

# Broward's Advanced Signal Control System

*Moving forward into the future*

Presented to:  
City of Fort Lauderdale City Commission  
February 20, 2024



Signal system technology is evolving very quickly now, and in many directions...



# Surtax/Mobility Advancement Program (MAP) Programs are also Moving Forward...

- Continuous Refinement and Improvement using Existing Modernized Core Signal System (Non-Adaptive)
- New Adaptive Traffic Signal Control Deployments (ATSC)
- Automated Traffic Signal Performance Measures (ATSPM)
- Video Detection Predictive Maintenance Program
- Transportation Systems Management & Operations (TSM&O) Partnership with FDOT & MPO



## Other MAP Programs Underway...

- Connected Vehicle (CV) System Deployments
- Advanced Bike/Pedestrian Sensor Technology
- Near-Miss Safety Technologies



# So where are we headed with the Signalization Program in the City of Fort Lauderdale?



# Core Objectives for City of Fort Lauderdale:

- Improve travel time, reduce traffic congestion, eliminate unnecessary delay and improve access and mobility through our ongoing signal coordination/retiming program.
- Continuously monitor and improve worst periods of peak season traffic and manage incidents and special events.
- Accelerate deployment of new and emerging technologies such as adaptive signal control and vulnerable user detection.
- Create safer signal systems in support of City's Vision Zero.
- Support bus transit and future rail modes of travel.



# Completed corridor retiming projects Fort Lauderdale Area

## 2020/2021

- Broward Boulevard from US 1/Federal Highway to I-95
- Broward Boulevard from I-95 to SR 7/US 441
- NE/SE 3 Avenue from Flagler Drive to SE 7 Street
- Andrews Ave from N 6 Street to S 7 Street
- Oakland Park Boulevard from SR 7/US 441 to Middle River Drive

## 2022/2023

- Commercial Boulevard from SR 7/US 441 to US 1/ Federal Highway
- Federal Highway/US 1 from NE 13 Street to Oakland Park Boulevard
- SE 17 Street from Eisenhower Boulevard to US 1/Federal Highway
- Sunrise Boulevard from I-95 to US 1/Searstown
- SR 84 from SW 15 Avenue to Andrews Avenue
- US 1 from NE 13 Street to Commercial Boulevard



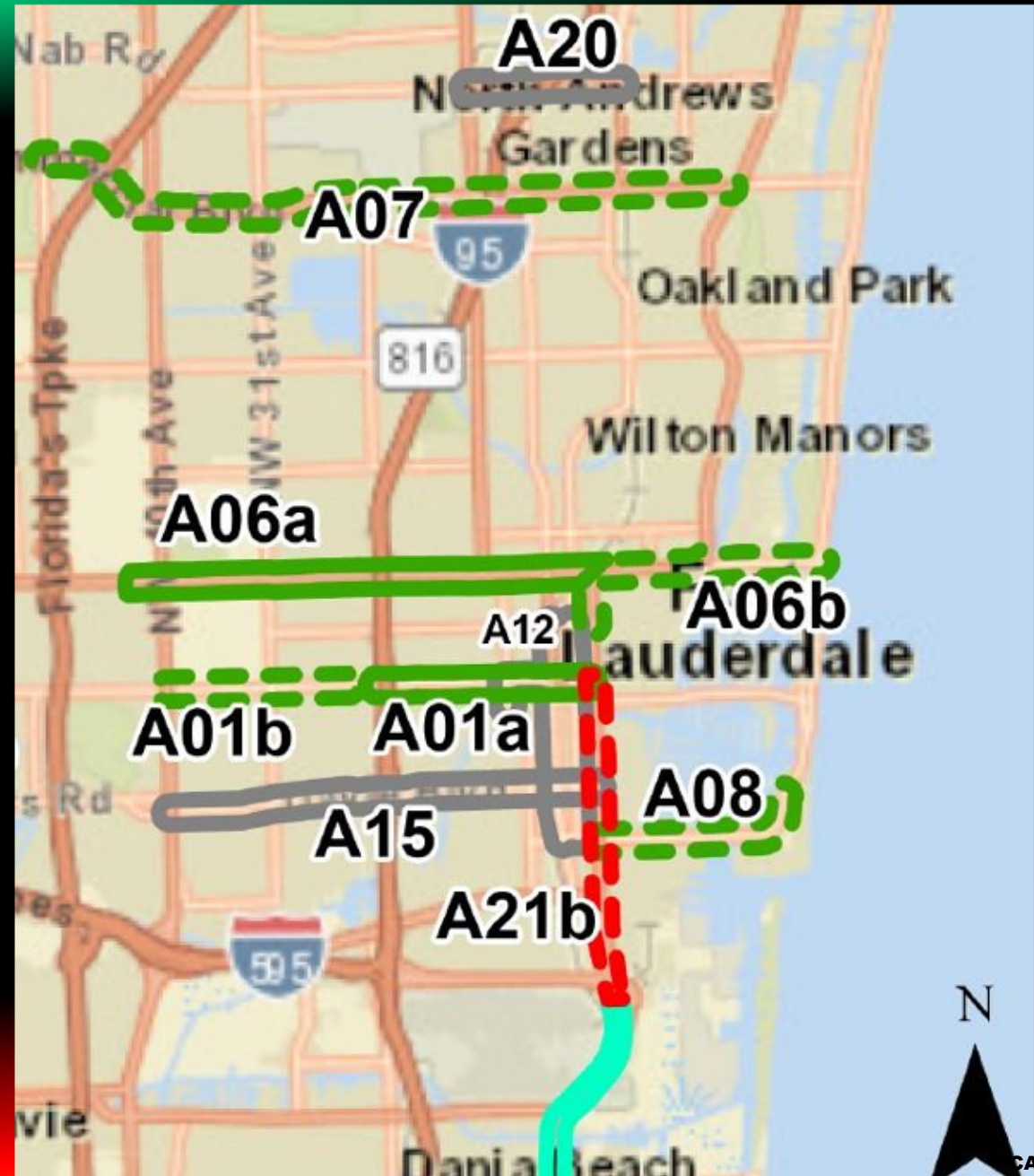
# Corridor retiming projects planned for 2024 Fort Lauderdale Area

- SR A1A from Mayan Drive to Sunrise Boulevard
- US 1 from Davie Boulevard to US 1/Searstown
- Powerline Road from Sunrise Boulevard to Commercial Boulevard
- Broward Boulevard from US 1/SE 8 Avenue to SR 7/US 441
- Cypress Creek/NE 62 Street from Dixie Highway to NW 31 Avenue

# Adaptive Traffic Signal Control (ATSC) Projects “Smart Signals”

City of Fort Lauderdale Area

Surtax-Funded  
Adaptive Traffic Signal  
Control Projects (11 Projects)





# Smart Corridor Selection

## Fort Lauderdale Area Traffic Congestion Intensity & Duration Heat Map (December 2017)

30-Days of Continuous Real-Time Connected Vehicle Data Served as the Basis for Surtax Adaptive Corridor Selection





## Fort Lauderdale Area Adaptive Projects (Programmed 2023 thru 2026):

- **A21b** US-1: Griffin Road to Broward Boulevard\*
- A01b Broward Blvd: SR-7 to West 24 Avenue
- A06b Sunrise Blvd: North Flagler Drive to State Rd A1A
- **A08** SE 17 Street: US-1 to Holiday Drive\*
- A01a Broward Blvd: West 22 Avenue to Southeast 8 Avenue
- A06a Sunrise Blvd: SR-7 to North Flagler Drive
- A07 Commercial Blvd: Rock Island Road to US-1

\*Supports Port Everglades Bypass Congestion-Reduction

## Fort Lauderdale Area Adaptive Projects (Scheduled beyond 2026):

- A12            After 2026            Fort Lauderdale Downtown (24+ intersections)
- A15            After 2026            Davie Blvd: SR-7 to US-1
- A20            After 2026            Cypress Creek Rd: Powerline to Dixie
- A21a           After 2026            US-1: Pembroke Road to Griffin Road

**11 Adaptive Projects Total = \$43.6 Million Surtax Investment**

# Why Adaptive Signal Control?

- Continuously analyzes and redistributes green time in a more “equitable” fashion based on real-time intersection arrivals.
- More responsive to dramatic fluctuations in traffic conditions.
- Improves travel time predictability and reliability.
- More effective in flushing out queues and restarting normal traffic flow resulting from railroad crossings, drawbridge openings, incidents, and special events.



# Broward's First Two Adaptive Control Systems:

ATCS	Synchro Green	InSync	Surtrac
2070 ATC Compatible	✓	✓	✓
TSP Capable	✓	✓	✓
Pedestrian Priority	✓		
Trafficware ATMS.now Compatible	✓	✓	✓
Grid System Capable			✓
Closed Loop Capable	✓	✓	✓
Central Network Preferred/Required	✓		
Central System Control	✓	✓	
Ethernet Networks Preferred	✓	✓	✓

- **InSync.** First adaptive system deployed in Broward: Pines Blvd @ I-75 vicinity; operates as an independent sub-system without needing centralized control.
- **Synchro Green.** Adaptive platform that can be cointegrated directly with existing countywide system and uses same communications protocol; will comprise most of future adaptive deployments.

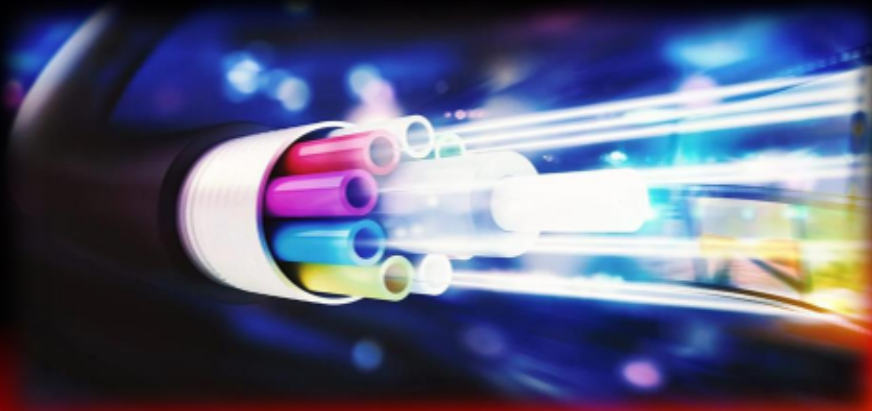
# Broward's First Adaptive Signal System (InSync) Pines Boulevard from Dykes Road to Flamingo Road Performance Improvement:

- Travel time ~ **10%** average reduction
- Vehicle delay ~ **22%** average reduction

These are relatively high degrees of performance improvement and should not be expected of all adaptive deployments. This segment of Pines Boulevard is well-suited for the linear nature of the deployed ATSC, but adaptive systems may face greater challenges in denser, downtown grid networks.

# County-FDOT Integrated Fiber Network

- Both agencies continue to install fiber along major arterials to support advanced traffic signal control systems and intelligent transportation system (ITS) devices, and to leverage state and federal funds.
- Fiber will be included in all adaptive signal control projects as part of Surtax/Mobility Advancement Program (22 adaptive segments in MAP program, 11 projects serving the Fort Lauderdale area).





# Active Arterial Traffic Management

- Fiber will also support expansion of FDOT Active Arterial Management Program (AMP) already operational on several FDOT corridors within the City, coordinated closely with County signal timing staff.
- County, FDOT & MPO collaborating on a unified active arterial management program and seeking technology grant opportunities (example – SMART Grant)



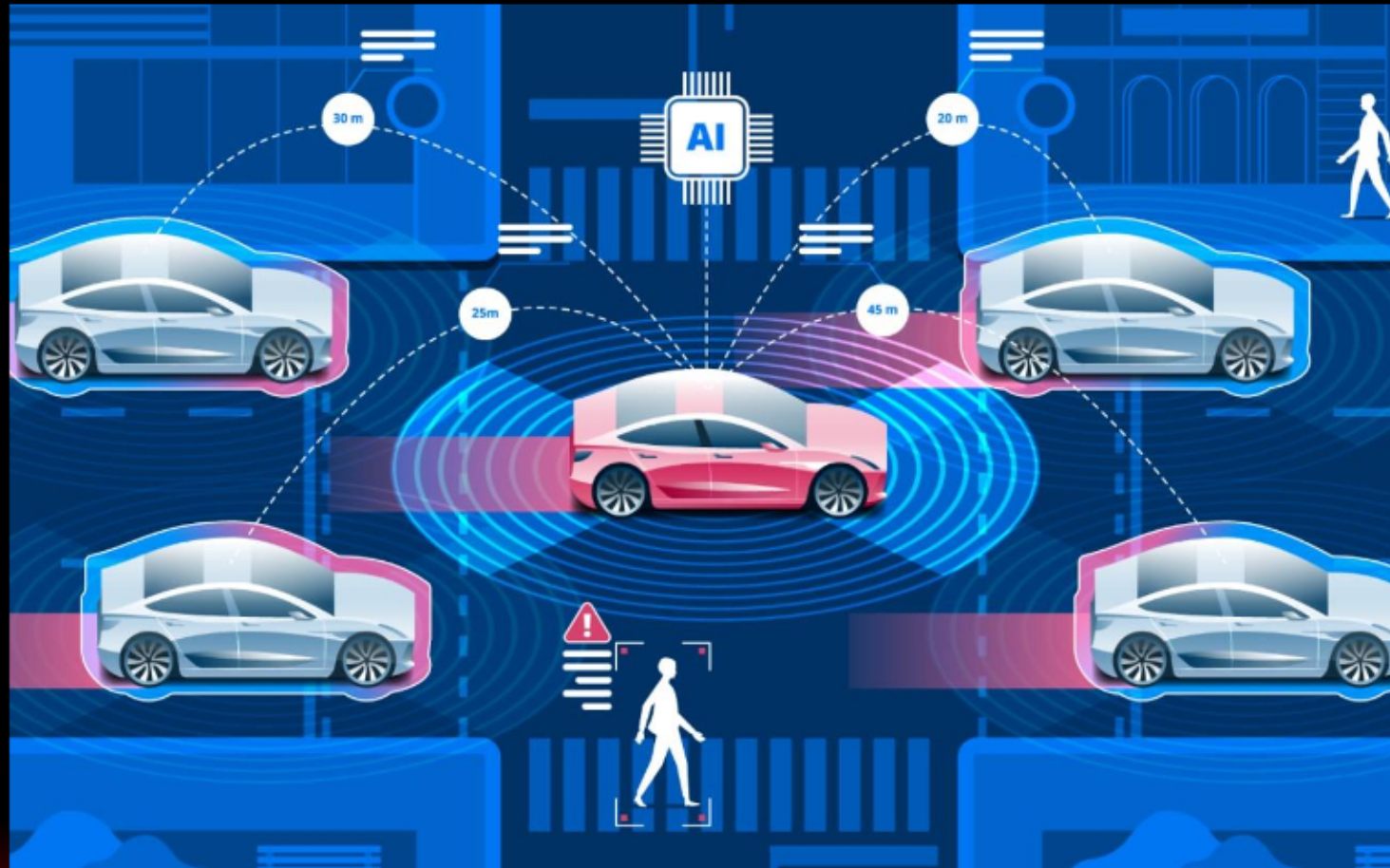


# Special Events and Incident Management

- FDOT AMP and County signal timing engineers work closely in developing special signal timing plans for planned special events and working in real-time to mitigate emergency incidents.
- Both agencies are working together on emergency “flush plans” for potential future downtown flooding events (April 2023).



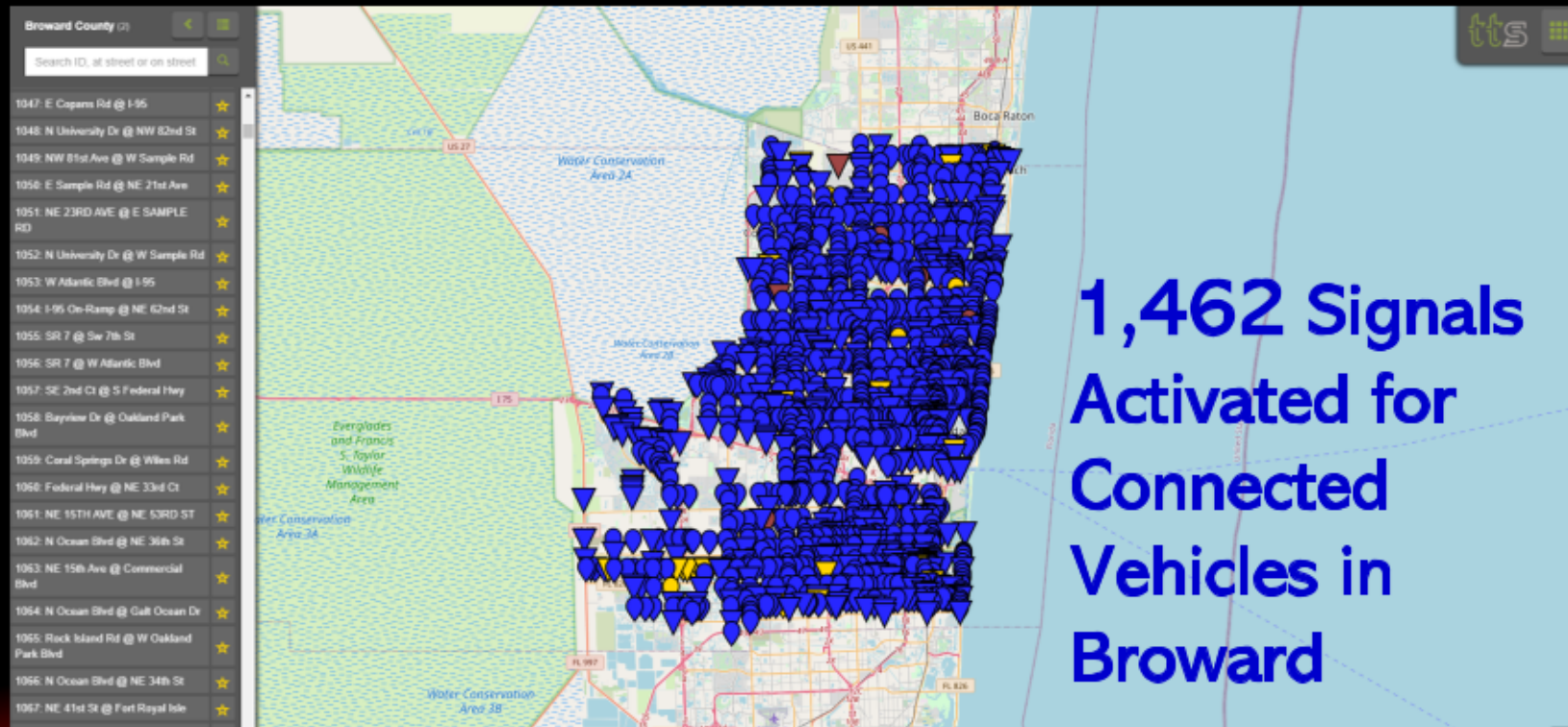
# Connected Vehicles (CV's) Driven by Artificial Intelligence (AI)





# Ongoing Connected Vehicle Industry Partnership

- During the summer of 2020, Broward County upgraded its existing ATMS.now countywide platform to allow real-time signal data to be accessible by third parties.



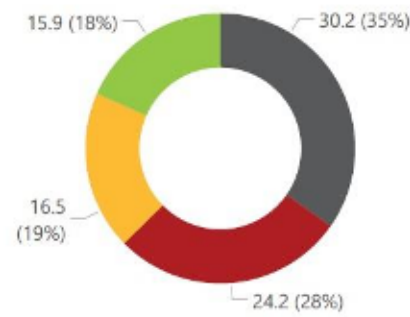


# Connected Vehicle Metrics Help Improve Signal Operations and Mobility within the City

We now can receive signal performance metrics from 10,000's of vehicles...

Data is used to diagnose signal performance and make proactive improvements.

Total Delay (Hours) by Peak



Peak Period ● Other ● Evening ... ● Midday ... ● Mornin...

Average Veh Delay

14.0

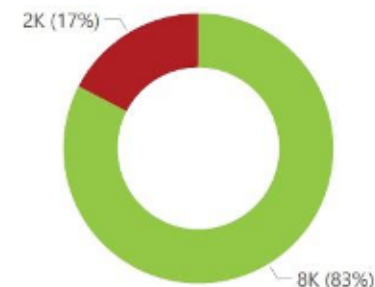
Total Delay (Hours)

86.8

Total Crossings

22.6K

Arrivals



Arrival State ● Green ● Yellow/Red

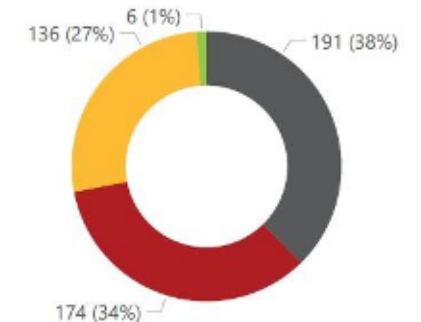
Red Arrival Rate

17.4%

Arrival Crossings

9490

Split Failures by Peak



Peak Period ● Other ● Evening ... ● Midday ... ● Mornin...

Split Failure Rate

2.2%

Total Split Failures

507

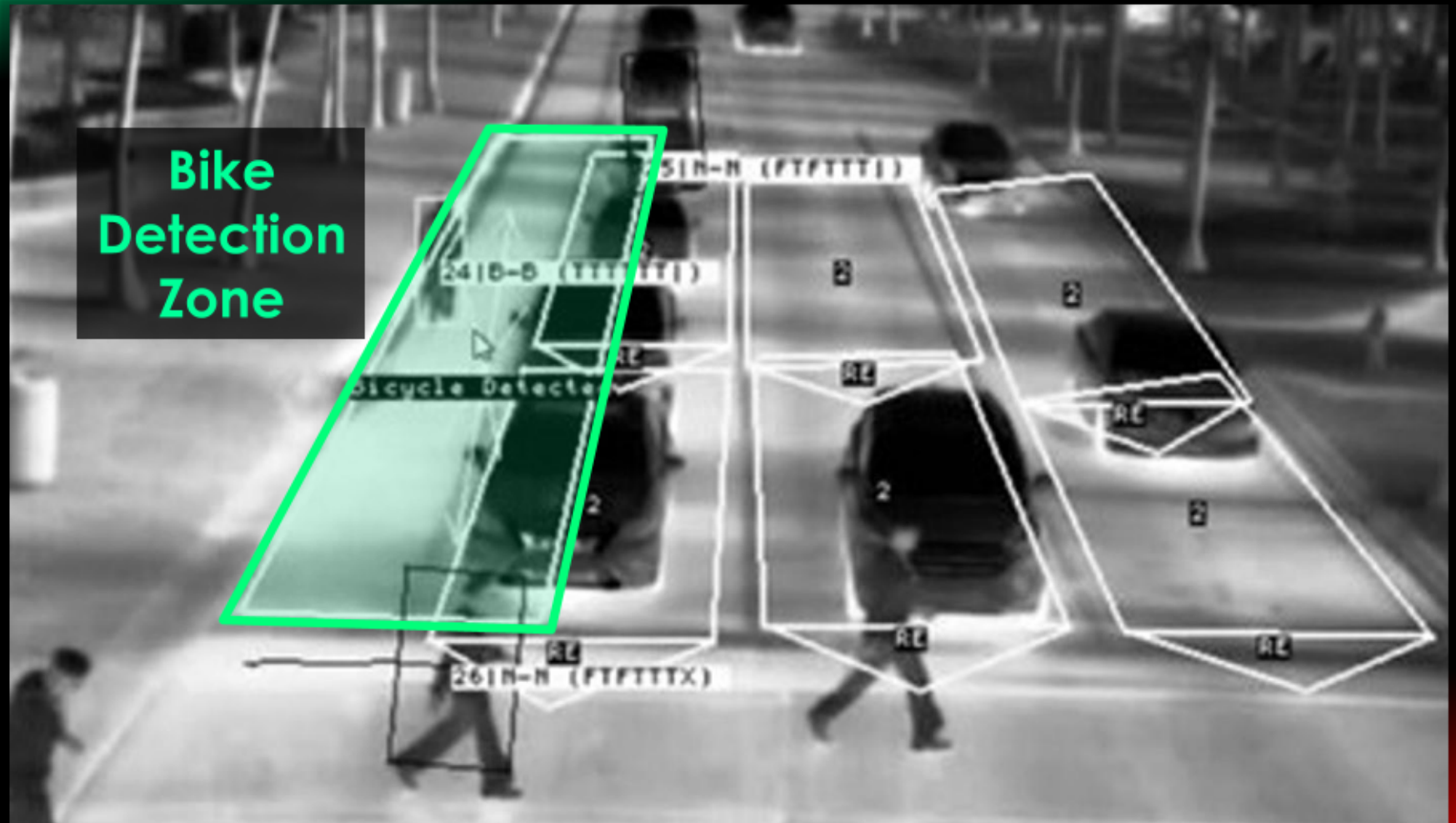
# Advanced Intersection Sensor Deployment in Support of City's Vision Zero

As an enhancement to advanced bike detection systems, the County (with FDOT) is installing intersection detection systems (optical, thermal and future LIDAR) that can also detect pedestrian activity in addition to bicycles, vehicles and other users.



Las Olas  
Boulevard at  
SR-A1A  
(Northbound  
Approach)

Showing Bike  
Detection  
Zone



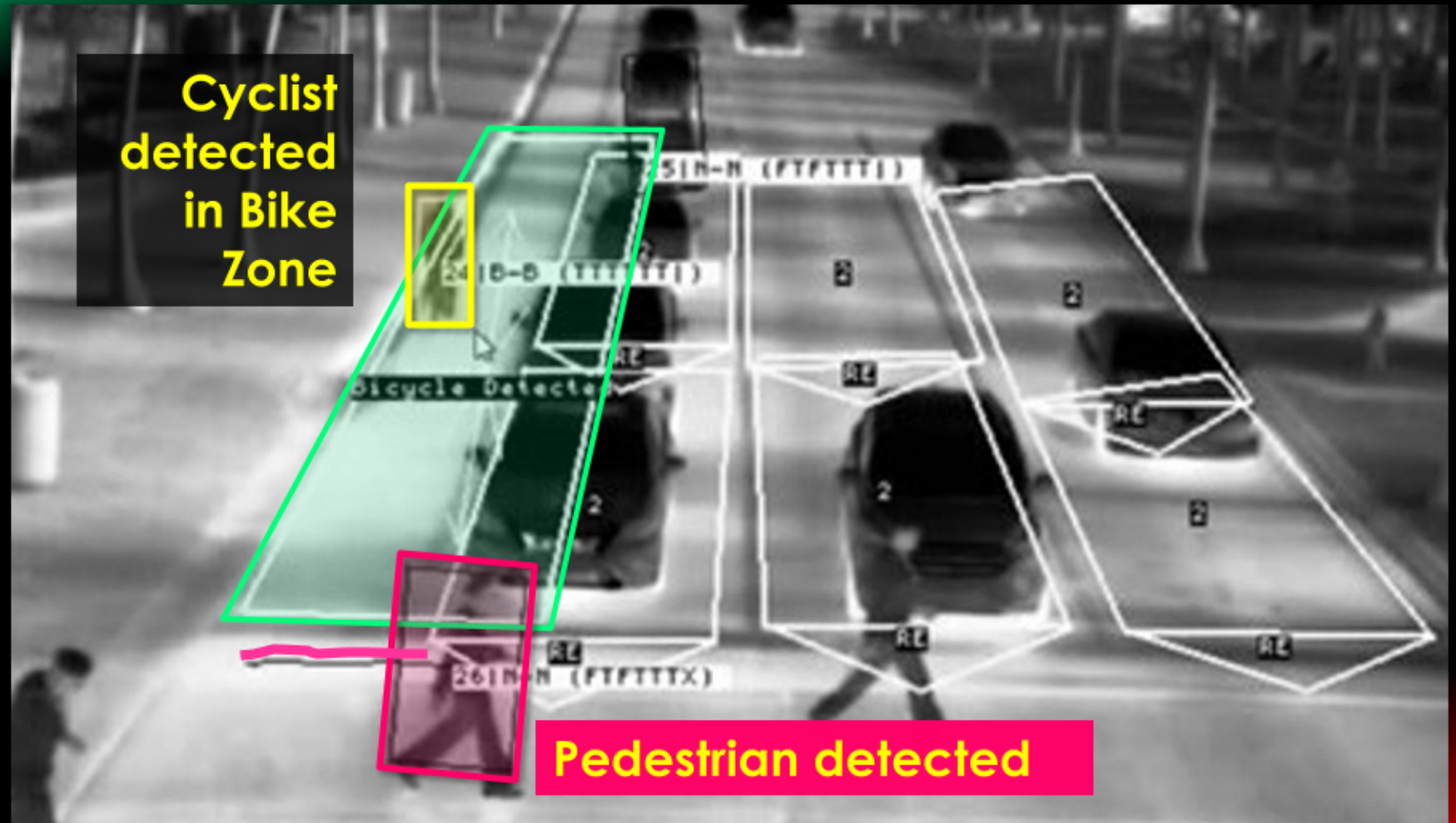
Trafisense2 technology (Teledyne FLIR):



# Advanced Thermal Sensor Technology

Las Olas  
Boulevard at  
SR-A1A  
(Northbound  
Approach)

Showing  
Multiple Users  
being  
Detected



Trafisense2 technology (Teledyne FLIR):

# True Bicycle Signalization on the Horizon

County staff is partnering with FDOT and MPO in selecting locations to deploy the sensor technology to provide special bike phasing and/or monitor pedestrian activity. The four (4) initial pilot locations are:

1. Sunrise Boulevard and Bayview Drive
2. Las Olas Boulevard and SR-A1A
3. Commercial Boulevard and SR-A1A
4. Wilton Drive and Northeast 21 Court



# Near-Miss Identification Safety Pilot Study (Partnership with University of Florida)



Artificial Intelligence (AI) algorithms will process video images captured from fisheye cameras along Stirling Rd to identify near-miss incidents.

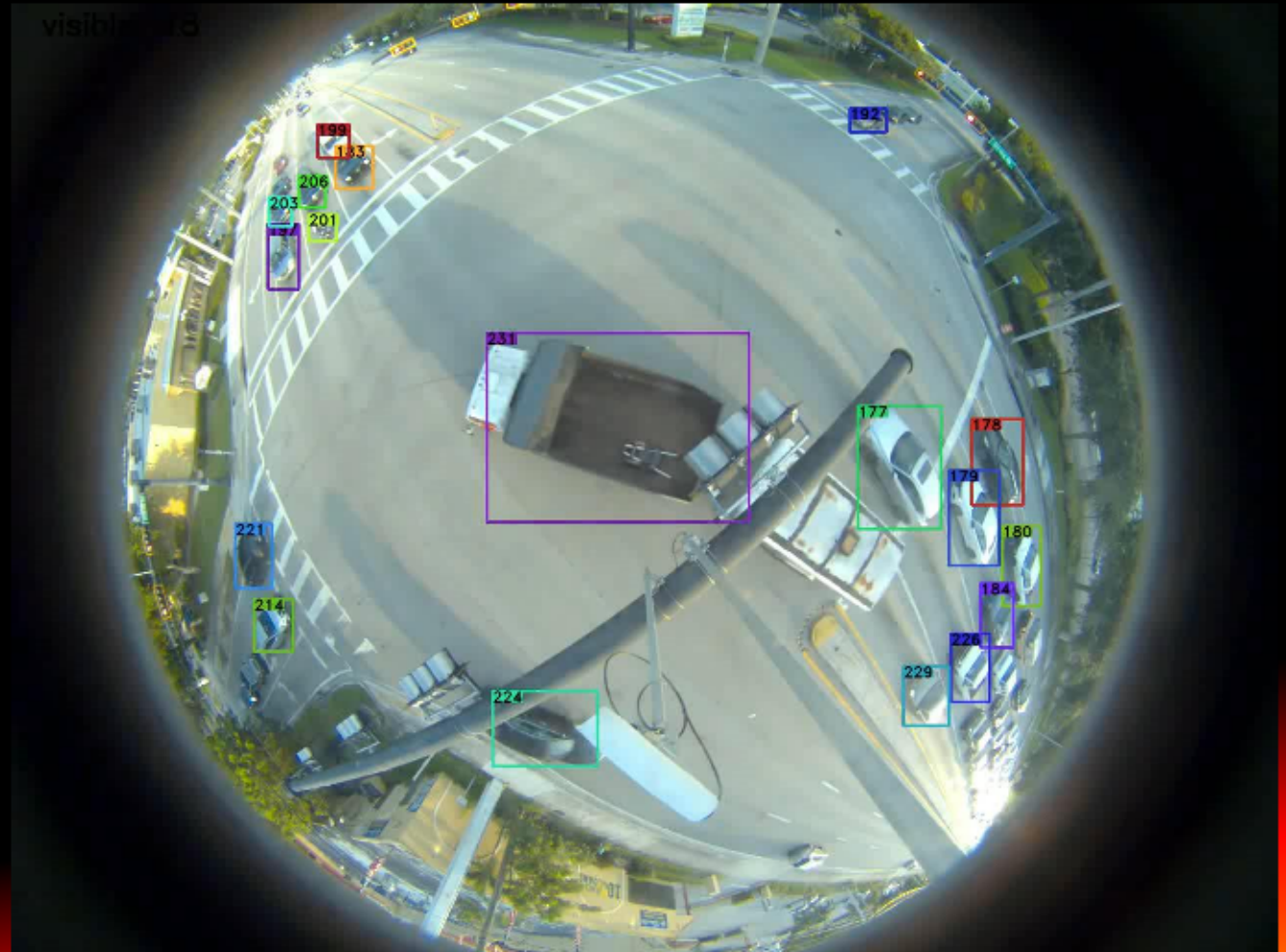


# Pedestrian-to-Vehicle (P2V) Near Miss

Location: Stirling Road and N 68th Avenue

Data: Collected in August 2023

Recorded Near-Miss: left-turning (protected) vehicles with opposing through vehicle



## In Summary, County Staff is Committed to the City of Fort Lauderdale to:

- Continue to implement best practices and achieve continuous improvement and efficiency of the signal network.
- Continue to evaluate, invest, and accelerate the installation of new and emerging signal system technologies.
- Create a safer transportation system in support of Vision Zero.
- Continue to collaborate with the City of Fort Lauderdale, FDOT and the MPO on funding opportunities to enhance mobility and safety throughout the area.
- Continue to coordinate with City staff on special events and emergency planning.





Thank you!  
**QUESTIONS?**

