Florida's
Intelligent Transportation System
Strategic Plan

Final Report
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Executive Summary

The purpose of the ITS Strategic Plan is to guide the Department, Florida Metropolitan Planning Organizations (MPOs) and local governments in the planning, programming and implementation of integrated multi-modal ITS elements to maximize the safety and efficiency of Florida's Transportation System.

This ITS Strategic Plan includes the Department's statewide vision for ITS as well as a set of guiding principles to assist in the long range planning and project development needed to achieve that vision. An ITS Business Plan is included that details the recommended steps for Department's ITS program development and deployment over the next 5 years.

The plan fits into the existing framework of the Department's Mission Statement and the goals and objectives as set forth in the 2020 Florida Transportation Plan. However, the plan also recommends an additional statewide goal in regard to Management and Operations of Transportation Facilities. The capabilities of ITS, as a set of tools for the operation and management of Florida's transportation system, is truly multi-modal scope. Therefore, this ITS Strategic Plan directly relates to all of the Modal Plans encompassed by the Florida Transportation Plan. The ITS Strategic Plan provides the management and operational guidance to assist each of these modal plans achieve their goals more efficiently.

Although this is a statewide plan, the Strategic Plan provides the Department's District offices and local government officials with the overall guidance necessary for the development of regional and local ITS programs, strategic plans and architectures that will lead to ITS deployment plans.

Why ITS?

The challenge of meeting Florida's transportation needs is a daunting one. ITS offers a new set of tools for meeting these needs. ITS is made possible through the use of new technology, combined with key lessons learned from management and operations applications around the country. ITS technology and the application of management and operations strategies will allow transportation system managers to minimize response time for incidents and accidents through the use of incident management programs; reduce commercial vehicle safety violations by applying automated safety programs; reduce weather related traffic incidents by using road-weather information systems; minimize grade crossing accidents by using highway-rail interface safety systems; improve emergency management communications while providing real-time traveler information systems for evacuation; and improve security for highway and transit users through the use of automatic vehicle location systems.

ITS supports national and community transportation goals and objectives of promoting and providing for the efficient movement of people and goods. Such goals include maintaining and operating a fiscally sustainable transportation network that encourages effective use of scarce resources, advocates cooperation and partnering and works *within the existing transportation system* making the whole greater than the sum of its parts. An integrated transportation system, <u>managed and operated more efficiently through the use of ITS</u>, enhances quality of life by making *travelers safer, promoting a strong and growing economy and enhancing and protecting environmental quality.*

Summary of Recommendations

As a strategic plan, the recommendations in this ITS Strategic Plan are general in nature. The first recommendation is to establish a Department Policy for the pro-active management and operation of the transportation system. Having established this policy, the next step for the implementation of a long range ITS strategy is to integrate ITS planning, development and operation into existing Department procedures and practices for the development and delivery of transportation services and facilities. These procedures and practices are documented in a set of guiding principles that characterize Florida's ITS Program and are designed to describe <u>how</u> Florida's ITS Vision will be realized over the next 20 years.

The guiding principles provide a basis for the long-range application of ITS strategies in Florida. In addition, an ITS Business Plan was developed that more specifically recommends actions needed over the next five years to establish an ITS program and implement ITS projects.

The following are summaries of the recommendations presented in this ITS Strategic Plan:

<u>**Department Policy**</u>

The Department should add a fifth goal or expand an existing goal in the Florida Transportation Plan that stresses the importance of the management and operation of the state's transportation system by providing a statewide, integrated transportation system that is managed and operated in real time.

<u>**Department ITS Program**</u>

The Department should establish an ITS Program office under the Assistant Secretary for Transportation Policy to be responsible for all ITS activities of the Department.

The Department should establish a position of statewide ITS Program Manager with a responsibility to manage the ITS budget, staff and coordinate all ITS and incident management activities.

<u>**District ITS Program**</u>

Each District should create a District ITS Program and designate a District ITS Program Manager who will be responsible for ITS and incident management activities and will seek full integration with the urban regions within that District.

<u>**ITS Program Goal**</u>

Each District should develop an ITS infrastructure and initiate development or enhancement of a transportation management center focusing on the Interstate highways. Consideration should be given to evolving the center to have multi-modal management capabilities and to be operated to provide a minimum level of service of 12 hours per weekday. The Districts will develop an implementation plan to achieve this goal and the Department's ITS Program will support this effort.

<u>**ITS Staff and Training Requirements**</u>

Each District should develop ITS staff requirements and staff training programs that will enable them to meet the ITS services they plan to deliver over the next five years.

Procurement

The Department should examine the procurement process to develop better ways of procuring ITS in order to reduce risk to the Department and provide more cost effective results. This requires an in-depth analysis of the Florida Public Records Law and existing Florida contracting procedures to assess their impact on ITS procurements and private sector response and provide recommendations for needed modifications.

ITS Architecture

The Department should develop and maintain a statewide ITS architecture and supporting standards. This architecture should utilize the National ITS Architecture and adapt as needed to meet Florida's needs.

Each District, in consultation with the appropriate local governments and MPOs, should develop regional architectures or frameworks for short and long term comprehensive ITS deployment for each urban region.

Standards and Specifications

The Department should develop ITS project implementation procedures. The procedures should cover both the planning and project design phases. This should include the development of ITS project standards and specifications.

ITS Planning

The Department should coordinate with and provide technical assistance, education and training, to the MPOs and rural county commissions as they integrate ITS into their transportation planning processes.

Rural/Inter-Urban Element

The Department should initiate the development and support of a rural/inter-urban ITS element.

CVO Element

The Department should establish a Commercial Vehicle Operations (CVO) element to coordinate all CVO activities in Florida and to achieve a goal of implementing a safety based pre-clearance system on I-4 and I-95 within five years. A CVO Business Plan to achieve this goal and to address other CVO issues should be developed.

ITS Research

The Department should continue and enhance the coordination and funding of ITS product testing and applied research. The research program should be used in the development of statewide ITS standards and specifications.

Stakeholder Involvement and Private Sector Coordination

The Department should define a model and process for stakeholder involvement at three levels: Statewide for strategic planning and policy issues, Regional for integration and local issues and directions, and Project for specific projects such as the I-4 ITS Corridor Study or program elements such as CVO and take the initial steps of implementing the process.

Training

The Department should identify training needs, both internal and external to the Department, and in conjunction with *ITS Florida*, establish priorities, implement and maintain an ITS training program.

ITS Program Budgeting

The Department should develop a program office and a program level budget to fund needed staff and to provide overview and guidance for ITS programs.

Each District should develop a budget to staff, locally plan and implement the ITS program for the District.

Each District should produce and update annually an ITS Implementation Plan that defines policies, staff needs, training needs, budgets and projects to be implemented over the next five years.

Organization of the ITS Strategic Plan

This Strategic Plan document is a summary of findings and recommendations developed and presented in a series of issue papers and reports. The following is a directory of the key products of this Strategic Plan effort, where they are presented in this document and in greater detail in the appendix or referenced issue papers and reports.

Strategic Plan Product	Location
ITS as a strategic application and tool for helping to meet Florida's transportation goals and objectives.	Section 1 - Purpose and Need; Section 2 - The Challenge; and Section 3 - What is ITS.
Florida's ITS vision, guiding principles and goals and objectives	Summarized in Sections 4 and 5 and in the Vision, Goals and Objectives, and Guiding Principles Report
The potential role of the ITS industry and ITS deployment to the economic growth of Florida	Summarized in Section 6–Business Plan and in the Economic Impact of ITS Issue Paper
The benefits of integration of ITS technologies into the management of the State transportation system.	Summarized in Section 3 and in the Economic Impact, Operations and Management and Rural/Inter–Urban Applications Issue Papers

Strategic Plan Product	Location
Business plan for implementing the Florida's ITS vision including a summary of key ITS implementation issues	Discussed in detail in Section 6 and in the ITS Business Plan Report
Recommendations for any needed modifications to Florida Statutes or Department Rules, Policies and Procedures	Summarized in Section 6–Business Plan and in the Procurement and Implementation Authority Issue Papers
Recommendations for the integration of ITS into the FTP, and the MPO long range transportation planning process	Summarized in Section 5 - Strategic Planning Guidelines; Section 6 - Business Plan and in the Integration of ITS into the MPO Planning Process Issue Paper
Recommendations on Operations, Management and Maintenance of ITS.	Summarized in Section 6 - Business Plan and in the O&M Issue Paper.
Analysis of and recommendations on Procurement of ITS technology and services.	Summarized in Section 6 - Business Plan and in the ITS Procurement Issue Paper.
Recommendations on ITS Applications in Rural and Interurban areas.	Summarized in Section 6 - Business Plan and in the Rural and Inter-Urban Issue Paper.
Recommendations on Commercial Vehicle ITS Applications.	Summarized in Section 6 - Business Plan and in detail in the ITS Business Plan Report.
Recommendations as to the long range application of the ITS Strategic Plan.	Section 5 - Strategic Planning Guidelines

1. Purpose & Need

The purpose of the Intelligent Transportation Systems (ITS) Strategic Plan is to guide the Department, Florida Metropolitan Planning Organizations (MPOs) and local governments in the planning, programming and implementation of integrated multi-modal ITS elements at the statewide, regional or local level, as appropriate. The plan provides a statewide vision of how ITS can help the Department to maximize the safety and efficiency of the Florida Transportation System and how it can contribute to the economic health and growth of the state in a world economy.

This is a statewide plan, but also provides sufficient direction to allow for individual professional judgement and consistency in the planning for and deployment of ITS at the regional and District level.

This ITS Strategic Plan includes the Department's statewide vision for ITS, a set of guiding principles to assist in the planning and project development decision process, short and long term goals and objectives, a business plan for the implementation of the vision and recommendations for phased Department organizational changes to implement the ITS plan.

This plan has both an urban and rural component focusing on the unique issues of each area type. The plan considers currently deployed and programmed ITS applications and how these would fit into a statewide vision.

The plan fits into the existing framework of the Department's Mission Statement and the goals and objectives as set forth in the 2020 Florida Transportation Plan and Short Range Component. However, the plan also recommends an additional statewide goal in regard to Management and Operations of Transportation Facilities. The capabilities of ITS, as a set of tools for the operation and management of Florida's transportation system, is truly multi-modal is scope and, thus, directly relates to all of the Modal Plans encompassed by the Florida Transportation Plan. The ITS Strategic Plan provides the management and operational guidance to assist each of these modal plans achieve their goals more efficiently.

The Strategic Plan provides the Department's District offices and local government officials with the overall guidance necessary for the development of regional and local strategic plans that will eventually lead to ITS deployment plans.

2. The Challenge

Problem: Increasing Demand

Florida's transportation system continues to face increasing demands as its role in serving passenger and freight travel grows. This trend is expected to continue well into the future.

Between 1990 and 1997, the daily vehicle-miles of travel served on Florida's roadways increased by one-third. The demand for roadways grew more than two-times faster than Florida's ability to add highway lanes to the system.

During this same period, traffic on Florida's roadways got "denser," that is, the number of vehicles per lane mile increased by about 21 percent. Floridians are experiencing more congested travel conditions throughout the system. Congested travel (defined as congested vehicle-miles of travel during the afternoon commute period) increased by 29 percent. Travel on the Interstate System is growing at a rate faster than other facilities. This is also true for truck travel.

Problem: Constraints on Alternatives

There have always been financial constraints on the amount of physical infrastructure that could be built to meet the increasing transportation demands. Over the last two decades, additional constraints have become even more critical. Environmental concerns have limited alternatives for constructing or widening roadways. Both environmental and growth management concerns have led to policy constraints on the number of lanes allowed for Florida's state highway system. The conclusion one quickly reaches is that we cannot build our way out of this problem. This, in turn, has led to the need for better and more efficient management and operation of the transportation system as a way to deal with these constraints.

National Management and Operations Efforts

Today the level of Management and Operations provided varies substantially among the nation's urban and rural areas. While there are no standards, the state-of-the-art and the state-of-the-practice are far apart. Only a small proportion of the nation's freeways (16 percent) has incident detection technology installed and only about a quarter has integrated incident response programs. Nationally, only 10 per cent of emergency response agencies participate in formal incident management programs.   Almost none of the nation's freeway operations are interconnected with parallel arterials and less than 3 per cent percent of the nation's signalized intersections are operated as traffic adaptive. Transit vehicle location technology is still limited to a quarter of fixed route vehicles. While some basic travel condition information is available by radio in most major metropolitan areas, an average of only 12 percent of key facilities in the top 76 metro areas have route–specific data available.

Current Management and Operations Efforts in Florida

These statistics hold true in Florida, also. Incident detection is currently available only in relatively short freeway segments in Orlando, Miami, Daytona Beach and Jacksonville. This is less than 100 miles (about 5%) of Florida's interstates and expressways.   Florida has some type of incident response or service patrol on slightly more than 200 miles. There are no major regional incident management programs underway, although several are planned.

However, the credibility of Management and Operations benefits with decision-makers and the public-at-large benefits requires further demonstration. Most Management and Operations improvements (usually ITS projects) are relatively invisible especially given the low expectations of customer-users that may not even be aware of the investments made. Visible impacts will require broader and more intensive application, integration of systems and consistent operations that has not yet occurred in most areas.

Management and Operations Issues and Challenges

The establishment of a Department policy promoting the pro-active management and operation of the transportation system is but one of many challenges and issues that must be addressed. Beyond the basic maintenance of the roadway, management and operation has not typically been a major function within the Department. Thus, the elevation of these functions within the Department represents a new way of doing business.

The current paradigm in Florida is illustrated by the practice for deployment of computerized traffic signal systems. For most of these systems, the Department evaluates the project feasibility, develops the system design and specifications and procures the system installation. Then, the Department relegates most, if not all, of the system operations to the local agency. In many cases, the local agency is then required to operate and maintain the system.

Given this current paradigm, there is little incentive for a local agency to spend their funds to integrate the operation of their signal system with adjacent jurisdictions. There are often technical differences in the systems that do not allow systems to exchange data. With no centralized standard for communication interfaces there is no guidance or incentive for system vendors to facilitate this exchange.

Another challenge is the integration of modes of transportation. The management and operation of transit systems and airports adds another office within the Department and at least one additional agency in most urban areas. Multi modal transportation alternatives are often only possible with a pro-active management and operations program that coordinates the various modes and provides travelers with the information needed to make alternate mode choices.

3. What is ITS?

Advances in information technology, communications and electronics are revolutionizing all aspects of our modern-day world, our homes and offices, our schools and how we spend our leisure time. Likewise, *information technology is changing how transportation services are being provided across the Nation*–in metropolitan areas, between metropolitan areas, and in rural communities. The latest advancements in computers, electronics, communications and safety systems are being used in a growing number of cars, buses, trucks and trains. *"Just-in-time" delivery of goods* has become the expected norm; reducing inventory and speeding the overall supply chain. The safety focus is shifting *to preventing crashes* rather than just mitigating their effects.

ITS Provides an Important Set of Tools in the Evolution of Florida's Transportation System

ITS represents the integrated application of advanced information, electronic, communications, and other technologies to address surface transportation problems. Freeway surveillance and incident management, and transit fleet management are all examples of new innovations in transportation systems and services. Computerized traffic signals, variable message signs, electronic "smart cards" for tolls and transit fares are all examples of new innovations in transportation products. Cruise control, trip planning, emergency notification and collision avoidance are examples of in-vehicle systems.

In the last decade, *the transportation industry has made great progress* in the utilization of ITS tools to enhance the nation's transportation systems. The U. S. Department of Transportation has invested in *substantial research and tes*ting of new technologies. States, local communities and public transportation agencies have made *substantial investments in new infrastructure* that incorporates many of the operational efficiencies of the new technologies. The private sector has invested in the *development of new products*. A National ITS Architecture has been adopted and many necessary standards are under development.

ITS Supports Transportation Goals and Offers Operational and Safety Benefits

ITS supports national and community transportation goals and objectives of promoting and providing for the efficient movement of people and goods. Such goals include maintaining and operating a fiscally sustainable transportation network that encourages effective use of scarce resources, advocates cooperation and partnering and works *within the existing transportation system* making the whole greater than the sum of its parts. An integrated transportation system enhances quality of life by making *travelers safer, promoting a strong and growing economy and enhancing and protecting environmental quality.*

Benefits in terms of savings lives, time, and money are now being clearly documented. Incident management systems can *reduce travel time by 10%-45%.* Enhanced transit applications can *foster smart growth policies* by encouraging transit-oriented development and encouraging modal shifts. Ramp metering systems *improve safety by reducing crashes from 10%-50%.* Transit management systems have enabled dramatic cost savings and between *10%-30% performance improvement.* ITS *accelerates economic development* through the development of tourist information systems in rural areas and by providing a multitude of information on transportation investments.

ITS Encourages Cooperative Planning and Decision Making

While significant *progress can be recorded* in the last decade, the transportation industry is in the infancy of the new information era. Realizing the potential benefits of ITS in addressing these challenges will be predicated upon a *multitude of individual decisions* made by public officials, product suppliers, manufacturers and consumers across the country. However, it will depend heavily upon the *formulation of new collaborative relationships* among public institutions, the private sector, and the universities and research establishments. It reflects the need for *new ways of doing business*, and an understanding of both the opportunities and difficulties of doing so.

User Services Provide Building Blocks for ITS Planning and Decision Making

The type of improvement that ITS offers is termed a User Service. The term User Service describes one or more requirements that an intelligent transportation system must provide. User Services are the building blocks of ITS deployments. To date, 30 User Services have been nationally defined. The User Services list may grow as new technologies become cost effective and deployable. The definition of User Services recognizes that the potential ITS users may include: travelers by any mode, operators of transportation management centers (TMCs), transit operators, planners such as Metropolitan Planning Organizations (MPOs), commercial vehicle owners and operators, other businesses relying on good transportation, emergency services providers, and the state or local governments.

The 30 defined User Services have been placed in seven categories or "bundles." "Bundles" provide a level of organization in addressing User Services. The "bundles" are logical groupings of User Services that incorporate common functionality, utilization of common technologies, match or maybe conveniently provided by a given institution. The following is a list of the User Services within each the seven bundles and whether the User Service is applicable to statewide, regional or corridor architectures. It is important to note, however, that the identification of User Services as applicable to statewide, regional or corridor architectures does not imply any particular priority or need for these User Services.

ITS User Service Bundle	ITS User Service	State-Wide	Region	Corridor
Travel and Transportation Management	En-Route Driver Information	I	I	I
	Route Guidance		I	I
	Traveler Services Information	I	I	I
	Traffic Control		I	I
	Incident Management		I	I
	Emissions Testing and Mitigation		I	I
Travel Demand Management	Pre-Trip Travel Information	I	I	I
	Ride Matching and Reservation		I	I
	Demand Management & Operation		I	I

ITS User Service Bundle	ITS User Service	State-Wide	Region	Corridor
Public Transportation Operations	Public Transportation Management	I	I	I
	En-Route Transit Information		I	I
	Personalized Public Transit		I	I
	Public Travel Security	I	I	I
Electronic Payment Services	Electronic Payment Services	I	I	I
Commercial Vehicle Operations	Commercial Vehicle Electronic Clearance	I		
	Automated Roadside Safety Inspection	I		
	On-Board Safety Monitoring *	I		
	Commercial Vehicle Administrative Processes	I		
	Hazardous Material Incident Response	I	I	I
	Commercial Fleet Management *	I		
Emergency Management	Emergency Notification and Personal Security *		I	I
	Emergency Vehicle Management		I	I
Advanced Vehicle Control and Safety Systems	Longitudinal Collision Avoidance *			I
	Lateral Collision Avoidance *			I
	Intersection Collision Avoidance *			I
	Vision Enhancement for Crash Avoidance *			I
	Safety Readiness *			I
	Pre-Crash Restraint Deployment *			I
	Automated Highway Systems *			I
	Railroad Crossing Safety	I	I	I

Those User Services marked above by asterisk (*) are primarily provided by the private sector (i.e., automobile manufacturers or commercial freight companies). These User Services, therefore, are not expected to be delivered by the Department or any other agency in the public sector. As the Florida ITS Program develops and User Service priorities are more fully defined, the Department may wish to accommodate those private sector User Services that provide a public benefit.

The 30 standard User Services are not exhaustive in that others may be added to recognize specific local needs. The National Architecture Committee of ITS America is currently reviewing recommendations to add a 31st User Service–"Archived Data" which would provide for the formatting and saving of ITS derived data for later use by transportation planners and engineers.

The development of Florida's ITS Program will include the selection and prioritization of User Services. In several urban areas in Florida, this User Service selection and prioritization process has already been completed. Regional and corridor based ITS architectures have also been developed to support and deliver these User Services.

ITS Architectures Integrate User Services for Coordinated Implementation

The Department should also develop a statewide ITS architecture to assure compatibility between and among its districts and also as a framework for delivering those ITS User Services. The relationship of this Statewide Architecture to the regional and corridor architectures is shown in Figure 1.

The point of Figure 1 is to show general relationships and not hierarchy. The Statewide Architecture, like the National ITS Architecture on which it would be based, does not require a certain methodology for implementing ITS. There are some User Services, such as CVO and rural/ inter-urban applications, that are best suited for statewide implementation. The Statewide Architecture will provide the framework, in some detail, to implement these statewide ITS applications. Each region and/or corridor would still develop and maintain their own architecture, but would coordinate with the Statewide Architecture development to identify data needs, functional requirements, standards and interfaces.

There will likely be "project level architectures" for corridors or special applications that are implemented without an overarching regional architecture. These project architectures should acknowledge the statewide architecture and any future regional architecture within which the project will ultimately operate.

Finally, there may be cases where an ITS type project does not need to be a formal part of any regional, corridor or statewide architecture. These cases would be governed by any applicable local standards and requirements.

**Statewide Architecture
(Inter-Urban, Rural, CVO)**

Distrct 3
Regional Architecture(s)

Project Architectures

Distrct 2
Regional Architecture(s)

Project Architectures

I-10 Corridor Architecture
(project architecture)

I-75 Corridor Architecture
(project architecture)

Region to Region
Data Flows

Distrct 7
Regional Architecture

Project Architectures

Distrct 5
Regional Architecture(s)

Project Architectures   MPO Architectures

I-4 Corridor Architecture
(project architecture)

I-95 Corridor Architecture
(project architecture)

Project Architectures

MPO Architectures

I-75 Corridor Architecture
(project architecture)

Turnpike Corridor Architecture
(project architecture)

Project Architectures

Distrct 1
Regional Architecture

**ITS Architecture Defnes Insitutional Roles, Functions,
Interfaces and Information Flows**

Project-level, corridor and regional architectures define
and support operational and technology agreements,
aswell as local functions and interfaces to deliver ITS User
Services within each corridor or region.

There may be a single architecture for an entire District or
there may be multiple architectures for each urban areas
within a District.

The Statewide Architecture also defines and supports
inter-agency operational agreements and maximizes the
interoperability and integration of ITS through standards
and interfacesfor the information flows between regional
and corridor architectures.

Distrcts 4 & 6
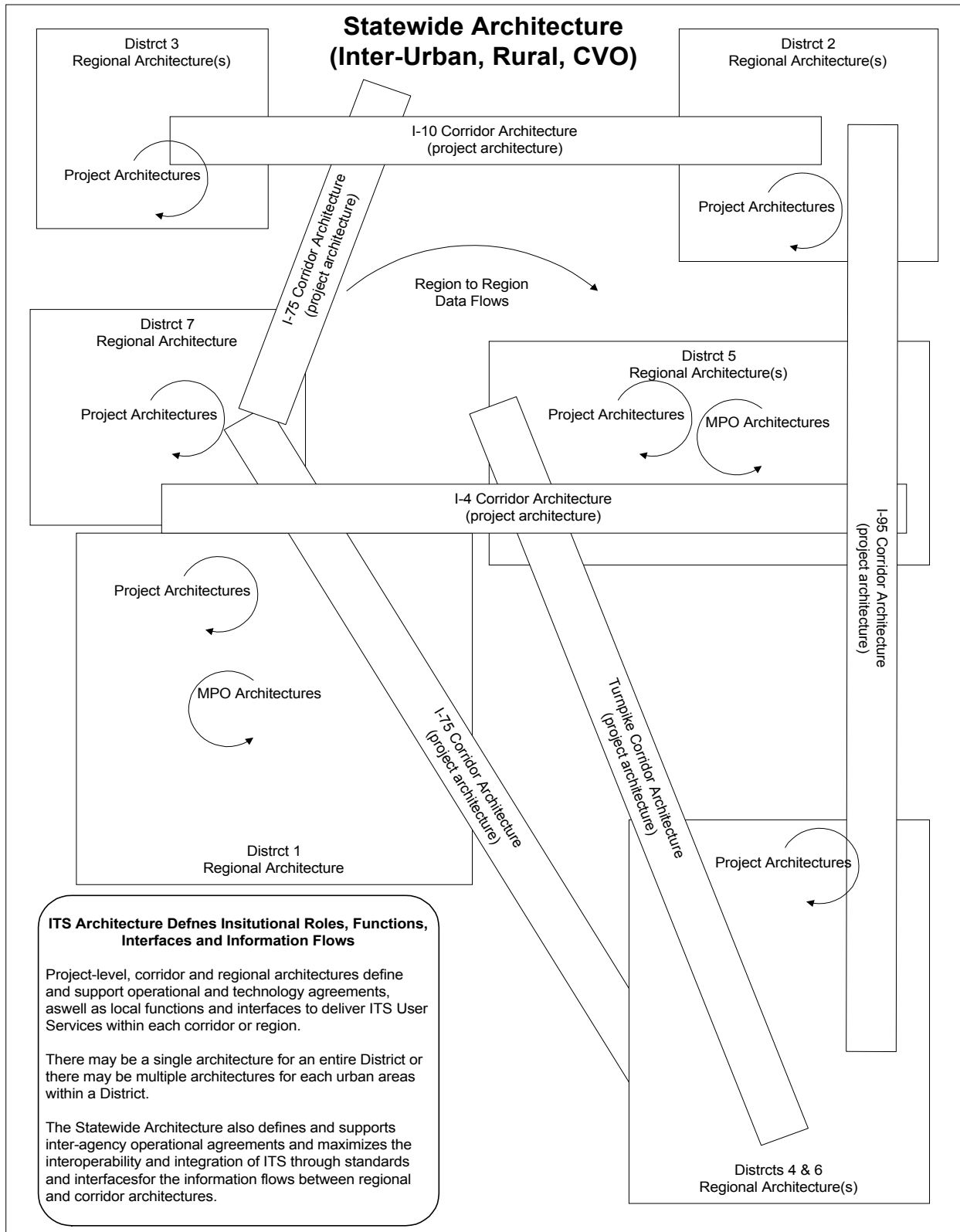Regional Architecture(s)

**Figure 1. Relationships Between Statewide ITS Architecture and Regional/Corridor
Architectures**

4. ITS Vision for Florida

This vision provides a framework to guide Florida's ITS program and is designed to be flexible enough to accommodate regional differences, but still relate to the 2020 Florida Transportation Plan (FTP) and the plans of the Metropolitan Planning Organizations (MPO) and local governments. Because ITS projects must compete for limited resources and contribute to Florida's overall goals, the ITS Vision, Guiding Principles, Goals and Objectives should reflect the unique features of Florida, the existing program legacy and the best efforts of other larger complex states.

Vision Development Background

The scope of this plan is clearly strategic in nature. Therefore, the time frame for the ITS vision, goals and objectives is long term (20 years plus) so that would fit within that of the 2020 Florida Transportation Plan (FTP). Many of the ITS strategies will be long term in nature and, therefore, compatible with the long range component of the FTP. There is no "short term" component, per se, of the ITS Strategic Plan. However, ITS offers several "early winners" that can benefit travelers now (zero to 5 years) and demonstrate the cost effectiveness of ITS strategies. The concept of ITS early winners is embodied in the guiding principles of this plan.

This ITS vision has been developed to support the 2020 FTP, since ITS is demonstrably a cost-effective means of pursuing the FTP goals.

After reviewing the visions of several states' ITS programs, it was clear that a short general statement, clearly linked into state policy would be the most useful for a Florida Vision. Program characteristics and specific services are then handled within program principals and goal-related objectives.

Florida's ITS Vision

"Nearly two decades into the 21st Century, travelers in Florida are seeing more and more benefits from an integrated and coordinated Intelligent Transportation System within each of its urbanized areas and along all major transportation corridors. ITS provides valuable services to travelers, business, industry and government that were unavailable just a few decades ago. Pedestrian, automobile and transit mobility have benefitted from real-time information sharing, route navigation, electronic payment systems and system management activities made possible through ITS. Business and commerce are both partners and benefactors in ITS using the improved information and intermodal linkages provided by the system to improve business operations. The economic vitality of Florida has never been better aided by a statewide transportation system made safer and more efficient by ITS. All stakeholders in Florida's transportation system benefit from improved safety provided by ITS technologies in our vehicles and the network of systems assisting emergency service providers. Florida's ITS Strategic Plan, first adopted in 1999 and updated regularly ever since, assures that Intelligent Transportation Systems are considered at all levels of planning, production, operations and management, providing improvements in safety, mobility and economic vitality to maximize the investment in Florida's multi-modal transportation system."

Goals and Objectives of the ITS Strategic Plan

These ITS Strategic Plan goals parallel the four 2020 FTP Goals. The corresponding objectives are designed to show how the ITS program contributes to FTP goals and can be tracked through

a common set of performance measures. Potential relevant ITS applications are shown in parentheses after each objective. This is important to help ensure a goal-oriented ITS program.

Goal 1:
Safe transportation for residents, visitors and commerce.

ITS Objectives

♦ Minimize response time for incidents and accidents (incident management programs)
♦ Reduce commercial vehicle safety violations (commercial vehicle operations safety programs)
♦ Reduce weather related traffic incidents (road-weather information systems)
♦ Minimize grade crossing accidents (highway-rail interface safety systems)
♦ Improve emergency management communications (coordination of communication frequencies; real-time traveler information systems for evacuation and major route closings, re-routings or restrictions)
♦ Improve security for highway and transit users (surveillance cameras, call boxes, and emergency services support)
♦ Improve the security, safety and convenience of pedestrians and bicyclists (improved interfaces at pedestrian crossings, signalized intersections, kiosks, surveillance systems)

Goal 2:
Protection of the public's investment in transportation

ITS Objectives

♦ Reduced vehicular delay from incidents (incident response programs)
♦ Improved peak period flow and throughput (traffic control systems and operations)
♦ Reduce cost of commercial vehicle fleet operations (CVO and intermodal systems)
♦ Assist in providing safe and efficient maintenance of traffic during project construction (work zone monitoring systems, real-time traveler information systems)

Goal 3:
A statewide interconnected transportation system that enhances Florida's economic competitiveness.

ITS Objectives

♦ Reduce cost and delay of intermodal connections (commercial vehicle operations and information systems)
♦ Minimize shipping and delivery delays to improve freight operations (real-time system management programs)
♦ Improved predictability of travel and delivery times (incident management systems)
♦ Improve efficiency of fleet operations (CVO information systems)
♦ Improve tourist access and convenience (special traveler information systems)
♦ Increased employment (new ITS industry in Florida)

Goal 4:

Travel choices to ensure mobility, sustain the quality of the environment, preserve community values and reduce energy consumption.

ITS Objectives

- ♦ Improve mobility and choices for highway and transit users (traveler information systems for conditions and modal/route options)
- ♦ Improve tourist access (specialized traveler information systems)
- ♦ Reduce need to travel (communications infrastructure to support telecommuting, teleconferencing, teleshopping, etc)
- ♦ Reduce energy use and environmental degradation (ITS systems management to reduce vehicle trips, and vehicle miles of travel)
- ♦ Improve service for special traveler needs (smart cards, computer aided dispatch and automated vehicle location system to enable true demand-responsive transit systems)
- ♦ Improved multi modal travel (smart cards, traveler information and transit management systems to reduce transit travel times)
- ♦ Reduced energy use and delay associated with major incidents (ITS systems management and route diversion)
- ♦ Improve efficiency of toll operations (electronic toll collection systems)
- ♦ Enhance and support ride sharing opportunities (high occupancy vehicle/high occupancy toll systems)

5. ITS Strategic Planning Guidelines

Typically, strategic plans review external opportunities and threats, internal strengths and weaknesses and then focus on responding through recommending and managing changes in: (1) mission, objectives and outcomes, performance measures; (2) organization and staffing; (3) program and process; (4) roles, relationships and resources.

The Vision, Goals and Objectives Report, issue papers, and organizational structure report address many of the elements of strategic planning listed in 1 through 4 above. Since there was no pre-existing ITS strategy for Florida, a lot of these strategic elements are incorporated in the ITS Business Plan, including recommendations for organization, finance and general program structure.

Next Step-Guiding Principles

Having established the policy of providing for the pro-active operation and management of Florida's transportation system, the next step for the implementation of a long range ITS strategy is to integrate ITS planning, development and operation into existing Department procedures and practices for the development and delivery of transportation services and facilities. The following guiding principles characterize the ITS Program and are designed to describe <u>how</u> Florida's ITS Vision will be realized over the next 20 years.

Planning and Development

- <u>Undertake strategic deployment</u>–clarify ITS project priorities; develop a cost-effective incremental approach to deployment, consider both short and long-term elements.
- <u>Provide a common framework for the planning, deployment and integration of systems through ITS architecture and standards consistency</u>–develop regional applications of the National ITS Architecture, maximize the use of common architecture and standards; provide for a migration plan for older (legacy) systems to meet ITS standards and architecture consistency; establish a statewide ITS infrastructure through the use of statewide and national standards and architecture.
- <u>Promote institutional and inter-jurisdictional cooperation and coordination in the planning, deployment, operations, management, and maintenance of ITS infrastructure</u>–include ITS in all regional and statewide processes for transportation infrastructure planning, development and maintenance, emergency operations planning and management, and system operations and management; optimize cooperation and coordination among key stakeholders, both "vertical" (FDOT, local government, MPOs) and "horizontal" (transit and toll authorities, police, fire, emergency management services (EMS), etc.)
- <u>Provide service on a regional, integrated and interoperable basis</u>–provide seamless service through the integration of traffic operations and transit services across jurisdictional lines.
- <u>Integrate ITS planning and ITS-related operations planning</u> with statewide, metropolitan, authority and local government planning processes; incorporate ITS plans with Long Range Transportation (LRTP) and with State Implementation Plans (SIP), Transportation Improvement Program (TIP), Congestion Management System (CMS) Transportation System Management (TSM), activities, etc.
- <u>Support concurrency/growth management program</u>–use ITS as means of both monitoring and supporting program objectives; maximize the use of ITS developed data as a resource for other

planning needs.

- Emphasize Intermodal/multi modal orientation to enhance both passenger and freight connections and transfers at ports, airports, and via all applicable modes.
- Utilize proven cost-effective technologies to deliver new and enhanced services to travelers and system users; use total life-cycle cost analysis to select appropriate ITS components and designs.

Operations & Management

- Provide performance-driven service–provide real-time operations and management of all transportation systems to maximize system performance, safety and time reliability; use ITS data to make real-time traffic control decisions and to evaluate transportation system performance.
- Adapt system operations and management strategies to changing conditions–incorporate new and modify existing service attributes based on performance evaluations.
- Provide emergency operations support–ensure traveler information systems and traffic management systems be capable of suporting hurricane and other emergency evacuation procedures.
- Actively pursue inter-agency operations and management agreements–agreements for the operation, maintenance, staffing, data-sharing and management of ITS deployments.

Finance

- Provide ITS Funding for Architecturally consistent projects–funding priorities should favor those ITS projects which are consistent with state and national ITS architecture and standards.
- Leverage value of "conventional" capital investment in roadway and transit improvements through ITS features that improve operational efficiency.
- Develop ITS funding strategies–pursue development of specific funding strategies for ITS deployment in the MPOs, TIPs and Department's Work Program. Such strategies should include funding for long-term operations and management.
- Capitalize on private sector resources–access technology, capital and entrepreneurship through public-private partnerships and private sector information service providers (ISPs); coordinate electronic payment services, such as "smart card technology", with private sector financial institutions, maximize customer-responsive commercial opportunities (with revenue potential); capitalize on innovative finance for both capital and operations funding through the use of privatization, commercialization, and cost-sharing; support private sector initiatives for personal safety and mobility (e.g., May Day systems, on-board navigation, etc.).

Public Awareness/Involvement

- Include education, training and outreach for policy makers, general public and technical staff.
- Respond to special user needs–provide for the mobility and safety needs of commuters, tourists, goods movement, pedestrians, bicyclists, older road users and mature drivers.
- Identify and support ITS advocates/champions–seek out and promote ITS champions in local government, public agencies, academia, and the private sector including the general public.

Research & Development

- <u>Support continued research and operational testing</u>–provide a systematic research program to evaluate emerging technologies, new systems, markets, and planning methods.

6. ITS Business Plan

ITS projects and activities are being initiated and implemented all over Florida. Several projects, such as the I-4 Freeway Operations Center in Orlando, the Daytona Area Smart Highways (DASH) Operations Center in Daytona, the Golden Glades Interchange Integrated System in Miami and the Sunguide Program in South Florida, are currently operating. Freeway Service Patrols are operational on I-4 in Orlando, on I-595 in Broward County and on I-95 in Palm Beach, Broward and Dade Counties. There are at least forty other ITS projects completed or currently under construction in various parts of Florida and many more are planned. These ITS activities are occurring with minimal statewide coordination and direction being produced by the ITS Working Group. Florida Department of Transportation (DOT) has concluded that coordination of efforts among the Districts and standards for deployment will provide for more efficient use of public resources.

6.1   The Purpose of the Business Plan

The ITS Strategic Plan is the long range (20 year planning horizon) element that describes the State's vision and guiding principles for ITS. It outlines in broad terms the Department's ITS Program, identifies directions in ITS procurement issues, operations and maintenance of ITS, rural applications, ITS user services that the Department desires to be deployed, and general roles of stakeholders. The purpose of this Business Plan is to document the resources, arrangements and program elements needed to implement the Florida Statewide ITS Strategic Plan for the next five years (1999-2004). This document also serves to identify, provide justification for and support the development of a statewide architecture and ITS projects that meet the Florida Statewide ITS vision, goals and objectives and guiding principles. The Department will use this Business Plan to define the application of advanced technologies in Florida and the near term activities needed to implement the Statewide ITS Strategic Plan. The process to update and maintain the Plan is shown in Section 6.7.

The ITS Business Plan includes recommendations for modifications to the Department's policy (see Section 6.3). As these recommendations are acted upon over time, future updates of the Business Plan will have fewer and different policy issues to be addressed. As this Strategic Plan outlines the vision and activities of the Department, other participants in the Florida ITS Program such as other modal agencies, the MPOs, other states, the private sector and jurisdictions within Florida are encouraged to use this document for guidance in developing their own ITS plans and programs. When developing any ITS plan, policy makers and planners are encouraged to follow the ITS axiom of "think regionally and act locally". Local areas are more aware of their own problems and which solutions may be successful and publicly acceptable. Regional thinking is necessary to ensure that coordination is achieved across jurisdictional boundaries providing for maximum benefits to the citizens of Florida.

6.2   New Strategies for a New Era: Managing and Operating the Transportation System

The goals, objectives and strategies of the existing Department Agency Strategic plan focused on the trade-offs in the use of resources for existing facilities' safety and preservation vs. new capacity and services. This approach is not only found in Florida. The Twentieth Century national surface transportation program has been substantially focused on the development of basic infrastructure. The Interstate Highway network and major rail transit investments symbolize the achievements of this construction orientation. As a result, inherited concepts, technology, programs and institutional

structure also reflect the needs of a facility development and preservation era. With the addition of major capacity improvement often being cost prohibitive and difficult to construct because of policy, political and environmental constraints, maximizing the operation efficiency and safety of the existing transportation systems will take on added significance.

Management and Operations of the Transportation System

The new challenge for Transportation in the 21st Century is introducing active real time management of these facilities, operating them to maximum advantage on a continuing sustainable basis–as has long been the case in other forms of transportation such as transit, rail, waterways and aviation.

This shift in emphasis reflects the reality that today's economy and quality of life are critically dependent on maintaining passenger and freight service on the basic network in the face of growing travel demand and capacity limitations–while at the same time providing for the range of new mobility needs of a service-based, information-driven economy–including reliability, security and navigation. The imperative for a consistent and integrated approach to Management and Operations results from a series of forces including:

- Growing and Changing Demands–Urban areas are facing a 50 percent growth in travel over the next 20 years. Spreading peaks and providing new movement patterns for which the existing network was not designed emphasize the need to actively manage the existing facilities to better respond to changing requirements.
- Constraints on Traditional Approaches–The impacts of new facility construction both high fiscal and environmental costs-often set practical limits on additions of new capacity. This necessitates the most aggressive efforts to make the best use of available facilities. Additionally, Florida growth management law constrains new roadway capacity.
- Growing Impacts of Disruptions–The "unpredictable" disruption caused by the high frequency non-recurring incidents including crash, breakdown or weather-related incidents are now routinely causing over fifty percent of urban travel delay. Added to this is the continuing reconstruction and maintenance activities associated with the aging infrastructure. These non-recurring incidents are best addressed through the adoption of operational measures.
- Increased Customer Responsiveness–The service orientation of the US economy is generating customer expectations–both passenger and freight–for a broader range of performance and service options.   Other sectors increasingly accommodate new services and options appropriate to a "just-in-time" economy. In transportation, these would include reliability, navigation, traveler information, security and crash-avoidance–in addition to speed and capacity.
- Introduction of Information Technology and Systems Engineering–The introduction of new computation, communication and control technology now provides the basis for ITS system architectures which can support a wide range of user services that provide operational and management features.

The Emerging Approach

The emerging approach to Management and Operations–in response to new needs, available

technology and emerging concepts–utilizes ITS as part of a set of related activities that differentiate it from traditional public works approaches. While potential ITS applications would vary in different settings, the essential elements of management and operations include:

- Performance Monitoring–Monitoring of transportation facilities performance on a real time basis including roads, transit or intermodal terminals to provide information for improved operations
- Incident Management–Detection, response, and management of incidents or other disruptions on a seamless regional basis to minimize delay and improve safety
- Information/Data Sharing–Aggressive information sharing, operational cooperation and joint service provision programs among agencies (across sectors), jurisdictions and private service providers for seamless coordinated service
- Facility Improvement–Institutionalizing incremental facility improvements through continuous adjustment of operations and related service features to modify user travel patterns in ways that maximize efficiency and safety
- Traveler Information–Informing the traveling public, businesses and commercial carriers about current and predicted travel conditions and viable travel options to better match travel behavior with available capacity
- Public/Private Partnerships–Supporting private provision of a variety of traveler information, logistics, security and amenity services–both free and custom–tailored consistent with the wide range of needs.
- Maintenance of Operations–Continuing maintenance of operational infrastructure to support fuller utilization of existing infrastructure investments.

These elements of Management and Operations also describe many of the essential elements of Intelligent Transportation Systems (ITS). In fact, the application of a Management and Operations program reveals the proper role of ITS within an organization. ITS is a collection of tools that enables operating entities to manage and operate the various elements of the surface transportation system efficiently.

The Benefits

Management and operations improvements generally provide measurable beneficial impacts on identifiable groups compared to capacity oriented investments, they are cost-effective in the short-run and, in the long run can be "tuned" and upgraded to provide additional advantages. This is demonstrated through applications which show traffic surveillance and signal control resulting in local travel time improvements of 10-15%, ramp metering reducing crashes by 50% and incident management programs reducing delays by 10-45%. These types of improvements typically have benefit–cost ratios, which average 9:1. An important aspect of management and operations strategies is the ability to maintain and recover capacity lost to incidents. Simulation shows that systematic applications of integrated Management and Operations can substitute for a significant proportion of conventional capacity increases.

Research into the economic impact of ITS conducted as a part of this strategic planning effort suggests there are significant economic benefits to be gained in Florida by the implementation of a statewide ITS. Overall the direct economic benefits of deploying a statewide ITS to Florida over the next 20 years is estimated to reach $13 billion. ITS is expected to have positive impacts for the following applications:

- Support of highway pricing initiatives/electronic toll collection,

- Improved regional data collection and dissemination for transportation planning,
- Improved inter-jurisdictional transportation planning, traffic operations, and incident management,
- Opportunities for new service and product innovations,
- Traffic operations during hurricane/flood/fire evacuations,
- Restoration of capacity after disasters/major incidents,
- Tourist travel information,
- Resident travel information/reliability of employee arrival,
- Traffic operations for draw bridges,
- Reliability of goods movement/impact on just-in-time delivery,
- Management of traffic/travel information/electronic clearance at intermodal terminals/access to ports and airports,
- More efficient allocation of existing highway capacity,
- Incident management/special events traffic management, and
- Management of traffic under construction.

6.3   The Approach for Management and Operations of the Transportation System in Florida

State and local governments are the owners of the nation's principal surface transportation infrastructure. In Florida, the Florida Department of Transportation (FDOT) is responsible for the Interstate system and the State Highway System (the elements of the National Highway System as defined for ISTEA and TEA-21 funding). While the Department is responsible for the management and operation of the State Highway System, priority has also been placed on the management and operation of the Florida Intrastate Highway System (FIHS). The FIHS consists of the Interstate system and Florida's Turnpike plus a number of high volume, limited or controlled access roadways, which is a small portion of the total transportation system in Florida.

Institutionalizing Management and Operations of the entire transportation system is a shared responsibility of the Department, local transportation agencies and regional planning and operating entities. The metropolitan focus of the federal aid program has been essentially urban, limited to "3C" planning and programming for major capital improvements. Nationally and in Florida, few areas have yet undertaken the extent of regional cooperation and coordination required for seamless Management and Operations. Nor has the federal aid program provided such a focus.

The first step for managing and operating the transportation system in Florida is to adopt a formal policy to do so. The Department has adopted the 2020 Florida Transportation Plan (FTP). The FTP has four goals for the Department, listed in priority order:

1. Provide safe transportation for residents, visitors and commerce.

2. Protect the public's investment in transportation.

3. Provide a statewide interconnected transportation system that enhances Florida's economic competitiveness.

4. Provide travel choices to ensure mobility, sustain the quality of the environment, preserve community values and reduce energy consumption.

> **The Department should *add a goal or expand an existing goal in the FTP* that addresses the management and operation of the state's transportation system by providing a statewide, integrated transportation system that is managed and operated in real time. This new (or enhanced) goal should be in third priority order after the Safety and Preservation goals.**

Section 4 presented the ITS Vision for Florida. The FTP goals were used to develop ITS specific objectives for this Strategic Plan. Similar objectives for the new or expanded FTP goal need to be developed. Examples of these objectives are:

- Adopt a common framework for the planning, deployment and integration of systems through ITS architecture and standards consistency.

- Provide performance-driven service.

- Capitalize on private sector resources.

6.4   The Florida ITS Program

The ITS Program in Florida will be developed to achieve the vision and guiding principles of this Strategic Plan. This Business Plan describes the initial process or methodologies needed to be achieved over the first five years of the program, 1999-2004.

6.4.1 Establish a Statewide ITS Program

> **The Department should establish a *Intelligent Transportation Systems Program* as a part of the Program Resource Plan process under the Assistant Secretary for Transportation Policy to be responsible for all ITS activities of the Department and for the Department's role in incident management programs.**

The Department should establish an ITS Program that will be responsible for all ITS and incident management activities conducted by the Department. The current statewide FIHS program should be considered as a model for this project. This ITS Program Office should be located in the Central Office and will work in consultation with the districts and other stakeholders. The Program Manager should report directly to senior management in the Department. In addition to ITS and incident management, other activities could be defined for the ITS Program as the program develops.

> **The Department should establish a position of statewide *ITS Program Manager* with a responsibility to manage the ITS budget, staff and resources and to ensure coordination of all ITS and incident management activities.**

The specific functions and activities that will be the responsibility of the Department ITS Program Manager and staff are as follows:

u   Policy, Program Development, Budgeting
  • Develop and maintain ITS policies and procedures
  • Coordinate ITS input in Program Resource Plan, Legislative Budget Requests and Work Program Development
  • Provide guidance on determining ITS staffing and resource needs
  • Develop or respond to Federal State Statutory and regulatory changes affecting the ITS program
  • Set priorities for and coordinate the Statewide ITS Research Program
  • Determine ITS grant sources and coordinate grant applications

u   ITS Architecture and Standards
  • Coordinate regional and statewide architecture development to ensure consistence with the National ITS Architecture
  • Ensure statewide consistence in incident management and implementation
  • Coordinate the development of an Operations and Management Manual and any other needed supporting manuals, handbooks or guidelines.
  • Coordinate the development of data management/warehousing standards consistent with national requirements and Department databases
  • Ensure ITS applications standard consistency
  • Provide support and guidance on migration of "legacy systems" to national and statewide ITS standards
  • Coordinate, review and input to national ITS architecture and standards development issues

u   Intergovernmental and Public/Private Stakeholder Input and Coordination
  • Determine the needs and coordinate and support the development of a statewide ITS training, education and public awareness program
  • Ensure coordination of ITS activities with public transportation organization including transit agencies, rail agencies and companies, and airline and airport authorities.
  • Promote, coordinate and support private sector "stakeholder" involvement activities
  • Coordinate state-level partners in service delivery (police, fire, medical)
  • Develop and maintain the ITS element of the Department's webpage integrating general ITS information and real-time traveler information from the Transportation Management Centers
  • Coordinate statewide communication with federal officials

u   Commercial Vehicles and Toll Operations
  • Coordinate the development of a safety based pre-clearance CVO element for Florida
  • Coordinate CVO activities with other states, organization and the FHWA
  • Coordinate the development of a seamless electronic toll collection systems for all toll facilities in Florida

There are several reasons for creating the position of ITS Program Manager under the Assistant Secretary for Transportation Policy. These include:

1. ITS provides both support and enhancement for all Department activities and programs that report to Transportation Policy, including Planning, Public Transportation and Engineering. Thus, a Program Manager at this level will be able to reach out directly to the managers of each of these areas.
2. This Strategic Plan includes recommendations for changing the way the Department operates and manages the transportation system. A Program Manager at this level will have the authority to implement these recommendations across all other program areas.
3. A high level ITS Program Manager will function as a central point of contact for local government agencies, educational institutions and private sector interests. This will help keep the emerging ITS program coordinated at all levels.

4. A high level ITS Program Manager position is commensurate with corresponding ITS management positions in other states and the US DOT Joint Program Office for ITS. This will provide Florida's ITS program will both a high level of visibility and coordination with the federal ITS program, thereby improving opportunities for receiving federal funding.

The recommended staffing level for the Department ITS Program is shown in Figure 2. The ITS Program Manager is, of course, the first priority and should be created as soon as possible. It is recommended that the remainder of positions be established within five years. The order of priority would be for the public information and urban positions first followed by the CVO and architecture positions and then the administrative assistant position.
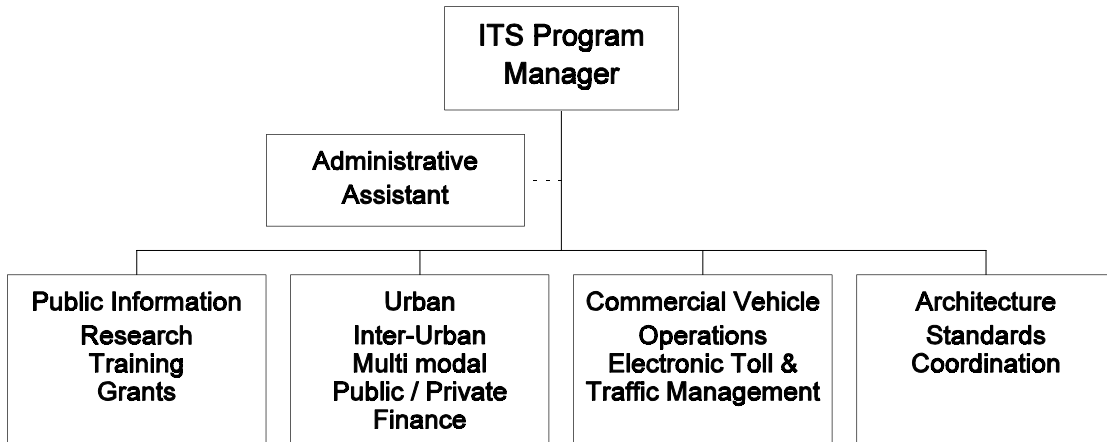
Figure 2. Recommended Staffing Level for the Department's ITS Program

In addition to the staffing of the ITS Program Office, other Central Office ITS support positions will be needed. For example, the Office of Traffic Operations will require staff to develop and maintain systems architecture, standards and direct research and training. The Systems Planning Office will require staff to coordinate ITS planning at the statewide and local levels. The Public Transportation Office will require staff to coordinate and support ITS activities in transit and port agencies. Table 1 shows the projected staffing for the Department's Central Office ITS Program over the next five fiscal years.

Table 1.
Recommended Department ITS Program Staffing by Fiscal Year

Central Office	FY 97-98 & 99-00	FY 2000-01	FY 2001-02	FY 2002-03	FY 2003-04	FY 2004-05	Total
ITS Program Office	-	1	2	2	1	-	6
Traffic Engineering	-	1	-	-	-	-	1
Planning	-	1	-	-	-	-	1
Public Transportation	-	1	-	-	-	-	1

The first duties of the ITS Program Manager will be to develop a budget to fund the staff and program activities and organize the staff needed to carry out the program's activities over the initial five-year period.

The Department should develop ITS Program performance measures that conform to the State's performance-based budgeting requirements.

Program performance measures are needed for 1) design purposes, 2) accountability requirements of the legislature, the public and the FTP and 3) the tracing of the ITS Program's progress. These performance measures will be used to evaluate the Program's effectiveness and to provide the data necessary for Florida's performance-based program budgeting process.

Another application of performance measures should be considered by the ITS Program. That is the development of ITS application standards for deployment. An example of ITS application standards could be that a freeway management system is warranted in an urban area when the volume/capacity ratio reaches 1.0 for several contiguous freeway segments. The application standards will vary by context, i.e. urban vs. rural, level of congestion.

6.4.2 Establish District ITS Programs

Each District should create a District ITS Program and designate a District ITS Program Manager who will be responsible for District ITS and incident management activities and will ensure full integration with the urban regions within that District.

A position corresponding to the statewide ITS Program Manager should be created in each district. The District ITS Program Manager should perform a role similar to the statewide program manager at the District level. As the District ITS Program develops and expands, the Department should consider elevating this program to the District Director level. The specific functions and activities that will be the responsibility of the District ITS Program Manager are:

u   ITS Planning
   •   Develop and maintain a long-range District ITS program and resource plan
   •   Develop and pursue an ITS public involvement plan for the District; seek inclusion of ITS tasks in the Unified Planning Work Program of the District's MPOs; and assist MPOs with the inclusion of ITS elements in the Long Range Transportation Plans
   •   Promote the advance of ITS projects in the MPO Transportation Improvement Programs
   •   Oversee the development and maintenance of ITS architectures so that consistency can be attained to the maximum extent feasible
   •   Coordinate ITS Planning with adjacent Districts and with statewide activities
   •   Develop and manage ITS based data collection, storage and distribution system to support general transportation planning and traffic engineering activities
u   ITS Integration
   •   Within ITS architecture development, assure that systems engineering principles are utilized
   •   Promulgate and promote the institutional agreements needed to meet adopted ITS architectures
   •   Within the ITS architecture development, assure integration of the several transportation modes.
u   ITS Production
   •   Seek inclusion of adequate skills on design staffs to produce ITS plans and specification
   •   In coordination with statewide activities, develop and maintain ITS component standard specifications
   •   Oversee production of "stand alone" ITS projects and review plans of other projects for potential ITS inclusions
   •   Contribute to maintenance of traffic (MOT) plans for all construction projects
u   ITS Construction
   •   Assist or perform, as necessary, in the inspection of the construction of ITS projects to assure compliance with ITS architecture and standards
   •   Assure that existing ITS infrastructure is not damaged by any other construction
u   ITS and Public Transportation
   •   Promote use of ITS in Public Transportation in accordance with an adopted ITS architecture
   •   Provide technical and financial assistance and ITS support to transit organizations
u   ITS and Expressway Authorities
   •   Promote use of ITS within an adopted architecture
   •   Assist Expressway Authorities with their ITS planning and implementation
u   ITS Operations
   •   Oversee the operation of regional transportation management centers to assure reliability of center functions
   •   Coordinate highway operations with the Florida Highway Patrol, local governments and transit operators, Emergency Operations Center Director and other emergency services
   •   Develop and maintain District management, operations and maintenance procedures
   •   Develop and maintain a District ITS training program
   •   Assist the public, the press and other governmental agencies with information on the District ITS Program activities
   •   In coordination with the Department's statewide Webpage, develop and support District level Webpage information
   •   Promote development and coordination of a network of Operations Centers

A level of staffing similar to the Central Office ITS Program will be required to support the District ITS Programs. The recommended level of staffing, by fiscal year, is shown in Table 2.

Table 2.
Recommended District ITS Program Staffing by Fiscal Year

District Office	FY 97-98 & 99-00	FY 2000-01	FY 2001-02	FY 2002-03	FY 2003-04	FY 2004-05	Total
District 1	-	1	2	2	1	-	6
District 2	-	1	2	2	1	-	6
District 3	-	1	2	2	1	-	6
District 4	-	1	2	2	1	-	6
District 5	-	1	2	2	1	-	6
District 6	-	1	2	2	1	-	6
District 7	-	1	2	2	1	-	6
Turnpike District	-	-	-	-	-	-	0

The District ITS Program Manager will need to work closely with the district Government Liaison group and the MPOs and local operating agencies in their District. All projects, including any ITS deployment, ITS studies or incident management deployment must be part of the MPO long range transportation planning process and be consistent with the National ITS Architecture to receive federal funds. Coordination with the MPOs and local agencies will provide for project tailoring to the local situation and possibly additional funding or assistance.

6.5   Initial Actions for the Department's ITS Program

In the course of developing this Business Plan, the Department's ITS Working Group (representatives of each District and the Planning and Traffic Engineering offices of the Central Office) adopted guidance for level-of-service (LOS) for ITS operations statewide. This concept was developed in the Operations and Maintenance Issues paper produced for this project. Furthermore, the Department ITS Working Group adopted a statewide goal of operating traffic management and incident response centers on the Interstate system in all urban areas for twelve (12) hours each Monday through Friday (defined as LOS 3). Some Districts may be able to achieve that goal quickly and may decide to extend service to other segments of the FIHS or to provide additional services.

Each District should develop an ITS infrastructure and initiate development or enhancement of a transportation management center focusing on the Interstate highways. Consideration should be given to evolving the center to have multi-modal management capabilities and

to be operated in urban areas at Level-of Service (LOS) 3 within five years. The Districts will develop an implementation plan to achieve this goal and the Department's ITS Program will support this effort.

6.5.1   Develop Guidance for ITS Maintenance

Districts should document all ITS operations and maintenance costs, by component, and develop a process to reliably estimate the cost of providing emergency response and routine periodic maintenance for use and support in obtaining adequate funds to carry out maintenance responsibilities. Documenting in-house costs will also allow agencies to estimate outsourcing costs if they elect to out source maintenance activities.

Each District should develop a maintenance plan and annual maintenance cost estimate in order to develop budget and staffing needs. The Department's ITS Program will coordinate and assist in this effort.

Whether in-house or out sourced resources provide maintenance, agencies should develop a preventative maintenance plan. A good preventative maintenance plan will clearly note all required materials, equipment, and procedures, thus allowing in-house staff to expedite and achieve a higher level of consistency and quality in conducting preventative maintenance activities. A good preventative maintenance plan will also allow agencies seeking to out source to properly budget, advertise and receive quality proposals from interested parties.   Either way, preventative maintenance, if carried out properly, will reduce response maintenance activities. A maintenance plan should include:

*   An adequate spare parts inventory developed and maintained to support proper and professional in-house response maintenance activities.
*   A definition of safety requirements, liability, acceptance levels of service, and the degree to of various types of malfunctions tolerance, which establishes priorities needed for the maintenance of specific ITS equipment. Overall, scheduled preventative maintenance is an important element of a comprehensive ITS maintenance program. However, it is also realistic to expect that response maintenance will also create a significant demand on maintenance resources.
*   Definition of the necessary maintenance support of field equipment linked to traffic control centers. The prompt repair of field communications and other equipment linked to the traffic control center is essential to the effective real-time functioning of ITS system.
*   Procedures to maintain complete as-built and as-modified drawings and specifications of all system equipment.
*   A list and description of each ITS maintenance activity.
*   Recommended/required ITS maintenance standards.

Procedures to effectively maintain system software should be given a high priority to minimize liability risk. Staffing levels should be maintained for overseeing those areas that can be maintained in-house and funding should be provided for those areas that require outsourcing. District maintenance staff should be as familiar as possible with the operation and interaction of the software because with highly complex software, best results are obtained when in-house and outsourcing staff can work closely together. In order to achieve effective maintenance of system software, the following items are recommended:

- Utilization of the Department's Office of Information Services.
- An annual maintenance contract on all computers and other hardware that is not easily supported by agency maintenance staff.
- An annual maintenance contract on all computer software.
- A detailed inventory of all system components.

6.5.2 Develop Guidance for ITS Operations & Management

The Department should develop an ITS Operations Manual. Each District will adapt the policies and procedures to their requirements.

The Department's ITS Program, working with the Districts, should develop an operations manual for system operator reference. A typical manual should cover three basic areas–general information, policies and procedures on internal O&M, and polices and procedures involving traffic management.

Operations and maintenance personnel should be included in all phases of the project to ensure that their perspective is included in all phases of the system life cycle. This approach will also help train these staff in all aspects of the system they will be operating and managing.

6.5.3 Develop ITS Operations and Management Staffing Requirements

Staffing levels should support the needs and intent of the system. Adequate staff considers all shifts without jeopardizing the individual staff member's mental and physical well being and their ability to perform the task at hand. A signal systems oriented traffic control center that is highly automated and typically addresses routine day-to-day functions could operate with a reduced staff. On the other hand, a traffic operations center with a need for interagency communications, information and data sharing on a 24-hour basis will be required to maintain a significantly greater number of staff.

Each District should develop ITS staff and requirements and training program that will enable them to meet the ITS services they plan to deliver over the next five years.

The District ITS Program should define staff requirements and classifications. The staff levels should be phased in, commensurate with the level of ITS services provided by the District. It is also recommended that incident management services be provided on the roadways within the TMC coverage area, especially on the FIHS. It must be noted that additional support staff may be required for administrative and maintenance activities.

In defining ITS Program staff requirements, the Department should explore opportunities for public/private partnerships and partnerships with local government agencies and other state agencies (e.g., Florida Highway Patrol) to provide operational support for the Department's ITS. The staffing guidelines developed in the Operations and Maintenance Issue Paper provide recommendations on which positions are candidates for these types of partnerships.

For freeway management systems, staffing with no less than two system operators per shift is recommended. This staffing recommendation depends upon the composition, intent, and functionality of the traffic operations center. The need for a break, personal security, lavatory relief, meals, and continuity of operations requires more than one system operator, particularly during major incidents and events.

Staffing guidelines for a typical urban freeway operations center are presented in the Operations and Maintenance Issue Paper. These are guidelines only and their use in determining District staffing will depend greatly on the type of program and concept of operations defined by the District for each center. Other factors that will impact staffing requirements of a particular traffic management center include deployment phasing and geographic area of coverage.

Based on the recommendations in the Business Plan and the Operations and Maintenance Issues Paper as well as an assessment of current staffing and operations, the Department's ITS Working Group developed requirements for ITS operations and maintenance staffing for the next five years. Table 3 presents the requested full-time equivalent ITS positions by district.

Table 3.
Requested ITS Operations and Maintenance Staffing by Fiscal Year

District Office	FY 97-98 & 99-00	FY 2000-01	FY 2001-02	FY 2002-03	FY 2003-04	FY 2004-05	Total
District 1	-	-	-	-	-	-	0
District 2	6	-	-	-	-	-	6
District 3	-	-	-	-	-	-	0
District 4	-	2	-	1	1	-	4
District 5	6	2	2	2	2	2	16
District 6	5	4	4	3	2	5	23
District 7	-	-	1	3	3	6	13
Turnpike District	-	-	-	-	-	-	0

Most Districts will locate their TMC coverage in urban areas however some Districts (particularly Districts 1 and 3) will likely have significant rural and/or inter-urban applications. If so, the LOS requirements for these rural and inter-urban applications may be different than those listed for urban areas.

An on-going training program to provide a well-trained and cross-trained staff for both operating and managing systems must also be developed. Elements of the training program should include exposure to the system architecture, other traffic, transit and related operational systems, debriefings of actual events, and funding requirements for each element of the system.

6.5.4 Implementation Alternatives for ITS Operations and Management

Outsourcing should be considered as an appropriate method to obtain the necessary staff to provide support for Operations and Management issues and to supplement District staff. Software and hardware maintenance, communications maintenance, and system administration lend themselves to outsourcing.

Each District should assess staff resources and capabilities to determine which, if any, operations and maintenance functions are appropriate for outsourcing.

A sound estimate that addresses the District's strengths and weaknesses should be developed prior to determining the appropriate Operations and Management implementation course. Liabilities and risks should also be considered in selecting the best implementation course.

6.5.5 Develop Guidance for ITS Procurement

The Procurement Issue paper produced for this project discussed general guidelines the Department should employ in preparing for ITS procurements and provided recommendations for which contracting methods should be considered for specific procurements. There are basic steps described in that paper to be considered in preparing to purchase ITS. While these generally apply to system and software acquisitions, many of these steps can and should be applied to acquiring consultant services, as well. A key decision in this process is to select an appropriate contracting method. The issue paper presented a number of contracting types and issues to consider for each type of procurement.

The Department should conduct an <u>in-depth</u> analysis of the Florida Public Records Law and existing Florida contracting procedures to assess their impact on ITS procurements and private sector response and provide recommendations for needed modifications.

This Strategic Plan recommends that the statewide ITS Program Manager work with the Florida Attorney General and other agencies to assess several issues regarding procurement for ITS. The breadth and scope of the Florida Public Records Law has been cited as a significant barrier to effective ITS procurement in the state. But very little research and information exists on how the law actually operates with respect to ITS procurements in particular. Significantly more research is needed to truly understand the implications of the law, and "how far the envelope can be pushed." While the language of the statute is restrictive, the law does provide for some exceptions. There is no case law, Attorney General Opinions (AGOs), or detailed DOT guidelines on how the law is to be interpreted. There may be strategies available to reduce or eliminate some of the perceived barriers created by the law. The Orlando-Orange County Expressway Authority (OOCEA) found it had to request an amendment to the Public Records Law in order to protect the privacy of its customers using the new E-Pass electronic toll collection (ETC) system. Without the amendment, which was passed in 1995, all toll records (including times, dates and places of passage) could have been open to the public.

The Department is also encouraged to consider developing new contracting method for ITS procurements. There has been interest and some effort in other states to develop new contracting methods for ITS procurement (or to adopt existing procurement methods from other state agencies

to buy ITS). Florida should consider (perhaps in conjunction with other states and/or with the Federal government) developing these new procurement techniques. Other states have toyed with the idea of creating new contracting approaches, building on past procurement successes, and incorporating lessons learned from past failures.

6.5.6 Prepare Statewide and Regional ITS Architectures

> **The Department should develop and maintain a statewide ITS architecture and supporting standards. This architecture should utilize the National ITS Architecture and adapt as needed to meet Florida's needs.**

The scope of a statewide architecture must recognize and accommodate existing regional ITS architectures in Jacksonville, Orlando, the Tampa Bay area, Miami and Ft. Lauderdale as well as corridor architectures such as for I-4, the Florida Turnpike and existing ITS infrastructure (legacy systems). The statewide ITS architecture should focus on inter-urban and rural applications, but should also add value to urban areas. ITS development would be preceded by an analysis and mapping of the User Services needed to meet the adopted concept of operations.

> **Each District, in consultation with the appropriate local governments and MPOs, should develop an architecture or framework for short and long term comprehensive ITS deployment for each urban region.**

A concept of operations will allow for the desired uses of the infrastructure, thus lowering costs by avoiding unnecessary replication of subsystems for individual purposes. The regional architecture approach would be developed within the ITS National Architecture and used as an appropriate template for user services and market and equipment packages for the region. This systems engineering approach also saves cost by avoiding early obsolescence or failure of ITS projects/subsystems.

The District, in consultation with its MPOs will determine the definition of an urban region. Some Districts may determine that one District wide architecture is appropriate while others may define several urban area architectures within a District. Where more than one architecture is developed within a District, the District is responsible for coordinating and integrating the individual urban areas.

6.5.7 Define Project Implementation Procedures

> **The Department should develop ITS project implementation procedures. The procedures should cover both the planning and project design phases.**

The Department's ITS Program, working with the Districts, should prepare detailed planning level implementation procedures in conjunction with the MPOs in accordance with FHWA guidelines for each regional ITS deployment and individual project. All phases of project development should be addressed for a well thought out project concept and deployment plan. One approach to ITS deployment does not fit all projects. Each planning level regional and project plan should have adequate resources applied to thoroughly address all implementation plan aspects with project

specific analyses to maximize benefits relative to cost and provide decision inputs to the design, construction and operations project stages. The procedures should address architectural consistency, regional integration and standards, stakeholder input expanded beyond the traditional participants, guidelines for project cost estimates and methods of procurement.

In the project design phase, each ITS project should include preliminary design studies and tradeoff analyses to determine the most cost-effective design from a life cycle cost standpoint. This is especially important with the major subsystems such as communications, control centers, changeable message sign, detector stations and closed circuit television subsystems. Recurring costs of the Department and operators resulting from the design over the project's life cycle must be considered also.

ITS design guidelines should be developed by the Department for ITS projects in the areas of component details and placement, and their density along the roadway. These guidelines will be helpful for streamlining the planning and design process for new deployments. The guidelines will also serve as a starting point for consistent regional deployments.

6.5.8 Develop Statewide ITS Specifications, Standards and Guidelines

The Department should develop ITS project standards and specifications.

The Department should develop and maintain statewide ITS specifications, and standards for project elements, based on national guidelines such as NTCIP and experience in Florida and other states. They need not be singular for each component, but serve as a baseline for system designers, contractors and suppliers. This will serve to level the costs of ITS elements around the state and reduce the overall costs as bidders begin to recognize the lower risk of known and understood requirements. The specifications should address minimum functional requirements and proven technologies, while remaining flexible to innovative technology.

The Department should also evaluate and revise current guidelines and develop new ones as needed for contract administration for ITS projects, addressing procurement methods, and warrantee and payment provisions.

6.5.9   The Roles of the Department, the Districts and the MPOs

The Department should coordinate with and provide technical assistance, education and training, to the MPOs as they integrate ITS into their long range transportation planning process.

The Department has a role in ensuring consistency and standards across Florida so that the public encounters a "seamless" system while using the transportation system. The Districts will be applying these standards and deploying ITS at the local/regional level and their role is ensure that projects are integrated with other projects. The MPO's role is to define projects that can be integrated with other projects and to fund them in the long range plan and TIP. Each partner must work closely with the other partners to achieve this integrated, "seamless" transportation system.

The Department, working in cooperation with the MPOs and local governments, should ensure the development of an ITS architecture for each urban area consistent with National

ITS Architecture guidelines. This should include the development of an ITS task in the unified planning work program and an ITS element in the long range transportation plan, and definition of the roles for the MPO and operating agencies in ITS deployment.

The successful integration and main streaming of ITS initiatives into the overall transportation planning, programming, and project delivery process does not require making radical changes to the "traditional" highway and transit infrastructure planning and programming framework. Rather, success in advancing ITS initiatives requires a major shift of thinking from capacity improvements to the operation of the system, not a shift in the transportation planning process. The process of advancing ITS projects may start with local initiatives, but must come through the MPO process, coordinated with the District. Other projects related to broad multi-district issues may be initiated by the state and be funded through the Department's ITS Program. In both cases coordination with the other parties is essential to achieve the objective of an integrated system.

The transportation project planning and delivery process, ITS included, remains one of receiving input from stakeholders, establishing a vision, setting goals, identifying actions, prioritization, resource allocation, and the evaluation of results. The MPO is well suited to serve as a facilitator for intergovernmental and jurisdictional coordination. The process of advancing of ITS initiatives would then include a more diverse base of customer partners. This new partnership will have to balance perspectives and interests, address emerging technologies, and new institutional relationships, as well as develop innovative funding partnerships to achieve the full potential of ITS strategies. Over time, the MPO process will need to be modified to accommodate the new issues that will arise from this partnership.

In addition to the Statewide Guiding Principles, each MPO should consider the following guidelines in the integration of ITS into their transportation planning process.

- Add a step to consider ITS in all stages of the multi-modal transportation planning process,
- Facilitate institutional and inter-jurisdictional cooperation and coordination in the planning, deployment, operation and management of ITS,
- Determine the consistency and conformance of ITS plans and projects with the National ITS Architecture and standards,
- Identify the special challenges for each stakeholder created by ITS and work to remove the barriers to implementation these challenges create,
- Introduce ITS into the planning process as a combination top-down and bottom-up approach,
- Recognize and seize opportunities for including ITS as an integrated element alongside "traditional" infrastructure improvements,
- Seek out and encourage advocates for ITS within the planning environment,
- Evaluate potential ITS projects in light of alternative roles for the public sector, private sector, or public/private partnerships,
- Develop and utilize resource centers to disseminate ITS information,
- Evaluate public involvement plans and procedures for application to ITS planning and project implementation,
- Develop coordinated concepts of operations to secure the involvement and commitment from a range of regional systems operators across modes and jurisdictions and non-public works agencies; and
- Focus on integration and regional architecture as the key to developing regional multi-jurisdiction ITS projects that are interoperable, expandable and which integrate legacy systems.

6.5.10   Develop a Rural/Inter-Urban ITS Element

The Department should initiate the development and support of a rural/inter-urban ITS element.

Rural, inter-urban, corridor, CVO and tourist traveler information ITS applications may cross more than one Department District and therefore in many cases must be planned and coordinated at the statewide level. The implementation, operation and management of such ITS applications must be a joint responsibility of the statewide program and the districts. These projects may require management by a committee of districts, agencies and stakeholders. The responsibility for funding should be allocated according to the different missions of the district and central office functions. For example, database maintenance for traffic volume data collected in rural areas is currently the responsibility of the Central Transportation Statistics Office; emergency management and evacuation during hurricanes is a shared responsibility and roadway maintenance is a local district responsibility.

The following recommendations are suggested for the rural inter-urban, corridor, CVO and tourist traveler information ITS applications:

*   Connect to urban ITS (cost leveraging). Provide for natural extensions into rural and inter urban areas in proximity to ITS currently being deployed in urban areas.
*   Assure adequate coverage of ITS User Services as provided by Advanced Rural Transportation Systems (ARTS),
*   Enhance economic redevelopment and provide for more efficient rural trip making in Federally-designated rural enterprise communities with the greatest overall need,
*   Identify specific high activity intermodal areas for both passenger and freight real-time information kiosks.
*   Develop a virtual transportation management center for areas of rural Florida to be jointly operated by all involved Districts and the State Office of Emergency Management.

6.5.11   Develop a Statewide Commercial Vehicle Operations Element

The Department should establish a Commercial Vehicle Operations (CVO) element to coordinate all CVO activities in Florida and to achieve a goal of implementing a safety based pre-clearance system on I-4 and I-95 within five years. A CVO Business Plan to achieve this goal and to address other CVO issues should be developed.

Commercial Vehicle Operations (CVO) are better operated as a statewide program rather than a District level program because the CVO industry is licensed on a statewide basis and the weigh/inspection stations must have interoperable equipment and standards.

The CVO element needs to develop a CVO Business Plan in order to determine needs and priorities. The Department has already established a need for a safety based pre-clearance system on major truck routes. Without waiting for the CVO Business Plan, it is recommended that the Department continue to deploy this pre-clearance system. Real time communications must be established between the pre-clearance locations and a central processing point. This program has

been completed on I-75 in Florida (the Advantage CVO project). The pre-clearance program is planned for expansion to other Florida roadways and, as a minimum, should be able to:

•be compatible and inter-operable with Advantage CVO,
•check vehicle weight,
•check for vehicle and driver credential status,
•conduct safety inspections,
•check for out-of-service vehicles and
•communicate directly with the FHWA SAFER program.

The Department has determined that I-4 and I-95 carry the highest volume of commercial traffic. It is recommended that deployment of pre-clearance stations continue on I-4 and I-95. The Department has also begun deployment of communications infrastructure along I-10, the development of pre-clearance stations can be completed later. One consideration in the deployment of pre-clearance stations is the availability of right-of-way on the Interstates. In some cases it may be necessary to place detection and weigh-in-motion devices on the mainline with the pull-off area for inspections and violations located off the Interstate on a nearby local road.

The CVO Business Plan should consider a number of CVO issues as it is developed, including:

•   Financing the pre-clearance station deployment through a public/private partnership. The HELP, Inc. program is an example.
•   Tag transmitter/receiver standards should be consistent throughout the state.
•   All state agencies involved in CVO credentials should coordinate with the Department to provide the most efficient CVO program possible.
•   The Department should consider establishing secure CVO staging areas and driver rest stops in some areas of the state.
•   Florida should apply to be designated as a CVISN state.

The Commercial Vehicle Information Systems and Networks (CVISN) program is a national program expected to result in enhanced safety for drivers and trucks and improved operating efficiencies for government agencies and motor carriers. In turn, both the public and private sector participants are expected to realize savings in time, resources and the cost of doing business. The program includes electronic screening for both weight and safety inspection and automated reporting and record keeping for licenses, permits and safety records.

6.5.12   Develop a Statewide ITS Research Element

The Department should continue and enhance the coordination and funding of ITS product testing and applied research. The research program should be used in the development of statewide ITS standards and specifications.

Florida has an on-going research program through the Traffic Engineering Research Laboratory (TERL) in Tallahassee and in other universities in Florida. The Department's ITS Program should identify and fund needed research to enhance the deployment of ITS in Florida. The focus of the research program will be in two areas, 1) product testing on hardware and software, and 2) the application of national research to update standards and specifications in Florida. Examples of

potential research projects are statewide traffic signal controller certification and equipment testing for NTCIP compliance.

6.5.13 Develop an ITS Stakeholder Process

The Department should define a model and process for stakeholder involvement at three levels: S*tatewide* for strategic planning and policy issues, *Regional* for integration and local issues and directions, and *Project* for specific projects such as the I-4 ITS Corridor Study or program elements such as CVO and take the initial steps of implementing the process.

There are many stakeholders that will play a part in the deployment, operations and management of ITS in Florida. Stakeholders include both public and private sector participants. The successful participation of these stakeholders in Florida's ITS program requires two things: organization and outreach. The MPOs already have developed and documented stakeholder involvement programs, the ITS stakeholder involvement activities should be coordinated with these existing stakeholder programs.

The Department should establish both a statewide policy and model organization for involving other organizations (e.g., FHP and other police agencies) in mission critical activities such as incident response, incident clearance and hurricane evacuation. There are many potential models for organizing stakeholders to maximize input and efficient working relationships. Some states' DOTs are tasking the ITS America state chapter with conducting the stakeholder program. ITS Georgia, for example, has organized a series of interest groups to allow companies, agencies and individuals with similar interests to meet, discuss common interests and coordinate with Georgia DOT. The interest groups created by ITS Georgia to date are CVO; transportation system management; public transportation; emergency services and highway safety; and traveler services and information. These groups meet individually at least quarterly and plan to meet occasionally with other interest groups. All groups participate in the ITS Georgia Annual Meeting.

6.5.14 Develop Stakeholder Organization

The Department, in cooperation with *ITS Florida*, should initiate the formation of a Statewide ITS Stakeholder Advisory Committee to provide input into statewide strategic planning and policy issues.

The Department, the Regional Planning Councils and the 26 MPOs in the state have a well-established set of roles and responsibilities for planning and deploying transportation system improvements. A key element of this ITS Strategic Plan is that these roles and responsibilities must be expanded to include facilitating the operation and management of this system. This expansion, therefore, will include not only new activities, but also new stakeholders, such as emergency service providers and law enforcement, that must be regularly involved. To help facilitate these expanded roles and responsibilities in complex urban areas, each district and each metropolitan area may develop and maintain a regional architecture and deployment plan that is developed with the appropriate stakeholders. These regional architectures should be compatible with the statewide architecture and, where appropriate, the National ITS Architecture.

Similar groups could be formed either with *ITS Florida* or as separate stakeholder groups. During the development of the ITS Strategic Plan, an ad hoc group, the Florida ITS Advisory Team, was

formed to monitor and provide input into the plan. This statewide group and several regional groups could be formalized into a stakeholder association. In any case, it is suggested that groups of similar interest be formed so that stakeholder involvement can be managed.

Examples of stakeholders that will have a role in Florida's ITS are listed below. It is recommended that these groups be contacted along with others as the stakeholder involvement process proceeds.

- *ITS Florida*
- ITE-Florida District
- AAA
- American Trucking Association
- Private trucking companies
- Fleet managers (FedEx, UPS, utility companies, rental cars)
- Local transit agencies
- Rural transit providers
- Local police and sheriffs departments
- Florida Highway Patrol
- Port authorities
- Tourist and visitor agencies
- Theme parks (Disney, Universal Studios, Sea World, etc.)
- Local Chambers of Commerce
- Metropolitan Planning Organizations (MPOs)
- Local governments, particularly traffic engineering departments
- Towing companies
- Emergency service providers (medical services, fire)
- Emergency management agencies
- Universities and university transportation centers
- Media (TV, radio, print)
- Telecommunications companies
- Toll authorities
- Airport authorities
- Parking managers
- Information service providers
- Management and operations service providers
- Federal agencies (FHWA, FTA, FAA, EPA)

6.5.15   Develop Private Sector Outreach

The Department should develop a private sector outreach element within the ITS Program to actively encourage private sector participation in ITS and to solicit private sector proposals to the proper District(s) or program element.

Participation by private sector partners is key to the full deployment of ITS in Florida. The Department must strongly encourage proposals, solicited or unsolicited, by firms or persons desiring to participate in the Florida ITS program. One method of encouraging partnerships is for the Department to develop demonstration projects or field operational tests that will be operated through a partnership with private sector participants. In order to properly evaluate and coordinate these proposals, all private sector proposals should be coordinated by the Florida ITS Program Manager.

DOTs have not had a relationship with the automobile industry. This industry, including auto manufacturers and after-market vendors, are becoming important participants in the ITS arena through the development of in-vehicle devices. The ITS Program Manager should develop contacts with those industries and seek input on issues that will certainly develop in the near future.

6.5.16   Operate and Maintain a Statewide ITS Web Page

The Department should develop, operate and maintain a Statewide ITS Web page that will provide coordination of District ITS Web sites and public information.

The Department's ITS Program should develop, operate and maintain an ITS web page. This web site would provide links to an ITS web page for each District and provide public information on the ITS Program to the public.

6.5.17   Develop a Statewide Training Plan

The Department should identify training needs, both internal and external to the Department, and in conjunction with *ITS Florida*, establish priorities, implement and maintain an ITS training program.

Training the Department's staff to develop an understanding of ITS concepts and guidelines and in the proper use of equipment and operating techniques will provide a more efficient and cost-effective ITS Program. The Central Office staff should coordinate with the Districts to determine staff training needs and provide a menu of training courses to meet those needs. Training will be needed in many elements of ITS such as operations and maintenance of hardware, telecommunications equipment, software operations, software maintenance, ITS planning and incident management. The Department will be responsible for coordinating with and assisting other agencies, stakeholders and the general public in receiving ITS training.

6.5.18   Coordinate with Public Transportation Plans and Activities

The Department should pro-actively support the development, coordination and deployment of public transportation ITS technology.

Public transportation system have varying degrees of technical and financial capacity to implement ITS applications. ITS applications in public transportation may also cross district boundaries. They also face the unique situation that they are, in most cases, implemented and managed by local and private-sector organization such as transit agencies, rail companies, airlines, and airport authorities. ITS for public transportation is further complicated by the fact that sometimes the implementing

agencies are not autonomous entities, but sub-units of a local government. The Department should develop policies and strategies to support and ensure coordination of public transportation related ITS activities, including:

- Assuring a role for the District ITS Program Manager in coordinating with the Department's Public Transportation Office on ITS issues,
- Seel adequate involvement of public transportation operating agencies in the planning, development and operation of transportation management centers (TMC),
- Provide technical and financial support and guidance to public transportation systems for integrating these systems into regional ITS architectures; and
- Supporting multi-modal and inter-modal ITS planning and programming.

6.6   Department ITS Program Funding

The Department should develop a program level budget to fund needed staff and to carry out ITS programs.

The Department's ITS Program must develop a budget to fund the staff and program activities described in the previous sections. Statewide and District program deployment will not only require an increase in funding for equipment and infrastructure but also for training and operations and maintenance (O&M). Several Federal programs are available to support deployment of Intelligent Transportation Systems (ITS). However, funding levels for the deployment and O&M of transportation systems is currently inadequate. Also, while ITS operations and management costs are eligible for federal aid, maintenance costs are not. However, if federal aid were to be used to pay for operations and management, the MPOs would first need to fund it in their TIPs.

6.6.1   ITS Program Needs

The ITS Program in Florida has not been fully defined. This program will be the focus of initial efforts outlined in the ITS Strategic Plan and in this Business Plan. In order to complete this Plan, a range of costs must be defined so that Department has a notion of the scale of the ITS effort. For purposes of this initial estimate, the ITS Program is defined as the sum of the Statewide Program and the Districts' Program.

The Department's ITS Program, with the elements described previously in Sections 6.4 and 6.5, will require six to nine staff to deliver the initial program. This level of staffing (or equivalent consultant services) along with funding for parallel programs such as standards, statewide architecture, ITS assistance to MPOs, ITS training, etc., will initially require an estimated $2 to $3 million.

Each District should develop a budget to staff and implement the ITS program for the District.

The District Program, which is defined to meet a level of service (LOS) 3, will require a staff of six to ten per District. Along with other ITS activities (developing operations manuals, maintenance plans, regional architectures, etc.), the District budget may reach $1-2 million per District. Some districts are much further along toward this goal, however it is assumed for this estimate that these districts will continue to expand their ITS program beyond the interstates and onto other facilities.

Thus, the total ITS operations budget for the Districts could range from $8 to 16 million annually. Outsourcing of any of these functions would likely cost more to account for a vendor's overhead and margin.

ITS work program funding is subject to a needs analysis, an analysis of architectural requirements and project development. The Central Office is currently gathering a detailed ITS needs analysis. For the purpose of this Business Plan, it is assumed that each district will develop a freeway management center for each major urban area within five years. Based on Florida (and national) experience, this basic freeway management infrastructure will cost $10-20 million, per urban area to implement (see the Cost Analysis Issue Paper). The urban areas of Miami, Orlando, Daytona and Jacksonville already have a basic freeway management center infrastructure. The remaining urbanized areas with any significant freeway and/or expressway facilities include Ft. Lauderdale, West Palm Beach, Titusville/Melborne, Naples, Fort Myers, Sarastoa/Bradenton, Tampa (1), St. Petersburg (1), Gainesville, Tallahassee, and Pensacola. The Turnpike District has plans for an operations center in Pompano Beach and Orlando. These 14 freeway/expressway management systems will cost $140 million to $280 million in capital expenditures over the next five years.

There are other ITS project needs for elements such as CVO and rural applications. Statewide expenditures are estimated at $20 million to $30 million over five years for CVO and intra-urban projects.

Operations and maintenance funding can be estimated to be approximately 5 to 10% of the initial capital costs annually. Therefore, operation and maintenance costs for the ITS deployments can be expected to be $7 million to $28 million annually for the urban projects and $1 million to $3 million annually for non-urban projects.

In summary, the initial 5-year budget to implement the Florida ITS Business Plan can be estimated for planning purposes as shown in Table 4.

Table 4.
Estimated 5-Year ITS Program Budget

Cost Element	Statewide Program *	District Program * (all districts)
Program Operating Costs	$1-2 million	$8-$16 million
Capital Costs	$20-$30 million (Rural and Inter-urban)	$140-$280 million (Urban)
Operations and Maintenance	$1-$3 million (Rural and Inter-urban)	$7-$28 million (Urban)

* 5-year total, in 1999 dollars
These estimates must be refined as part of ITS Program development.

6.6.2 Current ITS Spending

The Florida Department of Transportation is a trust funded state agency. That means funds for the Department's operations are earmarked for transportation from such sources as state fuel taxes, motor vehicle fees, and federal transportation apportionments/grants. No general revenue is customarily used to fund the Department or any of its transportation projects. Turnpike projects are funded by toll collections, concession revenues, and bond revenue proceeds. State law requires the Department to develop a Five-Year Work Program. That is the Department's commitment to the public to build specific projects during that time period. Most of the Department's funds are spent on projects in the work program.

The Department is the only state agency authorized to operate on a **cash flow basis**, but it is required to maintain a minimum cash balance in the State Transportation Trust Fund of 5% of outstanding obligations or $50 million, whichever is less. The sources of Department funds are shown in Table 5.

Table 5.
Department Revenue and Appropriations Sources

Revenue Sources	1995-96	1996-97	1997-98
State Fuel Taxes	$1,057,700,000	$1,124,000,000	$1,202,100,000
Motor Vehicle Fees	$476,800,000	$494,600,000	$495,100,000
Federal Apportionments/Grants	$854,500,000	$809,600,000	$694,700,000
Other	$302,400,000	$418,400,000	$618,200,000
Total	$2,691,400,000	$2,846,600,000	$3,010,100,000

Legislative Appropriations	1998-99
State Trust Funds	$3,795,468,230
Total	$3,795,468,230

Source: Florida Department of Transportation

The TEA-21 program of federal transportation will increase the federal grants from the ISTEA level of $800 million per year to approximately $1.2 billion per year. This may increase the total State Trust Fund to over $4 billion per year.

The Highway Construction and Engineering Program is outlined in the table below. This program constitutes the largest portion of the total Department annual budget. A summary of this program is shown in Table 3.

Table 3.
Department Program Allocations

Agency Program Component Allocations	1996-97	1997-98	1998-99
Highway Construction and Engineering	$1,429,600,000	$1,531,500,000	$1,821,092,805
Pre-Construction and Design Services	$277,700,000	$347,900,000	$343,373,211
Transportation Planning	$44,100,000	$45,800,000	$45,595,089
Materials Testing and Research			
Materials Testing	$23,900,000	$25,000,000	$25,688,779
Research	$6,800,000	$8,300,000	$6,771,129
Traffic Operations	$12,400,000	$11,700,000	$14,750,899
Total	$1,794,500,000	$1,970,200,000	$2,257,271,912

Source: Florida Department of Transportation

As the table indicates, the Traffic Operations Division, which will include operations and management programs and ITS, currently has a budget of 0.66% of the Highway Construction and Engineering Program and 0.375% of the Department total projected budget. There are also numerous construction projects that are ITS projects or that include ITS components. This analysis indicates that funding for operations and maintenance of ITS is small in Florida.

The amount of money currently being spent on ITS deployment is difficult to define since some ITS projects are included within roadway capacity construction projects. It is recommended that a summary of statewide ITS capital project costs be gathered by the ITS Program Office as an initial action. This will be useful in further developing the Department's ITS Program and in measuring overall cost effectiveness and performance.

6.6.3 ITS Program Capital Funding Alternatives

The Department should examine available funding sources for both capital projects and operations and maintenance, the role of public/private partnerships and ITS project main streaming to determine the best method of funding the ITS Program over the next several years.

There are many possible approaches to funding ITS projects, including most federal aid categories, state funds, local funds and public/private partnerships. Internally there are decisions that the Department must make regarding budgets and accounting of funds. Among these decisions are should the ITS Program be funded by a pre-determined allocation or line item the overall Department budget or should individual projects be funded as they become priorities (main streaming).

The available federal funding program, which can include ITS are described in detail in the appendix. The total TEA-21 (five year program) federal funds for programs that can fund ITS projects are Interstate Maintenance–$1.2 billion, National Highway System–$1.7 billion, Surface Transportation Program–$1.9 billion and Congestion Mitigation/Air Quality–$250 million.

6.6.4 ITS Operations and Maintenance Funding Alternatives

Each District should estimate and budget recurring costs such as response and preventative maintenance activities, staffing, spare parts inventory, and in-house equipment needed to operate and maintain systems.

Budget estimates for all systems should include the cost of anticipated system and component replacements that deliver the same functionality as the deployed system. Driving forces in anticipating these "in-kind" replacements include the service life of the components, technology obsolescence, cost and availability of spares, and access to qualified O&M staffing resources. System expansion costs should be developed and included in the ITS Strategic Plan. Districts should consider the training requirements for all personnel when preparing plans and budgets.

The most common funding source is federal transportation funds. System Operations and Maintenance costs should be estimated in a manner that allows agencies to take full opportunity in securing federal STP, NHS, IM and 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 the Department, and revenue opportunities. Examples of potential funding sources are: revenue from Information Service Providers and leasing of telecommunications capacity.

6.7   Business Plan Process

The Business Plan is a living document. It must be flexible and significant modifications are to be expected often. The plan must also provide input to the Department's program planning, work program development and budget process.

Each District should produce and update annually an ITS Implementation Plan that defines policies, staff needs, training needs, budgets and projects to be implemented over the next five years.

The Business Plan defines and describes processes or methodologies for implementing this ITS Strategic Plan. It also provides a basis for long range ITS planning activities in the form of an ITS vision, goals and objectives and guiding principles.

ITS Processes and Methodologies

- Planning–The ITS planning process is described in terms of a vision, goals and objectives, the development of ITS strategies and supporting ITS architectures. Addressing architecture consistency in ITS planning is a new required process.

- Operations and Management–Guidance is provided for development of manuals to describe and make uniform the management of highway operations and maintenance.

- Staffing–A new concept for determining the staffing of a District's highway operations and management activities, termed Level of Service, is described. Each District is to utilize the Level of Service to derive Staffing Plans.

- Transportation Management Centers (TMC)–The Business Plan proposes that, as a matter of Department Policy, each District wold staff and activate at least one TMC within five (5) years.

- Procurement–Several methods to procure ITS improvements are discussed and evaluated, and a determination made as to which are most suitable for each type of Market Package.

- Rural and Inter-Urban Applications–Rural and Inter-Urban ITS applications are compared and contrasted with strictly urban applications and a determination made as to which ITS User Services have greater potential for rural areas.

- Rapid Technology Change–The Business Plan recognizes the importance of keeping up with rapidly developing technologies and techniques.

- ITS Finance–Several ways of funding ITS improvements are described, including directly within the Department's Finance Plan, in partnership with the MPOs or with private entities.

A number of actions are recommended to be conducted by the Department's ITS Program. Since the Department has given the responsibility of operations and maintenance of the roadway system to the Districts, each District needs to develop an action plan to implement ITS based on the priorities established in the Business Plan.

6.7.1   Business Plan Update Process

The Florida ITS Business Plan should be reviewed annually and updated as necessary by the Department's ITS Program Manager in cooperation with the District ITS Program Managers. Since there are few ITS specific funds in TEA 21, ITS project funding may be mainstreamed into the Department funding cycle. Therefore, the update process should be coordinated with the Department budget update cycle. On rare occasions consideration may be given to "off-cycle" updates between annual updates if all participating parties agree. The Districts should provide input through updates to the District ITS Implementation Plan.

Each participant will be asked to submit specific tasks or projects needed to accomplish the required modifications. The Department's ITS Program Manager will facilitate a meeting of participants within a month of the notice so that the proposed modifications can be coordinated and discussed. The meeting will include a discussion of priorities for programs, projects and tasks and likely funding sources. After the Business Plan update meeting a draft updated Business Plan will be developed and sent to the participants for review.

6.7.2   Role of the Business Plan in Department's Work Program and Budget Process

Items in the Business Plan will often be implemented via the Department's Work Program and Budget Process. Therefore, the annual ITS Business Plan updates will be scheduled in accordance with the needs of those who take part in Work Program and Budget activities (see Figure 3). The Business Plan may also have impact on other Department plans, procedures or policy development activities (e.g., the Florida Transportation Plan update, development of procedural manuals or promulgation of new procurement policies). In each case, the ITS Business Plan updates must be scheduled to provide the necessary inputs.

A final Business Plan document will be produced and submitted to the Department Executive Committee in time for the annual Program and Resource Plan process cycle, which is normally

initiated each summer. After program level resources are allocated in the ten-year Program and Resource Plan, the Department conducts a gaming exercise each fall to balance projects and funding and produces a Tentative Department Work Program. The five-year Work Program projects, staff requests and required resources are refined in the Work Program process and provided to the Florida Legislature. The Legislative Budget process produces the final budget for the Department, which is adopted by the Department Secretary each July. Feedback from the Legislative Budget process is input the next year's Program and Resource Plan process.

Figure 3 shows the current policy, budget and work program development process with the addition of steps recommended to accommodate the ITS Business Plan. Note that the ITS-specific program elements are driven by the same policy and program objective requirements as the traditional work program elements.

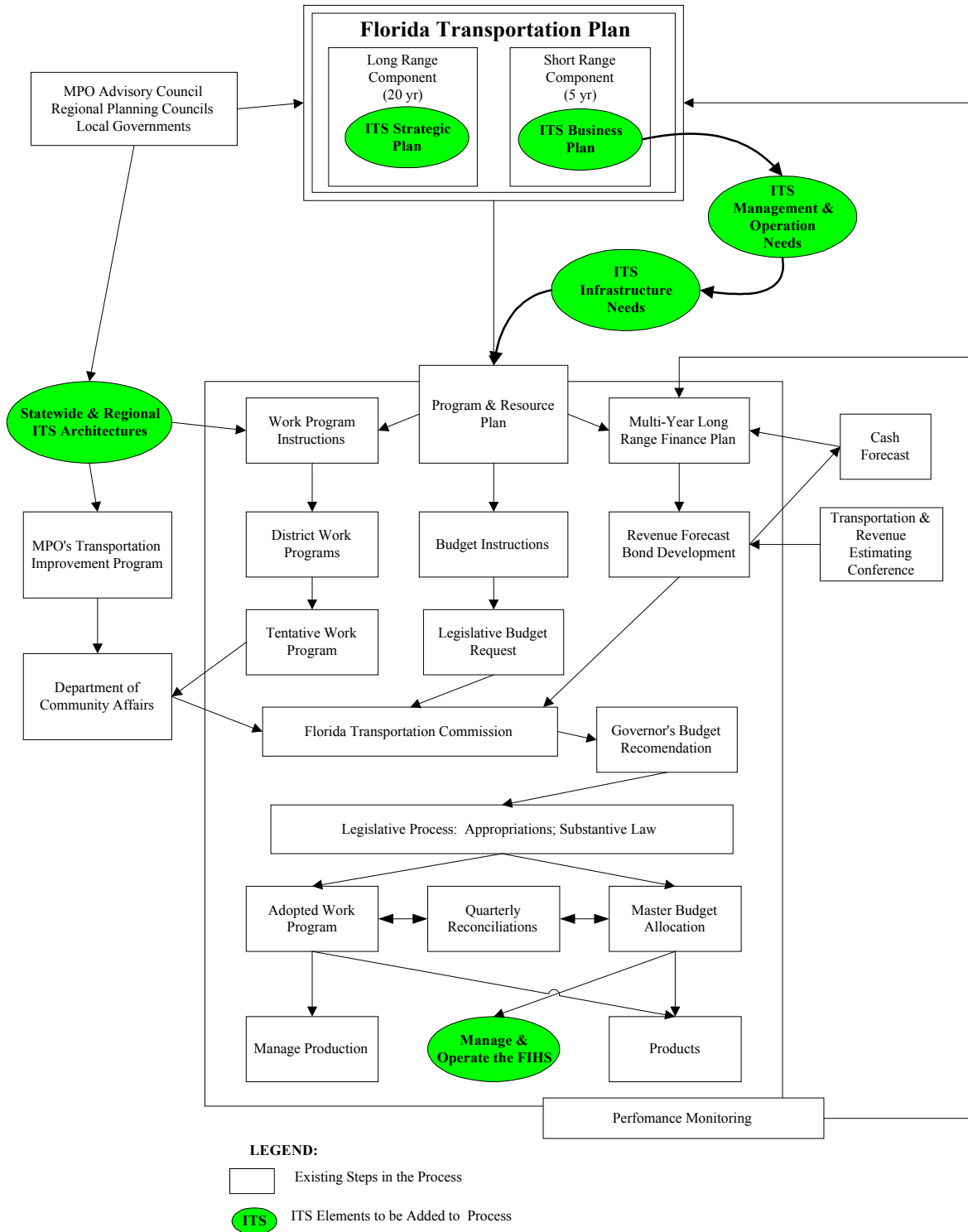# Policy, Budget & Work Program Development

Figure 3.
Integration of the ITS Business Plan into the Department's Budget and Work Program Development Process

Appendices

Statutory Authority

Issue Papers:
        ITS Project Cost Analysis
        Economic Impact of ITS
        Integration of ITS Planning into MPO Planning
        Operations and Maintenance of ITS
        ITS Procurement
        Rural & Interurban ITS Applications

Recommended FDOT Organizational Structure for Implementing ITS