

FDOT Active Arterial Management (AAM) Program

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DISTRICT 4 ARTERIAL MANAGEMENT SYSTEMS ENGINEER

FDOT TRAFFIC OPERATIONS



Transportation System Management and Operation (TSM&O)

TSM&O is a program based on measuring **performance**, **actively managing the multimodal transportation network**, and delivering **positive safety & mobility** outcomes to the traveling public.

TSM&O practices involve “**taking back**” the capacity lost to congestion, incidents, construction, weather, and traffic control delay.



TSM&O Systems

Freeway Management System

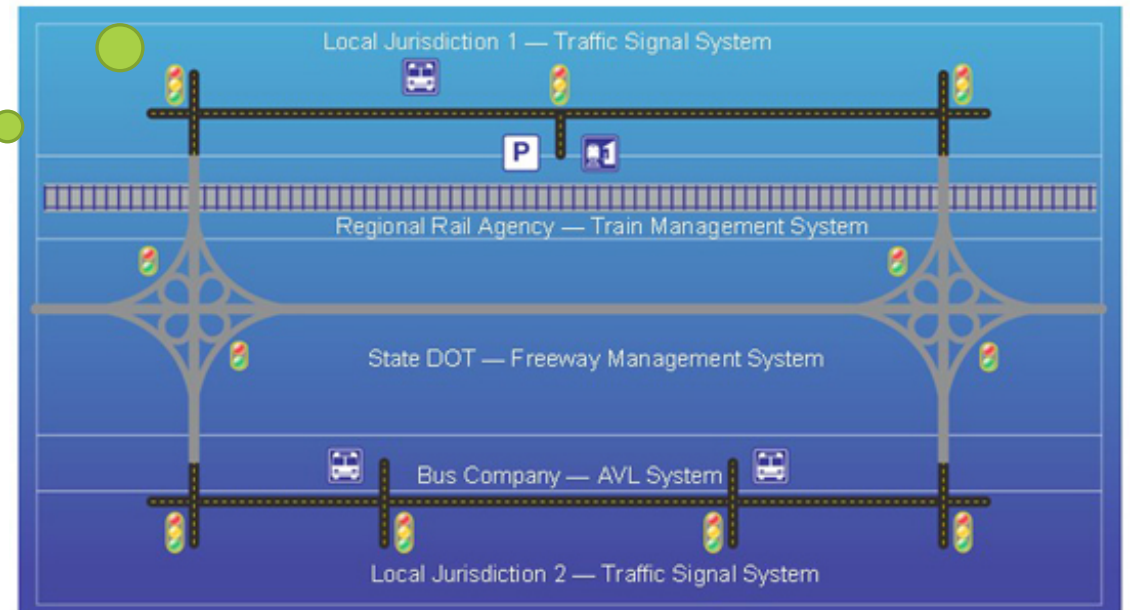
- Incident management
- Traveler information
- Managed lanes
- Ramp Signals
- ITS devices

Arterial Management System

- Active Arterial Management
- TSP
- Queue Jump
- Pedestrian and Bicycle features
- Traveler Information
- Dynamic Signal Retiming
- Adaptive Traffic Control
- ATMS devices

Rail Systems

Goal: Transportation system is managed as an integrated system



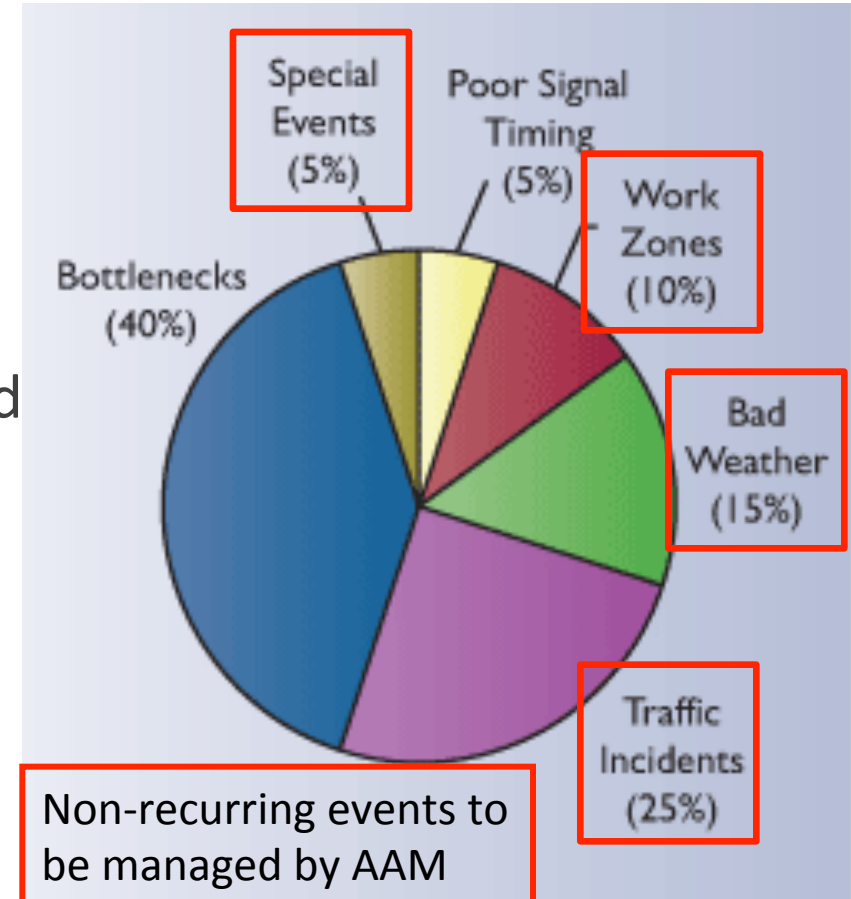
Active Arterial Management (AAM)

Passive management

- TOD signal plans
- Unconditional Transit Signal Priority

Active Arterial Management (AAM)

- Real time congestion management for all modes
- Conditional Transit Signal Priority



Sources of Congestion (FHWA)

How does AAM work?

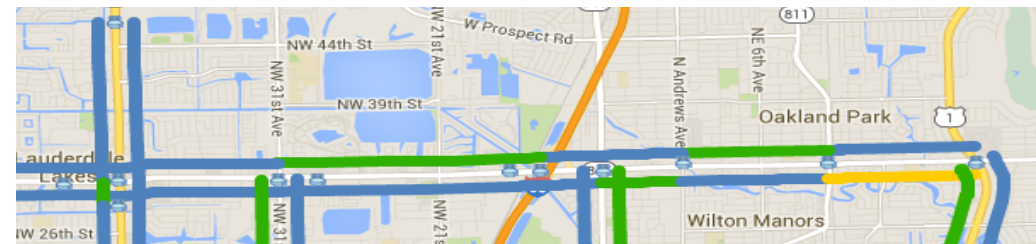
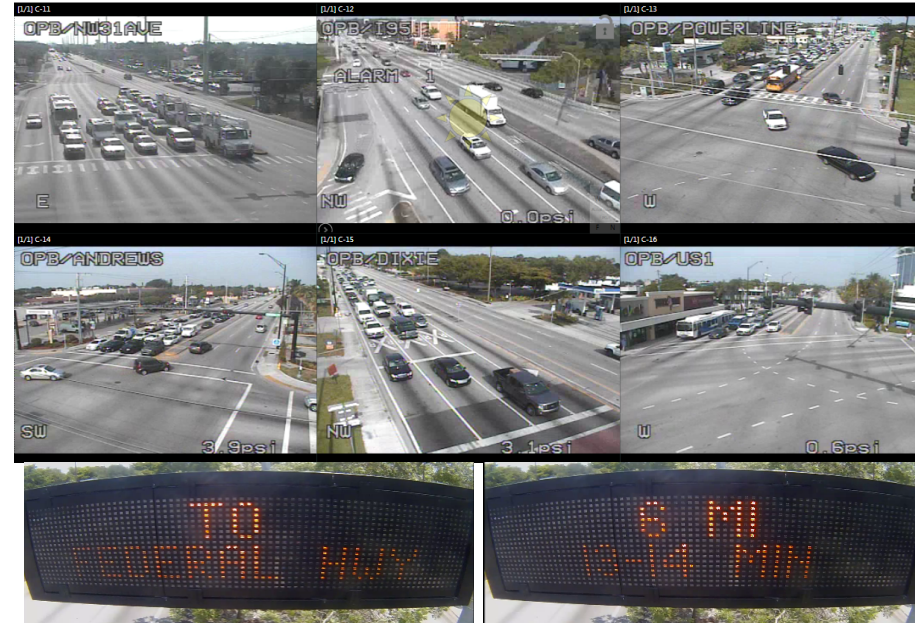
Monitor the transportation system in real time

Detect the causes of congestion

Coordinate with the operating agencies to respond to the causes of congestion (proactively if possible)

- Coordinate with signal operating agencies for signal retiming changes
- Coordinate with law enforcement and emergency responders to reduce incident response time
- Disseminate traveler information for better decision making

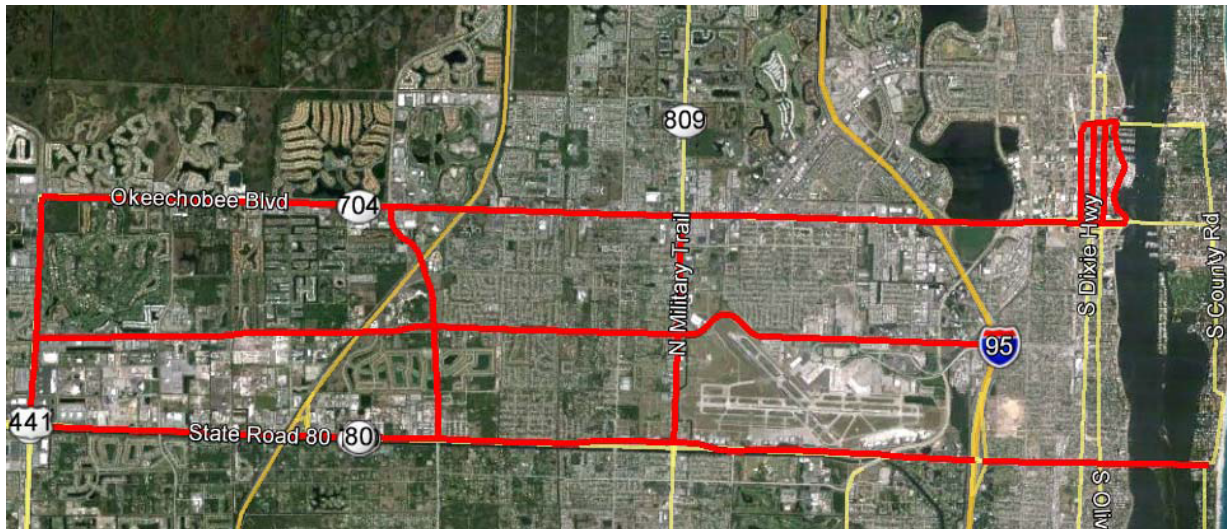
Evaluate and report benefits of AAM



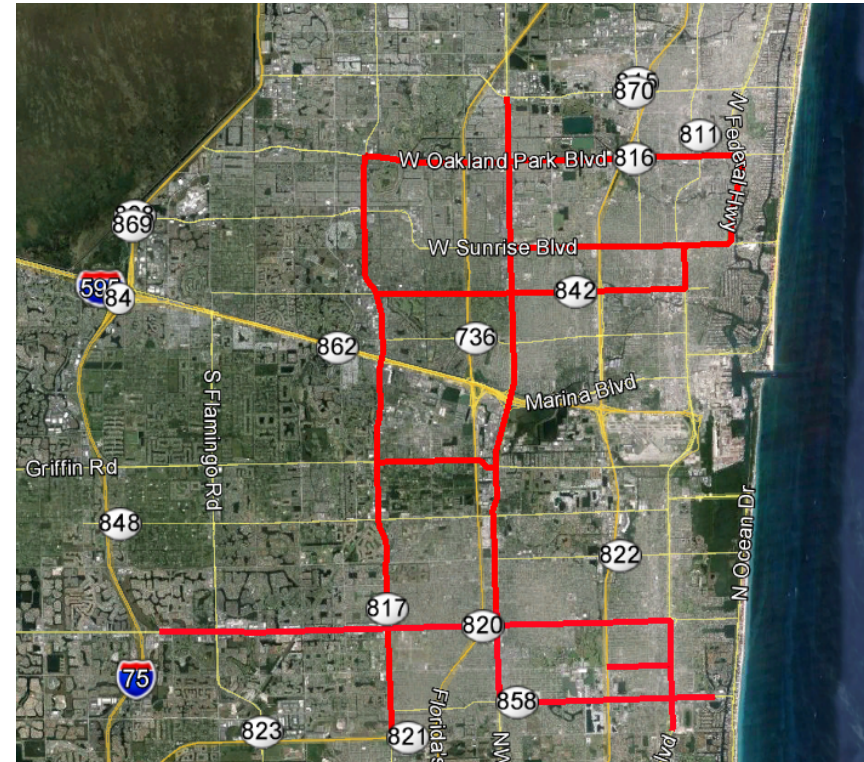
Where is AAM being applied today?

IN DISTRICT 4:

PALM BEACH COUNTY AAM NETWORK



BROWARD COUNTY AAM NETWORK



Regional Climate Action Plan

“The transportation sector contributes 45 percent of the region’s greenhouse gas emissions...”

“GOAL: Reduce greenhouse gas emissions by planning, designing, and prioritizing walkable, affordable communities supported by sustainable multimodal transportation options.”

- Taken from RCAP, pg. 18

Regional Climate Action Plan

SP-19 Focus transportation investments and service expansions on projects and strategies contributing to greenhouse gas emissions reductions and enhancing resilience to climate change.

a. Continue to enhance and implement regionally coordinated transportation planning through the Regional Long Range Transportation Plan (RLRTP). Identify goals and objectives in the RLRTP which, as they are attained, reinforce the desired achievement of greenhouse gas emissions reductions and enhanced resilience to climate change. Articulate the supportive role of these goals and objectives for emissions reductions and climate resilience.

b. Give higher investment priority to and advocate for state and federal transportation infrastructure investments, programs and services that will reduce greenhouse gas emissions and enhance resilience and adaptability to climate change. **Performance standards for climate and related metrics, such as reduced VMT and increased mode split, should be incorporated in transportation plans and programs.** Transportation planning should include performance measures¹ in major decision-making phases such as land use visioning, long range transportation plans, corridor studies, programming, environmental review, and performance monitoring.

c. Incorporate evaluation criteria and processes to prioritize projects that meet RLRTP goals and objectives — into local and regional planning and programming processes — **with an initial emphasis on evaluation criteria that reduce VMT and increase use of transportation modes other than the personal vehicle.** Projects that enhance economic vitality should also be given priority, such as projects and service expansions along transit-oriented corridors and those that improve connections to major airports and seaports.

d. Prioritize studies funded through existing programs and other sources addressing effective climate adaptation and mitigation strategies, particularly those addressing barriers to adaptation and assisting in integrating land use and transportation planning.

e. Improve coordination among economic development, land-use/housing, transportation and water resource planning activities. Review local and regional planning and decision making processes to ensure a complementary approach toward developing and maintaining a transportation network, including for purposes of reducing VMT and providing more transportation choices.

Regional Climate Action Plan

SP-28 Continue to implement strategies aimed at maximizing the efficiency of the existing transportation network by all agencies across the region. Many of these strategies also result in greenhouse gas emissions reductions. There is a need for a toolbox of successful strategies that can be duplicated across the region. Agencies should make an effort to collect information that will allow for evaluation of the effectiveness of a strategy in reducing greenhouse gas emissions. Information collected by implementing agencies should include emissions reductions, fuel reductions, VMT impacts, or other performance measures as appropriate. Information collected should also include steps for implementation, costs, and lessons learned. Among the strategies to consider are use of roundabouts, **real time operation of the traffic signal system, traffic signal prioritization and queue jumps for transit, interstate ramp metering, and employment of a virtual freight network (freight network managed in real time using intelligent transportation systems).**

Where we stand now:

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SP-28 Continue to implement strategies aimed at maximizing the efficiency of the existing transportation network by all agencies across the region.

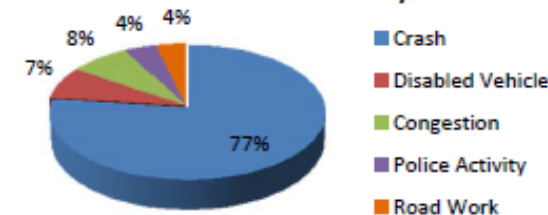


Number of Monitored Incidents	Number of Managed Incidents	Number of Signal Timing Changes	Average Incident Duration (Min.)	Benefit-to-Cost (B/C)	Net Benefit Value
91	26	206	47.93	5.09	\$245,147

Estimated Monthly Benefits Summary

Performance Measure	Benefit
Travel Time/Delay Savings	\$190,719
Reduction in Emissions	\$13,165
Reduction in Fuel Consumption	\$29,838
Safety Benefits	\$71,425
Total Benefits	\$305,147
Estimate Monthly O&M Costs	\$60,000

Incidents Summary



ITS Device Summary (County Maintained)

Device Type	Number of Devices
Online Traffic Signals (expressed as the percentage of total signals)	78%
Signal System Health	> 95%
Incident Management CCTV Cameras	130
Online Intersections with Video Detection System	66
Sensys Detection (no. of Intersections)	3
BlueTOAD Devices	26
Fiber Optic System (approx. no. of miles)	530
Opticom Devices	1

How do we improve? Focus on reducing delay, for all users by expanding AAM coverage – more arterials, more modes covered.

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Reduction in Fuel Consumption (in gallons) =

$$\boxed{\text{(Delay Savings in veh - hrs)}} \times \left(\frac{\text{Measured Average Speed during congestion in mph}}{\text{}} \right) \times \text{(Fuel Consumption in gal/mile)}$$

Speed (mph)	Fuel Consumption (Gallon/VMT)
5	0.144
10	0.091
15	0.073
20	0.064
25	0.059
30	0.056
35	0.053
40	0.051

“Benefits Analysis for the Georgia Department of Transportation NaviGator Program” – Final Report (2006)
http://www.ops.fhwa.dot.gov/travelinfo/gdotbenefit/gdotfinalreport_0806.pdf

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Reduction in Emissions = $\text{Delay savings (in veh-hrs)} * \text{Emissions (in tons/hour)} * \text{Dollar Value}$

Pollutant Name	Consumption (ton/hr)	Dollar Value
HC	25.676 / 10 ⁶	\$1,774 per ton
NOx	338.69 / 10 ⁶	\$3,731 per ton
CO	36.064 / 10 ⁶	\$3,889 per ton

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Manage the systems together to share resources, share data while implementing strategies that maximize throughput and minimize VMT through AAM.

- invest in expansion of the Advanced Management Systems
- increase the management of facilities to address the causes of congestion
- Share real time schedule adherence, headway, passenger count information
- Make delay reduction decisions that target mass transit mobility
- Requires investments to integrate Transportation Management Centers (BCT, BCTED, Palm Tran, PBC Vista Center, etc.)
- Additional Operations staff to monitor network performance and program improvements.
- Maintenance resources will be needed to maintain these systems

Challenge– With agencies already dealing with lean budgets, how do we accomplish our RCAP goals? How do we hold ourselves accountable?

Open Discussion

With agencies already dealing with lean budgets, how do we accomplish our RCAP goals? How do we hold ourselves accountable?

- “what gets measured, gets improved”

How do we balance the needs of the ped/bike users and motoring public on the arterials?

- Pedestrians need longer green times to cross the street. The “waiting traffic” is delayed impacting fuel consumption and emissions.
- Can we establish mobility targets for all users that balances our mobility , safety, emissions and fuel consumption goals? Perhaps these targets are different by facility and/or even time of day?

How do we incorporate these details into the MPO priorities and LRTPs?

- RTTAC TSM&O Subcommittee was just formed