SUNGUIDE® DISSEMINATOR

Florida Department of Transportation's Traffic Engineering and Operations Newsletter

Centennial FDOT 1915 ★ 2015

FTE Continues HD Camera Replacements

By Ryan Brown, Florida's Turnpike Traffic Operations

In 2014, Florida's Turnpike Enterprise (FTE) let two contracts to furnish and install replacement high-definition (HD) closed-circuit television cameras, numbering greater than 200 of its more than 500 cameras on the system. The results of replacing these cameras have been profound in providing a greater field of view, greater detail in the images, and better nighttime viewing.

In mid-May, FTE let four additional camera replacement contracts, continuing its replacement efforts for system-wide upgrade to HD cameras along the entire system. These contracts, paired with construction projects and capitalizing on existing maintenance efforts, will provide a complete system-wide replacement to the HD style cameras in the near future. These projects total just over $1.2 million and will replace more than 200 additional cameras along system roadways, providing the enhanced capabilities of HD video and converting the video network end-to-end in an Internet Protocol-based video solution. The projects are expected to be completed by the end of 2015 and will also position the FTE for future video wall and video management enhancements.

HD resolution gives transportation management center operators a much clearer picture of what's going on, especially during periods of traffic congestion. At over six times the resolution of standard definition cameras, the new HD cameras pick up considerably more visual information than ever before.

The HD cameras in use on Florida's Turnpike have a dedicated night mode that picks up more light than it would during the day, giving operators a clear view of the road even when no headlights are illuminating the area.

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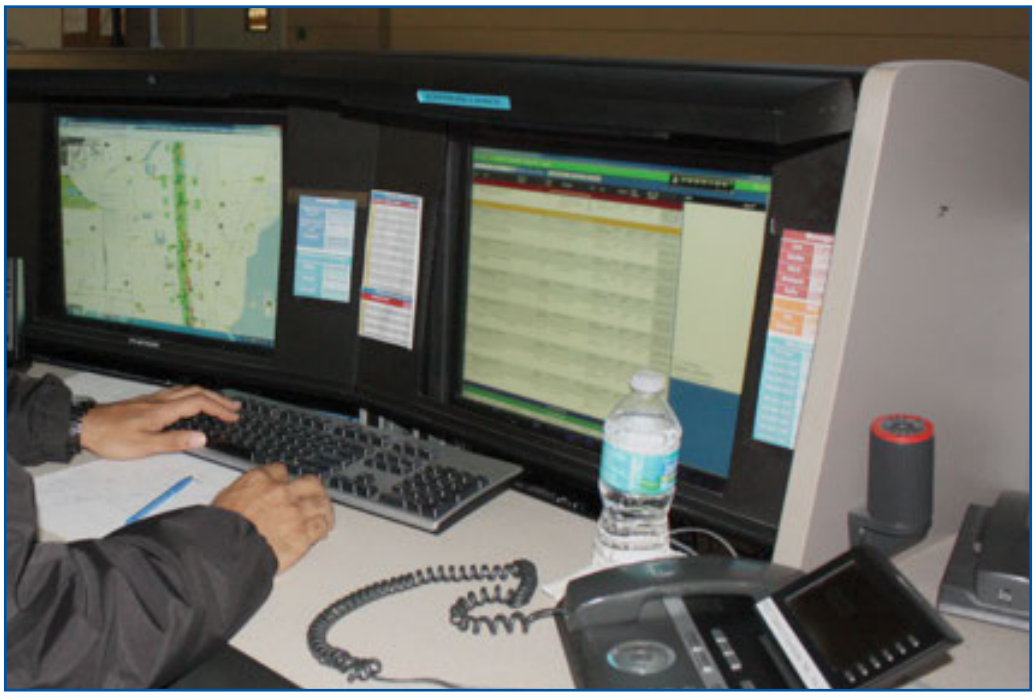
FDOT District Six ITS Upgrades to SunGuide® Software Version 6.0

By Javier Rodriguez, FDOT District Six

The Florida Department of Transportation (FDOT) District Six Intelligent Transportation Systems (ITS) Program recently upgraded to the new SunGuide® software release 6.0 to enhance its ITS operations. This switch is part of the District's commitment to ensure the transportation management center (TMC) is using the most up-to-date software and helps position it to manage future traffic demand.



District Six SunGuide software release 6.0 in service.

The software update became operational in April 2015, and is making it easier for District Six staff to monitor traffic and related events. Staff conducted extensive testing to verify the functionality of this upgrade and ensure in-house developed applications, such as the Operations Task Manager and Operator Quality Control, worked correctly since both applications utilize SunGuide software data for operations.

One of the update's key features is its support of color dynamic message signs. This feature lets operators post messages using color text, full color shield logos, and approved color graphics. This is particularly helpful for the District's traveler information efforts since the correlation of color signage to driver comprehension has been widely noted in previous FDOT studies. Additional improvements included enhancements made to the software's graphical user interface and wrong-way driver detection functionalities. These updates have not only enhanced operator interaction, they are also improving safety by making it easier for operators to detect and sign for wrong-way traffic events on the highway.

Upgrading to SunGuide software release 6.0 is the first step in the District's plan to switch from Oracle to MySQL database. This will also allow the District to stay up-to-date with the current features provided by the statewide ITS platform and ensure it integrates with future upgrades more efficiently.

SunGuide software is one of the critical tools TMC operators and managers use to manage roadways that move people to and from their destinations. TMCs all over the state perform thousands of actions every day that would not be possible without a comprehensive software designed specifically for ITS management. Software such as SunGuide allows District Six to manage a wide variety of roadways in South Florida with a small efficient team of operators and minimal impact to taxpayers.

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

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Utilities Telecom Council 2015. . .Wait, What? Why?

By David Heupel, John Glowczewski, and Steven Sciotto, Schneider Electric

Why would the Florida Department of Transportation (FDOT) send transportation technology professionals to the Utilities Telecom Council (UTC) Conference, and what are utilities engaged in that would interest them? The answer is in the second word of the conference name: 'Telecom' or telecommunications.

Utilities make use of many high-value, point-to-point circuits to protect and maintain their distribution and transmission assets. Further, many utility organizations throughout the country are undergoing a shift in their underlying network infrastructure. Large telecommunications companies are phasing out circuit-switched leased lines in favor of lower cost, next-generation packet-switched networks. Not only are they less expensive to deploy and maintain over their lifespan, but packet-switched networks offer self-healing capabilities that are not commonly available on older circuit-switched systems.

It is important that FDOT maintains its infrastructure on a par with utility and other government operators, which also means its important to keep up with telecom technology.

Like many regional utilities, FDOT has an expansive telecommunications network, but it supports radio communications, dynamic message signs, and traffic monitoring and control – intelligent transportation systems (ITS). Like many utilities, FDOT's ITS networks are comprised of thousands of endpoint devices and hundreds of Ethernet switches and routers, spanning thousands of miles of optical fiber and wireless links. In similar fashion, electric power utilities use this same technology to monitor power generation facilities, distribution sub-stations, and transmission lines. Water management districts use supervisory control and data acquisition systems to control ground water accumulation by interfacing their networks to a series of gates, weirs, and pump stations. Gas companies monitor head pressure at particular distribution nodes for safe, reliable delivery of their product; all this and more is accomplished through modern, internet-working technology.

FDOT's statewide ITS network infrastructure is composed of over 120 sites throughout Florida, which are presently interconnected via circuit-switched microwave and over 2,410 miles of optical fiber, with expansion projects in the pipeline. Since FDOT is its own telecommunications carrier in this regard, why would they be interested in migrating to packet-switched networks?

The answer is simple—equipment availability and ongoing maintenance costs. Since major utilities are also upgrading their networks to next-generation packet-switched technology and moving increasing amounts of network traffic via Internet Protocol (IP), manufacturers are discontinuing the production of circuit-switched equipment in favor of newer technology. It is estimated that within eight years, getting circuit-switched service (i.e.: 4-wire audio, or simple point-to-point T1) from a major telecommunications company will be nearly impossible because the equipment that supports these older technologies will no longer be available.

Therefore, FDOT is interested in how the utilities market addresses these issues, since the underlying statewide infrastructure is in need of a similar technology refresh.

From a cultural perspective, electric power and other utilities often share infrastructure and resources with local and state government operators, including public safety. So too does FDOT. It is, therefore, in the best interest of FDOT to maintain its infrastructure on a par with utility and other government operators.

Further driving the need for new technology are the many applications and services, which require more bandwidth than existing networks can deliver; this need appears to grow geometrically with each passing year. With the advent of vehicle-to-vehicle and vehicle-to-infrastructure communications, FDOT must support these emerging technologies by providing the necessary bandwidth and communications capabilities to its eight regional Districts and to other transportation partners such as the Miami-Dade Expressway and Central Florida Expressway Authority.

There were also a number of vendors offering two-way radio equipment and related hardware and software. Multiple vendors offer digital mobile radio subscribers and systems. Of particular interest was what might be available to supplement or eventually replace FDOT's current two-way radio system and improve its flexibility and usefulness without sacrificing its dependability. Equipment vendors displayed clear knowledge and experience in the design, build, and ongoing support of wide area radio communication systems as deployed by utilities and state government agencies.

The UTC 2015 event in Atlanta, Georgia, provided a forum for FDOT network engineers to learn more about the difficulties and successes experienced by their peers in the utilities industry. Discussions included the selection process of the technology they employed and how they came to their decisions. It also provided an opportunity to speak with the many equipment manufacturers' representatives present to learn how their products can solve problems that both utilities and FDOT have in common.

One such problem is increasing security threats from both inside and outside influences. Among the many different forums at this year's UTC, FDOT personnel learned how to identify and mitigate these threats in terms of both physical and data security.

Next-generation firewalls, a new concept, were also reviewed. Older generation firewalls either allowed or denied access to a network. Next generation firewalls provide these same services in addition to intrusion prevention and antivirus inspection within the payload of network packets. More than 80 percent of new attacks on networks are done through the use of malware, leveraging existing applications that authorize access to the network.

The prevailing theme of this year's event, however, was clearly one of migration away from legacy networks and analog microwave systems to fully IP/Ethernet native optical fiber and microwave systems. The number of vendors offering these solutions has literally exploded over the past five years. Conversely, finding replacement hardware to keep aging legacy network equipment operational has become a challenge.

FDOT staff are currently evaluating the technology products of multiple vendors in attendance at this year's conference; some of which will soon be implemented as a part of several projects planned for the statewide ITS network.

They include, but are not limited to:

- An upgrade to the microwave system in the Florida Keys,
- A fiber expansion project in Florida's Panhandle,
- Another fiber expansion project in South Florida to support the upgraded microwave system in the Keys, and
- A global network management system to monitor and control the entire statewide ITS network.

Applications of these new technologies will eventually comprise the core of FDOT's next-generation statewide ITS network; therefore, the knowledge obtained at UTC 2015 is of enormous technical advantage as engineering decisions are made in response to particular challenges.

Summing up the experience of the four-day event, one attendee noted: "Every vendor has something to sell. Our job is to ensure we get the technology and other engineered solutions that we need; and not necessarily what the vendor community wants to sell."

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

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FDOT Exhibits at Florida's I³ Transportation Showcase

By Ron Meyer, Atkins

Staff from multiple sections of the Florida Department of Transportation's (FDOT) Traffic Engineering and Operations Office attended, exhibited, and presented at the recent Florida I³ Transportation Showcase. The I³ Transportation Showcase, held May 26-29, was a joint exhibition of the Institute of Transportation Engineers (ITE), the Intelligent Transportation Society of Florida (ITS Florida), and the Florida Section of the International Municipal Signal Association (FL IMSA). The event was the first combined conference of these three transportation organizations and brought together agencies, engineers, manufacturers, technicians, and other professionals of the transportation industry.

The showcase and exhibition was an excellent venue for outreach by the entire office, including the ITS Section and the Traffic Engineering Research Lab. The FDOT booth in the exhibition hall provided visitors an opportunity to learn about ongoing activities and recent developments. Russell Allen, ITS Program Development Engineer, provided information on the ITS Program, including information on current and future deployments, Florida 511, SunGuide® software, FDOT data sharing with WAZE, operations performance measures, and FDOT's connected vehicle initiatives. Alan El-Urfali, Deputy State Traffic Operations Engineer and the Traffic Engineering Research Lab Manager, briefed visitors on the consolidation of the Quality Products List with the Approved Product List, the Innovative Products List, the developmental specification process, research activities managed by the TERL, and the future plans of the lab. Staff who manned the display booth during the exhibition also used the opportunity for outreach to vendors and manufacturers attending and displaying at the show.

FDOT's TERL exhibit at the I³ Transportation Showcase.

In addition to activities in the exhibit hall, FDOT Central Office staff also attended and participated in a number of technical sessions and classes offered during the event. Raj Ponnaluri presented information on the Statewide Arterial Management Program (STAMP), and Mark Wilson and Fred Heery shared information on FDOT Traffic Operations Initiatives and Legislative Updates.

Overall, the event was a terrific opportunity for the office to interact with industry colleagues, exchange information, and engage in discussions about projects, experiences, challenges, and successes.

For information, please contact Mr. Alan El-Urfali at (850) 921-7361 or e-mail to Alan.El-Urfali@dot.state.fl.us.

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Update on Spectrum Issues Related to 5.9 GHz

By Suzanne Murtha, Atkins

In November 1999, the Federal Communications Commission (FCC) allocated 75 MHz of space around 5.9 GHz to enable the development of connected vehicle technology that would significantly reduce crashes and fatalities related to driving. Over a decade has passed and in that time:

- Standards have been developed to support high-speed over-air data transfer, which are nearly complete;
- Back office support programs have been studied;
- Over 15 deployments of dedicated short-range communications (DSRC) based systems have been deployed nationwide;
- Security systems for DSRC based connected vehicle programs have been studied and will be in place by the end of the year;
- Certification programs are currently being finalized for DSRC based hardware
- Continent wide satellite based certificate management systems began to be developed; and
- The United States Department of Transportation (USDOT) has announced funding for roughly six connected vehicle pilots across the country.

Also in that time, several major providers of Internet services and systems came together to ask FCC to reconsider its allocation of spectrum and amend the rules for 5.9 GHz to also include unlicensed WiFi® use of the same spectrum space.

Several members of Congress are also involved in the discussion and passed legislation requiring FCC to formally explore the possibility and impacts of sharing this spectrum. The Institute of Electrical and Electronics Engineers (IEEE) led a Tiger Team in August 2013, to explore the possibility of spectrum sharing. The team met frequently over the last 18 months with roughly 50-75 attendees in each meeting. The team considered two major approaches to sharing:

1) Qualcomm® proposal, which required a "repacking" of the band and, therefore, likely a new Notice of Proposed Rulemaking as well as a possible redesign of existing DSRC hardware.
2) Cisco proposal, which described the "Listen, Detect and Avoid" scenario in which equipment that would share the spectrum with DSRC would listen for any DSRC users, detect them, and then avoid use of the space for ten seconds after the last detection.

The Tiger Team officially produced "no recommendation." IEEE currently holds no official position on the spectrum sharing issue. This outcome, however, still remains hotly contested by the cable industry, which, in its own FCC filings of March 30, 2015, claims wrongdoing by the Tiger Team and alleges the group was packed with automotive manufacturers and, therefore, produced an unfair conclusion.

In early May 2015, members of the automotive industry, Toyota and GM specifically, visited FCC with their trade association representatives and Cisco to announce that they would be pursuing testing of the Cisco proposal described above. Lab testing is to begin in the coming weeks and field testing is to be completed by the end of the year.

The connected vehicle industry, and general automotive safety interest groups are looking for state and local support in maintaining the integrity of the 5.9 GHz band.

For information, please contact Ms. Elizabeth Birriel at (850) 410-5606 or e-mail to Elizabeth Birriel@dot.state.fl.us.

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ITS Florida: Showcase the Best Photos of ITS Projects in Florida

By Sandra Beck, ITS Florida

The Best (and Newest) of ITS Projects in Florida Photo Contest for the ITS Florida 2016 Calendar

The Intelligent Transportation Society of Florida (ITS Florida) is calling all of our members to be creative and submit photos demonstrating the best (and newest) intelligent transportation systems (ITS) projects in Florida. Florida is a powerhouse in ITS and ITS Florida wants to spotlight this in the 2016 ITS Florida calendar.

This annual photo contest is a chance to showcase the best work of ITS Florida members. Each winner will be awarded with placement of their photo in the calendar to be seen all over Florida and potentially the southeast.

How to Enter

Please submit photographs in high-resolution, landscape* format (jpg, png). In addition, provide a document identifying each photo with a short caption for use in the calendar. Please also include contact information for the submitter of the photo(s) should ITS Florida have any questions. Photos should be submitted on CD/DVD via mail delivery. The mailing address to submit photos to is:

Ms. Sandy Beck
ITS Florida
215 NW Monroe Circle North
St. Petersburg, FL 33702
Phone: (727) 430-1136 / Email: itsflorida@itsflorida.org

Deadline for submittals is Friday, August 14, 2015, by 5:00 p.m.

A panel of judges will judge the photos and include representation for all geographical regions of the state. Winners will be announced at the ITS Florida Annual Meeting and Technical Forum. (The dates will be announced next month.)

Photos submitted in last year's contest may be resubmitted for consideration. ITS Florida will not include any photos submitted last year in this year's contest; to be considered for this year's contest, they must be resubmitted.

For questions, please contact Mr. Jonathan Tursky at Jonathan.Tursky@TransCore.com or Ms. Sandy Beck (contact information listed above).

*Photos in the portrait format may be used as an insert only as this format does not fit the cover or monthly layout.

****Please note that all photos submitted to ITS Florida for the calendar photo contest shall become property of ITS Florida. No copyrighted photos will be accepted. ****

For more information on ITS Florida, please check the ITS Florida web site at www.itsflorida.org or contact Sandy Beck, Chapter Administrator, at itsflorida@itsflorida.org.

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

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Editorial Corner: FDOT Design Training Expo

By Elizabeth Birriel, FDOT Traffic Engineering and Operations

The Florida Department of Transportation (FDOT) Design Office hosted its fourth annual Design Training Expo at the Buena Vista Palace in Orlando, on June 9-11, 2015. This was an excellent training opportunity as there was no charge for the training event, which also offered professional development hours.

This year's theme was Innovative Solutions for Tomorrow's Transportation Needs and had eight one-hour sessions over three days, totaling 116 sessions. Information offered ranged from design modeling to planning development to information on the *Highway Safety Manual*, and more.

FDOT's Traffic Engineering and Operations Office participated with presentations on fiber design for traffic signal and intelligent transportation systems (ITS) products; an update of the *Traffic Engineering Manual* (*TEM*); design countermeasures for wrong-way driving; and using systems engineering for ITS projects. Short descriptions of the presentations follow.

Fiber Design for Traffic Signal and ITS Products

Michael Lubin presented a general overview of communications design as it relates specifically to fiber optic cable and its application in ITS and signal design. The goals of this presentation were to provide general knowledge on the advantages of fiber optic cable, describe how fiber optic cable functions, understand common terminology related to fiber optics, interpretation of splice details, how to perform link budget analysis, and provide general guidelines for design of a fiber optic network.

Systems Engineering for ITS Projects

Derek Vollmer presented on the system engineering process for ITS projects. The presentation introduced the Federal Highway Administration's (FHWA) 23 Code of Federal (CFR) Regulations Part 940 titled "Intelligent Transportation System Architecture and Standards." 23 CFR Part 940 has a requirement that "All ITS projects funded with highway trust funds shall be based on a systems engineering analysis." Derek provided an overview of the systems engineering process, introduced the stakeholders' roles and responsibilities, and introduced the documentation required as part of the systems engineering process.

This presentation helped spread awareness of the federal regulation for ITS projects and ensures that projects meet the requirements of 23 CFR 940.

Design Countermeasures for Wrong-Way Driving

FDOT has been at the forefront of developing countermeasures for wrong-way driving in the state. Based on the statewide study recommendations, the Traffic Engineering and Operations Office worked closely with the Design Office to develop the new minimum requirements for signing and pavement markings in order to help provide additional guidance to motorists. Raj Ponnaluri discussed the proposed new design requirements in this presentation.

Traffic Engineering Manual Update

Angela L. Wilhelm covered updates to FDOT's *TEM*. The *TEM* provides traffic engineering standards and guidelines to be used on the State Highway System. Angela's session provides a brief overview of the manual and discussed recent changes to its contents, notably pedestrian crossing treatments and route shield pavement markings.

As in the past three years, this year's Design Training Expo was well-attended and provided information on a variety of relevant topics – a success four years in a roll!

For information, please contact Ms. Birriel at (850) 410-5606 or e-mail to Elizabeth.Birriel@dot.state.fl.us.

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Announcements

Welcome Dana Knox

We would like to welcome Ms. Dana Knox to the Traffic Operations Team. She will be joining us in the role of Highway Signing Program Manager. Dana comes to us from FDOT's Transportation Statistics Office where she was responsible for coordinating the road transfer and functional classification process as well as projects relating to performance measures and travel time reliability. Dana is a graduate of the Florida State University with a Bachelor's degree in Geography and has held various program development and leadership positions in both the public and private sector. She has experience in a diverse range of areas including transportation, software development and finance.

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Good Luck Pat Keaton

We would like to wish Pat good luck as she moves into the phase of her life - retirement! Pat served FDOT for 35 years, the past 12 of which have been in the Traffic Engineering and Operations Office.

Patricia's last day with FDOT was May 30th. In the near future, she plans to travel to south Florida to spend time with her family.

Good luck Patricia, we will miss you!

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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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