



VPRESS

FDOT District Five Deploys Smart Work Zone Trailer

District Four TSM&O Resource Management

Navigating in TSM&O

Public Tours Ramping Up Again at the District Six TSM&O Office

FLORIDA DEPARTMENT OF TRANSPORTATION'S TRAFFIC ENGINEERING AND OPERATIONS PUBLICATION





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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.

## Looking to be a Contributor for the Next Issue of the TSM&O Disseminator?

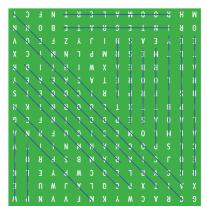
Email Deborah Fiesler (deborah.fiesler@dot.state.fl.us) with your story subject and title.

We would love to have your contribution be a part of the next edition.

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# FDOT District Five Deploys Smart Work Zone Trailer on Wekiva Parkway Project

By Gabriel Smith, Technical Information Consultant, District Five

When the Florida Department of Transportation (FDOT) begins a new construction project, safety for both the workers and traveling public is paramount in planning. As part of the Wekiva Parkway (State Road 429) expansion project, FDOT District Five will deploy a new safety technology known as a Smart Work Zone Trailer.

This may look like any other trailer commonly seen in a work zone, however, it can be operated remotely from the Regional Transportation Management Center (RTMC). The most noticeable difference in design between this trailer and most others on a construction site, are the large, collapsible array of solar panels on each side that provide power to the unit and its many devices.

On top of the trailer is a cluster of three cameras that have a variety of functions. In conjunction with other safety features, the cameras detect vehicles entering the work zone, identify pedestrians traveling in and out of safe areas, and help to deter theft. Each smart work zone trailer also comes equipped with a high-intensity warning strobe and a powerful siren. These tools provide visual and audible warnings for workers and drivers in the event of potentially dangerous situations or security concerns.

Also at the top of the trailer is the Connected Vehicle Roadside Unit. This technology allows messages to be sent directly to motorists through in-vehicle systems. Motorists will be able to receive Traveler Information Messages (TIM), which will alert drivers approaching the work zone of current conditions such as active work zones or lane closures.

These systems all work together to ensure that workers, motorists and pedestrians are kept safe in active work zones. Video analytics and event-based triggers, remotely configurable from the RTMC, offer a look at the future of work zone safety.

According to Nathan Mozeleski, a consultant serving as the District Five Technical Manager, "What we're doing today is kind of that first step and we think this is a burgeoning industry that will continue to grow and grow and grow. And as technology continues to improve, so do our abilities at the Department to provide those benefits of safety and operations to the public, and to construction workers."

The Smart Work Zone Trailer can be completely set up for use in under three minutes. The trailer is being deployed to the Wekiva Parkway construction project as two more sections of the Wekiva Parkway in Seminole County are expected to open to traffic this year. The final section, which includes a new interchange at I-4 that will connect with S.R. 417, is expected to open in 2023.

For more information contact Gabriel Smith at Gabriel.Smith@dot.state.fl.us.



# Rail Detection Evaluation in District Two

By Adam Storm, PE Embedded District Two ITS/Traffic Consultant, Atkins

Northeast Florida's history and geographical significance contribute to the prevalence of railroads in District Two. Jacksonville alone contains six of the nine railroads operating within D2 and is home to two major freight carriers. As highways must conform to geometric constraints and existing conditions, so too must they interface with other means of travel such as rivers and railroads. Roads may be parallel to or bridge over water, but railroads allow for additional crossing methods that include passive and active warning systems. Although highwayrailroad grade crossings present safety and mobility concerns across the state, the Jacksonville region has a unique challenge located just south of its downtown area.



The Baptist Medical Center on Jacksonville's Southbank is a massive health complex servicing the city and surrounding region. While the hospital is conveniently located right off Interstate 95, several of the roads leading to it are crossed by the Florida East Coast Railway. Depending on the length and speed of a freight train making its way through the area, emergency vehicles rushing to the ER may be caught by blocked crossings and resulting traffic. Any crossing that is not a bridge, a tunnel, or removed altogether has a risk of catastrophic collisions and unpredictable delays. However, when a crossing is along the route of an emergency vehicle where seconds are critical, the stakes are even higher.

In partnership with the North Florida Transportation Planning Organization (TPO), an ITS project is under development to address this major safety issue. The basic concept of operations is that when a train is detected to be blocking any of the crossings near the hospital, a warning will be broadcast to the dispatch system to dynamically route emergency vehicles around the temporary blockage. The next phase is planned to notify motorists via DMS and flashing beacons where applicable, and then advanced directional detection along the train corridor and historical/ predictive scheduling will be integrated as the system is further developed. But before the initial project design is finalized and deployed, the best detection technology for different scenarios must be determined.

District Two started by evaluating CCTV and lidar devices feeding into a computer processor at the network. A location was selected along a CSX/Amtrak corridor parallel to US 17, about five miles southwest of the Baptist hospital. The detectors are aimed at a segment of adjacent rail to catch a train right as it is entering or leaving a crossing, depending on the direction of

## Rail Detection Evaluation in District Two, cont. from page 4

travel and placement of the detector. It became clear that while lidar is a great *detection* technology, the current *perception* software is not tuned to effectively detect trains. As long as they are far enough away, moving objects with distinct boundaries such as pedestrians and cars can be easily detected. But trains do not fit within a lidar's field of view and appear as a wall within a point cloud. Despite spaces between rail cars, the detection software is not capable of distinguishing them. We proceeded with a CCTV based approach and made some pretty good progress. As long as the camera is properly configured and pedestrians are filtered out, we had a detection (presence and direction) rate of over 95% and a false positive rate less than 1% using the built-in CCTV video analytics. While the detection is good for certain scenarios, the solution is still in its infancy and needs additional backend software development for better data analytics and scalability.

After this, an innovative solution produced by a company called TRAINFO was also installed at the same location. This technology utilizes acoustic detection of distinct rail crossing sounds such as bells, horns, and rumbling of a moving train. A TERL-permitted pilot demonstration was quickly deployed and produced 100% accurate detection. The potential downsides of this solution are 1) it cannot determine direction without additional detectors along the corridor, and 2) it relies on the gate arm bell continuously ringing if a train slows down and stops. Although rare compared to the rest of North America, it is quite common for crossings in Jacksonville to silence their bells once the gate arm is lowered. Knowing they could potentially run into this, TRAINFO quickly sent a camera for verification to their acoustic system, which adds an extra layer of accuracy at crossings where such a system exists.

At the time of writing this article, District Two is in the process of procuring these train detection systems to deploy at Baptist. Additionally, we will evaluate their corridor-level applications using devices along US 17 between I-295 and I-10. The next step will be to evaluate how the different equipment can be integrated into a centralized system at the RTMC. TRAINFO will be going through the approval process to get their equipment onto the APL.

Depending on the results of these projects, District Two will look to deploy on other corridors along US 17, US 1, and US 90 which are all parallel to major railroads within the district. Aside from emergency vehicle response, other railroad safety and mobility concerns exist in and around the North Florida TPO counties. Multiple local agency partners are interested in the ability to inform drivers of a blocked route including Jacksonville Transportation Authority's transit system, a St Johns County development "land-locked" by a single entrance crossing a railroad, and the City of Fernandina Beach which has a railroad running along its central riverfront district. Additionally, an effective rail detection technology opens the door to innovations such as dynamic routing via FL511, predictive travel time impacts, tracking blockage time infractions, connected Vehicle-to-Train applications, and other RTMC use cases to enhance FDOT's ability to operate safely and efficiently among our railroad transportation counterparts.

For more information, please contact Adam Storm by email at Adam. Storm@dot.state.fl.us





Two images above: US 17 signal mast arm used for technology evaluation

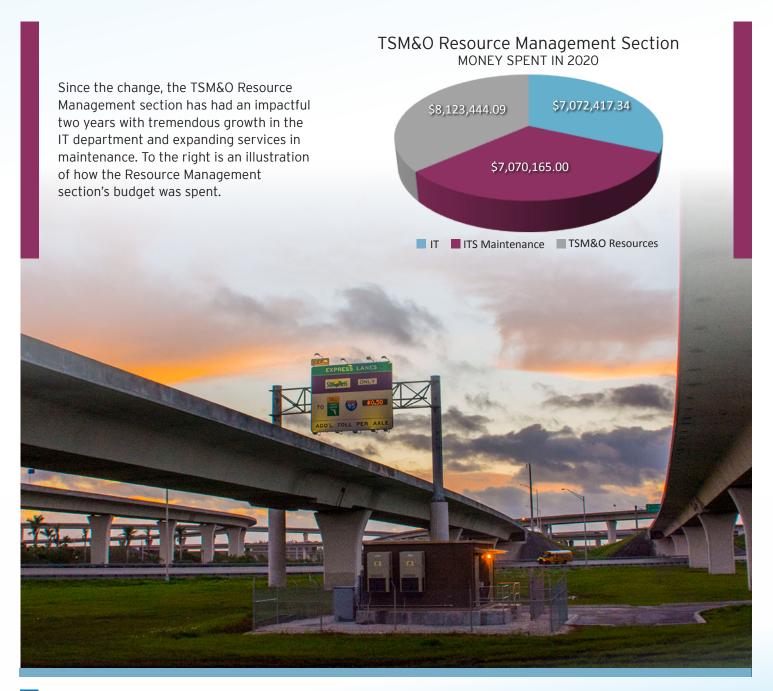


Rail map of Jacksonville

# District Four TSM&O Resource Management

By Nicole Forest, TSM&O Resource Manager and Alexandra Lopez, TSM&O Engineer, District Four

After the formation of the TSM&O Resource Management section in 2019, individual groups within the District Four TSM&O team: Transportation Management Center (TMC) Operations, Information Technology (IT), Maintenance, and TSM&O Purchasing began operating as a strategic unit to instill more collaboration and innovation.





## District Four TSM&O Resource Management, continued from page 6 Information Technology

District Four's TSM&O IT services have grown with the vision to advance operations and provide more support to technical projects. In 2020, many achievements centered on improving interagency collaboration and overall operational efficiency. Here are some of these advancements:

RoomAlert Deployment: Room Alert is an environmental monitoring system designed to ensure that weather variables in the IT environment are conducive to operational IT systems. This includes water, humidity, temperature, and open/closed doors. RoomAlert was integrated into arterial and freeway management hub buildings.

Customized IP Video Transcoding Software: The District Four TSM&O IT team identified this customized transcoding software to increase distribution of live video to external and internal partners. This customization allowed the transcoding software to compress video streams at a lower bandwidth without the use of the timestamp on the live video stream. It also reduced the overall number of resources needed to compress multiple instances of high-definition video.

Teleworking Operational Plan: Out of an abundance of caution and preparation during the COVID-19 pandemic, a comprehensive plan for remote daily operations was created. This effort included a checklist outlining procedures and resources needed to facilitate teleworking capabilities for part time and full time staff. In preparation the following actions were taken:

- » More than 30 laptops were gathered, imaged, and prepped for teleworking.
- » More than 30 FirstNet radios were deployed.
- » Lastly, in the case of full remote operations, a failover option was created for TMC operators. IT innovatively developed virtual machines that allowed operators to view cameras, SunGuide software, and other resources from within the network on a consolidated desktop like the one they use in the control room.

### TSM&O Maintenance

In 2020, the District Four TSM&O Maintenance team overcame multiple challenges resulting from the COVID-19 pandemic. Since TMC operations continued functioning 24/7/365, maintenance staff and resources ensured that all ITS devices were working and that preventive maintenance stayed on track. TSM&O Maintenance improved upkeep activity tracking through the Maintenance Information Management System by upgrading the quality of cabinets to ensure longer lifespan of all ITS devices. The team also updated cameras, detectors, and uninterrupted power supply in each cabinet.

The District Four 2020 Annual Report can be found at: https://www.fdotd4traffic.com/assets/pdfs/documents/ annual/2020AnnualReportFinal.pdf.

For more information, please contact Nicole Forest at Nicole.Forest@dot.state.fl.us.



## 2021 ITS Outstanding Achievement Award for District Four

FDOT District Four Transportation Systems Management and Operations (TSM&O) Manager, Nicole Forest, accepted the 2021 ITS Florida Outstanding Achievement award on behalf of the TSM&O Resource Management unit for their outstanding service in the fields of Maintenance, Information Technology (IT), and Procurement. During the last two years, TSM&O Resource Management has achieved impressive accomplishments including the integration of Room Alert Deployment into arterial and freeway management hubs, the development of IP Video Transcoding Software, and the development of Teleworking Operational Plan, which allow operators to access cameras, SunGuide software, and other resources from within the network on a consolidated desktop. These accomplishments and more can be found in the 2020 TSM&O Annual Report:

https://www.fdotd4traffic.com/assets/pdfs/documents/ annual/2020AnnualReportFinal.pdf.

# Break Time

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COLLAPSIBLE COMMUNITY CIVIC EDUCATION ACCOMPLISHMENT PLATFORM MAPPING WEKIVA TRANSCODE ROOMALERT STROBE SIREN RAILROAD TRAINFO PILOT PLANGINEER RECALIBRATE INTEGRATE EXPRESS MOBILITY LEARN



# Public Tours Ramping Up Again at the District Six TSM&O Office

By Javier Rodriguez, PE, TSM&O Engineer, District Six

Public tours and events are ramping up again at the District Six Transportation Systems Management and Operations (TSM&O) Office. Organizations from around south Florida have requested the District's participation at their industry meetings to promote civic education and engagement.

In-person events signal a move forward from the virtual platforms of the pandemic era. The TSM&O Office is cautiously easing back to hosting events because they are important to the community and to the advancement of the program's mission in our region. Kickstarting the series was a tour for Florida Highway Patrol (FHP) Troop E and their communication vendors. TSM&O staff provided guests with a detailed overview of the SunGuide Transportation Management Center (TMC) that is co-located with FHP. They talked about the importance of maintaining reliable communications between the agencies and their shared use of the Statewide Law Enforcement Radio System (SLERS) in their daily operations. The Office was then asked to participate in the quarterly meeting for the South Florida Section of the Florida Puerto Rico District of the Institute of Transportation Engineers (FLPRite). The FLPRite is a professional group that hosts industry conferences, facilitates networking opportunities, and provides professional development to promote the transportation industry. The TSM&O Office presented about its latest projects including the expansion of its arterial management division, connected vehicle projects, and managed lanes operations. This was followed by a separate tour for new staff members of the Miami-Dade Transportation Planning Organization (TPO). They were given a guided walk-through of the TMC and were introduced to FDOT staff promoting continued coordination between both agencies. The Office also participated in the Village of Pinecrest Police Department's 25-year anniversary community event. TSM&O staff hosted an information booth showcasing their Incident Response Vehicle and distributed educational materials to promote driver safety and awareness.

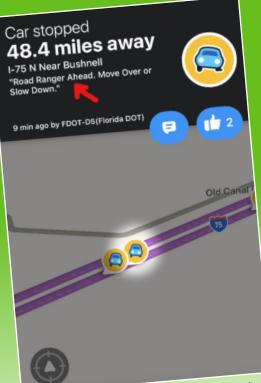
Public education is a key factor in providing a sound transportation system. District Six remains committed to engaging in community events that will move the transportation needle forward. Future tours include the Indiana Department of Transportation and the Federal Highway Administration.



For more information about the program or to request a tour, please visit: www.sunguide.info.

# Navigating in TSM&O

By Sheryl Bradley, ICM Project Manager



District Five's I-75 ICM team has recently launched a new initiative for mapping and navigation. The Mapping & Navigation Support Team will interface with FDOT, local stakeholders, and various mapping/ navigation platforms to provide more timely base map layer updates, enhanced messaging to motorists, and special event coordination. The new team has well-established relationships with Waze, Google, Apple, TomTom, and OpenStreets, and is continually growing the number of other platforms with which, they are integrating services. The team works cooperatively with the partnering navigation platforms to enhance systems to the benefit of both FDOT and the motoring public.

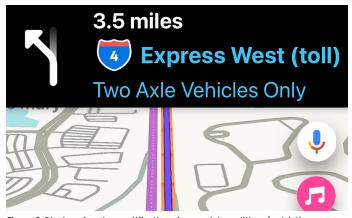
Figure 1: Sample of "Road Ranger Ahead" message being displayed in Waze

As part of this effort, District Five's team recently established automated data sharing services with several of these platforms to provide real-time information about incidents and roadway conditions. With an elevated focus on Road Ranger safety, this data sharing now includes the provision of AVL data to alert motorists of Road Rangers' presence in or alongside the roadway. The AVL sharing is being done with data points that exist within the SunGuide database, eliminating the need for the ongoing expense of 3rd party alert services.

The benefit of this new mapping and navigation effort was realized a few months back with the opening of I-4 Ultimate. I-4 Express Lanes were added to baseline mapping across multiple navigational platforms via the in-house consultant team in advance of the opening of express lanes, as opposed to waiting on the 3rd party navigation applications to make the changes on our behalf. For the first time, District Five was able to coordinate for real-

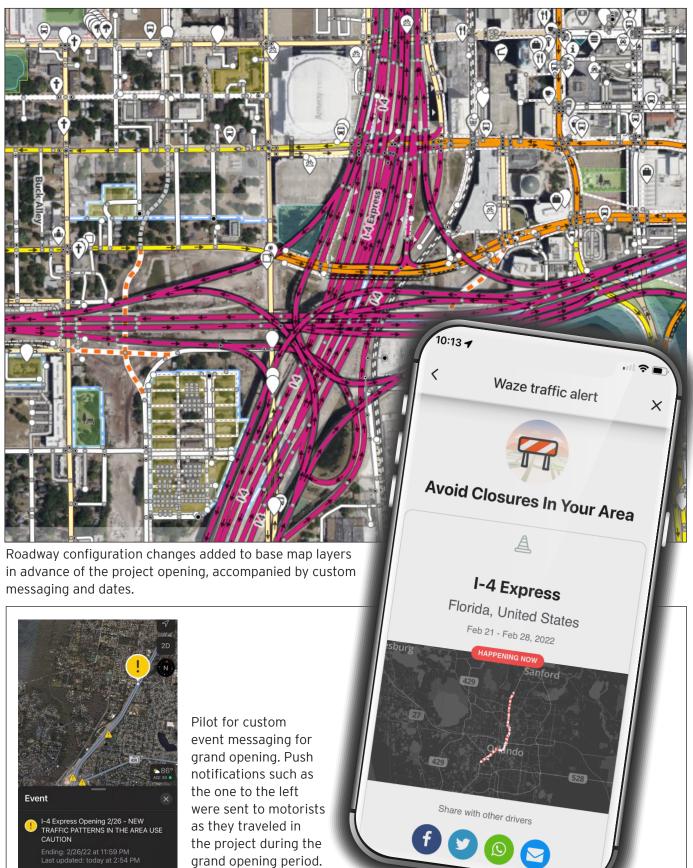
time go-live coordination with the roadway opening, which included never-before-used messaging to alert motorists of the new traffic patterns.

Because the Mapping & Navigation Support Team works with the navigation companies on a routine basis, they are entrusted with editorial privileges that exceed that of the average map editors and provide expanded privileges in navigation applications that do not currently support crowd-sourced or end-user edits. The team has also been able to pilot new features, such as expanded messaging for an enhanced Road Ranger safety message, and real-time push notifications to motorists traveling in the project area.



*Figure 2: Display of custom notifications for special conditions/restrictions* 

Navigating in TSM&O, continued from page 10



For more information, please contact Sheryl Bradley by email at Sheryl.Bradley@dot.state.fl.us.

## Wayne Bryan, Traffic Operations Manager for the City of Tallahassee Traffic Division Retires

*By Fred Heery, PE, State TSM&O Program Engineer, Central Office* 





Wayne worked 29 years with the city of Tallahassee Traffic, working his way up the ranks ultimately becoming the Traffic Operations Manager over the county-wide signal system. Wayne was involved from the beginning of the installation of the Tallahassee Advanced Transportation Management System (TATMS) which replaced the old Mod Comp computer and all field cabinets to a distributed system including the 70 miles of fiber optic cable and 50 CCTVs in the initial deployment. Wayne since grew that system to greater heights into what it is today with over 190 miles of fiber optic cable and 200 CCTVs. One of Wayne's many achievements was his leadership, vision, championing and overseeing the planning and construction of the Tallahassee Regional Transportation Management Center within the City of Tallahassee/Leon County Public Safety Complex.

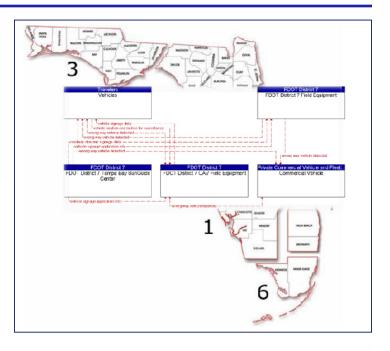
Wayne has been an active leader in the IMSA. He was always on the cutting edge of technology to make traffic flow safer and more smoothly. Wayne worked well with the FDOT and through that partnership, was instrumental deploying the first connected vehicle corridor in Florida, a 7.7 mile corridor consisting of 22 intersections equipped with DSRC communications along US 90 in Tallahassee. Wayne has always enjoyed golfing and fishing – two hobbies that he will certainly have more time to pursue!

## Florida ITS Architecture FDOT Lunch & Learn

Clifford Heise, Regional Vice President, Iteris, Inc.

The Florida's Statewide and Regional Intelligent Transportation System (ITS) Architectures define the functional relationships between transportation systems across the State of Florida. Florida transportation agencies and organizations, including FDOT, can use the ITS Architectures to plan and develop transportation solutions to meet their organization's transportation needs. FDOT began a project in 2019 to update the Statewide and Regional ITS Architectures to reflect the latest transportation systems implementations and to identify what will potentially be needed to support and address the transportation needs over the next ten years.

The ITS Architectures need to reflect the world of ITS as it continues to evolve with new technologies and communication approaches that support connected and automated vehicles, advances in transportation management capabilities, cybersecurity, and data management and analytics. The Florida ITS Architectures have undergone a major update and are being maintained



as needed as part of the Florida ITS Architecture Update and Support project. The ITS Architectures' content evolves as ITS projects are defined, developed and implemented or as changes in transportation service delivery takes place. To keep folks informed about the Florida ITS Architecture, FDOT conducted a Lunch & Learn session on September 14, 2022 at 12:00 Noon eastern time. The Lunch & Learn session reviewed the ITS Architecture project and processes, explored the Florida ITS Architecture website content, and informed stakeholders about how to communicate changes to the architectures to reflect their perspectives, systems and services.

For more information contact James Landini at James.Landini@dot.state.fl.us.

## Save-the-Date for Upcoming Events!

## **AASHTO Annual Meeting**

OCTOBER 19 - 23, 2022 Hilton Bonnet Creek, Orlando Florida

Bringing public and private experts together to share the latest in industry policy and innovation. The meeting will host several AASHTO committees and the Board of Directors where members will set their priorities for the coming year.

- » PDH available
- » Network with colleagues
- » Technical sessions
- » AASHTO Committee Meetings and Board Meeting scheduled

For more information and to register, visit: https://web.cvent.com/event/117fd874-bc35-47ab-923ba928162d55c4/websitePage:33bb36ed-69a1-42a4-85e6-6b25fb660a71



Fall 2022 will bring together ITS Georgia (ITSGA), ITS Carolinas (ITSC), ITS Florida (ITSFL), ITS Tennessee (ITSTN) and Gulf Region ITS (GRITS) for a joint annual meeting.

- » EDUCATE (PDH hours are provided)
- » NETWORK with colleagues
- » TECHNICAL SESSIONS

For more information and to register, visit: https://web.cvent.com/event/2132433d-1ba1-4e8e-8321-3b7e2ef9a31b/summary



# Recalibrating the Future

By Jay Calhoun, Sandy Beck and Russell Allen, ITS Florida

Transpo2022 was a huge success. Although it took three years to hold it - it was delayed twice due to COVID - it was worth the wait. Transpo2022 was held at the Hyatt Regency Coconut Point in Bonita Springs from July 17 to 20. We had over 450 attendees, and a common refrain was, "it's so good to see people again."

The conference started Sunday afternoon with training on State-of-the-Art Intersections/Connected Vehicle Technology. The experts – Raj Ponnaluri, Fred Heery, Pete Vega, and Jeremy Dilmore from the FDOT – provided new information on connected vehicle deployments in the state and lessons learned.

A highlight of the conference was Melissa Wandall's keynote presentation at the Opening Session. Her description of the red-light running crash that killed her husband, how that led to the passage of the Mark Wandall Traffic Safety Act and the creation of the Mark Wandall Foundation, and her attitude for a forgiving life was awe-inspiring and set the tone for the conference.

There were technical sessions from over 60 of our peers, social events for networking, and a great Exhibit Hall providing a look at the newest technology. The conference wrapped up with Secretary Nandam's presentation at the Banquet. He encouraged us to be better "plangineers" and to deal with people, not just issues – a fitting close to an excellent conference. Following the presentation, ITE and ITS Florida presented respective awards including the following:



FLPRITE outgoing president, Vishal Kakkad



Secretary L.K. Nandam at closing banquet



## Transpo2022 - Recalibrating the Future, continued from page 14

#### » ITS Florida Outstanding Achievement Awards

- FDOT District Four TSM&O Resource Management Section in Recognition of Outstanding Service to ITS in District Four Through Improved Productivity, Innovation, and Cost Control
- FDOT District Six SW 8th Street Adaptive Signal Control Technology Pilot Project in Recognition of Leadership, Design, and Construction of the SW 8th Street Adaptive Signal Control Technology Pilot Project
- » ITS Florida Professional of the Year
  - Mukunda Gopalakrishna with Manatee County Government in Recognition of his Outstanding Service to ITS in Florida and his unwavering contribution to the advancement of the transportation industry
- » ITS Florida Champion of the Year
  - Alejandro Motta in Recognition of his Vision and Discipline for the Advancement of Intelligent Transportation Systems throughout District Six

Additional details on these and other awards will be provided in a future article.

If you attended, you can download the Transpo2022 technical presentations and register for a PDH certificate.

For more information contact Sandy Beck at: ITSFlorida@ITSFlorida.org.





FDOT District Six TSM&O engineer, Javier Rodriguez, accepts the ITS Florida Champion of the Year on behalf of FDOT District Six's Alejandro Motta



Keynote Presenter, Melissa Wandall at the Opening Session

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