

 Hollywood, FL

 June 13-14, 2024

2024 TRANSPORTATION SYMPOSIUM

Truck Parking: The Challenge and Meeting the Challenge



Marie Tucker & Ronald Meyer

FDOT Traffic Engineering and Operations Office

FDOT Freight and Rail Office

OBJECTIVES

- Provide overview of FDOT Truck Parking needs and initiatives
- Share challenges, successes, and lessons learned from system design and deployment experiences

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Truck Parking: Toolbox and Implementation Strategies



Marie Tucker

FDOT State Traffic Engineering and Operations Office

THE TRUCK PARKING CHALLENGE

**TRUCK DRIVERS
RANK PARKING A
TOP 5 INDUSTRY
ISSUE SINCE 2015**

(AMERICAN TRANSPORTATION
RESEARCH INSTITUTE)

98% of truck drivers report problems finding safe parking, costing drivers more than **56 minutes** of drive time. That wasted time is estimated to cost drivers **\$5,500** per year – roughly a **12%** pay cut. (American Transportation Association and Owner Operator Independent Drivers Association)

58% of drivers say they have parked in unauthorized places at least **three** times a week. (American Transportation Research Institute)



SOLVING ALIGNS WITH FDOT'S PRIORITIES

SAFETY: Parking shortage forces drivers to park in unauthorized locations that creates hazards for themselves and others.

COMMUNITIES: Lack of truck parking forces drivers to park on local roads in residential communities.

WORKFORCE DEVELOPMENT: Providing parking facilities for truck drivers attracts industry which increases economic opportunities.

RESILIENCY: Truck parking sites can be used during disaster recovery to stage crews and equipment, or provide space for rapid debris removal.

TECHNOLOGY: Technology is allowing us to provide real-time safe parking availability information to drivers.

ROBUST SUPPLY CHAIN: Time is money for drivers. Lost time looking for parking wastes fuel, increases maintenance costs, and eventually leads to higher prices for consumers.



HOW FDOT IS MEETING THE CHALLENGE

FDOT TRUCK PARKING TOOLBOX includes the following implementation approach to strategically meet the critical demand for additional truck parking spaces



Add
Capacity



Leverage
Technology

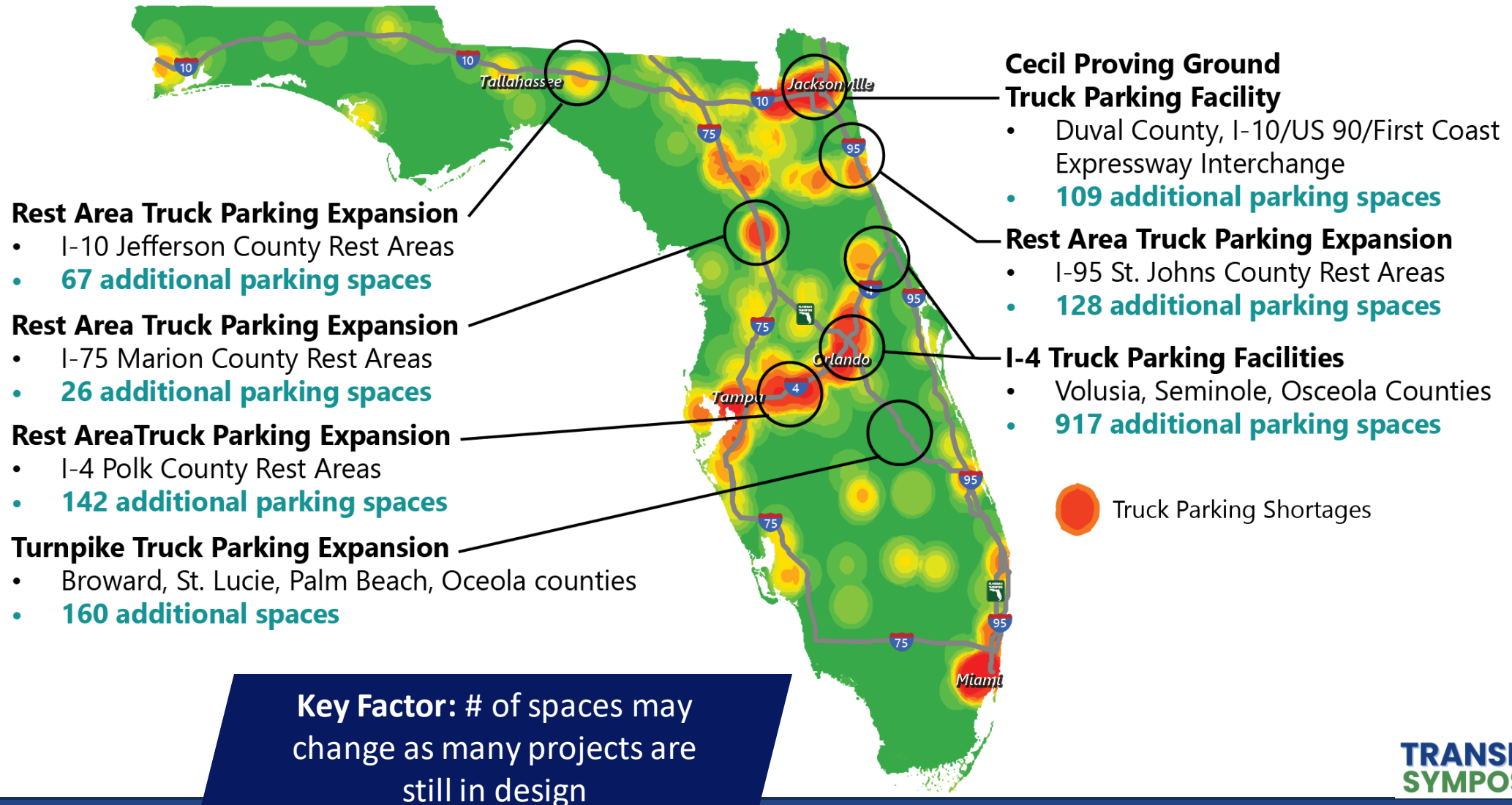


Enhance
Policies



Build
Partnerships

SPOTLIGHT TRUCK PARKING CAPACITY



SPOTLIGHT PROJECT

West Central Florida I-4 Truck Parking Facility



Currently in
Design Phase



Add
Capacity



New Truck Parking Facility

- 120 truck parking spaces expandable to 250 in future phases
- Bi-directional facility
- Restroom facilities
- Picnic shelter



Pedestrian Safety and Connectivity

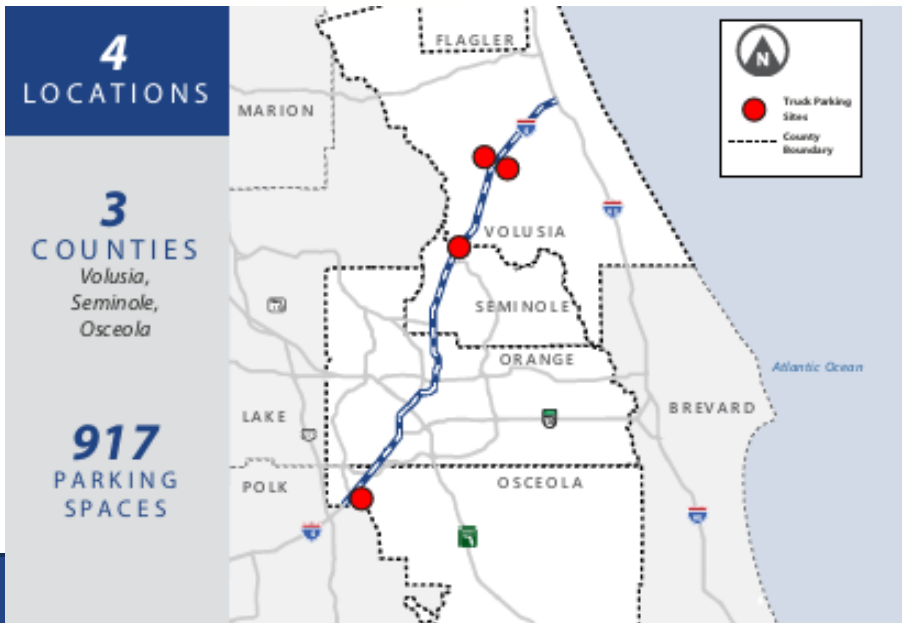
- New connections to on-site and local amenities
- Sidewalks
- Crosswalks
- Bike lanes
- Pedestrian refuge islands



Roadway Improvements

- Add left turn lane from the I-4 EB off-ramp
- Add turn lanes, one left and one right, on the I-4 WB off-ramp
- Reduce radii and add truck aprons to slow vehicular turns while accommodating trucks
- Reconfigure lanes along County Line Road to reduce truck delay and improve mobility

SPOTLIGHT PROJECT



I-4 Truck Parking Facilities

The I-4 corridor within FDOT District 5 has the highest unmet truck parking demand in the state of Florida with only 36 existing public truck parking spaces.

2024-2025	2024-2026	2026-2028
DESIGN	ROW	CST

917
TOTAL
SPACES
ADDED



Add
Capacity

**TRANSPORTATION
SYMPOSIUM**

SPOTLIGHT TRUCK PARKING TECHNOLOGY



Leverage
Technology

OPERATIONS INNOVATION

FDOT implemented the Truck Parking Availability System (TPAS) in 2017. This statewide program gives information about the number of available spaces at Florida weigh stations, rest areas, and Welcome Centers via FL511.



2,719 state-owned
truck parking spaces
monitored by TPAS

NEXT STEPS

Technology to automate detection of over-parking and provide continuous/real-time utilization data for all state-owned facilities

SPOTLIGHT POLICIES & PARTNERSHIPS

Initiate a statewide **communications** and outreach campaign

Formalize a statewide truck parking program (TPIP) and working group for a **consistent approach** to implementation

Incorporate alternative parking solutions in FDM

Identify funding **opportunities** for capacity concepts



Enhance **Policies**



Build **Partnerships**



TRANSPORTATION SYMPOSIUM

LATEST OBJECTIVES



Improve truck parking utilization at Motor Carrier Size and Weight (MCSAW) weigh station facilities

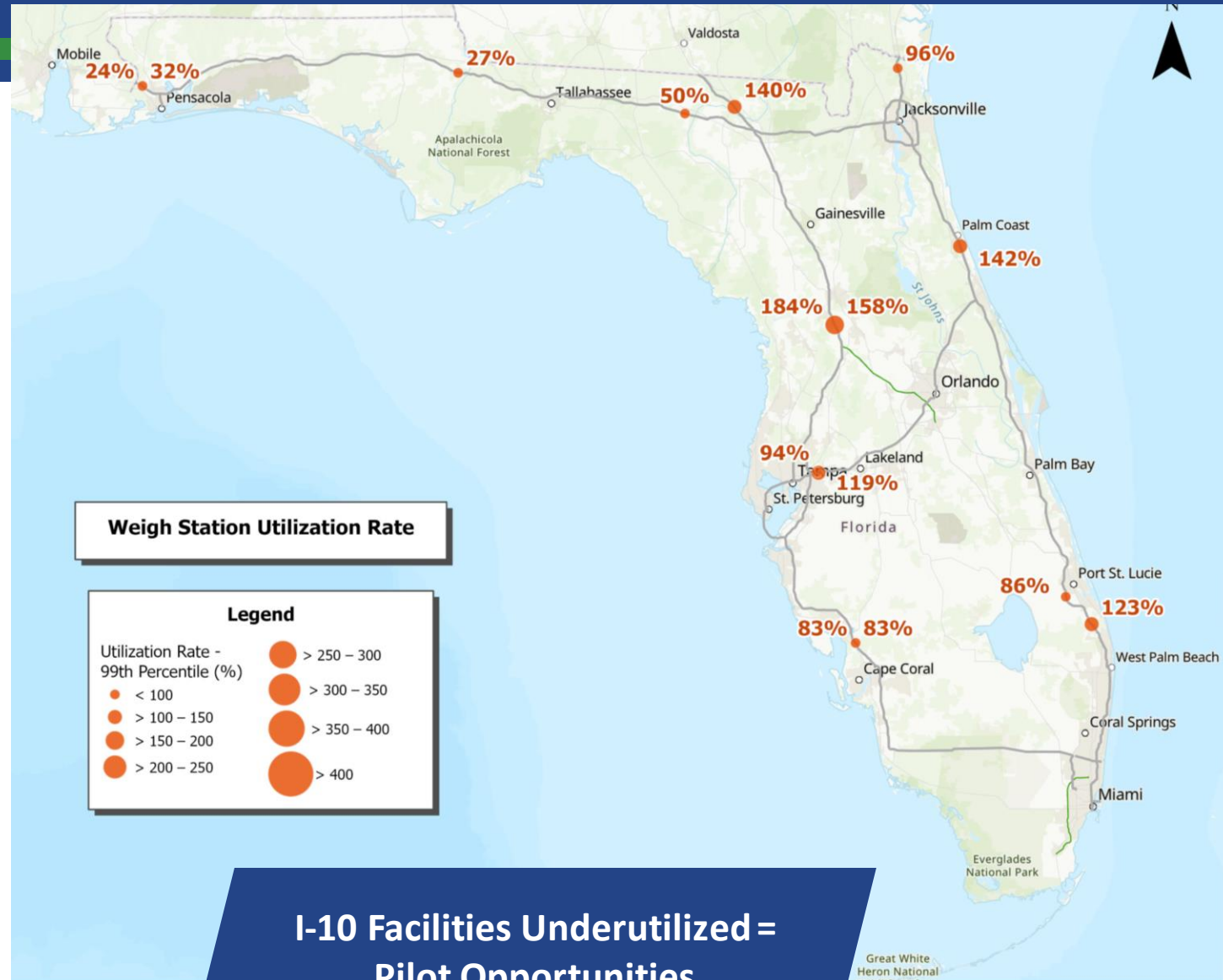


Increase truck parking capacity at state-owned rest areas, welcome centers, and weigh stations



Identify innovative uses of FDOT right-of-way for truck parking

INCREASING WEIGH STATION UTILIZATION



Enhance
Policies



Build
Partnerships

ENHANCED AMENITIES & IMPROVED SIGNAGE

Provide WiFi and vending machines at underutilized facilities

- I-10 corridor pilot projects

Include supplemental signage that communicates available amenities at all facilities

Provide clearer messaging that truck parking is available

- Change “Comfort Station” to “Truck Parking”



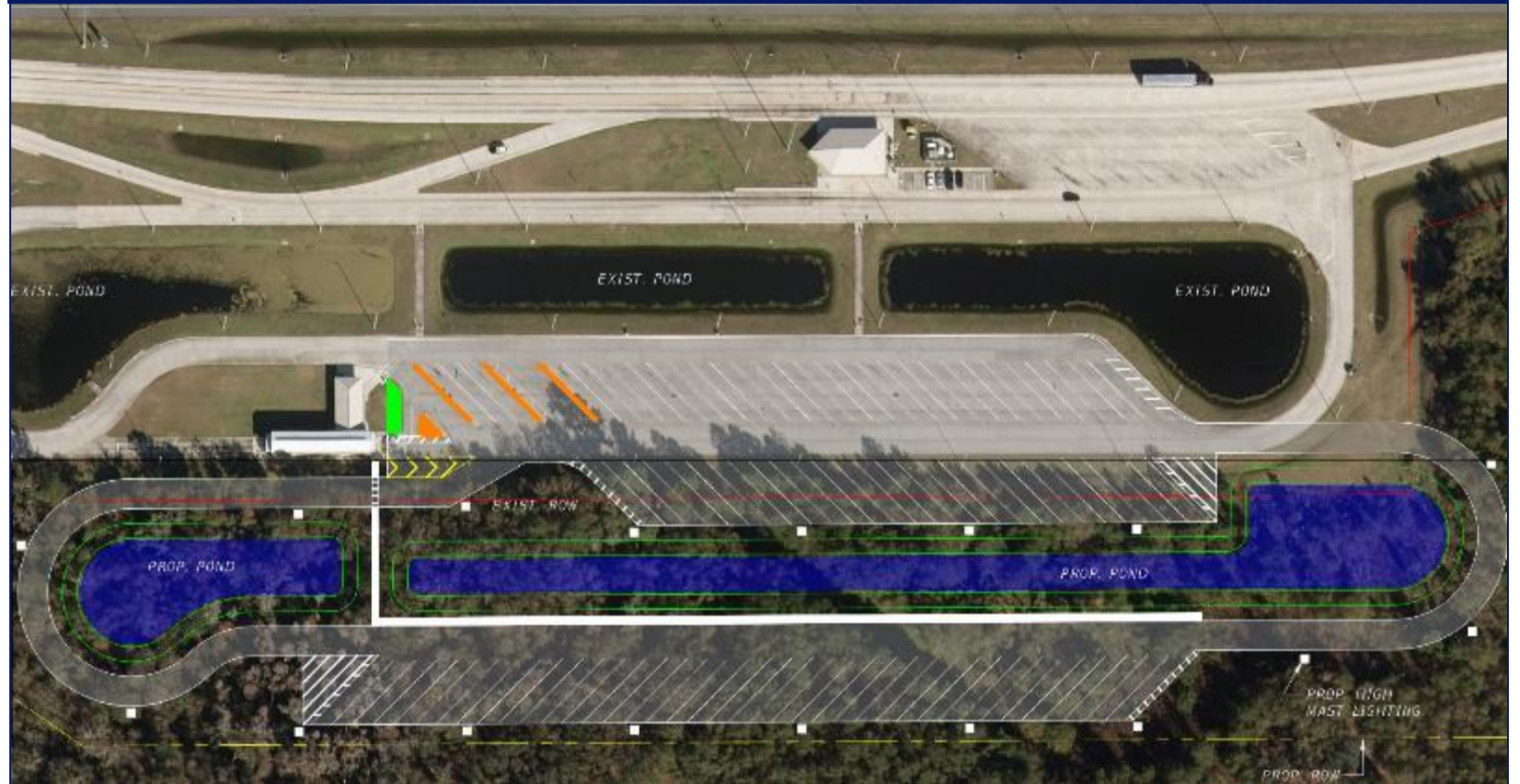
WEIGH STATION CAPACITY PROJECT CONCEPTS

- Concepts were developed to increase capacity at facilities experiencing significant overutilization including Flagler, White Springs, Seffner, and Wildwood
- Low, medium, and high right of way (ROW) impact concepts were developed for each identified site that included:
 - ◆ Conceptual design
 - ◆ Environmental screening
 - ◆ Cost estimates



Add
Capacity

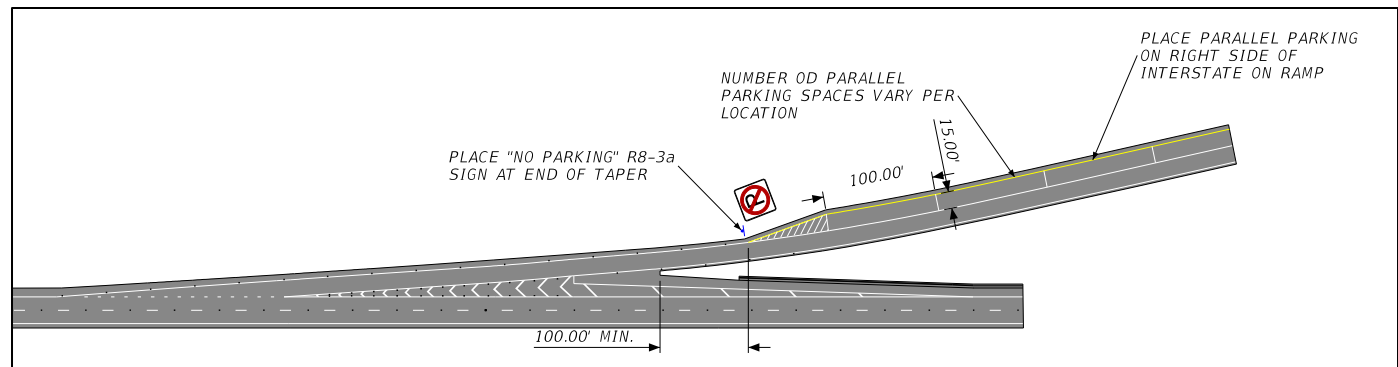
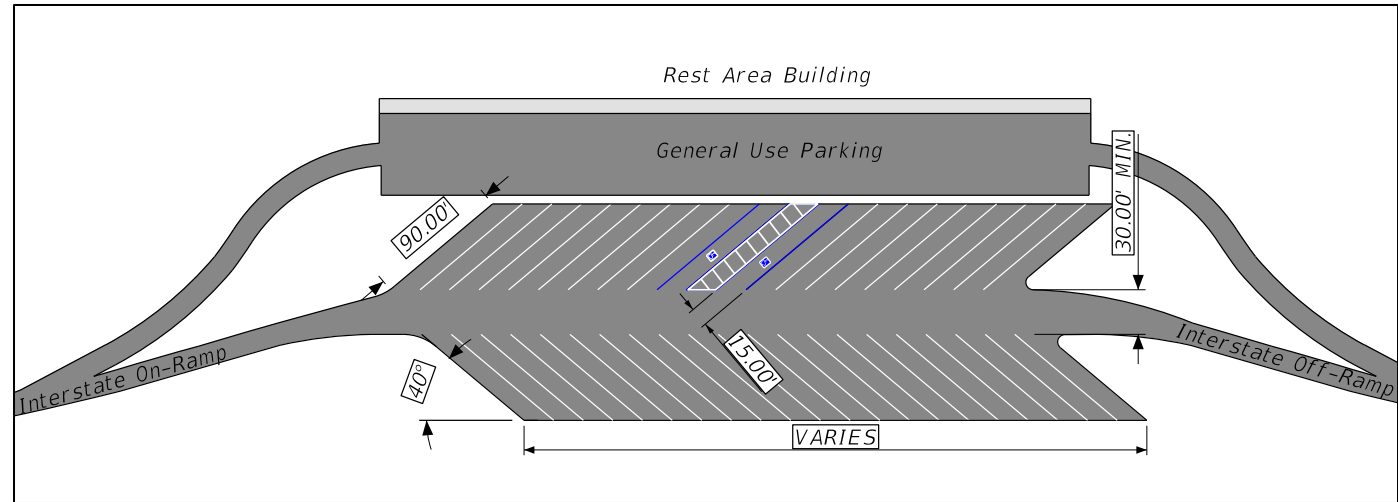
High Impact: Considerable ROW acquisition required for additional pavement and drainage. Additional concept plans have been developed for Low and Medium impact applications.



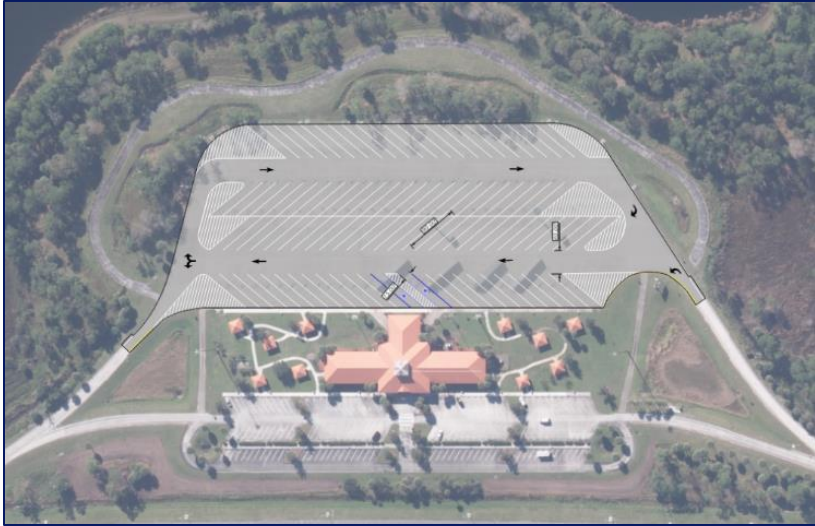
**TRANSPORTATION
SYMPOSIUM**

REST AREAS – ADDITIONAL CAPACITY

- Design considerations and FDM standards developed for back-in, parallel, and ramp parking strategies
- **Back-in** parking can provide up to 30% more capacity and requires less ROW compared to pull-through design
- **Parallel and ramp** parking utilize existing roadways, ramps, and shoulders to increase parking and should consider:
 - ◆ Distance from gore area
 - ◆ Sight line
 - ◆ Clear zone
 - ◆ Safety
 - ◆ Innovative pavement solutions



REST AREAS – ADDITIONAL CAPACITY



Restriping:

In this example, an FDOT rest area was re-configured to include 30% more truck parking spaces by switching to a back-in parking layout.



Repurposing:

In this concept an existing picnic loop is repurposed to accommodate parallel parking

ALTERNATIVE ROW CONCEPTS



Rehabilitating:

This concept was developed using the footprint of a closed rest area and utilizes a back-in parking strategy.

Median Parking:

This concept was developed to increase truck parking capacity utilizing available space in medians.



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2024 TRANSPORTATION SYMPOSIUM

Truck Parking: TPAS Technology and Deployment Experiences



Ronald Meyer

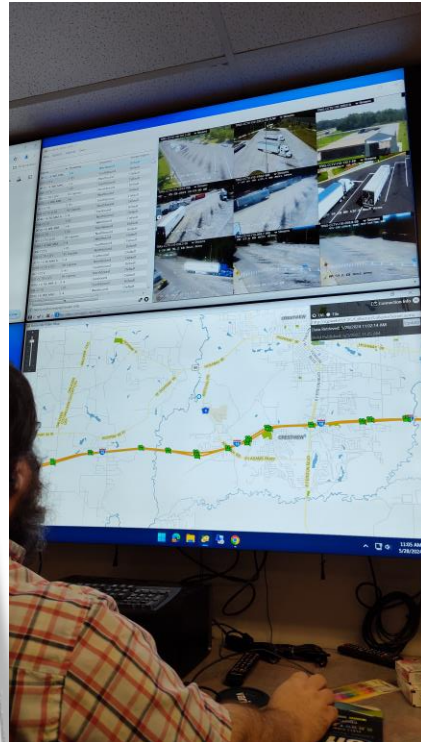
FDOT Traffic Engineering and Operation Office
Traffic Engineering Research Laboratory (TERL)

ROLE OF THE TERL

- Approved Products List (APL)
- Florida Statutes 316.0745, Uniform signals and devices
- Evaluation of new products and technologies



TERL TPAS ACTIVITIES



- Support evaluation and use of new technologies by FDOT Districts
- Preliminary system evaluations
- Developmental Specifications
- Support for ongoing SunGuide development and enhancements, including Truck Parking Subsystem



TPAS GOALS AND USE OF OTHER FDOT SYSTEMS

Florida 511 Connect. Know. Go. Florida's Official Source for Real-Time Traffic Information

ALERTS Lake Worth: 6th Avenue South is closed west of I-95 from Grove Street to Congress Avenue due to construction through August 2024. Motorists should use caution in the area and seek an alternate route.

Truck Parking Availability

Facility Name	I-75 NB Alachua Rest Area (MM 383)
Roadway	I-75
Available Parking Spaces	3
Total Parking Spaces	6

DIVAS DFS Source Truck Parking

Global Filter: All Networks | Apply Filter | Show Error Data | Refresh | Export

Network ID	Device ID	Device Location	Latitude	Longitude	Roadway	Total Parking Spaces	Available Parking Spaces	Last Comm Time (UTC)	Last Updated (UTC)
District 1	10	Collier County Truck Stop on I-75	26167417	-81078200	I-75	52	0	05/27/2024 03:38 PM	05/27/2024 03:38 PM
District 1	11	Lee County Truck Stop on I-75N	26549875	-81792225	I-75	19	0	05/27/2024 03:38 PM	05/27/2024 03:38 PM
District 1	8	Charlotte County Truck Stop NB	26880286	-81984552	I-75	23	22	05/27/2024 03:39 PM	05/27/2024 03:39 PM
District 1	9	Charlotte County Truck Stop SB	26880286	-81984552	I-75	23	3	05/27/2024 03:38 PM	05/27/2024 03:38 PM
District 2	26	I-10 WB Madison Rest Area (MM 204)	30370579	-83242549	I-10	23	19	05/27/2024 03:39 PM	05/27/2024 03:39 PM
District 2	29	I-75 NB Alachua Rest Area (MM 382)	29589729	-82366476	I-75	13	1	05/27/2024 03:39 PM	05/27/2024 03:39 PM
District 2	3	I-95 NB Nassau Weigh Station (MM 376)	30669145	-81665925	I-95	25	25	05/27/2024 03:39 PM	05/27/2024 03:39 PM
District 2	30	I-75 NB Alachua Rest Area (MM 383)	29591744	-82359266	I-75	6	0	05/27/2024 03:39 PM	05/27/2024 03:39 PM
District 2	36	I-95 SB St Johns Rest Area (MM 303)	29714594	-81338567	I-95	16	8	05/27/2024 03:39 PM	05/27/2024 03:39 PM
District 2	39	I-10 EB Baker Rest Area (MM 318)	30232209	-82404026	I-10	23	17	05/27/2024 03:39 PM	05/27/2024 03:39 PM
District 2	4	I-75 NB Hamilton Weigh Station (MM 449)	30417961	-82897768	I-75	29	29	05/27/2024 03:39 PM	05/27/2024 03:39 PM
District 2	40	I-95 NB St Johns Rest Area (MM 331)	30091449	-81492204	I-95	73	14	05/27/2024 03:39 PM	05/27/2024 03:39 PM
District 2	41	I-95 SB St Johns Rest Area (MM 331)	30094494	-81503019	I-95	61	11	05/27/2024 03:39 PM	05/27/2024 03:39 PM
District 2	43	I-95 NB St Johns Rest Area (MM 302)	29702964	-81323375	I-10	14	5	05/27/2024 03:39 PM	05/27/2024 03:39 PM
District 2	44	I-95 SB Nassau Welcome Center (MM 378)	30696530	-81682147	I-95	42	39	05/27/2024 03:39 PM	05/27/2024 03:39 PM
District 2	45	I-10 EB Suwannee Rest Area (MM 205 9)	30272688	-82800972	I-10	28	25	05/27/2024 03:39 PM	05/27/2024 03:39 PM
						Total Items: 68			

TPAS GOALS AND USE OF OTHER FDOT SYSTEMS

The image displays two screenshots of web-based management interfaces for truck parking facilities.

Truck Parking Facility Configuration

This interface allows for the management of facility configurations. It includes a toolbar with actions like 'New Facility', 'Delete Facility', 'Retrieve Configuration', 'New Area', 'Delete Area', 'New Zone', 'Delete Zone', 'Find on Map', and 'Place on Map'. Below the toolbar is a table listing various facilities with their respective configurations.

Name	Driver	Protocol	Poll Cycle	URL	Username	Password	Default Area	Roadway	Directions	Latitude	Longitude	Publish to C2C?
civicsmart fac	TpsDriver	CivicSmart	20	http://thanos/CivicSmart			Default Area	I-195	Eastbound	26115831	-80315036	<input type="checkbox"/>
Description												
Default Area												
	Total Spaces	Report Full At	Low Alarm Threshold	Recovery Threshold								
	15	2	4	6								
ipsens fac	TpsDriver	IPSens	20	http://thanos:17055/lpSens			Default Area	95 Express	Northbound	26151123	-80337009	<input type="checkbox"/>
Description												
Default Area												
	Total Spaces	Report Full At	Low Alarm Threshold	Recovery Threshold								
	15	2	4	6								
New Facility	Tss	Passage					Default Area	95 Express	Northbound,Southbo...	25795872	-8028362	<input type="checkbox"/>
passage fac	Tss	Passage					Default Area	GGI	Eastbound,Westbou...	26151123	-8034800	<input type="checkbox"/>
snaps fac	TpsDriver	Snaps	20	http://thanos:17056/Snaps	user	pass	Default Area	I-395	Eastbound	26086233	-8036241	<input type="checkbox"/>

Zone Configs

This section shows configurations for DMS and Cameras. It includes a table for zone descriptions.

Description	Lot Id	Zone Id
tps.ipsens-link1-lane1	0	7
tps.ipsens-link1-lane2	0	8
tps.ipsens-link1-lane3	0	9

Truck Parking Facility Status

This interface provides a real-time status overview of the facilities. It includes a toolbar with 'Set Op Status', 'Dismiss Alert', 'Find on Map', and 'Facilities Configure'. Below is a table showing the operational status of various facilities.

Name	Op Status	Last Updated	Roadway/Direction	Has Alarm Area?	
civicsmart fac	Out of Service	12/14/2018 14:47:12	I-195 Eastbound	No	
Parking Area Description					
Default Area					
	Last Updated	Default Area?	Available Spaces	Total Spaces	Alarm Status
	N/A	Yes	N/A	15	No
ipsens fac	Out of Service	12/14/2018 14:47:12	95 Express Northbound	No	
New Facility	Out of Service	12/14/2018 14:47:12	95 Express Northbound, Southbo...	No	
passage fac	Out of Service	12/14/2018 14:47:12	_ Eastbound, Westbound	No	
snaps fac	Out of Service	12/14/2018 14:47:12	I-395 Eastbound	No	
TPS 7.1.2 Facility	Out of Service	12/14/2018 14:47:12	I-75 Eastbound	No	

Facility: civicsmart fac , Area: Default Area

This detailed view shows the device status, availability, and DMS information for a specific facility.

Object Type	Object Name	Status
Parking Zone:	tps civicsmart-link1-lane1	
Parking Zone:	tps civicsmart-link1-lane2	
Parking Zone:	tps civicsmart-link1-lane3	
DMS:	tps civic smart DMS 1	Out of Service
DMS:	tps civic smart DMS 2	Out of Service
Camera:	004-CCTV	Error

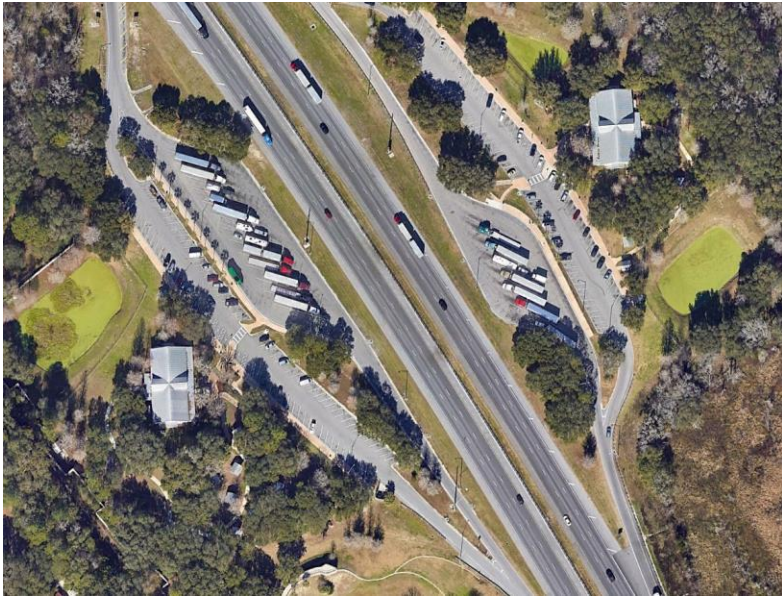
Availability

Reported Availability: N/A
Actual (Raw) Availability: 0
Offset/Difference: 0
New Corrected Availability: 0
Send Corrected Availability

DMSs

tps.civic.smart.DMS.1 tps.civic.smart.DMS.2

TPAS DETECTION SYSTEM ARCHITECTURES



- Count In / Count Out
 - Works best with tightly controlled truck entry and exit points
 - Unable to provide additional data (e.g., individual space utilization, etc.)
- Per Space
 - Can provide additional operational information besides overall counts (e.g., space utilization metrics, overstay, etc.)

“COUNT-IN / COUNT-OUT” SYSTEMS

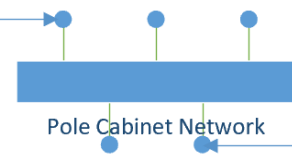


- Not as easy as you may think
- Needs dedicated ingress/egress for best accuracy
- Expect the unexpected
- Count detectors are imperfect
- Human intervention often required

“PER SPACE” SYSTEMS (WIRELESS DETECTORS)

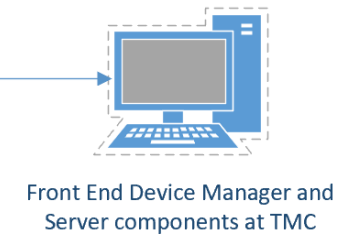


ISM Band Comms
AES 256 Encryption

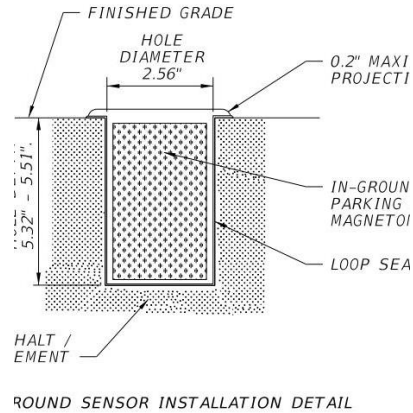


FDOT Network
UDP Port 8787/7878
Encrypted comms

20161 I-75 Columbia Rest Area NB	20162 I-75 Columbia Rest Area SB	20171 I-75 Alachua Rest Area NB	20172 I-75 Alachua Rest Area SB	20310 I-95 Nassau Welcome Center SB
20321 I-95 N SJC Rest Area NB	20322 I-95 N SJC Rest Area SB	20331 I-95 S SJC Rest Area NB	20332 I-95 S SJC Rest Area SB	20611 I-95 Nassau Weigh Station NB
20612 I-95 Nassau Weigh Station SB	20621 I-75 Hamilton Weigh Station NB	20622 I-75 Hamilton Weigh Station SB	20631 I-10 Madison Weigh Station SB	20632 I-10 Madison Weigh Station WB

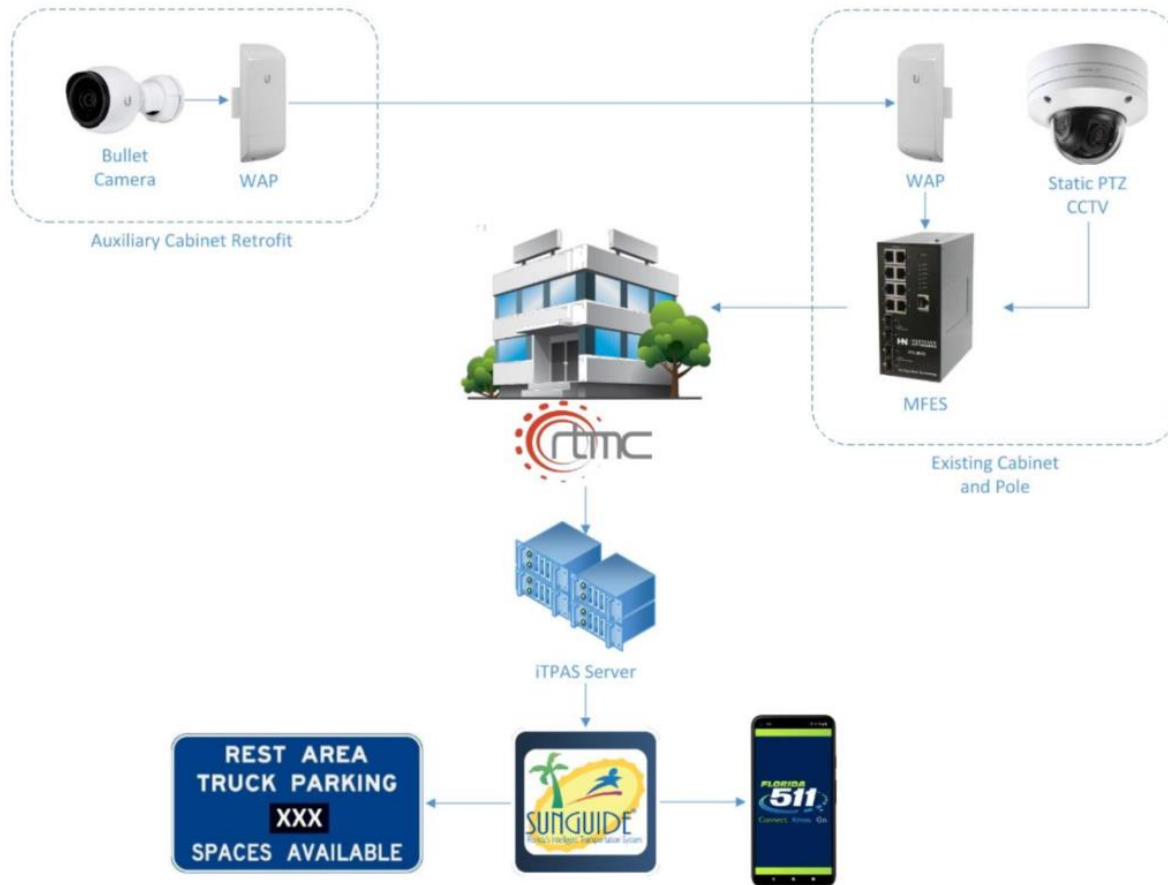


“PER SPACE” SYSTEMS (WIRELESS DETECTORS)



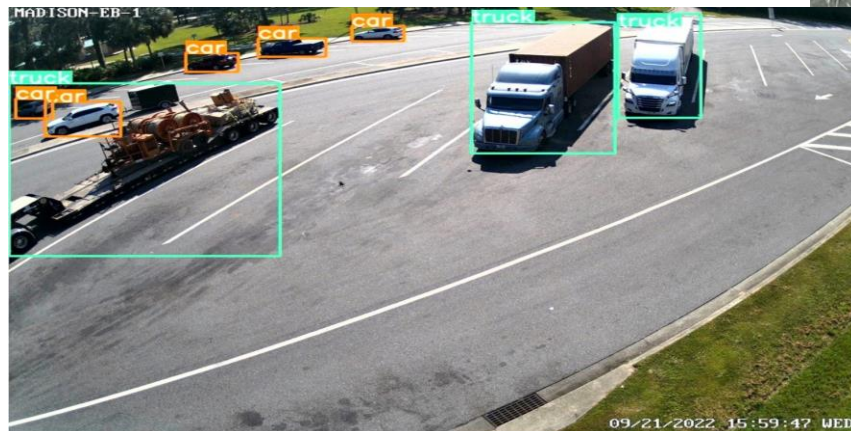
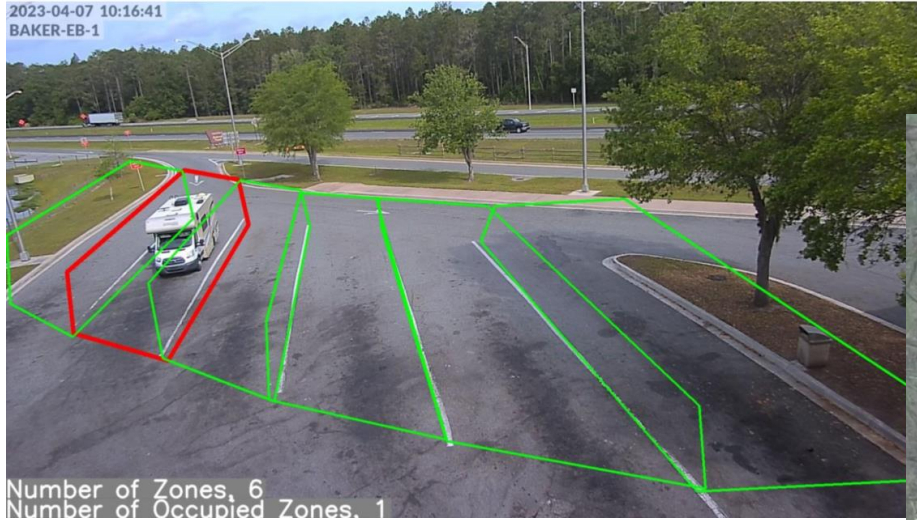
- Significant detector failures
- Frequent site visits and repairs needed to keep operational
- Supply chain issues with replacement pucks
- Cost of hardware removal/replacement
- Software licensing costs

“PER SPACE” SYSTEMS (VIDEO ANALYTICS)



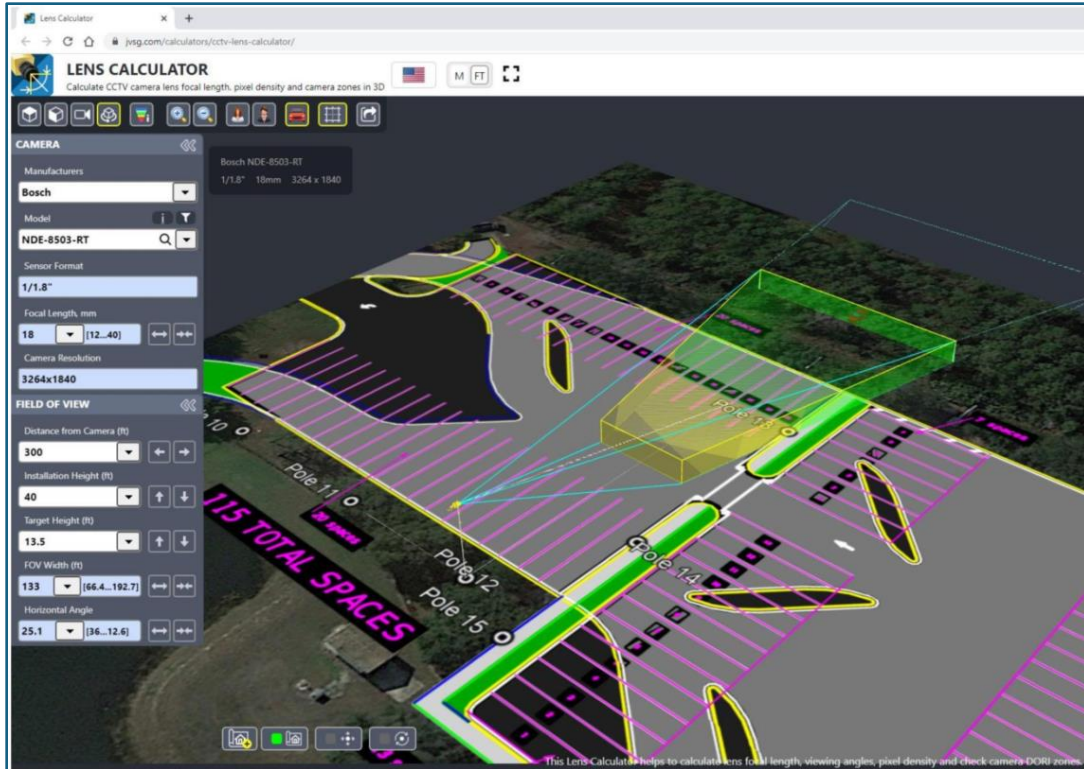
- Cameras capture images of parking areas at regular intervals
- Images are sent to a server for real-time analytics
- Computer vision algorithms process the latest image to determine occupied and available spaces
- Counts from multiple images are aggregated, displayed with images for confirmation, and timestamped count data is made available to SunGuide.

“PER SPACE” SYSTEMS (VIDEO ANALYTICS)

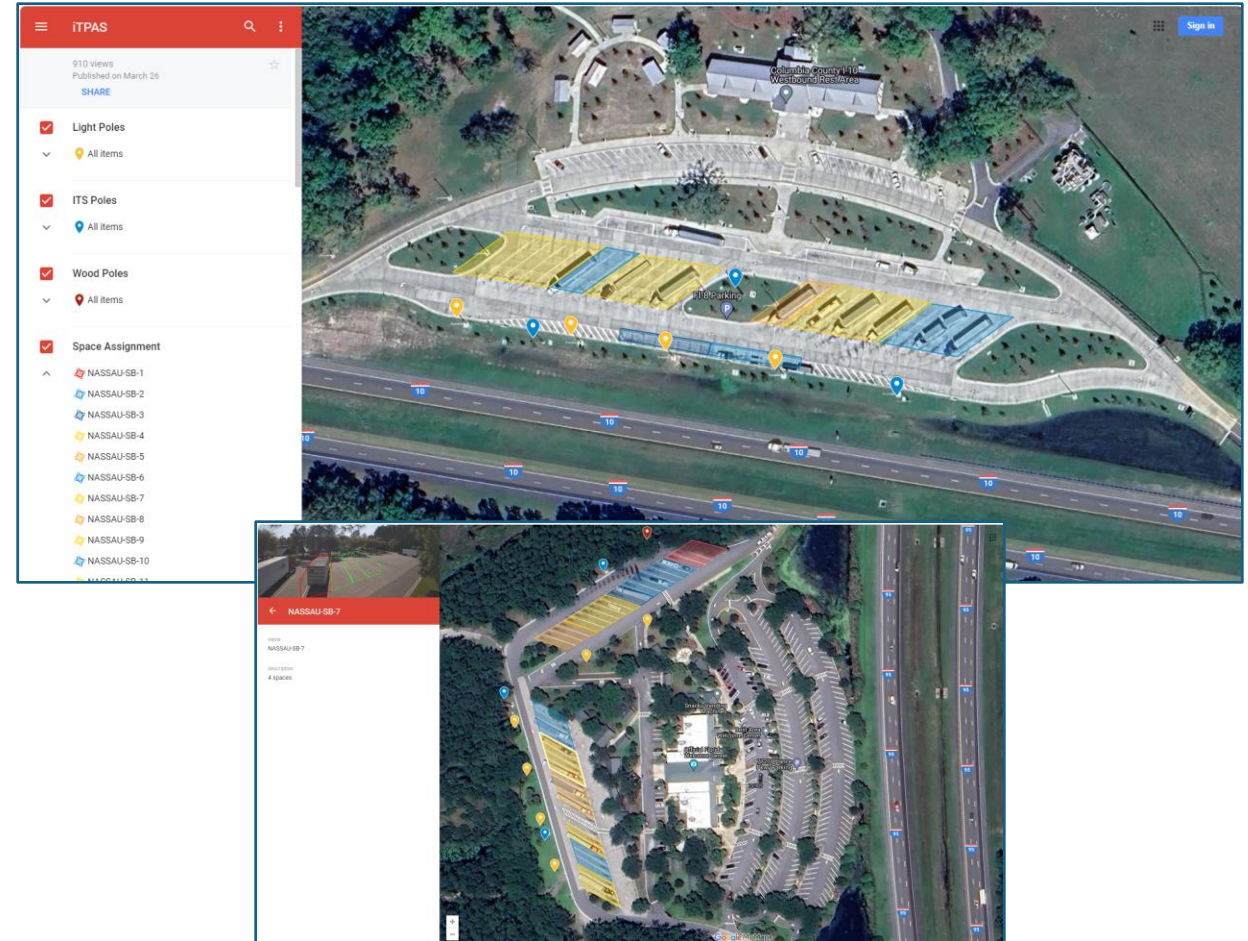


- Fixed camera retrofit on existing light pole
- Poles are often positioned adjacent to travel lanes for angle parking, etc.
- Low cost camera and wireless system can be used (only requires power connection at pole).
- Sample image shows typical field of view with camera at 20' height.
- Images processed by YOLOv5 detection module

“PER SPACE” SYSTEMS (VIDEO ANALYTICS)



<https://www.jvsg.com/calculators/cctv-lens-calculator/>



“PER SPACE” SYSTEMS (VIDEO ANALYTICS)

Real-Time Truck Parking Data

	Available Spaces	Total Spaces	Percent Occupied	Camera Status	Last Updated
Madison I-10 WB Rest Area	17	23	26%	5/5 cameras online	Wed Aug 16 10:38:12 2023
Baker I-10 EB Rest Area	18	25	28%	6/6 cameras online	Wed Aug 16 10:38:22 2023
Baker I-10 WB Rest Area	17	25	32%	6/6 cameras online	Wed Aug 16 10:38:35 2023
Alachua I-75 NB Rest Area	1	6	83%	1/1 cameras online	Wed Aug 16 10:38:36 2023
Alachua I-75 SB Rest Area	2	13	84%	3/3 cameras online	Wed Aug 16 10:38:44 2023
Hamilton I-75 SB Welcome Center	23	39	41%	9/9 cameras online	Wed Aug 16 10:39:03 2023
Nassau I-95 SB Welcome Center	28	42	33%	11/11 cameras online	Wed Aug 16 10:39:23 2023
Columbia I-75 NB Rest Area	36	49	26%	⚠️ 8/9 cameras online	Wed Aug 16 10:35:24 2023
	37	48	22%	10/10 cameras online	Wed Aug 16 10:35:48 2023
est Area	37	73	49%	12/12 cameras online	Wed Aug 16 10:36:16 2023
est Area	27	61	55%	13/13 cameras online	Wed Aug 16 10:36:46 2023
est Area	2	14	85%	4/4 cameras online	Wed Aug 16 10:36:53 2023
est Area	11	16	31%	3/3 cameras online	Wed Aug 16 10:36:59 2023

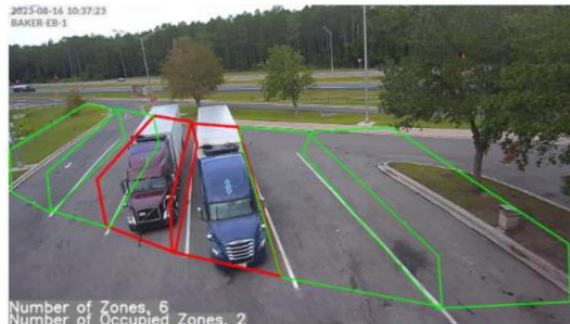
Detection Image Viewer

Choose a site

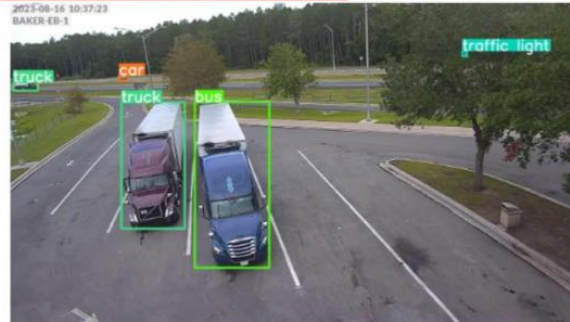
Baker I-10 EB Rest Area

BAKER-EB-1

2023-08-16 10:37:23
BAKER-EB-1



See detections for BAKER-EB-1, click to view



Save the original image for BAKER-EB-1

TPAS ARCHITECTURES AND FUTURE DIRECTION



TPAS Architecture Capability Matrix		
Function	Support	
	Count in/out	Per Space
Total count of vehicles in lot	Yes	Yes
Duration of stay (e.g., overstay alerts that warrant occupant health/safety checks)	Yes*	Yes
Duration of stay per space	No	Yes
Handicapped space utilization	No	Yes
Parking behavior (e.g., identifying preferred spaces, space selection/use trends)	No	Yes
Space utilization by vehicle class (e.g., tractor-trailer, bus, RV)	No	Yes**
Detection of vehicles parking outside of designated spaces	No	Yes**

*Only supported if counting system is also capable of unique vehicle ID (e.g., license plate recognition at ingress/egress)

**Generally requires use of systems that rely upon video analytics

TPAS ARCHITECTURES AND FUTURE DIRECTION



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Thank You!



Questions?

- Marie.Tucker@dot.state.fl.us
- Ronald.Meyer@dot.state.fl.us
- Holly.Cohen@dot.state.fl.us



SAFETY



COMMUNITIES



**WORKFORCE
DEVELOPMENT**



RESILIENCY



TECHNOLOGY



ROBUST SUPPLY CHAIN