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

FDOT

OBJECTIVES

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

Hollywood, FL

June 13-14, 2024

2024 TRANSPORTATION SYMPOSIUM

Truck Parking:
Toolbox and Implementation Strategies

Marie Tucker

FDOT State Traffic Engineering and Operations Office

FDOT

THE TRUCK PARKING CHALLENGE

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)

TRANSPORTATION SYMPOSIUM

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

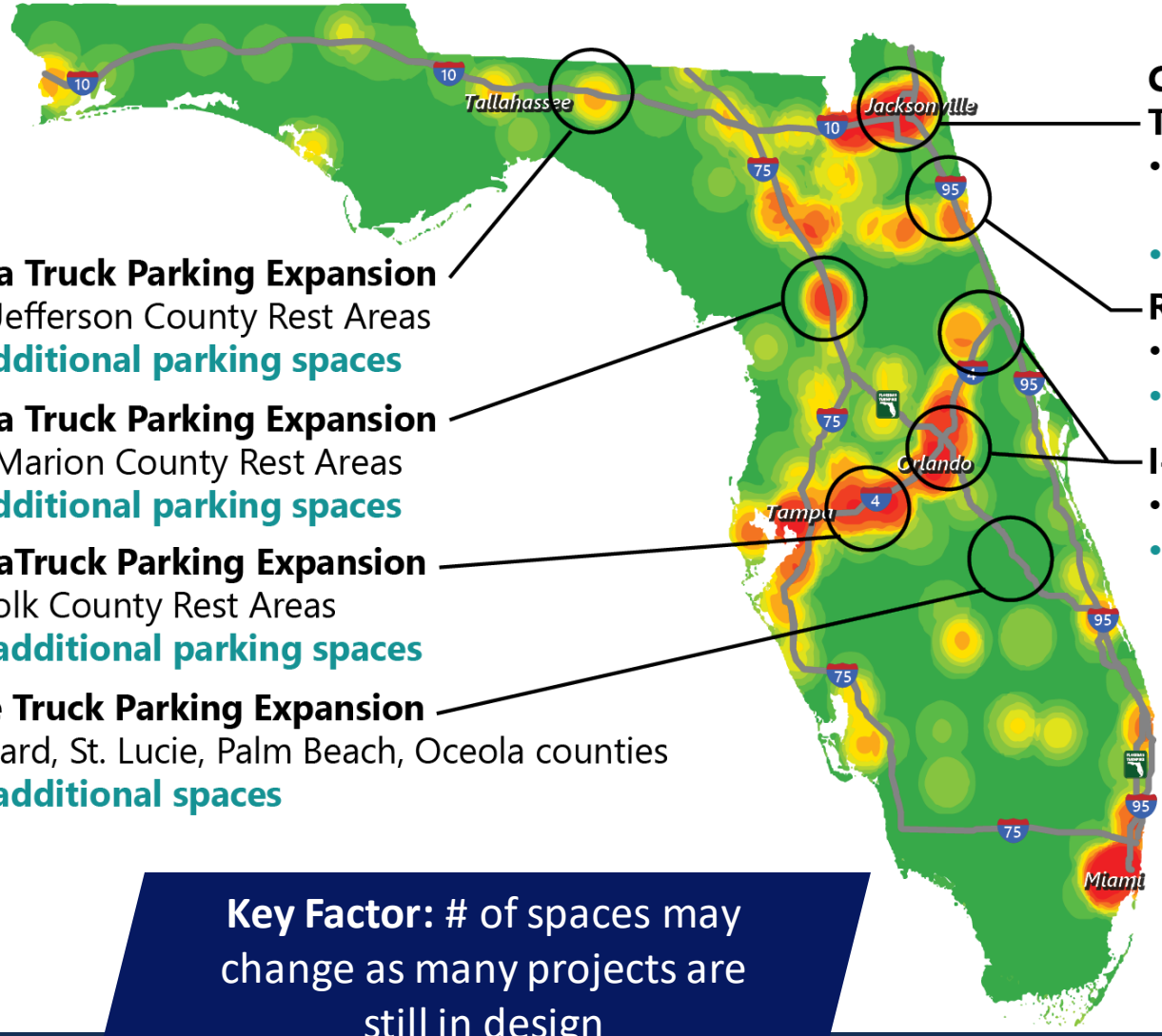
Add **Capacity**

Leverage **Technology**

Enhance **Policies**

Build **Partnerships**

SPOTLIGHT TRUCK PARKING CAPACITY



Rest Area Truck Parking Expansion
- I-10 Jefferson County Rest Areas
- **67 additional parking spaces**

Rest Area Truck Parking Expansion
- I-75 Marion County Rest Areas
- **26 additional parking spaces**

Rest AreaTruck Parking Expansion
- I-4 Polk County Rest Areas
- **142 additional parking spaces**

Turnpike Truck Parking Expansion
- Broward, St. Lucie, Palm Beach, Oceola counties
- **160 additional spaces**

Cecil Proving Ground Truck Parking Facility
- Duval County, I-10/US 90/First Coast Expressway Interchange
- **109 additional parking spaces**

Rest Area Truck Parking Expansion
- I-95 St. Johns County Rest Areas
- **128 additional parking spaces**

I-4 Truck Parking Facilities
- Volusia, Seminole, Osceola Counties
- **917 additional parking spaces**

Truck Parking Shortages

Key Factor: # of spaces may change as many projects are still in design

TRANSPORTATION SYMPOSIUM

SPOTLIGHT PROJECT

West Central Florida I-4 Truck Parking Facility

Currently in Design Phase

New Truck Parking Facility

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

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

Pedestrian Safety and Connectivity

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

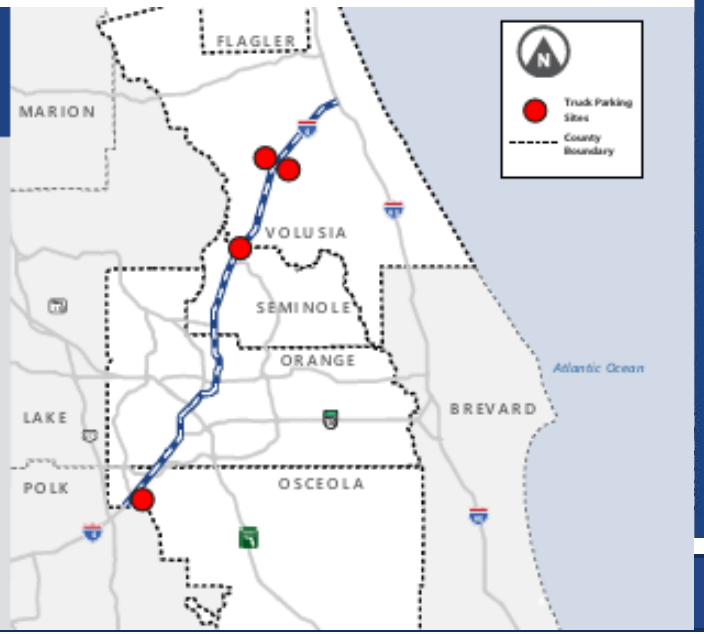
Add **Capacity**

SPOTLIGHT PROJECT

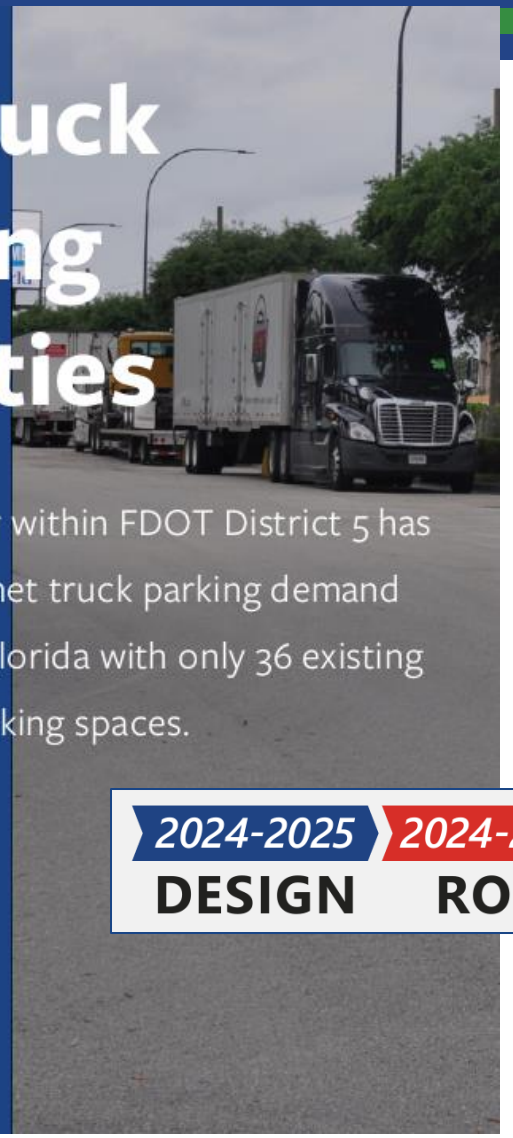
4
LOCATIONS

3
COUNTIES
Volusia, Seminole, Osceola

917
PARKING SPACES



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.

917
TOTAL SPACES ADDED

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

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**

FDOT Office of Maintenance

FDOT TRAFFIC ENGINEERING AND OPERATIONS

FDOT CIM CIVIL INTEGRATED MANAGEMENT

FDOT FREIGHT & RAIL

FDOT SEAPORTS

FDOT MOTOR CARRIER SIZE & WEIGHT

TRANSPORTATION SYMPOSIUM

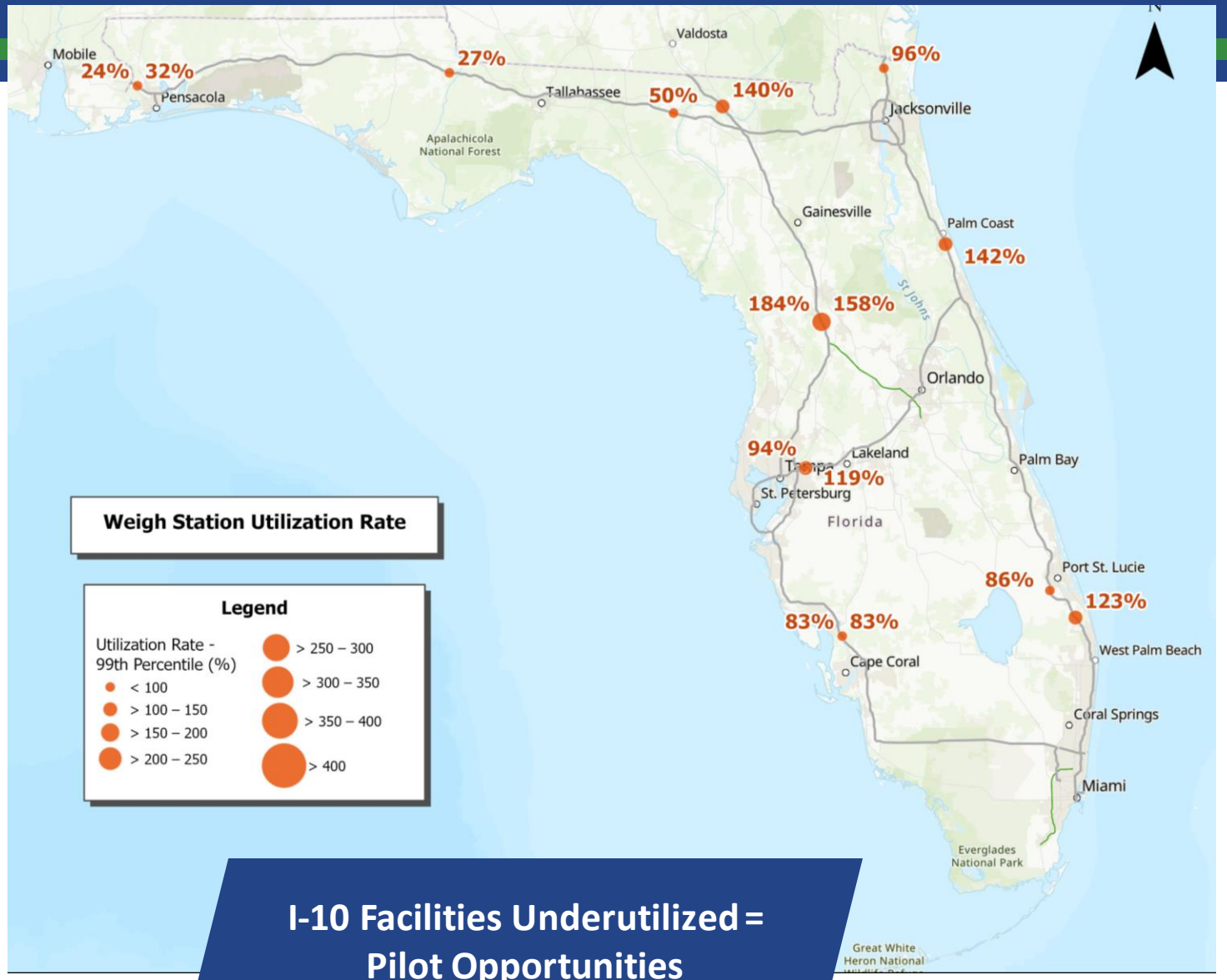
LATEST OBJECTIVES

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



I-10 Facilities Underutilized = Pilot Opportunities

Enhance **Policies**

Build **Partnerships**

TRANSPORTATION SYMPOSIUM

ENHANCED AMENITIES & IMPROVED SIGNAGE

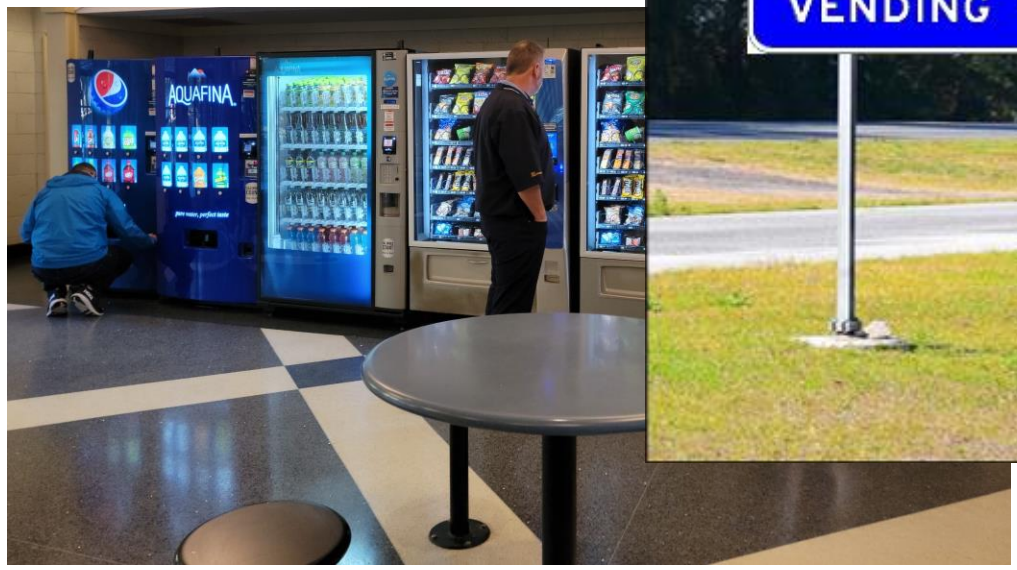
Provide WiFi and vending machines at underutilized facilities

- 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”



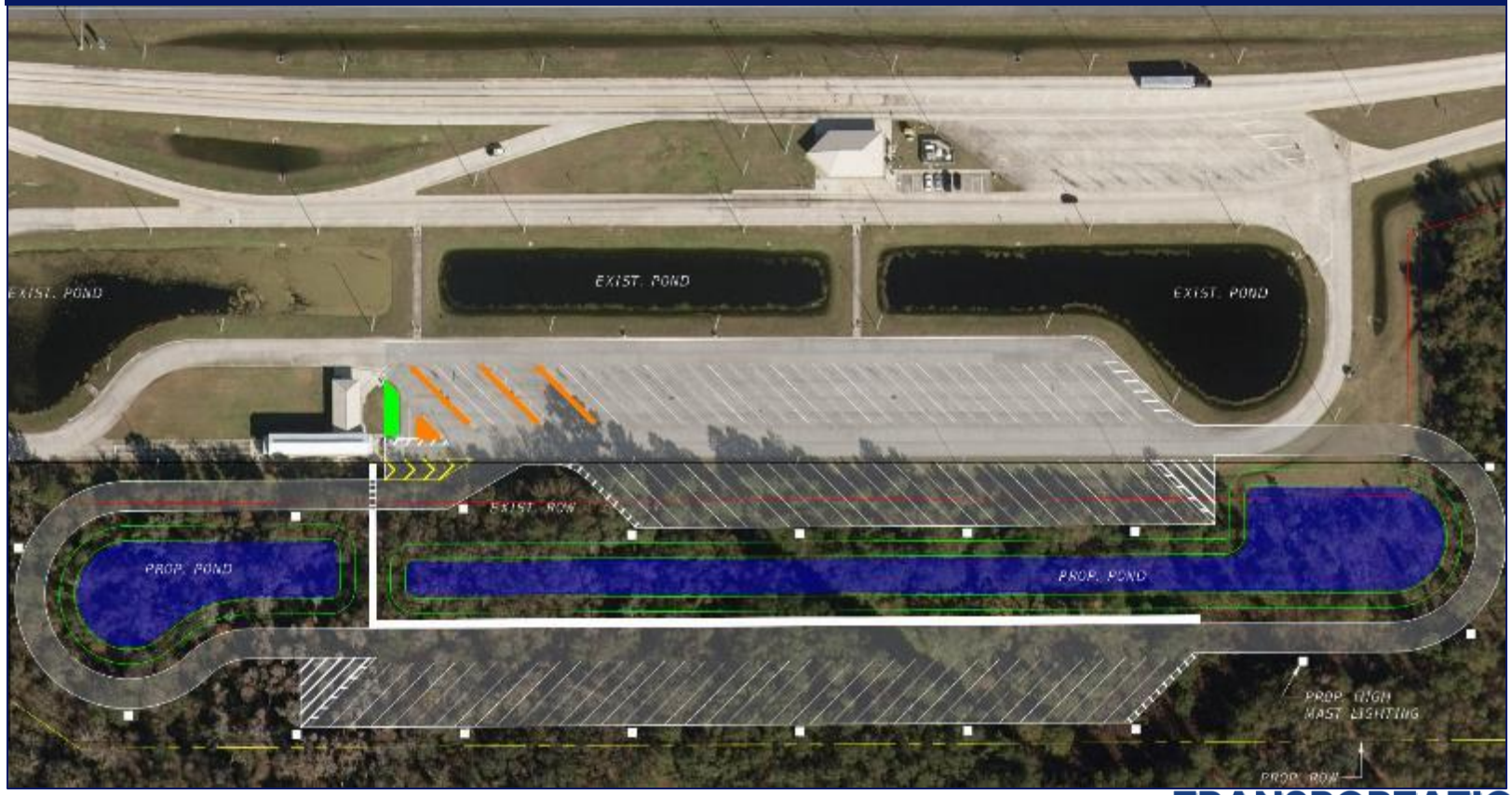
WEIGH STATION CAPACITY PROJECT CONCEPTS

- 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

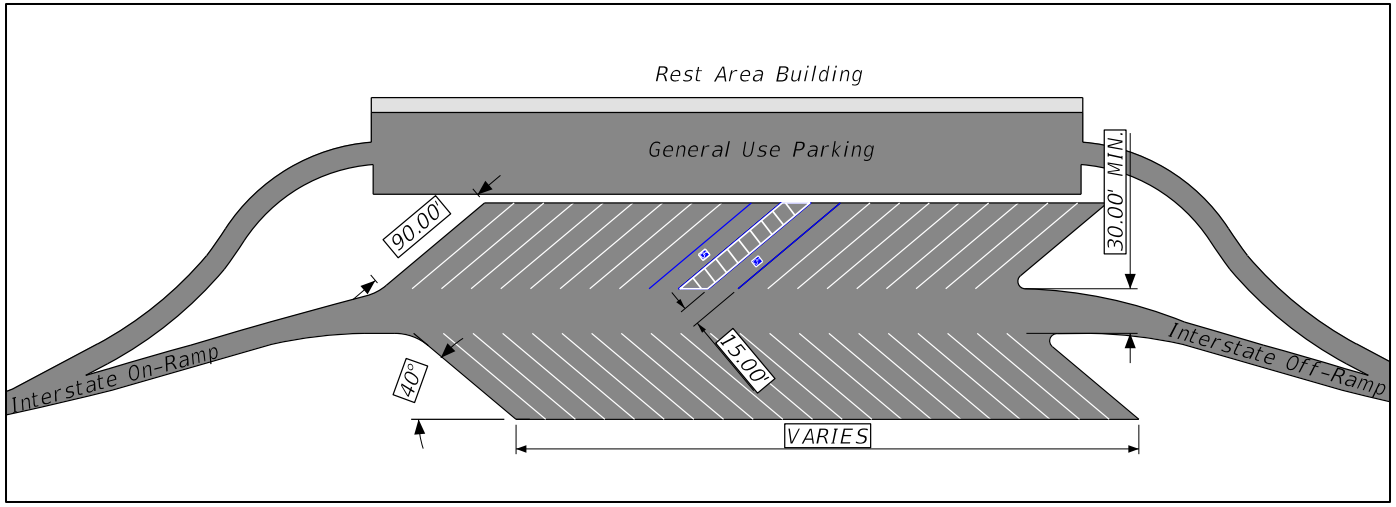
High Impact: Considerable ROW acquisition required for additional pavement and drainage. Additional concept plans have been developed for Low and Medium impact applications.

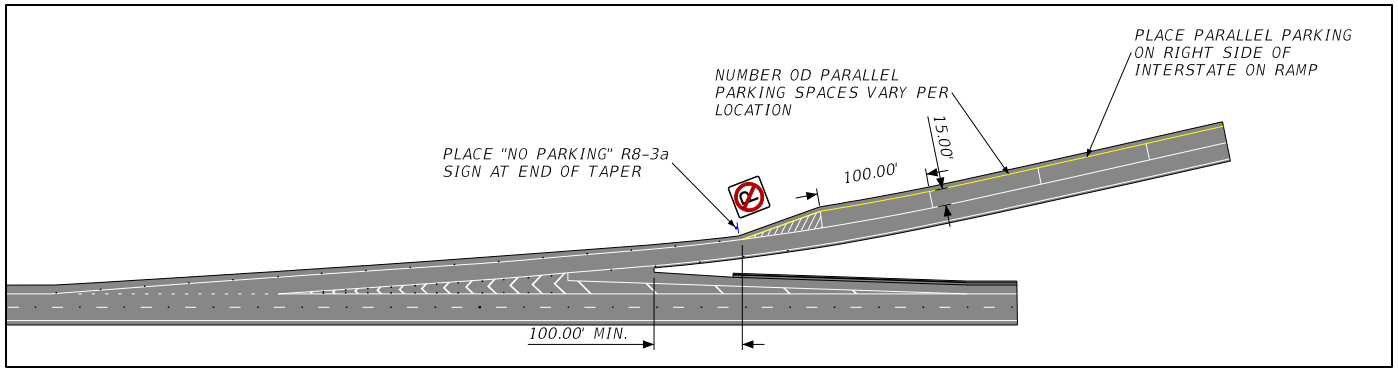


TRANSPORTATION SYMPOSIUM

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

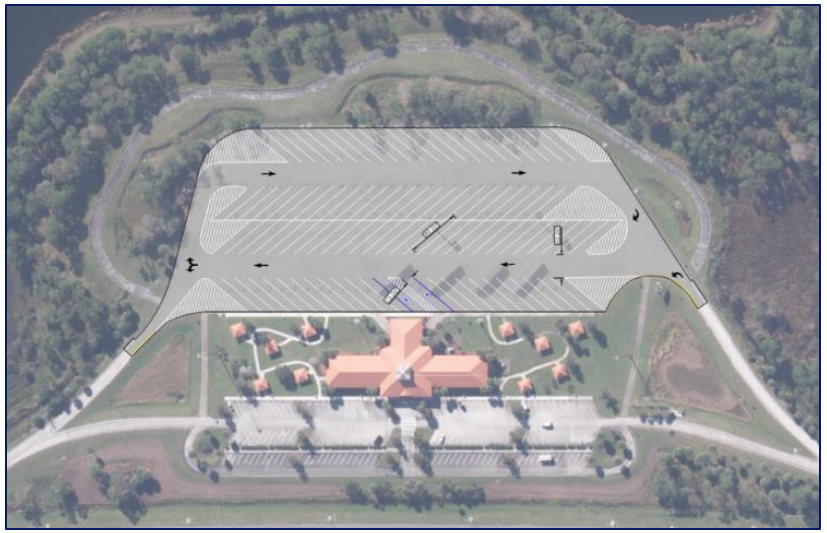




Enhance
Policies

TRANSPORTATION SYMPOSIUM

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

TRANSPORTATION SYMPOSIUM

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.

TRANSPORTATION SYMPOSIUM

Hollywood, FL

June 13-14, 2024

2024 TRANSPORTATION SYMPOSIUM

Truck Parking:
TPAS Technology and Deployment Experiences

Ronald Meyer

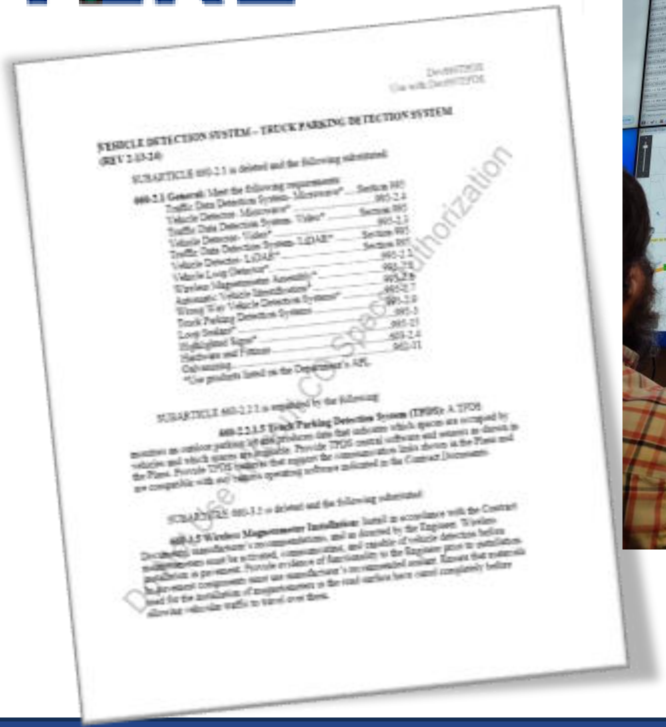
FDOT Traffic Engineering and Operation Office
Traffic Engineering Research Laboratory (TERL)

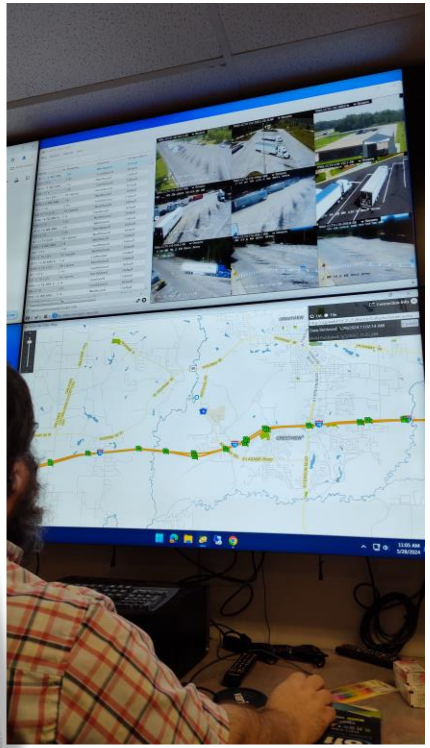
FDOT

ROLE OF THE TERL

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

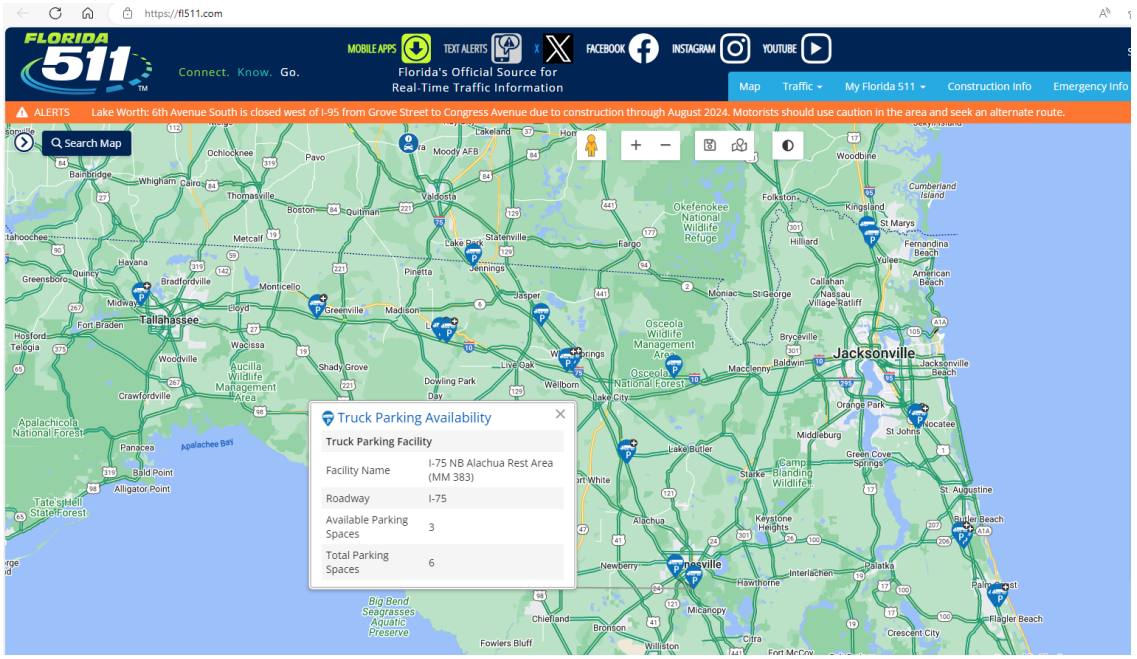
TERL TPAS ACTIVITIES

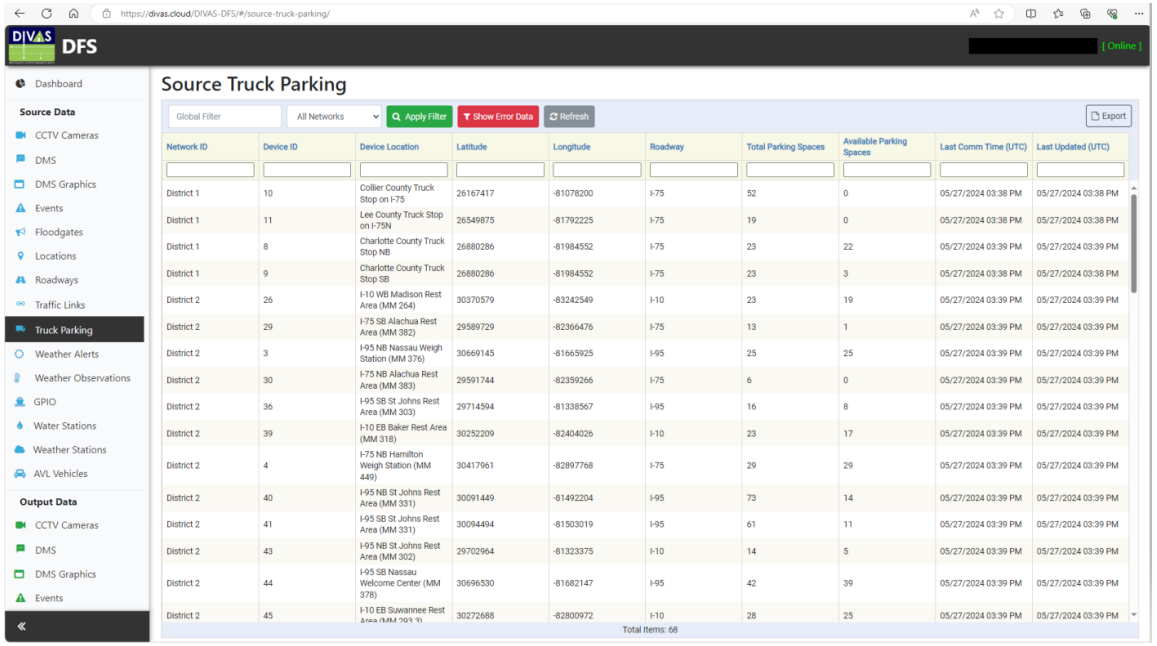

VEHICLE DETECTION SYSTEM – TRUCK PARKING DETECTION SYSTEM



- 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

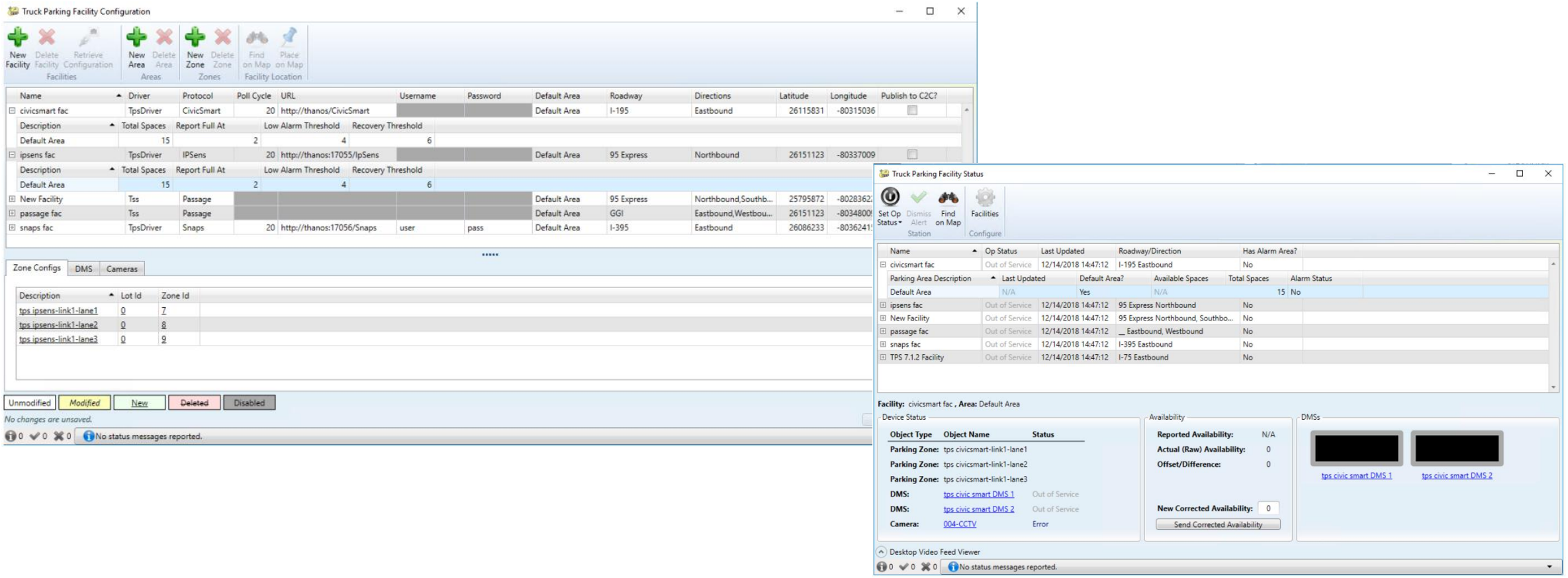
TPAS GOALS AND USE OF OTHER FDOT SYSTEMS





TRANSPORTATION SYMPOSIUM

TPAS GOALS AND USE OF OTHER FDOT SYSTEMS



TRANSPORTATION SYMPOSIUM

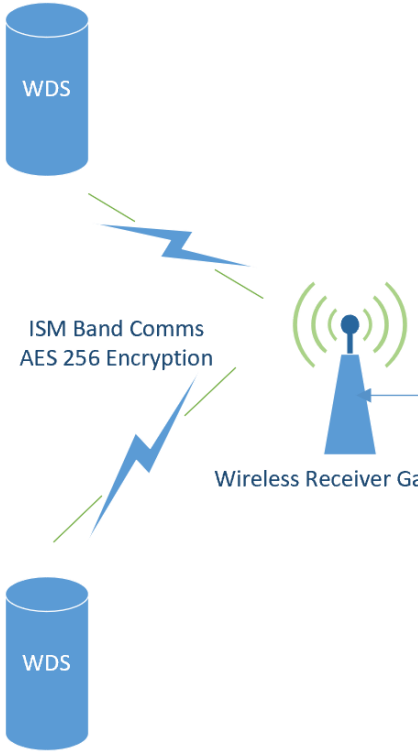
TPAS DETECTION SYSTEM ARCHITECTURES

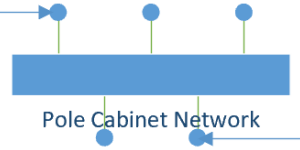
- Count In / Count Out
  - Works best with tightly controlled truck entry and exit points
  - Unable to provide additional data (e.g., individual space utilization, etc.)
- Per Space
  - Can provide additional operational information besides overall counts (e.g., space utilization metrics, overstay,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

“COUNT-IN / COUNT-OUT” SYSTEMS

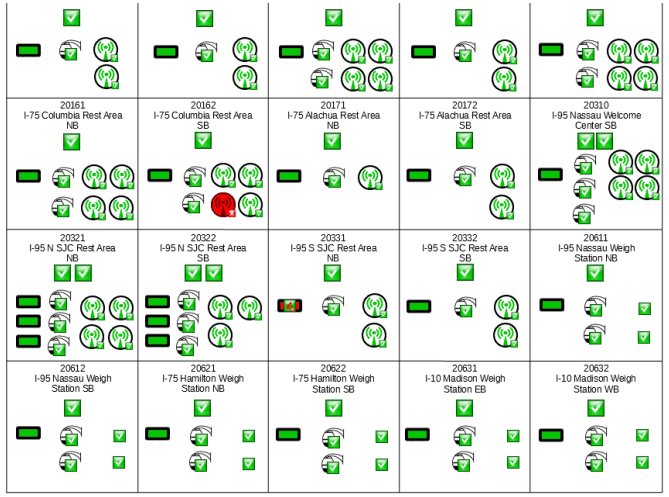
- Not as easy as you may think
- Needs dedicated ingress/egress for best accuracy
- Expect the unexpected
- Count detectors are imperfect
- Human intervention often required

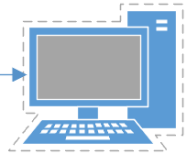
“PER SPACE” SYSTEMS (WIRELESS DETECTORS)





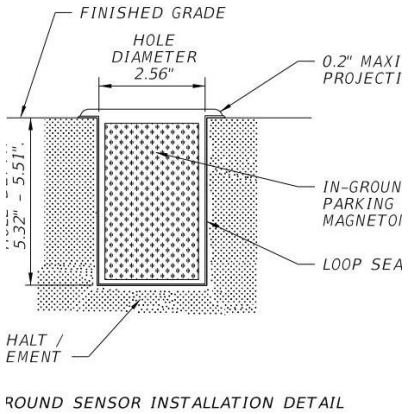
FDOT Network
UDP Port 8787/7878
Encrypted comms





Front End Device Manager and
Server components at TMC

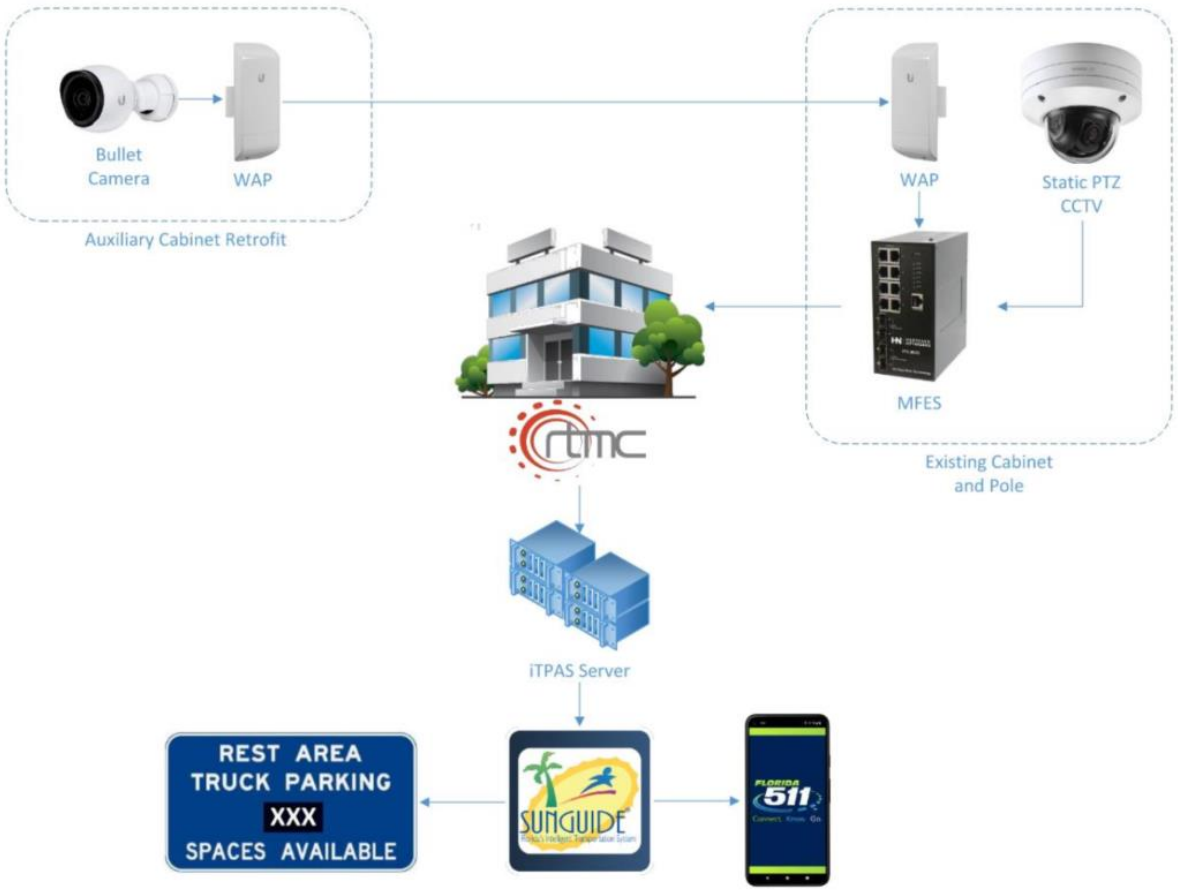
“PER SPACE” SYSTEMS (WIRELESS DETECTORS)



ROUND SENSOR INSTALLATION DETAIL

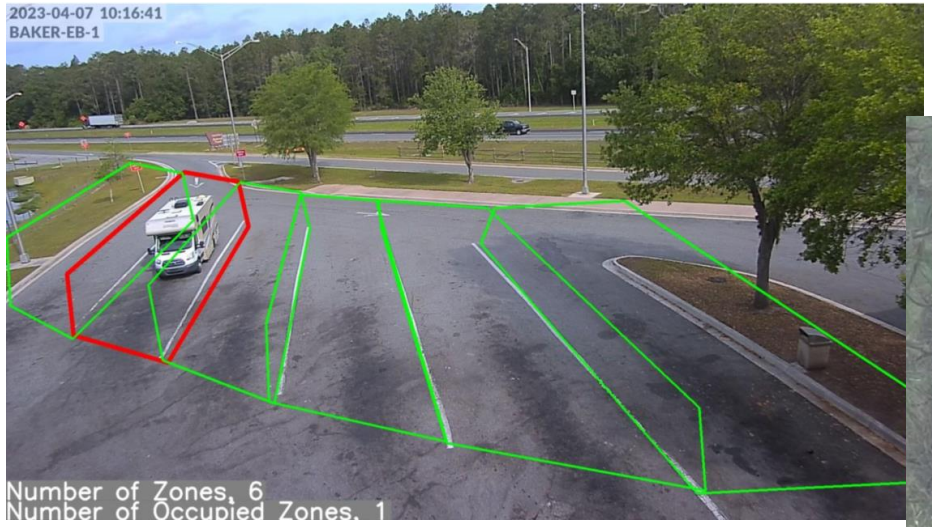
- Significant detector failures
- Frequent site visits and repairs needed to keep operational
- Supply chain issues with replacement pucks
- Cost of hardware removal/replacement
- Software licensing costs

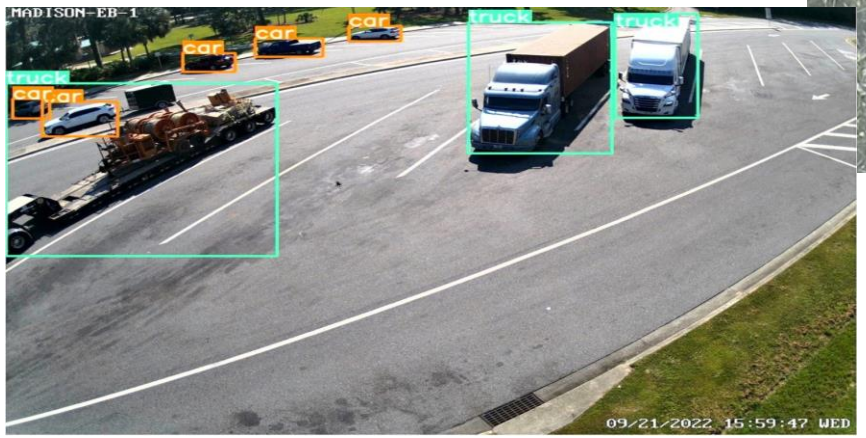
“PER SPACE” SYSTEMS (VIDEO ANALYTICS)



- 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.

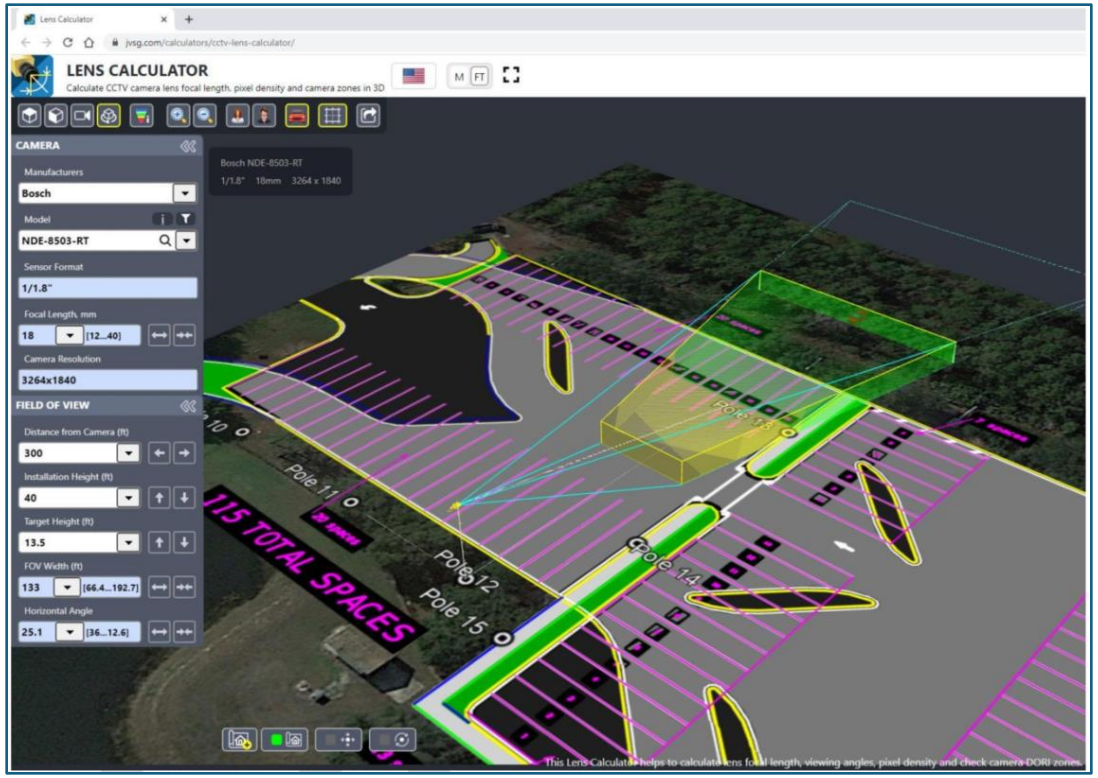
“PER SPACE” SYSTEMS (VIDEO ANALYTICS)



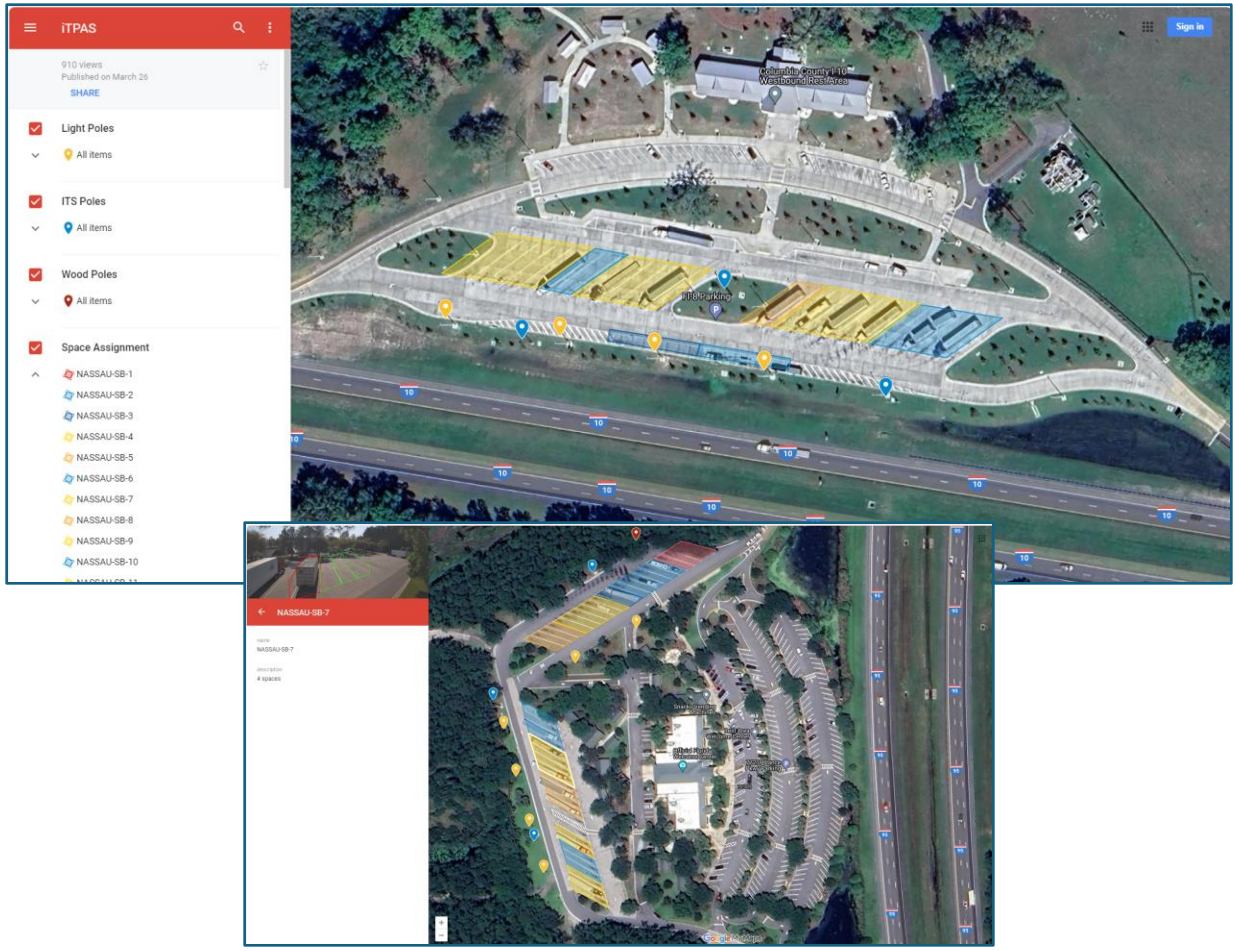


- Fixed camera retrofit on existing light pole
- Poles are often positioned adjacent to travel lanes for angle parking, etc.
- Low cost camera and wireless system can be used (only requires power connection at pole).
- Sample image shows typical field of view with camera at 20’ height.
- Images processed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

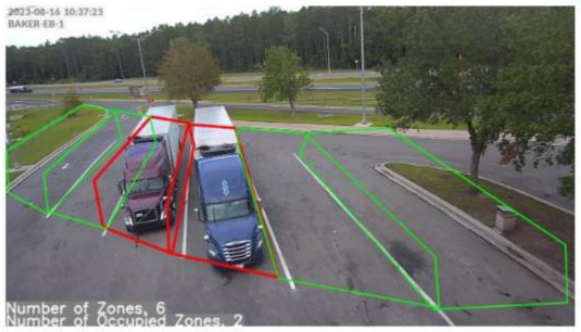
Detection Image Viewer

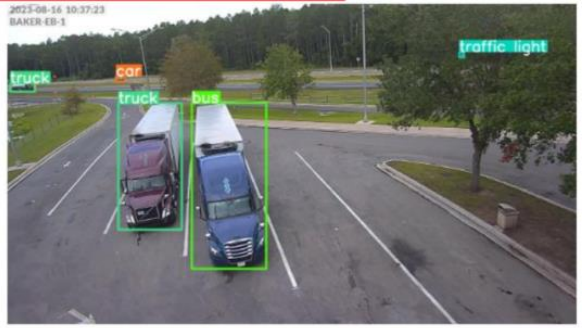
Choose a site

Baker I-10 EB Rest Area

BAKER-EB-1

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





Save the original image for BAKER-EB-1

TRANSPORTATION SYMPOSIUM

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

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

Thank You!

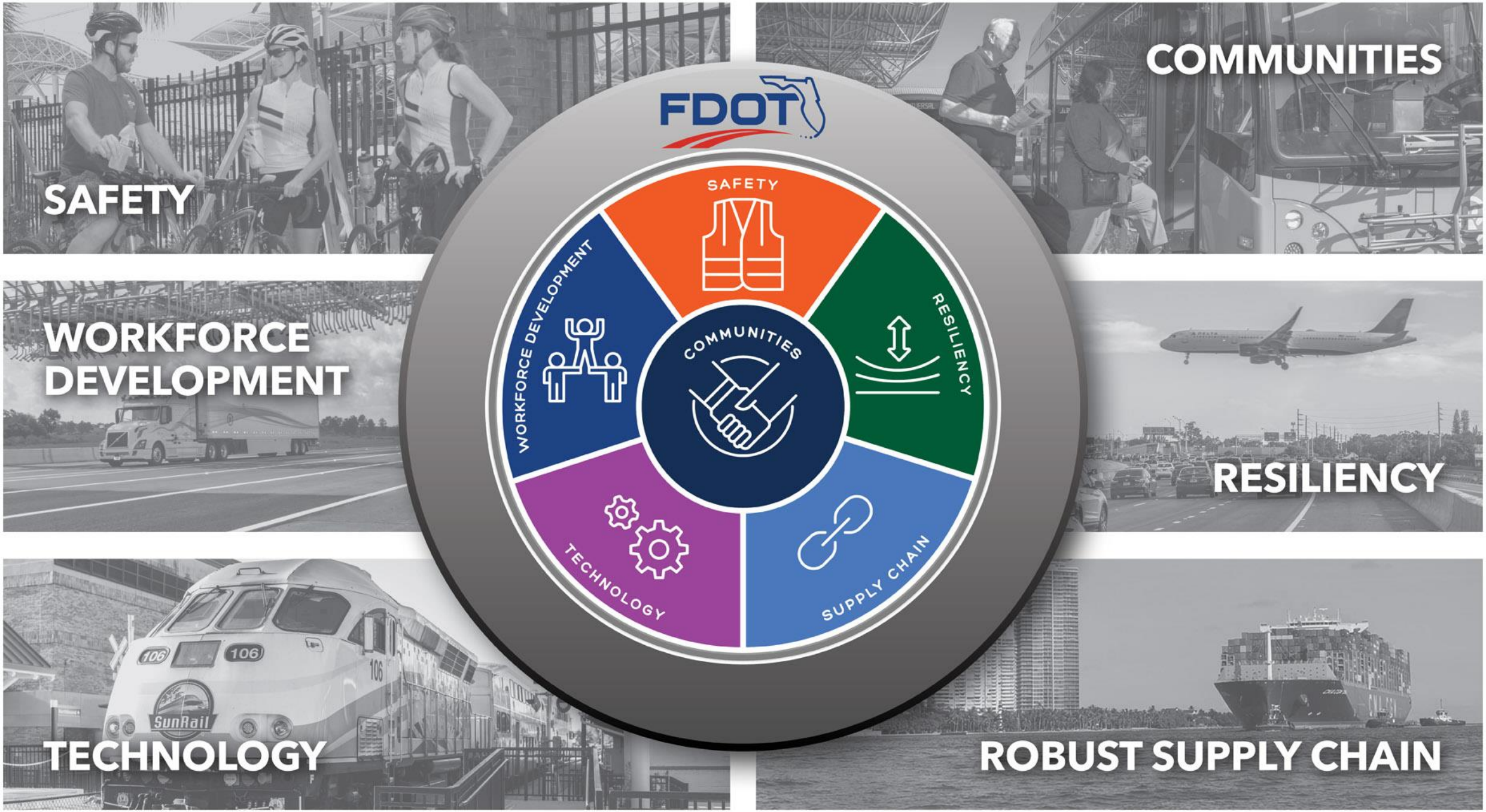
TRANSPORTATION SYMPOSIUM

CONTACT US

Questions?

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

TRANSPORTATION SYMPOSIUM


FDOT
SAFETY
COMMUNITIES
WORKFORCE DEVELOPMENT
RESILIENCY
TECHNOLOGY
SUPPLY CHAIN
SAFETY
COMMUNITIES
WORKFORCE DEVELOPMENT
RESILIENCY
TECHNOLOGY
SUPPLY CHAIN
106
SunRail