates, Inc., Etak Inc., Fastline, IBI Group, ICON, King County Department of Transportation, Metro Traffic Control, Inc., Microsoft, Inc., Pacific Rim Resources, Inc., PB/Farradyne Inc., Seiko Communications Systems, Inc., Puget Sound Regional Council, TRAC-UW, Transportation Division Seattle Engineering Department, University of Washington, Washington State Department of Information Services, Washington State Department of Transportation, XYPOINT Corporation, and Greater Redmond Transportation Management Association

Start Date: October 1996

End Date**:** December 1999

Estimated Total ITS Funds: $13,688,000

Estimated Total Project Cost: $54,826,000

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Completed Projects

ADA COUNTY TRAVEL DEMAND MANAGEMENT EMISSIONS DETECTION

Description: The primary objective of this test was to evaluate the feasibility of using remote sensing technology to monitor vehicle emissions. Active infra-red roadside emissions detection technology was used to determine the relative contributions of in-county and out-of-county vehicles to mobile-source emissions.

Project Location **:** Ada County - Boise, Idaho

Partner(s) : Idaho DOT, Ada Planning Association, and Ada Air Quality Board

Start Date: August 1994

End Date**:** April 1996

Estimated Total ITS Funds: $253,000

Estimated Total Project Cost: $319,000

Contacts**:**

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ADDITIONAL PROTOTYPE DEVELOPMENT (RT-TRACS)

Description: This study focused on the development of four additional real-time traffic adaptive signal control (RT-TRACS) prototypes which, together with the prototype developed under the ongoing RT-TRACS study, will be evaluated under a subsequent study.

Project Location **:** See Contractors

Contractor(s) : University of Minnesota, Miami Valley Research Institute, University of Maryland, and University of Arizona

Start Date: May 1994

End Date**:** December 1996

Estimated Total ITS Funds: $1,680,000

Estimated Total Project Cost: $1,680,000

Contacts**:**

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ADVANCE

Description: ADVANCE (Advanced Driver and Vehicle Advisory Navigation Concept) was a cooperative effort to evaluate the performance of a large-scale in-vehicle navigation and dynamic route guidance system. Initially, 3,000 private, commercial and public agency vehicles in the northwestern suburbs of Chicago were scheduled to be equipped with in-vehicle navigation and dynamic route guidance systems. Early in FY 1995, the partnership became concerned with issues that surfaced involving development of the system and the status of the overall in-vehicle navigation and dynamic route guidance system market in this country. The issues were further refined and quantified and several deployment options were developed and evaluated. The Steering Committee at a meeting in late February 1995, unanimously approved the recommended targeted deployment option. A significant portion of the original project goals and objectives were met under targeted deployment. This option allowed for limited, specific testing of the in-vehicle navigation and dynamic route guidance system in a controlled environment at a significantly lower budget. Based on revised project goals and objectives, in-vehicle testing for the targeted deployment phase was completed in December 1995 using approximately 75 vehicles; 32 of these vehicles (project vehicles) were deployed for testing and evaluation. Eighty local households participated in a test of the system and their reactions were favorable. Vehicles served as probes, providing real-time traffic information to a Traffic Information Center (TIC). This information was processed and transmitted to the equipped vehicles and used to develop preferred routes. The routing information was presented to the driver in the form of dynamic routing instructions. An evaluation plan for ADVANCE based on targeted deployment was developed, adopted, and implemented. The evaluation was completed and the results were made available to the general public in January 1997. The Steering Committee also concurred in the further development and modification of the ADVANCE TIC (application phase of ADVANCE) so it can serve as the Corridor Transportation Information Center (C-TIC) for information dissemination efforts for the Gary-Chicago-Milwaukee (GCM) ITS Priority Corridor.

Project Location : Northwest suburbs of Chicago, Illinois

Partner(s) : Illinois DOT, Motorola Inc., Illinois Universities Transportation Research Consortium (IUTRC), American Automobile Association (AAA)

Start Date: July 1991

End Date: December 1996

Estimated Total ITS Funds: $15,000,000

Estimated Total Project Cost: $23,500,000

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ALTERNATE BUS ROUTING

Description: The Alternate Bus Route Project was a pilot evaluation of next generation Vehicle-to-Roadside Communications (VRC). The first phase utilized a VRC transponder as both an advanced read/write traffic probe and to advise a bus driver of traffic conditions between the Raritan Toll Plaza and Interchange 129 via visual and audio messaging.

Project Location **:** Garden State Parkway, New Jersey

Partner(s) : New Jersey DOT, New Jersey Highway Authority, Transportation Operations Coordinating Committee (TRANSCOM), and Hughes Transportation Management Systems

Start Date: August 1993

End Date**:** September 1995

Estimated Total ITS Funds: $500,000

Estimated Total Project Cost: $1,027,253

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ATLANTA ATIS-KIOSK PROJECT

Description: The Atlanta Traveler Information Kiosk project focuses on Traveler Information statewide. The project provides Traveler Information at a variety of locations including rest areas, welcome centers, shopping, employment, and lodging centers. The Kiosks are operated by Georgia Net, a Georgia state authority responsible for dissemination of various types of information. The evaluation for the project was led by Oak Ridge National Laboratory, along with the Georgia Institute of Technology, Clark-Atlanta University, and Concord Associates. A User Acceptance Test Report was produced by the evaluators. A network of 130 statewide deployed kiosks provide real-time traveler information including incident and congestion information, route planning, transit information, and more.

Project Location **:** Georgia, statewide with a concentration in the Atlanta Metropolitan Area

Partner(s) : Georgia DOT, Georgia Net, and other private sponsors

Start Date: March 1994

End Date**:** December 1997

Estimated Total ITS Funds: $4,000,000

Estimated Total Project Cost: $5,000,000

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ATLANTA DRIVER ADVISORY SYSTEM (ADAS)

Description: The primary objective of this test was to evaluate the benefits of en-route traveler advisory and traveler services information using FM subcarrier wide area communications systems and applications of the 220 MHz frequency pairs. The evaluators of the field operational test produced a system performance test report for the project.

Project Location **:** Atlanta, Georgia

Partner(s) : Scientific-Atlanta, Federal Express, TRW, Concord Associates, Georgia Tech Research Institute, Georgia Tech., Clark Atlanta University, Georgia DOT, and Oak Ridge National Laboratory

Start Date: March 1995

End Date**:** September 1997

Estimated Total ITS Funds: $7,236,916

Estimated Total Project Cost: $8,557,116

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ATLANTA TRAVELER INFORMATION SHOWCASE

Description: The Atlanta Traveler Information System (TIS) project provides timely transportation information to travelers in the Atlanta metropolitan area through the use of Personal Communication Devices (PCDs), in-vehicle navigation devices, on-line computer information services, interactive television in selected hotels, and cable television. This information is available to both residents and visitors for trip planning purposes. The project was operational before, during, and after the 1996 Summer Olympic and Paralympic Games. The TIS includes information on multimodal travel options, including bus, rail and air travel. The TIS also includes an extensive public information campaign. The Showcase project successfully transferred all of the devices to the Georgia DOT for incorporation as legacy devices in the Statewide ITS. The Personal Communication Devices and the in-vehicle navigation devices are the only devices that are currently not being supported.

Project Location **:** Atlanta, Georgia

Partner(s) : Battelle, Georgia DOT, and MARTA

Start Date: February 1995

End Date**:** March 1997

Estimated Total ITS Funds: $14,219,577

Estimated Total Project Cost: $14,219,577

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BALTIMORE-WASHINGTON CORRIDOR: SURVEILLANCE INFRASTRUCTURE IMPLEMENTATION

Description: The Baltimore Washington Corridor Surveillance Infrastructure Project consists of CCTV cameras, overhead mounted radar, and the communications required to take the equipment from the roadway to Maryland State Highway Administration's Statewide Operations Center to provide real-time traffic data. The overhead mounted radar is used for roadway speed monitoring and not for enforcement purposes. The infrastructure installation is on I-695, I-495, I-595, I-395, I-70, I-95, I-83, and I-270 in Maryland to provide MD State Highway Administration statewide operations center with real-time traffic data.

Project Location **:** Maryland

Partner(s) : Maryland State Highway Administration

Start Date: January 1993

End Date**:** February 1996

Estimated Total ITS Funds: $2,200,000

Estimated Total Project Cost: $2,750,000

Contacts**:**

Steve Clinger	FHWA Region 3, HEO-03	(410) 962-0077	Ext. 3055
Tom Jacobs	FHWA Maryland Division HB-MD	(410) 962-4342	Ext. 129
Mike Zezeski	Maryland State Highway Administration	(410) 787-5859	Ext.

BORMAN EXPRESSWAY ADVANCED TRAFFIC MANAGEMENT SYSTEM (ATMS) PHASE I

Description: INDOT, in conjunction with Hughes Transportation Systems, JHK, and Avilla, developed and installed a functioning prototype Advanced Traffic Management System (ATMS) deploying several of the more promising electronic sensors and integrating them into the prototype using spread spectrum radio communications. The equipment was independently evaluated for dependability and cost effectiveness by Purdue University before being incorporated into the permanent ATMS that will be constructed in a later phase. The Borman ATMS has become an essential component of the Gary-Chicago-Milwaukee, Midwest ITS Priority Corridor.

Project Location **:** The Borman ATMS is a part of the Gary-Chicago-Milwaukee, Midwest ITS Priority Corridor

Partner(s) : Federal Highway Administration (FHWA), Indiana Department of Transportation (INDOT)

Start Date: July 1994

End Date**:** December 1996

Estimated Total ITS Funds: $950,000

Estimated Total Project Cost: $2,150,000

Contacts**:**

William Brownell	FHWA Region 5, HES-05	(708) 283-3549	Ext.
Dan Shamo	Indiana DOT	(219) 362-6125	Ext.

BOSTON SMARTRAVELER

Description: The project tested the public acceptance and potential traffic impacts of a telephone-based audiotext traffic information service. An independent evaluation of the project was done and the final report is available. The project has moved beyond operational testing using other funds.

Project Location **:** Boston, Massachusetts

Partner(s) : Project contributors include the Massachusetts Highway Department, SmartRoute Systems. Several local radio and television stations donated advertising and promotion for the project

Start Date: September 1992

End Date**:** December 1994

Estimated Total ITS Funds: $1,515,000

Estimated Total Project Cost: $3,395,000

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518)431-4224	Ext. 228
Edward Silva	FHWA Massachussets Division	(617)494-2253	Ext.
Michelle Boucher	Massachussetts Highway Department	(617)973-7315	Ext.

CALIFORNIA SMART TRAVELER

Description: This project was comprised of two components: (a) Los Angeles Smart Card, and (b) Orange County Smart Intermodal System. The Los Angeles Smart Card tested the use of smart cards for express transit services as well as for parking and other services at employment sites. Two different card technologies were tested: a contact card and a radio frequency (RF) proximity card. The Orange County Smart Intermodal System operationally tested (1) an integrated transit and traffic management system and (2) a real-time information system that included special event information.

Project Location **:** Los Angeles and Orange County, California

Partner(s) : Los Angeles Metropolitan Transportation Authority (LAMTA), Volpe National Transportation Systems Center, Aegis Transportation Information Systems, Inc., Merced County Council of Government, University of California, and California DOT (Caltrans)

Start Date: September 1992

End Date**:** December 1994

Estimated Total ITS Funds*: $1,520,000

Estimated Total Project Cost: $3,290,000

Contacts**:**

Ron Boenau	FTA Headquarters, TRI-11	(202) 366-0195	Ext.
Cliff Loveland	CalTrans	(916) 654-9970	Ext.

* Federal Funds are FTA vs. ITS Funds

CAPITAL: WASHINGTON, D.C. AREA OPERATIONAL TEST

Description: This ITS Operational Test made extensive use of the existing cellular infrastructure for both areawide surveillance and communications. Engineering Research Associates (ERA) equipment was collocated on Bell Atlantic Mobile towers to detect cellular usage and geolocate phones on designated roadways. Specific evaluation goals included determination of the accuracy of geolocation data; the accuracy and completeness of traffic information; the usefulness of passive statistical processing for measuring volume and incidents; the criteria for selecting roadways that can be monitored by these techniques; system capabilities; costs for deployment; public acceptance; and the usefulness of information dissemination to fleet vehicles.

Project Location **:** Washington, District of Columbia Metropolitan area

Partner(s) : Virginia DOT and Maryland State Highway Administration, Raytheon E Systems, Bell Atlantic NYNEX Mobile, and PB Farradyne

Start Date: August 1993

End Date**:** June 1997

Estimated Total ITS Funds: $5,531,733

Estimated Total Project Cost: $7,229,418

Contacts**:**

Chung Eng	FHWA Headquarters, HTV-3	(202) 366-8043	Ext.
Charles Hall	Virginia DOT	(804) 786-6777	Ext.
Glenn McLaughlin	Maryland State Highway Administration	(410) 787-5872	Ext.
Bob Ewald	Engineering Research Associates	(703) 208-1211	Ext.

CHART STRATEGIC PLAN - MARYLAND

Description: This study developed a strategic plan for statewide deployment of ITS. CHART is Maryland's statewide transportation management program. This specific study developed a CHART strategic plan. Two areas that received emphasis are traffic management strategies and communications alternatives. The effort initially concentrated on congestion management in the Baltimore-Washington corridor. Both current and future needs were evaluated, including the application of ITS technologies and services. This project also provides for CHART systems integration using Congestion Mitigation Funds.

Project Location **:** Maryland

Partner(s) : Maryland State Highway Administration

Start Date: December 1992

End Date**:** May 1996

Estimated Total ITS Funds: $300,000

Estimated Total Project Cost: $2,245,000

Contacts**:**

Steve Clinger	FHWA Region 3, HEO-03	(410) 962-0077	Ext. 3055
Tom Jacobs	FHWA Maryland Division HB-MD	(410) 962-4342	Ext. 129
Mike Zezeski	Maryland State Highway Administration	(410) 787-5859	Ext.

CONNECTICUT FREEWAY ADVANCED TRAFFIC MANAGEMENT SYSTEMS (ATMS)

Description: This ATMS project evaluated the use of roadside mounted radar detectors in combination with closed circuit television (CCTV) for incident detection and verification. The ATMS utilizes 44 radar detectors (wide- and narrow-beam) and compressed video.

Project Location **:** Hartford, Connecticut: I-91 and I-84 in the Hartford region

Partner(s) : Connecticut DOT

Start Date: December 1991

End Date**:** December 1996

Estimated Total ITS Funds: $600,000

Estimated Total Project Cost: $1,380,000

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Bob Ramirez	FHWA Connecticut Division	(860) 659-6703	Ext. 3004
James Mona	Connecticut DOT	(860) 594-3450	Ext.

DETECTION TECHNOLOGY FOR ITS

Description: This contract developed functional and performance specifications for permanently deployed and portable vehicle detectors in ITS applications. Candidate vehicle detector technologies were evaluated through laboratory and field testing of currently available state-of-the-art detectors. Such detectors include ultrasonic, infrared, microwave radar, video image processors, magnetometers, and inductive loops. In some instances, commercially available detectors did not meet ITS specifications. In these cases, functional requirements were developed for the detectors. Another part of the study dealt with determining if a permanent national vehicle detector test facility is needed to provide vehicle detector test data for future commercial vehicle detectors used in ITS. The executive summary for this project can be found on the internet at www.tfhrc.gov.

Project Location **:** Fullerton, California

Contractor(s) : Hughes Ground Systems Group

Start Date: September 1991

End Date**:** September 1996

Estimated Total ITS Funds: $1,777,000

Estimated Total Project Cost: $1,777,000

Contacts**:**

Milton K. Mills	FHWA - TFHRC, HSR-2	(703) 285-2402	Ext.

DETROIT TRANSPORTATION CENTER TRANSIT INFORMATION

Description: This was a joint FTA/FHWA project that provided real-time traffic condition information to dispatch centers of public transit agencies in the Detroit area. MDOT's Detroit Freeway Operations Center collected traffic information on 32 miles of freeway through a buried inductive loop system. The information was then graphically displayed on computer monitors by color coding individual freeway segment (link) speeds. This project demonstrated the ability to provide the information to public and private transit operators inexpensively, and then monitored performance changes and evaluated the results.

Project Location **:** Detroit, Michigan

Partner(s) : City of Detroit and Michigan DOT

Start Date: December 1993

End Date**:** April 1995

Estimated Total ITS Funds: $50,000

Estimated Total Project Cost: $100,000

Contacts**:**

Sean Ricketson	FTA Headquarters, TRI-11	(202) 366-6678	Ext.

EVALUATING ENVIRONMENTAL IMPACTS OF ITS USING LIDAR

Description: This test combined Light Detection and Ranging (LIDAR) technology for wide area emissions detection with active infrared technology for roadside emissions detection to evaluate changes in air quality due to implementing traffic responsive control strategies for events at a sports complex. The objectives were to: (1) measure the effect of MnDOT's Portable Traffic Management System on air quality, (2) determine the ability of LIDAR technology to provide quantitative and qualitative air quality data, and (3) assess the overall effectiveness of LIDAR as an evaluation tool.

Project Location **:** Minneapolis and St. Paul, Minnesota

Partner(s) : Minnesota DOT, Santa Fe Technologies, Loral Federal Systems, and University of Minnesota

Start Date: July 1994

End Date**:** June 1997

Estimated Total ITS Funds: $500,000

Estimated Total Project Cost: $766,847

Contacts**:**

William Brownell	FHWA Region 5, HES-05	(708) 283-3549	Ext.
Jim McCarthy	FHWA Minnesota Division, HDA-MN	(612) 291-6112	Ext.
Marthand Nookala	Minnesota DOT	(612) 296-8567	Ext.

FM/SCA PROTOTYPE FOR TRAFFIC INFORMATION BROADCAST

Description: This project involved the test and evaluation by an industry organization of the prototype Subsidiary Communications Authorization (SCA) Traffic Information Channel (STIC) waveform. A system based on this waveform will allow a commercial FM broadcast station's subcarrier to transmit traffic and other data at rates higher than previously achieved. The data rate for this system will be high enough to support broadcast of individual link travel times (e.g., for routing applications). The completed prototype transmission and reception scheme will be tested using mostly off-the-shelf equipment in several diverse areas to assess concept feasibility. The equipment, developed by Mitretek Systems, under contract to FHWA over the last several years, was built to meet the specific requirements of ITS, but has application for other data broadcast scenarios.

Project Location **:** Washington, DC

Contractor(s) : Electronic Industries Association

Start Date: September 1993

End Date**:** December 1997

Estimated Total ITS Funds: $50,000

Estimated Total Project Cost: $50,000

Contacts**:**

James Arnold	FHWA - TFHRC, HSR-10	(703) 285-2974	Ext.

GENESIS

Description: Genesis is an advanced traveler information system (ATIS) that uses personal communications devices (PCDs) to distribute information. Timely delivery means gathering the data in real-time and distributing the data to travelers when they need it, where they need it and how they need it. Genesis is an element in the Minnesota Guidestar ITS program. With transit and traffic data, Genesis is able to provide the urban traveler with current data relevant to a chosen trip mode and route. The Genesis PCD is portable and transit information is fully accessible to the user.

Project Location **:** Minneapolis/St. Paul, Minnesota

Partner(s) : Minnesota DOT, Motorola Center for Transportation Studies, University of Minnesota

Start Date: September 1992

End Date**:** October 1997

Estimated Total ITS Funds: $4,069,000

Estimated Total Project Cost: $5,666,000

Contacts**:**

William Brownell	FHWA Region 5, HES-05	(708)283-3549	Ext.
Jim McCarthy	FHWA Minnesota Division, HDA-MN	(612)291-6112	Ext.
Ray Starr	Minnesota DOT	(612)582-1459	Ext.

GIS APPLICATIONS AND TECHNICAL SUPPORT

Description: This project developed Geographic Information System (GIS) applications and provided technical support for implementation of the National Transit GIS. Coding was provided for fixed guideway facilities including heavy rail, light rail and people movers. Equipment has been purchased in this project to accomplish the work. Outreach activities included information booth displays and brochures.

Project Location **:** Cambridge, Massachusetts

Contractor(s) : Volpe National Transportation Systems Center

Start Date: March 1995

End Date**:** December 1995

Estimated Total ITS Funds: $600,000

Estimated Total Project Cost: $600,000

Contacts**:**

William Wiggins	FTA Headquarters, TRI-11	(202) 366-0915	Ext.

GOLDEN GLADES INTERCHANGE

Description: This project resulted in the deployment of advanced traffic management technologies. The State of Florida installed advanced traffic management technologies at the Golden Glades Interchange on Interstate 95 in Dade County, Florida. Real-time monitoring and rapid verification of incidents was provided with closed circuit television (CCTV), and variable message signs (VMS) provide motorist information for this section of the freeway network.

Project Location **:** Dade County, Florida

Partner(s) : Florida DOT

Start Date: July 1992

End Date**:** June 1996

Estimated Total ITS Funds: $3,300,000

Estimated Total Project Cost: $4,125,000

Contacts**:**

Mark Doctor	FHWA Region 4, HES-04	(404) 562-3685	Ext.
Maisar Khaled	FHWA Florida Division, HDA-FL	(850) 942-9596	Ext.
Grant Zammit	FHWA Florida Division, HDA-FL	(850) 942-9693	Ext.

INCIDENT DETECTION ISSUES - PART I : FREEWAYS

Description: The "Incident Detection Issues - Part I (Freeways)" project developed a support system in three modular parts. The first part developed malfunction management techniques to help provide useful data under conditions of detector component failure. The second part developed algorithms to take the information and develop a "current status" of the network. The third part developed algorithms that will detect an incident when there are significant discrepancies in the predicted/expected overall network operating status.

Project Location **:** San Luis Obispo, California

Contractor(s) : VERAC; BALL Systems

Start Date: April 1993

End Date**:** September 1997

Estimated Total ITS Funds: $1,923,000

Estimated Total Project Cost: $1,923,000

Contacts**:**

Aladdin Barkawi	FHWA - TFHRC, HSR-10	(703) 285-2093	Ext.

ITS FOR VOLUNTARY EMISSIONS REDUCTION

Description:

An active infrared roadside emissions sensor and a variable message sign at a freeway exit ramp provided real-time vehicle emissions readings to passing motorists. A telephone information hotline, and brochures were made available at area service stations provided motorists additional information on the benefits of keeping their vehicle tuned. The focus of this project was to prompt people to tune their vehicles to reduce emissions. The effectiveness of the test was evaluated through surveys and by measurement of identified high emitters at the site over time. The primary objective of this test was to evaluate the usefulness and public acceptance of providing real-time emissions information to drivers and education material about the fuel savings and air quality benefits of well tuned vehicles.

Project Location **:** Denver, Colorado

Partner(s) : Colorado DOT, University of Denver, Remote Sensing Technologies Inc., Conoco Inc., Skyline Products Inc.

Start Date: September 1994

End Date**:** August 1997

Estimated Total ITS Funds: $304,663

Estimated Total Project Cost: $498,358

Contacts**:**

Lloyd Rue	FHWA Region 8, HPD-08	(303) 969-5772	Ext. 326
Scott Sands	FHWA Colorado Division	(303) 969-6730	Ext. 362
Neil Lacey	Colorado DOT	(303) 757-9971	Ext.

ITS MODELS AND SIMULATION SYSTEMS PROGRAM

Description: This activity modified existing traffic models to simulate ITS operations such as real-time control strategies, route guidance capabilities, real-time graphics displays, environmental and safety measures of effectiveness, effects of in-vehicle navigation systems, probe vehicle/path selection capabilities, and user interfaces. As a minor effort, this activity also examined the feasibility and applicability of incorporating advanced analytic techniques (such as image processing, neural networks, parallel processing, control theory, and real-time distributed systems) into the models.

Project Location **:** Colorado Springs, Colorado

Contractor(s) : Kaman Sciences Corporation

Start Date: September 1995

End Date**:** December 1997

Estimated Total ITS Funds: $2,969,872

Estimated Total Project Cost: $3,169,796

Contacts**:**

James Clark	FHWA - TFHRC, HSR-10	(703) 285-2681	Ext.

MULTI-JURISDICTIONAL LIVE AERIAL VIDEO SURVEILLANCE SYSTEM, I

Description: This ITS operational test project provided for the procurement, installation, and evaluation of live video transmission from a gyro-stabilized camera mounted on helicopters for use in observing, evaluating, and properly managing major highway incidents and situations of a public safety nature. The live color video was transmitted to police and state highway traffic management centers, and to mobile command centers at incident sites. Communications technologies included microwave, Community Access TV (CATV), and state-owned coaxial cable. It was found that the use of real-time airborne video serves as a valuable component of an Advanced Traffic Management System (ATMS), particularly in major incident management.

Project Location **:** Fairfax County, Virginia

Partner(s) : Fairfax County Police, Virginia State Police, and Virginia DOT

Start Date: September 1991

End Date**:** July 1995

Estimated Total ITS Funds: $355,000

Estimated Total Project Cost: $355,000

Contacts**:**

Steve Clinger	FHWA Region 3, HEO-03	(410) 962-0077	Ext. 3055
Tom Jennings	FHWA Virginia Division, HDA-VA	(804) 281-5107	Ext.
Jim Chu	Virginia DOT	(703) 383-2600	Ext.
CPT. Bob Fitzpatrick	Fairfax County Police	(703) 556-7750	Ext.

MULTI-JURISDICTIONAL LIVE AERIAL VIDEO SURVEILLANCE SYSTEM, II

Description: Similar in concept to the completed project in Fairfax County, Virginia, this operational test project evaluated live video transmission from fixed-wing aircraft to county and state traffic management centers. Maryland and Virginia cooperated in this effort and transmitted video to traffic management centers in both states. Maryland, like Virginia, also tested the feasibility of transmitting live video to mobile command centers. The project was recently amended to include establishment of a data and video link between the Montgomery County ATMS and the ITS Room located at US DOT Headquarters in Washington, DC.

Project Location **:** Montgomery Country, Maryland

Partner(s) : Montgomery County Office of Traffic and Maryland State Highway Administration

Start Date: September 1991

End Date**:** June 1997

Estimated Total ITS Funds: $645,000

Estimated Total Project Cost: $645,000

Contacts**:**

Steve Clinger	FHWA Region 3, HEO-03	(410) 962-0077	Ext. 3055
Tom Jacobs	FHWA Maryland Division, HB-MD	(410) 962-4342	Ext. 129
Mike Zezeski	Maryland State Highway Administration	(410) 787-5859	Ext.
Emil Wolanin	Montgomery County	(301) 217-2208	Ext.

NORFOLK MOBILITY MANAGER

Description: This project operationally tested and evaluated how transit and paratransit user subsidies can improved transportation services available to low-income transit riders. Subsidies provided directly to low-income people encouraged private operators to provide better transportation services. Part of the project allowed Tidewater Regional Transit (TRT) to act as a mobility manager through its distribution of "Mobility Vouchers" to employers who, first, contribute to the face value of the vouchers and then, gave them to qualified employees as a benefit. Employees used the vouchers to pay for the transit service of their choice. In addition to working through employers, the project included an effort to work with social service agencies, especially in the medical area.

Project Location **:** Norfolk, Virginia

Partner(s) : Tidewater Transportation District Commission

Start Date: April 1989

End Date**:** December 1993

Estimated Total ITS Funds*: $500,000

Estimated Total Project Cost: $600,000

Contacts**:**

Ron Boenau	FTA Headquarters, TRI-11	(202) 366-0195	Ext.

* Federal Funds are FTA vs. ITS Funds

PORTLAND SMART BUS

Description: This project reviewed the German-made Flexible Operation Command and Control System (FOCCS) that integrates fixed-route transit, dial-a-ride minibus, and contract taxi services. The information integration provides arrival and destination data to travelers and operators. The review included the following: first, evaluating the technical and economic feasibility of adding audiotex/videotex components and carpool matching capabilities to the systems; second, evaluating the technical requirements of adding a FOCCS components to Tri-Met's central control plans; third, evaluating the cost-effectiveness of FOCCS in Portland's rapidly growing suburbs; and fourth, designing an operational test for those components found suitable. Hardware and software requirements are included in the analysis.

Project Location **:** Portland, Oregon

Contractor(s) : Tri-Met of Portland, Oregon

Start Date: September 1990

End Date**:** September 1993

Estimated Total ITS Funds*: $54,000

Estimated Total Project Cost: $90,000

Contacts**:**

Ron Boenau	FTA Headquarters, TRI-11	(202) 366-0195	Ext.

* Federal Funds are FTA vs. ITS Funds

ROGUE VALLEY MOBILITY MANAGEMENT

Description: This project demonstrated the Mobility Manager concept to integrate transportation users, providers, and funding sources. Advanced electronic technology was used to record financial transactions and included magnetic-stripe farecards. It included transportation service to the elderly and disabled unable to use fixed route transit.

Project Location **:** Medford, Oregon

Partner(s) : Call-A-Ride, Upper Rogue Community Center, Ashland Senior Program, Group Ride Service, Metro Taxi, Ashland, Cascade, White City/Cascade Cab Company, Head Start, Rogue Valley Medical Center, and Oregon DOT

Start Date: September 1991

End Date**:** June 1995

Estimated Total ITS Funds*: $380,000

Estimated Total Project Cost: $775,900

Contacts**:**

Ron Boenau	FTA Headquarters, TRI-11	(202) 366-0195	Ext.
Mary Delamare-Schaefer	Rogue Valley Council of Governments	(503) 664-6674	Ext.

* Federal Funds are FTA vs. ITS Funds

SACRAMENTO RIDESHARE

Description: The Sacramento Real-Time Ridesharing project used a geographic information system (GIS) to provide single-trip or multiple-trip real-time ridesharing information. A driver seeking a rider entered the request into the system through one of the transportation management associations (TMAs). A prospective rider entered a destination and ride request. Driver incentives were also identified in the implementation of the system.

Project Location **:** Sacramento, California

Partner(s) : Division of New Technology and Research of the California DOT (Caltrans), Sacramento Rideshare, Transportation Management Associations (TMA), Sacramento Council of Governments, and Volpe National Transportation Systems Center

Start Date: January 1993

End Date**:** December 1995

Estimated Total ITS Funds*: $204,000

Estimated Total Project Cost: $825,000

Contacts**:**

Ron Boenau	FTA Headquarters, TRI-11	(202) 366-0195	Ext.
Cliff Loveland	CalTrans	(916) 654-9970	Ext.

* Federal Funds are FTA vs. ITS Funds

SANTA CLARA COUNTY SMART VEHICLE

Description: This project used global positioning system (GPS) technology for automatic vehicle location (AVL) operation of a paratransit system in conjunction with bus, light rail, and train operation. The service provided allows disabled travelers to request specific transportation service. A vehicle was routed and, where appropriate, the traveler was transferred to a fixed-route mode. Use is made of AVL technology, demand-responsive dispatching software, and a navigable map database which allows the closest available vehicle nearest a requester to be dispatched.

Project Location **:** Santa Clara County, California

Partner(s) : Division of New Technology and Research of the California DOT (Caltrans), Santa Clara County Transportation Authority, Outreach Paratransit Broker, Trimble Navigation, UMA Engineering, Navigation Technologies, and Volpe National Transportation Systems Center

Start Date: November 1993

End Date**:** October 1995

Estimated Total ITS Funds*: $425,000

Estimated Total Project Cost: $850,000

Contacts**:**

Ron Boenau	FTA Headquarters, TRI-11	(202) 366-0195	Ext.
Cliff Loveland	CalTrans	(916) 654-9970	Ext.

* Federal Funds are FTA vs. ITS Funds

SEATTLE SMART TRAVELER

Description:

This project examined ways in which mobile communications, such as cellular phones, and information kiosks could be used to make ridesharing (carpooling and vanpooling) more attractive, and evaluated a Traveler Information System. A set of information-based services for ride matching was developed in Phase I in cooperation with the mobile telecommunications industry in an effort to increase the use of HOV facilities. The initial focus advised private auto drivers of rideshare possibilities using mobile communications. A second phase operationally tested a prototype computer-based, interactive commuter information center in an office building in downtown Bellevue. The center provided computerized transit information, rideshare matching, and a method to schedule occasional carpool or vanpool trips. In addition to cellular telephone, the technological applications included voice mail, computer-based ride matching, traffic monitoring computers, and electronic maps.

Project Location **:** Metropolitan Seattle, Washington

Partner(s) : Bellevue Transportation Management Association (TransManage), University of Washington, City of Bellevue, Washington State DOT, and Municipality of Metropolitan Seattle

Start Date: October 1991

End Date**:** August 1995

Estimated Total ITS Funds*: $100,000

Estimated Total Project Cost: $245,000

Contacts**:**

Ron Boenau	FTA Headquarters, TRI-11	(202) 366-0195	Ext.
Mark Haselkorn	University of Washington	(206) 543-2577	Ext.

* Federal Funds are FTA vs. ITS Funds

SMART CALL BOX

Description: This operational test took advantage of the extensive call box system installed on California freeways and sought to increase their functionality by adding an interface to traffic management devices. The project included testing the feasibility of using the Smart Call Boxes to collect traffic census data; obtain traffic counts, flows and speeds for incident detection; report information from roadside weather information systems; control changeable message signs; and control roadside closed-circuit television cameras.

Project Location **:** San Diego, California

Partner(s) : San Diego Service Authority for Freeway Emergencies (SDSAFE), California DOT (Caltrans), California Highway Patrol (CHP), and San Diego State University

Start Date: September 1993

End Date**:** September 1996

Estimated Total ITS Funds: $915,000

Estimated Total Project Cost: $1,607,600

Contacts**:**

Frank Cechini	FHWA California Division, HTA-CA	(916) 498-5005	Ext.
David Dutcher	CalTrans	(619) 688-4274	Ext.
Mike Perkins	S. D. Svc Authority for Freeway Emergencies	(619) 694-2190	Ext.

TRAFFIC RESEARCH LABORATORY (TREL)

Description:

The TreL is an ATMS testbed which integrates research and development tools into a seamless analysis environment. This project used the TreL testbed to address crucial issues in ATMS such as: the impact of incident detection upon level of service, the effects of dynamic traffic assignment, and system integration issues to help guide ATMS deployment. The Phase I testbed was completed in 1995. It provided the research and analysis capabilities needed to help quantify the benefits of ITS deployment and answer initial critical issues. The Phase II testbed is to provide real-time and faster than real-time simulation capabilities to support emulation of an actual advanced traffic management control center. The Phase II testbed will answer questions such as how to design and implement the functionality of the ATMS control center. The TreL testbed also provided a foundation for ATMS and human factors training.

Project Location **:** McLean, Virginia

Contractor(s) : Information Dynamics, Inc.

Start Date: September 1993

End Date**:** September 1997

Estimated Total ITS Funds: $3,000,000

Estimated Total Project Cost: $3,000,000

Contacts**:**

James Clark	FHWA - TFHRC, HSR-10	(703) 285-2681	Ext.

TRANSIT NETWORK ROUTE DECISION AID

Description: This project developed specifications for designing, implementing, and evaluating a computerized information system to aid a telephone operator in rapidly identifying useful itineraries for passengers in a mass transit system. Specifically, it developed a procedure for constructing a decision aid; investigated algorithms and discussed how to extend or specialize them; and developed a plan for decision aid evaluation.

Project Location **:** Ann Arbor, Michigan

Contractor(s) : University of Michigan - Department of Industrial Operations and Engineering

Start Date: September 1991

End Date**:** October 1993

Estimated Total ITS Funds: $70,000

Estimated Total Project Cost: $70,000

Contacts**:**

Chelsea White	University of Michigan	(313) 763-5464	Ext.

TRANSIT TECHNOLOGY RESEARCH

Description: This activity evaluated various new technologies for their potential benefit to transit. Human factors and engineering factors were investigated and designed into ITS systems being developed to maximize benefits to implementation. Spectrum allocation, advanced vehicle location, and architecture studies were conducted for subsequent operational test implementation. This project also studied the transit requirements for an orderly transition into new ITS technologies which are required to allow the maximum benefit.

Project Location **:** Cambridge, Massachusetts

Contractor(s) : Volpe National Transportation Systems Center

Start Date: October 1993

End Date**:** December 1994

Estimated Total ITS Funds*: $160,000

Estimated Total Project Cost: $160,000

Contacts**:**

Ron Boenau	FTA Headquarters, TRI-11	(202) 366-0195	Ext.
Bob Ow	Volpe National Transportation Systems Center	(617) 494-2411	Ext.

* Federal Funds are FTA vs. ITS Funds

TRANSMIT

Description:

The "TRANSMIT" (TRANSCOM's System for Managing Incidents and Traffic) Operational Test evaluated the use of automatic vehicle identification (AVI) technology as an incident detection tool. The system of AVI "tag" readers allows vehicles equipped with transponders to serve as traffic probes. Tag-equipped probe vehicles are assigned a random identification number as they enter a system populated with AVI readers spaced approximately 2 kilometers apart. Software analysis is used to help identify potential incidents by comparing actual to predicted travel times between readers, in addition to determining real-time traffic information such as speed and travel time.

Project Location **:** Rockland County, New Jersey/Bergen County, New Jersey

Partner(s) : New Jersey DOT, New York State Thruway Authority, New Jersey Highway Authority, TRANSCOM

Start Date: April 1993

End Date**:** November 1997

Estimated Total ITS Funds: $2,750,000

Estimated Total Project Cost: $3,437,500

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Breck Jeffers	FHWA New Jersey Div, HTC-NJ	(609) 637-4231	Ext.
Tom Batz	TRANSCOM	(201) 963-4033	Ext.

TRAVLINK

Description: TravLink implemented an Advanced Traveler Information System and Advanced Public Transportation System along the I-394 corridor extending from downtown Minneapolis, approximately 12 miles to the west. TravLink is a part of the Minnesota Guidestar ITS program and provided real-time transit schedule and traffic information through a combination of kiosks and terminals at work, home, shopping centers, and transit stations.

Project Location **:** Minneapolis, Minnesota

Partner(s) : Minnesota DOT, St. Paul Metropolitan Council Operations, US West, 3M-Renix, City of Minneapolis, University of Minnesota

Start Date: September 1992

End Date**:** October 1996

Estimated Total ITS Funds: $4,116,000

Estimated Total Project Cost: $6,956,000

Contacts**:**

William Brownell	FHWA Region 5, HES-05	(708) 283-3549	Ext.
Jim McCarthy	FHWA Minnesota Division, HDA-MN	(612) 291-6112	Ext.
Marilyn Remer	Minnesota DOT Program Manager	(612) 582-1540	Ext.

TRAVTEK

Description:

TravTek (Travel Technology) provided traffic congestion information, motorist services ("yellow pages") information, tourist information and route guidance to operators of 100 test vehicles, rented through AVIS, that were equipped with in-vehicle TravTek devices. Route guidance reflected real time traffic conditions in the TravTek traffic network. A Traffic Management Center obtained traffic congestion information from various sources and provided this integrated information, via digital data radio broadcasts, to the test vehicles and the data sources. TravTek rental operations began in March 1992. The operations phase ended in March 1993. The data collection for project evaluation is completed. Eight final evaluation reports were made available in late 1995. A video has been developed to disseminate information on the TravTek evaluation project. The video serves as an executive summary for the project, providing information on the overall project goals and objectives, the public/private partnership created to carry out the effort, the system design approach, the key evaluation questions, and finally a summary of the results from the evaluation activities. The video was developed for FHWA by SAIC in consultation with the TravTek partners. In addition to the TravTek partners, the National Highway Traffic Safety Administration participated in the TravTek evaluation. All reports have been completed.

Project Location : Orlando, Florida

Partner(s) : City of Orlando, Florida DOT, General Motors/Hughes, and American Automobile Association (AAA)

Start Date: January 1990

End Date: March 1996

Estimated Total ITS Funds: $4,200,000

Estimated Total Project Cost: $12,000,000

Contacts:

Robert Rupert	FHWA Headquarters, HTV-3	(202) 366-2194	Ext.
Jim Arnold	FHWA - TFHRC, HSR 10	(703) 285-2974	Ext.
Mark Doctor	FHWA Region 4, HES-04	(404) 562-3685	Ext.
Grant Zammit	FHWA Florida Division	(850) 942-9693	Ext.

WASHINGTON, D.C. ADVANCED FARE MEDIA

Description:

The purpose of this project was to develop and demonstrate an advanced Integrated Fare Collection System that would employ advanced technologies, improve security, and allow the sale and use of long term transit pass while assuring reliability and security against fraudulent abuse. Washington Metro Area Transit Authority (WMATA) selected Cubic's Go-Card System, a proximity reader/encoder that activates the fare gates when the passenger holds the pass within inches of the reader. The fare media also accommodated debiting the card on exiting the system and having the capability to integrate the fare collection system throughout the Authority by allowing passengers to use the same fare media to pay for Metrorail, Metrobus, and parking. The new system was installed in both directions of at least two aisles on as many as possible of the 93 mezzanines at the 70 stations. The system worked in conjunction with, or in addition to, the equipment currently being used and did not reduce the capabilities of the existing equipment.

Fare collection equipment has been installed at 29 Metro stations, on 21 buses and at 5 parking lots. The system was installed and put into operation February 6,1995, for a one year demonstration period.

Project Location **:** Washington, DC metropolitan area

Partner(s) : WMATA and Cubic

Start Date: December 1994

End Date**:** February 1996

Estimated Total ITS Funds: $997,899

Estimated Total Project Cost: $997,899

Contacts**:**

Irv Chambers	FTA Headquarters, TRI-11	(202) 366-0238	Ext.
Ramon Abromovich	Washington Metropolitan Area Transit Authority	(202) 962-5274	Ext.

WINSTON-SALEM MOBILITY MANAGEMENT

Description: This project defined and identified system needs and operationally tested and evaluated a mobility management system for the City of Winston-Salem. It included automated scheduling and demand-responsive, shared-ride transit for the young, elderly, and disabled who are unable to use fixed-route transit (Phase I). The project extended the transportation service to fixed-route transit, ridesharing and taxis used by the general public (Phase II). Integration with the Winston-Salem traffic management program was accomplished. Technologies being investigated also include smart cards, GPS, and automatic vehicle location.

Project Location **:** Winston-Salem, North Carolina

Partner(s) : Winston-Salem Transit Authority (WSTA), City of Winston-Salem, North Carolina DOT, and North Carolina State University's Institute for Transportation Research and Education

Start Date: May 1993

End Date**:** September 1995

Estimated Total ITS Funds*: $220,000

Estimated Total Project Cost: $275,000

Contacts**:**

Ron Boenau	FTA Headquarters, TRI-11	(202) 366-0195	Ext.
John Stone	North Carolina State University	(919) 515-7732	Ext.

* Federal Funds are FTA vs. ITS Funds

III. ADVANCE RURAL TRANSPORTATION SYSTEMS (ARTS)

III. ADVANCED RURAL TRANSPORTATION SYSTEMS (ARTS)

Rural America accounts for a small and dispersed portion of our nation's population, yet it encompasses a significant portion of the transportation system. Rural areas account for 80% of the total U.S. road mileage and 40% of the vehicle miles traveled, and there is a unique set of characteristics associated with this system. Consequently, rural travelers have ITS needs similar to those experienced by their urban counterparts, though the priority of these needs differs. These differences reflect the rural environment characterized by long distances, relatively low traffic volumes, relatively rare traffic congestion, travelers unfamiliar with their surroundings, and rugged terrain in remote areas. Furthermore, rural characteristics soliciting ITS solutions include an over representation of fatal crashes (about 60% of traffic fatalities and 55% of work zone fatalities occur in rural areas), safety problems related to high speeds on non-interstate rural roads and increased response time for Emergency Medical Services.

Early ITS efforts were driven by the desire to address growing transportation problems in urban areas and in interurban corridors. While many of the technologies and systems aimed at solving these problems also have application outside urban settings, the market structure, application logistics, and motivating factors underlying their deployment vary considerably from urban to rural areas. During 1996, U.S. DOT developed the ARTS Strategic Plan which covers the Federal ARTS program's role in developing and fostering the application of Intelligent Transportation Systems in rural areas. The Strategic Plan describes the vision, mission, goals, objectives, and measures which provide the foundation upon which the Federal ARTS program is built. Because of the diversity of needs and settings in rural America, it also developed seven critical program areas, or clusters, which provide areas of common interest and focus within the overall program. A companion Program Plan is under development which describes what is known and unknown within each cluster, sets the strategic priorities, and lays out the program (projects by year) to solve the unknowns. Together they provide the roadmap for the Federal ARTS program through the year 2003.

Achieving the strategic objectives of the Federal ARTS program means recognizing the extremely diverse nature of the rural transportation system. Diversity is exhibited in the system's wide-range of motorists, managers, maintenance staff, operators, road types, terrain, climates, jurisdictions, land use, and seasonal characteristics. These diverse characteristics translate into a wide variety of needs, problems, and opportunities for improvement. Consequently, the ARTS solutions, i.e., the application of advanced technologies to meet these disparate needs, problems and opportunities, must be diverse as well. The strategies to identify these solutions must also recognize this diversity.

Given this diversity of the rural transportation system, and the wide breadth of the program (i.e., encompassing a large number of needs of a large number of users), the ARTS program has been organized into seven Critical Program Areas (CPA). It was found that while rural settings differ greatly (Jackson Hole, Wyoming, vs. Death Valley, California, vs. Cape Cod, Massachusetts), there was general agreement on the classes of needs that exist within each setting and the principal users of ITS. The clusters were therefore developed around Major Needs and Service Groupings and are:

1. Traveler Safety and Security
2. Emergency Services

3. Tourism and Travel Information Services
4. Public Traveler Services/Public Mobility Services
5. Infrastructure Operating and Maintenance
6. Fleet Operating and Maintenance
7. Commercial Vehicle Operations.

The above division is the primary dimension for this cluster concept and focuses on identifiable needs categories. Tourism and Travel Information Services for example refers to the needs that a visitor (both driver and passenger) unfamiliar with a rural area may require as well as the Visitors and Tourism Bureaus, transit service providers, information providers, etc., that provide the services to meet their needs. In a tourist resort area, this may be the main focus of the ITS program. In other areas it may exist but play a smaller role. Likewise, the Public Traveler Services/Public Mobility Services focuses on reducing the isolation of the transportation disadvantaged and increasing the mobility of all. Its constituents also include both the potential travelers and service providers. Because of the costs of the provision of services in rural areas, the operations and maintenance activities may also form their own divisions. As ITS services are shown to reduce the cost of these services and improve their efficiency, these areas and the organizations responsible for providing them become natural constituents and advocates for the programs.

ITS applications such as incident notification (cellular and Mayday), advanced hazard warning systems, advanced traveler information services, and in-vehicle crash avoidance systems, are some of the ITS applications which can address the issues above and significantly impact the safety and mobility of rural travelers. Other ITS R&D programs within NHTSA and FHWA have substantial rural components--that is, they examine crash avoidance/warning, traveler information, vehicle control, automated roadway, or other safety technologies that have primary applications in improving rural safety. Most of these projects are covered in Chapter V, “Advanced Vehicle Control and Safety Systems.”

Advanced Rural Transportation Systems (ARTS)
(Research & Development)

AN AUTOMATED VEHICLE LOCATION PILOT SYSTEM IN A MAINTENANCE OPERATIONS SETTING

Description: This project will evaluate the use of an Automated Vehicle Location (AVL) system to aid in the administration of snow removal and ice control contract forces, and provide information concerning road conditions to the public and media and the management and performance of snow removal and ice control operations. The benefits anticipated from this system include: continuous location of snowplow fleet operations; ability to identify vehicles with abnormal behavior; increased safety for the vehicle operator; ability to detect and minimize waste and fraud; ability to capture statistical data; and improved communications efficiency. The evaluation will also focus on the benefits of incorporating snow and ice removal status received from the AVL system into traveler information programs in the Northern Virginia District.

Project Location **:** Northern Virginia District

Partner(s) : Virginia DOT

Start Date: August 1997

End Date**:** July 1998

Estimated Total ITS Funds: $50,000

Estimated Total Project Cost: $850,000

Contacts**:**

Chung Eng	FHWA Headquarters, HTV-3	(202) 366-8043	Ext.
Steve Clinger	FHWA Region 3, HEO-03	(410) 962-0077	Ext. 3055
Andy Mergenmeier	FHWA Virginia Division, SHA-VA	(804) 281-5134	Ext.
Ron Miner	Virginia DOT	(703) 383-2003	Ext.

RURAL APPLICATIONS OF ADVANCED TRAVELER INFORMATION SYSTEMS

Description:

This study will examine an Advanced Traveler Information Systems (ATIS) for rural applications. The research will examine a broad range of rural environments, categories of travelers, ATIS applications, and advanced electronic and communication technologies. The study involves determining the needs for ATIS services in rural and small urban areas and developing the functional requirements for providing them. The feasibility and cost-effectiveness of alternative applications and Advanced Traveler Information Systems related technologies will be assessed. Alternative system designs for the promising applications and technologies will be developed and evaluated. Based upon these analyses, priorities and plans for subsequent prototyping and operational field testing will be developed. The most promising rural ATIS applications will be developed and tested in a limited rural environment; including an evaluation of satellite communications for Mayday and a Surveillance and Delay Advisory System. A similar process to assess rural transit user and operator needs and system concept development are also being conducted.

Focus group discussions and telephone survey of rural travel needs and concerns have been completed. Some 20 preliminary concepts developed to meet rural travel needs were evaluated in terms of potential cost, benefits, implementation issues and trade-offs. A rural Action Plan was developed, and work is underway to develop and test an Action Plan project.

Project Location **:** Virginia

Contractor(s) : TransCore (formerly JHK & Associates) (lead), Hughes, Virginia Tech, and Bell-Atlantic

Start Date: January 1993

End Date**:** April 1998

Estimated Total ITS Funds: $1,990,853

Estimated Total Project Cost: $2,153,353

Contacts**:**

Paul Pisano	FHWA - TFHRC, HSR-30	(703) 285-2498	Ext.

Advanced Rural Transportation Systems (ARTS)
(Operational Tests)

ADVANCED RURAL TRANSPORTATION INFORMATION AND COORDINATION

Description: The Advanced Rural Transportation Information and Coordination (ARTIC) project is part of the Minnesota Statewide ITS program, Guidestar. ARTIC will coordinate the communications systems of several public agencies (highway, state patrol, and transit) by establishing a centralized communication site. Improvements are expected in response time to accident and road condition emergencies, and real-time vehicle status and schedule information will be provided through ARTIC. The primary objective of ARTIC is to evaluate the improvement in the transportation system and traveler safety by establishing a centralized communication site.

Project Location **:** Itasca and St. Louis Counties, Minnesota

Partner(s) : Minnesota DOT, Minnesota State Patrol, Arrowhead Transit, City of Virginia Transit, Arrowhead Regional Development Commission, and U.S. West

Start Date: July 1994

End Date**:** August 1998

Estimated Total ITS Funds: $903,000

Estimated Total Project Cost: $1,542,000

Contacts**:**

Edward Stillings	FHWA Region 5, HES-05	(708) 283-3550	Ext.
Jim McCarthy	FHWA Minnesota Division, HDA-MN	(612) 291-6112	Ext.
Richard Maddern	Minnesota DOT	(218) 749-7793	Ext.

ADVANCED TRANSPORTATION WEATHER INFORMATION SYSTEM

Description: This project is to provide an evaluation and demonstration of how current technologies in mesoscale meteorological analysis and forecasting can be effectively used to produce precise spatial and temporal weather information for integration into an Advanced Transportation Information System for safer and more efficient operations. Through this evaluation and demonstration, a prototype information and management center to support traffic weather analysis and forecasting in a responsive decision support environment will be developed. This system will be capable of providing immediate assessment of difficulties in travel arising from changing weather conditions. This project will demonstrate a prototypical advanced weather information system which may be implemented on a larger national scale.

Project Location **:** North Dakota and South Dakota

Partner(s) : North Dakota DOT, South Dakota DOT, University of North Dakota, U.S. West Communications, North Dakota Highway Patrol, South Dakota Highway Patrol, NOAA/Forecast Systems Lab, and Surface Systems Inc.

Start Date: May 1995

End Date**:** August 1998

Estimated Total ITS Funds: $1,750,000

Estimated Total Project Cost: $2,950,000

Contacts**:**

Lloyd Rue	FHWA Region 8, HPD-08	(303) 969-5772	Ext. 326
Steve Busek	FHWA North Dakota Division	(701) 250-4348	Ext.
Leon Osborne	University of North Dakota	(701) 777-2479	Ext.

ARIZONA I-40 TRAVELER AND TOURIST INFORMATION SYSTEM

Description:

The I-40 Interstate Corridor is the only access to a number of National Parks and tourist centers in the region. The purpose of this project is to evaluate various means of providing traveler information to visitors traveling to and from the Grand Canyon National Park, Petrified Forest National Park, Navajo Nation, various welcome/tourist information centers, Arizona Department of Tourism's Painted Cliffs Welcome Center, Little America truck stop in Flagstaff, Kingman port-of-entry, and 25 other recreation areas. It incorporates multimodal components such as commercial vehicle operations, transit, parking management and information systems.

Project Location **:** Arizona I-40 Corridor

Partner(s) :

Arizona DOT; Grand Canyon National Park; National Weather Bureau; Winslow Chamber of Commerce; Arizona Department of Public Safety; AZ Office of Tourism; Northern Arizona University; Arizona State University; City of Bullhead; Computran Systems Corp.; Kimley-Horn & Assoc.; Castle Rock Consultants, Inc.; Fastline; Smartroute Systems, Inc., Transmit Technologies, Inc.

Start Date: October 1997

End Date**:** May 1999

Estimated Total ITS Funds: $250,000

Estimated Total Project Cost: $3,350,000

Contacts**:**

Dale Thompson	FHWA Headquarters, HTV-3	(202) 366-0640	Ext.
Alan Hansen	FHWA Arizona Division, HPR1-AZ	(602) 379-6856	Ext.
Tim Wolfe	Arizona DOT	(602) 255-6622	Ext.

BRANSON, MISSOURI TRIP (TRAVEL AND RECREATIONAL INFORMATION PROJECT)

Description: Branson, a rural community located in the heart of the Ozark Mountains, has become known as the live entertainment capital of the world. The pristine natural surroundings of Branson have always attracted large numbers of visitors. The Branson TRIP seeks to provide Branson Tri-Lakes area tourists with comprehensive tourist attractions, weather, traffic and road construction information. This information will be provided through technologies such as the World Wide Web, dial-in telephone services, changeable message signs, highway advisory radio, commercial radio, kiosks, and cable television. The project will evaluate those means of conveying information.

Project Location **:** Branson, Missouri

Partner(s) : Missouri DOT; City of Branson, MO; Missouri Division of Tourism; Stone County, Taney County, Southwest Missouri Advisory COG; Branson/Lakes Area Chamber of Commerce; Table Rock Lake Chamber of Commerce, Castle Rock/Black Veatch; Addco; Intuitive Solutions; The Branson Connection; The Vacation Channel

Start Date: October 1997

End Date**:** May 1999

Estimated Total ITS Funds: $600,000

Estimated Total Project Cost: $1,200,000

Contacts**:**

Pam Crenshaw	FHWA Headquarters, HTV-3	(202) 366-1482	Ext.
Bruce Baldwin	FHWA Region 7, HEO-07	(826) 276-2741	Ext.
Tom Ryan	Missouri DOT	(573) 526-0124	Ext.

CAPE COD RURAL ADVANCED INTERMODAL TRANSPORTATION SYSTEM

Description: This project will evaluate the use of Automatic Vehicle Location systems on fixed route, shuttle, paratransit and Council of Aging transit vehicles. A customer information system will be developed with multi-modal information for dissemination through various media designed to greatly enhance the reliability of transit service on the Cape.

Project Location **:** Cape Code Region, Cape Cod, MA

Partner(s) : Bridgewater State College, Bridgewater, MA

Start Date: October 1997

End Date**:** June 1999

Estimated Total ITS Funds: $200,000

Estimated Total Project Cost: $408,000

Contacts**:**

William Wiggins	FTA Headquarters, TRI-11	(202) 366-0255	Ext.
Dennis Walsh	Cape Cod Regional Transit Authority	(508) 385-8311	Ext.
Larry Harman	Bridgewater State College	(508) 279-6144	Ext.

FORETELL - INTEGRATING ITS WITH ADVANCED WEATHER PREDICTION

Description: The project objectives are twofold: (1) to develop an integrated weather information system that improves and broadens the scope of atmospheric and road surface condition information available to highway users and operators; and (2) to assess the benefits of integrating the functions of Road Weather Information Systems, other weather information sources, and transportation management and traveler information operations for a rural section of the transportation system.

Project Location **:** Iowa, Wisconsin, Missouri, Minnesota, Illinois

Partner(s) : Iowa DOT, Illinois DOT, Missouri DOT, Wisconsin DOT

Start Date: October 1997

End Date**:** March 2000

Estimated Total ITS Funds: $1,300,000

Estimated Total Project Cost: $4,450,000

Contacts**:**

Paul Pisano	FHWA - TFHRC, HSR-30	(703) 285-2498	Ext.
Bruce Baldwin	FHWA Region 7, HEO-07	(816) 276-2741	Ext.
Jim Hogan	FHWA Iowa Division, HDV-IA	(515) 233-7305	Ext.

GREATER YELLOWSTONE RURAL ITS PROJECT

Description:

One of the key products to be developed as a part of this project is a Strategic Deployment Plan for the Greater Yellowstone Rural ITS Project. This effort will address the feasibility, demonstrate and evaluate how current ITS technologies may be applied as a viable solution to addressing travel and safety issues in a rural transportation environment. The specific setting of the project encompasses the three major transportation corridors in the surrounding states of Idaho, Wyoming and Montana which travelers use to access the National Park.

The Greater Yellowstone Rural ITS Project will also serve as a testbed for rural ITS applications to facilitate moving the state-of-the art in Advanced Rural Transportation Systems forward. This project will support a limited amount of deployment and testing of the short term projects identified as priorities in the Strategic Deployment Plan. The ability to provide information to travelers has been identified as one of the key needs to be addressed in the initial study. The initial goals identified for the study include increasing safety, improving emergency response, improving commercial vehicle operations, increasing travel information and trip enhancement, improving interagency communications, reduce congestion and increase economic activity.

Project Location **:** Idaho and Montana; US 191/20 from Bozeman, MT to Idaho Falls, ID; I-15 from Butte, MT to Idaho Falls, ID (including I-90 from Bozeman to Butte); US 89/26 from Livingston, MT to Idaho Falls, ID (including I-90 from Bozeman MT to Livingston MT).

Partner(s) : Idaho DOT, Western Transportation Institute, Montana DOT, Wyoming DOT, National Park Service, Idaho National Engineering Laboratory, Idaho State Police, Travel Montana, Gallatin (MT) County

Start Date: June 1997

End Date**:** June 1999

Estimated Total ITS Funds: $500,000

Estimated Total Project Cost: $625,000

Contacts**:**

Lloyd Rue	FHWA Region 8, HPP-08	(303) 969-5772	Ext. 326
Bob Seliskar	FHWA Montana Division, HDT-MT	(406) 441-1234	Ext. 244
Dennis Hult	Montana DOT	(406) 444-9237	Ext.
Steve Albert	Western Transportation Institute	(406) 994-6114	Ext.

HERALD EN-ROUTE DRIVER ADVISORY SYSTEM VIA AM SUBCARRIER

Description:

The main concept of this project is to disseminate traveler information in difficult-to-reach, remote rural areas using a subcarrier on an AM broadcast station. The three basic components of Herald -- message generation, message transmission and message reception -- have been developed under an effort by the multi-state organization called ENTERPRISE. This project will determine the performance of the system and analyze the impacts on broadcasters, travelers and equipment manufacturers. The primary objective of this test will be to assess real world impacts of the system related to transmission of traveler information in challenging terrain (Colorado), potentially interfering environmental conditions (Iowa), improvements to safety, and the overall marketability of the system.

Project Location **:** Colorado and Iowa

Partner(s) : Modulation Sciences and members of the ENTERPRISE group (Departments of Transportation from the States of Arizona, Colorado, Iowa, Michigan, Minnesota, North Carolina and Washington State, and the Dutch Ministry of Transport, Ministry of Transportation of Ontario, and Transport Canada)

Start Date: January 1995

End Date**:** March 1998

Estimated Total ITS Funds: $200,000

Estimated Total Project Cost: $380,000

Contacts**:**

Lloyd Rue	FHWA Region 8, HPD-08	(303) 969-5772	Ext. 326
Scott Sands	FHWA Colorado Division	(303) 969-6730	Ext. 362
John Whited	Iowa DOT	(515) 239-1411	Ext.

IDAHO STORM WARNING SYSTEM

Description: The purpose of the Idaho Storm Warning Operational Test is to investigate various sensor systems that could provide accurate and reliable visibility and weather data, and to use that data to provide general warnings, speed advisories, and possible road closure information to travelers on a section of I-84 in southeast Idaho that is highly prone to reduced visibility from blowing snow and dust. The primary goal of such a system is a major reduction in visibility-related multi-vehicle accidents in rural areas. Information will be transmitted to the motorist via changeable message signs.

Project Location **:** Interstate 84 in southeastern Idaho.

Partner(s) : Idaho Transportation Department, CH2M Hill, Handar Incorporated, Santa Fe Technologies, and Surface Systems Incorporated

Start Date: June 1993

End Date**:** August 1998

Estimated Total ITS Funds: $804,500

Estimated Total Project Cost: $1,231,900

Contacts**:**

Ed Fischer	FHWA Region 10, HEO-010	(503) 326-2071	Ext.
Ben Frevert	FHWA Idaho Division	(208) 334-1843	Ext.
Larry Vanover	Idaho Transportation Department	(208) 334-8558	Ext.

NORTH FLORIDA RURAL TRANSIT INTELLIGENT TRANSPORTATION SYSTEMS

Description: This project will assist in providing regional, multi-agency application of Intelligent Transportation Systems (ITS) technologies to three different countywide rural transit systems in Flagler, Putnam, and St. Johns counties in north Florida. The resulting electronic coordinated transit service provides transportation for the public for the purpose of job training, employment, medical service, nutrition trips, rehabilitation, and other life-sustaining functions. This project will be a national model in initiating regional, electronically coordinated transit service in rural areas involving several transit organizations. ITS technologies being considered include automatic vehicle location (AVL) systems using geographic positioning systems (GPS), and automated scheduling, dispatching, and billing software.

Project Location **:** Florida

Partner(s) : Flagler County Transport; ARC Transit of Putnam County, St. John's County Council on Aging

Start Date: September 1997

End Date**:** April 2000

Estimated Total ITS Funds: $200,000

Estimated Total Project Cost: $240,000

Contacts**:**

Ron Boenau	FTA Headquarters, TRI-11	(202) 366-0195	Ext.
Jennifer Bowers	Florida Comm. for the Transp. Disad.	(940) 488-6036	Ext.

TRAVEL - AID

Description:

This project will use variable speed limit signs, variable message signs, and in-vehicle communications and signing equipment to improve safety along a 40-mile stretch of I-90 across Snoqualmie Pass, a rural area prone to snow, ice and poor visibility. Electronic sensing and equipment will be installed to monitor traffic, speeds, road and weather conditions. This information will help determine a safe speed. Warnings about road conditions, accidents, or slow-moving equipment will be broadcast via the various devices. The in-vehicle message device would have an alert signal to inform the motorist that a message is available. Up to 200 vehicles will be equipped with devices to deliver information similar to that displayed from the roadway variable message sign system.

Project Location **:** Snoqualmie Pass, Washington State

Partner(s) : Washington State DOT, Farradyne Systems Inc., Engineering Research Associates (ERA), General Logistics, Surface Systems Incorporated (SSI), University of Washington - Washington State Transportation Center (TRAC), and Traffic Master

Start Date: November 1992

End Date**:** July 1998

Estimated Total ITS Funds: $1,828,525

Estimated Total Project Cost: $4,700,291

Contacts**:**

Ed Fischer	FHWA Region 10, HEO-010	(503) 326-2071	Ext.
Larry Senn	Washington State DOT	(206) 543-6741	Ext.

Advanced Rural Transportation Systems (ARTS)
(Completed Projects)

EVALUATION OF RADIO AND MICROWAVE TECHNOLOGY FOR MOTOR VEHICLE SAFETY WARNING SYSTEMS

Description: This cooperative agreement has two (2) objectives:

(1) To assist the Federal Highway Administration (FHWA) in evaluating the utility of a prototype motor vehicle safety warning system that utilizes police radar frequency transmissions to alert drivers (in real-time) of hazardous road conditions;

(2) To characterize system technical requirements for an effective warning system, and to evaluate the performance of the prototype system.

Project Location **:** Georgia

Contractor(s) : Georgia Technical Research Institute; Georgia Department of Transportation

Start Date: September 1996

End Date**:** December 1997

Estimated Total ITS Funds: $200,000

Estimated Total Project Cost: $200,000

Contacts**:**

Paul Pisano	FHWA - TFHRC, HSR-30	(703) 285-2498	Ext.

IDENTIFICATION OF SIMPLE SOLUTIONS FOR THE RURAL TRANSPORTATION SYSTEM

Description: There are four (4) tasks associated with this cooperative agreement:

(1) An information search to identify the successful, small-scale technology applications appropriate for rural areas;

(2) An assessment and evaluation of the most promising applications;

(3) The documentation of these solutions and other findings;

(4) The presentation of these findings at the appropriate venues.

Project Location **:** Colorado

Contractor(s) : Castle Rock Consultants; Colorado Department of Transportation; Enterprise

Start Date: September 1996

End Date**:** July 1997

Estimated Total ITS Funds: $80,000

Estimated Total Project Cost: $80,000

Contacts**:**

Paul Pisano	FHWA - TFHRC, HSR-30	(703) 285-2498	Ext.

TRANSCAL

Description:

This project was a comprehensive Inter-Regional Traveler Information System, integrating road, traffic, transit, weather, and value-added traveler services information sources from the entire geographic region. The location of the project is along the I-80/US 50 corridor between San Francisco, California and Lake Tahoe/Reno, Nevada. Land line and cellular telephone, and wireless FM subcarrier networks were used to transport information to and from travelers via telephones, personal digital assistants, in-vehicle devices and kiosks. Additionally, the test assessed the ability to integrate information from multiple sources (urban, rural, rough terrain, severe weather, etc.), and the ability to integrate traveler services and transit information with real-time regional congestion and incident content.

Project Location : California and Nevada

Partner(s) :

TRW/ESL, Shadow Broadcast, Cue Network Corporation, Ellen Williams and Associates, Geotechnology Development Inc., ETAK, Navigation Technologies, Sony Corporation, NET, Metropolitan Transportation Commission, Sacramento Area Council of Governments, The Tahoe Transportation District, Regional Transportation Commission of Washoe County (Nevada), California DOT (Caltrans), Nevada DOT, University of California at Davis, California Highway Patrol, Nevada Highway Patrol, Sierra Counties Consortium, and California Alliance for Advanced Transportation

Systems

Start Date: July 1994

End Date: December 1997

Estimated Total ITS Funds: $3,303,000

Estimated Total Project Cost: $7,355,000

Contacts:

Frank Cechini	FHWA California Division, HTA-CA	(916) 498-5005	Ext.

IV. COMMERCIAL VEHICLE OPERATIONS (CVO)

IV. COMMERCIAL VEHICLE OPERATIONS (CVO)

Assisted by technology, trucks and buses will move safely and freely throughout North America. Achieving this envisions a system that will allow motor carriers to be screened electronically with the help of nationwide data and information systems. The system is called Commercial Vehicle Information Systems and Networks (CVISN). It supports commercial vehicle electronic clearance at weigh stations and borders, automated roadside safety inspections, one-stop electronic purchase of credentials, automated mileage/fuel reporting, on-board safety monitoring, international electronic border clearance, hazardous materials incident response, and freight mobility. Except on a random basis, the developed system will allow safe and legal commercial motor vehicle drivers and vehicles to proceed at highway speeds without being stopped for weight, credential verification, or safety checks.

A. Research and Development. The CVO research and development program for FY 1997 focused on the development of system components that will allow commercial motor vehicles and drivers to be screened and identified electronically. Specific research areas include: 1) the development of a real-time data and information system (Commercial Vehicle Information Systems and Networks), and installation in two prototype states and eight pilot states; 2) Support for 26 states intending to eventually deploy CVISN under mainstreaming program; 3) state and industry cost benefit analysis; 4) roadside identification and screening, including automation of the inspection process, i.e. inspection selection system, pen-based computers, brake testing technologies, and the development of the safety and fitness electronic records system (SAFER); and 5) on-board safety systems development, focusing on driver fitness, vehicle diagnostics, and black box development; and

B. Operational Tests. CVO operational tests for FY 1997 are contained in four principal areas: 1) electronic clearance (I-75 and Oregon Greenlight), which will electronically verify properly documented trucks to proceed past weigh stations at mainline speeds with minimal stopping; 2) hazardous materials (Operation RESPOND, National Institute for Environmental Renewal), which will establish computerized information systems for emergency response personnel; 3) one-stop shopping (Help, Inc, Midwest, Southwest), which will allow carriers to apply for, pay for, and receive all necessary credentials or permits electronically; 4) roadside safety (pen-based computers at 200 MCSAP Sites, out-of-service verification), which will provide electronic access to carrier safety data and driver license status at roadside inspection sites; and 5) international borders (MONY, IBEX, TRIBEX, EPIC), which will deploy ITS technologies to facilitate the flow of safe and legal commerce between the U.S. and its trading partners.

C. Mainstreaming. The purposes of the CVO Mainstreaming program are to provide training, outreach and technical assistance to accelerate the deployment of CVISN, ITS/CVO technologies and programs. CVO includes streamlining the administration of motor carrier regulations, focusing safety enforcement activities on high-risk carriers, and reducing congestion costs for motor carriers. The objectives of the CVO Mainstreaming program are to:

- Increase the states' and carriers' technical and institutional capacity to implement CVO/CVISN;
- Incorporate ITS/CVO more fully into state and metropolitan transportation planning activities;
- Coordinate ITS/CVO activities among agencies and among states; and

- Explain the ITS/CVO program to key decision makers in the public and private sectors.

D. Commercial Vehicle Information Systems and Networks: A Model Deployment Initiative. Commercial Vehicle Information Systems and Networks refers to the ITS communications technologies that support CVO. CVISN is not a new information system, but rather a way for existing systems to electronically exchange information through the use of standards and the commercially available communications infrastructure in the U.S. CVISN includes information systems owned and operated by state/local governments, carriers, and other stakeholders. It does not include the sensor and control elements of ITS/CVO technologies. CVISN will increase the safety and productivity of commercial operations and serve to educate key state and industry decision makers, and the general public, on the costs and benefits of advanced technology for CVO.

The CVISN deployment strategy is divided into 5 phases. Phase 1 developed the management plans and technical frameworks necessary to coordinate the subsequent phases. Phase 2 is prototyping the technology, in a live environment, to demonstrate the operational concepts and validate the requirements. Phase 3 is the model deployment. Eight states from all regions have been funded to pilot safety, credentials and clearance services, and related technologies developed during the Prototype Phase. Phase 4 is expansion to additional states in the same regions. Phase 5 allows for full deployment of CVISN to all interested states. By this time, the technology, concepts, costs, and benefits should be well understood and documented. The end result would be deployment of the CVISN and technologies in a straightforward manner with little unforeseen risk to the public or private sector.

Commercial Vehicle Operations (CVO)
(Research & Development)

AUTOMATED SAFETY ASSESSMENT PROGRAM

Description:

The primary objective of the Automated Safety Assessment Program (ASAP) is to obtain data from the motor carrier that will enable the Office of Motor Carriers (OMC) to detect the motor carrier's safety performance without going to the carrier's place of business at a significant cost in time and money. The ASAP program allows motor carriers to present information, through an electronic means, to the OMC regarding their compliance with the Federal Motor Carrier Safety Regulations. The ASAP program consists of menu-driven software that will be provided to eligible motor carriers. The motor carriers would load the software into microcomputer systems and complete a data input process. The data would be downloaded to the Office of Motor Carriers for validation and analysis.

Project Location **:** Massachusetts

Contractor(s) : Volpe National Transportation Systems Center

Start Date: May 1995

End Date**:** October 1998

Estimated Total ITS Funds: $1,500,000

Estimated Total Project Cost: $1,500,000

Contacts**:**

Ken Rodgers	FHWA - OMC, HSA-10	(202) 366-4016	Ext.
Cynthia Mitchell	Volpe Center	(617) 494-2271	Ext.

COMMERCIAL VEHICLE FLEET MANAGEMENT AND INFORMATION SYSTEMS

Description: Commercial and public fleet management problems and needs that might be addressed through advanced technologies will be identified through case studies and in-depth interviews with fleet managers, dispatchers, and drivers. Phase II will study the application of ITS to intermodal freight movement.

Project Location **:** Cambridge, Massachusetts

Contractor(s) : Cambridge Systematics, Inc.

Start Date: September 1993

End Date**:** September 1998

Estimated Total ITS Funds: $405,461

Estimated Total Project Cost: $405,461

Contacts**:**

Gene McHale	FHWA - TFHRC, HSR-10	(703) 285-2973	Ext.

CVISN - DESIGN OF A COMMERCIAL VEHICLE INFORMATION SYSTEM NETWORK

Description:

FHWA is currently designing, testing, and evaluating ITS technology to provide automated clearance, electronic credential purchasing, and automated roadside safety information processing for interstate and intrastate Commercial Vehicle Operations (CVO). Currently commercial vehicles are stopped at state borders and checked for size and weight violations. While these are necessary checks, they cause millions of dollars in lost productivity.

An information system is required to allow commercial vehicles to be cleared as they pass at highway speeds. Also, commercial vehicle operators must spend time and effort gathering appropriate credentials (permits) from each state and agency they do business with. Electronic purchasing of credentials and permits would reduce the administrative burden on carriers significantly and help to streamline the states' process of issuing credentials. Additionally, to facilitate the decision process regarding high-risk carriers, the intent is to provide real-time safety data. A national information systems architecture is being designed to support various scenarios. Models of the system will be developed to evaluate those alternatives that best support user services. Subsequently, the system will provide the design for a national CVO information system network. Testing is occurring in two (2) prototype states and eight (8) pilot states.

Project Location **:** Laurel, Maryland

Contractor(s) : Johns Hopkins University's Applied Physics Laboratory/RSIS

Start Date: August 1995

End Date**:** August 1998

Estimated Total ITS Funds: $10,500,000

Estimated Total Project Cost: $10,500,000

Contacts**:**

Doug McKelvey	FHWA-ITS/CVO, HSA-20	(202) 366-9246	Ext.
Michael Curtis	FHWA - TFHRC, HSR-10	(703) 285-2991	Ext.

DEVELOPMENT, EVALUATION, AND APPLICATION OF BRAKE TESTING DEVICES-BATTELLE MEMORIAL INSTITUTE

Description:

The Office of Motor Carriers has contracted with Battelle Memorial Institute to evaluate and test devices that show substantial promise of increasing the efficiency of roadside inspections. Several State inspection/enforcement agencies are testing a variety of brake devices in conjunction with Commercial Vehicle Safety Alliance Level 1 brake inspections on commercial vehicles (heavy trucks and buses). These joint inspections, combined with daily use, training, and maintenance records, will provide data from which an objective evaluation of the technologies will be made. The project will assess a variety of technologies including roller dynamometers, flat-plate testers, infra-red detectors, torsional devices, and decelerometers.

Project Location **:** Ohio, West Virginia, Colorado, Connecticut, Indiana, Oregon, Wisconsin, Nevada, Maryland, and Ontario, Canada

Contractor(s) : Battelle Memorial Institute

Start Date: September 1993

End Date**:** September 1998

Estimated Total ITS Funds: $1,076,264

Estimated Total Project Cost: $3,075,000

Contacts**:**

Steve Keppler	FHWA - OMC, HSA-20	(202) 366-2978	Ext.
Dr. Steve Shaffer	Battelle Memorial Institute	(614) 424-4960	Ext.

INTER-REGIONAL INSTITUTIONAL STUDY PROJECT

Description: This study will contribute to the establishment of uniformity in truck weights enforcement and the creation of a uniform, single registration form for all port reporting states.

Project Location **:** Georgia

Contractor(s) : Georgia DOT

Start Date: September 1994

End Date**:** December 1998

Estimated Total ITS Funds: $575,000

Estimated Total Project Cost: $1,150,000

Contacts**:**

Jeff Loftus	FHWA - OMC, HSA-20	(202) 366-4516	Ext.
Glennon Musial	FHWA - OMC, HMC-04	(404) 347-4049	Ext.
Mark Doctor	FHWA Region 4, HES-04	(404) 347-4075	Ext.

ITS/CVO LEGAL & PRIVACY STUDY

Description: This cooperative agreement initiated a literature review and contacted various members of the ITS/CVO community, industry representatives, transportation experts and legal/privacy act experts to identify key issues relating to ITS/CVO.

Project Location **:** Durham, North Carolina

Contractor(s) : North Carolina Central University

Start Date: October 1996

End Date**:** January 1998

Estimated Total ITS Funds: $77,000

Estimated Total Project Cost: $77,000

Contacts**:**

Kate Hartman	FHWA-OMC, HSA-20	(202) 366-2742	Ext.
Dean Percy Luney, Jr.	North Carolina Central Univ. School of Law	(919) 560-6427	Ext.

ON-BOARD BRAKE RESEARCH AND TESTING

Description: FHWA and NHTSA have entered into a reimbursable agreement to develop and evaluate prototype electronic braking systems. These systems potentially offer many advantages compared to pneumatically-controlled systems in terms of reliability, safety, efficiency, and productivity. This multi-year effort will develop functional and performance specifications for electronic braking systems that will enable them to act as status monitors and recorders.

Project Location **:** Winston-Salem, North Carolina

Contractor(s) : Various vehicle/electronic manufacturers

Start Date: October 1995

End Date**:** September 1998

Estimated Total ITS Funds: $500,000

Estimated Total Project Cost: $500,000

Contacts**:**

Steve Keppler	FHWA - OMC, HSA-20	(202) 366-2978	Ext.

ON-BOARD DRIVER MONITORING/FITNESS-FOR-DUTY TESTING

Description: This pilot test is evaluating the ability of a lane tracking device to monitor a driver's fitness-for-duty. Drivers using this device establish a "base" for their ability to keep a vehicle in its lane. If deviation is detected, the driver is notified. If it continues, both the driver and the carrier are notified. The driver then stops the vehicle at the closest safe location and takes a five minute test. Depending on the test results, the driver may continue driving or may be required to sleep before resuming driving responsibilities.

Project Location **:** San Diego, California

Contractor(s) : Trucking Research Institution; Trucking Research Institute and Evaluation Systems, Inc.

Start Date: June 1995

End Date**:** October 1998

Estimated Total ITS Funds: $628,000

Estimated Total Project Cost: $628,000

Contacts**:**

Kate Hartman	FHWA - OMC, HSA-20	(202) 366-2742	Ext.
Bill Rogers	Trucking Research Institute	(703) 838-7912	Ext.

SAFETY AND FITNESS ELECTRONIC RECORDS SYSTEM (SAFER)

Description: SAFER system will provide electronic records of carrier safety fitness to ITS/CVO and will enable carrier safety fitness data to be accessed by roadside inspectors at 100 MCSAP sites.

Project Location **:** Baltimore, Maryland

Contractor(s) : Johns Hopkins University's Applied Physics Laboratory

Start Date: January 1994

End Date**:** June 1998

Estimated Total ITS Funds: $5,850,000

Estimated Total Project Cost: $5,850,000

Contacts**:**

Tom Hillegass	FHWA - OMC, HIA-10	(202) 366-4023	Ext.

Commercial Vehicle Operations (CVO)
(Operational Tests)

DYNAMIC TRUCK SPEED WARNING FOR LONG DOWNGRADES

Description: This project provides for the installation of a weigh-in-motion station to determine the weight of each truck passing the site (ignoring vehicles under 30,000 pounds GVW) and for the installation of loops to determine vehicle speed. Using the weight and configuration of the vehicle, the safe descent speed is computed from the algorithm published in FHWA-RD-79-116 "Feasibility of a Grade Severity Rating System" as modified by "The Development and Evaluation of a Prototype Grade Severity Rating System." The vehicles are advised of the safe speed using variable message signs.

Project Location **:** Colorado

Partner(s) : Colorado DOT, Colorado Motor Carriers Association, and International Road Dynamics

Start Date: June 1993

End Date**:** October 1998

Estimated Total ITS Funds: $195,000

Estimated Total Project Cost: $243,000

Contacts**:**

Eva Sniezek	FHWA Region 8, HPD-08	(303) 969-5772	Ext. 326
Scott Sands	FHWA Colorado Division, HFO-CO	(303) 969-6730	Ext. 362

ELECTRONIC CLEARANCE FOR INTERNATIONAL BORDERS

Description:

The Office of Motor Carriers is overseeing a coordinated set of operational tests whose purpose is to demonstrate commercial vehicle electronic clearance at international borders including proper identification of Mexican and Canadian motor carriers by using innovative Intelligent Transportation Systems technology. These projects comprise a comprehensive effort designed to support the development of a comprehensive North American system design and standard for international border crossings. The project sites are located at:

* Detroit, Michigan, and Buffalo, New York Crossings
* Otay Mesa, California Crossing
* Nogales, Arizona Crossing
* Loredo and El Paso, Texas Crossings

A key element of these tests is integrating the North American Trade Automation Prototype (NATAP) an initiative of the U.S. Treasury Department.

In addition, while not part of the NATAP, two additional crossings at Blaine, Washington, and Sweetgrass, Montana, were Congressionally directed to be developed for electronic clearance.

Project Location **:** The city and states enumerated above.

Partner(s) : Lockheed Martin IMS, HELP Inc., Hughes TMS, PERCEPTICS, Western Highway Institute, Michigan DOT, New York DOT, Arizona DOT, California DOT CalStart, Ontario Ministry of Transportation, Sandia National Laboratory, and JHK

Start Date: September 1994

End Date**:** May 1998

Estimated Total ITS Funds: $11,640,000

Estimated Total Project Cost: $19,000,000

Contacts**:**

Lee Jackson	FHWA - OMC, HSA-20	(202) 366-4415	Ext.

ITS/CVO GREENLIGHT PROJECT

Description:

The Oregon ITS/CVO Green Light Project will improve the safety and efficiency of commercial vehicle operations and increase the performance of the highway system. The project will electronically verify safety and weight information of drivers, vehicles, and carriers from fixed and mobile roadside sites at highway speeds. The Green Light project will be interoperable with the HELP, Inc. and ADVANTAGE I-75 electronic clearance efforts to form the national deployment of an electronic information network for commercial vehicles and States.

The primary features of this effort are to:

- deploy mainline electronic pre-clearance sites;
- deploy integrated tactical enforcement sites;
- create safety enhancements including electronic access to driver/vehicle/carrier safety status, downhill speed control notification systems, and road/weather conditions;
- integrate vision technology for vehicles not equipped with transponders
- provide hardware/software upgrades and database management and
- development to support the project; and
- perform an independent objective evaluation of the project.

Project Location **:** Oregon

Partner(s) : Oregon DOT and Oregon State University; Iowa State University; Walton & Associates

Start Date: March 1995

End Date**:** April 2000

Estimated Total ITS Funds: $20,000,000

Estimated Total Project Cost: $25,500,000

Contacts**:**

Zeborah English	FHWA - OMC, HSA-20	(202) 366-0398	Ext.
Jeff Loftus	FHWA - OMC, HSA-20	(202) 366-4516	Ext.
Mike Nolan	FHWA - HMC-OR	(503) 399-5775	Ext.
Joel Hiatt	FHWA - OMC, HMC-WA	(360) 753-9875	Ext.
Ken Everet	Oregon DOT	(503) 945-7938	Ext.
Paul Henry	Oregon Public Utilities Commission	(503) 378-6736	Ext.

NATIONAL INSTITUTE FOR ENVIRONMENTAL RENEWAL (NIER)

Description:

This project is designed to demonstrate the feasibility of utilizing computerized emergency response information, including telecommunications technologies, to provide hazardous materials information to emergency response units.

Phase I objectives are to:

* Identify contents of shipments of hazardous materials transported by motor carriers, and
* Link systems that identify, store and allow retrieval of data for emergency response to incidents and accidents involving transportation of hazardous materials by motor carriers either directly or through links with other systems.

During Phase II, the project has been expanded to include the OPERATION RESPOND System and intermodal movements at the port of Los Angeles.

Project Location **:** Phase I, Mayfield, Pennsylvania: Phase II, Port of Los Angeles, California

Partner(s) : NIER and various subcontractors

Start Date: September 1996

End Date**:** March 1998

Estimated Total ITS Funds: $4,000,000

Estimated Total Project Cost: $4,000,000

Contacts**:**

Lee Jackson	FHWA-OMC, HSA-20	(202)366-4415	Ext.
Robert Ketenheim	FHWA - OMC, Region 3	(410) 962-0098	Ext.

OPERATION RESPOND

Description: This project is designed to provide an electronic link with 911 operators and participating carriers during the initial response to hazardous materials accidents. The project is currently being expanded to establish computerized information systems for emergency responders and participating railroads and motor carriers serving Mexican and Canadian border crossings. The crucial information provided by this innovative system will enable emergency responders to have real-time access to hazardous materials information on the scene across North America to facilitate assessment of situations and to determine appropriate immediate action. This will further ensure the safety of the public and emergency personnel.

Project Location **:** Houston, Texas; Atlanta, Georgia; New Orleans, Louisiana Nuevo Laredo, Mexico; Laredo, Texas; Contra Costa County, California; Buffalo, New York; Niagara Falls, Detroit, Michigan; Canada and other locations to be determined.

Partner(s) : Operation Respond Institute, Inc.

Start Date: January 1997

End Date**:** April 1998

Estimated Total ITS Funds: $1,540,000

Estimated Total Project Cost: $3,015,000

Contacts**:**

Lee Jackson	FHWA - OMC, HSA-20	(202) 366-4415	Ext.

OUT-OF-SERVICE VERIFICATION OPERATIONAL TESTS

Description: Two operational tests are currently underway that will utilize technologies that will provide automatic, real-time out-of-service verification at the roadside. The Wisconsin/Minnesota project will utilize video identification equipment and a database which would be created containing key out-of-service data on specific vehicles. Subsequent downstream identification of vehicles will determine whether or not a vehicle is in violation of an out-of-service order. The Idaho project will utilize AVI tags, video imaging analysis and an inspection site alarm system that would be activated when an out-of-service vehicle attempts to leave.

Project Location **:** Minnesota/Wisconsin and Idaho

Partner(s) : Minnesota Department of Public Safety, Minnesota DOT, Wisconsin DOT, Wisconsin Division of State Patrol, Idaho Department of Law Enforcement, Idaho National Energy Laboratory, Hughes Missile Systems Company

Start Date: April 1994

End Date**:** February 1998

Estimated Total ITS Funds: $1,016,000

Estimated Total Project Cost: $1,400,000

Contacts**:**

Steve Keppler	FHWA - OMC, HSA-20	(202) 366-2978	Ext.
Lt. Tim Carnahan	Wisconsin State Patrol	(608) 266-0264	Ext.
Saundra DeClotz	Idaho State Police	(208) 884-7220	Ext.

ROADSIDE MCSAP COMPUTER SYSTEM (200 SITES)

Description:

This Congressionally mandated project has the goal of providing by December 31, 1995 carrier safety data and driver license status to the roadside for at least 100 MCSAP inspection sites; and, by mid-1997, the additional capability to access this data electronically via communication from at least 200 MCSAP sites. This project uses information systems technology to better target inspections, improve driver license checks, and provide for electronic recording and uploading of inspection data via portable computers.

The project encompasses the following projects:

*Development of a functional vehicle driver inspection system (ASPEN)
*Evolution of roadside data communications options (SAFER)
*Development of Inspection Selection System (ISS)

Status – A first generation ASPEN inspection system (for DOS) was deployed in 1995 in 25 States. It was replaced in 1996 by a second generation ASPEN written for Windows. This version currently is deployed in 45 States and is in use by approximately 2,000 law enforcement officers. The pen-computer strategy by has given way to a laptop computer strategy because of limitations in pen-computer hardware technology. Widespread use of ASPEN greatly has improved inspection accuracy, inspection report readability, and timeliness of data transfer into the National information system. A third generation rebuild of ASPEN into a 32-bit system for Windows NT is slated for 1998.

The Inspection Selection System (ISS) was developed and deployed in 45 States with great success. Societal benefits have been calculated to exceed $60 million per year (see final ISS report). A version of ISS for voice input has been developed and is being tested. To tie ISS closely with OMC's SAFESTAT carrier prioritization algorithm, a second generation ISS, based closely on SAFESTAT is currently under development. The SAFER communications system is a many-faceted project and is still under development. Currently, functional parts include:

* Inspection transfer via a data mailbox system
* Unknown carrier name & address and "snapshot" lookup
* Weekly refresh of local ISS carrier snapshot databases
* Carrier information availability via the Internet

The next major addition to SAFER is implementation of a 30-day past inspection database, and query retrieval system. This is expected to be operational by early Spring 1998 with release of ASPEN version 1.4.

Widespread deployment of SAFER to State users has proved to be more complex than originally anticipated. Currently, SAFER use is limited to beta testing with about 30 users in three States (CT, DE, NY). In the coming months we expect SAFER to be deployed in MD, VA, PA, NJ, RI, WV, WA, and NE. Additional States will follow quickly after that. We anticipate 200 state SAFER/ASPEN 1.3 users by January 1998 and over 1,000 by the end of 1998.

Project Location **:** 45 States

Partner(s) : 45 States, MCSAP funds

Start Date: September 1995

***End Date*:** January 1998

Estimated Total ITS Funds: $2,000,000

Estimated Total Project Cost: $3,600,000

***Contacts*:**

Tom Hillegass	FHWA - OMC, HIA-10	(202) 366-4023	Ext.

Commercial Vehicle Operations (CVO)
(Model Deployment Initiative)

CVISN - MODEL DEPLOYMENT (COMMERCIAL VEHICLE INFORMATION SYSTEMS & NETWORKS)

Description:

The model deployment of CVISN is focused on safety information exchange, roadside electronic screening, and credentials administration. Safety Information Exchange provides carrier, vehicle and driver safety information to roadside enforcement personnel and other authorized users. Roadside electronic screening provides for screening vehicles that pass a roadside check station, determining whether further inspection or verification of credentials is required, and taking appropriate actions. Vehicle-to-roadside communications via transponders and readers/writers facilitate the screening functions at mainline speed. Weigh-in-Motion provide for high speed, mainline weighing. Credentials Administration provides for electronic application, processing, fee collection, issuance and distribution of CVO credentials, support of base State agreements and provides for CVO tax filing/auditing.

Status – The model deployment states have completed their CVISN project plans. These plans define the overall approach to the CVISN project, including establishing project objectives, work elements and responsible organizations/individuals, allocation of resources, budget, and schedule/milestones.

Project Location **:** Kentucky, Connecticut, Michigan, Colorado, Minnesota, California, Washington, Oregon

Partner(s) : Departments of Transportation in participating states

Start Date: October 1996

End Date**:** September 1999

Estimated Total ITS Funds: $7,300,000

Estimated Total Project Cost: $20,000,000

Contacts**:**

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Jeff Secrist	FHWA-OMC-HSA-20	(202) 366-2963	Ext.

Commercial Vehicle Operations (CVO)
(Completed Projects)

ADVANTAGE CVO

Description: Advantage CVO, formerly Advantage I-75, represents a multi-state partnership of public and private sector interests along the I-75 corridor. The project facilitated motor-carrier operations by allowing transponder-equipped and properly documented trucks to travel any segment along the entire length of I-75 at mainline speeds with minimal stopping at weigh/inspection stations. Electronic clearance decisions at downstream stations were based on truck size and weight measurements taken upstream and on computerized checking of operating credentials in each state. Advantage I-75 features the application of transponder technology and decentralized control, with each state retaining its constitutional and statutory authority relative to motor carriers and their operations. Four thousand trucks participated in the project. Federal ITS funds ended in September 1992. The participating States are continuing and are proposing to expand to 20,00 trucks.

Project Location : I-75 in Florida, Georgia, Tennessee, Kentucky, Ohio, Michigan and Ontario

Partner(s) : Florida, Georgia, Tennessee, Kentucky, Ohio, Michigan, Ontario (Canada), Motor Carrier Industry, American Trucking Associations, National Private Truck Council, United Parcel Service, SAIC, Hughes, and University of Kentucky

Start Date: January 1991

End Date: October 1997

Estimated Total ITS Funds: $8,400,000

Estimated Total Project Cost: $17,532,308

Contacts:

Doug McKelvey	FHWA - OMC, HSA-20	(202) 366-0950	Ext.
Glennon Musial	FHWA - OMC, HMC-04	(404) 562-3600	Ext.
Joe Crabtree	Kentucky Transportation Center	(606) 257-4513	Ext.

ASSESSMENT OF STATE BENEFITS AND COSTS FROM ITS/CVO SERVICES

Description:

The purpose of this study was to assess the benefits and costs of Intelligent Transportation Systems/Commercial Vehicle Operations (ITS/CVO) technology applications for States nationwide. This project had two distinct phases. Phase 1 consisted of the development of an education tool for Governors that will provide a policy analysis of ITS activities at the Federal level and the implications on transportation systems in their States. Phase 2 consisted of an in-depth economic assessment of the costs and benefits of ITS/CVO technology applications from a State perspective. In addition to this economic assessment, State business plans for the deployment and operation and maintenance of the ITS/CVO applications were also developed. The Governors of the United States, Territories, and Commonwealths of America have worked through the National Governors' Association (NGA) to deal collectively with issues of public policy and governance. The NGA's ongoing mission is to support the work of the Governors by providing a bipartisan forum to help shape and implement national policy and to solve State problems. The Center for Policy Research is the research and development arm of the NGA. The center is a vehicle for sharing knowledge about innovative State activities, exploring the impact of Federal initiatives on State government, and providing technical assistance to States. The center works in a number of policy fields, including economic development, information management, and transportation. The priorities for the NGA's research are set by the Governors.

Project Location **:** Various

Contractor(s) : Iowa DOT and Nevada DOT; Iowa DOT; Nevada DOT

Start Date: September 1995

End Date**:** July 1997

Estimated Total ITS Funds: $519,859

Estimated Total Project Cost: $519,859

Contacts**:**

Jeff Loftus	FHWA - OMC, HSA-20	(202) 366-4516	Ext.
Thom Rubel	National Governor's Association	(202) 624-7740	Ext.

BLACK BOX DEVELOPMENT

Description: This project was designed to address the feasibility of placing a vehicle incident recorder on commercial vehicles for accident reconstruction. The contractor evaluated which vehicle functions need to be monitored and showed how these functions could be used in accident reconstruction.

Project Location **:** New Mexico

Contractor(s) : Sandia National Laboratory

Start Date: August 1995

End Date**:** March 1997

Estimated Total ITS Funds: $750,000

Estimated Total Project Cost: $750,000

Contacts**:**

Kate Hartman	FHWA - OMC, HSA-20	(202) 366-2742	Ext.

COMMERCIAL VEHICLE CREDENTIAL SYSTEM ARCHITECTURE

Description:

This study designed a national CVO information system architecture that provides all authorized users on-line access to Registration, Fuel Tax and Safety Information. Further it coordinated numerous national information system development efforts underway in response to congressional legislation and user requirements. This project was an umbrella for the following projects:

1. Commercial Vehicle Fleet Management and Information Systems
2. Systems Planning for Automatic Commercial Vehicle Licensing and Permitting Systems

Project Location **:** Laurel, Maryland

Contractor(s) : Johns Hopkins University's Applied Physics Laboratory

Start Date: February 1994

End Date**:** September 1995

Estimated Total ITS Funds: $2,660,000

Estimated Total Project Cost: $2,660,000

Contacts**:**

Mike Curtis	FHWA - TFHRC, HSR-10	(703) 285-2991	Ext.
Mike Onder	USDOT ITS JPO, HVH-1	(202) 366-2639	Ext.

ELECTRONIC ONE-STOP SHOPPING OPERATIONAL TESTS

Description:

The HELP, Inc., Midwest States, and SW States Electronic One-Stop Shopping Operational Tests are comprised of 14 states. The projects tested different approaches to one-stop, multi-state electronic purchase of credentials from locations such as motor carrier facilities, permitting services, truck stops and state agencies. The carriers were able to purchase registration, fuel tax, authority, and over-dimensional permits from participating states through the systems. Credentials could be delivered electronically to the requesting location or to a location specified by the carrier. The carriers would electronically request and pay for credentials through their base state or individual states. The primary objective of these tests was to evaluate improvements in state and motor carrier productivity from a one-stop electronic system which will make it possible for a motor carrier to apply for, pay for, and receive all necessary credentials or permits electronically either from the base or individual states.

Project Location **:** HELP Inc.: CA, AZ, NM; Midwest: IA, MN, NE, WI, KS, MO, IL, SD; Southwest: CO, NM, AR, TX

Partner(s) : Various, HELP Inc, State Agencies in participating states, Lockheed-Martin, In-Motion, RSIS; 50 private motor carriers

Start Date: January 1995

End Date**:** September 1997

Estimated Total ITS Funds: $4,525,937

Estimated Total Project Cost: $7,874,856

Contacts**:**

Alan Brown	FHWA - OMC, Region 8 (SW Test)	(303) 969-6744	Ext. 358
John Cartin	FHWA - OMC, Region 7 (MW Test)	(816) 276-2760	Ext.
Jeff Kolb	FHWA Region 8, HPD-08 (SW Test)	(303) 969-5772	Ext. 341
Mike Nighbert	FHWA - OMC, Region 5 (MW Test)	(708) 283-3577	Ext.
Susan Seckler	FHWA - OMC, Region 9; (HELP Inc., Test)	(415) 744-3088	Ext.
Jeff Loftus	FHWA - OMC, HSA-20	(202) 366-4516	Ext.

ITS/CVO COMMUNICATIONS-OUTREACH PLAN

Description:

The ITS/CVO Communications-Outreach Plan, designed and oversaw development and production of the necessary communications tools to assure that the ITS/CVO program is fully communicated to selected audiences. Major areas of emphasis included:

I. Communications
- -- Product dissemination plan
- -- ITS/CVO promotional, educational and presentation materials
- -- Bi-lingual education, presentation materials
- -- Portable ITS/CVO exhibit displays
- -- National Listening Session
- -- Media Relations strategy and campaign
- -- National database for ITS/CVO technology information

II. Outreach
- -- National Focus Groups Meetings
- -- ITS/CVO Training Course

Additionally, the Coordinator planned, and oversaw development of a variety of outreach activities designed to educate and inform selected audiences while gaining support and participation in the ITS/CVO program.

Project Location **:** Various

Partner(s) : DRI - Walcoff & Associates, Transportation Safety Institute, and CVSA

Start Date: September 1995

End Date**:** September 1996

Estimated Total ITS Funds: $380,000

Estimated Total Project Cost: $380,000

Contacts**:**

Zeborah English	FHWA - OMC, HSA-20	(202) 366-0398	Ext.

PASS

Description: PASS (Port-of-Entry Advanced Sorting System) was a test of mainline sorting at Oregon's Ashland Port-of-Entry on northbound I-5. The project examined integrating Automatic Vehicle Identification (AVI), Weigh In Motion (WIM) and Automated Vehicle Classifications (AVC) to identify, weigh, classify and direct selected heavy vehicles in advance of weigh stations and ports-of-entry. Legally operating trucks participating in the project were directed, by the use of an in-vehicle device, to bypass the port and the static scale weighing process, resulting in time savings for both the carrier and the port personnel.

Project Location : Ashland Port of Entry, Northbound I-5

Partner(s) : Oregon DOT and Motor Carrier Industry

Start Date: July 1992

End Date: December 1996

Estimated Total ITS Funds: $350,000

Estimated Total Project Cost: $552,000

Contacts:

Mike Nolan	FHWA-OMC-OR ITS/CVO	(503) 399-5775	Ext. 325
Milan Krukar	Oregon DOT	(503) 378-4082	Ext.
Ken Everet	Oregon DOT	(503) 378-6054	Ext.

SMART CARD DEVELOPMENT

Description: The smart card project was developed three smart card prototypes; 1.) Smart CDL, 2.) Smart Cargo Manifest, and 3.) Smart Vehicle Card. These cards were developed and tested to determine what type or combination of types (i.e., bar code, magnetic stripe, computer chip) of technology these cards should employ in order to provide real-time safety data and reduce the paperwork burden for the carrier(s) and driver(s).

Project Location **:** Woodbridge, Virginia

Contractor(s) : 3-G International

Start Date: September 1995

End Date**:** December 1996

Estimated Total ITS Funds: $1,000,000

Estimated Total Project Cost: $1,000,000

Contacts**:**

Kate Hartman	FHWA - OMC, HSA-20	(202) 366-2742	Ext.

SYSTEMS PLANNING FOR AUTOMATED COMMERCIAL VEHICLE LICENSING AND PERMITTING SYSTEMS

Description: The objective of this study was to develop a systems plan for the development of various automated licensing and permit compliance and verification systems. This study included all the necessary activities leading up to the actual hardware and software design for such systems. The study did not include any actual system design or testing efforts.

Project Location **:** Cambridge, Massachusetts

Contractor(s) : Cambridge Systematics, Inc.

Start Date: June 1992

End Date**:** February 1997

Estimated Total ITS Funds: $618,000

Estimated Total Project Cost: $625,000

Contacts**:**

Michael Freitas	FHWA - TFHRC, HSR-10	(703) 285-2421	Ext.

V. ADVANCED VEHICLE CONTROL AND SAFETY SYSTEMS (AVCSS)

V. ADVANCED VEHICLE CONT ROL AND SAFETY SYSTEMS (AVCSS)

The personal, social, and economic costs of motor vehicle crashes include pain and suffering, direct costs sustained by injured persons and their insurers, and for many crash victims, a lower standard of living or quality of life. The taxpayer and society are burdened by unnecessary health care and public assistance costs, lost productivity and associated loss of tax revenues. During the past two decades, motor vehicle collisions accounted for over 90 percent of all transportation fatalities and an even larger percentage of transportation accidents and injuries. Over 40,000 people die each year in motor vehicle crashes with the total economic loss to U.S. society is estimated at over $150 billion annually. Driver error is cited as the primary cause in about 90 percent of all police-reported crashes involving passenger vehicles, trucks, and buses.

Ongoing and recently completed research and development indicate that collision avoidance systems offer the potential for significantly reducing motor vehicle crashes. Preliminary estimates by the National Highway Traffic Safety Administration (NHTSA) show that rear-end, lane change, and roadway departure crash avoidance systems have the potential, collectively, to reduce motor vehicle crashes by one sixth or about 1.1 million crashes annually. Such systems may take the form of warning drivers, recommending control actions, and introducing temporary or partial automated control of the vehicle in hazardous situations.

Recognizing that advanced computing, sensor and communication technologies potentially offer major benefits to improve safety and efficiency, the U.S. Department of Transportation has had three complementary efforts; advanced crash avoidance, driver vehicle interface and automated highway systems research.

Crash Avoidance Research

The NHTSA Office of Crash Avoidance Research published a strategic plan for crash avoidance research in January 1997. FY 1997 was a significant transition year for the collision avoidance program. During the period between 1991, when the program was begun, and 1996 a significant amount of work has been completed to lay a solid foundation. This includes the development of first-generation performance specifications for systems that address several types of collisions as well as the development of critical new research tools. During this period, a foundation of cooperative partnerships with industrial and academic partners has also been established. However, at this time, collision avoidance systems are not readily available to the buying public as standard or optional equipment in their vehicles. The emphasis of the crash avoidance program shifted to the steps necessary to make effective systems available to car buyers. This includes developing an enhanced understanding of the trade-off between desirable and achievable system capability and much greater understanding of user acceptance expectations, as well as expanded capability to estimate benefits that will accrue to users of advanced-technology collision avoidance systems.

Driver Vehicle Interface for ITS: Five-Year Program Plan

Advances in ITS and other areas of electronics are leading to the introduction of multiple in-vehicle devices (e.g., cellular phones, navigation devices, collision avoidance warning systems, etc.) which may distract the driver’s attention from the roadway. This increased amount and complexity of

information presented to the driver has the potential to be a cause of automotive crashes, thereby possibly offsetting or negating some or all of the safety benefits that these new systems offer. To better address this potential problem, NHTSA and FHWA merged their complementary efforts in Crash Avoidance Display Research and In-Vehicle Information Systems development. This was done to leverage NHTSA's in-vehicle driver-interface expertise with FHWA's historical driver-roadway interface expertise. The two agencies developed an integrated program that will result in comprehensive performance specifications/guidelines for use by the automotive industry. These guidelines will provide automotive designers with a tool which will help ensure that their in-vehicle displays for integrated multiple systems offer the highest possible level of safety.

Automated Highway System (AHS)

Spurred by that promise and the potential for more rapid development of component crash-avoidance technologies, the U.S. DOT launched 15 AHS "precursor" studies in late l993 to investigate the viability of both the technology and its potential benefits. The studies involved 55 organizations, ranging from universities to law firms to system integrators, and was completed in early l995.

Although the studies identified a number of significant technical and societal challenges, there were no technology "showstoppers." Reasonable courses of action that delivered real benefits were identified for potential challenges: AHS could improve vehicles/lane/hour by two- or three-fold, cut travel time by 33-50%, and potentially reduce accidents by 50-80%. Not surprisingly, non-technical challenges likely will be more difficult to resolve than technical ones, and will require careful balancing of stakeholder needs (e.g., safety versus efficiency, versus environmental impact, versus costs).

The FHWA signed a cooperative agreement with the National Automated Highway System Consortium (NAHSC) in October l994 to launch a multi-year research effort to develop an AHS concept. The idea of vehicle-highway communication sufficient to assume driving functions for the driver is not new. Researchers have articulated both its value and feasibility for several decades; and military and vehicle manufacturer test facility developments have proven the concept's viability. As mounting congestion conflicts with environmental constraints, the AHS promise of doubling our existing highway system's capacity is worth investigating.

The Automated Highway System proof-of-technical-feasibility demonstration, “Demo ‘97," mandated in ISTEA, was held August 7-10, 1997, in San Diego, California. Demo ‘97 showcased the potential of vehicle control technology, working within a cooperative vehicle-highway system, to dramatically enhance safety and relieve congestion, by augmenting the human driver’s capabilities. Safety and throughput could each be enhanced manyfold (2-4 times) with the application of this technology, through the orderly roll-out of increasingly sophisticated systems. The capabilities demonstrated, using a variety of technology approaches, included:

- Intelligent Cruise Control for passenger cars and heavy trucks
- Creep Control (car-following in congested stop-and-go traffic)
- Partial automation (lane-keeping and vehicle-following) for rural applications
- Fully automated autonomous vehicles operating amongst non-automated vehicles (i.e. capable of operating in today’s traffic stream on today’s freeways)

- Fully automated vehicles operating in close-headway platoons for exclusive-lane operation, a mode which offers maximum throughput (at least 2-3 times today's average throughputs)
- Full automation of transit buses, to showcase automated transit operations
- Collision warning system for heavy trucks (a commercially available product)

Intelligent Vehicle Initiative

During the period covered by ISTEA, the Department developed an extensive knowledge base in collision avoidance, automated highways and driver-vehicle interface. Building on this progress, the Department has resolved to focus the ITS Vehicle programs into a Human-Centered *Intelligent Vehicle Initiative* in order to achieve maximum public safety benefit in the shortest time. The Department will conduct the Intelligent Vehicle Program in cooperation with the automotive industry and other stakeholders. We will continue to improve our understanding of the causes of crashes, the potential for reducing these crashes through the application of advanced vehicle based and infrastructure cooperative technologies and to encourage deployment of these systems. To achieve the program goals, the Department will conduct research to increase the understanding of systems capability for the various levels of driver assistance products which complement the human driver's ability and perceptions. The primary goal of the IVI is, jointly with the motor vehicle and trucking industries, state and local DOTs, and other stakeholders, to accelerate the development, introduction, and commercialization of driver assistance products to reduce motor vehicle crashes and incidents.

The activities listed in this book cover 1997 when the crash avoidance, driver-vehicle interface and automated highway systems programs were managed as separate efforts. In the 1998 version of this book there will be a single section titled "Intelligent Vehicles." The projects in this section will be guided by a single program plan and roadmap which will be published in early 1998.

Advanced Vehicle Control and Safety Systems (AVCSS)
(Research & Development)
(*In-Vehicle Information Systems*)

HUMAN FACTORS IN ATIS AND CVO DESIGN EVOLUTION

Description:

The objective of this contract is to develop human factors guidelines for in-vehicle ATIS and CVO components of ITS. To accomplish this, in-vehicle driver and CVO operator requirements and human factors issues will be examined within the context of in-vehicle routing and navigation systems, motorist information services, safety advisory and warning systems, and in-vehicle signing systems. Results will be documented in the following working papers:

1. Literature Review
2. Supplement to the Literature Review
3. ATIS/CVO Development Objectives Performance Requirements
4. ATIS and CVO Functional Description
5. Comparable Systems Analysis
6. Task Analysis of ATIS/CVO Functions
7. Alternate Systems
8. Identify and Explore Driver Acceptance of In-Vehicle ITS Summary
9. Define and Prioritize Research Studies

Project Location **:** Washington State

Contractor(s) : Battelle Human Affairs Research Center

Start Date: October 1992

End Date**:** July 1998

Estimated Total ITS Funds: $5,738,525

Estimated Total Project Cost: $5,738,525

Contacts**:**

Joseph Moyer	FHWA - TFHRC, HSR-30	(703) 285-2404	Ext.

HUMAN FACTORS PROGRAMS: ADMINISTRATIVE AND TECHNICAL SUPPORT

Description:

This effort focuses on providing the necessary staffing and expertise required to assist the FHWA's Human Factors group in conducting and monitoring research efforts on various ITS subsystems. These studies include human factors investigations in Advanced Traffic Management Systems (ATMS), Advanced Traveler Information Systems (ATIS), Automated Highway Systems (AHS), and Commercial Vehicle Operations (CVO). On-site staff research areas include In-Vehicle Signing (IVS) and In-Vehicle Safety Advisory Warning Systems (IVSAWS).

The major contractual efforts (involving ATMS, ATIS, and AHS) are being monitored in regard to critical analytical, empirical and integration human factors issues that will result in design guidelines addressing the specific and integrated ITS areas. The empirical aspect is of pivotal importance in that numerous simulation and field research studies will be conducted and analyzed to provide specific human factors research results that will be transformed into design guidelines and computer-aided design packages. In-house ITS research staff projects are also developed, managed, and monitored as part of the Human Factors Research Program. Significant human factors ITS knowledge gaps that are identified will be addressed through contract or staff research.

Project Location **:** McLean, Virginia

Contractor(s) : Science Applications International Corporation (SAIC)

Start Date: April 1994

End Date**:** March 1998

Estimated Total ITS Funds: $4,530,000

Estimated Total Project Cost: $4,530,000

Contacts**:**

Truman Mast	FHWA - TFHRC, HSR-30	(703) 285-2404	Ext.

IN-VEHICLE DISPLAY ICONS AND OTHER INFORMATION ELEMENTS

Description: This study will first examine the full range of in-vehicle information types (e.g., routing, safety advisories, traffic information, crash avoidance warnings), identifying the optimal means of conveying each type of information. This will be based on a combination of previous research and laboratory studies conducted as a part of this project. While the focus will be on icons, other means of display will be studied as well, including textual and aural messages. The results of this work will feed directly into IVIS display guidelines.

Project Location **:** Seattle, Washington

Contractor(s) : Battelle, Transportation Research Center

Start Date: October 1997

End Date**:** April 2000

Estimated Total ITS Funds: $975,000

Estimated Total Project Cost: $975,000

Contacts**:**

Nazemeh Sobhi	FHWA - TFHRC, HSR-30	(703) 285-2907	Ext.

IN-VEHICLE INFORMATION SYSTEMS BEHAVIORAL MODEL AND DESIGN SUPPORT

Description: The In-Vehicle Information System (IVIS) Behavioral Model and Design Support System will include a set of design tools to assist in the design of an IVIS and a driver behavioral model to assess IVIS. The behavioral model will be capable of taking IVIS design specifications and producing a prediction of driving behavior while using them. The design support system will be a set of human factors tools to be used in the design of in-vehicle information systems. The development of the IVIS Behavioral Model and Design Support System will require empirical research, analysis, and documentation of the design process for in-vehicle information systems. The behavioral model and the design support system will be implemented as a prototype software program and shall be viewed as a demonstration of the feasibility of the concept.

Project Location **:** Blacksburg, Virginia

Contractor(s) : Virginia Polytechnic Institute

Start Date: September 1996

End Date**:** June 1999

Estimated Total ITS Funds: $796,334

Estimated Total Project Cost: $796,334

Contacts**:**

Joseph Moyer	FHWA - TFHRC, HSR-30	(703) 285-2008	Ext.

PRELIMINARY HUMAN FACTORS REVIEW OF INTELLIGENT VEHICLE INITIATIVE (IVI)

Description: The objective of this activity is to provide for the definition and establishment of human factors requirements for the near-term intelligent vehicles. The contract provides an opportunity to solicit input from stakeholders and to build consensus for the human-centered design of IVI vehicles. In this study, preliminary infrastructure and in-vehicle architecture requirements for IVI Generation 1, 2, and 3 vehicles (with heavy emphasis on Generation 1) will be identified and analyzed. Vehicle classes to be addressed include primarily cars and, to a lesser extent, buses, trucks, and emergency/special vehicles. Information gathered will be used to determine needed human factors research gaps for candidate technologies and systems, as well as document a set of requirements for supporting infrastructure, vehicle, and human factors research.

Project Location **:** Columbus, Ohio

Contractor(s) : Battelle, Human Affairs

Start Date: September 1997

End Date**:** May 1998

Estimated Total ITS Funds: $350,000

Estimated Total Project Cost: $350,000

Contacts**:**

Truman Mast	FHWA - TFHRC, HSR-30	(703) 285-2404	Ext.

TECHNICAL SUPPORT FOR IVIS DEVELOPMENT AND OPERATIONAL TEST

Description: This project was initially titled "Development of An In-Vehicle Information System," and involved the technologies and issues associated with in-vehicle signing systems. It has been expanded to include evaluations of an in-vehicle information system for handling all sources on information that may be presented within the vehicle. Completed tasks include reports on "Functional Requirements Specification for an In-Vehicle Information System," "In-Vehicle Information System Concepts," "Cost of In-Vehicle Information Systems and Associated Infrastructure," and "In-Vehicle Information Communication Protocol." A platform is being developed to operationally test new in-vehicle devices which can include routing and navigation, real-time traffic, motorist services, and collision avoidance subsystem. Four workshops have been held.

Project Location **:** Oak Ridge, Tennessee

Contractor(s) : Oak Ridge National Laboratory

Start Date: June 1994

End Date**:** October 2000

Estimated Total ITS Funds: $5,162,500

Estimated Total Project Cost: $5,162,500

Contacts**:**

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Advanced Vehicle Control and Safety Systems (AVCSS)
(Research & Development)
(*Crash Avoidance*)

AUTOMOTIVE COLLISION AVOIDANCE SYSTEM DEVELOPMENT

Description: The purpose of this project is to provide a highly focused effort to accelerate the deployment of near-term collision warning systems. Secondary goals are to advance the development of promising, but immature technologies and to reduce manufacturing costs of key system components. This project is funded by The Defense Advanced Research Projects Agency and administered by NHTSA as a cooperative agreement with several leading automotive industry and academic research organizations.

Project Location **:** Kokomo, Indiana

Contractor(s) : Delco Electronics, Hughes Research Labs, General Motors North American Operations, General Motors Research

Start Date: January 1995

End Date**:** January 1998

Estimated Total ITS Funds: $6,116,000

Estimated Total Project Cost: $13,034,000

Contacts**:**

Jack Ference	NHTSA Headquarters, NRD-51	(202) 366-0168	Ext.

AUTONAV/DOT

Description: The U. S. Department of Transportation's National Highway Traffic Safety Administration and the Department of Defense seek to collectively develop dual use emerging collision avoidance technologies to improve surface transportation safety. The U.S. Army Research Laboratory will conduct tests and evaluations of each product technology elements of the Autonomous Vehicle Navigation Control System (AUTONAV) project to determine the potential for contribution to the collision avoidance capability of motor vehicles and their drivers.

Project Location **:** Aberdeen and Gaithersburg, Maryland

Contractor(s) : The U. S. Army Research Laboratory (ARL)

Start Date: October 1996

End Date**:** January 1998

Estimated Total ITS Funds: $300,000

Estimated Total Project Cost: $300,000

Contacts**:**

August Burgett	NHTSA Headquarters, NRD-51	(202) 366-5667	Ext.

COMMERCIAL VEHICLE COMMUNICATION AND POWERING ENHANCEMENT SYSTEMS - II

Description: This is one of two cooperative agreements that is assessing alternative means of providing power and communications on multi-unit combination heavy commercial tractor/trailers. The functional capabilities, limitations, reliability and practicality will be evaluated. This contractor is assessing a standard 13-pin connector with multiplexing, in conjunction with a fiber optic link, and a bi-directional data bus imposed on a power supply circuit..

Project Location **:** Kokomo, Indiana

Contractor(s) : DELCO Electronics Corporation

Start Date: November 1995

End Date**:** September 1998

Estimated Total ITS Funds: $575,000

Estimated Total Project Cost: $2,000,000

Contacts**:**

Jim Brittell	NHTSA Headquarters, NRD-53	(202) 366-5678	Ext.

CRASH AVOIDANCE METRICS PARTNERSHIP (CAMP) – REAR-END COLLISION WARNING RESEARCH, TEST METRICS AND TEST METHODOLOGY DEVELOPMENT PROGRAM

Description: The focus of this effort is to conduct research activities jointly with industry to investigate vehicle-borne systems which address rear-end collisions. The goal of this project is to define and develop pre-competitive enabling elements of rear-end collision warning systems by establishing common analytical methods, performance metrics, test procedures, databases, function definitions, and minimum performance specifications for these systems.

Project Location **:** Michigan

Contractor(s) : General Motors and Ford Motor Company

Start Date: February 1996

End Date**:** November 1998

Estimated Total ITS Funds: $1,797,757

Estimated Total Project Cost: $3,595,569

Contacts**:**

Jack Ference	NHTSA Headquarters, NRD-51	(202) 366-0168	Ext.

CRASH AVOIDANCE RESEARCH TECHNOLOGY SUPPORT FOR COMMUNICATIONS, ELECTRONIC CONTROLS, AND COMPUTERS - TASK ORDER 4

Description: This is the fourth task in a five-year Indefinite Quantity Contract (IQC) designed to support the research needs of NHTSA in the crash avoidance areas pertaining to communications, electronic controls, and computers. The objective of this task is to conduct an extensive analysis of the performance of current and developing in-vechicle data busses to support a variety of automotive safety systems using discrete event simulation software tools and to study and report on the current development of infrastructure and inter-vehicular communications protocols and implementations that affect performance of future safety systems.

Project Location **:** Virginia

Contractor(s) : Stanford Telecommunications, Inc.

Start Date: November 1997

End Date**:** November 1998

Estimated Total ITS Funds: $424,868

Estimated Total Project Cost: $424,868

Contacts**:**

Jack Ference	NHTSA Headquarters, NRD-51	(202) 366-0168	Ext.

DEVELOPMENT AND EVALUATION OF THE DRIVER INTERFACE FOR A REAR OBJECT WARNING SYSTEM

Description: This project will develop and evaluate a prototype back up warning system driver interface based on the preliminary recommendations of recent COMSIS, Inc. research. The prototype will be used to evaluate the usability of recommended warning criteria and interface displays.

Project Location **:** Silver Spring, Maryland

Contractor(s) : WESTAT

Start Date: September 1996

End Date**:** May 1998

Estimated Total ITS Funds: $261,800

Estimated Total Project Cost: $261,800

Contacts**:**

Michael Perel	NHTSA Headquarters, NRD-52	(202) 366-5675	Ext.

DEVELOPMENT, EVALUATION, AND DEPLOYMENT OF FORWARD CRASH AVOIDANCE SYSTEMS (FOCAS)

Description: This project will investigate how the functions provided by an Automatic Intelligent Cruise Control (AICC) system can be extended to produce a rear-end collision avoidance system. A prototype AICC system developed by Leica to demonstrate its infrared sensor technology has been installed in a Saab 9000 which will serve as the development testbed.

Project Location **:** Michigan

Contractor(s) : University of Michigan Transportation Research Institute (UMTRI)

Start Date: May 1994

End Date**:** June 1999

Estimated Total ITS Funds: $1,499,741

Estimated Total Project Cost: $2,550,288

Contacts**:**

Art Carter	NHTSA Headquarters, NRD-51	(202) 366-5669	Ext.

HUMAN FACTORS STUDIES FOR THE EVALUATION, ANALYSIS, AND OPERATIONAL ASSESSMENT OF AN INTELLIGENT CRUISE CONTROL SYSTEM

Description: This program will address a range of human factors issues associated with implementation of Intelligent Cruise Control (ICC) systems. These issues include: (1) driver usability in terms of ease of learning ICC operation; (2) driver reaction to the ICC limits, for maximum deceleration and acceleration and minimum headway; (3) driver attention and response to braking situations.

Project Location **:** Dearborn, Michigan

Contractor(s) : Ford Motor Company

Start Date: September 1994

End Date**:** June 1999

Estimated Total ITS Funds: $900,000

Estimated Total Project Cost: $1,744,057

Contacts**:**

Michael Perel	NHTSA Headquarters, NRD-52	(202) 366-5675	Ext.

INTERSECTION COLLISION AVOIDANCE USING ITS COUNTERMEASURES

Description: Performance requirements (both hardware and human factors) for advanced technology systems to assist drivers in avoiding intersection crashes. This project will lead to the development of performance specifications (both hardware and human factors) for advanced technologies to improve crash avoidance of vehicles negotiating intersections. This project will address autonomous vehicle-based systems, vehicle-vehicle communication systems, and/or cooperative highway-vehicle systems requiring instrumentation of intersections.

Project Location **:** New York and Ohio

Contractor(s) : CALSPAN Corporation

Start Date: October 1993

End Date**:** October 1998

Estimated Total ITS Funds: $4,676,000

Estimated Total Project Cost: $4,676,000

Contacts**:**

Arthur Carter	NHTSA Headquarters, NRD-51	(202) 366-5669	Ext.

NATIONAL ADVANCED DRIVING SIMULATOR (NADS)

Description: The objective of this NHTSA project is to develop a design for a state-of-the-art driving simulator in the U.S. that will serve as a national research asset for use by scientists and engineers in both the public and private sectors. It is estimated that NADS will cost $32 million to design, construct and validate. This driving simulator will enable researchers to conduct multi-disciplinary investigations and analyses on a wide range of issues associated with traffic safety, highway engineering, Intelligent Transportation Systems (ITS), human factors, and motor vehicle product development. Phase I, which is discussed here, covers the design of the NADS. Phase II will cover actual construction.

Project Location **:** Iowa City, Iowa

Contractor(s) : TRW, Inc.

Start Date: February 1996

End Date**:** August 1999

Estimated Total ITS Funds: $34,763,000

Estimated Total Project Cost: $34,763,000

Contacts**:**

Keith Brewer	NHTSA Headquarters, NRD-51	(202) 366-5662	Ext.

NIGHT DRIVER THERMAL IMAGING CAMERA AND HEAD UP DISPLAY DEVELOPMENT PROGRAM FOR CRASH AVOIDANCE

Description: The focus of this cooperative agreement is to investigate new methods and technologies related to the development of automotive head-up-displays(HUD) and to develop an improved, production-realistic, prototype HUD capable of supporting night driving applications and operating reliably in the automotive environment.

Project Location **:** Dallas, Texas

Contractor(s) : Raytheon, Texas Instruments Systems (RTIS)

Start Date: September 1997

End Date**:** October 1998

Estimated Total ITS Funds: $346,340

Estimated Total Project Cost: $698,680

Contacts**:**

Jack Ference	NHTSA Headquarters, NRD-51	(202) 366-0168	Ext.

PERFORMANCE SPECIFICATIONS: COUNTERMEASURES AGAINST LANE CHANGE, MERGING, AND BACKING COLLISIONS

Description: This project will lead to the development of performance requirements (both hardware and human factors) for advanced technologies to improve crash avoidance during lane change, merging and backing maneuvers. This project is designed for countermeasure systems that will be self-contained within the vehicle. However, it does not exclude from consideration those countermeasure systems that may require, or that might be improved by, auxiliary equipment installed in the road or in other vehicles.

Project Location **:** California and Texas

Contractor(s) : Interagency agreement with U.S. Air Force; work conducted by TRW.

Start Date: July 1993

End Date**:** June 1999

Estimated Total ITS Funds: $4,630,000

Estimated Total Project Cost: $4,630,000

Contacts**:**

Jack Ference	NHTSA Headquarters, NRD-51	(202) 366-0168	Ext.

PERFORMANCE SPECIFICATIONS: COUNTERMEASURES AGAINST REAR-END COLLISIONS

Description: This project will lead to the development of performance requirements (both hardware and human factors) for advanced technologies to prevent or decrease the severity of rear-end crashes. This project is designed for countermeasure systems that will be self-contained within the vehicle. However, it does not exclude from consideration those countermeasure systems that may require, or that might be improved by, auxiliary equipment installed in the road or in other vehicles.

Project Location **:** Arizona and Iowa

Contractor(s) : Sensor Technologies & Systems, Inc. (formerly Frontier Engineering, Inc.)

Start Date: May 1993

End Date**:** May 1998

Estimated Total ITS Funds: $4,430,773

Estimated Total Project Cost: $4,430,773

Contacts**:**

Art Carter	NHTSA Headquarters, NRD-51	(202) 366-5669	Ext.

PERFORMANCE SPECIFICATIONS: COUNTERMEASURES AGAINST ROADWAY DEPARTURE COLLISIONS

Description: This project will lead to the development of performance requirements (both hardware and human factors) for advanced technologies to improve crash avoidance during roadway departures ("ran-off-road"). This project is designed for countermeasure systems that will be self-contained within the vehicle. However, it does not exclude from consideration those countermeasure systems that may require, or that might be improved by, auxiliary equipment installed in the road or in other vehicles.

Project Location **:** Pittsburgh, Pennsylvania; Columbus, Ohio; and Buffalo, New York

Contractor(s) : Carnegie Mellon University

Start Date: September 1993

End Date**:** March 1999

Estimated Total ITS Funds: $4,678,325

Estimated Total Project Cost: $4,678,325

Contacts**:**

Lloyd Emery	NHTSA Headquarters, NRD-51	(202) 366-5673	Ext.

PROTOTYPE HEAVY VEHICLE DROWSY DRIVER DETECTION AND WARNING SYSTEM

Description: This project will develop, test, and evaluate a prototype in-vehicle continuous driver alertness monitoring/drowsiness detection system for heavy trucks. System drowsiness detection algorithms and warning signals will be derived primarily from the findings of the Driver Status/Performance Monitoring program. Based on the prototype design and lessons learned from the test and evaluation, a system functional performance specification will be developed.

Project Location **:** Pittsburgh, Pennsylvania

Contractor(s) : Carnegie Mellon Research Institute

Start Date: July 1995

End Date**:** September 1998

Estimated Total ITS Funds: $2,085,000

Estimated Total Project Cost: $2,085,000

Contacts**:**

Paul Rau	NHTSA Headquarters, NRD-53	(202) 366-0418	Ext.

SYSTEM FOR ASSESSMENT OF VEHICLE MOTION ENVIRONMENT (SAVME)

Description: VME prototype hardware and software. This project will develop and validate a measurement system that can quantify the specific motions that vehicles exhibit as they move in traffic under the full array of traffic operations. In subsequent projects, the measurement system will be used to gather information such as reaction to other drivers cutting in front, normal following distance and typical lane change trajectories. This information will provide the foundation for development of ITS countermeasures that identify the need for intervention and/or collision avoidance instructions to the driver.

Project Location **:** Michigan

Contractor(s) : University of Michigan Transportation Research Institute (UMTRI) and ERIM

Start Date: September 1992

End Date**:** July 1998

Estimated Total ITS Funds: $1,697,073

Estimated Total Project Cost: $2,235,000

Contacts**:**

Arthur Carter	NHTSA Headquarters, NRD-51	(202) 366-5669	Ext.

VARIABLE DYNAMIC TEST VEHICLE DEVELOPMENT

Description: A computer-controlled variable subsystems, drive-by-wire (steering, braking, throttle) and four-wheel steering testbed vehicle will be developed. The VDTV will be used by NHTSA to support the ITS crash avoidance and Automated Highway System programs.

Project Location **:** Pasadena, California

Contractor(s) : Jet Propulsion Laboratory

Start Date: August 1995

End Date**:** May 1998

Estimated Total ITS Funds: $2,976,800

Estimated Total Project Cost: $2,976,800

Contacts**:**

Lloyd Emery	NHTSA Headquarters, NRD-51	(202) 366-5673	Ext.

Advanced Vehicle Control and Safety Systems (AVCSS)
(Research & Development)
(*Automated Highway Systems*)

ADVANCED VEHICLE CONTROL SYSTEMS INFRASTRUCTURE AND TRAFFIC IMPACTS

Description: Several types of AVCS systems are under study by NHTSA, including run-off-the-road warning/avoidance and intersection collision warning/avoidance systems. This major research effort is expected to raise numerous issues concerning infrastructure interactions with these type systems. In many cases, system concept feasibility hinges upon this infrastructure element. This effort addresses these infrastructure issues, in close coordination with NHTSA. In addition, AVCS are conceptualized and existing concepts are evaluated with a focus on improved traffic flow. The contracts are structured to conduct work on a task order basis; individual tasks were generated based on the status of ongoing AVCS efforts.

Project Location **:** Falls Church, Virginia

Contractor(s) : E-Systems

Start Date: May 1994

End Date**:** May 1998

Estimated Total ITS Funds: $695,634

Estimated Total Project Cost: $1,149,949

Contacts**:**

Robert Ferlis	FHWA - TFHRC, HSR-10	(703) 285-2680	Ext.

NATIONAL AUTOMATED HIGHWAY SYSTEM CONSORTIUM

Description: The National AHS Consortium successfully demonstrated the feasibility of both partially and fully automated vehicle-highway systems at Demo '97, on I-15 in San Diego. Building on this, subsequent work is focused upon incremental steps which implement this technology to achieve benefits at each stage of the way. The consortium is working within the framework of the new USDOT Intelligent Vehicle Initiative. Future plans include development and evaluation of IVI user services, cross-cutting technology development, site-specific case studies, simulation tool development, and prototype/test/evaluation of promising user services. Work will encompass all vehicle types within IVI: passenger cars, commercial vehicles, transit buses, and specialty vehicles.

Project Location **:** Troy, Michigan (NAHSC Program Office)

Contractor(s) : The NAHSC Consortium

Start Date: November 1994

End Date**:** December 2001

Estimated Total ITS Funds: $160,000,000

Estimated Total Project Cost: $210,000,000

Contacts**:**

Robert Ferlis	FHWA - TFHRC, HSR-10	(703) 285-2680	Ext.

Advanced Vehicle Control and Safety Systems (AVCSS) (Operational Tests)

AUTOMATED COLLISION NOTIFICATION OPERATIONAL FIELD TEST

Description: This project is an operational field test of an advanced in-vehicle system that determines that a serious collision has occurred and automatically summons Emergency Medical Services (EMS) response. The Team will design, build and deploy an automated collision notification system (ACN), using 1000 privately owned cars in a large area covering the western portion of New York State.

Project Location **:** Erie County, New York

Partner(s) : CALSPAN Advanced Technology Center, the New York DOT, General Motors, Cellular One, Rockwell, Erie County Emergency Management Service

Start Date: September 1995

End Date**:** October 1998

Estimated Total ITS Funds: $3,472,358

Estimated Total Project Cost: $4,555,614

Contacts**:**

Arthur Carter	NHTSA, NRD-51	(202) 366-5669	Ext.

COLORADO MAYDAY SYSTEM

Description:

This project will evaluate the use of GPS for vehicle location and cellular phone for two-way communications in order to provide emergency and non-emergency assistance to travelers operating in an area of over 12,000 square miles in north-central Colorado. The test will involve up to 1,000 vehicles equipped with a low-cost location device called TIDGET. The TIDGET sensor sends raw GPS satellite signals to the control center for processing to determine the location of the vehicle. The primary objective of this test will be to evaluate the impact of an infrastructure-based GPS system and response network on emergency response activities, time and public safety. Additionally, this test will identify the necessary structure, responsibilities and service levels of a traveler assistance center necessary to commercially operate such a system.

Project Location **:** Central - Northeast Colorado

Partner(s) : NAVSYS Corporation, ESRI, AT&T Wireless Inc., Castle Rock Consultants, and members of the ENTERPRISE group (Departments of Transportation from the State of Arizona, Maricopa County , Colorado, Iowa, Michigan, Minnesota, North Carolina, Washington State, Dutch Ministry of Transport, Ministry of Transportation of Ontario, and Transport Canada)

Start Date: June 1995

End Date**:** August 1998

Estimated Total ITS Funds: $2,439,654

Estimated Total Project Cost: $3,832,286

Contacts**:**

Lloyd Rue	FHWA Region 8, HPP-08	(303) 969-5772	Ext. 326
Neil Lacey	Colorado DOT	(303) 757-9971	Ext.

INTELLIGENT CRUISE CONTROL FIELD OPERATIONAL TEST

Description: The field operational test serves as a bridge between research and development and deployment. The performance and user acceptance of a system that permits a vehicle to maintain automatically a safe level of speed and distance between it and preceding vehicles will be tested and evaluated on a fleet of vehicles.

Project Location **:** Michigan

Partner(s) : The Regents of the University of Michigan Transportation Research Institute (UMTRI), Michigan DOT, Leica AG (now A.D.C. GmbH), and Haugen Associates

Start Date: September 1995

End Date**:** June 1998

Estimated Total ITS Funds: $3,010,498

Estimated Total Project Cost: $3,874,121

Contacts**:**

August Burgett	NHTSA Headquarters, NRD-51	(202) 366-5672	Ext.

Advanced Vehicle Control and Safety Systems (AVCSS)
(Completed Projects)

ANALYTICAL SUPPORT/ANALYSIS OF ACCIDENT AND DRIVER PERFORMANCE DATABASES

Description: Target crash problem size assessment and statistical descriptions. The goals of this project were to: (1) analyze existing NHTSA and state accident databases to determine vehicle, driver, and environmental contributing factors (and their interactions) and characteristics of target crashes of conventional and ITS crash avoidance countermeasures, and (2) assess the effects of existing vehicle design features on the incidence and severity of crashes in the "real world."

Project Location **:** Washington, DC

Contractor(s) : Information Management Consultants, Inc. (IMC)

Start Date: May 1990

End Date**:** September 1996

Estimated Total ITS Funds: $75,000

Estimated Total Project Cost: $75,000

Contacts**:**

Duane Perrin	NHTSA Headquarters, NRD-53	(202) 366-5654	Ext.

ASSESSMENT OF POTENTIAL BIOLOGICAL EFFECTS FROM ELECTROMAGNETIC RADIATION IN MICROWAVE AND INFRARED REGIONS

Description: Evaluation of potential health hazards that might result from widespread usage of collision avoidance systems using active sensors.

Project Location **:** Pittsburgh, Pennsylvania

Contractor(s) : Carnegie Mellon Research Institute

Start Date: July 1994

End Date**:** May 1995

Estimated Total ITS Funds: $53,474

Estimated Total Project Cost: $53,474

Contacts**:**

Jack Ference	NHTSA Headquarters, NRD-51	(202) 366-0168	Ext.

BRAKING ANALYSIS FOR COLLISION AVOIDANCE: HEAVY COMMERCIAL VEHICLES

Description: This project studied the feasibility of adding automatic braking to heavy commercial vehicles. The project included braking performance modeling, development of design requirements and fabrication and testing of prototype hardware. This 18-month program concluded with extensive test track work and a demonstration of the prototype system.

Project Location **:** Southfield, Michigan

Contractor(s) : Eaton Corporation

Start Date: March 1994

End Date**:** December 1996

Estimated Total ITS Funds: $451,138

Estimated Total Project Cost: $559,290

Contacts**:**

Jim Britell	NHTSA Headquarters, NRD-53	(202) 366-5678	Ext.

CHARACTERIZATION OF A FORWARD-LOOKING AUTOMOTIVE RADAR SENSOR

Description: A cooperative agreement to develop knowledge base of radar cross-section data from measurements taken in the laboratory and a variety of freeway settings using a 94GHZ forward looking automotive radar sensor.

Project Location **:** Ann Arbor, Michigan

Contractor(s) : Environmental Research Institute of Michigan (ERIM) and TRW, Inc.

Start Date: March 1994

End Date**:** December 1997

Estimated Total ITS Funds: $880,376

Estimated Total Project Cost: $1,139,487

Contacts**:**

Jack Ference	NHTSA Headquarters, NRD-51	(202) 366-0168	Ext.

COMMERCIAL VEHICLE COMMUNICATION AND POWERING ENHANCEMENT SYSTEMS - I

Description: This is one of two cooperative agreements that assessed alternative means of providing power and communications on multi-unit combination heavy commercial tractor/trailers. The functional capabilities, limitations, reliability and practicality were evaluated. This contractor assessed a standard seven-pin connector with multiplexing.

Project Location **:** Southfield, Michigan

Contractor(s) : EATON Corporation

Start Date: April 1995

End Date**:** October 1997

Estimated Total ITS Funds: $476,169

Estimated Total Project Cost: $1,200,000

Contacts**:**

Jim Britell	NHTSA Headquarters, NRD-53	(202) 366-5678	Ext.

CRASH AVOIDANCE AND THE OLDER DRIVER

Description: Assessment of older driver crash avoidance research needs. The purpose of this initiative was to analyze the traffic crash experience of older drivers, assess their capabilities and limitations as drivers, and identify and evaluate vehicle design features that will ensure the safety of their driving while accommodating their mobility needs.

Project Location **:** Seattle, Washington

Contractor(s) : Battelle Memorial Institute

Start Date: March 1994

End Date**:** March 1995

Estimated Total ITS Funds: $90,000

Estimated Total Project Cost: $90,000

Contacts**:**

Mike Perel	NHTSA Headquarters, NRD-52	(202) 366-5675	Ext.

CRASH AVOIDANCE RESEARCH TECHNICAL SUPPORT: FIELD DATA COLLECTION - PRELIMINARY INVESTIGATION OF THE SAFETY IMPLICATIONS OF CELLULAR PHONE USE IN VEHICLES

Description: Task Order 4 of the Indefinite Quantity Contract to provide field data collection for the preliminary assessment of and to evaluate public/law enforcement experiences with in-vehicle cellular phone use and its potential impact on driver performance and safety. Also, recommendations for the need to carry out in-depth research in this area.

Project Location **:** Annnapolis, Maryland

Contractor(s) : Dynamic Science

Start Date: February 1995

End Date**:** September 1995

Estimated Total ITS Funds: $119,490

Estimated Total Project Cost: $119,490

Contacts**:**

Michael Goodman	NHTSA Headquarters, NRD-52	(202) 366-5677	Ext.

CRASH AVOIDANCE RESEARCH TECHNOLOGY SUPPORT FOR COMMUNICATIONS, ELECTRONIC CONTROLS AND COMPUTERS - TASK ORDER 1

Description: This was the first task of a 5-year Indefinite Quantity Contract (IQC) designed to support the research needs of NHTSA in the crash avoidance areas pertaining to communications, electronic controls, and computers. The result of this task was identification and assessment of the main features of automotive computer and electronic interface architectures that may affect the deployment of advanced technology crash systems.

Project Location **:** Virginia

Contractor(s) : Stanford Telecommunications, Inc.

Start Date: September 1994

End Date**:** April 1995

Estimated Total ITS Funds: $104,842

Estimated Total Project Cost: $104,842

Contacts**:**

Jack Ference	NHTSA Headquarters, NRD-51	(202) 366-0168	Ext.

CRASH AVOIDANCE RESEARCH TECHNOLOGY SUPPORT FOR COMMUNICATIONS, ELECTRONIC CONTROLS AND COMPUTERS - TASK ORDER 2

Description: This was the second task in a 5-year Indefinite Quantity Contract (IQC) designed to support the research needs of NHTSA in the crash avoidance areas pertaining to communications, electronic controls, and computers. The objective of this task was to determine the architectures, interfaces, and data flows needed to support the safety related ITS user services, as defined in the ITS National Program Plan, within the framework of the National ITS Architecture.

Project Location **:** Virginia

Contractor(s) : Stanford Telecommunications, Inc.

Start Date: June 1995

End Date**:** May 1996

Estimated Total ITS Funds: $175,651

Estimated Total Project Cost: $175,651

Contacts**:**

Jack Ference	NHTSA Headquarters, NRD-51	(202) 366-0168	Ext.

CRASH AVOIDANCE RESEARCH TECHNOLOGY SUPPORT FOR COMMUNICATIONS, ELECTRONIC CONTROLS, AND COMPUTERS - TASK ORDER 3

Description: This is the third task in a five-year Indefinite Quantity Contract (IQC) designed to support the research needs of NHTSA in the crash avoidance areas pertaining to communications, electronic controls, and computers. The objective of this task was to predict the performance of electronic busses for in-vehicle communication requirements for ITS safety-related user services.

Project Location **:** Virginia

Contractor(s) : Stanford Telecommunications, Inc.

Start Date: July 1996

End Date**:** May 1997

Estimated Total ITS Funds: $260,377

Estimated Total Project Cost: $260,377

Contacts**:**

Jack Ference	NHTSA Headquarters, NRD-51	(202) 366-0168	Ext.

DEVELOP AN ANALYTICAL MODELING FRAMEWORK/COLLISION AVOIDANCE SYSTEM

Description: This project is the first task of an Indefinite Quantity Contract (IQC) titled "Crash Avoidance Research Technology Support - Simulation Models." The objective of this task was the development of an analytical framework that can be used to combine a number of ITS program features. The framework provided a means for assessing the safety impact of collision avoidance concepts and systems.

Project Location **:** Michigan

Contractor(s) : University of Michigan Transportation Research Institute (UMTRI)

Start Date: July 1994

End Date**:** November 1995

Estimated Total ITS Funds: $199,940

Estimated Total Project Cost: $199,940

Contacts**:**

Lloyd Emery	NHTSA Headquarters, NRD-51	(202) 366-5673	Ext.

DIRECT PSYCHOPHYSIOLOGICAL MONITORING OF DRIVER ALERTNESS

Description: This Small Business Innovative Research (SBIR) project developed a low cost device for direct monitoring of eye activity as an indicator of driver alertness. The device, Personal Alertness Monitor (PAM), is able to function as a stand alone alertness monitor. PAM also has the capability to work cooperatively with driver performance monitoring systems, as a component of a more complex system that includes continuous measure of driver performance, and with an integrated protocol for the presentation of warning signals. Phase I of the project is complete and resulted in a working prototype.

Project Location **:** Chelmsford, Massachusetts

Contractor(s) : MTI Research, Inc.

Start Date: October 1993

End Date**:** June 1997

Estimated Total ITS Funds: $243,964

Estimated Total Project Cost: $243,964

Contacts**:**

Paul Rau	NHTSA Headquarters, NRD-53	(202) 366-0418	Ext.

DRIVER STATUS/PERFORMANCE MONITORING

Description: Cooperative Agreement leading to the development of detection algorithms and alerting mechanisms for a vehicle-based drowsy driver detection/warning system, countermeasures that will monitor driver status/performance and detect degraded performance to provide a warning signal or other countermeasure to prevent its continuance. The program developed vehicle-based detection algorithms for reduced driver performance (e.g., symptomatic of drowsiness/fatigue) and test candidate driver interfaces (i.e., advisories and alerting stimuli). These results provide the basis for the development of an on-road prototype.

Project Location **:** Blacksburg, Virginia

Contractor(s) : Virginia Polytechnic Institute and State University

Start Date: September 1991

End Date**:** December 1996

Estimated Total ITS Funds: $660,000

Estimated Total Project Cost: $835,000

Contacts**:**

Paul Rau	NHTSA Headquarters, NRD-53	(202) 366-6826	Ext.

EVALUATION OF ASSESSING POTENTIAL HEALTH HAZARDS FROM WIDE-SPREAD USAGE OF ANTI-COLLISION DEVICES USING ITS TECHNOLOGIES

Description: Evaluation of potential health hazards that might result from widespread use of collision avoidance systems using active sensors. This project conducted an evaluation of potential health hazards that might result from wide-spread usage of anti-collision devices using ITS technologies.

Project Location **:** S. Deerfield, Massachusetts

Contractor(s) : Millitech Corporation

Start Date: October 1993

End Date**:** December 1995

Estimated Total ITS Funds: $100,000

Estimated Total Project Cost: $124,000

Contacts**:**

August Burgett	NHTSA Headquarters, NRD-51	(202) 366-5672	Ext.

EVALUATION OF TRAVELAID OPERATIONAL TEST

Description: Safety assessment of operational task of TRAVELAID hazard warning system.

Project Location **:** Washington State

Contractor(s) : Washington State Transportation Center (TRAC)

Start Date: June 1992

End Date**:** June 1997

Estimated Total ITS Funds: $250,000

Estimated Total Project Cost: $250,000

Contacts**:**

August Burgett	NHTSA Headquarters, NRD-51	(202) 366-5672	Ext.

HEAD UP DISPLAY (HUD): DRIVER AGE AND VISUAL INTERFERENCE CONCERNS

Description: Experimental data on ability of younger and older drivers to respond to safety relevant roadway objects when using HUDs.

Project Location **:** Lansdale, Pennsylvania

Contractor(s) : Scientex Corp.

Start Date: August 1994

End Date**:** September 1997

Estimated Total ITS Funds: $290,000

Estimated Total Project Cost: $290,000

Contacts**:**

Michael Perel	NHTSA Headquarters, NRD-52	(202) 366-5675	Ext.

HEAVY VEHICLE INTELLIGENT DYNAMIC STABILITY ENHANCEMENT SYSTEMS

Description: The purpose of this project was to develop stability-enhancing systems for heavy trucks to reduce the incidence of vehicle rollover. The first product was a rollover warning system to be developed for a typical tractor-trailer, and will display to the driver how close to the rollover threshold the vehicle is being operated. The second product was a rearward amplification suppression system for multiple-trailer trucks. This system applied individual brakes on the vehicle to improve the stability and prevent trailer rollovers during vehicle maneuvers that typically excite the trailers in lateral acceleration.

Project Location **:** Ann Arbor, Michigan

Contractor(s) : University of Michigan Transportation Research Institute (UMTRI)

Start Date: June 1995

End Date**:** December 1997

Estimated Total ITS Funds: $650,000

Estimated Total Project Cost: $1,321,876

Contacts**:**

Jim Britell	NHTSA Headquarters, NRD-53	(202) 366-6826	Ext.

HUMAN FACTORS REQUIREMENTS FOR SIDE OBJECT DETECTION WARNING SYSTEMS

Description: This program collected human factors data to support the development of recommendations for the information display characteristics of side object detection/warning systems.

Project Location **:** Seattle, Washington

Contractor(s) : Battelle Memorial Institute

Start Date: January 1995

End Date**:** December 1996

Estimated Total ITS Funds: $450,000

Estimated Total Project Cost: $450,000

Contacts**:**

Michael Perel	NHTSA Headquarters, NRD-52	(202) 366-5675	Ext.

IN-VEHICLE CRASH AVOIDANCE WARNING SYSTEM - HUMAN FACTORS CONSIDERATIONS

Description: Development of human factors guidelines for in-vehicle warning systems. The focus of this project was the development of human factors guidelines to ensure that the design of in-vehicle crash avoidance warning systems is compatible with driver capabilities, limitations and needs. Human factors data were being collected to determine desirable human interface requirements for rear object crash warning systems.

Project Location **:** Silver Spring, Maryland

Contractor(s) : COMSIS, Inc.

Start Date: September 1991

End Date**:** September 1996

Estimated Total ITS Funds: $953,000

Estimated Total Project Cost: $953,000

Contacts**:**

Michael Perel	NHTSA Headquarters, NRD-52	(202) 366-5675	Ext.

IN-VEHICLE SAFETY ADVISORY AND WARNING SYSTEMS (IVSAWS)

Description: The In-Vehicle Safety Advisory and Warning System is a Federal Highway Administration program to develop a nationwide vehicle information system that provides drivers with advance, supplemental notification of dangerous road conditions using electronic warning zones with precise areas of coverage. Extensive market investigation with the public and safety professionals revealed that while they both liked the IVSAWS concept, safety professionals wanted maximum compatibility with existing procedures, and motorists were concerned with avoiding false alarms. The operational concept selected uses centralized broadcasts from a regional IVSAWS operations center. Systems design analysis showed that an electronic warning zone with a specific area of coverage is the proper means to guarantee relevant alerts. Furthermore, a geolocation capability is the cost-effective means for implementing these electronic warning zones. Two candidates were selected which are compatible with centralized broadcasts and available geolocation systems.

Project Location **:** Fullerton, California

Contractor(s) : Hughes Ground Systems Group

Start Date: September 1990

End Date**:** March 1995

Estimated Total ITS Funds: $911,000

Estimated Total Project Cost: $911,000

Contacts**:**

James Arnold	FHWA - TFHRC, HSR-10	(703) 285-2974	Ext.

PATH COOPERATIVE AVCSS RESEARCH PROGRAM

Description: This program was a cooperative agreement between FHWA, CalTrans, and PATH for the research of vehicle-follower longitudinal control technologies. The program was divided into three major work areas: (1) sensor technologies, (2) vehicle-to-vehicle communications, and (3) vehicle-follower longitudinal control. The vehicle-follower work area was further researched in the following areas: system performance and test specifications, braking actuators technology, hardware computing platforms, operating system, control software development, and testing of vehicle-follower longitudinal control systems.

Project Location **:** Richmond, California

Partner(s) : Partners for Advanced Transit and Highway (PATH)

Start Date: October 1994

End Date**:** March 1997

Estimated Total ITS Funds: $1,275,000

Estimated Total Project Cost: $2,500,000

Contacts**:**

Robert Ferlis	FHWA - TFHRC, HSR-10	(703) 285-2680	Ext.

PORTABLE HUMAN FACTORS DATA ACQUISITION SYSTEM FOR CRASH AVOIDANCE RESEARCH (DASCAR)

Description: The objectives of this project were to apply state-of-the-art technology and methods to develop an easily-installed, portable instrumentation package and a set of analytical methods/tools to allow driver-vehicle performance data to be collected using a variety of vehicle types. This project covered Phase I, which recommended system design and software specifications.

Project Location **:** Oak Ridge, Tennessee

Contractor(s) : Oak Ridge National Laboratory

Start Date: September 1992

End Date**:** December 1995

Estimated Total ITS Funds: $1,198,000

Estimated Total Project Cost: $1,198,000

Contacts**:**

Michael Goodman	NHTSA Headquarters, NRD-52	(202) 366-5677	Ext.

PROBLEM DEFINITION AND ANALYSIS OF TARGET CRASHES AND ITS COUNTERMEASURE ACTIONS

Description: An analytical methodology for defining, analyzing, and modeling target crashes and ITS/crash avoidance countermeasure action for use in establishing research priorities and/or assessing potential safety benefits. This project has developed an analytical methodology for defining, analyzing, and modeling target crashes and ITS/crash avoidance countermeasure action for the purpose of assessing potential effectiveness and identifying R&D priorities and/or assessing potential safety benefits. The methodology has been applied to several types of collision. These findings will help the U.S. DOT to prioritize and guide research and development on these countermeasures.

Project Location **:** Columbus, OH

Contractor(s) : Battelle, CALSPAN, Castle Rock

Start Date: August 1991

End Date**:** April 1995

Estimated Total ITS Funds: $1,877,000

Estimated Total Project Cost: $1,877,000

Contacts**:**

Duane Perrin	NHTSA Headquarters, NRD-53	(202) 366-5654	Ext.

PUGET SOUND HELP ME (PUSHME) MAYDAY SYSTEM

Description: The primary objective of this project was to assess operational, institutional and technology requirements for implementing a regional MAYDAY system that would allow a driver to send an immediate notification of an incident, its location and need for assistance to a response center.

Project Location **:** Puget Sound (Northwest Washington State) region

Partner(s) : Washington State DOT, Washington State Patrol, David Evans and Associates, Motorola, IBI Group, Sentinel Communications, Response Systems Partners, and University of Washington

Start Date: August 1994

End Date**:** September 1997

Estimated Total ITS Funds: $1,400,000

Estimated Total Project Cost: $2,500,000

Contacts**:**

Ed Fischer	FHWA Region 10, HEO-010	(503) 326-2071	Ext.
Mike Morrow	FHWA, Washington Division, HPM-WA	(360) 753-9551	Ext.
Pete Briglia	Washington State DOT	(206) 543-3331	Ext.

RESEARCH AND TECHNOLOGY REVIEW FOR DRIVER VISION ENHANCEMENT SYSTEMS

Description: This project conducted a state-of-the-art review of research and technologies which are relevant to proposed and future driver vision enhancement systems.

Project Location **:** Pittsburgh, Pennsylvania

Contractor(s) : Carnegie Mellon Research Institute (CMRI)

Start Date: January 1994

End Date**:** August 1994

Estimated Total ITS Funds: $100,000

Estimated Total Project Cost: $100,000

Contacts**:**

Jack Ference	NHTSA Headquarters, NRD-51	(202) 366-0168	Ext.

SAFETY EVALUATION OF TRAVTEK OPERATIONAL TEST

Description: Safety assessment of operational test of traffic route guidance and navigation system.

Project Location **:** McLean, Virginia

Contractor(s) : SAIC

Start Date: September 1991

End Date**:** June 1995

Estimated Total ITS Funds: $450,000

Estimated Total Project Cost: $450,000

Contacts**:**

August Burgett	NHTSA Headquarters, NRD-51	(202) 366-5672	Ext.

STANDARDIZED DRIVING SIMULATION TASKS AND SCENARIOS

Description: The objective of this NHTSA project was to specify and develop a set of driving tasks and scenarios that can be used as standard reference test conditions for assessments/ evaluations of driver performance under a number of experimental conditions involving both normal driving and imminent crash threats. These tasks/scenarios/protocols were derived from predominant driving patterns and crash types, and will be used in advanced driving simulators, including the National Advanced Driving Simulator (NADS).

Project Location **:** Iowa City, Iowa

Contractor(s) : University of Iowa

Start Date: September 1993

End Date**:** September 1995

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $400,000

Contacts**:**

Duane Perrin	NHTSA Headquarters, NRD-53	(202) 366-5654	Ext.

VEHICLE FEEDBACK CUES AND DRIVER PERFORMANCE

Description: This project identified and analyzed vehicle feedback cues which most influence a driver's safety-relevant behavior and performance. Additionally, the project developed evaluation protocols and performance specifications for technology that affects feedback cues that drivers use to control the vehicle.

Project Location **:** Michigan

Contractor(s) : University of Michigan Transportation Research Institute (UMTRI)

Start Date: September 1992

End Date**:** October 1995

Estimated Total ITS Funds: $150,000

Estimated Total Project Cost: $150,000

Contacts**:**

Duane Perrin	NHTSA Headquarters, NRD-53	(202) 366-5654	Ext.

VEHICLE-BASED LANE DETECTION

Description: This program is a cooperative agreement with Rockwell International to conduct a two-year field evaluation of a prototype machine vision lane detection sensor. Sensor performance was evaluated under various operating conditions and general lane detection sensor performance requirements will be identified. Estimation of future vehicle position is key capability that will be an integral part of collision avoidance and automatic vehicle control systems. No viable technology to perform this function reliably and inexpensively is currently commercially available. The TASK 1 system validation effort has been completed and the TASK 2 data collection and analysis effort is about to begin.

Project Location **:** Anaheim, California

Contractor(s) : Rockwell International

Start Date: April 1994

End Date**:** October 1996

Estimated Total ITS Funds: $824,733

Estimated Total Project Cost: $824,733

Contacts**:**

Lloyd Emery	NHTSA Headquarters, NRD-51	(202) 366-5673	Ext.

VI. EVALUATION/PROGRAM ASSESSMENT

VI. EVALUATION/PROGRAM ASSESSMENT

Intelligent Transportation Systems evaluations and program assessment are activities that are fundamental to ensuring achievement of the ITS Program national goals and objectives. As stated in the National ITS Program Plan (March, 1995), these goals are: (1) improve the safety of the Nation's surface transportation system; (2) increase the operational efficiency and capacity of the surface transportation system; (3) reduce energy and environmental costs associated with traffic congestion; (4) enhance present and future productivity; (5) enhance the personal mobility and the convenience and comfort of the surface transportation system; and (6) create an environment in which the development and deployment of ITS can flourish. The Program Plan continues with a listing of activities to be performed to achieve the objectives. Evaluation and program assessment provide the critical feedback loops necessary for confirming or adjusting the present course and planning the future course of ITS projects to meet National ITS goals and objectives.

Evaluation. The most effective ITS evaluation activities are those that are intertwined with ITS projects throughout their life cycle. A principal benefit of evaluation is early participation of independent evaluators with project teams to ensure clear identification of the project goals and objectives, standards for successful performance, and measures of effectiveness agreed to by the project partners or project teams. Because evaluation is inherent to successful performance of any program, evaluation efforts (e.g., as part of research and development, operational field tests, mainstreaming, and architecture and standards work) are included as part of other sections of this projects report. Projects listed in this section are those that concentrate upon evaluations, or improving evaluation methods. With the selection of the four Metropolitan ITS Model Deployment sites and the initiation of the eight-state CVISN Pilot Projects, special emphasis is being placed on the evaluation of these projects by the ITS Joint Program Office (JPO). Moreover, future field operational tests will be evaluated by the ITS JPO. These evaluations are being provided through two parallel ITS Program Assessment Support (IPAS) contracts.

Program Assessment. Program assessment takes a global look at the U.S. ITS Program. Projects listed in this section of the ITS projects report focus on methods of integrating evaluation results to assess higher level program goals and objectives. Program assessment ultimately leads to investment strategies that must take an integrated look at program cost and effectiveness so that resources can be allocated to address the best solution approaches. Other projects listed in this section address methods for measuring ITS costs and benefits The ITS Deployment Tracking Projects are laying the groundwork for future program assessment by identifying the current level of ITS infrastructure deployments in the field.

Evaluation/Program Assessment
(Research)

ADVANCED PUBLIC TRANSPORTATION SYSTEMS (APTS) OPERATIONAL TEST EVALUATIONS

Description: Project evaluation is the link between operational tests and technology transfer from the APTS Program. It serves as the bridge between the conduct of a particular operational test and understanding the actual performance at the site, as well as potential effectiveness at other locales. Specific objectives for each test are identified along with measures of effectiveness to communicate results to all interested professionals. Key issues are being evaluated ranging from the reliability of particular new technologies in transit applications to the effectiveness of new service and management methods made possible by the technologies. Crosscutting studies will develop a national set of insights across different site conditions.

Project Location **:** Cambridge, Massachusetts

Contractor(s) : Volpe National Transportation Systems Center

Start Date: October 1994

End Date**:** April 2000

Estimated Total ITS Funds: $1,470,000

Estimated Total Project Cost: $1,770,000

Contacts**:**

Ron Boenau	FTA Headquarters, TRI-11	(202) 366-0195	Ext.
Robert Casey	Volpe National Transportation Systems Center	(617) 494-2213	Ext.

EVALUATION OF AUTOMATED COLLISION NOTIFICATION OPERATIONAL FIELD TEST

Description: The objective of this project is to conduct an independent safety evaluation of an operational field test of an in-vehicle system which will automatically determine that a serious crash has occurred and then summon an Emergency Medical Services (EMS) response, especially in rural areas.

Project Location **:** Laurel, Mayland

Contractor(s) : Applied Physics Laboratory of the Johns Hopkins University

Start Date: September 1995

End Date**:** October 1998

Estimated Total ITS Funds: $797,213

Estimated Total Project Cost: $797,213

Contacts**:**

Art Carter	NHTSA Headquarters, NRD-51	(202) 366-5669	Ext.

EVALUATION SUPPORT FOR ITS OPERATIONAL TESTS

Description: This is a support contract intended to provide technical support to FHWA headquarters and field offices as well as the operational test partners in designing and conducting operational test evaluations. The intent is to ensure the evaluations of the operational tests support the national ITS program. The level of support varies from test to test depending on need and ranges from the review of draft plans and reports to the actual development of these plans and reports in some cases.

Project Location **:** McLean, Virginia

Contractor(s) : Booz, Allen, Hamilton & Associates

Start Date: July 1994

End Date**:** June 1999

Estimated Total ITS Funds: $8,832,000

Estimated Total Project Cost: $9,749,581

Contacts**:**

Michael Freitas	FHWA - TFHRC, HSR-10	(703) 285-2421	Ext.

ITS PROGRAM ASSESSMENT SUPPORT (IPAS)

Description:

These are support contracts intended to provide ITS program assessment technical and program support in the following areas:

(1) Design, manage, implement, and support independent evaluations of the effectiveness of ITS projects, including Metropolitan and CVISN Model Deployments, showcases, and other ITS.

(2) Collect and analyze ITS performance, benefits, cost, economic, and program data. Data and information collected can be used to identify benefit/costs of ITS projects to support inclusion of ITS technology in state and local transportation problem solving.

(3) Synthesize the information produced in (2); evaluate the degree to which ITS policies and procedures have led to the achievement of current ITS costs, schedule, and performance goals; and provide yearly quantitative and qualitative inputs to the refinement of goals and the resultant Federal ITS investment strategy.

(4) Develop and refine the tools and information needed to support the JPO Program assessment and decision-making process.

Project Location **:** Washington, DC; (4) Metropolitan Model Deployment Sites; (10) State CVISN Pilot And Prototype Model Deployments

Contractor(s) : SAIC; Battelle Memorial Institute

Start Date: September 1996

End Date**:** August 2001

Estimated Total ITS Funds: $25,000,000

Estimated Total Project Cost: $25,000,000

Contacts**:**

Joe Peters	USDOT ITS JPO, HVH-1	(202) 366-2202	Ext.

ITS USER ACCEPTANCE RESEARCH

Description:

This program examines two aspects of user acceptance of ITS products and services. 1) The ITS Joint Program Office is conducting primary research to measure end-users' acceptance and willingness to pay for ITS user services. The program goal is to identify obstacles to and opportunities for encouraging broader ITS deployment. User groups include operators of commercial vehicles, private travelers, and public sector transportation managers. 2) Examining the evolution of the ITS consumer market, this user acceptance research project provides periodic reports on the market for traffic and traveler information products and services.

Completed reports (in chronological order) include "Critical Issues Relating to Acceptance of Commercial Vehicle Operations Services by Interstate Truck and Bus Drivers," May, 1995, Penn & Schoen Assoc.; "User Acceptance of ATIS Products and Services: A briefing book on the current status of JPO research," March, 1996, Charles River Assoc.; "ITS User Acceptance on Public Sector Transportation Managers: A Summary of Current ITI Deployment Knowledge," March, 1996, John A. Volpe National Transportation Systems Center;" "An Update of the Commercial ATIS Market," March, 1996, and January, 1997, Volpe Center;" "User Acceptance of ATIS Products and Services: What do we currently know?" October, 1996, Charles River Assoc.; "Acceptance of ATIS Products and Services: A report of qualitative research," December, 1996, Charles River Assoc.; "An Assessment of the ITS Commercial Trucking Market," February, 1997, Volpe Center.

Research in process for publication in fiscal year 1998 will address market demand of private travelers for in-vehicle crash avoidance countermeasures and advanced traveler information services; and obstacles and opportunities to accelerate ITS deployment among metropolitan area public sector transportation agencies.

Project Location **:** Washington, DC

Contractor(s) : Contract for CVO: Penn & Schoen Associates, Contract for research on private travelers: Charles River Associates, and Contract for economic analysis: Volpe National Transportation Systems Center

Start Date: January 1994

End Date**:** October 1998

Estimated Total ITS Funds: $2,647,680

Estimated Total Project Cost: $2,647,680

Contacts**:**

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METROPOLITAN ITS INFRASTRUCTURE DEPLOYMENT TRACKING

Description:

The purpose of this project is to provide the ITS Joint Program Office feedback on achieving the US DOT Operation TimeSaver goal. This goal is to deploy a metropolitan ITS infrastructure nationwide by December 2005. The project uses a three-step process: 1) Define major indicators of both component and integration deployment; 2) Periodically measure the presence of these indicators at 76 of the nation's largest metropolitan areas compared to the opportunity for deployment; and, 3) Work with partners at these sites to ascertain deployment goals and report back deployment against these goals. This approach acknowledges that ITS must be tailored to individual needs within each metropolitan area and that such needs are determined in a cooperative working environment among Federal, State, and local government participants. To date, there has been much progress in defining a set of indicators and obtaining a baseline measurement of these indicators. Analysis and quality review of the baseline data will be performed in FY 1998 to ensure the reliability and validity of the data and the indicator definitions. As indicators are reviewed, work will begin to see how they might be used in beginning to accomplish the third step described above.

Project Location **:** Oak Ridge, Tennessee

Contractor(s) : Oak Ridge National Laboratory

Start Date: October 1995

End Date**:** December 2005

Estimated Total ITS Funds:	$950,000	Through September 1998
Estimated Total Project Cost:	$950,000	Through September 1998

Contacts**:**

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Evaluation/Program Assessment
(Completed Projects)

ITS BENEFITS ASSESSMENT FRAMEWORK

Description: This project developed an analytical framework for assessing the benefits achievable from the deployment of ITS technologies and strategies. The framework utilizes existing computer models for estimating potential changes in congestion, vehicle emissions, energy consumption, safety and other values. Although the framework is intended to encompass most ITS technologies, this project was primarily concentrated on Advanced Traffic Management Systems (ATMS), Advanced Traveler Information Systems (ATIS), and interacting Advanced Public Transit Systems (APTS). Planning models were used to assess both short- and long-term impacts of proposed ITS deployments. The product of this effort is a set of interrelated models for estimating the impacts of specific ITS deployment alternatives. Network and corridor case studies were produced using existing operational tests and corridor projects for which data exists.

Project Location **:** Cambridge, Massachusetts

Contractor(s) : Volpe National Transportation Systems Center

Start Date: April 1992

End Date**:** September 1995

Estimated Total ITS Funds: $2,000,000

Estimated Total Project Cost: $2,000,000

Contacts**:**

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ITS NATIONAL INVESTMENT AND MARKET ANALYSIS

Description:

The ITS National Investment and Market Analysis provided public agencies, private companies, and legislatures with an understanding of the scope, cost, and resulting benefits and opportunities expected to emerge as a result of realizing the national goals of fully deploying Intelligent Transportation Systems in the United States. Results of this study also will be used to inform discussions and hearings on the Intermodal Surface Transportation Efficiency Act (ISTEA) reauthorization and the Federal FY98 budget in early 1997.

This study supplemented existing and ongoing research to provide following answers.

* Quantify the public investment in the infrastructure required to satisfy national goals for ITS deployment.
* Explore the willingness of the private sector to invest in ITS based upon the expected public infrastructure deployment.
* Link the benefits received to the cost required to deploy the infrastructure.
* Determine the impact on the general economy of full investment in ITS technology.
* Summarize the findings of the research to present a picture of the possibilities for, and impact of, deploying Intelligent Transportation Systems into the next decade.

Project Location **:** ITS America, Washington, DC

Partner(s) :

ITS America is working in cooperation with the U.S. Department of Transportation's Joint Program Office to complete this analysis. Apogee Research, Inc., is the prime contractor with support from Wilbur Smith, and a team of advisors.

A steering committee and technical advisory committee comprised of other ITS stakeholder organizations advised the scope and direction of this effort.

Start Date: June 1996

End Date**:** December 1997

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $962,160

Contacts**:**

Joe Peters	USDOT ITS JPO, HVH-1	(202) 366-2202	Ext.

ITS OPERATIONAL TEST META-EVALUATION

Description:

Although ITS operational tests include evaluations as an integral part, these evaluations are specific to the individual operational tests. To address national ITS program information needs, particularly those related to deployment decisions, additional information based on the comparison and analysis of inputs from all available information sources, including R&D, operational test results, and architecture efforts, is required. This project has provided meta-evaluation methodologies and applied those methodologies to address key questions of interest to FHWA in administering the national ITS program. Four studies have been conducted as part of this project. The various statistical approaches for the meta-evaluation of ITS user services were identified in a paper titled, "A Data Fusion Framework for Meta-evaluation of ITS System Effectiveness. A second study focused on the role of the incident detection component of freeway management systems and its role in the reduction of fatalities. This study was titled, "The Impact of Rapid Incident Detection on Freeway Accident Fatalities." In the third study, titled, "Reducing Accident Fatalities with Rural MAYDAY Systems," the impact of rural MAYDAY systems on rural roadway fatalities was examined. In the final study, titled "The Impact on Fatal Involvements of CVO User Services" the role of ITS CVO technologies in reducing fatal accidents involving commercial vehicles was examined.

Project Location **:** Washington, DC

Contractor(s) : Mitretek Systems

Start Date: April 1994

End Date**:** July 1996

Estimated Total ITS Funds: $332,000

Estimated Total Project Cost: $332,000

Contacts**:**

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MEASURING USER RESPONSE AT OPERATIONAL TESTS

Description:

This effort had two parts: A seminar entitled "Applying Consumer Research Methods to ITS Challenges" and a guidebook to collecting and analyzing user response and market acceptance data. The project was undertaken primarily to support the evaluation of field operational tests, but had applicability to other deployment-oriented ITS programs such as the Early Deployment and Priority Corridors Programs. The seminar and guide provide an analytical framework to assist program managers and evaluators in defining critical user acceptance research objectives, structuring a suitable experimental design, and selecting appropriate research tools.

The Volpe National Transportation Systems Center produced the seminar "Applying Consumer Research Methods to ITS Challenges" on April 12-13, 1995, in Boston, MA. The guidebook was available in early 1997.

Project Location **:** Cambridge, Massachusetts

Contractor(s) : Volpe National Transportation Systems Center

Start Date: May 1994

End Date**:** December 1995

Estimated Total ITS Funds: $250,000

Estimated Total Project Cost: $250,000

Contacts**:**

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VII. ARCHITECTURE, STANDARDS, AND NATIONAL COMPATIBILITY PLANNING

VII. ARCHITECTURE, STANDARDS, AND NATIONAL COMPATIBILITY PLANNING

National ITS Architecture Development and Deployment. In July 1996, the Architecture Team completed development of the National ITS Architecture. This effort has provided the supporting analysis, implementation strategy, and detailed requirements essential to accelerate the ITS standards development process. The National ITS Architecture, in conjunction with the developed standards, will supply the transportation and communications framework necessary for a nationally compatible intelligent transportation system.

The architecture program has identified interfaces between the system components, recommended the message sets and data that would be exchanged and that would need standards development, and has provided an implementation strategy for use by public and private sector transportation planners in developing their unique ITS systems. In addition, a newly identified user service, highway-rail intersection, was coordinated between FRA and FHWA, and was fully integrated into the National ITS Architecture in January 1997.

With the architecture development essentially complete, the focus turns to ITS deployment support. The architecture will be updated and maintained - based upon evolving standards, deployment experiences, and operational test results - and thus continue to support the further deployment of ITS systems throughout the country. An effort has been underway to support both the Model Deployment Initiative Program and other ITS deployment efforts to foster standardization and compatibility between projects.

A second major effort has been the support of the Standards Development Organizations, where the Architecture Team has been working with them in clarifying ITS standards requirements identified in the architecture and facilitating the effort to accelerate the development and approval of national standards.

Finally, an interactive architecture training course has been developed and conducted with frequent presentations planned throughout the country next year. In addition, education and technical assistance to the public and private sector from FHWA, with the use of the Architecture Team, has begun to be conducted to aid in the total ITS planning and deployment process. Understanding the broad foundation provided by the National ITS Architecture is leading to an acceleration of ITS deployment nationwide, bringing us closer to the vision set by ISTEA.

Standards Development. U.S. DOT currently is supporting a multi-year program designed to accelerate the development of ITS standards. The program supports the consensus-based, volunteer standards development process currently in existence in the U.S. by Standards Development Organizations (SDOs). The approach will allow U.S. DOT to leverage significant volunteer resources in five of the SDOs and greatly facilitate the deployment of ITS.

U.S. DOT in coordination with ITS America, has examined the standards requirements identified in the National ITS Architecture and has prioritized them in an effort to identify those most needed to facilitate early deployments, especially for the metropolitan infrastructure. These requirements include key interface standards (e.g., message sets and data dictionaries), crosscutting standards (e.g.,

location referencing), and some safety standards. In some cases, development of communications standards specific to ITS applications is required.

Top priority standards needs and requirements have been provided to the SDOs, together with near term funding support, to facilitate the consensus standardization process. The subsequent development and approval of non-proprietary, national ITS standards will accelerate ITS deployment by lowering the risk to both the public and the private sectors, facilitating expansion of the emerging industry, and promoting national interoperability.

National Compatibility Planning. Research is being conducted in a number of ITS areas that are addressed in the architecture to demonstrate the technologies and prove their value in facilitating interoperability and compatibility. These areas include a detailed analysis of particular wireless and wireline communications technologies used with ITS systems as well as evaluations of the electromagnetic compatibility of various proposed communications components. Location referencing methods in use are being examined for their suitability to a national ITS and their applicability to supporting national interoperability. Finally, research is being conducted to support the development of a nationwide GPS augmentation infrastructure that will support the public safety aspects of ITS. These projects complement both the architecture development and the standards development efforts in support of the overall ITS program.

Architecture, Standards, and National Compatibility Planning (Research)

AUGMENTATION FOR GPS

Description:

This project is a three phase effort that supports and facilitates the development of a nationwide GPS Augmentation infrastructure to provide the basic positioning system for the public safety apsects of ITS. Phase I analyzed the ability of available GPS Augmentation systems to meet user requirements. Recommendations for the most effective GPS Augmentation services were developed. Phase II is an-depth analysis of the characteristics of the systems recommended under Phase I to determine if there are any technical issues that need resolution. This includes interference analysis, development of a system concept, and a tradeoff analysis of various technical parameters. Phase III is a study of the institutional and policy issues that need to be resolved upon implementation of the recommended GPS Augmentation system. Examples of these issues include liability in case of degraded system performance, and the impact on the user community, service providers and the commercial electronics industry as a whole. Several scenarios are to be examined including a privately installed, operated and maintained system, a publicly installed, operated and maintained system and various combinations of these two.

Project Location **:** Boulder, Colorado, Annapolis, Maryland; Rockville, Maryland

Partner(s) : Institute for Telecommunication Sciences and ARINC

Start Date: February 1994

End Date**:** September 1999

Estimated Total ITS Funds: $2,430,000

Estimated Total Project Cost: $2,755,000

Contacts**:**

James Arnold	FHWA - TFHRC, HSR-10	(703) 285-2974	Ext.

ELECTROMAGNETIC COMPATIBILITY TESTING FOR ITS

Description: A resource has been established to conduct evaluations of the electromagnetic compatibility of various proposed ITS communications components, operating singly and in combination. Many of the issues to be investigated will be drawn from the ITS System Architecture development effort. Sophisticated simulations, anechoic chambers, and antenna test ranges will be employed to perform this testing.

Project Location **:** Colorado

Contractor(s) : Institute for Telecommunication Sciences of the National Telecommunications and Information Administration

Start Date: June 1993

End Date**:** November 2001

Estimated Total ITS Funds: $2,850,000

Estimated Total Project Cost: $2,850,000

Contacts**:**

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INTELLIGENT TRANSPORTATION SYSTEMS (ITS) SPATIAL DATA INTEROPERABILITY

Description:

Intelligent Transportation Systems (ITS) applications will require communication of locationally-referenced information. Location referencing methods such as linear, link, address, and coordinate based methods have been applied historically to limited geographic, functional, or organizational domains with homogeneous databases. ITS applications will be implemented over large domains, and will require location referencing in real time over communications links between dissimilar databases at central sites, at home or office, within travelway infrastructure, and in vehicles.

By far the dominant requirements for location referencing are from those applications requiring vehicle tracking or location reporting, link travel time updates or other real-time information to vehicle navigation systems, and particular implementations assuming central-site generation of routes. This project will address these issues and accomplish the following:

- With the aid of the communities of interest involved, develop the specification of an appropriate and flexible interoperability protocol for ITS, based on the concept of the location reference message protocol (LRMS).
- Develop the specification for the ITS Datum, a database of ground control points, including a prototype national Datum for testing and evaluation process.
- Support appropriate standardization organizations to produce a national and international location referencing standard for ITS.
- Support a prototype testbed for the validation and verification of the LRMS and ITS Datum concepts in a realistic operation setting.
- Develop a testbed for the LRMS and the ITS Datum on the World Wide Web - for the testing of user compliance with regard to standards.
- Establish strategies and processes for implementing and maintaining the LRMS and ITS Datum, and users' manuals and aids.

Project Location **:** Oak Ridge, Tennessee

Contractor(s) : Oak Ridge National Laboratory

Start Date: June 1995

End Date**:** September 1998

Estimated Total ITS Funds: $1,579,500

Estimated Total Project Cost: $1,579,500

Contacts**:**

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INTELLIGENT TRANSPORTATION SYSTEM STANDARDS PROGRAM

Description:

The U.S. DOT ITS Standards Program is an extensive, multi-year program of accelerated standards development to facilitate the successful deployment of ITS, with a special emphasis on the Intelligent Transportation Infrastructure. The standards typically chosen for U.S. DOT funding are those needed to implement the Intelligent Transportation Infrastructure, as identified in the U.S. National Architecture. These include interface standards - including message sets and data dictionaries - and foundation standards including location referencing and some safety standards which are needed to deploy Intelligent Transportation Infrastructure functions safely and efficiently.

The U.S. DOT has chosen to support, guide, and reinforce the existing standards efforts in the U.S. by providing funding to five existing Standards Development Organizations (SDOs). This "bottom-up" approach will allow U.S. DOT to leverage significant volunteer resources and to foster public-private partnerships in the deployment of ITS. The five SDOs chosen for funding are:

1.) The Society of Automotive Engineers (SAE)
2.) The American Society for Testing and Materials (ASTM)
3.) The Institute of Electrical and Electronics Engineers (IEEE)
4.) The American Association of State Highway and Transportation Officials (AASHTO)
5.) The Institute of Transportation Engineers (ITE)

By utilizing the talents of all 5 SDOs, the U.S. DOT program builds on expertise from the multiple disciplines of ITS. The DOT program provides an important aspect of coordination and overall planning. Many of the standards identified for U.S. DOT funding are being developed by several of the SDOs. The U.S. DOT program is encouraging and facilitating increased coordination in the U.S. for ITS standards development.

Project Location **:** Various

Contractor(s) : SAE; ASTM; IEEE; AASHTO, ITE

Start Date: January 1996

End Date**:** December 2000

Estimated Total ITS Funds: $16,000,000

Estimated Total Project Cost: $16,000,000

Contacts**:**

Michael Schagrin	USDOT ITS JPO, HVH-1	(202) 366-2180	Ext.

ITS COMMUNICATIONS ALTERNATIVES TEST AND EVALUATION

Description: Investigations into communications technologies and issues associated with ITS systems will be conducted. Activities will be focused upon identifying and analyzing particular communications technologies, which include wireless and wireline, for ITS functions. Investigations will also include communications protocol issues. Preferred communications alternatives will be recommended for specific ITS functions. Finally, a technical analysis of required quantity and location of spectrum will be completed.

Project Location **:** Annapolis, Maryland

Contractor(s) : ARINC

Start Date: July 1994

End Date**:** January 1999

Estimated Total ITS Funds: $3,981,847

Estimated Total Project Cost: $3,981,847

Contacts**:**

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NATIONAL ARCHITECTURE DEPLOYMENT SUPPORT

Description:

A consensus national architecture has been developed to serve as the framework for Intelligent Transportation Systems' deployment. U.S. DOT has recognized the need for three major tasks to be accomplished to maximize the return on this investment. The first is to maintain the architecture in a current status, incorporating input from deployment programs throughout the country as well as emerging standards. It is available on the World Wide Web and on CD ROM for the broadest and most user friendly distribution with the updated CD ROM available and first distributed in June 1997. It will thus continue to be the definitive and accurate reference for ITS deployment planning. The second task is to work with the Standards Development Organizations (SDOs) to ensure a major effort is accomplished in accelerating the ITS standards development and approval. This has involved participation on SDO subcommittees drafting the numerous ITS standards. The third task is an outreach program - supporting the Model Deployment Initiative Program and other deployment programs, meeting with public and private sector personnel across the transportation spectrum to assist in explaining the architecture and its benefits to the users, and developing or assisting in the development of ITS training programs. In the latter instance, an architecture training course has been developed and conducted with frequent presentations planned throughout the country next year.

Project Location **:** Manassas, Virginia and Anaheim, California

Contractor(s) : Lockheed Martin Federal Systems and Odetics

Start Date: August 1996

End Date**:** August 2001

Estimated Total ITS Funds: $10,625,000

Estimated Total Project Cost: $10,625,000

Contacts**:**

Lee Simmons	USDOT ITS JPO, HVH-1	(202) 366-8048	Ext.

Architecture, Standards, and National Compatibility Planning (Completed Projects)

NATIONAL ARCHITECTURE DEVELOPMENT

Description:

The National ITS Architecture has been developed to guide, not mandate, consistency among investors, purchasers, producers, and users in order to reduce the risk of incompatibility among the numerous intelligent transportation systems components to be manufactured and purchased in this industry. Phase I of the architecture development involved four industry teams, each producing an open national ITS architecture that provided the full set of ITS services (as defined in the National ITS Program Plan) while meeting critical ITS goals and objectives. In Phase II of the architecture development, two of the four teams were selected to resolve differences and develop the final national ITS architecture in an open, non-competitive process that allowed for outside input. Phase II has been completed and the single National ITS Architecture produced and documented. An additional user service, highway rail intersection (HRI), has been identified and was incorporated into the National ITS Architecture in January 1997.

The architecture development program, to include the HRI user service, has yielded a comprehensive set of standards requirements that have been forwarded to the ITS Standards Program Office and ITS-contracted Standards Development Organizations in order to accelerate ITS standards development.

Project Location **:** Manassas, Virginia and Anaheim, California

Contractor(s) : Lockheed Martin Federal Systems and Rockwell International Corporation

Start Date: September 1993

End Date**:** January 1997

Estimated Total ITS Funds: $19,018,940

Estimated Total Project Cost: $19,018,940

Contacts**:**

Lee Simmons	USDOT ITS JPO, HVH-1	(202) 366-8048	Ext.

SYSTEM ARCHITECTURE CONSENSUS BUILDING AND OUTREACH

Description:

This project was the outreach arm of the effort to develop and analyze a system architecture and deployment strategy, to provide the foundation for nationally interoperable ITS.

Understanding the diverse needs of the many and varied ITS stakeholders was a prerequisite for successful development of an architecture that met the requirements laid out by the set of ITS User Services, as described in the National ITS Program Plan. The DOT and the contractors on this effort have been, and will continue to, work cooperatively to gauge and foster consensus on a nationwide deployment scenario for ITS, as advocated by the architecture development program. The partnership of contractors and DOT is referred to as the Consensus Building and Outreach Team.

Services provided under this contract included: working with DOT and architecture development contractors to develop material appropriate for outreach; arranging and facilitating task force and focus group meetings to discuss architecture, standards, and deployment issues identified by the architecture development program; coordination with the various State and Regional ITS Chapters to encourage their involvement in the process of determining stakeholders' concerns; and all general planning, advisory, and coordination support needed to accomplish the objectives of the consensus-building effort, namely: (1) to maximize responsiveness to concerned stakeholder groups; (2) to maximize coverage of the country; and (3) to schedule and execute activities in a timely manner to aid the architecture development contractors in producing each successive refinement of their products.

Project Location **:** Washington, DC

Contractor(s) : Part of this effort has been incorporated as part of the ITS America cooperative agreement. Other pieces of the program were executed as separately funded task orders with ITS America, TRESP & Associates, and others during the course of the program.

Start Date: October 1992

End Date**:** July 1996

Estimated Total ITS Funds: $1,500,000

Estimated Total Project Cost: $1,500,000

Contacts**:**

William Jones	USDOT ITS JPO, HVH-1	(202) 366-2128	Ext.

VIII. MAINSTREAMING

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The strategy for deployment of ITS emphasizes "mainstreaming" in the planning process, educating, training, providing technical assistance, and achieving "buy in" and application at the state and local levels.

A. Deployment Planning

The existing planning and programming process for transportation improvements is well-established, and includes procedures for considering the long-range needs in an area, environmental issues, and creation of a specific program of projects for funding. In order to contribute to transportation improvements, ITS solutions must become part of the set of alternatives being considered. U.S. DOT has 90 early deployment planning studies completed or underway. Merging ITS into the planning process and offering innovative ways for state and local governments to acquire ITS solutions is critical to the success of the ITS program.

B. Deployment Support

The deployment support objectives include: (1) bringing together, in a series of workshops, public and private sector professionals to discuss practical solutions to problems which may be encountered in the deployment of ITS; (2) providing technical assistance through information exchange in peer-to-peer workshops and through technology transfer; and (3) identifying and carrying out activities needed to effectively promote ITS in the state and metropolitan planning processes, to educate the ITS community as to how those processes work, and to educate those involved in regional planning regarding ITS.

C. Professional Capacity Building (PCB)

In order to support the deployment of ITS, it is imperative that the technical capacity of transportation professionals at a variety of institutional levels be expanded. Focusing initially on federal employees and engaging state and local professionals, the Professional Capacity Building program will support the national ITS program by:

- Increasing knowledge about ITS benefits and deployment options among decision makers;
- Expanding the technical capabilities of public sector implementing and support agencies;
- Developing an education and training infrastructure at multiple levels, including colleges, universities, public agencies, and commercial providers.

Mainstreaming
(Early Deployment Planning)

AKRON, OHIO METROPOLITAN AREA EARLY DEPLOYMENT PLANNING STUDY

Description: The Akron, Ohio area will focus its initial efforts on the feasibility of traffic management on the regional freeway and feeder systems. The central traffic control system and a roadside/roadway system will define the infrastructure necessary to support and influence the interaction of the various functional subsystems of ITS including an Advanced Traffic Management System, an Advanced Traveler Information System, the Commercial Vehicle Operations, and Advanced Public Transportation Systems.

Project Location **:** Akron, Ohio

Partner(s) : Akron Metropolitan Area Transportation Study (AMATS)

Start Date: October 1996

End Date**:** June 1999

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

William Brownell	FHWA Region 5, HES-05	(708) 283-3549	Ext.
Jim Buckson	FHWA Ohio Division, HDA-OH	(614) 469-6896	Ext.
Kenneth Hanson	AMATS	(330) 375-2436	Ext.

ALLENTOWN/BETHLEHEM/EASTON, PENNSYLVANIA EARLY DEPLOYMENT PLANNING STUDY

Description: The Pennsylvania Department of Transportation is conducting an early deployment study that will develop a strategic deployment plan for ITS technologies which will address the needs of the Allentown/Bethlehem/Easton Metropolitan area.

Project Location **:** Allentown/Bethlehem/Easton, Pennsylvania

Partner(s) : Pennsylvania DOT

Start Date: November 1996

End Date**:** November 1998

Estimated Total ITS Funds: $320,000

Estimated Total Project Cost: $400,000

Contacts**:**

Steve Clinger	FHWA Region 3, HEO-03	(410) 962-0077	Ext. 3055
Mike Castellano	FHWA Pennsylvania Division, HPC-PA	(717) 221-4517	Ext.
Steve Koser	Pennsylvania DOT	(717) 705-1443	Ext.

BALTIMORE, MARYLAND EARLY DEPLOYMENT PLANNING STUDY

Description: The Baltimore Metropolitan Council, in cooperation with Maryland State Highway Administration, is conducting an Early Deployment Project for Metropolitan Baltimore that will be done in two phases: (1) ITS User Services Plan and ITS Strategic Deployment Plan, and (2) a Detailed Implementation Plan including an initial deployment of one or more high priority user services. The Baltimore Metropolitan Area, which includes Baltimore City, and Anne Arundel, Baltimore, Carroll, Harford, and Howard Counties, accounts for about 50% of Maryland's total population, business establishments and economic activity.

Project Location **:** Baltimore, Maryland

Partner(s) : MSHA and Baltimore Metropolitan Council

Start Date: June 1995

End Date**:** October 1998

Estimated Total ITS Funds: $456,000

Estimated Total Project Cost: $570,000

Contacts**:**

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Jack Anderson	Baltimore Metropolitan Council	(410) 333-1750	Ext. 217

BATON ROUGE, LOUISIANA EARLY DEPLOYMENT PLANNING STUDY

Description: The Louisiana Department of Transportation and Development and the Capital Region Planning Commission will develop a master plan for Intelligent Transportation Systems in the Baton Rouge metropolitan area. The study will include evaluation of existing and future traffic control capabilities and incident management considerations.

Project Location **:** Baton Rouge, Louisiana

Partner(s) : Louisiana Department of Transportation and Development

Start Date: August 1997

End Date**:** September 1998

Estimated Total ITS Funds: $170,000

Estimated Total Project Cost: $212,500

Contacts**:**

Jerry Jones	FHWA Region 6, HNG-06	(817) 978-4358	Ext.
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Chris Orillion	Louisiana DOTD	(504) 358-9102	Ext.

CHICAGO, ILLINOIS AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description:

This feasibility and planning study will develop and document an integrated, multi-modal, areawide ITS multi-year strategic deployment plan for implementation of ITS user services and technologies incorporating and integrating the existing, extensively deployed, multi-modal ITS infrastructure within the Chicago metropolitan planning area. The plan will recommend a list of projects for implementation, provide a staged implementation plan and identify potential public and private funding sources. The plan will also maintain sufficient flexibility to incorporate emerging technologies. Although the study will primarily address the freeway, expressway and tollway systems and the public transit systems, appropriate strategic regional arterials will also be addressed. The IVHS Planning and Project Deployment Process will be utilized and consistency will be achieved with the National ITS Program Plan, Intelligent Transportation Infrastructure and national ITS architecture development process. The study will also be closely integrated with the Gary-Chicago-Milwaukee (GCM) ITS Priority Corridor Initial Program Plan. The consultant (TransCore) for the study has been selected, the agreement for planning services has been executed, and work began in early 1997.

A multimodal Advanced Technology Task Force has been established by CATS to oversee development and implementation of the strategic early deployment plan for northeastern Illinois. Approximately 9 of 17 tasks have been completed, including the following deployment action memoranda: Existing Transportation Systems, Problems and Opportunities, User Service Objectives and Performance Criteria/Market Package Plan (includes 28 candidate actions and 11 immediate actions), ITS-Related Activities in the Region, Alternative ITS Technologies and Regional ITS: Status and Perspectives. Approximately 35% of the work has been completed.

Project Location **:** Chicago, Illinois

Partner(s) : Chicago Area Transportation Study (CATS), Illinois DOT, Illinois State Toll Highway Authority (ISTHA), Regional Transportation Authority (RTA), and Chicago DOT

Start Date: July 1995

End Date**:** October 1998

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Edward Stillings	FHWA Region 5, HES-05	(708) 283-3550	Ext.
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David Zavattero	CATS	(312) 793-0360	Ext.

EL PASO, TEXAS EARLY DEPLOYMENT PLANNING STUDY

Description: The study will develop a plan to integrate real-time ITS technology with sound traffic management principles and will focus on the movement of large commercial vehicles in the El Paso area and across the Mexican border. For example, truck locations, destination, type of load (if hazardous), and weight could be automatically tracked from an existing Transportation Management Center in City Hall. Current planning activities and implementation strategies of multiple agencies will be integrated to facilitate the movement of trucks as a continuing activity. Prioritization of future improvements will be closely coordinated through a multi-jurisdictional Traffic Management Center.

Project Location **:** El Paso, Texas

Partner(s) : Texas DOT, City of El Paso

Start Date: April 1995

End Date**:** April 1998

Estimated Total ITS Funds: $336,000

Estimated Total Project Cost: $420,000

Contacts**:**

Jerry Jones	FHWA Region 6, HNG-06	(817) 978-4358	Ext.
Mark Olson	FHWA Texas Division, HTA-TX	(512) 916-5966	Ext.
Carlos Chavez	Texas DOT - El Paso District	(915) 774-4307	Ext.
Ted Marquez	City of El Paso	(915) 541-4035	Ext.
Gene Schroeder	Texas DOT - TRF (Austin)	(512) 416-3309	Ext.

FORT LAUDERDALE, FLORIDA AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: The Florida Department of Transportation, in cooperation with the Broward County Government, is conducting an early deployment planning study that will allow for a comprehensive ITS assessment and develop an areawide strategic ITS deployment plan for the Fort Lauderdale area.

Project Location **:** Fort Lauderdale, Florida

Partner(s) : Florida DOT

Start Date: September 1996

End Date**:** March 1999

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Mark Doctor	FHWA Region 4, HES-04	(404) 562-3685	Ext.
Grant Zammit	FHWA Florida Division, HDA-FL	(850) 942-9693	Ext.
William A. Lewis, P.E.	Florida DOT, District 4	(954) 777-4110	Ext.

FORT WORTH, TEXAS EARLY DEPLOYMENT PLANNING STUDY

Description: An ITS plan will be developed that integrates the existing and projected features of traffic management activities underway in Fort Worth with the expanded scope and services provided by ITS technologies. This plan will also provide a comprehensive linkage to the ITS plan concurrently under development in Dallas to provide a regionally integrated system.

Project Location **:** Fort Worth, Texas

Partner(s) : Texas DOT

Start Date: April 1995

End Date**:** April 1998

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Jerry Jones	FHWA Region 6, HNG-06	(817) 978-4358	Ext.
Mark Olson	FHWA Texas Division, HTA-TX	(512) 916-5966	Ext.
Wallace Ewell	Texas DOT-Fort Worth District	(817) 370-6619	Ext.
Walt Daniel	Texas DOT - TRF (Austin)	(512) 416-3158	Ext.
Poonam Wiles	TTI - Arlington	(817) 261-1661	Ext.

FRESNO, CALIFORNIA EARLY DEPLOYMENT PLANNING STUDY

Description: This study will result in a Strategic ITS Deployment Plan for the Fresno metropolitan area and Fresno County. The full range of ITS user services will be considered in the development of this plan. The study will seek stakeholder input, including the public, in order to develop a User Service Plan. Functional requirements will be developed from the User Service Needs. These needs will be considered along with funding and procurement issues in order to identify and screen alternative technologies. The Council of Fresno County Governments in partnership with Caltrans District 06 will conduct this ITS effort with the concept of statewide coordination as a guiding principle, and will develop a strategic plan for deployment of ITS technologies throughout Fresno County as well as coordinating it with other Central Valley ITS deployment efforts.

Project Location **:** Fresno County, California

Partner(s) : California DOT and Council of Fresno County Governments

Start Date: September 1996

End Date**:** October 1998

Estimated Total ITS Funds: $320,000

Estimated Total Project Cost: $400,000

Contacts**:**

Frank Cechini	FHWA, California Division, HTA-CA	(916) 498-5005	Ext.
Tony Boren	Council of Fresno County Governments	(209) 233-4148	Ext.

HARRISBURG/LEBANON/CARLISLE, PENNSYLVANIA EARLY DEPLOYMENT PLANNING STUDY

Description: The Pennsylvania Department of Transportation is sponsoring an early deployment planning study that will develop a strategic deployment plan for ITS technologies which will address the needs of the Harrisburg/Lebanon/Carlisle Metropolitan area.

Project Location **:** Harrisburg/Lebanon/Carlisle, Pennsylvania

Partner(s) : Pennsylvania DOT

Start Date: November 1996

End Date**:** May 1999

Estimated Total ITS Funds: $320,000

Estimated Total Project Cost: $400,000

Contacts**:**

Steve Clinger	FHWA Region 3, HEO-03	(410) 962-0077	Ext. 3055
Mike Castellano	FHWA Pennsylvania Division, HPC-PA	(717) 221-4517	Ext.
Steve Koser	Pennsylvania DOT	(717) 705-1443	Ext.

I-10 NEW ORLEANS, LOUISIANA TO SAN ANTONIO, TEXAS EARLY DEPLOYMENT PLANNING STUDY

Description: The project will develop a strategic plan for ITS deployment along the I-10 corridor from New Orleans, LA to San Antonio, TX. Particular emphasis will be given to intermodal freight movement at strategic ports, efficiency of freight movement through the corridor, and rural ITS safety applications.

Project Location **:** I-10 Corridor between New Orleans, Louisiana and San Antonio, Texas

Partner(s) : Texas DOT & Louisiana Department of Transportation and Development (DOTD)

Start Date: February 1997

End Date**:** August 1998

Estimated Total ITS Funds: $300,000

Estimated Total Project Cost: $355,000

Contacts**:**

Jerry Jones	FHWA Region 6, HNG-06	(817) 978-4358	Ext.
Mark Olson	FHWA Texas Division, HTA-TX	(512) 916-5966	Ext.
Curtis Beaty	Texas DOT	(512) 416-3297	Ext.
Eric Kalivoda	Louisiana DOTD	(504) 358-9124	Ext.

I-71 CORRIDOR BETWEEN COLUMBUS AND CLEVELAND EARLY DEPLOYMENT PLANNING STUDY

Description: This feasibility study will investigate the application of ITS technologies to a rural corridor. It will also link the urban regional traffic management systems for the Columbus and Cleveland metropolitan areas.

Project Location **:** I-71 between Columbus and Cleveland, Ohio

Partner(s) : Ohio DOT

Start Date: June 1996

End Date**:** August 1998

Estimated Total ITS Funds: $200,000

Estimated Total Project Cost: $250,000

Contacts**:**

Edward Stillings	FHWA Region 5, HES-05	(708) 283-3550	Ext.
James Buckson	FHWA Ohio Division, HDA-OH	(614) 469-5877	Ext.
George Saylor	Ohio DOT	(614) 752-8099	Ext.

KNOXVILLE, TENNESSEE EARLY DEPLOYMENT PLANNING STUDY

Description:

The Knoxville Urban Area Metropolitan Planning Organization, in cooperation with the City of Knoxville, the Tennessee Department of Transportation, and the University of Tennessee, is conducting an early deployment planning study that will allow for a comprehensive ITS assessment and develop a strategic ITS deployment plan for the Knoxville area.

The transportation system in Knoxville will be going through major reconstruction in the upcoming years. The study will specifically be focused on improving the system efficiency and safety through "SMART" technology under construction conditions.

Project Location **:** Knoxville, Tennessee

Partner(s) : Knoxville Urban Area Metropolitan Planning Organization and Tennessee DOT

Start Date: September 1996

End Date**:** June 1998

Estimated Total ITS Funds: $200,000

Estimated Total Project Cost: $250,000

Contacts**:**

Mark Doctor	FHWA Region 4, HES-04	(404) 562-3685	Ext.
Leigh Ann Tribble	FHWA Tennessee Division, HDA-TN	(615) 736-7107	Ext.
Jeff Welch	Knoxville Urban Area MPO	(423) 215-2500	Ext.

MEMPHIS, TENNESSEE EARLY DEPLOYMENT PLANNING STUDY

Description: This project will allow for comprehensive ITS assessment, and the development of a strategic ITS deployment plan for the Memphis area. Areas of concentration include traffic management and surveillance; transit, paratransit and ridesharing; and commercial fleets and urban commodities movement.

Project Location **:** Memphis, Tennessee

Partner(s) : Tennessee DOT and Memphis MPO

Start Date: June 1995

End Date**:** April 1998

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Mark Doctor	FHWA Region 4, HES-04	(404) 562-3685	Ext.
Leigh Ann Tribble	FHWA Tennessee Division, HDA-TN	(615) 736-7107	Ext.
Alan Gray	Memphis MPO	(901) 576-7433	Ext.

NEW CASTLE COUNTY, DELAWARE EARLY DEPLOYMENT PLANNING STUDY

Description: The Delaware Department of Transportation is developing a strategic plan that will provide a clear path toward the successful deployment of an integrated ITS/transportation management plan for the State. The plan considers the various modes and activities of other jurisdictions and stakeholders in the interest of developing a comprehensive program of regional compatibility and coordination.

Project Location **:** New Castle County, Delaware

Partner(s) : Delaware DOT

Start Date: March 1995

End Date**:** August 1998

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Steve Clinger	FHWA Region 3, HEO-03	(410) 962-0077	Ext. 3055
Greg Murrill	FHWA Delaware Division, HDA-DE	(302) 734-1719	Ext.
Gene Donaldson	Delaware DOT	(302) 739-7786	Ext.

NEW HAVEN-MERIDEN, CONNECTICUT EARLY DEPLOYMENT PLANNING STUDY

Description: This study will develop a comprehensive ITS strategic deployment plan which responds to near-term I-95 and I-91 corridor needs, and maximizes transportation system effectiveness given a basic supply/demand imbalance. It will also complement related efforts in the state and the northeast, and provide a building block for broader mid-range ITS applications in the region.

Project Location **:** New Haven-Meriden, Connecticut

Partner(s) : Connecticut DOT and South Central Regional Council of Governments (SCRCOG)

Start Date: June 1996

End Date**:** April 1998

Estimated Total ITS Funds: $350,000

Estimated Total Project Cost: $437,500

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Bob Ramirez	FHWA Connecticut Division	(860) 659-6703	Ext. 3004
Hal Decker	Connecticut DOT	(860) 594-2636	Ext.

NEW YORK CITY, NEW YORK EARLY DEPLOYMENT PLANNING STUDY

Description: This study will develop a coordinated areawide Early Deployment Plan that will address both the safety/personal security and mobility/accessibility needs of the NYC Region. The plan will emphasize the application of ITS to highways, as well as transit and other multi-modal elements. The plan will also coordinate and complement other ITS related projects and planning efforts on both the highway and transit systems.

Project Location **:** New York, New York

Partner(s) : New York DOT

Start Date: March 1995

End Date**:** January 1998

Estimated Total ITS Funds: $750,000

Estimated Total Project Cost: $4,681,250

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Arthur O'Connor	FHWA/FTA NYC Metro Office	(212) 466-3856	Ext.
Ed Roberts	New York State DOT	(518) 457-1232	Ext.

NEWARK, NEW JERSEY EARLY DEPLOYMENT PLANNING STUDY

Description: The City of Newark, in cooperation with the New Jersey Department of Transportation, is conducting an early deployment study that will develop a strategic deployment plan for ITS technologies which will address the needs of the Newark metropolitan area.

Project Location **:** Newark, New Jersey

Partner(s) : City of Newark, New Jersey DOT

Start Date: September 1996

End Date**:** March 1998

Estimated Total ITS Funds: $280,000

Estimated Total Project Cost: $350,000

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Breck Jeffers	FHWA New Jersey Division, HTC-NJ	(609) 637-4231	Ext.
Fernando Rubio	City of Newark	(973) 733-8417	Ext.

OKLAHOMA CITY, OKLAHOMA AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: The Oklahoma City Areawide Early Deployment Planning Study will establish criteria to measure the performance of a proposed traffic operations system, including reductions in travel times, fuel consumption, accidents and intersection delay. A more qualitative measurement will involve a survey of drivers who use these area's arterial and freeway corridors to determine their perception of improved traffic flow. The study will examine needed functional areas for a traffic control center, including traffic network monitoring, adaptive traffic control, traveler advisory, communications, incident detection and management, parking management and demand management. The study will determine where and when these services are needed.

Project Location **:** Oklahoma City, Oklahoma

Partner(s) : Association of Central Oklahoma Governments (ACOG)

Start Date: October 1996

End Date**:** October 1998

Estimated Total ITS Funds: $250,000

Estimated Total Project Cost: $312,000

Contacts**:**

Jerry Jones	FHWA Region 6, HRA-06	(817) 978-4358	Ext.
Deanna Mills	FHWA Oklahoma Division	(405) 945-6172	Ext.
Alan Soltani	Oklahoma DOT	(405) 521-2861	Ext.

PHILADELPHIA, PENNSYLVANIA EARLY DEPLOYMENT PLANNING STUDY

Description: The purpose of this project is to accelerate the development and application of the appropriate institutional cooperative agreements and coordination network for the exchange of vital intermodal transportation related information utilizing existing and future ITS technologies in place within the I-95 corridor and the Philadelphia metropolitan area. This project will build on the framework of the advanced traffic and incident management systems developed by Pennsylvania DOT. The focus of the project is to further develop the intermodal regional and areawide coordination activities proposed in the traffic and incident management systems and implemented under the traffic and incident management systems Early Action Program Projects. Project completion will be based on the results of PENN DOT's I-95 Intermodal project.

Project Location **:** Philadelphia, Pennsylvania

Partner(s) : Pennsylvania DOT

Start Date: July 1994

End Date**:** To Be Determined

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Carmine Fiscina	FHWA/FTA Philadelphia Metro Office	(215) 656-7111	Ext.

SAN ANTONIO, TEXAS EARLY DEPLOYMENT PLANNING STUDY

Description: The purpose of this study is to develop a metropolitan system ITS architecture which integrates the Texas DOT, City of San Antonio, VIA (San Antonio's transit authority) and the MPO's current management systems into a single unified system. This will give each organization involved a standard which will allow sharing of data, control, and response. This project has been incorporated into the ITS Model Deployment project in San Antonio, Texas.

Project Location **:** San Antonio, Texas

Partner(s) : Texas DOT

Start Date: April 1995

End Date**:** April 1998

Estimated Total ITS Funds: $397,000

Estimated Total Project Cost: $496,250

Contacts**:**

Jerry Jones	FHWA Region 6, HNG-06	(817) 978-4358	Ext.
Mark Olson	FHWA Texas Division, HTA-TX	(512) 916-5966	Ext.
Pat Irwin	Texas DOT - San Antonio District	(210) 731-5249	Ext.
Curtis Beaty	Texas DOT - Traffic Operations Div. - Austin	(512) 416-3297	Ext.

SAN DIEGO BORDER CROSSING EARLY DEPLOYMENT PLANNING STUDY

Description: The effort will carry out the development of an Early Deployment Plan for ITS technologies as applied to intermodal commercial facilities and California International Border Crossings. The study will result in the development of a strategic ITS deployment plan for the San Diego Border crossing area and will be coordinated with the Southern California Priority Corridor planning activities. The study is closely following the ITS planning process. The study will seek stakeholder input, including the public, in order to develop a User Service Plan. Functional requirements will be developed from the User Service Needs. These needs will be considered along with funding and procurement issues in order to identify and screen alternative technologies.

Project Location **:** San Diego, California

Partner(s) : California DOT

Start Date: September 1995

End Date**:** July 1998

Estimated Total ITS Funds: $200,000

Estimated Total Project Cost: $250,000

Contacts**:**

Frank Cechini	FHWA California Div, HTA-CA	(916) 498-5005	Ext.

SAN JUAN, PUERTO RICO AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: The Commonwealth of Puerto Rico is investigating the feasibility of implementing various ITS technologies throughout the San Juan metropolitan area to reduce congestion while maximizing the utility of all its transportation modes. The plan includes interaction with the proposed light-rail mass transit system to be constructed within the next decade.

Project Location **:** San Juan, Puerto Rico

Partner(s) : Puerto Rico DOT

Start Date: September 1993

End Date**:** April 1998

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Eddie Rivera	FHWA, Puerto Rico Division	(809) 766-5600	Ext.

SPRINGFIELD, MASSACHUSETTS EARLY DEPLOYMENT PLANNING STUDY

Description: This study will produce an ITS strategic plan for the Springfield region that is consistent, compatible, and integrable with statewide and regional transportation planning studies. It will outline a vision aimed at smoothing intermodal linkages, integrating the intra-regional transportation system, and promoting a coordinated deployment of user services that will avoid costly duplicative efforts.

Project Location **:** Springfield, Massachusetts

Partner(s) : Massachusetts Highway Department

Start Date: March 1995

End Date**:** January 1998

Estimated Total ITS Funds: $350,000

Estimated Total Project Cost: $437,500

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Edward Silva	FHWA Massachussetts Division	(617) 494-2253	Ext.
Steve Pepin	Massachussetts EOTC	(617) 973-8051	Ext.

SYRACUSE, NEW YORK EARLY DEPLOYMENT PLANNING STUDY

Description: This study will establish a comprehensive strategic plan for the coordinated areawide deployment of ITS for the Syracuse area transportation system. The plan will also identify early action projects that will provide immediate benefits and form the foundation for a comprehensive areawide traffic management system.

Project Location **:** Syracuse, New York

Partner(s) : New York State DOT

Start Date: March 1995

End Date**:** March 1999

Estimated Total ITS Funds: $350,000

Estimated Total Project Cost: $437,500

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Jerry Zell	FHWA New York Division, HTD-NY	(518) 431-4129	Ext. 228
Ed Roberts	New York State DOT	(518) 457-1232	Ext.

TOLEDO, OHIO EARLY DEPLOYMENT PLANNING STUDY

Description: This study will seek to find the most appropriate ITS technology that would yield maximum benefit to the users. The ITS technology categories that will be the focus of the study will include Advanced Traffic Management Systems, Advance Traveler Information Systems, Commercial Vehicle Operations, and Advanced Public Transportation Systems. Major emphasis will be placed on finding the most appropriate ITS technology to solve the most critical problems of the Toledo region.

Project Location **:** Toledo, Ohio

Partner(s) : Toledo Metropolitan Area Council of Governments (TMACOG)

Start Date: October 1996

End Date**:** June 1999

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

William Brownell	FHWA Region 5, HES-5	(708) 283-3549	Ext.
Jim Buckson	FHWA Ohio Division, HDA-OH	(614) 469-6896	Ext.
William L. Knight	TMACOG	(419) 241-9155	Ext.

WASHINGTON, D.C. EARLY DEPLOYMENT PLANNING STUDY

Description: The District of Columbia Department of Public Works is conducting an Early Deployment Study for the District of Columbia that will identify and assess potential DC surface transportation priorities that can be addressed by the application of ITS technologies, and the institutional and technical issues and alternatives required to implement them.

Project Location **:** Washington, DC

Partner(s) : District of Columbia Department of Public Works

Start Date: December 1996

End Date**:** January 1998

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Steve Clinger	FHWA Region 3, HEO-03	(410) 962-0077	Ext. 3055
Maurice Keys	District of Columbia Department of Public Works	(202) 939-8010	Ext.

WICHITA, KANSAS EARLY DEPLOYMENT PLANNING STUDY

Description: The city of Wichita, Kansas will develop a long-range, comprehensive plan for the development and implementation of ITS technologies. These will include traffic/transit management and traveler information. This plan will provide a direction for incorporating this technology into the city's long-range transportation plan and transportation improvement program.

Project Location **:** Wichita, Kansas

Partner(s) : Kansas DOT and City of Wichita

Start Date: July 1997

End Date**:** July 1998

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Bruce Baldwin	FHWA Region 7, HEO-07	(816) 276-2741	Ext.
Bob Alva	FHWA Kansas Division	(913) 276-7286	Ext.
Matt Volz	Kansas DOT	(913) 296-6356	Ext.
Scott Canefield	City of Wichita	(316) 268-4446	Ext.

YOUNGSTOWN-WARREN, OHIO EARLY DEPLOYMENT PLANNING STUDY

Description: The focus of this planning effort will center on the study and development of feasible alternatives for regional traffic management systems applicable to the local highway network. A strategic plan will be prepared for the Youngstown-Warren area to guide the implementation of transportation system operation projects on an area-wide scale. The plan will address ITS user services to increase safety, reduce motorist delays, reduce air pollution, and improve the overall efficiency of vehicle operations through the use of advanced surveillance, communications, navigation, sensors, control strategies, traveler interface, and data processing.

Project Location **:** Youngstown-Warren, Ohio

Partner(s) : Eastgate Development & Transportation Agency

Start Date: October 1996

End Date**:** June 1999

Estimated Total ITS Funds: $200,000

Estimated Total Project Cost: $250,000

Contacts**:**

William Brownell	FHWA Region 5, HES-05	(708) 283-3549	Ext.
Jim Buckson	FHWA Ohio Division, HDA-OH	(614) 469-6896	Ext.
John Getchey	EDATA	(330) 746-7601	Ext.

Mainstreaming
(Early Deployment Planning)
(*CVO Mainstreaming*)

ITS/CVO MAINSTREAMING PROJECTS

Description:

Since 1992, every State except Hawaii has participated in an ITS/CVO institutional issues study. These individual and multi-State studies provided forums for State regulatory agencies and representatives from the motor carrier industry to identify opportunities to streamline compliance functions with ITS/CVO technology applications. Now that the barriers to ITS/CVO deployment have been identified, the States are moving towards the next stage - ITS/CVO Mainstreaming.

Mainstreaming means moving ITS/CVO services beyond concept development and testing into operation. The basic building block for the ITS/CVO program is the State; however, State CVO programs must be developed in the context of regional CVO programs that serve the nation's major trucksheds. Most truck trips are under 200 miles from home base and are concentrated within major population and economic regions, which can be defined as 7 regional platforms (SE, SW, MW, NE, NW, W, and Great Lakes). The CVO program must establish and maintain regional CVO forums aligned with these trucksheds to ensure that CVO services are delivered where the trucks are and that services within trucksheds are relatively uniform from the carrier's perspective.

This program has many functions: 1) the support of State officials (including DOT, DMV, State Patrol, DOR officials, etc.) and motor carriers (especially smaller motor carrier firms) participation in regional ITS/CVO forums, 2) the analysis of benefits and costs of ITS/CVO technologies to individual State agencies as well as motor carriers, 3) the development of ITS/CVO business plans for regional platforms as well as individual States, and 4) the facilitation of State-and region-wide long term deployment of proven ITS/CVO technologies. Funds also will support full-time, regional champions who will coordinate and convey the purposes, technologies, costs, and benefits of ITS/CVO activities at the states to legislatures, business, and the public.

Currently, there are seven CVO Mainstreaming projects comprised of 33 States. Several states are seeing the benefits of joining multiple regional mainstreaming consortia to ensure that their individual state mainstreaming activities are synchronized with neighboring states. The Regional Consortia (with lead states identified) are as follows:

I-95 Coalition/Northern: NJ* (Lead) MA, CT, RI, ME

I-95 Coalition/Eastern: NJ* (Lead), WV*, VA*, MD, DE, NY, PA

Advantage CVO/Southeastern: KY* (Lead), NC, TN, GA, LA, VA*

Advantage CVO/Great Lakes: KY* (Lead), OH, IN, MI, MN, WI, WV*

Mississippi Valley: MO--Lead, KS, NE, SD

Northwestern: WA--Lead, ID, MT, WY, UT*

Western: OR--Lead, CA, UT*, CO

* Designates states participating in more than one regional consortium.

Project Location **:** As reflected in the description of the Regional Consortia.

Contractor(s) : Various

Start Date: January 1992

End Date**:** May 1998

Estimated Total ITS Funds:	$7,230,000
Estimated Total Project Cost:	$13,220,000

***Contacts*:**

Jeff Loftus	FHWA - OMC, HSA-20	(202) 366-4516	Ext.

Mainstreaming
(Deployment Support)

INCORPORATING ITS INTO REGIONAL TRANSPORTATION PLANNING

Description:

This three-year study began by examining current transportation planning methods used by MPOs and implementing agencies to address ITS deployment, particularly in the alternatives analysis stage. If such methods are inadequate, new approaches will be developed. The resulting methods shall be applied to two case studies. The case studies will cover an area or region, rather than a single traditional project. The range of transportation improvement projects considered will include construction of new roads or lane miles, conventional signage or signal installations, transit improvements, Transportation Demand Management (TDM) measures, Advanced Traveler Information Systems, Advanced Traffic Management Systems, and Advanced Public Transportation Systems.

Phase I of this project was completed on 30 June 1996. The two cases studied were Houston, TX, and Seattle, WA. An analysis of the approach and methods used by the MPO's in these areas to select among projects as part of the Transportation Improvement Process (TIP) was conducted. A report was produced that documented this process and provided some recommendations for how to deal with ITS projects as part of the TIP. Based on the results of this phase the Seattle area was selected for a more detailed analysis of how to include and evaluate ITS enhancements to traditional highway construction projects. In Phase II, Mitretek initiated a modified Major Investment Study (MIS) type analysis to develop methods and techniques to evaluate transportation improvement alternatives, including alternatives with ITS enhancements. As part of Phase II, the analysis framework was defined and published in an interim report, "Incorporating ITS into Corridor Planning Seattle Case Study," June 1997. In Phase III this corridor analysis will be completed and the Phase II report will be revised based on comments received from DOT. This study is expected to be completed in June 1998 with a handbook of these methods for use by transportation planners.

Project Location **:** Washington, DC

Contractor(s) : Mitretek Systems

Start Date: July 1995

End Date**:** June 1998

Estimated Total ITS Funds: $1,413,000

Estimated Total Project Cost: $1,413,000

Contacts**:**

Paula Ewen	USDOT ITS JPO, HVH-1	(202) 366-9682	Ext.

ITS PROFESSIONAL CAPACITY BUILDING

Description:

The purpose of this program is to provide education and training programs for Federal, state and local agency professionals and for elected officials and the general public concerning the deployment of Intelligent Transportation Systems. The activities are multilevel in nature, incorporating awareness programs, technical training, and education programs at the undergraduate and graduate levels. By the year 2000, it is anticipated that elected officials and the general public will understand the value and applications of ITS components, and that there will be sufficient numbers of trained U.S. DOT, state and local ITS professionals in place. It is also anticipated that sufficient numbers of trained professionals will be entering the work force and that comprehensive, multi-disciplinary programs will be in place.

The "Five Year Strategic Plan for Professional Capacity Building for ITS Transportation Management and Traveler Information Services" was issued in March 1996. A series of six awareness seminars and four short courses were given to federal, state and local participants during FY 1997. Additional education and training activities in FY 1998 will continue to be designed to systematically encourage, enhance and leverage opportunities for programs at all levels. An Implementation Plan is available to provide details on such programs, with budgets and priorities established to implement the most effective strategies. Seminars, short courses and workshops are offered in subject areas such as ITS Awareness, ITS and The Transportation Planning Process, ITS Public/Private Partnerships, Deployment, Shared Resources and Applying the National ITS Architecture to Deployments.

Project Location **:** Washington, DC; FHWA Region and Division Offices, FTA Region Offices, State and Local government agencies

Contractor(s) : Various

Start Date: September 1996

End Date**:** On-going

Estimated Total ITS Funds: Not Applicable (Multi-Year)

Estimated Total Project Cost: Not Applicable

Contacts**:**

Larry Swartzlander	FHWA Headquarters, HTV-3	(202) 366-6066	Ext.
Tom Humphrey	USDOT ITS JPO, HVH-1	(202) 366-2211	Ext.

NIAGARA INTERNATIONAL TRANSPORTATION TECHNOLOGY COALITION

Description:

Using a revolving loan fund to finance the NITTEC Program, the many agencies and jurisdictions which own and operate the Niagara River Border Crossings and the major approaches to those crossings will establish a multiagency transportation coordination and management council to:

a) Develop regionally compatible travel information and traffic management strategies (e.g., non-stop electronic customs processing, ETTM);

(b) Establish a Regional Transportation Management Center to monitor regional traffic and coordinate traffic management strategies (e.g., incident management and tourist/travel information service); and

(c) Help finance operating and capital improvements by operating agencies to expedite the movement of traffic across and to the border.

Project Location **:** Buffalo/Niagara Region

Partner(s) : New York State DOT, New York Thruway Authority, Niagara Falls Bridge Commission, Buffalo and Fort Erie Peace Bridge Authority, Ministry of Transportation Ontario, and other local agencies

Start Date: December 1995

End Date**:** On-going

Estimated Total ITS Funds: $2,500,000

Estimated Total Project Cost: $5,000,000

Contacts**:**

Al Alonzi	FHWA Region 1, HPD-01	(518) 431-4224	Ext. 228
Jerry Zell	FHWA - New York Division HTS-NY	(518) 431-2125	Ext. 228
Robert Russell	New York State DOT, HTD-NY Buffalo Region	(716) 847-3238	Ext.

Mainstreaming
(Deployment Support)
(*CVO Deployment Support*)

ITS/CVO TECHNOLOGY TRUCK

Description: The ITS/CVO technology truck project goal is to create a national demonstration project -- using an 18-wheeler designed and constructed to house portable ITS technology, classroom-type facilities, and informational kiosks -- in the area of CVO designed to demonstrate, educate, and inform state agencies and motor carrier communities regarding the technologies and potential benefits of the ITS/CVO program. The program will also serve as a method of introducing ITS/CVO technology to the secondary audiences -- motor carrier safety enforcement officers, motor vehicle operators (truck/bus drivers), transportation students and the general public by providing hands-on demonstrations as well as interactive, multi-media based informational presentations.

Project Location **:** Oak Ridge, Tennessee

Contractor(s) : Oak Ridge National Laboratory

Start Date: February 1995

End Date**:** September 1999

Estimated Total ITS Funds: $1,600,000

Estimated Total Project Cost: $1,600,000

Contacts**:**

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Zeborah English	FHWA - OMC, HSA-20	(202) 366-0398	Ext.

ITS/CVO TRAINING

Description:

The primary objective of this effort is to plan, develop, implement and update ITS/CVO training courses. These courses will provide ITS/CVO state, federal and private managers and implementers with the skills and knowledge necessary to accomplish the ITS/CVO Mission and Goals. ITS/CVO training curriculum will consist of two broad areas: project management skills development and technical skills development. Upon completion of these courses, participants will be able to:

* Understand and articulate the ITS/CVO Program's Vision, Mission and Program Goals and Objectives;
* Understand the standards and procedures for ITS/CVO program funding, development, testing and deployment along with operations and technology maintenance requirements;
* Understand the institutional issues or barriers to program success, and promote the importance of the non-technical agreements which are critical for a state to develop, thus ensuring successful long-term technology deployment;
* Understand the technical issues in the areas of communication technologies, system integration, and technology standards, as well as the strategies necessary to deploy these technologies;
* Understand the requirements for implementation of strategies designed to ensure cooperation among state partners, and serve as a catalyst for further efforts toward employment of ITS/CVO technologies.

A basic management course is the first in a series of courses which will help create uniformity and standardization in reaching common goals and objectives among ITS/CVO partners and stakeholders. This course was available in the spring of 1997. Technical courses will provide federal and state personnel with the skills necessary to effectively deploy, operate and evaluate ITS/CVO technologies that enhance public safety and are cost-effective, user friendly, and interoperable with existing public and private information systems. Technical courses were available in the fall of 1997. Both management and technical courses will be updated regularly.

Project Location **:** Washington, D.C.

Contractor(s) : MELE & Associates, JHU/Applied Physics Laboratory, Booz-Allen & Hamilton

Start Date: October 1995

End Date**:** September 1998

Estimated Total ITS Funds: $2,000,000

Estimated Total Project Cost: $2,000,000

Contacts**:**

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Mainstreaming
(Completed Projects)

ATLANTA, GEORGIA AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: This project developed an integrated, multi-modal, statewide ITS Strategic Deployment Plan for implementation of ITS technologies using the on-going Atlanta projects as a foundation. The plan recommended a list of projects for implementation, provided a staged implementation plan, and identified potential public and private funding sources. The plan also maintained sufficient flexibility to incorporate emerging technologies.

Project Location **:** Atlanta, Georgia

Partner(s) : Georgia DOT, Georgia Tech Research Institute

Start Date: October 1994

End Date**:** November 1997

Estimated Total ITS Funds: $450,000

Estimated Total Project Cost: $600,000

Contacts**:**

Mark Doctor	FHWA Region 4, HES-04	(404) 562-3685	Ext.
Katie Wyrosdick	FHWA Georgia Division, HDA-GA	(404) 562-3638	Ext.

AUSTIN, TEXAS AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: The City of Austin and the Texas Department of Transportation jointly developed both short- and long-range objectives for the implementation and deployment of ITS technologies throughout the metropolitan Austin area.

Project Location **:** Austin, Texas

Partner(s) : Texas DOT

Start Date: June 1993

End Date**:** October 1997

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Jerry Jones	FHWA Region 6, HNG-06	(817) 978-4358	Ext.
Mark Olson	FHWA Texas Division, HTA-TX	(512) 916-5966	Ext.
Bubba Needham	Texas DOT - Austin District	(512) 832-7053	Ext.
Walt Daniel	Texas DOT - TRF (Austin)	(512) 416-3158	Ext.

BIRMINGHAM, ALABAMA AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: The Alabama Department of Transportation developed an ITS/Congestion Management Program for the Birmingham metropolitan area. The consultant worked with a State-selected Oversight Committee comprised of State, City, County, and private sector personnel. The consultant identified levels of congestion on freeways and other highways of national significance recommending short-term and long-term measures and ITS strategies to alleviate congestion. The program described the needs, the applicable ITS user services, the functional requirements, the system architecture, implementation issues, the cost effectiveness, and the performance monitoring plan. As a result of this study, the State is developing plans for a computerized traffic signal upgrade, fiber optic cable communications, and camera surveillance/detection system. Also, freeway service patrols began in the first half of 1997.

Project Location **:** Birmingham, Alabama

Partner(s) : Alabama DOT

Start Date: February 1994

End Date**:** January 1996

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Mark Doctor	FHWA Region 4, HES-04	(404) 562-3685	Ext.
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BOSTON, MASSACHUSETTS AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: The Early Deployment study resulted in a two-phased conceptual ITS plan for the Boston Metropolitan area for the years 1995 and 2000. The 1995 plan is the short-range plan consisting of the latest state-of-the-practice technologies. The long-range plan for the year 2000 includes advanced and promising technologies. The study also recommended organizational changes needed to manage the recommended ITS program.

Project Location **:** Boston, Massachusetts

Partner(s) : Massachusetts Highway Department

Start Date: May 1992

End Date**:** January 1994

Estimated Total ITS Funds: $360,000

Estimated Total Project Cost: $450,000

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Edward Silva	FHWA Massachusetts Division	(617) 494-2253	Ext.
Steve Pepin	Massachusetts EOTC	(617) 973-8051	Ext.

BUFFALO/NIAGARA FALLS, NEW YORK AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description:

The area's coordinated effort developed a strategic plan for area-wide deployment of Intelligent Transportation Systems (ITS). The study followed the FHWA's User Services/ITS Planning and Deployment Process. Key elements of the study included:

* Establishing the coalition of key stakeholders;
* Developing an area-wide Strategic Plan based on the area's unique user service needs;
* Identifying key early implementation projects;
* Developing a Phased Implementation Plan with timetable and funding availability;
* Identifying/quantifying operations and maintenance resource needs;
* Identifying needed institutional arrangements;
* Establishing public outreach programs.

In order to keep the ITS design/deployment process moving as efficiently as possible, the consultant study contract was established with a mechanism to proceed directly into project design. In addition to the $2 million earmark for deployment, New York State Department of Transportation has programmed more than $10 million in its five year capital program for ITS activities for the Buffalo area. Early action projects for the area include establishment of an interim traffic management center, development and support of an incident management team, and deployment of portable changeable message signs and highway advisory radio.

Project Location **:** Buffalo/Niagara Falls, New York

Partner(s) : New York State DOT

Start Date: September 1993

End Date**:** June 1997

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $784,000

Contacts**:**

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Jerry Zell	FHWA New York Division, HTD-NY	(518) 431-4125	Ext. 228
Ed Roberts	New York State DOT	(518) 457-1232	Ext.

CHARLESTON, SOUTH CAROLINA AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description:

The Early Deployment Study identified methods for implementing new technologies to manage and reduce congestion in Charleston, South Carolina. There are five project tasks.

Task 1: Identify routes and sources of potential congestion.

Task 2: Identify and recommend traffic operations systems techniques which may be used to detect and monitor traffic conditions.

Task 3: Recommend traffic operations system and management techniques which may be utilized to mitigate congestion.

Task 4: Recommend the method of monitoring, the physical facilities, the location of this control, and the equipment and staffing requirements.

Task 5: Prepare plans, specifications and estimates to procure and construct those devices, techniques, methods or processes.

Project Location **:** Charleston, South Carolina

Partner(s) : South Carolina DOT

Start Date: September 1992

End Date**:** June 1997

Estimated Total ITS Funds: $320,000

Estimated Total Project Cost: $400,000

Contacts**:**

Mark Doctor	FHWA Region 4, HES-04	(404)562-3685	Ext.
Steve Ikerd	FHWA South Carolina Division, HDA-SC	(803)253-3885	Ext.
Pat Harrison	South Carolina DOT	(803)737-1456	Ext.

CHARLOTTE, NORTH CAROLINA AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description:

The overall project for the Charlotte metropolitan area, titled "Congestion Avoidance and Reduction for Autos and Trucks", or CARAT, will incorporate elements of Advanced Traffic Management Systems, Advanced Traveler Information Systems and Commercial Vehicle Operations for the greater Charlotte/Mecklenberg area. The project is to be implemented in phases. The phase I initiative consists of the development and operation of a freeway management system for a 15.2-mile section of I-77. Future phases of the project will extend surveillance and control to a total of 360 miles of freeways in the Charlotte urban area.

The Early Deployment Planning study focused primarily on development of the functional specifications for the regional traffic management system.

The full project report describes the fundamental system elements necessary to implement this regional traffic management system in the greater Charlotte area. Analyses of the alternative technologies and strategies are presented as a basis for the recommendations. Where appropriate, functional specifications are included for use in the preparation of final design documents.

Project Location **:** Charlotte, North Carolina

Partner(s) : North Carolina DOT

Start Date: June 1992

End Date**:** December 1993

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

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Max Tate	FHWA North Carolina Division, HDA-NC	(919) 856-4354	Ext.

CLEVELAND, OHIO AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: The purpose of this project was to develop a traffic surveillance and control system feasibility study for the Cleveland metropolitan area. The consultant prepared a Strategic Deployment Plan focusing on the freeway/expressway system and an Incident Management Plan. The Strategic Deployment Plan identified the user service requirements in the study region, the user service objectives based on these requirements, the functions required to support the user services, and defined the system architecture.

Project Location **:** Cleveland, Ohio

Partner(s) : Ohio DOT

Start Date: September 1993

End Date**:** October 1996

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

William Brownell	FHWA Region 5, HES-05	(708) 283-3549	Ext.
Dale Schiavoni	Ohio DOT	(216) 581-2100	Ext.
James Buckson	FHWA Ohio Division, HDA-OH	(614) 469-5877	Ext.

COLUMBUS, OHIO EARLY DEPLOYMENT PLANNING STUDY

Description: The project was a feasibility study of an interface between traffic signal control systems and the freeway management system in Columbus, Ohio. These systems are currently operating independently. The Mid-Ohio Regional Planning Commission proposed to interface the systems in order to maximize efficiency of traffic operations in the Columbus area. The result of this study provided a working model of the interface between the systems.

Project Location **:** Columbus, Ohio

Partner(s) : Ohio DOT and Mid-Ohio Regional Planning Commission (MORPC)

Start Date: August 1995

End Date**:** August 1997

Estimated Total ITS Funds: $188,000

Estimated Total Project Cost: $235,000

Contacts**:**

William Brownell	FHWA Region 5, HES-05	(708) 283-3549	Ext.
James Buckson	FHWA Ohio Division, HDA-OH	(614) 469-5877	Ext.
Ahmad Al-Akhras	Mid-Ohio Regional Planning Commision	(614) 228-2663	Ext.

DALLAS, TEXAS AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description:

The purpose of the Dallas area-wide ITS plan was to improve mobility, safety, and productivity. The goals of the plan were to:

* Coordinate with public and private sectors to collect and disseminate real-time information on traffic and transit conditions.
* Optimize transportation system operations by coordinating operations among governmental agencies.
* Encourage transit and High Occupancy Vehicle (HOV) usage.

These goals are being addressed through six objectives with specific tasks associated with each objective.

1. Establish a broadly-based Steering Committee with representatives from multiple agencies.
2. Assess the existing transportation management and communications linkages and investigate the potential application of ITS technologies.
3. Identify institutional and legal barriers to coordination and recommend solutions.
4. Produce an integrated, area-wide multi modal, multi-jurisdictional ITS plan while maintaining flexibility to incorporate emerging technologies.
5. Develop project evaluation criteria, costs and benefits, priorities, and staged implementation plan.
6. Define projects for implementation, prepare proposals, and identify private and public funding sources.

Project Location **:** Dallas, Texas

Partner(s) : Texas DOT

Start Date: September 1992

End Date**:** October 1996

Estimated Total ITS Funds: $600,000

Estimated Total Project Cost: $750,000

Contacts**:**

Jerry Jones	FHWA Region 6, HNG-06	(817) 978-4358	Ext.
Mark Olson	FHWA Texas Division, HTA-TX	(512) 916-5966	Ext.
Terry Sams	Texas DOT, Dallas District	(214) 320-6231	Ext.
Walt Daniel	Texas DOT, TRF (Austin)	(512) 416-3158	Ext.
Jim Carvell	Texas Transportation Institute	(214) 691-8124	Ext.
Carol Walters	Texas Transportation Institute	(817) 261-1661	Ext.

DAYTON/SPRINGFIELD, OHIO AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: The purpose of this project was to develop a traffic surveillance and control system feasibility study for the Dayton/Springfield metropolitan area. A consultant developed a strategic deployment plan that identified the needs for the area and the strategies to meet those needs.

Project Location **:** Dayton/Springfield, Ohio

Partner(s) : Ohio DOT and Miami Valley Regional Planning Commission (MVRPC)

Start Date: August 1995

End Date**:** September 1997

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

William Brownell	FHWA Region 5, HES-05	(708) 283-3549	Ext.
James Buckson	FHWA Ohio Division, HDA-OH	(614) 469-5877	Ext.
Anne Hassoun	MVRPC	(937) 223-6323	Ext.

DENVER, COLORADO AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: This Early Deployment Planning Project developed an Intelligent Transportation Systems Strategic Plan for the Denver Metropolitan Area. The plan, covering the next 10 years, selects a smart corridor and provides a guide for the implementation and deployment of ITS technologies in this corridor, as well as throughout the metro area. Phase I was completed April 30, 1995. Phase II will be completed as part of the Denver, Colorado Preliminary Engineering Early Deployment Planning Study.

Project Location **:** Denver, Colorado

Partner(s) : Colorado DOT

Start Date: December 1991

End Date**:** April 1993

Estimated Total ITS Funds: $213,000

Estimated Total Project Cost: $316,000

Contacts**:**

Eva Sniezek	FHWA Region 8, HPD-08	(303) 969-5772	Ext. 341
Scott Sands	FHWA Colorado Division, HFO-CO	(303) 969-6730	Ext. 362

DENVER, COLORADO PRELIMINARY ENGINEERING EARLY DEPLOYMENT PLANNING STUDY

Description: The Colorado DOT developed an Intelligent Transportation System Strategic Plan for the Denver Metropolitan Area. The plan provides a guideline for the implementation of ITS technologies during the next 10 years. One of the first recommendations was to develop and implement an Advanced Traffic Management System (ATMS) as the focal point for multi-agency and public/private sector traffic management and ITS activities. This early deployment planning project developed the preliminary design of the ATMS and the field elements that are needed to support the system's functions. The Colorado DOT (CDOT) is continuing with a follow on project to complete the design and implementation of the ATMS using a design/build procurement.

Project Location **:** Denver, Colorado

Partner(s) : Colorado DOT

Start Date: August 1992

End Date**:** June 1997

Estimated Total ITS Funds: $500,000

Estimated Total Project Cost: $625,000

Contacts**:**

Eva Sniezek	FHWA Region 8, HPD-08	(303) 969-5772	Ext. 341
Scott Sands	FHWA Colorado Division, HFO-CO	(303) 969-6730	Ext. 362
Larry Cocoran	Colorado DOT	(303) 757-5159	Ext.

DES MOINES, IOWA AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: The objective of this study was to develop a strategic plan for deployment of ITS user services in the Des Moines metropolitan area. The study, conducted for the Iowa DOT by the Center for Transportation Research and Education, provided a framework for incorporating ITS into the metropolitan area's long-improvement program.

Project Location **:** Des Moines, Iowa

Partner(s) : Iowa DOT and the Des Moines MPO

Start Date: March 1995

End Date**:** December 1997

Estimated Total ITS Funds: $275,000

Estimated Total Project Cost: $343,750

Contacts**:**

Bruce Baldwin	FHWA Region 7, HEO-07	(826) 276-2741	Ext.
Jim Hogan	FHWA Iowa Division, HDA-IA	(515) 233-7305	Ext.
Tim Crouch	Iowa DOT	(515) 239-1545	Ext.
Tom Maze	CTRE	(515) 294-8103	Ext.

DETROIT, MICHIGAN AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description:

The Michigan Department of Transportation prepared a comprehensive deployment plan addressing the issues related to an upgrade and expansion of the existing 32.5-mile Advanced Traffic Management Systems (ATMS)/Advanced Traveler Information Systems (ATIS) (freeway surveillance) system in the Southeast Michigan - Metropolitan Detroit Area. The existing system was installed in 1980-81 and is a direct descendant of the John Lodge Freeway Surveillance project of the late 1960's. The State's existing five-year action plan calls for extending ATMS/ATIS coverage over a system encompassing some 250 miles. Staging, costs and all technical aspects of this plan were reexamined and refined in the context of evolving ITS technologies. The study reviewed traffic data, determined the area's functional requirements for ATMS/ATIS services, identified and analyzed alternative ATMS/ATIS technologies, and presented a staged plan of recommended actions. The study also developed a model approach to the development and deployment of alternative routings and traffic management plans for handling incidents.

Project Location **:** Detroit, Michigan

Partner(s) : Michigan DOT, FHWA, Wayne County Road Commission, Road Commission for Oakland Co., Macomb Co Road Commission, MI State Police, SE Michigan Council of Governments.

Start Date: September 1992

End Date**:** October 1994

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

William Brownell	FHWA Region 5, HES-05	(708)283-3549	Ext.
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Dr. Kunwar Rajendra	Michigan DOT	(517)373-2247	Ext.

EVALUATION OF TELECOMMUNICATIONS COST OF OWNERSHIP VERSUS COST OF LEASING TRADEOFF

Description:

The State of Maryland has conducted a detailed study to define its telecommunications requirements for the deployment of ITS throughout the State. This project provided a number of design options for their telecommunications, and conducted a detailed life cycle cost analysis of these options to determine if it should lease or own this infrastructure. In addition, Maryland has examined the relative value of various video quality levels to be used in their CCTV network surveying the roadways. They concluded that compressed video was acceptable to perform the required functions. This decision has a major impact on the cost of telecommunications. This project has been extended to produce both summary and detailed documentation on their results as well as the methodology, and to provide a video on the relative merits of compressed versus broadcast quality video. Finally, Maryland and their contractor have prepared a one day seminar on lessons learned in the telecommunications study, which are available on request from the ITS JPO:

(1) "A Case for Intelligent Transportation (ITS Telecommunications Analysis)," FHWA-JPO-97-0015.

(2) "ITS Telecommunications: Public or Private? A Cost Tradeoff Methodology Guide," FHWA-JPO-97-0014

Project Location **:** Maryland

Contractor(s) : Computer Sciences Corporation

Start Date: October 1995

End Date**:** December 1997

Estimated Total ITS Funds: $325,000

Estimated Total Project Cost: $435,000

Contacts**:**

William S. Jones	USDOT ITS JPO, HVH-1	(202) 366-2128	Ext.
Alisoun Moore	Maryland State Highway Administration	(410) 685-1040	Ext.

GARDEN STATE PARKWAY, NEW JERSEY EARLY DEPLOYMENT PLANNING STUDY

Description: This study developed a coordinated strategic plan for deploying an integrated ITS along the Garden State Parkway corridor in New Jersey. The corridor includes all of the facilities operated by the New Jersey Highway Authority, as well as the neighboring facilities and agencies with identified transportation needs, or which can be used as alternate routes. The plan is also consistent with the recently developed State of New Jersey "Integrated Transportation Management Strategies Master Plan."

Project Location **:** New Jersey

Partner(s) : New Jersey DOT

Start Date: July 1996

End Date**:** November 1997

Estimated Total ITS Funds: $320,000

Estimated Total Project Cost: $440,000

Contacts**:**

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Breck Jeffers	FHWA New Jersey Division, HTC-NJ	(609) 637-4231	Ext.
Roy Little	New Jersey Highway Authority	(908) 442-8600	Ext.

GRAND RAPIDS, MICHIGAN AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: The Michigan Department of Transportation prepared a Strategic ITS Deployment Plan focusing on integrated freeway and major arterial system management. It also contained an Incident Management Program. The deployment plan identified "user service" requirements and objectives for the area, the "functions" necessary to support each service, and defined a system architecture. Identified user services to be included are areawide traffic management and traveler information systems, a system that facilitated the movement of public transit and emergency vehicles, and a data collection database. Various technologies reviewed for deployment included signal control equipment, a communications network, sensors, detectors, CCTV, HAR transmitters, changeable message signs, ramp metering, and the possible future accommodation of HOV operations. The Incident Management Plan is applied to the US-131 freeway through Grand Rapids.

Project Location **:** Grand Rapids, Michigan

Partner(s) : Michigan DOT, FHWA, Grand Rapids & Environs Transportation Study, Grand Rapids Area Transit Authority, MI State Police, Kent Co Road Commission, Ottaqwa Co Road Commission, City of Grand Rapids

Start Date: July 1994

End Date**:** August 1996

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

William Brownell	FHWA Region 5, HES-05	(708) 283-3549	Ext.
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Kunwar Rajendra	Michigan DOT	(517) 373-2247	Ext.

GREENSBORO, NORTH CAROLINA CORRIDOR EARLY DEPLOYMENT PLANNING STUDY

Description: The purpose of the Early Deployment Study was to identify transportation problems and existing transportation systems and development strategies in the local area, and to develop a vision for future deployment.

Project Location **:** Greensboro, North Carolina

Partner(s) : North Carolina DOT

Start Date: June 1992

End Date**:** August 1994

Estimated Total ITS Funds: $150,000

Estimated Total Project Cost: $187,500

Contacts**:**

Mark Doctor	FHWA Region 4, HES-04	(404) 562-3685	Ext.
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M. Pat Strong	North Carolina DOT	(919) 715-2464	Ext.

GREENVILLE, SOUTH CAROLINA AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description:

This congestion management plan consisted of two phases. Phase I included:

* Inventory and Data Collection
* Alternate Routes and Strategies
* Conceptual Advanced Traffic Management Systems (ATMS) Development
* Evaluation of Driver Information Systems
* ATMS Organization Development
* Legislation and Regulation Review
* Preliminary Study Report Preparation

Phase II included the preparation of conceptual designs as a result of the steering committee recommendations and the preparation of the final study report.

Project Location **:** Greenville-Spartanburg, South Carolina

Partner(s) : South Carolina DOT

Start Date: September 1992

End Date**:** March 1996

Estimated Total ITS Funds: $200,000

Estimated Total Project Cost: $250,000

Contacts**:**

Mark Doctor	FHWA Region 4, HES-04	(404) 562-3685	Ext.
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Pat Harrison	South Carolina DOT	(803) 737-1456	Ext.

HAMPTON ROADS, VIRGINIA AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: Virginia Department of Transportation (VDOT) and those cities and counties which make up the Hampton Roads/Tidewater area conducted a study to investigate the potential for bringing advanced technologies to the transportation system along the Virginia eastern shore. The outcome was an area-wide plan for utilizing existing and advanced technologies that integrates transportation management systems (traffic, transit, etc.) of the State and individual cities. This study included an evaluation of FHWA's ITS Planning and Project Deployment Process.

Project Location **:** Hampton Roads, Virginia

Partner(s) : Virginia DOT

Start Date: September 1992

End Date**:** October 1995

Estimated Total ITS Funds: $497,000

Estimated Total Project Cost: $597,000

Contacts**:**

Steve Clinger	FHWA Region 3, HEO-03	(410) 962-0077	Ext. 3055
Tom Jennings	FHWA Virginia Division, HDA-VA	(804) 281-5107	Ext.
Stephany Hanshaw	Virginia DOT	(804) 924-2567	Ext.

HARTFORD, CONNECTICUT AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description:

This study produced a Strategic ITS Deployment Plan for the Hartford metropolitan area. The full range of ITS user services were considered in the development of this plan. The Hartford MPO is a key player, along with the Connecticut DOT, in the study, and ensured public involvement in the process. This study was closely coordinated with future studies in New Haven, CT, and Springfield, MA, providing for a comprehensive plan for the I-91 corridor through southern New England. The overall goal is to prepare a strategic ITS deployment plan for the Hartford metropolitan area including a strategy for integrating the Hartford area system with other areas of the state. The plan covered a full range of ITS functions over a 20-year horizon. High priority needs include the integration of existing state freeway and arterial traffic management systems, implementing a regional incident management system, serving the information needs of select ISTEA-mandated management systems, and provision for coordination with ITS systems in other areas of the state. The Plan was developed using the FHWA ITS planning process outline (user services-based approach). The Plan includes eight tasks divided into two planning phases: development of an ITS User Services Plan and development of the ITS Strategic Deployment Plan.

Project Location **:** Hartford, Connecticut

Partner(s) : Connecticut DOT and Capital Region Council of Governments (CRCOG)

Start Date: June 1994

End Date**:** June 1997

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

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Bob Ramirez	FHWA Connecticut Division	(860) 659-3703	Ext. 3004
Hal Decker	Connecticut DOT	(860) 594-2636	Ext.

HONOLULU, HAWAII EARLY DEPLOYMENT PLANNING STUDY

Description: This study developed a Strategic ITS Deployment Plan for the Honolulu metropolitan area. The study sought stakeholder input, including the public, in order to develop a User Service Plan. Functional requirements were developed from the User Service Needs. These needs were considered along with funding and procurement issues in order to identify and screen alternative technologies.

Project Location **:** Honolulu, Hawaii

Partner(s) : Hawaii DOT, City/County of Honolulu Department of Transportation Services, Oahu Metropolitan Planning Organization

Start Date: July 1994

End Date**:** April 1997

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $507,000

Contacts**:**

Barbara Braswell	FHWA Hawaii Division, HRW-HI	(808) 541-2700	Ext.
Richard Masuda	City/County of Honolulu DOT Services	(808) 527-6912	Ext.

I-5 SEATTLE TO VANCOUVER, BC AND I-90 SEATTLE TO SPOKANE, WASHINGTON EARLY DEPLOYMENT PLANNING STUDY

Description: The study resulted in a strategic ITS plan for the I-5 and I-90 corridors. The study sought stakeholder input to identify user needs and develop a list of User Services appropriate for the corridor. Specific ITS projects were identified, compared and selected for the corridor. Prospectus-type information was developed for the selected projects which includes project costs and anticipated benefits.

Project Location **:** Seattle and Spokane, Washington; Vancouver, British Columbia

Partner(s) : Washington State DOT

Start Date: March 1995

End Date**:** September 1997

Estimated Total ITS Funds: $240,000

Estimated Total Project Cost: $300,000

Contacts**:**

Ed Fischer	FHWA Region 10, HEO-010	(503) 326-2071	Ext.
Mike Morrow	FHWA Washington Division, HPM-WA	(360) 753-9411	Ext.
Eldon Jacobson	Washington State DOT	(206) 685-3187	Ext.

I-40 NORTHERN ARIZONA EARLY DEPLOYMENT PLANNING STUDY

Description: This study resulted in the development of an ITS Strategic plan for I-40 which is a rural interstate corridor. Input in the plan was sought from the various stakeholders in order to determine the user needs. Existing ITS components were incorporated into the study. Since this was the first ITS Strategic Plan for a rural corridor, it can serve as a benchmark for further deployment of ITS technologies on rural corridors.

Project Location **:** Northern Arizona

Partner(s) : Arizona DOT

Start Date: March 1995

End Date**:** June 1997

Estimated Total ITS Funds: $130,000

Estimated Total Project Cost: $162,500

Contacts**:**

Tom Fowler	FHWA Arizona Division, HPR2-AZ	(602) 379-3923	Ext.

I-70 DENVER, COLORADO CORRIDOR EARLY DEPLOYMENT PLANNING STUDY

Description: This Colorado DOT study focused on the application of ITS technology in the I-70 corridor west of Denver. The corridor has a high potential for developing the rural application of ITS technologies with heavy emphasis on Advanced Traffic Management Systems (ATMS) and Advanced Traveler Information Systems (ATIS). This study focused on developing a comprehensive implementation program of ITS technologies aimed at a multi-phase effort which identified the most feasible options, gains public support, and then enlists cooperation of private sector interests. The project has three phases. This effort included phase one only, in which a consultant identified and evaluated applicable ITS technologies, identified early action items, prepared a corridor master plan, assisted in educational efforts, and prepared reports on the project.

Project Location **:** Denver, Colorado

Partner(s) : Colorado DOT

Start Date: July 1992

End Date**:** August 1996

Estimated Total ITS Funds: $168,000

Estimated Total Project Cost: $210,000

Contacts**:**

Eva Sniezek	FHWA Region 8, HPD-08	(303) 969-5772	Ext. 341
Scott Sands	FHWA Colorado Division, HFO-CO	(303) 969-6730	Ext. 362
John Kiljan	Colorado DOT	(303) 757-5159	Ext.

I-79 ERIE TO WASHINGTON, PENNSYLVANIA EARLY DEPLOYMENT PLANNING STUDY

Description: This project was conducted by the Pennsylvania Department of Transportation which provided an ITS user service plan and an ITS deployment plan for the safe and efficient movement of people and goods along the I - 79 corridor from Erie to Washington, Pennsylvania. The I - 79 corridor considered in this project will cut across seven counties and four Pennsylvania DOT Engineering Districts in both rural and urban areas.

Project Location **:** Pittsburgh, Pennsylvania

Partner(s) : Pennsylvania DOT

Start Date: June 1995

End Date**:** June 1997

Estimated Total ITS Funds: $300,000

Estimated Total Project Cost: $375,000

Contacts**:**

Steve Clinger	FHWA Region 3, HEO-03	(410) 962-0077	Ext. 3055
Mike Castellano	FHWA Pennsylvania Division, HPC-PA	(717) 221-4517	Ext.
Steve Koser	Pennsylvania DOT	(717) 705-1443	Ext.

I-84 PORTLAND, OREGON TO BOISE, IDAHO EARLY DEPLOYMENT PLANNING STUDY

Description: This study resulted in a strategic ITS deployment plan for the I-84 and SR-14 corridor between Portland, OR - Vancouver, WA and Boise, ID. The study sought stakeholder input to identify user needs and developed a list of User Services appropriate for the corridor. Specific ITS projects were identified, compared and selected for the corridor. Prospectus-type information was developed for selected projects which included project costs and anticipated benefits.

Project Location **:** Portland, Oregon and Boise, Idaho

Partner(s) : Washington State DOT

Start Date: March 1995

End Date**:** September 1997

Estimated Total ITS Funds: $320,000

Estimated Total Project Cost: $400,000

Contacts**:**

Ed Fischer	FHWA Region 10, HEO-010	(503) 326-2071	Ext.
Eldon Jacobson	Washington State DOT	(206) 685-3187	Ext.

I-94 MILWAUKEE TO MINNEAPOLIS AND I-90 BELOIT TO LACROSSE EARLY DEPLOYMENT PLANNING STUDY

Description:

The purpose of this ITS Early Deployment Planning Study was to develop a strategic plan to develop ITS Intercity Corridor initiatives which will improve mobility, efficiency and safety of travel on the I-94 corridor, Milwaukee to Minneapolis, and the I-90 corridor, Beloit to Lacrosse. The study proposal included the evaluation of the need for and the identification of ITS solutions appropriate for the corridors. This study focused on commercial vehicle operations, incident management and personal travel safety, and provision of route guidance and real-time travel condition information. ITS technology and systems applications existing or programmed for future implementation as part of the Gary-Chicago-Milwaukee ITS Priority Corridor were also considered as part of the study.

Project Location **:** Milwaukee and LaCrosse, Wisconsin; Minneapolis, Minnesota

Partner(s) : Wisconsin DOT

Start Date: March 1995

End Date**:** May 1997

Estimated Total ITS Funds: $240,000

Estimated Total Project Cost: $349,988

Contacts**:**

Edward Stillings	FHWA Region 5, HES-05	(708) 283-3550	Ext.
Mark Hoines	FHWA Wisconsin Division, HDA-WI	(608) 829-7515	Ext.
Phil DeCabooter	Wisconsin DOT	(608) 267-0452	Ext.

INDIANAPOLIS, INDIANA AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: The purpose of this project was to determine which ITS User Services will be the most cost effective and beneficial for the Indianapolis area, culminating in the development of a multi-year strategic ITS deployment plan. The Indiana DOT has formed a "deployment committee" to implement the first of the plan's recommended improvements.

Project Location **:** Indianapolis, Indiana

Partner(s) : Indiana DOT

Start Date: June 1994

End Date**:** July 1996

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Edward Stillings	FHWA Region 5, HES-05	(708) 283-3550	Ext.
Wendall Meyer	FHWA Indiana Division, HDA-IN	(317) 226-5234	Ext.
William Flora	Indiana DOT	(317) 233-3944	Ext.

ITS STRATEGIC PLAN FOR MARICOPA COUNTY - PHOENIX AREA

Description: This study resulted in the development of a Strategic ITS Deployment Plan for the Phoenix Metropolitan Area. The study sought stakeholder input, including the public, in order to develop a User Service Plan. Functional requirements were developed from the User Service Needs. These needs will be considered along with funding and procurement issues in order to identify and screen alternative technologies. The administration of the project was carried out by the Maricopa County DOT. Coordination of the study was a cooperative effort between the County and the MPO and took advantage of steering teams previously formed to study the regional coordination of the traffic signal systems.

Project Location **:** Phoenix. Arizona

Partner(s) : Arizona DOT and Maricopa County DOT

Start Date: May 1994

End Date**:** January 1996

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Alan Hansen	FHWA Arizona Division	(602) 379-3646	Ext.
Donald Wiltshire	Maricopa County DOT	(602) 506-8659	Ext.

JACKSONVILLE, FLORIDA EARLY DEPLOYMENT PLANNING STUDY

Description: This project resulted in a definitive, comprehensive study that will chart the correct course for the Jacksonville Urban area to attain an efficiently managed transportation system. Areas of concentration included: Travel and Traffic Management, Public Transportation Management, and Emergency Management.

Project Location **:** Jacksonville, Florida

Partner(s) : Florida DOT

Start Date: April 1995

End Date**:** October 1997

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Mark Doctor	FHWA Region 4, HES-04	(404) 562-3685	Ext.
Grant Zammit	FHWA Florida Division, HDA-FL	(850) 942-9693	Ext.
Marc Bounds	Florida DOT	(904) 381-8807	Ext.

KANSAS CITY, MISSOURI-KANSAS AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: The goal of this study was to develop a master plan for implementing ITS user services for transportation management. The plan is based on user services that can successfully address the needs of the bi-state Kansas City transportation system. The consultant evaluated congestion in the area and recommended strategies which include, but are not limited to, the Incident Management and Traffic Control user services.

Project Location **:** Kansas City, Missouri-Kansas

Partner(s) : Kansas DOT (lead agency), Missouri DOT, and Kansas City MPO

Start Date: September 1993

End Date**:** March 1996

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Bruce Baldwin	FHWA Region 7, HEO-07	(826) 276-2741	Ext.
Bob Alva	FHWA Kansas Division, HPG-KS	(913) 267-7281	Ext.
Virgil Stiffler	FHWA Missouri Division, HDP-MO	(314) 636-7104	Ext.
Edward Halter	Kansas DOT	(913) 677-5963	Ext.
Dale Ricks	Missouri DOT	(816) 889-6301	Ext.

KERN COUNTY, CALIFORNIA EARLY DEPLOYMENT PLANNING STUDY

Description: This study resulted in the development of a strategic ITS deployment plan for the Kern County metropolitan area. The study developed a User Service Plan and functional requirements developed from User Service Needs. These needs were considered along with funding and procurement issues in order to identify and screen alternative technologies.

Project Location **:** Kern County, California

Partner(s) : California DOT, Kern County Council of Governments

Start Date: September 1995

End Date**:** July 1997

Estimated Total ITS Funds: $350,000

Estimated Total Project Cost: $500,000

Contacts**:**

Frank Cechini	FHWA California Div, HTA-CA	(916) 498-5005	Ext.
Ronald Brummett	Kern Co. Council of Governments	(805) 861-2191	Ext.

LAS VEGAS, NEVADA AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: This study resulted in the development of a strategic ITS Deployment Plan for the Las Vegas metropolitan area. The study sought stakeholder input, including the public, in order to develop a Users Service Plan. Functional requirements were developed from the User Services Needs. These needs were considered along with funding and procurement issues in order to identify and screen alternative technologies.

Project Location **:** Las Vegas, Nevada

Partner(s) : Nevada DOT

Start Date: September 1993

End Date**:** December 1996

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Greg Novak	FHWA Nevada Division, HPR-NV	(702) 697-1203	Ext.
Keith Maki	Nevada DOT	(703) 888-7446	Ext.

LEXINGTON, KENTUCKY EARLY DEPLOYMENT PLANNING STUDY

Description: This project provided a framework in which the local transportation community can develop and document a strategic deployment plan, allowing planners to continue to apply state-of-the-art solutions to the area's transportation problems.

Project Location **:** Lexington, Kentucky

Partner(s) : Kentucky Transportation Cabinet, and City of Lexington

Start Date: March 1995

End Date**:** February 1997

Estimated Total ITS Funds: $200,000

Estimated Total Project Cost: $250,000

Contacts**:**

Mark Doctor	FHWA Region 4, HES-04	(404) 562-3685	Ext.
Brent Sweger	FHWA Kentucky Division, HDA-KY	(502) 223-6743	Ext.

LOS ANGELES/SAN DIEGO, CALIFORNIA CORRIDOR EARLY DEPLOYMENT PLANNING STUDY

Description: This study examined the current and proposed uses of ITS technology in the San Diego - Los Angeles ITS priority corridor. The study was multi modal in nature and included all major facilities and all categories of ITS technology. The primary product of this study was a master plan to coordinate the deployment of ITS technology in the corridor and in the major metropolitan areas along the corridor (San Diego, Orange County, San Bernadino/ Riverside, Los Angeles).

Project Location **:** Southern California

Partner(s) : California DOT

Start Date: September 1992

End Date**:** December 1997

Estimated Total ITS Funds: $150,000

Estimated Total Project Cost: $150,000

Contacts**:**

Dale Thompson	FHWA Headquarters, HTV-3	(202) 366-0640	Ext.
Frank Cechini	FHWA California Division, HTA-CA	(916) 498-5005	Ext.
George Smith	CalTrans	(916) 654-9849	Ext.

LOUISVILLE, KENTUCKY AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description:

This planning study developed a regional Advanced Traffic Management Systems (ATMS) plan for metropolitan Louisville, Kentucky. A consultant performed the necessary studies for development of the early implementation plan. The tasks included:

1. Inventory the existing system and collect data including traffic volumes, speeds, and delays.

2. Develop management strategies and alternative routing plans for incidents. Elements considered include detection, communication systems, closed circuit TV, changeable message signs, highway advisory radio, and a centralized traffic control center. The end product was the Traffic Management Plan, the recommended system modifications required to implement the plan, and the estimated cost of implementing each recommended element.

3. Develop and optimize traffic signal timing plans on selected arterials in Louisville.

Project Location **:** Louisville, Kentucky

Partner(s) : Kentucky Transportation Cabinet

Start Date: June 1992

End Date**:** August 1994

Estimated Total ITS Funds: $468,616

Estimated Total Project Cost: $585,770

Contacts**:**

Mark Doctor	FHWA Region 4, HES-04	(404) 562-3685	Ext.
Brent Sweger	FHWA Kentucky Division, HDA-KY	(502) 223-6743	Ext.
Bob Flener	Kentucky Transportation Cabinet - District 5	(502) 367-6411	Ext.

LOWER HUDSON VALLEY/WHITE PLAINS, NEW YORK EARLY DEPLOYMENT PLANNING STUDY

Description:

The area's coordinated Intelligent Transportation System (ITS) effort developed a strategic plan for areawide deployment. The study followed the FHWA's User Services planning and deployment process. Key elements of the study included:

- Establishment of a coalition of key stakeholders;
- Development of an area-wide Strategic Plan based on the area's unique user service needs;
- Identification of key early implementation projects;
- Development of a Phased Implementation Plan with timetable and funding availability;
- Identification/quantification of operations and maintenance resource needs;
- Identification of needed institutional arrangements;
- Establishment of public outreach programs.

In support of this ITS effort, the New York State Department of Transportation has programmed more than $27 million in their five-year capital program for Intelligent Transportation Systems (ITS) activities for the Lower Hudson Valley area.

Project Location **:** Lower Hudson Valley/White Plains, New York

Partner(s) : New York State DOT

Start Date: July 1994

End Date**:** December 1997

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Mike Schauer	FHWA New York Division, HTD-NY	(518) 431-4125	Ext. 236
Ed Roberts	New York State DOT	(518) 457-1232	Ext.

NASHVILLE, TENNESSEE EARLY DEPLOYMENT PLANNING STUDY

Description:

The Nashville Area MPO implemented a program of ITS user services which emphasizes traveler and tourist information and traffic management. This program was built upon the traffic and transit management and infrastructure improvements already underway in the 5-county area. Services were concentrated in locations which are the primary destinations of tourists and business travelers, including the Nashville CBD, Opryland, Music Row, Nashville International Airport, and the Vanderbilt University area.

Traveler information services will include traveler advisories, traveler information services (including non-traffic information), trip planning, location displays, and route selection. These services will be offered at visitor information centers, intermodal centers such as the landport, convention hotels, the regional airport, and along major travel corridors.

The traveler information services would be tied in with a Traffic Management Center (TMC) which would offer a coordinated program of accident detection and management, traffic network monitoring, traffic control, and construction management.

Project Location **:** Nashville, Tennessee

Partner(s) : Tennessee DOT and Nashville MPO

Start Date: December 1994

End Date**:** July 1997

Estimated Total ITS Funds: $220,000

Estimated Total Project Cost: $275,000

Contacts**:**

Mark Doctor	FHWA Region 4, HES-04	(404) 562-3685	Ext.
Leigh Ann Tribble	FHWA Tennessee Division, HDA-TN	(615) 736-7107	Ext.
Preston Elliott	Nashville MPO	(615) 862-7204	Ext.
Paige Watson	Nashville MPO	(615) 862-7215	Ext.

NATIONAL CAPITAL METRO AREA (UMBRELLA) EARLY DEPLOYMENT PLANNING STUDY

Description: This study provided guidance on regionwide ITS applications and priorities to the agencies responsible for developing and implementing transportation management systems in Maryland, Virginia, and the District of Columbia. The primary objectives were (1) to identify effective mechanisms for interjurisdictional cooperation to make sure ITS activities are compatible and coordinated, (2) to identify methods to establish a basis for area decision makers and political leaders to endorse ITS on a regionwide basis, and (3) to identify options for a high level regional system architecture for the National Capital Metropolitan Area.

Project Location **:** National Capital Metro Area

Partner(s) : Virginia DOT

Start Date: March 1995

End Date**:** April 1997

Estimated Total ITS Funds: $200,000

Estimated Total Project Cost: $250,000

Contacts**:**

Pamela Marston	FHWA Region 3, HEO-03	(410) 962-0077	Ext. 3054
Jim Robinson	Virginia DOT - Richmond	(804) 786-6677	Ext.

NEW ORLEANS, LOUISIANA AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: The Louisiana Department of Transportation and Development (LDTOD) and the New Orleans Regional Planning Commission (RPC) developed an Intelligent Transportation System Strategic Plan for the New Orleans metropolitan area. The plan considered both short- and long-range objectives for the implementation and deployment of ITS technologies throughout the metropolitan area.

Project Location **:** New Orleans, Louisiana

Partner(s) : Louisiana DOT

Start Date: September 1993

End Date**:** March 1997

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Jerry Jones	FHWA Region 6, HEO-06	(817) 978-4358	Ext.
Seve Serna	FHWA Louisiana Division, HDA-LA	(504) 389-0251	Ext.
Conrad Rein	New Orleans Regional Planning Commission	(504) 568-6625	Ext.

NORTHERN VIRGINIA/WASHINGTON, D.C. AREA EARLY DEPLOYMENT PLANNING STUDY

Description: The primary objective of this study was to develop a long-range, comprehensive plan of an Advanced Traffic Management Systems (ATMS) in the Northern Virginia region of the Washington, D.C. metropolitan area. The study analyzed and assessed current and planned extensions of traffic management capabilities in the region; defined an expandable and adaptable systems architecture; identified supporting advanced technologies, and developed an implementation plan to guide ATMS deployment. This study was coordinated with other Early Deployment initiatives in the Washington, D.C. area.

Project Location **:** Northern Virginia/Washington, DC

Partner(s) : Virginia DOT

Start Date: September 1993

End Date**:** May 1996

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Steve Clinger	FHWA Region 3, HEO-03	(410) 962-0077	Ext. 3055
Tom Jennings	FHWA Virginia Division, HDA-VA	(804) 281-5107	Ext.
James R. Robinson	Virginia DOT	(804) 786-6677	Ext.

OMAHA, NEBRASKA AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: The objective of this study was to develop a long-range, comprehensive plan for development and implementation of ITS user services in the Omaha-Council Bluffs metropolitan area. This study, conducted by the University of Nebraska at Lincoln (UNL), resulted in a plan which will provide a "road map" for incorporating ITS solutions into the area's long-range transportation plan and transportation improvement program.

Project Location **:** Omaha, Nebraska

Partner(s) : Nebraska Department of Roads, Iowa DOT, Omaha MPO

Start Date: September 1993

End Date**:** June 1997

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Bruce Baldwin	FHWA Region 7, HEO-07	(826) 276-2741	Ext.
Milo Cress	FHWA Nebraska Division, HDA-NE	(402) 437-5221	Ext.
Patrick McCoy	University of Nebraska, Lincoln	(402) 472-5019	Ext.

ORANGE COUNTY, CALIFORNIA EARLY DEPLOYMENT PLANNING PROJECT

Description: This project developed a Preliminary Design Report which identified the functional requirements, area of coverage, hardware and software requirements, costs, estimated benefits, and project phasing for Phase I of a county-wide Advanced Traveler Information System. Plans, specifications and estimates were developed for the field installation and the system hardware and software components.

Project Location **:** Orange County, California

Partner(s) : California DOT and Orange County Transportation Authority

Start Date: September 1993

End Date**:** March 1996

Estimated Total ITS Funds: $450,000

Estimated Total Project Cost: $562,500

Contacts**:**

Frank Cechini	FHWA California Division, HTA-CA	(916) 498-5005	Ext.
Dean Delgado	Orange County Transportation Authority	(714) 560-6282	Ext.

ORLANDO, FLORIDA EARLY DEPLOYMENT PLANNING STUDY

Description: This project developed an areawide ITS plan for the Orlando area to improve mobility, safety and productivity on the highway and transit networks. Congestion levels on significant routes in the area were determined, and short - medium, and long - term measures and ITS strategies were identified to alleviate congestion.

Project Location **:** Orlando, Florida

Partner(s) : Florida DOT

Start Date: April 1995

End Date**:** November 1997

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Mark Doctor	FHWA Region 4, HES-04	(404) 562-3685	Ext.
Grant Zammit	FHWA Florida Division, HDA-FL	(850) 942-9693	Ext.

PENNSYLVANIA TURNPIKE CORRIDOR EARLY DEPLOYMENT PLANNING STUDY

Description: The Pennsylvania Turnpike Authority conducted an ITS Early Deployment corridor study consisting of a needs-based approach examining the possible applications of advanced technologies to existing and future traffic and incident management programs. A Strategic Plan was developed for ITS deployment on the Pennsylvania Turnpike in the Greater Philadelphia to Greater Pittsburgh corridor.

Project Location **:** Pennsylvania

Partner(s) : Pennsylvania DOT and Pennsylvania Turnpike Commission

Start Date: November 1993

End Date**:** February 1996

Estimated Total ITS Funds: $300,000

Estimated Total Project Cost: $375,000

Contacts**:**

Steve Clinger	FHWA Region 3, HEO-03	(410) 962-0077	Ext. 3055
Mike Castellano	FHWA Pennsylvania Division, HPC-PA	(717) 221-4517	Ext.
Tim Scanlon	Pennsylvania Turnpike Commision	(717) 939-9551	Ext. 5590

PITTSBURGH, PENNSYLVANIA AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: The Pennsylvania Department of Transportation (DOT) through this deployment planning study has developed strategic plans for the Pittsburgh area freeway management system. The system, which will mainly cover I-276/376, will tentatively include closed circuit television, parkway advisory radio, ramp metering, surveillance and control system, changeable message signs (CMS), and an operations center. This Freeway Management System will interface with other existing and planned systems (i.e., existing high occupancy vehicle HOV lanes, changeable message signs, a planned telephone advisory system, and the planned City of Pittsburgh computerized traffic signal system).

Project Location **:** Pittsburgh, Pennsylvania

Partner(s) : Pennsylvania DOT

Start Date: December 1992

End Date**:** March 1994

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Steve Clinger	FHWA Region 3, HEO-03	(410) 962-0077	Ext. 3055
Mike Castellano	FHWA Pennsylvania Division, HPC-PA	(717) 221-4517	Ext.
Thomas Fox	Pennsylvania DOT	(412) 429-4975	Ext.

PORTLAND, MAINE EARLY DEPLOYMENT PLANNING STUDY

Description: The Greater Portland Council of Governments (GPCOG) conducted an early deployment study that developed a strategic deployment plan for ITS technologies which addresses the needs of the Portland metropolitan area.

Project Location **:** Portland, Maine

Partner(s) : Greater Portland Council of Governments

Start Date: September 1996

End Date**:** December 1997

Estimated Total ITS Funds: $56,000

Estimated Total Project Cost: $70,000

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Steve Beningo	FHWA Maine Division, HPR-ME	(207) 622-8350	Ext. 22
Joe Kott	Greater Portland Council of Governments	(207) 774-9891	Ext.

PORTLAND, OREGON AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: The plan developed by this effort is a six year plan for implementation of an Advanced Traffic Management System (ATMS). The estimated total capital cost for the six year implementation is approximately $25 million. Detection will include closed circuit television, dedicated cellular service and detectors primarily at ramp meter locations. The Traffic Operations Center (TOC) will utilize existing space owned by ODOT and be remodeled to accommodate TOC equipment and personnel.

Project Location **:** Portland, Oregon

Partner(s) : Oregon DOT

Start Date: July 1991

End Date**:** January 1995

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Ed Fischer	FHWA Region 10, HEO-010	(503)326-2071	Ext.
Torri Kinne	FHWA Oregon Division	(503)399-5749	Ext.
Dennis Mitchell	Oregon DOT	(503)731-8218	Ext.

PROCUREMENT FOR ITS

Description: The objectives of this project were to (1) identify and analyze contracting issues which have arisen or are likely to arise in the development and deployment of ITS and which may be constraining or hampering the implementation of ITS technologies and (2) develop legally sound, innovative models for contracting for ITS technologies by State and local contracting agencies. The research effort included an examination of the requirements for competitive bidding, combined bidding, combined bidding/joint ventures, advertisement, content of proposals or bids, use of patented processes or technologies or exclusive sources, bid security deposits, submission of proposals, negotiations, awards of contracts, and intellectual property rights to technology developed or acquired under the procurement contract. A final report titled "Innovative Contracting Practices for ITS" has been produced.

Project Location **:** Cambridge, Massachusetts

Partner(s) : L. S. Gallegos & Associates

Start Date: October 1994

End Date**:** December 1996

Estimated Total ITS Funds: $312,684

Estimated Total Project Cost: $312,684

Contacts**:**

William Jones	USDOT ITS JPO, HVH-1	(202) 366-2128	Ext.

PROVIDENCE, RHODE ISLAND AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: This project created a plan which will direct the implementation and operation of ITS in the State of Rhode Island based on the specific needs and resources of the State. The study used the ITS Planning and Project Deployment Process. Rhode Island is pursuing ITS and their Congestion Management System planning concurrently, and is developing and utilizing common baseline data, performance standards, and goals.

Project Location **:** Providence, Rhode Island

Partner(s) : Rhode Island DOT

Start Date: January 1994

End Date**:** May 1997

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Gabe Brazao	FHWA Rhode Island Division, SHA-RI	(401) 528-4551	Ext.
Cynthia Levesque	Rhode Island DOT	(401) 277-1362	Ext. 4010

RALEIGH/DURHAM/CHAPEL HILL, NORTH CAROLINA AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: This project was an areawide study of potential ITS deployment activities in the Raleigh/Durham/Chapel Hill area. A twelve-county study area has been identified; however, the primary focus of the report was the most urbanized counties including Durham, Orange, and Wake. Through a cooperative effort by the North Carolina Department of Transportation, the Metropolitan Planning Organizations (MPO), and local advisory committees, the study detailed both short-term, medium-term, and long-term traffic management needs for this area.

Project Location **:** Raleigh/Durham/Chapel Hill, North Carolina

Partner(s) : North Carolina DOT

Start Date: July 1994

End Date**:** April 1997

Estimated Total ITS Funds: $250,000

Estimated Total Project Cost: $312,500

Contacts**:**

Mark Doctor	FHWA Region 4, HES-04	(404) 562-3685	Ext.
Max Tate	FHWA North Carolina Division, HDA-NC	(919) 856-4354	Ext.
Blake Norwood	North Carolina DOT	(919) 733-4705	Ext.

RICHMOND, VIRGINIA AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: The purpose of this study was to identify opportunities for the application of ITS services in the Richmond metropolitan area and to develop a strategic deployment plan that provides for coordination among the involved jurisdictions and integration of ITS with existing systems. The Richmond metropolitan area includes the cities of Richmond, Petersburg, Colonial Heights and Hopewell and the counties of Henrico, Chesterfield, and Hanover in central Virginia.

Project Location **:** Richmond, Virginia

Partner(s) : Virginia DOT

Start Date: July 1994

End Date**:** October 1996

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Steve Clinger	FHWA Region 3, HEO-03	(410) 962-0077	Ext. 3055
Tom Jennings	FHWA Virginia Division, HDA-VA	(804) 281-5107	Ext.
Robb Alexander	Virginia DOT	(804) 524-6000	Ext.

ROCHESTER, NEW YORK AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: This project provided direction for the design of an areawide advanced traffic management system to be implemented within the next few years and integrated with the existing computerized county-wide signal system. The project consisted of three tasks. The objective of Task I was to conduct an area-wide corridor assessment to inventory and identify existing congestion problems. This task also evaluated freeway management techniques and detection technologies. Task II reviewed communication processes and incident response plans in order to develop a comprehensive incident management program. Task III focused on overcoming the technical and legal stumbling blocks that impede the working relationship between area jurisdictions. This was accomplished by identifying, prioritizing, and recommending solutions for inter-jurisdictional issues.

Project Location **:** Rochester, New York

Partner(s) : New York State DOT

Start Date: September 1992

End Date**:** May 1996

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Jerry Zell	FHWA New York Division, HTS-NY	(518) 431-4125	Ext. 228
Ed Roberts	New York State DOT	(518) 457-1232	Ext.

SACRAMENTO, CALIFORNIA EARLY DEPLOYMENT PLANNING STUDY

Description: This study resulted in a Strategic ITS Deployment Plan for the Sacramento metropolitan area. The full range of ITS user services were considered in the development of this plan. The study sought stakeholder input, including the public, in order to develop a User Service Plan. Functional requirements were developed from the User Service Needs. These needs will be considered along with funding and procurement issues in order to identify and screen alternative technologies.

Project Location **:** Sacramento, California

Partner(s) : California DOT and Sacramento Area Council of Governments

Start Date: September 1993

End Date**:** August 1996

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Frank Cechini	FHWA California Division, HTA-CA	(916) 498-5005	Ext.
Michael Hoffacker	Sacramento Area Council of Governments	(916) 457-2264	Ext.

SALT LAKE CITY, UTAH AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: This Early Deployment Planning project developed an Intelligent Transportation Systems Strategic Plan for the Salt Lake City Metropolitan Area. The plan will serve as a guide for the implementation and deployment of ITS technologies including ATMS, traveler information, roadway weather, carry on management and transit applications throughout the metro area. This plan identifies a direction for coordinated ITS deployment, and builds off of the ongoing contracts to develop an advanced traffic management system in the Salt Lake Valley area.

Project Location **:** Salt Lake City, Utah

Partner(s) : Utah DOT

Start Date: September 1993

End Date**:** March 1997

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Eva Sniezek	FHWA Region 8, HPD-08	(303) 969-5772	Ext. 341
Martin Knopp	FHWA Utah Division, HPM-UT(2)	(801) 963-0078	Ext. 236
Dave Kinnecom	Utah DOT	(801) 965-4910	Ext.

SAN FRANCISCO BAY AREA EARLY DEPLOYMENT PLANNING STUDY

Description: This study resulted in a Strategic ITS Deployment Plan for the San Francisco Bay Area, which encompasses nine counties and over 100 local jurisdictions. The full range of ITS user services were considered in the development of this plan. The study closely followed the ITS planning process. The study sought stakeholder input, including the public, in order to develop a User Service Plan. Functional requirements were developed from the User Service Needs. These needs will be considered along with funding and procurement issues in order to identify and screen alternative technologies.

Project Location **:** San Francisco Bay Area, California

Partner(s) : California DOT and Metropolitan Transit Commission

Start Date: September 1993

End Date**:** August 1996

Estimated Total ITS Funds: $450,000

Estimated Total Project Cost: $562,500

Contacts**:**

Frank Cechini	FHWA California Division, HTA-CA	(916) 498-5005	Ext.
David Schnur	Metropolitan Transit Commission	(510) 464-7700	Ext.

SCRANTON/WILKES-BARRE, PENNSYLVANIA EARLY DEPLOYMENT PLANNING STUDY

Description: The Pennsylvania Department of Transportation conducted an early deployment study that developed a strategic deployment plan for ITS technologies that will address the needs and problems in the Scranton/Wilkes-Barre Metropolitan area. The proposed project encompassed the cities of Scranton, Wilkes-Barre, and parts of Lackawanna and Luzerne Counties along the I-81 and other major corridors.

Project Location **:** Scranton/Wilkes-Barre, Pennsylvania

Partner(s) : Pennsylvania DOT

Start Date: June 1995

End Date**:** July 1997

Estimated Total ITS Funds: $350,000

Estimated Total Project Cost: $437,500

Contacts**:**

Steve Clinger	FHWA Region 3, HEO-03	(410) 962-0077	Ext. 3055
Mike Castellano	FHWA Pennsylvania Division, HPC-PA	(717) 221-4517	Ext.
Steve Koser	Pennsylvania DOT	(717) 705-1443	Ext.

SEATTLE, WASHINGTON TO PORTLAND, OREGON CORRIDOR EARLY DEPLOYMENT PLANNING STUDY

Description: The objective of this study was to develop a plan to reduce congestion and improve safety along the I-5 corridor between Portland and Seattle utilizing intelligent transportation systems technologies. The final report for this corridor including project prospectus information on costs and potential benefits for recommended projects has been received.

Project Location **:** Seattle, Washington/Portland,Oregon

Partner(s) : Washington State DOT

Start Date: April 1993

End Date**:** March 1996

Estimated Total ITS Funds: $120,000

Estimated Total Project Cost: $150,000

Contacts**:**

Ed Fischer	FHWA Region 10, HEO-010	(503)326-2071	Ext.
Morgan Balogh	Washington State DOT	(206)543-0078	Ext.

SHARED RESOURCES PROJECT

Description:

A number of state and local transportation authorities have formed partnerships with telecommunications companies to exchange access to public roadways for telecommunications capacity to be used principally for ITS projects. This report examines the legal and institutional issues encountered by a number of these partnerships. After completing the research for wireline telecommunications, the study was extended to examine these same issues when wireless tower sites are the subject of location on public rights-of-way. The results of these two analyses have been published in three reports. "Shared Resources: Sharing Right-of-Way for Telecommunications;--Guidance on Legal and Institutional Issues" and the "Final Report." FHWA-JPO-96-0015 & 14. The third report is "Wireless Shared Resources: Sharing Right-of-Way for Wireless Telecommunications," FHWA-JPO-97-0024. These reports are available from the ITS Joint Program Office.

The JPO is providing workshops to public agencies on these subjects on a request basis.

Project Location **:** Bethesda, Maryland

Contractor(s) : Apogee Research, Inc.

Start Date: September 1994

End Date**:** December 1997

Estimated Total ITS Funds: $460,000

Estimated Total Project Cost: $701,723

Contacts**:**

William Jones	USDOT ITS JPO, HVH-1	(202) 366-2128	Ext.

ST. LOUIS, MISSOURI AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: This study developed a freeway management plan for the bi-state St. Louis area. The completed plan incorporates ITS technologies principally in the Advanced Traffic Management Systems (ATMS) and Advanced Traveler Information Systems (ATIS) areas. It recommends specific strategies for incorporation into a comprehensive plan designed to meet future needs using ITS technologies. It assesses current operations such as the call box and emergency patrol operations. It makes recommendations for staffing structure and requirements. Elements considered in the plan included communications techniques, detection methods, information dissemination, ramp metering and cellular incident response.

Project Location **:** St. Louis, Missouri

Partner(s) : Missouri DOT, St. Louis MPO

Start Date: September 1992

End Date**:** May 1994

Estimated Total ITS Funds: $269,038

Estimated Total Project Cost: $336,298

Contacts**:**

Bruce Baldwin	FHWA Region 7, HEO-07	(816) 276-2741	Ext.
Tom Brooks	FHWA Missouri Division, HDA-MO	(313) 636-7104	Ext.
Tom Dollus	Missouri DOT	(314) 340-4511	Ext.

TAMPA, FLORIDA AREAWIDE EARLY DEPLOYMENT PLANNING STUDY

Description: The project developed an action plan for the implementation of an integrated transportation information center for the Tampa Bay area. The plan included methods of obtaining real-time traffic condition data, integrating it into a reliable and continuous database, and disseminating condition information to the traveler in a usable and timely manner. The project contained six work tasks: (1) establish a multi-agency project advisory group to oversee the project work; (2) identify and evaluate the methods available for gathering real-time traffic condition information; (3) analyze control center alternatives, including location and operations; (4) analyze various information dissemination techniques addressing multiple media applications; (5) conduct a small scale market research effort to determine user preferences for interpreting traffic condition information; and (6) provide a final report consisting of technical memoranda and the recommended action plan. Also, a brochure oriented to the general public was developed summarizing the project action plan.

Project Location **:** Tampa, Florida

Partner(s) : Florida DOT

Start Date: June 1992

End Date**:** October 1993

Estimated Total ITS Funds: $80,000

Estimated Total Project Cost: $80,000

Contacts**:**

Mark Doctor	FHWA Region 4, HES-04	(404) 562-3685	Ext.
Grant Zammit	FHWA Florida Division, HDA-FL	(850) 942-9693	Ext.
Mike Pietrzyk	CUTR	(813) 974-3120	Ext.

TUCSON ADVANCED TRANSPORTATION TECHNOLOGIES IMPLEMENTATION PLAN

Description: This study resulted in the development of a Strategic ITS Deployment Plan for the Tucson metropolitan area. The study was done in four parts, including a resource and stakeholder input phase which will result in a User Service Plan. The study addressed infrastructure and services that are available or needed to develop strong interagency communications and will result in a Communications Plan. The project used this information, as well as functional requirements, funding and phasing, to develop a Deployment Plan. The administration and coordination for the project was carried out by the MPO with individual components of the study subcontracted as needed. Steering teams have been formed to provide guidance for each of the study components of this plan.

Project Location **:** Tucson, Arizona

Partner(s) : Arizona DOT and Pima Association of Governments

Start Date: September 1993

End Date**:** July 1996

Estimated Total ITS Funds: $400,000

Estimated Total Project Cost: $500,000

Contacts**:**

Alan Hansen	FHWA Arizona Division, HPR1-AZ	(602) 379-3646	Ext.
Paul Cassertano	Pima Association of Governments	(602) 628-5313	Ext.

IX. OTHER RELATED PROGRAMS

IX. OTHER RELATED PROGRAMS

This section includes projects funded with Federal ITS dollars but which do not fit any of the other categories in this projects report.

Other Related Programs
(Research)

ITS IDEA PROGRAM

Description:

The Innovations Deserving Exploratory Analysis Program solicits "IDEAs" for and funds feasibility studies of high-risk, innovative Intelligent Transportation Systems (ITS) concepts. Concepts which show continuing promise may move to phase II funding support, wherein prototype development can occur. The objective of this initiative is to establish a continuing program to identify and explore innovative concepts for ITS that are proposed by individual researchers both within and outside the usual transportation research community. This intermodal ITS program is supported by the Federal Highway Administration in the amount of $6.5 million. Additionally, the National Highway Traffic Safety Administration and the Federal Railroad Administration have contributed $2 million and $1 million respectively to program support.

A progress report titled "Emerging Concepts and Products for Intelligent Transportation Systems" may be obtained by contacting:

Intelligent Transportation Systems
Innovations Deserving Exploratory Analysis (IDEA) Program
Transportation Research Board, National Research Council
2101 Constitution Avenue, N.W.
Washington, D.C. 20418
Tel: (202) 334-3568

Additional information on the ITS IDEA Program can be found on the internet at www.nas.edu/trb/about/itslist.html

Project Location **:** Washington, DC

Partner(s) : Transportation Research Board and National Academy of Sciences

Start Date: September 1992

End Date**:** December 1998

Estimated Total ITS Funds: $9,500,000

Estimated Total Project Cost: $9,500,000

Contacts**:**

David Gibson	FHWA - TFHRC, HSR-10	(703) 285-2407	Ext.

ITS RESEARCH CENTERS OF EXCELLENCE

Description:

ITS Research Centers of Excellence (RCE's) program mission is to establish internationally recognized centers of excellence that provide long term ITS research solutions, promote ITS technologies and prepare ITS professionals to build and operate these intelligent transportation systems. The centers provide approximately $1,500,000 in matching funds each year. Over one hundred students are working in RCE-related projects at the centers. Areas of emphasis are as follows:

University of Michigan:

Seven major areas define the University of Michigan Center's focus on near term, pre-competitive aspects of ITS: Information Technology, Controls Technology, Enterprise/Institutional Issues, Traffic Modeling, Human Factors and Behavior, Evaluation and Fleet Management.

Texas A & M:

The Texas A&M Center focuses on Public Transportation Services, Traffic Management Services and International Border Transportation Services.

Virginia Polytechnic Institute:

The Virginia Polytechnic Institute Center focuses on Incident Management, Automated Highway Systems, Smart Highways (sensors/communications), Advanced Traveler Information Systems, and Advanced PublicTransportation Systems.

A report titled "The ITS Research Centers of Excellence Program" may be obtained by contacting:

ITS RCE Clearinghouse
Texas Transportation Institute
The Texas A&M University System
College Station, Texas 77843-3135
Tel: (409) 845-1734

The RCE Information Clearinghouse can be accessed via the internet at http://rce.tamu.edu/clearingHouse/index.html.

Project Location **:** Ann Arbor, Michigan; College Station, Texas; and Blacksburg, Virginia

Partner(s) : University of Michigan, Texas A&M University, and Virginia Polytechnic Institute

Start Date: September 1993

End Date**:** September 1998

Estimated Total ITS Funds: $15,350,000

Estimated Total Project Cost: $15,350,000

***Contacts*:**

David Gibson	FHWA - TFHRC, HSR-10	(703) 385-2407	Ext.

NATIONAL AVIATION & TRANSPORTATION CENTER

Description: This project supports the implementation and evaluation of an International Intermodal Transportation Simulation System and NAFTA Intermodal Transportation Institute at the National Aviation and Transportation Center/Dowling College on Long Island.

Project Location **:** Long Island, New York

Partner(s) : New York State DOT and Dowling College

Start Date: September 1995

End Date**:** December 1998

Estimated Total ITS Funds: $3,870,000

Estimated Total Project Cost: $4,830,750

Contacts**:**

Al Alonzi	FHWA Region 1, HPP-01	(518) 431-4224	Ext. 228
Mike Schauer	FHWA New York Division, HTD-NY	(518) 431-4125	Ext. 236
Ed Roberts	New York State DOT	(518) 457-1232	Ext.

Other Related Programs
(Completed Projects)

AUTOMATED TRAVEL TIME ACQUISITION PROTOTYPE

Description:

This project involved the design, development, and testing of a prototype device for automating traffic speed and travel time surveys. The device makes use of a commercial off-the-shelf GPS receiver and a laptop computer in a moving vehicle. It acquires speed and location information in real time and generates time vs. distance and speed vs. distance plots. Data can be stored for subsequent playback and analysis. The device is highly portable and can be installed in a vehicle in a matter of minutes.

A prototype was built and laboratory testing successfully completed. Field testing was carried out on suburban and urban freeways and arterials. The results agree with those obtained manually and with those obtained using commercial devices hard-wired to the transmission. Furthermore, the continuous stream of position data generated by the device was found to offer a number of advantages over manually-collected "point" data. Efforts are underway to support field application of the device by the Metropolitan Washington Council of Governments and other state and local jurisdictions.

Project Location **:** Washington, DC

Contractor(s) : Mitretek Systems

Start Date: April 1995

End Date**:** June 1996

Estimated Total ITS Funds: $141,000

Estimated Total Project Cost: $141,000

Contacts**:**

Raj Ghaman	FHWA Headquarters, HSR-10	(703) 285-2408	Ext.

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