

**PALM BEACH COUNTY  
BOARD OF COUNTY COMMISSIONERS**

**WORKSHOP SUMMARY**

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**Meeting Date:** April 25, 2023

**Department:** Engineering & Public Works

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**I. EXECUTIVE BRIEF**

**Title:** Discussion of the Palm Beach County (County) Advanced Traffic Management System (ATMS), state of the industry, as well as, ongoing and future efforts.

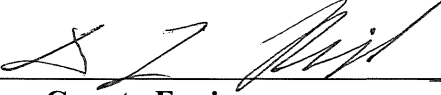
**SUMMARY:** During the December 20, 2022 Public Hearing, as part of the discussion of the County's Five Year Road Program agenda item, staff was directed to return at a future date to give a more complete outline of the County's approach to traffic management. This item before the Board provides an overview of the current County ATMS, state of the industry, as well as, ongoing and future efforts by staff. Countywide (YBH)


**Background and Policy Issues:** The County's current ATMS was deployed in 2002/2003 as a complete package provided by Cubic ITS, Inc. (formerly Naztec, Inc.) including field hardware, firmware and central control software. The system continues to be among the most widely deployed systems in the State with over 40 agencies currently utilizing it. On a national scale, the system is deployed at approximately 60,000 traffic signals, which amounts to 20% of the total number of traffic signals nationwide.

The County, in partnership with the Florida Department of Transportation (FDOT), has led the way regionally from maximizing the use of its current system, deployment and assessment of various detection devices and adaptive traffic signal control systems, to building a robust fiber optic traffic signal communication network. The FDOT/County Active Arterial Management Program, which focuses on addressing unforeseen incidents using the latest technology and real-time staff intervention, is a highly successful program and has been expanded accordingly. To best position the County for the future, staff has identified several emerging technologies and potential expansions of ongoing projects that will be presented and discussed at the workshop.

Attachment:

1. PowerPoint – Advanced Traffic Management System
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**Recommended By:**  4/11/2023  
County Engineer Date

**Approved By:**  4/20/23  
Assistant County Administrator Date

**II. FISCAL IMPACT ANALYSIS**

**A. Five Year Summary of Fiscal Impact:**

Fiscal Years	2023	2024	2025	2026	2027
Capital Expenditures	-0-	-0-	-0-	-0-	-0-
Operating Costs	-0-	-0-	-0-	-0-	-0-
External Revenues	-0-	-0-	-0-	-0-	-0-
Program Income (County)	-0-	-0-	-0-	-0-	-0-
In-Kind Match (County)	-0-	-0-	-0-	-0-	-0-
<b>NET FISCAL IMPACT</b>	-0-	-0-	-0-	-0-	-0-
# ADDITIONAL FTE					
<b>POSITIONS (Cumulative)</b>	-0-	-0-	-0-	-0-	-0-

Is Item Included in Current Budget? Yes  No

Does this item include the use of federal funds? Yes  No


Budget Account No:

Fund                      Dept                      Unit                      Object

**Recommended Sources of Funds/Summary of Fiscal Impact:**


\*\*\*\*This item has no fiscal impact .Fiscal impact is indeterminable at this time.

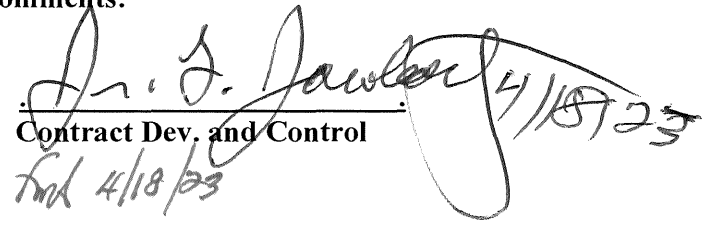
**C. Departmental Fiscal Review:**

  
\_\_\_\_\_

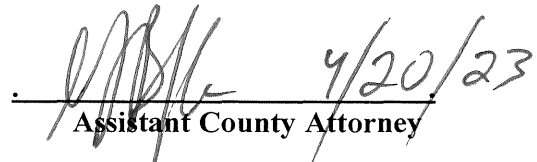
**III. REVIEW COMMENTS**

**A. OFMB Fiscal and/or Contract Dev. and Control Comments:**

  
MG 4/17      OFMB 9/4/17

  
Contract Dev. and Control  
Fnd 4/18/23


**B. Approved as to Form and Legal Sufficiency:**

  
Assistant County Attorney

**C. Other Department Review:**

\_\_\_\_\_  
Department Director

This summary is not to be used as a basis for payment.



# Palm Beach County Advanced Traffic Management System (ATMS)

ONGOING & FUTURE EFFORTS; STATE OF THE INDUSTRY

## Palm Beach County Board of County Commissioners

April 25, 2023 Workshop

# Overview

- ▶ PBC's Current Traffic Signal System
- ▶ Other Leading Available Systems
- ▶ Traffic-Adaptive Signal Systems
- ▶ Key Ongoing Efforts

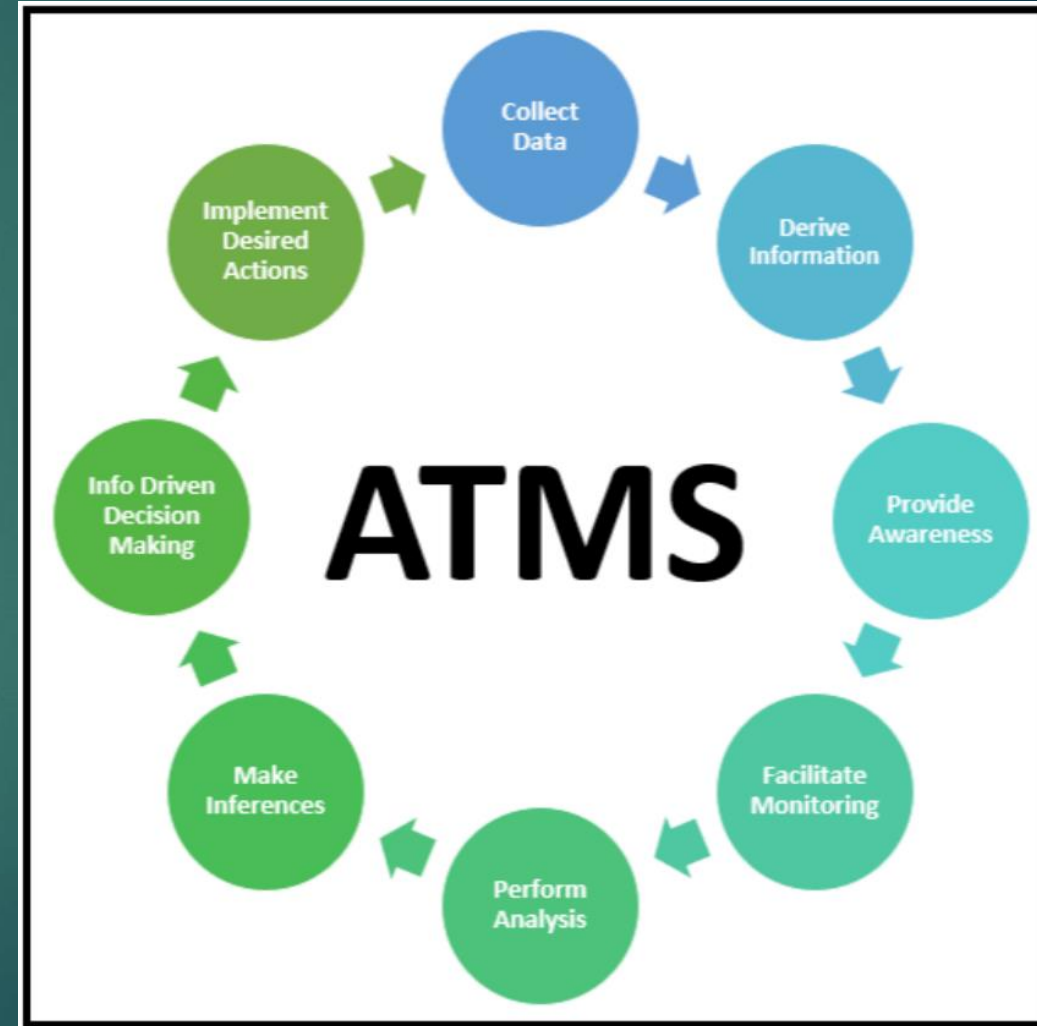
# PBC's Current Traffic Signal System

- ▶ Cubic ITS, Inc.: central software and hardware at ~1,100 traffic signals
- ▶ Deployed in PBC back in 2002/2003; routine systematic upgrades since then
- ▶ Deployed at approx. 60,000 traffic signals nationwide
- ▶ Utilized by 40+ signal maintaining agencies in FL



# PBC's Current Traffic Signal System, Cont'd

- ▶ Core functionality is comparable to leading industry offerings
- ▶ Primary Components:
  - Central Server & command software/database
  - Real-time second-by-second data/alarms
- Supported / Supplemented by
  - Ethernet communication over extensive 480-mile fiber optic network.
  - Over 180 CCTV monitoring system
  - Video / radar / loop detection system











# PBC's Current Traffic Signal System, Cont'd

- ▶ Core system architecture is ~20 years old
- ▶ Routine system updates; latest update in 2021
- ▶ Vendor working on full revamp of central system with a tentative 2024 release
  - Enhanced interface and level of information
  - Improved reporting and dashboards
  - Maximizes the potential for advanced traffic controllers (new PBC standard moving forward)

# Leading Industry Offerings – Deployments in Largest FL Agencies

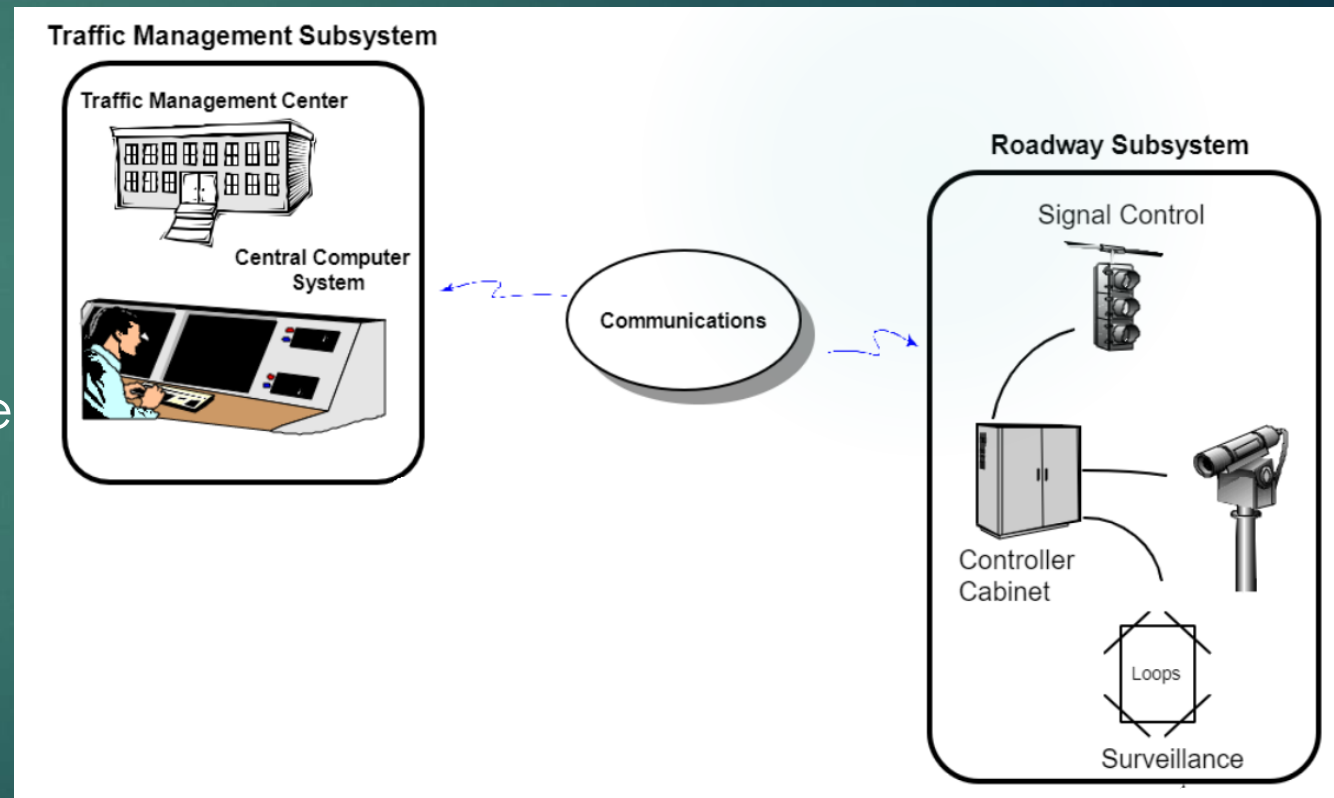
→ Approximate number of traffic signals nationwide = 300,000

System	Nationwide Deployments (total # of traffic signals)	PBC	Broward County	Miami-Dade County	Orange County	Hillsborough County	Pinellas County
Cubic ITS	60,000						
Q-Free/ Intelight	50,000						
Econolite/ Centracs	57,000						
Yunex	Data Unavailable						



# Traffic Signal System Replacement is Extensive and Costly

- ▶ Industry is heavily proprietary
  - A system replacement requires full migration to include field controllers/hardware, firmware and central software as these components are not interchangeable/interoperable among vendors
- ▶ Cost per intersection average = \$10K - \$20K
  - **(Total of \$11M – \$22M for PBC)**



# Types of Traffic Signal Operation

## Fixed Time

- No detection
- Pre-timed: movements receive pre-determined green times regardless of demand
- Coordination: time-of-day plans

## Actuated

- Relies on Detection
- Coordination: time-of-day plans

## Adaptive

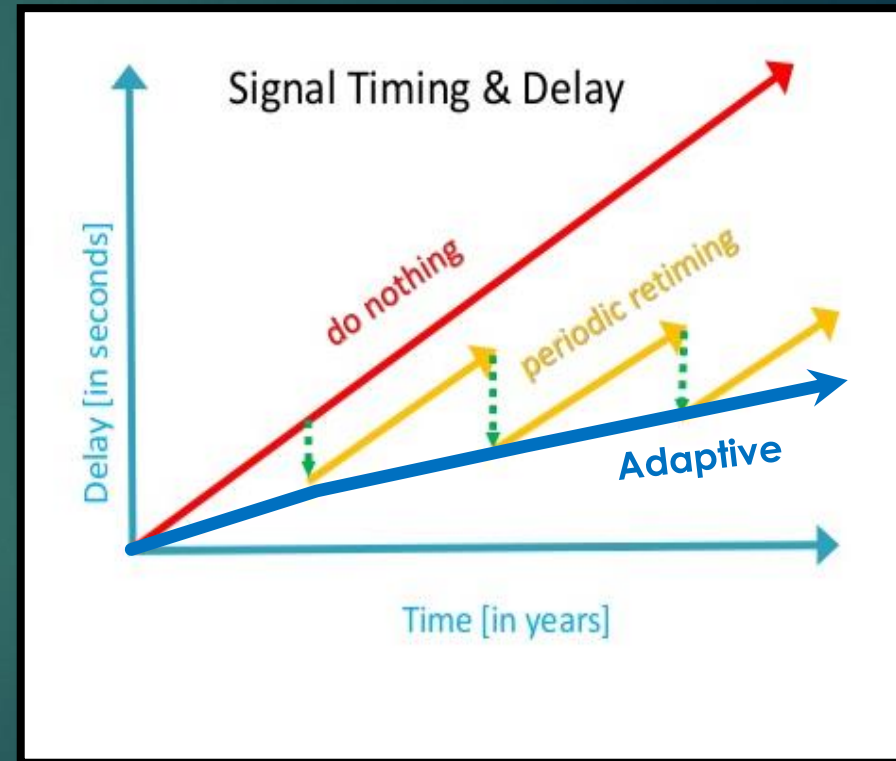
- Relies on extensive detection to measure delay and demand
- Algorithms optimize signal timing in Real-Time
- No added benefit for saturated conditions

### ▶ Applies to *All Types of Operation*:

- Predictable traffic patterns = historical data-dependent signal timing
- Unforeseen events are best handled by adjusting signal timing in real-time along key roadway segments as adaptive systems' detection does not address the roadway network holistically.
- Peak period signal timing essentially runs similar to pre-timed/fixed time

# Traffic-Adaptive Signal Control Systems

- ▶ Optional module of the core signal system, or as a standalone external system
- ▶ Relies on added vehicle detection, communication and optimization algorithms to continuously measure traffic demand and delay; optimizes signal timing in real-time
- ▶ Could help address unforeseen demand fluctuations and off-peak operations; **however, it cannot overcome over-capacity/constrained roadways**
- ▶ Not plug-and-play systems as advertised/marketed



*Adaptive Traffic Control's Intended Goal*

# Traffic-Adaptive Signal Control Systems, Cont'd

## ▶ Types of Systems:

- **Module** within proprietary central traffic signal system (SynchroGreen, SCOOT, MaxAdapt, Centrac Adaptive)
- **Standalone** system, distributed or central: InSync, NoTraffic, SCATS, Rhodes, ACS-Lite)

## ▶ FDOT & PBC deployed one of the Standalone systems between 2015 and 2020 on the following 4 corridors with poor results due to significant reliability and maintenance concerns:

- ❖ Okeechobee Blvd, Tamarind Ave – Flagler Dr
- ❖ Northlake Blvd, Military Tr – US 1
- ❖ PGA Blvd, Ave of Champions – US 1
- ❖ Glades Rd, Lyons Rd – Jog Rd

Other signal maintaining agencies in the state had similar experiences.

▶ Avg. Cost Per Intersection Range: **\$20K – \$80K**

→ **(Total of \$4M – \$16M for PBC assume 200 intersections)**

# Investments at Regional Agencies

## Broward County Mobility Advancement Program/Penny for Transportation

- \$30M traffic signal system fiber optic deployment
- \$57M adaptive traffic control systems
- \$1.3M vehicle video detection systems

## Miami-Dade County ATMS Project

- \$150M full replacement of outdated traffic signal system
- Includes field hardware, central software, detection and adaptive traffic control system

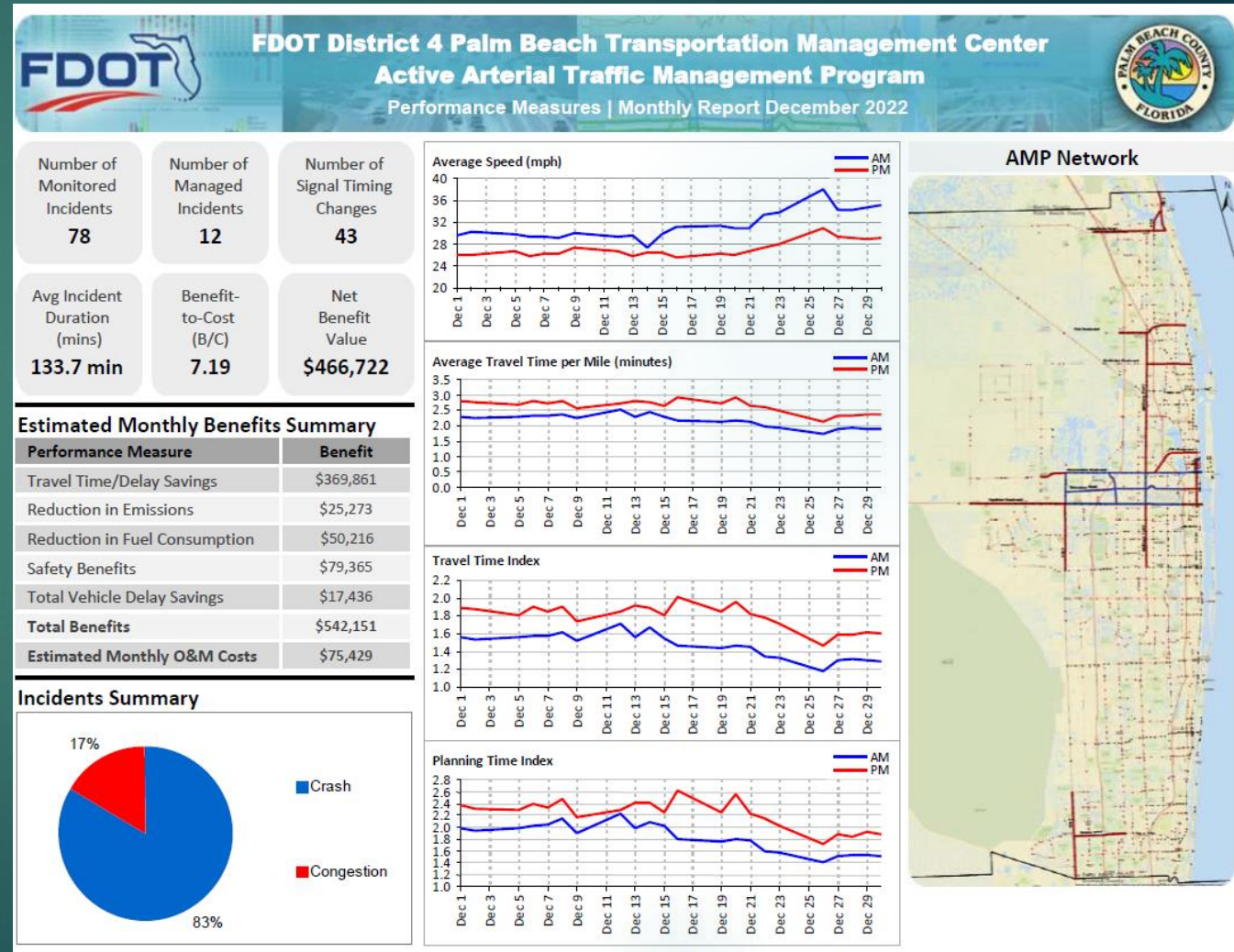
# PBC Traffic Signal Management: Key Ongoing and Future Efforts

- ▶ Arterial Management Program
- ▶ Traffic Management Center (TMC) Upgrade/Update
- ▶ Transit Signal Priority (TSP) and Emergency Signal Pre-emption (ESP)
- ▶ New Vehicle Detection Reliability Testing/Evaluation
- ▶ FDOT SR-710 Project – Test Bed for Emerging Technologies.
- ▶ Deployment of the Flashing Yellow Arrow (FYA) signal for right turn – following the deployment of the FYA for left turn.



# Active Arterial Management Program

- ▶ Started in 2012 through a partnership with FDOT
- ▶ A multi-layered approach leveraging available technology tools and human real-time intervention to address unforeseen events
- ▶ Proactive and performance-based program to improve travel time reliability
- ▶ Successfully expanded in 2019



# Vehicle Detection Reliability/Testing

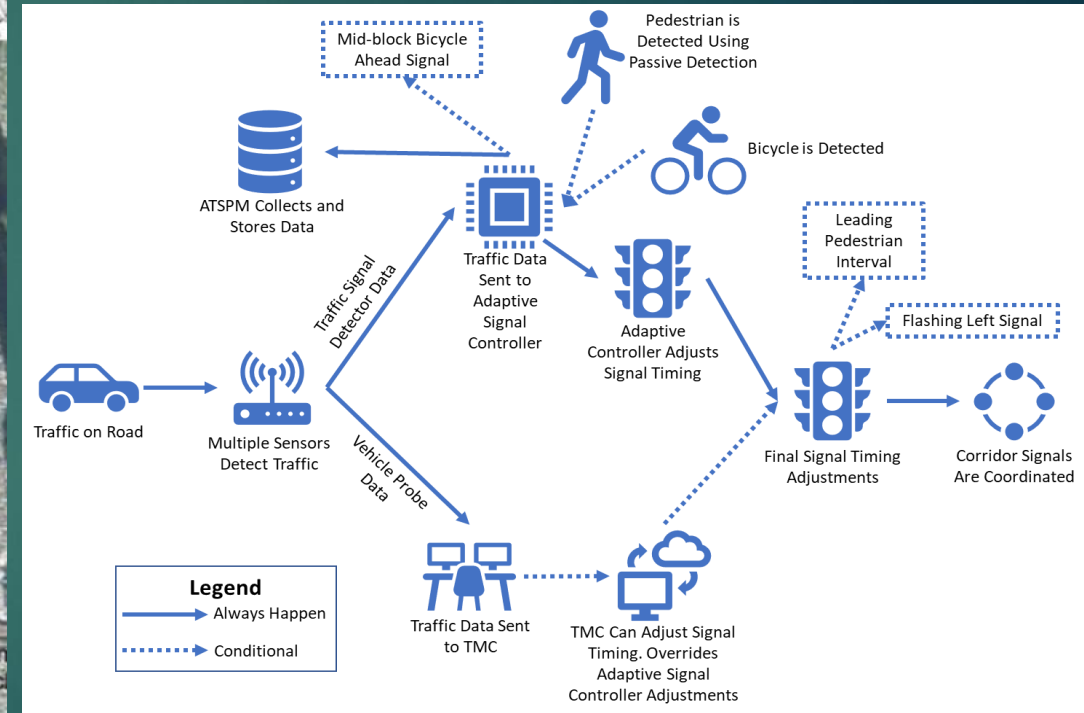
- ▶ Vehicle detection is a highly essential and primary component that serves as the “eyes” for a traffic signal and provides optimal operation
- ▶ PBC has deployed alternate vehicle detection devices at approximately 300 intersections (video detection systems, radar detection systems) to replace traditional inductive loop detectors
- ▶ Issues: reliability, short life cycle and high cost

→ ***PBC is looking to test and validate emerging detection systems over the next couple of years in order to make informed decisions regarding future investments (NoTraffic, Bosch, ITS+, Iteris)***





# FDOT SR-710 Project: A Test Bed For Emerging Technologies



Source: FDOT ConOps

# FDOT SR-710 Project:

## A Test Bed For Emerging Technologies, Cont'd

### Phase I (FY24 Construction)

- Adaptive Traffic Control System;
- Passive pedestrian detection;
- Bicycle detection/warning systems;
- Automated Traffic Signal Performance Metrics;
- Advanced Traffic Signal Controllers

### Future Phases (II & III)

- Connected Vehicle (**CV**) applications including *red light violation warning*, *dynamic red light extension*, *active pedestrian crossing warning*

# Emerging Technologies – Examples

## *Glance TravelSafely Application: Connected Vehicles*



GLANCE  
TRAVELSAFELY

### **Traffic Signal Alert Applications**

- Signal Phase and Timing Information (SPaT)
- Red Light Running Warning

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Powered by Applied Information Glance Smart City Supervisory System





# Emerging Technologies – Examples, Cont'd

## *University of Florida: Near-Miss Detection Systems*





Questions?