FLORIDA DEPARTMENT OF TRANSPORTATION

TSM&O DISSEMINATOR

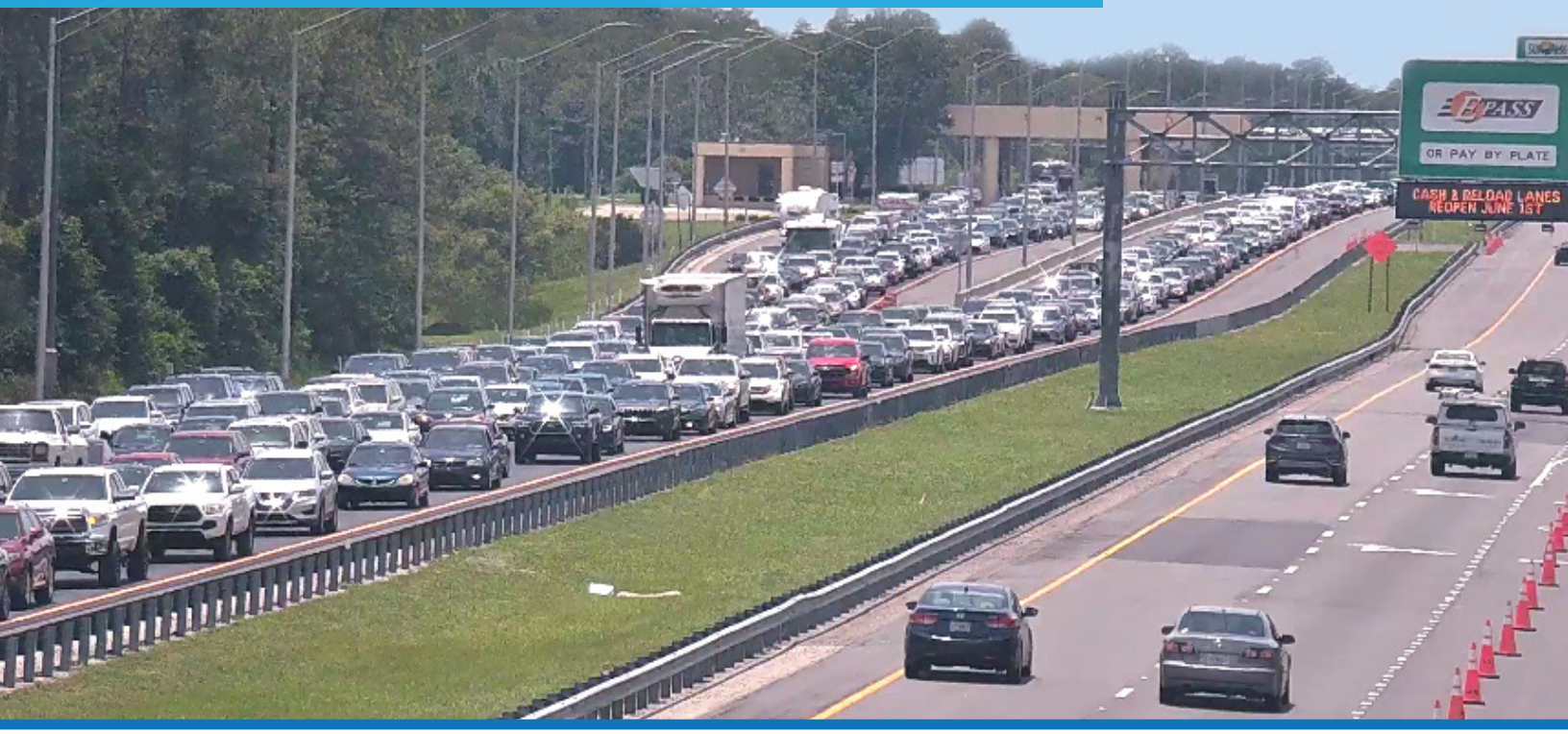
TRANSPORTATION SYSTEMS MANAGEMENT & OPERATIONS
May - June 2020

Rolling out RRIMS: D7's New Road Ranger App

Amid COVID-19 Uncertainty, District One Implements Florida's First Fully Virtual TMC

District Five Goes Two for Two in May Knocking Both Out of the Park

A long queue of vistors make their way to the Space Coast from SR 528 EB in Orange County.



FLORIDA DEPARTMENT OF TRANSPORTATION'S
TRAFFIC ENGINEERING AND OPERATIONS PUBLICATION

FDOT TSM&O
Transportation Systems Management & Operations

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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 Brenda Murphy (Brenda.Murphy@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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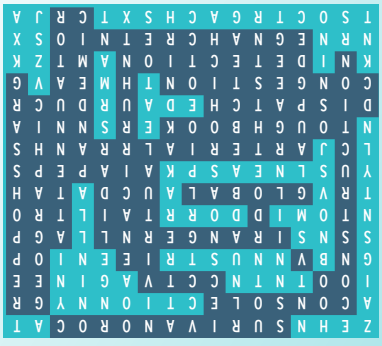


Signal Detection, On-Going Construction, and Ramp Terminals: District One Scores Early Wins in Arterial Management

By Renjan Joseph, District One TSM&O Engineer III, FDOT and Dan D'Antonio, Signal Timing Engineer, HNTB

District One's focus on their growing arterial management program has yielded early benefits for the traveling public. As the foundation is laid for a growing and scalable program, the arterial team has focused its efforts on the following three initiatives:

- Identify failures in signal detection and partner with local maintaining agencies to remedy the issues.
- Partner with construction teams to optimize signal timings within ongoing construction projects.
- Monitor I-75 exit ramps for backups that impact the mainline and make active and permanent signal timing adjustments.

Signal Detection

District One has developed an innovative way to proactively identify signal detection failures that are not reported by automated traffic management system (ATMS) platforms. Arterial operators run split history reports in ATMS.now and Centracs between the hours of 3:00 a.m. and 4:00 a.m. Main line movements that continuously max out or do not gap out properly with side street or conflicting traffic presence gives indication of a potential detection failure. Additionally, minor movements that reach their MAX green time during the early morning hours when volumes are typically low also point to potential detection failure. The rows are highlighted and sent

POLK COUNTY

Split History with Max(M),Gap(G), and Force-off(F)

Report Date: 2/6/2020

Controller: 1318 US 27_Posner

Time: 02/06/2020 03:00:00 To 02/06/2020 03:59:59

Date/Time	Pattern	Cycle	SP1	SP2	SP3	SP4	SP5	SP6	SP7	SP8	SP9	SP10	SP11	SP12	SP13	SP14	SP15	SP16
02/06/2020 03:00:53 AM	254	57	0	31/G	26/M	0	0	31/G	26/G	0	0	0	0	0	0	0	0	0
02/06/2020 03:01:50 AM	254	82	0	55/G	27/M	0	0	55/G	0	27/G	0	0	0	0	0	0	0	0
02/06/2020 03:03:12 AM	254	89	0	63/G	26/M	0	0	63/G	26/G	0	0	0	0	0	0	0	0	0
02/06/2020 03:04:41 AM	254	83	28/M	28/G	27/M	0	15/G	41/G	0	27/G	0	0	0	0	0	0	0	0
02/06/2020 03:06:04 AM	254	82	13/G	42/G	27/M	0	0	55/G	0	27/G	0	0	0	0	0	0	0	0
02/06/2020 03:07:26 AM	254	59	13/G	19/G	27/M	0	0	32/G	0	27/G	0	0	0	0	0	0	0	0
02/06/2020 03:08:25 AM	254	51	0	24/G	27/M	0	0	24/G	0	27/G	0	0	0	0	0	0	0	0
02/06/2020 03:09:16 AM	254	89	0	62/G	27/M	0	21/G	41/G	0	27/G	0	0	0	0	0	0	0	0
02/06/2020 03:10:45 AM	254	74	12/G	35/G	27/M	0	12/G	35/G	0	27/G	0	0	0	0	0	0	0	0
02/06/2020 03:11:59 AM	254	57	0	30/G	27/M	0	0	30/G	0	27/G	0	0	0	0	0	0	0	0
02/06/2020 03:12:56 AM	254	75	13/G	35/G	27/M	0	0	48/G	0	27/G	0	0	0	0	0	0	0	0
02/06/2020 03:14:11 AM	254	58	0	31/G	27/M	0	0	31/G	0	27/G	0	0	0	0	0	0	0	0
02/06/2020 03:15:09 AM	254	46	0	19/G	27/M	0	0	19/G	0	27/G	0	0	0	0	0	0	0	0
02/06/2020 03:15:55 AM	254	77	0	51/G	26/M	0	0	51/G	26/G	0	0	0	0	0	0	0	0	0
02/06/2020 03:17:12 AM	254	66	0	39/G	27/M	0	0	39/G	0	27/G	0	0	0	0	0	0	0	0
02/06/2020 03:18:18 AM	254	68	0	41/G	27/M	0	0	41/G	27/M	0	0	0	0	0	0	0	0	0
02/06/2020 03:19:26 AM	254	75	0	48/G	27/M	0	12/G	36/G	0	27/G	0	0	0	0	0	0	0	0
02/06/2020 03:20:41 AM	254	75	0	48/G	27/M	0	0	48/G	0	27/G	0	0	0	0	0	0	0	0
02/06/2020 03:21:56 AM	254	94	0	67/M	27/M	0	0	67/G	0	27/G	0	0	0	0	0	0	0	0
02/06/2020 03:23:30 AM	254	63	13/G	23/G	27/M	0	0	36/G	0	27/G	0	0	0	0	0	0	0	0
02/06/2020 03:24:33 AM	254	60	0	34/G	26/M	0	0	34/G	26/G	0	0	0	0	0	0	0	0	0
02/06/2020 03:25:33 AM	254	63	13/G	24/G	26/M	0	0	37/G	26/G	0	0	0	0	0	0	0	0	0

Signal Detection, On-Going Construction, and Ramp Terminals: District One Scores Early Wins in Arterial Management, continued from page 3

to the local maintaining agencies to investigate further (see split history report below). The District is currently working to automate this process. Since this activity began in April 2019, District One has identified 417 detection failures within a geographic area limited to Polk, Manatee, and Sarasota counties. The local maintaining agencies have fixed 296 failures to date, or about 71 percent.

Table 2

TOTAL DELAY DURING PEAK HOURS	AM Peak	PM Peak
Intersection Delay Normal Operation (s/veh)	10.9	20.5
Intersection Delay Side Street Detector Failure (s/veh)	13.2	35.8
Difference (s/veh)	2.3	15.3
Total Vehicles	3340	4100
Difference in Delay (veh-s)	7682	62730
Difference in Delay (veh-hr)	2.1	17.4
Hours Plan Operates	4.0	3.5
Average/Peak Ratio	0.8	0.9
Total Difference per Plan	6.8	54.9
Total Difference in Delay (hr)	61.7	
Total Difference per Week (hr)	308.6	
Total Difference per Year (hr)	16046.5	
VEHICLE TYPE	Auto	Truck
Percent of Vehicles	98%	2%
*Value of Time/Commercial Cost ($/hr)	$18.29	$59.94
Vehicle Occupancy	1.61	1.00
Total Weekly Benefit per Vehicle Type	$8,905.16	$369.93
Weekly Operational Loss from Change in Delay	$9,275.10	
Annual Operational Loss from Change in Delay	$482,304.95	

**Texas Transporation Institue, Urban Mobility Report*

FUEL CONSUMED DURING PEAK HOURS	AM Peak	PM Peak
Fuel Consumed Normal Operation (gal)	56	96
Fuel Consumed Side Street Detector Failure (gal)	66	110
Difference (gal)	10	14
Hours Plan Operates	4.0	3.5
Average/Peak Ratio	0.8	0.9
Total Difference per Plan (gal)	32.0	44.1
Total Difference (gal)	76.1	
Total Difference per Week	380.5	
Total Difference per Year	19786	
*Fuel Cost	$1.88	
Weekly Operational Loss from Change in Delay	$715.34	
Annual Operational Benefit Loss Change in Delay	$37,197.68	

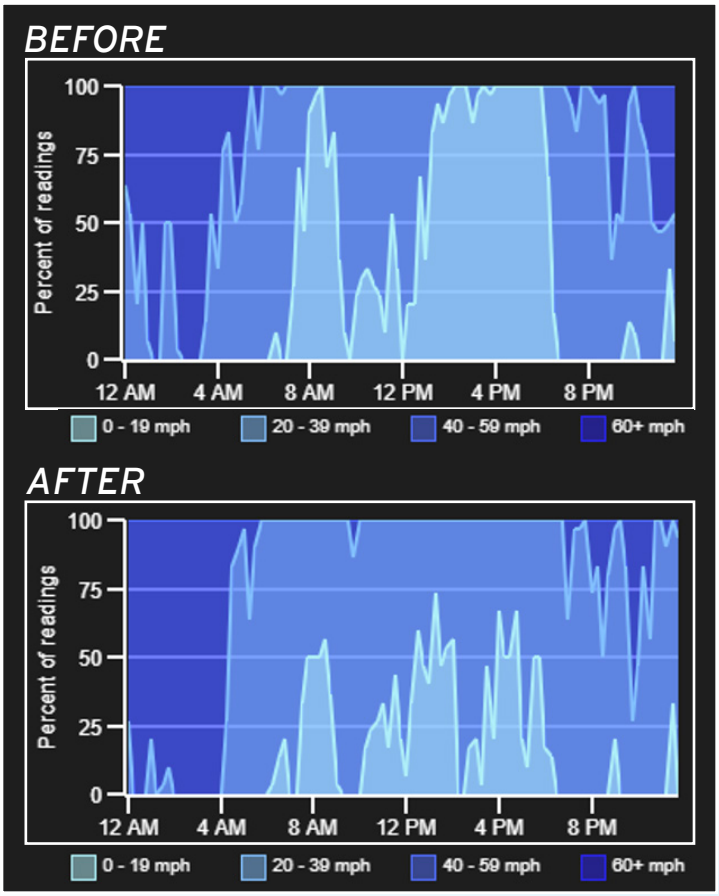
**AAA Gas Prices for Manatee County*

Total Annual Loss from Detector Failure	$519,502.63

Detection failures can result in unnecessary delay and driver frustration. At intersections with mainline phase failures, minor movements that revert to MAX Recall or that have continuous detector calls can starve the oversaturated movements of needed green time. This results in substantial economic impact due to delay, wasted fuel, and added environmental pollution. As shown in Table 1, if detection issues are not fixed, they can add up to significant annualized user costs. The scenario also shows the results of Synchro software modeling for an intersection in Manatee County where a detection failure had been identified and corrected. A MAX Recall was placed on the side street to simulate a failed detector. This failed detector increased the overall delay of the intersection by 2.3 seconds during the AM Peak and 15.3 seconds during the PM Peak. One detection failure that goes uncorrected for a year can result in over $500K annualized lost user costs due to delay and wasted fuel during just the morning and afternoon plans.

Ongoing Construction

Since the beginning of the year, District One arterial management engineers have supported construction teams and local agencies to improve operations within several ongoing construction projects including I-75 at SR 70 interchange, US 41 at Fruitville Road roundabout, and US 41 Venice Bypass.

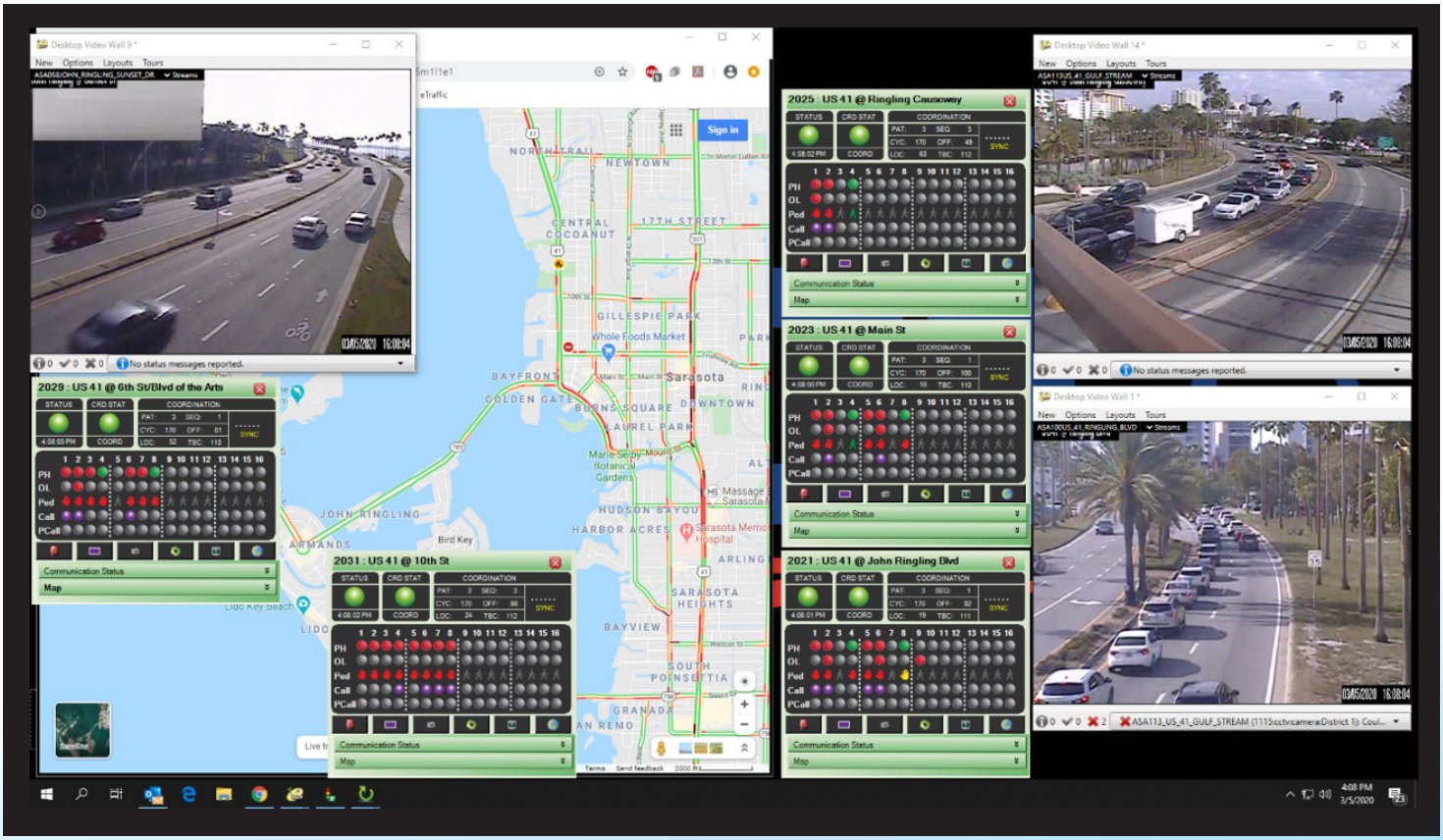


Signal Detection, On-Going Construction, and Ramp Terminals: District One Scores Early Wins in Arterial Management, continued from page 4

Within the I-75 at SR 70 interchange project, a new traffic control phase eliminated the westbound to southbound loop ramp and transferred the volume to dual westbound left turn lanes now conflicting with the heavy eastbound through movement. The new signal phase caused the controller to run FREE resulting in backups nearly two miles long in the eastbound direction on SR 70. As a temporary solution, District One signal timing engineers acted quickly to develop and implement new FREE timings that better accommodated peak hour volumes while new coordinated patterns were developed. Within days, new coordinated patterns were developed, tested, implemented, and fine-tuned. Average speed in the eastbound direction within a 3.3-mile segment of SR 70 from Lockwood Ridge Road to Lena Road increased from 13 mph to 31 mph in the PM peak hour. The following charts show the Regional Integrated Transportation Information System (RITIS) speed stratification in the eastbound direction for two days before the timing changes were made and two days after the timing changes were made.

The City of Sarasota is constructing a roundabout at US 41 and Fruitville Road. Construction activities required detours and lane closures throughout downtown Sarasota. In partnership with the city and the construction team, protected-permissive left turn phasing was implemented along US 41 as a safety solution where left turn volumes were expected to increase as a result of closures and detours. Prior to the traffic control phase that included these changes, District One signal timing engineers proactively developed and implemented new local and coordinated timing patterns at three intersections on US 41 within the project limits. The project also included a prolonged lane closure of one of three left turn lanes from eastbound SR 789 to northbound US 41. This is a critical movement for traffic heading north and east from St. Armands Square and Longboat Key, the closure having occurred during peak season traffic. Challenges within the system included heavy pedestrian traffic, daily traffic variations, a non-interconnected and closely spaced high-intensity activated crosswalk (HAWK), and gaps in CCTV coverage. From noon until 6:30 p.m. every weekday, District One signal timing engineers actively managed the system by balancing green time to clear queues, implementing special timing patterns, and providing daily reports to District One leadership to proactively inform local elected officials.

The US 41 Venice Bypass project presented a straightforward issue that District One signal timing engineers worked with the construction team to address. Prior to construction, the southbound left turn movement on US 41 at Center Road consisted of dual lanes. During temporary traffic control, the left turn lanes were reduced to a single lane which caused complaints, unserved demand, and queue spillover. District One signal timing engineers observed the condition from the TMC and made active split adjustments and made the timing changes permanent. This addressed the issues and resolved



Signal Detection, On-Going Construction, and Ramp Terminals: District One Scores Early Wins in Arterial Management, continued from page 5

the driver complaints.

Through support of these ongoing construction projects, the District One arterial management team was able to provide immediate benefit to the construction teams, local maintaining agencies, elected officials, and the traveling public within the District.

Ramp Terminals

A focus of the program from the beginning has been to actively monitor I-75 and I-4 exit ramp terminals. Exit ramp queues that extend to the mainline present potential safety concerns. This sort of friction on the interstate mainline can lead to breakdown, which causes congestion events that may last for extended periods of time. Arterial operators follow a standard operating procedure that includes the following activities:

- Scan Google Maps and other data sources for potential backups at ramp terminals.
- Verify backups using CCTV cameras.
- When ramp backup exceeds beyond half the ramp length, operators send alerts to consider implementing timings to clear the off-ramp, and possibly prevent the backup from reaching the interstate.

The northbound exit ramp at SR 758 (Bee Ridge Road) was generating alerts on a daily basis between the hours of 7:00 a.m. and 8:30 a.m. The off-ramp is just over 2,000 feet in length and can store up to 80 vehicles. The backups were non-intuitive, so District One signal timing engineers evaluated the split history reports from ATMS.now and found gap outs during cycles when the queues were at their longest. With occluded CCTV camera coverage through the middle of the ramp, the theory that drivers were missing the gap extension was verified in the field. As a solution, MAX Recall was programmed for the off-ramp movement during the AM peak hour so lengthening the gap extension did not cause inefficiencies throughout the rest of the day. This resolved the issue and backups on this ramp no longer impacted the I-75 mainline. This area of I-75 experiences congestion during the AM peak hour. To evaluate if the ramp back-ups were contributing to congestion on the mainline, RITIS was used to compare speeds between the two weeks prior to the change and two weeks after the change. As indicated in Table 2, a significant improvement in speeds on I-75 was observed after implementation of the signal timing adjustment. This appears to confirm that the friction from speed differentials and occasional blocking of the outside general use lane contributed to degradation of the I-75 mainline.

Table 2

Start Time	Average Speed (mph)	
	Pre-Condition	Post-Condition
7:30 AM	65	66
7:45 AM	49	62
8:00 AM	38	60
8:15 AM	37	59
8:30 AM	37	59

The District One arterial program is still in its early stages with signal timing engineer activities starting in January 2020. Despite the focus on foundational activities such as monitoring and reporting, the team has partnered with stakeholders to provide major benefits to the residents and visitors of FDOT District One.

For more information, please contact Renjan Joseph at (863) 519-2746 or by email at Renjan.Joseph@dot.state.fl.us.

Sixty-six alerts have been entered into the Tolls Lane Filter Database, with nine successful hits since the new process was implemented.

FTE Toll Plaza/Lane Search Filter for Vehicle Alerts

By Mary Lou Veroline, TSM&O Technical Writer, FTE and Kelly Kinney, TMC Team Manager, FTE

Through the use of tolls technology, the Florida's Turnpike Enterprise (FTE) Traffic Management Center (TMC) has been able to implement a new protocol to aid in the search for vehicles that are the subject of an Amber, Silver, or Law Enforcement Alert.

In the past when an alert was issued, TMC Operators were limited to entering the information into SunGuide, lighting DMS boards in the area, and alerting Road Rangers to be on the lookout for the vehicle. While these were all good steps to take, the missing piece of the puzzle was tapping into the SunPass tolls database in real time to see if the vehicle had recently passed through a tolling point. Leaders within the Turnpike's Traffic Operations and Tolls departments knew that opportunities to assist were slipping through their fingers and set about developing an access route for the TMC to use.

Enter the "Tolls Lane Filter" website, which is used to monitor the Tolls network for all vehicle license plates traveling through Turnpike toll plazas. With the new partnership between Traffic Operations and Tolls, as soon as a vehicle alert is activated, a TMC Supervisor can enter the vehicle information into the website's lane filter database twenty-four hours/seven days per week. When the system detects a license plate match, an email is sent to the TMC within 60 seconds.

The email contains an image of the vehicle and the toll plaza ID/lane number. The TMC then makes contact with the appropriate FHP dispatch center and relays the information regarding the vehicle's location and direction of travel. The TMC also contacts the regional Road Ranger for that area to make them aware of the vehicle's last known location.

TMC personnel were trained on the system on November 20, 2019. On November 24 at 10:35 p.m., a Silver Alert 'hit' was detected at the Commercial Boulevard exit ramp in Fort Lauderdale and was relayed to the Florida Highway Patrol (FHP) Troop K dispatch center. FHP then worked with local authorities to continue a more targeted search.

The Tolls Lane Filter search tool also allows Turnpike TMC staff to monitor non-FTE roadways that make use of SunPass equipment for tolling, inclusive of Express Lane corridors and toll roads in other FDOT Districts.

As with any new program rollout, there have been some challenges uncovered during system use, primarily intermittent connectivity issues and inaccurate or missing plaza ID numbers in the system (due to all-electronic tolling [AET] conversions), but through communication amongst stakeholder leadership, solutions are forthcoming. In the meantime, the team is energized about the potential life-saving tool that has been added to the TMC's toolbox.

For more information, please contact John Easterling at (954) 934-1620 or by email at John.Easterling@dot.state.fl.us.

District Three Completes Successful Mapping Activities Using ATMA

By Amy DiRusso, District Three TSM&O Program Engineer, FDOT and Russell Allen, Atkins

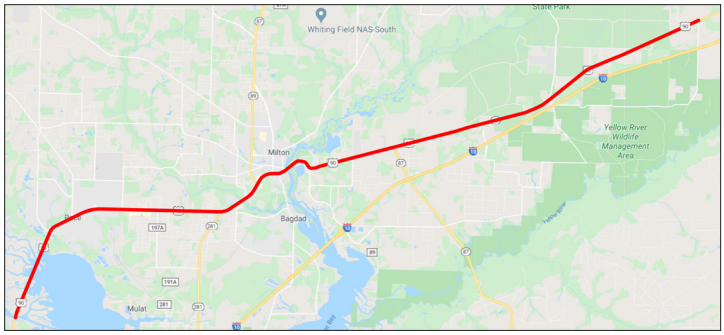
The Florida Department of Transportation (FDOT) District Three recently completed collection of global positioning system (GPS) seed file data along 28 miles of US-90 in Santa Rosa County for the purpose of accurately mapping proposed intelligent transportation systems (ITS) infrastructure into the ITS Facility Management (ITSFM) system. What made this data collection effort unique was the first time use in Florida of an autonomous truck-mounted attenuator (ATMA) vehicle to collect data. In this inaugural case, it was in support of the upcoming ITS fiber deployment from I-10 to Milton Operations along Avalon Boulevard and US-90.

Royal Truck lead vehicle (left) and ATMA vehicle (right) at FDOT Milton Operations

District Three Completes Successful Mapping Activities Using ATMA, continued from page 8

First developed by the United States military, an ATMA vehicle is a self-driving truck that operates completely unmanned as a follower vehicle when it is paired with a lead vehicle. The ATMA vehicle follows the lead vehicle, matching the lead vehicle movements using steering, throttle, and brake actuators. The ATMA vehicle uses a front-mounted radar to detect the lead vehicle. Using an ATMA vehicle allows for a safer scenario in the unlikely event of a crash.

This ATMA project builds on a great deal of research, testing, and trials. This includes the success of a live demonstration conducted on August 15, 2019 at a test track on the campus of Northwest Florida State College in Niceville, Florida. Representatives from the Florida Highway Patrol (FHP) and the FDOT Traffic Engineering and Operations, State Maintenance, and District Three Traffic Operations offices were on hand for this event.



Map of project limits

Kickoff Meeting

On March 12, 2020, the FDOT District Three staff and their general consultant met with the ATMA vendor and the FHP at Milton Operations at 8:00 a.m. CST for a kickoff meeting. An overview of the project scope and expectations for the day were reviewed, followed by a brief group discussion with questions and answers. After the kickoff meeting, the group was invited to take a closer look at the lead truck and ATMA vehicle to be used for project activities.

A drone with a licensed pilot was also available to capture aerial video and images throughout the day. A search was performed in several key locations throughout the project limits to determine where the drone could be flown safely. A few "no fly zones" within the project limits were encountered; however, there were plenty of other opportunities to gather footage of the lead truck and ATMA as they proceeded with GPS seed file data collection.

Driverless ATMA vehicle driving along US-90 eastbound

Project Preparation

The GPS seed file data collection began at the west end of the project limits. Before data collection could begin, the ATMA vehicle was aligned and linked to the leader vehicle. This was crucial to ensure that the ATMA vehicle would follow the actual path of the lead vehicle. Once the vehicles were linked, the project team began collecting GPS seed file data along US-90. The crew started at the Escambia/Santa Rosa County line and worked east to the Santa Rosa/Okaloosa County line. Although it was anticipated that the collection process could take about eight hours, due to "smoother than anticipated" conditions, data collection for the 28-mile corridor was completed in less than six hours.

Key Elements for Implementation

Coordination

Coordination between all stakeholders was a key element in the safe execution of this project. Proper coordination between the FDOT and FHP was essential to safe performance. Keeping stakeholders informed of plans, both locally and at the statewide level, was paramount.

Communication

Clear communication and direction ensured that all team members were on the same page, familiar with moving operations, and that directions given were clear and concise. During the first attempt to pull over and allow motorists to pass, each vehicle driver had a different opinion as to how the movement should be executed. While the GPS vehicle was pulled completely off the road and out of the travel lane, the lead and ATMA vehicles were still straddling the lane and shoulder. This was one of the areas where use of the drone was shown to be important. After witnessing this with the drone, the team had a brief meeting to discuss and adjust the operation so that all vehicles pulled off the road at the same time thereby providing a clearer indication to motorists that they were allowed to pass.

Identifying Obstacles

The ATMA vehicle is equipped with both radar and LIDAR sensors to safely avoid hitting objects such as other cars or pedestrians. However, one object that was not anticipated was tall grass. During one of our attempts to pull over and let motorists pass, the ATMA vehicle "unlinked" from the lead vehicle after it had pulled completely off the roadway. The team had not anticipated that tall grass might be an obstacle. When the ATMA vehicle attempted to pull over, it sensed the tall grass and interpreted it as an object. Therefore, the emergency breaking system was engaged and the ATMA vehicle came to a stop. This was not anticipated but was the correct response by the ATMA vehicle as it encounters a perceived hazard or obstacle.

Break Time

Z	E	H	N	S	U	R	I	V	A	N	O	R	O	C	A	T
A	C	O	N	S	O	L	E	C	T	I	O	N	N	Y	G	R
I	O	O	T	N	T	N	C	C	T	V	A	G	I	N	E	E
G	N	B	V	N	N	U	S	T	R	I	E	E	N	I	O	P
S	S	N	S	I	R	A	N	G	E	R	N	L	L	A	G	P
N	T	O	M	I	D	D	O	R	R	T	A	I	L	T	R	O
T	R	V	G	L	O	B	A	L	A	U	C	D	A	T	A	H
Y	U	S	L	N	E	A	S	P	K	A	I	A	P	E	P	S
L	C	J	A	R	T	E	R	I	A	L	R	R	A	N	H	S
N	T	O	U	G	H	B	O	O	K	E	R	S	N	N	I	A
D	I	S	P	A	T	C	H	E	D	A	U	R	D	U	C	R
C	O	N	G	E	S	T	I	O	N	T	H	M	E	A	V	G
K	N	I	D	E	T	E	C	T	I	O	N	A	M	T	Z	K
N	R	N	E	G	N	A	H	C	R	E	T	N	I	O	S	X
T	S	O	C	T	R	G	A	C	H	S	X	T	C	R	J	A

ATTENNUATOR
GLOBAL
RANGER
CCTV
DETECTION
CONSTRUCTION
ARTERIAL
GEOGRAPHIC
INTERCHANGE
CONGESTION
DISPATCH
LIDAR
COVID
CONSOLE
PANDEMIC
CORONAVIRUS
TOUGHBOOK
GRASSHOPPER
HURRICANE
VIRTUAL

District Three Completes Successful Mapping Activities Using ATMA, continued from page 9

Project vehicles pulling over to allow queued traffic to pass.

Liability

For insurance purposes, the vendor had to always have a "driver" in the ATMA vehicle. For safety reasons, the vendor's insurance policy did not allow them to drive autonomously on active roadways without the presence of a driver. Milton Operations has a long driveway behind their facilities that the team used to perform a demonstration of full autonomy, while the "driver" either walked beside the ATMA vehicle or rode in the cab on the lead vehicle. As connected and autonomous vehicle applications advance, we hope to see these types of restrictions reduced since one of the most compelling reasons for ATMA vehicles is to reduce the risk to drivers and occupants of injury in the event the ATMA vehicle is struck by an impaired or distracted driver.

Conclusion

FDOT District Three considers that implementation of this project was a huge success. When the project was completed for the day, all objectives were met, including:

1. Performance of all activities in a safe manner
2. Collection of GPS seed file data for ITSFM system use
3. Operation of the ATMA without a driver (either "hands-off" in the driver seat, or with no driver at all)
4. Preservation of a relatively "fixed" separation between the lead vehicle and the ATMA vehicle
5. Demonstration of pulling over and allowing motorists to pass the ATMA moving operation

For more information please contact Amy DiRusso at (850) 330-1241 or by email at Amy.DiRusso@dot.state.fl.us.

FDOT District Six TSM&O Office Releases 2018-2019 Annual Report

By Javier Rodriquez, District Six TSM&O Program Engineer, FDOT

The FDOT District Six Transportation Systems Management and Operations (TSM&O) Office published its Annual Report for Fiscal Year 2018-2019.

The report highlights the operational accomplishments and looks ahead to the future as the Department continues to expand its arterial management responsibilities through the implementation of connected vehicle technologies.

With the "Future Is Now" theme, the report highlights the Office's cutting-edge services and how trends like ridesharing and new transit solutions are shaping the way people move throughout their communities.

The annual report covers the program's five primary functions: ITS Deployments, Transportation Management Center (TMC) Operations, Incident Management, IT/ITS Maintenance, and Traveler Information. It also features a section on the program's benefits to the public featuring incident duration times, number of events managed, and more.

The average incident duration in Fiscal Year 2018-2019 was 25.7 minutes, which is lower than the 26.5 minutes from the previous fiscal year and is about a 50 percent decrease from the average baseline duration in 2005. The TMC managed 59,800 events this year, compared to 19,860 in 2005.

The report is filled with interesting information for each traffic service and provides a look-ahead for what is sure to be another exciting year for the District's TSM&O Office.

The FDOT District Six TSM&O Annual Report is located at this website.

For more information, please contact Javier Rodriguez at (305) 640-7307 or by email at Javier.Rodriquez2@dot.state.fl.us.

ITS Florida

Call for Papers!

Deadline for Submittals is January 29, 2021 by 5:00 p.m.

To submit a paper please e-mail your abstract to the Vishal Kakkad (vicepresident@flprite.org) and Pete Costello (pfc@iteris.com)

ITS Florida is inviting you to submit a technical/ scientific paper or a special session for Transpo2021 in Bonita Spring, FL, September 25 - 30, 2021.

This call for papers is open and ITS Florida invites ITS experts to submit a paper to be considered for presentation and publication at Transpo2021.

Transpo2020 has been rescheduled from October 11 – 14, 2020 to Transpo2021, September 25 – 30, 2021.

Ops Scenario A

District Four COVID-19 Continuity of Operations Plan

By Hossam Abdel All, District Four Freeway Management System Engineer, FDOT

Preceding the COVID-19 pandemic, the District Four Transportation Systems Management and Operations (TSM&O) team was challenged with devising a continuity of operations plan (COOP), to minimize disruption to operations at the District Four Regional Transportation Management Center (RTMC). It was imperative that the plan be readily actionable, coordinated, and operationally scenario driven.

The COVID-19 pandemic presented a novel emergency event type, quite unique from other conventional emergencies that national and local agencies have encountered in some time. The novelty centered on not just providing redundant locations of operation (i.e., through other available transportation management centers), but the potential need to extend to fully remote operation and management of District Four roadways.

Early on in the development process, the TSM&O team convened on multiple occasions to forecast the different operational scenarios the RTMC would face.

The discussions yielded the following three distinct and unique scenarios (illustrated in Figure 1):

Operational Scenario A - Preemptive Resource Allocation:

Under this operational scenario, RTMC personnel are reduced to operations-centric roles such as operators and shift supervisors. Other roles capable of performing typical functions remotely would vacate their offices. The vacated office space would then function as consoles for the RTMC operators, as a means of increasing social distancing. This implementation would result in only two operators in the control room with the remaining six to seven operators spread out amongst the vacated office spaces.

Operational Scenario B - Staff Reduction to Skeleton Crew:

Similar to the above scenario, scenario B reduced the number of personnel to a minimum number of operators capable of sustaining operations out of the District Four RTMC.

Operational Scenario C - Fully Remote Operations:

Should the need arise to provide fully remote RTMC operations, this operational scenario identified the resource and information technology (IT) gaps that would need immediate addressing. The following were deemed necessary resources to meet the subject operational scenario:

Laptop Computers:

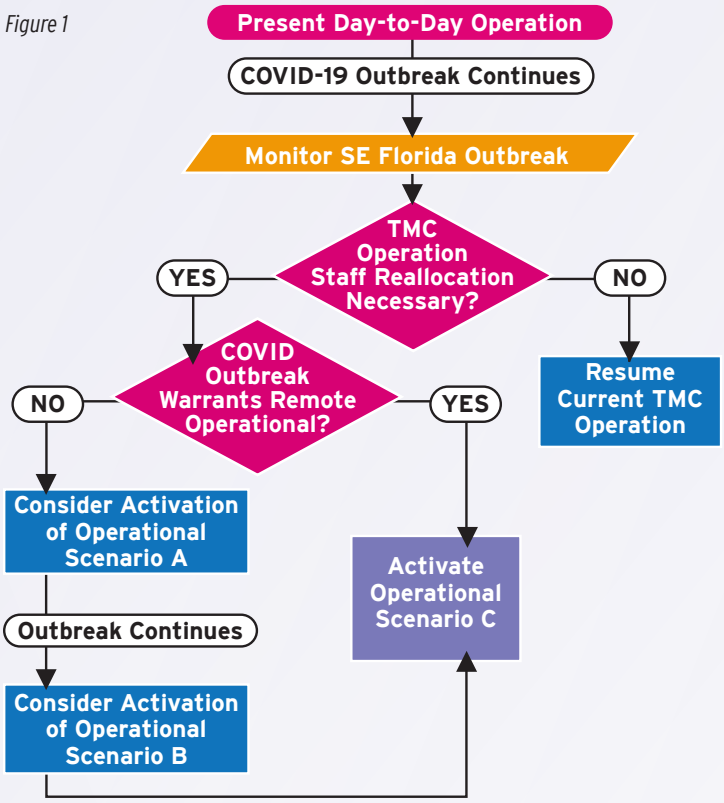
A core component to allowing for remote operations is securing a sufficient number of laptops. In collaborating with the District Five Office of Information Technology, District Four was able to secure 25 laptop computers scheduled for retirement. It was realized that although these laptops may be relatively timeworn, they solved the immediate need for laptop computers should Operational Scenario C be activated. These laptops were then imaged with a SunGuide version and prepared for operator hand-off.

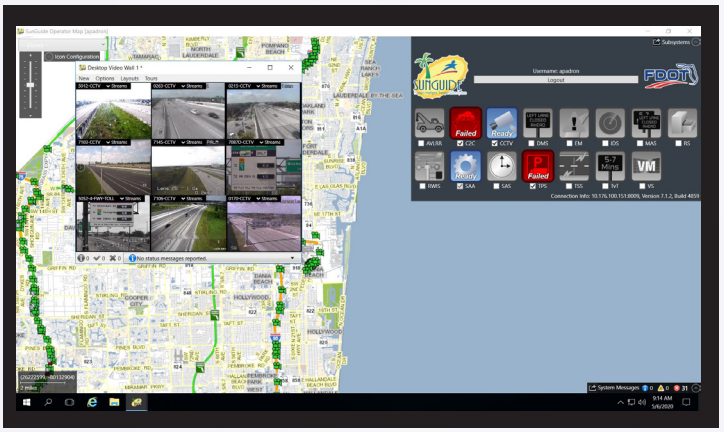
Radios:

Another key element in everyday operation are radios. It was determined that a total of 10 radios were available for remote operations.

Early on, IT acknowledged that despite having the ability to remotely connect to multiple TMC features, accessing closed circuit camera television (CCTV) feeds through a virtual private network (VPN) would introduce significant limitations. Unless connected to the ITS network, a user may

Figure 1





only have access to a few camera feeds due to bandwidth limitations.

In addition to inefficient operations, the remote RTMC experience would prove lacking if access to video streams is limited to only two or three. Another concern associated with accessing video streams was rendering the remote users with clear and stable playback of video feeds.

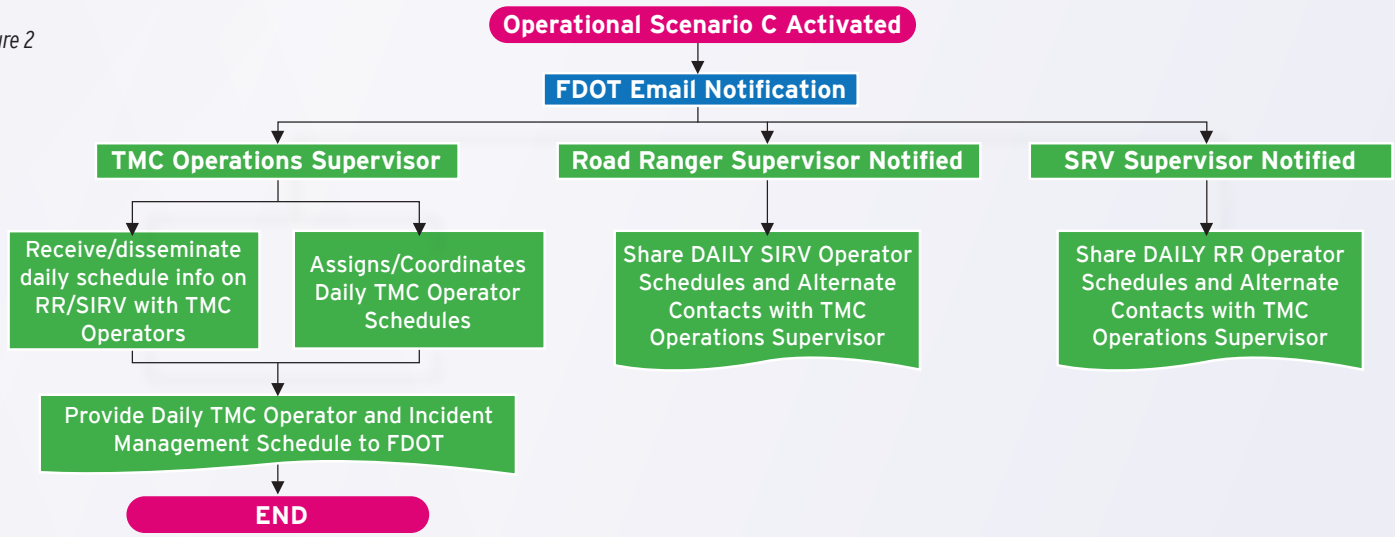
To overcome this issue, the TSM&O IT staff came up with an innovative solution to help support the above operational scenario as part of the COVID-19 COOP. The innovation focused on substituting operator remote desktop access via VPN with Remote Desktop Protocol access by utilizing a powerful cluster of terminal servers on hand at the RTMC. This solution allowed for the concurrent streaming of up to 10 CCTV streams without any distortion of images for each user, in addition to maintaining fully functioning pan-tilt-zoom capability.

Understanding that Operational Scenario C would present a new and distinct method of operations, a dedicated process flowchart was created. To further ensure comprehension of each of the above operational scenarios, the COOP was supplemented with Action Items, a Responsibility Assignment Matrix (RAM), and an Essential Functions and Contact List.

Effective March 21, 2020, management activated Operational Scenario A as a preemptive measure to help mitigate the potential spread of the COVID-19 virus. Operational Scenario A was implemented with relative ease and in an expedient manner, with no foreseeable disruption to District Four's RTMC operations. The exercise of preparing and applying the COVID-19 COOP by the District Four TSM&O team demonstrated its resilience in adapting to the imminent and unknown; a quality that in these trying times cannot be understated in its importance.

For more information on District Four's COVID-19 COOP, please email Hossam Abdel All, Freeway Management System Engineer at Hossam.AbdelAll@dot.state.fl.us.

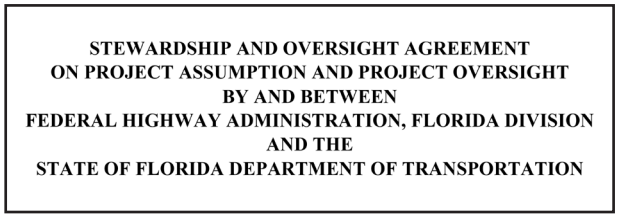
Figure 2



FDOT System Engineering Development

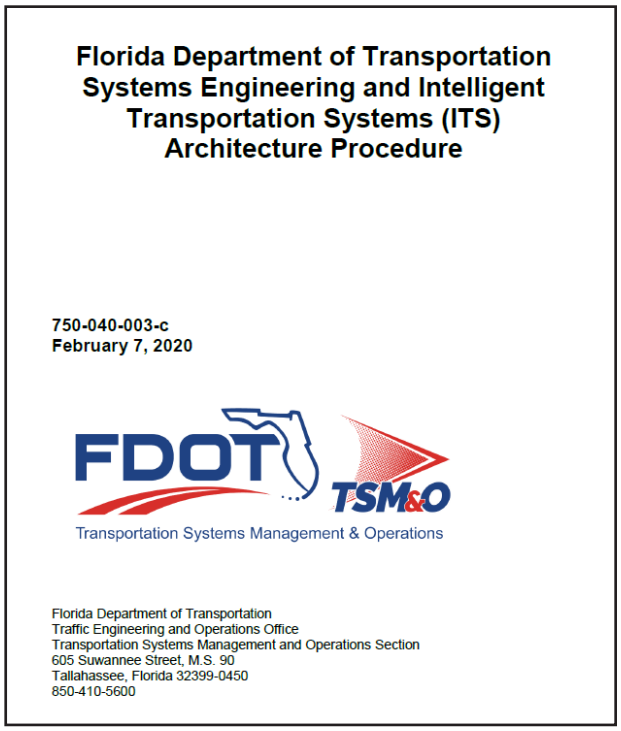
By Christine Shafik, State ITS Software Engineer, FDOT

Federal regulations pertaining to systems engineering analyses for intelligent transportation systems (ITS) projects are defined in the Code of Federal Regulation, Section 23 Part 940.11 (23 CFR 94.11). The Federal Highway Administration (FHWA) and the Florida Department of Transportation (FDOT) have entered into a "Stewardship and Oversight Agreement" (S&O Agreement) which delegates the FDOT authority to perform certain Federal-aid Highway Program activities normally performed by the FHWA. The S&O Agreement was recently updated on August 20, 2018. The "Project Action Responsibility Matrix" dated February 6, 2015, delegates approval of systems engineering analyses for intelligent transportation system (ITS) projects to the FDOT.



STEWARDSHIP AND OVERSIGHT AGREEMENT
ON PROJECT ASSUMPTION AND PROJECT OVERSIGHT
BY AND BETWEEN
FEDERAL HIGHWAY ADMINISTRATION, FLORIDA DIVISION
AND THE
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

Stewardship and Oversight Agreement



Florida Department of Transportation
Systems Engineering and Intelligent Transportation Systems (ITS) Architecture Procedure

750-040-003-c
February 7, 2020

FDOT TSM&O
Transportation Systems Management & Operations

Florida Department of Transportation
Traffic Engineering and Operations Office
Transportation Systems Management and Operations Section
605 Suwannee Street, M.S. 90
Tallahassee, Florida 32399-0450
850-410-5600

The FDOT's "Systems Engineering and ITS Architecture Procedure" (750-040-003-c) describes the procedures the FDOT uses to comply with 23 CFR 940.11 and the S&O Agreement. The current version of 750-040-003-c was approved by FDOT Secretary Kevin Thibault on February 7, 2020, replacing version 750-040-003-b that had been approved on July 17, 2008.

Systems Engineering Procedure (750-040-003-c), Effective February 7, 2020

The FDOT began a comprehensive review and update to 750-040-003-b . This update was done within the FDOT's Office of Traffic Engineering and Operations (TEO), ITS Division. Between March 2012 and September 2015, two drafts were developed and reviewed by the FHWA and the FDOT's Office of Policies and Procedures Management, and the FDOT's District Offices. Many reviewer comments focused on the need to clarify how risk assessments worked, how to tailor systems engineering analyses to project risk and complexity, the need for updates to systems engineering analysis forms attached to the procedure, and the need for training.

The TSM&O Division continued updating the procedure in mid-2016, taking measured steps balancing progress with other TSM&O program priorities at the time. In late 2017 through 2018, FHWA Traffic Operations and Planning reviewed the draft update and provided extensive comments. During that same time frame, the FHWA and the TSM&O Division held a

series of meetings to discuss FHWA's comments and resolve responses. The FHWA reviews and comment resolution meetings were completed in 2018.

In late 2018, the TSM&O Division initiated the formal FDOT internal review process with reviews by all districts, the Director of TEO, the Office of Administration, the Office of General Counsel, and finally, review by the FDOT Chief Engineer. The FDOT internal reviews and comment resolution were completed and the final approval of 750-040-003-c by Secretary Kevin Thibault was effective on February 7, 2020.

Parallel Efforts for FDOT ITS Stewardship and Oversight

When the update effort resumed in late 2016, the TSM&O Division addressed comments in three additional ways: stand-alone forms, updated guidance documents, and training modules.

Forms, Published October 2017

The FDOT converted the forms attached to the 750-040-003-b to three stand-alone forms. This change was undertaken to allow the forms to be more accessible to users and to allow the forms to be updated apart from the procedure, if enhancements were identified. The three stand-alone forms are posted on the FDOT's Forms and Procedures website with instructions on how to use the forms described in 750-040-003-c.

- Form 750-040-04: ITS Architecture Change Request Form
- Form 750-040-05: Project Risk Assessment and Regulatory Compliance Checklist
- Form 750-040-06: Systems Engineering Project Checklist

Guidance Documents, Published September 2019

The FDOT revised its most often used systems engineering report templates in September 2019. They provide updated instructions and guidance on how to tailor the documents based on risk and complexity. These guides were posted on the FDOT's website once 750-040-003-c had been reviewed within the FDOT's formal update process. These five guidance templates are:

- Form-SE-01: Concept of Operations (ConOps)
- Form-SE-09: Project Systems Engineering Management Plan (PSEMP) Template
- Form-SE-21: System Validation Plan Template
- Form-SE-22B: Requirements Traceability Verification Matrix (RTVM)
- Form-SE-23: System Verification Plan Template

Training Modules, by 2020

The TSM&O Division began working on three systems engineering training modules. PowerPoint slides were developed for the following three training modules:

- 100 – Introduction for FDOT staff and consultants
- 101 – Overview for Local Agency Program (LAP) focused
- 102 – Detailed, two-day face-to-face training

In 2017, module 101 was presented at five LAP workshops for FDOT Districts Two, Three, Four, Five, and Six.

At the conclusion of these five sessions, it was recommended by the FDOT's Local Programs managers to simplify the courses as they were too complex for the intended audience, the FDOT local program managers, and project development local agency staff.

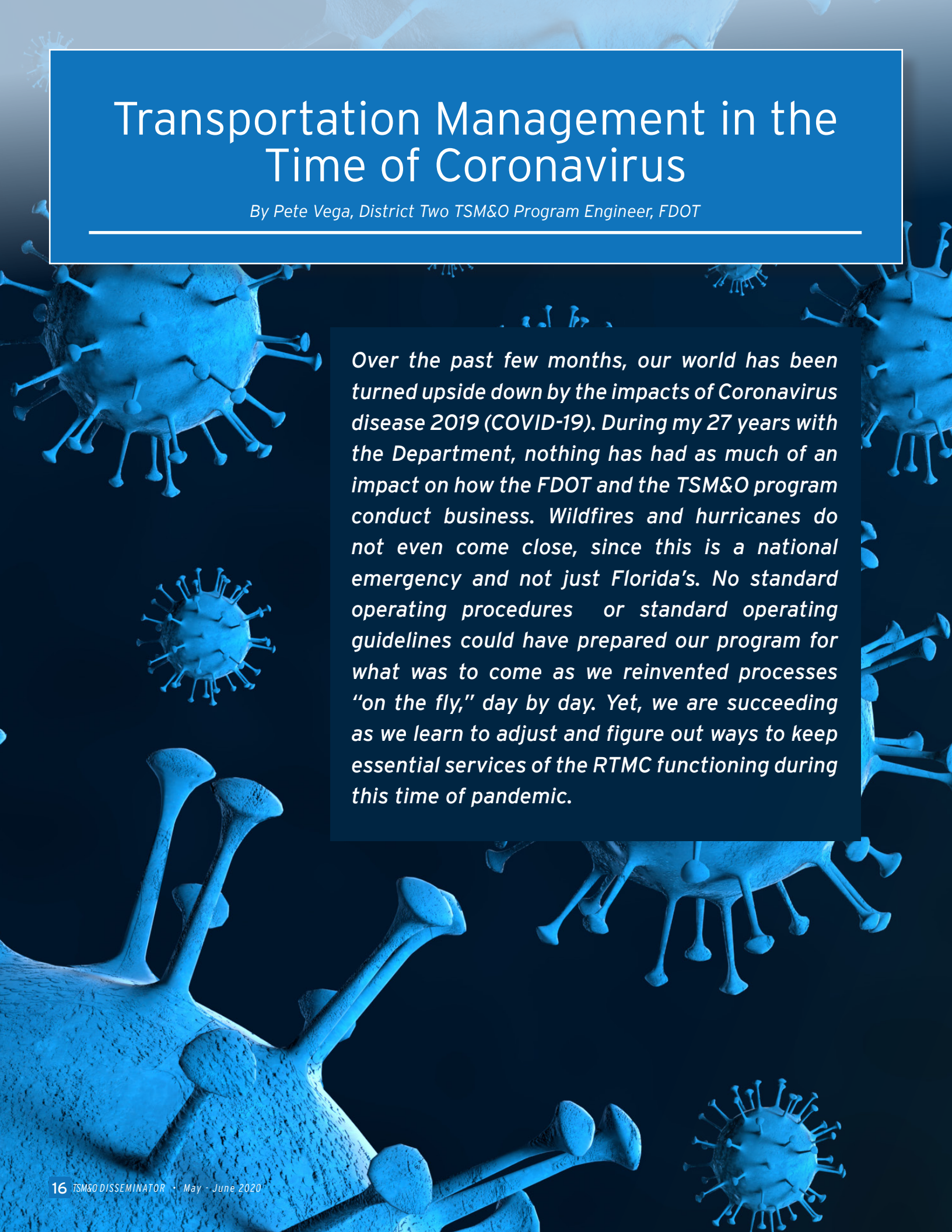
In 2018 the TSM&O Division updated module 101 based on comments received from the LAP managers. Following those updates, in April and July 2019, module 101 was presented to Central Office and Districts One and Two to determine if the content met attendees' needs. After a final review, the module was retitled as Course 100 *Overview of FDOT Systems Engineering Procedures for ITS Projects* and was approved for conversion into a computer-based training (CBT) module. Availability of the CBT module is expected by July 2020.

SE 100 introduces basic ideas about systems and systems engineering, why we do systems engineering for ITS, Federal and FDOT systems engineering requirements, and systems engineering deliverables for ITS projects. The course presents the forms used by FDOT TSM&O managers for Risk Assessment, Architecture Changes, and the High-Risk Project Checklist. The course also shows how to use the systems engineering process in developing the various systems engineering documents needed for project management, operations, requirements, procurement, testing and systems acceptance. The Training is based on and consistent with the ITS Procedure 750-040-003-c. The FDOT is considering development of an advanced systems engineering module depending on the needs of Districts, local agencies, and consultant engineers who take the introductory course.

For more information, please contact Christine Shafik at (850) 410-5615 or by email at Christine.Shafik@dot.state.fl.us.

Transportation Management in the Time of Coronavirus

By Pete Vega, District Two TSM&O Program Engineer, FDOT



Over the past few months, our world has been turned upside down by the impacts of Coronavirus disease 2019 (COVID-19). During my 27 years with the Department, nothing has had as much of an impact on how the FDOT and the TSM&O program conduct business. Wildfires and hurricanes do not even come close, since this is a national emergency and not just Florida's. No standard operating procedures or standard operating guidelines could have prepared our program for what was to come as we reinvented processes "on the fly," day by day. Yet, we are succeeding as we learn to adjust and figure out ways to keep essential services of the RTMC functioning during this time of pandemic.

Transportation Management in the Time of Coronavirus, continued from page 16

For those of you unfamiliar with the North Florida Regional Transportation Management Center (NFRTMC), we are a multi-agency facility housing the Florida Department of Transportation (FDOT) RTMC staff, Florida Highway Patrol (FHP) duty officers, Florida Fish and Wildlife Conservation Commission (FWC) dispatchers, Jacksonville Sheriff's Office (JSO) personnel, and North Florida Transportation Planning Organization (NFTPO) employees. Each day, we have 62 individuals working in the facility, with 52 of them considered essential to the operation. Once the severity of COVID-19 became evident, the NFTPO and JSO personnel were directed by their leadership to telework for the duration of the Duval County stay-at-home orders. The essential staff, critical to RTMC operations, had to develop a plan to continue operations while maintaining the safety and well-being of our employees.

Fortunately, the NFRTMC was designed with employee safety and comfort in mind. During this time, we have come to fully appreciate the design features as they have proven their worth when dealing with the Covid-19 situation. First, all workstation areas were designed in a "quad" fashion, whereby each workstation has four employees facing away from each other and positioned approximately 10 feet apart. Facing them are five large monitors that act as a "shield" when speaking to someone on the other side of the workstation. Second, there are hand sanitizers placed at several access points in the work area, as well as access doors to the bathrooms that allow employees to easily enter to wash their hands. These bathroom doors were designed for hands-free use, which you push to enter and use the touch free door handles (using your arm) to exit. Likewise, all faucets, urinals, and toilets are equipped with sensors, making them hands-free as well.

The design itself incorporated a wide walking space around the quads (between six to 12 feet) that will help staff avoid close contact when moving around the operations floor. Offices for supervisory staff are located on the south and west side of the floor, with each having a door that can be kept ajar or closed for this type of situation. Access and hallway areas outside the operations floor have wide areas that allow for staff to keep the proper six-foot distance. The breakroom is large enough to accommodate 20 persons at one time, thus allowing staggered breaks in this room while maintaining proper distancing.

Key changes that were implemented by the FDOT's RTMC operations contractor included temperature checks prior to their staff entering the building to start a shift, mandatory wearing of masks while in the building, hand sanitizer at each workstation, disinfectant spray at each workstation, and social distancing of six feet or greater. FHP and FWC employees have developed similar processes that include the wearing of masks, hand sanitization, and social distancing.

Although the first few weeks under COVID protocols presented some adjustment difficulties for the RTMC staff, everyone understood these measures were taken for the benefit of their well-being. The hardest habit to break was when there was a significant roadway incident or closure displayed on the front video wall, because it typically led to floor personnel congregating in front of the screen as a response plan was developed. This is no longer the case, with effective coordination now conducted from each individual's workstation. Another challenge that presented itself was when a supervisor had to assist an RTMC operator. Social distancing had to be kept in mind even while trying to assist with some unique events. Keeping the six-foot distance was especially complicated when a supervisor was trying to view an RTMC operator's screen in order to provide guidance. Fortunately for us, a large majority of these operators have several years of experience, so these moments were very rare.

It appears that dealing with COVID-19 will not take just days or months, but possibly years. We are fortunate that the North Florida RTMC reflects so much thoughtful planning and design. This has allowed us to perform our duties in a safe and efficient manner. We have a Plan B in place in case we ever have to shut down the floor. We have the North Florida TPO Board Room as a back-up location on the other side of the building. This 2,000 square foot room is connected to our data room, so if push comes to shove we just have to slightly reduce staff levels, relocate some workstations and monitors, transfer the phones to our cellular lines, and shift operations to that floor. We anticipate that we'd be out of commission for about 30 minutes as this relocation is initiated. Hopefully, that will never be the case during these trying times.

For more information, please contact Pete Vega at (904) 360-5463 or by email at Peter.Vega@dot.fl.state.fl.us.

Rolling out RRIMS: District Seven's New Road Ranger App

By Dan Buidens, District Seven ITS Operations Manager, FDOT; Romona Burke, District Seven ITS Support Manager, FDOT; Michael Crawson, District Seven RTMC Manager, Lucent Group; Joe Parks, Senior Systems Specialist, Lucent Group; Carlton Urban, Project Manager, Lucent Group

In March 2019, District Seven was faced with the challenge of replacing its existing in-vehicle Road Ranger Automated Incident Software. Support for this product was expiring at the end of the year. The Department tasked the Operations consultant manager to quickly develop a new product for use. As a result, the Road Ranger Incident Management System (RRIMS) application was born.

Today, RRIMS is used as a visual-based interactive communication link between the Tampa Bay SunGuide Center (TBSG) RTMC Operators and the Road Ranger (RR) service patrol vehicle operators.

The RRIMS application has facilitated the exchange of roadway event information between the RTMC Operators and the Road Rangers since October 2019. This article discusses how RRIMS works and highlights several useful features that may be of value to Road Ranger Programs in other Districts within Florida.

How RRIMS Works

A deployment of the RRIMs application requires collaboration between the developers of SunGuide and the RTMC Information Technology (IT) support team.

A longtime FDOT vendor will provide the necessary installation and setup of the SunGuide® Smart Phone Application for Road Rangers (SPARR) drivers. An IP address accessible from outside the local RTMC firewall is necessary for the RRIMS application to access and communicate with SunGuide via the installed SPARR driver.

IT support will need to configure RRIMS for each specific District. For District Seven, RRIMs was loaded onto ruggedized laptops that were equipped with cellular network cards and on-board GPS. Each of District Seven's Road Ranger trucks were also equipped with a signal booster on the dashboard in order to enhance the laptop's GPS signal.

Installing the RRIMs application

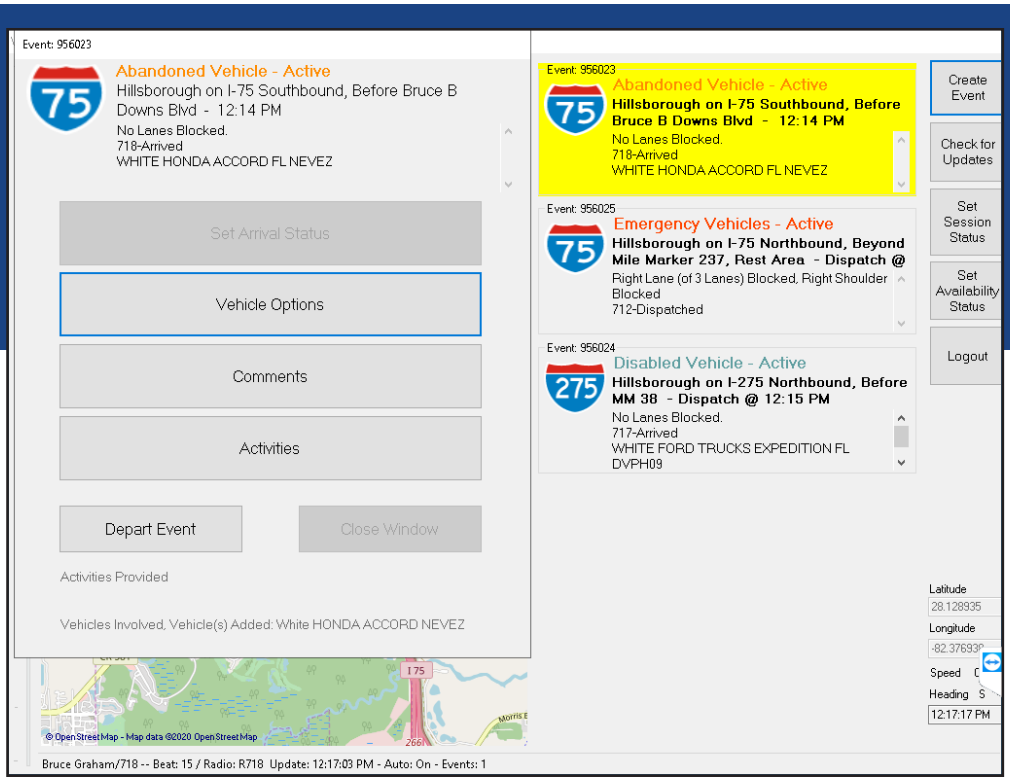
After the application is installed, the laptop is configured with the vehicle's identification information assigning it to a specific SunGuide Automated Vehicle Locator (AVL)/ Road Ranger vehicle definition. Each vehicle is uniquely identified and can only be in use by one driver at a time. All District-specific AVL/RR and Event Management (EM) information is provided to RRIMS via the SPARR driver. The RRIMS application is updated every time a user logs in so that any changes to EM or AVL/RR information (new roadway locations and vehicle descriptions, for example) are immediately available to each Road Ranger.

Creating and Closing-out an Event Feature

While patrolling, the Road Ranger has the ability to create an event in SunGuide using the RRIMS app. The on-board GPS provides for a range of event reference points within a mile of the Road Ranger's current location. By choosing the appropriate location reference point, the Road Ranger can then select the event type (see Figure 1).

Rolling out RRIMS: District Seven's New Road Ranger App, continued from page 18

Figure 1. Laptop Display
Road Ranger "Arrived" at an event. The Active Event information dialog is open on the left and additional events are listed on the right side of the window. Events assigned to the current Road Ranger are always highlighted and are always at the top of the list of events. The application uses large point and click boxes for ease of navigation and to take advantage of the laptop's touch screen.



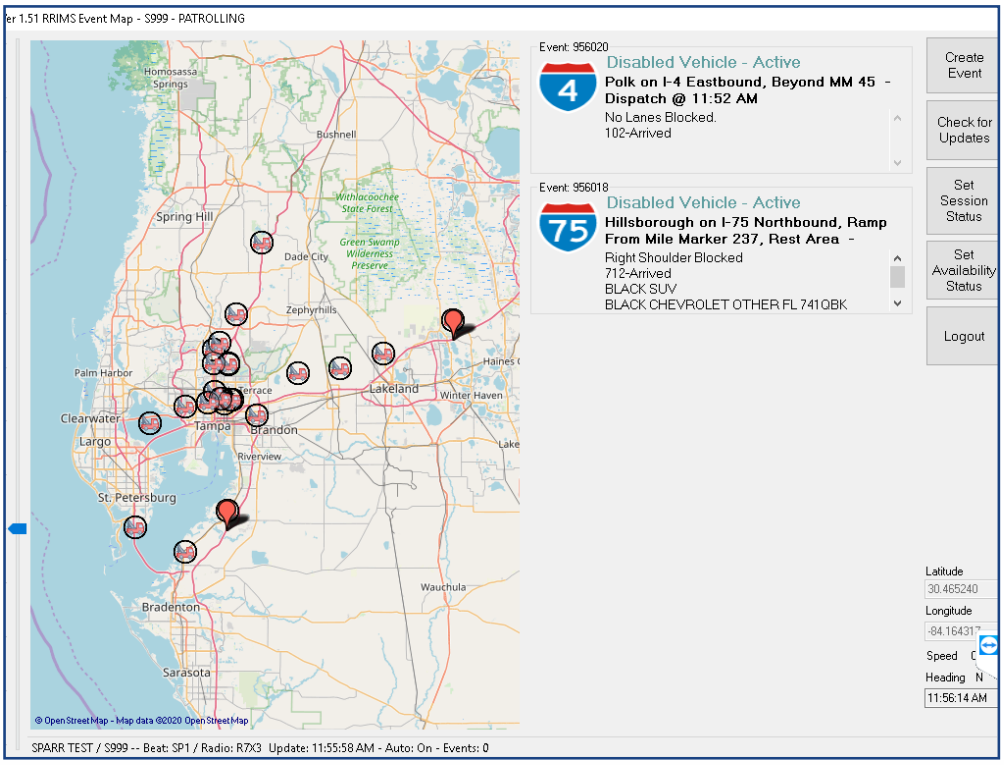


Figure 2. Regional Display of Patrolmen
Supervisor Mode Feature: In this mode, the supervisor vehicle is provided with credentials to see the location and status of all the Road Rangers. By default, Road Rangers can only see their own location and all event locations.

Moreover, the Road Ranger also has the ability to add vehicle make/model/color and tag information about the vehicles involved in the event. There is no need for interaction with the RTMC until the event is closed. The Road Ranger can depart the event, but it is up to the operator to officially close the event after clearing all DMS messages and documenting other activities.

Additional Mapping Features are Provided by External Web Services

As an added enhancement, all Road Ranger location information is captured and presented on a web-based mapping application. This is similar to the Road Ranger tracking provided by SunGuide but gives the RTMC Operators a separate map to view all vehicles on patrol within the District. This makes it easier to track Road Rangers separate from all the other information displayed on the SunGuide map. This mapping feature also allows designated Road Rangers to view the location of all trucks on patrol (see Figure 2). By default, a Road Ranger's map only shows their own current location and the location of all events.

Test Rollout and Road Ranger Training

The initial test deployment of the application included two Road Ranger trucks. The test phase provided initial feedback between the RTMC Operators and Road Rangers and tested the GPS tracking units within each truck. During the initial rollout, installation of the app, testing of the wireless connection, and GPS location identification were performed at a coned-off area or "transfer point" at the District Seven parking lot.

After the initial two vehicles were successfully deployed, the fleet was asked to come to the TBSG center parking lot with their laptops, where a TBSG Center IT technician installed the new application on each truck. Critical to the successful rollout of a new application is meaningful training! To facilitate the transition of the Road Rangers from the existing program to the new application, IT personnel met one-on-one with each Road Ranger as the application was installed and a brief tutorial was provided by staff on how to use the new application. Additionally, a User's Manual and a laminated one-page Quick Reference Guide were provided to each Road Ranger patrolman.

RTMC Operations Utilizing RRIMS

RRIMS provides Road Rangers with a real-time visual display of SunGuide event dispatching and updates while patrolling. A built-in mapping feature continuously displays the Road Ranger's current location and the location of all dispatched events. In return, RRIMS automatically sends the Road Ranger's location and status data directly to SunGuide and these updates are in turn displayed on the SunGuide map and in the SunGuide AVL/RR status dialog. A Road Ranger will receive a pop-up notification alert when dispatched to an event. The alert will provide the location, event type, any lane blockage and descriptions of vehicles involved in the event. All RTMC dispatched events will be displayed on the Road Rangers screen, but their specific events will be highlighted in yellow. Since a Road Ranger sees all the dispatched events pending in their zone, they can prioritize events by location and proximity to their location and not have to rely solely on the order the dispatched events were received.

Upon receiving an event dispatch, the RR places themselves "Enroute" to that event, thereby notifying the Operators and SunGuide of their acknowledgment of the dispatch. This is recorded in the event chronology and also updates the Road Ranger's status in SunGuide to Enroute. Upon arrival at the event, the RR uses RRIMS to activate "Arrived" status and SunGuide captures this in the event chronology. Upon arrival, the RR can document all services provided and enter in comments about the event into SunGuide in real time. All interaction between the Road Ranger and SunGuide are documented in the event chronology. All event information exchanged between the Road Ranger and SunGuide, except for comments and vehicle tag, is provided through pre-populated drop-down menu choices making the iteration simple, efficient, and consistent for the Road Ranger to input. The ability to self-document an event significantly reduces the Road Ranger's reliance with RTMC Operators in documenting event activities. This seamless interaction between the Road Ranger and SunGuide allows the Operators to focus on other event activities such as setting DMS messaging and notifying other responders.

Troubleshooting TMC Communications and Trouble Tickets

Trouble tickets either from the RTMC or from the Road Ranger side with the RRIMS application are routed from the Road Ranger Shift Supervisor to the consultant's primary Source Code Manager. Trouble tickets can be called in 24/7/365. A remote desktop management application was loaded on each laptop to provide hands-on troubleshooting.

Most of the early learning issues experienced with the application dealt with "how to" issues such as re-establishing communications between SunGuide and the Road Ranger when cellular service was lost (i.e., dead cellular spots). Operators were also trained to be more aware of issues involved with closing events with an arrived Road Ranger since this would sometimes result in "orphaned" Road Rangers (i.e., arrived, but no longer assigned to an active event). The rollout of RRIMS has resolved this issue.

Success

The success of the RRIMS application in District Seven has led to a second deployment in District One. The tow company provider for Road Ranger services successfully deployed the RRIMS application to the entire District One Road Ranger fleet in February 2020.

If you would like a virtual demonstration or more information regarding the RRIMS application to assist your Road Ranger program, please email Daniel Buidens at Daniel.Buidens@dot.state.fl.us, or Romona Burke at Romona.Burke@dot.state.fl.us.

Photo Contest for ITS Florida 2021 Calendar

ITS Florida is calling all members to be creative and submit photos for its award-winning calendar!

ITS Florida is having its annual photo contest to select the best in Florida to be used in the 2021 ITS Florida Calendar.

The calendars will be distributed by December 2020.

Deadline for Submittals is Friday, July 31, 2020 by 5:00 p.m.

Ms. Sandy Beck
ITS Florida
PO Box 56468
St. Petersburg, FL 33732
Phone: (727) 430-1136
Email: itsflorida@itsflorida.org or SandyBeck@tampabay.rr.com

How to Enter

Please submit photographs in high-resolution, landscape* format (.jpg or .png) and a document identifying each photo with a short caption that can be used 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 is below. To setup an alternate means for digital submittal, please coordinate with Sandy Beck (email addresses listed below).

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

For questions, please feel free to contact Mr. Jonathan Tursky at Jonathan.Tursky@TransCore.com or Ms. Sandy Beck (contact information listed to the left).

*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.

Amid COVID-19 Uncertainty, District One Implements Florida's First Fully Virtual TMC

By Mark Mathes, District One TSM&O Program Engineer, FDOT; Dan D'Antonio, Project Manager, HNTB; and Michael Braun, IT Manager, Kyra Solutions, Inc.

"The only difference between success and failure is the ability to take action."

— Alexander Graham Bell

or "Necessity is the mother of invention."

— Plato

The threat and impact of COVID-19 has changed the transportation industry in almost every possible way. In the eight days between the first reported cases in Florida on March 1 and Governor DeSantis' state of emergency declaration on March 9, each day brought many more questions than answers about how we would be affected. One thing was clear. Social distancing was an effective way to "flatten the curve" and slow the spread. But how could a traffic management center that relies so heavily on coordination and collaboration using sophisticated technology implement social distancing? Rather than cope with another question unanswered, District One leadership decided to take action and prepare to implement a virtual TMC, if necessary.

On the evening of March 12, a survey was distributed to the operations team that asked two simple questions:

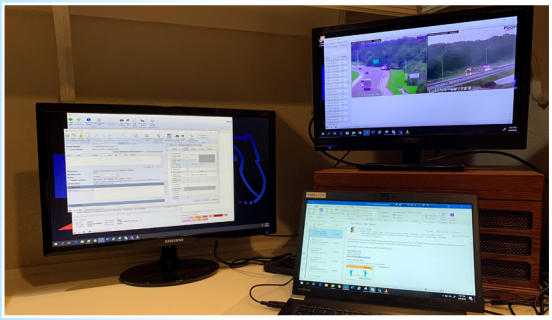
1. Do you own a personal computer that you are willing to use for work functions?
2. Do you have access to a high-speed internet connection that you are willing to use for work functions?

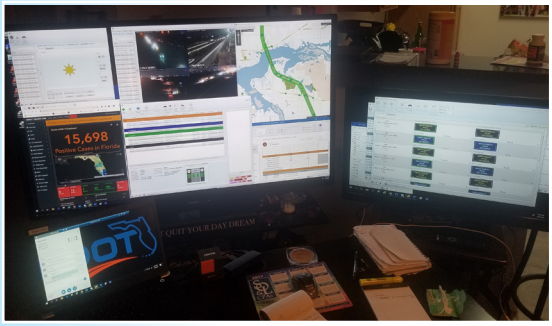
Two days later, on Saturday March 14, a potential COVID-19 situation developed at the SWIFT Center that required implementation of remote work procedures much sooner than anticipated. Only two weeks after the first cases in Florida and with so many unknown variables about the disease, District One leadership decided to close the SWIFT Center to protect the health and safety of the staff that work there. The closure was implemented on Monday, March 16, just three full days after the very first step was taken to deploy a virtual TMC.

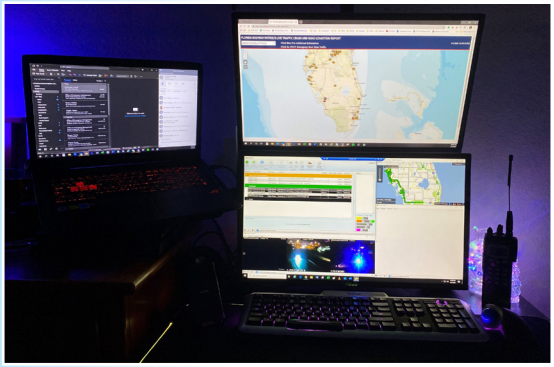
With some quick thinking, the IT team called "all hands on deck" and configured remote access to the TMC workstations from personal and contractor computers. Changes were made to the firewall and internal network to support the increased number of users that utilize Virtual Private Network (VPN) connections, the protocol which allows personnel to access work resources from remote sites.

A RADIUS (Remote Authentication Dial-In User Service) server was utilized to provide authentication for remote users. This server authenticates through Active Directory, minimizing the number of passwords users needed to remember, hence simplifying the login process. An added layer of security was implemented, DUO two-factor authentication. This security feature utilizes text messages or phone calls to validate a user's identity.

Next, straight-forward standard operating procedures (SOPs) were created and provided to staff. These simple yet intuitive instructions served as guides for the TMC operators and managers to configure their home computers for VPN access. A password-protected site provided one-click shortcuts to Remote Desktop Protocol (RDP) that could be downloaded to each user's desktop ensuring quick and repeatable access to their respective TMC operations workstation.







Amid COVID-19 Uncertainty, District One Implements Florida's First Fully Virtual TMC, continued from page 22

There were a few minor challenges that needed to be addressed along the way. Computer policies had to be implemented to prevent users from shutting down their remote computers and desktop shortcuts were added for the users to only be able to log off or reboot. Additionally, when possible, the wake on LAN (WOL) and AC power recovery features were enabled in the bios of the remote computers, in case power was lost with no one available to turn the computer back on.

After a few days, many operators realized the value of a video wall and the 18.75 square feet of expansive monitor real estate at the SWIFT Center. To overcome home limitations, operators used surplus ITS and vendor monitors along with their home televisions. The creativity and ability to overcome adversity has instilled pride in the team.

Maintaining seamless communication with first responders and Road Rangers presented challenges in the early days. Calls were routed from the TMC numbers using Google Voice and distributed to the personal cell phones of operators. The issue was that Google Voice did not distribute to all operators on the shift at the same time and if an operator was on the phone, the incoming call could go to voicemail. The team quickly upgraded to a paid service from Grasshopper which eliminated the issue by distributing incoming calls to all operators on the shift. The distribution list is configured by supervisors at the beginning of each shift.

Running multiple simultaneous events, especially Level 3s, requires significant collaboration amongst the operations team. This is the reason for the open-floor layout or pod setup of most TMCs. The collaborative environment was moved to a virtual space using Skype and Microsoft Teams. At the beginning of each shift, the shift supervisors create the group chat and add each operator to the forum. The team has seamlessly worked 13,416 total events in the time period from March 15, 2020 to June 2, 2020 with 5,948 from camera finds (44 percent). To put that in perspective, from the same time period one year ago, the team worked 18,784 events with 9,810 from camera finds (52 percent). Although the number of total events are down by 28 percent, the aggregate daily volume reductions on I-4, I-75 and US 301 in District One ranged from -38 percent to -71 percent in the month of April as compared to historic traffic volumes. Driven by necessity to keep staff healthy and safe, the District One operations team cleared a new path into the future by implementing Florida's first fully virtual TMC.

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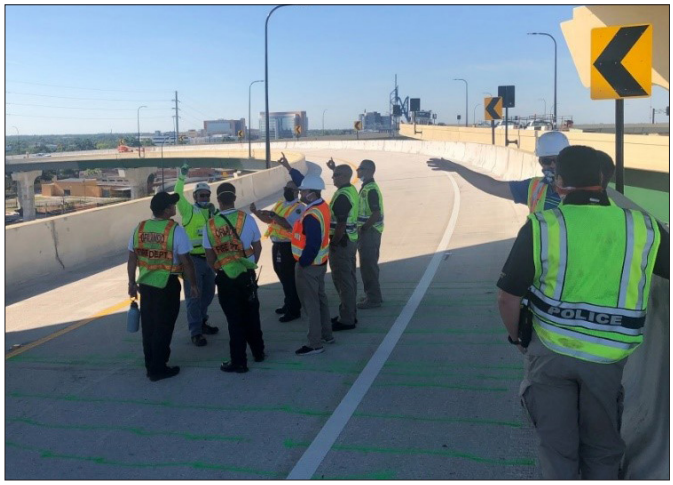
District Five Goes Two for Two in May Knocking Both Out of the Park

By Sheryl Bradley, District Five TIM Program Manager, FDOT
and Jeremy Dilmore, District Five TSM&O Program Engineer, FDOT

During the month of May, District Five rose to the occasion for two very unique and challenging transportation events. The first, the early opening of five new I-4/SR 408 flyover ramps, involved bringing I-4 down to a single westbound lane for a time as part of the reconstruction effort. The second event required exacting efforts to plan and execute traffic management for over half a million onlookers along Florida's Space Coast for the first manned space launch in a decade.



Members of Orlando Police Department's Traffic Unit, and Traffic Homicide Unit, along with members of Orlando Fire Department join the project concessionaire and the District Five TIM staff for tours of the I-4/408 interchange.

Emergency responders get a bird's eye view of the I-4/408 interchange from an 85' high ramp, where motorists will travel from I-4 WB to SR 408.

The preparation for both events were similar even if the challenges were quite different. In both cases, signing plans were developed to control traffic demand and present trip choices to drivers using Arterial Dynamic Message Signs (ADMS), Portable Dynamic Message Signs (PDMS), and Freeway Dynamic Message Signs (DMS). Signal timing flush plans to assist with inbound/outbound traffic, developed via the District's Integrated Corridor Management implementations, were available and provided control in coordination with the maintaining agencies.

The I-4 construction project included extensive coordination with Maintenance and Construction to provide guidance to drivers en route and information to the public via local media, in a consistent manner. The manned space launch included extensive coordination with local emergency management, public information officials, and numerous emergency response partners to provide pre-event outreach and education on available parking for prime viewing areas, and alternate east-west routes to aid in dispersing inbound and outbound traffic.

Six new traffic signals were installed for the I-4 efforts to provide the ability for real-time monitoring of traffic flow. The cellular connections ran to the District's Regional Transportation System in a private network and were then connected to the maintaining agencies signal control software. The ITS team then worked to facilitate network connectivity between the devices and SunGuide® to prepare them for operations. Along the Space Coast, several signals along key corridors did not have communications and many of these needed cameras to allow for monitoring. The Transportation Systems Management and Operations (TSM&O) group pulled together to quickly deploy cellular modems to 12 traffic cabinets for the launch, some of which were upgraded at the last minute by Brevard County and the City of Titusville to provide Ethernet connections to the controllers. Additionally, eight cellular-based CCTVs were installed for the launch.

District Five Goes Two for Two in May Knocking Both Out of the Park, continued from page 24

Members of Orlando's emergency response community pose atop the I-4 WB to 408 ramp, with the city of Orlando skyline in the background.

During ramp tours, responders were introduced to the District's new ramp labeling system.

Major Interchange Opens Early On I-4 Ultimate

In line with the State's plan to expedite construction projects in light of COVID-related low traffic volumes, District Five was able to advance completion of a major interchange within the I-4 Ultimate project.

The interchange at I-4 and SR 408 includes nine ramps, the tallest of which is 120 feet above ground level. Two of the nine ramps were already open, but six of the remaining seven were opened three months earlier than originally planned because of the expedited construction schedule. The announcement of the opening was made by Governor Ron DeSantis on Monday, May 18, 2020, with FDOT Secretary Kevin Thibault also on hand for the event.

Part of this accelerated plan involved closing two of three lanes on westbound I-4 over a long weekend, leading up to opening day. Although traffic volumes were still significantly lower than normal, the closure had major implications causing significant delay to users. An alternative route was established on SR 423, a major arterial around the lane closure and work zone. The District Five Regional Transportation Management Center (RTMC) developed flush plans and managed signal timings along this route. As a result, the SR 423 corridor travel time was generally better than the I-4 travel time throughout the closure and saw delays lower than typical PM peak periods.

An elaborate signing and arterial diversion plan to provide motorists with ample information to make decisions about their route was implemented before and continued during the closures. Anticipated travel times and alternative route information was effectively conveyed to the motorists.

In addition, the District worked with the project concessionaire to facilitate ramp tours for emergency responders, allowing them an opportunity to walk the ramps and get a bird's eye view of the interchange, including on/off ramp configurations and emergency shoulders. District Five also took this opportunity to introduce a new ramp labeling system, designed to assist responders with identifying the location of motorists needing emergency assistance within the interchange's complex ramp configuration. The new labeling system was coordinated with responders who had requested a labeling system that would avoid use of map books or reference diagrams. As such, the labeling system provides an exit number, direction, and ramp letter designation in a four-digit label, on light posts throughout the interchange.

3...2...1... Lift Off! Traffic Management For Space Travel

Manned spaceflight from the Kennedy Space Center has resumed! While the attendance numbers are not yet in, early estimates place the crowd at well over half a million people, the majority of which converged along a 35-mile stretch of Brevard County, east of US 1, on primarily arterial and surface streets. The team's efforts not only made for a safer, more efficient traffic flow, but also lifted a tremendous burden on local law enforcement resources. This allowed local law enforcement to more fully assist with other areas like controlling ingress/egress from various parking areas that have been a source of hazards in the past and monitoring/controlling pedestrian movement for safety.

Overall, these efforts established a foundation for a regional traffic plan, a first for the Space Coast, that will be utilized and improved upon for future launch events. This is critical with the anticipated growth of the space program. Local partners praised the District's efforts and support throughout both launch attempts, and the FDOT received several positive mentions in the media for their involvement in the traffic management effort.

District Five Goes Two for Two in May Knocking Both Out of the Park, continued from page 25

A long queue of visitors make their way to the Space Coast from SR 528 EB in Orange County.

The first launch attempt, scheduled for Wednesday, May 27, was scrubbed in the final minutes leading up to the launch window. The plans, however, were put to the test in accommodating the huge crowd that had showed up hoping to see a spectacular liftoff. The District Five team proved successful in both "planning the work" and "working the plan".

The team then capitalized on their efforts with a second attempt and successful launch on Saturday, May 30, making minor changes to the plans based on feedback from local agencies and field units. These adjustments proved extremely beneficial when the weekend crowd grew significantly from the first attempt.

Personnel were staffed in the Brevard County Emergency Operations Center (BCEOC) and the District's RTMC to provide real-time coordination with emergency responders from at least 10 different local agencies, signal timing engineers, and Maintenance staff, to deploy plans and facilitate quick detection, response, and recovery of all traffic incidents, while also assisting agencies in navigating overly-congested roadways when responding to non-traffic emergencies. TIM personnel also provided real-time traffic information with Waze and a GIS mapping system which would geographically locate the parking areas and provide real-time status updates to supplement the District's usual driver feedback tools.

Both events proved to be great successes. They underlined the importance of TSM&O and demonstrated that these events are best worked as a team, bringing together freeway, arterial, first responders, and other offices within the FDOT.

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SR 405 at US 1 in Titusville, at the boundaries of the Kennedy Space Center property, is a hot spot for viewers. The uncontrolled parking, however, creates significant challenges in effectively managing egress with pedestrian movements.

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