

FLORIDA STRATEGIC HIGHWAY

Vision Zero Workshop

May 7, 2019





Welcome Back



How Do We Get to Zero?





Connecting Effective Strategies

- Proven strategies
 - Collaborating on state-owned roads in cities
 - Context-sensitive designs/applications
 - Managing speed for safety, all roads
- New ideas and actionable actions



Agenda

- Today
 - Connecting Effective Strategies
 - Presentations
 - Table Discussions/Strategy Development
 - Next Steps
- Lunch (on your own)
- Long Range Visioning Session (1:00-5:00 PM)



Let's Start Sharing

- Works best from app/website no registration required
- Use <u>www.pollev.com/VZLRV</u> or the Poll Everywhere app to access the polling questions
- Respond to each question using your mobile device or laptop



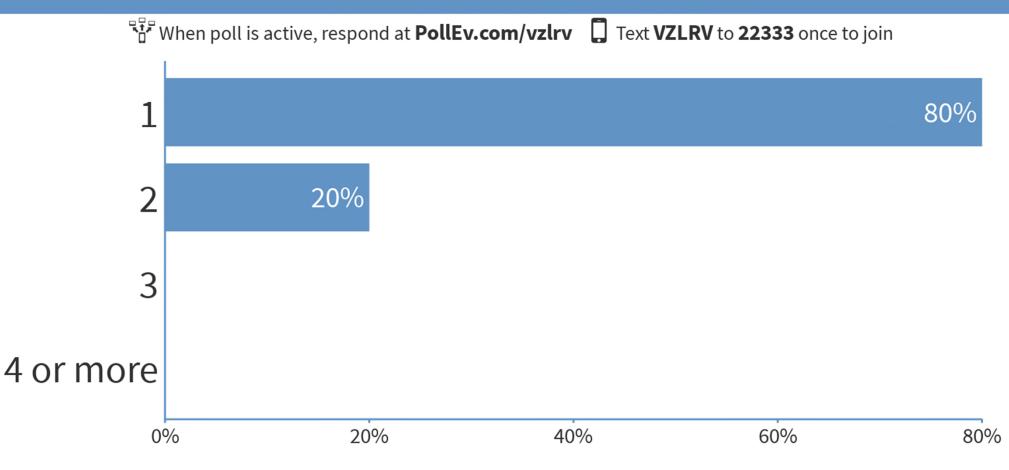


Where Did You Eat Dinner Last Night?

When poll is active, respond at **PollEv.com/vzlrv** [] Text **VZLRV** to **22333** once to join

"Hotel restaurant" "Bearded pig" "Omni" "BBQ downtown" "Local pizza delivered" "Hotel" "Home"							
"Downstairs - Bruins, Celtics and Red Sox" "Super Food Brewery" "Here in the bar" "Burrito Gallery" "Hotel restaurant							
"Sidecar's Neighbor (A Pizza Place)" "Cowford Chophouse" "hooters" "Juliette" "Burrito Gallery" "At Juliette's"							
"Downtown Jacksonville" "Sadly Hooters" "Southside" "Bay St Bar and Grill" "Hawkers" "Burrito Gallery"							
"Mellow Mushroom" "RIVER AND POST" "BBQ place" "Burrito gallery" "Five points mello mushroom" "BeerPub"							
"Here at the hotel" "Taverna" "Here" "Restaurant" "Home" "Jimmy Johns" "Gili's" "Hotel"							
"UberEats delivered via bicycle" "Millers ale house" "While driving over" "Hotel" "Home" "Home" "Home"							
"Burrito Gallery" "Cross Creek Steakhouse" "Mellow Mushroom" "Family member's house" "NYC" "Hooters"							
"Juliette's" "Hotel" "Burrito gallery" "By the river" "Hooters" "My room" "Omni" "Bearded Pig"							
"Home" "Bay Street Bar and Grill" "Hawkers in 5points" "Super food and brew" "Omni" "Here." "Hotel"							

How Many Different Modes of Transportation Did You Use to Get There and Back?



Identifying New and Innovative Strategies



Identifying New and Innovative Strategies

- Three topics
 - Coordinating across city, regional, and state lines
 - Design context, design manuals, initiatives
 - Traffic operations and connected and automated vehicles
- Format
 - Presentations
 - Table discussions/action plan development
 - Shared dialogue



Design Context, Design Manuals, Initiatives Gevin McDaniel, State Roadway Engineer, FDOT







Roadway Design Initiatives

Gevin McDaniel, P.E. Roadway Design Criteria Administrator Central Office, Roadway Design (850) 414-4284 gevin.mcdaniel@dot.state.fl.us





State Road or Local Road?



Public expectation is the same...





Vision Zero supported by new FDOT Policies and Initiatives:

- FDOT Design Manual
- Florida Greenbook
- Restructuring of Standard Plans (Old Design Standards)
- Safety Program Initiatives
- Partnering with local agencies
- Use of Technology
- Reduced Congestion



Focus Areas:

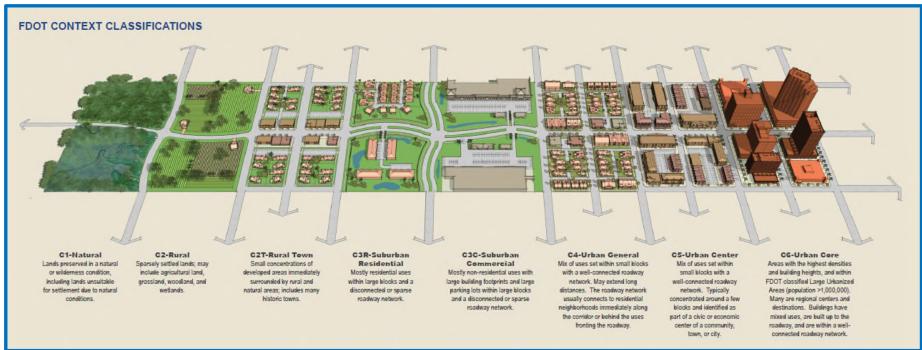
- Context-based design policy (Complete Streets)
- Lane Departure
- Intersection Safety
- Lighting
- Bicycle/Pedestrian Safety



Context-based Design Policies

FDO

- Change the way we think about our facilities
- Consideration for all modes of transportation
- Consideration for Human Factors





Context-based Design Policies:

- FDOT Design Manual (FDM)
 - Replaced the Plans Preparation Manual in 2018
 - Reorganized and rewritten for Context-based Design
 - Provides more flexibility for designers
- Florida Greenbook

FDOT

- Working toward Context-based Design
- Includes Context Classification in 2018 Draft
- Adjusted geometric criteria to provide more flexibility for local roads

"The Right Facility in the Right Context"

Lane Departure:

FDOI

- Keep vehicles in the lane
 - Pavement Markings
 - Curve Delineation
 - Surface Friction
- Feedback when departing the lane
 - Audible Vibratory Treatments
- Reduce consequences and severity
 - Clear Zone
 - Wide Paved Shoulders
 - Recoverable Slopes
 - Barriers





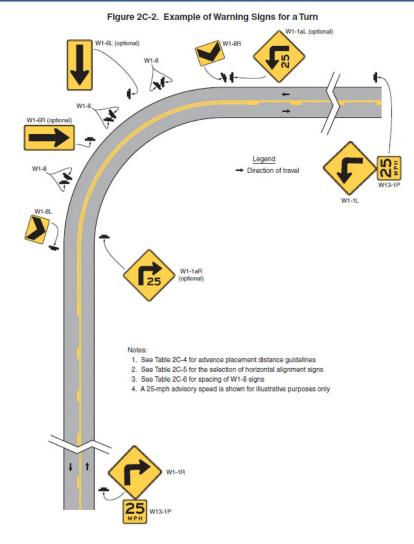
Pavement Markings:





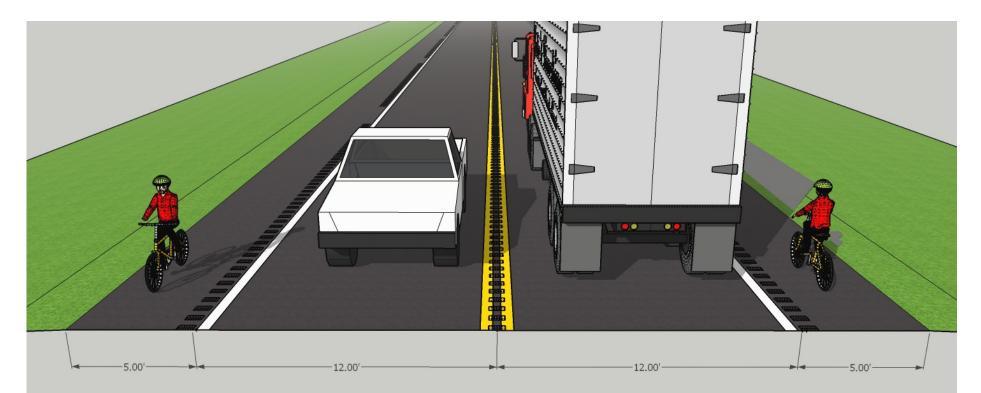
Enhancements for Curves:

- Horizontal Alignment Warning Signs
 - Chevrons
 - Arrows
 - Advisory Speed Signs
- High Friction Surface Treatments
 - Ramps
 - Tight radius curves
- Internally Illuminated Raised Pavement Markers (IIRPMs)
 - Substandard horizontal alignment or super-elevation
 - Substandard lane widths
 - Substandard shoulder widths





Audible Vibratory Treatments (AVTs):



Unique to Florida: Various levels of AVT based on context



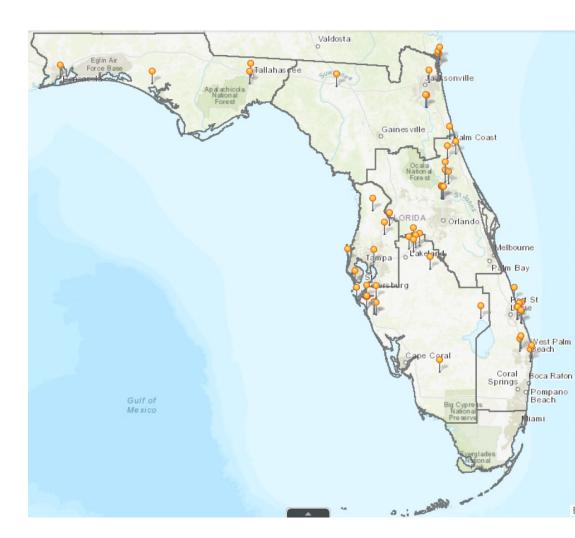
Intersections:

- Intersection Control Evaluation (ICE)
 - Goal: Limit the number of conflict points
 - Required for new intersections or modifications to existing intersections
 - Considers context and the needs of all road users

Modern Roundabouts:

FDOŤ

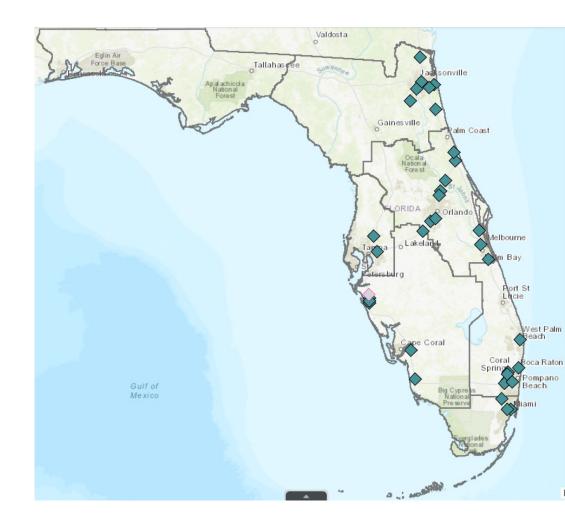
- Reduced crash severity
- Reduced congestion
- Geometry critical to success
- Change culture/Change experience
- Extensive statewide training
- Required Central Office geometric review
- Developed policy from review experience
- In 2020: Part of ICE process



Diverging Diamond Interchanges:

- Reduces conflict points
- Reduces congestion
- 1 completed

- 7 under construction
- 29 planned
- Provided Statewide Training
 - Organizing second round of Statewide training
- Central Office resources





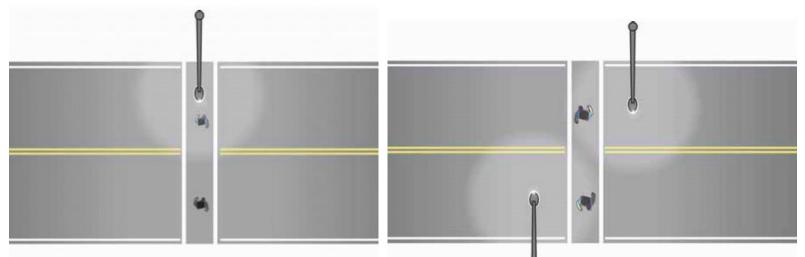
Lighting:

- 2016 converted from HPS to LED
- Pedestrian Lighting
 - Signalized Intersections
 - Midblock Crossings
- Coming soon: Wildlife-sensitive Lighting





Pedestrian Lighting:



Traditional midblock crosswalk lighting layout



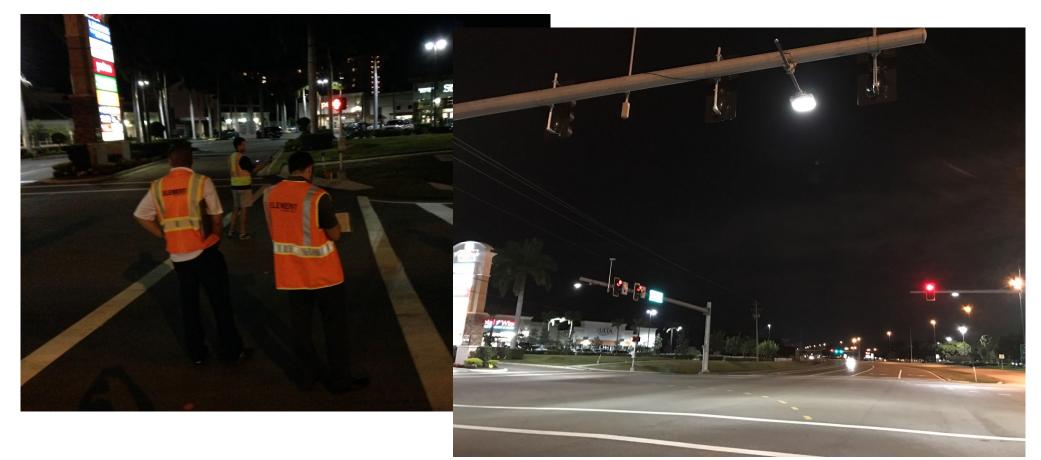
New design for midblock crosswalk lighting layout



Recommended lighting level: 20 lux at 5' above pavement



Pedestrian Lighting:



Bicycle and Pedestrian Safety:

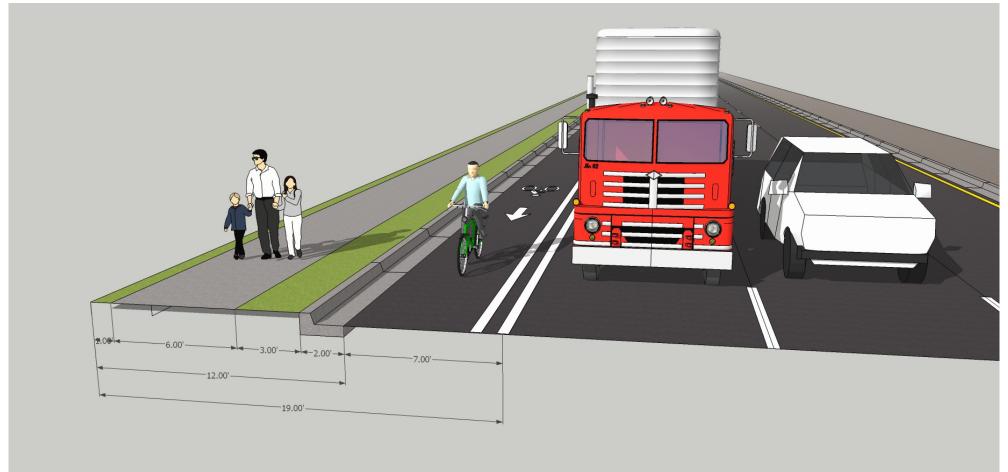
- Buffered Bike Lanes
- Bulb-outs

FDO

- Separated Bike Lanes
- Shared Use Paths
- Protected Bike Lanes
- Protected Intersections
- Leading Pedestrian Intervals (LPI)
- Pedestrian Hybrid Beacons (PHB/HAWKS)
- IA: Bicycle Signal Face
- IA: Green Colored Pavement Markings (Conflict Zones)
- IA: Rapid Rectangular Flashing Beacons (RRFB)



C3 Context Classification – 45 mph design speed



Partnership Alternative – Shared Use Path, no Bike Lane

6.00'

-2.00'--

00

• Uses same width

FDOT

 Tighter road section helps speed management

10.00

19.00'





EDC-5: Safe Transportation for Every Pedestrian (STEP):

Spectacular Seven

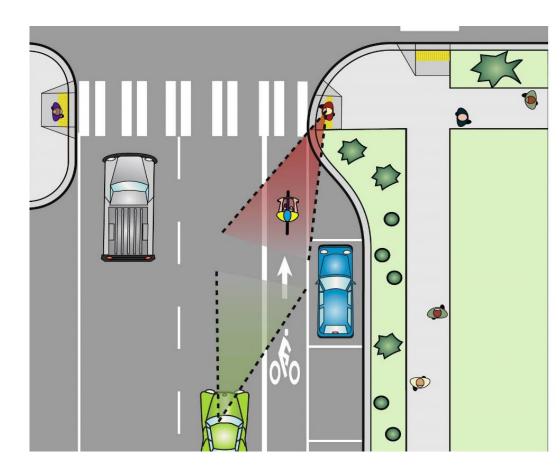
- Crosswalk Visibility Enhancements
 - Raised Crosswalks
 - Pedestrian Refuge Islands
 - Rectangular Rapid Flashing Beacon
- Pedestrian Hybrid Beacon (PHB)
- Road Diets
- Leading Pedestrian Interval (LPI)



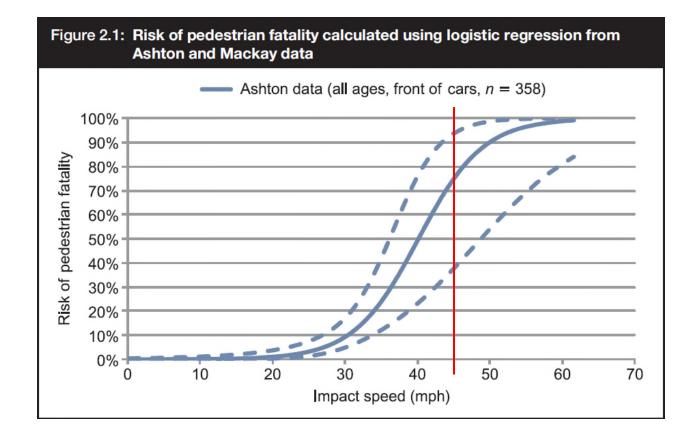


Curb extensions (Bulb-outs):

- Focused on reducing crossing distance
- Better visibility between peds and motorists
- Traffic calming



Speed vs. Crash Severity





Design Speed Categories – Very Low Speed

201.4 Design Speed

Design speed is a principal design control that regulates the selection of many of the project standards and criteria used for design. The selection of an appropriate design speed must consider many factors. The AASHTO publication, *A Policy on Geometric Design of Highways and Streets*, has a thorough discussion on design speed.

There are three categories of design speed:

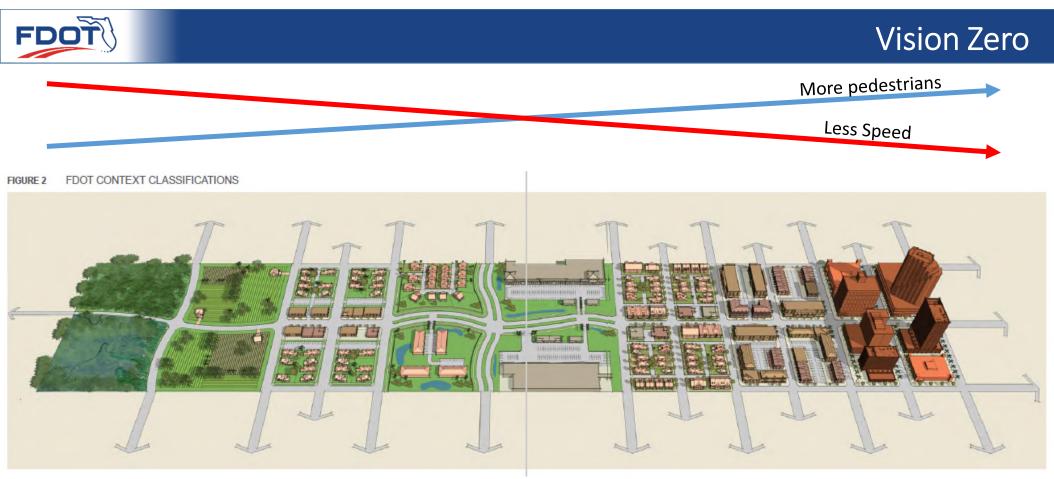
High Speed: Design Speeds 50 mph and greater.

Low Speed: Design Speeds of 45 mph and less.



FDO

Very Low Speed: Design Speeds 35 mph and less.



C1	C2	C2T	C3R	C3C	C4	C5	C6
50+	50+	25-45	35-55	35-55	30-45	30-35	25-30
mph	mph	mph	mph	mph	mph	mph	mph



Vision Zero

Speed Management – FDM 202

Context Classification	Design Speed (mph)	Strategies
C1	55-70	Project-specific; see FDM 202.4.
C2	55-70	Project_specific see FDM 202 4

Table 202.3.1 Strategies to Achieve Desired Operating Speed

		C2 55.70 Project-specific see EDM 202.4	
C4	40-45	Roundabout, Lane Narrowing, Horizontal Deflection, Speed Feedback Signs, RRFB and PHB	ns ta
	35	Techniques for 40-45mph plus On-Street Parking, Street Trees, Short Blocks, Median Islands at Crossings, Bulbouts, Terminated Vista	וג
	30	Techniques for 35-45 mph plus Chicanes, Median Islands in Curve Sections, Textured Surface	- n -
C5	35	Roundabout, On-street Parking, Street Trees, Short Blocks, Speed Feedback Signs, Median Islands in Crossings, Road Diet, Bulbouts, RRFB and HAWK, Terminated Vista	
	30	Techniques for 35 mph plus Chicanes, Median Island in Curve Sections, Textured Surface	a 14
	25	Techniques for 30-35 mph plus Vertical Deflection	
		Sufface	aure
		25 Techniques for 20 mph plus untited deflection	

25 Techniques for 30 mph plus vertical deflection





Questions?



Gevin McDaniel, P.E. Roadway Design Criteria Administrator Central Office, Roadway Design (850) 414-4284 gevin.mcdaniel@dot.state.fl.us

Traffic Operations and Connected and Automated Vehicles Raj Ponnaluri State Connected Vehicles and Arterial Management Engineer, Florida DOT



Vision Zero: Using Technology to Improve Safety

Raj Ponnaluri, PE, PTOE, PhD, PMP

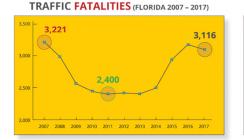
State Connected Vehicle and Arterial Management Engineer, FDOT May 6, 2019

Florida Department of Transportation's (FDOT) Mission and Vision

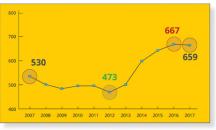
- Mission: The department will provide a <u>safe</u> transportation system that ensures the mobility of people and goods, enhances economic prosperity, and preserves the quality of our environment and communities.
- Vision: As one FDOT team, we serve the people of Florida by providing a transportation network that is well planned, supports economic growth, and has the goal of being congestion and <u>fatality free</u>.

VISION ZERO DRIVING DOWN FATALITIES

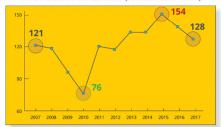




PEDESTRIAN FATALITIES (FLORIDA 2007- 2017)



BICYCLE FATALITIES (FLORIDA 2007 - 2017)



207

Why Use Technology for Safety?

- 94% of serious crashes are due to human error according to the National Highway Traffic Safety Administration
- Despite traditional measures, safety gains are only partially obtained
- Unlike human drivers, technologies are not prone to:
 - Distraction
 - Fatigue
 - Impaired driving
- When carefully integrated, technology can help motor vehicles detect and avoid vulnerable road users

Creation of the CAV Business Plan



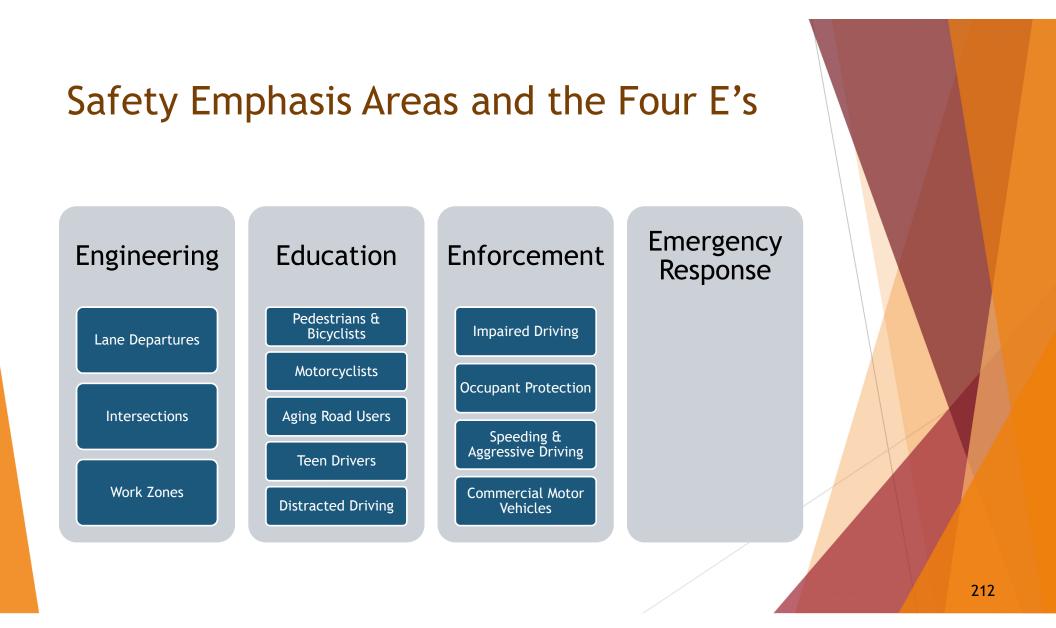


ROADMAP to FLORIDA CAV

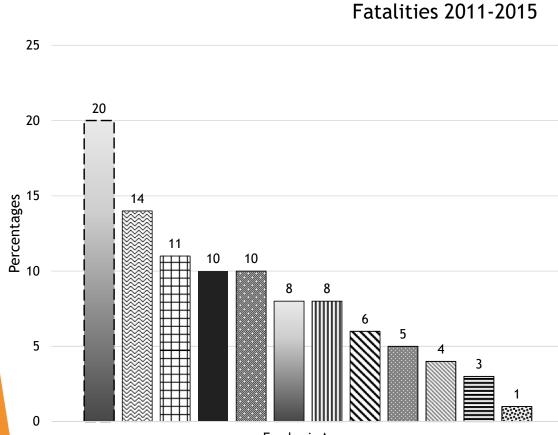


CAV Focus Areas

- 1. Policies and Governance
- 2. Program Funding
- 3. Education and Outreach
- 4. Industry Outreach and Partnerships
- 5. Technical Standards and Specifications Development
- 6. Implementation Readiness
- 7. Deployment and Implementation



Fatalities by the SHSP Emphasis Area



Emphasis Areas

Lane Departure Crashes ☑ Impaired Driving Crashes □ Pedestrians and Bicyclists Intersection Crashes ■ Unrestrained Occupants ■ Motorcyclists ■ Aging Drivers Speeding and Aggressive Driving Crashes Commercial Motor Vehicle Crashes **I** Teen Driver Crashes ■ Distracted Driving Crashes Work Zone Crashes 213

How CAV Technology Can Improve Safety?

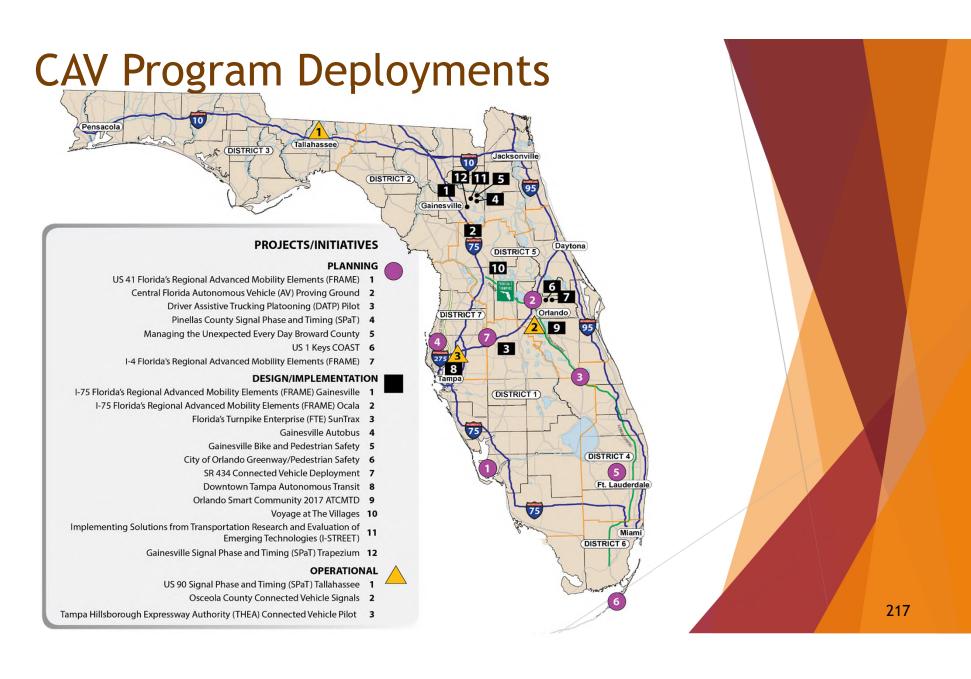
Emphasis Area	Traditional Methods	Potential CAV Technology
Lane Departure	Rumble Strips, Signing, Delineation, High- friction Surface Treatments	Lane Departure Warning, Lane Departure Prevention, Lane Keeping Assistance, Blind-Spot Monitoring
Impaired Driving	Ignition Interlocks, Sobriety Checkpoints	Heart Rate-monitoring Sensors, Cameras Detecting Abnormal Movements
Pedestrian and Bicyclists	Road Diets, Pedestrian Hybrid Beacons, Pedestrian Refuge Islands	Vehicle-to-Everything (V2X) Beacons, Automatic Emergency Braking System, Passive Pedestrian Detection Systems, Personal Information Devices
Intersections	Fixed Timing Controls, Actuated Signal Controls, Adaptive Signal Control	Vehicle-to-Infrastructure (V2I), CAV/CV applications (Signal Phase and Timing, Pedestrian in Signalized Crosswalk, Signal Priority, Red-Light Warning)

How CAV Technology Can Improve Safety?

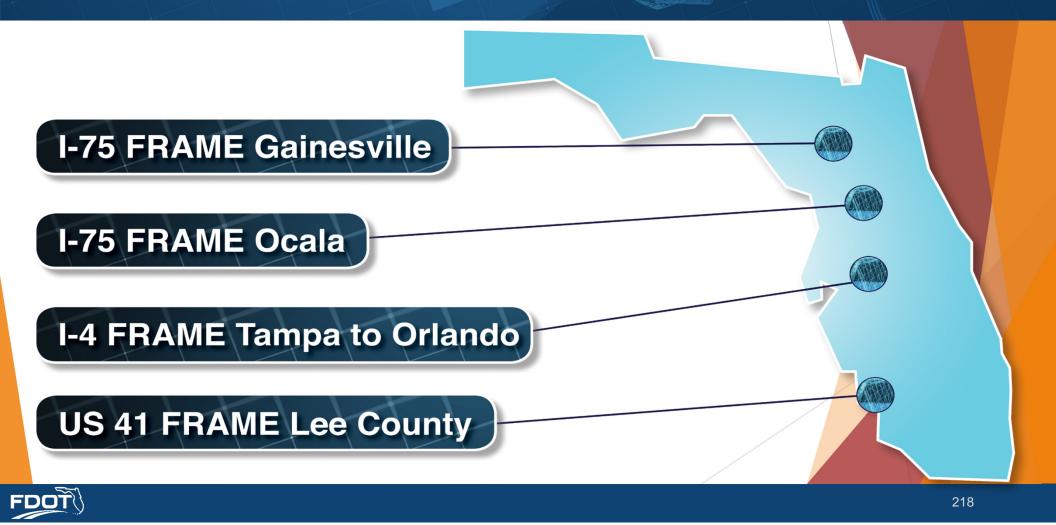
Emphasis Area	Traditional Methods	Potential CAV Technology
Unrestrained Occupants	Public Campaigns	None at this time, system can detect occupants not wearing seat belts and notify them
Motorcyclists	Public Education	Detection and warning systems through V2X communications
Aging Drivers	Change the abilities or strategies of the person, Change the characteristics of the environment	Blind Spot Identification, Intersection Navigation, Left-Turn Assistance
Speeding & Aggressive Driving	Mid-block Chicanes, Traffic Humps, Rumble Strips, Raised Pedestrian Platforms	Camera Radar Warning Driving, Autonomous Vehicles

How CAV Technology Can Improve Safety?

Emphasis Area	Traditional Methods	Potential CAV Technology
Commercial Motor Vehicle	Law Enforcement	Vehicle-to-Vehicle (V2V) Communications, Active Braking Technologies, Collision Warning, Heavy Vehicle Adaptive Cruise Control
Teen Driving	Driver Education and Legal Structure of Testing and Licensure	Adaptive Cruise Control, Distance Alert, Collision Warning with Full Auto Brake, Driver Alert Control, Lane Departure Warning
Distracted Driving	Public Campaign, Some Law Enforcement	Same Potential CAV Technologies for Teen Driving
Work Zone	Flaggers, Safety Clothing, Mobile Barrier System, Channelizing Devices	Smart Drums, CV devices to broadcast real-time work zone information to motorists, Active Geo-Fencing Work Zone, Personal Information Devices



Florida's Regional Advanced Mobility Elements (FRAME)

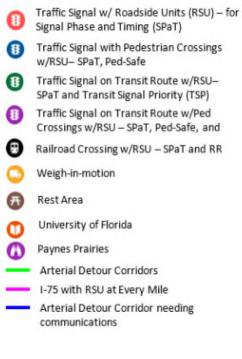


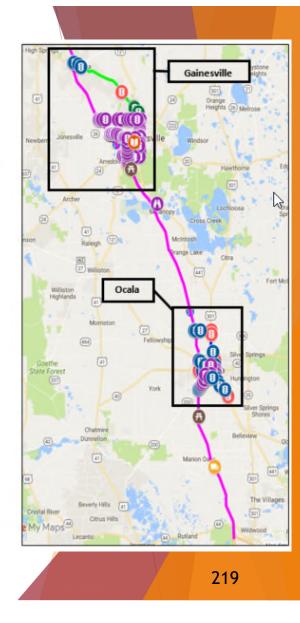
I-75 FRAME Safety Focus

- Integrated Corridor Management, Traffic Incident Management, Incident Clearance and Secondary Crashes mitigation.
- Optimize the use of existing infrastructure by managing a system rather than managing facilities or modes individually.
- Metrics are safety (crashes and secondary crashes), mobility (travel time, travel time reliability, throughput), system efficiency.

Traffic Incident Management

Legend





Gainesville Bike and Pedestrian Safety

13 Traffic Signals 8 Mid-block Crosswalks

Roadside Unit On-Board Unit Pedestrian Detection System

Bicycle & Pedestrian Safety



220

Gainesville Bike and Pedestrian Safety

Major Features and Anticipated Benefits

FHWA Accelerated Innovation Deployment award of \$1 Million; State and Off-system roads

Passive pedestrian detection, advance vehicle detection, roadside units, on-board units, personal information devices (smartphones)

Dedicated short range communication and cellular

Improved pedestrian safety at signalized intersections and mid-block crossings

Verification if personal information devices can be used to warn pedestrians and to request pedestrian phases

Demonstration of the viability of on-board units for communicating with transit and city fleet operators about pedestrians ahead

Signal Phase and Timing (SPaT) Projects

US 90 (Mahan Drive)

• 7 miles and 21 intersections on US 90 from Duval Street to I-10 in Tallahassee

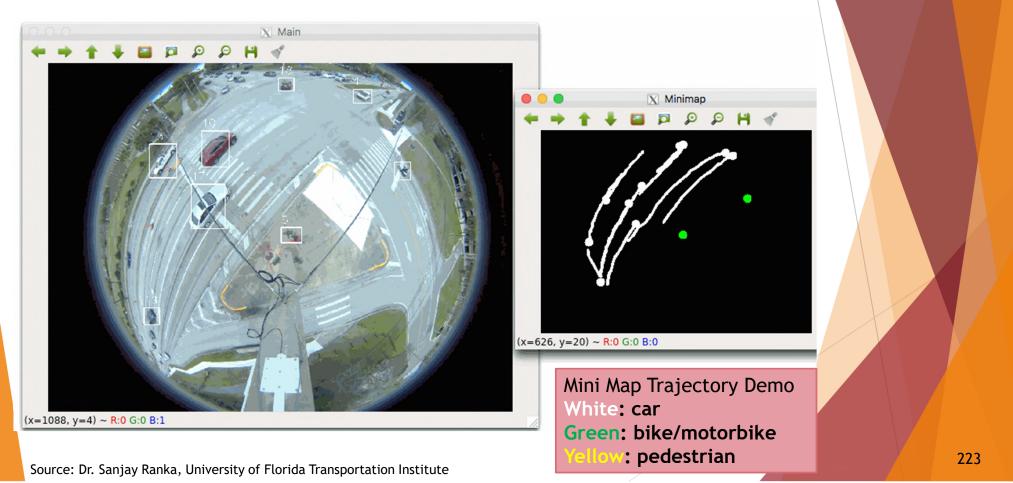
Gainesville Trapezium

27 intersections on SR 26, SR 121, SR 24, and US 441 in Gainesville

Pinellas County

 22 miles and 23 intersections on US 19 from SR 688 north to Beckett Way

Artificial Intelligence and Machine Learning for Transportation: Multiple Object Detection



I-STREET: FDOT Partners with UF and Gainesville

Implementing Solutions from Transportation Research and Evaluation of Emerging Technologies (I-STREET)

Goal Areas

Safety

Mobility

- Request for Information process
- Industry responses point to implementation interest
- **Research and Development underway**
- Projects expected to benefit:
 - I-75 FRAME
 - **UF AID**
 - Gainesville SPaT Trapezium
 - Gainesville Autobus



224

Tampa Hillsborough Expressway Authority (THEA) Connected Vehicle Applications

	Application	Description
V2I	End of Ramp Deceleration Warning (ERDW)	Alerts driving approaching curve with speed safety warning
V2V	Emergency Electronic Brake Light (EEBL)	Enables broadcast to surrounding vehicles of severe braking
V2V	Forward Collision Warning (FCW)	Warns driver of impending collision ahead in same lane
V2I	Intersection Movement Assist (IMA)	Indicates unsafe (i.e., wrong way) entry into an intersection
V2I	Intelligent Traffic Signal Systems (I-SIG)	Adjusts signal timing for optimal flow along with Pedestrian Signal (PEG-SIG) and Transit Signal Priority (TSP)
V2I	Probe Date Enabled Traffic Monitoring (PDETM)	Uses vehicles as probes to calculate travel times
V2I	Transit Signal Priority (TSP)	Allows transit vehicle to request and receive priority at a traffic signal
V2V	Vehicle Turning Right in Front of a Transit Vehicle (VTRFTV)	Alerts transit vehicle driver that a car is attempting to turn right in front of the transit vehicle
V2I	Wrong-Way Entry	Warns driver of potential and actual Wrong Way travel direction
V2I V2V	Pedestrian Collision Warning (PCW)	Alerts vehicle to the presence of pedestrian in a crosswalk
Sou	rce: THEA	Safety applications are bolded.

THEA's Pedestrian Safety Application

Pedestrian Safety – LiDAR detection allows RSU to generate PCW alerts and transmit to vehicles via DSRC.

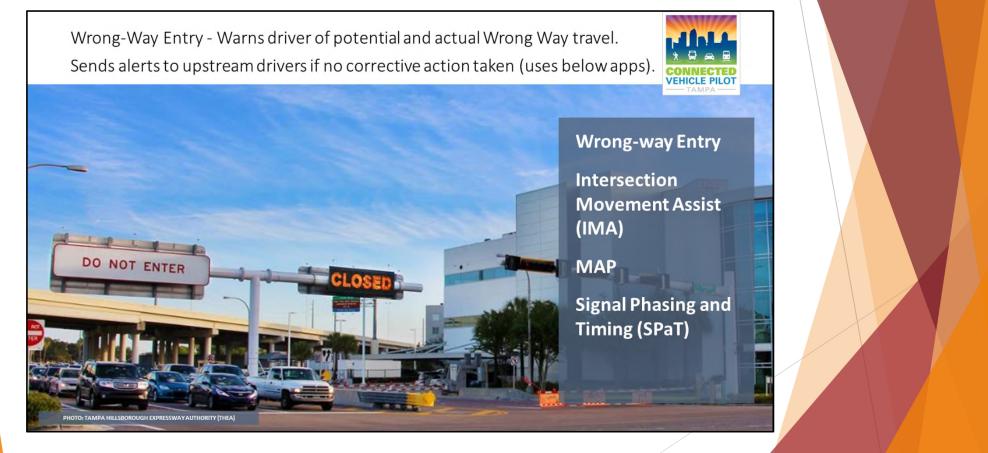
Pedestrian in a Signalize Crosswalk Warning (Ped-X)

Pedestrian Collision Warning (PCW)

HOTO: TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY (THEA)

Source: THEA

THEA's Wrong Way Entry Application

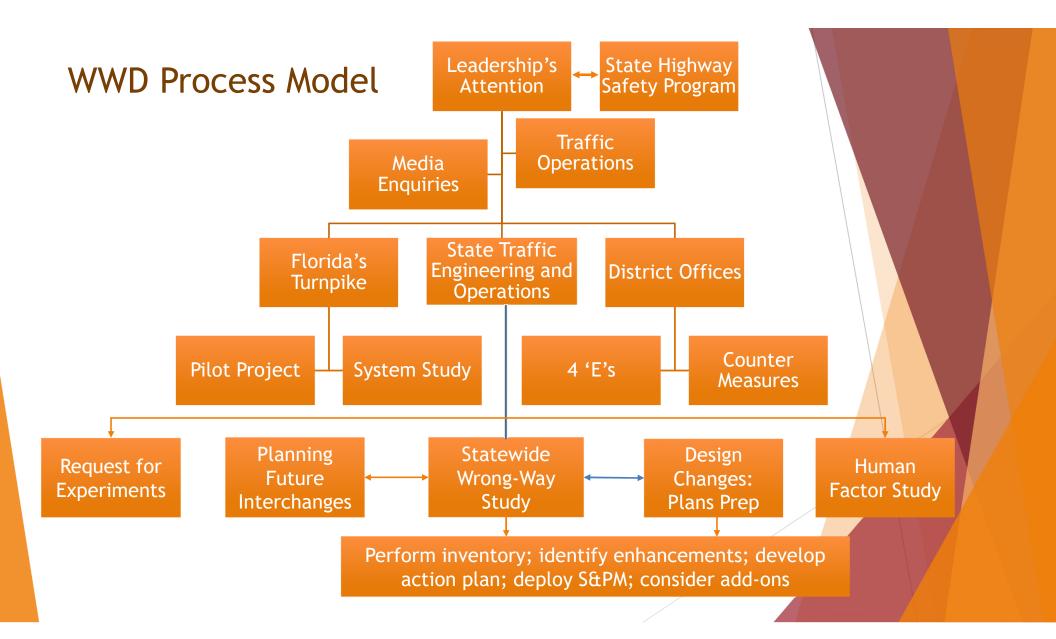


Source: THEA

THEA's Streetcar Conflict Application

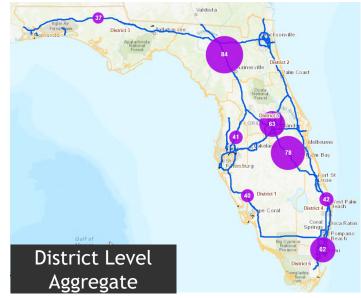


Source: THEA



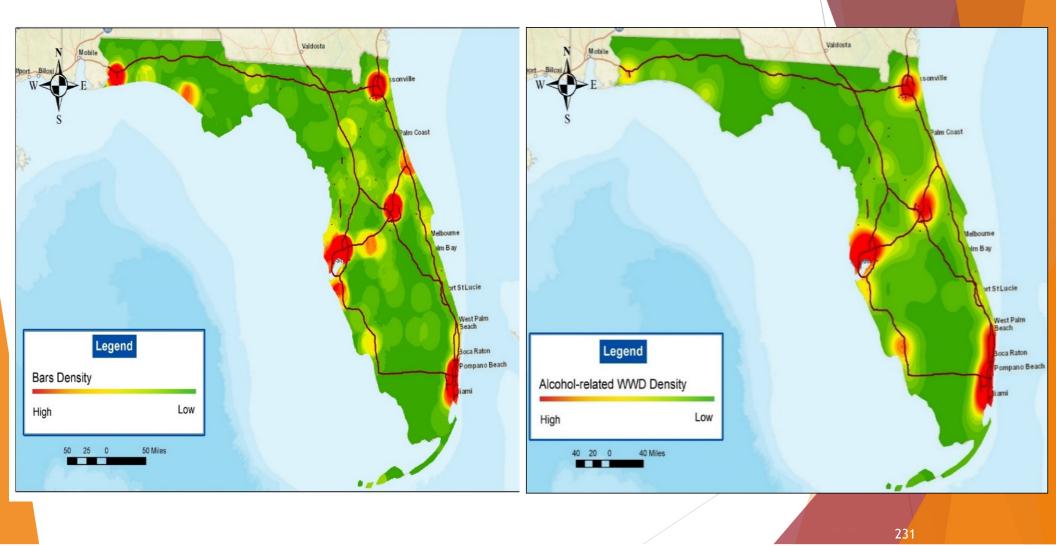
Wrong-Way Driving: Current Situation

WWD Crashes on Freeways
49
66
55
56
55
51
62

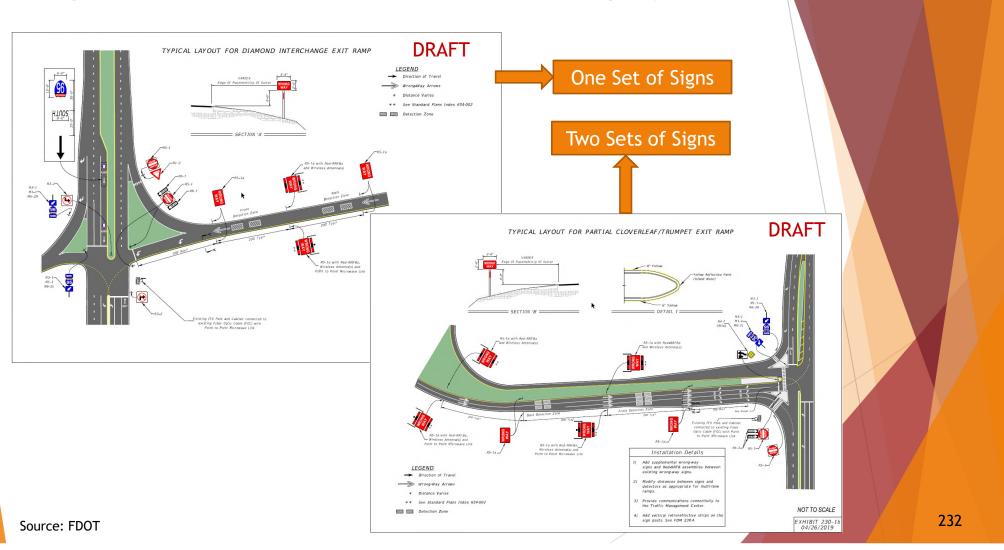


- From 2011 to 2017, <u>394 WWD crashes</u> occurred on freeways resulting in <u>125</u> <u>fatalities and 561 injuries or serious injuries</u>.
- Of these 394 crashes, <u>82 (21%) are fatal</u> and <u>197 (50%) are injury or serious</u> injury crashes.
- Impaired drivers caused 45% of WWD crashes.
- The majority of WWD movements are entering the freeway <u>from an exit ramp</u>. Source: FDOT

WWD-DUI



Proposed Advanced Countermeasure Deployment



Proposed Wrong-Way Driving Countermeasures

- Red Rectangular Rapid Flashing Beacons (Red-RRFBs) (if Interim Approval is granted) -One set of 2 Red-RRFBs
- LED Highlighted Sign (if Red-RRFB Interim Approval is not granted)
- Internally Illuminated Raised Pavement Markers will be deployed, as necessary and at District's discretion.
- Some ramps will require 4 signs due to ramp geometry.

Recommended Countermeasure Type	Cost (\$)
Red-RRFB or LED Highlighted Sign	\$30,000 per ramp







Source: FDOT

WWD Countermeasure: Red-RRFB (District 7)



Source: FDOT

Pedestrian Rectangular Rapid Flashing Beacons

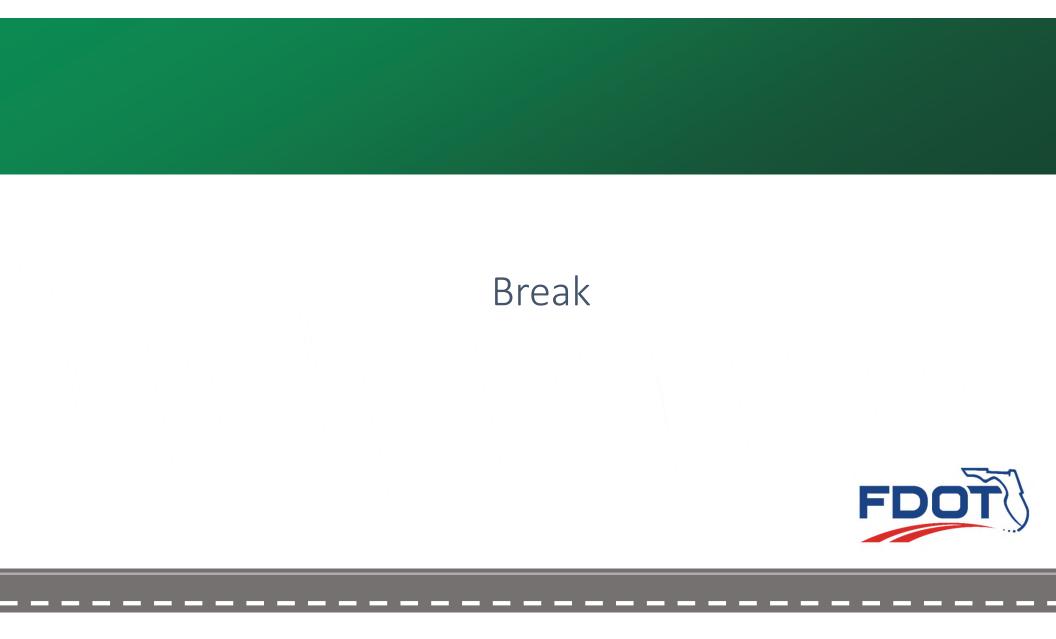


Source: TAPCO (Traffic & Parking Control Co., Inc. via YouTube)

Questions?

Thank you! Raj Ponnaluri, PE, PTOE, PhD, PMP State Connected Vehicle and Arterial Management Engineer

FDOT



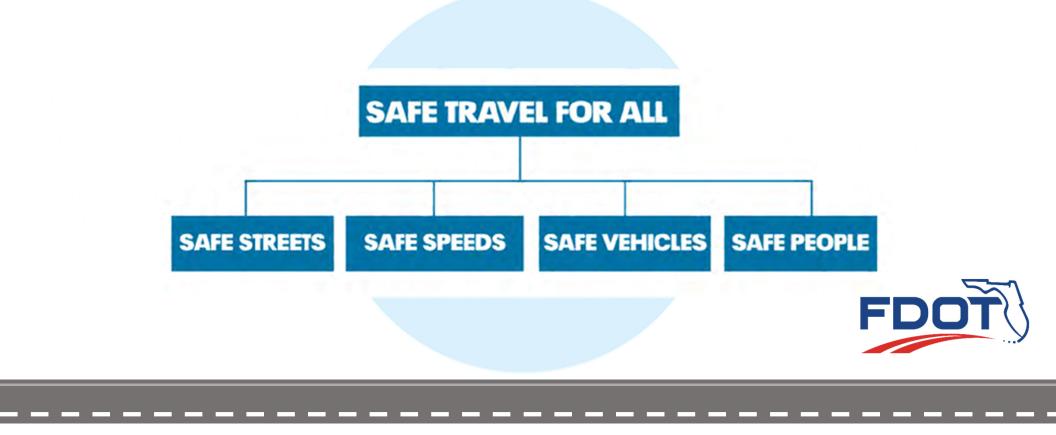
Coordinating Across City, Regional, and State Lines Greg Stuart, Executive Director, Broward MPO



How Do We Get to Zero?







THEMES FROM YESTERDAY

- Funding Speed Management Human Behavior Collaboration Data
 - Leadership Partnerships Technology

Land Use Equity

SAFE SPEEDS

SAFE STREETS

SAFE TRAVEL FOR ALL

SAFE VEHICLES



SAFE PEOPLE

Table Discussions



Identify 3 actionable strategies for the topic your table chose.

What is the timeframe within which these strategies should be implemented?

Who is responsible for implementing these strategies? FDOT

Identify 3 actionable strategies for the topic your table chose.

What is the timeframe within which these strategies should be implemented?

Who is responsible for implementing these strategies **FDOT**

Identify 3 actionable strategies for the topic your table chose.

What is the timeframe within which these strategies should be implemented?

Who is responsible for implementing these strategies? **FDOT**

Report Out



What Actionable Strategies Should We Consider?

When poll is active, respond at **PollEv.com/vzlrv** [] Text **VZLRV** to **22333** once to join

"Table 9- addressing future	freight operations to i	mproving safe str	reets."	"#15-Streets context firs	t!" "Safe	people"
"Table 3 Safe Streets. Make	Safe Streets a focus a	rea of SHSP "	"Table 11 -	Safe People - Adapting w	arrants based o	on context class."
"Table 14 Safe Streets"	"Table 22: Safe spe	eds. Master plan	for all mode	s of transportation "	"People"	"Visual cues"
"Table 19 - Speed: 1)Trees/buffers/visual cues 2)Question the 85th percentile and revision process 3)Speed cameras "						
"#15- Streets: FDM should state it is Guidlnes"		"Table 20 Safe	Streets - Pro	oactively address safety w	vith land use ch	anges"
"Table 8 - Safe Speeds "						
"Educate local chambers of safety plans/programs Tak		irage them to pro	omote safety	/ to local businesses to he	elp facilitate the	e development of

"14-Safe Streets - Challenge F.S to provide greater flexibility for funding on and off the state system, eliminating roadblocks."

"Table 5-Streets"	"Table 2: #SafesSpeed=SafePeople "	"Table 21 - Safe Speeds - Automated Speed Enforcement in selected zones"
-------------------	------------------------------------	--

AICP Certification Maintenance Credits

- Vision Zero Workshop 6.25 credits
- Long-Range Visioning Session 3.5 credits
- AICP members can earn Certification Maintenance (CM) credits for these sessions. More information about AICP's CM program can be found at <u>www.planning.org/cm</u>



Stay Connected www.fdot.gov/safety

Lora Hollingsworth FDOT Chief Safety Officer 850-414-4177 Lora.Hollingsworth@dot.state.fl.us



Notes

• If you took notes today and are willing to share them with us, please email them to planning@dot.state.fl.us



Reinforcing our Commitment to Zero



Notes

• If you took notes today and are willing to share them with us, please email them to planning@dot.state.fl.us



FUTURE OF TRANSPORTATION IN FLORIDAVISION
ZEROLONG-RANGE
VISIONING

May 6, 1 to 5 pm & May 7, 8:30 to 11:30 am

WORKSHOP

May 7, 1 to 5 pm

SESSION

OMNI Jacksonville, FL // More information can be found at www.floridatransportationplan.com/ftpvisioning.htm