



# SUNGUIDE® DISSEMINATOR



Florida Department of Transportation's Traffic Engineering and Operations Newsletter

## FDOT's ITS Mobile Communications Assets

By Brian Kopp, The Semaphore Group, Inc.

Six years ago the Florida Department of Transportation (FDOT) acquired a communications trailer and outfitted it with WiFi® and a satellite Internet link to investigate whether the traveling public had an interest in accessing the Internet from their smartphones, personal digital assistants, and laptops. Now, years after that successful initial project, FDOT has moved into a new era of mobile communications. The original communications trailer has been re-tasked as both an emergency response tool and an investigative tool for intelligent transportation systems (ITS) projects and it will be heading to the Florida Keys very soon for a new deployment. In addition, the single trailer has now also become a fleet, being joined by two additional trailers, each with their own specific tasks. FDOT's Transportation Systems Management and Operations (TSM&O) Program now has a growing cache of mobile communications assets that should be able to assist with emergency events and investigative projects in the future.

In 2009, when the original communications trailer was deployed, there were only a few small programs around the country (Texas had the only statewide WiFi system at the time) and FDOT wanted to know if Florida travelers would use the WiFi when they stopped at rest areas. The FDOT communications trailer was used to answer this question without installing costly, permanent equipment at rest areas around the state. Even before that task was completed FDOT saw another use for the communications trailer. With a 100-foot tall telescoping tower onboard, it was



*Original communications trailer.*

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possible to mount cameras high in the air and deploy the communications trailer quickly to provide situational awareness where it was needed during an event or emergency. The Deepwater Horizon oil spill was the first emergency deployment of the original communications trailer and there were more such deployments to follow.

In recent years, the original communications trailer has had several modifications in various refit activities and now includes the following impressive list of features:

- 1) Three pan-tilt-zoom (PTZ), day-night secure web-connected cameras.
- 2) One PTZ forward-looking infrared secure web-connected camera.
- 3) Password protected WiFi Internet service to a radius of ~500 feet.
- 4) A satellite-based weather station including temperature, humidity, pressure, rain, wind speed and direction, and visibility that will soon integrate with SunGuide® software.
- 5) Emergency notification radios including a highway advisory radio and a CB Wizard for communicating directly to commercial truck drivers.
- 6) A vehicular radio repeater to facilitate the interoperability of public safety entities with FDOT road crews and District personnel via voice radio.
- 7) Redundant Internet connectivity via cellular and satellite that fail-over and fail-back when either service goes down and is subsequently restored.
- 8) Redundant power supplies, a propane back-up generator, and solar-assist power panels.
- 9) Real-time alarm monitoring.

With all of the wireless systems that FDOT's TSM&O Program operates and maintains statewide, FDOT has established a strong relationship with the Federal Communications Commission (FCC), both regionally and in Washington. The FCC has asked FDOT for its help by providing access to the original WiFi communications trailer to permit them to establish a point of presence for their Operation Roll Call project. This unique project is a joint effort of the FCC, the Department of Homeland Security, and the Federal Emergency Management Agency to help assess what radio assets are on the air before, during, and after a disaster that affect our infrastructure. By locating a trailer near various large cities, the FCC can monitor the spectrum in real-time via onboard cellular and satellite Internet connections. This important federal and state team effort adds an additional facet to the functionality of the first

communications trailer as a multi-jurisdictional mobile communications asset.

FDOT recognized the success of the original communications trailer, while at the same time understanding that it is a singular resource and at times needs to be taken off-line for maintenance of its many onboard systems. As a result, when FDOT's TSM&O Program identified two additional communications assets that were available, they were immediately acquired and added to the project. Each of the new trailers was slightly different from the first, which is reflected in their tasking.

The second trailer to join the FDOT ITS mobile communications fleet is referred to as the emergency communications trailer, or "EMCOMM Trailer." It has a simple intended mission—provide emergency communications. Like the original trailer, it has redundant satellite and cellular Internet connections and can provide secure WiFi service to the surrounding area. Currently, the EMMCOMM Trailer is deployed at the FDOT District Two headquarters to serve as a back up for the District Emergency Operations Center, should they need it. In addition to WiFi this second trailer also has a vehicular radio repeater onboard, similar to the original communications trailer, which can support FDOT and public safety voice communications interoperability.



*The second trailer to join the FDOT ITS mobile communications fleet - the EMMCOMM Trailer.*

The third trailer in the fleet is known as the logistics trailer. This trailer was initially considered as a back up to the main services on the first two trailers. It currently has cellular Internet connectivity and limited secure WiFi capability. Like the original trailer, this third trailer has a tall telescoping tower onboard. This fall, a newly funded research project at





*The third trailer in the fleet is known as the logistics trailer.*

the FDOT State Traffic Engineering and Operations Office has been identified that may be able to take immediate advantage of this trailer. A large microwave antenna may be temporarily installed on the trailer tower prior to a beach side deployment in Destin, Florida, where the trailer will be used as part of an over-water microwave radio test that may make it possible to enhance the connectivity of the FDOT ITS networks. This new role as an investigative research tool brings the FDOT mobile communications fleet full circle back to where it started. It remains to be seen what else these powerful assets will be called upon to do in their service to FDOT's TSM&O Program.

For information, please contact Mr. Randy Pierce at (850) 410-5608 or e-mail to [Randy.Pierce@dot.state.fl.us](mailto:Randy.Pierce@dot.state.fl.us).

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## Students Learn About ITS as a Career

*By Jim Hilbert, Florida's Turnpike Enterprise Traffic Operations*

For the tenth consecutive year, Florida's Turnpike Enterprise Traffic Operations team participated in the annual South Florida Construction Career Days at the Bergeron Rodeo Grounds in Davie, Florida. Held on October 20 and 21, the event hosted approximately 2,000 high school students from the South Florida area, with more than 600 visiting the Turnpike's Transportation Management Center (TMC) Operations / Intelligent Transportation Systems (ITS) "Learning Lab." The 24 learning labs at the event provided the students with invaluable hands-on demonstrations of

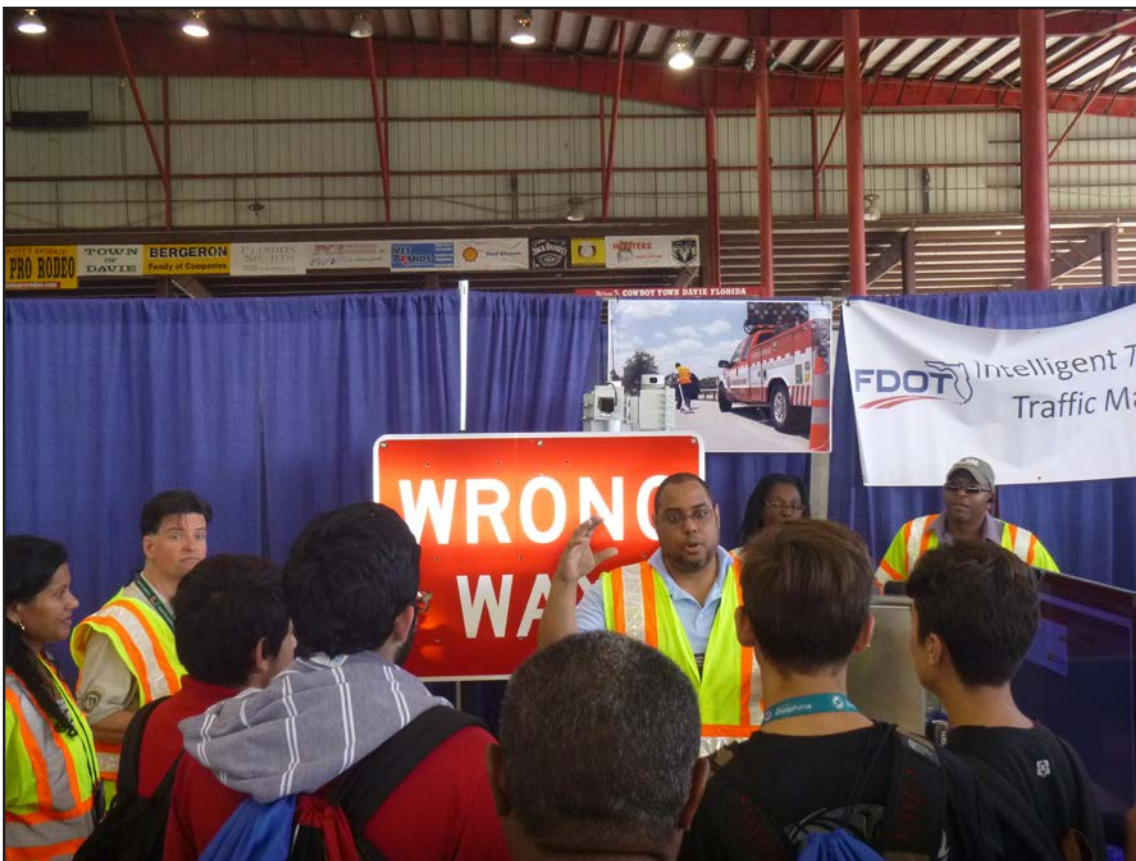
various activities involved in the construction and operations of highway and bridge projects.

At the Turnpike's TMC/ITS learning lab, the students were able to learn about and use ITS hardware including field devices such as closed-circuit television cameras, vehicle detectors, fiber optic splicing, and dynamic message sign controllers. For the first time, wrong-way detection hardware and operations were included in the booth set-up. Wrong-way light-emitting diode signs were demonstrated along with the





*South Florida students participating at the Turnpike's TMC/ITS learning lab during the South Florida Construction Career Days.*



ability of sensors and cameras to detect a wrong-way activity and send an alert to a TMC workstation. The students were encouraged to ask questions and converse with the lab crew, discussing career paths and interests. The goals of driver safety and emergency responder safety were highlighted during brief presentations to each group of about 25 students that would visit the lab at 15-minute intervals. Many of the questions asked focused on how to become a traffic engineer.

Construction Career Days is a nationally recognized event and continues to target high school and technical school students to help them discover the world of roadway construction and operations. The event's general goals are to spark interest, make students aware of diversified career opportunities, teach them about safety, interview skills, etc. – in other words, prepare them a little bit for the next step in their lives. The event allows the high school students to gain insight into the infinite number of career opportunities available in all aspects of our industry.

For information, please contact Mr. Eric Gordin at (407) 264-3316 or e-mail to [Eric.Gordin@dot.state.fl.us](mailto:Eric.Gordin@dot.state.fl.us).

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# Florida Highway Patrol Supervisors and Regional Officers Visit District Four RTMC

By Natalie Cortes, FDOT District Four

On October 1, 2015, District Four's SMART SunGuide® Regional Transportation Management Center (RTMC) hosted a private tour for Florida Highway Patrol (FHP) Supervisors and Regional Officers from FHP's Regional Communications Center in Lake Worth, Florida, to enhance communications between responding agencies and the RTMC during traffic incidents.

FHP Regional Communications Center Manager Aerica Ramos, along with 10 of her staff, were interested in learning how the RTMC operates during several traffic incidents in order to implement important techniques at FHP's Regional Communication Center in Lake Worth, Florida. "It is important to us to better understand and communicate how we can assist within traffic incident management because we all work toward the same goal," said Ramos.

RTMC staff provided the Supervisors and Regional Officers with presentations on the District Four Intelligent Transportation Systems (ITS) Program history as well as a detailed overview of its operations and the recent expansion of the managed lanes systems. Throughout the tour, FHP's Supervisors and Regional Officers also gained valuable information during a private meet and greet held with RTMC operators. Everyone gathered around operator consoles and watched as operators dealt with a multi-lane closure traffic incident on I-95.



*FHP Regional Officers gather around RTMC operator consoles during tour.*

"We received so much information and tips on how to deal with motorist calls and preparing incident logs. It was all so helpful. I am very thankful," said one Regional Officer.

Approaching the end of the tour, RTMC staff provided FHP's Supervisors and Regional Officers with additional information regarding 511 and District Four's SMART SunGuide web site for future traffic-related use.

For information, please contact Mr. Daniel Smith at (954) 847-2785 or email to [Daniel.Smith@dot.state.fl.us](mailto:Daniel.Smith@dot.state.fl.us)

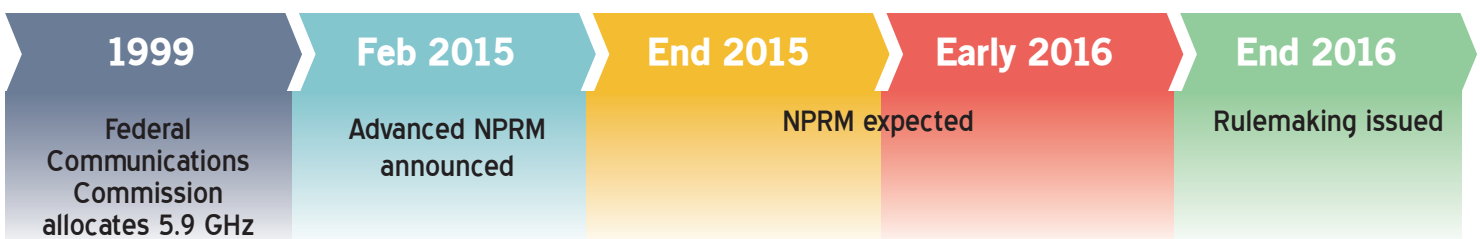
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## Basic Training – What is in the Basic Safety Message and What Does That Mean to Connected Vehicle Deployers?

By Suzanne Murtha, Atkins

In February 2015, the United States Department of Transportation (USDOT) released an Advanced Notice of Proposed Rulemaking regarding the dedicated short-range communications (DSRC) requirements in vehicles. The USDOT is expected to issue a Notice of Proposed Rulemaking (NPRM) by the end of 2015. Although it is not known what will be in the final rulemaking expected by the end of 2016, current thinking is that USDOT will require a single DSRC onboard unit that will transmit only basic safety messages (BSM).

### National Highway Traffic Safety Administration Rulemaking Process



As recently balloted by Society of Automotive Engineers, the BSM contains:

- Date and time
- Latitude
- Longitude
- Elevation
- Positional accuracy
- Transmission state
- Speed
- Heading
- Steering wheel angle
- Acceleration set four way
- Brake system status
- Vehicle size (length and width)

This matters to deployers of CV technology because the applications that can be deployed using only these messages are somewhat limited. The BSM, for example, does not include vehicle type, thus making signal prioritization based on vehicle type a challenging application to execute.

While there are limits to the applications that can be deployed with the BSM, as it will be released, the upside is that there is a fairly clear understanding of what will be in the BSM. This means that deployers can be more clearly advised about what data will come from vehicles. Having this more specific understanding of what will be required from vehicles allows deployers to plan which, and where, applications will be executable and if additional on-board equipment may be needed on fleet vehicles. This information will help deployers anticipate how much data they may receive and manage.

Even without additional data, the BSM content will allow agencies and departments of transportation to at least understand where vehicles are, the direction they're heading, and if there are any braking actions on vehicles thus indicating potential slowing or mobility problems. Agencies can look forward to having sufficient data available to successfully deploy traffic signal-based applications such as traveler information transmissions, traffic studies, work zone data transmissions, queue warnings, dynamic transit applications, curve speed warnings, and many others.

For information, please contact Mr. Fred Heery at (850) 410-5606 or email to [Fred.Heery@dot.state.fl.us](mailto:Fred.Heery@dot.state.fl.us).

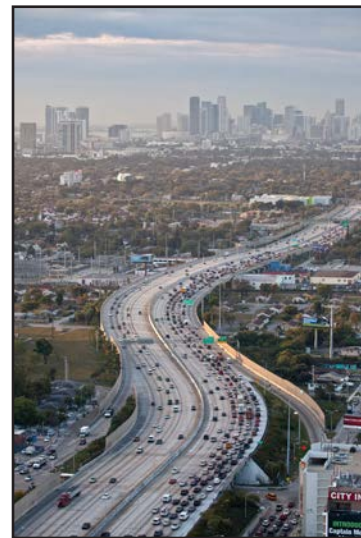
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## District Six to Replace DMSs on I-95

*By Javier Rodriguez, FDOT District Six*

The Florida Department of Transportation (FDOT) District Six Intelligent Transportation Systems (ITS) Program is in the process of replacing its existing dynamic message signs (DMS) along Interstate 95 (I-95) and 95 Express with new and more advanced signs. This effort is part of the annual plan to remove ITS devices that have reached their end-of-life cycle to promote a more reliable system.

A total of 15 signs are being replaced with new color DMSs. The color DMSs are set to improve the District's traffic operation efforts on I-95, enhancing drivers' experience on this critical highway. Color DMSs offer several advantages over the current legacy signs. This feature will provide transportation management center operators with more flexibility in both the length and type of message they can display. For instance, the new DMSs will allow operators to incorporate text with simple graphics, such as a roadway logo or warning signs to enhance communications with drivers.



*I-95 in Miami*

The project will also replace several static guide signs complying with the display of multiple express lane destinations, which will support the extension of 95 Express to Broward County as part of the 95 Express Phase 2 project. More importantly, color DMSs will allow Florida Highway Patrol troopers to enforce lane closures on 95 Express since these signs will be able to display messaging in black and white as is required for regulatory enforcement.

The contract for this project was awarded this year and construction is expected to begin in January 2016 with expected completion by March 2017.

For information, please contact Mr. Rodriguez at (305) 470-5757 or email to [Javier.Rodriguez2@dot.state.fl.us](mailto:Javier.Rodriguez2@dot.state.fl.us).

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# SunGuide® Software Extends to Arterial Networks

By Clay Packard, Atkins

SunGuide® software has served freeway management for a decade, having traffic detection data since its initial release. It has gone through several versions and modifications, each adding additional support for new devices, technologies, and algorithms for obtaining traffic conditions data for uninterrupted facilities. Due to a growing emphasis on the Florida Department of Transportation's (FDOT) participation in arterial management, transportation management centers are taking on more and more responsibility to include some arterial roads. Many arterial roads are state roads and travel is interrupted by traffic signals. There are many overlapping features needed in a software system to be used for managing arterials and freeways. Making a small change to SunGuide software is a more cost-effective solution than using a different software package altogether and recreating many of the features already provided by SunGuide software. Thus, SunGuide software has been enhanced to support interrupted roadways with an improved probe traffic detection algorithm and support of new BlueTooth® device makes/models.



Probe detection devices have already been deployed along arterial roadways. They read the presence of vehicles and report this information to SunGuide software. Probe detection is better suited for interrupted roadways, as it detects the average travel time without being grossly affected by widely varying speeds at different points along the roadway. However, due to the widely varying geometry, there are many additional parameter adjustments needed to provide the flexibility to calculate travel time for each unique interrupted roadway segment. The probe fusion algorithm in SunGuide software adds support for many additional configuration parameters to provide this additional flexibility.

The basic concept of probe detection is to obtain a vehicle timestamp and identifier at two locations and take the timestamp difference to calculate the travel time of that vehicle. However, there are several additional details to the algorithm to handle various real-world situations and challenges in this approach.

The first challenge that was improved upon in the probe algorithm enhancement was to better determine which timestamp to use for the vehicle at each location. The new arterial probe algorithm will use the timestamp from the reading with the strongest signal strength, as the strongest signal strength represents when the vehicle was closest to the reader. If the signal strength is not available, it will take the middle of all of the timestamps received from that vehicle. This is an improvement over the former version of the algorithm that arbitrarily takes the first timestamp. Any of these three approaches can be configured for each probe reader device.

The next challenge to overcome for arterial road segments was to accommodate the varying geometry and positioning of the interruptions to the flow, or traffic signal placements relative to the probe detection readers. This is accomplished by adding in several filtering capabilities on a per segment basis. Each travel time is evaluated for validity to ensure it is not an anomaly. This helps filter out travel times that might be influenced by vehicles that pull off the road to stop for gas, for extreme speeds not representative of a travel time that would be reported, or for device maintenance issues.

There are also times when data from devices or vehicles are unavailable. To overcome this, SunGuide software will use historical data for a configurable time in the past to represent the current travel time conditions.

Another enhancement to SunGuide software to better support arterial management is the addition of lane types not used in freeways and not previously available for defining roadways in the software. Right turn lanes and left turn lanes allow SunGuide software to better define the actual roadway network and more accurately describe the roadway conditions to operators as well as the motoring public through the FL511 advanced traveler information system.

As FDOT's mission to provide a safe and efficient transportation system extends beyond freeways into arterials, so does SunGuide software.

For information, please contact Mr. Derek Vollmer at (850) 410-5615 or e-mail to [Derek.Vollmer@dot.state.fl.us](mailto:Derek.Vollmer@dot.state.fl.us).

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## ITS Florida Annual Meeting Agenda

By Sandra Beck, ITS Florida

Make plans today to attend the ITS Florida Annual Meeting December 2 – 4, 2015, on the Jacksonville Riverfront! ITS Florida will host the Awards Banquet the evening of December 3rd. Earn Professional Development Hours by attending. This multi-day event includes:

### Wednesday, December 2

3:00 – 4:30 ITS Florida Board Meeting  
7:00 Exhibitor Setup

### Thursday, December 3

8:00 – 3:00 Exhibitor Hall Opens  
9:00 – 10:30 Technical Presentations  
11:30 – 1:00 Lunch in the Exhibit Hall  
1:00 – 3:00 Executive Roundtable  
3:00 – 5:00 Florida Department of Transportation's Transportation Systems Management and Operations Program Update  
6:00 – 7:00 Reception  
7:00 – 8:30 Awards Banquet

### Friday, December 4

8:30 – 1:00 United States Department of Transportation Connected Vehicle 102 Training  
9:00 – 10:30 Technical Presentations  
11:00 – 1:00 New District Two Regional Transportation Systems Tour

Registration and hotel information will be e-mailed and posted on [www.ITSFFlorida.org](http://www.ITSFFlorida.org). If you have questions, please contact [ITSFlorida@ITSFlorida.org](mailto:ITSFlorida@ITSFlorida.org).

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For more information on ITS Florida, please check the ITS Florida web site at [www.ITSFFlorida.org](http://www.ITSFFlorida.org) or contact Ms. Sandy Beck, Chapter Administrator, at [ITSFlorida@ITSFlorida.org](mailto:ITSFlorida@ITSFlorida.org).

If you wish to contribute an article to the *SunGuide® Disseminator* on behalf of ITS Florida, please email Ms. Stephanie Hoback at [Stephanie.Hoback@Wavetronix.com](mailto:Stephanie.Hoback@Wavetronix.com) or Sandy Beck.

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# Editorial Corner: Moving Forward with Florida's Next Gen FL511 System

By Russell Allen, FDOT Traffic Engineering and Operations, and Jo Ann Oerter, Atkins

The Next Gen FL511 system will be a state-of-the-art system that allows the Florida Department of Transportation (FDOT) to provide the best resources to deliver travel information to its transportation users. In the new architecture of the FL511 system, we will focus on modularity. As we have learned over the past few years with the current FL511 system, we cannot just stay stagnant. We need to change with the times and technology. The Next Gen FL511 system will need to transition from 'pull' dissemination to more of a 'push' dissemination. In today's times, our transportation users want more and more information and they want it now. They also do not want to search for information; they want it provided to them. The concept of the Next Gen FL511 system is to be proactive and provide concise information as quickly as possible.

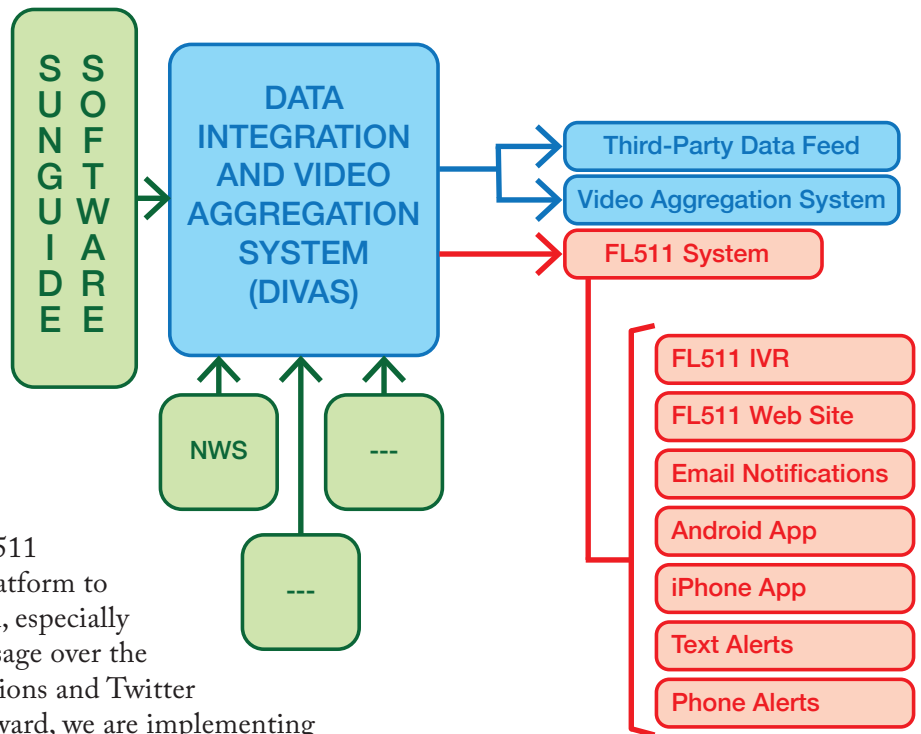
The components of the FL511 system over the years have been adequate. However, with the demand for data from our transportation users, we had to take a hard look at what and how we were providing the transportation information. We also needed to look at the resources for the information. Until today, all data for FL511 has been funneled through SunGuide® software, Florida's advanced traffic management systems software. Although SunGuide software is an excellent resource, the Next Gen FL511 needed more. We are developing a system that can integrate multiple data resources, SunGuide software being one of them.

One of the trends we have seen in the current FL511 system is the transition in use from one type of platform to another. The phone system, while still a viable tool, especially during emergencies, is seeing a slight decline in usage over the past couple of years. However, the mobile applications and Twitter accounts are on the up-tick. Thus, as we move forward, we are implementing options that will make the phone system more user-friendly and streamlined and will make major enhancements to the mobile applications. One of the main complaints we have received via the FL511 feedback is that users think the interactive voice response (IVR) phone menus are too long and complicated, and the current system does not recognize the caller. The Next Gen FL511 will incorporate call flows in our IVR system that are dynamic and can adapt to user needs. The Next Gen FL511 system contract requires that the system be adaptive. It will 'learn' the caller's patterns and provide information to them rather than them having to navigate through a system menu to get the information. The mobile applications will be moving toward a 'push' option to enhance the safety of usage while driving. We are implementing a system that will utilize global positioning system technology to identify the user's general location, and as they enter into a 'zone,' the Next Gen FL511 system will detect the user and provide information to them on events they are approaching that may cause them delays.

As we move to the next generation of FL511, we recognize the need to focus on data, both from our Districts and third-party providers. The information going out of FL511 is only as good as the information going in. We are committed to providing the most accurate information and disseminating that information via the best resources to our transportation users. We will also ensure that we deliver the information in the quickest, least distracting methods possible.

For information, please contact Mr. Allen at (850) 410-5626 or e-mail to [Russell.Allen@dot.state.fl.us](mailto:Russell.Allen@dot.state.fl.us).

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## Announcements

### Welcome Robert

Please join us in welcoming Robert Ubieta to the staff of the ITS Telecommunications General Consultant at FDOT's Traffic Engineering and Operations Office.

Robert is providing information technology (IT) support, web site maintenance and development, local area network, and networking support for the office.

Robert comes to us with a Bachelor in Science in Information Technology and over seven years of IT support experience at Florida State University.

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## FDOT Traffic Engineering and Operations Mission and Vision Statements

### Mission:

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

### Vision:

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

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