



TSM&O CONSORTIUM MEETING SUMMARY

Meeting Date: January 12, 2017 (Thursday) **Time:** 10:00 AM – 12:00 PM

Subject: TSM&O Consortium Meeting

Meeting Location: FDOT's Orlando Office
133 S. Semoran Blvd., Orlando, FL
Lake Apopka B Conference Room

I. OVERVIEW

The purpose of this recurring meeting summary is to provide an opportunity for District Five FDOT staff and regional agency partners to collaborate on the state of the TSM&O Program in District Five and ongoing efforts.

II. DISTRICT FIVE TSM&O IMPLEMENTATION PLAN

Melissa Gross presented slides on topics relating to the TSM&O Implementation Plan. She noted that the current draft of the Implementation Plan will be made available to Consortium attendees through the District Five website. Melissa asked that any feedback be emailed to David Williams at DWilliams@VHB.com or Jeremy Dilmore at Jeremy.Dilmore@dot.state.fl.us.¹

- Purpose of the Implementation Plan
 - Creates the framework for the District Five TSM&O Program
 - Specific to District Five
 - The TSM&O Guidebook is a more generalized, “best practices” document for use nationwide
 - The TSM&O Guidebook focuses primarily on the Business Process dimension of how we develop projects, and some connections with the other dimensions
 - Inclusive of all six Capability Maturity Framework dimensions
 - Further expanded to include goals and objectives, as well as task action items, for each dimension
 - Applicable to all projects
 - Applicable to all functional units
- Audience of the Document
 - All agencies and their functional units responsible for planning, maintaining, and operating the transportation network in Central Florida
 - Includes Leadership, Planning, Design, Right-of-Way, Construction, Traffic Operations, and ITS

¹Please note that the Implementation Plan is still in the draft process. The District is making the document available to its regional partners to receive their valued input, as outlined in the document's *Preface*. It is not a finished product. Not all content has been included in this iteration, but will be further implemented upon gaining consensus regarding the general purpose and structure of the document. Similarly, please disregard any grammar or spelling errors within the document, as they will be removed prior to the adoption of the Implementation Plan.

- 2014 CMF Review
 - This was a self-assessment between District Five and partner agencies identifying where each agency scored within each of the six dimensions (see next page)

CAPABILITY MATURITY SELF-ASSESSMENT

Dimension	Level Score (out of 4)	Agency / Type
Business Processes	1.5	Consensus
Systems and Technology	1.0	Transit
	1.5	Other
Performance Measurement	1.0	Consensus: Arterials
	2.0	Consensus: Freeways
Culture	1.5	MPOs, FDOT, Transit Counties
	1.0	
Organization and Staffing	2.0	FDOT
	3.0	MetroPlan
	1.0	MPOs & Counties
Collaboration	2.0	Consensus

- Question: Why was MetroPlan ranked higher than other regional agencies regarding Organization & Staffing in the CMF self-assessment?
 - MetroPlan has made progress in staffing TSM&O-related positions and in the organization of TSM&O processes
- Goals & Objectives – Melissa presented goals and objectives for each of the six dimensions as outlined in the draft Implementation Plan. The goals are discussed below.
 - Six Dimensions:
 - Business Process – *Target Capability Level 3.0*
 - Gain consensus on a regional approach regarding TSM&O project identification process / system-wide evaluation procedure
 - Integration of TSM&O program into regional jurisdictions, to include various transportation planning documents (LRTPs, Master Plans, etc.)
 - Consensus on standardized and documented TSM&O project development life cycle
 - Development of programming/budgeting processes for TSM&O
 - Culture – *Target Capability Level 3.0*
 - Achieve leadership/management and public official buy-in
 - Achieve regional stakeholder buy-in
 - Establish wide public visibility and understanding of TSM&O and its benefits
 - Shifting focus from capacity improvements to operating existing facilities more efficiently
 - Organization/Staffing – *Target Capability Level 4.0*

- Establish TSM&O-specific organizational concept within/among jurisdiction outlining core capacity/personnel needs
 - Establish resource-sharing (personnel and infrastructure) mechanism within the region
- Establish a TSM&O program organizational chart for the District which includes direct access between TSM&O management and top leadership
- Collaboration – *Target Capability Level 3.0*
 - Establish a relationship within the District between leadership, TSM&O management, and the various functional units
 - Identify appropriate job specifications, certifications, and training for core positions
 - Establish regular communication and collaboration between the District and regional/local agencies
 - Identify opportunities to share communication infrastructure between the District and local agencies
- Systems & Technology – *Target Capability Level 3.0*
 - Develop and document regional con-ops and architectures; employ appropriate procurement process
 - Manage ITS assets and infrastructure proactively
 - Standardize and document systems and technology
 - Incorporate new technologies effectively
- Performance Measures – *Target Capability Level 3.0*
 - Identify TSM&O performance measures
 - Utilize TSM&O performance measures for objective-based program improvements
 - Utilize TSM&O performance measures to enhance District Five roadway operating conditions
- DISCUSSION & Q/A
 - FDOT is committed to advancing the TSM&O program
 - The Implementation Plan will be a living document
 - There are different target capability levels for the different measures. Who is going to determine where the various agencies are at with regard to capability level and performance measures?
 - The University of Maryland developed guidelines on the target levels, but this is a self-assessment.
 - Complete Streets is a concept that is being pushed forward. TSM&O does not seem to be incorporated in the discussions regarding complete streets.
 - Complete Streets is another strategy under the TSM&O program, as it aims to improve the multimodal system
 - FDOT is trying to encourage any kind of corridor effort to consider the regional entity's ITS Master Plan to see how their ITS can be brought into the project
 - The Implementation Plan will also elaborate on when specific expertise should be brought into a project

- Melissa and Jeremy will consult with Heather Garcia relating to incorporation of TSM&O practices into Complete Streets projects

III. METROPLAN ORLANDO ITS MASTER PLAN UPDATE

Eric Hill provided an update on the MetroPlan Orlando ITS Master Plan.

- ITS Master Plan has been under development for the past year
 - Status:
 - Task 1 – Develop Vision
 - Complete
 - Task 2 – Document existing conditions
 - Complete
 - Task 3 – Identify Needs
 - Complete
 - Task 4 – Prioritize ITS Master Plan
 - Challenges:
 - Business Case – how do we justify these investments and measure their effectiveness?
 - In Progress
 - Strategies
 - Held a workshop with local stakeholders to identify needs
 - Included two mayors
 - One question raised that needs to be addressed/resolved by the ITS Master Plan is how to capitalize on the data acquired in the ITS process
 - Developing criteria for ranking projects
 - The team is currently trying to identify new strategies to consider transit, bike/ped, complete streets, and other types of projects
 - The ITS Master Plan is not project-specific
 - MetroPlan Orlando has submitted several grant applications
 - The ITS Master Plan is a marketing document in this sense, as MetroPlan Orlando can use the document to market to federal agencies, as well as to attract local private firms
 - Discussion & Q/A
 - Do you allow funding for operation/organizational staffing to local agencies?
 - Eric: No, MetroPlan does not. This question was raised during the workshop. How do we support local partners?
 - Do you pay for retiming signals?
 - Eric: Yes.
 - How often do you retime signals?
 - We would like to do this every 3 years, but this is flexible
 - This year MetroPlan Orlando is managing the retiming effort
 - Is it worthwhile to perform the “before” and “after” studies?
 - Yes, so you can show improvement

IV. SPACE COAST TPO ITS MASTER PLAN UPDATE

Steven Bostel provided an update on the Space Coast TPO ITS Master Plan.

- ITS Master Plan was completed in July 2015
 - Currently working on the implementation and follow-through
 - It is apparent that an update is needed considering the advancement in strategies and technologies
- Two primary operators are Brevard County and the City of Melbourne
 - They have very different elements within both jurisdictions
 - The City of Melbourne has a more advanced ITS infrastructure and process in place, for a concentrated area, while Brevard County has a less sophisticated ITS approach for a much larger area
 - The TPO has been providing funding for staff salaries and benefits
 - Was not always the case; establishing this was a significant process
 - The City of Melbourne has submitted three projects thus far
 - Nothing adaptive yet
 - Brevard County, in addition to the funding provided by the TPO, has established a process whereby any excess funds (small amounts) can go toward updating the county's ITS infrastructure
 - It was originally difficult to align the funding mechanism for this process, but the TPO has since improved the process to allow for quicker allocation of excess funds for this purpose
 - Brevard County is in the process of advertising for an ITS Operator position
 - Discussion & Q/A
 - Do you pay for retiming signals?
 - We currently do not. That has not come up as a priority from the local jurisdictions.

V. RIVER TO SEA ITS MASTER PLAN UPDATE

Robert Keeth provided an update on the River to Sea TPO ITS Master Plan.

- Phase 1 of the ITS Master Plan completed about six months ago
 - Phase 1 developed a vision for the ITS Master Plan, identifying preliminary goals and objectives
 - Concluded with the development of a Phase 2 scope
 - Largely followed in the footsteps of SCTPO and MetroPlan Orlando ITS Master Plans
- An RFP will be issued within the next week to begin Phase 2
 - Phase 2 will continue through the next fiscal year
- Discussion & Q/A
 - Do you pay for retiming signals?
 - No. It is anticipated that Phase 2 will consider this more closely.

VI. LAKE COUNTY ITS MASTER PLAN UPDATE

Dale Cody provided an update on the Lake County ITS Master Plan.

- Approximately six months ago, the Lake County ITS Master Plan commenced
 - Task 1 – Determine ITS Vision (Complete)
 - Task 2 – Document Existing Conditions/Infrastructure (In review)
 - Task 3 – Identify Transportation ITS Needs (In development)
 - Task 4 – Identification of Applicable ITS Strategies (Begin February 2017)
 - Task 5 – Regional ITS Architecture (Begin June 2017)
 - Task 6 – Concept of Operations (Begin June 2017)
 - Task 7 – Prioritized ITS Master Plan (Begin July 2017)
 - Completion of the ITS Master Plan is anticipated for the end of 2017
- Stakeholder meetings included a variety of non-transportation agencies
 - Lake County is unlikely to see an expansion of staff for the purposes of TSM&O
- Over the next few months Lake County will be identifying transportation needs, with some questions to be considered
 - Can Leesburg infrastructure be leveraged?
 - What kind of collaboration will be possible with local agencies?
 - Lake County is identified as an evacuation destination
 - Where other counties must consider how to evacuate residents/visitors, Lake County must consider how to accept people in times of emergency
- Discussion & Q/A
 - Does the TPO have set-aside box funding for retiming?
 - No.
 - Does the TPO conduct retiming?
 - No. That is left up to the local agencies.
 - Did you see any push-back from the more rural areas of Lake County?
 - When the discussion of Connected/Autonomous Vehicles began, there was some push-back indicating fleet turnover may be untenable for lower-income populations

VII. CURRENT INITIATIVES

Jeremy Dilmore presented an overview of current initiatives within District Five, including:

- FDOT Central Office Strategic Plan
 - Policy focused
 - FDOT Workforce evaluation
 - Need to have the proper workforce in place
 - Project Recommendations
 - Need to provide for O&M Funding
 - Active Arterial Management
 - Integrated Corridor Management
 - Adaptive Signal Control/Sign Performance Metrics
 - Connective Vehicles

- Performance Measure Driven
 - Need to have a business case
 - With more emphasis on multimodal efforts
- Integration of TSM&O into other units in FDOT
 - Executive management is pushing strongly for this
 - Once TSM&O documentation is in place, management will push TSM&O into the functional units
- Grant Opportunity
 - Connected Vehicle Test Bed
 - Partners – District Five, FTE, City of Orlando, Kennedy Space Center (KSC) / NASA, UCF, USF, and Florida Polytechnic University
 - Multistage approach – testing in KSC private roads, as well as Florida Polytechnic University’s test track currently under construction
 - Results of the application forthcoming
 - ATCMTD
 - Another round is coming shortly
 - *PedSafe, Greenway, and SunStore*, the project submitted last year, was funded for design
 - The I-75 *FRAME* project that was also submitted was funded for design and construction
 - The goal of the I-75 *FRAME* project is to deploy and integrate a combination of Integrated Corridor Management (ICM) and Connected Vehicle (CV) technology on I-75 and US 301/441
 - This is a large multijurisdictional effort between Districts Two and Five, as well as Sumter and Marion counties, and the City of Ocala
 - On-Board Units (OBU) will be distributed to first responders, transit, and some members of the general public
 - A smart phone application developed by FDOT will also be available

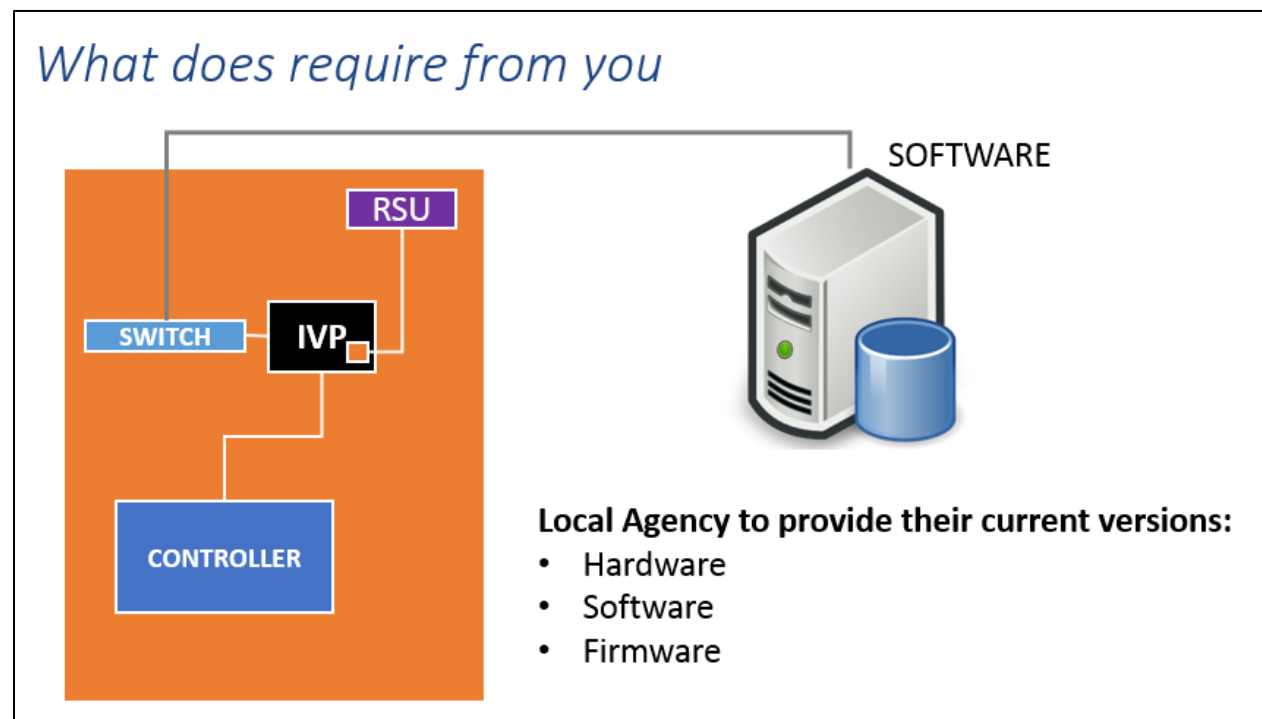
I-75 FRAME PROJECT TECHNOLOGIES

Technology	What	Where	Expected Benefits	Lead
SPaT Decoder (IVP)	To make SPaT information available for RSU broadcasting	Signal cabinets	Improved safety and traffic flow	Install: FDOT Maintenance: LA
Transit Signal Priority	To make transit information available to the traffic signal controller and to CV using RSU	Signal cabinets	Improved on time performance of transit	Plan Development: FDOT Maintenance: LA
Pre-emption	To emergency vehicle information available to the traffic signal controller and to CV using RSU	Signal cabinets	Improved on time performance of emergency vehicles	Plan Development: FDOT Maintenance: LA
Smart Phone Application	Develop application for pedestrian, bicyclist, transit, for smartphone	Project wide	Provide smartphone application to the users	FDOT
On Board Units (OBUs)	To test the Connected Vehicle (CV) technology for two-way communication	Local Agency Vehicles	Field testing and verification	Install: FDOT Maintenance: LA
Road Side Units (RSUs)	To broadcast Signal Phasing and Timing (SPaT), road weather, and other Traffic Advisory Messages (TAMs)	Signal Cabinets	Improved safety and traffic flow	Install: FDOT Maintenance: LA
Fiber Optic Cable (FOC)	To provide communications to the roadways not currently have FOC	Few arterials in Ocala and on portions of US 441 and US 301	Arterials connected and communicating back to traffic operations center	Install: FDOT Maintenance: LA
Server Upgrades	Needed Upgrades to support CV Software	Local Agency Servers	Allow applications to run	Install/Config: FDOT Maintenance: LA

I-75 FRAME PROJECT ROADWAYS

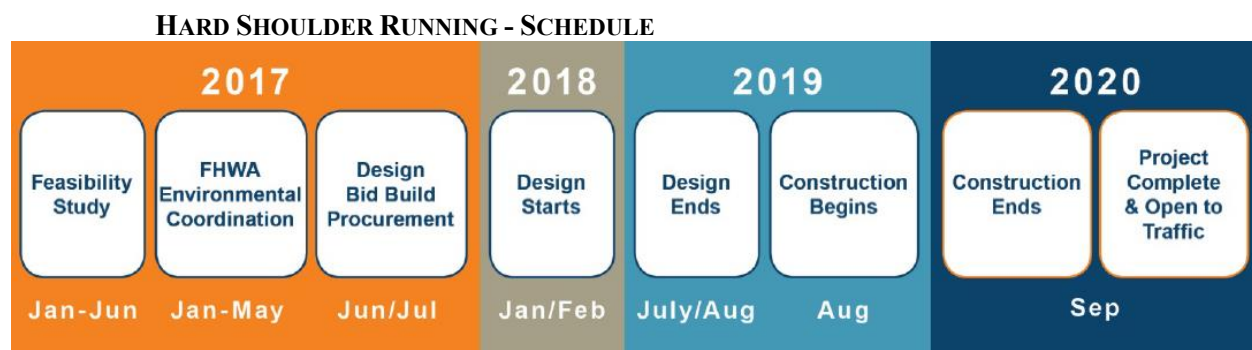
Facilities	Length (miles)	Signals	Mid-Block Crossings	Total Signals	Technology Deployments	Software to integrate	Software Required	Who Server
SR 326	3	3	0	4	SPM/ DSRC (SPaT/TSP/Ped)	LA-CSS	Transit, Ped-Bike, SPaT	LA
SR 500	3	5	0	5	SPM/ DSRC (SPaT/TSP/Ped)	LA-CSS	Transit, Ped-Bike, SPaT	LA
SR 40	3	4	0	4	SPM/ DSRC (SPaT/TSP/Ped)	LA-CSS	Transit, Ped-Bike, SPaT	LA
SR 200	4	11	0	11	SPM/ DSRC (SPaT/TSP/Ped)	LA-CSS	Transit, Ped-Bike, SPaT	LA
SW 27th Avenue	4	3	0	3	SPM/ DSRC (SPaT/TSP/Ped)	LA-CSS	Transit, Ped-Bike, SPaT	LA
I-75					DSRC (TAM)	SunGuide	TIM, RWIS, and Freight Operation	CO/D5/D2
US 301 /US 441	82	57	3	62	SPM/ DSRC (SPaT/TSP/Ped)	LA-CSS	Transit, Ped-Bike, SPaT	LA

- Only CV technology is under consideration by District Five at this time
 - Automated Vehicle technology is more dependent on the vehicle's own technological capabilities (and the capabilities of the automotive industry)
 - CV technology is dependent on both the capabilities of the vehicle and the associated infrastructure (which will need to be provided by the USDOT and its subsidiaries)
- Jeremy discussed the deployment of the CV technology on a cabinet for the I-75 FRAME Project



- The RSU will be installed every two miles along I-75 and US 301/441 and at signal locations with MMITS. It will receive and send messages to and from connected vehicles, transit, freight and emergency vehicles, and other RSUs using 5.9 GHz Dedicated Short Range Communication (DSRC).
- The IVP (blackbox) will also be added on the cabinets and connected to the RSU
- District Five and partners need to coordinate the compatibility of the existing software, hardware and firmware
- FASTLANE
 - Installing hard shoulder running along segments of I-75
 - From the Turnpike to CR 484, connecting to the I-75 FRAME project

- Would take the existing inside shoulder and make it a travel lane during times of congestion



- Discussion & Q/A
 - Have you seen the recent article with regards to users unable to understand this concept?
 - FDOT looked at this issue and determined the signage was not consistent in the example referenced by the article
 - What kind of system is being implemented along I-4 from Orlando to Tampa Bay?
 - Series of completed projects that will enter into construction areas
 - Will not invest in the permanent truss structure, will use a temporary cantilever system until conclusion of I-4 construction
 - FDOT is not looking at implementing variable speed limit signs
 - FDOT staff have identified entry/exit points, how to stripe it, etc.
 - Have not gotten into deeper detail
 - Integrated Corridor Management (ICM)
 - Presented at Transpo, Disseminator, and TRB
 - Jeremy discussed the presentation given at TRB
 - Asking for large funding sums does not generally work
 - FDOT had to break down the project into more manageable portions to make funding more tenable
 - The Orlando Regional Integrated Operations Network (ORION) includes FDOT, MetroPlan, CFX and FTE, LYNX, SunRail, Orange, Seminole and Osceola county signal systems, and four cities
 - TSM&O Data Sharing Concept
 - ↳ Real-time input data streams
 - ↳ TSM&O Real-Time systems and applications
 - ↳ Data Marts

 Data Users

- Decision Support System (DSS)
 - Primary focus of the decision support system is to provide consistent and repeatable response to events within the District
 - Currently, each operator can respond differently to the same even based on personal experience
 - Previously agreed-to response plan sets will be developed over the next 18 months
- Approach to ICM
 - Information exchange network
 - DSS
- Decision Support System Philosophy
 - Hierarchical DSS
 - Level 1: Local Signalized Intersections
 - When the deterministic model determines a signal and adjacent signals are operating outside of norms, it sends a message to the operator with recommended changes
 - Level 2: Regional ICM Response
 - Event-based Rules engine selects initial Plan set (Location of Event, Severity, Time of Day)
 - Predictive Model will evaluate Plan Set to determine best options versus a “Do Nothing” approach
 - Level 2 Response Plans will overrule Level 1 changes
- Active Projects
 - Re-IP
 - Complete – City of Orlando, Orange, Seminole County
 - In Progress
 - I-75
 - Polk County to CR 470 – Burn-in Complete
 - CR 470 to Turnpike – Under Construction
 - Turnpike – Under Construction
 - Turnpike to US 27 – Complete
 - US 27 to Alachua County – In Burn-in
 - AAM
 - Bluetooth technology to identify travel time and O/D
 - Phase 1 Complete
 - Phase 2 In construction
 - Phase 3 Design Complete
 - Transit Signal Priority
 - Attempts to improve on-time arrival for SunRail

- Phase 1 – Complete
- Phase 2 – In construction
- Phase 3 – Study Design next FY
- Question: When will local agencies get access to CMS server?
 - A CMS domain is required for this
 - Currently in the planning phase
 - **Jeremy will follow up on this**
- RTMC
 - The project for the building has been advertised; currently receiving bids
- Event Management
 - Plans complete
- Bridge Security
 - Updating technology to allow for quicker, more effective notice to the proper authorities
 - Originally part of the I-4 project
 - Plans complete
- Adaptive Ramp Metering
 - Simulations finalizing, upcoming stakeholder meeting
 - How do we educate law enforcement, transit operator, etc.?
- Future Work
 - Advertised Work
 - TSM&O Continuing Services (Retiming)
 - Route and Mode Choice
 - Study looking at creating an engine that takes multimodal data and makes it easily consumed by users
 - Did not get the required three bidders to move forward with advertisement/procurement
 - Will be included in Planned/Add next week, Add the following week (or two)
 - Advertising Soon
 - I-75/I-95 Ramp Metering Study
 - How do we incorporate ramp metering into large capital investment projects?
 - SR 40 Design-Build-Operate-Maintain (DBOM)
 - Funded by Central Office
 - RFP under development
 - ITS Software (Road Ranger, AVL, iVDS, MIMS, etc.)
 - Looking to expand AVL
 - Available to field users (Fire, Police, etc.) with appropriate internet connection

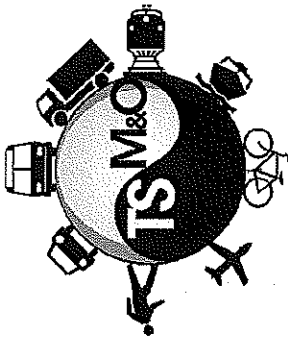
- SR 434 Connected Vehicle
 - Central Office outlined goals with regard to CV
 - District Five offered several options; Central Office identified SR 434 as an opportunity
- TMC Operations (Freeway and Arterial)
 - TMC Contract anticipated for next week (hopefully)
 - Will include freeway and arterial so there are no contractual issues between freeway/arterial
 - Transportation, not freeway/arterial
- Discussion & Q/A
 - Emergency Access Gates (EAG)
 - Need UPS on controller (not the whole system)
 - John Young Parkway / Princeton
 - Local agencies were told by FDOT staff that they would be required to upgrade from static “reduce speed school zones” signs to electronic signs. Are there any updates on this?
 - Nothing has occurred regarding this, yet

VIII. ATTACHMENTS

- A – Sign in sheets
- B – Presentation Slides
- C – Meeting agenda

END OF SUMMARY

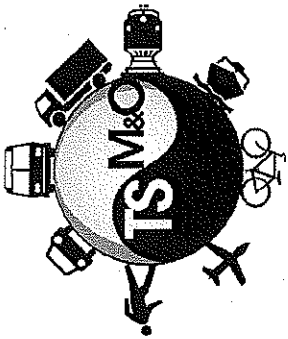
This summary was prepared by David Williams and Melissa Gross, and is provided as a summary (not verbatim) for use by the Consortium Members. The comments do not reflect FDOT's concurrence. Please review and send comments via e-mail to dwilliams@vhb.com so they can be finalized for the files.



TSM&O Consortium Meeting

January 12, 2017

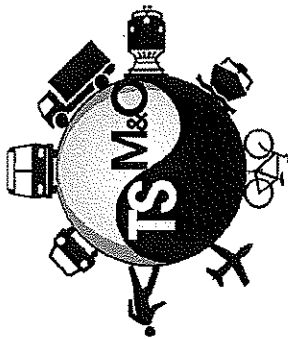
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TSM&O Consortium Meeting

January 12, 2017

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TSM&O Consortium Meeting

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Welcome to the TSM&O Consortium Meeting January 12, 2017



Transportation Systems Management & Operations



Meeting Agenda

1. Introduction
2. D5 TSM&O Implementation Plan
3. MetroPlan Orlando ITS Master Plan Update
4. Space Coast TPO ITS Master Plan Update
5. Lake County ITS Master Plan Update
6. River to Sea TPO ITS Master Plan Update
7. FDOT Current Projects Overview



Transportation Systems Management & Operations



TSM&O Implementation Plan Overview

- D5 TSM&O Program Goals
- Purpose of the Implementation Plan
 - Audience of the Document
- 2014 CMF Review and Goals & Objectives



Transportation Systems Management & Operations



TSM&O Program Goals

Proactively managing the operations of the transportation system to:

Improve Safety

Manage Congestion

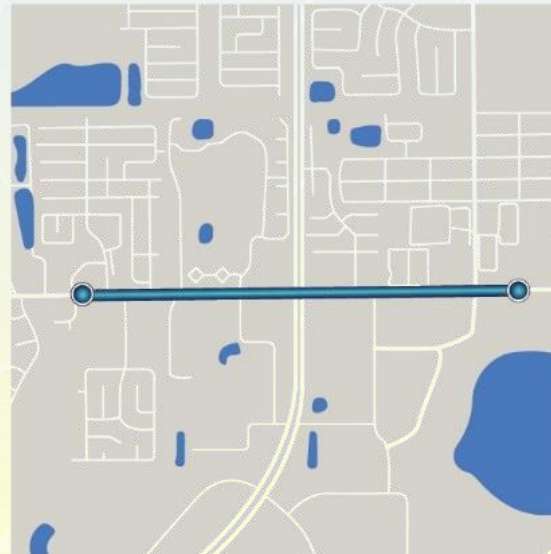
Improve Reliability

Maximize Return on Investment

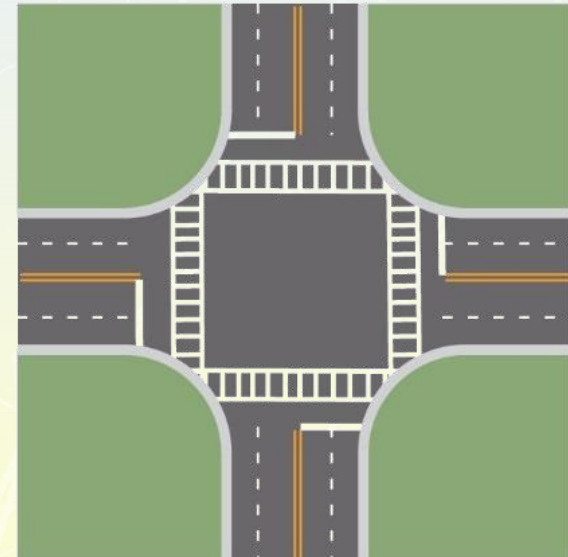
System Level



Corridor Level



Intersection Level



Transportation Systems Management & Operations



FDOT Project Development Life Cycle	TSM&O Program Modifications
Planning	Operations and management strategies are incorporated into every project
	Projects are selected based on the ability to maximize safety, operations, and capacity
	Network operations are incorporated into LRTP's and other MPO/TPO plans
	Data, tools, and performance measures are used to assess operations projects
PD&E	All projects consider operational improvement strategies in the evaluation process
Design	Operations and management strategies are incorporated into every project
Operations	Networks are managed in real-time
	Performance measures are identified and monitored
Construction	Real-time traffic management throughout construction MOT and maintenance activities
Maintenance	Assets are continuously monitored and inventoried for optimal performance



Transportation Systems Management & Operations



Purpose of the Implementation Plan

The TSM&O Implementation Plan **IS**:

- Program framework
- A living document
- Inclusive of all 6 CMF Dimensions
- D5 Specific
- Dependent on **Stakeholder Buy-In!!!!**



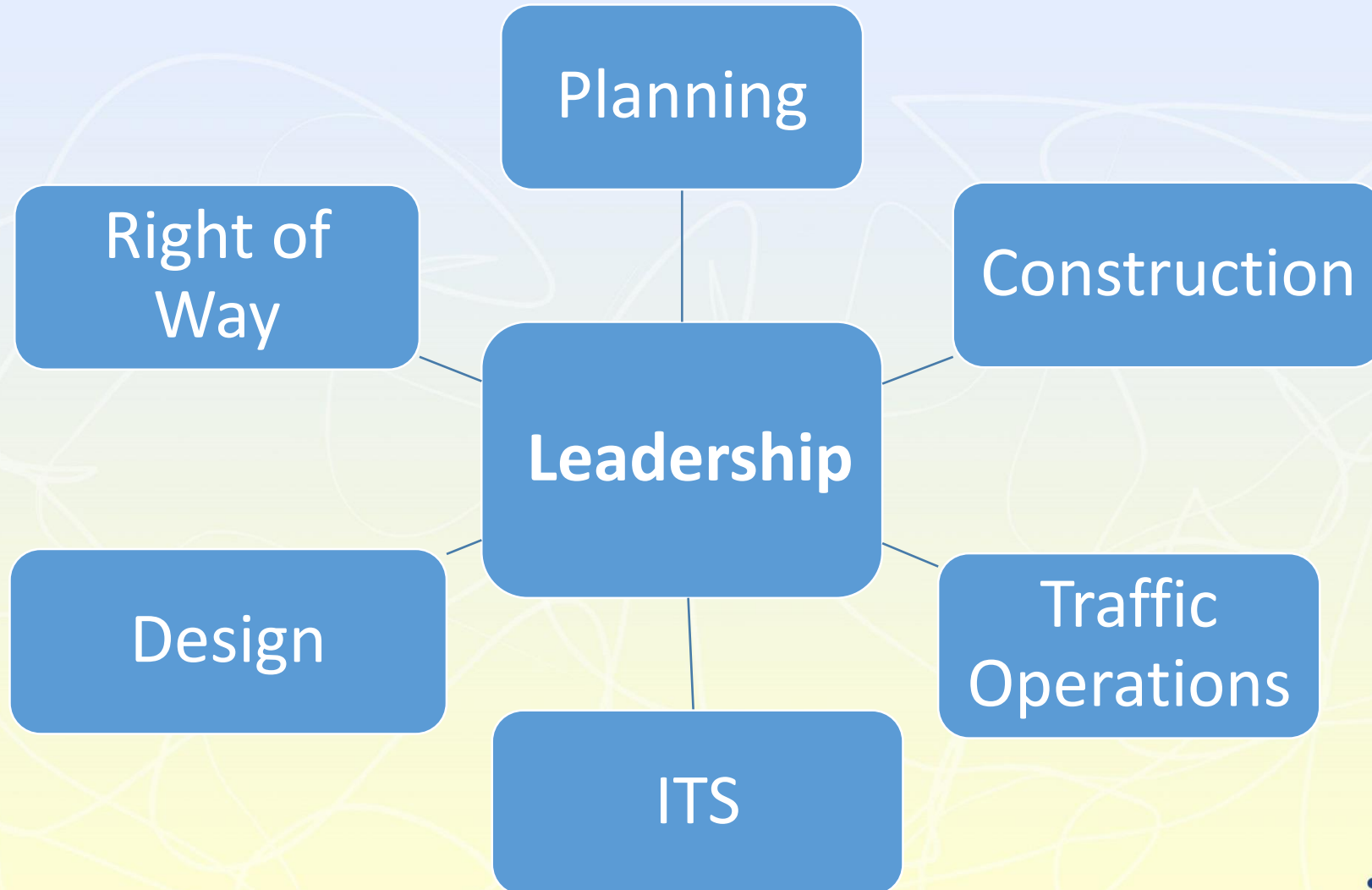
Transportation Systems Management & Operations

The TSM&O Implementation Plan **IS NOT**:

- Project Specific
- Only applicable to some functional units
- An ITS program
- One size fits all



Implementation Plan Audience



Transportation Systems Management & Operations



2014 Capability Maturity Self-Assessment

Dimension	Level Score (out of 4)	Agency / Type
Business Processes	1.5	Consensus
Systems and Technology	1.0	Transit
	1.5	Other
Performance Measurement	1.0	Consensus: Arterials
	2.0	Consensus: Freeways
Culture	1.5	MPOs, FDOT, Transit
	1.0	Counties
Organization and Staffing	2.0	FDOT
	3.0	MetroPlan
	1.0	MPOs & Counties
Collaboration	2.0	Consensus



Transportation Systems Management & Operations



Priority Action Items

- **Business Process** - Development of a regional strategic TSM&O program plan for freeways, arterials, and transit. This would be done through the appropriate cooperative framework between FDOT district and MPOs/TPOs with the participation of other key players.
- **Culture** – Develop a persuasive audience-oriented “business case” to support focus on the appropriate TSM&O investments within the district/region.
- **Organization and Staffing** – Build on existing relationship by formulating a regional task force focused on providing mutual aid among all jurisdictions including a resource directory and use of mutual aid strategies to help overcome staffing and resource shortfalls among key players.



Transportation Systems Management & Operations



Business Process Dimension

Level	1 – Performed	2 – Managed	3 – Integrated	4 – Optimized
Criteria	Each jurisdiction operating independently according to individual priorities and capabilities	Consensus on a regional approach developed regarding TSM&O goals, deficiencies, B/C, networks, strategies and common priorities	Regional program integrated into jurisdictions' overall multimodal transportation plans with related staged program <ul style="list-style-type: none"> • Processes documented • Performance measured • Organization/partners aligned • Funding program identified 	TSM&O integrated into jurisdictions' multi-sectoral plans and programs, based on a formal, continuing planning processes
Consensus	2014 Capability Level: 1.5		Target Capability Level : 3.0	



Transportation Systems Management & Operations



Business Process Dimension

Goals	Objectives
<p>Consensus on a regional approach regarding TSM&O project identification process/system-wide evaluation procedure</p>	<p>Consensus on a plan to uniformly identify network goals, deficiencies, B/C, networks, strategies and common priorities by 2018</p>
<p>Regional program integrated into jurisdictions' overall multimodal transportation plans with related staged program</p>	<p>Coordination plan for future updates to regional and local transportation plans by 2018</p>
<p>Consensus on a standardized and documented TSM&O project development life cycle to include template, project schedules, scoping language and requirements (NEPA, SYS engineering, FTA)</p>	<p>Detail a cradle-to-grave project development process for all FDOT projects by 2018</p>
	<p>Identify requirements associated with different improvement strategies (i.e. transit improvements, ITS deployment, environmental impacts) by 2018</p>
	<p>Clearly define roles and responsibilities of different functional units within the project development life cycle as illustrated in the Organization & Staffing Dimension</p>
	<p>Gain consensus on scoping language and standardized project schedules for different project types (i.e. transit improvements, ITS deployment, environmental impacts)</p>
<p>Develop programming and budgeting processes for TSM&O</p>	<p>Identify potential TSM&O program funding source(s) by 2020</p>
	<p>Gain consensus on system-wide evaluation procedure from regional partners by 2018</p>
	<p>Provide guidance and assistance to regional partners for needs assessment and system-wide evaluation by 2019</p>

Culture

Level	1 – Performed	2 – Managed	3 – Integrated	4 – Optimized
Criteria	Individual Staff champions promote TSM&O	Jurisdictions’ senior management understands TSM&O business case and educates decision makers/public	Jurisdictions’ mission identifies TSM&O and benefits with formal program and achieves wide public visibility/understanding Funding focus shifts from constructing new facilities to more efficiently operating existing ones	Customer mobility service commitment accountability accepted as formal, top level core program of all jurisdictions
Consensus	2014 Capability Level: <ul style="list-style-type: none"> • 1.5 for MPOs, FDOT, transit • 1 for Counties 		Target Capability Level : 3.0	



Transportation Systems Management & Operations



Culture

Goals	Objectives
To establish a formal TSM&O program within the District	Obtain FDOT leadership buy-in on the TSM&O Implementation Plan by 2018
To establish the regional mission to identify TSM&O and its benefits by utilizing a formal program.	Obtain regional stakeholder buy-in on a TSM&O program by 2018 -Obtain MOU's from regional stakeholders by 2018 (measure)
	Support regional partners to develop their own TSM&O program/process by 2018
To achieve wide public visibility/understanding of TSM&O program benefits within the District.	Producing materials for both leadership and public to illustrate benefit-cost of the TSM&O program and network-operational improvements by 2018
Funding focus shifts from constructing new facilities to more efficiently operating existing ones	Obtain a dedicated funding source for operational improvements by 2020
	Implement the TSM&O checklist in all planning projects

Organization and Staffing

Level	1 – Performed	2 – Managed	3 – Integrated	4 – Optimized
Criteria	TSM&O added to units within existing structure and staffing -- dependent on technical champions	TSM&O-specific organizational concept developed within/among jurisdictions with core capacity needs identified, collaboration takes place	Program includes TSM&O Managers which have direct access to top management; Job specs, certification and training for core positions <ul style="list-style-type: none"> • Key staff positions identified 	TSM&O senior managers at equivalent level with other jurisdiction services and staff professionalized <ul style="list-style-type: none"> • Key staff positions filled
Consensus	2014 Capability Level: <ul style="list-style-type: none"> • 1 for MPOs and Counties • 2 for FDOT • 3 for MetroPlan Orlando 			Target Capability Level : 4.0



Organization and Staffing

Goals

Objectives

TSM&O-specific organizational concept developed within/among jurisdictions with core capacity needs identified, collaboration takes place

Establish TSM&O program organizational chart as a resource for local agencies by 2018

Identify opportunities for resource-sharing within the region on personnel and infrastructure by 2018

Program includes TSM&O program organizational chart for the District with direct access to top management

Establish FDOT District Five TSM&O program Organization and Staffing structure by 2018

Establish job specifications, certifications and qualifications for each TSM&O program position by 2018

Establish clearly defined roles and responsibilities within the project development life cycle by 2018

Collaboration

Level	1 – Performed	2 – Managed	3 – Integrated	4 – Optimized
Criteria	TSM&O added on to units within existing structure and staffing -- dependent on technical champions	TSM&O-specific organizational concept developed within/among jurisdictions with core capacity needs identified, internal and external collaboration takes place	TSM&O Managers have direct access to top management; Job specs, certification and training for core positions. Operations and Planning work cohesively in the TSM&O Program <ul style="list-style-type: none"> • Organization/partners aligned 	TSM&O senior managers at equivalent level with other jurisdiction services and staff professionalized
Consensus		2014 Capability Level: 2	Target Capability Level : 3.0	



Transportation Systems Management & Operations



Collaboration

Goals	Objectives
TSM&O Managers have direct access to District leadership	Formalize a communication plan between District leadership and TSM&O Management Team by 2018
Ensure coordination between different functional units within the Department	Establish a communication process consistent with the TSM&O project development life cycle by 2018
	Establish clearly defined roles and responsibilities of functional units by 2018
Identify job specifications, certification and training for core positions.	TSM&O program job specifications, certifications, and training identified within the Organization & Staffing Dimension
Establish regular communication and collaboration between the District and regional/local agencies (i.e. MPOs/TPOs, counties, cities, transit agencies, emergency responders, safety officers)	Establish a plan for regional collaborative meetings on a bi-monthly or quarterly basis by 2017
	Establish a resource-sharing forum for education and guidance materials on the Department's website by 2018
Identify opportunities to share communication infrastructure between the District and local agencies	Identify District and local agency needs for data and communication infrastructure by 2018
	Identify opportunities for resource-sharing within the region on personnel and infrastructure by 2018

Systems & Technology

Level	1 – Performed	2 – Managed	3 – Integrated	4 – Optimized
Criteria	Ad hoc approaches to system implementation without consideration of systems engineering and appropriate procurement processes	Regional con-ops and architectures developed and documented with costs included; appropriate procurement process employed	Systems & technology standardized and integrated on a districtwide basis (including arterial focus) with other related processes and training as appropriate	Architectures and technology routinely upgraded to improve performance; systems integration/interoperability maintained on continuing basis
Consensus	2014 Capability Level <ul style="list-style-type: none"> • 1 for transit • 1.5 for highways 		Target Capability Level : 3.0	



Transportation Systems Management & Operations



Systems & Technology

Goals	Objectives
<p>Regional con-ops and architectures developed and documented with costs included; appropriate procurement process employed</p>	<p>Produce a districtwide vision for ITS infrastructure goals and objectives.</p>
	<p>Follow evolving and emerging technology and the applications to the transportation network</p>
<p>Manage ITS assets and infrastructure proactively</p>	<p>Establish asset management strategies for asset inventory and maintenance records.</p>
	<p>Asset management strategies will provide considerations for asset life cycle to include maintenance and replacement cost.</p>
<p>Systems and technology standardized, documented and trained statewide, and new technology incorporated (L3)</p>	<p>Provide consistency across the district on ITS infrastructure connections across jurisdictions and ensure interoperability</p>
	<p>To provide training as need to local agencies on emerging transportation related technology, processes, or requirements.</p>
	<p>Streamline the systems engineering process and provide districtwide consistency with ConOps and SEMP documentation</p>

Performance Measures

Level	1 – Performed	2 – Managed	3 – Integrated	4 – Optimized
Criteria	Some outputs measured and reported	Output used directly for after-action debriefings and improvements; data easily available and dashboarded	Outcome measures identified (networks, modes, impacts) and routinely utilized for objective-based program improvements	Performance measures reported internally for utilization and externally for accountability and program justification
Consensus	2014 Capability Level: <ul style="list-style-type: none"> • 1 for arterials • 2 for freeways (not all are instrumented) 		Target Capability Level : 3.0	



Transportation Systems Management & Operations



Performance Measures

Goals	Objectives
<p>Identify program performance measures</p>	<p>Establish performance measures for each FDOT Unit which accomplish the overall TSM&O program goals and objectives by year 2018</p>
	<p>Obtain consensus on District 5 performance measures for system, corridor, and intersection level analyses by year 2018.</p>
	<p>Utilize Map 21 Performance measures, in which data is readily available, or can be efficiently obtained, to provide consistency with statewide performance measurement initiatives.</p>
<p>Utilize TSM&O Performance measure for objective-based program improvements</p>	<p>Develop a system wide evaluation tool, which is suitable and customizable for all District stakeholders by YR 2018</p>
<p>Utilize Performance measures to enhance the District Five roadway operating conditions</p>	<p>Improve the safety on the District Five roadway network by decreasing the overall crash rate by x percent by year x</p>
	<p>Manage the congestion on the District Five roadway network by decreasing the congested lane-miles by x percent by year x</p>
	<p>Improve the District Five network reliability by reducing the network travel time delay by x percent by year x</p>
	<p>Maximize the District Five return on investment by achieving a total cost/benefit of x by year x</p>

MetroPlan Orlando ITS Master Plan Update

Eric Hill, MetroPlan Orlando



Transportation Systems Management & Operations



Space Coast TPO ITS Master Plan Update

Steven Bostel, Space Coast TPO



Transportation Systems Management & Operations



River to Sea TPO ITS Master Plan Update

Robert Keeth, River to Sea TPO



Transportation Systems Management & Operations



Lake County ITS Master Plan Update

Dale Cody, Metric



Transportation Systems Management & Operations



Lake County TSM&O Master Plan



TSM&O Master Plan



Task 1: Determine ITS Vision, Goals and Objectives - *Complete*

Task 2: Document Existing Conditions/Infrastructure – *Currently in Review*

Task 3: Identify Transportation ITS Needs – *In Development*

Task 4: Identification of Applicable ITS Strategies – *Begin 2/20/17*

Task 5: Regional ITS Architecture (RITSA) – *Begin 6/12/17*

Task 6: Concept of Operations – *Begin 6/26/17*

Task 7: Prioritized ITS Master Plan – *Begin 7/25/17*



Overall Process



TSM&O Master Plan



Stakeholder Meetings

- Lake County Facilities
- Lake County Libraries
- Lake County Community Services
- Lake County Sheriff's Office
- Lake County School Board
- Lake County 911/
Communications Center
- Lake County EOC
- Lake County Emergency 911
- Lake County Emergency
Management
- Lake County EMS
- LakeXpress
- Florida Central Railroad
- City of Leesburg
- City of Mt. Dora
- City of Clermont
- City of Minneola
- City of Lady Lake
- City of Eustis
- City of Tavares
- City of Groveland





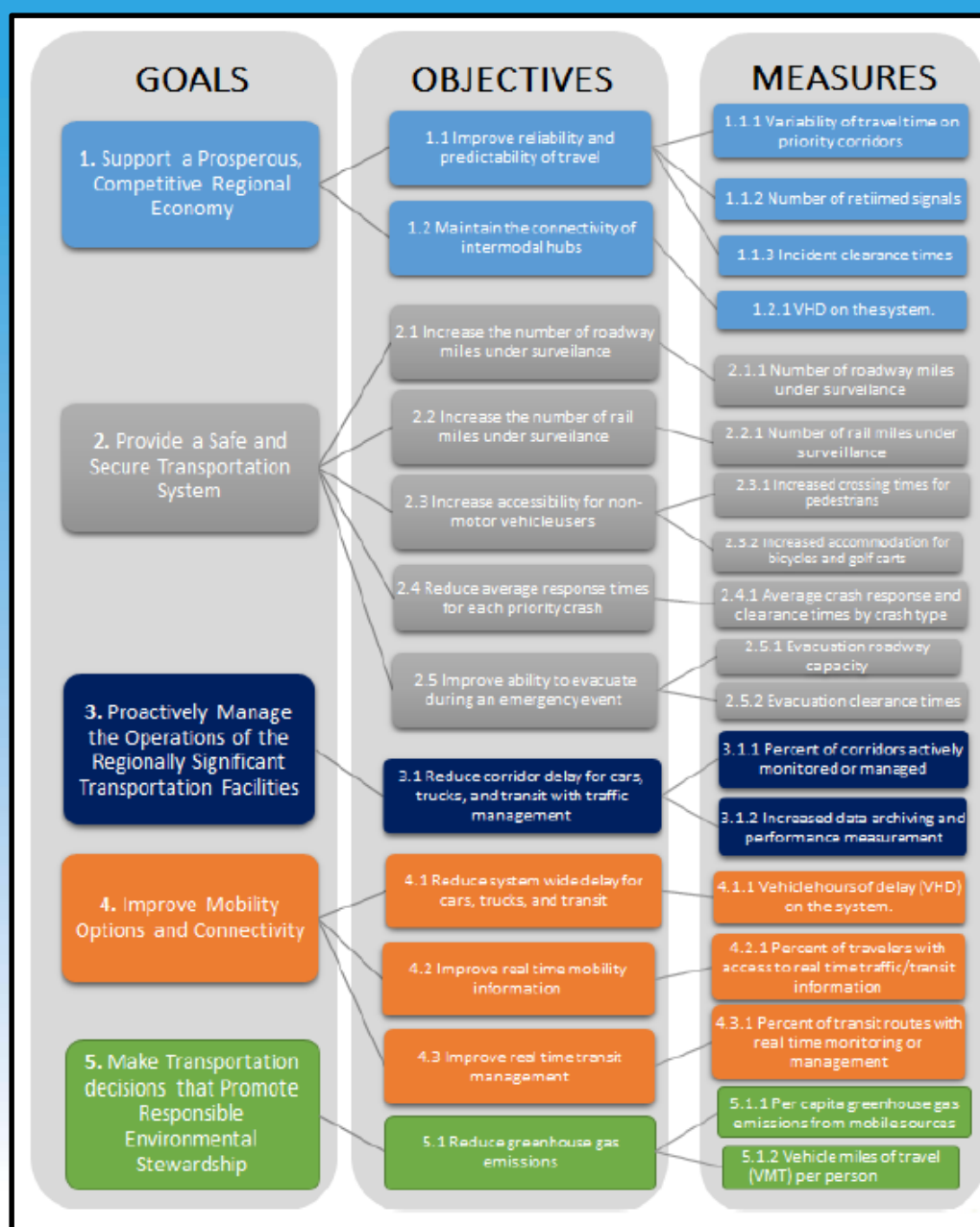
Lake Sumter MPO TSM&O Vision Statement:



“Provide an efficient, reliable, safe and environmentally friendly multi-modal transportation experience through inter-agency cooperation that utilizes cost effective and innovative TSM&O methods to enhance the quality of life for the citizens and visitors of Lake County.”

ITS Visions, Goals, and Objectives

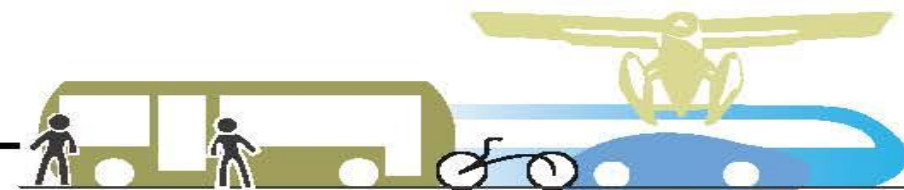




ITS Visions, Goals, and Objectives



Questions/Comments?



Current Initiatives Update

Jeremy Dilmore, District Five ITS



Transportation Systems Management & Operations





TSM&O Consortium Meeting

FDOT CO Strategic Plan

- FDOT CO Strategic Plan
- Grant Opportunity
- ICM
- Active Work
- Future Work

FDOT CO Strategic Plan

- Policy Focused
 - FDOT Workforce Evaluation
 - Project Recommendations
 - Operations and Maintenance Funding
 - Active Arterial Management
 - Integrated Corridor Management
 - Adaptive Signal Control/Sign Performance Metrics
 - Connected Vehicle
 - Performance Measure Driven
 - Integration for TSM&O into other units in FDOT

Grant Opportunities

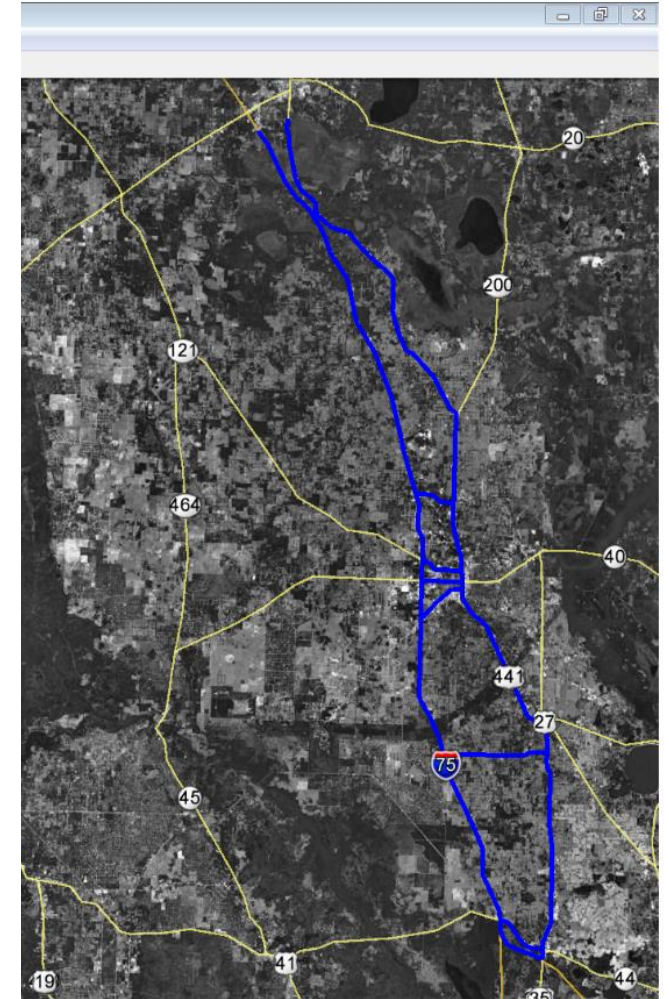
- Connected Vehicle Test bed
- ATCMTD
- FASTLANE

ATCMTD

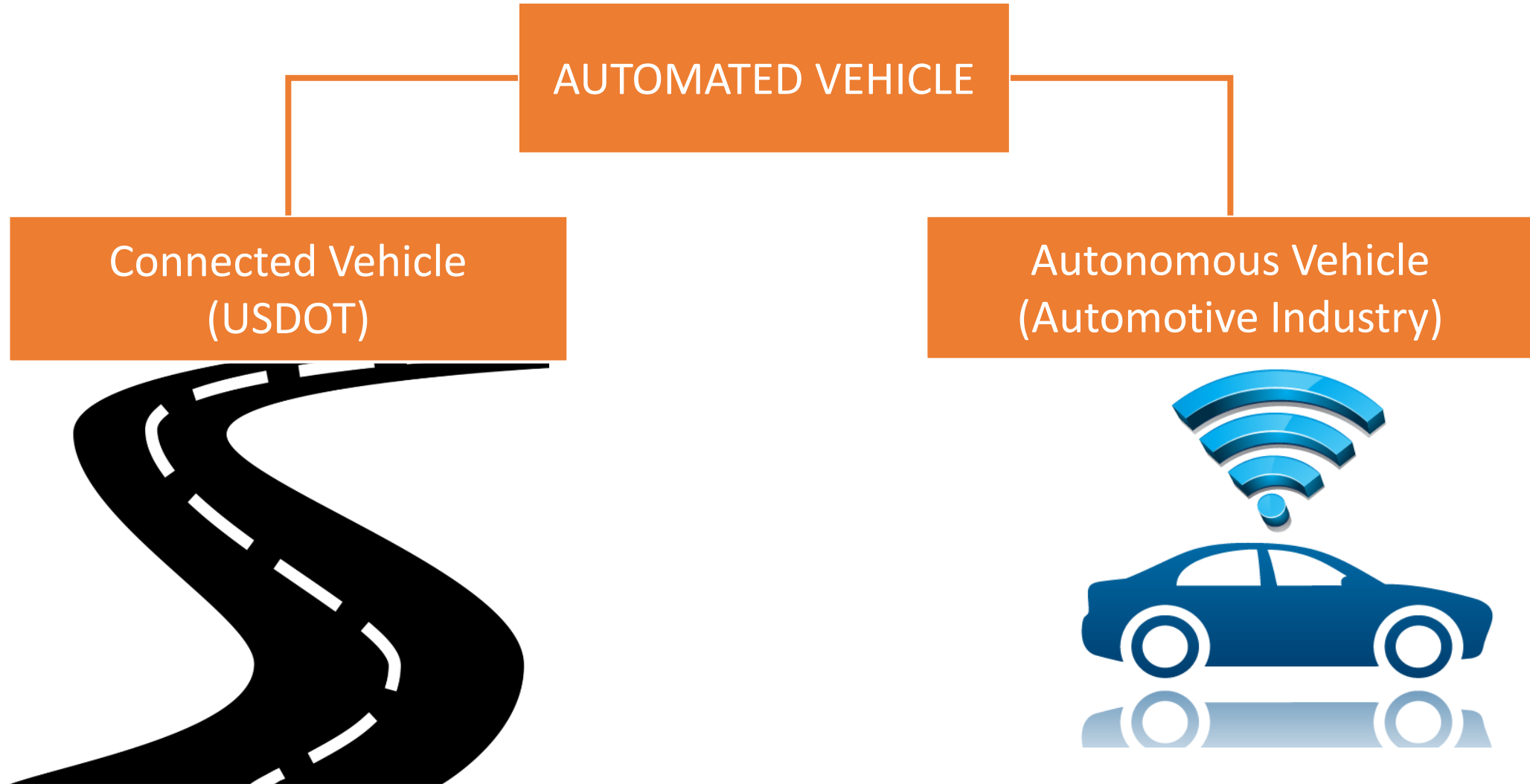
- I-75 FRAME
 - Funded for Design and Construction
- PedSafe, Greenway, and SunStore
 - Funded for Design

I-75 FRAME Concept Funded

- ICM plus CV
- CV on US 301/US441 and I-75 – running TAMs, SPaT, TSP, Preempt
 - Plan development for TSP and Preempt from FDOT
 - OBU to be distributed by FDOT to first responders, transit, and some members of general public
 - Smart Phone application developed by FDOT
 - Integration into Sunguide for ATIS/TAM



CV Technology

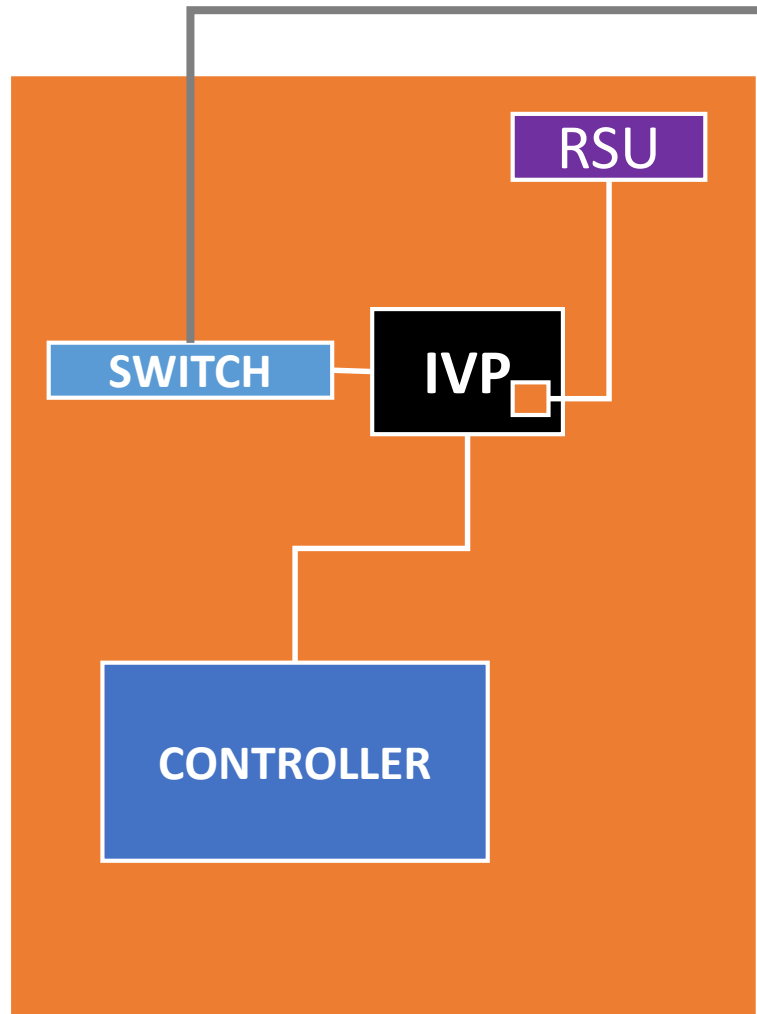


Technology	What	Where	Expected Benefits	Lead
SPaT Decoder (IVP)	To make SPaT information available for RSU broadcasting	Signal cabinets	Improved safety and traffic flow	Install: FDOT Maintenance: LA
Transit Signal Priority	To make transit information available to the traffic signal controller and to CV using RSU	Signal cabinets	Improved on time performance of transit	Plan Development: FDOT Maintenance: LA
Pre-emption	To emergency vehicle information available to the traffic signal controller and to CV using RSU	Signal cabinets	Improved on time performance of emergency vehicles	Plan Development: FDOT Maintenance: LA
Smart Phone Application	Develop application for pedestrian, bicyclist, transit, for smartphone	Project wide	Provide smartphone application to the users	FDOT
On Board Units (OBUs)	To test the Connected Vehicle (CV) technology for two-way communication	Local Agency Vehicles	Field testing and verification	Install: FDOT Maintenance: LA
Road Side Units (RSUs)	To broadcast Signal Phasing and Timing (SPaT), road weather, and other Traffic Advisory Messages (TAMs)	Signal Cabinets	Improved safety and traffic flow	Install: FDOT Maintenance: LA
Fiber Optic Cable (FOC)	To provide communications to the roadways not currently have FOC	Few arterials in Ocala and on portions of US 441 and US 301	Arterials connected and communicating back to traffic operations center	Install: FDOT Maintenance: LA
Server Upgrades	Needed Upgrades to support CV Software	Local Agency Servers	Allow applications to run	Install/Config: FDOT Maintenance: LA

Concept

Facilities	Length (miles)	Signals	Mid-Block Crossings	Total Signals	Technology Deployments	Software to integrate	Software Required	Who Server
SR 326	3	3	0	4	SPM/ DSRC (SPaT/TSP/Ped)	LA-CSS	Transit, Ped-Bike, SPaT	LA
SR 500	3	5	0	5	SPM/ DSRC (SPaT/TSP/Ped)	LA-CSS	Transit, Ped-Bike, SPaT	LA
SR 40	3	4	0	4	SPM/ DSRC (SPaT/TSP/Ped)	LA-CSS	Transit, Ped-Bike, SPaT	LA
SR 200	4	11	0	11	SPM/ DSRC (SPaT/TSP/Ped)	LA-CSS	Transit, Ped-Bike, SPaT	LA
SW 27th Avenue	4	3	0	3	SPM/ DSRC (SPaT/TSP/Ped)	LA-CSS	Transit, Ped-Bike, SPaT	LA
I-75					DSRC (TAM)	SunGuide	TIM, RWIS, and Freight Operation	CO/D5/D2
US 301 /US 441	82	57	3	62	SPM/ DSRC (SPaT/TSP/Ped)	LA-CSS	Transit, Ped-Bike, SPaT	LA

What does require from you



SOFTWARE

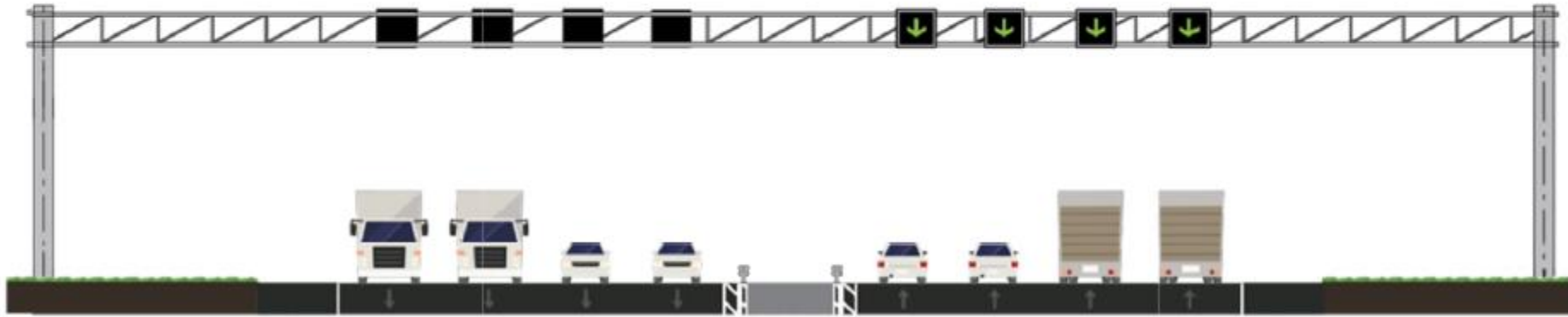


Local Agency to provide their current versions:

- Hardware
- Software
- Firmware

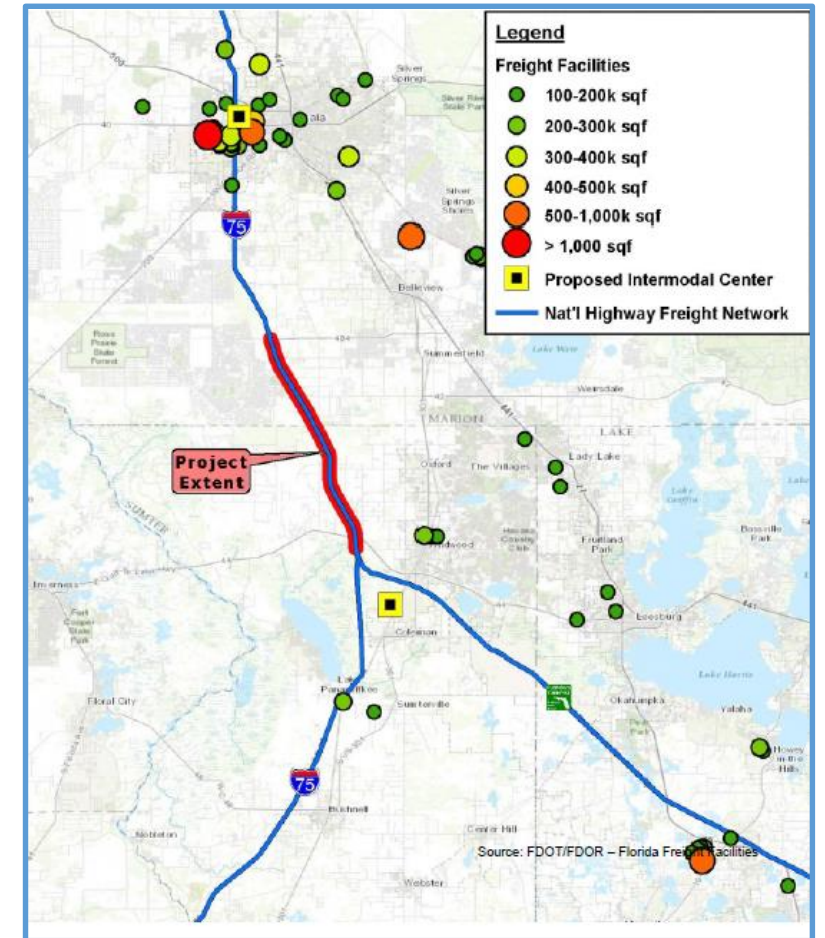
FASTLANE

Conceptual Future Cross Section with HSR & DMS



Hard Shoulder Running

- Inside Shoulder
- Lane Availability
- Turnpike to CR 484
- Connects to FRAME



Integrated Corridor Management

- Presented at
 - Transpo
 - Disseminator
 - TRB

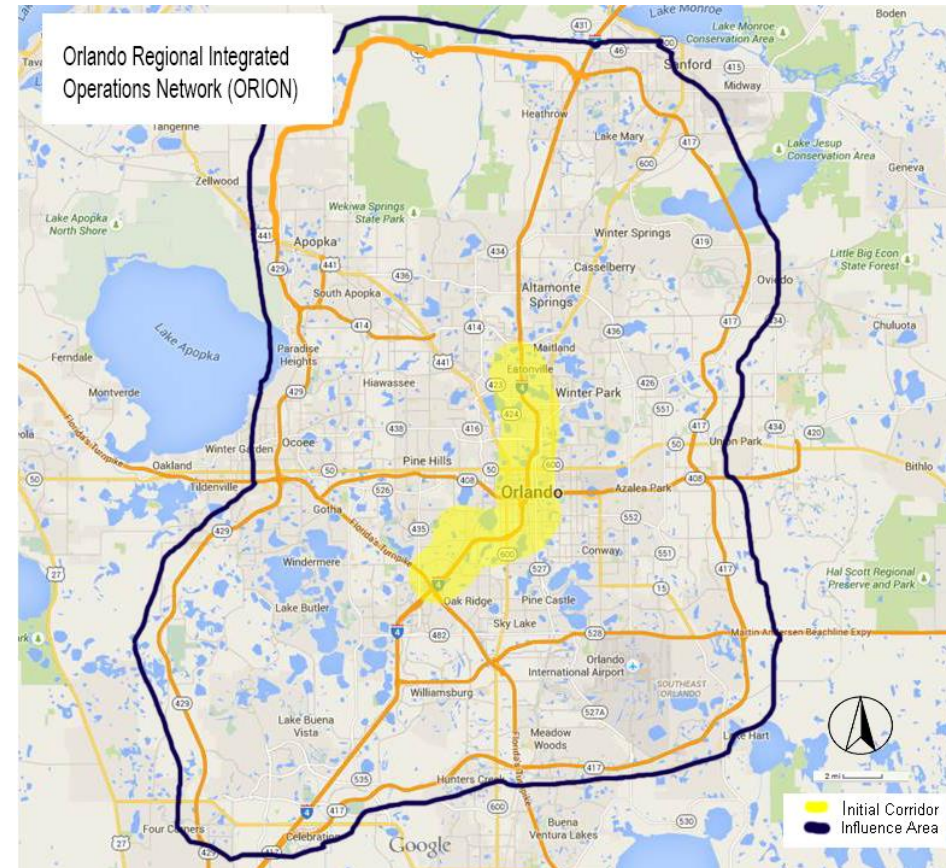
Following is presentation for TRB

Florida DOT – District 5: Big Data and Decision Support for an Integrated Corridor Management System



FDOT D5 – Integrated Corridor Management Program

- Orlando, FL region
 - FDOT (Freeways and Active Arterial Mgmt)
 - MetroPlan (MPO)
 - 2 Toll Authorities (FTE, CFX)
 - LYNX (Bus)
 - SunRail (Commuter Rail)
 - 3 County Signal Systems (Orange, Seminole, Osceola)
 - 4 Cities (Orlando, Winter Park, Maitland, Kissimmee)

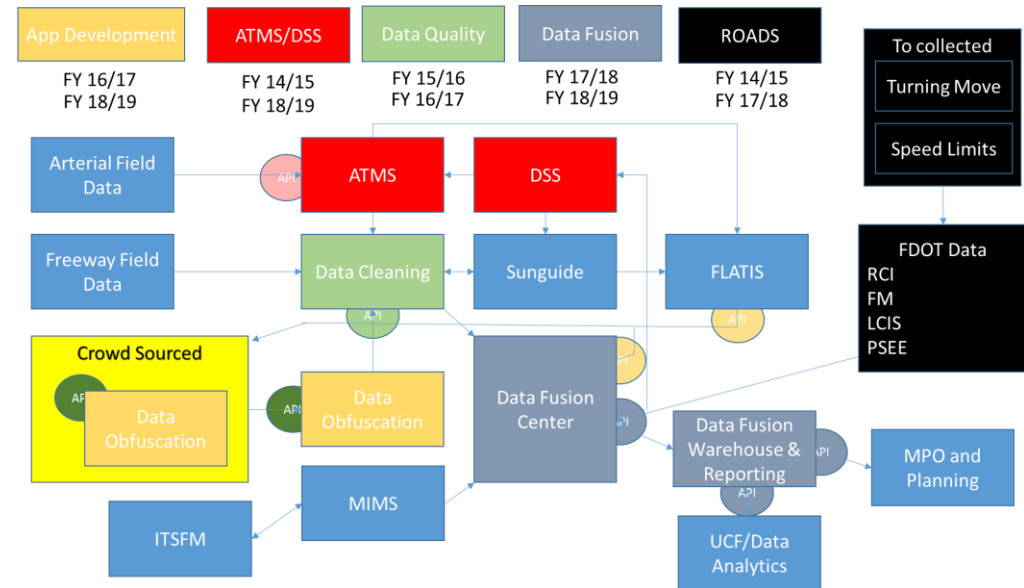


Corridor Assets

Transportation Facility (With Corresponding Agency(ies)) within the Orlando region	Summary Total
Transportation Management Centers	8 TMCs (FDOT/CFX, City of Orlando, Orange County, Seminole County, Osceola County, LYNX, SunRail, FTE)
Commuter Rail Transit System	61.5 miles (SunRail)
Bus Transit System	63 Routes (LYNX)
Computer Controlled Traffic Signal Systems	
Seminole County (TrafficWare)	380 signalized intersections
Orange County (Siemens)	600 signalized intersections
Osceola County (Econolite)	177 signalized intersections
City of Orlando (TrafficWare)	500 signalized intersections
Park and Ride Lots	12 SunRail Stations
Interstate Highway (I-4)	~ 72 miles (FDOT), 21 miles of express lanes
Toll Roads	~ 55 miles (Florida Turnpike) ~ 109 miles(CFX)

FDOT D5 - Approach

- Multi-Year / Multi-Project Approach for TSM&O within the District
 - Data Fusion and Analytics
 - Data Quality
 - Decision Support
 - Active Arterial Management
- Leverage FDOT Statewide Assets and Programs
 - SunGuide
 - ROADS



Big Data Purpose in TSM&O

- TSM&O Goals
 - To operate the arterial and freeway system more effectively, efficiently, and autonomously
 - To reduce transportation systems O&M cost
 - To identify and predict transportation issues earlier for prevention and resolution
- Big Data Solutions
 - To synergize various input data streams and sources
 - To provide real-time information to TSM&O Operations
 - To provide TSM&O information and valuable analytics to users

TSM&O Big Data Components

TSM&O Data Sharing Concept

- Get Data
- Use Data
- Share Data
- Rinse, Repeat

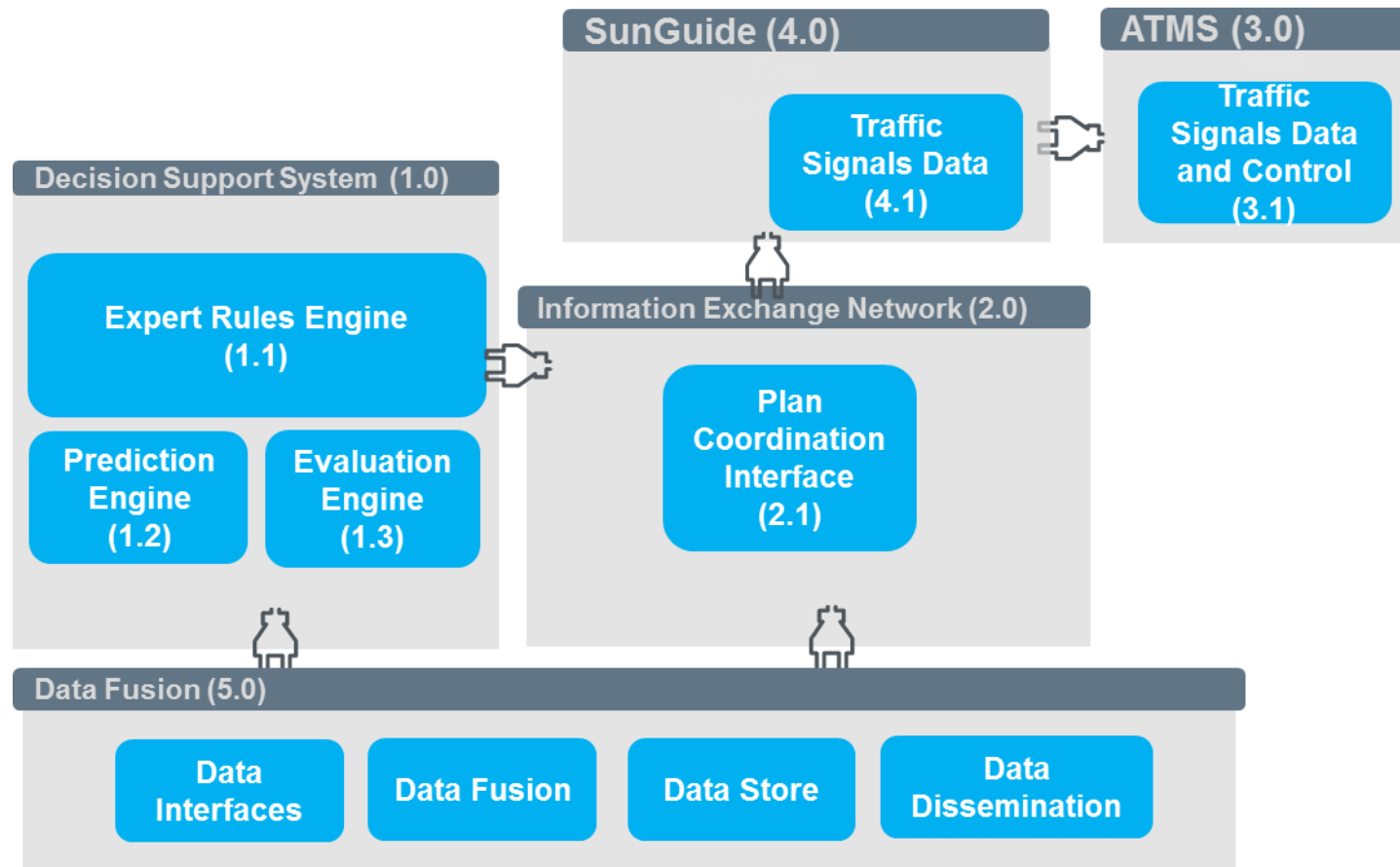
Decision Support System

- Primary Focus of the Decision Support System is to provide a consistent and repeatable response to events within the District
 - Responses to Crashes
 - Signal Timing Plans Modifications/ Selection
 - Responses to Regional Special Events
 - Responses to Transit Events
 - Responses to Commuter Rail Events
- Currently, each operator can respond differently to the same event based on personal experience
- Pre-agreed Response Plan Sets will be developed over next 18 months

Decision Support System

- Utilize a Decision Support System with Data Analytics and Predictive Modeling Support to select Response Plan
- SunGuide™ Focus for FDOT
 - Utilize ATMS functionality (CCTV, DMS, Incident Mgmt)
 - Leverage Response Plan Generation Algorithms
 - Add functionality for Signal System interfaces
- DSS and Data Fusion will interface with the SunGuide™ software

Decision Support System



Approach to ICM

- **Information Exchange Network**

- Stakeholders can view/ edit/ create events and equipment status
- Coordinate Response Plans

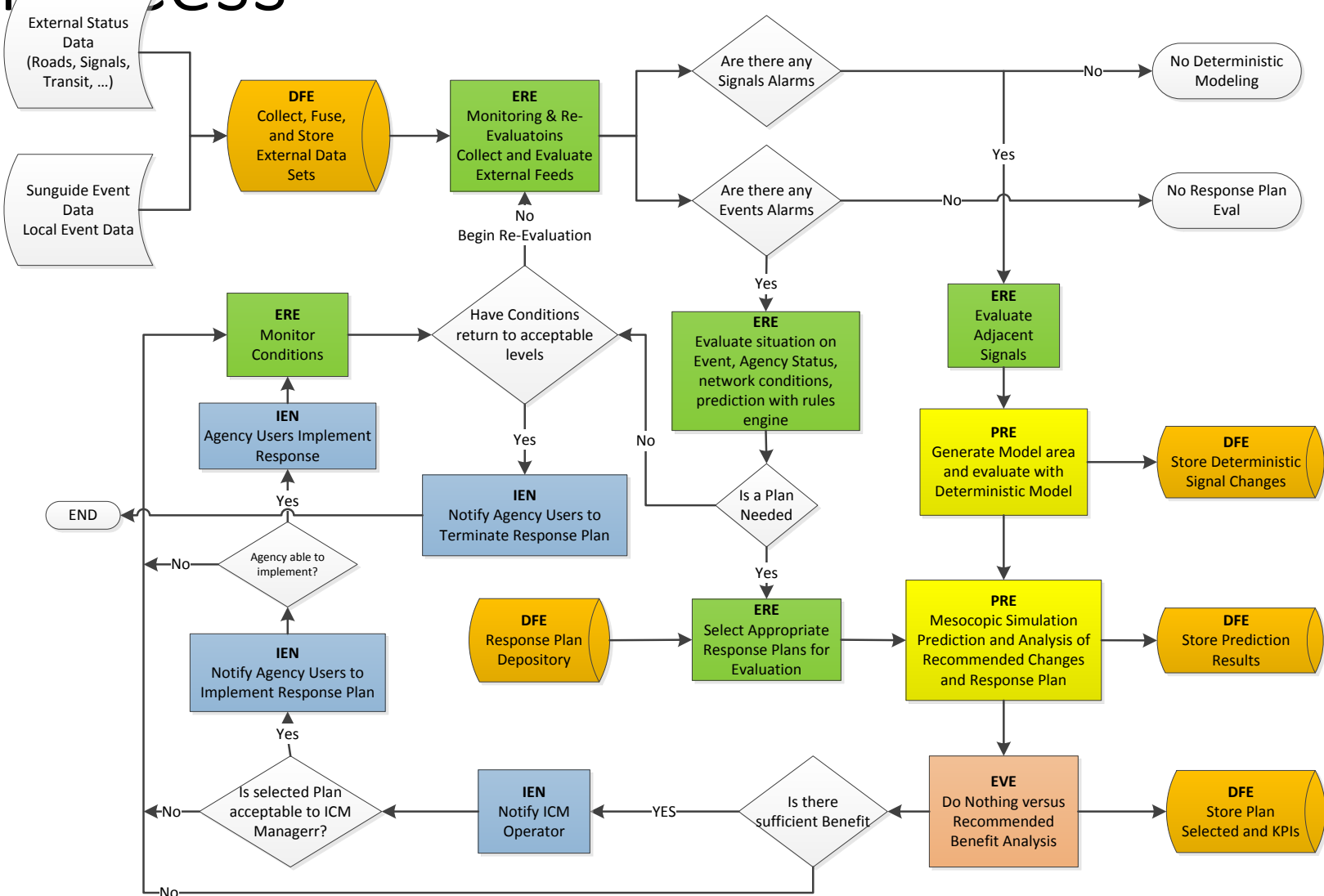
- **Decision Support System**

- Expert Rules Engine: Criteria based logic to select a Response Plan Set
- Predictive Model: Select best options within each Response Plan Set and recommend a response plan or do nothing
- Evaluation Model: Offline used to evaluate how response was done, and recommend improvements to plans

DSS Philosophy

- Hierarchical DSS
 - Level 1 : Local Signalized Intersections
 - Deterministic Model to evaluate if a signal and adjacent signals are operating outside of norms
 - Send Message to Operator with recommended changes
 - Level 2 : Regional ICM Response
 - Event Based Rules Engine select initial Plan Set (Location of Event, Severity, Time of Day)
 - Predictive Model will evaluate Plan Set to determine best options (Signal Plans, DMS Messaging, Transit Impacts) vs. a “Do Nothing” approach
 - Through IEN will notify stakeholders of changes
- Level 2 Response Plans will overrule Level 1 changes

DSS Process



Development / Procurement

- Active Arterial Management
 - Utilize existing City and County vendor traffic signal software
 - Procure a central multi-vendor traffic signal software for smaller municipal systems and FDOT to operate (TBD)
- Decision Support System
 - Invitation to Negotiate for design/ build/ O&M for a works for hire software development
 - Procure Mesoscopic Modeling Platform
- Data Fusion System
 - Invitation to Negotiate for design/ build/ O&M for a works for hire software development
 - Utilize Data Warehousing and Data Analytics Tool sets

Dr. Kevin T. Miller, PE, PMP
ICM Practice Lead
Kapsch TrafficCom Transportation
kevin.miller@kapsch.net

Active Projects

- ReIP
 - Complete – City of Orlando, Orange, Seminole County
 - In Progress – Brevard, Volusia, Osceola, Lake, Marion
- I-75
 - Polk County to CR 470 – Burn-In Complete
 - CR 470 to Turnpike – Under Construction
 - Turnpike – Under Construction
 - Turnpike to US 27 – Complete
 - US 27 to Alachua County – In Burn-In

Active Projects

- AAM
 - Phase 1 - Complete
 - Phase 2 – In Construction
 - Phase 3 – Design Complete
- TSP
 - Phase 1 – Complete
 - Phase 2 – In Construction
 - Phase 3 – Study Design next fiscal year

Active Projects

- RTMC
 - Clearing and Grubbing now
 - Project has advertised, receiving bids
- Event Management
 - Plans Complete
- Bridge Security
 - Plans Complete
- Adaptive Ramp Metering
 - Simulations finalizing, upcoming stakeholder meeting

Future Work

- Advertised Work
 - TSM&O Continuing Services (Retiming)
 - Route and Mode Choice
- Advertise Soon
 - I-75/I-95 Ramp Metering Study
 - SR 40 DBOM
 - ITS Software (Road Ranger, AVL, iVDS, MIMS, etc)
 - SR 434 Connected Vehicle
 - TMC Operations (Freeway and Arterial)



TSM&O Consortium Meeting

MEETING AGENDA

D5 Urban Office
133 S. Semoran Blvd.
Orlando, FL
Lake Apopka B Conference Room

January 12, 2017; 10:00 AM-12:00 PM

- 1) WELCOME
- 2) FDOT D5 TSM&O IMPLEMENTATION PLAN FRAMEWORK
 - Melissa Gross, VHB
- 3) METROPLAN ORLANDO ITS MASTER PLAN UPDATE
 - Eric Hill, MetroPlan
- 4) SCTPO ITS MASTER PLAN UPDATE
 - Steven Bostel, SCTPO
- 5) RIVER TO SEA TPO ITS MASTER PLAN UPDATE
 - Robert Keeth, River to Sea TPO
- 6) LAKE COUNTY ITS MASTER PLAN UPDATE
 - Dale Cody, Metric
- 7) CURRENT INITIATIVES UPDATE
 - Jeremy Dilmore, D5 ITS