



2004 Annual Report

SMART SunGuide TMC

Florida Department of Transportation District IV

Broward County, Florida

MESSAGE FROM THE TMC OPERATIONS MANAGER

On behalf of the Florida Department of Transportation (FDOT) District IV office, we are pleased to submit our initial annual report for the SMART SunGuide Transportation Management Center (TMC) located in Broward County, Florida.

SMART stands for “Systems Management for Advanced Roadway Technologies.” Our vision is for the SMART SunGuide TMC to become one of the leading TMCs in the United States. We recognize the significant effort required to achieve our vision, as well as the challenges we will have to overcome on our path to success. To focus our efforts, we have defined this path as “**The SMART Way**,” formalizing an approach that includes the following measures:

VISION
Become the best transportation management center (TMC) in the nation by 2010.

- Utilization of constantly changing, state-of-the-art technology.
- Building a superior work force through careful recruitment and continuous training and development.
- Meeting the needs of each customer by differentiating our products.
- Delivering superior customer service.
- Creating a high level of visibility and awareness of our services by a consistent and carefully targeted marketing strategy.

By doing it “**The SMART Way**,” our transportation management center programs will meet and exceed the public’s transportation needs.

The purpose of this report is to share our past successes and document future plans, both of which are highlighted below.

2004

This past year has been a very successful and rewarding one for the SMART SunGuide TMC. Activities of particular note include the following:

- Moving operations from the interim facility into the new TMC.
- Expanding operations from 16 hours per day/5 days a week to 24 hours per day/5 days a week.
- Conducting incident management activities.
- Setting up the Road Ranger Service Patrol dispatch system.
- Carrying out regional TMC coordination.

2005

During 2005, the momentum that has been established will be augmented with several new initiatives. These include the following:

- Developing System Management for Advance Roadway Technologies (SMART) software.
- Setting up the SMARTSunGuide.com Web site.
- Completing Phase I CCTV/detection deployment.
- Starting Phase II CCTV/DMS/detection deployment.

- Setting up an ITS kiosk.
- Begin testing of the Statewide SunGuide software.
- Initiating 24 hours per day/7 days a week operations.
- Setting up the SMART SunGuide video distribution system (SSVDS).

In conclusion, this report documents our successes during 2004, and clearly defines the outline for our five-year plan to earn recognition as one of the leaders in the nation. Since this our initial annual report, this document will establish the baseline for the following years and enable us to quantify the benefits annually. The importance of producing an annual report enables the TMC Management Team to evaluate performance and make adjustments if necessary to stay on course with our 5-year business plan.

Quantifiable benefits in this report are the savings in motorist delay attributed to the operation of the Smart SunGuide Transportation Management Center (TMC). During the operation of the facility for 2004, the estimated motorist delay savings were over 2.9 million vehicle hours. This estimate is based on travel time savings (reduction of incident duration) vs. annualized capital and operating cost to come up with a benefit/cost ratio. The \$6,558,081 in annual cost for SMART SunGuide TMC in 2004 was divided into the annual delay benefits of \$51,543,107, yielding a benefit/cost ratio of 7.86. Therefore, SMART SunGuide TMC programs brought significant **value** to the public in 2004.



Steven Corbin
TMC Operations Manager
FDOT District IV

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1.0 INTRODUCTION

According to the annual urban mobility report released by Texas Transportation Institute in September 2004, South Florida residents spend an average of 52 hours a year tied up in traffic; this is 13 hours worse than 10 years ago, and makes Florida the 12th worst state in the nation. More than 50 percent of the nation's traffic congestion is related to crashes and other incidents on the roads. The cost of all these delays amounts to about \$2.56 billion a year.

As we move into the 21st century, the capacity and degree of integration of our transportation system will become critical variables defining the mobility of people and goods. There are limitations associated with building new roads to meet these demands. Therefore, transportation professionals will need to rely more on management tools to successfully meet mobility challenges. Intelligent transportation systems (ITS) offer the tools to successfully manage and integrate our transportation systems.

SunGuide is Florida Department of Transportation's (FDOT) ITS program for transportation management. ITS is a combination of computer and telecommunication technologies—coupled with institutional partnerships—that makes all modes of the existing transportation systems operate more efficiently and safely. For the highway system, ITS technologies include dynamic message signs (DMS), closed circuit television (CCTV), vehicle detectors, telecommunications, automatic vehicle locator system (AVL), computerized traffic signalization systems, and other technologies that are used to manage, monitor, and control traffic at the transportation management center (TMC).

FDOT District IV's approach to SunGuide entails more than just the implementation of ITS technologies. It includes people and programs to utilize these ITS technologies, such that **value** is brought to the public. With **value** at the forefront of every idea, plan, and activity, FDOT District IV's SunGuide program recognizes that a *team* philosophy must exist to coordinate operations and programs and maximize the value of each program, producing real benefits to the public. The SMART SunGuide TMC in Broward County, Florida has been identified as the central hub for bringing people, programs, and technologies together in a coordinated professional atmosphere.

During the late 1990s, FDOT developed a master plan for a new transportation management center to monitor and control the ITS infrastructure being deployed in the field. The SMART SunGuide TMC was conceived as a facility that would enable the primary transportation partners to manage the surface transportation system from a common locality. These partners include FDOT District IV ITS staff to monitor and control the freeway management system; Broward County Traffic Engineering Division (BCTED) to manage the computerized traffic control system; the Florida Highway Patrol (FHP), which takes a leading role in incident management; and Broward County Transit to monitor and control its transit bus, rail, automated people mover, and water bus systems.

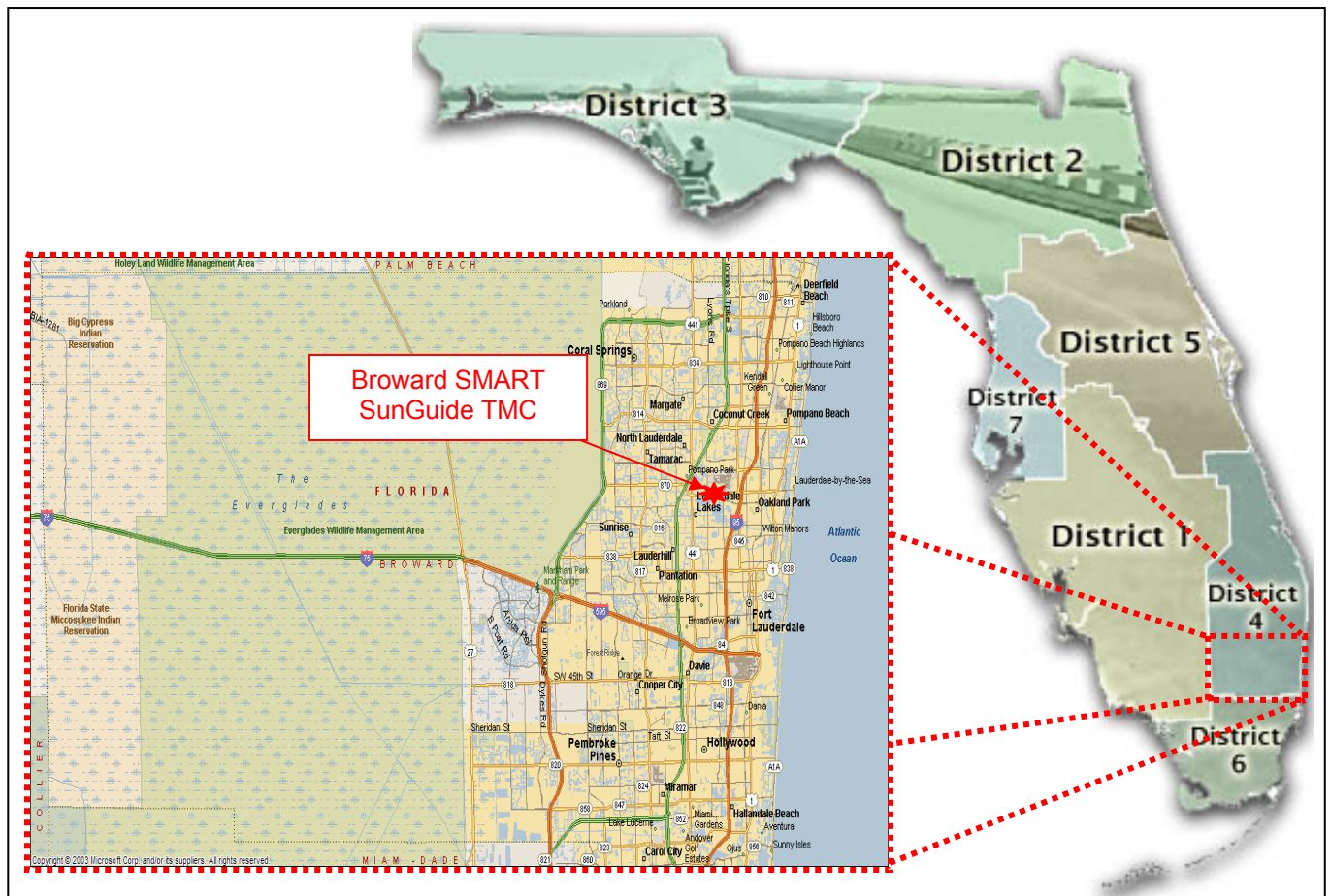


The SMART SunGuide TMC was designed and built during a four-year period, 2000–2004. Located in District IV and within Broward County (at 2300 W. Commercial Boulevard, Fort Lauderdale, Florida 33309), the 42,396–square foot facility has two floors. The first floor serves

as the TMC, while the second floor serves as the BCTED headquarters. In addition, a BCTED operations and maintenance facility was built in the southwest corner of the property.

The SMART SunGuide TMC received its temporary certificate of occupancy (TCO) on September 1, 2004, and officially began full operations on September 20, 2004. The TMC includes 12 operator consoles to be shared by FDOT, BCTED, BCT, and FHP staff; a large video wall; conference, media, and training rooms; a computer/communications room; and general office space to accommodate the multi-agency staff.

The SMART SunGuide TMC is responsible for managing the interstate system (I-95, I-75, I-595) in Broward County; see exhibit 1. Broward County has a population of roughly four million residents, and an annual average daily traffic (AADT) count of over half a million commuters traversing the interstate system.



Source: Statewide Map from <http://etdmpub.fla-etat.org>

Exhibit 1: SMART SunGuide TMC Location

2.0 BUSINESS PLAN

This section presents a high-level five-year business plan for the SMART SunGuide TMC. This section was developed with a proactive mind-set that focuses on bringing value to the SMART SunGuide TMC customers.

The business plan presented below is consistent with the methodology adopted by the FDOT at the statewide, district, and program levels. It includes developing a vision (who we want to be) and a mission (what we do every day). To further define the “how” and the “what” of the vision and mission, objectives are developed and categorized into the following critical areas:

- Leadership,
- Strategic planning,
- Performance measurement and results,
- Human resource focus,
- Process improvement,
- Customer and market focus, and
- Measurement and knowledge management.

Once the objectives have been established, the business plan becomes a tool for guiding measurement of performance—introducing accountability into the organization. In addition, this section identifies a five-year implementation plan that will help the SMART SunGuide TMC consider needs for tomorrow’s projects in today’s activities.

2.1 Vision and Mission

Over the years, the FDOT has established itself as a leader in the ITS arena. The SMART SunGuide TMC has adopted a vision that will continue to support the FDOT as a leader by building on previous successes. The SMART SunGuide TMC vision is this:

***“Become the best transportation management center (TMC)
in the nation by 2010.”***

The SMART SunGuide TMC was planned, designed, and constructed with the intent of establishing it as a central hub for information and a leader for managing the transportation system in Broward County. Broward County offers various modes of transportation to ensure the mobility of goods and people, mobility that is critical to maintaining a thriving economy. Therefore, the SMART SunGuide TMC’s mission is to

***“Lead an integrated operation to proactively monitor and control
the surface transportation system within Broward County.”***

2.2 Measuring Performance

The SMART SunGuide TMC business plan will establish a framework for measuring performance in 2005. Exhibit 2 communicates this guidance through the following information:

- Objectives,
- Activities expected to be completed or worked on,
- Performance indicators for measuring success, and
- Targets and progress.


	Objectives	Activities	Performance Indicator	Target / Year
LEADERSHIP	Employee Empowerment	Mentor TMC Staff to support professional development	Staff promotions	20% of staff promoted / 2005
	Organizational Performance Review	Maintain a high level of staff productivity	Weekly task status updates	Complete tasks on-time / 2005
STRATEGIC PLANNING	Deploy ITS along Interstates in Broward County	Complete Phase I CCTV	Acceptance Test	Complete / 2005
		Start Phase II CCTV	Project Status	Ongoing
	Establish standard interface with field devices	Test Statewide SunGuide Software	Acceptance Test	Complete / 2005
PERFORMANCE MEASUREMENT & RESULTS	Maximize performance of Districtwide ITS system	Identify parameters to be measured	Measurement parameters identified	On-going
	Reduce Non-Recurring Congestion	Reduce incident related delays	Incident Durations	15% reduction / 2005
		Advance TIM Program	FHWA Self-Assessment	Score of 70% / 2005
	Maintain System Availability	Determine system availability requirements	Technical Memorandum	10/1/05
		Maintain database availability	Monthly Report and Annual Report produced	On-going
HUMAN RESOURCE FOCUS	Improve Employee Satisfaction	Recognize and award outstanding employee services	Annual SMART SunGuide TMC Service Awards	On-going
	Employee Continuous Education	Provide training to enhance skill sets	Additional training materials	On-going
		Develop an interactive online training program	Interactive online training materials	On-going
PROCESS IMPROVEMENT	Monitor and improve key operations processes	Develop process measurements	Technical memorandum	10/01/05
CUSTOMER & MARKET FOCUS	Improve and maintain high level of customer satisfaction	Develop public survey instruments and methodology	Technical memorandum	10/01/05
	Improve and maintain communication with internal and external customers	Launch TMC website	TMC website launched	02/01/05
		Produce TMC Annual Report	Annual Report produced	02/01/05
		Actively participate in Regional Committees	Attend SEFRTOC, TIM and ITS Coalition Mtgs.	Ongoing
		Build an ITS Kiosk	Kiosk complete	02/01/05
MEASUREMENT & KNOWLEDGE MANAGEMENT	Determine a way of measuring performance	Developed methodology for estimating benefits	Technical memorandum	10/01/05
	Enhance data collection, sharing, and reporting	Deploy SMART SunGuide software	Acceptance Test	Complete / 2005
		Deploy video sharing system	FDOT D6 and ITMS video into TMC	Complete / 2005

Exhibit 2: SMART SunGuide TMC Business Plan

2.3 Implementation Plan

In order to ensure future project needs are considered in today's projects, the SMART SunGuide TMC has developed a five-year implementation plan. This will help to mitigate any integration and expandability issues as equipment and systems are deployed.

2005

- Expand DMS, CCTV, and VDS coverage area.
- Launch SMART software.
- Integrate SunGuide software.
- Hire high-quality TMC staff to support expanded coverage.
- Convert existing training manuals and presentations to an interactive training program.
- Expand training materials to include new ITS devices and software.
- Refine/finalize performance metrics.
- Develop data collection system to support performance measurement.
- Complete Phase I deployment of CCTV (45) and detectors (106).
- Start design of Phase II deployment, which includes video wall upgrade, 10-DMS, 55-CCTVs, 124-detectors and 50-miles of fiber optics communication.
- Expand operations to 24 hours a day/7 days a week.
- Increase Road Ranger direct monitor/dispatch hours as TMC continues to expand.
- Launch and enhance SMART SunGuide TMC Web site.
- Present individual outstanding service awards to SMART SunGuide TMC partners, such as Road Rangers; Road Watchers; Traffic Incident Management Team; and TMC operators, maintenance, and management.

2006

- Establish metrics baseline after deployment and testing of traffic detection system.
- Video distribution system to TMC partners and general public.
- Conduct focused training based on results of performance metrics.
- Provide travel-time information to transit, TMCs, and other transportation partners.

2007

- Coordinate CCTV operations along corridors.
- Implement highway advisory radio (HAR) technology as part of the advanced incident information system.
- Install a Gigabit-Ethernet communications plant to support ITS.
- Complete Phase II deployment.

2008

- Automate travel time messaging on DMSs.
- Research/develop predictive algorithms for incidents.

2009

- Automate CCTV pan/tilt/zoom on incidents.

3.0 PROGRAMS INSIDE THE TMC

The SMART SunGuide TMC is the central hub for three FDOT District IV ITS program areas: ITS Operations and Maintenance, ITS Deployments, and Freeway Operations. Exhibit 3 depicts the organizational structure of these program areas. These program areas manage the following projects:

- ITS Operations and Maintenance
 - TMC Operations
 - ITS Maintenance
 - Road Watchers
 - AMBER Alerts
 - Southeast Regional TMC Operations Committee
- ITS Deployments
- Freeway Operations
 - Road Rangers
 - Traffic Incident Management Teams

The following subsections provide an overview of the project. This overview is intended to familiarize the reader regarding activities within the SMART SunGuide TMC. A status update regarding ITS Deployments covered in section 4.

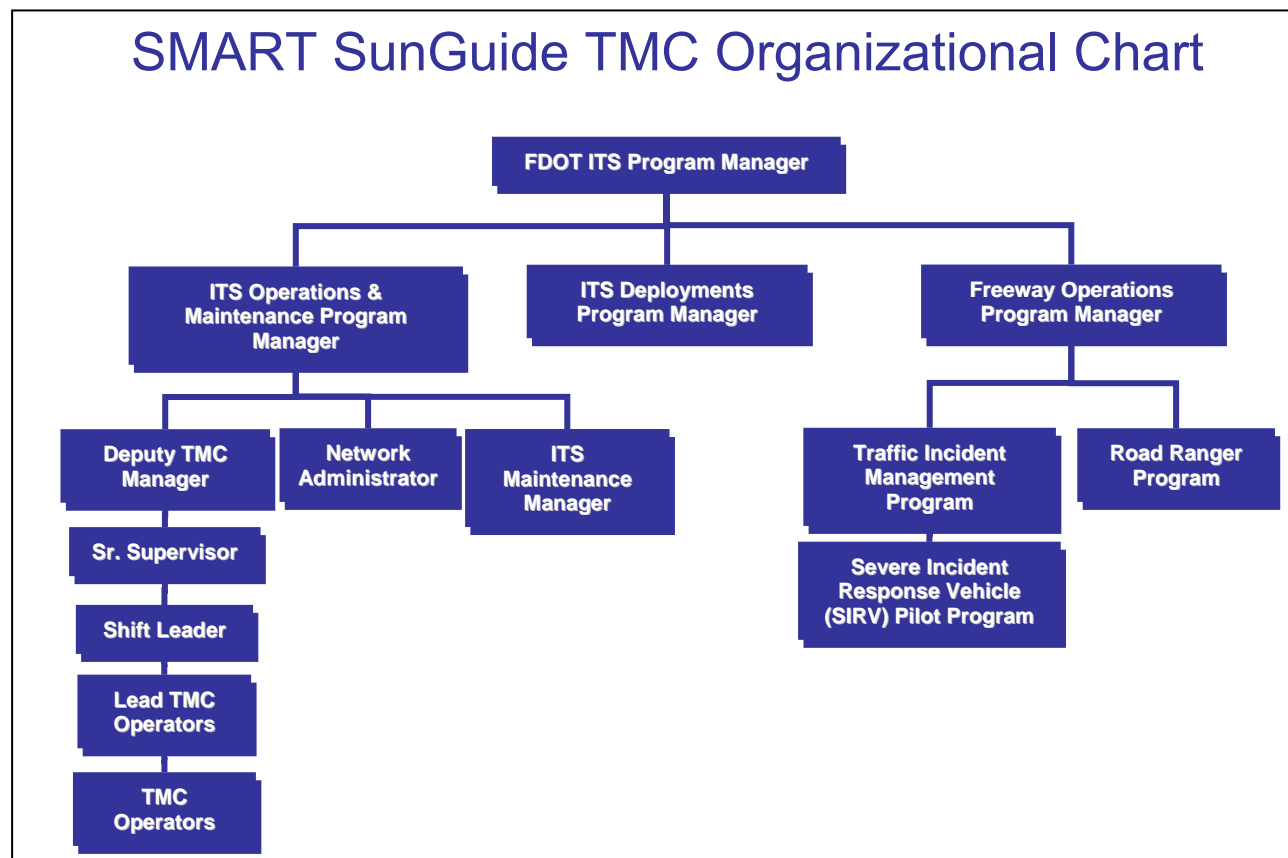


Exhibit 3: SMART SunGuide TMC Organization Chart

3.1 TMC Operations

In January 2003, FDOT's District IV outsourced their TMC operations and began operating an interim TMC at the District IV headquarters. Operations covered two shifts, working Monday through Friday from 6:00 am to 8:00 pm. Initially, two TMC operators were hired (one per shift). During the next year and a half, the TMC staff grew to two operators, a TMC manager, and a TMC supervisor. As the growth of the TMC progressed with additional funding, staff, and deployment of ITS devices, TMC management developed a plan to migrate to a 24 hours per day/seven days a week operation by spring 2005. The plan included relocation into a new facility (Exhibit 4).

In July 2004, prior to moving into the new building, the TMC increased its management staff to include two deputy TMC managers, an administrative assistant, and a network administrator. On September 20, 2004, FDOT District IV Broward County opened the doors to the new state-of-the-art facility. Strategically located near I-95, the SMART SunGuide TMC houses ITS equipment, software, resources, and staff to provide quick, efficient, and innovative incident management tools and techniques. Since the move into the new facility, hours of operation and staffing have increased as follows:

- October 25, 2004 – Transitioned to a 6:00 am–10:30 pm schedule, Monday–Friday.
- December 4, 2004 – Transitioned to a 24 hours a day/five days a week (Monday–Friday) schedule.



Exhibit 4: New SMART SunGuide TMC

The TMC staff has increased to include six full-time TMC operators since its 2003 inception. The current Monday–Friday, 24 hours a day schedule contains three-shifts: (6:00 am–2:30 pm; 2:00 pm–10:30 pm; 10:00 pm–6:30 am), the six TMC operators work rotating shifts—two operators per shift. The administrative assistant was also trained as a TMC operator to act as a backup. Additional operators will be hired as we transition to round-the-clock operations in 2005.

Currently, new TMC Operators are oriented into the TMC environment by way of a two-week training program. The training begins with theory; moves on to practical; and culminates in hands-on. A technical overview of ITS includes all the systems as they are and as they will be. Each component is covered in detail from design and deployment to operations and maintenance. The mission and vision of the center is clearly conveyed along with the center's role from a local, regional, and statewide perspective. During the two week training program, the new TMC Operators are tested each day. These tests are reviewed daily to monitor the progress of each trainee. Once the training program is completed and all tests have been passed, the trainee receives a certification. Additional training programs, as well as, certifications will be developed as new systems come online.

Copies of all the training materials are provided along with the Standard Operating Guidelines (SOG). The SOG provides guidance for managing the day-to-day operations and maintenance of the TMC and system field devices. The information addresses existing and future policies and procedures that direct both routine and emergency activities of the TMC and its staff.

The SMART SunGuide TMC operators collect and manage data on all TMC activities through the use of the FDOT Incident Database System (FIDS). FIDS is used to produce monthly statistical reports, incident reports, and trouble reports on ITS equipment. FIDS also has the capability to send out e-mail notifications on major incidents. The SMART SunGuide TMC currently has approximately 47 subscribers from various public and private agencies.

More advanced training programs are being developed to address the ever-changing dynamics of the TMC. The new web browser based training will be interactive in nature and will incorporate past training material as well as new ITS devices, software, basic traffic engineering principles and customer service courses. Additional information on the training program will be available by the end of January 2005 on our new Web site: www.smartsunguide.com.

3.2 ITS Maintenance

Critical to the success of a TMC is the reliability of its systems. The ITS maintenance function entails both preventive and response maintenance. Preventive maintenance is a set of procedures that must be routinely performed at scheduled intervals for the upkeep of the equipment. It focuses on checking all equipment for proper operation and performing the necessary tests and making repairs to keep devices running. Response maintenance is the initial response to failed or damaged equipment. Depending on the time, severity of the problem, and overtime cost, the maintenance contractor may be dispatched during off-hours or wait until normal business hours. The SMART SunGuide TMC operations and maintenance staff work closely together to monitor and repair the ITS equipment.

3.3 Road Watchers

Using FDOT employees to observe and report incidents during their daily commute to and from work is another **SMART** program FDOT District IV has implemented. The Road Watcher program is an incident detection program that enlists volunteer FDOT commuters; it provides significant benefits in incident management, at no cost. While traveling to and from work, Road Watchers act as advisers to the TMC for the purpose of collecting and reporting real-time information regarding incidents and traffic conditions that exist along their travel routes.



Source: The SunGuideSM Disseminator

3.3.1 Benefits of the Road Watcher Program

By reporting incidents to the TMC, Road Watchers have made a difference in roadway safety and clearance time. Once an incident has been confirmed by Road Rangers, FHP, or video cameras, messages can be posted on dynamic message signs (DMS) to help reduce:

- Travel times,
- Secondary accidents,
- Hydrocarbon emissions and fuel consumption, and
- Incident response times.

In 2004 our Road Watcher partners reported 514 events out of the 22,798 “Total Recorded Activities” on I-95, I-75, and I-595 within Broward County.

3.3.2 Road Watcher Selection and Training

Based on their travel route and work hours, a small number of FDOT employees in District IV were selected from a pool of volunteers to participate in the Road Watcher program. Each Road Watcher is trained on what to look for and how to report safety hazards and incidents that severely affect traffic (e.g., vehicle accidents, disabled vehicles blocking travel lanes, disabled vehicles on shoulder, debris in the roadway).

Road Watchers are also trained in communication protocols for connecting directly to the TMC. Training covers standardized reporting guidelines that are designed to minimize the number of questions and the amount of time it takes to exchange information. Types of information required from Road Watchers are as follows:

- Type of incident/debris,
- Route number/road name,
- Direction,
- Intersection/Cross Street,
- Number of travel lanes blocked/closed,
- Estimated extent of the queue (backup), and
- Presence of any authorities on scene.

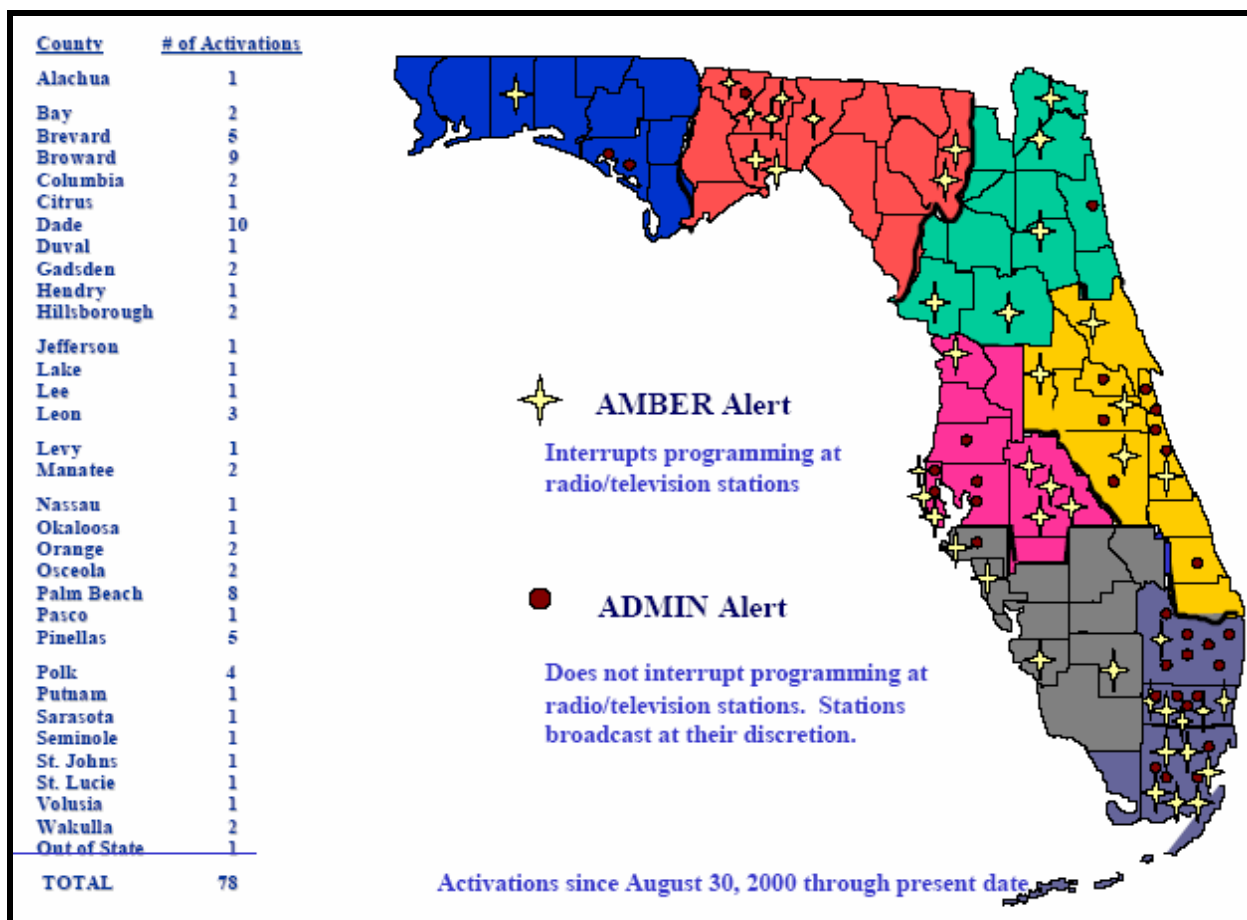
3.4 AMBER Alert

The SMART SunGuide TMC participates in the “America’s Missing Broadcast Emergency Response” program known as “AMBER Alert.” Highly successful in locating missing children, the program was created in 1996 in Dallas, Texas. It is named after nine-year-old Amber Hagerman, who was kidnapped while riding her bicycle, and subsequently murdered.

The state of Florida has activated 78 AMBER Alerts since August 30, 2000, of which nine of them occurred in Broward County (see Exhibit 5). In addition to Broward County, the SMART SunGuide TMC responds to regional AMBER Alert events. In 2004, we assisted with DMS messaging for five such regional events.



Source: <http://codeamber.org/>



Source: FDLE Web site: <http://www.fdle.state.fl.us/amberplan/AmberActivationMap.pdf>

Exhibit 5: Statewide Amber Alert Activations

The public plays a key role in the success of the AMBER Alert program. Once alerted, they can be on the lookout for the missing child and the suspect's vehicle. The public is instructed to dial 911 immediately and provide the location and any other useful details if the suspect or the child is spotted.

Criteria for activation of event and DMS messaging:

- The child must be under 18 years of age.
- There must be a clear indication of abduction.
- Law enforcement must conclude the child's life is in danger.
- The authorities must have a detailed description of the child, the abductor, or the vehicle to broadcast.
- Activation must be recommended by the local law enforcement agency.

How it works**(a) Activation of an AMBER Alert:**

- Local law enforcement contacts the Florida Department of Law Enforcement (FDLE).
- FDLE evaluates the request.
- FDLE issues an alert to other law enforcement agencies.
- If FLDE agrees that DMS should be used, FDLE contacts FDOT's regional transportation management center (RTMC) in Orlando.
- RTMC issues information to other TMCs.
- SMART SunGuide TMC receives a facsimile message from RTMC in Orlando.
- SMART SunGuide TMC receives verbal notification from RTMC. If not, the TMC contacts RTMC to obtain the following data elements:
 - Sent by
 - AMBER Alert name
 - Area(s) of activation (must include statewide or Broward County location activation request)
 - Date/time
 - Required message to be displayed on DMS
 - CHILD ABDUCTION ALERT
 - Look for vehicle
 - Vehicle description
 - State and tag number
 - Call *FHP
- SMART SunGuide TMC notifies on-call manager and creates an active incident log.
- Once approved by manager, SMART SunGuide TMC activates message on DMS.
- SMART SunGuide TMC sends a Level 3 Nextel text alert to incident management clients.

(b) Termination of an AMBER Alert:

- SMART SunGuide TMC receives a facsimile cancellation message from RTMC.
- SMART SunGuide TMC receives verbal cancellation notification from RTMC. If not, the TMC contacts RTMC.

- SMART SunGuide TMC blanks all AMBER Alert messages from DMS signs.
- SMART SunGuide TMC sends a Level 3 Nextel text alert to incident management clients, notifying them that the event is cleared.
- SMART SunGuide TMC notifies the on-call manager.
- SMART SunGuide TMC closes the event log.

3.5 South East Florida Regional TMC Operation Committee (SEFRTOC)

The South Florida Regional ITS Coalition brings together operations with municipal, county, regional and state agencies to ensure compatible implementation of intelligent transportation systems throughout the region. The Southeast Florida Regional TMC Operations Committee (SEFRTOC) has been formed to further the objectives of the coalition by leading initiatives related to day-to-day operations.

Mission

To facilitate regional mobility in Southeast Florida through coordinated transportation management center operations.

SEFRTOC comprises transportation center managers from various districts and agencies in Southeast Florida, as listed below. The committee's objective is to establish a regional approach to ITS operations and incident management through coordinated communication, decision making, and planned resource sharing.

- District IV SMART SunGuide TMC
- District IV Palm Beach ITMS TMC
- District VI Miami-Dade MDX TMC
- District VI SunGuide TMC
- Florida's Turnpike Enterprise

Standard operating guidelines have been developed to assist with meeting the objectives and mission of the committee. The guidelines are intended to clearly identify the partners and partners' resources and to specify the individual roles and responsibilities with regard to interagency communication, DMS messaging structure, resource sharing, documentation, performance measurement, and the incident review process. In 2004, the SMART SunGuide TMC assisted SEFRTOC partners in DMS messaging 95 out of 726 times that our signs were used for incidents.

The committee's continued success will be contingent on the commitment of all partners to continuously provide active participation and continuing improvements in the regional TMC communication protocol. This commitment entails monthly meetings, incident debriefings, and a regional approach to incident management.

3.6 Road Ranger Service Patrol

The Road Ranger Service Patrol program is a well received and very successful free service provided to motorists by FDOT.

Mission

Provide free highway assistance services during incidents to reduce delay and improve safety for the motoring public and responders.

In the late 1980s, the service focused on assisting disabled vehicles in construction zones and was first provided in District 4 by a contractor at the Department's direction for the uncompleted section of I-95. In February of 1995, District 4 started the current form of the Road Rangers, which initially covered the I-95 70-mile long corridor throughout Broward and Palm Beach Counties. The program has since been expanded to include all types of roadway incidents; it has become one of the most effective of FDOT's incident management programs. In December 1999, the department began funding the program statewide.



Florida's program deploys some 88 patrol vehicles servicing 918 centerline miles. In Broward County, 11 vehicles cover 57.73 centerline miles, which includes I-95 (25.29 centerline miles), I-75 (19.58 centerline miles), and I-595 (12.86 centerline miles). Note, however, that I-75 coverage only extends from the Miami-Dade county line to the east toll plaza at Alligator Alley.

The Broward County Road Ranger fleet consists of the 11 daytime (6:00 am–7:00 pm) and 6 nighttime (7:00 pm–6:00 am) service patrol vehicles deployed Monday–Friday. Currently, the Road Rangers are dispatched from the SMART SunGuide TMC during those hours. On weekends, only 6 vehicles cover the 6:00 am–7:00 pm and the 7:00 pm–6:00 am shifts and dispatch of the Road Rangers is handed over to FHP. Once the TMC goes to round-the-clock operations, all service patrol vehicles within Broward County will be dispatched from the SMART SunGuide TMC.

3.6.1 Services Performed

The Broward County Road Rangers continuously rove I-95, I-75 and I-595 looking for stranded motorists, roadway debris, traffic accidents, or other events that affect the normal flow of traffic. The following *free* services are provided by the Road Rangers:



- Change flat tires
- Jump-start vehicles and make minor repairs
- Provide stranded motorists two free local calls
- Clear disabled vehicles from travel lanes
- Clear debris from travel lanes
- Supply emergency gasoline, diesel, water
- Monitor abandoned vehicles and notify FHP
- Provide maintenance-of-traffic (MOT) services during incidents

The Road Ranger trucks are equipped, at a minimum, with the following items:

- | | | |
|---------------------------|----------------------|----------------|
| ➤ 5 gallons of speedy dry | ➤ cell phone | ➤ wood blocks |
| ➤ flashing arrow board | ➤ first aid kits | ➤ gas / diesel |
| ➤ public address system | ➤ 2-ton jacks | ➤ auto fluids |
| ➤ reflective cones | ➤ fire extinguishers | ➤ flares |
| ➤ booster cables | ➤ air compressor | ➤ water |

To present a professional appearance, the drivers are required to wear uniforms and name tags. They are very courteous and provide excellent customer service. A comment card is given to every assisted motorist, requesting mail in feedback on their experience. Responses have been extremely positive and the program is a major success. Samples of actual Road Ranger Feedback and thank-you letters will be available by the end of January 2005 on our new Web site: www.smartsunguide.com.

3.6.2 Road Ranger Training

Essential to the success of the Road Ranger program is the training of the drivers in areas such as safety, emergency response, first aid, CPR, communication protocols, and maintenance-of-traffic (MOT) procedures. Many of these areas are covered under a Statewide Training Program. Statewide Road Ranger basic training includes the following 12 modules:

- Module 1: Road Ranger History
- Module 2: Traffic Incident Management
- Module 3: District Contract/Scope
- Module 4: Vehicle Inspection
- Module 5: Road Ranger Safety
- Module 6: Florida's Laws/Statutes
- Module 7: Road Ranger Etiquette
- Module 8: System Security
- Module 9: Relocating Vehicles
- Module 10: Communications
- Module 11: General
- Module 12: Maintenance of Traffic

Training in other areas not covered by the Statewide Training, such as first aid and CPR is provided locally. Most Road Rangers have already taken these courses, or will take them in the near future.

3.7 Traffic Incident Management (TIM Team)

Traffic incident management (TIM) is one of several successful proactive programs designed to assist our regional TMCs with incident management and surface transportation-related activities throughout South Florida.

According to the Federal Highway Administration (FHWA), traffic incident management is the planned and coordinated program process to detect, respond to, and remove traffic incidents, restoring traffic capacity as safely and quickly as possible. This coordinated process involves a number of public and private sector partners, including the following agencies and services:



working together... making a difference

- Law enforcement
- Fire and rescue
- Emergency medical services
- Transportation
- Public safety communications
- Emergency management
- Towing and recovery
- Hazardous materials contractors
- Traffic information media

3.7.1 TIM Protocol

The TIM protocol brings together the various agencies responsible for responding to incidents. They address the issues that arise as a result of the diverse institutional functions and individual agency goals.

The multi-agency TIM partners meet bimonthly in Broward County to discuss issues and identify solutions related to incident management. The TIM team in Broward County has approximately 60 members. To maintain momentum and increase productivity, the teams typically break out into working groups. The working groups are specific to certain aspects of the incident management process, and each group's members have expertise or special interest in that particular area. Each team has developed a mission statement and tasks for which they are responsible. More information about the TIM program will be available by the end of January 2005 on our new web site (www.smartsunguide.com).

3.7.2 Severe Incident Response Vehicle

The Severe Incident Response Vehicle (SIRV) pilot program consists of one leased vehicle (Exhibit 6) that is available around the clock to serve as an incident command station and FDOT liaison during major incidents. The pilot program will be conducted for one year within Broward County; it will also serve as the basis for developing the final requirements for a comprehensive SIRV program for District IV.

The SIRV vehicle is a Ford F350 dual-wheel, covered, utility body truck with a red strobe light system and siren to facilitate emergency response. There are two telescoping high-intensity floodlights on the front of the truck, and two fixed high-intensity floodlights on the rear. A computer docking station in the front seating area enables staff to use a laptop computer to support incident command functions. The onboard digital video camera system, with still-shot capability, allows real-time incident footage to be sent out to other agencies via a wireless Internet system. There is a self-contained radio system with 6 portable radios that are given to each responding agency's commander, providing a common channel for communication among incident responders at the scene. The truck also carries traffic management and hazardous spill equipment such as cones, signs, flares, "oil dry," and fuel-absorbent materials.

The SIRV vehicle will be based at the SMART SunGuide TMC. SIRV staff provides improved coordination and communication between Road Rangers and incident response team members in the field, as well as with TMC operations and FDOT maintenance staff. The SIRV staff also conducts incident debriefings, assists with audits of the Road Ranger vehicles, prepares incident report summaries, and other administrative functions (when not dispatched in the field).

Following the one-year SIRV pilot program, an evaluation report will be prepared to document performance and SIRV program recommendations for the future. SIRV pilot program evaluation criteria will be both quantitative and qualitative. The evaluation criteria will utilize incident data currently being collected, as well as new incident data to be collected by SIRV staff. The evaluation will include perception surveys of all primary incident management agencies and departments.



Exhibit 6: Severe Incident Response Vehicle (SIRV)

4.0 ITS DEPLOYMENTS

In addition to the many programs mentioned earlier, FDOT has implemented a very aggressive plan to deploy ITS systems along designated freeways in Broward County. As ITS components continue to be deployed, these systems will provide superb coverage of Broward County's surface transportation system, interfacing with other TMCs within the region and enabling the TMC partners to achieve their mission and vision statements.

The 83.55 centerline miles of freeway under FDOT District IV Broward County's jurisdiction include I-95 (25.29 centerline miles), I-75 (45.40 centerline miles), and I-595 (12.86 centerline miles). There are two ongoing deployment projects, termed Phase I and Phase II. In addition to current deployments, exhibit 7 illustrates that by the completion of Phase I (2005), at least 40 percent of centerline miles will be covered by DMS and fiber optic communication, 45 percent will be covered by CCTV, and 46 percent will be covered by detectors. By the completion of Phase II (2007), 100 percent of District IV Broward County's centerline miles on freeways will be covered by ITS devices. The following sections provide an overview of Phase I and Phase II projects.

ITS Field Devices	Current Deployment		By End of Phase I (2005)		By End of Phase II (2007)	
	Number of Systems (I-95, I-595, I-75)	Centerline Miles Covered	Number of Systems (I-95, I-595, I-75)	Centerline Miles Covered	Number of Systems (I-95, I-595, I-75)	Centerline Miles Covered
DMS	31	40%	31	40%	41	100%
CCTV	0	0%	45	40%	100	100%
Detectors	0	0%	106	40%	230	100%
Fiber Optics	33	40%	33	40%	83	100%

Exhibit 7: Current and Future ITS Deployments

4.1 Phase I

Phase I involves the deployment of a fully operational CCTV traffic video monitoring subsystem (45 cameras) and traffic detection subsystem (106 detectors) along the I-595 and I-95 corridors within Broward County. The project also includes designing, furnishing, installing, integrating, testing, training, and documenting the system and its processes. These subsystems will be used to detect and verify incidents occurring on the freeways in support of the Department's I-95/I-595 DMS subsystem that is currently in operation.

The scope of work will include deployment of central and field components and upgrading of the I-95/I-595 communication system. The system will include central and field component deployment, in addition to upgrading to an Ethernet-based system to support the CCTV camera surveillance and traffic detection subsystem deployment.

The design of the Phase I project has been completed. The construction process began on December 6, 2004, and is expected to be completed by the end of October 2005.

Phase I of the SMART SunGuide project entails the following improvements to the freeway system within Broward County (I-95, I-75, and I-595):

- Provide additional ITS coverage on I-95 and I-595 (from I-95 to Hiatus).
- Deploy CCTV cameras (approximately one per mile).
- Deploy traffic/vehicle detectors (approximately one every half-mile).
- Establish an Ethernet communications backbone.
- Implement a video wall upgrade.

4.2 Phase II

Phase II is a design/build project in Broward County that incorporates engineering, designing, furnishing, installing, integrating, testing, documenting, and providing training on a fully operational fiber optical/wireless communication network (approximately 50 miles) subsystem; a CCTV camera surveillance subsystem (approximately 55 cameras); a DMS subsystem (approximately 10 DMSs); a traffic detection subsystem along the I-595 and I-75 corridors (approximately 124 detectors); and an upgrade of the video wall subsystem from 9 cubes to 33 cubes (24" × 67" each) in the SMART SunGuide TMC.

The subsystems will be provided, implemented, or installed for the I-75 corridor in Broward County between the Miami-Dade/Broward county line and the Collier/Broward county line (including the segment from south of Sawgrass Expressway to the I-595/I-75 interchange); the I-595 corridor between I-75 and 1,000 feet east of the Pine Island Road interchange; and along I-595 between the interchange with I-95 to the terminus (eastward) of I-595. The requirements also address upgrades to fiber optics of the nine existing DMS that are currently using dial-up connections.

All devices deployed from the Phase II project will be integrated into the Phase I system, and will be monitored and controlled from the SMART SunGuide TMC. Highlights of the Phase II project on Broward County–owned freeways (I-95, I-75, and I-595) include the following:

- Provide complete ITS coverage on I-75 and I-595.
- Deploy additional CCTV, detection, and DMS units.
- Complete the deployment of fiber optics.
- Complete the next stage of the video wall upgrade.
- Complete the deployment of CCTV cameras (one approximately every mile).
- Complete deployment of traffic/vehicle detectors (one approximately every half-mile).
- Complete the Ethernet communications backbone.

4.3 SMART SunGuide Software

System Management for Advanced Roadway Technologies (SMART) is the latest version of the database software FDOT District IV Broward County is installing in the SMART SunGuide TMC. It will replace the FDOT Incident Database System (FIDS) software and the Incident Tracking Data System (ITDS). The SMART system will provide a means for the TMC staff, the Road Rangers, the SIRV operator, the FDOT District IV ITS maintenance staff, and FDOT District IV personnel to interact directly through a single, central system. The advantages of such a system include live access to data for all types of traffic events; common interfaces from disparate, distributed locations; and support for mobile data collection from the Road Rangers and the SIRV.

The system is specifically designed to address the data management needs of the FDOT District IV traffic management centers in Broward and Palm Beach Counties, but with sufficient flexibility to include other TMCs from other FDOT districts. The elements of the design, including tagging all data with district and county labels, permit compatible extension beyond the region, whether for data sharing with adjacent districts or for use by others who need a similar capability.

4.4 Statewide SunGuide Software

The statewide SunGuide software is being developed by the central office of the Florida Department of Transportation. This software will be available to all TMCs in Florida. SMART SunGuide TMC is the test site for developing the software; the TMC will begin implementation in 2005. The goal of the SunGuide software is to integrate all of the common functions needed by a TMC operator into one easy-to-use application. The SunGuide software merges into one tool the ability to control cameras, display images on the video wall, post messages to DMS signs, track incidents occurring on the roadways, and track data from roadside traffic/vehicle sensors.

Currently, most districts are using a number of applications that have either been created in-house or are provided by the manufacturers. This requires TMC operators to learn multiple tools to be able to perform their jobs. Additionally, each TMC has different software, depending on the hardware they have in the field. The SunGuide software brings all of this together into one tool that can be consistent across all TMCs.

5.0 2004 PERFORMANCE MEASURES

Monthly, quarterly, and yearly performance measurements are important tools to determine progress, help set goals and standards, detect and correct problems, improve processes, and document accomplishments. SMART SunGuide TMC proactively documents and tracks the performance of existing systems and programs, using a high-standard filing system that follows ISO 9001 standards. Our 2004 performance measurements are based on information collected and documented throughout the year; they will serve as a baseline for future measurements.

SMART SunGuide TMC currently collects performance data via three existing databases: the FDOT incident database system (FIDS), the incident tracking database system (ITDS), and the Road Ranger contractor's database. The FIDS is a customized Microsoft Access database used by the SMART SunGuide TMC operators to collect incident management and ITS device maintenance data. The ITDS is a Web-based SQL Server database application used by the TIM team to assess incident data on more severe incidents. The data is manually collected by Road Rangers—using supplemental incident data forms—and entered into the ITDS. This data supplements the data collected by the Road Rangers contractor, which includes data on services performed.

The SMART software will be deployed in 2005 to improve the reliability of the data collection process by integrating all three data collection processes and placing the data into one central database. The SMART software will be deployed in 2005, and will become the data source for future performance measure analyses. In addition to providing real-time information on traffic conditions, the SMART software will make data readily available for the public and government agencies to use for statistical analysis. The following sections provide an overview of the data collected for measurements of both system availability and operational performance in 2004.

5.1 System Availability

To ensure that our ITS assets are available as needed, avoid/minimize downtime, reduce total cost of operation, improve effectiveness, and extend the life of ITS assets, the SMART SunGuide TMC employs an ITS maintenance contractor. The ITS maintenance contractor performs regularly scheduled preventative maintenance, and is required to be readily available 24 hours a day/7 days a week to resolve issues with the DMS. The ITS maintenance contractor's responsibilities will expand as new ITS devices come on line.

Like all TMCs and other industries using technology solutions, SMART SunGuide TMC's goal is to maintain the availability of the systems to maximize the benefits of ITS. One of the goals for 2005 is to develop system availability requirements for each of the major ITS subsystems. A white paper will explore the technical aspects of this topic, and better define the way system availability will be measured in the future.

For purposes of this report, system availability is described in terms of uptime percentage (a measure of the percentage of time the system or service is available). Below are charted performance rates generated for our ITS field devices and office systems. Availability statistics in this report do include downtime for routine maintenance activities and equipment damage due to hurricanes and other weather-related failures.

5.1.1 Field Devices

Currently, the primary field devices for the SMART SunGuide TMC are DMSs, which includes the sign, controller, housing, and modem. Exhibit 8 illustrates that our DMS availability was above 90 percent for 10 out of the 12 months, with an overall availability average for the year of 93.83 percent. In June 2004, the DMS system communications were down for six days. As a

result, all DMS were down for those six days as well. In September 2004, our system's performance took a hit due to the extensive hurricanes (see section 6.0).

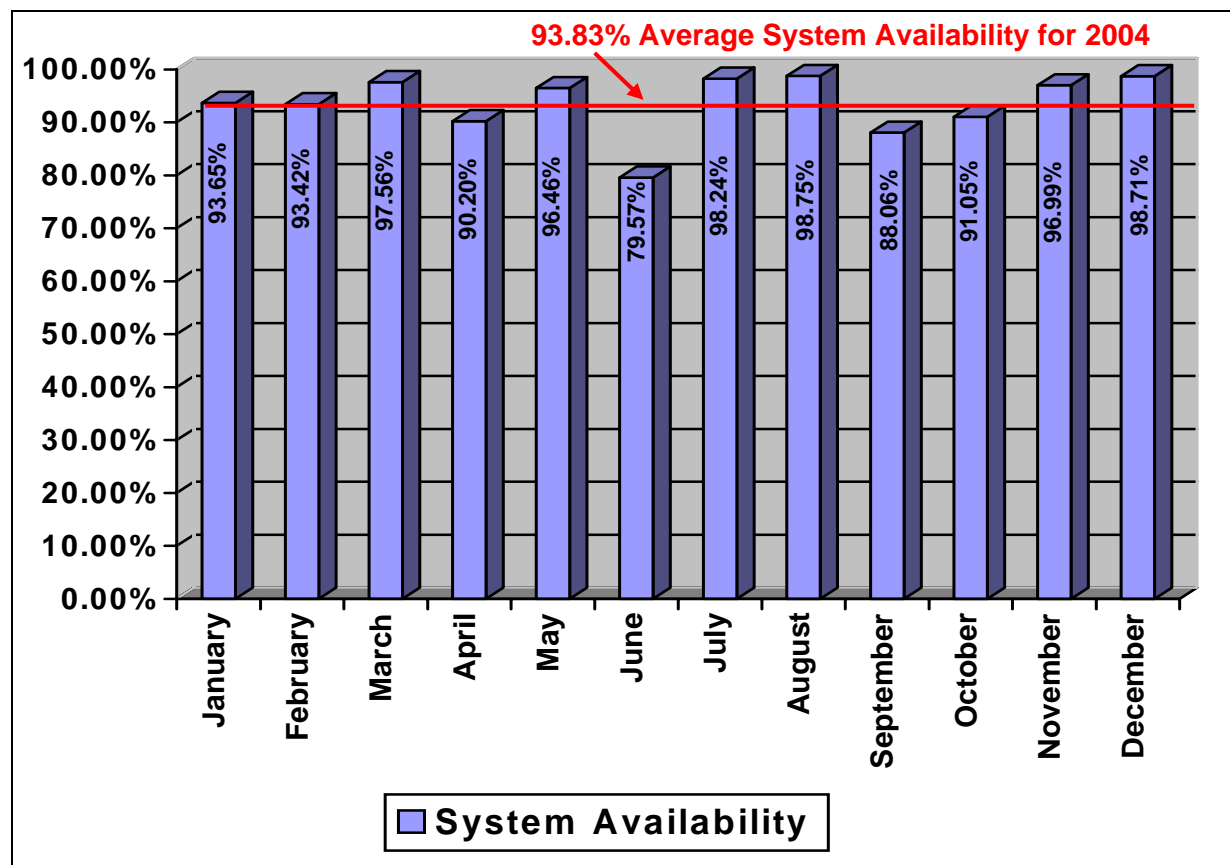


Exhibit 8: Field Device System Availability for 2004

5.1.2 Office Systems

The office systems associated with this 2004 performance availability review are as follows:

- **Central Computer System (CCS)** – The software and server that controls the dynamic message sign (DMS) system.
- **FDOT Incident Database System (FIDS)** – The proprietary incident management database used to record and track incident data, create/send emergency e-mail notifications, generate incident reports, and to input equipment malfunctions, equipment inventory, and equipment warranties.
- **BARCO Video Wall** – The 201-inch center matrix video wall that allows operators to display and manipulate CCTV cameras, graphical images, and other data on the large screen.

Exhibit 9 illustrates that our CCS, FIDS, and the BARCO video wall systems performed well in 2004, with annual availability rates of 99.20 percent, 99.72 percent, and 99.29 percent, respectively. Since the BARCO video wall did not come on line until September 20, 2004, the system availability calculation for that system only considered October, November, and December of 2004.

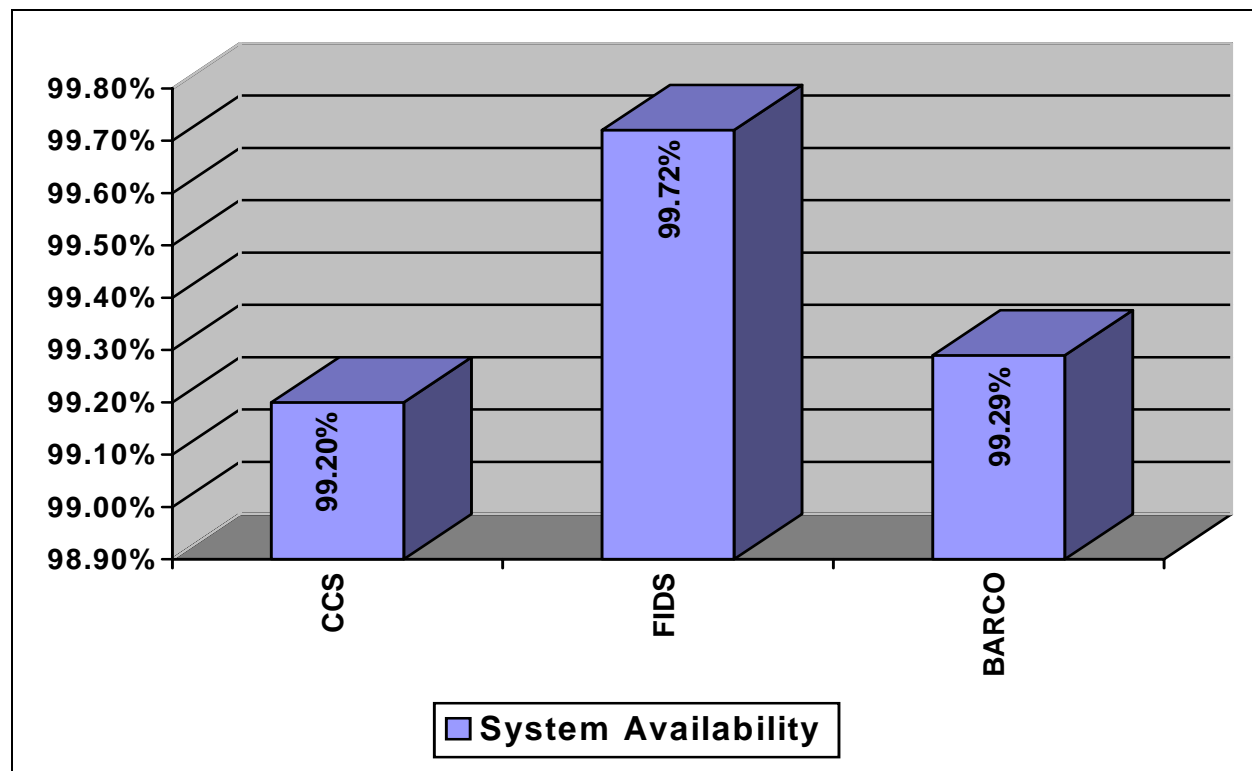


Exhibit 9: Office Systems Availability for 2004

5.2 Operational Performance

From 2003 to 2004, the SMART SunGuide TMC has used a modified Microsoft Access database called FIDS to record and track incident and activity data such as arrival and departure times, incident durations, equipment/systems availability, accidents, disabled vehicles blocking travel lanes, disabled vehicles on shoulder, special events, and debris in the roadway. In addition to the Broward County data, the SMART SunGuide TMC collects traffic-related information in other areas. Below is a list of the 37 distinctive types of information that are routinely collected and documented into FIDS.

1. Total recorded activities.
2. Total recorded incidents with travel lane closures.
3. Incidents involving commercial vehicles.
4. Incidents with reported injuries.
5. Recorded Palm Beach County activities, by roadways.
6. Recorded Broward County activities, by roadways.
7. Recorded Miami/Dade County activities, by roadways.
8. Recorded Martin County activities, by roadways.
9. Recorded Palm Beach County incidents with travel lane closures, by type.
10. Recorded Broward County incidents with travel lane closures, by type.

11. Recorded Miami/Dade County incidents with travel lane closures, by type.
12. Recorded Martin County incidents with travel lane closures, by type.
13. Total recorded average incident duration, by type.
14. Recorded Palm Beach County average incident duration, by type.
15. Recorded Broward County average incident duration, by type.
16. Recorded Miami/Dade County average incident duration, by type.
17. Recorded Martin County average incident duration, by type.
18. Recorded Palm Beach County incidents with travel lane closures, by lanes closed.
19. Recorded Broward County incidents with travel lane closures, by lanes closed.
20. Recorded Miami/Dade County incidents with travel lane closures, by lanes closed.
21. Recorded Martin County incidents with travel lane closures, by lanes closed.
22. Total recorded incidents with travel lane closures, by level.
23. Recorded Palm Beach County incidents with travel lane closures, by level.
24. Recorded Broward County incidents with travel lane closures, by level.
25. Recorded Miami/Dade County incidents with travel lane closures, by level.
26. Recorded Martin County incidents with travel lane closures, by level.
27. Number of Road Ranger calls logged, by zone.
28. Requests for Road Ranger assists, by source.
29. Road Ranger activity.
30. Incident - DMS statistics.
31. Number of emergency road work patterns.
32. Road work - DMS statistics.
33. Incoming call source.
34. Outgoing calls from the TMC .
35. Average daily operational field equipment percentage.
36. Central hardware/software operational percentage.
37. Communications operational percentage.

Within each of these 37 categories, the SMART SunGuide TMC operations unit further classifies the information into as many as 29 subcategories. This data is collected via telephone communications with various public and private organizations. The magnitude of information collected is evident from the 71,218 incoming and outgoing annual calls processed by operators. This demonstrates that the SMART SunGuide TMC is a central hub for traffic-related information. Descriptions and statistics for five of the listed items are provided below.

5.2.1 Total Recorded Activities

Exhibit 10 diagrams item #1 data “total recorded activities,” and illustrates the monthly totals of TMC-recorded activities and the annual total of 22,798 activities for 2004. Activities are events entered into the FIDS by the operator, and may represent anything from a severe incident to a Road Ranger assist to emergency roadwork. In January the TMC was operating with one operator and one supervisor per shift between 8:00 am and 5:00 pm. By December, the operations staff and hours of coverage expanded, reaching 24 hours a day/5 days a week. As a result, the Broward SunGuide TMC has more than doubled its activities from January 2004 to December 2004. With the deployment of additional ITS devices and by expanding the hours of operation to 24 hours a day/7days a week, the SunGuide TMC expects to detect, dispatch, and document substantially more activities in the coming year.

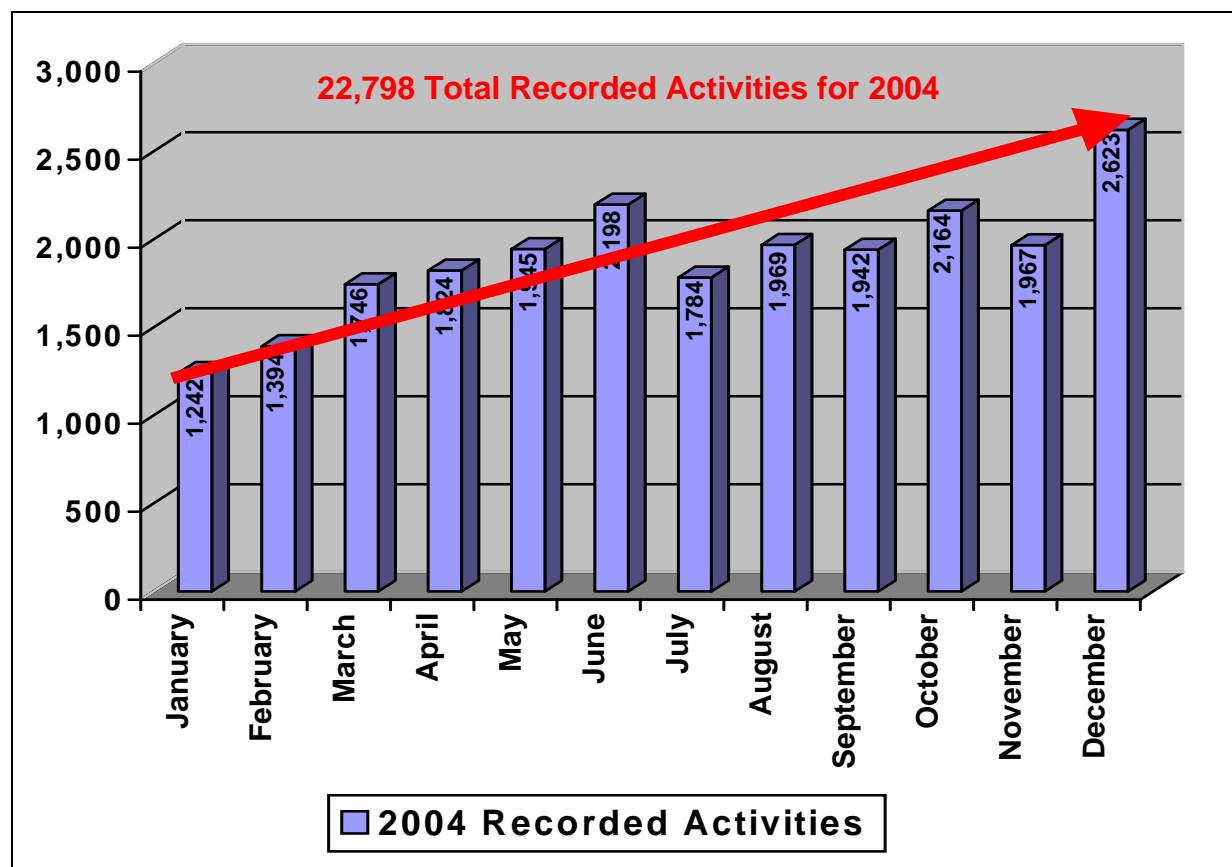
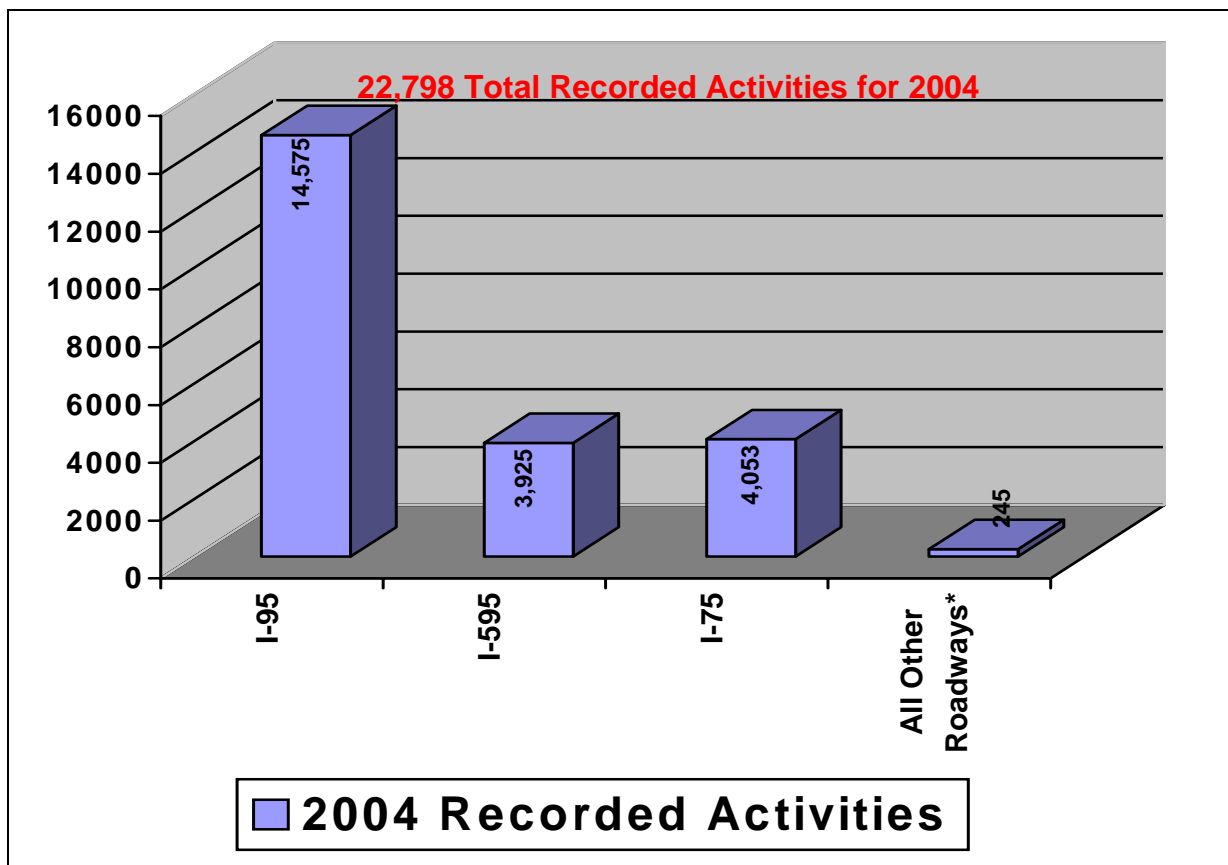


Exhibit 10: SMART SunGuide TMC Recorded Activities for 2004

5.2.2 Recorded Broward County Activities, by Roadways

Exhibit 11 depicts item #6, “Recorded Broward County Activities, by Roadway,” and illustrates that more than half the total activities are associated with I-95. It is important to note that “All Other Roadways” category only includes activities on other roadways when the TMC was notified by the agency responsible for each such roadway. Therefore, the 245 activities may not reflect the actual level of activity on roadways outside of the SMART SunGuide TMC jurisdiction.



* - Includes SR 869, Fla Tpke, and US 1 in Broward County. Activities are logged when another agency contacts Broward TMC to report an activity on their roadway.

Exhibit 11: SMART SunGuide TMC Activities, by Roadway for 2004

5.2.3 Request for Road Ranger Assists, by Source

As indicated earlier, Broward County Road Rangers are dispatched from the SMART SunGuide TMC during operating hours. Exhibit 12 illustrates the number of requests for Road Ranger assists, by requesting source. These requests don't include when the Road Ranger is the first responder. As indicated by exhibit 12, the Florida Highway Patrol (FHP) is the primary source (88 percent) requesting Road Ranger assistance in responding to incidents. However, this is expected to change in 2005 as broader CCTV coverage is implemented, enabling the SMART SunGuide TMC operators to expand their use of CCTV for incident detection. The SMART SunGuide TMC operators detected and requested Road Ranger assistance 96 times through the use of just one CCTV over a period of three months. As the use of this technology is expanded, it is expected that the CCTV will be the primary source for identifying Road Ranger assistance requirements.

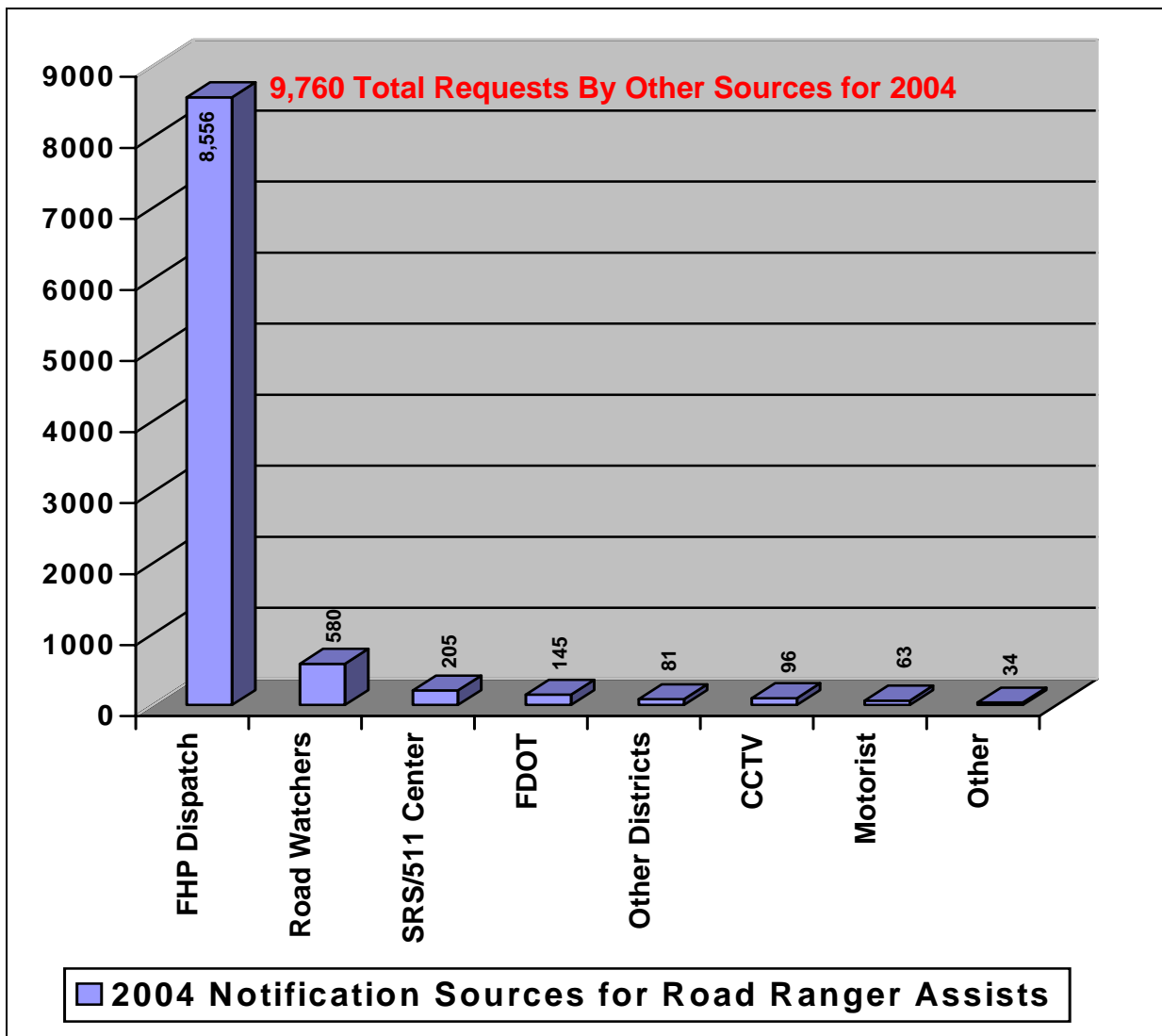


Exhibit 12: Notification Sources for Road Ranger Assists for 2004

5.2.4 Road Ranger Activity

Exhibit 13 illustrates that Road Rangers provided 47,716 motorist assists on I-95, I-75, and I-595 within Broward County. This number is greater than “Requests for Road Ranger Assists” because Road Ranger activity includes situations where a Road Ranger is a first responder, or the first to detect an incident. In general, the Road Rangers are the first responders 70 to 80 percent of the time. The Road Rangers may also provide multiple services when responding to an incident (such as changing a flat tire and towing a disabled vehicle to the shoulder).

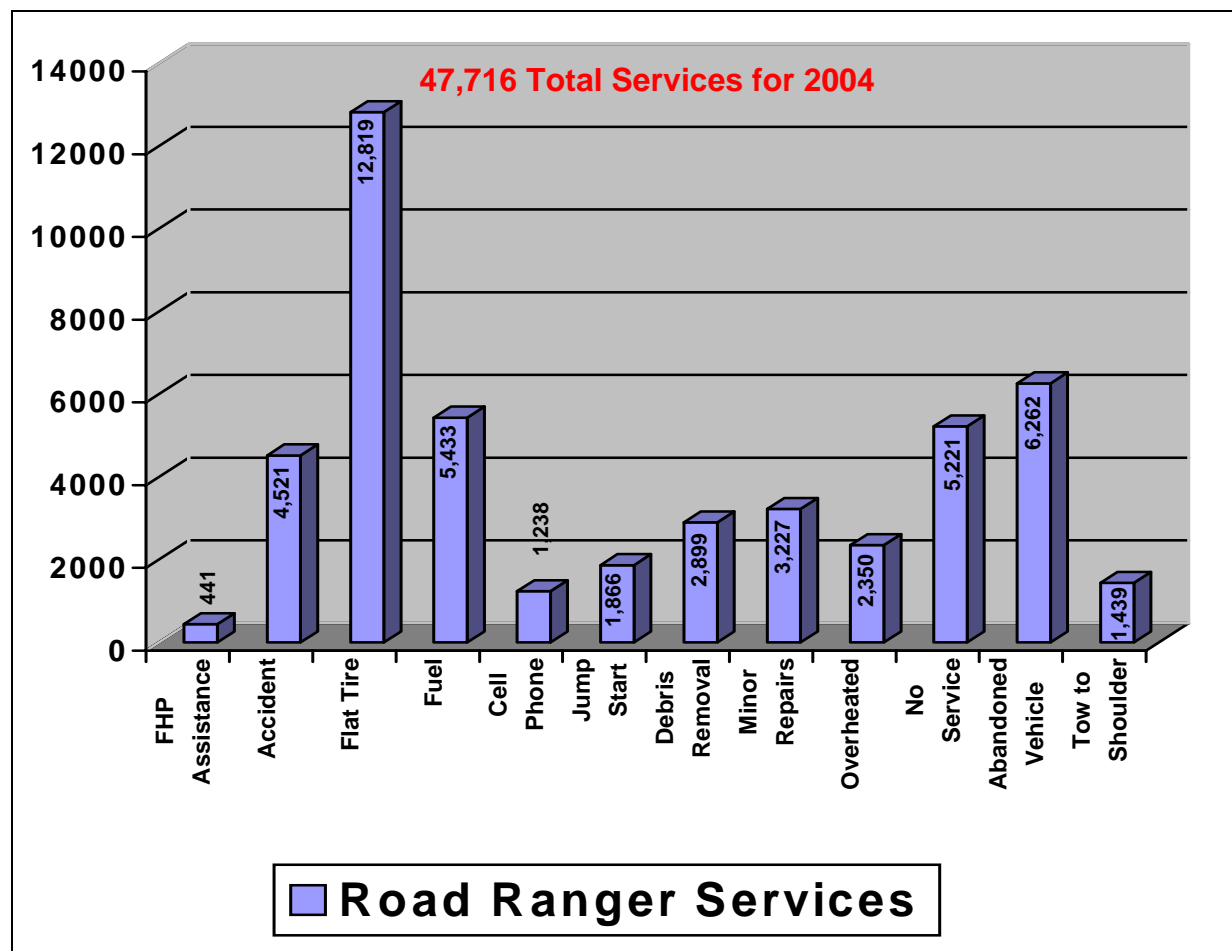


Exhibit 13: 2004 Road Ranger Services for 2004

5.2.5 Dynamic Message Sign Utilization

Dynamic Message Sign (DMS) utilization is collected and categorized by usage (incidents vs. road work). Data is collected showing each time the DMS system is used, and the number of signs activated for each event. The SMART SunGuide TMC policy regarding DMS usage is to only post messages for live lane-blockage events after they have been verified by a Road Ranger or responding agency at the event scene. This policy was established to ensure that the information posted is as accurate as possible, thereby fostering a high level of trust regarding the information displayed on the DMS. This DMS policy will probably change when additional ITS devices are deployed, allowing events to be verified by CCTV and congestion to be monitored by detectors. The deployment of CCTV and detectors will result in a shorter verification time, while adding the ability to determine the exact nature, impact, and duration of the incident. This will result in a higher utilization of the DMS system.

Exhibit 14 depicts our proactive approach for using DMS. The SMART SunGuide TMC operations staff posted messages for 726 lane-blocking incidents, using an average of about three DMS for each incident. In addition to the utilization of DMS for incidents, the DMS were used for eight different road work activities.

DMS Statistics	January	February	March	April	May	June	July	August	September	October	November	December	Total
Total no. of DMS signs utilized	155	285	266	176	161	181	94	208	154	150	197	280	2,307
No. of incidents utilizing DMS	38	48	75	69	60	72	33	74	50	62	60	85	726
Average no. of DMS per incident	4	6	4	3	3	3	3	3	3	2	3	3	3.33
Average DMS message duration	48	69	83	38	36	43	87	63	116	65	140	66	71

Exhibit 14: DMS Utilization for Incidents in 2004

6.0 Activities and Achievements

6.1 Hurricanes

The summer of 2004 brought a wave of unusual weather to South Florida. In addition to record-setting rainfall, several devastating hurricanes hit our region in a period of less than two months:

- Hurricane Charley (August 13, 2004)
- Hurricane Frances (September 2, 2004)
- Hurricane Ivan (September 9, 2004)
- Hurricane Jeanne (September 25, 2004)



The SMART SunGuide TMC took a very proactive approach during the 2004 hurricane season, initiating activities and providing services such as the following:

- Holding emergency staff meetings to develop hurricane response plans for each stage (i.e., before, during and after the storm).
- Conducting conference calls with SEFRTOC partners to discuss regional DMS messaging plans.
- Meeting and coordinating with other regional incident management partners.
- Creating operator/manager staffing schedules for each stage of the hurricane.
- Utilizing all available resources to monitor hurricane watch and warning activities.
- Creating unique FIDS incident reports documenting all hurricane activities.
- Posting messages on DMS (e.g., advising motorists of toll suspensions on the Florida Turnpike).
- Providing notifications and updates to the public information officer and the district engineer.
- Extending hours of operation as necessary (including weekends).
- Coordinating FHP and Road Ranger procedures for shutting down operations (e.g., leaving roadways) when sustained wind speeds reach 35–40 mph.
- Assessing and documenting DMS and other ITS equipment status/problems after the storm.
- Dispatching the maintenance contractor to service failed equipment.
- Verifying the safety of each staff member by contacting one another using the TMC staff contact list. Developed a plan for driving to the homes of staff members who had been unreachable.
- Verifying the operational status and safety of SEFRTOC partners, offering assistance in case of power outages or structural damage to their facilities.

6.2 Toys for Tots Event

The 17th Annual Toys in the Sun Run (Toys for Tots) was held on Sunday, December 5, 2004. This motorcycle toy run attracted over 30,000 participants, and required the coordinated effort of 22 police departments and 230 officers to close down three interstate highways in order to ensure the safety of the motorcade and parade. Since the event's inception, over \$20 million worth of toys has been collected and handled by the Fraternal Order of Police and then distributed in four counties in South Florida.



The SMART SunGuide TMC proactively assisted in this event by providing staff coverage and multi-day use of our DMS. Days before the event, the SunGuide Broward TMC began warning motorists of the upcoming special event. Since the actual event occurred on the weekend, staff worked overtime to document and monitor the event, display and update messages as the event progressed, and finally close the event out.

The SMART SunGuide TMC also coordinated with fellow SEFRTOC members from Florida's Turnpike Enterprise and Palm Beach ITMS to help advise affected motorists of road closures. Real-time information was also disseminated to the 511/SmarTraveler system.

Since the event ended in the vicinity of our CCTV camera on I-595, the TMC operator was able to access and view real-time information on the parade. The CCTV camera also allowed the operator to spot the extremely heavy traffic behind the procession and notify 511/SmarTraveler and the TMCs of the delay.

Once the event ended and all lanes were reopened, Florida's Turnpike Enterprise, the Palm Beach ITMS, and the 511/SmarTraveler system were notified, and all signs were blanked.

6.3 Awards

The SMART SunGuide TMC developed six awards to recognize the excellence, commitment, and hard work demonstrated by supporting members of the ITS team:

- Road Ranger Service Patrol Program Award – Presented to a Road Ranger who shows dedication, commitment, and loyalty in providing services to motorists in need.
- Road Watcher Program Award – Presented to an individual who displays particular devotion to providing assistance and protecting motorists' safety.
- ITS Maintenance Program Award – Presented to an individual who demonstrates dedication to the upkeep and maintenance of the systems within the ITS maintenance program.
- ITS Management Team Award – Presented to the individual who depicts great leadership, dedication, and innovation.
- ITS Operations Team Award – Presented to an operator who “goes that extra mile” by mentoring other operators while consistently providing excellent customer service.
- Traffic Incident Management Team (TIM Team) Award – Presented to an individual who shows dedication and commitment to the team by his or her participation, time, effort, and contributions to each TIM meeting.

The continuous commitment and hard work of our SMART SunGuide team has generated recognition and accolades from fellow transportation organizations and partners, as demonstrated by the following awards:

- Florida Department of Law Enforcement Recognition to Missing Children Program 2002 Award – Awarded to SMART SunGuide TMC on September 9, 2002, in recognition of our efforts and valuable contributions to the successful program used to locate Florida’s missing children.
- The Intelligent Transportation Society of Florida ITS Organizational Member of the Year 2003 Award – Awarded to FDOT District IV on December 2, 2003, in recognition of outstanding services to ITS Florida.
- The I-95 Corridor Coalition Improvement of Transportation Network for Region Award 2004 Award – Awarded by the 2004 executive board leadership to FDOT District IV for cooperation and partnership with the I-95 Corridor Coalition in their efforts to improve the transportation network in the region.
- The Intelligent Transportation Society of Florida TIM Team Award – Awarded to FDOT District IV on December 7, 2004, in recognition of outstanding leadership and innovation for ITS applications.



6.4 Public Outreach

The SMART SunGuide TMC’s staff (exhibit 15) is dedicated to serving our customers to the highest degree—even as we work together as a team to become the best TMC in the nation. In 2004, The SMART SunGuide TMC developed the concept and design for two special public outreach projects that will be completed in 2005. Since the public is our #1 customer, we will introduce a very educational and informative Web site to serve them. In addition, an ITS kiosk will be deployed inside the TMC to give the public a “hands on” experience with operating ITS systems.



Exhibit 15: SMART SunGuide TMC Staff

6.4.1 New TMC Web Site

Our new Web site, www.smartsunguide.com, will contain a host of traffic, TMC operations, incident management, training, and other significant information. It also includes a public forum where transportation-related information and ideas can be shared and questions presented. Below is a list of the items that will be available on our Web site.



- Traveler information
- Maps
- ITS device descriptions
- Data
- Operations
- Public forum
- TMC history
- Future deployment plans
- Photo archives
- Frequently asked questions (FAQs)
- Acronyms
- Projects/programs
- TMC operator training programs and materials
- Annual reports
- Newsletters
- Games
- Driver education
- Animation on system operation/operator interface

6.4.2 ITS Kiosk

An interactive ITS kiosk is deployed in the main lobby of the SMART SunGuide TMC. The kiosk is equipped with a computer, touch-screen control monitor, keyboard, and joystick. Attached to the kiosk is an actual ITS hardware structure containing an interactive demo pan/tilt/zoom (PTZ) color dome CCTV camera, a full-matrix LED DMS, a sample control cabinet, and a flat panel monitor (exhibit 16). In addition to receiving traveler information, the kiosk allows hands-on interaction with the various ITS devices to view, control, and even display messages on the DMS.



Exhibit 16: SMART SunGuide ITS Kiosk

7.0 BENEFIT-COST ANALYSIS

A benefit-cost analysis was performed for 2004. The benefit-cost analysis calculates the benefit/cost ratio. The benefit/cost ratio is used to determine the effectiveness of SMART SunGuide TMC programs. If the benefit/cost ratio is greater than 1.0, then the SMART SunGuide TMC programs are considered to bring *value* to the public. While SMART SunGuide TMC provides regional benefits, this section focuses on benefits specific to Broward County. In addition, this section doesn't factor in any qualitative benefits to the public. A method for measuring qualitative benefits will be developed in 2005 and will become part of this section in the future.

7.1 Benefits

This section estimates quantifiable benefits that are provided to motorists; the data is used in the benefit-cost analysis. These estimated benefits are conservative because they only consider the reduction in delay as a result of reducing incident duration. They don't consider reduced travel time savings that occur when motorists divert to avoid delays.

Exhibit 17 summarizes the incident data used for the analysis. The data was extracted from FIDS for 2003 and 2004. The data was further reviewed to identify incidents located on main-line travel lanes along I-95, I-595 and I-75. Ramp incidents were excluded because the ramp incident may or may not affect main-line traffic. The incidents are classified into three levels: Level 1 has lanes blocked for less than 30 minutes; Level 2 has lanes blocked for 30 minutes or more, but less than 120 minutes; and Level 3 has *all* lanes blocked for any period of time, or individual lanes blocked for greater than 120 minutes. Exhibit 17 also shows that the average incident duration was reduced by 7.29 minutes in 2004 from 2003. Other important observations about the data include the following:

- More incidents were detected and documented in 2004 than 2003 because the SMART SunGuide TMC hours of operation had expanded.
- The number of Level 3 incidents decreased from 2003 to 2004, indicating the number of severe incidents is being reduced. However, the average incident duration for Level 3 incidents increased. Further analysis of the data indicated that there were two incidents that lasted longer than 10 hours, which is skewing the averages.
- The percentage of Level 1 incidents increased in 2004 from 2003, indicating that minor incidents are being cleared quicker.

Incident Type	2004			2003			Difference		
	Total Incidents	Total Lane Block Time (min)	Average Lane Block Time (min)	Total Incidents	Total Lane Block Time (min)	Average Lane Block Time (min)	Total Incidents	Total Lane Block Time (min)	Average Lane Block Time (min)
Level 1	297	5,165	17.39	174	3,018	17.34	123	2147	0.05
Level 2	370	19,243	52.01	248	13,565	54.70	122	5678	-2.69
Level 3	32	6,245	195.16	41	7,096	173.07	-9	-851	22.08
Totals	699	30,653	43.85	463	23,679	51.14	236	6974	-7.29

Exhibit 17: Incident Data Comparison (2004 vs. 2003)

Exhibit 18 translates the reduced incident durations into monetary benefits, such that the data can be used in the benefit-cost analysis. The estimated reduced delay benefits in exhibit 17 assume the following:

- For each minute reduced in incident duration, there is a reduction of five minutes in individual vehicle delay¹.
- A value of \$17.34 per vehicle hour is assigned².
- Vehicles per hour affected per incident is 7,000; this is an estimated average for I-95, I-75, and I-595 based on average annual daily traffic loads.³

Based on these assumptions and available data, the estimated “reduced delay” benefits for 2004 are \$51,543,107. This is a conservative estimate because it doesn’t include any benefits associated with emissions or fuel savings.

Reduced Incident Duration (min)	Number of Incidents	Delay Reduction (Veh-Hrs)	Benefits
7.29	699	2,972,498	\$51,543,107

Exhibit 18: Estimated 2004 Benefits

7.2 Costs

The costs of SMART SunGuide TMC deployments associated with the programs operated from the SMART SunGuide TMC facility were considered in the analysis. The capital, operating, and maintenance costs included in the analysis are summarized in exhibit 19. The capital cost for the I-95/I-595 DMS system (including communications) was annualized based on a 10-year life cycle. The I-95/I-595 DMS system maintenance cost is based on the ITS maintenance contractor’s contract limits. The I-95/I-595 DMS system operations cost includes estimated power and other utility costs. The new SMART SunGuide TMC building capital cost was annualized based on a 20-year life cycle. The new SMART SunGuide TMC building maintenance costs cover from July 2004 to December 2004. From January 2004 to June 2004, the SMART SunGuide TMC operations were conducted in existing office space in the FDOT District IV headquarters building; as such, the maintenance-related costs are negligible. The SMART SunGuide TMC operational support costs are the consultant contract amounts for 2004. The Road Ranger and traffic incident management team costs are contract limits for 2004. Therefore, the total estimated annual cost for SMART SunGuide TMC Programs is \$6,558,081.

7.3 Benefit/Cost Ratio

The \$6,558,081 in annual costs for SMART SunGuide TMC in 2004 was divided into the annual delay benefits for 2004 of \$51,543,107, yielding a benefit/cost ratio of 7.86. Therefore, SMART SunGuide TMC programs brought significant **value** to the public in 2004.

¹ *Freeway Incident Management Handbook*, FHWA-SA-91-056, Federal Highway Administration (FHWA), U.S. Department of Transportation, 1991.

² *Houston TranStar Annual Report 2003*, Texas Department of Transportation, October 2004.

³ *2003 Annual Average Daily Traffic Report*, FDOT Transportation Statistics Office.

Program	Capital Cost	Annualized Capital Costs	Operations Cost	Maintenance Cost
I-95 / I-595 Dynamic Message Sign System ¹	\$11,000,000	\$1,465,471	\$18,600	\$750,000
The new SMART SunGuide TMC Building ²	\$6,700,000	\$576,011		\$150,000
SMART SunGuide TMC Operational Support			\$698,000	
Broward County Road Rangers			\$2,500,000	
Traffic Incident Management Team			\$400,000	
Totals	\$17,700,000	\$2,041,481	\$3,616,600	\$900,000

1 – Annualized capital cost assumes a 10-year design life and 6 percent interest

2 - Annualized capital cost assumes a 20-year design life and 6 percent interest

Exhibit 19: SMART SunGuide TMC 2004 Costs