

2010 SMART SunGuide ITS Annual Report

Florida Department of Transportation, District Four
Fort Lauderdale, Florida





**District Four
SMART SunGuide Regional
Transportation Management Center**

2300 W. Commercial Blvd.
Fort Lauderdale, FL 33309
954-847-2785
www.SMARTSunGuide.com

ITS Staff

Gaetano Francese	14 years
Sylvester Sammy	8 years
Dong Chen	7 years
Anthony Mendoza	5 years
Daniel Smith	4 years
Jason Trujillo	3 years

ITS Consultants

AECOM
Anchor Towing
Eland Engineering
Florida International University
Gannett Fleming
Highway Safety Devices
I-595 Express, LLC
IBI Group
Miller Electric
Sunshine Towing at Broward, Inc.
Telvent
TransCore

A Message to Our Readers...

Year to year, we strive to grow and improve our Intelligent Transportation Systems (ITS). In the past year, we've experienced significant growth in the Treasure Coast, which is made up of Martin, St. Lucie, and Indian River Counties. We went from no ITS to having full ITS coverage and a Road Ranger Service Patrol in place.

This year's annual report shares how ITS in the Treasure Coast evolved from paper to reality. It's a highly visible change; one that has received a lot of media attention. A media event was hosted when the Road Ranger program was launched, but other than that, the attention has been garnered based on performance. A *positive* performance. Through the many thank you letters sent in by motorists, the ITS expansion is appreciated - especially the Road Rangers.

The hard work doesn't stop at what's visible to the motorists. In fact, just as much work is done on tasks that the public will probably never see. For instance, our Maintenance Inventory Management System is a custom software we built to manage every item we're responsible for in our district. With this tool, we can better track our resources, make quicker decisions, and respond to maintenance issues faster and more efficiently. The time we save is money saved for taxpayers.

Our new software - among other process improvements - has earned us a record seven Prudential Financial Davis Productivity Awards in a single year. These awards are given based on taxpayer dollars saved, so the number received in the last year alone speaks highly of our effort to control costs while still providing the best service possible.

Therefore, with services now available in the Treasure Coast, Palm Beach ITS on its way to completion, and improvements scheduled in Broward, we feel that 2010 has been another successful year. We hope you enjoy reading about our activities in this year's annual report as we start on our plans to continue thriving in 2011.

Dong Chen

*FDOT District Four
ITS Program Manager*

Table of Contents

Benefit-Cost Ratio 4

Find out about the ITS Program's return on investment.

Freeway Operations 6

District Four starts its expansion northward.

Infrastructure 8

Look here for current deployment statuses.

TMC Operations 10

DMS: Not just for lane closure messages anymore!

Information Technology 11

District Four improves internal and external applications.

Traffic Information 12

District Four spreads the word!

Report Card 13

District Four grades its performance.

Activities 14

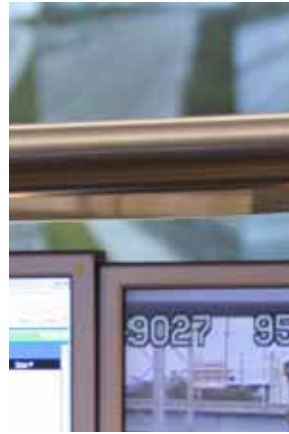
Learn about new initiatives here.

Achievements 15

District Four is honored to be acknowledged by its peers.

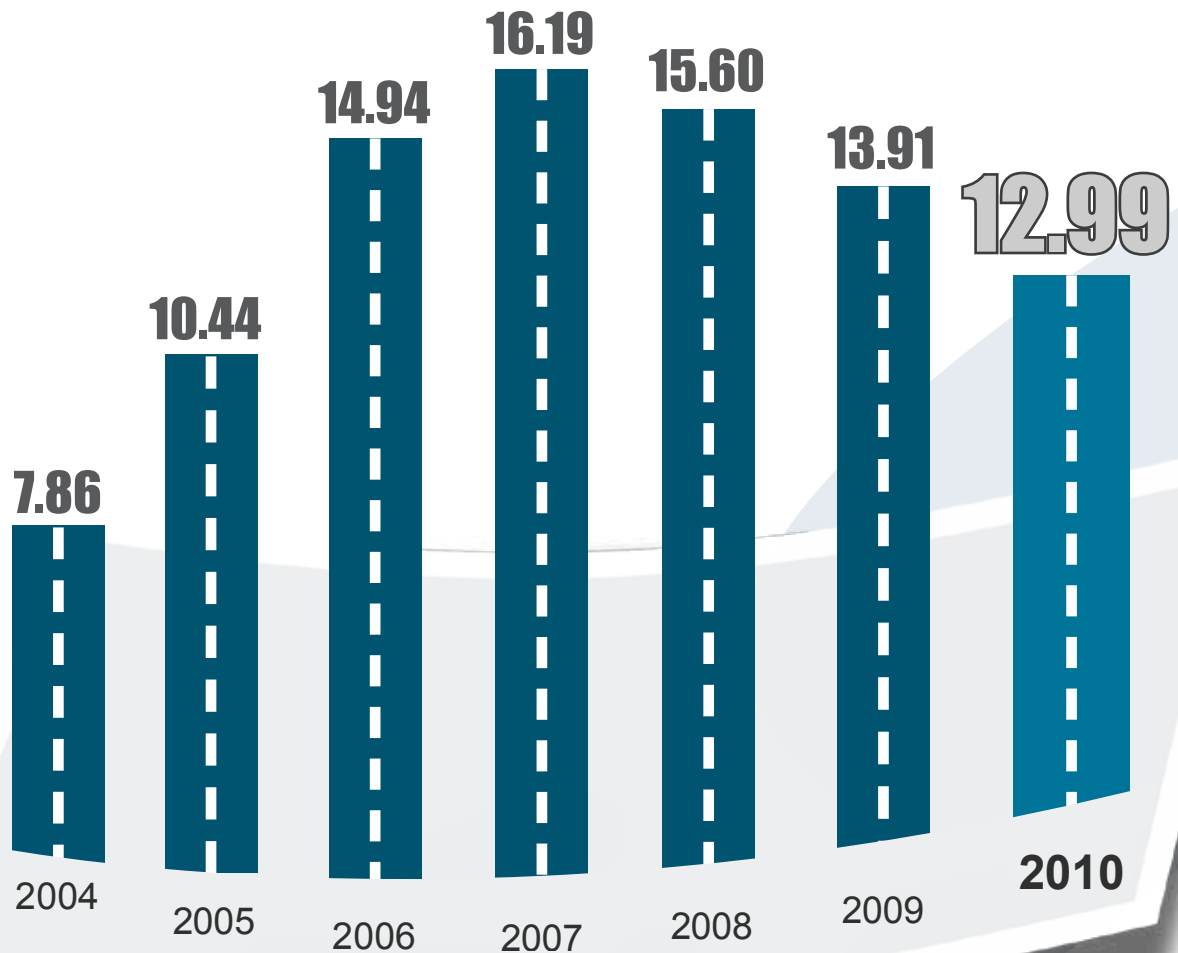
What's Inside:

The Florida Department of Transportation (FDOT) SMART SunGuide 2010 ITS Annual Report highlights program growth, the work that it took to complete, and the positive impacts on the community. It's the story behind District Four's effort in its work program, deployments, and special projects. Each step in the program's growth was meticulously planned and optimized for cost effectiveness. The benefits are shared by motorists and emergency responders alike. Look inside to find out how.



10





Benefit-Cost Ratio

The year 2010 marks the seventh consecutive year that the District Four ITS Unit has highlighted its Benefit-Cost (B-C) ratio. It is an important annual performance measure to the ITS Unit because it indicates, numerically, the annual return on investment that ITS provides to motorists for each dollar invested. The 2010 calculated benefit is \$239,686,357 (2% greater than 2009) and the total annual cost is \$18,452,571 (over 9% higher than 2009). Therefore, the benefit-cost ratio for 2010 is 12.99.

The majority of the cost increase was realized by the completion of the Broward County Advanced ITS project and the inclusion of its capital cost thereof (see chart on next page). Over 30 new dynamic message signs were installed along critical arterials

approaching both I-95 and I-75; providing freeway information to oncoming motorists to allow them to make more informed decisions before entering the highway. The ITS Unit is currently working on how to include the benefit from these devices into their formula for future years.

Though the B-C ratio has shown moderate decreases since 2007 (including nearly 7% from 2009), at nearly \$13 benefit to motorists for every dollar invested, the ITS Unit is very pleased to have such a high return. The ITS Unit expects that the B-C ratio will begin to stabilize as the program will be introducing new costs and benefits in the coming years. Also noteworthy is the consistency of the Net Present Value (NPV) of the program, which is still approximately \$2 billion for the fourth consecutive

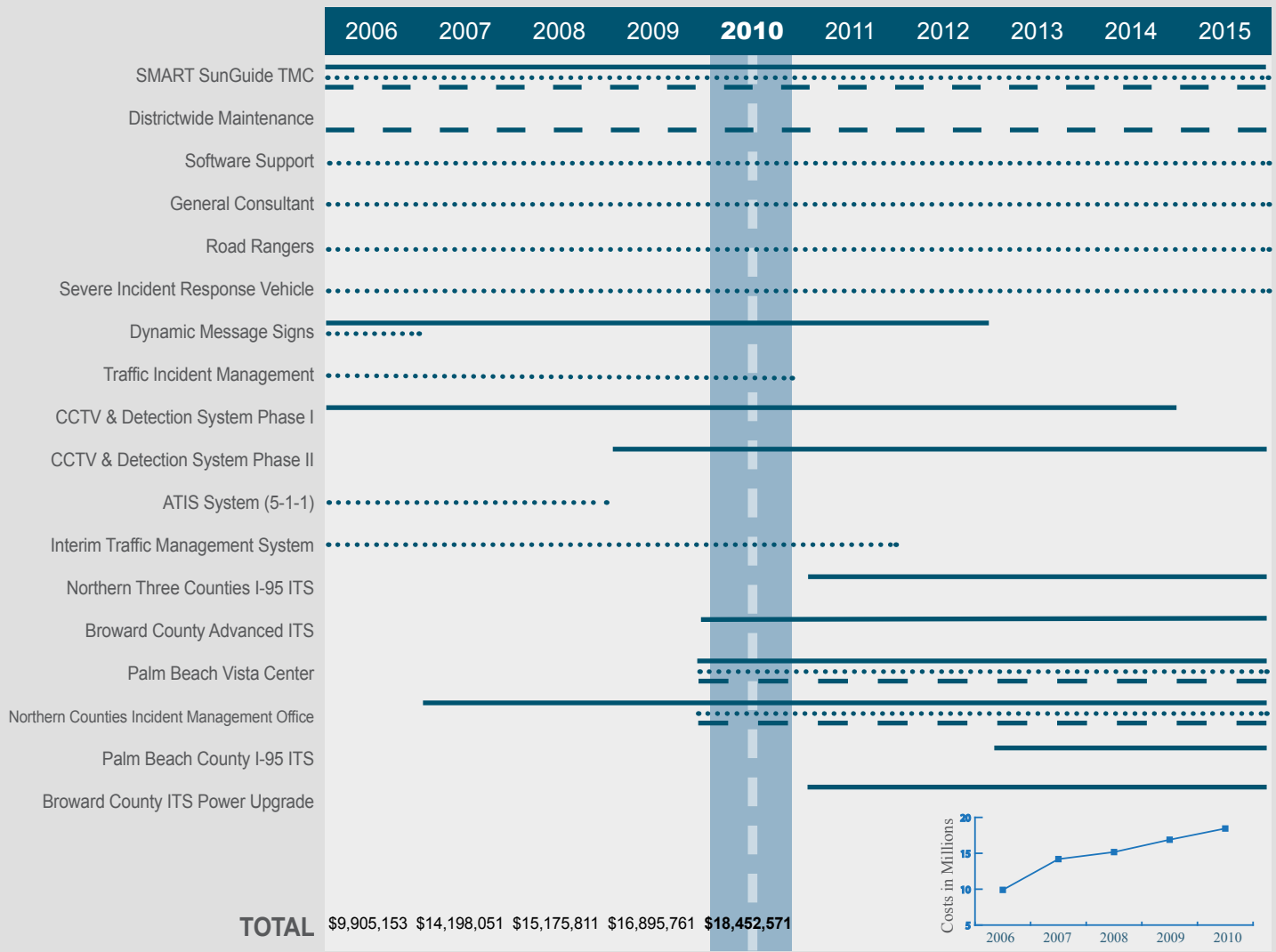
“The NPV has remained consistently near \$2 billion for four consecutive years.”

year. NPV is a measure of long-term profitability of a project. In this case, the NPV was based on a 15-year time span and a 7% interest rate.

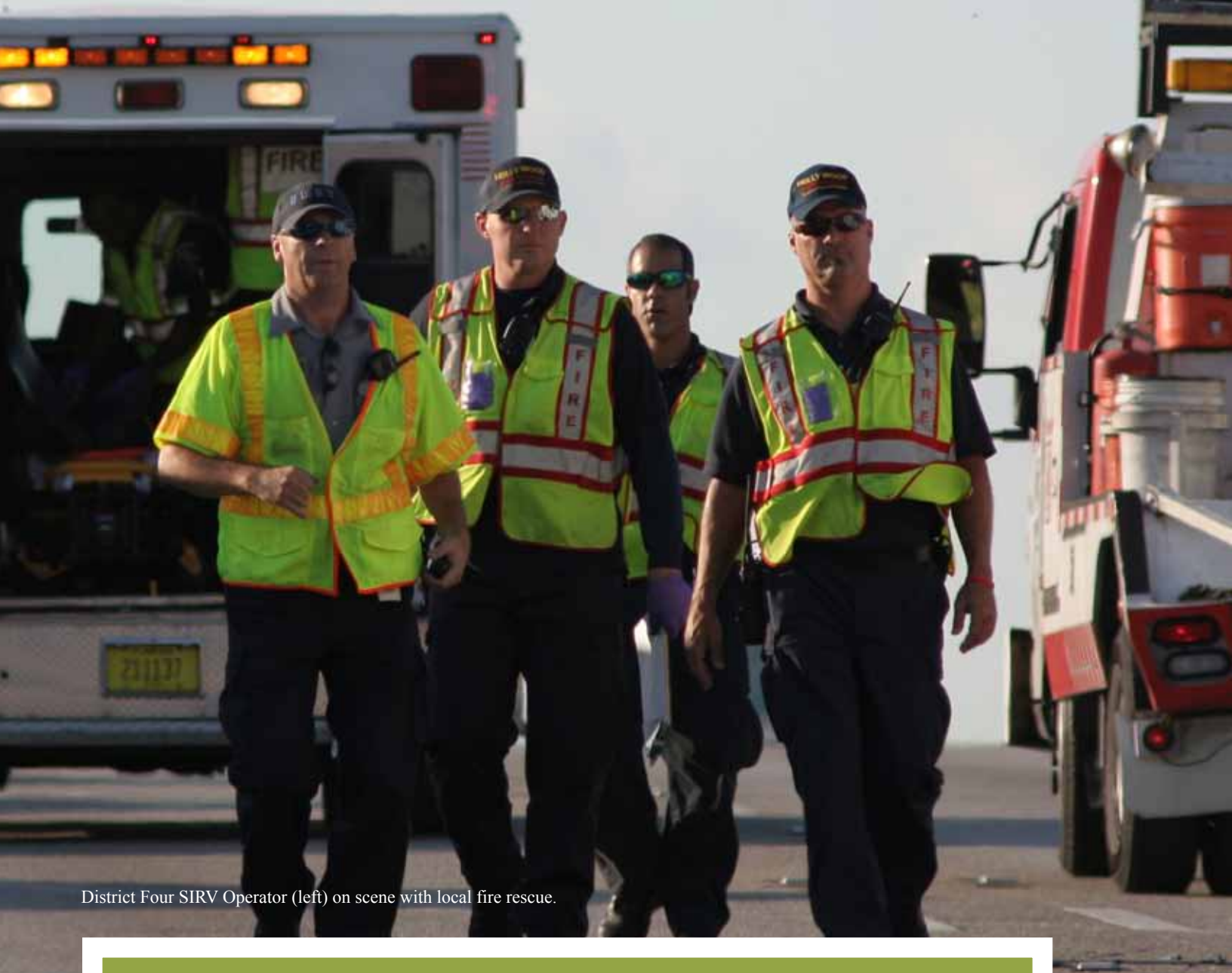
Since 2007, the District Four ITS Unit has used the chart below as a graphical representation of its ITS Program costs. It is a 10-year snapshot of a cost forecasting and tracking tool created by the ITS

Unit managers for the three types of spending they manage: capital cost, operating cost and maintenance. The ITS Unit annualizes the capital cost over the life expectancy of the project using a 20-year life expectancy for TMCs and a 10-year life expectancy for ITS field device deployments (at 6% amortization). This methodology provides a more even distribution of total costs and eliminates large fluctuations in the benefit-cost ratio.

District Four ITS Program Costs



Legend — Annualized Capital Cost (Capital cost distributed over project lifetime) Operating Cost — Maintenance Cost



District Four SIRV Operator (left) on scene with local fire rescue.

Freeway Operations

TREASURE COAST INCIDENT MANAGEMENT

The year 2010 brought a heavily anticipated incident management tool to the Treasure Coast. Seventy-one miles of Interstate 95 are now serviced by the Road Rangers in Martin, St. Lucie and Indian River Counties. Regular patrols began on September 6 and operate Monday through Friday, 6 a.m. to 10 p.m. with 8 truck beats and a roving supervisor. Truck designs were customized with large push bumpers and extra cab space for the type of traffic and incidents along this more rural but increasingly busy stretch of freeway in the northern three counties of the District. Assisting the Florida Highway Patrol with incidents, debris clearance and maintenance of traffic is the program's ultimate mission. Each truck is equipped with a global positioning device to allow for better fleet management

and is the District's first Road Ranger contract operating on the Florida State Law Enforcement Radio Systems (SLERS) controlled from the Broward RTMC. In its first four months, the Treasure Coast Road Rangers have made over 5,100 assists between Jupiter and Fellsmere.

PALM BEACH SIRV PILOT PROGRAM

Paving the way to a permanent program in 2011, the existing Broward Severe Incident Response Vehicle (SIRV) program was expanded into a portion of Palm Beach County in 2010. Using existing funds, SIRV began rush hour patrols between Boca Raton and West Palm Beach in July. The Florida Highway Patrol immediately took notice to the extra assistance they received with maintenance of traffic, minor spill mitigation

and road repair. Within six months, SIRV saved partnering agencies 1625 minutes where fire and police units were able to return to service while SIRV professionals tended to the remaining incident scene. SIRV trucks carry a wide variety of equipment to all lane blocking events allowing quicker clearance, reduction of secondary crashes and return of regular traffic flow.

TIM TEAMS

The District's three Traffic Incident Management (TIM) Teams continued to lead the forum on discussing critical traffic management issues and incidents in 2010. Spreading the word on safety and quick clearance practices is a constant challenge. This year over 14,000 TIM members received the FDOT TIME 4 Safety incident management training program. This five-module course outlines best practices for parking at scenes, updating traffic control devices and educating various responders on each agency's responsibilities at crash scenes. Major James Moyer of the Davie police department wrote, "...thanks for providing the training. The feedback that I received was all positive...(and) very valuable."

PALM BEACH RAMP IDs

The Jupiter fire department responds to calls along Interstate 95 near the Indiantown Road interchange. The long sweeping ramps and configuration are often confusing to motorists reporting incidents. Through the TIM team, FDOT placed ramp identification markers to enable 911 dispatchers to gather more detailed information from callers. (The ramp IDs decrease response time and reduce the number of fire rescue units dispatched.)

STATEWIDE ROAD RANGER SURVEY

TIM feedback is invaluable for constant improvement and performance. The FDOT District Four TIM team conceived and took part in the first annual statewide Florida Road Ranger Survey in 2010. Completed questionnaires were received from nearly 800 incident responders (211 from the FDOT District Four TIM Teams) asking about familiarity with the program, services rendered and any suggestions for improvement. This "first of its kind" program will be streamlined in 2011 with improved processing and distribution of constructive information.

FACT:

The urban areas of Fort Lauderdale have an average daily traffic count of 250,000 on a 10-lane highway compared to the rural areas of Fort Pierce with average daily traffic of 50,000 on a 4-lane highway.

84,462

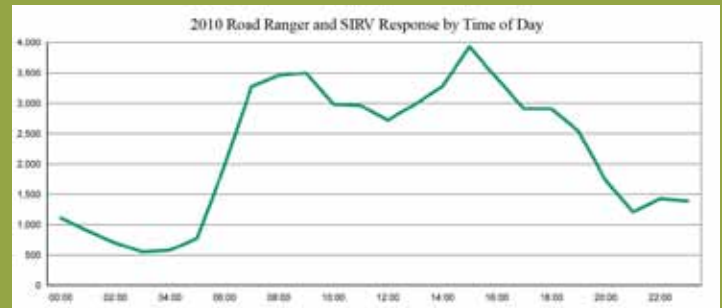
Road Ranger Stops

662

SIRV Responses

37

Minutes Saved Per SIRV Response



ADVANCED ITS

The Broward Advanced ITS deployment is a combination of Dynamic Message Signs (DMS) on select arterials approaching the Interstate, Highway Advisory Radio (HAR), Roadway Weather Information Systems (RWIS), and a wireless redundant communication system (Voice over IP, or VoIP). These devices have been deployed along the Interstate 75 (I-75) and Interstate 95 (I-95) corridors in Broward County. Final acceptance of this project was in March 2010.

REDUNDANT POWER

Reliable power sources are a critical part of a successful ITS field deployment. To enhance power reliability, District Four retained a design-build firm to design, construct, install and integrate a power distribution system with backup, consisting of underground power conduits and conductors, transformers,

a failure of the primary power. This project was completed in May 2010.

TREASURE COAST ITS

Construction was completed this year for the District's northern three counties (N3C), which covers I-95 in Martin, St. Lucie, and Indian River Counties. As one of the largest ITS design-build projects in the state, the project included the design, installation, integration, testing, and maintenance of a fiber optic communication network, a power distribution subsystem, Closed Circuit Television (CCTV) cameras, Dynamic Message Signs, Vehicle Detection (VDS) devices, a Voice over IP subsystem, a Road Weather Information System and Highway Advisory Radio equipment within the I-95 corridor. The project covers 71 miles from the Palm Beach/Martin County line to the Indian River/Brevard County line. The scope of work included integration of all subsystems, devices, and components into the



generators, automatic transfer switches and uninterrupted power supplies. This highly reliable power system has been connected to the existing ITS devices along I-95 in Broward County between Sunrise Blvd. and the Broward/Palm Beach County line. The project split this portion of I-95 into five segments with existing ITS components within each segment powered through a single common commercial power drop. The generator backup is located at the power drop point with a transfer switch programmed to automatically take over upon

existing ITS system controlled and monitored by SunGuide software at the SMART SunGuide TMC in Broward County, and a new connection to the Northern Counties Traffic Incident Management Support Office at the Treasure Coast Operations Center in St. Lucie County. Final acceptance testing and the 90-day system burn-in period began in October.

The following two ITS deployment projects are currently under construction:

PALM BEACH ITS

In Palm Beach County, ITS deployment along I-95 is divided into two phases: Phase A for the segment south of PGA Blvd and Phase B for the segment north of PGA Blvd. Currently the design for both Phase A and B is completed and all of the underground infrastructure is constructed. Approximately 80% of the field devices are installed under Phase A. The expected completion date is mid-year 2011 for Phase A and mid-year 2012 for Phase B.

I-75 SAFETY PROJECT

The Alligator Alley/I-75 ITS Safety Project will use sensors to detect a motorist's speed and, if it is excessive, post a message on a nearby DMS advising the motorist to reduce their speed. Special weather sensors will also be utilized to detect and monitor the

Infrastructure



191.5
ITS Freeway Miles Managed
71 mile increase since 2009 creating 100% Highway Coverage in District Four

87.1%
ITS Device Availability

smoke/fog, rain and wet pavement conditions along the I-75 corridor. Currently, the design documents (90% level) have been submitted for review and the field construction started in December 2010. The project is expected to be complete by August 2011.

ITS DEVICE AVAILABILITY

The device availability for 2010 was 87.1%, which consistent with last year's availability. This measurement is expected to improve as the interim devices in Palm Beach County are replaced with permanent ones.

Above left: Typical installation of a redundant power supply field assembly.

TMC Operations

SEVERE WEATHER ALERTS ON DMS

While the effects of severe weather are felt by everyone, motorists are particularly susceptible and many, such as motorcyclists, are better served by avoiding it. One of the primary purposes of Dynamic Message Signs is to give motorists information which allows them to make more informed driving decisions. This year the FDOT District Four ITS Unit added severe weather alerts to the list of information provided on the signs. Severe weather alerts include: tropical storms, hurricanes, tornadoes and severe thunderstorms.

Using alerts from the National Weather Service, Regional Transportation Management Center (RTMC) Operators identify the affected area, confirm the warning and post messages on the DMS both approaching and within the warning area. Once the threat has passed, messages are promptly removed from the signs.

SKYWARN TRAINING

To obtain critical weather information, NOAA's National Weather Service (NWS), part of the U.S. Department of Commerce, established SKYWARN®, a volunteer program with nearly 290,000 trained severe weather spotters. These volunteers help keep their local communities safe by providing timely and accurate reports of severe weather to the National Weather Service.

In June 2010, FDOT District Four ITS Unit coordinated SKYWARN training held at the District Headquarters building. Approximately 120 staff members from the District Office, the ITS Unit and the



“120 District Four staff and consultants trained on SKYWARN in 2010.”

TMC attended. For more information about SKYWARN, go to www.weather.gov/skywarn.

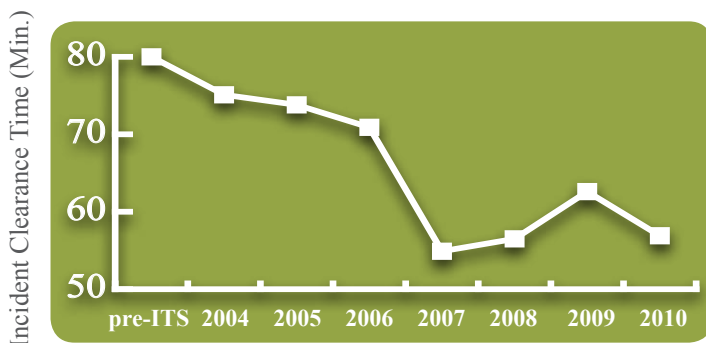
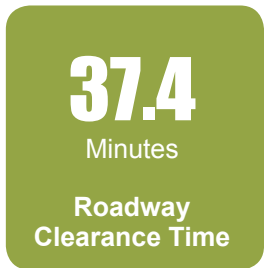
DISASTER / HURRICANE PREPAREDNESS

Even though major storms and weather did not impact the District severely in 2010, field and ITS staff were busy preparing for any type of interruption to the ITS network while enhancing information to the public. ITS staff also conducted field device failure and restoration testing along the I-75 and I-95 corridors. Back up power generators in hub configurations are set to keep CCTV cameras and DMS operating in case of regional power outages. System redundancy on the fiber communication network was also successfully checked for its ability to still connect to the RTMC in case a link goes down.

REDUCED INCIDENT CLEARANCE TIME

The chart below shows the trend of District Four's incident clearance time since 2004. In 2010, the clearance time went down by 9%. This time savings was directly due to maintaining Road Rangers at 100% coverage for the entire year. The Road Rangers' response time decreased (on average) by over six minutes per incident because more trucks were available at any given time.

Starting in 2011, District Four ITS Unit looks forward to incorporating the Road Ranger activities in the Treasure Coast as part of this annual graphic.



Information Technology

MIMS INVENTORY TRACKING ENHANCEMENTS

In late 2009, the ITS Unit developed a new inventory tracking system. The enhancement, called MIMS (Maintenance Inventory Management System), included the implementation of a mobile application that runs on a Motorola PDA with an integrated scanner, and an interface module that supports real time wireless, bidirectional, communication between each PDA and MIMS. The mobile PDA application identifies and tracks the scanned items that have relevant barcodes, displaying and/or recording the item's current location, scanned frequency, change of location, summary of parts at current location, etc. In the past, it took a full-time employee five weeks to track down and inventory all of the ITS Unit's devices across District Four. Using the Enhanced MIMS software, which is integrated into District Four's SunGuide system, the same full-time employee can inventory all ITS Unit devices in less than one, an effort reduction of 80%.

Noteworthy features of the MIMS inventory tracking enhancements include:

- Significant reduction in annual inventory labor
- Real-time inventory information
- Minimizes the introduction of human error
- Provides accountability of spare parts
- Integrated with the TMC's SunGuide software program
- Centralizes the management of the District's ITS inventory and spare parts (active ITS field devices, central IT devices, spare parts, office equipment and furniture)

iVEDDS SPEED GRAPH ENHANCEMENT

In the fall of 2010, the ITS Unit added an enhancement to the existing Interagency Video and Event Data Distribution System (iVEDDS); a tool that allows partnering public agencies to view streaming CCTV camera video via the Internet. The enhancement included a graphical display of speed data from detectors upstream of the relevant event; this data is displayed and refreshed in real time to allow users to monitor, quantitatively, the impact of the selected event on traffic flow.

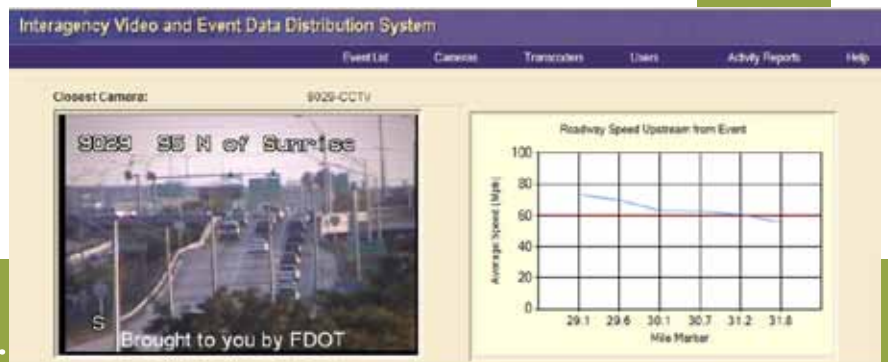
957,997

Traffic Alerts

116,874

Unique Website Visitors

www.SMARTSunGuide.com
www.pb-itms.org



iVEDDS now shares speed data from detectors upstream of the relevant event.

Traffic Information

During the second half of the year, the ITS program was featured on several broadcast and cable media outlets. The opportunity to work with the media (radio, television and print) is not so much about the attention as it is the opportunity to educate the public on the services available to them. This year's highlights include:

- Palm Beach Channel 20 "Special Edition" – ITS Operations Manager Daniel Smith and Consultant Project Manager Bob Murphy were featured in a 30-minute program on Palm Beach County's Channel 20, a public access station. The interview covered all aspects of the ITS Program and featured photos and videos of FDOT equipment. The program was scheduled to run regularly on Channel 20 as will the ITS Unit's short outreach video.
- Treasure Coast Road Ranger media event – FDOT hosted an open house event for the media prior to the Road Rangers' September launch in the Treasure Coast. The event was well attended and resulted in media ride alongs, follow up interviews, and scheduled live shots for their first day on the road.
- TC Palm.com – The Treasure Coast's on-line newspaper was very supportive of FDOT programs and deployment along I-95 in 2010. Reporter Elliott Jones followed the progress of Road Rangers and

the ITS equipment in five articles that were also distributed to the Sun-Sentinel and Miami Herald websites.

Other ongoing events, such as working with partner agencies to distribute information and providing tours of the TMCs, occurred throughout 2010. District Four had an ITS presence at the annual South Florida Construction Career Days in October with Road Ranger participation in the roadway clearance demonstration. Students from over 50 South Florida high schools were able to talk with Road Rangers and many others about careers and safety on the roadway.


In 2010, staff from the SMART SunGuide TMC spread the District Four messages and successes at conferences throughout Florida and the U.S. They included:

- National Unified Goal Summit for Traffic Incident Management, Baltimore, Maryland – performance measures presentation
- Transpo 2010, Jacksonville, Florida – Severe Incident Response Vehicle presentation
- Presentations made to Department of Transportation staff in Tennessee, Minnesota, and multiple emergency response agencies in South Florida



***765,935**

511 Calls in
District Four
*27.6% of all calls
statewide



Palm Beach County's Channel 20 "Special Edition" featured a 30-minute interview with ITS managers.

Report Card

The Report Card below depicts the ITS Unit's performance in "letter-grade" format. The "overall" grade, bounced back in 2010, as it increased from a 3.4 last year to 3.6 (out of 4.0 possible). The reasons for the increase this year include the new results of the statewide Road Ranger Customer Satisfaction Survey and the nearly six-minute decrease in average Incident Clearance Time. Both of these important performance measures went from a B to an A as shown in the table below.

The System Reliability for ITS Field Devices continues to bring the ITS Unit's overall grade down. It is anticipated that as the mobile devices in Palm Beach County phase out and become permanent over the next two years, this number will increase to be more comparable with the Broward County device reliability – 94.3% in 2010.

Performance Measure (Metric)	2009 Score	2010 Score	A	B	C	D	F
ITS Systems							
% Completion of Systems Build-Out (Actual # Miles Built Per Year / Planned # Miles Built Per Year)	A 100	A 100	≥90%	80-89%	70-79%	60-69%	<60%
ITS Operations							
Annual Benefit / Cost Ratio (BCR - from Annual Report)	B 13.91	B 12.99	>15	11-15	6-10	1-5	<1
ITS Maintenance							
System Reliability - Field Devices (% Time Operational)	D 87.6	D 87.1	>97%	95-97%	91-94%	85-90%	<85%
Road Rangers							
Customer Satisfaction (% of Respondents Satisfied with Service)	B 92	A 95	≥95%	90-94%	80-89%	70-79%	<70%
Traffic Incident Management							
Incident Clearance Time (Overall Time to Clear Travel Lanes after Road Ranger Arrival)	B 62.6	A 56.9	<60 min.	60-75 min.	76-90 min.	91-120 min.	>120 min.
ITS Systems							
System Reliability - TMCs (% Time TMC Systems are Operational)	A 99.11	A 99.01	>99%	98-99%	95-97%	92-94%	<92%
Partnering							
Number of Private and/or Public Partners (# Partners Collaborating with on a Daily Basis)	A 8	A 8	≥7	6	5	4	≤3
Traveler Information							
Regional Travel Time Index (Peak Period Travel Times vs. Free Flow)	A 1.00	A 1.00	1.00-1.09	1.10-1.24	1.25-1.44	1.45-1.69	≥1.70
Public Outreach							
Satisfaction with ITS Program (Customer Survey - Scale of 1 to 10)	A 9.2	A 9.0	>9	8-9	7-8	6-7	<6
New ITS Initiatives							
Number of New Initiatives (# of New Initiatives)	A 5	A 5	≥4	3	2	1	0

Activities

In summary, the FDOT District Four ITS Unit continued its expansion and technical improvement throughout the year. The standout successes include:

- Treasure Coast Incident Management: The addition of Road Rangers in Martin, St. Lucie and Indian River Counties brings 100% service patrol coverage in District Four. (Page 6)
- Palm Beach SIRV Pilot Project: The Severe Incident Response Vehicle has been a welcome addition to incident management efforts in Palm Beach County. (Page 6)
- Palm Beach Ramp IDs: Stemming from a suggestion by the Traffic Incident Management Team, ramp IDs provide an added level of certainty when responding to incidents on complex interchanges. (Page 6)
- Weather Warning Messages: The partnership established with the National Oceanic and Atmospheric Administration in 2009 resulted in weather spotter training and posting severe weather messages on DMS. (Page 10)
- Disaster/Hurricane Preparedness Testing: Though the District has been fortunate not to be hit by severe weather, preparation and practice is necessary, as discovered through newly established testing procedures. (Page 10)



The ITS Unit began semi-annual power redundancy testing in 2010.



Daniel Smith, ITS Unit Operations Manager, proudly adds to the collection of District Four awards.

Achievements

STATEWIDE AWARDS

- ▶ Intelligent Transportation Society of Florida (ITS Florida)
 - Outstanding Achievement Award in recognition of development and implementation of the Maintenance Inventory Management System.
- ▶ The 2010 Prudential Financial – Davis Productivity Awards
 - ITS Deployment Team - “Coordinated Communications Connection for Weigh in Motion Station” recognized with an honorable mention certificate
 - ITS Video Surveillance Team – “Value-Engineered Video Monitoring for Arterial Resurfacing Project” recognized with a plaque
 - ITS Systems Maintenance Team – “Fixed Critical Fiber Backbone Cut Under 20 Hours” recognized with a plaque
 - ITS Project Management Team – “Created Critical Project Extension with Additional Funding Request” recognized with a plaque

- ITS 511 Promotion Team – “Deployed Traffic Information Signs on Existing Freeway Infrastructure” recognized with a certificate of commendation
- ITS Freeway Operations Team – “Increased Freeway Service Patrol Coverage through Private Financing” recognized with a plaque
- ITS Operations Team – “Provided Free Streaming Video to Emergency Response Partners” recognized with a plaque.

LOCAL RECOGNITION

- ▶ FDOT District Four 2010 Unit of the Year Award recognized with a plaque
- ▶ Palm Beach County Traffic Safety Award 2010 for Media Coordination and Cooperation

