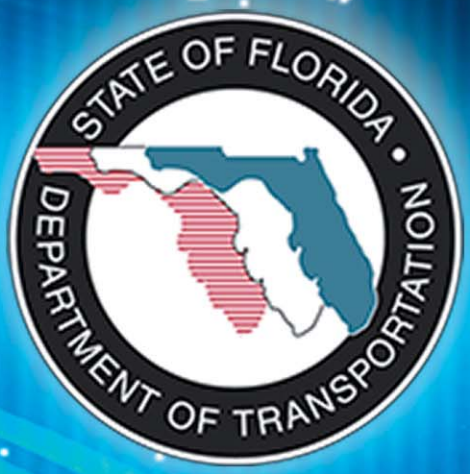
Florida Department of Transportation
Intelligent Transportation Systems Program

Annual Report
Fiscal Year 2004-2005



ITS–It's What's Happening in Florida's Transportation

Mission Statement

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

Vision Statement

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

General Content

ITS Program Highlights

Florida Department of Transportation

JEB BUSH
GOVERNOR

605 Suwannee Street, MS90 Tallahassee, FL 32399-0450

JOSÉ ABREU
SECRETARY

Dear Reader:

As Fiscal Year 2004-2005 draws to a close, I reflect on the progress of our ITS Program. This has been a productive year, a year of sharing our Florida program with other ITS programs, and learning from them in return.

We were honored to receive a visit from a delegation of researchers from Japan in October. We shared information with them and toured the District 5 transportation management center.

We participated in several technical conferences during the year including the National Rural ITS (NRITS) Conference, ITS Georgia, Transpo2004, the First Annual I-95 Corridor Coalition Meeting, and the ITE 2005 Spring Conference.

May 2005 brought the premier national ITS event—ITS America's 15th Annual Meeting and Exposition in Phoenix, Arizona. The FDOT Central Office, District 4, Florida's Turnpike Enterprise, and ITS Florida exhibited in a large booth showcasing Florida's ITS deployments.

I just recently returned from Quebec City in Canada where the ITS Canada 8th Annual Conference and General Meeting was held. After a presentation on Florida's ITS Program, attended by participants from the United Kingdom, France, and Canada, many were impressed by Florida's commitment to ITS.

Florida has made significant progress in several initiatives that we have been working on during the past year. We move closer and closer to deployment of the SunGuide software in Florida's transportation management centers. As a matter of fact, SunGuide was deployed in District 4 just before the end of this fiscal year. Our *ITS Strategic Plan* is undergoing the last revisions to finalize its update, and this past summer we completed our *Systems Engineering Management Plan* along with training.

One of our greatest achievements this fiscal year, however, was obtaining funding for the operations and equipment replacement costs for our ITS Program. Working closely with all of the Districts, we were able to secure $140 million of funds over the next ten years for transportation management center operations and ITS equipment replacement ensuring the continuity of our ITS Program.

We look forward to the upcoming year. New technologies, such as vehicle infrastructure integration, promise to revolutionize the way we live and do business. The ITS Program looks forward to being a part of this new future.

Elizabeth Birriel

Elizabeth Birriel, PE
Deputy State Traffic Operations Engineer
ITS Program Manager

Florida's Transportation Future

Florida's Growth Fast Facts

Over the past 20 years, transportation demand in Florida has grown at a rapid pace. It is anticipated that this growth will continue to accelerate.

Population

- Florida has the fourth highest population in the nation.
- Florida's population is projected to increase to more than 21 million by 2020, a 36 percent increase from 2000 levels—twice the projected national growth.
- By 2030, Florida should pass New York as the third most populous state.

Commerce

- Florida created more than 177,000 new jobs during the 12 months ending in mid-2004, marking 28 straight months of job growth.
- With $73.2 billion in 2003 trade and its multi-cultural population, Florida is the national leader in international commerce.
- Florida hosts some 2,000 firms from other countries, including 300 regional headquarters.
- Machinery exports from Florida totaled more than $7.4 billion in 2003.
- Florida is the third ranked state in dollar value of its high-tech exports and fourth in high-tech workers.
- Defense-related spending (direct and indirect) accounts for $44 billion (9.8 percent) of Florida's gross state product.
- With deposits of $90 billion-plus, about 550 financial institutions—banks, savings and loans, and credit unions—operate in Florida.

Tourism

- Florida is the leading national tourist destination for the entire nation and ranks second as an international tourist destination.
- More than 76 million out-of-state tourists came to Florida in 2004, and over 100 million are projected by the year 2020. Fifty-one percent of these tourists traveled to Florida by non-air transportation (car, train, bus, etc.).

Transportation Infrastructure

- Florida land transportation includes four interstate highways, 40,000 lane-miles of state highway, and nearly 3,000 miles of rail.
- No place in Florida is more than 90 miles from one or more of 14 deep-water ports.

Sources: University of Florida, Bureau of Economic and Business Research; 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

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 Intellligent 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, according to the FDOT *Five-Year Work Program*, $6.3 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 $800 million between 2002 and 2014.

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 four program areas:

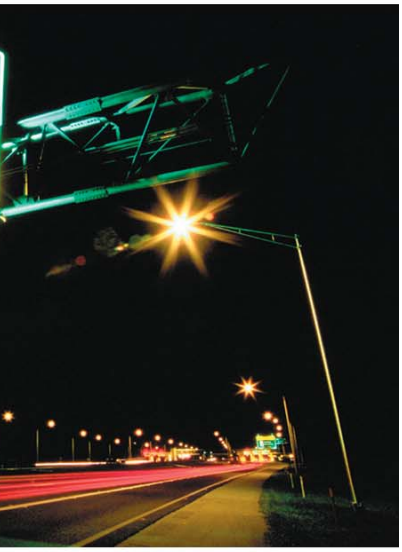
- ITS Management/Deployments—*Gene Glotzbach, P.E.*
- ITS Architecture, Standards, Software, Research, and Training—*Liang Hsia, P.E.*
- Commercial Vehicle Operations—*Michael Akridge*
- Telecommunications Program Management—*Nick Adams*

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
- Develop and update the ITS standards and specifications
- Provide technical support and assistance to FDOT's District Offices and other partners

Transportation Management Center Engineering, Software, ITS Architecture, Standards, and Research

- Manage the development of the SunGuide℠ Software System for freeway and incident management and center-to-center communications
- Update and maintain the *Statewide ITS Architecture*
- Coordinate statewide ITS professional capacity building to provide a qualified work force for ITS deployments
- Coordinate and manage the statewide data warehouse research project to enhance advanced traveler information systems and performance monitoring
- Oversee ITS for the Traffic Engineering Research Lab



Commercial Vehicle Operations

- Support deployment of information and communications technologies to serve commercial vehicles
- Guide deployment of the Commercial Vehicle Information Systems and Networks infrastructure and infostructure to assist both state and motor carrier communities
- Continue support of the Cooperative Vehicle Highway Automation System program
- Continue research in the use and deployment of transponders and other communications devices as probes for real-time traffic data and statistics for planning

Telecommunications Program Management

- Guide deployment of a communications backbone to serve ITS deployments on major corridors
- Manage and update the Statewide ITS Wide Area Network (WAN) to support ITS deployments
- Manage the maintenance program for the Statewide ITS WAN to support ITS deployments, motorist aid call boxes, and various ITS research and development initiatives
- Manage the Federal Communications Commission statewide radio license database
- Manage the Wireless General Manager Agreement, a resource sharing public/private partnership which places commercial wireless carriers on FDOT rights-of-way, with SpectraSite

FDOT's ITS Program Accomplishments

Florida's ITS accomplishments are numerous. The following is a list of the Fiscal Year 2004-2005 major accomplishments.

ITS Management/Deployments

- Updated the *Ten-Year ITS Cost Feasible Plan.*
- Gained Executive Board approval to fund operations and equipment replacement costs for the regional transportation management centers.
- Promoted 511 traveler information in Florida with continued support to Districts 1 and 2 in the development of the statewide advanced traveler information system/511.
- Provided support to District Traffic Operations and Work Program staff.
- Provided support to District 1's Traffic Operations, Construction, and Contractual Services Office with the I-75 corridor plan sets.
- Provided support to District 2's Traffic Operations Office with the Phase IV Interstate 95 North ITS Expansion and Phase V Interstate 295 Projects in Jacksonville.
- Provided support to District 3's Traffic Operations with the development of design plans for the Bay County advanced traffic management system.
- Assisted District 5 with the *i*Florida FHWA grant.
- Assisted District 7 with the Skyway Bridge lightning protection plan.
- Began processing ITS device standards and specifications through the FDOT standards development process.
- Completed the *Hurricane Response Evaluation and Recommendations Report.*
- Completed a draft update of the *ITS Strategic Plan.*
- Completed the *Systems Engineering Management Plan (SEMP)* and conducted training.
- Continue to operate the Change Management Board and processed *Engineering Change Proposal 1.1 (ECP 1.1).*
- Continue to produce the *SunGuide℠ Disseminator* (FDOT's Traffic Engineering and Operation's monthly newsletter).
- Exhibited at TRANSPO2004 and ITS America's 15th Annual Meeting and Exposition to showcase FDOT's ITS accomplishments.
- Held the Annual FDOT ITS Working Group Meeting to showcase ITS in the state of Florida.

- Provided support to FDOT's Public Transportation Office for their Resource for Advanced Public Transportation System Program.
- Provide quality assurance support to the Traffic Engineering Research Lab.
- Provide the design for deployment of dynamic message signs on I-10 in Tallahassee to support the Amber Alert Grant received from FHWA.
- Supported the development of ITS performance measures.

Transportation Management Center Engineering, Software, ITS Architecture, Standards, and Research

- Continued development of the SunGuide℠ Software System and deployment in District 4's Broward transportation management center. Coordinated real-time applications of the software with various statewide agencies; and integrated transportation management systems with the Miami-Dade Expressway Authority and Lee County.
- Oversight of the Traffic Engineering Research Lab, including: NTCIP standards development, testing, and training; quality research engineering; approved product list vendor qualification program management; dynamic message sign (DMS) qualification program management; testing of display properties for LED traffic signals and DMSs; travel time and delay software development; and ITS product approval process development.
- Started the update for the Statewide ITS Architecture for operations, maintenance, and security.
- Sponsored and/or managed the following research projects:
  - Development of a Central Data Warehouse for Statewide ITS and Transportation Data Phase II: Proof of Concept
  - TRB NCHRP XML Standard for Exchange of Transportation Data (TransXML) Research Review Panel
  - BD-548-04 Relating Crash Occurrence to Freeway Loop Detectors Data, Weather and Geometric Factors
  - BC-550-5, RPWO #5, Linking Crash Patterns to ITS-Related Archived Data: Phase II, FY 2004-2005, UCF Acct. No. 16-50-7034
  - Real-Time Route Diversion Research Project

Commercial Vehicle Operations

- Continued increase in the number of participants in the Florida Department of Agriculture and Consumer Services' AgPass® pre-clearance program; benefits to Florida's Department of Revenue from AgPass in the collection of $501,000 in unpaid sales and use taxes in the 2004 calendar year.

- Addition of two more HELP/PrePass® pre-clearance locations on I-10 in Pensacola by the FDOT Motor Carrier Compliance Office (MCCO).
- Utilization of Florida's Commercial Vehicle Help Desk (telephone and Web site) increased dramatically—automated Helpdesk (850-414-4700) use increased 350 percent and Web site (www. FloridaTruckingInfo.com) visits also increased substantially.
- FDOT's MCCO and the Florida Department of Highway Safety and Motor Vehicles (DHSMV) Office of the Florida Highway Patrol updated their current fax-based cargo theft alert system to an Internet-based system which allows notification of cargo theft 24/7/365.
- FDOT's MCCO to implement a bypass detection system near the weigh stations at Punta Gorda to detect and advise law enforcement officers of trucks bypassing the weigh stations.
- The DHSMV kicked off the Electronic Credentialing Project which will allow motor carriers to apply for, pay for, and receive International Fuel Tax Agreement (IFTA) and International Registration Plan (IRP) credentials electronically via the Internet.

Telecommunications Program Management

- Completed the ITS statewide Wide Area Network (WAN) Plan.
- Completed design of the ITS WAN pilot project connecting Districts 4 and 6 and Florida's Turnpike Enterprise (south).
- Completed Statewide Microwave System Upgrade projects for increased capacity and operational efficiency.
- Issued a report on wireless technology for ITS deployment.
- Added 12 wireless collocations and constructed a major tower on Alligator Alley (I-75) under the SpectraSite Wireless General Manager contract.
- Upgraded the 47 MHz radio system from base stations to a repeater configuration in District 1.
- Maintained radio facilities on-line and functional during multiple hurricanes to assist in recovery efforts.
- Completed research on road weather information systems for ITS use.
- Deployed emergency backup power generators, for continuity during power outages, at six microwave system locations.

511 in Florida—

Our Success is Just Beginning

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

On July 21, 2000, the Federal Communications Commission (FCC) assigned the 511 dialing code for the provision of telephone-based transportation information on a national basis. After extensive planning and design work, the Florida Department of Transportation (FDOT) District Five office launched the Central Florida Traveler Information 511 Service on June 24, 2002; the FDOT District Six office launched the Southeast Florida SunGuide℠ 511 Service on July 16, 2002; and the FDOT District Seven office launched the Tampa Bay Regional Traveler Information Service on September 2, 2004.

Florida's 511 services currently account for between 30 to 40 percent of all 511 calls nationwide. This high level of success has been achieved despite the fact that FDOT only recently reached an agreement with Verizon Wireless to enable the 511 dialing code for their Florida customers. Given the size of Verizon Wireless' customer base, it is anticipated that 511 usage will grow as these customers begin to access the services.

In addition to the existing regional 511 services, a statewide 511 service is being devised as part of the *i*Florida Model Deployment, which will provide exception reporting (primarily incident data and construction/work zone information) in all parts of the state not currently covered by the existing regional 511 services. In 2006, the statewide service will be enhanced to include multi-modal traveler information for Southwest Florida and Jacksonville. By 2008, it is anticipated that this service will be expanded to facilitate the integration of all regional 511 services into a single statewide system.

The value of 511 to FDOT and the traveling public will continue to increase as the statewide service comes online in fiscal year 2005-2006 and undergoes numerous improvements from 2006 through 2008 and beyond.

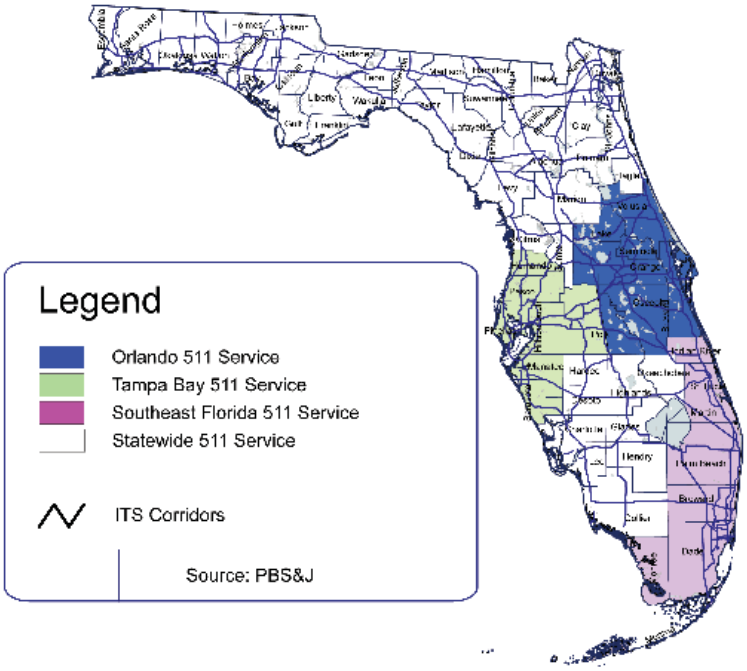
The value of 511 to FDOT and the traveling public will continue to increase as the statewide service comes online in 2005 and undergoes numerous improvements from 2006 through 2008 and beyond. As with existing regional 511 services in Florida, these new 511 services will continue to focus on quality and timeliness of data disseminated to provide the backbone for service usage growth. It is this combination of factors that has resulted in Florida's phenomenal success in establishing superior 511 services, giving it a national leadership role in this emerging ITS field.

Leading the Nation

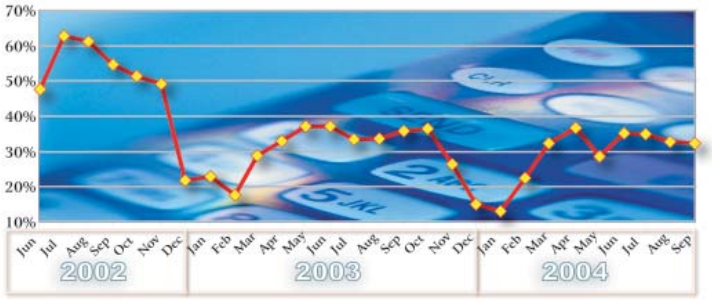
As of December 2004, Florida had received more than five million calls—approximately 30 percent of the national total.

During 2002, the two existing 511 services in Florida accounted for between 50 to 60 percent of all 511 calls nationally (at that time there were between 6 and 11 other 511 services operational nationwide). Since launching, Florida's 511 services have, on average, accounted for between 30 to 40 percent of all 511 calls nationally from the 24 services in operation as of December 2004. The Tampa Bay area service, which came on line in September 2004, accounted for approximately 83,000 calls during its first month of operation.

Current Florida 511 Services

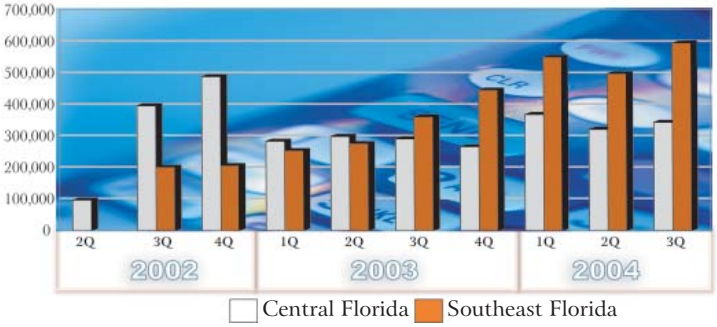


Percentage of National Calls Made in Florida



The drop in percentage of national 511 calls occurring between November and February each year, accounted for by Florida-based usage, is not due to a drop in calls in Florida, but rather significant increases in calls by users from other 511 service areas that experience severe winter weather.

Central and Southeast Florida 511 Service Call Volumes



Use of the Central and Southeast Florida-based 511 services has grown (with the exception of usage spikes around the time of the service launch) during each quarter since their inception.

"In 2005, all travelers in Florida will be able to dial 511 to access travel-related information through the telephone."

511 Statewide Implementation Plan

Current 511 Services—
Growth and Enhancements

At present, the **Central Florida Traveler Information 511 Service** provides reports for four segments along the I-4 corridor (Volusia and Seminole counties, downtown Orlando, and the Central Florida attractions area), accessible by road segment, city, or cross street. It also offers information about I-75 and SR 528 in Brevard County. In mid-2005, as part of the *i*Florida Model Deployment, the geographic coverage area of this regional 511 service will be expanded to include all limited-access facilities and seven key arterials in the Orlando metropolitan area. The service will include multi-modal data for the Orlando International Airport, the Sanford-Orlando International Airport, the Central Florida Regional Transportation Authority (LYNX), and Port Canaveral.

Finally, the 511 service's functionality will also be enhanced to support a statewide reporting service that will provide exception reports on 59 Florida Intrastate Highway System roadways. It is anticipated that this statewide service will be expanded during 2006 to include multi-modal metropolitan traveler information for the Southwest Florida and Jacksonville areas.

The **Southeast Florida SunGuide 511 Service** provides traveler information, in both English and Spanish, for roadways in Miami-Dade, Palm Beach, and Broward counties, as well as the Florida Keys portion of Monroe County. Content-related enhancements are planned that will incorporate traveler-related data collected from new sensor deployments along the Palmetto Expressway (SR 826), I-75, portions of Florida's Turnpike and US-1, facilities operated by the Miami-Dade Expressway Authority, and some of the more important arterial facilities in the region. A regional transit information database that will provide supplemental information to 511 users is also under development and will be one of the most advanced in the nation.

In early 2005, this service expanded to provide traveler information to 511 users in Martin, St. Lucie, and Indian River counties.

The **Tampa Bay Regional Traveler Information Service** provides traveler information for Pinellas, Hillsborough, Pasco, Hernando, Manatee, and parts of Polk counties. Existing data resources provided by FDOT's public partners are supplemented by approximately 100 vehicle detection sensors deployed along I-4, I-75, and I-275 as part of the Federal Highway Administration's Intelligent Transportation Infrastructure Program (ITIP).

Florida's 511—Enabled By Legislation

Unlike most other states, where implementation of 511 services is unregulated by state law, on July 14, 2003, Florida's legislature designated FDOT as the lead agency for implementing 511 and as the state's point of contact for coordinating 511 services with telecommunications service providers (334.60 F.S.). This includes:

- Coordinating with other transportation authorities in the state to provide multi-modal traveler information through 511 services and other means;
- Developing uniform standards and criteria for the collection and dissemination of traveler information using the 511 number or other interactive voice response systems; and
- Entering into joint participation agreements or contracts with highway authorities and public transit districts to share the costs of implementing and administering 511 services in the state. FDOT may also enter into other agreements or contracts with private firms relating to the 511 services to offset the costs of implementing and administering 511 services in the state.

Benefits to 511 Customers

"Benefits that customers receive from using 511 have surfaced in formal research, such as focus groups and surveys, and also through customer comments and through coverage of 511 by the media. Among the many features and benefits identified, those considered important to 511 users were:

- Ease of use and convenience
- Real-time, accurate, quality road and traffic conditions
- Avoiding traffic congestion and road construction
- Weather information
- Reducing frustration and relieving stress
- Helping users to make informed travel choices
- Changing travel behavior including altering routes and departure times
- Saving time and lives
- Receiving information about tourism and other services"

Source of Benefits Information: "The Value of Deploying 511," by the 511 Deployment Coalition, published May 2004

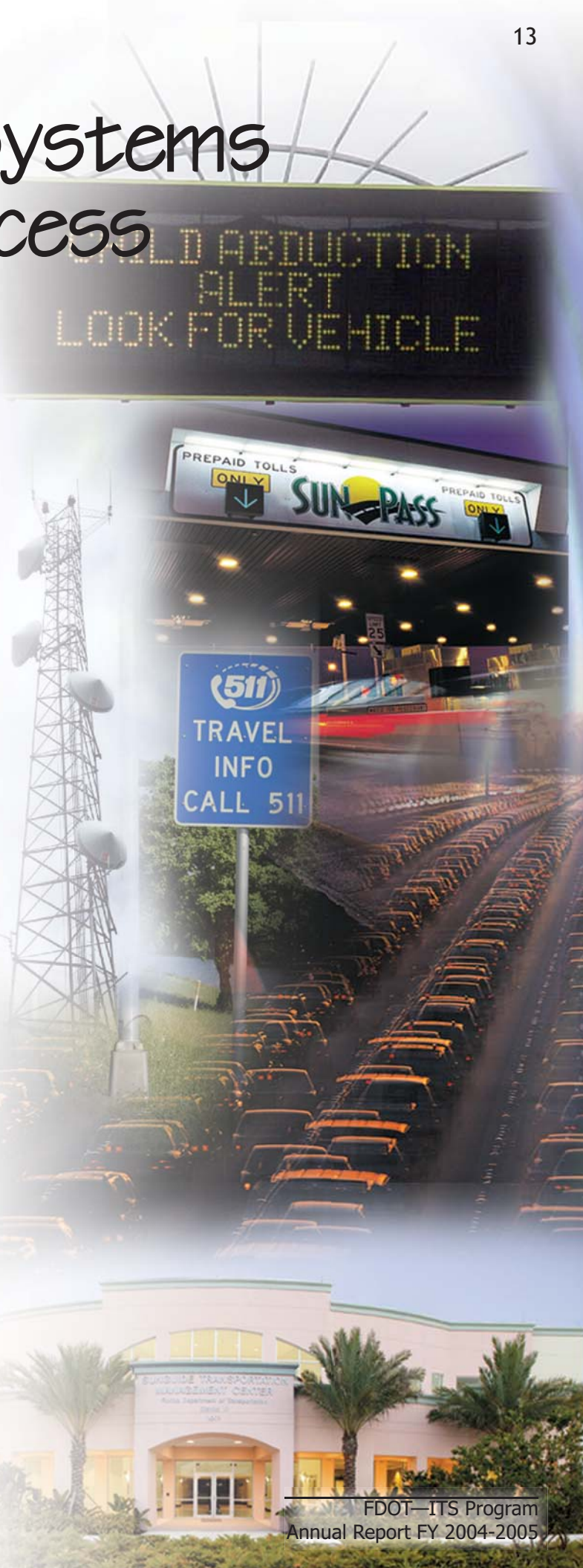
Ensuring Access to Floridians With Disabilities

The Florida Department of Transportation and its partners are eager to work with the disabled community to make 511 as useful as possible to all potential users. To that end, FDOT is currently working with the Florida Association of the Deaf, Inc., to ensure that traveler information can be accessed via multiple dissemination mechanisms so as to meet all Americans with Disabilities Act (ADA) requirements.

The SunGuide Systems Engineering Process

Lighting the Way to Better Projects

by John Bonds and Martin Sas, PBS&J and
Gene Glotzbach, FDOT



Why should we use the systems engineering process in Florida? After all, we have established processes to design, and we build roads that have worked well for us. Won't using the systems engineering process add unnecessary costs, and delay the project by generating a lot of documents that nobody will read? Besides, isn't systems engineering used by rocket scientists to solve complex problems like getting to the moon?

In the past, the FDOT Districts have done exceptionally well at solving concrete transportation problems by using established processes to construct roads, bridges, and facilities. But since about 1990, more roads, more lanes, and more bridges have not been enough to alleviate the transportation problems Florida faces. Today, the Districts have a choice of an amazing array of high-technology devices that are touted to be the ultimate solution to our transportation problems. High-technology devices are becoming more and more dependent on software and less on hardware, so solutions are much harder to touch, feel, and really understand. Adding a significant amount of software development to any project will greatly increase the project's complexity with an order of magnitude increase in the project's risk of failure. A software's success is defined as delivering the functionality that was asked for, at or below the budget agreed upon, and in the time frame needed.

Results from a Standish Group (1986) study (Standish Group–CHAOS research, presented by

Frank Cechini, FHWA California District at the ITS America 15th Annual Meeting and Expostion on May 4, 2005) of 8,360 information technology software application projects revealed that:

- Average cost overrun on these projects was 189 percent.
- Only 16 percent of the projects met the stated requirements.
- 31 percent of the projects were cancelled.
- Projects that weren't cancelled met an average of only 61 percent of the initially specified functions.

Additionally, it was reported that the total amount of money spent on software development in the United States has been estimated to be more than $275 billion each year. The waste of money is approximately $63 billion in cancelled software projects, or $149 billion if project failures that were not cancelled are factored in (*Return on Software: Maximizing the Return on Your Software Investment*, Steve Tockey, Addison Wesley Professional).

In response to these appalling statistics, governments and companies have been applying a more rigorous software development process using the principles of systems engineering; and they are having remarkable success. The Standish Group reported that over a four year period, from 1994 to 1998, the project success rate for large software projects (costing more than $1 million) rose by 65 percent, with less dramatic increases for medium to small projects—41 and 4 percent, respectively (*Turning Chaos into Success,* Jim Johnson, December 1999, SoftwareMAG.com).

Using structured systems engineering processes to manage the development of projects will save time and money, as indicated in Figure 1.

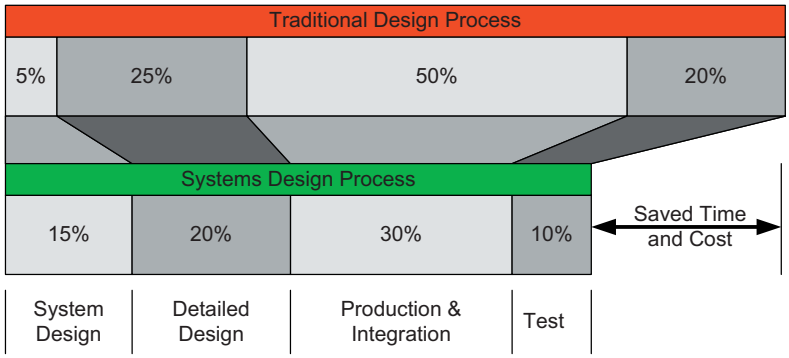


Figure 1: Intuitive value of systems engineering process

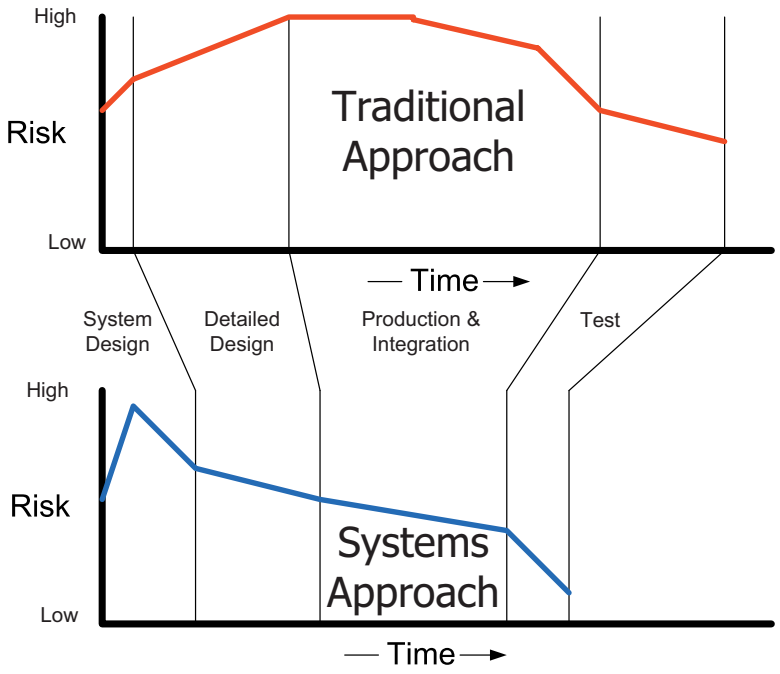


Figure 2: Risk reduction using systems engineering

"Systems Engineering Implementation in California," presented by Frank Cechini, FHWA, at ITS America's 15th Annual Meeting and Exposition

The savings in time and cost result from a decrease in project risk. There is a decrease in the risk that: requirements were not well understood, problems were discovered during integration and redesign was needed, and testing will indicate functionality was not provided. All these risks can be graphically portrayed as a function of time during the project timeline as shown in Figure 2.

It may appear from the previous discussion that the emphasis on applying systems engineering processes is focused solely on software development or software application projects. Systems engineering is really appropriate over a broad range of applications. The application of systems engineering principles is used by engineers and managers to

manage, and to control, a project through the use of leadership and technical direction ensuring that stakeholders' (i.e. users) needs (i.e. requirements) are satisfied in a high-quality, cost-efficient, and schedule-compliant manner throughout a project's entire life cycle.

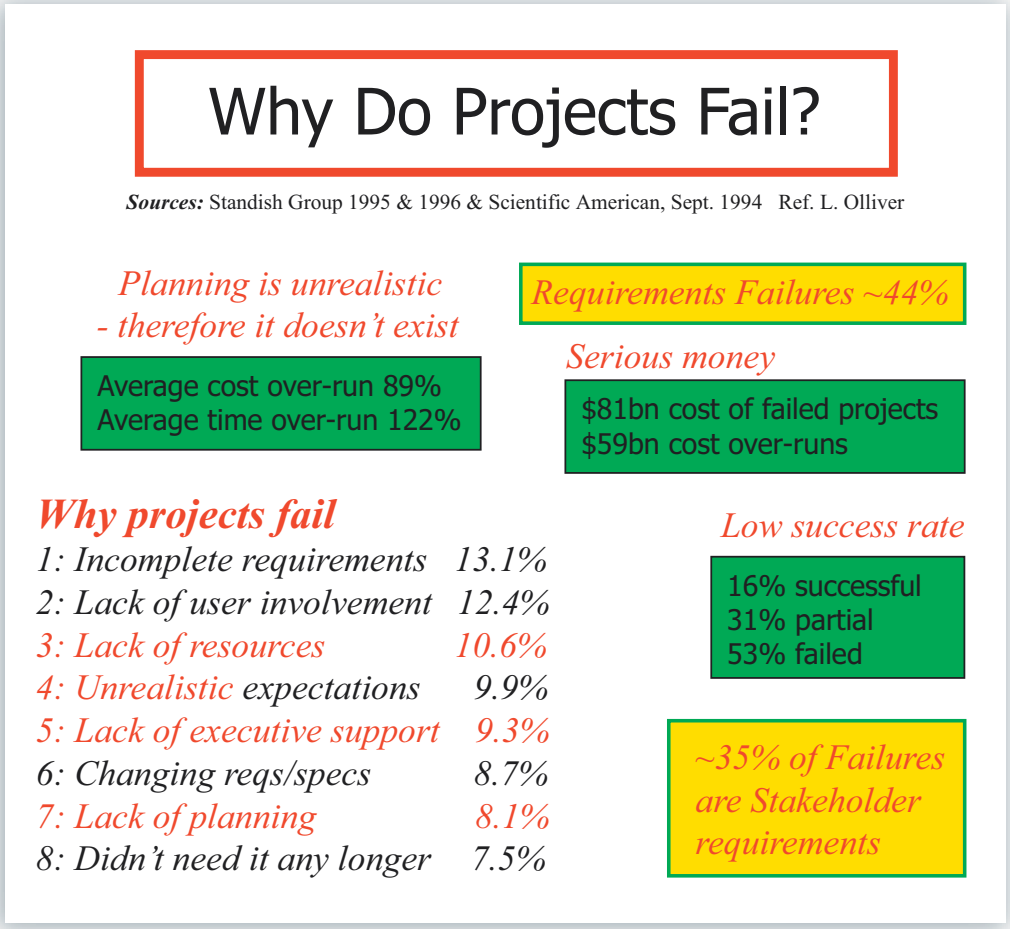


Figure 3: Dominant causes for project failures

Implementing a standard systems engineering process for the deployment of ITS projects in Florida increases the likelihood of a project's successful deployment. Studies have shown that the overall success rate for projects without some form of management plan, such as systems engineering, is just over 15 percent, while the remainder of the projects were either cancelled or deemed inadequate (*Introduction to Systems Engineering for Advanced Transportation*, Federal Highway Administration (FHWA), NHI-02-025, Course No. 137024). The underlying causes for these projects' inadequacies or cancellations were related to deficiencies in the management of quality, schedule, and budget. As shown in Figure 3, nearly all of the reasons shown reflect a deficiency in the management and control of the project.

Because these project elements are the primary concern of systems engineering, the implementation of a systems engineering process that is documented, measurable, stable, has low variability, and is used the same way by all, will lead to a well-integrated, high-quality system that satisfies stakeholders' desires within cost and schedule constraints.

Implementing a standard systems engineering process for the deployment of ITS projects in Florida increases the likelihood of a project's successful deployment.

As a means to ensure high-quality, well-integrated statewide ITS, FDOT developed a systems engineering process, that is documented in the FDOT *Statewide Systems Engineering Management Plan (SEMP)*. The *SEMP* is a misnomer since it is really a reference manual for the Districts to use in developing systems engineering plans for specific ITS projects. The FHWA requires that states use

a systems engineering process on ITS projects to qualify for Federal funding assistance in deploying ITS projects. FDOT complied with this requirement by studying the best practices in use and developing a reference manual that describes the systems engineering process, explains how it is employed, and even provides an accompanying training course. The two-year development process that was followed is shown in Figure 4.

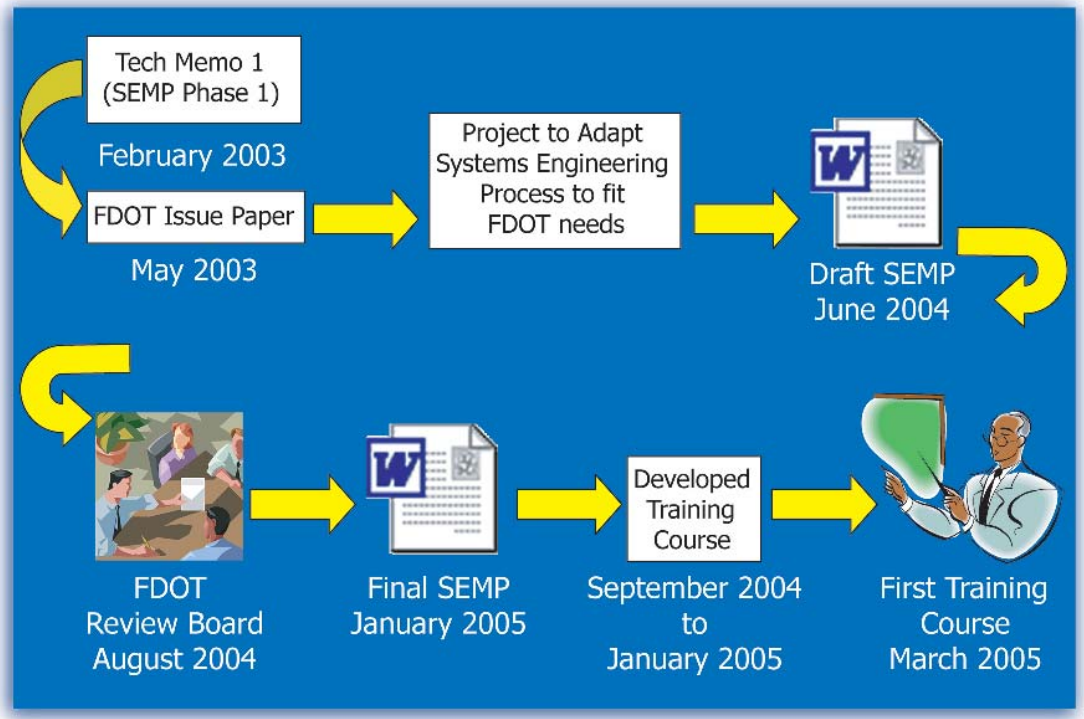


Figure 4 : Development of the *SEMP*

The *SEMP* describes a systems engineering process based on the FHWA Vee model, which establishes user requirements and allocates them to a functional system design that is developed with checks and balances along the way to make sure that the functionality required by FDOT is truly delivered. A simplified version of the Vee model is shown in Figure 5.

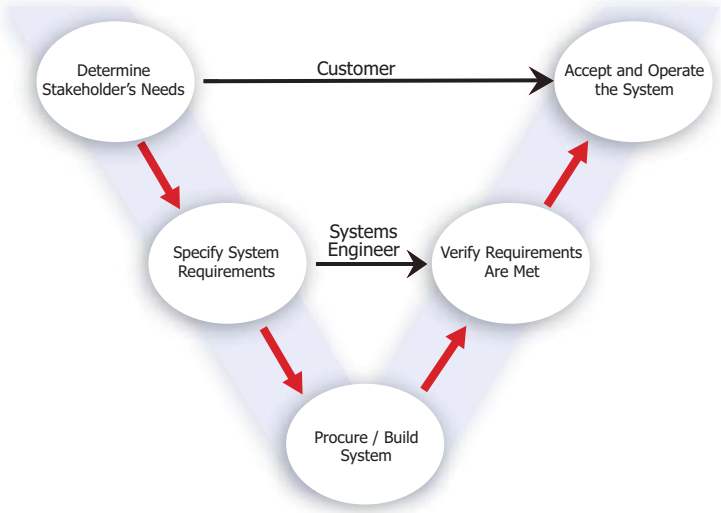


Figure 5 : Simplified Vee model

About half of the nearly 400 pages in the *SEMP* are devoted to templates that engineers and project managers can use to develop the required documents that guide systems development and integration, and establish the project controls necessary to assure a successful project deployment. The first half of the reference manual describes the basics of the systems engineering process and how to use it. The *SEMP* training course not only presents the systems engineering theory, but also goes on to apply it using the systems engineering process on a current FDOT ITS project.

To ensure that District projects qualify for FHWA funding, a SunGuide℠ ITS Checklist is included, which is used to assess the completeness of the systems engineering process as required by the regulation contained in *Part 940 of the Federal Code of Regulations for ITS Projects*. The checklist, and the supporting information submitted with it, provides the fundamental basis for FHWA funding approval as well as the District's acknowledgement of its commitment to manage the project using the systems engineering principles and methods as they apply to the project. Additionally, the documentation submitted, together with existing District processes, form the basis for a project-specific SEMP that will be used for managing and controlling the deployment of the ITS project.

More information on the *SEMP* may be obtained by contacting the FDOT Traffic Engineering and Operations Office at (850) 410-5600.

SUNGUIDE℠ Software—

Modern Incident Management Made Easier

by Liang Hsia, FDOT

Amid great anticipation by transportation management center staffs, managers, and users, the first of FDOT's Districts deployed the multi-million dollar software system called SunGuide℠ in June 2005, marking a new era in traffic transportation management for Florida.

The product of two years of development and testing, SunGuide enables Florida's transportation management centers (TMCs) to integrate numerous hardware, software, and network applications as well as exchange data and video with other TMCs. Because SunGuide standardizes common TMC functions, it helps the various District facilities become more interoperable—a goal of ITS across Florida and throughout the nation.

SunGuide Software Release 1.1 was deployed for the first time on June 13th in Fort Lauderdale at District 4's Broward TMC. This followed successful testing of the software in May by representatives from FDOT's Central and District 4 ITS Program and Southwest Research Institute (SwRI), FDOT's software development contractor.

Later, SunGuide Release 2 will be deployed in District 6 and at the Miami-Dade Expressway Authority (MDX). Another prospective user, Lee County, plans to incorporate the software as part of the Lee County Bridge Incident Management System.

SunGuide evolved from similar efforts in Texas and Maryland, where those states' DOTs worked to develop comprehensive TMC software based on an open architecture and the ability to manage multiple subsystems. The objective there, as in Florida, was to invest in the software development once, then use the program many times at multiple facilities. With SunGuide, the TMC operators can perform various incident management tasks, obtain data from traffic detection devices, control closed-circuit television cameras along the freeway, display video from the cameras on any of several screens, and alert motorists via highway advisory radio, dynamic message signs (DMSs), or 511 advanced traveler information systems (ATISs).

Development of the software system occurred in two distinct phases. The first, which began in April 2002, was to analyze the need for a Florida-specific traffic management software, then prepare the necessary documents for contractor selection. In the second phase, SwRI was chosen for the software development effort and began work in October 2003. This phase also included the testing needed to verify the software's capabilities and installation of the milestone demonstration versions at TMCs. Early tests were successful and the project team pressed on.

On a rainy day in October 2004, the team installed a test version of SunGuide at the District 4 TMC to conduct a milestone demonstration. While an FDOT staff member in the field watched from his vehicle for verification, SunGuide was used to transmit the first message from the TMC to a DMS on I-595 between Hiatus Road and Nob Hill Road. The sign displayed the words "Florida Department of Transportation" for eastbound motorists. A second successful test took place the following day on I-95.

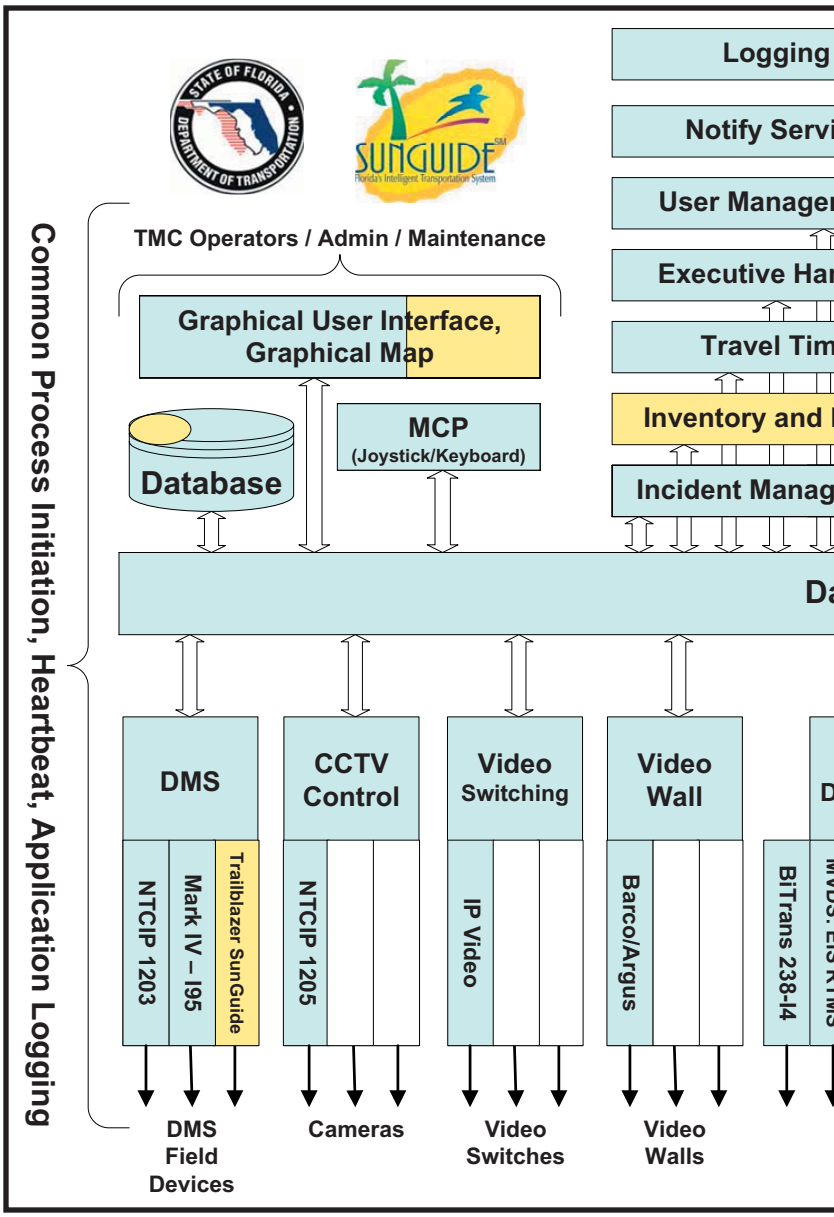
With improved incident detection and response, traffic tie-ups can be resolved sooner and the freeway returned to normal operation.

Sign activation is just one of the modules in the SunGuide library of programs. TMC operators will be able to utilize a unique alarm function that will notify them of traffic slowdowns on a section of roadway, the most common clue that an incident is affecting travel. SunGuide will then assist the operator in identifying the nature of the incident, its location, and what response actions are most appropriate. With improved incident detection and response, traffic tie-ups can be resolved sooner and the freeway returned to normal operation.

SunGuide is designed to be flexible and expandable to match the individual needs of the 12 TMCs FDOT plans for the state. Though each facility will serve a different community's travel needs, each one will be able to collect, assess, and manage real-time traffic data and video, then disseminate meaningful and accurate transportation management information to both the motoring public and commercial vehicle operators. To accomplish this, SunGuide's basic components consist of modules that provide:

(1) Operations management and control for ITS field devices.

(2) Expert systems and databases with the algorithms to support automated incident detection and response.



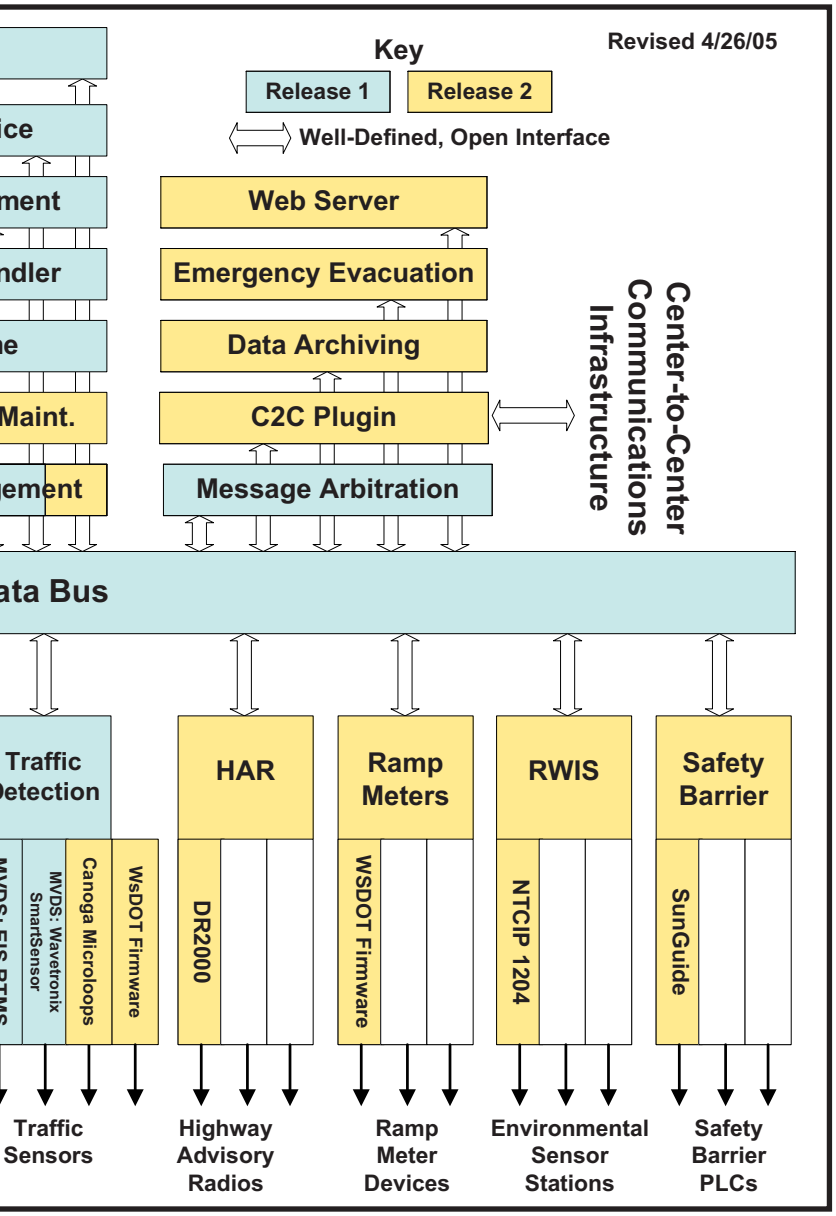
(3) Data archiving of incident and traffic that can be used for ATIS and stored in a statewide data warehouse.

(4) Configuration management of SunGuide and electronic documentation of the software.

As various SunGuide deployments take place, this FDOT project will be achieving important ITS goals for Florida. There will be integration of statewide ITS hardware, software, and network applications, plus a reliable means for center-to-center communications across the state. SunGuide allows operators in one TMC to interact with and control devices in another, as long as they have secured the necessary authorization.

District 1's TMC Architectural Rendering

District 4's TMC



SunGuide is designed to be flexible and expandable to match the individual needs of the 12 TMCs FDOT plans for the state.

District 7's TMC Architectural Rendering

District 6's TMC

SunGuide will be a ready-made system for use by future TMCs identified in the FDOT *ITS Ten-Year Cost Feasible Plan*. This means that, system-wise, a new facility will be compatible with existing TMCs the day it opens. SunGuide provides a basis for statewide incident management when such events as hurricanes or other disasters strike an entire region of the state. In such cases, TMCs will have the tools to support emergency management, evacuation, and related tasks.

As an information source, SunGuide will support a Web-based service for tourists, commuters, and other highway users needing information about traffic conditions.

The SunGuide era has definitely arrived, marked by more efficient TMC operations and a greater level of service to the traveling public. The software system is demonstrating its reliability, and the planned TMCs will benefit from having an established, proven means of handling freeway incidents. In fact, FDOT looks forward to the following SunGuide deployments as new facilities open:

- September 2005: SunGuide Release 2 deployment in District 6, Miami.
- October 2005: SunGuide Release 2 deployment at MDX for expressway operations in Miami.
- Fall 2006: SunGuide software deployment at the District 7 regional transportation management center (RTMC) in Tampa.
- December 2006: SunGuide software deployment at the District 1 RTMC in Fort Myers.
- Fiscal Year 2006: SunGuide software deployment (tentative) in District 2.
- Fiscal Year 2007: SunGuide software deployment (tentative) in District 3's Pensacola TMC.

More information on SunGuide may be obtained by contacting the FDOT Traffic Engineering and Operations Office at (850) 410-5600.

Wide Area Network—

Interconnecting Florida's TMCs

by Frank Deasy, PB Farradyne and
Nick Adams, FDOT

FDOT's Telecommunications Program Management is coordinating the deployment of an ITS wide area network (WAN), interconnecting the regional transportation management centers (RTMCs) across the state. RTMCs in Districts 2 and 5 are already interconnected, while RTMCs in Districts 4 and 6, and Florida's Turnpike Enterprise will be interconnected later this year. This ITS WAN provides an operational network allowing Florida's RTMCs to share traffic information, ITS roadside device control, and video images.

The ITS WAN will increase the operational effectiveness and efficiency of both the interconnected RTMCs and their operators, to maximize the potential benefits of ITS in Florida on a statewide basis. These benefits include enhancing mobility and safety, providing coordinated transportation services within and between FDOT Districts (including Florida's Turnpike Enterprise), and improving incident management. Other uses envisioned for the network include remote command and control of ITS devices, dissemination of traveler information, monitoring of security applications and emergency services, including hurricane evacuation, and facilitating access of archived data services.

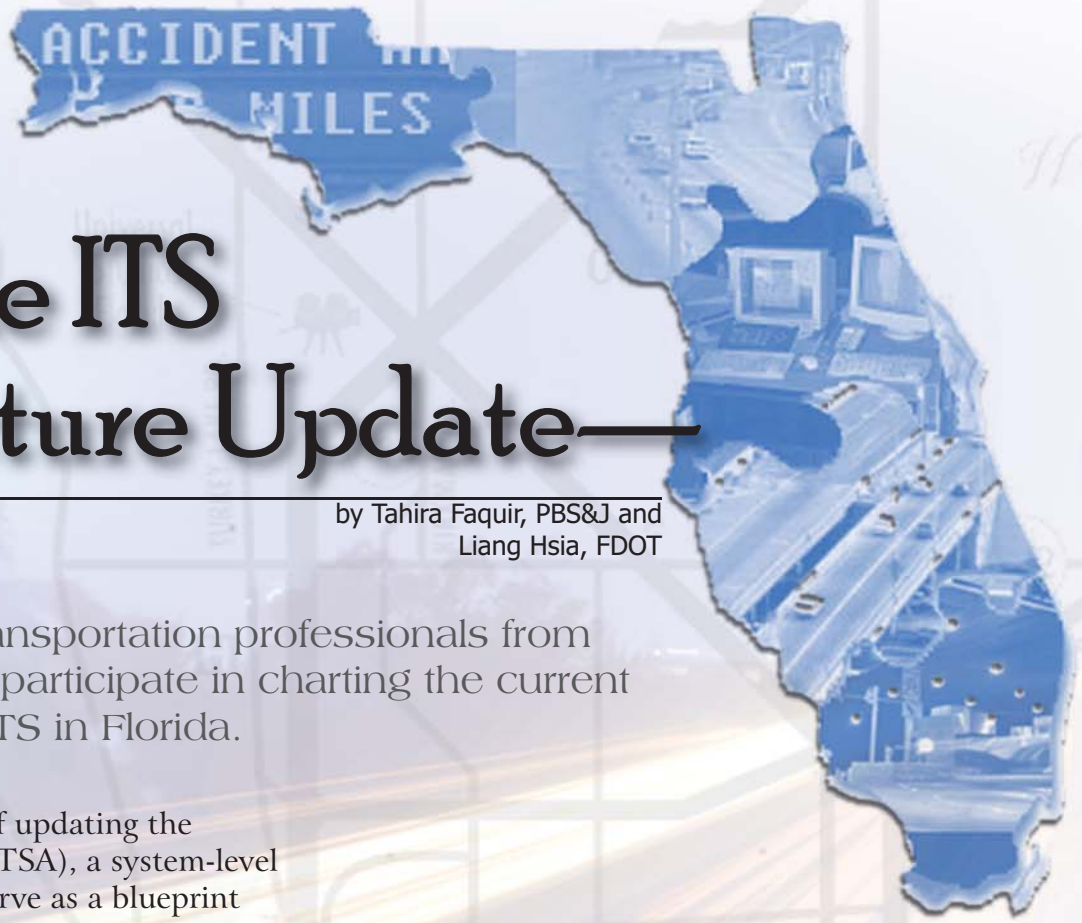
A significant amount of planning occurred over the past two years to bring this network to fruition. A concept of operations for center-to-center (C2C) communications was formulated based on stakeholder workshops held in each FDOT District and Florida's Turnpike Enterprise. A literature search was conducted to review current research, national ITS standards efforts, and current best practices for similar C2C deployments in other states. The literature search, along with a review of the National Transportation Communications for ITS Protocol/Traffic Management Data Dictionary documents, helped streamline the C2C requirements suitable for Florida. These C2C requirements also fulfilled one of the systems engineering steps and led to the development of functional and communications requirements for the ITS WAN. The stakeholder workshops defined the need for information (data), video, and command/control sharing among the RTMCs.

The ITS WAN operations will be headquartered and managed from the Traffic Engineering Research Lab (TERL) in Tallahassee. A network manager will be stationed at the TERL to provide oversight and provisioning of the ITS WAN.

The TERL is also home to the SunGuide℠ software testing operations. An ITS lab, a small replication of an RTMC, is being built within a section of the TERL. This lab will be used for ITS testing and research, and will give FDOT the ability to thoroughly research and evaluate ITS devices and techniques prior to implementation. This arrangement will also allow the ITS WAN to utilize the SunGuide software's C2C communications capabilities and various communications technologies. These are fundamental components that provide data sharing between the RTMCs and are essential for testing the transfer of control from one RTMC to another in the event of an emergency.

The ITS WAN will provide connectivity throughout the state by utilizing the statewide microwave system (SMS). The SMS was recently upgraded to support video and data sharing between operational RTMCs. The SMS was upgraded from an analog, non integrated system to a digital, DS-3 backbone to create a seamless and homogenous statewide network. The SMS upgrade was performed in three phases. The first phase involved the construction of towers and shelters at various locations. The second phase involved changes to the microwave radios, rechannelization of the system, reconfiguration of the motorist aid call box system, and installation of a statewide network management system. The third, and final phase, involved a data network overlay to facilitate data and video transport across the state. This high-speed data network is capable of transmitting up to 33 Mbps between hub sites and up to 3 Mbps from remote sites to hub sites. The SMS can also support the transmission of multiple streams of IP-based traffic information from remote field devices to RTMCs which are connected to the microwave system data network.

As FDOT moves forward with developing and constructing RTMCs, the ITS Program will continue to provide assistance with planning the interconnection of these RTMCs within the ITS WAN. The ITS WAN will take advantage of FDOT Districts' installed fiber optic facilities, where available, along with the SMS in other areas, to effectively complete interconnections. The ITS WAN will advance ITS in Florida by providing statewide interconnectivity for the RTMCs.



Statewide ITS Architecture Update—

Revising Florida's Roadmap for ITS

by Tahira Faquir, PBS&J and
Liang Hsia, FDOT

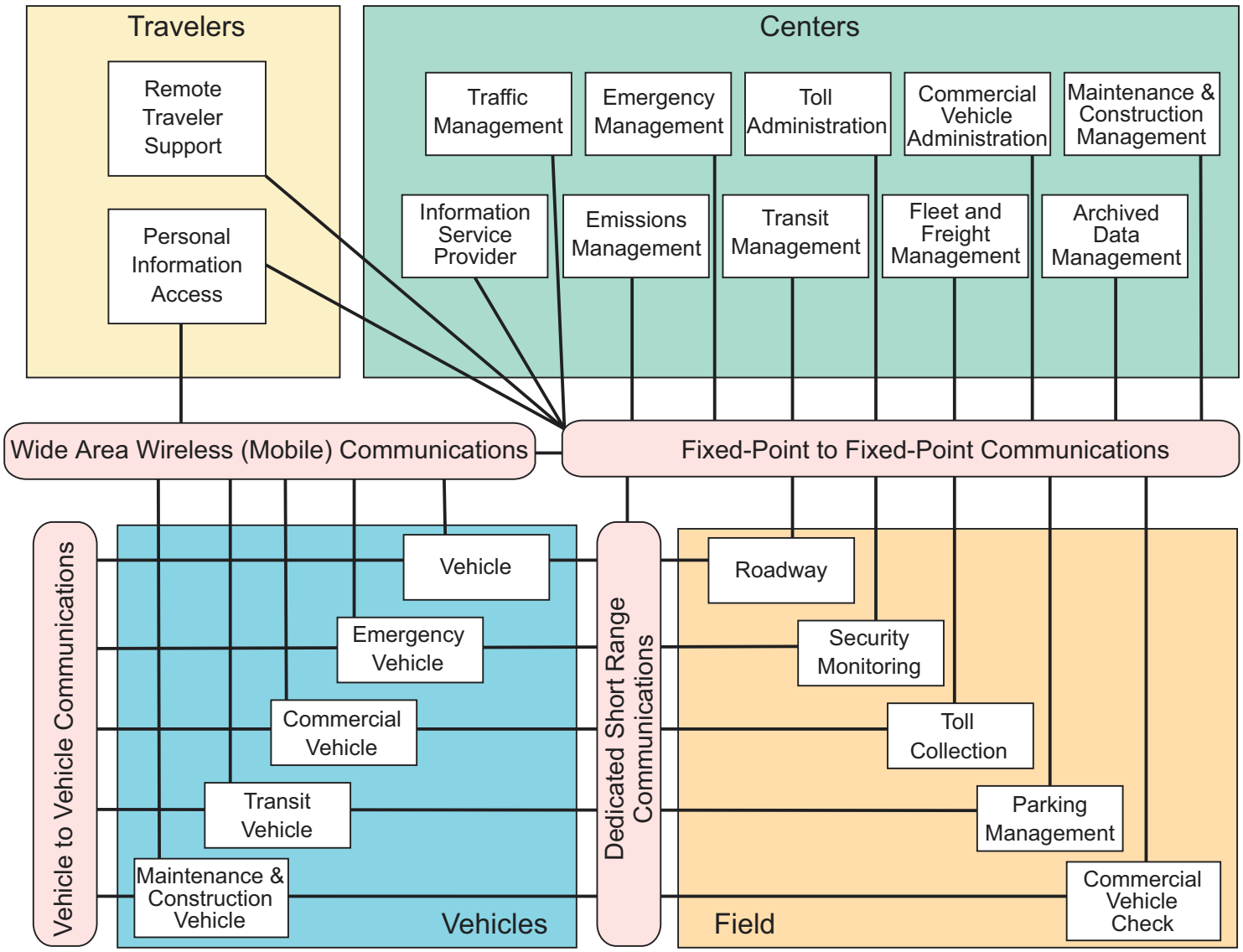
FDOT has invited transportation professionals from across the state to participate in charting the current and future course for ITS in Florida.

FDOT has begun the process of updating the Statewide ITS Architecture (SITSA), a system-level document and database that serve as a blueprint for the planning, design, development, integration, implementation, maintenance, and operation of Florida ITS projects The SITSA provides a unifying framework to ensure that transportation technologies can work together smoothly and effectively on Florida's highways.

FDOT's Message—
Now is the Time to be Heard

There are four compelling reasons for the update. First, the SITSA must reflect Florida's current and future ITS Program needs. The rapid pace of ITS deployment in Florida and throughout the country makes it essential that transportation officials and stakeholders pause to examine the big picture—where is ITS headed, what needs should it meet, and how will important objectives be achieved in coming years? Once these essentials have been outlined, they form the basis for a guiding plan that agencies will use to direct their efforts and measure their progress. The SITSA will guide Florida's current and future ITS Program, based on the experience and input from stakeholders who are participating in the update process.

The second reason that the SITSA is being updated is that Florida's ITS architecture should comply with the current National ITS Architecture, which is the "roadmap" for the entire country. Section 5206(e) of the federal Transportation Equity Act for the 21st Century (TEA-21) mandates that ITS projects relying on dollars from the Highway Trust Fund, including the Mass Transit Account, must be part of a regional architecture that conforms to the National ITS Architecture and Standards. This is accomplished by making certain that Florida's previously developed SITSA is revised to comply with the new National ITS Architecture. The national architecture was updated several times since 2001 and now covers elements that Florida's does not, such as ITS maintenance and operation, the enhancement of security coverage, disaster response and evacuation, 511 support, road closure management, and emissions management.



National ITS Architecture, Version 5.1

The third reason for updating the SITSA is to integrate ITS planning and deployment with operations, maintenance, and security subsystems. The update of Florida's SITSA will not only enhance the current framework for long-range ITS planning, development, and construction, but also integrate ITS operations and maintenance. This architecture defines major ITS components and describes how system elements can work together as envisioned. It provides a technical and institutional framework that allows individual ITS services and technologies to interact and share information during operation and maintenance, long after deployment.

The fourth reason for updating the SITSA is to harmonize all existing regional ITS architectures, which include the Statewide, District 3, District 7, Florida's Turnpike Enterprise; and the I-4, I-10, I-75, and I-95 Corridor ITS Architectures. This process will ensure that all Florida ITS operations can interface with each other.

The Time for Public Involvement is Now

Florida's SITSA is based on stakeholder input and concurrence on the plan's provisions, projects, and the roles for ITS partners. While FDOT has long-range goals for ITS, the program itself is dependent upon local and regional transportation needs being met. The more voices heard during the update process, the more responsive FDOT can be in addressing local needs with ITS solutions.

Florida has made a significant investment in ITS and will continue on that course. In 2002, FDOT committed more than $790 million over ten years to deploy ITS, plus another $140 million beginning in 2005 for ITS operation and maintenance. Combine these efforts with the multi-million dollar investments being made by local governments, expressway authorities, transit systems, and metropolitan planning organizations, and it becomes apparent that having an updated ITS architecture is imperative to protect these investments and to ensure that the best use is being made of the dollars being spent.

Florida's SITSA is really about integration and vision—what ITS will look like in the future and how it will serve the needs of travelers in our state.

The only way for the SITSA to reflect the various regions' real vision is for the stakeholders to help develop it. To this end, FDOT will hold a series of stakeholder meetings across the state so that those interested may participate. A final series of workshops will be held in each meeting location approximately eight weeks after the initial workshop in order to gain consensus for the draft SITSA update and to show participants how to use the architecture.

As the process concludes later in the year, Florida transportation leaders will have a clear directive for ITS and a revised course to follow to achieve it.

The time for your involvement is now!

Recent months at the FDOT Traffic Engineering Research Lab have been accented with the rapping of hammers and the buzz of circular saws—yet the interior construction isn't just about new drywall, flooring, lights, and plumbing.

Expanded Mission for TERL—Evaluation, Approval of ITS Devices

by Jeffrey M. Morgan, FDOT

Actually, the Traffic Engineering Research Lab (TERL) is adding a new dimension.

Since 1997 this FDOT testing lab on Springhill Road in Tallahassee has been the facility that evaluates the various traffic control signal devices proposed for sale or installation in Florida. Devices that pass the evaluation tests are placed on FDOT's Approved Product List (APL), signifying that they meet FDOT's specifications and performance requirements. With the rate of ITS deployment accelerating and new technologies emerging across the industry, TERL was the logical choice to direct the evaluation and approval of the various ITS devices used in Florida. These include dynamic message signs, closed-circuit television camera systems, vehicle detection equipment, and the different network devices that interconnect them—device servers, Ethernet switches, fiber optic cable, and video encoders and decoders.

At the core of this new mission is the development of an ITS Lab test area equipped with the same SunGuide℠ Software System that FDOT Districts will use. In this environment, TERL will be able to simulate an actual transportation management center (TMC) operation in which the various video, data, and communications systems function with SunGuide and provide operators with a full range of traffic management capabilities.

The new ITS Lab will enable TERL staff to evaluate ITS software and hardware, verifying that the necessary network communications links are active and compatible with SunGuide. This upfront evaluation will improve both the material quality and operational effectiveness of ITS equipment and communications. It also affords TERL a platform for ensuring that new devices comply with FDOT's ITS equipment specifications and are capable of meeting all user requirements.

Ultimately, this review and analysis will reduce problems encountered after deployment of ITS devices. A major cause of hardware and software failure in the field is the unpredictability of the real-world environment. While not every variable can be reproduced in the ITS Lab setting, the TERL test area and TMC can help demonstrate the ITS product's basic functions and its compatibility with other devices in the lab's network. Through this effort, FDOT is confident that the success rate of actual ITS projects will be improved.

TERL's traditional role has been to support the development of transportation equipment standards, testing procedures, and testing implementation. Other activities include qualification testing of dynamic message signs and the evaluation of vendors' quality control and quality assurance programs, based on criteria established by FDOT.

TERL also performs various research activities and development projects to ensure that the traffic control technology utilized on Florida's streets and highways is the best and most reliable possible. This work is a cooperative effort of TERL staff, researchers from Florida State University, and the FDOT Traffic Engineering and Operations Office's general engineering consultants.

As is done with the traffic control devices, the ITS equipment that TERL has determined meets FDOT specifications will be placed on the APL. This indicates to the Districts, local expressway authorities, and others that the equipment has passed the evaluations, the vendors' quality assurance plans have been accepted, and the devices are compatible with SunGuide in the TMC environment.

The ITS Lab is designed to provide a laboratory environment capable of replicating as many functional aspects of an actual operating TMC as possible. This includes physical and operational characteristics ranging from the SunGuide operator workstations, video display wall, and supporting software systems to internal and external device interfaces and communications links. The ITS Lab will utilize the different data transmission media (copper, fiber, and wireless), and have examples of actual field devices deployed in proximity to the TERL building, such as cameras, encoders, dynamic message signs, and vehicle detectors. A primary goal of establishing the ITS Lab is to provide a controlled environment in which to test and evaluate ITS devices through the various stages of a project life cycle. Testing in a controlled environment means the inputs to the test system are repeatable and consistent.

A primary goal of establishing the ITS Lab is to provide a controlled environment in which to test and evaluate ITS devices through the various stages of a project life cycle.

Another aspect of the TERL expansion is the microwave communications test area. This facility will enable TERL staff to test the SunGuide software's center-to-center (C2C) communications requirements and various communications technologies. The C2C communications capability allows data and video sharing between the state's TMCs, and is essential for transferring control from one regional TMC to another in an emergency. For this reason, Florida's statewide microwave system (SMS) has been upgraded to support video and data sharing between TMCs. Because various communication infrastructures and C2C functions are an integral part of Florida's ITS investment, the ITS Lab will also support the testing, management, and maintenance of SMS devices, and oversee SMS-related contractual services.

When the building renovation project is finished, the expanded TERL will include facilities and general office space to support a myriad of hardware and software testing related to traffic control signal devices and ITS devices. The additions consist of technical workstations, electronics testing areas, and various types of mechanical, electrical, and environmental testing apparatus. These facilities, along with the device evaluation and testing activities they support, will help guarantee that transportation devices deployed in Florida adhere to high standards of quality and performance.

ITS Performance Measures—An FDOT Commitment

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

The development of ITS performance measures has been a key issue for the Florida Transportation Commission and FDOT for the last couple of years.

In 2004, ITS Florida, Florida's state chapter of ITS America, presented the *Statewide ITS Performance Measures Report* to the Florida Transportation Commission (FTC) Performance Measures Working Group. The performance measures identified in this report mostly quantified the output of FDOT's ITS Program.

After completion of a data collection effort, given the current state of data availability and other related data issues for each of the interim ITS performance measures identified in the report, three recommended statewide ITS performance measures were presented to the FTC in November 2004:

- **Total Annual 511 Calls** (by month, by service area, and state total)
- **Total Annual Road Rangers Stops** (by District and state total)
- **FIHS Limited-Access Miles Managed by ITS** (by District and state total)

The FTC Performance Measures Working Group requested that more outcome-based measures be added to truly report on the benefits of Florida's ITS Program from the perspective of the ultimate customer—the traveling public.

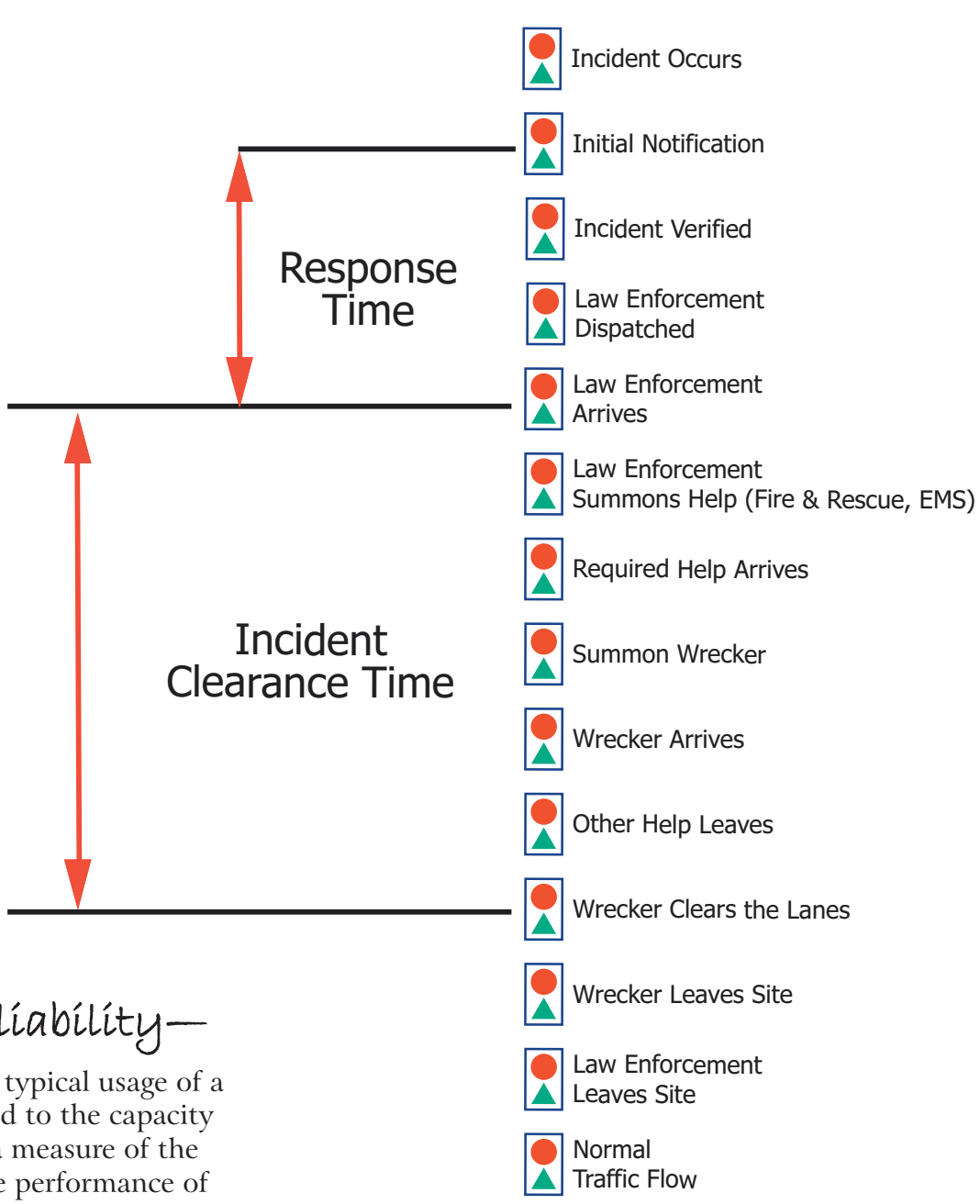
The focus in 2005 has been to recommend key outcome-based measures that can be reported annually to the FTC in addition to the output measures. After discussion with FDOT Central Office and District staffs, and review by the FTC Performance Measures Working Group, three outcome performance measures were selected. Once data is available, these measures will be included in the *Performance and Production Review of the Florida Department of Transportation*, published annually.

Incident Duration—

Incident duration is the time elapsed between when an incident occurs until the incident is cleared and traffic returns to normal flow. Total incident duration is made up of five time component increments that include:

1) Detection time,
2) Verification time,
3) Response time,
4) Incident clearance time, and
5) Traffic queue clearance time.

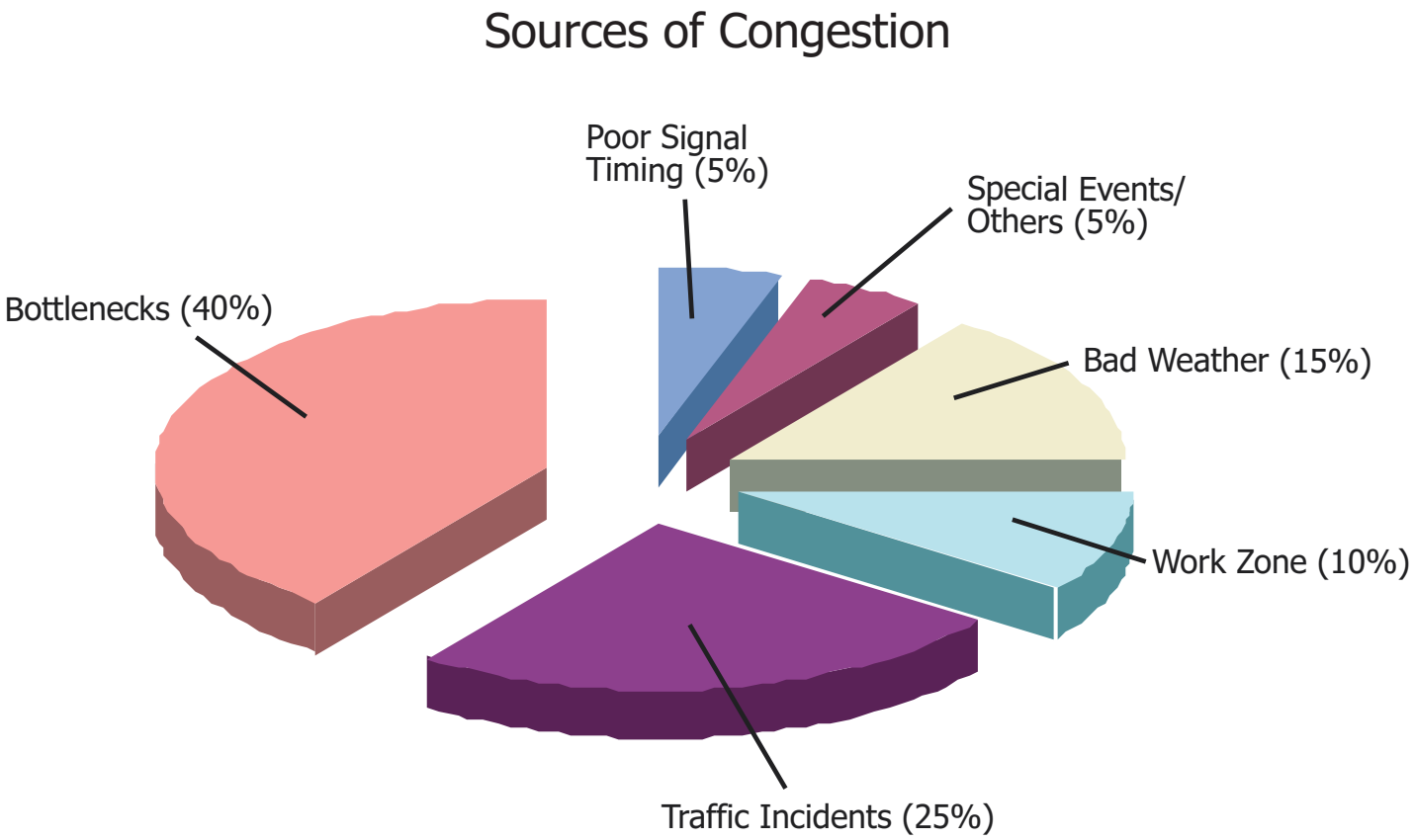
Each one of these time components can be impacted by ITS deployment, some more than others. The expansion and integration of future ITS deployment should reduce total incident duration.



Congestion and Reliability—

Congestion is a measure of the typical usage of a transportation facility compared to the capacity that is provided. Reliability is a measure of the variability or uncertainty in the performance of the facility over time. Unreliable travel times are associated with variations in congestion levels caused either by higher than normal traffic demand or reduced available capacity. Recent national studies have estimated that of all congestion-related delay, approximately half is caused by congestion (recurring typical conditions) and half by temporary disruptions such as traffic incidents (accident, disabled vehicles, etc.), work zones, and weather (non-recurring). It is important that both congestion and reliability be measured and reported to capture the impact of ITS on both types of congestion.

The definition of congestion and reliability measures for FDOT still needs to be determined before a measurement program can be conducted. However the required data—speed and travel time—is the same for all reliability measures and can be collected now.



Customer Satisfaction—

Customer satisfaction is a measure of the users' perception of a service or product, and how well it meets their needs or expectations. Customer satisfaction is most commonly measured by surveys that ask users to describe the usefulness or adequacy of a product or service.

In 2005, several tasks will be conducted to continue making progress for the FDOT's ITS Program performance measures. A Performance Measures Workshop, with representatives from each FDOT District and the Central Office, was held in May to discuss data collection issues, and each of the Districts reported on their readiness to provide the data for the three output and three outcome measures. It was determined that the Districts will be able to provide the output measures data. The outcome measures data can be provided by some Districts for one or two of the measures. A number of additional data collection issues were discussed and several action items were identified.

Data collection issues identified during the Performance Measures Workshop will be addressed in the next several months. New tasks will include the development of methodologies for estimating congestion and reliability using travel times or traffic volumes and travel demand model factors. These methodologies will be used until continuous speed data can be processed and reported for the congestion and reliability measures. Secondly, temporary methodologies will be developed for extracting incident response time and clearance time from the Florida Highway Patrol's data files to be used until all of the Districts have automated the collection of incident data. Also standardized customer satisfaction survey questions will be developed for use by the Districts.

A new task work order was executed through the ITS General Consultant to address the data collection issues for reporting on the ITS performance measures. This new task work order will develop methodologies to begin the reporting process, thus allowing FDOT to sail "full steam ahead!"

FLORIDA'S ELECTRONIC FREIGHT THEFT MANAGEMENT SYSTEM—

Ready to Tackle a Multi-Million Dollar Problem

by Richard Easley and Sharon Easley, E-Squared Engineering and
Michael Akridge, FDOT

A Little Background Information...

In the United States, cargo crime accounts for an estimated direct merchandise loss of $25 billion per year. Of this, Florida accounts for $61 million in losses. The average cargo theft in Florida is valued at $102,000 per incident (Information presented during a Cargo Security Summit held in Tallahassee, Florida, in February 2005).

Cargo is defined by law enforcement officers as "any goods, wares, products, or manufactured merchandise that has been loaded into a trailer, rail car, or cargo container, awaiting or in transit." The National Cargo Security Council, a coalition of public and private transportation organizations, estimates that 85 percent of all cargo thefts are from trucks (commonly called tractor-trailers). A 1998 Associated Press article called Florida a "Casablanca" for cargo crimes, and discussed how the increase of these types of crimes threatened Florida's economy. The article went on to explain that with 14 deepwater ports, Florida's economy was dependant on transportation; however, the increase in thefts resulted in many insurers refusing to insure shipments into Florida.

To combat a problem of such magnitude, law enforcement agencies, along with the Florida Trucking Association (FTA) established two major cargo theft task forces. The Tactical Operations Multi-agency Cargo Antitheft Squad (TOMCATS) is based at the Miami-Dade Police Department and includes members of the Miami-Dade Police Department, Federal Bureau of Investigation, U.S. Customs, FDOT's Motor Carrier Compliance Office (MCCO), the Florida Department of Law Enforcement (FDLE), Florida Highway Patrol (FHP), and the Broward County Sheriff's Office. This task force has historically been the nationwide leader in combating cargo crimes.

In 2001, the Florida Commercial Vehicle and Cargo Theft Task Force was established with Marion County Sheriff Ed Dean chairing the group, which includes the Florida Sheriff's Association, FDOT MCCO, Department of Agriculture and Consumer Services' (DACs') Office of Agricultural Law Enforcement, FDLE, FHP, National Insurance Crime Bureau, and TOMCATS. This task force was awarded the International Cargo Security Council's inaugural Task Force of the Year Award in 2003.

With the expertise in combating cargo crimes in Florida, it was only natural for Florida to lead the way in using innovative techniques to combat this problem.

Developing the Tools to Fight Cargo Theft...

In 1994, concerned about the increasing number of truck and cargo thefts in Florida, the FTA approached FHP. These two entities worked together and created the first Cargo Theft Notification System which was based on the most widespread office technology of the time—the fax (facsimile) machine. At the time, fax machines were very widespread and easily found in almost every business and law enforcement agency office. The first system, known as the Fax Alert System, consisted of a series of predetermined steps which would take place upon receipt of a completed form, which contained detailed information regarding a theft that had occurred. Victims of these thefts would fax their theft information to Ryder Security in Miami. Ryder Security would then fax the theft information to FHP and the MCCO. These law enforcement agencies would then rebroadcast the fax to their various field offices and truck weigh stations located throughout Florida. While this system had some obvious limitations, due to its dependence on an excessive amount of human interaction, it was the first advance toward increasing the speed at which law enforcement was advised of the theft of cargo and/or the truck that was carrying it.

In 1999, the Fax Alert System was upgraded in an effort to speed up the process for notifying law enforcement of cargo theft and to create a database containing details of cargo thefts in Florida. First, the labor-intensive process of dissemination of information to law enforcement was automated using a central computer loaded with WinFax software, housed at FHP's Lakeland station. A computer (rather than a person) received the fax information and immediately sent it out through a broadcast fax to various law enforcement agencies, whose telephone numbers had been pre-programmed. The goal was to notify law enforcement agencies to "Be On the Lookout" (known as a BOLO by law enforcement officers) for the stolen property as soon after the event as possible. Unfortunately, the notification process was still dependant on dispatchers to radio the information to officers on patrol. With large amounts of radio traffic, which included dispatching calls and radio traffic initiated by officers, the BOLOs were sometimes not delivered in a timely fashion.

To allow law enforcement personnel to analyze trends in cargo theft, a cargo theft database was created by manually entering the data from the faxed cargo theft alert sheets into a database program. The ability to analyze trends, such as which counties, highways, truck stops, etc., had the highest incidence of theft, was very valuable to the law enforcement community because it allowed them to better target prevention and enforcement resources. However, due to the large amount of manual processes (handwritten documents, manual input of data into the database, interpretation of illegible handwriting, etc.) the database was limited in terms of accuracy and timeliness of the data. Although this system was a vast improvement over the initial system, and was certainly an innovation that other states had not yet emulated, with the development and implementation of new technologies, there was still opportunity for improvement.

Better Technology, Better Tools...

Prior to coming to MCCO, Lieutenant Colonel David Binder, who would later help develop the electronic version of the theft alert system, was assigned to the FHP's Bureau of Investigations

and was responsible for writing the FHP's truck and cargo theft strategic plan. In addition, Colonel Graham Fountain, Director of MCCO, recognized the opportunity to expand MCCO's role in combating truck and cargo theft. The development of new technologies was identified as an opportunity that FDOT could positively influence. Colonel Fountain stated "with the FDOT mission statement including a commitment to enhance economic prosperity, MCCO clearly had the mandate as well as the expertise and resources to assist in combating this problem."

Around the time Lt. Col. Binder and Col. Fountain began to work together, the Internet was being utilized more and more as a method for automating and providing access to a myriad of services that had previously been accessed either in person, by telephone, or in the case of Cargo Theft Alert, by fax. Lt. Col. Binder visualized a system in which theft victims could log on to a secure Web site and report thefts, with the information immediately being sent to laptop computers in officers' patrol cars, MCCO weigh stations, and agricultural interdiction stations. This would ensure the timely dissemination of information as well as reduce the need for human interaction. Additionally, intelligence information could be stored and reports automatically generated using a computer as opposed to the manual method used to produce cargo theft reports.

Lt. Col. Binder discussed his ideas with staff at the University of Central Florida's Center for Advanced Transportation Systems Simulation (UCF CATSS). FDOT regularly partners with UCF CATSS when they have challenging issues that relate to Florida's transportation system. During these conversations the concept of developing an Internet-based Cargo Theft Alert System (later known as the Electronic Freight Theft Management System) was born.

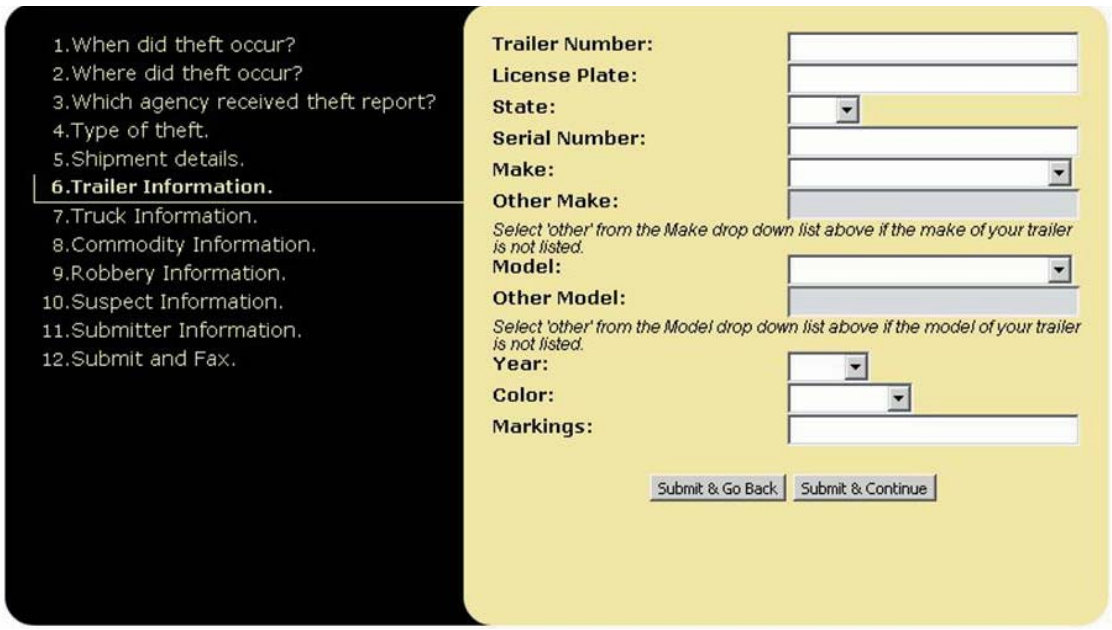
This concept of an Internet-based Electronic Freight Theft Management System (EFTMS) was presented to the Florida Commercial Vehicle Information Systems and Networks (CVISN) Executive Steering Committee during their January 2004 meeting. Florida's CVISN Program, which is managed by Michael Akridge, Deputy State Traffic Engineer for Incident Management and Commercial Vehicle

What is CVISN?

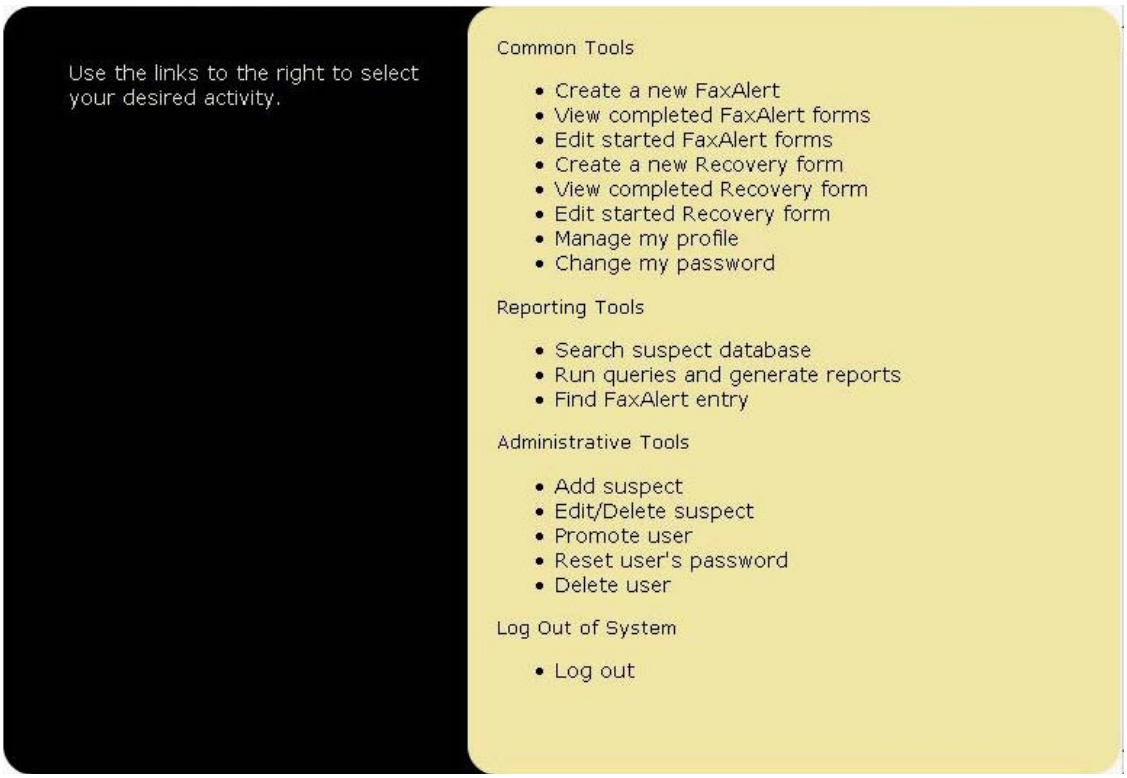
Florida's CVISN Program is a multi-agency initiative using advanced technology to improve commercial vehicle safety, streamline the regulation of the commercial vehicle industry, and improve the efficiency of the motor carriers and motor coach companies operating in Florida. The Florida CVISN Team is made up of members from various Florida state agencies: FDOT, Department of Highway Safety and Motor Vehicles, Department of Revenue, and the DACS; the Federal Highway Administration (FHWA); and the private sector (including several representatives from the trucking community as well as the Florida Trucking Association).

Operations Programs, coordinates the state regulatory activities of the trucking industry in an effort to utilize technology to increase efficiency and minimize time/cost burdens to the industry. The Florida CVISN Executive Steering Committee, chaired by Kevin Thibault, FDOT Assistant Secretary, provides oversight to the CVISN Program and approves funding for new projects added to the program. Members of the committee immediately recognized the benefits of the EFTMS and unanimously approved funding for its development. The cost for this system was just over $100,000—less than the average cost of the typical cargo shipment theft in Florida. The potential return on investment for such a system could be very high.

UCF CATSS was the vendor chosen to take the EFTMS from concept to reality. It took approximately one year to develop the system. The EFTMS, which can be accessed through any Internet connection, is made up of several components. First there is an interface for filing initial cargo theft reports and updating those reports as additional information becomes available or the cargo and/or truck are recovered. The user simply logs on to the system and provides information regarding the theft incident.



Cargo theft interface



Menu of standardized reports and a query functionality

The system also contains two databases, one with data on cargo theft incidents and recovery, the other with suspect data. There is also a menu of standardized reports and a query functionality that allows law enforcement officials to analyze trends in cargo theft.

The final EFTMS component is notification of law enforcement of the reported incident, through computers in their offices and patrol cars. By computerizing the process and utilizing the Internet as the method for accessing the theft reporting system, all of the limitations of the fax-based system have been eliminated. This has resulted in Florida law enforcement personnel and the trucking industry having access to a very powerful, secure, and user-friendly tool for addressing the problem of cargo theft in Florida.

Development of the new Internet-based EFTMS is complete and is currently in its final test phase. It will be housed on FHP computers and is scheduled to go live in July 2005. New capabilities of the system include a database with standardized reports and query functionality and an additional, complementary suspect database. The suspect database contains photos and biographies of known cargo theft suspects. This information is uploaded into the system by TOMCATS task force members. This provides law enforcement officers with a method of comparing suspicious individuals lurking around a truck stop with photos of known cargo theft suspects. Officers that use the system will be advised that the suspect database does not provide "probable cause," just as is the case with any other BOLO. It does, however, provide them with valuable information on persons that may require closer scrutiny.

Law enforcement officers are keenly aware that with every minute that passes, the radius of where the stolen freight could be located increases; therefore, it is imperative that the theft be reported to law enforcement as soon as possible in order to increase chances for recovery. The EFTMS provides a tool to keep this time interval as small as possible. Currently, users from both the trucking industry and law enforcement are being registered to use the system. Users will log into the secure system with a user id and password. Members of the trucking industry will only be able to access or update information for their particular company and will not be able to view data for any other company. Law enforcement officers will have access (and update capability) to all information in the theft and suspect databases.

The Florida EFTMS has been successfully demonstrated to several other states' law enforcement agencies as well as state and national associations involved in the trucking industry. The Florida system complements the current efforts to establish a national database for information relating to crime and terrorist activities affecting cargo transportation.

For over ten years, Florida has been a national leader with regard to using technology to implement real solutions to large transportation-related problems. There are numerous programs, of which the Florida CVISN Program is just one. The successful development of the EFTMS, through a partnership between law enforcement, state regulatory agencies, and industry, demonstrates Florida's commitment to saving lives, time, and money for its citizenry. The Florida CVISN Program provides benefit for Florida's regulatory agencies, commercial vehicle industry and the general public. The EFTMS initiative is another example of Florida's CVISN Program taking a leading role at the national level to effectively use technology to solve real world challenges through a collaborative team effort.

Partnerships

Since its inception in 2000, the ITS Program has established working relationships with a number of organizations to better fulfill its mission to facilitate the deployment of ITS in the state of Florida.

Agency Affiliations Established by the FDOT ITS Program

by Gene Glotzbach, FDOT

The first relationship established was with the **American Association of State Highway and Transportation Official's (AASHTO's) Special Committee on Wireless Technology**. One of the duties of this committee is to coordinate the allocation of frequencies for the Highway Maintenance Service. Coordination is needed to assure that frequencies allocated to the states will be reasonably free from interference. FDOT still utilizes radios to communicate with maintenance units in the field. These radios operate within the 47 Mhz frequency range. Affiliation with this AASHTO committee has benefited the state of Florida in that a frequency allocation plan was developed by this committee that minimizes the chances of adjacent state maintenance radio systems interfering with Florida's maintenance radio system.

The second relationship was with the **511 Deployment Coalition (Coalition)**. The Coalition was established to help spread the word about and to guide the implementation of 511 on a national scale. The Coalition was established by AASHTO in conjunction with many other organizations including, the American Public Transportation Association and ITS America, with the support of the U.S. DOT. An executive-level policy committee and a supporting working group have been established to conduct the work of the Coalition. The 511 Deployment Coalition Working Group established a vision and developed implementation guidelines and reports to support the national deployment of 511. Utilization of these guidelines, and active participation in the working group, has provided the impetus for FDOT's successful 511 Program.

The third relationship established was with the **I-95 Corridor Coalition**. This is a partnership of state departments of transportation, regional and local transportation agencies, toll authorities, and related organizations, including law enforcement, from Maine to Florida with affiliate members in Canada. The I-95 Corridor Coalition's mission is to work together to improve multimodal transportation service in the region through information sharing and coordinated management and operations. The ITS Program provides a co-chair for the I-95 Corridor Coalition's Inter-Regional Multimodal Traveler Information Program Track, and a committee member on the Program Management Committee. Membership in the I-95 Corridor Coalition helps Florida establish its role as an important member of a larger region.

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