Florida Department of Transportation

Intelligent Transportation Systems Program Annual Report Fiscal Year 2007-2008

Vision Statement

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

Mission Statement

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

Report Contents

General

ITS Program Highlights

Florida Department of Transportation

CHARLIE CRIST
GOVERNOR

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STEPHANIE KOPELOUSOS
SECRETARY

Dear Reader,

On behalf of the Florida Department of Transportation ITS Program, we are pleased to present this Annual Report for fiscal year 2007-2008. Fiscal year 2007–2008 has been a busy and exciting time.

The FDOT ITS Program has undertaken new challenges while continuing to move forward with projects already initiated. The I-95 Express Project, which converts existing high occupancy vehicle lanes to high occupancy toll lanes has been an interesting and complex project from the ITS perspective. Throughout the year, the ITS Program's statewide SunGuide™ Software has been enhanced to support the tolling applications of this high occupancy toll lane deployment.

Our existing 511 traveler information services were redesigned to provide a seamless statewide system. Currently accounting for over 18 percent of the national 511 calls, designing an enhanced system allows us to better meet our customers needs.

In mid June, wireless internet access was launched at two of our welcome centers. The welcome centers on I-75 in District 2 and US 231 in District 3 now offer this valuable service to our travelling public. The remaining two welcome centers will have wireless internet access available in August 2008.

These projects and several others are showcased in this annual report. We are convinced of the benefits ITS deployments provide to our customers.

There is no doubt that improved safety and mobility provided by ITS deployments are extremely valuable benefits we provide to the travelling public.

Elizabeth Birriel

Elizabeth Birriel, PE
Deputy State Traffic Operations Engineer
Florida Department of Transportation
ITS Program Manager

Florida's Transportation Future

Florida's Growth Fast Facts

Over the past several years, transportation demand in Florida has grown at a rapid pace. Although Florida and our nation are currently facing some tough times, travel demand in Florida is still growing at a rate that exceeds population growth; and this trend may continue into the foreseeable future. The following is a collection of indicators showing the anticipated future growth in Florida.

Population

- Between 2000 and 2007, Florida's population grew by about 2.4 percent per year. However, with the slowing economy, growth has sunk to its lowest levels in three decades with anticipated growth at 1.1 percent per year between 2007 and 2010. This rate is expected to increase to 1.6 percent per year between 2010 and 2020.
- By 2035, Florida is on track to break the 26 million mark.

Commerce

- Florida metropolitan areas dominated the Milken Institute / Greenstreet Partners 2007 Best Performing Cities Index with three cities (Ocala, Orlando-Kissimmee, and Naples-Marco Island) ranked in the top six cities where America's jobs are being created and sustained. Ten other Florida metro areas rounded up the top 50.
- Florida's unemployment rate for 2007 (4 percent) remained below the national average; while preliminary figures for 2008 indicate Florida at the national average of 5.5 percent.
- Florida was the national leader in its number of new high-tech establishments from 2004 to 2005, and ranked second in the nation in number of new high-tech jobs added (10,900).
- In 2007, Florida continued to outpace the nation in both per capita personal income growth (5.3 percent increase) and total personal income growth (7.2 percent increase).
- With its deep water ports and air transportation facilities, Florida is able to support a very large volume of exports and imports, keeping Florida as a national leader in international commerce.
- Florida hosts some 2,000 firms from other countries, including 300 regional corporate headquarters.
- Florida ranked seventh in the U.S. in 2006 for exports, with an annual volume of $61 billion in combined exports of goods and services.
- More than 84 million out-of-state tourists came to Florida in 2007, with an impact of approximately $65 billion in total tourism spending.

Transportation Infrastructure

- The 2005 federal highway bill (Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users) brings $10.4 billion to Florida through 2011.
- No place in Florida is more than 90 miles from one or more of 14 deep-water seaports.

Sources: University of Florida, Bureau of Economic and Business Research; Florida Department of Transportation, Planning - "Trends and Conditions Report - 2008;" American Electronics Association; U.S. Department of Labor; U.S. Census Bureau; Enterprise Florida Inc.; U.S. Department of Commerce, Bureau of Economic Analysis; Florida Office of Economic and Demographic Research; Visit Florida; Travel Industry Association of America

Overall Vision

To ensure that Florida's transportation system meets future demands, the Florida Department of Transportation (FDOT) is working to achieve the following mission:

FDOT's Mission

> *Provide a safe transportation system that ensures the mobility of people and goods, enhances economic prosperity, and preserves the quality of our environment and communities.*

To achieve this mission, four primary goals were established—safety, systems management, economic competitiveness, and quality of life.

FDOT's ITS Program Mission

> *To provide effective intelligent transportation systems for Florida's travelers that enhances the safety and mobility of people and goods, economic competitiveness, and the quality of our environment and communities by serving commuters, tourists, commercial vehicles, and evacuees.*

FDOT's Commitment to ITS

FDOT maintains a State Highway System of more than 12,000 centerline miles and 42,082 lane miles. According to the FDOT *Five-Year Work Program*, $6.6 billion was budgeted in this fiscal year to support Florida's transportation needs. As part of its annual program, FDOT made significant investments in ITS and is committed to investing approximately $875 million between 2002 and 2017.

FDOT's ITS Program Areas

FDOT's Traffic Engineering and Operations Office coordinates and promotes the deployment of ITS throughout Florida. The ITS staff is led by Elizabeth Birriel, P.E., Deputy State Traffic Engineer—ITS Program Manager.

Florida's ITS is organized into the following program areas:

- ITS Management/Deployments—*Gene Glotzbach, P.E.*
- ITS Software, Architecture, and Standards—*Trey Tillander, P.E.*
- Telecommunications Program Management—*Randy Pierce*
- Traffic Systems—*Elizabeth Birriel, P.E.*

ITS Management/Deployments

- Promote ITS deployments on Florida's roadways, develop standards, maintain the *ITS Strategic Plan*, and implement a systems engineering process to support procurement and deployment of ITS
- Deploy advanced traveler information systems and 511
- Provide technical support and assistance to FDOT's District Offices and other partners
- Manage the *Ten-Year ITS Cost Feasible Plan* and develop the *Arterial ITS Plan*
- Continue research in the use and deployment of transponders, license plate readers, and other communications devices as probes for real-time traffic data and statistics for planning
- Manage the Federal ITS Discretionary Grant Program
- Support the I-95 Corridor Coalition through the co-chairmanship of the Travel Information Services Program Track

ITS Software, Architecture, and Standards

- Manage the SunGuide™ Software System for freeway and incident management, transportation management center interoperability, and reporting
- Manage the FDOT Ramp Metering Software System for ramp meter control and monitoring
- Manage the *Statewide ITS Architecture* to promote integrated ITS regions, corridors, and projects
- Promote and coordinate the statewide use of robust, non-proprietary ITS standards
- Coordinate ITS training to enhance the quality and quantity of the state's ITS workforce
- Develop and update ITS standards and specifications
- Coordinate Traffic Operations and ITS support for public/private partnership and managed lanes projects

Telecommunications Program Management

- Guide deployment of a communications backbone to serve ITS deployments on major corridors
- Implement and manage the Statewide ITS Wide Area Network (WAN) to support ITS deployments
- Manage the operations and maintenance program for the statewide ITS telecommunications network to support ITS deployments, motorist aid call boxes, and various ITS research and development initiatives
- Manage all FDOT Federal Communications Commission radio licenses
- Manage the Wireless General Manager Agreement, a resource-sharing public/private partnership which places commercial wireless carriers on FDOT rights-of-way with Lodestar/American Tower
- Develop operations standards and equipment specifications to support District telecommunications initiatives in their ITS, Maintenance, and Traffic Incident Management programs

Traffic Systems

- Develop, test, maintain, update, and publish minimum standards for traffic control systems and devices; and evaluate and certify these systems and devices for use in Florida
- Develop, implement, and maintain quality assurance and certification programs through the Approved Product List (APL)
- Develop and maintain standards and specifications for ITS devices used in Florida
- Provide testing and change management for ongoing development and updates of the state's SunGuide™ Software with corresponding devices
- Research, compile, develop, and document recommended practices and procedures for ITS devices used in Florida
- Provide technical assistance and training relating to the design, implementation, and operation of ITS devices used in Florida
- Conduct the Traffic Engineering Research Laboratory (TERL) testing and research programs
- Maintain and update traffic operations and ITS device asset inventory for quality assurance and certification record
- Perform traffic operations, ITS and communications testing

FDOT's ITS Program Accomplishments

Florida's ITS Program accomplishments are numerous. The following is a list of the Fiscal Year 2007-2008 major accomplishments.

ITS Management/Deployments

- Updated the *Ten-Year ITS Cost Feasible Plan*.
- Promoted 511 traveler information in Florida with continued support to Districts 1 and 2 for the provision of data to the statewide 511 traveler information system.
- Executed a contract with LogicTree for development of the Next Generation Advanced Traveler Information System (ATIS). Completed development of the interactive voice response (IVR) system and Web site; began the end-to-end design; and moved in to final stages of the data fusion system development.
- Executed a contract with Global-5 Communications to provide marketing for the Next Generation ATIS and began a marketing effort to determine the public's reaction to providing traveler information via IVR and a Web site.
- Produced *Florida's 511 Progress Report—Eliminating the Boundaries*, an annual report for 2007.
- Completed the procurement process for a probe data collection pilot project. Inrix and Cellint were selected to provide travel times through the use of global positioning system devices and cellular phones.
- Provided support to District Traffic Operations and Work Program staffs to update the Districts' portions of the T*en-Year ITS Cost Feasible Plan*.
- Continued to provide post-award support to District 1's Traffic Operations with the Interstate 75 ITS deployment project.
- Continued to provide post-award support to District 2's Traffic Operations Office with the Phase V Interstate 295 projects.
- Selected Traffic Control Devices, Inc. (TCD) to install license plate readers in Tallahassee to determine travel time information to post on dynamic message signs. Design work to install the LPRs was started.
- Provided support to District 3 with the Bay County advanced traffic management system (ATMS).
- Continued to provide oversight to District 3 for the installation and testing of dynamic message signs in the Tallahassee area, a federal grant project to support the America's Missing Broadcast Emergency Response (AMBER) Alert process.

- Continued to support and provide quality assurance to the Traffic Engineering and Research Lab (TERL) with development of an ITS lab to test ITS equipment operability using the SunGuide™ Software.
- Conducted research in the development of an asset database to better manage ITS operations.
- Continue to operate the Change Management Board and process engineering change proposals.
- Continue to produce the SunGuide™ Disseminator (FDOT's Traffic Engineering and Operation's monthly newsletter).
- Initiated development of the *Arterial ITS Plan* with research regarding ATMS deployment and the benefits of signal retiming.
- Held FDOT's Annual ITS Working Group Meeting in March 2008, to showcase ITS in the state of Florida.
- Continued to provide support to FDOT's Public Transportation Office for their Resource for Advanced Public Transportation System Program.
- Continued work on developing ITS performance measures by researching ways to collect data to establish a uniform method to determine incident response times and travel time reliability.

ITS Architecture, Software, and Standards

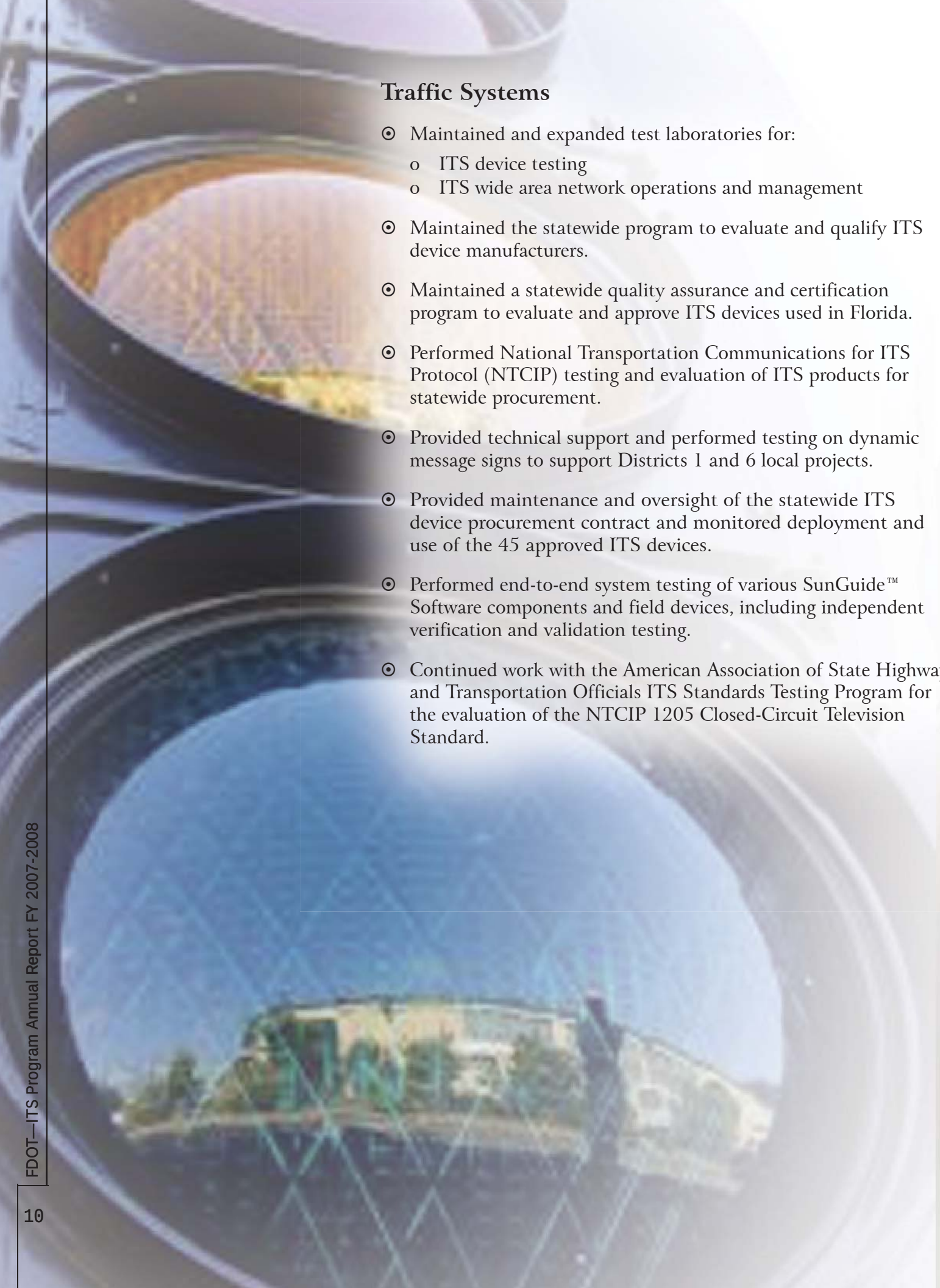
- Conducted SunGuide™ Software Release 3.0 Independent Validation and Verification at the FDOT Traffic Engineering Research Laboratory.
- Delivered SunGuide Software Release 3.0 adding 511, Web site, variable speed limits, event management, Road Ranger, reporting, and performance measures functionality.
- Delivered SunGuide Software Release 3.1, adding pricing and virtual video wall functionality.
- Launched the upgraded, SunGuide Software-enabled www.fl511.com Web site.
- Deployed the SunGuide Software for the Miami-Dade Expressway Authority at the Miami Regional Transportation Management Center.
- Provided SunGuide Software coordination with the University of Central Florida and the University of Florida to assist with FDOT-sponsored research projects.

- Began development of SunGuide Software Release 4.0 to support the next generation Florida statewide advanced traveler information system.
- Began development of SunGuide Software Release 4.1 to provide probe travel time functionality.
- Coordinated development of requirements for a future SunGuide Software release to support an additional Road Ranger automatic vehicle location system.
- Began development of the SunGuide Reports Repository to document, validate, and efficiently share reports.
- Updated the Statewide ITS Architecture to support the South Florida 95 Express and Orlando Bus Rapid Transit projects.
- Provided Statewide ITS Architecture support to the I-10 ITS Freight Corridor project.
- Updated the FDOT procedure for compliance with the Federal Highway Administration Rule 940 regarding systems engineering and ITS architecture.
- Developed and provided SunGuide Software Operator initial and follow-up training.
- Continued monitoring use of completed FDOT Standard Specifications for General Requirements for ITS Devices (Section 780), Motorist Information Systems (Section 781), Video Equipment (Section 782), Fiber Optic Cable and Interconnect (Section 783), Network Devices (Section 784), and Infrastructure (Section 785).
- Performed technical reviews and provided support for project-specific requests related to specification modification.
- Began an update of the FDOT Standard Specification Section 781 to support the use of arterial dynamic message signs.
- Provided technical support to the
  - 95 Express Operations Group in the areas of ITS, signing, operational analysis, and incident management.
  - I-595 Public/Private Partnership procurement team in the areas of ITS and software.
  - Alligator Alley ITS Task Team in the areas of ITS, traffic operations, and incident management.
- Managed the legal protection of the SunGuide logo by registering it as a federal trademark.
- Managed the legal protection of the SunGuide Software source code by registering it as a federal copyright.

- Presented at the 2008 Freeway and Tollway Operations Conference regarding SunGuide Software center-to-center communications and managed lanes.

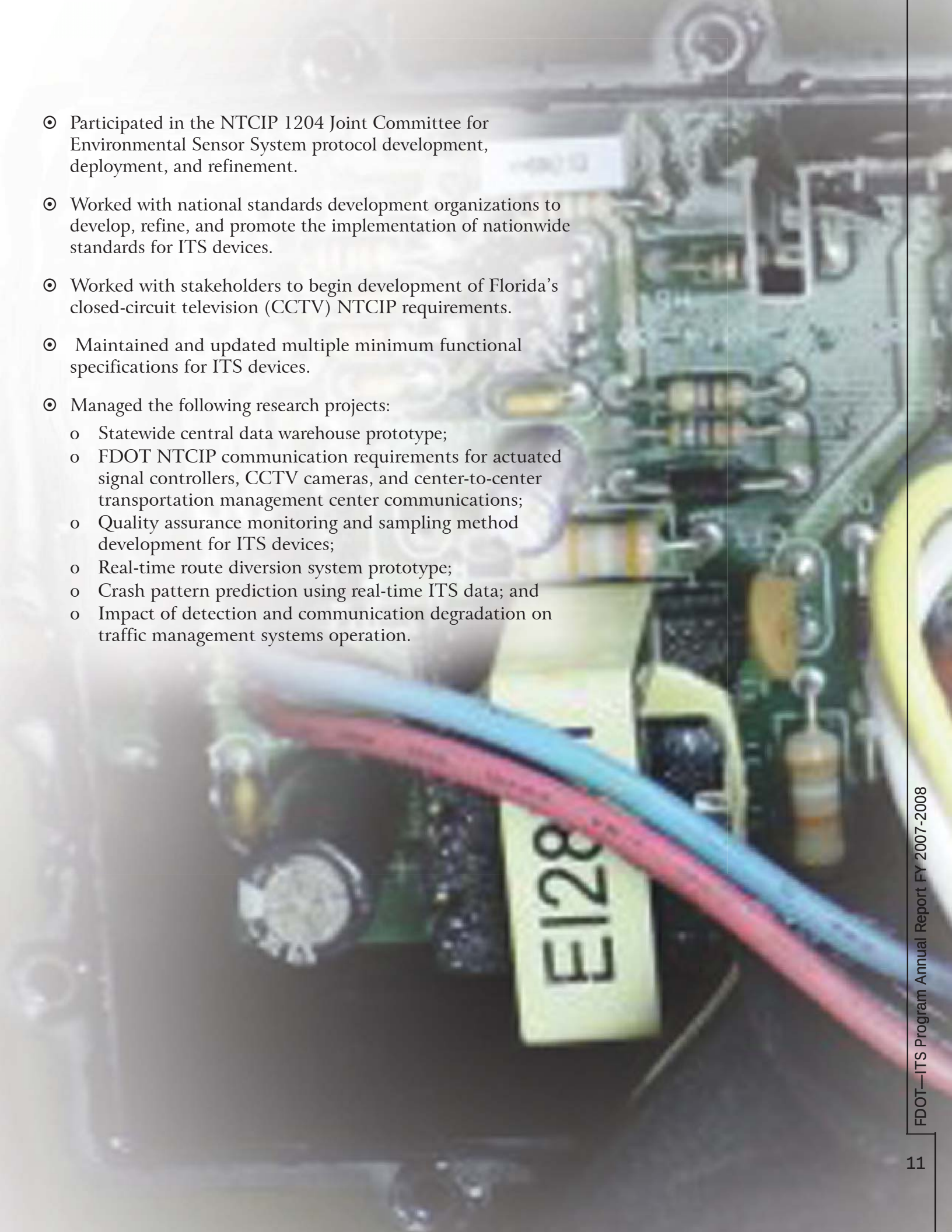
Telecommunications Program Management

- Completed a contract for installation of the ITS Wide Area Network (WAN) project connecting the regional transportation management centers (RTMCs) in Districts 4 and 6, Florida's Turnpike Enterprise (south), and the Traffic Engineering Research Lab (TERL).
- Awarded a contract for installation of the ITS WAN project to connect the Districts 2 and 5 RTMCs to the recently complete South Florida project.
- Completed the ITS Facility Management System (ITS-FM) pilot project in Districts 4 and 6, and the southern portion of the Florida's Turnpike; developing a statewide ITS-FM to enable the Districts to manage their overall telecommunications networks, field system configuration, and components.
- Added seven wireless collocations under the Lodestar/American Tower Wireless General Manager Agreement and completed structural modifications to the FDOT Holt tower.
- Awarded a contract for deployment of permanent emergency backup power generators at five microwave system locations to provide continuity during power outages.
- Awarded a contract for deployment of a replacement telecommunications equipment shelter at an operational microwave system site in District 2.
- Completed system optimization of the repeater deployment for the 47 MHz radio system in Districts 2 and 3, including mobile radio reprogramming.
- Completed dismantling and disposing of seven decommissioned telecommunications towers and facilities.
- Awarded a contract for repeater deployment for the 47 MHz radio system in Districts 4 and 6.
- Completed installation and cut-over to integrate Florida's Turnpike network control and surveillance with the statewide telecommunications network management system.
- Completed the system design and network equipment installation to extend the statewide telecommunications network to the District 7 Tampa Bay SunGuide™ Center to support ITS applications and the motorist aid system dispatch console operations.



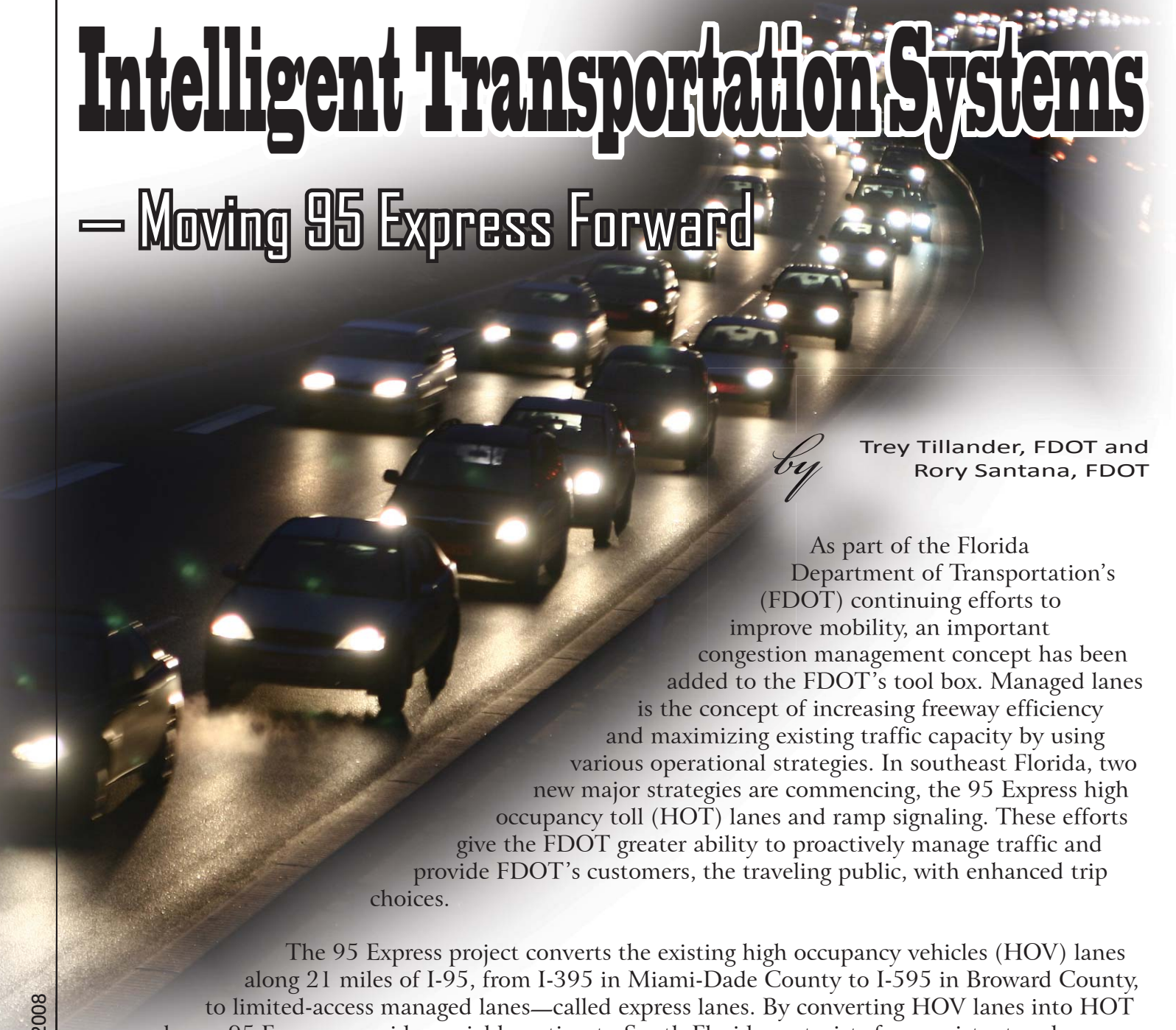
Traffic Systems

- Maintained and expanded test laboratories for:
  - ITS device testing
  - ITS wide area network operations and management
- Maintained the statewide program to evaluate and qualify ITS device manufacturers.
- Maintained a statewide quality assurance and certification program to evaluate and approve ITS devices used in Florida.
- Performed National Transportation Communications for ITS Protocol (NTCIP) testing and evaluation of ITS products for statewide procurement.
- Provided technical support and performed testing on dynamic message signs to support Districts 1 and 6 local projects.
- Provided maintenance and oversight of the statewide ITS device procurement contract and monitored deployment and use of the 45 approved ITS devices.
- Performed end-to-end system testing of various SunGuide™ Software components and field devices, including independent verification and validation testing.
- Continued work with the American Association of State Highway and Transportation Officials ITS Standards Testing Program for the evaluation of the NTCIP 1205 Closed-Circuit Television Standard.



- Participated in the NTCIP 1204 Joint Committee for Environmental Sensor System protocol development, deployment, and refinement.
- Worked with national standards development organizations to develop, refine, and promote the implementation of nationwide standards for ITS devices.
- Worked with stakeholders to begin development of Florida's closed-circuit television (CCTV) NTCIP requirements.
- Maintained and updated multiple minimum functional specifications for ITS devices.
- Managed the following research projects:
  - Statewide central data warehouse prototype;
  - FDOT NTCIP communication requirements for actuated signal controllers, CCTV cameras, and center-to-center transportation management center communications;
  - Quality assurance monitoring and sampling method development for ITS devices;
  - Real-time route diversion system prototype;
  - Crash pattern prediction using real-time ITS data; and
  - Impact of detection and communication degradation on traffic management systems operation.

Intelligent Transportation Systems — Moving 95 Express Forward



by Trey Tillander, FDOT and Rory Santana, FDOT

As part of the Florida Department of Transportation's (FDOT) continuing efforts to improve mobility, an important congestion management concept has been added to the FDOT's tool box. Managed lanes is the concept of increasing freeway efficiency and maximizing existing traffic capacity by using various operational strategies. In southeast Florida, two new major strategies are commencing, the 95 Express high occupancy toll (HOT) lanes and ramp signaling. These efforts give the FDOT greater ability to proactively manage traffic and provide FDOT's customers, the traveling public, with enhanced trip choices.

The 95 Express project converts the existing high occupancy vehicles (HOV) lanes along 21 miles of I-95, from I-395 in Miami-Dade County to I-595 in Broward County, to limited-access managed lanes—called express lanes. By converting HOV lanes into HOT lanes, 95 Express provides a viable option to South Florida motorists for consistent and dependable travel conditions, particularly during peak travel times. These HOT lanes are separated from regular traffic lanes and motorists can choose to use them when their time is more valuable than the cost of the toll. Bus rapid transit; registered HOVs with three or more people, registered hybrid vehicles, registered over-the-road buses, motorcycles, and emergency vehicles may use the express lanes at no cost. Single occupant vehicle (SOV) customers can choose to use the express lanes by paying the toll electronically through SunPass®. Variable toll pricing will fluctuate to maintain traffic in the express lanes at a target speed of approximately 50 miles per hour or greater while maximizing flow rate.

Congestion management projects, including 95 Express HOT lanes and ramp signaling, are not possible without enabling intelligent transportation systems (ITS) technology. ITS components that enable 95 Express include dynamic message signs (DMS), electronic toll collection (ETC), vehicle detector systems (VDS), closed-circuit television (CCTV) cameras, ramp signals, communications infrastructure, and central software.

The most visible and critical 95 Express ITS component are DMSs. In order for I-95 travelers to make informed choices, they must know the 95 Express price prior to using the facility. Since the toll rate

changes based on real-time traffic conditions, DMSs are a critical ITS technology to keeping motorists informed. DMSs are used to display toll rate information prior to entering the express lanes and as a confirmation once a motorist is using the facility.

DMS used to display toll rates

DMS confirmation at ETC point

ETC technologies allow cashless toll collection for SOV travelers who choose to use 95 Express. Two key ITS technologies used by Florida's Turnpike Enterprise (FTE) are automatic vehicle identification (AVI) and license plate readers (LPR). The 95 Express project uses AVI readers and toll transponders provided as part of the FTE SunPass program. The SunPass transponder attached to the vehicle windshield transmits a radio signal to AVI readers mounted above the express lanes.

SunPass toll transponders

To ensure that motorists properly use the 95 Express lanes, the FDOT must maintain a violation enforcement program. SOV motorists who do not have a SunPass transponder will have their license plates photographed and may receive a notice or citation for failing to pay the toll. LPR technology is a primary component of the FTE violation enforcement system. LPRs facilitate the automatic recognition of vehicle license plates, significantly reducing the labor required for the violation enforcement process.

To actively monitor and manage the 95 Express lanes, real-time traffic data is required. This data is provided by VDS technology. The VDS enables non-intrusive detection of vehicles allowing collection

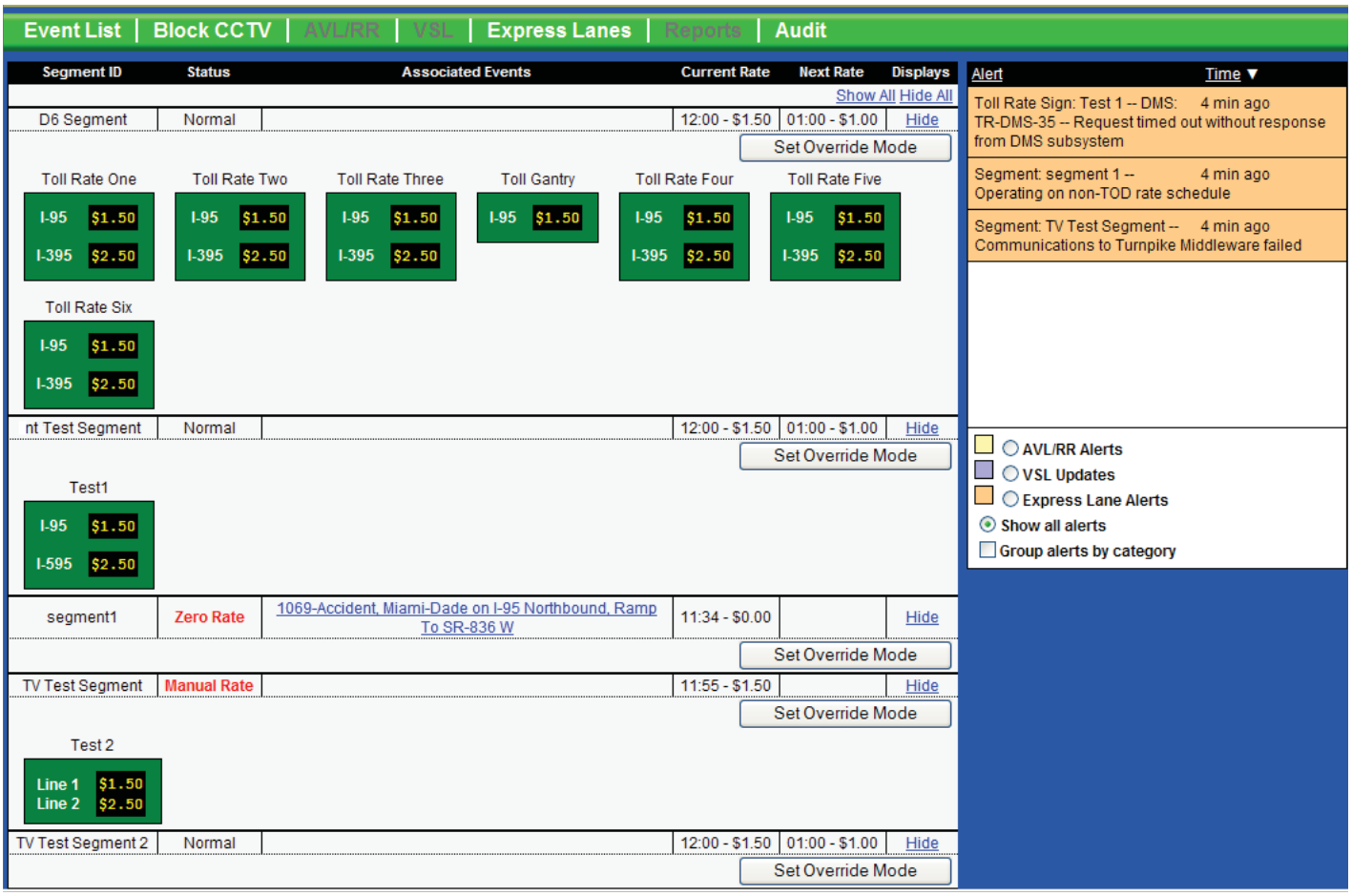
I-95 ramp signal

of volume, speed, and density data. This traffic data is used by the Miami Regional Transportation Management Center (RTMC) to detect incidents and proactively manage traffic. VDS technology is also used to detect vehicles at the ETC point for toll collection and enforcement.

CCTV cameras are a traditional ITS component that enable a new aspect required for the 95 Express operations. Because accurate, timely toll rate information is crucial to the express lanes operations, CCTV cameras allow the operators at the RTMC to verify that the toll rate displays update each time the toll rates change (or should be changed). CCTV cameras also provide real-time visual verification as traffic responds to the changing toll rates. Of course, these cameras continue to assist in all of the traditional freeway operations tasks, such as incident management.

The other important congestion management strategy that will be implemented concurrent with HOT lanes is ramp signaling. Ramp signals are traffic lights that control the rate at which vehicles merge onto a freeway from an entrance ramp. Ramp signals reduce congestion on freeways by restricting the total flow entering the freeway and breaking up platoons of vehicles to allow more efficient merging. ITS components, such as ramp signals, allow most I-95 customers to experience an overall reduction in travel time.

The communications infrastructure and the central software are the ITS components that bring all the previously described ITS components together into a functioning system. 95 Express requires high-availability communications for express lane operations, toll collection, and ramp signaling. This is satisfied by a high bandwidth and redundant fiber optic communications system. The communications system is an excellent example of a successful public-public-partnership between the FDOT District 6, FTE, and the Miami-Dade Expressway Authority (MDX). Redundancy is provided by eight fiber optic cable strands along the FDOT District 6's I-95 and Palmetto Parkway; FTE's Turnpike Mainline and Homestead Extension; and MDX's State Road 836.



Example of the SunGuide Software express lanes graphical user interface

ITS central software is used to implement variable tolling based on congestion pricing and to manage ramp signaling. For 95 Express, this means that if travel speeds in the express lanes start to slow below approximately 53 miles per hour, the toll increases to maintain a free flowing condition. Implementing variable tolling requires automated and intelligent monitoring, which is enabled by software.

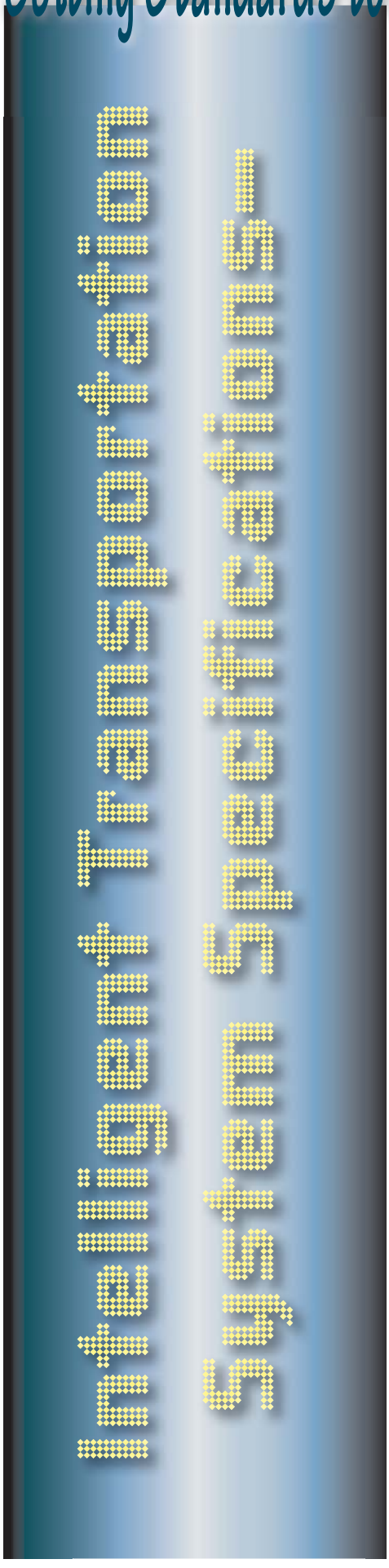
In August 2007, the FDOT initiated central software enhancements to support the state's HOT lanes efforts, and specifically the 95 Express project. The SunGuide™ Software is an advanced traffic management system that was chosen to provide key express lanes functionality and to leverage existing software technologies already used by the FDOT Districts 4 and 6.

The SunGuide Software applies variable toll rate changes, displays the toll rates on DMSs, and communicates the toll rates to the FTE. SunGuide Software allows the configuration of toll rates by segment, time of day (TOD), day of week, and type of day. DMS messages include the cost of the associated segment and the cumulative total of upcoming segments. For normal operations, SunGuide Software applies toll rate changes based on a configurable TOD schedule.

For abnormal operational conditions, the RTMC operator has three override mode options. The "Congested" override mode is typically used if heavy demand causes congestion in the express lanes. The "Closed" override mode is enacted for maintenance or if there is a major lane-blocking incident in the express lanes. The "Zero Rate" override mode is used if traffic is diverted into the express lanes due to a major lane-blocking incident in the general purpose lanes or during emergency evacuations.

The FDOT continues to strive for new technologies and strategies to ease congestion and improve safety along Florida's evolving freeways. The 95 Express project meets this call for action and ITS provides the technology base for efficient operations. Managed lanes and ITS enhance mobility in Florida, thereby providing better service to FDOT's customers—the traveling public.

Setting Standards to Ensure Quality, Compatibility, and Longevity



by Trey Tillander, FDOT and
Ron Meyer, PBS&J

The Florida Department of Transportation (FDOT) develops and publishes written specifications that describe the materials and products used to construct roads, build bridges, and equip facilities with electronic equipment to improve safety and efficiency. These specifications are incorporated into construction contracts, design requirements, and other contractual documents used by the FDOT to purchase equipment and services. The specifications describe how equipment must function along with other attributes, such as how a device must communicate with other devices and/or an overall network, physical connections, warranty requirements, and others.

Creating Specifications and Standards

Prior to 2006, when the FDOT statewide specifications for intelligent transportation systems (ITS) devices made their first debut in the *Workbook of Implemented Modifications to the Standard Specifications for Road and Bridge Construction* (the *Workbook*), published by the State Specifications Office, ITS device specifications and standards were developed on a project-by-project basis. Since there were no statewide specifications for ITS devices, each time a project was designed and sent to construction for bids and procurement, time and money were spent to produce single-project specifications for common equipment. As one would expect, these project-oriented specifications typically focused on the needs of the project at hand, and often did not consider long-term statewide goals, such as a device's interoperability and interchangeability with other equipment. Producing a new set of specifications for every project also meant that there was a considerable amount of duplicated effort. The goal of creating the specifications was to prepare basic equipment requirements for the most common ITS devices utilized in today's deployments.

This began to change in 2006 when the publication of several ITS device specifications and standards marked the conclusion of a three-year ITS Program effort to create standard specifications for the various devices used in deployments throughout the state. According to the Federal Highway Administration (FHWA) Florida was the first state in the nation to adopt a comprehensive array of statewide ITS device specifications and standards. During 2007 and 2008, the use of these initial specifications was monitored to ensure that they provide a good framework of minimum requirements for the design and construction of ITS projects that have been undertaken since their release. This activity is expected to continue to ensure that Florida's ITS specifications reflect

current technologies and to incorporate the functions and features that the FDOT requires.

Internal and external FDOT project designers, consultants, and end-users have incorporated and used these specifications in various ways. Project designers have incorporated them into their design documentation; procurement contracts have used them to describe material to solicit bids for product purchases; inspectors have used them to review material provided on construction projects. The Traffic Engineering and Operations Office ITS Program is responsible for the technical content of these specifications and, while monitoring their use, have received feedback from users, in some cases. This feedback has helped clarify requirements, ensuring the continuous improvement of these specifications by requiring the ITS Program to periodically review their technical content.

According to the Federal Highway Administration Florida was the first state in the nation to adopt a comprehensive array of statewide ITS device specifications and standards.

Since these specifications are also used as criteria for testing equipment and devices submitted for listing on the FDOT's Approved Product List (APL), they are under constant scrutiny by the FDOT staffs responsible for device testing and also by equipment manufacturers who submit their equipment to the FDOT for approval. While there have been minor areas identified in these specifications as having room for improvement, the vast majority of requirements have proven to be correct, enforceable, and sound. This fact is a testimony to the significant research, review, and stakeholder involvement that was a part of their development.

The specifications appear in the *Workbook* under Sections 780 to 786; each one grouped according to the general categories of devices it contains. The specifications approval process included the development of FDOT pay item numbers for the devices (every material and service used or provided during a construction project has pay item number associated with it, used to account for project costs and to pay invoices) and a 30-day industry review period during which comments on the specifications were solicited. The approval process ends with the specifications being submitted to the FHWA for approval. The *Workbook* is updated by the FDOT Specifications Office every six months, and any revisions or modifications to the current documents are proposed and published well in advance for comment prior to adoption.

Latest technologies are reflected in these specifications while emphasizing product reliability, ease of maintenance, and overall performance. An additional goal was interoperability among ITS deployments. With Florida's ITS projects developed from a common set of hardware requirements, the equipment in Florida's transportation management centers is more likely to be compatible, enabling traffic information sharing and seamless freeway management systems operations across jurisdictional lines.

Review, Monitor, and Evolve

The statewide ITS specifications development process was conducted in accordance with the systems engineering management process. The project relied upon the skills and experience of numerous stakeholders, who played an important role in making certain that the requirements adopted were relevant to District needs. A specifications review and acceptance steering committee was formed, composed of FDOT Central Office ITS staffs, FDOT District ITS engineers, and traffic operations personnel. The steering committee members worked to identify the desired functional requirements for each ITS device. Additional input came from the State Specifications Office, the FDOT Traffic Engineering Research Laboratory, and various equipment manufacturers.

The committee members responsible for developing and reviewing the initial specifications are also enlisted to monitor their use and respond to any request for information that the FDOT receives on content and use.

The specifications are revised and published by the State Specifications Office and can be viewed at http://www.dot.state.fl.us/specificationsoffice.

Section 780 General Requirements for ITS Devices

Section 781 Motorist Information Systems
- 781-1 Dynamic Message Sign
- 781-2 Highway Advisory Radio
- 781-3 Road Weather Information System

Section 782 Video Equipment
- 782-1 CCTV Camera
- 782-2 Video Display Equipment

Section 783 Fiber Optic Cable and Interconnect
- 783-1 Fiber Optic Cable
- 783-2 ITS Fiber Optic Connection
- 783-3 ITS Fiber Optic Connection Hardware
- 783-4 ITS Conduit
- 783-5 ITS Pull Box for Fiber Optic
- 783-6 ITS Splice Box for Fiber Optic
- 783-9 ITS Locate System Electronic Equipment

Section 784 Network Devices
- 784-1 ITS Managed Field Ethernet Switch
- 784-2 ITS Device Server
- 784-3 ITS Digital Video Encoder with Software Decoder
- 784-4 ITS Digital Video Decoder

Section 785 Infrastructure
- 785-1 ITS Pole
- 785-2 ITS Field Cabinet
- 785-3 ITS Equipment Shelter

Section 786 Vehicle Detection & Data Collection
- 786-1 Microwave Vehicle Detection System
- 786-2 Video Vehicle Detection System
- 786-3 Magnetic Traffic Detection System
- 786-4 Acoustic Detection System

Performance Measures—

Rating Florida's ITS Management Tools

by Elizabeth Birriel, FDOT and Kenneth Voorhies, Cambridge Systematics, Inc.

In order to better accommodate Florida's rapid growth in population, tourism, and commerce, the Florida Department of Transportation (FDOT) is committed to developing and deploying sophisticated, fully integrated, statewide intelligent transportation systems (ITS) in a cost-efficient manner.

ITS represents the application of real-time information systems and advanced technologies as transportation management tools to improve the movement of people, goods, and services. ITS utilizes advanced technologies to remedy mobility and safety problems, so new road construction and the expansion of existing roads are accomplished smartly. ITS is currently evolving in Florida and, as a result, the capability to report actual performance is also evolving. When the ITS Program first began to address performance in 2004, the FDOT Districts had no automated data collection systems and were initially limited to measures of basic production and usage (output). The initial output measures reported statewide were:

1. 511 calls,
2. Road Ranger assists, and
3. Centerline miles of limited-access highways managed by ITS.

As ITS deployments and integration have increased, performance and the resulting benefits (or outcome) have been more accurately documented and reported. Three ITS outcome performance measures have been identified by FDOT and were subsequently approved by the Florida Transportation Commission (FTC) in 2005. These measures are:

1. Incident duration,
2. Travel-time reliability, and
3. Customer satisfaction.

Beginning in 2006, available data for the incident duration and customer satisfaction measures were collected and reported. All three output and three outcome measures will be reported in 2008. The performance measures data, except customer satisfaction, were

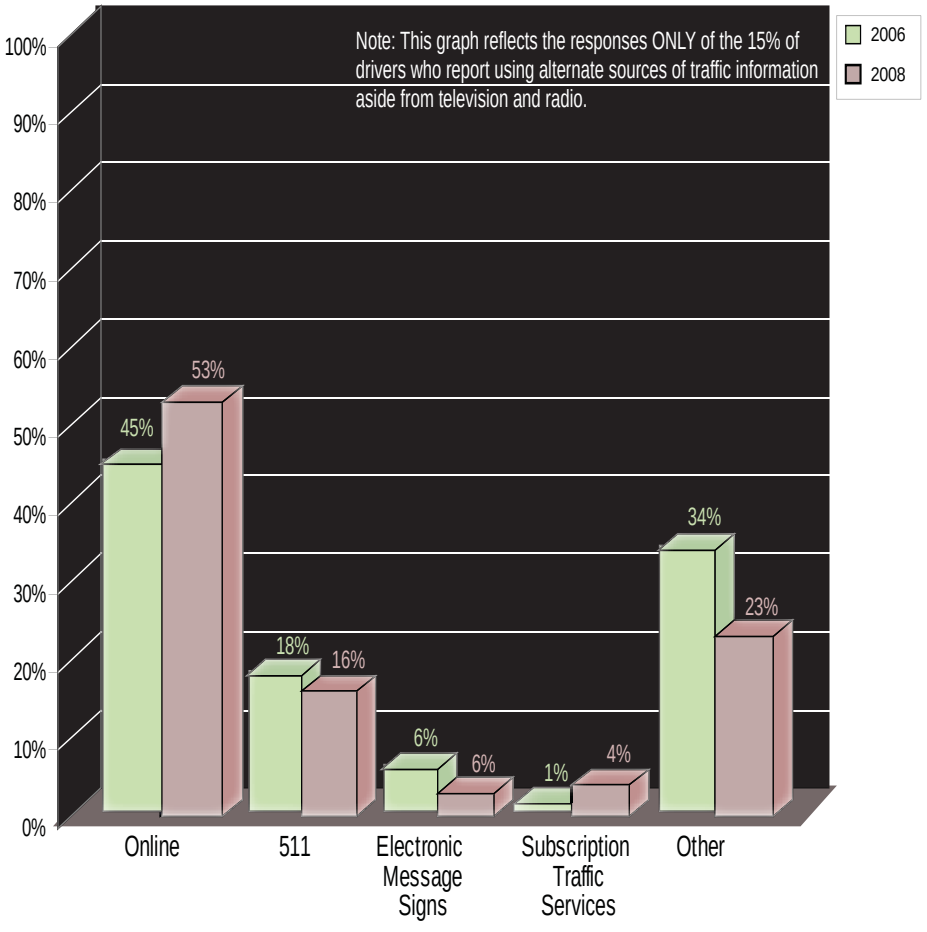
being collected for the period beginning July 1, 2007 and ending June 30, 2008, and reported in August 2008. A summary of the results is documented in the remainder of this article.

Customer Satisfaction Survey Results

FDOT contracted with a professional survey firm, The Schapiro Group (TSG), who interviewed 2,800 drivers across Florida to explore usage of, attitudes toward, and perceptions of the FDOT's ITS services. TSG randomly sampled phone numbers within FDOT's seven Districts to obtain telephone survey data during March 2008. The margin of sampling error for statewide results is ±1.8 percent. Because the survey instrument is nearly identical to the instrument FDOT and the contractor fielded in March 2006, most results may be used to track changes in opinions and usage of FDOT's ITS services over the past two years. The following information was taken from the June 2008 FDOT Customer Tracking Study draft report indicating some of the most interesting findings from the customer survey.

- Over half of drivers surveyed listen to radio traffic reports, and most of those listen more than three times a week.
- Just over half of the drivers watch traffic reports on television, and most of them do so more than three times per week.
- Since the last study period, there has been a slight increase in the number of drivers who use information sources other than radio and television to obtain traffic information. However, the vast majority still do not use alternative information sources.
- Of the 15 percent who say they use alternate traffic information sources, most (53 percent) report relying on the internet; further intensifying the trend from the last study period. Not surprisingly, online traffic information continues to be especially popular among younger drivers, ages 18-39. The 511 traveler information service, on the other hand, draws most heavily on drivers in the 40-49 age group.
- When asked what additional types of traffic information FDOT should provide, most drivers responded that they would find information on alternate routes useful.
- Awareness of the 511 traveler information services remains about the same as in the last study period, with 23 percent of drivers knowing something about the service.
- Among those who know about the 511 traveler information service, about one-third use it once a week or more; and 11

Where else do you go for traffic information?

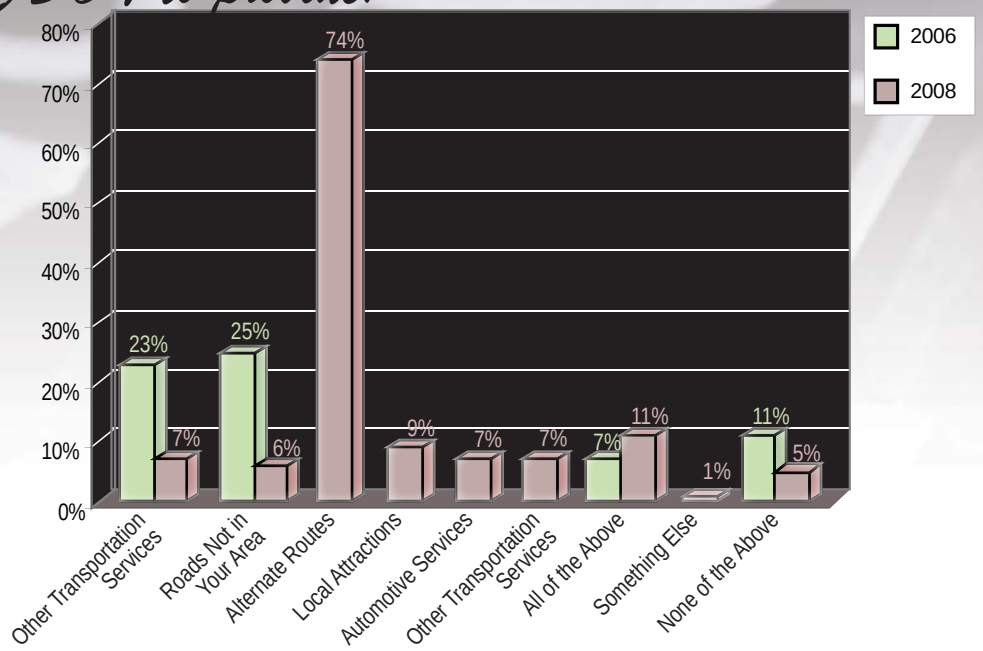


percent use it at least two to three times per week. Slightly more drivers in 2008 (5 percent) say they have never used 511.

- Despite low awareness, the 511 traveler information service has made significant progress in gaining consumers trust. In 2008, 9 percent more 511 users say they are "very likely" to change their route based on the information they receive from 511.

- The vast majority of drivers read electronic message signs at least once a week.

What new traveler information would you like FDOT to provide?

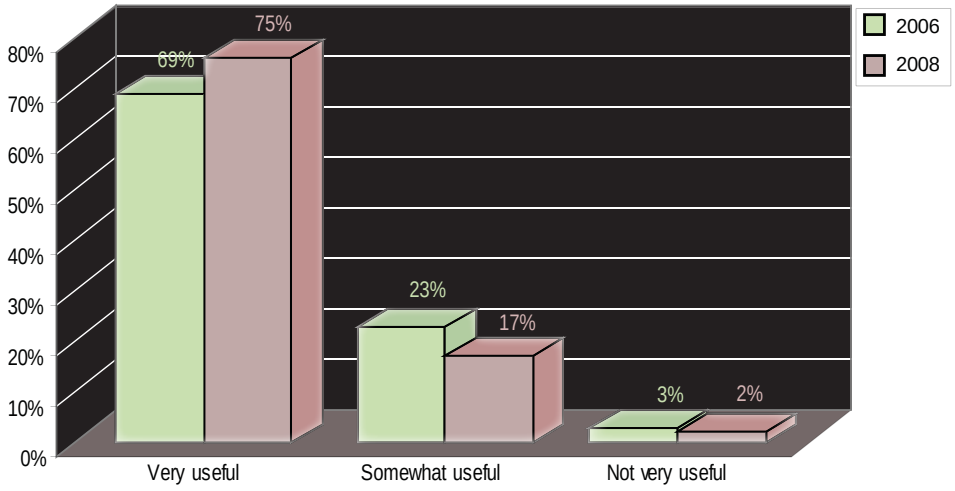


- Because they are so visible, electronic message signs are an excellent way to display information about FDOT's ITS services, when appropriate. In fact, since 2006 there has been a slight increase in the number of drivers who first learned about the 511 traveler information service through freeway signage

- Although many drivers know about Road Rangers, they do not necessarily know how to contact one to request assistance.

- Not only do more drivers in 2008 know about Road Rangers, but they also see more value in the service. Since the last study period, there has been a 7 percent increase in the number of drivers who believe Road Rangers are "very useful."

How useful do you think Road Rangers are?



FDOT is committed to documenting benefits in areas where ITS already meets or exceeds expectations and identifying areas for future potential performance measures. The ITS performance measures are key to providing this information; and FDOT will continue to document the effectiveness of ITS deployments in the upcoming years.

A Creative, Comprehensive Approach to Tell Florida Drivers About 511

by Gene Glotzbach, FDOT and
Vicky Mixson, Global-5 Communications

Imagine building a brand-new highway in a major city that would help relieve congestion, keep drivers safer, and save people time and money on their daily commutes—except nobody knows about it or uses it. That's exactly what could happen to the Florida Department of Transportation's (FDOT) free 511 traveler information service without an aggressive marketing approach.

Florida is a national leader in congestion. According to the Texas Transportation Institute's (TTI) 2007 Urban Mobility Report, three Florida cities are among the 25 worst congested cities in the nation: Orlando, Miami/Fort Lauderdale, and the Tampa Bay area.

Florida is also a leader in deploying and marketing 511 services. Florida launched the sixth 511 service in the nation when Central Florida's Interstate 4 service went online in 2002. Since then, FDOT has launched four additional regional systems in the state's most congested cities, expanded the Central Florida service to include 15 major metropolitan roadways, and provided a statewide service which covers all of the state's interstate highways and Florida's Turnpike. These six services account for nearly 22 percent of all 511 calls placed throughout the United States through December 2007.

The value of 511 is that it gives drivers access to the information they need to make more intelligent decisions about travel—including whether to alter their route—and helps them remain calm in traffic, reducing accidents and congestion. According to TTI's 2007 Urban Mobility Report, modifying how drivers use the transportation network can help highways handle more demand and reduce congestion. In short, 511 is personal, on-demand congestion management.

But having a 511 service available isn't enough—drivers have to know about it and use it. That's where marketing comes in.

The key to getting information out to the motoring public is partnerships. FDOT does not have the financial nor personnel resources necessary to effectively reach all 15 million licensed drivers in the state with the 511 message. It needs help. Other government agencies—both state and local—private companies, tourism agencies and destinations, law enforcement, military bases, and the media are all willing to work with FDOT to market 511. Partners work with FDOT because FDOT has a reputation as being the reliable source for traffic information. They also see the benefits of 511 for them, their employees, and their customers.

Some of the tools that FDOT uses to help its partners talk about 511 include standard marketing pieces: brochures, fliers, rack cards, and bumper stickers. FDOT is also going more high-tech in its outreach by distributing customized Web video promotions. Partners place these short streaming videos, which tout the partnership with FDOT and share the benefits of 511, on their Web sites.

FDOT is also taking advantage of opportunities to talk about 511 with large audiences. Representatives have made presentations and set up displays at hurricane and transportation conferences throughout the state. They have also talked with public safety communications officers, transportation builders, chambers of commerce, and more.

The media partnerships are even bigger. A single media event at a transportation management center can result in literally millions of people hearing about 511. In the past months, FDOT has invited reporters to do live news and traffic reports from transportation management centers in Orlando, Tampa, Fort Lauderdale, and West Palm Beach, and plans to do more events coordinated with major travel holidays. By including partners, such as the Florida Highway Patrol (FHP) and AAA Auto Club South, in its media tours and events, FDOT's efforts take on a life of their own. FHP includes 511 information in its major holiday and safety media releases. AAA has links to 511 on its Web site and reminds its members to call 511 for travel information when they use AAA trip planning services.

FDOT is also looking internally with its marketing efforts, providing 511 information to staffs in each District. Electronic newsletters are being distributed, letting employees know about 511 and offering tips on how to use

the service. Traveling displays, featuring a free-standing 511 banner and literature, are placed in lobbies at District and urban offices throughout the state.

These same traveling displays are also placed in the Division of Driver License offices throughout the state. This targeted marketing effort is providing 511 information to licensed drivers at a place where they have time to sit and read about the service. The displays are also appearing in the lobbies of hospitals, major employers, and government offices.

Other partnerships that have netted major exposure for 511 include public service announcement billboards placed statewide through the Florida Outdoor Advertising Association, and free brochure placements in hotels, visitor centers, gas stations, and other travel destinations.

As FDOT develops its Next Generation, bilingual, statewide 511 service, it faces new marketing challenges. The new service needs time to learn to respond to Florida's varied accents. Current users will need to be taught how to use the new service and encouraged to be patient as the new service learns to understand them. The fact that the service is bilingual means FDOT will have to step up its efforts to reach Hispanic/Latino drivers. Through its established partnerships and new partnerships that are waiting to be built, FDOT will continue to show the way to develop, deploy and promote 511.

The Evolution Continues—

by Trey Tillander, FDOT and
David Chang, PBS&J

SunGuide™ Software

The Florida Department of Transportation's (FDOT) SunGuide™ Software continues to evolve and keep pace with new technologies and users' needs.

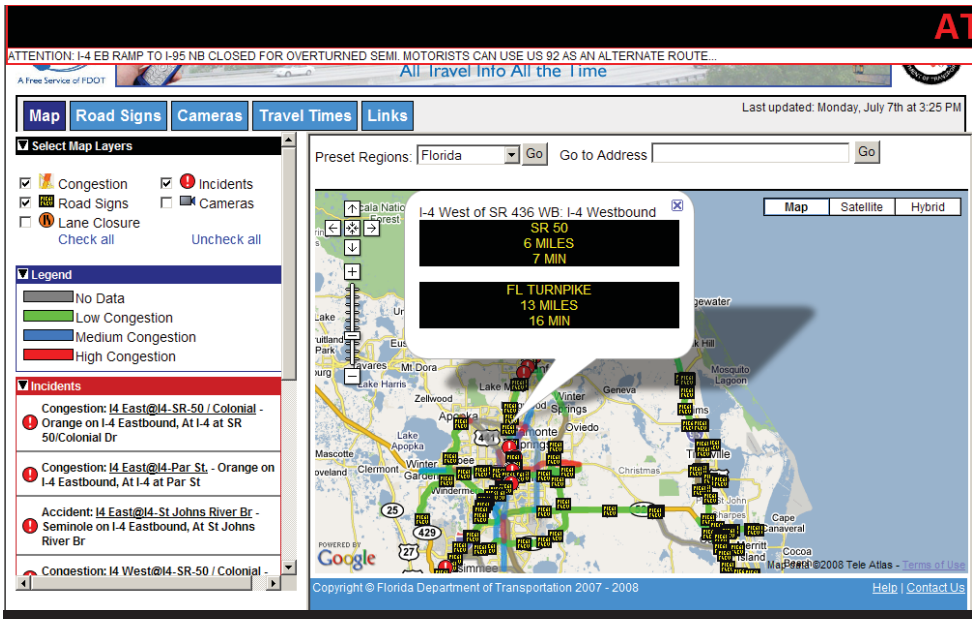
An additional milestone was reached during fiscal year 2007-08 with the new deployment of SunGuide Software by the Miami-Dade Expressway Authority (MDX). In addition to advanced traffic management system (ATMS) software, SunGuide Software has been enhanced to support statewide incident management and statewide advanced traveler information systems (ATIS).

New Development

SunGuide Software Release 3.0 was developed and deployed in fiscal year 2008. This release includes the development of seven new subsystems and six new software interfaces. In addition, Release 3.0 enhances nine existing subsystems as well as the database and the graphical user interface (GUI). This includes enhancing Florida's statewide traveler information Web site (www.fl511.com) and the 511 traveler information service. This release provides control for variable speed limit (VSL) signs and functionality to recommend speed limits for VSL signs based on congestion thresholds. This release further integrates the event management and reporting subsystem and adds the responder audit subsystem. The enhanced event management subsystem gives transportation management center (TMC) operators increased capabilities by adding event information to manage incidents and distribute traveler information in an efficient and timely fashion. The addition of new Road Ranger and automatic vehicle location (RR/AVL) interfaces gives TMC operators the ability to track and monitor Road Rangers in a dispatch environment. The reporting subsystem allows reports to be generated directly from the SunGuide Software GUI. The responder audit subsystem provides TMC management staff with the appropriate permissions to audit data collected through the event management subsystem. The integrated event management, reporting, and responder audit subsystems satisfy key user needs by enabling more accurate and efficient performance measures reporting and providing on-demand operational feedback. Release 3.0 was developed using the systems engineering process. Two major design reviews were conducted in DeLand and Miami, Florida; three factory acceptance tests (FAT) were conducted at San Antonio, Texas, and Ft. Lauderdale, Florida; and the individual validation and verification test was performed at the FDOT Traffic Engineering Research Lab (TERL) in Tallahassee,

Florida. At the end of 2007, Release 3.0 was deployed at the District 2 Jacksonville Regional Transportation Management Center (RTMC), District 4 Broward County RTMC, District 5 Orlando RTMC, District 6 Miami RTMC, District 7 Tampa RTMC, and the TERL.

SunGuide Software Release 3.1 was initiated to support the needs of the 95 Express project in South Florida and developed in coordination with Central Office, FDOT Districts 4 and 6, and Florida's Turnpike Enterprise (FTE). This release includes the addition of the pricing subsystem and toll viewer. The pricing subsystem provides toll rates based on the time of day to the dynamic message sign (DMS) displaying the toll rate. This is a critical function to inform travelers of the current toll rate. The pricing subsystem also gives TMC management the ability to override the toll rate under abnormal conditions, including closure and incidents. The pricing subsystem interfaces with the FTE to verify the correctness of the toll rate being displayed on the DMS, and notifies the FTE customer service representatives (CSR) of the toll rate changes and history. The CSR can review the toll rate history via the toll viewer. This release also includes a new feature to provide a virtual video wall GUI display. This allows flexibility of video displays on computer monitors or television, in addition to video walls, and serves as a back-up option for a video wall controller. This release was deployed at the District 2 Jacksonville RTMC and the District 6 Miami RTMC in May 2008.



511 traveler information Web site - www.fl511.com

New Deployment

Upon execution of the Joint Participation Agreement between FDOT and MDX, the SunGuide Software was deployed at the Miami RTMC in March 2008. MDX is currently collocated with FDOT District 6 at the Miami RTMC. MDX has since become a voting member of FDOT's Statewide ITS Change Management Board.

SunGuide Software Training

FDOT continues to provide in-depth SunGuide Software training based on the specific needs of the software users. The training program includes initial training for SunGuide system administrators after each software deployment and follow-up training for the TMC operators. The training sessions include software review by module and hands-on sessions with operational scenarios. In fiscal year 2007-08, FDOT provided training at the District 2 Jacksonville RTMC, District 5 Orlando RTMC, District 6 Miami RTMC, and the District 7 Tampa RTMC.

Support and Maintenance

With the successful deployment of the SunGuide Software, the support services were enhanced by adding a more responsive issue tracking tool for software users and additional on-site support while maintaining the regular 24/7 support line. Issue tracking is accomplished via a Web-based tool for software users to report and research issues and for the software support team to monitor and resolve issues in a timely fashion.

This tool also grants access with view-only privileges to non-SunGuide Software users, such as universities and project consultants. Non-SunGuide Software users are able to research the software knowledge base to supplement the published project documentation. A second on-site support staff was added to provide more efficient and timely response. Currently, there are two on-site support staffs located in Tallahassee and South Florida.

Looking Forward

SunGuide Software Release 4.0 is currently under development to provide the data fusion functionality to serve as a "heart" for Florida's statewide ATIS (FL-ATIS) project. Data collected and generated from the SunGuide Software, including travel times, incident management, weather conditions, and traffic conditions will be disseminated to the general public via FL-ATIS. This release is scheduled to be deployed by end of the 2008 to support the activation of the new 511 statewide traveler information service and the corresponding Web site, www.fl511.com.

SunGuide Software Release 4.1, which will enhance the existing RR/AVL subsystem, is in the planning stage. This release will also include an integrated interface with the Florida Highway Patrol (FHP) computer aided dispatch (CAD). The FHP CAD enhancement will increase coordination with the FHP during incident management to allow more efficient response to events. This release also includes enhanced travel time functionality to accommodate new SunGuide Software-supported devices using license plate readers and automatic vehicle identification technologies.

Copyrights

FDOT manages the legal protection of the SunGuide logo by registering it as a federal trademark and the SunGuide Software source code by registering it as a federal copyright. The certificate of registration was received from the United States Copyright Office in September 2007.

The FDOT continues to enhance the SunGuide Software with new technologies and strategies to better serve the traveling public. SunGuide Software has progressed from an ATMS software tool to also support ATIS and incident management to further advance FDOT's safety and mobility goals.

TACKLING ARTERIAL CONGESTION—

Developing a Plan

by Gene Glotzbach, FDOT and
Bobbie Sanghvi, PBS&J

Historically, large-scale intelligent transportation systems (ITS) deployments in Florida have been focused on the limited-access roadway network. Local agencies are increasingly realizing the benefits of ITS; frequently in conjunction with decisions concerning implementation of traffic signal management systems, also called advanced traffic management systems (ATMS). Some local agencies have already implemented ATMS components, such as closed-circuit television cameras, traffic signal systems, and/or detection devices. Given the increasing deployment of such ATMS, there is a need for development of a statewide plan to outline the direction that local agencies can take to improve the day-to-day operations of their arterial road systems.

An *Arterial ITS Plan* would focus on improving arterial traffic operations in congested areas through improvements to ATMS-related software, infrastructure (controllers, detection, and communications), operations, and maintenance. This plan would provide FDOT with a road map to assist local agencies in expanding their ATMS programs. This plan would also act as a database of all local ITS activity; allowing FDOT to be aware of any upcoming ITS projects and providing opportunities for coordination.

The first phase of the *Arterial ITS Plan* was to look at signal timing. Signal timing is the process of optimizing signalized intersection operations by responding to the demands of motor vehicles, bicycles, and pedestrians in a desirable manner. Or, stated another way, signal timing is the process of revising the timing settings of a traffic signal to improve traffic flow through a group of signals.

Implementing ITS devices along congested corridors can help alleviate congestion without adding more rights-of-way.

Photo credit: Tor-Erik Bakke

A brief survey was sent to the FDOT Districts as well as local government agencies in Florida to:

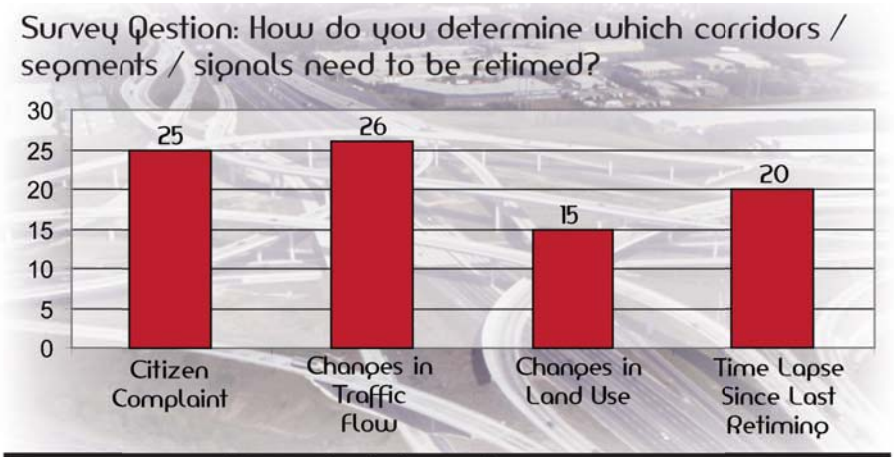
- Identify the number of traffic signals on Florida's state routes,
- Determine the condition of each traffic signal to verify if any repairs are needed,
- Decide how often the traffic signals are retimed,
- Establish the process used to identify which traffic signals need to be retimed, and
- Determine the amount of funding used to operate and maintain the traffic signals.

The U.S. Department of Transportation's Intelligent Transportation Systems Joint Program Office contains a benefit-cost database that documents many traffic signal studies from across the United States. These studies show that the benefits of investments in signal timing outweigh the costs by as much as 40 to 1. A few examples include:

- Signal improvements to an 11-intersection arterial road system in St. Augustine, Florida, showed reductions of 36 percent in arterial delay, 49 percent in arterial stops, and 10 percent in travel time, resulting in an annual fuel savings of 26,000 gallons and an annual cost savings of $1.1 million.[1]
- Georgia's Fast Forward program, which has made improvements to 32 traffic signal systems and 321 signalized intersections, shows a benefit to cost ratio of 32 to 1. Environmentally, nitrogen oxide emissions decreased 6 percent, carbon monoxide emissions decreased 3 percent, and volatile organic compounds were reduced by 11 percent. This amounts to more than 236 tons of pollutant reduction from the Atlanta area air.[2]
- The Traffic Light Synchronization program in Texas shows a benefit to cost ratio of 62 to 1, with reductions of 25 percent in delay, 9 percent in fuel consumption, and 14 percent in stops.[3]

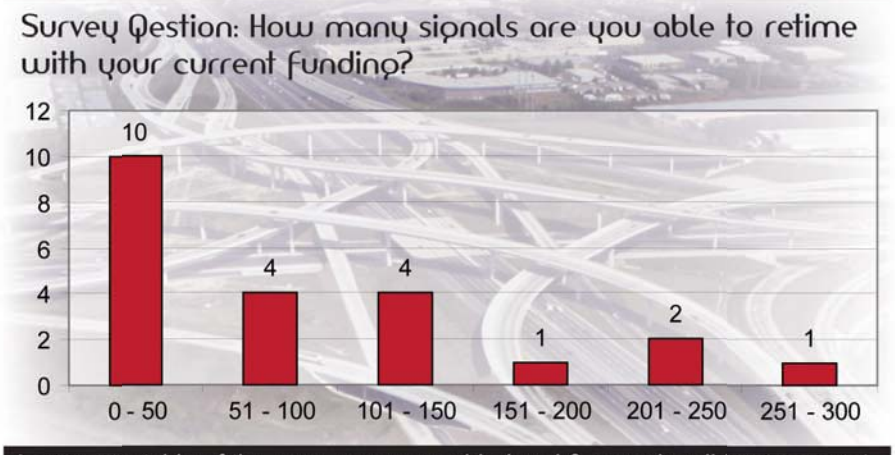
The second phase of the *Arterial ITS Plan* is to gather data on the existing and planned ITS deployments along arterial roads. Metropolitan planning organizations develop long range transportation plans to identify their regional transportation needs and projects that will help meet these needs. Congestion usually plays a key role in identifying areas where improvements are needed. Implementing ITS devices along congested corridors can help alleviate congestion without adding more rights-of-way.

1 Sunkari, S., "The Benefits of Retiming Traffic Signals," ITE Journal, April 2004
2 Fast Forward – Metro Atlanta Signal Timing Program (GDOT: Atlanta, GA, 2007)
3 Sunkari, S., "The Benefits of Retiming Traffic Signals," ITE Journal, April 2004

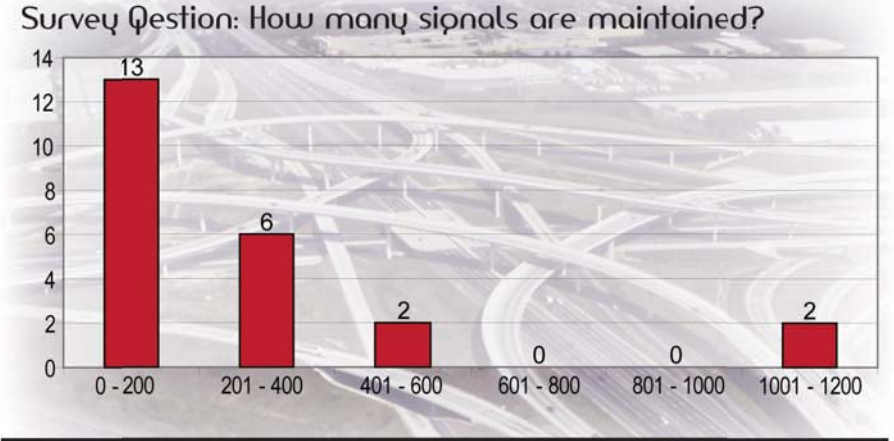


27 agencies had more than one answer.

Answers outside of the survey were provided and 1 agency did not respond.



Answers outside of the survey were provided and 6 agencies did not respond.



8 agencies did not respond.

Numerous local agencies in Florida have already implemented ITS along their arterial road ways. Some regions have a significant amount of ITS, whereas others are just getting started.

Through a survey, 100 local government agencies were contacted, of which 56 responded and sent in information regarding their ITS deployments. As the project continues to progress it will be important to continue engaging local government agencies as well as the FDOT Districts to ensure that their arterial ITS needs are being addressed.

With the development of the *Arterial ITS Plan* the FDOT Traffic Engineering and Operations Office will be able to support their internal vision and goals as well as FDOT's overall vision and goals. Specifically, the *Arterial ITS Plan* will enhance the efficiency of Florida's transportation system; increase mobility of people and goods; and assist in preserving the environment by providing an arterial road way system that increases traffic throughput and assists in reducing recurring congestion.

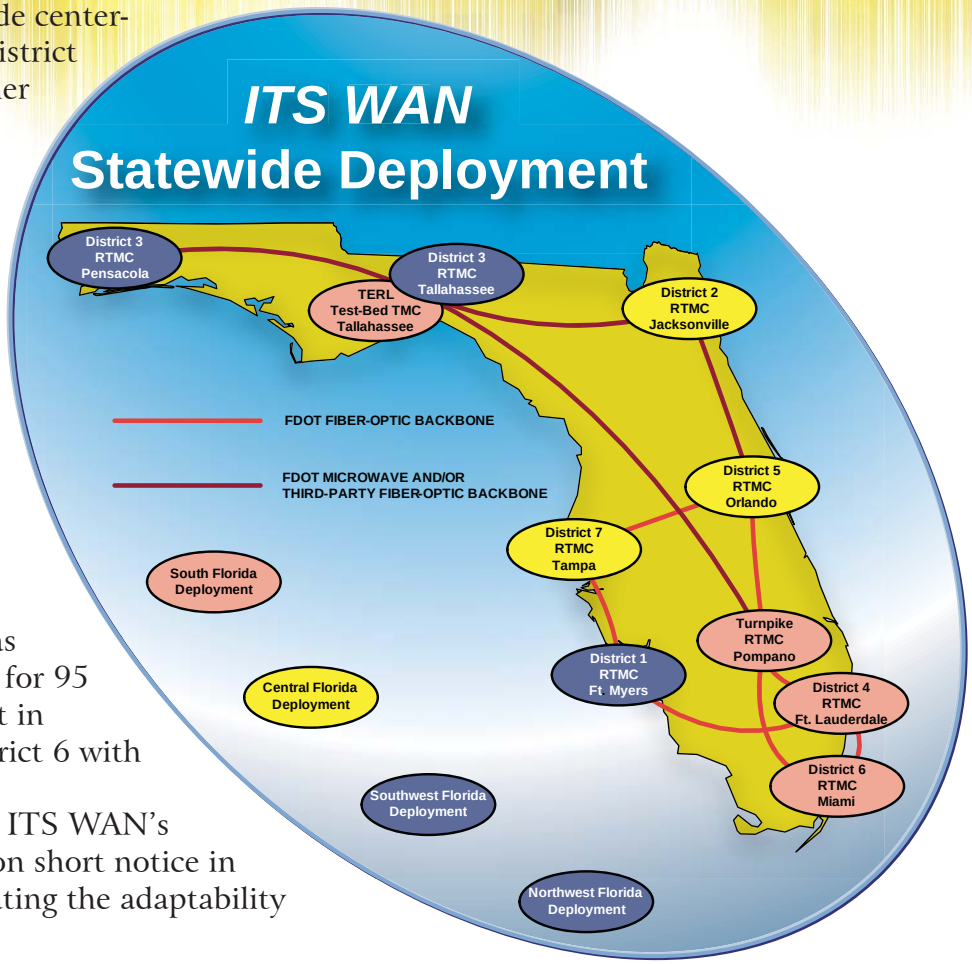
Wide Area Network—

Providing Connectivity

by Randy Pierce, FDOT and
Bill Lueck, Telvent Farradyne

This year, the Florida Department of Transportation's (FDOT) intelligent transportation systems (ITS) wide area network (WAN) became a reality. The South Florida Deployment (SFD), the first phase of implementation, was completed, interconnecting the Florida's regional transportation management centers (RTMC) at Districts 4 and 6, the Florida's Turnpike Enterprise (FTE) Pompano Plaza, and the Traffic Engineering Research Laboratory in Tallahassee test-bed transportation management center. By extension, the interconnection of these RTMCs accomplished interconnection of the respective District ITS networks.

The connectivity provided to these four sites enables the SunGuide™ Software to provide center-to-center communications, inter-district traffic-video transmission, and other ITS communications, including those supporting incident management and responses to natural disasters. The ITS WAN conforms to the transmission control protocol/internet protocol (TCP/IP), the set of communications protocols used worldwide for data communications, assuring compatibility with current and future ITS products and systems.



Even before the RTMC interconnection, the ITS WAN was able to provide a dedicated circuit for 95 Express, the managed lanes project in South Florida, by connecting District 6 with the FTE's Toll Data Center. This interconnection demonstrated the ITS WAN's ability to be rapidly reconfigured on short notice in response to changing needs, validating the adaptability afforded by its design.

The inauguration of the ITS WAN represents the culmination of over three years of design, planning, coordination, and purchasing effort by the ITS Program. As the next generation statewide network, the ITS WAN is designed to provide very high bandwidth, low-latency, real-time data transport by means of a hardened, redundant, carrier-class architecture. This will serve Florida's growing ITS communications needs well into the future with reliable and survivable 24/7 service.

Reliability and survivability are due in large part to the preferential use of fiber optic backbone circuits. With the FDOT Districts' cooperation, the ITS Program has interconnected District-owned fiber, where available, to build a wide-area fiber backbone. Additionally, other fiber optic facilities are being pursued to expand the optical portion of the ITS WAN. In areas where fiber service is not yet available, the existing FDOT Statewide Microwave System provides multi-megabit circuits to extend coverage.

Even as the first phase was being implemented, work continued on the second and third phases—the Central Florida Deployment (CFD) and the Southwest Florida Deployment (SWFD), respectively. The first sub phase of the CFD was completed; an Invitation to Bid (ITB) was advertised; and a contract was awarded to Ronco Communications and Electronics, Inc., the same company that successfully bid the contract for the SFD. This first sub phase will bring the ITS WAN, RTMCs, and Districts 2 and 5 networks online; the second sub phase will add the District 7 RTMC and network. The CFD will utilize both fiber optic and FDOT microwave backbone links. The SWFD design has begun and will continue into the next year. The SWFD will add, by means of fiber optic cable across the Alligator Alley portion of I-75, the District 1 RTMC in Ft. Myers. The remaining phases are outlined as follows:

Phase Name	Completion Date	Site(s)
Central Florida Deployment, Sub phase I	June 30, 2009	District 2 RTMC, Jacksonville District 5 RTMC, Orlando
Central Florida Deployment, Sub phase II	Late 2009 (Estimated)	District 7 RTMC, Tampa
Southwest Florida Deployment (SWFD)	Late 2009 (Estimated)	District 1 RTMC, Ft. Myers
Northwest Florida Deployment (NWFD)	Dependent on RTMC construction progress.	District 3 RTMCs, Pensacola and Tallahassee

Lessons learned from the SFD were successfully applied to the CFD. As an example, it was found that the high level of technical detail included in the original SFD Scope of Services was unnecessary, as much of the detail could be handled post-award during implementation. This allowed the Scope of Services for the CFD to be written much more quickly, shortening the overall time needed to prepare the ITB documentation and resulting in an earlier bid advertisement and award.

As the ITS WAN grows and more FDOT Districts are brought online, center-to-center capabilities will expand, enhancing inter-district coordination and promoting statewide cooperation in the management of Florida's public highways. The ITS WAN will play an important role in FDOT's continuing goal to better meet the transportation needs of Florida's citizens.

Wireless Internet Services—

Keeping Travelers Connected

by Randy Pierce, FDOT and
Brian Kopp, Clifton, Weiss & Associates, Inc.

In May 2008, the Florida Department of Transportation (FDOT) began a pilot project offering wireless internet services to travelers. Now, when travelers arrive at the I-75 or US 231 welcome centers they will find this new and exciting service waiting for them. Under a pilot project contract started in February 2008 with Zoom Information Systems, the FDOT is installing "Wi-Fi hot spots" that permit travelers to access the internet and check their emails from their own personal computers at five locations. By mid-July 2008, similar services will be available at the I-10 and I-95 welcome centers, and also at the Turkey Lake Service Plaza on the Florida's Turnpike. This pilot project extends through June 2009.

There are several challenges associated with bringing internet connectivity to the traveling public and this initial effort will help the FDOT develop the knowledge to deploy a statewide network of Wi-Fi hot spots at rest areas and service plazas at a later date. High among these challenges is establishing internet connectivity to rural FDOT traveler locations. The use of state-of-the-art satellite communication services makes this connectivity possible.

When travelers open their personal computers and initiate an internet session they will be greeted by an FDOT Web home page that was developed jointly by FDOT and Zoom Information Systems. The home page allows the traveler to link to traffic and weather information and connect through to the internet. By mid-July FDOT will also institute a modest fee-for-service charge for travelers to access the internet. Online advertising and sponsorships are future avenues for additional revenue that FDOT plans to investigate with Zoom during the pilot project. FDOT envisions that a future statewide network of Wi-Fi hot spots could assist with local and regional emergencies and also help disseminate further ITS-related information such as America's Missing Broadcast Emergency Response (AMBER) Alerts, nearby traveler services, and state-to-state traveler information.

Wi-Fi for Travelers

With the deployment of Wi-Fi hot spots, FDOT is enhancing the traveler's ability to stay connected and also improving driver safety at the same time. By providing a safe opportunity to rest while re-establishing "a connection" with the outside world, travelers will be more alert and focused on their driving task on Florida's roads. In addition, having up-to-date information about weather conditions and road construction projects will improve driver awareness and allow them to alter their route, simultaneously improving their Florida driving experience and relieving congestion on the roads.

Surfing a Walled Garden

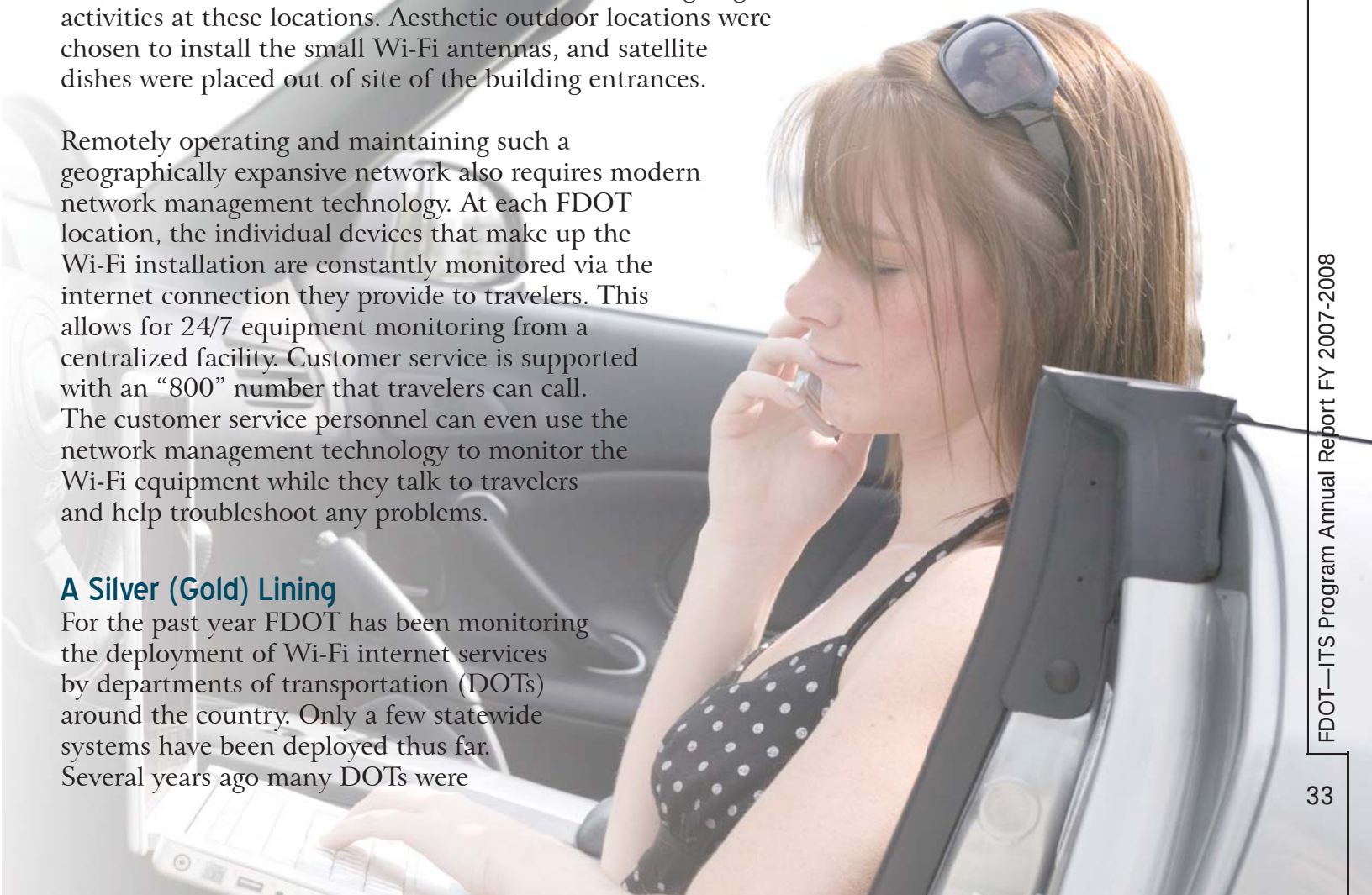
When travelers turn on their personal computers and access the FDOT wireless services they will be greeted by an FDOT home page customized to their location.

There are several links the traveler can also access without connecting through to the internet. Access to traffic and weather information, as well as an information "ticker" that scrolls across the bottom of the home page is available to the traveler without paying for internet access. After experiencing this walled garden of FDOT-provided links, travelers can click on the blue internet access button. This action will allow users to access the internet for 15 minutes at no charge. If, after the initial 15 minutes, they want to continue to check email and surf the internet they will be required to pay a modest fee. Travelers are only allowed to access the internet for an hour and a half and then must wait two hours before trying again. This ensures that travelers do not spend an inordinate amount of time using the internet services at an FDOT location.

Challenges: Delivering the Internet to New Places

Unlike urban locations, delivering the internet to FDOT traveler locations such as Welcome Centers, Turnpike Service Plazas, and rest areas presents a unique challenge. Most of these relatively rural locations cannot be supported by typical broadband internet access services such as cable television and telephone digital subscriber line (DSL). To bring a broadband internet connection to these sites requires a communications service that must travel more than 20,000 miles out into space and then back again. These satellite-based broadband internet connections are a new communications service that FDOT is deploying at four of the five sites in this pilot project, as well as on the mobile Wi-Fi trailer.

The satellite-based broadband internet connection is only one part of the Wi-Fi hot spot installation at each FDOT location. To deliver wireless internet to travelers also requires that Wi-Fi wireless access points and network equipment be installed and linked to the satellite service. Every effort has been made to ensure that the installations do not affect ongoing activities at these locations. Aesthetic outdoor locations were chosen to install the small Wi-Fi antennas, and satellite dishes were placed out of site of the building entrances.



Remotely operating and maintaining such a geographically expansive network also requires modern network management technology. At each FDOT location, the individual devices that make up the Wi-Fi installation are constantly monitored via the internet connection they provide to travelers. This allows for 24/7 equipment monitoring from a centralized facility. Customer service is supported with an "800" number that travelers can call. The customer service personnel can even use the network management technology to monitor the Wi-Fi equipment while they talk to travelers and help troubleshoot any problems.

A Silver (Gold) Lining

For the past year FDOT has been monitoring the deployment of Wi-Fi internet services by departments of transportation (DOTs) around the country. Only a few statewide systems have been deployed thus far. Several years ago many DOTs were

hoping to deploy Wi-Fi at little or no cost, intending for the revenue from traveler internet access fees to cover the budget for installing and operating a large network. As the first few networks were deployed, it became clear that the revenue was not sufficient. With this pilot project, FDOT has chosen to subsidize the installation and operation costs, sharing the modest revenue from traveler fees with the contractor, Zoom Information Systems. While this revenue from traveler fees may be modest, other project-related revenue sources may prove more promising.

Two revenue generating ideas that are being explored by some DOTs are the use of online advertising and Wi-Fi hot spot sponsorships. Online advertising revenue is targeted at local travel-oriented retailers and service providers near the Wi-Fi hot spot. Wi-Fi hot spot sponsorships can be implemented by using Federal Highway Administration-approved right-of-way signage to allow a travel-oriented business to sponsor a Wi-Fi hot spot. FDOT intends to investigate these types of revenue generating ideas during the pilot project.

Mobile Wi-Fi Can Go Where it's Needed

FDOT is investigating the use of mobile Wi-Fi internet services by outfitting an existing FDOT trailer with a complete mobile Wi-Fi system. The trailer will have the ability to be moved to several different locations during the pilot project to investigate the issues associated with deploying a self-contained mobile communications vehicle to support special events and emergency communications.

Where to Next?

As of mid-June both the I-75 and US-231 welcome centers have wireless internet services available for travelers. By mid-July the I-95 and I-10 welcome centers as well as the Turkey Lake Service Plaza will also have Wi-Fi internet services. The mobile Wi-Fi trailer testing should begin in late August. Work on advertisement and sponsorship concepts will begin in late July 2008.

Moving Forward...

FACILITY MANAGEMENT

by **Randy Pierce, FDOT and Mark McDougald, Byers Engineering Company**

The intelligent transportation systems facility management (ITS-FM) project continues to move forward with the operational deployment. The ITS-FM project came about from the need to establish a statewide standard software system to manage the Florida Department of Transportation's (FDOT) fiber optic network which connects and carries data from various ITS field devices to the regional transportation management centers.

In addition to managing the fiber optic network, the ITS-FM also manages ITS devices, such as closed-circuit television (CCTV) cameras, vehicle detector systems (VDS), and dynamic message signs (DMS). The ITS-FM is a centralized and collaborative software designed for sharing by the FDOT Districts and partner agencies, such as expressway authorities and city and county ITS departments who share fiber optic network facilities with the FDOT Districts. This centralized system facilitates the Districts' ability to share these common facilities and for each to see their entire network regardless of District data segmentation or geographical boundaries. The ITS-FM software provides the ability to analyze the fiber optic and ITS networks statewide, including the statewide microwave system. With centralized software, and its inherent management tools, system maintenance, network outage analysis and response (fiber or electrical), interconnect design, and ITS budgeting and planning will be improved.

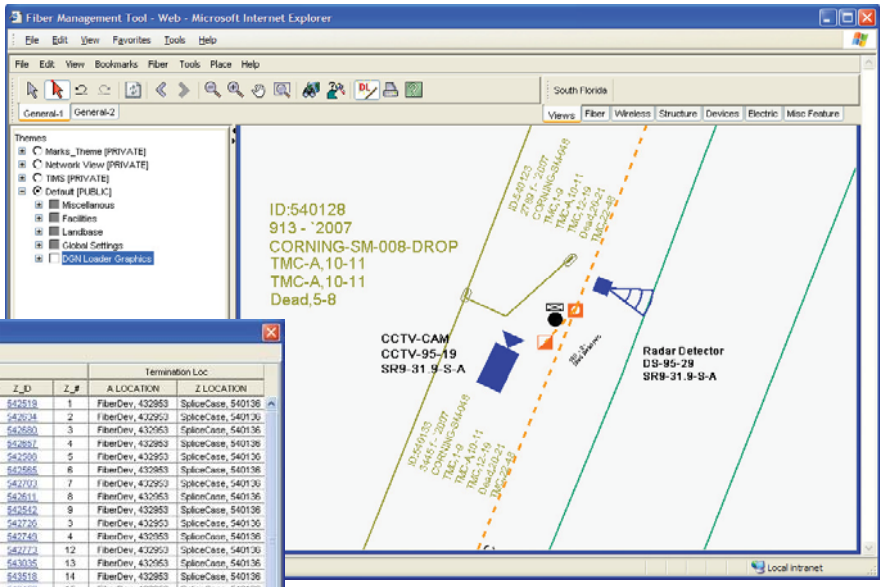
ITS-FM DEFINED

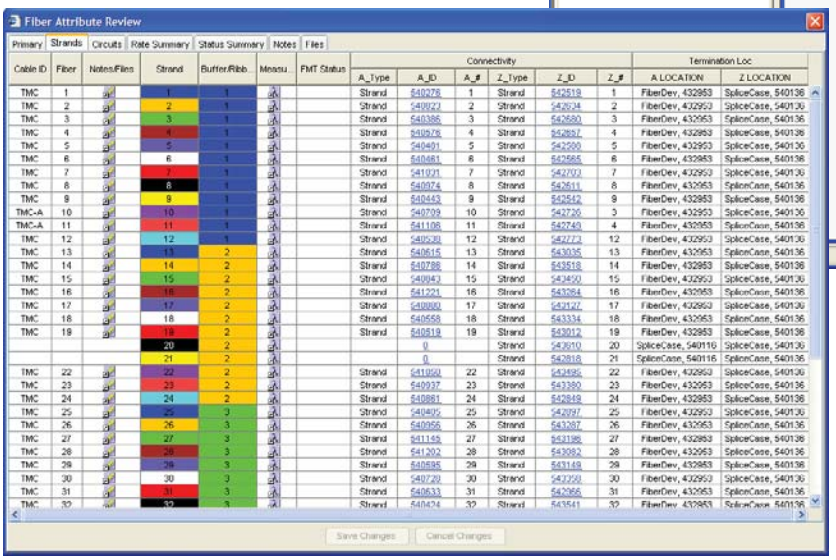
ITS-FM is a geographical information system (GIS) based Web application that provides for modeling of the fiber optic network and connected fiber optic devices as well as ITS devices and their electrical power systems. The core on which the ITS-FM software runs is the fiber management tool (FMT) from Byers Engineering Company of Atlanta, Georgia. FMT is utilized by telecommunications companies, such as AT&T and Embarq, for outage management, network utilization monitoring, path planning, and optical loss budget development. The software is a Web-based application that is accessed with a secure login from any computer connected to internet; there is no software to install or maintain on the user's computer. The application provides dynamic and interactive mapping of the facility network on the user's computer. This core FMT product provides standard GIS functions, such as:

- Spatial query – Search for mapped network components by geographic area or specific data criteria.
- Thematic mapping – Create custom thematic map views based on user criteria.
- Dynamic labels and tool tips – Dynamically access feature attributes from the map interface. This attribute data is presented in popup windows when hovering over intelligent features.
- Document management – Link a document of any type to any feature or record, allowing access of this document stored in the ITS-FM database by any user.

The fiber specific functionalities include:

- Fiber trace – Rapidly visualizes in both map and tabular views a fiber path in the network from point A to point Z.
- Fiber outage locate – Determines the geographical location of a fiber outage based on its optical loss or the linear optical sheath distance.
- Diversity check – Determines if fiber paths are diverse from a fiber sheath or geographic corridor perspective.
- Fiber loss management – Stores both actual span and splice loss as captured during as-built acceptance testing.
- Specific fiber reports – Spans, splices, and strands detail reports.
- Fiber strand management – Manages strands—both logical and physical—status and usage.
- Rack management – Manages the bays and racks at an equipment location.





The core FMT product was configured to support the needs of FDOT's ITS network management which included the following modifications:

- ITS devices – Can be placed with associated attributes and linked to their serving cabinet.
- Electrical circuit features – Designed to allow placement of electrical facilities, such as cable, cabinets (load center, meter point and service point), and the association of electrical circuits to serviced cabinets.
- Wireless facilities – Provided for the placement of tower, antenna, and wireless path as well as the ability to connect optical paths through the wireless path.
- Specific ITS locates – Search by:
  - Equipment cabinets by: type, site number, address (name), logical fiber, or electric circuit name.
  - ITS device by: type, model, year, serial number, internet protocol address, or logical fiber.
  - Electrical circuit by: circuit name or meter number.

THE ITS-FM PILOT

The ITS-FM pilot project was successfully concluded in June 2008. Implemented in 2007, this pilot project involved the configuration of the FMT product to meet the ITS-FM requirements and the inventorying and data encoding of the entire District 4 fiber optic network along with a subset of the District 6 and Florida's Turnpike Enterprise (Pompano Beach transportation management center) network.

The field inventory effort consisted of a GPS survey of communications conduit to sub-meter accuracy, capturing access point details, including fiber sheath distance readings and capturing fiber equipment details within each cabinet and the ITS devices located at each cabinet site. Then the ITS-FM database was populated with the field captured data and the as-built plans. Once the database was populated, the application was made available to FDOT personnel via a hosted Web server.

This pilot project met the objective of being able to effectively evaluate the ITS-FM software with actual District data loaded. It was also very useful in presenting the application to the other Districts and partner agencies within the state.

LOOKING AHEAD

In preparation for the full production roll out, modifications were made to the ITS-FM application this year to support multi-District users. Now user roles can be established that allow a specific user to view and/or edit data across multiple Districts. This allows for a fiber path that extends through multiple Districts, and even into an outside agency's network, to be modeled and analyzed in the ITS-FM software. As interconnections between Districts and other agencies become more commonplace, the ITS-FM can fully support documenting the shared fiber network data within a single application database. The opportunities to streamline data sharing and mapping of statewide facilities in this centralized application are endless. An addition in the near future will be mapping of the statewide microwave wireless facilities, replacing what is now currently managed in spreadsheets. The initial production deployment will be hosted at an outside facility, but will ultimately be moved to an FDOT facility. This will allow for integration and interfaces to be developed between other existing or future systems at FDOT requiring access to the ITS infrastructure data adding more value to the operational benefits of ITS-FM.

Probe-based Data Collection Concept Test–
Testing Data Quality

by Gene Glotzbach, FDOT and
Armand Ciccarelli, PBS&J

Over the past few years, private sector-provided probe vehicle data has emerged as an increasingly attractive means for monitoring traffic flow in support of both traffic management and traveler information applications—without the steep costs typically associated with the deployment of sensor infrastructure. Due to advances in this area, the Florida Department of Transportation (FDOT) commissioned research during 2001 and again in 2007 to assess the state of the practice in the traffic data collection industry. Based on the results of the most recently completed research effort, the FDOT opted to conduct a concept test to evaluate the quality of probe vehicle data generated by two technologies:

- Cell phones as probes
- Global positioning system (GPS)-based probes

With that goal in mind, the FDOT released an Invitation to Negotiate (ITN) to solicit the participation of appropriate third party content providers. As the purpose of this test is to evaluate the quality of wirelessly collected probe data, no roadside sensor infrastructure will be deployed to support either of the selected providers' data collection efforts. Key concept test-related requirements include the provision of:

- Probe data (travel time and speed) and validation testing of its data quality attributes (e.g., accuracy, reliability, and timeliness) for 90 continuous calendar days. Roadways for which data is to be provided include:

  a. Freeways:
     - I-10 (in the Tallahassee area)
  b. Arterials:
     - Thomasville Road (US 319) from downtown Tallahassee to the Georgia state line
     - Monroe Street (US 27) from downtown Tallahassee to the Georgia state line
     - Northeast/Southeast Capital Circle from Thomasville Road to the Apalachee Parkway

- Data for roadway segments based on logical breaks in the roadway (e.g., interchanges, important exits, and major arterial intersections)
- Data updates for all roadway segments at least once every five minutes
- A Web-based monitoring application for viewing data in real-time and an data archive to support independent validation testing of the quality of data produced by each providers' system

FDOT's procurement process concluded during the spring of 2008, and resulted in the selection of two data providers—Inrix and Cellint—to participate in the concept test. It is projected that the test will occur during the fall of 2008.

Inrix, based in the Seattle area, was founded in July 2004, by former Microsoft and Expedia executives. Inrix aggregates anonymous, real-time GPS probe data from more than 750,000 commercial fleet, delivery, and taxi vehicles across the U.S., integrating it with data from state DOT sensor networks and information on construction, road closures, incidents, and weather. Using this data, Inrix offers real-time and predictive travel time estimates, predictive dynamic routing, incident data, and traffic speeds.

Cellint is an Israeli company that provides cell phone-based data collection solutions—referred to as TrafficSense. Unlike most other cell phone-based data collection systems, which rely on cell phone tower hand-off and other location-related data collection, Cellint uses a pattern-matching geo-location approach. This approach allows Cellint to correlate each probe vehicle's location with an exact location on a roadway.

Benefits of Conducting This Test

Previous demonstrations of probe vehicle technology have been fairly successful when applied to freeways and other limited-access roadways, but remain relatively unproven for signalized arterials. Consequently, the FDOT test, which will evaluate the ability of each technology to provide traffic flow data on a range of roadway types, should provide FDOT and other interested parties with the information needed to support future decisions related to purchasing third party traffic data content. Should probe vehicle-based data collection prove to be a truly viable alternative to fixed-sensor-based data collection, it will have far reaching beneficial effects on a wide range of FDOT activities including: traffic and incident management, provision of traveler information (especially in rural areas), performance measurement, and capital and operations-related planning.

Travel Times—

Tallahassee's License Plate Reader Project

by Gene Glotzbach, FDOT and
Ashis Sanyal, PBS&J

License plate reading technology, also referred to as automated license plate recognition (ALPR) is a video camera-based system that utilizes infrared illuminators and image-processing technology for the purpose of identifying vehicles by their license plates. ALPR systems are prevalent in the enforcement of signal violation, parking, and tolls; and over the past few years have begun to be used in the calculation of travel times. ALPR systems have essentially the same functionality as transponder-based systems, but as all vehicles have a license plate, each has the potential to be used as a probe vehicle. Consequently, ALPR systems have the potential to operate successfully—even in areas where toll transponder penetration is low or non-existent.

The existing toll systems (where tolling functions are already in place and a large population of drivers is equipped with toll tags), in conjunction with the installation of supplemental toll tag readers, can prove to be an accurate and valuable source for continuous real-time travel time estimation. Data from such a system can be used for a variety of applications, including: traveler information, incident detection, fleet management, and regional performance measurement.

Video image processing from license plate readers (LPR) has a wide range of potential applications—from toll and signal enforcement to border crossing and travel time estimation. This technology has the potential to capture a greater percentage of the roadway traffic without the need for in-vehicle device presence (e.g., toll tags). It is, however, susceptible to environmental factors and can be costly to deploy on a regional basis as compared to systems that leverage existing tolling infrastructure.

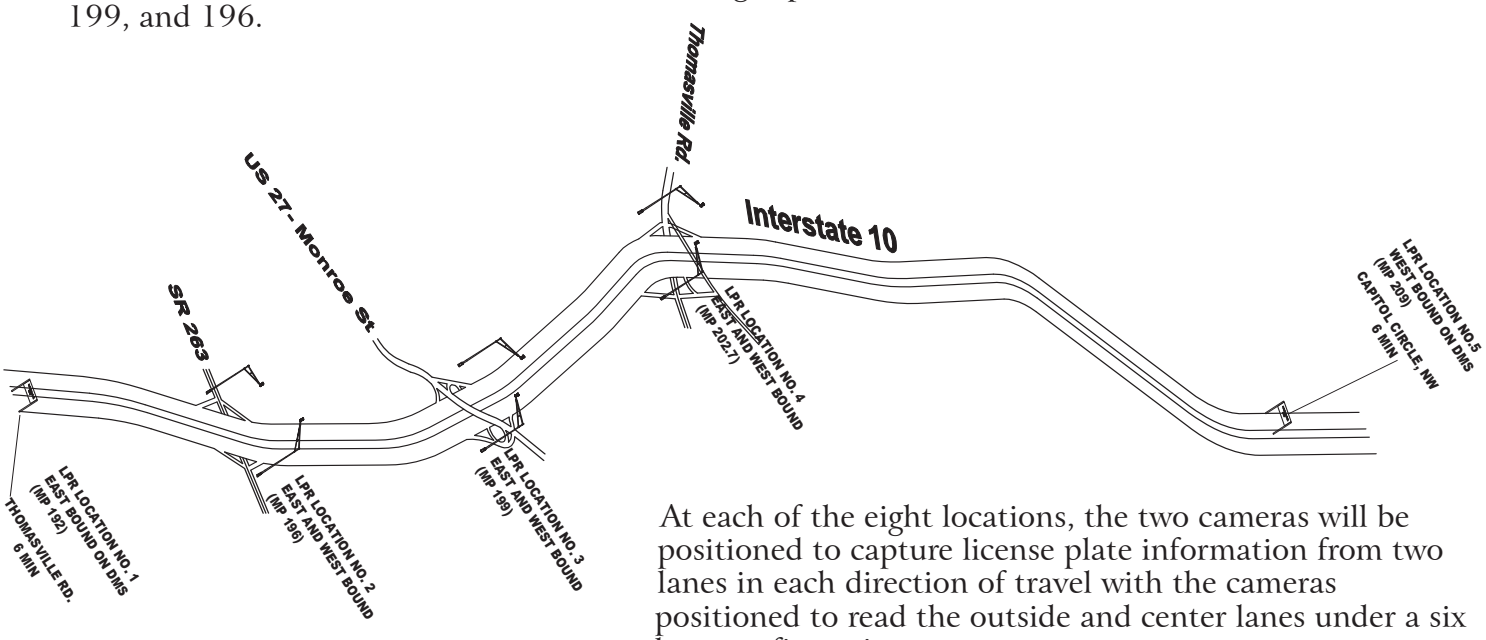
The Florida Department of Transportation (FDOT) received a grant from the America's Missing Broadcast Emergency Response (AMBER) Alert Implementation Assistance Program to install multiple dynamic message signs (DMS) around the Tallahassee area to support the AMBER Alert notification process. In addition to displaying real-time information about AMBER Alerts, the DMSs will be utilized to provide information on incidents, traffic, construction, weather, pavement conditions, and other traffic information that could affect driver safety and traffic flow.

The design team evaluated a series of locations on Interstate 10 (I-10) and United States (U.S.) Highway 27 to maximize exposure to the motoring public for AMBER Alert warnings and to provide traffic and other information. Out of the three signs that are being installed, two are of interest to the Tallahassee LPR Deployment project. These two signs are located on I-10 at exit 192 (on the east bound side) and exit 209 (on the west bound side).

The LPR project resulted from the FDOT's desire to display travel-time information on the DMSs. LPRs were chosen to collect traffic information because field studies performed in the Orlando and Tallahassee areas indicated that the devices provide good data to calculate travel times. Based on these studies, the decision was made to install LPRs in the Tallahassee area on I-10 to collect license plate data and derive at travel times.

The LPR cameras will be placed at the following locations:

- For eastbound traffic, the first two cameras will be on the DMS structure at exit 192. There will also be three more sets of two cameras each on the light pole structures on the shoulders at exits 196, 199, and 203.
- For westbound traffic, the first two cameras will be on the DMS structure at exit 209. There will also be three more sets of two cameras each on the light pole structures on the shoulders at exits 203, 199, and 196.



At each of the eight locations, the two cameras will be positioned to capture license plate information from two lanes in each direction of travel with the cameras positioned to read the outside and center lanes under a six lane configuration.

The camera placements will enable FDOT to calculate travel times between exits for both directions of traffic in the Tallahassee area. Floating car runs, or test runs, will be conducted to validate the travel times generated from LPR data. The purpose of this project is to determine how closely the data collected by the LPR system resemble the real-time traffic situation.

An Invitation to Negotiate (ITN) was issued to select a prime vendor to do the job. Traffic Control Devices, Inc. (TCD) was selected as the prime contractor for the job. After negotiations about scope and costs, a Notice to Proceed (NTP) was issued to TCD on March 26, 2008. The plans and shop drawings have been finalized and approved by FDOT. The construction phase will begin in July, 2008. It is expected that by the end of 2008 real-time travel information will be posted on the two DMSs on I-10 in the Tallahassee area.

The information captured at each location will be transmitted to the City of Tallahassee traffic management center, which will host and operate the AMBER Alert system and the DMS devices. The SunGuide™ Software will be used to calculate travel times for posting on the DMSs. This software will match license plate information from different locations to calculate travel times.

Next Generation 511—

Driving FDOT to a New Generation in ITS Asset Management

by Elizabeth Birriel, FDOT and
Mary Hamill, Global-5 Communications

The development and launch of Florida's next generation statewide 511 advanced traveler information system (ATIS) is ushering in a new generation of technology and policy improvements that appear to be unequaled nationwide.

The commercial marketplace sets a very high value on the Florida Department of Transportation's (FDOT) intelligent transportation systems (ITS) investments statewide. Recognizing and quantifying the value of those assets, in this era of uncertain transportation budgets, is resulting in a business philosophy of long-term, consistent, progressive management of these strategic investments with the objective of generating revenue to provide supplemental funding to enhance ITS.

The long-term goal is to protect and leverage FDOT 511 assets and investments for greatest return to the people of Florida, commercial vehicle operators, and tourists.

These impressive assets include:

- Approximately 2,000 traffic cameras statewide in the next couple of years
- An unequaled fiber optic network
- Twelve regional transportation management centers by 2011
- An integrated statewide bilingual 511 and FL511.com Web site
- First in the nation personalized My Florida 511 services, including e-alerts, text messages, and a phone call from 511 to registered users.

FDOT and 511 branding applied to camera images at the regional Traffic Management Centers and used by authorized media partners will deliver millions of dollars of promotional value to FDOT annually.

The next generation, bilingual statewide 511 service will be launched in late 2008 to replace the five regional 511 services. In May 2008, the FDOT Executive Board approved the implementation of uniform, statewide ITS/511 Asset Management Policies and Procedures, including Revenue Generation. FDOT Secretary Stephanie C. Kopelousos gave her full endorsement to the effort and said, "We need to proceed as OneFDOT." The fully-integrated, statewide 511 service, supported by the new policies and procedures, is designed to serve the people of Florida for years to come.

Why Are Policies and Procedures Necessary?

Many media outlets are now selling live FDOT assets, such as traffic camera images, to sponsors; but FDOT does not receive any of the revenue. Additionally, the media often claim the traffic cameras as their own, and do not mention FDOT. The new Asset Management Policies and Procedures will end those practices through multiple marketing and partnership efforts, and create mutually beneficial partnerships for FDOT, the media and other companies, and, ultimately, the public.

FDOT is focused on managing its assets solely for the long-term benefit of the public—not private companies who seek to receive FDOT assets for free so they can be sold or bartered in the commercial marketplace, as they have been in the past.

The Voice of Florida Agrees

The research arm of the University of Central Florida conducted 511 and FDOT ITS asset management focus groups statewide and asked participants in Miami, Jacksonville, Orlando, Tampa, and Tallahassee their opinion of advertising placement on 511 products. A participant in Orlando said, "Go ahead and allow advertising and use the money to pay for 511 and Road Rangers." Those sentiments were strongly echoed statewide. Conservative revenue projections from advertising on 511 products over 20 years show net revenue of more than $87 million dollars returned to FDOT.

Focus group participants statewide also agreed that FDOT should be compensated by private firms seeking to use FDOT's taxpayer-funded assets in the commercial marketplace. With the full endorsement of the FDOT Executive Board, it is clear a new generation of FDOT 511/ITS asset management and revenue generation has begun.

The Road to Supplemental Funding for System Enhancements

Deputy State Traffic Operations Engineer and Florida ITS Program Manager Elizabeth Birriel is heading a multi-functional panel composed of representatives from the Federal Highway Administration (FHWA) along with FDOT legal, right-of-way, and public information experts to oversee the revenue generation efforts. Three main sources of revenue are being pursued: advertising on 511 products, and subscription and licensing fees for the authorized use of FDOT traffic camera assets and real-time traffic data.

Advertising is recommended for 511 products, such as the new FL511.com Web site, 511 phone call greetings and transfers, personalized services, and 511 roadside signs. The first task in this effort will focus on developing an approach that would allow sponsorship of 511 roadside signs.

The next generation 511/ statewide ATIS will be managed as OneFDOT to maximize the value of all FDOT assets. To maintain consistency and quality customer service in line with the OneFDOT direction consistent advertising, subscription, and licensing rates will be charged statewide

How advertising may look on the next generation 511/ATIS Web site. Advertisers support 511 and are looking for opportunities to enhance the system through their sponsorship dollars

to ensure maximum return on investment to FDOT and the people of Florida. Multiple revenue generation efforts would cause confusion, frustration, and inconsistent customer service to advertisers and other customers. In fact, FDOT is already generating and collecting revenue—an important administrative function that is already in place. The revenue generated by ITS asset management will go directly to FDOT accounts to be used for enhanced traffic operations.

In addition to advertising policies, subscription and licensing agreements and fees are also being developed. The current 10-year old, one-size-fits-all FDOT traffic camera agreement no longer addresses the complexities of the digital marketplace. New policies and agreements are being tailored for emerging technologies that seek to use FDOT traffic cameras and real-time traffic data in this digital age.

Two Major Transitions for FDOT and the Broadcasting Industry

At the same time that Florida is transitioning from its regional 511 services to one fully integrated statewide 511 service, the broadcasting industry is going through its "digital transition," a move mandated by the Federal Communications Commission. This digital transition is transforming the broadcasting industry and that industry's desire to use FDOT traffic camera and data assets for additional digital channels and mobile programming. FDOT's Asset Management Policies and Procedures are developed to accommodate these seismic shifts in broadcasting and the advancing technologies that will provide live mobile programming on phones, personal digital assistants (PDA), and in vehicles.

FDOT ITS Asset Management Business Strategy

Approach
Long-term, forward-looking, consistent, progressive management of FDOT ITS assets in this digital age.

Objective
Generate revenue to provide supplemental funding to enhance the system—in this era of uncertain transportation budgets.

Foundation
Taxpayer funded ITS investments are used daily by FDOT to serve the public through improved traffic operations and management.

Other requests for usage will be considered. FDOT and the taxpayers will be compensated for use of FDOT assets in the commercial marketplace within established policies and procedures.

FDOT traffic camera image and data subscriptions will be offered to local media and other firms. The digital transition in broadcasting now allows broadcasters to offer multiple channels—called multicasting—and many broadcasters are planning to broadcast "Weather and Traffic" channels on their newly assigned digital channels. These channels will be supported by advertising and FDOT traffic camera images would only be authorized for use according to the guidelines and fees specified by the new Closed-Circuit Television (CCTV) Subscription Agreement. Conservative revenue projections for subscriptions over 20 years total more than $25 million.

All traffic camera images made available by FDOT to authorized agreement holders will carry the FDOT and 511 branding that is being implemented at the regional transportation management centers, so acknowledgment of FDOT as the source of the information and promotion of the free 511 traffic information service is part of every image provided. This 511/FDOT promotional branding will deliver millions of dollars in free promotional value to FDOT annually.

Perfect Timing: Implementing New Policies Makes Sense

Maintaining exceptional media relations is a priority; and a true partnership approach with the local media is being pursued. It will make sense to broadcasters that FDOT is implementing new policies during their digital transition—policies that anticipate their requests for additional FDOT camera and data feeds for their additional tier of digital programming channels, and new mobile programming options that will be available in the years ahead.

Media outlets will be offered CCTV Camera Agreement choices based on their business model. No company will be required to pay a subscription fee unless they are planning to use FDOT assets to generate revenue through sponsorships or other means. Media companies that do not plan to sell FDOT assets to sponsors or others will be eligible for the FDOT CCTV Non-Revenue Generating Local Market Single User Agreement.

An important precedent in the marketplace that media companies know well is the National Weather Service (NWS)—another government agency which charges subscribers a $1000 connection fee and yearly maintenance fees of $28,000 to $33,000. The NWS has followed this policy for almost 20 years, and now has more than 300 subscribers. Subscribers are also required to carry NWS alerts.

Licensing agreements will be used for large clients seeking to use FDOT assets, such as third-party traffic information providers,; national media companies, including CNN and the Weather Channel; telecommunications mobile carriers; map data companies; driving direction providers; in-vehicle navigation systems; and commercial vehicle operators. These policies, rates, and revenue projections will be developed in FDOT fiscal year 2009. A later phase will encompass new, emerging technology delivery services and products such as vehicle infrastructure integration.

Advancing Technology with a Caution

Technology companies are rushing to deliver live mobile programming to consumers who will increasingly rely on their mobile handheld and in-vehicle devices to watch entertainment and informational programming, including real-time traffic reports from broadcasters. Many FDOT ITS managers and focus group participants have expressed concern about distracted drivers who are using mobile phones to retrieve information while driving.

FDOT will develop a distracted driver safety campaign for this new era of digital mobile programming and for current Web-enabled mobile phones, PDAs and in-vehicle navigation units which can now access anything on the Web.

Mobile programming technology products enabled by the digital transition may increase incidents of distracted driving. FDOT is incorporating strong safety message warnings regarding all driver distractions and the proper use of new mobile technologies in news releases and 511 marketing materials. Distracted driver safety messages will be important elements of all 511 media relations, promotional and marketing efforts. Additionally, licensing agreements with telecommunications or broadcasting companies providing mobile programming will include a Distracted Driver Safety Campaign.

- Manufacturers predict most people will have Web-enabled mobile phones in 2010
- In-vehicle navigation and cell phone "content programming" is advancing to include live television programming
- Navigation unit manufacturers are building-in safety features
- Some states are fining drivers for using cell phones or mobile devices while driving

The Long-Term Promise of the ITS Asset Management Policies

Emerging mobile technologies, the television digital transition, and regular requests for FDOT traffic camera images and data all confirm the high value of FDOT's strategic ITS/511 investments and resulting assets in today's commercial marketplace. FDOT's commitment to manage, protect, and leverage these assets in this new digital era will ensure that the maximum value is returned to FDOT today and for years to come.

Traffic Engineering and Research Laboratory—

Ensuring Safety, Efficiency, and Uniformity

by Jeffrey Morgan, FDOT

The Traffic Engineering Research Laboratory (TERL) is a vital part of the Florida Department of Transportation's (FDOT) Traffic Engineering and Operations Office and the Intelligent Transportation System (ITS) Program. FDOT strives to ensure safety, efficiency, and uniformity within the ITS and traffic control systems constructed and operated throughout Florida. The TERL's core responsibility is evaluation of traditional traffic control products and ITS devices. For decades, the TERL has reviewed and approved traditional traffic control electronics and materials that are used in the construction and operation of signalized intersections. As technology and traffic operation techniques have evolved, electronic control and monitoring has played an increasingly prominent role in the safe and efficient operations of intersections and freeways.

The review and approval of traffic control devices makes up the Approved Product List (APL). This list enables the easy identity of devices that have been reviewed and approved. Devices list on the APL are certified as meeting FDOT specifications and minimum functional requirements. In order for certain devices (those defined by state specifications) to be legally sold and deployed in Florida for transportation projects, they must be reviewed, approved, and listed on the APL.

The APL should be very familiar to designers and contractors who perform work in Florida, as it easily identifies products that are known to meet published FDOT standards and ensures that these products are authorized for use in traffic control systems within the state of Florida. State, county, and local officials, charged with operating or maintaining intersections and other traffic control facilities, are also familiar with the APL, as Florida law mandates that "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…[FDOT specifications]." It is important to note that the consequences for purchasing or installing non-approved devices can include fines and imprisonment.

The laws and specifications in Florida were implemented to ensure that the advanced traffic management systems deployed along with the intersection control materials and electronics are held to high standards of safety, reliability, and operation. The TERL evaluation activities help ensure that these devices are interoperable, conform to state and national standards, and the manufacturers have demonstrated that they possess and use a sufficient quality assurance program in manufacturing their products. All of these things combined help to ensure that devices listed on the APL will operate reliably upon initial deployment and are also likely to remain viable products for years to come. Considering that the design life of traffic control systems are often measured in decades, it is particularly important to emphasize durability, proven performance, and support of data transmission standards to maximize the chances of approved products having an adequate design and operational lifespan.

For years, the TERL has been renowned for its work testing traditional traffic control devices, such as intersection controllers, LED signals, and a host of intersection-related electronics. Now, the TERL also has a facility for the centralized review and approval of ITS devices. The TERL is also nationally recognized for its contribution in testing the National Transportation Communications for ITS Protocol (NTCIP) set of standards.

The NTCIP is a joint standardization project of the American Association of State Highway and Transportation Officials (AASHTO), Institute of Transportation Engineers (ITE), and National Electrical Manufacturers Association (NEMA) to provide the protocols necessary to allow electronic traffic control equipment from different manufacturers to operate with each other as a cohesive system. The intent of the NTCIP is to allow various devices from more than one manufacturer to communicate with each other. This is important because, traditionally, traffic control devices have used protocols specific to their manufacturer. Over the past few years, NTCIP has grown from an emerging standard to a deployed, real-world communication protocol.

As with many technical endeavors, the original standards are revisited and improved as experience is gained through deployment and operation. FDOT has been instrumental in these activities. When NTCIP standards are available for a device, they are generally incorporated into FDOT's statewide specifications. In addition, NTCIP is often a mechanism used by FDOT's statewide SunGuide™ Software to control field devices, such as dynamic message signs (DMS), closed-circuit television cameras (CCTV), and road weather information systems. The SunGuide™ Software also uses NTCIP for communications between regional transportation management centers (RTMC) for management of events that might span jurisdictions and other activities involving inter-system communications or transfer of command and control.

The laboratory facilities in Tallahassee are designed to allow the FDOT to perform functional device evaluation and testing, NTCIP testing, and end-to-end system testing in an environment that mimics the architecture of Florida's ITS deployments (similar network topology, multiple devices operating concurrently, similar command/control software, similar diagnostic and manufacturer specific software, etc.). It is critical that the core focus of the Florida's RTMCs be the operation and management of the roads under their supervision and control. Therefore, the FDOT has provided this laboratory to offer a safe environment to evaluate new products, technologies, and techniques. Although the TERL possesses the same operational capabilities of a functional RTMC, it is not charged with operation or oversight of a road network; therefore, the perfect environment for initial device testing, software testing, and a host of other activities can be provided.

During the past year, TERL performed system testing of multiple releases of the SunGuide Software, including the first field trials of a Road Ranger Service Patrol module for electronic fleet management and dispatch. This software module, combined with a mobile computer in the Road Ranger vehicles, provides location information and details about incidents and assistance. In addition, a number of ITS devices were installed and evaluated on the TERL test network. The initial ITS Device Approved Product List was published on-line (including 40 approved ITS devices, such as fiber optic cable, CCTV cameras, detectors, network devices, and a number of others). In conjunction with these activities, the TERL continued working with the Standards Development Organizations responsible for NTCIP standards by acting as a host facility for the testing of NTCIP 1204 (the published standard for road weather information systems). TERL staff and researchers also made progress on testing and improving vendor support of NTCIP 1203 (DMS) and NTCIP 1205 (CCTV).

The TERL's core work of establishing and maintaining the FDOT APL provides a unique opportunity, in that these activities provide direct real-world feedback that is indispensable to the specifications development and standards testing activities that are also conducted by the Traffic Engineering and Operations Office and ITS Program within the FDOT. The TERL's hands-on approach and the feedback that these activities provide on the content of specifications—installation, integration, and operation of products—and the requirements for the statewide software yield continuous improvement in a number of areas—all of which benefit the FDOT and ultimately Florida taxpayers.

It has become clear over the years that although the TERL serves the interests of FDOT first, there is a secondary national benefit from much of the work performed. Florida's product specifications can often be found incorporated into other states' product specifications. Further, by its very nature, the NTCIP work performed at the TERL has national impact. Because of the expertise that the TERL has consistently demonstrated with respect to NTCIP deployments in Florida, the national committees and organizations responsible for NTCIP standards have requested that the TERL participate in a number of standards-related projects. This work is expected to continue as the FDOT Traffic Engineering and Operations Office's ITS Program and the TERL continue to deploy and promote NTCIP and its work with vendors to ensure consistent interpretations of the standards.

All of the activities that occur within the TERL—specifications development, review, and updating; evaluation of equipment and APL; testing and operational feedback provided for SunGuide Software; and the vendor Quality Assurance Program—support the FDOT's goal to establish and maintain a safe, efficient, and uniform system of traffic control. In addition, these activities help ensure that products used in traffic control systems meet minimum standards for functionality; are reliable and safe; and are manufactured by companies with good quality practices and customer service. In general, the TERL promotes accountability and ensures that the FDOT receives the best possible products for use on its roads.

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