Technical Memorandum No. 4.2

ITS Business Plan for Deployments along Florida's Principal FIHS Limited-Access Corridors

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List of Acronyms

APTS.....Advanced Public Transportation System
ATIS.....Advanced Traveler Information System
ATMS .....Advanced Traffic Management System
AVL .....Automated Vehicle Location
CCTV.....Closed-Circuit Television
CMAQ.....Congestion Mitigation Air Quality
CVIEW .....Commercial Vehicle Information Exchange Window
CVISN..... Commercial Vehicle Information Systems and Network
CVO .....Commercial Vehicle Operations
DMS.....Dynamic Message Sign
EMC.....Emergency Management Center
EPS..... Electronic Payment System
ETC.....Electronic Toll Collection
FDOT ..... Florida Department of Transportation
FFN ..... Florida Fiber Network
FHWA.....Federal Highway Administration
FIHS.....Florida Intrastate Highway System
FMS..... Freeway Management System
FTA .....Federal Transit Administration
HAZMAT ..... Hazardous Materials
HOT .....High Occupancy Toll
HOV.....High Occupancy Vehicle
IM..... Inter-Modal
IMS .....Incident Management System
ISP.....Information Service Provider
ISTEA .....Intermodal Surface Transportation Efficiency Act
ITN..... Invitation to Negotiate
ITS.....Intelligent Transportation System
IVR..... Interactive Voice Response
LOS .....Level of Service
MIST™ .....Management Information System for Transportation™

MOU ..... Memorandum of Understanding
MPO ..... Metropolitan Planning Organization
NHS ..... National Highway System
NITSA ..... *National ITS Architecture*
ROO ..... Regional Operating Organization
RR Service Patrols ..... Road Rangers Service Patrol
RTMC ..... Regional Traffic Management Center
SDO ..... Standards Development Organization
SEMP ..... *Systems Engineering Management Plan*
SITSA ..... *Statewide ITS Architecture*
STP ..... Surface Transportation Program
SUL ..... Special-Use Lanes
TEA-21 ..... Transportation Equity Act for the 21st Century
TMC ..... Traffic Management Center
TTMS ..... Telemetered Traffic Monitoring System
USDOT ..... United States Department of Transportation
VMS ..... Variable Message Sign
VMT ..... Vehicle Miles Traveled
WIM ..... Weigh-In-Motion

1. Introduction

1.1 Background

Florida's beaches, major tourist attractions, and gateway status for the Americas attract nearly 60 million visitors each year. The demand for transportation services resulting from these visitors, the 16 million residents of Florida, and one of the United State's fastest growing populations is outpacing the ability of the state and local governments to build new highways to meet this demand. For example, on the Florida Intrastate Highway System (FIHS) – a priority system of about 3,778 miles of freeways, toll roads, and intercity arterials – travel demand [measured in vehicle miles traveled (VMT)] increased 43 percent and the percent of travel that is congested operating during peak conditions (5:00 to 6:00 PM) increased 40 percent from 1990 to 1999 [Florida Department of Transportation (FDOT) Statistics Office]. During the same period, FDOT invested more than $3.1 billion in construction (only) on the FIHS, which resulted in a 10.3 percent increase in the number of lane-miles. Florida's growth is not expected to subside. By the year 2020, more than 21 million residents and 80 million visitors are projected. The 2020 transportation system must also respond to an anticipated three-fold increase in Florida's imports and exports. VMT are expected to increase by about 60 percent, transit trips by about 40 percent, and air travel will more than double. Traditional roadway expansion and infrastructure management will be insufficient to keep pace with this demand.

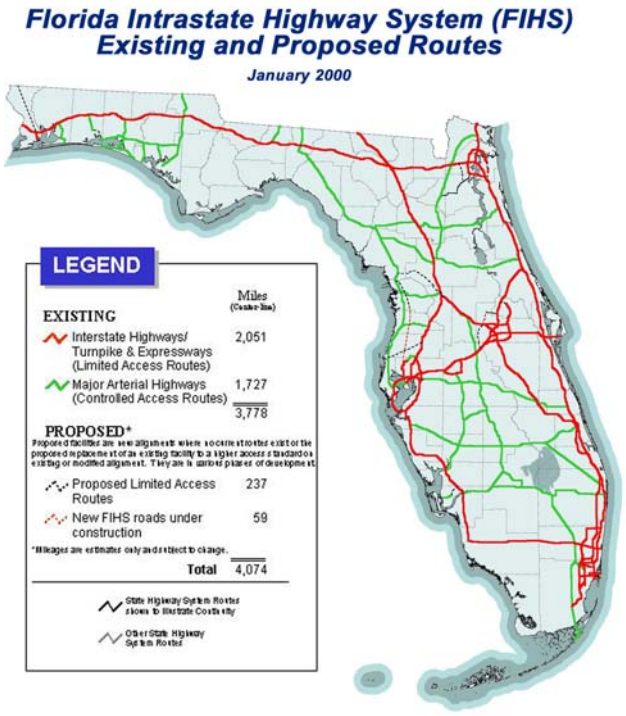


Figure 0.1 –
FIHS Existing and Proposed Routes

In order to respond to these increases in demand and congestion, FDOT has focused its mission on serving four goals: safety, systems management, economic competitiveness, and quality of life. Intelligent transportation systems (ITS) will be an important operational and management tool in achieving these goals.

1.2 FDOT's ITS Office

To support the coordinated deployment of ITS on a statewide basis, FDOT recently established an ITS Office. The mission of the ITS Office is to coordinate and promote the deployment of ITS and incident management activities conducted by FDOT. The Office was established as a result of a strategic planning process adopted by FDOT. Four major program areas were developed in the Office: the Telecommunications Program, ITS Architectures and Standards, ITS Program Management, and Commercial Vehicle Operations (CVO)/Electronic Toll Collection (ETC).

Figure 1.2 –
***ITS Corridor Master Plans'* Study Corridors**

The major initiatives being undertaken by the ITS Office are:

The ITS Office provides statewide program management and leadership that will be used to leverage FDOT's resources and implement a fully integrated, statewide ITS system in a cost-effective manner. This program will build on Florida's history of success in ITS deployment.

- Guide the deployment of a communications backbone to serve ITS on major transportation corridors throughout the state;
- Adopt a corridor approach to the implementation of the FIHS limited-access corridors and develop conceptual systems engineering solutions for these corridors to support procurement and deployment of ITS services;
- Establish statewide standards and specifications for ITS which include the resolution of disparate traffic management center (TMC) software;
- Support the deployment of a statewide central data warehouse to support advanced traffic/traveler information services (ATIS);
- Support the deployment of information and communications technologies to serve commercial vehicles and promote electronic payment systems (EPS);
- Provide technical support and assistance to FDOT's district offices and other partners; and
- Support ITS professional capacity building to provide a qualified work force in support of ITS deployments.

1.3 Purpose

The purpose of the *ITS Business Plan* is to outline the strategies, tactics, and related roles and responsibilities of the key stakeholders involved in the deployment of ITS along the FIHS limited-access routes to support the desired outcomes for deployment. This document is intended to go hand-in-hand with *Technical Memorandum No. 4.1 – ITS Concept of Operations* which outlines in detail the roles and responsibilities for the operations and management of the system once in place.

1.4 Mission and Vision

The ITS Mission and Vision statements were derived from the *ITS Strategic Plan* and included in the *ITS Corridor Master Plans* to assist in defining the ultimate 20-year ITS services for the limited-access corridors and to guide the selection of appropriate solutions to fulfill the ultimate ITS vision. This vision is based on the vision provided in the *ITS Strategic Plan* but adapted for specific use on the limited-access corridors.

1.4.1 Mission

Provide effective ITS services for the five principal FIHS limited-access corridors that enhance the safety and mobility of people and goods, economic competitiveness, and the quality of our environment and communities.

1.4.2 Vision

Two decades into the 21st Century, travelers and shippers of goods along Florida's limited-access transportation corridors are benefiting from infrastructure, and information and communications technologies that improve the safety, mobility, economic competitiveness, and livability of communities in Florida. Information is available that assists travelers and shippers in the route planning, predicting travel times, and scheduling their trip/shipment to reduce delays and arriving at scheduled times. When congestion is severe along specific facilities, alternate routes and modes of travel will be suggested that may be more reliable or cost-effective. During their trip, information of travel conditions is provided in real-time so that scheduling and diversions can be planned if needed as a result of an incident. If an incident occurs, automated information technologies are capable of verifying the location and assessing the appropriate response to incidents. If necessary, emergency personnel or roadside assistance is dispatched, arriving in a short period of time. Traffic flow is restored quickly and delays minimized.

During normal operations, traffic flow is managed within the corridor to keep traffic moving. Information on weather conditions is provided to an in-vehicle information service that alerts the driver when visibilities are compromised and advises a safe travel speed. If a natural disaster is impending, information is provided on appropriate local shelter locations, routes for travelers choosing to drive to another area, and other modes of travel.

The economy is thriving as a result of world-class access to international markets at ports, airports, and railhead from our agricultural, mining, and manufacturing industries and efficient deliveries of goods and services at the local level. Decisions on the operations, management, and future improvements to the corridors are made through a number of key partners. These decisions are based on measured benefits and a record of the performance of various technologies and elements are customized for communities to reflect their unique values and priorities. However, similar services are available statewide and on related arterial systems and are easily recognized by elderly drivers or visitors since strong name recognition exists for traveler information, roadside assistance, electronic tolls, and other essential services. FDOT is viewed as an ITS powerhouse and a model for how to cost effectively deploy ITS services and partner with other public agencies and the private sector to create win-win agreements for the benefit of the citizens of Florida.

1.5 Goals and Objectives

To achieve this mission, the following goals and objectives are recommended:

1. Move People and Goods Safely
- 1.1. Reduce accident rates.
  - 1.1.1. Reduce accident rates caused by driver errors and the severity of accidents.
  - 1.1.2. Reduce accident rates and severities in construction work zones.
  - 1.1.3. Reduce accident rates at highway-rail grade crossings.
- 1.2. Reduce queuing on mainlines.
  - 1.2.1. Reduce queues on limited-access roadways from highway-rail grade crossings.
  - 1.2.2. Reduce queues at weigh and inspection stations along the corridors.
  - 1.2.3. Reduce queues at intermodal facilities that impact corridor operations.
- 1.3. Improve the safety of commercial vehicle operators in rest areas.
- 1.4. Provide evacuation coordination services and emergency management.
  - 1.4.1. Provide pre-trip planning information for evacuation conditions.
  - 1.4.2. Provide traffic management during evacuation conditions.
  - 1.4.3. Manage demand through communication with shelters and other safe harbors.
  - 1.4.4. Provide route guidance information and information on traffic/travel conditions and weather including winds, rainfalls, and storm surges.
  - 1.4.5. Support remote configuration management of highways during evacuation conditions or other emergencies.
  - 1.4.6. Provide accurate and timely traveler information regarding incidents on evacuation routes and updated weather information.
  - 1.4.7. Share emergency information among local and regional traffic management centers (RTMCs) and emergency management facilities.

1.4.8. Detect, verify, respond to, and clear incidents and manage traffic around accidents, emergencies, and other incidents.
1.4.9. Support infrastructure security through surveillance at critical structures and interchanges.

2. Preserve and Manage the System
2.1. Enhance mobility and efficiency.
2.1.1. Improve travel times along the corridors.
2.1.2. Improve predictability and reliability of travel times.
2.1.3. Reduce accidents and other incidents during normal flows that result from congestion and delays that are caused by "rubber-necking" during incidents.
2.1.4. Reduce congestion-related delays by decreasing queues and spillback from other facilities.
2.1.5. Reduce delays caused by congestion in construction work zones.
2.1.6. Manage traffic accessing these major corridors at interchanges to improve mainline throughput and traffic flow.
2.1.7. Reduce unnecessary delays at tollbooths.
2.1.8. Reduce unnecessary delays at the gates of intermodal facilities.
2.1.9. Provide traveler information services with route and mode choice information.
2.2. System Preservation
2.2.1. Improve enforcement of illegally overweight vehicles.
2.3. Incident Management
2.3.1. Improve ability to detect, verify, respond to, and clear incidents.
2.3.2. Improve incident-related traveler information.
2.3.2.1. Predict delays and clearance times.
2.4. Manage Special-Use Lanes (SULs)
2.5. Provide Data Archiving and Warehousing
2.5.1. Conduct system evaluation and alternative analysis
2.5.2. Support and supplement other statewide data collection programs
2.5.3. Support highway operational performance reporting, modeling simulation and other techniques for operations and management of the system.
2.5.4. Develop before and after studies for ITS deployments.

3. Enhance Economic Competitiveness
3.1. Ensure efficient landside access to intermodal, port, airport, and truck terminal facilities.
3.2. Ensure efficient intermodal transfer of people and goods.
3.3. Promote safe and efficient access of vehicles to markets.
3.4. Expedite permitting and clearance of commercial vehicles at weigh and agricultural inspection sites to keep commerce moving.
3.5. Ensure efficient access to major activity centers such as tourist attractions, state parks, and other areas of interest.

3.6. Provide safe and efficient tourist travel and reduce VMT through the provision of accurate and timely traveler information.
3.7. Support the designation of corridors as strategic intermodal corridors and funding for ITS deployments.

4. Enhance Quality of Life and the Environment

4.1. Provide efficient statewide ITS services with autonomy for decision-making to support local needs and regional cooperation to promote efficiency and support regional and statewide goals.
4.2. Improve interoperability of ITS services through the development of statewide uniform device standards and specifications.
4.3. Support integration of ITS into local planning processes, programs, and capacity projects.
4.4. Provide name recognition of key ITS-related services through branding that will instill trust and confidence in traveler information services, roadside assistance, electronic payment services, and other strategic services.
4.5. Provide easy access and data mining capabilities for transportation planning and design for all partners to support decision-making.
4.6. Provide accurate real-time data to technology, business and operational users for effective and responsive transportation operations.
4.7. Reduce air-quality emissions from mobile sources.
4.8. Reduce the potential for impacts from hazardous materials' (HAZMAT) incidents.
    4.8.1. Improve HAZMAT response systems.
    4.8.2. Improve the availability of traveler, weather, and shelter information during man-made and natural disasters.
    4.8.3. Provide safe routes for HAZMAT that avoid densely populated areas.

5. Deploy an Integrated, Effective System

5.1. Provide research and development for technologies to support deployments.
5.2. Develop statewide standards and specifications for ITS field devices.
5.3. Develop statewide standards for TMC software.
5.4. Develop a communications architecture and backbone for statewide deployment.
5.5. Develop standard procedures for operations and management.
5.6. Develop statewide information exchange network standards and criteria.
5.7. Brand all critical statewide services such as traveler information, interactive voice response (IVR) systems (511 or 1-800 services), Road Ranger (RR) Service Patrols, ***SunPass***®, Pre-Pass, etc.
5.8. Standardize performance measures and archive data to produce a history of trends and establish benchmarks.
5.9. Develop statewide procurement guidelines.
5.10. Develop a statewide systems engineering process for design, integration, and testing that includes regular updates and enhancements of statewide architecture.
5.11. Develop statewide procurement contracts to leverage economies of scale.

5.12. Develop an ITS asset management program to track and program replacement parts, migrate legacy systems, and manage the life-cycle of deployments.
5.13. Establish a statewide-managed funding program for ITS with project decision recommendations made by the ITS Office.
5.14. Dedicate a percent of all FDOT funds, statewide-managed and district-allocated, for operations and management of ITS deployments.
5.15. Update work program instructions to develop traceability with the *Statewide ITS Architecture (SITSA)*.
5.16. Increase the professional capacity of the public and private sector in Florida to support planned deployments.
5.17. Promote public-public partnerships to leverage financial and human resources.
5.18. Promote public-private partnerships to leverage financial and human resources.

1.6 Themes and Strategies for Deployment

Based on these goals and objectives, the following themes and strategies summarize the desired outcome of ITS deployments along the five principal FIHS limited-access corridors. These themes and strategies are intended to describe the desired outcomes in non-technical terms that stakeholders can understand and may not follow strict technical definitions.

1.6.1 Coordinated Operations

- Facilitate, support, and enhance the coordination and implementation of interagency efforts in response to the needs of intercity travel, major incidents or special events of regional significance along the corridor, and the security of the transportation infrastructure.

- Promote coordination and cooperation among all organizations involved in incident management including state, county, and local transportation departments, toll road authorities, law enforcement agencies, emergency service providers, and other operating agencies within the corridor.

- Foster and facilitate continued development and implementation of regional incident management initiatives and educate the public and responders to the benefits of incident management.

- Encourage technology and resource sharing by coordinating the development of training programs to support member agencies' incident management programs and activities.

- Demonstrate and evaluate the application of innovative procedures and technologies to enhance incident management activities.

- Provide regional solutions for serving intercity travel by promoting the through movement of vehicles.

- Provide procedures and coordination during evacuation and other emergency situations to make the best use of system resources.

- Promote coordination among agencies in the notification and implementation of maintenance and construction.

1.6.2 Active Facilities Management

- Support traffic management along all facilities in a coordinated way.

- Support incident management for the detection of, response to, and clearance of accidents and other major incidents such as freeway service patrols and Mayday/E-911 support, development of incident response scenarios and traffic diversion plans, incident response centers or command posts, and traffic surveillance technologies.

- Provide transit management, including bus, commuter rail, and park-and-ride facilities, as well as other transit-related activities and manage SULs, such as high occupancy toll (HOT) or other value pricing, reversible lane control for high occupancy vehicle (HOV) facilities, and transit or emergency vehicle signal preemption systems.

- Improve the ability to monitor, schedule, and dispatch maintenance, construction, special services, or other public/community transportation fleets.

- Manage traffic flow and safety during evacuations related to hurricanes, fires, and other emergencies.

- Serve CVO, such as electronic screening systems, to verify the compliance of motor carriers with size, weight, safety and credentials regulations, and emergency response systems.

- Promote the use of ETC and EPS to improve traffic flow efficiencies and reduce infrastructure requirements.

- Implement procedures and systems that cost-effectively manage work zone activities.

- Manage lane closure prediction and scheduling.

- Collect/Maintain data on work zone locations and delay and alternate routing for mainlines and standard diversion or evacuation routes.

- Automate speed enforcement and variable speed limits in work zones.
- Support ATIS.
- Provide evacuation guidance that includes basic information to assist potential evacuees in determining whether evacuation is necessary. Once the decision is made to evacuate, the services will also assist evacuees in determining destination routes to shelters and other lodging options. This function will also provide guidance for returning to evacuated areas, information regarding clean up, and other pertinent information to be distributed from federal, state, and local agencies.
- Provide evacuation travel information that will benefit evacuees in planning their evacuation trip once that decision has been made. This function will also allow travelers to change course during the trip based on route and destination conditions.
- Provide evacuation traffic management to assist evacuation coordination personnel in the management of evacuation operations on the transportation network.
- Provide evacuation planning to support the evacuation process by providing information, current and historical, to emergency management planning personnel.
- Promote evacuation resource sharing to allow information and resource sharing between agencies involved in the evacuation including transportation, emergency management, law enforcement and other emergency service agencies.
- Improve the coordination of construction activity and other roadway activities with maintenance.
- Provide infrastructure security against terrorist attacks.

1.6.3 Information Sharing

- Coordinate data collection and information processing, management, and distribution.
- Coordinate data collection programs and sensor installation/operations.
- Inform and exchange data through coordinated operations.
- Centralize information processing, management, and storage.

- Open access to information delivery and use.
- Coordinate information report development.
- Coordinate transportation management strategy development.

1.7 Deployment Issues

Through the deployment of these existing ITS, a number of critical ongoing issues have emerged that should be addressed in order to achieve successful ITS deployment along the FIHS limited-access corridors.

1.7.1 Incorporating Legacy and Sunk Investments

The ITS program must take full account of the need to preserve legacy systems and make maximum use of sunk investments in existing infrastructure and organizational arrangements. For example, if TMC software is being used successfully, plans for future TMC software should build on this deployment and migration to new statewide TMC software should occur over time to manage risk and leverage existing investments. Similarly, field equipment that does not meet current standards should only be replaced in accordance with normal maintenance schedules unless the existing element can not be fully integrated into new software or comply with other standards migration.

1.7.2 Partnering with Local Operational Management to Achieve Synergy

There is a huge opportunity to boost the effectiveness and efficiency of the proposed ITS deployment through the exploitation of synergy and the development of suitable regional partnering arrangements. The full exploitation of opportunities to share infrastructures such as sensors, information delivery systems, command and control, and communications systems will ensure cost effectiveness, minimize risk, and maximize the delivery of real benefits to Florida's transportation customers. This infrastructure and information sharing will also enable the delivery of innovative services and additional value to the customer. For maximum effect, such collaboration should span the full range of activities from research and development, planning and deployment, through funding, procurement, and evaluation, to commissioning and operational management. This cooperation should span the primary operational agencies involved, such as the respective FDOT districts along the corridors, but should also encompass other transportation partners such as metropolitan planning organizations (MPOs), law enforcement agencies, emergency services, and local governments in full support of successful planning and implementation of ITS on an integrated regional basis.

1.7.3 Promoting Efficient Operations and Management

Operations and management have become a critical part of the overall application of ITS since the use of information and communications technologies have the greatest impact in this part of the transportation system management process. Due to the complex nature of ITS, the need to support data sharing, and the application of complementary management strategies and procedures, care must be taken when developing and defining operations and management approaches. The development of common procedures for similar tasks in different partner organizations and the agreement to apply pre-defined, coordinated management strategies will be important elements in meeting this challenge. These coordinated management strategies will support cooperation and sharing of work efforts in the definition of such procedures, staff training, and implementation support.

1.7.4 Integrating Software to Promote Statewide Coordination and Communications

Early ITS deployment activities in the state have resulted in a set of legacy software platforms that must be integrated to support the data and information sharing required to achieve statewide objectives. Bringing the software to a common base of functionality in support of agreed operations and management strategies is an important step in meeting this challenge.

The ITS Office recently completed a *TMC Software Study* with the Michigan Department of Transportation that looked at synergies and reducing costs for TMC software. The study recommended the following:

- Do not abandon the current efforts underway at TMCs within the state. Continue those development efforts over the short-term.

- Begin development of a statewide operational concept to define what capabilities are required for both statewide and district-by-district operations. Buying software systems to satisfy non-codified requirements is inefficient. This effort has begun under the direction of the ITS Office as part of developing functional requirements to support procurement of a statewide TMC software.

- Based on the statewide definition of requirements, begin development of a statewide library of functional components. These will form the basis of new deployments and eventually replace components of existing systems. Seek to inform multi-state coalitions for software expenditures.

- Use a currently deployed, commercially available system already licensed to Florida [i.e., PB Farradyne's Management Information System for Transportation (MIST^{TM})] for short-term implementation needs. Pay careful attention to system network design to assure that transition to statewide components can be accomplished efficiently as they become available.

- Utilize statewide buying power (for quantities) to acquire national standards-compliant hardware.

The integrated statewide TMC software system will provide a unifying platform to ensure that technologies can work together smoothly and efficiently. The statewide TMC software system will allow unified function of TMCs, toll collection, freeway and incident management, traveler information over wireless, microwave, copper, and fiber optic communications.

1.7.5 Developing Statewide Standards, Specifications, Procurement Guidelines, and Performance Measures

To support the effective and complete implementation of the desired end-state as defined by the corridor-wide ITS architecture, standards will be required. These standards will need to address the major interfaces between subsystems and can be derived from standards development work at international, national, or local levels. Subsystems will also need to be addressed through the development of standard specifications for devices and components to be integrated and the specification of equipment packages for procurement. In support of effective procurement of the ITS hardware and software required, procurement guidelines and bulk purchase arrangements will be required.

1.7.6 Balancing the Need for Local Autonomy and Control with Centralized Coordination and Cost Efficiency

The need and desire for increased service coordination has been clearly identified in the course of the architecture development work. The preservation of local management and control in support of the independent pursuit of transportation policy objectives has also been identified as a primary requirement. In order to support the attainment of both objectives, the technical and organizational elements of the systems will need to be carefully balanced. Subsystems and interfaces must be designed to support the balanced application of data and information sharing, with the implementation of locally directed strategies and procedures. Operating and management procedures and approaches as defined in *Technical Memorandum No. 4.1 – Concept of Operations* take full account of these conflicting needs and support the balance described above.

1.7.7 Implementing Services to Provide Coordinated Operations, Active Facilities Management, and Information Sharing

The primary elements of the desired future ITS state have been captured and defined from a systems perspective in terms of logical and physical architectures and directly mapped to a range of desired ITS User Services that will be supported by the architectures. This end-state has been defined in terms of three major themes or service groups – coordinated operations, active facilities management, and information sharing. The effective implementation of these services will require the definition of technical and organizational strategies and tactics that fully support their development and introduction in a logical, financially viable manner.

1.7.8 Supporting the Needs of the Full Range of ITS Users Including Commuters, Tourists, Commercial Vehicles, and Evacuees

It is recognized that the intended user group for the services to be provided by the corridor-wide ITS deployment is composed of several different sub-groups, the most important of which include commuters, tourists, commercial vehicle operators, and evacuees from natural or man-made disasters. The strategies and tactics devised to support the development and subsequent operations and management of the ITS deployments must take full account of the varying needs of each of these sub-groups. For example, users in the commuters' sub-group will have a focus on access to traveler information and traffic management from a number of different information delivery channels. Strategies and tactics to leverage existing and planned information delivery systems, operated by both public and private organizations, will need to be developed to address this need. Users in the tourists' sub-group may well be interested in information regarding access to recreational and resort areas or specific tourist attractions. In this case, there may be a need to strike partnership arrangements with tourism and leisure industry operators for the provision and collection of traveler information. In the case of the commercial vehicle operators, the need may revolve around the estimation of travel times and the improvement of travel time prediction accuracy and travel time reliability. This may require strategies that make use of public sector roadside infrastructures for travel time data collection and that harness private sector CVO information and fleet management services to deliver the required information in a cost-effective manner. For evacuees, links to shelter management personnel, travel time, and weather information are critical.

1.7.9 Deploying ITS in a Coherent, Structured Manner that Provides a Complete Backbone of ITS Services along the Five Major FIHS Corridors at an Early Stage

This overall *ITS Business Plan* must support a logical deployment sequence that fully supports the effective and efficient deployment of the corridor-wide ITS in an optimum sequence over time and geographical coverage areas. This must take into account past and current public sector deployments and planned private sector initiatives.

1.7.10 Developing Efficient and Rapid Deployment Based on Practical Experience and Lessons Learned Throughout Florida and Nationally

The deployment sequence identified and supported in this *ITS Business Plan* must also address the need to support efficient and rapid deployment of several "early winner" projects and initiatives. These should be selected on the basis of lessons learned and experiences gained in the course of prior deployments in Florida and nationally. Early elements of the deployment sequence ideally should be robust, low risk, high confidence projects that make use of proven technologies.

1.7.11 Supporting the Effective Development and Deployment of the Communications Infrastructure Required to Support ITS, Including the Florida Fiber Network (FFN)

The plan must also provide support for the effective planning and deployment of the communications infrastructure required to support the level of data and information sharing desired. The definition of strategies and tactics that define the public sector investment program and potential public-private partnership opportunities will be essential. In particular, the FFN element of the communications infrastructure represents a key part of the communications capability required for the corridor and the state. Consequently, the overall *ITS Business Plan* activities must provide full support for the ultimate development and deployment of this infrastructure.

1.7.12 Supporting Continued Professional Capacity Building and Training

To support the progression from conventional transportation network deployment and management to the application of advanced technologies, improved professional capacity building education and training will be required. ITS Florida has been tasked with coordinating ITS training activities in Florida. Strategies and tactics should be defined in the *ITS Business Plan* to support the development of current capabilities, the identification of future needs, and the development of new education and training capabilities that fully support the development, deployment, and operation of the proposed ITS.

ITS Florida has also initiated a structured training program to support training needs throughout the ITS profession in Florida that will supplement training programs developed by FDOT.

1.7.13 Use ITS to Support Public Safety

The September 11, 2001, attacks by terrorists in New York City, Virginia[1], and Pennsylvania have resulted in a heightened awareness of public safety issues. ITS provides information that may be useful in certain situations for law enforcement to prevent similar attacks using surface transportation systems in Florida.

[1] The Pentagon is located along the western banks of the Potomac River in Arlington, Virginia.

ITS can also play a role following man-made or other disasters. The role of ITS as a traffic management tool and the use of information systems to support disaster recovery efforts has tremendous potential to reach a large number of travelers and prevent unnecessary delays or further damages. Continued study of the potential role of ITS in these scenarios is needed.

1.7.14 Life-Cycle Considerations

Little attention has been given to the full funding of life-cycle costs for ITS deployments in the past. For traditional highway improvements, life cycles are planned to be twenty years for pavement structures and fifty years for bridges. However, the life cycles of ITS elements can be as short as three years for some information technology hardware and typically five to seven years for field devices such as closed-circuit television (CCTV). The replacement costs of these field devices, software upgrades, and migration to meet new standards and performance specifications should be careful considerations of any program plan. A ten-year life cycle is recommended for planning purposes.

1.7.15 Proving Technology Through Research and Pilot Studies

ITS technology and strategies are emerging at a rapid rate. Prudent use of emerging technologies is dependent on adequate research and demonstration in pilot studies prior to a broad adoption. This approach will manage risk and ensure resources are being utilized for proven technologies.

1.7.16 Performance Measures and Evaluation

Performance measures are "yardsticks" that transportation agencies use to measure their operating results and to assess investment options. Performance measures can be used by FDOT to help focus their limited resources to better serve customer needs. By defining specific measures, FDOT will be able to better define the goals and objectives and measure the effectiveness of their programs in meeting these objectives.[2] The measures will help FDOT staff to be more effective and more accountable to citizens of Florida. The ability to focus on and measure results will also assist FDOT in allocating resources more consistently with its objectives and to identify needs in a more consistent manner. Secretary Tom Barry recently stated, "We measure ourselves for two reasons – to make sure we are spending the taxpayers' money as efficiently as possible and to try to improve how we provide

> ***We measure ourselves for two reasons - to make sure we are spending the taxpayers' money as efficiently as possible and to try to improve how we provide transportation to the people of Florida.***
>
> Secretary Tom Barry

[2] The measurement of transportation system performance is a complex problem and many externalities, such as the economy and resulting changes in driver behavior, can have profound impacts on system performance. These external factors are outside FDOT's control and, therefore, the use of performance measures only in the assessment of agency performance may not accurately reflect the full effectiveness of FDOT.

transportation to the people of Florida." Performance measures are becoming an important part of the way government works in Florida and by proactively approaching the development and recommendation of these measures, FDOT is ensuring its long-term sustainability by having measures that reflect their mission statement.

FDOT's mission is to:

"Provide a safe transportation system that ensures the mobility of people and goods, while enhancing economic prosperity and sustaining the quality of our environment."

FDOT establishes the goals and objectives for the state transportation system from its mission statement. The *Florida Transportation Plan* includes a long-range component that establishes goals and objectives for twenty years and a short-range component that establishes objectives for the next ten years. The long-range component is updated every three to five years and the short-range component is updated annually. Progress towards the accomplishment of FDOT's objectives is reported on an annual basis in the *Annual Performance Report*. In this context, ITS performance measures are just one type of performance measure FDOT uses to evaluate agency performance. Other performance measures used by FDOT include mobility, safety, pavement condition, bridge condition, public transportation facility asset management, and environmental concerns.

Similar to the FDOT's other major programs, ITS performance measures are needed to assess the agency's performance in supporting the *Florida Transportation Plan* through ITS deployments. The types of measures needed include mobility- and safety-related performance measures and agency oriented-measures.

1.7.17 Integration of ITS Data and Planning Data Systems

Data collected through the instrumentation of transportation systems provide an opportunity to improve transportation planning as a whole. However, the operational data is collected using ITS and the planning-related data is collected through Florida's telemetered traffic monitoring system (TTMS). Significant synergies and costs savings are possible through the integration of these data sources.

2. Strategies and Tactics

A series of strategies and tactics are outlined and associated with each major program area goal. These strategies and tactics were derived from the *ITS Business Plan* included in Florida's *ITS Strategic Plan*. The strategies and tactics presented in this *ITS Business Plan* build upon processes and strategies recommended in the *ITS Strategic Plan*, in order to establish, manage, and operate a successful, statewide ITS program. Table 2.1 identifies strategies and tactics contained in both business plans and support and maintain the ITS program's primary goals and objectives:

- Develop the statewide ITS Office.
- Guide the deployment of a communications backbone to serve ITS on major transportation corridors throughout the state.
- Adopt a corridor approach to the implementation of ITS along the FIHS limited-access corridors that ideally mirrors the FFN and develop conceptual systems engineering solutions for these corridors to support procurement and deployment of ITS services.
- Establish statewide standards and specifications for ITS that include the resolution of disparate TMC software.
- Support the deployment of statewide central data warehouse to support ATIS.
- Support the deployment of information and communications technologies to serve commercial vehicles and promote EPS.
- Provide technical support and assistance to FDOT's district offices and other partners.
- Support ITS professional capacity building to provide a qualified work force in support of ITS deployments.

Table 2.1 – Strategies, Tactics, Responsibilities, and Status

Strategies and Tactics	Responsibilities				Status	In Florida's *ITS Strategic Plan*
	FDOT CO	FDOT Districts	FHWA	Local Gov't		
Develop a Statewide ITS Office						✓
Establish a statewide ITS Office	●				Complete	✓
Hire a qualified core staff of FDOT personnel	●				Complete	✓
Solicit and procure a Telecommunications General Consultant	●	❍			Complete	
Solicit and procure an ITS General Consultant	●	❍			Complete	
Coordinate ITS statewide planning with districts and other statewide activities/programs	●	❍			On-Going	✓
Develop an *ITS Business Plan* for the ITS Office	●	❍			Complete	✓
Secure statewide-managed funds for the ITS Program	●	❍			Complete	✓
Develop eligibility requirements for use with the statewide-managed funds program	●	❍			Complete	✓
Develop an *Ten-Year ITS Cost Feasible Plan*	⦿	⦿			Complete	✓
Maintain an *Ten-Year ITS Cost Feasible Plan*	⦿	⦿			On-Going	✓
Contribute to the work program cycle for statewide-managed funds	●	❍			On-Going	✓
Provide input to work program instructions for ITS	●	❍			On-Going	
Maintain an integrated master schedule for all ITS-related activities that are Completed, On-Going, or Planned by FDOT	●	❍			On-Going	
Develop model scopes of work and work break down structures for typical ITS deployments	●	❍			FY 02/03	
Conduct risk analyses of new technologies and strategies	●	❍			On-Going	✓
Provide statewide ITS standards conformance reviews for ITS deployments on limited-access corridors	●	❍			FY 02/03	
Coordinate with the Federal Highway Administration (FHWA_	●	❍			On-Going	✓
Update *ITS Strategic Plan*	●	❍			FY 02/03	
Promote partnerships with other public and private agencies	⦿	⦿	❍	❍	On-Going	✓

Table 2.1 (Continued)

Strategies and Tactics	Responsibilities				Status	In Florida's *ITS Strategic Plan*
	FDOT CO	FDOT Districts	FHWA	Local Gov't		
Adopt a Corridor Approach						
Develop a corridor approach for ITS deployments	●	❍			Complete	✓
Develop a corridor approach for systems engineering	●	❍			On-Going	✓
Develop *ITS Corridor Master Plans* for the FIHS limited-access corridors – I-4, I-10, I-75, I-95, and Florida's Turnpike	●	❍			On-Going	
Develop a concept of operations for the FIHS limited-access facilities	●	❍	❍		On-Going	
Identify ITS needs for other FIHS limited-access routes	●	❍	❍	❍	On-Going	
Develop ITS project concept reports and design criteria packages for ITS deployments along the FIHS limited-access facilities	❍	●			FY 02/03 and beyond	✓
Procure ITS projects along the FIHS limited-access facilities	❍	●			FY 02/03 and beyond	✓
Deploy ITS projects along the FIHS limited-access corridors	❍	●			FY 02/03 and beyond	
Operate and manage the ITS projects along the FIHS limited-access corridors and provide feedback to design and procurements	❍	●			FY 02/03 and beyond	✓
Develop ITS performance criteria and evaluation	●	❍			FY 01/02	✓
Develop ITS performance criteria and evaluation	●	❍			FY 02/03 and beyond	
Develop statewide recognition of brand names for major services areas	●	❍			Complete	
Develop a statewide operational plan and procedures for freeway and incident management services	●	❍			FY 02/03	✓

Table 2.1 (Continued)

Strategies and Tactics	Responsibilities				Status	In Florida's *ITS Strategic Plan*
	FDOT CO	FDOT Districts	FHWA	Local Gov't		
Establish Statewide Standards and Specifications						✓
Develop a statewide ITS architecture in compliance with the *National ITS Architecture (NITSA)*	●	❍			Complete	✓
Maintain and update a *SITSA*	●	❍			On-Going	·
Develop corridor ITS architectures	●	❍			On-Going	·
Harmonize statewide, corridor, district, and other regional ITS architectures	●	❍			On-Going	·
Analyze and recommend an approach and standards for center-to-center software	●	❍			Complete	
Develop and maintain a standards application plan based on standards from the national Standards Development Organizations (SDO), United States Department of Transportation (USDOT), and Florida-specific standards	●	❍			On-Going	✓
Support the testing of field devices for standards compliance	●	❍			On-Going	✓
Develop a *Rule 940 Implementation Plan*	●	❍			On-Going	✓
Develop standard specifications for ITS field devices	●	❍			On-Going	✓
Develop standard specifications for utility connections to ITS field devices	●	❍			FY 01/02	
Provide input to the *Roadway Plans Preparation Manual*, the *Index of Standard of Plans*, and *Standards for Roadway and Bridge Construction*	●	❍			FY 01/02	
Establish an ITS Standards Conformity Committee to guide the development, adoption, and use of standards in Florida	●	❍			FY 01/02	
Establish policies and procedures to support statewide deployment approaches and systems engineering processes	●	❍			FY 01/02	✓
Monitor compliance with policies, procedures, and standards	●	❍			On-Going	✓
Develop and distribute technical tools for ITS design	●	❍			FY 02/03	
Identify and resolve potential conflicts in the interpretation of ITS standards through enhancements and coordination with districts	●	❍			On-Going	✓

Table 2.1 (Continued)

Strategies and Tactics	Responsibilities				Status	In Florida's *ITS Strategic Plan*
	FDOT CO	FDOT Districts	FHWA	Local Gov't		
Support the Deployment of Statewide Information Sharing through Central Data Warehouses and ATIS						
Conduct a feasibility study and requirements analysis for a statewide central data warehouse of ITS data sources	●	❍			On-Going	✓
Deploy a statewide central data warehouse	●	❍			FY 02/03	✓
Conduct feasibility studies for the deployment of ATIS	●	❍			Complete	
Develop an implementation plan for statewide 511 services	●	❍			On-Going	
Develop an invitation to negotiate (ITN) for ATIS along the I-4 corridor	●	❍			On-Going	
Negotiate with an information service provider (ISP) to provide ATIS along the I-4 corridor	●	❍			FY 02/03	
Deploy ATIS along the I-4 corridor	❍	●			FY 03/04	
Operate and manage ATIS along the I-4 corridor	❍	●			FY 04/05	
Develop an ITN for ATIS in the Jacksonville metro area	●	❍			FY 03/04	
Negotiate with an ISP(s) to provide ATIS in the Jacksonville metro area	●	❍			FY 03/04	
Deploy ATIS in the Jacksonville metro area	❍	●			FY 04/05	
Operate and manage ATIS in the Jacksonville metro area	❍	●			FY 05/06	
Develop an ITN for ATIS in Southwest Florida	●	❍			FY 03/04	
Negotiate with an ISP(s) to provide ATIS in Southwest Florida	●	❍			FY 04/05	
Deploy ATIS in Southwest Florida	❍	●			FY 05/06	
Operate and manage ATIS in Southwest Florida	❍	●			FY 06/07	
Develop an ITN statewide 511 services	●	❍			FY 02/03	
Negotiate with an ISP(s) to provide 511 services statewide	●	❍			FY 03/04	
Deploy statewide 511 services	●	❍			FY 04/05	
Operate and maintain statewide 511 services	●	❍			FY 05/06	

Table 2.1 (Continued)

Strategies and Tactics	Responsibilities				Status	In Florida's *ITS Strategic Plan*
	FDOT CO	FDOT Districts	FHWA	Local Gov't		
Support CVO						✓
Promote CVO-related safety without undue costs to the motor carrier industry	●	❍			On-Going	✓
Improve the state's CVO regulatory environment	●	❍			On-Going	✓
Optimize the safe, efficient movement of people and goods throughout the state	●	❍			On-Going	✓
Guide the development and installation of the adopted Commercial Vehicle Information Systems and Network (CVISN) projects and programs in an efficient and cost-effective manner	●	❍			On-Going	✓
Provide Technical Support and Assistance to FDOT's District Offices and Partners						✓
Support the federal oversight review process	●	❍			On-Going	✓
Assist the districts in ITS program management	●				On-Going	✓
Provide systems engineering and CEI services as requested by the districts	●	❍			FY 02/03 and beyond	✓
Provide support to other offices of FDOT such as Design, Construction, Maintenance, Transportation Statistics, and Public Transportation	●	❍			On-Going	✓
Coordinate state-level partners and stakeholders (other DOTs)	●	❍	❍		On-Going	✓
Perform plans and design verification reviews	●	❍			On-Going	
Assist in the resolution of construction and design issues	●	❍			On-Going	
Chair the statewide ITS Standards Conformance Committee and participate in standard conformance reviews on projects	●	❍			FY 02/03 and beyond	
Identify and resolve potential conflicts in the interpretation of ITS standards through enhancements and coordination with the districts	●	❍			On-Going	

Table 2.1 (Continued)

Strategies and Tactics	Responsibilities				Status	In Florida's *ITS Strategic Plan*
	FDOT CO	FDOT Districts	FHWA	Local Gov't		
Professional Capacity Building						✓
Identify training needs	●	❍			Complete	✓
Facilitate career growth and development within FDOT for ITS professionals	●	❍			On-Going	✓
Conduct training	●	❍			On-Going	✓
Support and attend national and regional conferences and expositions on ITS	◉	◉			On-Going	
Reward and recognize achievements of public and private sector personnel	◉	◉			On-Going	
Identify needs for applied research and development	◉	◉			On-Going	✓
Provide oversight for ITS research and development programs	●	❍			On-Going	✓
Participate in ITS America and exhibit at annual meetings from time to time	●	❍			On-Going	
Identify proof-of-concept or pilot projects for deployment based on successful research demonstrations	◉	◉	❍	❍	On-Going	
Promote an understanding of ITS benefits and technologies in other FDOT offices	◉	◉	◉	❍	On-Going	✓
Operations and Maintenance of ITS Deployments						✓
Operate ITS Deployments	❍	●			On-Going	✓
Maintain ITS Deployments	❍	●			On-Going	✓

● = Lead
❍ = Participate
◉ = Shared Responsibility

3. Organizational Structure

To support the coordinated deployment of ITS on a statewide basis, FDOT recently established an ITS Office. The mission of the ITS Office is to coordinate and promote the deployment of ITS and incident management activities conducted by FDOT. The Office was established as a result of a strategic planning process adopted by FDOT. Mr. Chester Chandler, P.E., was named the ITS Program Manager in July 2000 and a team was assembled. Four major program areas were developed in the ITS Office including the Telecommunications Program, ITS Architectures and Standards, ITS Program Management, and CVO/ETC. Two general consultant teams support these four program areas. This organization is presented in Figure 3.1.

In addition to the staffing chart identified in Figure 3.1, the ITS Office has also developed an organigram that illustrates the relationship between the ITS Office and various stakeholders involved in ITS deployments in Florida as shown in Figure 3.2.

Figure 3.1 – ITS Office Organization Chart

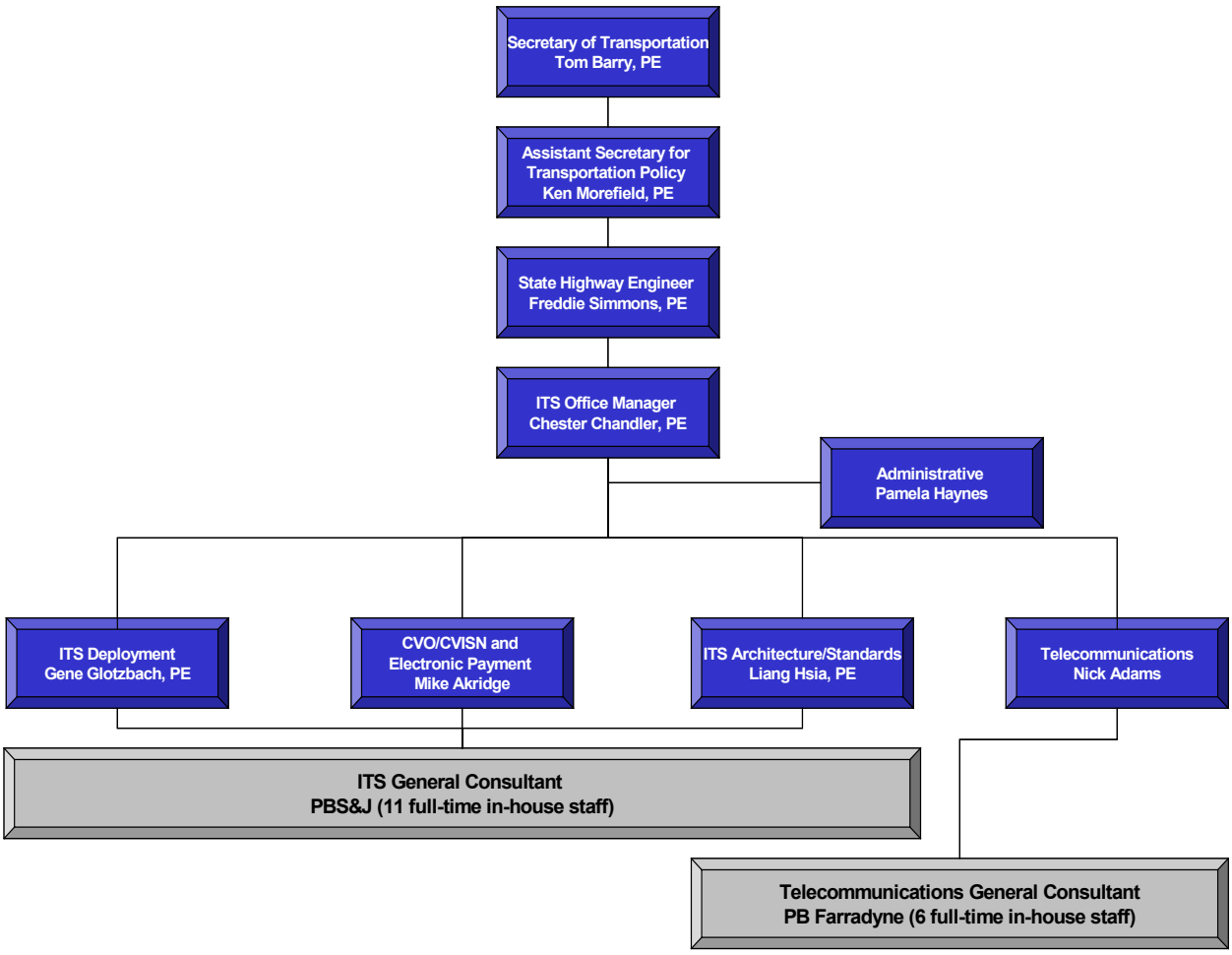
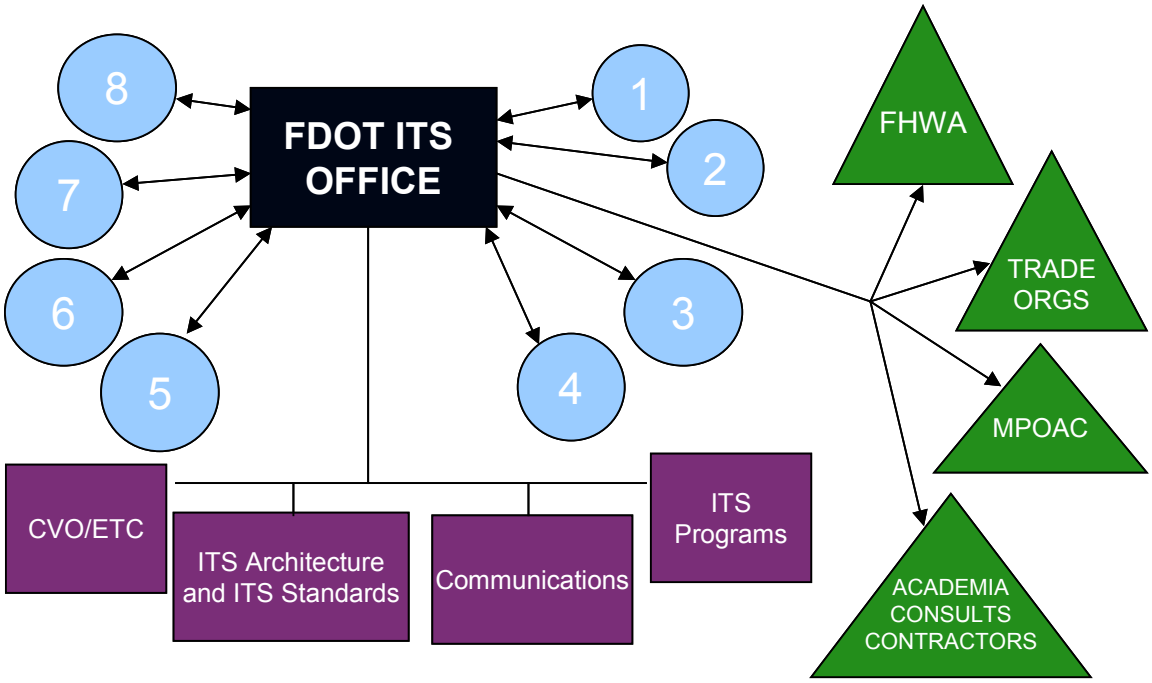


Figure 3.2 – ITS Office Organigram[3]



[3] This organigram is not intended to be limiting or all-inclusive but to provide an indication of the major relationships and stakeholders for which the ITS Office participates. The purple boxes indicate sections within the ITS Office, the blue circles indicate the district offices, and the green triangles indicate other agencies outside of FDOT.

4. Performance Measures and Benchmarks

The following summarizes the recommended ITS program performance measures. These measures reflect the desired outcomes (system performance from the users' perspective) and outputs (measures that the ITS Office has direct control over and that can influence the outcomes). Table 4.1 summarizes the relationship between each of these measures and the goals and objectives for the ITS deployments along the FIHS limited-access facilities.

4.1 Mobility- and Safety-Related Measures (Outcomes)

4.1.1 Derived from Goals and Objectives:

- Total delay in vehicle-minutes
- Predictability of travel times
- Reliability of travel times
- Accident rate per million VMT by severity type
- Queue length and frequency of queue formation annually
- Throughput in passenger car equivalents per lane per hour

4.1.2 Needed to Support National ITS Performance Measures' Objectives:

- Improvement in customer satisfaction
- Reduce travel costs (can be derived from delay)
- Reduce emissions (can be derived from delay)
- Reduce energy consumption (can be derived from delay)

The only additional performance measure that is not directly derived from the measures based on the goals and objectives statement is improvement in customer satisfaction. To implement this measure for ITS, it is recommended that the ITS Office evaluate the current customer satisfaction survey performed by FDOT to determine if additional items can be added that directly relate to customer satisfaction with ITS deployments. Such items may include satisfaction with traveler information services, service patrols, or incident response times.

4.2 Agency Performance Measures (Outputs)

- ATIS coverage
- Overweight vehicle enforcement coverage
- Incident management system (IMS) coverage
- Freeway management system (FMS) and IMS coverage of SULs
- Data collection system coverage
- Data collection system functionality
- Percent of ITS deployments with before and after studies
- Publish guidelines on how to mainstream ITS in transportation planning
- Branding of major services
- HAZMAT response team coverage
- Designation and signing of detour routes
- Continue research and development at existing or greater funding levels
- Publish statewide standards and specifications for ITS field devices and implement
- Publish statewide standards for TMC software and implement
- Publish a statewide communications architecture and implement
- Communications backbone coverage
- Publish standard operating procedures and implement
- Publish statewide information exchange network standards and criteria
- Publish performance measures and archive data requirements and implement
- Publish a *Systems Engineering Management Plan (SEMP)*
- Establish a statewide-managed funds program for ITS
- Implement ITS funding targets for FDOT
- Publish work program instructions
- Complete training program assessment and implement
- Percent of project costs funded (total cost) by other agencies through public-public partnerships
- Number of regions that implement regional operating organization (ROO) partnerships
- Percent of project costs funded (total cost) through public-private partnerships

Table 4.1 – Recommended *Ten-Year ITS Cost Feasible Plan* Performance Measures (Goal Area 1)

Goals and Objectives		Performance Measures	Benchmark (for 2012 unless otherwise noted)
1.	**Move People and Goods Safely**		
1.1	**Reduce accident rates.**		
1.1.1	Reduce accident rates caused by driver errors and the severity of accidents.[4]	Accident rate per million VMT annually.	Reduce accident rates by 15 percent where freeway and incident management systems are deployed and reduce the severity of accidents by 15 percent (a reduction of fatality and injury accident rate in proportion to the total rate)
1.1.2	Reduce accident rates and severities in construction work zones.	Accident rate per million VMT annually.	Reduce accident rates by 15 percent where smart work zone management systems are deployed
1.1.3	Reduce accident rates at highway-rail grade crossings.	Accident rate per million VMT annually.	Reduce accident rates by 15 percent where advanced highway-rail grade crossing systems are deployed.
1.2	**Reduce queuing on interstate mainlines.[5]**		
1.2.1	Reduce queues on limited-access roadways from highway-rail grade crossings.	Queue length (feet) on mainline and the frequency of queue formation (times per year)	Reduce queue length and frequency of queue formation by 15 percent where advanced highway-rail grade crossing systems are deployed.
1.2.2	Reduce queues at weigh and inspection stations along the corridors.	Queue length (feet) on mainline and the frequency of queue formation (times per year)	Reduce queue length and frequency of queue formation by 15 percent at weigh and inspection systems where electronic clearance and credentialing is deployed.
1.2.3	Reduce queues at intermodal facilities that impact corridor operations.	Queue length (feet) on mainline and the frequency of queue formation (times per year).	Reduce queue length and frequency of queue formation by 15 percent at intermodal facilities where inspection systems, electronic clearance, and credentialing are deployed.
1.3	**Improve the safety of commercial vehicle operators in rest areas.**	The number of crimes against commercial vehicle operators in rest areas.	Reduce the number of crimes committed against commercial vehicle operators where surveillance and public safety systems are deployed.
1.4	**Provide evacuation coordination services and emergency management.**		
1.4.1	Provide pre-trip planning information for evacuation coordination.	ATIS coverage.	Dissemination of pre-trip traveler information for evacuations through ISPs to Florida coastal counties.
1.4.2	Provide traffic management during evacuation conditions.	Traffic management services coverage during evacuations.	Management of Traffic information on Florida's five principal FIHS corridors for evacuations.
1.4.3	Manage demand through communication with shelters and other safe harbors.	Communication links to county emergency management centers (EMCs) and shelter management personnel.	Provide communication links from all RTMCs to county emergency operation centers and shelter management personnel and provide shelter information in statewide 511 services.
1.4.4	Provide route guidance information and information on traffic/travel conditions and weather including winds, rainfalls, and storm surges.	Route guidance coverage.	Provide route guidance information during evacuations on Florida's five principal FIHS corridors for evacuations.
1.4.5	Support remote configuration management of highways during evacuation conditions or other emergencies.	Remote configuration deployment coverage.	Provide remote configuration technology deployments along all candidate corridors for contra-flow operations during evacuations.
1.4.6	Provide accurate and timely traveler information regarding incidents on evacuation routes and updated weather information.	ATIS coverage.	Provide ATIS coverage along Florida's five principal FIHS corridors.
1.4.7	Share emergency information among local and RTMCs and emergency management facilities.	Communication links to county EMCs and shelter management personnel.	Provide a communications link from all RTMCs and links to local county emergency operation centers and shelter management personnel and provide shelter information in statewide 511 services.
1.4.8	Detect, verify, respond to, and clear incidents and manage traffic around accidents, emergencies, and other incidents	Incident response and clearance times.	Minimize the incident response and clearance times during evacuation conditions.
1.4.9	Support infrastructure security through surveillance at critical structures and interchanges.	Percent of critical structures, interchanges with surveillance, and at RTMCs.	Provide coverage at 75 percent of critical structures on limited-access facilities and at 100 percent of RTMCs.

[4] The severity of accidents is commonly divided into three strata: accidents involving fatalities, accidents involving injuries (but no fatalities), and accidents involving property damage only.

[5] This objective is intended to promote measures that reduce the queuing that forms on mainlines from surface street elements formed by exiting vehicles.

Table 4.1 – Recommended *Ten-Year ITS Cost Feasible Plan* Performance Measures (Goal Area 2)

Goals and Objectives		Performance Measures	Benchmark (for 2012 unless otherwise noted)
2.	**Preserve and Manage the System**		
2.1	**Enhance mobility and efficiency.**		
2.1.1	Improve travel times along the corridors.	Total delay in vehicle-minutes.	Reduce delays by 15 percent where freeway and incident management services are deployed.
2.1.2	Improve predictability and reliability of travel times.	Predictability of travel times in minutes.	Provide travel time prediction models for ATIS capable of predicting actual travel times within 5 percent of trip duration for 95 percent of all trips along the five principal FIHS corridors.
		Reliability of travel times measured as the percent of trips that are achieved less than the predicted travel time plus a 20 percent margin.	Operate and manage the system to provide at least 85 percent reliability for a 20 percent margin of trip travel time along the five principal FIHS corridors.
2.1.3	Reduce accidents and other incidents during normal flows that result from congestion and delays that are caused by "rubber-necking" during incidents.	Accident rate per million VMT annually.	Reduce accident rates by 15 percent where freeway and incident management services are deployed.
2.1.4	Reduce congestion-related delays by reducing queues and spillback from other facilities.	Queue length (feet) on mainline and the frequency of queue formation (times per year).	Reduce queue length and frequency of queue formation at ramp interchanges where ramp metering and surface street control is deployed.
2.1.5	Reduce delays caused by congestion in construction work zones.	Total delay in vehicle-minutes.	Reduce delay by 15 percent where smart work zone management systems are deployed.
2.1.6	Manage traffic accessing these major corridors at interchanges to improve mainline throughput and traffic flow.	Total delay in vehicle-minutes	Reduce delays by 15 percent where freeway and incident management services are deployed.
		Throughput in passenger car equivalents per lane per hour.	Increase throughput in interchange areas by 10 percent where freeway and incident management services are deployed.
2.1.7	Reduce unnecessary delays at tollbooths	Total delay in vehicle-minutes.	Reduce delay at tollbooths by 10 percent where electronic payment services are deployed.
2.1.8	Reduce unnecessary delays at the gates of intermodal facilities.	Total delay in vehicle-minutes.	Reduce delay at intermodal terminals by 10 percent where electronic clearance and credentialing services are deployed.
2.1.9	Provide traveler information services with route and mode choice information.	Advanced traveler information service coverage.	Provide advanced traveler information services along Florida's five principal FIHS corridors.
2.2	**System Preservation**		
2.2.1	Improve enforcement of illegally overweight vehicles.	Overweight enforcement coverage.	Increase the use of portable overweight vehicle enforcement technologies such as seismic weigh-in-motion (WIM).
2.3	**Incident Management**		
2.3.1	Improve abilities to detect, verify, respond to, and clear incidents.	Incident management service coverage.	Provide incident management services on at least 85 percent of Florida's five principal FIHS corridors in urbanized areas and at high accident locations in other areas.
		Road Rangers Service Patrol coverage.	Provide incident management services on at least 85 percent of Florida's five principal FIHS corridors in urbanized areas and at high accident locations in other areas.
2.3.2	Improve incident-related traveler information.	ATIS coverage.[6]	Provide advanced traveler information services along Florida's five principal FIHS corridors.
2.3.2.1	Predict delays and clearance times.	Predictability of travel times in minutes.	Provide travel time prediction models for ATIS capable of predicting actual travel times within 5 percent of trip duration of 95 percent of all trips along the five principal FIHS corridors.
2.4	**Manage SULs**	Freeway and IMS coverage of special-use lanes.	Provide incident management services on at least 85 percent of special-use lanes along Florida's five principal FIHS corridors in urbanized areas and at high accident locations in other areas.
2.5	**Provide Data Archiving and Warehousing**		
2.5.1	System evaluation and alternative analysis.	Data collection system spatial coverage.	Provide data collection system coverage for all freeway and IMS's deployed.
2.5.2	Support and supplement other statewide data collection programs.	Data collection system functionality.	Document requirements and provide archived data to other statewide data collection programs.
2.5.3	Support highway operational performance reporting, modeling simulation, and other techniques for operations and management of the system.	Data collection system functionality.	Document requirements and provide archived data to highway operational performance reporting, et. al.
2.5.4	Providing before and after studies for ITS deployments	Percent of ITS deployments with before and after data.	Implement before and after studies to document benefits of statewide ITS deployments for at least 10 percent of all deployments.

[6] Implementation of ATIS requires instrumentation of our highways to provide accurate and reliable travel times in near real-time.

Table 4.1 – Recommended *Ten-Year ITS Cost Feasible Plan* Performance Measures (Goal Areas 3 & 4)

Goals and Objectives		Performance Measures	Benchmark (for 2012 unless otherwise noted)
3.	**Enhance Economic Competitiveness**		
3.1	**Ensure efficient landside access to intermodal, port, airport, and truck terminal facilities.**	See items 1.1.3, 1.2.1, 1.2.2, 1.2.3, 2.1.8, and 2.2.1.	See items 1.1.3, 1.2.1, 1.2.2, 1.2.3, 1.2.8, and 2.2.1.
3.2	**Ensure efficient intermodal transfer of people and goods.**	See items 1.1.3, 1.2.1, 1.2.2, 1.2.3, 2.1.8, and 2.2.1.	See items 1.1.3, 1.2.1, 1.2.2, 1.2.3, 2.1.8, and 2.2.1
3.3	**Promote safe and efficient access of vehicles to markets.**	See all above.[7]	See all above.
3.4	**Expedite permitting and clearance of commercial vehicles at weigh and agricultural inspection sites to keep commerce moving.**	See items 1.1.3, 1.2.1, 1.2.2, 1.2.3, 2.1.8, and 2.2.1.	See items 1.1.3, 1.2.1, 1.2.2, 1.2.3, 2.1.8, and 2.2.1.
3.5	**Ensure efficient access to major activity centers such as tourist attractions, state parks, and other areas of interest.**	See all above.	See all above.
3.6	**Provide safe and efficient tourist travel and reduce VMT through the provision of accurate and timely traveler information.**	See items 1.4.1, 1.4.6, 2.1.9, and 2.3.2.	See items 1.4.1, 1.4.6, 2.1.9, and 2.3.2.
3.7	**Support designation of corridors as strategic intermodal corridors and funding for ITS deployments.**	See item 2.5.	See item 2.5.
4.	**Enhance Quality of Life and the Environment**		
4.1	**Provide efficient statewide ITS services with autonomy for decision-making to support local needs and regional cooperation to promote efficiency and support regional and statewide goals.**	See all above.	See all above.
4.2	**Improve interoperability of ITS services through the development of statewide uniform device standards and specifications.**	See Goal Area 5.	See Goal Area 5.
4.3	**Support integration of ITS into local planning processes, programs, and capacity projects.**	Publish guidelines on how to mainstream ITS in transportation planning.	Complete *Rule 940 Implementation Plan* by the end of 2002 and provide regular support of metropolitan planning organizations (MPO's) on ITS planning integration.
4.4	**Provide name recognition of key ITS-related services through branding that will instill trust and confidence in traveler information services, roadside assistance, electronic payment services, and other strategic services.**	Branding of major services.	Adopt statewide brands for (1) traveler information services, (2) roadside assistance and (3) electronic payment services by the end of 2001 and others as needed.
4.5	**Provide easy access and data mining capabilities for transportation planning and design for all partners to support decision-making.**	See item 2.5.	See item 2.5.
4.6	**Provide accurate real-time data to technology, business, and operational users for effective and responsive transportation operations.**	See item 2.5.	See item 2.5.
4.7	**Reduce air-quality emissions from mobile sources.**	See items 2.1.1, 2.1.5, 2.1.6, 2.1.7, 2.1.8, and 2.4.	See items 2.1.1, 2.1.5, 2.1.6, 2.1.7, 2.1.8, and 2.4.
4.8	**Reduce the potential for impacts from HAZMAT incidents.**	See items 1.1.1, 1.1.2, and 1.1.3.	See items 1.1.1, 1.1.2, and 1.1.3.
4.8.1	Improve HAZMAT response systems.	HAZMAT response system coverage.	Provide HAZMAT response coverage on 85 percent of Florida's principal FIHS corridors in urbanized areas and at high-accident locations in other areas.
4.8.2	Improve the availability of traveler, weather, and shelter information during man-made and natural disasters.	See items 1.4.1 and 1.4.6.	See items 1.4.1 and 1.4.6.
4.8.3	Provide safe routes for HAZMAT that avoid densely populated areas.	Designation and signing of detour routes.	Designate and sign detour routes for Florida's five principal FIHS corridors.

[7] All of the measures identified for ITS support this objective.

Table 4.1 – Recommended *Ten-Year ITS Cost Feasible Plan* Performance Measures (Goal Area 5)

Goals and Objectives		Performance Measures	Benchmark (for 2012 unless otherwise noted)
5.	**Deploy an Integrated, Effective System**		
5.1	**Provide research and development for technologies to support deployments.**	Continue research and development at existing or greater funding levels.	Promote continued research and development of emerging technologies and activities to support deployments.
5.2	**Develop statewide standards and specifications for ITS field devices.**	Publish statewide standards and specifications for ITS field devices and implement.	Complete by end of 2001.
5.3	**Develop statewide standards for TMC software.**	Publish statewide standards for TMC software.	Complete by end of 2001.
5.4	**Develop a communications architecture and backbone for statewide deployment.**	Publish statewide communication architecture and implement.	Complete by end of 2001.
		Communication backbone coverage.	Pursue private partnerships to advance deployment of statewide communication backbone to achieve 50 percent coverage of the five principal FIHS corridors.
5.5	**Develop standard procedures for operations and management.**	Publish standard operation procedures.	Complete by end of 2002.
5.6	**Develop statewide information exchange network standards and criteria.**	Publish statewide information exchange network standards and criteria and implement.	Complete by end of 2002.
5.7	**Brand all critical statewide services such as traveler information, interactive voice response (IVR) systems (511 or 1-800), RR Service Patrols, *SunPass*®, Pre-Pass, etc.**	Brand all critical statewide services such as traveler information, IVR systems (511 or 1-800), Road Rangers, ***SunPass***®, Pre-Pass, etc.	Complete by end of 2001.
5.8	**Standardize performance measures and archive data to produce a history of trends and establish benchmarks.**	Publish performance measures and archive data requirements and implement.	Complete by end of 2002.
5.9	**Develop statewide procurement guidelines.**	Publish procurement guidelines and implement.	Complete by end of 2002.
5.10	**Develop a statewide systems engineering process for design, integration, and testing that includes regular updates and enhancements of statewide architecture.**	Publish SEMP.	Complete by end of 2002.
5.11	**Develop statewide procurement contracts to leverage economies of scale.**	Develop statewide procurement contracts.	Complete by end of 2002.
5.12	**Develop an ITS asset management program to track and program replacement parts, migrate legacy systems, and manage the life-cycle of deployment.**	Deploy asset management program.	Complete by end of 2002.
5.13	**Establish a statewide-managed funding program for ITS with project decision recommendations made by the ITS Office.**	Establish statewide-managed funds program.	Complete by end of 2001.
5.14	**Dedicate a percentage of all FDOT funds, statewide-managed and district-allocated, for operations, management, and ITS deployment.**	Implement ITS funding targets for FDOT.	Complete by end of 2002.
5.15	**Update work program instructions to develop traceability with the *Statewide ITS Architecture (SITSA)*.**	Publish work program instruction changes.	Complete by end of 2002.
5.16	**Increase the professional capacity of the public and private sectors in Florida to support planned deployments.**	Publish training needs assessment and implement.	Complete training needs assessment by end of 2001 and implement structured training program by 2003.
5.17	**Promote public-public partnerships to leverage financial and human resources.**	Percent of project costs funded (total cost) by other agencies through public-public partnerships.	One percent of total project costs funded through partnerships on FIHS limited-access facilities.
		Number of regions that implement regional operating organization (ROOs) partnerships.	Establishment of ROO in Orlando, Miami, Jacksonville, and Tampa.
5.18	**Promote public-private partnerships to leverage financial and human resources.**	Percent of project costs funded (total cost) through public-private partnerships.	One percent of total project costs funded through partnerships on FIHS limited-access facilities.

5. Financial and Commercial Analysis

FDOT is a trust funded state agency. That means that funds for FDOT's programs are provided primarily from state fuel taxes, motor vehicle fees, and federal apportionments/grants that are deposited into the State Transportation Trust Fund. Turnpike projects are funded by toll collections, concession revenues, and bond revenue proceeds. State law requires FDOT to develop a Five-Year Work Program that is FDOT's commitment to the public to build specific projects during that time period. Most of FDOT's funds are spent on projects in the work program.

There are many possible approaches to funding ITS projects, including most federal aid categories, state funds, local funds, and public/private partnerships. However, the *ITS Business Plan* is focused on the use of FDOT's statewide-managed funds for the ITS Program. These statewide-managed funds include funding from a number of federal and state funding sources.

The most common funding source for ITS deployment is federal transportation funds. System operations and maintenance costs are eligible and should be estimated in a manner that allows agencies to take full opportunity in securing federal Surface Transportation Program (STP), National Highway System (NHS), Inter-Modal (IM), and Congestion Mitigation Air Quality (CMAQ) funds.

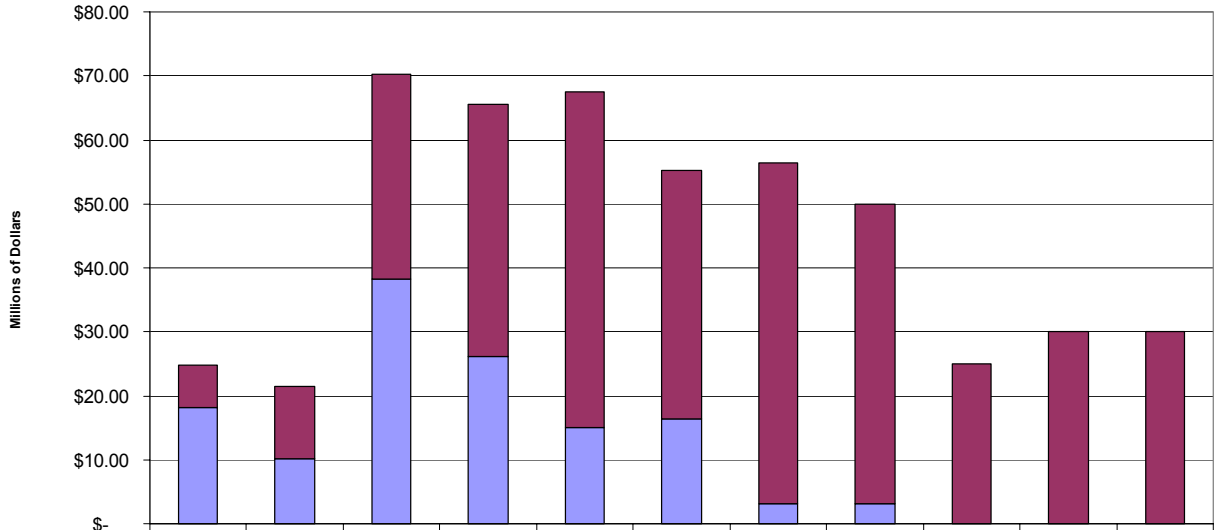
Innovative funding sources should be explored within statutory constraints to supplement available federal and state funds. These potential funding sources could include public/private partnerships, resource sharing with public agencies both within and external to FDOT, and revenue opportunities. Examples of additional revenue opportunities include revenue from ISPs and the leasing of telecommunications capacity.

5.1 ITS Statewide-Managed Funds

In July 2000, the FDOT Secretary of Transportation established an ITS Office and dedicated funds for ITS deployments along the FIHS limited-access corridors. This program has now been allocated $496 million dollars through fiscal year 2012. Table 5.1 shows the anticipated funding levels for this program by year.

The remainder of this section outlines the proposed work program instructions needed to support the programming of funds using the ITS Program, identified as ITSS in the Work Program Administration. Two options are provided for the tracking of ITS expenditures by work program mix. The first uses existing codes and the second identifies a new set of work mix codes that relate ITS deployments to the market package bundles identified in the *SITSA*.

Table 5.1 – ITS Program Statewide-Managed Funds



	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
Available	$6.59	$11.24	$31.98	$39.52	$52.40	$38.94	$53.20	$46.80	$25.00	$30.00	$30.00
Committed	$18.21	$10.16	$38.32	$26.08	$15.10	$16.36	$3.10	$3.20	$-	$-	$-

5.1.1 Definition of ITS

ITS are the application of information systems and communications technologies to serve transportation. ITS projects address the needs of commuters, commercial vehicle operators, tourists and evacuees.

5.1.2 ITS Office

To support the coordinated deployment of ITS on a statewide basis, FDOT established an ITS Office in July 2000. The mission of the ITS Office is to coordinate and promote the deployment of ITS and incident management activities conducted by FDOT. Four major program areas were established in the ITS Office, including the:

- Telecommunications Program;
- ITS Architectures and Standards Program;
- ITS Program Management; and
- CVO/ETC Program

The major initiatives being undertaken by ITS Office are:

- Guide the deployment of a communications backbone to serve ITS on major transportation corridors throughout the state;
- Adopt a corridor approach to the implementation for the FIHS limited-access corridors and develop conceptual systems engineering solutions for these corridors to support procurement and deployment of ITS services;
- Establish statewide standards and specifications for ITS which include the resolution of disparate TMC software;
- Support the deployment of a statewide central data warehouse to support ATIS;
- Support the deployment of information and communications technologies to serve commercial vehicles and promote EPS;
- Provide technical support and assistance to FDOT's district offices and other partners; and
- Support ITS professional capacity building to provide a qualified work force in support of ITS deployments.

FDOT has set aside funding to support ITS deployments on the FIHS limited-access facilities. A *Ten-Year ITS Cost Feasible Plan* was completed in the Spring of 2002 that summarizes the ITS needs and priorities along these corridors. This *Ten-Year ITS Cost Feasible Plan* was developed through completion of *ITS Master Plans* along the five major FIHS limited-access corridors: I-4, I-10, I-75, I-95, and Florida's Turnpike, ATIS, communications system needs, and CVO. These *ITS Master Plans* were completed in accordance with FHWA's *Rule 940, Intelligent Transportation Systems (ITS) Architecture and Standards,* and the *NITSA*.

5.1.3 Eligibility for ITS Program Funds

Projects eligible for ITS Program funds include: constructing ITS infrastructures, installing ITS devices, acquisition of software, construction of TMCs, deployment of information systems to support advanced traveler and commercial vehicle information systems and networks, construction of communications infrastructures, RR Service Patrols' start-up activities, systems engineering, ITS architecture, construction inspection, testing and acceptance activities, and evaluations of ITS deployments.

Projects are determined to be eligible for funding under this statewide program based on the following conditions:

- The project is located on an FIHS limited-access route. First priority will be given to projects located along the five principal FIHS corridors – I-4, I-10, I-75, I-95, and Florida's Turnpike.

- The project must lead to a permanent installation of ITS field devices and communications systems. Portable deployments that involve leased equipment are not eligible.

- Routine operations and management activities, including replacement costs for permanent installations of field devices, are not eligible.

- The project must be contained with the *Ten-Year ITS Cost Feasible Plan* and identified as a district and statewide priority.

- The project must satisfy the *SITSA,* corridor architectures, and *ITS Corridor Master Plans* developed for the FIHS limited-access corridors.

- The project must be developed consistently with FDOT's *Systems Engineering Management Plan (SEMP) for ITS Deployments along the FIHS Limited-Access Corridors* and FHWA's *Rule 940*.

- The project must conform to all applicable federal and state standards.

- The project must demonstrate a strong commitment to cooperation with corridor stakeholders and any institutional/operational agreements required for the project must be in place prior to procurement.

- The project must be supported by an operation and management plan and funding for operation and management (from other sources) to ensure the deployment is sustainable. Funding for the operations and maintenance of ITS deployments is available through two funding streams. FDOT's maintenance program is typically used for preventative and responsive maintenance as outlined in *Technical Memorandum No. 4.1 – Concept of Operations*. The maintenance program may also be used to support operations by the transfer of staff positions. Work program projects for the acquisition of consultant services may be used in lieu of FDOT's internal resources. Maintenance may be included in general district-wide maintenance contracts or as a specific project. Operations may be funded as a contract operation.

All requests for participation in the ITS program shall be coordinated through the ITS Office as follows:

Chester Chandler, P.E.
ITS Office Manager
Florida Department of Transportation
605 Suwannee Street, MS 90
Tallahassee, Florida 32399-0450
(850) 410-5600
(850) 414-8673 fax

Technical Guidelines for Participation:

(a) Refer to *Impacts of Other Management Reports/System, Section 2, Work Program Instructions,* for guidance on the item segment definition programming conventions which will adequately and reliably define ITS projects and programs for mapping and reporting. ITS projects must be programmed on a specific highway (system 01-07) or PTO system (08-11) transportation system. RTMCs should be programmed as non-system specific improvements (13).

(b) Use of an applicable phase group and corresponding program number is required.

(c) Standalone ITS projects must be programmed using one of the following work mixes based on the market package bundles defined in the *NITSA*:

Option 1 – Use Existing Work Mixes where Available (name of existing mix)

0750	ITS Communications Systems
0717	Arterial Traffic Management Systems/Traffic Signal System
9983	Electronic Tolls (corridor improvement)
6060	IMS and RR Service Patrols (routine maintenance)
0767	Advanced Railroad Grade Crossing Systems
0206	Advanced Parking Management Systems (parking facility)
0716	Motorist Aid Call Boxes (traffic control)
8064	Advanced Public Transportation Systems (APTS)
0754	ATIS (ITS information systems)
0758	CVISN and Commercial Vehicle Information Exchange Window (CVIEW)
0112	WIM
0759	Emergency Management
8530	ITS Archived Data Systems
	ITS Maintenance and Construction Operations (included in construction mix)
9928	ITS Training
9950	ITS Research

XXX Proposed new

Option 2 – New Mix for all ITS Areas

0800-0809 Reserved for ITS Communications Systems
- 0802 Wireless ITS Communications Systems
- 0804 Wireline ITS Communications Systems
- 0806 Fiber Optic Communications System

0810-0819 Reserved for Advanced Traffic Management
- 0811 Arterial Traffic Management Systems/Traffic Signal Systems
- 0812 Freeway Traffic Management System
- 0813 Electronic Tolls
- 0814 IMS and RR Service Patrols
- 0815 Advanced Railroad Grade Crossing Systems
- 0816 Advanced Parking Management Systems
- 0817 Motorist Aid Call Boxes

0820-0824 Reserved for APTS
- 0824 APTS

0825-0829 Reserved for ATIS
- 0825 ATIS

0830-0835 Reserved for CVO
- 0830 CVISN and CVIEW
- 0112 WIM

0836-0839 Reserved for Emergency Management
- 0836 Emergency Management

0840-0845 Reserved for ITS Archived Data Systems
- 0840 ITS Archived Data Systems

0846-0849 Reserved for ITS Maintenance and Construction Operations

0850-0855 Reserved for ITS Training and Research
- 0850 ITS Training
- 0852 ITS Research

0856-0859 Reserved for RTMCs
- 0856 TMCs (Facilities)
- 0858 TMCs (Systems)

When ITS projects are funded as part of a larger construction project, the appropriate ITS work mix should be identified as a minor work type.

(d) ITS work funded with the ITS Program will be identified by a specific item group identifier (ITSS).

(e) The districts may use district-allocated funds to support or deploy any ITS project or program.

(f) As required for other statewide-managed programs, the district must notify the Statewide Programs Manager in the Program Development Office and request additional funding before adjustments can be made to ITS Program projects programmed in their district. When districts request increased funding for estimated increases or changes in the scope of work, etc., on projects that are funded with statewide funds, they should submit an e-mail to the Statewide Programs Manager who will accommodate the need from the statewide reserve box, if funding is available. Such requests should include the item number; the fund/budget amount needed; the type of fund required; the phase; the associated program number, and an explanation for the fund/budget increase. When additional statewide funds are approved and transferred to the districts, the districts are responsible for initiating budget allotment transfers requesting the budget to support the funds transferred from the statewide reserve box.

(g) When cost estimates on ITS projects' phases decrease as a result of lower bids, the district will box the amount for contingency in the future. The Statewide Programs Manager may request the district to transfer funds and budget made available from the estimate decrease to statewide reserve to meet statewide ITS Program priorities.

(h) Any available statewide or district allocated fund may be programmed on ITS projects, unless specifically prohibited by FDOT or FHWA procedure.

5.1.4 Ten-Year ITS Cost Feasible Plan

The *Ten-Year ITS Cost Feasible Plan* consists of the ITS projects located on the FIHS limited-access facilities' current Adopted Five-Year Work Program plus five additional years of ITS projects defined in the Work Program Administration. With the development of the Tentative Work Program, the sixth year of the previous years' *Ten-Year ITS Cost Feasible Plan* becomes the new fifth year of the Tentative Work Program. The annual update of the *Ten-Year ITS Cost Feasible Plan* will be to develop a new tenth year for the *Plan*.

The projects added to the new tenth year of the plan will be selected by the ITS Office from *the Technical Memorandum No. 2 – ITS Needs Model*. Candidate projects will be mapped and summarized in a table format and distributed to the districts for review. At this time, the districts and ITS Office may consider changes to the priority, costs estimates, or schedules for projects in the *Plan*. Following review by the districts and by the Assistant Secretary for Policy and Programs, the new tenth year will be added to the plan. The *Ten-Year ITS Cost Feasible Plan*

will also be updated to reflect expenditure of district allocated funds on the FIHS limited-access facilities in the Adopted Work Program or projects identified by other sources, such as expressway authorities. Following this review, the Statewide Programs Manager and Program Development Office will finalize statewide balancing actions consistent with guidance from the Assistant Secretary using a process similar to the FIHS Interstate Program. A final *Ten-Year ITS Cost Feasible Plan* will then be published by the ITS Office.

5.1.5 Turnpike

Although funding of ITS projects on the Turnpike will be made using only Turnpike funds, these projects shall be programmed in accordance with the *Ten-Year ITS Cost Feasible Plan* for consistency with FDOT policy and standards. Turnpike projects will be reported in the *Ten-Year ITS Cost Feasible Plan* for statewide tracking of ITS deployments.

5.1.6 Expressway Authorities

Although funding of ITS projects on expressway facilities will be made using only expressway funds, these projects will be reported in the *Ten-Year ITS Cost Feasible Plan* for statewide tracking of ITS deployments.

5.1.7 Other FIHS Arterial Routes

ITS projects on the arterial portion of the FIHS will be funded using district-allocated funds. Integration of arterial traffic management systems and FMS will be considered for ITS Program funds on a case-by-case basis with approval of the Statewide Programs Manager and Assistant Secretary for Policy and Programs.

5.1.8 Operations and Maintenance Costs

The *Ten-Year ITS Cost Feasible Plan* contains an estimate of the operations and maintenance costs required to support the deployments funded. Operations and maintenance costs are to be funded through the district maintenance programs.

Additional instructions on how to program these funds are being prepared by the Traffic Operations Office and maintenance engineers. A reference to these instructions will be added.

Other issues that have been asked and may be covered under separate instructions include:

- Phase ID for the use of systems manager contracts;
- Phase ID for design/build ITS projects;
- Phase ID for construction incentives in ITS projects; and
- Phase ID for software/information systems acquisition and operations.

5.2 District-Allocated Funding Programs

The FDOT district offices are also active in the funding of ITS deployments and the operations and management of the systems. Projects to be funded by the districts may be funded independently or combined with other capacity improvements. This *ITS Business Plan* does not address the funding or eligibility of projects under the district programs.

5.3 Federal Funding Programs Under TEA-21

On June 9, 1998, the Transportation Equity Act for the 21st Century (TEA-21) was signed into law, thereby authorizing the federal STP until 2003. The total funding is $217.5 billion over six years. Florida's portion totals $1.2 billion per year for six years. The provisions of TEA-21 are very similar to the previous bill, Intermodal Surface Transportation Efficiency Act (ISTEA). On October 21, 1998, the Omnibus' spending bill, which included the FY '99 transportation appropriations, was signed into law. The total amount appropriated for FY '99 is $26.7 billion. Florida's portion totals $1.2 billion for FY '99.

5.3.1 ITS Program

TEA-21 reauthorizes the federal ITS Program administered by the FHWA. The bill provides overall funding for national ITS at $1.28 billion from 1998 to 2003. There are two broad categories: 1) ITS standards, research, and operational tests funded at $95 to $110 million per year; and 2) ITS deployments funded at $101 to $122 million per year.

The deployment incentives program will focus on projects of three types:

- Integration of ITS infrastructures in metropolitan areas deployed using other funds;
- Development of ITS infrastructures in rural areas; and
- Development of CVO infrastructures.

Agencies applying for these funds must submit an analysis of the operations and maintenance life-cycle costs and a multi-year financing and operations plan for consideration by FHWA.

Florida received several earmarks for specified projects in TEA-21: $1 million each for Dade and Volusia counties, $1.5 million for ITS improvements on U.S. 19 in Pasco County, and $750,000 for the I-275 advanced traffic management system (ATMS) in Pinellas County. Other demonstration projects in Florida include: ITS for bridge crossings in Duval County and a cooperatively deployed fiber optic network in Bay County to support education and transportation needs.

5.3.2 Federal Aid Highway Program

The Federal Aid Highway Program is the primary mechanism used by Congress to finance surface transportation in the United States. The first Federal Aid Highway Act was passed in 1916 when Congress provided direct aid to states in the form of matching money to construct post roads.

The 1916 bill provided the same federal-state matching partnership that exists today. Funds to support these programs are derived from the collection of user fees at a federal level. These funds are in turn apportioned to states for the purpose of planning, design, and construction of roadway facilities. This partnership between the federal and state governments has historically proven to be very effective. Programs under TEA-21 that fund the deployment of ITS technologies to support incident management activities include the:

- NHS;
- STP; and
- CMAQ.

5.3.3 National Highway System (NHS)

The NHS focuses federal resources on projects that are most important to interstate travel and national defense, roads that connect with other modes of transportation, and roads essential for international commerce. These roads are collectively referred to as federal aid roads, or the NHS.

Previously, this Act limited the time period that funds could be used for start-up costs for traffic management and control to two years. ISTEA and TEA-21 both eliminate the two-year limitation on reimbursement of start-up and operating costs for traffic management and control. Also "infrastructure-based intelligent system capital improvements" are added as eligible projects for NHS funding. Additionally, as now defined in 23 U.S.C. 103(b)(6), the term “operating costs for traffic monitoring, management, and control” includes:

- Labor costs;
- Administrative costs;
- Cost of utilities and rent; and
- Other costs associated with the continuous operation of traffic control, such as integrated traffic control centers.

Operating expenses can also include costs incurred for hardware and software system upgrades and system maintenance activities to assure peak performance of installed systems. Replacement of defective or damaged computer components and other traffic management system hardware, including street-side hardware, is considered eligible as well. However, these funds are still restricted from being used for maintenance activities.

5.3.4 Surface Transportation Program (STP)

The STP is a block-grant type program that may be used by states and localities for any roads (including NHS) that are functionally classified as local or rural minor collectors or above. Once funds have been allocated by the states, each state must set aside ten percent of the funds for safety construction activities and ten percent of the funds for transportation enhancements. As under the NHS program, "infrastructure-based intelligent system capital improvements" are added as eligible projects in STP. STP funds can be used indefinitely for capital and operating costs for traffic monitoring, management, and control facilities. As with NHS funds, STP funds cannot be used for maintenance activities. Other funding sources may also augment STP funds.

Florida's STP funding for FY ’99 was $328.6 million. Additionally, Florida receives $217.3 million from the minimum guarantee program that is added to the STP funds.

5.3.5 Congestion Mitigation and Air Quality (CMAQ) Program

The CMAQ directs funds towards transportation projects in Clean-Air Act non-attainment areas for ozone and carbon monoxide. Both traffic management and congestion management strategies are eligible for CMAQ funding if they can prove that they improve air quality.

CMAQ guidance issued on July 13, 1995, and continued in TEA-21 provides that operating expenses for traffic monitoring, management, or control are eligible for CMAQ funding under the following conditions:

- Projects must be proven to have beneficial air quality benefits;
- Expenses for the project are incurred by new or additional services; and
- Previous funding mechanisms, such as fees for services, are not displaced.

Operating expenses are eligible under the CMAQ program for a period of three years from the start of the additional service. Operating expenses of traffic management and control services are eligible under NHS and STP with no time limits. TEA-21 permits the transfer of CMAQ funds to other funding sources including NHS and STP if additional operating expenses are required to operate a traffic management system. If a state does not have non-attainment areas, the funds may be used as if they are STP funds. CMAQ funds are also restricted from being used for maintenance activities.

5.3.6 Federal Transit Administration (FTA) Funding

The Federal Transit Administration (FTA) provides funding in regular appropriations and special earmarks that may include funding for various intelligent technologies. Many of the transit technologies not only provide funding support to transit services but also can support other needs such as traveler information systems, electronic fare systems, automated vehicle location (AVL) and surveillance, and traffic control monitoring information, communications systems, computer assistance needs, and other functions. FTA funding is generally available for capital acquisition but can, in some instances, cover operational and maintenance expenses.

5.4 Other State and Local Funding Sources

Several mechanisms are available to fund the deployment and operation of ITS. These funding programs are typically used for matching federal funds but could be used to fund the construction of projects in their entirety. The largest source of state-generated revenue for transportation comes from fuel taxes that are deposited in the State Transportation Trust Fund.

State statutes require that 15 percent of the funds deposited in the Trust Fund be used for public transportation programs. Many of the transit ITS applications implemented locally are funded in part with state transit funding. Some of the programs will only provide funding for up to three years while other programs may be available longer. State transit funding can be applied to both capital acquisition and operating and maintenance expenses, depending on the specific program. Many of these technologies support other activities and ITS applications in a manner similar to the FTA funding described above.

5.5 Private Sector Funding

The basic mechanism available to fund the deployment and operation of ITS involving the private sector is traveler information. Opportunities exist for public/private partnerships with ISPs to provide traveler information services.

The treatment of ISPs is therefore a key element in both the architecture design and implementation. ISPs are considered to be the information bundler for the various ITS information sources. While either the public sector or the private sector can fulfill the function of the ISP, clearly a strong role is envisioned for the private sector. Various forms of public/private partnerships can serve as a bridge to encourage private sector participation in early deployments and testing.

Private ISPs may be key players in potential public/private partnerships to deliver traveler information. They take many forms. In the Orlando area, newspapers and television stations are currently providing information via the Internet, on movies, during special events, with weather information, etc. Other ISPs, such as the cable companies, provide both information content as well as Internet infrastructure and access.

6. Relationship to Operations and Management

Although the ITS Office does not have primary responsibility for the operations and management of the ITS deployments, to ensure the ITS deployments are sustainable, the deployment plans must consider the requirements for operations and management. Currently, the districts have primary responsibility, coordinated by the Traffic Operations Center.

6.1 Operations

Staffing is important to ITS in order to achieve the full potential of the system. In essence, a good system plus good people equal good operations. To attain full system potential, agencies should consider the operations staff as much a part of the system as the hardware and software itself. They should also consider using a Memorandum of Understanding (MOU) to document inter-agency operations and management issues and agreements. This is commonly done by many agencies and has proved to be a successful tool in facilitating operations and management functions.

Staffing needs associated with FMS and IMS are divided into two camps: field staff and operations center staff.

6.1.1 Field Personnel

Field Technician – The field technical is responsible for maintaining ITS field devices and identifying failures of surveillance and control devices. He/She should also be capable of assisting an electronics technician in troubleshooting and testing incoming equipment.

Electronics Technician – The electronics technician is responsible for diagnostic maintenance to a predetermined level. The person should be capable of diagnosing a failure and initiating corrective action as well as performing or monitoring preventative maintenance on ITS field devices.

Field Administrator – In addition to being capable of performing the field and electronics technicians' duties, the field administrator should be responsible for scheduling and monitoring the work performance of the group, equipment inventory and replenishment, cost estimates, and the annual budget.

6.1.2 Operations Center Staff

Program Manager / Ops Center Manager – These refer to the overall manager of the program or operations center. As a senior level manager, this position can most easily assume the additional responsibilities of a combined center.

Shift Manager / Supervisor / Project Manager – As a middle level manager, this position is responsible for shift operations and projects. Therefore, some sharing of responsibilities is possible.

System Operator / Dispatcher / Liaison – These positions were used in different contexts with the individual ITS functions previous tables. In this table, these positions are assumed to be less specialized and can perform multiple functions, but are listed separately for clarity. The system operator is responsible for confirming incidents, initiating response, and disseminating traveler information. The dispatcher is primarily responsible for dispatching and communicating with the service patrol drivers, but can also assist in incident response by communicating with public safety providers. The liaison position can be a "catch-all", providing general interface with local agencies and the public, including (in the case of the ATIS function) help desk functions for the ISPs.

Computer / Network Support – These positions are similar in all of the individual function scenarios, therefore some responsibility sharing is possible in a combined center.

Administrative Support – This position is very easily shared in combined operations center. This position can also pick up some of the liaison's responsibilities.

The staffing needs for the RTMC are a function of the market packages and services provided and the hours of operations. To support the deployments outlined in *Technical Memorandum No. 4.1 – Concept of Operations*, three basic scenarios exist. The existing and planned RTMCs are identified with the applicable scenario in Table 6.1.

Table 6.1 – Identification of Long-Term Staffing Need Scenarios in RTMCs

District	RTMC	Independent of Law Enforcement Dispatch	Co-located with Law Enforcement Dispatch	Regional ATIS will be Services Provided
1	Ft. Myers		✓	✓
2	Jacksonville		✓	✓
3	Tallahassee		✓	
3	Pensacola	✓		
4	Broward	✓		✓
4	Palm Beach		✓	✓
5	Orlando		✓	✓
6	Miami		✓	✓
7	Tampa		✓	✓
T	Pompano Beach		✓	✓
T	Turkey Lake	✓		✓

To estimate the staffing requirements, a level of service (LOS) 5 (24 hours a day, 7 days a week) operation was assumed in the largest metropolitan areas (Miami, Broward, Palm Beach, Tampa, Orlando, and Jacksonville) and the Pompano Beach RTMC. A LOS 4 (16 hours a day) operation was assumed for the remaining centers. Table 6.2 summarizes the staffing needed to support these operations in full-time equivalents by the year 2012 based on the staffing guidelines provided in the *ITS Strategic Plan*. Table 6.3 identifies the anticipated annual costs for the support of RTMC operations and staffing through 2012. Each RTMC is anticipated to develop their own unique detailed operational plan that will outline and more specifically address the phasing of these staffing requirements over time and whether positions are filled using FDOT personnel or consultant staff.

Table 6.2 – Projected ITS Operational Staffing Levels as Proposed by the Districts

District	RTMC	LOS[(1)]	TMC Manager		Shift Manager, Operations Engineer, Senior Operator, or Maintenance Engineer		System Operator		Computer Network Support		Admin Support		**TOTAL**		
			FDOT	Cons.	FDOT	Cons.	FDOT	Cons.	FDOT	Cons.	FDOT	Cons.	FDOT	Cons.	Total
1	Ft. Myers	5	1.00	-	-	2.00	-	9.00	-	1.00	-	1.00	1.00	13.00	14.00
1	Sarasota	4	1.00	-	-	1.00	-	3.00	-	-	-	-	1.00	4.00	5.00
2	Jacksonville	5	1.00	-	-	2.00	-	9.00	-	2.00	-	-	1.00	13.00	14.00
3	Tallahassee	5	1.00	-	-	3.00	-	5.00	-	3.00	-	2.00	1.00	13.00	14.00
3	Pensacola	5	1.00	-	-	3.00	-	5.00	-	3.00	-	2.00	1.00	13.00	14.00
4	Broward	5	1.00	-	3.00	2.00	-	12.00	-	2.00	-	2.00	4.00	18.00	22.00
4	Palm Beach	5	-	1.00	-	5.00	-	12.00	-	2.00	-	2.00	-	22.00	22.00
5	Orlando	5	1.00	-	-	2.00	-	9.00	-	0.25	-	-	1.00	11.25	12.25
6	Miami	5	1.00	-	2.00	1.00	1.00	11.00	1.00	2.00	-	1.00	5.00	15.00	20.00
7	Tampa	5	1.00	1.00	-	5.00	-	8.00	1.00	1.00	-	2.00	2.00	17.00	19.00
T	Pompano Beach	5	-	1.00	-	3.00	-	7.50	-	1.00	-	-	-	12.50	12.50
T	Turkey Lake	5	-	1.00	-	3.00	-	7.50	-	1.00	-	-	-	12.50	12.50
	Total		9.00	4.00	5.00	32.00	1.00	98.00	2.00	18.25	-	12.00	17.00	164.25	181.25

General Notes:

(1) LOS Indicators: LOS 4 indicates 16 hours of operation per day. LOS 5 indicates 24 hours of operation per day.
(2) Hyphens (e.g., -) in the table above indicate no value or a zero change.
(3) The consultant operational staffing levels needed to support the current ATIS efforts in Orlando and Southeast Florida are addressed through a separate work program item.
(4) The consultant operational staffing levels needed to support future ATIS efforts for the Tampa Bay, Jacksonville, Southwest Florida, and statewide 511 services will be addressed through separate work program items.

Table 6.3 – Annual Costs to Support Operations/Staffing through 2012

		Revised (June 26, 2002)		
Position	**FDOT**	**Rate [1] [2]**	**Number**	**Costs ($)**
Program Center Manager	FDOT	$ 120,000.00	10.5	1,260,000.00
	Consultant	$ 156,000.00	1	156,000.00
Shift Manager/ Supervisor	FDOT	$ 100,000.00	20	2,000,000.00
	Consultant	$ 130,000.00	20	2,600,000.00
System Operator	FDOT	$ 60,000.00	11	660,000.00
	Consultant	$ 78,000.00	68	5,304,000.00
Road Rangers Dispatcher	FDOT	$ 60,000.00	0	-
	Consultant	$ 78,000.00	34	2,652,000.00
Road Rangers Field Personnel/ Drivers	FDOT	$ 60,000.00	0	-
	Consultant	$ 78,000.00	334	26,052,000.00
Public Safety Ops Center Liaison	FDOT	$ 80,000.00	9	720,000.00
	Consultant	$ 104,000.00	0	-
Computer Network Support	FDOT	$ 130,000.00	2	260,000.00
	Consultant	$ 169,000.00	27	4,563,000.00
Admin Support	FDOT	$ 50,000.00	1	50,000.00
	Consultant	$ 65,000.00	12.5	812,500.00
			Total	**47,089,500.00**
			Change	**(14,803,500.00)**

(1) Rate reflects fully burdened costs for overhead benefits for FDOT staff; 2.0 multiplier assumed.

(2) Rate reflects fully burdened costs for overhead benefits, FCCM, and operating margin for consultants; 2.6 multiplier assumed. The multiplier is based on field office overhead, a benefit rate of 135 percent, and a 10 percent operating margin.

6.2 Maintenance[8]

ITS requires an appropriate level of maintenance. Good maintenance will assure reliability and proper operation will protect the investment and enable adjustment to changing conditions. The maintenance of ITS is important in that malfunction can critically affect the ability of the system to perform its intended functions. Failure to function as intended could negatively impact traffic safety, public acceptance, and transportation network capacity. Failure of the system also has the potential to cause measurable economic loss and increase congestion, fuel consumption, pollutants, and traffic accidents.

Unlike traditional capacity improvement projects, providing the operations and maintenance costs to fully support the deployment is critical to the deployment. Therefore, the total life-cycle costs for all projects evaluated in *Technical Memorandum No. 4.1 – Concept of Operations* were estimated. ITS operations and management considerations should be evaluated before implementing a technology. Operations and management of ITS technologies and systems extend beyond simply keeping the equipment working. Reacting to emergency failure conditions, maintaining accurate maintenance logs, and conducting preventative maintenance programs all require highly skilled staff that is motivated and fully trained. A maintenance program can also be used to track failures and decrease the time needed to fix the failures.

Most, if not all, public agencies provide maintenance in response to alarms or identified problems. Response maintenance is defined as the repair of failed equipment and its restoration to safe, normal operation. It requires action based on the priority of the subsystem that has failed and takes precedence over preventative maintenance activities for the duration of the emergency. Response maintenance is a critical element of a comprehensive ITS maintenance plan. The importance stems from agencies' responsibility to keep traffic systems operating safely at all times. Table 6.4 identifies the response maintenance priorities and guidelines.

The safety of the traveling public and minimizing the agencies exposure to liability represent the two strongest reasons for establishing a sound approach to response maintenance. Typically, response maintenance requires that a qualified technician be on-call to receive notice of any and all problems that arise with field equipment.

[8] Major elements of this section were adapted from the *ITS Strategic Plan*.

Table 6.4 – Response Maintenance Priorities and Guidelines

Priority	Time to Respond	Problem	Time to Repair
High	4 hours	Critical	Next rush hour
		Non-critical	5 working days
Medium	8 hours	Critical	2 working days
		Non-critical	10 working days
Low	Next working day	Critical	5 working days
		Non-critical	20 working days

Response maintenance may involve both field and shop maintenance procedures to fully repair a failed component. Frequently, spares are kept in a ready state in the shop so that they can be used to switch-out the failed device in the field. This provides a means to affect a full and rapid repair in the field and permit the failed device to be completely repaired in the shop where comprehensive diagnostic tools are available and weather elements can be avoided. Spare components suitable to the maintenance demand should be kept on hand for repairs to equipment.

The following guidelines are provided to support response maintenance preparation and need:

- Electronic spare components should be kept in sufficient quantities to repair board failures. It is also advisable to keep some full spare printed circuit boards.

- Spare components are not interchangeable with those of different generations of equipment. It is advisable to note the differences and stock each component.

- Normally, a percentage of components relating to the total existing pieces of equipment in the field are required. Currently, no guidelines exist for inventorying these items; however, it should be prepared as part of the operational plan associated with each RTMC.
- Where failures of certain become common, it is advisable to stock more than the recommended percentage.

- It may not be appropriate to stock large expensive items such as dynamic message sign (DMS) sign cases complete with the internal equipment for the eventuality of a catastrophe, because such may be too expensive to carry on the books.

While most, if not all, public agencies provide response maintenance, few provide preventative maintenance on a regular, routine scheduled basis. Preventative maintenance, or routine maintenance as it is sometimes referred to, is defined as a set of checks and procedures to be performed at regularly scheduled intervals for the upkeep of equipment. It includes checking, testing, inspection, record keeping, cleaning, and replacement based on the function and rated service life of the device and its components. Preventative maintenance is intended to ensure reliable mechanical and electrical functioning and operation of equipment, thereby reducing equipment failures, response maintenance, road user costs, and liability exposure. The emphasis in preventative maintenance is on checking for proper operation and taking proactive steps to repair or replace defective equipment, thus ensuring that problems are not left until failure occurs.

Lack of staffing and funds is often cited as primary reasons why preventative maintenance is not carried out. Furthermore, most ITS field devices are comprised of solid-state components that have become much more reliable in quality in over the past five years. As such, most agencies simply replace these components as they fail.

FMS have been planned, designed, and deployed throughout Florida to manage the roadway network in a proactive manner. These systems typically consist of various subsystems, i.e., detectors that monitor roadway conditions, CCTV cameras that verify roadway conditions, variable message signs (VMS) that provide en-route traveler information to motorists, and ramp metering systems that increase capacity at major interstate ramp junctures. Operations and control of these various devices typically occurs from a traffic control center.

The ability to obtain and communicate real-time information about roadway conditions is essential to the successful operation of FMS and the traveling public's trust in using the relayed information. As such, a proactive maintenance program is essential to the continued successful operation of FMS.

Table 6.5 provides guidelines on the suggested preventative maintenance in support of FMS.

Table 6.5 – Preventative Maintenance Guidelines

Subsystem	Minor Maintenance	Major Maintenance	Major Rehabilitation	Life Expectancy
Field Systems				
Cabinets		Twice per year	10 years	20 years
Power Supply	Twice per year	5 years	10 years	20 years
Grounding	Annually	5 years	10 years	25 years
Vehicle Detection Systems				
Loop Detectors and Cables	Twice per year	Annually	5 years	10 years
Controllers		Twice per year	2 years	7 years
Closed-Circuit Television (CCTV) Camera Systems				
Poles	Twice per year	5 years	15 years	50 years
Silicon Intensified Target Cameras		Twice per year	1.5 years	6 years
Charged Coupled Device Cameras		Twice per year	2 years	10 years
Pan-Tilt-Zoom Cameras	Twice per year	Annually	3 years	10 years
Receivers		Twice per year	3 years	10 years
Monitors	Twice per year	5 years		5 years
Dynamic Message Signs (DMS)				
Signcase		Twice per year	1.5 years	10 years
Protective Devices	Twice per year	1 year	2 years	10 years
Pixels, Modules and Drivers		Twice per year	3 years	6 years
Controllers		Twice per year	3 years	6 years
Ramp Metering Systems				
Signal Wiring	Quarterly	5 years		15 years
Signal Heads and Hardware	Quarterly	Annually	Annually	10 years
Poles and Footings	Annually	5 years	10 years	25 years
Loops and Cables	Quarterly	Twice per year	5 years	10 years
Sensor Units		Quarterly		7 years
Controllers		Quarterly	2 years	7 years
Communications Infrastructure				
Fiber Optic Cable Plant	Annually	5 years	25 years	25 years
Fiber Optic Plant Video and Data Equipment		Twice a year	3 years	10 years
Twisted Pair Cable	2 years	8 years	30 years	40 years
Coaxial Cable	Annually	6 years	20 years	30 years
Spread Spectrum	Twice a year	4 years	10 years	20 years

Notes:

1. Minor Maintenance is that which can be carried out without large scale testing or the use of heavy equipment. It includes the visual inspection and checking of many items, elementary testing, cleaning, lubricating, and minor repairs that can be carried out with hand tools or portable instruments.

2. Major Maintenance includes extensive testing, overhauling, and the replacement of components that require a scheduled power outage, the use of bucket trucks, and/or other heavy equipment, as well as all items normally done under minor maintenance.

3. Major Rehabilitation, or complete replacement, is contemplated for devices that experience frequent malfunctions or failures.

4. Life Expectancy is the period before total replacement is needed.

A statewide ITS asset management system is currently being considered that will track each device location, type, manufacturer, and maintenance/operations issues. This asset management system will provide a better source of information for the planning of preventative maintenance, inventories to support response maintenance, and planning and budgeting for ITS maintenance needs. This proposed system will be built on the ITS Deployment Tracking Database prepared for the *Ten-Year ITS Cost Feasible Plan* and *ITS Corridor Master Plans*.

Within the TMC, software is one the most critical elements of the ITS. As discussed in the *Section 1.7,Deployment Issues*, FDOT is migrating to a component-based statewide TMC software that should minimize the total spent on the maintenance of TMC at the district level. Since statewide configuration management is proposed, technical and management support for the TMC software will need to be maintained for the full life-cycle of the deployment. A more detailed concept of operations and functional requirements for the TMC software is currently being prepared under a separate document. Staffing and funding of configuration management activities for the statewide TMC software is currently funded through the *Ten-Year ITS Cost Feasible Plan*.

Estimates of the maintenance costs to support the projects identified in the *Ten-Year ITS Cost Feasible Plan* is summarized in Table 6.6. These costs are based on unit costs provided by the Maintenance Program or the FHWA Unit Cost Database where unit costs were not available from the Maintenance Program. The unit costs employed are summarized in Table 6.7.

Table 6.6 - Maintenance Costs to Support the Ten-Year ITS Cost Feasible Plan

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FIN / MapID	District	Facility	Project Limits	Description	Type	Phase	Project Opening Yr	End of Life Cycle	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	Thru 2012 Total	Funding Source
102502	1	I-75	From Collier/Lee County Line to Lee/Charlotte County Line	Freeway and Incident Management System	FMS	CONST	2006	2015				$0.40	$0.42	$0.43	$0.45	$0.46	$0.48	$0.49	$3.13	Statewide
102702	1	I-75	From Sarasota/Manatee County Line to I-275 (Manatee)	Freeway Management System	FMS	CONST	2013	2022											$0.00	Statewide
102802	1	I-75	From Charlotte/ Sarasota County Line to Sarasota/ /Manatee County Line	Freeway Incident Management System	FMS	CONST	2012	2021										$0.60	$0.60	Statewide
104202	1	I-75	From Broward/Collier County Line to Collier/Lee County Line	Freeway Incident Management System	FMS	CONST	2006	2015				$0.55	$0.57	$0.59	$0.61	$0.63	$0.65	$0.67	$4.25	Statewide
138502	1	I-75	From Lee/Charlotte Co. Line to Charlotte/Sarasota Co. Line	Freeway and Incident Management System	FMS	CONST	2010	2019								$0.33	$0.34	$0.35	$1.03	Statewide
204402	2	I-295	From I-10 to I-95 N	Incident Management System, Traveler Information, Management Center and Fiber Optics	FMS	CONST	2013	2022											$0.00	Statewide
204502	2	I-295	From I-95 S to I-10	Incident Management System, Traveler Information, Management Center and Fiber Optics	FMS	CONST	2012	2021										$0.15	$0.15	Statewide
204002	2	I-95	From I-10 to Trout River	I-95 North ITS Improvements - Incident Management - cctvs, vehicle detection units, DMSS	FMS	CONST	2005	2014			$0.03	$0.03	$0.03	$0.03	$0.03	$0.04	$0.04	$0.04	$0.27	Statewide
204102	2	I-95	From Trout River to Airport/Duval Road	I-95 North ITS Improvements - Incident Management - cctvs, vehicle detection units, DMSS	FMS	CONST	2006	2015				$0.07	$0.07	$0.07	$0.07	$0.08	$0.08	$0.08	$0.52	Statewide
321502	3	I-10	From Welcome Center to East of SR 87	Pensacola Area Freeway Management System	FMS	CONST	2009	2018							$0.37	$0.39	$0.40	$0.41	$1.58	Statewide
321702	3	I-10	From West of US 90 (Gadsden County) to East of US 90 (Leon County)	Tallahassee Area Freeway Management System	FMS	CONST	2010	2019								$0.28	$0.29	$0.30	$0.88	Statewide
307902	3	I-110	From I-10 to Pensacola Bay Bridge	I-110 Pensacola Area Freeway Management System	FMS	CONST	2009	2018							$0.13	$0.13	$0.14	$0.14	$0.54	Statewide
401402	4	I-75	From Sawgrass Expressway to Broward/Collier Co Line	DMSS, ATIS, ARTS, CCTV at Interchanges, OVCS	FMS	CONST	2009	2018							$0.34	$0.35	$0.36	$0.37	$1.41	Statewide
423302	4	I-75	From Southern Terminus to Sawgrass Expressway	DMSS, ATIS, ARTS, CCTV at Interchanges, OVCS	FMS	CONST	2009	2018							$0.62	$0.64	$0.66	$0.68	$2.60	Statewide
2317391	4	I-95	From Miami-Dade/Broward Co. Line to Broward/Palm Beach Co Line	I-95/I-595 Video Monitoring System Cameras Broward County	FMS	CONST	2006	2015				$0.10	$0.10	$0.11	$0.11	$0.11	$0.12	$0.12	$0.77	District
503802	5	I-4	From SR 44 to I-95	I-4 Surveillance Motorist Information System Phase 5	FMS	CONST	2005	2014			$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.01	Statewide
2425231	5	I-4	From World Drive to US 27	I-4 SMIS (7 Miles) Phase 4 / 6- Lane Reconstruction Project	FMS	CONST	2004	2013		$0.10	$0.10	$0.10	$0.11	$0.11	$0.11	$0.12	$0.12	$0.13	$0.99	District
2427021	5	I-4	From Lake Mary Blvd to SR 472	I-4 SMIS (22 Miles) Phase 3 - St. Johns River Bridge Replacement / Reconstruction	FMS	CONST	2003	2012	$0.14	$0.15	$0.15	$0.16	$0.16	$0.17	$0.18	$0.18	$0.19	$0.19	$1.68	District
512802	5	I-95	From SR 44 to US 1 (Volusia County)	Surveillance Motorist Information System/Daytona Area Smart Highways PhaseIII	FMS	CONST	2007	2016					$0.10	$0.10	$0.10	$0.10	$0.11	$0.11	$0.62	Statewide
523902	5	I-95	From SR 514 to SR44	Surveillance Motorist Information System/Daytona Area Smart Highway Phase IV	FMS	CONST	2007	2016					$0.63	$0.66	$0.68	$0.70	$0.72	$0.75	$4.13	Statewide
4702	5	Various	From Kirkman Road to SR 417 West	ITS-01:OOCEA's SR 408 & SR 417	FMS	CONST	2003	2012	$0.07	$0.08	$0.08	$0.08	$0.08	$0.09	$0.09	$0.09	$0.09	$0.10	$0.85	Expwy Auth
4902	5	Various		ITS-02: OOCEA's SR 408, SR 417, & SR 528	FMS	CONST	2004	2013		$0.08	$0.08	$0.08	$0.08	$0.09	$0.09	$0.09	$0.09	$0.10	$0.78	Expwy Auth
5602	5	Various		ITS-04: OOCEA's SR 408, SR 417, & SR 528	FMS	CONST	2004	2013		$0.14	$0.14	$0.15	$0.15	$0.16	$0.16	$0.17	$0.17	$0.18	$1.41	Expwy Auth
5801	5	Various		ITS-05: OOCEA's SR 408, SR 417, SR 528, SR 520, & SR 50	FMS	CONST	2005	2014			$0.13	$0.13	$0.14	$0.14	$0.15	$0.15	$0.16	$0.16	$1.15	Expwy Auth
2516821	6	I-95	From US 1 to Ives Dairy Road	I-95 Intelligent Corridor System Package B	FMS	CONST	2003	2012	$0.55	$0.57	$0.58	$0.60	$0.62	$0.64	$0.67	$0.69	$0.71	$0.73	$6.37	District
1001802	6	SR 836	From SR 821 to NW 27th Ave	ITS - 002	FMS	CONST	2003	2012	$0.05	$0.06	$0.06	$0.06	$0.06	$0.06	$0.07	$0.07	$0.07	$0.07	$0.63	Expwy Auth
702002	7	I-275	From Bearss Ave to I-75	Freeway and Incident Management System	FMS	CONST	2007	2016					$0.10	$0.10	$0.11	$0.11	$0.11	$0.12	$0.65	Statewide
743302	7	I-275	From Howard Frankland Bridge to Hillsborough River	Links II/III	FMS	CONST	2011	2020									$0.24	$0.25	$0.50	Statewide
2586432	7	I-275	From Hillsborough River to I-4	I-275/I-4 Freeway Management System	FMS	CONST	2006	2015				$0.05	$0.06	$0.06	$0.06	$0.06	$0.06	$0.07	$0.42	Statewide
4072331	7	I-275	From MLK Blvd to Bearss Ave	I-275 Freeway Management System	FMS	CONST	2006	2015				$0.12	$0.13	$0.13	$0.14	$0.14	$0.15	$0.15	$0.96	Statewide
4072332	7	I-275	From 54th Ave N to Howard Frankland	I-275 Freeway Management System	FMS	CONST	2006	2015				$0.06	$0.06	$0.07	$0.07	$0.07	$0.07	$0.07	$0.47	Statewide

Programmed Projects (V4)

FIN / MapID	District	Facility	Project Limits	Description	Type	Phase	Project Opening Yr	End of Life Cycle	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	Thru 2012 Total	Funding Source
4072333	7	I-275	From Howard Frankland to Kennedy Blvd	I-275 Freeway Management System	FMS	CONST	2006	2015				$0.07	$0.07	$0.07	$0.07	$0.07	$0.08	$0.08	$0.51	Statewide
4072334	7	I-275	From 54th Ave S to 54th Ave N	I-275 Freeway Management System	FMS	CONST	2008	2017						$0.32	$0.33	$0.34	$0.35	$0.36	$1.70	Statewide
2584012	7	I-4	From 14th St to 50th St	I-4 Freeway Management System	FMS	CONST	2006	2015				$0.05	$0.05	$0.05	$0.05	$0.05	$0.05	$0.05	$0.35	Statewide
4093661	7	I-4	From 50th Street to CR 579	I-4 Freeway Management System	FMS	CONST	2006	2015				$0.12	$0.12	$0.13	$0.13	$0.14	$0.14	$0.15	$0.93	Statewide
4093662	7	I-4	From CR 579 to Park Road	I-4 Freeway Management System	FMS	CONST	2007	2016					$0.23	$0.24	$0.25	$0.25	$0.26	$0.27	$1.51	Statewide
4093663	7	I-4	From Park Road to Hillsborough/Polk Co. Line	I-4 Freeway Management System	FMS	CONST	2008	2017						$0.08	$0.09	$0.09	$0.09	$0.10	$0.45	District
4093664	7	I-4	From Hillsborough/Polk Co. Line to US 27	I-4 Freeway Management System	FMS	CONST	2008	2017						$0.16	$0.16	$0.17	$0.17	$0.18	$0.84	Statewide
4109091	7	I-75	From US 301 to Fowler Ave	I-75 Freeway Management System	FMS	CONST	2007	2016					$0.18	$0.19	$0.20	$0.20	$0.21	$0.22	$1.20	Statewide
2558441	7	SR 589	From I-275 to Hillsborough River	Links Stage I	FMS	CONST	2005	2014			$0.07	$0.07	$0.08	$0.08	$0.08	$0.08	$0.09	$0.09	$0.64	Statewide
843802	8	SR 91	From MP 263 to MP 267	Ocoee Video System and Fiber Optics	FMS	CONST	2003	2012	$0.04	$0.04	$0.04	$0.04	$0.04	$0.04	$0.04	$0.04	$0.05	$0.05	$0.41	District
1907501	8	SR 91	From MP4 to MP 75	SunNav Phase 1 Fiber Project	FMS	CONST	2004	2013		$0.23	$0.24	$0.25	$0.26	$0.27	$0.28	$0.28	$0.29	$0.30	$2.41	District
4061231	8	SR 91	From Turnpike Mainline to	Intelligent Transportation System (ITS) Incident Detection	FMS	CONST	2008	2017						$0.24	$0.24	$0.25	$0.26	$0.27	$1.26	District
1907171	8	Various	From I-95 to I-75	Advanced Traveler Information System DMS, HAR , TMC's	FMS	CONST	2003	2012	$0.24	$0.25	$0.26	$0.27	$0.27	$0.28	$0.29	$0.30	$0.31	$0.32	$2.80	District
								Yearly Totals	$1.09	$1.68	$1.96	$3.62	$4.98	$5.94	$7.60	$8.46	$8.99	$10.03	$54.35	

Table 6.7 – Estimated Unit Maintenance Costs

Device	Unit	Construction	O&M Cost
Closed-Circuit Television	each	$48,000.00	$2,350.00
Detector Area	each	$1,850.00	$162.50
Dynamic Message Signs	each	$272,500.00	$11,600.00
Dynamic Trail Blazer	each	$75,000.00	$4,000.00
Emergency Stopping Site		$20,000.00	$1,000.00
Fiber	each	$116,000.00	$1,000.00
Highway Advisory Radio	each	$32,000.00	$1,000.00
Highway Advisory Radio Beacon	each	$75,000.00	$4,000.00
Communications HUB	each	$107,500.00	$1,000.00
Inductive Loop Detectors	each	$1,850.00	$162.50
Ramp Metering Station	each	$56,000.00	$3,500.00
RTMS	each	$6,000.00	$400.00
Road Weather Information System	each	$52,000.00	$3,500.00
Vehicle Identification Detection System	each	$30,000.00	$400.00

7. Summary

This *ITS Business Plan* outlines the strategies, tactics, and related roles and responsibilities of the key stakeholders involved in the deployment of ITS along the FIHS limited-access routes to support the desired outcomes for deployment. This document is intended to go hand-in-hand with *Technical Memorandum No. 4.1 – Concept of Operations* which outlines in detail the roles and responsibilities for the operations and management of the system once in place.

Specific recommendations are made to support the goals and objectives of the ITS deployments and performance measures are outlined for their monitoring and for evaluation of the effectiveness of the strategies proposed.

This *ITS Business Plan* provides guidelines for the programming of ITS Program funds and a summary of other funding sources that can be used to support ITS projects and discusses the costs of operations and maintenance that will be needed to support these deployments.