



SUNGUIDE® DISSEMINATOR

Florida Department of Transportation's Traffic Engineering and Operations Newsletter

Providing Opportunities Through Managed Lanes

By Jennifer Fortunas, FDOT Systems Planning Office

What is a managed lane? This is a good question because there seems to be a bunch of definitions floating out there. The term is sometimes used interchangeably with express lanes or high-occupancy toll lanes (HOT) causing some confusion.

A managed lane is a transportation systems management and operations (TSM&O) approach, defined as highway facilities or set of lanes within an existing highway facility where operational strategies are proactively implemented and managed in response to changing conditions with a combination of tools. These tools may include accessibility, vehicle eligibility, pricing, or a combination thereof. Some examples of managed lanes are high-occupancy vehicle (HOV) lanes, HOT lanes, truck only lanes, bus rapid transit lanes, reversible lanes, and express lanes.

Tolling is not a requirement for a managed lane; however, in situations where facilities experience extreme congestion, tolling is a tool used to provide individuals with a choice of paying a toll to move through the congested area and experience a more reliable trip (i.e. the express lanes in Miami on I-95, or 95 Express).

In Florida, express lanes are a type of managed lane located in a separate tolled corridor inside an existing facility where congestion is managed with pricing, access, eligibility, and dynamic tolling. When the express lanes begin to reach their capacity the price is increased to discourage drivers from entering the lanes. This allows the express lanes to maintain a certain level of trip reliability. As more and more drivers choose to use the general purpose lanes due to the higher price in the express lanes, the express lanes begin to stabilize and the price is adjusted downward accordingly. This is a constant balance repeated throughout peak periods. In fact, a secondary benefit to dynamically pricing the express lanes is that capacity in general purpose lanes becomes available from individuals choosing to use the express lanes, which provides a benefit to even those who choose not to use the express lanes.

The success of the 95 Express project in Miami-Dade County, Florida, created momentum to continue planned extensions along I-95 in Broward and Palm

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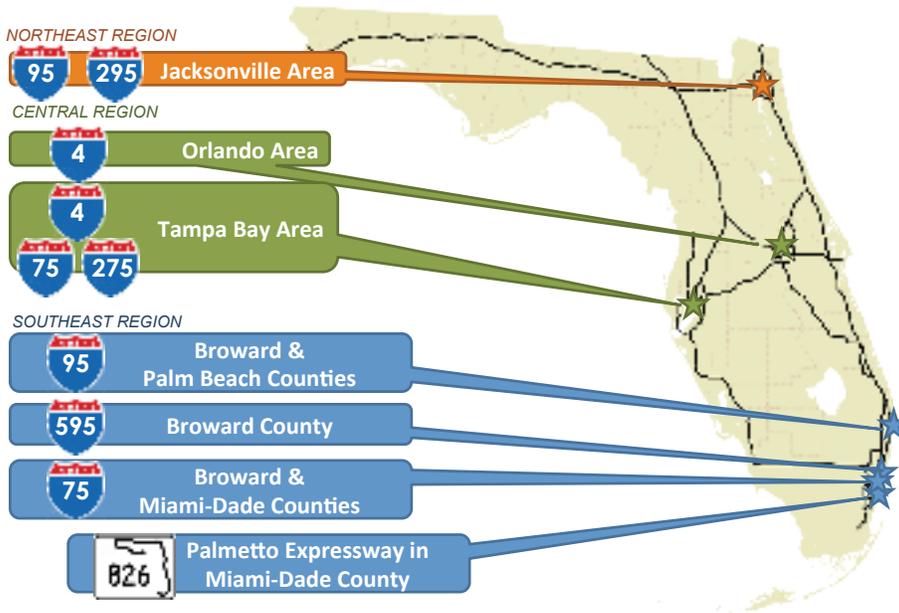
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Beach Counties. The expansion of the express lane concept has also extended to other facilities in the southeast Florida region, including I-595, I-75, and the Palmetto Expressway, creating a need to develop a Regional Concept of Operations for the Southeast Florida Express Lane Network. All the stakeholders, partners, and internal department coordination needed for a regional network requires some type of framework for policy decisions on how the network will function and operate as well as defining everyone's responsibilities.

As other parts of the state started to recognize that the TSM&O strategy of express lanes had the potential to provide opportunities in their area, Tampa, Jacksonville, and Orlando began looking at how to implement express lanes. The Florida Department of Transportation (FDOT) District staff sought guidance in the areas of feasibility, finance, tolling, design, TSM&O, and concept of operations. It became apparent that some type of statewide policy for express lanes was needed. This is the genesis of the effort to develop a statewide policy for managed lanes, recognizing the policy need for all types of managed lanes.



*95 Express.
(Photo courtesy of FDOT District Six)*



Map of potential express lane projects.

FDOT's Central Office Systems Planning, in coordination with the Districts, Florida's Turnpike Enterprise (FTE), expressway authorities, traffic operations, transit, and design, is leading the task to develop statewide policy for all types of managed lanes.

This policy will provide framework to coordinate plans and encourage consistent business rules for all express lane or other managed lane-type projects. The framework will include guidance on making decisions about dynamic versus static pricing on HOV conversions or new capacity projects, the use of heavy trucks, toll collection methods (transponder versus toll-by-plate), entry and exit locations, and identify the roles of each entity (FDOT, FTE, expressway authority, etc.). The policy will also look at certain performance metrics to monitor operations and customer satisfaction.

A statewide workshop was held on January 28-30, 2013, in Tallahassee, Florida, which included representatives from all the Districts and various discipline areas within FDOT. The purpose of the workshop was to bring together stakeholders to connect, coordinate, and contribute to writing draft statewide-managed lanes policy statements. Participants developed draft policy statements in facilitated breakout sessions and tested them against realistic scenarios. Participants weighed in on the statements developed by other breakout sessions and refined their policy statements based on the scenarios and peer review. These draft policy statements, in conjunction with direction from management and data collected related to managed lanes, will serve as the basis for the formation of the statewide-managed lanes policy. A draft statewide managed lane policy statement is due in March 2013.

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Bridge Wind Speed Monitoring Pilot Project On-Track

By Randy Pierce, FDOT Traffic Engineering and Operations Office

The second phase of the Florida Department of Transportation (FDOT) bridge wind speed monitoring pilot project is on-track to be finished before the 2013 hurricane season starts. There are currently 22 road bridges in northeast Florida that are providing wind speed and direction data to FDOT. FDOT is working with the regional public safety and law enforcement agencies to make informed decisions about when to close road bridges in advance of the high-wind conditions associated with severe weather. Once phase two is complete, FDOT will be collecting and disseminating wind data to the transportation management centers (TMC).

Currently, FDOT must rely on the National Oceanic and Atmospheric Administration (NOAA) to collect the data via satellite at their facility in Wallops Island, Virginia. FDOT must also rely on public internet for delivering the information to the TMCs. During a severe weather event, when the data is most valuable, using the public internet to disseminate this critical information could prove problematic if the internet is overloaded or the associated networks are down. During Hurricane Sandy in the fall of 2012, both of these conditions occurred and internet access was not possible in a large portion of the northeast United States.

To create a robust network for collection and dissemination of this data, FDOT has constructed a satellite earth station at FDOT's District Two radio shop in Lake City. This location is within the lowest severe weather wind contour for the entire state and is also a strategic hub on FDOT's intelligent transportation systems statewide area network. This means that once the data is collected from the NOAA satellite it can be easily disseminated on the network to any TMC. The Lake City satellite earth station receiving antenna is approximately 12 feet across and designed to reliably receive signals that travel from the road bridge wind speed monitors, up to the NOAA Geostationary Operational Environmental Satellite (GOES), which is in orbit over the Atlantic Ocean, and back down to Florida. The antenna system is connected to receiving equipment installed in FDOT's microwave shelter at the District Two radio shop. Once the data is received, it is processed by a database server for storage and to ensure integrity. From there it is made available on an FDOT intranet web server that is connected to the statewide area network. Only TMCs will have direct access to this data over the secure network. The servers are collocated with the receiving equipment at Lake City. Currently, the contractor, Microcom Design, has completed the hardware installation work and is focusing on the database and web server software. The software is expected to be completed in April 2013.



New FDOT satellite earth station at the District Two radio shop.

FDOT is anticipating that this project may become a statewide mission critical application. Several Districts other than District Two have expressed an interest in using the system. There are also ongoing discussions on integrating the data with the statewide SunGuide® software system. During 2012's Tropical Storms Beryl and Debbie, both Florida Highway Patrol and the District Two regional county sheriff's offices, emergency operations centers, and fire rescue agencies monitored the data and commented on its usefulness. Media agencies in Jacksonville and around the state have also commented on this system. During the tropical storms, the road bridge wind speed data was used on-air by Jacksonville television news agencies to inform the public. In planning for this to be a mission critical application, FDOT has also built a back-up satellite earth station at the Traffic Engineering Research Laboratory (TERL) in Tallahassee. This back-up station will be on stand-by to take over for the primary satellite earth station in Lake City, if needed, and will also be used to test software modifications and expansion ideas such as interfacing with SunGuide software without compromising the live system in Lake City.

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District Four Highlights Another Successful Year in 2012 Annual Report

By Dong Chen, FDOT District Four

It took a great deal of tactical planning, strong leadership, and smart budgeting in 2012 for the Florida Department of Transportation (FDOT) District Four Intelligent Transportation Systems (ITS) Unit to significantly expand operations in support of future ITS programs.

The SMART SunGuide® Transportation Management Center considerably expanded its operations and workstations to support future ITS programs, such as I-75 Express Lanes, Phase 2 of the I-95 Express Lanes, and I-595 Express Lanes. Installing and integrating ten additional workstations was just one of several upgrades to the control room over the past year. Five new monitors were added to each console to create a “mini video wall,” with 81 camera images displayed simultaneously. Projectors were also mounted onto the ceiling to display speed data, weather conditions, and web site status. Displaying “big picture” information in this manner gives both managers and operators a greater situational awareness of the roadway.

These and other accomplishments are highlighted in the *2012 SMART SunGuide ITS Annual Report*. The theme of the report, quite suitably, is “Vision into the Future.” The report can be found on the SMART SunGuide web site at <http://www.smartsunguide.com/SmartDocs.aspx>.

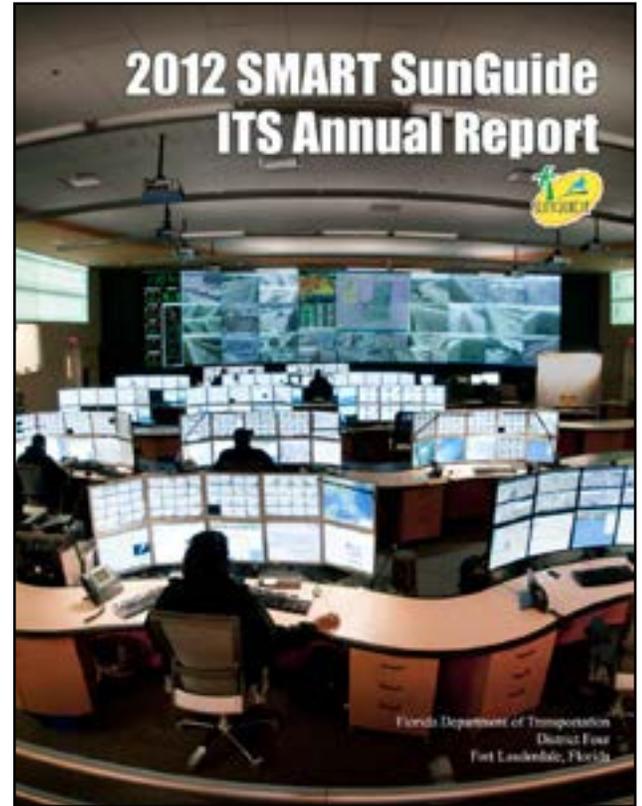
One of the highlights of the *2012 SMART SunGuide ITS Annual Report* is the benefit-cost ratio. This important measure shows the value of the dividends passed along to motorists on FDOT District Four investments in its ITS program. The 2012 benefit-cost ratio was 9.02. This means each dollar spent on ITS improvements generated \$9.02 worth of benefits. Motorists received these dividends primarily in the form of time and fuel savings from various programs within the ITS Unit. The Road Ranger service patrols, for example, assisted with traffic control at thousands of incidents, easing delays and restoring normal traffic flow as quickly as possible.

The change in the benefit-cost ratio in 2012 is a result of the inclusion of the capital cost of the ITS replacement equipment project in the calculation. Eighteen dynamic message signs (DMS) were replaced along I-95, I-595, and I-75. DMSs help drivers stay informed on the District’s roadway conditions by providing real-time traffic information and contribute to improving overall mobility and safety. This replacement project is a product of the ITS Program’s vision, “to be the best ITS program, by maximizing roadway efficiency, using technology, innovation, and continuous improvement.”

A key performance measure of any ITS program is incident clearance time. Once more, District Four continued its record of continuous improvement with an average clearance time of 53.8 minutes, a two percent improvement from 54.3 minutes in 2011.

The District Four ITS Unit’s “no challenge is too great” attitude attracted the attention of national and state partners throughout the year. The Intelligent Transportation Society of America recognized the District’s ITS-supported Smoke and Fire Plan with an Outstanding Achievement Award. The plan has pre-defined operational procedures, directing how emergency responders will respond to highway closures due to poor visibility, resulting in improved communications, coordination, and the rapid deployment of needed resources. A benefit to the public includes improving traveler information services along key corridors. This innovative, “take-charge” stance to a recurring problem can potentially save lives and significantly reduce travel delays.

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District Six Hosts Successful Incident Management Training Event

By Javier Rodriguez, FDOT District Six

The Florida Department of Transportation (FDOT) District Six Intelligent Transportation Systems (ITS) Program recently hosted its first ever Incident Management Refresher Training course to review program guidelines with its Road Ranger service patrols, incident response vehicle (IRV) operators, and transportation management center (TMC) operations staff. The meeting served as a platform where team members were given the opportunity to describe their roles and responsibilities as well as voice suggestions for areas of improvement. The event concluded with a table top exercise where Road Rangers and TMC operators reversed roles in mock traffic events.



The FDOT District Six Incident Management Team hosts round table discussion in February 2013.

The meeting was organized after an IRV operator suggested it as a way to improve the program's intercommunication and training strategies. It turned out to be a highly effective exercise, providing team members with better insight into the roles and responsibilities of each job. The Road Rangers got a glimpse of what TMC operators have to do when managing an event at the TMC. In the mock crash, Road Rangers verified the incident, deployed the appropriate resources to manage it, posted traffic alerts on dynamic message signs and the FL511 traveler information system as well as notified partner agencies all within the contract-required time periods. Through this exercise, they were able to experience the challenge of managing events in a timely and accurate manner, which reinforced the importance of ongoing communication while in the field. Similarly, the table top exercise allowed TMC operators to complete several Road Ranger tasks, such as maintenance of traffic and other incident clearance efforts, to give them a better understanding of the demands Road Rangers face as well.

The three-hour session also allowed all team members to meet face-to-face and interact on a more personal level as opposed to a voice on the radio or phone. This setting prompted open discussions in front of the contract managers and FDOT staff, providing the opportunity to hear firsthand accounts about which initiatives were working or not. Even though contractor and staff meetings take place on a regular basis, this event proved to be especially beneficial because it was the first time a meeting had been set up in a way that allowed a round table discussion with all team members present. Road Rangers felt it served to improve their morale, and managers felt they gained a more comprehensive account of the team's daily interactions. The team now plans on hosting this event every year.

For information, please contact Mr. Rodriguez at (305) 407-5341 or e-mail to Javier.Rodriguez2@dot.state.fl.us.

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ITS Florida: Lightning Protection in Traffic Operations and Intelligent Transportation Systems

By Bill Cook on behalf of ITS Florida

The traffic operations and intelligent transportation systems industry have slowly progressed from considering lightning damage at a site as an “act of god” to understanding that it can be prevented. This awareness is not too soon in coming as the sophistication of electronics on the roadside has reached astounding levels. Each new device brings with it better and better performance or features that were not dreamt of or imagined not so many years ago. Unfortunately, along with the progress, the cost of the equipment has escalated while the sensitivity to lightning surges has also escalated, compounding financial problems.

The time has come to get the lightning damage scenario under control.

There are a number of things to be considered. When a site sustains lightning-related damage, it is important that the site is restored quickly; but it is also important that the lightning protection system is investigated and “fixed” as it obviously did not protect the site. If this is not done, the damage will occur again and again.

The second thing to consider is adding an audit of each site’s protection system as part of a preventative maintenance program. This requires a clear understanding that the protection system will deteriorate with time, stress, and modifications. Done properly, an audit will help protect the site. Typically a site should be audited every 5 to 10 years depending on the significance of the site, frequency of lightning in the area, the soil type, and equipment installed.

The third consideration is to add a protection audit before the equipment or site is upgraded. When traffic signal equipment is upgraded to the latest versions at a site that may be over 20 years old, it is almost guaranteed that the protection system has deteriorated, increasing the probability that the site will sustain damage within the first few years.



Lightning strike.

All of this is just good engineering practice associated with the knowledge and acceptance that lightning damage can be prevented. The remaining problem is how to educate the designers of the upgrade projects of what details need to be specified, and the technicians who maintain the sites in the

techniques of a site audit including the use of meters to evaluate the grounding system.

There are dozens of myths and misunderstandings about the cause and effect of lightning protection. Training has to start with an understanding of lightning; how much energy we are dealing with and the coupling mechanisms that cause the damage. This has to be the foundation of the training program.

We then need to look to the system components, the electrical system, bonding in accordance with National Electrical Code article 250, the earthing system, and finally, the surge protection devices—where they go and their capabilities.

There are experts in each of these fields, but few understand the relationship and role of each component in the system and, therefore, how the whole system works.

How to test or evaluate a system at a site in a simple and effective manner is critical. Teaching these techniques is an important part of any training program. One of the areas of



Typical cabinet at a signalized traffic intersection.

confusion is how to measure the earth resistance of the grounding system. Traffic intersections do not have the open real estate to deploy a “fall-of-potential” meter, so there has to be an effective alternate. Historically, burying the ground rod 30 inches below grade prevents an accurate assessment of the earth resistance with a “clamp-on” meter, but measurements can be taken. The key is knowing how to interpret the readings, some of which can be confusing when measured at the cabinet.

Finally, knowing how to design and specify a protection system correctly simply avoids the damage and failures in the first place. Investigating and updating the systems after damage prevents further damage and, lastly, auditing sites as part of a preventative maintenance program provides for planned upgrades before damage and repair costs overwhelm the budget.

For information, please contact Mr. Cook at (321) 608-9162 or e-mail to BCook@lightningcontrol.com.

For more information on ITS Florida, please check the ITS Florida web site at www.itsflorida.org or contact Sandy Beck, Chapter Administrator, at itsflorida@itsflorida.org.

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Meter to measure the earth resistance of the grounding system.

Editorial Corner: Safety on Our Roads

By Joseph Santos, FDOT Safety Office

In 2010, there were 32,885 traffic fatalities in the United States. The number is staggering and, if put into perspective, would equal the undergraduate population of a major university. Although staggering, the traffic fatality number is at an all time low going back to 1949. Florida's traffic fatalities in 2010 were 2,444 and, similar to the national trend, have seen a steady decline.

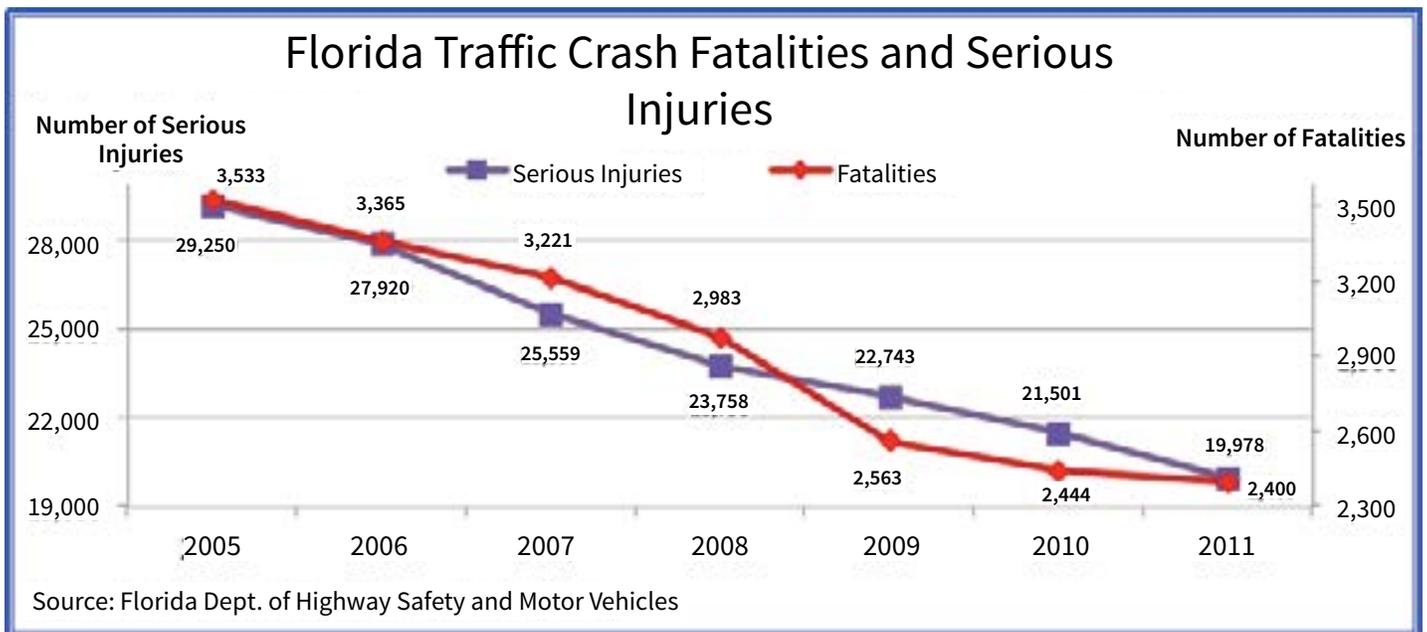
The transportation safety issue has been recognized at the national level. At the national level safety initiatives have been incorporated through legislation in The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) since 2005 and in the most recent legislation – Moving Ahead for Progress in the 21st Century Act (MAP-21) enacted in 2012. Included in the legislation is the requirement for states to address transportation safety on all public roads in their states through the implementation efforts of their Strategic Highway Safety Plan (SHSP).

Much has also been done at the federal, state, and local government levels to address transportation safety. Both the Federal Highway Administration (FHWA) and the National Highway Traffic Safety Administration (NHTSA) play a key role by providing funds to states for the Highway Safety Improvement Program (FHWA) and the State Highway Safety Grant Programs (NHTSA). An underlying theme to the safety components in both of the national legislative

efforts (SAFETEA-LU and MAP-21) is to be data driven and focused to bring down the number of fatalities and serious injuries. At the state and local levels, transportation safety is being conducted through implementation efforts of the Florida SHSP. The efforts of the SHSP bring together all of the Florida safety partners to focus on the 4Es (engineering, enforcement, education, and emergency medical services) of safety. The Florida SHSP was updated in 2012 to include the following eight emphasis areas: Aggressive Driving, Intersection Crashes, Vulnerable Road Users (pedestrians, bicyclists, and motorcyclists), Lane Departure Crashes, Impaired Driving, At-Risk Drivers (aging road users and teens), Distracted Driving, and Traffic Data. Each of the emphasis areas are led by teams of individuals that develop action plans to focus on key countermeasures to address transportation safety for their emphasis area.

Transportation safety is a serious issue and one that many people within the nation and state are working on. Implementation efforts of the Florida SHSP and bringing together the 4Es have made a difference in reducing the number of traffic fatalities and serious injuries in Florida.

For information, please contact Mr. Santos at (850) 245-1502 or e-mail to Joseph.Santos@dot.state.fl.us.



Reference materials:

- <http://www.saferoads.org/federal/2004/TrafficFatalities1899-2003.pdf>
- <http://www.dot.state.fl.us/safety/SHSP2012/StrategicHwySafetyPlan.pdf>
- <http://www.dot.state.fl.us/safety/3-Grants/Grants-Home.shtm>

Announcements

Mark Your Calendar Now!

Join the nation's leading transportation officials, technology providers, policy makers, and researchers at the Intelligent Transportation Society of America's (ITS America) 23rd Annual Meeting and Exposition on April 22-24, at the Gaylord Opryland Hotel and Convention Center in Nashville, Tennessee. ITS America is proud to partner with the Tennessee Department of Transportation and ITS Tennessee to host this important event.

More information is available at <http://www.itsa.org/annualmeeting>.

Make Plans for August

The 2013 National Rural ITS Conference is set to take place in Saint Cloud, Minnesota, on August 25-28. More information is available at <http://www.nritsconference.org/index.html>.

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FDOT Traffic Engineering and Operations Mission and Vision Statements



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