

The *SunGuide Disseminator* is a publication of:

605 Suwannee Street, M.S. 90

www.dot.state.fl.us.com

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Tallahassee, Florida 32399-0450

Traffic Engineering and Operations Office

Florida Department of Transportation (FDOT)

Link to Florida's Statewide ITS General Consultant

February 2005 Edition

Learn How to Meet Part 940 Requirements For Federal Funding



The State of Florida has been deploying ITS projects as long as anyone can remember; we have seen many

successful deployments and also numerous failures. Many of the early deployments were not called ITS. Now the time has changed and we have carved out a new niche within the traffic operations industry called ITS. The ITS formalization process began with the "Intelligent Transportation System Act of 1998," which defined the goals and statutes by which all agencies using "Title 23 Funds" shall follow when deploying ITS projects.

This formalized process began with the rulemaking process for the regulations contained in *Title 23, Code of Federal Regulations, Part 940* which became effective on February 7, 2001. At the beginning of the process, FHWA, Florida Division, and FDOT began with the concept of an informal process until such time as the application of the regulation was understood better.

Four years have gone by and FDOT's ITS Program is starting to mature. We are now starting to formalize the process for application of the regulation in hope of improving the quality of our ITS projects. *Section 940.11 Project Implementation* has seven requirements; the first requirement is that, **"All ITS projects funded with highway trust funds shall be based on a systems engineering analysis."** In the past, we (FHWA and FDOT) agreed to move all ITS projects through construction with very limited documentation of the systems engineering process due to the lack of an established process. **However, that will change shortly with the formal approval of the** *FDOT System Engineering Management Plan (SEMP)*. Once the *SEMP* is approved, the FHWA will require formal documentation (scale commensurate with the project) of all ITS projects. Therefore, we are in the process of developing the process, and a course associated with the process, to help guide project engineers and mangers through the required project documentation. This course will be taught during the upcoming Annual FDOT ITS Working Group Meeting to be held in March at the Wyndham Miami Airport in Miami, Florida.

This process shall be used to demonstrate compliance with the regulations contained in *Title 23, Code of Federal Regulations, Part 940.* Projects that are not in compliance with *Part 940* will not be eligible for reimbursement using the Highway Trust Funds.

This article was provided by Chung Tran, FHWA. For more information, please contact Mr. Tran at (850) 942-9650, extension 3041 or email <u>Chung.Tran@fhwa.dot.gov</u>.

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# Bay County—Going the ITS Way!

The Bay County Traffic Engineering Department is working to reduce the traffic congestion and travel time in the Panama City area by upgrading and expanding traffic signal controls at every intersection and adding closed-circuit television (CCTV) cameras at critical intersections. This project to build an Advanced Traffic Management System (ATMS) is a partnership of several agencies, including the FDOT, Bay County Public Works, Bay County Traffic Engineering, Bay County School Board, the City of Panama City, and the Federal Highway Administration (FHWA).

The ATMS will be constructed in two phases. Phase I primarily involves deployment of fiber optic cable as the communication backbone along pre-identified routes. Phase II consists of installing the CCTV cameras; upgrading the traffic signal controllers that Bay County and Panama City own along the fiber optic cable route; and renovating the existing Traffic Engineering Department facility to serve as the transportation management center (TMC). This project will also provide the Bay County School Board with the necessary fiber optic backbone infrastructure needed for the future development of the communications network



supporting Bay County schools. The ATMS will be integrated with the Hathaway Bridge ITS components and TMC software will be selected for controlling the arterial traffic signals and CCTV cameras.

The FDOT ITS Section is assisting Bay County by providing the design consulting services in Phase II through its General Consultant (GC), PBS&J. Besides developing the plans, specifications, and estimates (PS&E), PBS&J will assist in preparing the 100-percent plan sets for the Invitation to Bid.

The construction of the ATMS Phase I project is expected to be completed by August 2006, while the Phase II PS&E package is expected to be completed by August 2005. The construction of the Phase II project is scheduled to be completed by September 2006.

The project manager is Keith Bryant, Bay County Traffic Engineer. For more information, please contact Mr. Bryant at (850) 914-6431 or email <u>KBryant@co.bay.fl.us</u>.

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Travel Time Estimations Using Cell Phones

The FDOT ITS Section is sponsoring research into the use of cell phone data to provide travel time estimations. The



goal of this research is to determine whether cell phone data can be used to accurately estimate travel time based upon traffic flow and speed, as well as to identify the limitations of such a system. The project will have two phases: Phase 1 will investigate company claims regarding the use of cell phone data to estimate travel times; Phase 2 will utilize a pilot project to determine the accuracy and reliability of travel time estimations and investigate the limitations of such a system.

Florida International University (FIU) will conduct the research through its Department of Electrical and Computer Engineering. Subbarao V. Wunnava, Ph.D., P.E., will be



the Principal Investigator and Kang Yen, Ph.D., and Tad Babij, Ph.D., will be Co- Principal Investigators. Elizabeth Birriell, Deputy State Traffic Engineer - ITS, will provide oversight of the research project. Nick Adams is the Project Manager.

FDOT District 6 will be heavily involved in the research effort due to its proximity to FIU and a current relationship with the SmartRoutes Systems. Angel Reanos is the Operations Manager for District 6's transportation management center and will be the District 6 point of contact. Jim Mosser of the State Technology Office/Joint Task Force Board is the field contact and coordinator for FDOT.

The objectives of this research are to determine if cell phones can be used as reliable traffic sensors by tracking their position without disclosing the identity of the cell phone owner. Furthermore, the research will investigate the uncertainties and limitations of cell phone positioning technologies. FIU will evaluate existing technology, independently verifying and validating vendor claims through data analysis and pilot projects. FIU will also evaluate patents so as to identify potential future candidates. The long term results of the project are to enhance, supplement, and compliment the information available to the motoring public. This research will also investigate how privacy issues are being handled in other states.

FDOT is interested in determining if this technology has merit and whether existing off-theshelf products are ready for use or if waiting for technology maturity would increase accuracy and avoid wasted resources. FIU will study factors that decrease the accuracy and reliability of the data. The results of this research should also determine and describe the format of the data as it is delivered from cell phone carriers and the data format required by FDOT and its partners.

Roadways of interest in FDOT District 6 are:

- I-95 from US 1 to the Miami-Dade/Broward county line,
- SR 826, and
- SR 836.

Roadways of interest in FDOT District 4 are:

- I-595 and
- I-95 from the Miami-Dade/Broward county line to the Indian River/Brevard county line.

Additional information concerning this project may be found at <u>http://www.dot.state.fl.us/</u> <u>trafficoperations/its/ Architect Standards/Research/FIUDOT Cell Phone Proposal.pdf</u>.

This article was provided by Nick Adams, FDOT Traffic Engineering and Operations Office. For more information, please contact Mr. Adams at (850) 410-5608 or email <u>Nick.Adams@dot.state.fl.us</u>.

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*Smart Move* By Michael Turnbell Transportation Writer

Those message signs that loom like large blackboards over drivers on interstates 95 and 595 in Broward County haven't had much to say since they were turned on two years ago. All they do is flash traffic alerts when a congestion-causing wreck can be confirmed in person by authorities.

But the Florida Department of Transportation says the signs are going to be a lot more useful to drivers in the coming months. The signs will be linked to 45 cameras and 95 speed detectors currently being placed along I-95 and I-595 in Broward.

"We have gotten to the point where expanding the existing highway system will be difficult, so we must better manage what we have," said Steve Corbin, the DOT's intelligent transportation operations manager.

At a cost of \$2.7 million, the new cameras and sensors will come online between now and October. They will enable technicians to see slowdowns, track how fast traffic is moving and report accidents almost instantaneously.

"When that happens, you'll see usage of the signs almost triple," Corbin said.

A second phase of 55 cameras, 130 speed detectors, 10 more overhead message signs and fiber-optic cables, mostly along Interstate 75, should be in place within three years at a cost of \$14 million. By then, Broward's entire expressway network will be blanketed with the signs and gadgets.

One of the new overhead signs will be on eastbound I-595 east of I-95 to advise drivers about parking and delays at Fort Lauderdale-Hollywood International Airport.

The nerve center of this high-tech network is a sleek, \$10.8 million, 42,000-square-foot building on Commercial Boulevard in Fort Lauderdale, behind the old Broward County Traffic Engineering Division building that was razed.

Inside the traffic management center, the DOT and the county work side-by-side in a control room similar to NASA's Mission Control, with a two-story wall of video screens showing live traffic.

The new building is a counterpart to one that opened in Miami-Dade County last year. In Palm Beach County, the DOT is relying on a temporary traffic management center to shepherd drivers through miles of I-95 reconstruction.

While the message signs are the most visible symbol of the DOT's efforts to use technology to manage traffic, they are often the most criticized. The 31 signs flash traffic alerts only if the Florida Highway Patrol or the Road Rangers, the state's courtesy patrol trucks, verify the accidents.

Typically, that's only 60 times a month and almost never on weekends.

Larry Hagen, a researcher at the University of South Florida's Center for Transportation Research, said the DOT saved money because it phased in construction of the cameras, even though that meant the overhead signs weren't completely useful right away.

"With the leaps in technology made in the past few years, the costs have dropped significantly," said Hagen, a former Broward County traffic engineer.

The DOT's decision to limit usage of the overhead signs until the cameras are switched on makes sense to Hagen.

"They would rather put up no information than bad information," Hagen said. "You don't want to be sending out messages that are wrong, because you will lose credibility, and drivers will start ignoring them."

Hagen said drivers will benefit from the county and the DOT working together.

"In the past when there was a major incident on the interstate, there may or may not have been notification to the county," Hagen said. "The county can adjust the signals to accommodate it, but to do that they have to know about [the incident]."

In tandem with the DOT's congestion-busting efforts, Broward is spending \$80 million in the next 10 years to upgrade equipment and replace software that controls the majority of the county's 1,325 traffic signals.

The first phase of the signal project will be built this year in the area bounded by I-95, I-595, Commercial Boulevard and the beaches. The next phase, which could begin next year, will extend west to the Sawgrass Expressway.

This article was reprinted with permission of the Sun Sentinel. Michael Turnbell can be reached at <u>MTurnbell@sun-sentinel.com</u> or 954-356-4155 or 561-243-6550.

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The Full Monty

# Smart Highway—The Service Advantage

At first glance, the emerging industry that has developed around 'smart highways' is all about embedding new technologies and devices, interconnected by sophisticated telecommunication networks, into designs for new highway infrastructure and plans for major highway improvements.

It can be argued that what is really happening is an evolution of our capability to deliver highway infrastructure to include not only the technology but also an enhanced customer service capability that harmonizes with the highway infrastructure to provide new benefits and user value.

## **The New Definition**

A smart highway could be broadly defined as a coherent combination of asphalt, concrete, steel, telecommunications, and information technology, carefully engineered to support higher levels of safety, efficiency and effectiveness.

This definition, however, ignores a vital new dimension of the smart highway-the new ability to develop and deliver a range of services that complement the physical assets that comprise the smart highway. These can include information services, customer service operations, advances traffic management services, payment services, and other more commercially oriented services.

The good news is that we have already started to gain experience in the development and operation of these new smart highways. While the full range of possible services is not yet being delivered, we are at the dawn of the smart highways era–and our tollroad operators are leading the way.

# Where the Customer Comes First

Tollroad agencies are in a unique position at the leading edge of smart highway operations and management and are already embracing this new customer service/infrastructure product business model. Because they collect fees, their customers naturally expect something more for the money, more than they would get on an un-tolled road. Furthermore, the process of electronic toll collection provides a unique interface opportunity between the tollroad agency and its customers. Smart highways provide an excellent opportunity to provide delightful customer service plus improve an agency's operational efficiency. Improving operations will, ultimately, keep the price of the tollroad service manageable.

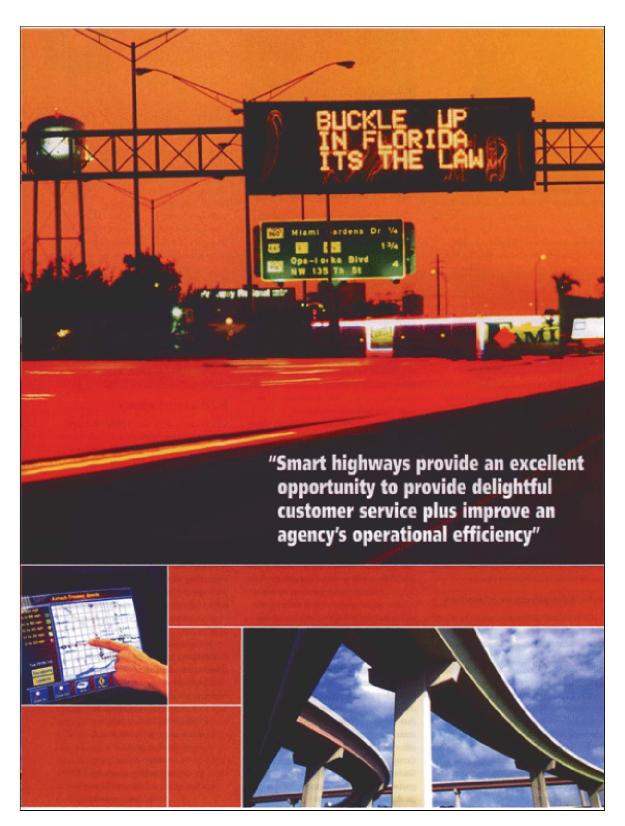
But smart highways needn't be limited to tollroads. All transportation agencies use customers' (i.e. taxpayers') moneys. The concept of smart highways can be applied to limited access highways (freeways and toll roads) and urban surface streets (including arterials and city streets) as well.

## **Elements of a Smart Highway**

How would a smart highway defined in terms of customer service differ from one defined by technology alone? In this new definition, a smart highway is more than a product. It's a compilation of integrated services with a strong customer focus.

First there's the structural infrastructure that comprises the highway itself, including travel lanes, ramps, service plazas, bridges, and other structures. As a baseline, this infrastructure needs to be safe, clean, well maintained, and of adequate capacity to handle the load. We can build on this basic platform and really deliver a package of service options to match demand and expectations.

We are at the beginning of an exciting era in which combinations of infrastructure 'products' and advanced technology-based 'services' will deliver new values and efficiencies to the highway user. While planning, design, development, and delivery of new highway infrastructure will remain the pivotal elements, the infrastructure delivery process will be enhanced and expanded with a range of complementary services.



Infrastructure plans and designs are already being enhanced to incorporate ITS sensors and embedded devices. We are making great progress. Already in the U.S. today, just less that 40 percent of freeway miles have variable message signs installed. Almost 28 percent have some form of electronic surveillance. We're will on the way to improving customer service.

Embedded devices are those technologies that monitor the movement and operations of a smart highway and support the delivery of information back to the traveler.

A robust network of embedded devices is critical because it provides the basic building blocks (in terms of accurate, current, and complete data) of information and management for the operation of infrastructure and traffic flow. Common embedded devices include, for example, dynamic message signs, moveable barriers, lane control signs, sensors, and CCTV.

And finally, telecommunications networks with a supporting power grid are how the information travels back and forth between the embedded devices, the vehicles, and the operations center. The networks comprise wireless or wireline backbone and last mile systems.

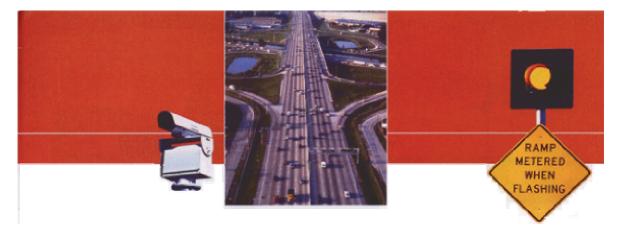
## Vehicle-infrastructure Interaction

Vehicle-infrastructure interaction is where the automobile communicated with the transportation agency and vice-versa. This encompasses applications as broad in range as vehicle crash-avoidance technologies, dynamic speed control to smooth traffic, and traveler information systems.

The technologies to support these applications of vehicle-infrastructure interaction services are as widely varied as the applications themselves. Consider, though, that each of these applications is actually a service-intended to improve the customers' experience in using the smart highway.

## From Product to Product/service

The smart highway, as merely the built product, is just the first step in the evolutionary process. To further evolve, we must reach beyond the delivery of the physical assets and migrate from a pure product delivery philosophy to a product/service hybrid approach, in which transportation agencies and other infrastructure providers and operators, consider each traveler as an individual customer. The steps to achieve a more service-oriented culture involve the types of business management practices that allow infrastructure providers –tollroad or other–to see their organizations as high-level business enterprises, with activities and operations similar to those of other successful service industries that excel in delightful customer service.



## **Know the Customer**

The first step is to truly understand the market and the customers-their needs and wants. This

includes qualitative and quantitative assessments of the smart highway users and al overall evaluation of their satisfaction with the products and service currently offered and future needs. In major metropolitan areas, reduction in traffic congestion with a commensurate reduction in travel times will certainly be high on the list of customers' desires. However, as new smart highway features are added to the suite of services offered to the customer, their needs and expectations may change.

A customer assessment should, therefore, also identify those potential future changes, including new innovations that could meet customer needs, or customers' reactions to other competitive offerings. What are the customers' thoughts, for example, on paying tolls for highway service–if it offers them greater benefit? What quality of service do they expect and what range of services do they want?

Second, transportation agencies may need to alter their vision and strategies to meet the defined needs and wants of their customers. This includes identifying economic trends in transportation use and emerging technologies, understanding current demographics and future changes, and identifying significant social, cultural, and environmental concerns.

It also includes activities such as developing or revising the agency's mission statement and long-term vision and then designing or modifying the agency's organizational structure and relationships between units to most effectively implement the agency's vision.

## **Build a Smart Agency**

Once these things are in place, it should be relatively straightforward to define the infrastructure and services needed to satisfy the vision. For a product/service-oriented agency, the major advances in smart highway technology over the past decade make this step highly rewarding.

Integrated in customer-focused infrastructure and services are also the systems and services that improve a transportation agency's business practices. We will be able to deliver something much closer to a total package of physical assets, high quality information on how to make the best use of those assets, and superior management approaches.

In doing so, the smart highway acts as a catalyst for the 'smart agency' to continue to operate efficiently, deliver the vital highway infrastructure that we need and provide excellent customer service.

This article was provided by Bob McQueen, PBS&J. For more information, please contact Mr. McQueen at (407) 806-4328 or email <u>BobMcQueen@pbsj.com</u>.

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If you wish to contribute an article to the *SunGuide Disseminator* on behalf of ITS Florida, please contact Erika Ridlehoover at (813) 376-0036, or email Erika.Ridlehoover@transcore.com. \* \* \* \*

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# Editorial Corner – Clearing Up Crash Scenes or Collision Avoidance?

## What is the Job of Incident Management and How Does ITS Play a Role?

Many people hear the words "Incident Management" and immediately assume that it means cleaning up the scene of a collision and getting traffic moving again. While that is typically the case, there is a bigger, more important, role and meaning—"Collision Avoidance."

If we can avoid collisions, we can improve congestion in all areas. It is estimated that the 55 percent of congestion in urban areas and 100 percent of congestion in rural areas is caused by incidents. This congestion is not just a concern to the traveling public, but also impacts the community's economy. The Federal Highway Administration estimates that the average cost of a truck delayed due to non-recurring congestion is \$100 an hour. This not only affects the bottom line of the trucking company it also affects the bottom line of everything you purchase on a daily basis. Eighty percent of all goods delivered to Florida are brought in by truck and those that arrive by ship or rail are ultimately delivered to their final destinations by trucks.

In the incident management world cleaning up the scene of a major crash is paramount to getting traffic moving and clearing the queue. While it is obvious to the traveling public that the main concern of incident management teams is getting the traveler back on the road to their ultimate destinations, the most important objective of this action is lost on most. That objective is the elimination or reduction of secondary crashes. It is estimated that secondary crashes account for 20 to 30 percent of all crashes nationwide. In Florida, the Orlando metropolitan area has the highest secondary crash rate in the nation at 33 percent. That being the case, it is incumbent on transportation officials, the responding police, and other emergency responders to clear the existing crash scene as soon as possible. If responders are delayed for any reason, they may end up clearing a one or two mile backup only to have to respond to a second, and sometimes a third, collision caused by the queue from the original incident.

Florida's Road Rangers also play a major role in all of this. It is not obvious to most how the Road Rangers actually assist in the elimination of accidents or incidents. I, for one, never thought much about this until I took over the Incident Management Program; it quickly became clear what an integral part of incident management these **Angels of the Highway** really are. During the period of time that most of the vehicles the Road Rangers operators assist are parked on the side of the road, they become distractions to the traveling public and, due to natural human



curiosity, many travelers "rubber neck" to see what has happened, even when their own travel

is not delayed. Others doing the same thing don't notice that the vehicle in front of them has slowed and all too often there is another crash that must be responded to. Unfortunately, vehicles and individuals on the side of the roadway also become magnets for some drivers. Even being off the road and out of the travel way has not stopped many from being fatally struck by a passing vehicle. An unfortunate statistic is that 60 percent of all police fatalities nationwide occur during traffic incident management and a large percentage of these happen with the officer being on the shoulder of the roadway.

ITS can, and does, play a major role in assisting in incident management. Through the use of loops and other detectors, incidents can be identified more quickly allowing for faster response before a queue forms. Transportation management centers (TMCs) use their closed-circuit television cameras for the same purpose and to see how the response is progressing allowing for automatic update of dynamic message signs (DMSs). Based on the severity of a crash and the length of time it takes to clear, DMSs can be changed and messages can be added to DMSs located further away from the scene alerting the traveling public of the situation ahead and advising them to be prepared to stop. Additionally, sophisticated TMC software is being developed to automatically establish a response plan and post messages on DMSs along with determining possible alternate routes and provide information back to TMC operators for possible implementation.

So, hopefully, readers of this column recognize that the largest single goal of any incident management program is not just clearing incidents, but ultimately eliminating secondary incidents, creating a more even and predictable commute to wherever your travels take you.

Your mission, should you choose to accept it, is to spread the word that anything that slows down the flow of traffic is, in fact an incident, and that all drivers should keep their hands on the wheel and their eyes on the road, NOT THE POLICEMAN, BROKEN DOWN VEHICLE OR ACCIDENT ON THE OTHER SIDE OF THE ROADWAY!!!!!!

This editorial was provided by Mike Akridge, FDOT Traffic Engineering and Operations Office. For more information, please contact Mr. Akridge at (850) 410-5607 or email <u>Michael.Akridge@dot.state.fl.us</u>.

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# FDOT Equipment Certification

The FDOT Traffic Engineering and Operations Office, through the Traffic Engineering Research Laboratory (TERL), is responsible for approving all traffic control signal devices. Approved devices are kept on the FDOT Approved Products List (APL), a listing of devices that may be relied upon as meeting FDOT specifications, standards, or other criteria.

The APL is a means for the FDOT to meet *Florida Statute 316.0745*, *Uniform Signals and Devices*, which states, "All official traffic control signals or official traffic control devices purchased and installed in this state by any public body or official shall conform with the

manual and specifications published by the Department of Transportation pursuant to subsection (2)."

More information on the FDOT APL may be viewed at <u>www.dot.state.fl.us.TrafficOperations/</u> <u>TERL/APL.htm</u>. Specific approved products in the FDOT APL may be searched at <u>rite.eng.fsu.edu/iapl/page1.php</u>.

For more information, please contact Carl Morse, FDOT Traffic Engineering and Operations Office, at (850) 414-4863 or email <u>Carl. Morse@dot.state.fl.us</u>.

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## Announcements

## The Annual FDOT ITS Working Group Meeting

The FDOT ITS Office has set the Annual FDOT ITS Working Group Meeting for March 16, 2005, at the Wyndham Miami Airport in Miami, Florida. Additionally, during the week of March 15-18, other ITS-related events have been scheduled. The following meetings/events have been scheduled:

- Change Management Board Meeting
- 511 Working Group Meeting
- ITS Florida Board of Directors Meeting
- Systems Engineering Management Plan Training

## We hope you will make plans to attend!

For more information, please contact Ms. Pamela Haynes at (850) 410-5632 or email Pamela.Haynes@dot.state.fl.us.

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# Systems Engineering Training Coming Soon!

FDOT will be conducting three Systems Engineering training sessions in 2005. The training sessions will be held throughout the state and will provide project managers with a background on Systems Engineering in order to satisfy FHWA's *Part 940* requirements.

The first training course will be held on March 17 and 18 at the Wyndham Miami Airport in Miami, Florida. You may register now to help ensure a spot in this course.

*Be on the look out for dates and locations for the upcoming training sessions in future SunGuide Disseminators.* For more information, please contact Ms. Pamela Haynes at (850) 410-5632 or email Pamela.Haynes@dot.state.fl.us.

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## **ITE 2005 Technical Conference and Exhibit**

ITE will hold the ITE 2005 Technical Conference and Exhibit, **MOBILITY NOW! GET MOVING WITH TRANSPORTATION MANAGEMENT AND OPERATIONS**, at the Flamingo Las Vegas Hotel in Las Vegas, Nevada from February 27 to March 2, 2005.

The ITE 2005 Technical Conference and Exhibit is held in partnership with the Federal Highway Administration and in cooperation with the National Transportation Operations Coalition, a coalition of associations interested in advocating for dramatic improvement in management and operations.

Representatives from FDOT will be presenting on Florida's Turnpike Enterprise Incident Management Program (Ingrid Birenbaum) and the Funding of Operations and Replacements Costs to the ITS Program (Elizabeth Birriel).

Further conference information may be found at http://www.ite.org/conference/.

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# FDOT Traffic Engineering and Operations Mission and Vision Statements

# Mission:

Provide leadership and serve as a catalyst in becoming the national leader in mobility.

# Vision:

Provide support and expertise in the application of Traffic Engineering principles and practices to improve safety and mobility.

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# SunGuide Disseminator

PBS&J QCAP Document Control Panel	
Created by:	
Reviewed by: England, Hurst	
Date:	January 31, 2005

February 2005