



TSMO CONSORTIUM MEETING SUMMARY

Meeting Date: January 24, 2018 (Thursday) **Time:** 10:00 AM – 12:00 PM

Subject: TSMO Consortium Meeting

Meeting Location: Central Florida Expressway Authority
4974 Orl Tower Rd
Orlando, FL 32807
CFX Pelican Room

I. OVERVIEW

The purpose of this recurring meeting is to provide an opportunity for District Five FDOT staff and local/regional agency partners to collaborate on the state of the TSMO Program and ongoing efforts in District Five. David Williams gave a short introduction and outlined the meeting agenda.

II. UPDATES TO WWW.CFLSMARTROADS.COM

David Williams gave an overview of recent updates to the CFLSmartRoads website.

- David pulled up the main page for cflsmartroads.com on the presentation screen
- Anything related to TSMO is in the bottom left of the page
- Included is a new organizational chart for the FDOT District Five TSMO Group
 - Color-coded based on contract
 - Grey is FDOT employee
 - 100 staff members under TSMO group
 - Next to each name is a number (#/5), which indicates how many days these staff are in-house at FDOT
 - This chart also lists the budget and the size of the program – to convey the resources going to management leadership
- Resources provided to help incorporate TSMO processes into Planning and PD&E work efforts
 - Under [TSMO - Technical Documents](#), have provided PD&E language for Scope of Services and references to information in scope
 - Mainstreaming TSMO to other areas
 - Guidance to LAP areas and tools (strategy guide) – PD&E tools to be incorporated
 - Not defining specific smart signals technology and other technology evolutions so this guide can remain valuable and current
 - Next step is to negotiate hours in a way that is fair and makes sure that things get done
- Question: When it comes to staff estimates, how will you come to make sure you have enough money – may not even doing SEMP document?

- Since projects are projecting further out, we are assuming SEMP will be necessary for hours negotiation
- Q: Will there be a minimum hours threshold?
 - A: Yes, there is a block
- Includes high-level cost estimates to **include O&M**; would like to not to have to come up with funding later
- Comment: Would like for local agencies (maintaining agency) to be involved in the PD&E process from the beginning so that the handoff is seamless
- Comment: It would be good to have a flow chart for who should be handed off to manage this process
- Question: In Sumter County there is no traffic engineer, so how will you get in touch with these jurisdictions?
 - A: We are aware and will ensure goes to the right person

III. AUTOMATED DRIVING SYSTEMS (ADS) GRANT APPLICATION

David Williams gave an update on the Automated Driving Systems Grant Application that is currently in process.

- USDOT Notice of Funding Opportunity (NOFO)
- Based on Public Law 115-141 for ‘highly automated vehicle research and development program’ to fund planning and research
- \$60 million set aside for demonstrations that test safe integration of ADS
- \$10 million award ceiling
- Application deadline March 21, 2019
- Each demonstration is a “pilot project” with a physical demonstration
- Modeling and simulation can be included but there must be a physical demonstration
- Must include a data management plan, with emphasis on data-sharing with USDOT and public
- Cost-sharing not required, but will be a “tiebreaker” if two projects are equal in every other factor
- Need to show how the proposed project has scalability and how it addresses challenges for supporting technologies
- 3 main goals of the grant:
 - Safety
 - Data for Safety Analysis and Rulemaking
 - Collaboration
- 7 focus areas
 - Public benefit
 - Market failures
 - Economic vitality – *Buy American and Hire American*
 - Complexity of technology – SAE Level 3+ automation
 - Diversity of projects – urban, suburban, rural)
 - Transpiration-challenged populations
 - Prototypes – safe demonstration of new technology; doesn’t need to be ready for market

- CFAVP Proposal: Project Delta Demonstration (formerly, “Connected Vehicle Standardization”)
 - 5 key areas
 - Interoperability
 - RSUs and OBUs do not communicate well across brands, models, software, and hardware
 - Looking for lower barriers to interoperability
 - Provide collected data
 - Demonstrations: deploy CV at UCF campus, test interoperability between different hardware
 - Electromagnetic Interference
 - Testing lightning strikes, up to 1km away
 - Assessing risks on AV fleet in The Villages
 - Human machine interface
 - How to get people to react correctly to warning messages from OBUs?
 - Should be a standard for interfaces – provide common information
 - Universities are doing research but this is not actually impacting standard and making its way to manufacturers
 - Need something that creates muscle memory
 - Cellphone OBU emulators
 - Automated map message generation
 - Static broadcast of intersection geometry
 - Manual process – labor and time – difficult to do this quickly and in real time
 - I-4 Ultimate Project includes over 200 MOT shifts and it is difficult to keep up with the shift
 - Standardize MAP Message and develop API for CV to receive MAP message
 - Use computer vision and drones for development of MAP message application
 - Cybersecurity
 - No real standards for transportation network cybersecurity
 - Budgets are limited; difficult to hold open-ended reviews of network security
 - Will hire white hat hacker and set them loose on vulnerabilities and their recommendations
 - Will host live hackathon for UCF students to see if they can expose any vulnerabilities
 - Iterative process
 - Want to make sure that you have people who are capable show up, but may want to invite other local schools
 - Mostly deploying onto existing hardware so no need to procure new hardware (*Buy American* concerns)

IV. BUILDING A BUSINESS CASE FOR TSMO

Jordan Crandall gave a presentation on a recently published report from FHWA on how to build a business case of Institutional, Operational and Procedural changes in support of TSMO.

- There are 5 Major Sections in the report:
 1. The Need for Institutional, Organizational and Procedural (IOP) Changes
 - TSMO implementation requires different processes from those that have been used to support traditional highway construction and maintenance. These changes will be incremental.
 - **Institutional** – Growing agency culture
 - **Organizational** – staff training and development, collaboration and structure changes
 - **Procedural** – Improving business and technical processes
 - Traditional IOP arrangements are not oriented to real-time operations or supportive of continuous improvement
 2. Getting Started on Making the Business Case
 - Events that trigger a focus on TSMO
 - A major disruptive traffic incident or event
 - TSMO self-assessment
 - A change in top-level policy priorities
 - Public concern about increased traffic congestion
 - The implications of more effective utilization of new technologies
 - Anticipation of major construction or maintenance projects
 - A shortfall in agency resources, making it more challenging to pursue expensive new capacity projects.
 - A business case is not always made in a formal document and may also take place in informal conversations, media presentations, infographics and web pages
 - 7 Characteristics of an effective business case:
 - Tailoring the IOP business case to **local priorities**
 - Illustrating how current experience and events indicate that TSMO can **augment the effectiveness and benefits** of the full range of current agency programs
 - Specifying the strategic IOP changes needed, including the **specific actions** that need to be made, the desired **outcomes**, and relating the changes to the appropriate **decision-making level**
 - Including both external and internal **benefits and payoffs** at the program level
 - Describing the required **levels of effort** and **resources** associated with the needed changes
 - Identifying relationships between **costs, benefits, and risks**
 - Targeting the IOP business case to **specific audiences**
 3. Preparing the Business Case – 7 Essential Sections
 - Describe the jurisdiction's current system as a **baseline**
 - Describe how **current problems** suggest that an effective TSMO response **requires changes** that integrate TSMO more formally
 - **Specify** the recommended or required **actions**
 - Identify the external and internal **benefits and payoffs**

- Identify and quantify **costs** (money and time)
- Discuss the overall balance between **rate of return and risks**
- Identify the **responsibilities** for change management
- 4. Agency Leadership Support for Key Institutional, Organizational and Procedural Changes
 - Internal Process changes rely on leadership
 - May include **agency directors** or **appointed officials** who are less familiar with existing processes
 - For career leadership, it is likely that their success has been built on their effectiveness in managing the legacy agency programs and fully understanding every aspect of agency structure and management
 - For externally appointed leadership, their appointment typically reflects management experience and understanding of broader governance which may or may not have included experience with your local agency—much less TSMO
 - Understanding Leadership Capital:
 - The **reputation** of the organization is the responsibility of leadership
 - Agency leaders have established their **credibility** by supporting an effective and stable organizational structure and may be **hesitant to introduce changes** that cause instability
 - Agencies are built around a **legacy** of technical expertise and new technologies and concepts are likely to be met with **skepticism**
- 5. Tailoring the Business Case to Specific Audiences
 - Agency Leaders and Management
 - Short and simple (2-4 pages) with links to overall agency mission
 - Cost benefit justification tailored to the agency, with **local examples** if possible
 - Clear explanation of how TSMO programs complement existing capacity, safety and maintenance programs
 - Concise description of next steps and their role in those steps (call to action)
 - Agency Staff
 - Effective execution relies on the buy-in of all staff involved
 - Ideally involved in generating the business case argument
 - A more technical discussion is likely helpful
 - Specific description of changes to day-to-day roles
 - Agency Partners
 - Information on how and why increased cooperation and alignment with TSMO strategies will enhance their own program effectiveness
 - Business case should be compact and retain primarily issues related to that partners own interests
 - Discussion will be more technical than those intended for general public
 - Common goals may include partnerships in traffic incident management, work zone management and project funding processes
 - General Public
 - Concise and high-level (1-2 pages)
 - Minimal text, with use of infographics and simple charts in order to engage as many people as possible

- Industry jargon including “TSMO” should be avoided
- Improvements should be discussed in terms of services and outcomes rather than projects and programs
- Benefit to cost ratios may be more appropriate than \$ figures
- Should be described as synergistic with traditional approaches since it may otherwise be communicated that funds were misspent in the past
- Elevator Speech
 - The overall objective of the business case for IOP changes
 - The top priority IOP change that the agency wants to accomplish
 - The basic argument/rationale for making this IOP change
 - A reference to the agency’s business case along with an offer to send an electronic or hard copy, or set-up a follow up meeting

V. DATA DOWNLOAD TOOL DEMONSTRATION

Jeremy Dilmore gave a brief presentation on the District 5 Data Fusion Portal [now **SunStore**], and how to access data that is available in it.

- As much data as possible has been aggregated into this portal
- But all the of the data that is available is not currently understandable or apparent
 - Since being initially released, a section has been added to download metadata to understand what is contained in the dataset
- Started to answer “what does that column mean” many times, so now the Department is working to make the user interface is more elegant. Users should be able to navigate interface without previous explanations of or experience with the SunStore platform.
- Now added a sample data button to help you understand what you’re getting quicker
- Can download as .csv or .json
- A login is required to provide a small barrier to entry so that a DDOS attack is not attempted
- Have certain datasets grouped based on who the user is
- The Department has set up a page to allow large downloads that will email you when the download is available
- The system will not show you the things you can’t download
- Can export smaller datasets by requesting info by an event window
- Working on how to isolate data before downloading better
- Working on quick summary – which dates include dates, etc – making the data more malleable
- Pre-staged data will show you already queried data that will push data much faster
- If you have two choices of data banks, you can choose the source
- Data is refreshed based on how often the data is published at the source
- Question: Are you considering additional filters to localize the data?
 - Working on temporal filtering and then location is next

VI. INTEGRATED CORRIDOR MANAGEMENT DOCUMENTATION

Jeremy Dilmore discussed how District Five is attempting to introduce new data analytics to improve the usefulness of data that exists today.

- Had design meeting for iteration #2 and demonstrated associated features
- Showed additional progress on dashboards
- Focusing on incidents that induce response plan
- ICMS operator review, agency approval, then execution (ex: flush corridor timing plan)
- Building out mesoscopic model
- Looking at doing signal retiming via needs-based not time-based
- Looking for what is out of step with the rest of the system
- Taking ATSPM data and making it more useful
 - Works better at under capacity roads and not as good at turning movements
- Looking at latent demand because loops don't pick up overcapacity roads because they are always full (data analysis is hard for these intersections)
- Current Issues
 - System concept and design
 - Response plan development
 - Operations
- ITSQA – first real time operational system in the journey
- Connects data sources to apps
- Adjusting before sent into HCS or Synchro to get the best data possible
- Rebranding effort to change name of data fusion environment
- A mentality of “collect once share often”
- Other work – signal inventory
 - MMA/MDP
 - App to take pictures and send to TMC – already geopositioned and populating additional data and can type notes more easily
 - Route and Mode Choice
 - OBU emulator
- Signal Inventory
 - Intent to integrate data streaming into MIMS
 - Creating MSP for future projects to stream back into MIMS/ITSFM
 - In design now (mobile app) – for iteration 2
 - Set up as progressive web app
- Comment: Best if it works with public access without getting IT involved without VPNs, etc.

VII. CAV BUSINESS PLAN – EXECUTIVE WORKSHOP

Jeremy Dilmore briefly discussed progress the CAV Business Plan Executive Workshop.

- Gave overview of 7 focus areas
- Moving forward: Trying to say that money is now available, showing what is programmed and what is still up for grabs

- Granular progression of learning more and more – what are the bite sized steps that can be accomplished for an overall programmatic view to be accomplished
- Implementation that benefits at the project scale but lessons that can be applied to the whole state

VIII. CURRENT INITIATIVES

Jeremy Dilmore briefly discussed current initiatives around the District.

- Department of Defense – No Chinese cameras by 2020
 - Do not need to get rid of hardware you already have
 - For new purchases in 2020
 - Will be taken off APL
 - Many manufacturers have already changed suppliers and the transition will be seamless by 2020
 - Buying in 2019 that isn't repairable in 2020 is not a good idea, however
- Push-button contract
 - Looking to best practices from other districts
 - D2 working on contract with Feds – can easily write contract quickly and get federal funding very quickly
 - Working to follow planning consistency while also meeting federal guidelines
 - Ongoing research efforts – UCF taking ATSPM data into TMC and working to optimize loops with TMC data to create a better picture
 - Measuring what cameras can see (bike, truck, etc) turning that into data and looking at trajectory, etc
 - Made most progress on ATSPM data from Seminole county and seeing what systems work together for different times of day- this will be displayed when full done
- Rebranding ATCMTD for greater visibility – appealing more to broader public
- AV Shuttle status
 - Still working with UCF – many recruiting offices
 - Getting check of approval with the ITB
 - Significant improvement – very specific about requirements
- RTMC – showed pictures that are one week old
 - Showing floor is in, roof is in, power is on, some carpet down – communications coming in
 - Next steps: Getting line in from phone company to hook up fire system, then can move furniture in
 - Opening in Mid-Feb (Jeremy) – or in May (Tushar)
- Q: Moving Master hub to OOC building
 - A: Bryan, thank you we set up on US 441 and SR 528, Turnpike and SR 429 – so offloading as many connections as possible
 - Comment: I have 144 fiber between I-4 and Colonial
 - Looking at replacing with 24
 - Bringing in from Semoran Blvd to Lake Underhill Rd

- Eric Hill Commented that the previously appointed group will need to get together soon to discuss the next steps for addressing the Central Florida MPO alliance.

IX. NEXT MEETING – March 7, 2018 at Central Florida Expressway Authority

X. ATTACHMENTS

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

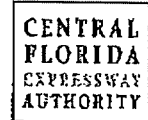
END OF SUMMARY

This summary was prepared by Jordan Crandall and David Williams, 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

CENTRAL FLORIDA EXPRESSWAY AUTHORITY
VISITORS SIGN IN/OUT LOG
JANUARY 2019



Date	Visitor's Name	Company Name	Person Authorizing Access	Time In	Time Out	Visitor Badge Number
1.24.2019	David Williams	VHB	E. Potter	9:00		107
1.24.2019	Jordan Crandall	VHB	E. Potter	9:00		36
1.24.2019	Shailesh Patel	Santer County	E. Potter	9:15	12:15	9
1.24.2019	RICHARD EARP	CITY of APOPKA	E. Potter	9:45		47
1.24.2019	Nael Olayza	Seminole County	E. Potter	9:40	12:00	43
1.24.2019	Chelsea Forgenie	SCTPD	E. Potter	9:40	12:04	53
1.24.2019	R. Z Hill	MetraPlan	E. Potter	9:50	11:45	110
1.24.2019	Ron Kato	WSP	E. Potter	9:50	12:00	98
1.24.2019	Melissa Gross	InNovo	E. Potter	9:50	12:02	30
1.24.2019	Scott Arnold	City of Melbourne	E. Potter	9:50	12:01	56



TSM & O CONSORTIUM

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

VISITORS SIGN IN/OUT LOG

JANUARY 2019

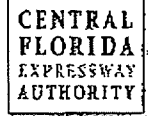


Date	Visitor's Name	Company Name	Person Authorizing Access	Time In	Time Out	Visitor Badge Number
1.24.2019	TODD DAVIS	VHB	E. Potter	9:06	12:14	14
1.24.2019	Deborah Snyder	SUMMER COUNTY	E. Potter	9:20	12:13	50
1.24.2019	Steven Cohoon	" "	E. Potter	9:20	12:13	106
1.24.2019	Tushan Patel	" "	E. Potter	9:35		1
1.24.2019	H. Warner	FTE	E. Potter	9:37	12:23	5
1.24.2019	Pam Richmond	Apopka	E. Potter	9:39		70
1.24.2019	Beau Kirkland	Apopka	E. Potter	9:40		72
1.24.2019	Charlie Wetzel	Seminole Co	E. Potter	9:40	12:00	91
1.24.2019	Steven Bester	SCTPC	E. Potter	9:40	12:05	58
1.24.2019	BRIAN HUTT	LAKE SUMMITT MPO	E. Potter	9:45	12:07	80



TSM & O CONSORTIUM

CENTRAL FLORIDA EXPRESSWAY AUTHORITY
VISITORS SIGN IN/OUT LOG
JANUARY 2019



Date	Visitor's Name	Company Name	*Person Authorizing Access*	Time In	Time Out	Visitor Badge Number
1.24.2019	Tithomas Davis	Suinter County	E. Potter	9:50	12:44	17
1.24.2019	Lidya Abdelmalak	Innova Partners	E. Potter	9:52	12:05	64
1.24.2019	AUSSA TURKES	ORANGE COUNTY	E. Potter	9:54	12:04	103
1.24.2019	Jeremy Tolun	FDOT	E. Potter	9:56		18
1.24.2019	Michael Wonn	LS MPD	E. Potter	9:50	12:03	7
1.24.2019	Jorge A. Barrios	Kittelson	E. Potter	9:57	12:00	47
1.24.2019	Katil King	Metric	E. Potter	9:58	12:23	54
1.24.2019	Hazen El-asser	Orange Co.	E. Potter	9:59	12:00	115
1.24.2019	Angus Thurin	Gaurett Fleury	E. Potter	9:59	11:40	42
1.24.2019	FRANCO FRANCO	LYNX	E. Potter	9:59	12:00	124

Welcome to the TSM&O Consortium Meeting January 24, 2019



Meeting Agenda

1. Welcome
2. Updates to CFLSmartRoads
3. Automated Driving Systems (ADS) Grant Application
4. Building a Business Case for TSM&O
5. Data Download Tool Demonstration
6. Regional Integrated Corridor Management Documentation
7. CAV Business Plan – Executive Workshop
8. Current Initiatives

Updates to CFLSmartroads.com

David Williams, VHB

CFLSmartRoads Updates – PD&E Scope of Services

The CONSULTANT will **evaluate a broad range of systems** as it relates to the PD&E study, such as Connected Vehicle, Autonomous Vehicle, traffic signal system, communication system, travel time systems, Transit Signal Priority (TSP), Adaptive Signal Control Technologies (ASCT), Signal Controller Technology, Integrated Corridor Management, and other Advanced Traveler Information Systems and Advance Traveler Management Systems. The CONSULTANT shall utilize the **TSMO Strategy Guide** for preliminary screening.

CFLSmartRoads Updates – PD&E Scope of Services

The CONSULTANT will **review existing master plans from the MPO, FDOT, and municipality** (where applicable) to determine existing and planned Intelligent Transportation Systems (ITS) infrastructure. Engineering judgment and corridor knowledge shall be applied to develop a recommended list of TSMO strategies to complement, postpone, or replace roadway improvements. Subsequently, the **CONSULTANT shall meet with FDOT TSMO for review and concurrence**. Alternatives will then be coordinated with the County Traffic Engineer and the City Transportation Engineer concerning existing and proposed ITS and Advanced Traffic Management System (ATMS) infrastructure.

CFLSmartRoads Updates – PD&E Scope of Services

The **CONSULTANT shall complete the Systems Engineering documentation** in accordance with Code of Federal Regulations Rule **(CFR) 940** and Department Systems Engineering Management Plan **(SEMP) guidance**. As part of the Systems Engineering process, the CONSULTANT will assess the risk for proposed strategies, using the **Project Risk Assessment and Regulatory Compliance Checklist** (Form 750-040-05).

CFLSmartRoads Updates – PD&E Scope of Services

For **low-risk elements**, the completed Project Risk Assessment document will satisfy the systems engineering documentation requirement. For **high-risk elements**, the Systems Engineering Project Checklist (Form 750-040-06) shall be completed, including a Project Systems Engineering Management Plan (PSEMP) along with the ConOps and Architecture updates, to satisfy CFR Rule 940 requirements.

CFLSmartRoads Updates – PD&E Scope of Services

The CONSULTANT will evaluate the need for improvements or modifications to the existing TSMO system in relation to the alternatives being considered. This includes **reviewing TSMO alternatives in combination with capacity improvements**. The CONSULTANT will develop a **high-level cost estimate** for the changes necessary to the infrastructure in order to meet project TSMO needs and goals. Cost shall include **operations and maintenance** phases. These items will be documented in the ConOps.

Automated Driving Systems (ADS) Grant Application

David Williams, VHB

ADS Demonstrations Grant Application

- Public Law 115-141 appropriates funding for a “**highly automated vehicle research and development program**” to fund planning, direct research, and demonstration grants for ADS and other driving automation systems/technologies.
- **\$60,000,000** must be used for demonstrations that test the safe integration of ADS into on-road transportation system
- **\$10,000,000** award ceiling
- <https://www.grants.gov/web/grants/view-opportunity.html?oppld=310839>



U.S. Department of Transportation

Notice of Funding Opportunity (NOFO) Number 693JJ319NF00001

“Automated Driving System Demonstration Grants”

Issue Date: 12/21/2018

Application Due Date: 3/21/2019

ADS Demonstrations Grant Application

- Each demonstration **must** include a physical demonstration
 - Modeling and simulation can be part of a demonstration
- Lack of data sharing will be viewed negatively
- Cost-sharing not required; viewed favorably
- Each demonstration must include **input/output user interfaces**
- Each demonstration must show it has **scalability**
- Demonstrations can address challenges for “**support technologies**”
- **Period of Performance: 1-4 Years**
- **Application Deadline: March 21, 2019**



U.S. Department of Transportation

Notice of Funding Opportunity (NOFO) Number 693JJ319NF00001

“Automated Driving System Demonstration Grants”

Issue Date: 12/21/2018

Application Due Date: 3/21/2019

ADS Demonstrations Grant Application – GOALS

- **Safety**

- Safe integration of ADS into Nation's roadway system
- Demonstrate how challenges to safe integration of ADS can be addressed

- **Data for Safety Analysis and Rulemaking**

- Significant data gathering and sharing of project data with USDOT/public
- Commitment to using demonstration data/results in innovative ways
- Provide data/information to identify risks, opportunities, and insights relevant for USDOT safety and rulemaking priorities

- **Collaboration**

- Create collaborative environments that harness the collective expertise, ingenuity, and knowledge of multiple stakeholders
- Early and consistent stakeholder engagement

ADS Demonstrations Grant Application – FOCUS AREAS

- **Significant Public Benefit**

- “larger-scale projects that result in a significant benefit(s) to the public”

- **Addressing Market Failures**

- Industry lacks adequate incentives to participate (cost/risk too significant)
- Lack of private sector investment has not proven sufficient to support particular groups (e.g., access for individuals with disabilities)

- **Economic Vitality** (“Buy American and Hire American”)

- Support U.S. industrial base through Buy American and other reqs.
- Support economic vitality at national/regional level
- Promote domestic development of intellectual property

- **Complexity of Technology**

- Demonstrate SAE Level 3 or higher automation

ADS Demonstrations Grant Application – FOCUS AREAS

- **Diversity of Projects**

- Serve a variety of **communities**: Urban / Suburban / Rural
- Serve a variety of **markets**: Freight / Personal Mobility / Public Transit

- **Transportation-challenged Populations**

- Test applications with the greatest potential to serve transportation-challenged populations (e.g., older adults, individuals with disabilities)
 - Options to make transfer easy

- **Prototypes**

- Include technologies that are, at a minimum, in **limited prototype state** suitable to support **safe demonstrations** but do not need to be ready for broader deployment

ADS Demonstrations Grant Application

- Working Title: CONNECTED VEHICLE STANDARDIZATION
- Five Key Areas
 1. Interoperability
 2. Electromagnetic Interference (EMI)
 3. Human-Machine Interface (HMI)
 4. Automated MAP Message Generation
 5. Cybersecurity
- Emphasis on standardizing documents, guidance materials, data
- Leverage existing hardware deployments
 - ATCMTD, UCF Campus, I-75 FRAME, THEA CV Pilot
- Leverage existing research partnerships

Key Area – Interoperability

- **Key Issue(s):**

- Lack of interoperability between RSU/OBU models leading to market deficiencies and public investment concerns; potential vendor lock
- Agencies and vendors have limited information

- **Objective(s):**

- Lower barriers to interoperability
- Standardize baseline hardware specs
- Provide industry with collected packet data for a development path

- **Demonstration(s):**

- Verify message types are consistent in Connected Vehicle
- Test that cellular and DSRC messages received by CV allow it to function appropriately
- Deploy CV at UCF Campus; test functionality with infrastructure hardware

Key Area – Electromagnetic Interference (EMI)

- **Key Issue(s):**

- What are the potential risks and impacts on ADS associated with electromagnetic interference

- **Objective(s):**

- Evaluate risks and impacts of EMI from lightning and other sources in controlled and uncontrolled environments

- **Demonstration(s):**

- Conduct closed testing at the UF Lightning Research Lab (direct strike to 1km)
- Assess risk of EMI impacts on AV fleet deployed in The Villages

Key Area – Human-Machine Interface (HMI)

- **Key Issue(s):**

- How do you get drivers to react correctly to warning messages from OBUs?
- Drivers in CAV must be able to react instantly to alert messages in emergency. There needs to be a standard for these messages.
- Manufacturers are tackling this issue in isolation; testing HMI can be expensive

- **Objective(s):**

- Provide common information for all manufacturers
- Understand transportability of platforms
 - Message delivery via in-mirror, in-dash, or head-up display. What about cellphone OBU emulators?

- **Demonstration(s):**

- Simulated cell-phone and vehicle-based HMI at SunTrax
- Demonstration in City of Ocala and at UCF based on simulation findings

Key Area – Automated MAP Message Generation

- **Key Issue(s):** *MAP message = static broadcast of intersection geometry from RSUs*
 - MAP message takes approximately **45 steps** to develop; **another 45 steps** to install
 - I-4 Ultimate Project includes over 200 MOT shifts; can't keep up with shifts
 - CAV will depend on real-time geometric information to avoid safety hazards
- **Objective(s):**
 - Standardize MAP message; Develop API for CV to receive MAP message
 - Use Computer Vision and Drone technology for development of MAP message application
 - Make application a web service for geocoded video for MAP generation
 - Allow webservice to receive confirmation on MAP message and push to RSUs/OBUs
- **Demonstration(s):**
 - Develop MAP message for known intersections at UCF, Sumter County, and Tampa (THEA)
 - Mock up intersection at SunTrax using cones; update MAP message to demonstrate timing
 - Deliver message to CV at UCF; evaluate receipt of and response to message

Key Area – Cybersecurity

- **Key Issue(s):**

- Central Florida has undergone an evaluation of its network and developed principles (general best practices) to follow to minimize risk of cyberattacks... **How'd we do???**
- No standard that speaks to traffic signal systems/ITS on how vulnerable an agency is and what standard should be met to prepare for future
- Budgets are limited; so is understanding of the real areas of risk in a system

- **Objective(s):**

- Hire a white hat hacker; set them loose; document vulnerabilities & recommendations
- Implement changes accordingly; document process/costs
- Rinse / Repeat

- **Demonstration(s):**

- After implementation of new cybersecurity standards (see objectives above), hold an event at UCF for cybersecurity students to conduct white hat hacks

ADVANCING TSMO:

Making the **Business Case** for
Institutional, Organizational, and
Procedural Changes



U.S. Department of Transportation

Federal Highway Administration

Transportation Systems Management & Operations



















Overview

1. The Need for Institutional, Organizational and Procedural (IOP) Changes
2. Getting Started on Making the Business Case
3. Preparing the Business Case – 7 Essential Sections
4. Agency Leadership Support for Key Institutional, Organizational and Procedural Changes
5. Tailoring the Business Case to Specific Audiences

The Need for Institutional, Organizational and Procedural Changes

The Need for TSM&O

		Decreased travel time and delay			Improved collaboration
		Improved reliability			Better agency efficiencies
		Reduction in crashes			Lower implementation costs
		Lower vehicle operating costs			Faster implementation timelines

The Need for Institutional, Organizational and Procedural (IOP) Changes

TSM&O implementation requires different processes from those that have been used to support traditional highway construction and maintenance. These changes will be incremental.

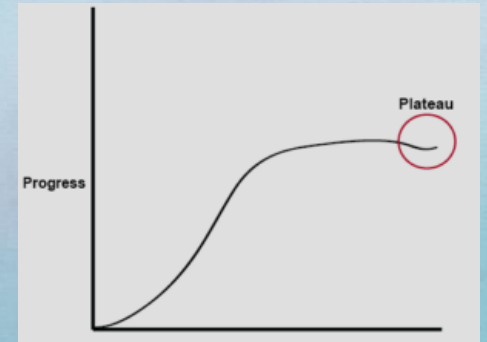
- **Institutional** – Growing agency culture
- **Organizational** – staff training and development, collaboration and structure changes
- **Procedural** – Improving business and technical processes



Why Make the Business Case

Traditional IOP arrangements are not oriented to real time operations or supportive of continuous improvement

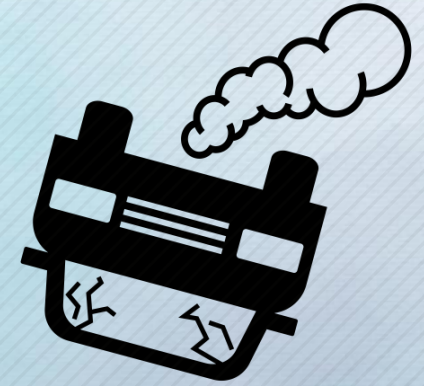
Since many of the needed IOP changes are beyond the span of control of TSMO managers on their own, this situation has often led to a “**plateauing**” of TSMO effectiveness—highlighting the need to make the business case to senior managers and agency leadership for a greater commitment to continuous advancement



Getting Started Making the Business Case

Events That Trigger a Focus on TSM&O

- A major disruptive traffic incident or event
- TSM&O self-assessment
- A change in top-level policy priorities
- Public concern about increased traffic congestion
- The implications of more effective utilization of new technologies
- Anticipation of major construction or maintenance projects
- A shortfall in agency resources, making it more challenging to pursue expensive new capacity projects.



Business Case Formats

A business case need not be confined to a technical document, and may serve best as:

- **Informal conversations** with agency colleagues
- Interactive **media presentations** to either internal audiences or external stakeholders
- Visual aids such as **infographics** that can quickly communicate key points to a variety of audiences
- A **Web page** or document posted on the agency's website.

Characteristics of an Effective Business Case

- A. Tailoring the IOP business case to **local priorities**
- B. Illustrating how current experience and events indicate that TSM&O can **augment the effectiveness and benefits** of the full range of current agency programs
- C. Specifying the strategic IOP changes needed, including the **specific actions** that need to be made, the desired **outcomes**, and relating the changes to the appropriate **decision making level**

Characteristics of an Effective Business Case

- D. Including both external and internal **benefits and payoffs** at the program level
- E. Describing the required **levels of effort** and **resources** associated with the needed changes
- F. Identifying relationships between **costs, benefits, and risks**
- G. Targeting the IOP business case to **specific audiences**

Preparing the Business Case

7 Essential Sections

Business Case Organization

1. Describe the jurisdiction's current system as a **baseline**
2. Describe how **current problems** suggest that an effective TSM&O response **requires changes** that integrate TSM&O more formally
3. **Specify** the recommended or required **actions**
4. Identify the external and internal **benefits and payoffs**
5. Identify and quantify **costs** (money and time)
6. Discuss the overall balance between **rate of return and risks**
7. Identify the **responsibilities** for change management

1. Current System Performance and TSM&O Activities as a Baseline for Change



Purpose: Orient the intended audience through a description of the seriousness of the system operational disruptions and challenges facing the agency

General Content:

- Current system performance, TSM&O related challenges, existing TSM&O activities and historical context
- Local statistics on congestion and incidents and how these affect the transportation system, how TSM&O supports the agency's mission

2. Describe How Current Experiences Suggest that an Effective TSM&O Response Requires Changes

Purpose: Describe that improving the agency's TSM&O effectiveness will require internal process improvements

General Content:

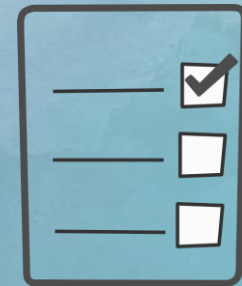
- Opportunities for improving effectiveness of the current system
- Describe desired next steps, and desire not to plateau in effectiveness due to internal barriers
- Cite federal research that shows the effectiveness of TSM&O programs are dependent on building strong internal processes

3. Specify the Recommended or Required IOP Actions

Purpose: Identify and document the specific IOP actions that are proposed to support evolution from “TSM&O as a set of ad hoc activities” to the desired status of “mainstreamed TSM&O.”

General Content:

- Gaps identified by CMM assessment and steps identified to move forward, which may include:
 - Adjusting key business and technical processes
 - Building staff capabilities
 - Targeting key organization and institutional changes



4. Identify Benefits and Payoffs from Proposed Changes

Purpose: This is the “why” of the specific proposed changes

General Content:

- Identify both **internal** (agency) and **external** (mobility and safety) payoffs with examples
- Ex: Research shows improving the effectiveness of TSM&O strategy applications will help address more than half of an average region’s delay

4.

Payoffs

IOP	Capability Improved	External (Customers)	Internal (Agency)
Processes	<ul style="list-style-type: none"> ▶ TSMO integrated into agency planning and programming. ▶ TSMO part of agency project development process. ▶ TSMO-oriented performance measures specified. ▶ Measures used for real-time operational management. ▶ Systems engineering utilized. ▶ Best available technology standardized. 	<ul style="list-style-type: none"> ▶ Better targeting on causes. ▶ Focus on more complex settings. ▶ Improved response time and strategy effectiveness. ▶ Providing continuous improvement. ▶ Effective detection and solution arrangements. ▶ Decision-support systems incorporated. 	<ul style="list-style-type: none"> ▶ Cost effective use of limited funds. ▶ Ability to use best available technology for efficiency. ▶ Assurance that funds are being used cost effectively. ▶ Public accountability. ▶ Improved detection and response to disruption, and real time management of the system.
Organization	<ul style="list-style-type: none"> ▶ Stove piping reduced. ▶ Staff capabilities improved. ▶ Improved coordination. 	<ul style="list-style-type: none"> ▶ More accurate and timely responses to nonrecurring events. 	<ul style="list-style-type: none"> ▶ Improved staff efficiency. ▶ Ability to capitalize on new concepts.
Institutional	<ul style="list-style-type: none"> ▶ TSMO embedded in formal agency mission and policy. ▶ Improved partner collaboration. ▶ Visible agency TSMO leadership and support. 	<ul style="list-style-type: none"> ▶ Clarifies expectations. ▶ Quicker/more effective response. ▶ Public accountability. 	<ul style="list-style-type: none"> ▶ Includes TSMO considerations in project prioritization. ▶ Reliable support for TSMO units. ▶ Efficient integration.

5. Identify and Quantify Costs and Resource Requirements

Purpose: To make it clear what is necessary to make the requested changes



General Content:

- **Dollar costs, level of effort and top management initiatives**
- Specify who will bear these costs
- There are also risks associated with actions not taken

6. Discuss the Balance Between Return and Risk

Purpose: To compare potential payoffs with resource expenditure to demonstrate which actions are appropriate

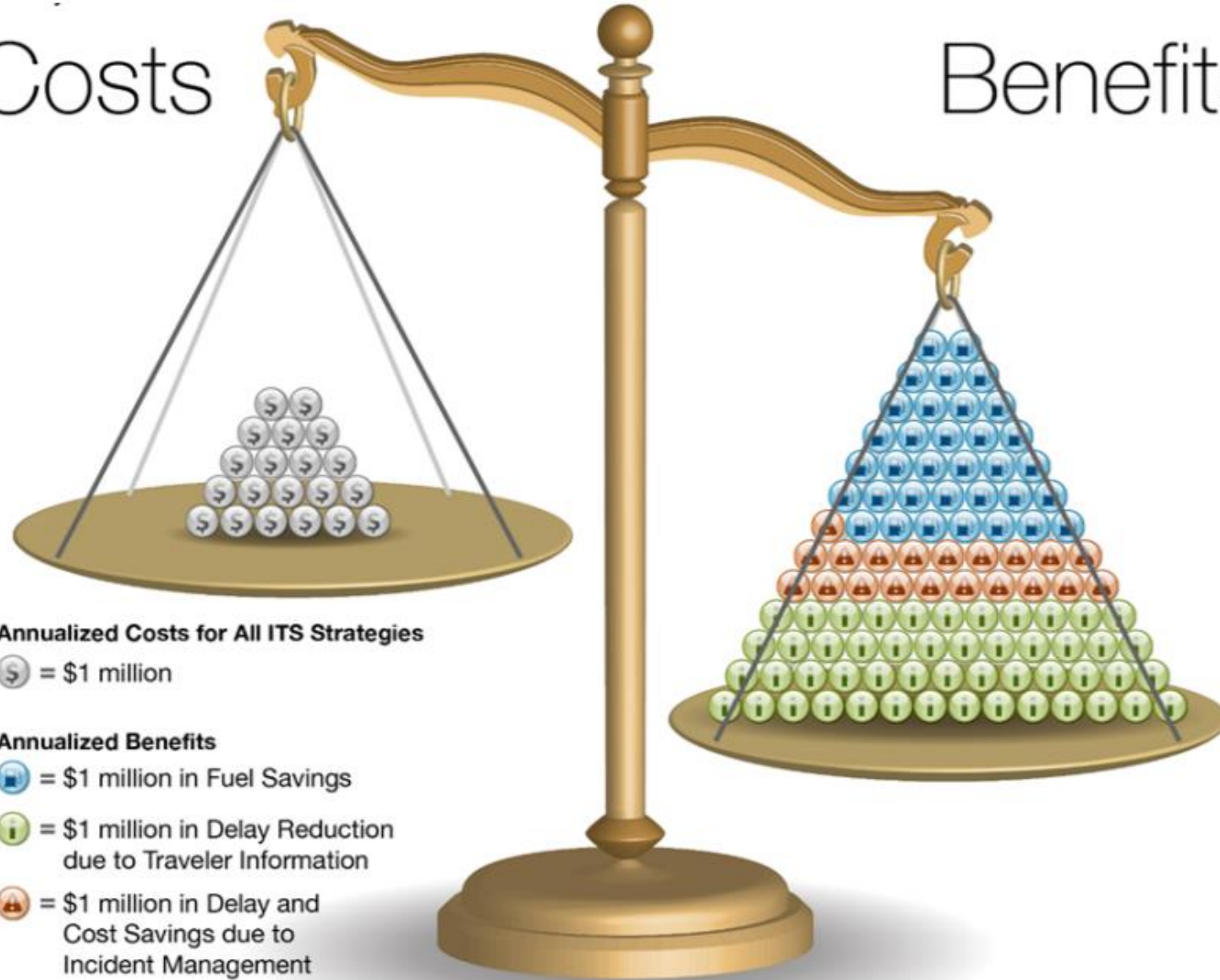
General Content:

- Show costs and benefits side by side
- Acknowledge that some benefits or yet to be measured or are unquantifiable altogether
- Discuss the cost of inaction and the benefits of action in contrast

6.

Costs

Benefits



Annualized Costs for All ITS Strategies

☞ = \$1 million

Annualized Benefits

🚗 = \$1 million in Fuel Savings

📍 = \$1 million in Delay Reduction due to Traveler Information

🚧 = \$1 million in Delay and Cost Savings due to Incident Management

\$4.0 million

Annual costs of all ITS strategies on arterials

\$20.0 million

Annual costs of all ITS strategies on freeways

5.2 TO 1

Benefit to Cost Ratio for freeways

\$70 million

Annual delay and cost savings from freeway incident management

\$104 million

Overall annual benefit from all ITS strategies on freeways

7. Identify Responsibilities for Change Management

Purpose: Identify specific responsibilities in order to best understand how implementation will proceed



General Content:

- Responsibilities at the individual, unit and agency level
- Identify critical changes that require support and authorization from management or among several units
- Create an understanding that process changes require time and effort

Agency Leadership Support for Key Institutional, Organizational and Procedural Changes

Tailoring the Business Case to Leadership

- Internal Process changes rely on leadership
- May include **agency directors** or **appointed officials** who are less familiar with existing processes
 - For career leadership, it is likely that their success has been built on their effectiveness in managing the legacy agency programs and fully understanding every aspect of agency structure and management
 - For externally appointed leadership, their appointment typically reflects management experience and understanding of broader governance which may or may not have included experience with your local agency—much less TSM&O

Understanding Leadership Capital



- The **reputation** of the organization is the responsibility of leadership
- Agency leaders have established their **credibility** by supporting an effective and stable organizational structure and may be **hesitant to introduce changes** that cause instability
- Agencies are built around a **legacy** of technical expertise and new technologies and concepts are likely to be met with **skepticism**

Tailoring the Business Case to Specific Audiences

Agency Leaders and Management



- Short and simple (2-4 pages) with links to overall agency mission
- Cost benefit justification tailored to the agency, with **local examples** if possible
- Clear explanation of how TSM&O programs complement existing capacity, safety and maintenance programs
- Concise description of next steps and their role in those steps (call to action)

Agency Staff

- Effective execution relies on the buy-in of all staff involved
- Ideally involved in generating the business case argument
- A more technical discussion is likely helpful
- Specific description of changes to day-to-day roles



Transportation Agency Partners



- Information on how and why increased cooperation and alignment with TSM&O strategies will enhance their own program effectiveness
- Business case should be compact and retain primarily issues related to that partners own interests
- Discussion will be more technical than those intended for general public
- Common goals may include partnerships in traffic incident management, work zone management and project funding processes

General Public



- Concise and high-level (1-2 pages)
- Minimal text, with use of infographics and simple charts in order to engage as many people as possible
- Industry jargon including “TSM&O” should be avoided
- Improvements should be discussed in terms of services and outcomes rather than projects and programs
- Benefit to cost ratios may be more appropriate than \$ figures
- Should be described as synergistic with traditional approaches since it may otherwise be communicated that funds were misspent in the past

Elevator Speech

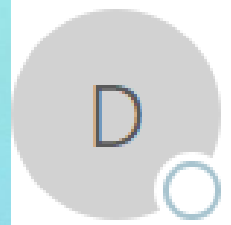


- The overall objective of the business case for IOP changes
- The top priority IOP change that the agency wants to accomplish
- The basic argument/rationale for making this IOP change
- A reference to the agency's business case along with an offer to send an electronic or hard copy, or set-up a follow up meeting

Data Download Tool Demonstration

Jeremy Dilmore, District 5 TSM&O

<http://tsmo4planning.cflsmartroads.com/trmanager/>



Wed 1/23/2019 7:40 AM

dfc-mailer@d5-its.tsmo.dot.state.fl.us

[External] DFE Data Export Job Has Been Submitted

To Williams, David

We have recived your data export request for the District 5 DFE environment

Your request for export data for data: **AAMEventsByDate** has been placed into our data export job queue and should begin shortly. Depending on your place in the queue and the type of data you have requested. Some request can take some time to complete. We will email you with an update once your submitted job has completed. You can also check the status of your submitted request in the D5 Token Role Manager by simply logging in.

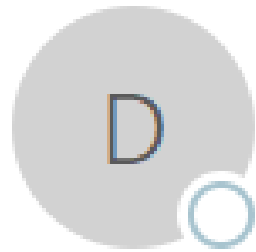
Link To District 5 Token Role Manager: <http://tsmo4planning.cflsmartroads.com/trmanager>

Thank You



Ignore Delete Archive Reply Reply All Forward Meeting IM More File Search Review Comment

Delete Respond Mail Manager



Wed 1/23/2019 12:40 PM

dfc-mailer@d5-its.tsmo.dot.state.fl.us

[External] Your Data Export Job Is Complete.

To Williams, David

You forwarded this message on 1/23/2019 12:40 PM.

Your Data Export Job Is Now Complete and Ready For Download.

Please Log Into The D5 Token Role Manager To Download Your Requested Data.

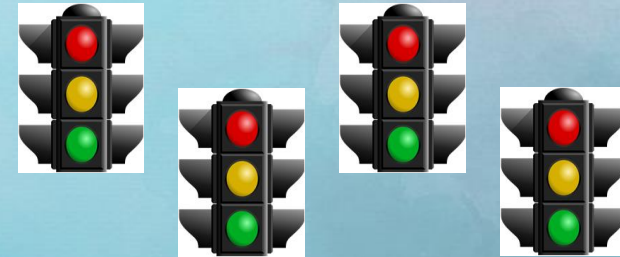
<http://tsmo4planning.cflsmartroads.com/trmanager>

Thank You

Data Initiatives Program



Central Florida DOT
Regional Freeway ATMS

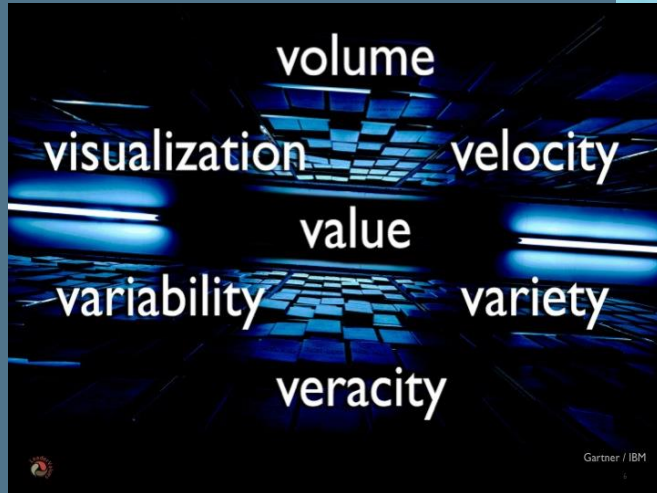


Multiple Local Agency
Traffic Signal ATMS systems

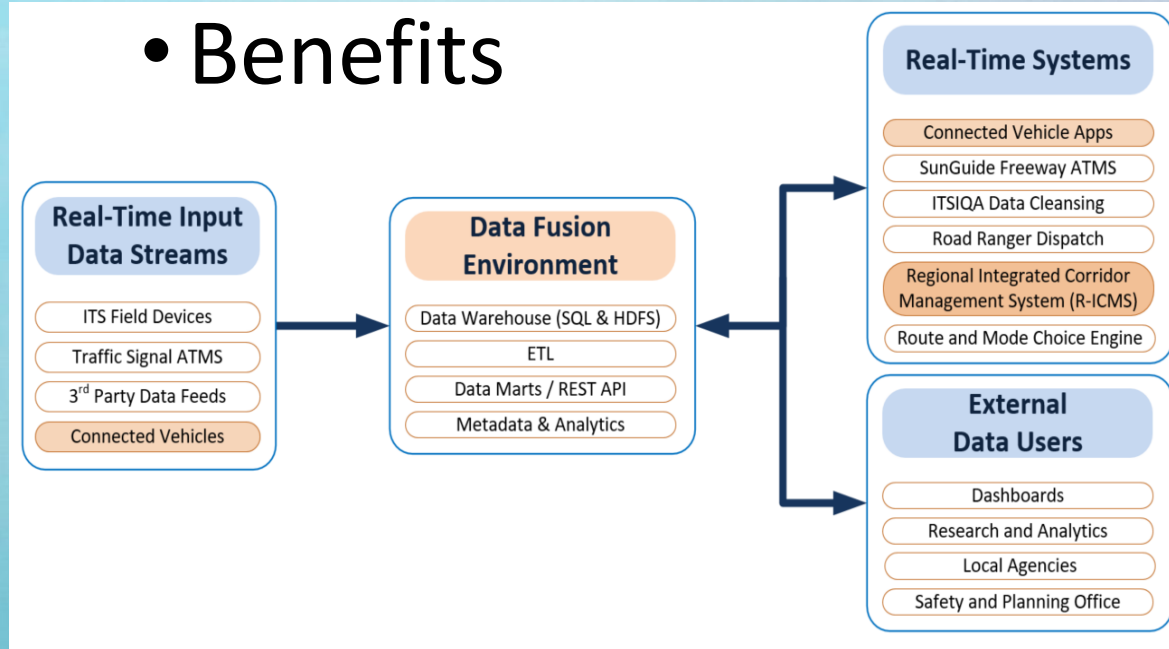


TSMO Data Initiatives Program

7 V's of Big Data



- Each Project Contributes:
 - Objectives
 - Activities
 - Outcomes
 - Benefits



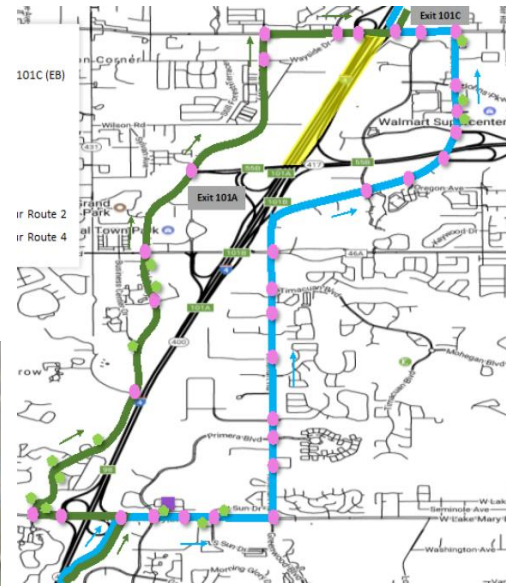
Our Journey Through Projects...



Regional Integrated Corridor Management System



Incident Detection



Response Plan
w/ Diversion Route



Data Fusion Environment



Signal Timing
Plan Selection and
Optimization



Mesoscopic
Simulation for
Realtime 30 Minute
Forecasting

Non-Recurring Incident Detection & Response

- Design Time:
 - Repository of Response Plans having Diversion Routes
 - Rules engine mapping event attributes to response plans
- Run-Time:
 - Rules Engine Selects response plan for active incident
 - Mesoscopic simulation engine predicts measures of effectiveness 30 minutes into future
 - Operator and Agency Approval obtained prior to activation



Signal Optimization Tool

$$I_d = \sqrt{\sum_{i=0}^n \left(\frac{v_{i,j}}{c_i} - \frac{v_{i,k}}{c_i} \right)^2},$$

- Separate offline process
- Grouping and clustering time intervals
 - Based on similarities of traffic demand and capacity
 - Considers every approach in the intersection
- Highway Capacity Software used for recommended offsets and cycle lengths
- Traffic Engineer Role:
 - Review,
 - Make adjustments,
 - Request recalculate measures of effectiveness
 - Approve and Implement via local agency traffic signal ATMS



Intersection Signal Timing Recommendation

☰ Integrated Corridor Management System
PLEASE RECALCULATE CORRIDOR
USER X

Intersection Recommendation - US 17-92 at Fairbanks – 24/7 all days from 11/1-1/19

Approach 1
Storage: 600', Avg. Max Queue: >600'
3000', 625', 400', 150'

Approach 2
Storage: 400', Avg. Max Queue: 125'
2400', 625', 400', 300'

Approach 3
Storage: 600', Avg. Max Queue: 125'
1200', 525', 400', >400'

Approach 4
Storage: 400', Avg. Max Queue: 125'
2045', 725', 600', >600'

MIMS
MAP
CAMERAS

Day/Time Pattern: M-AM ▼

Percent change in performance metric: FIT Improvement % ▼

Legend:
Improvement: Green
No Change: Yellow
Worse: Red

Comments

17:21 11/21/2016
@James Smith
Added 10 sec to the suggested offset for Aragon Ave....

New Recommended Timing Plans	Fit Improvement	Applicability
<i>COIT ROAD @ BELT LINE:</i>	11%	100%
<u>PLAN 8x</u>	12%	34%
<u>PLAN 8Y</u>	9%	26%
<u>PLAN 9A</u> Version history	12%	40%

Existing Timing Plans	Fit Improvement	Applicability
<u>PLAN 6x</u>	8%	42%
<u>PLAN 6Y</u>	9%	22%
<u>PLAN 7A</u>	7%	36%

RECALCULATE PERFORMANCE

BACK

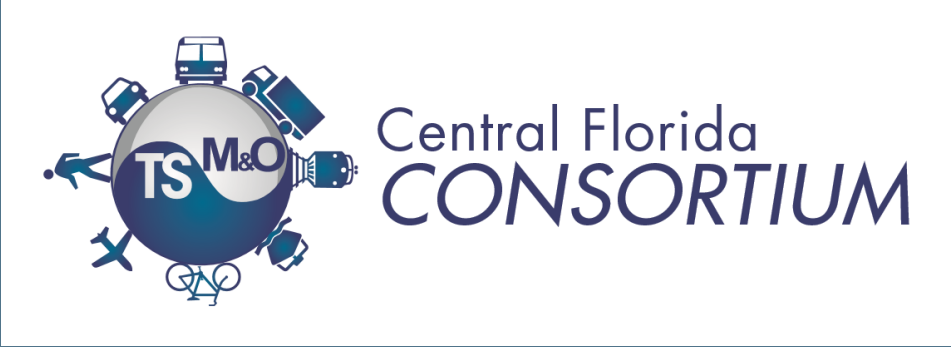
REVERT

SAVE

Recommended Plan 9A (modified)

Existing Plan 6x

Stakeholder Coordination & Agency Approval



- System Concept and Design
- Response Plan Development
- Operations...

☰
USER X

Integrated Corridor Management System

Limited Access Roadway Incident - Corridor Diversion Response Plan – Approval Status

BACK

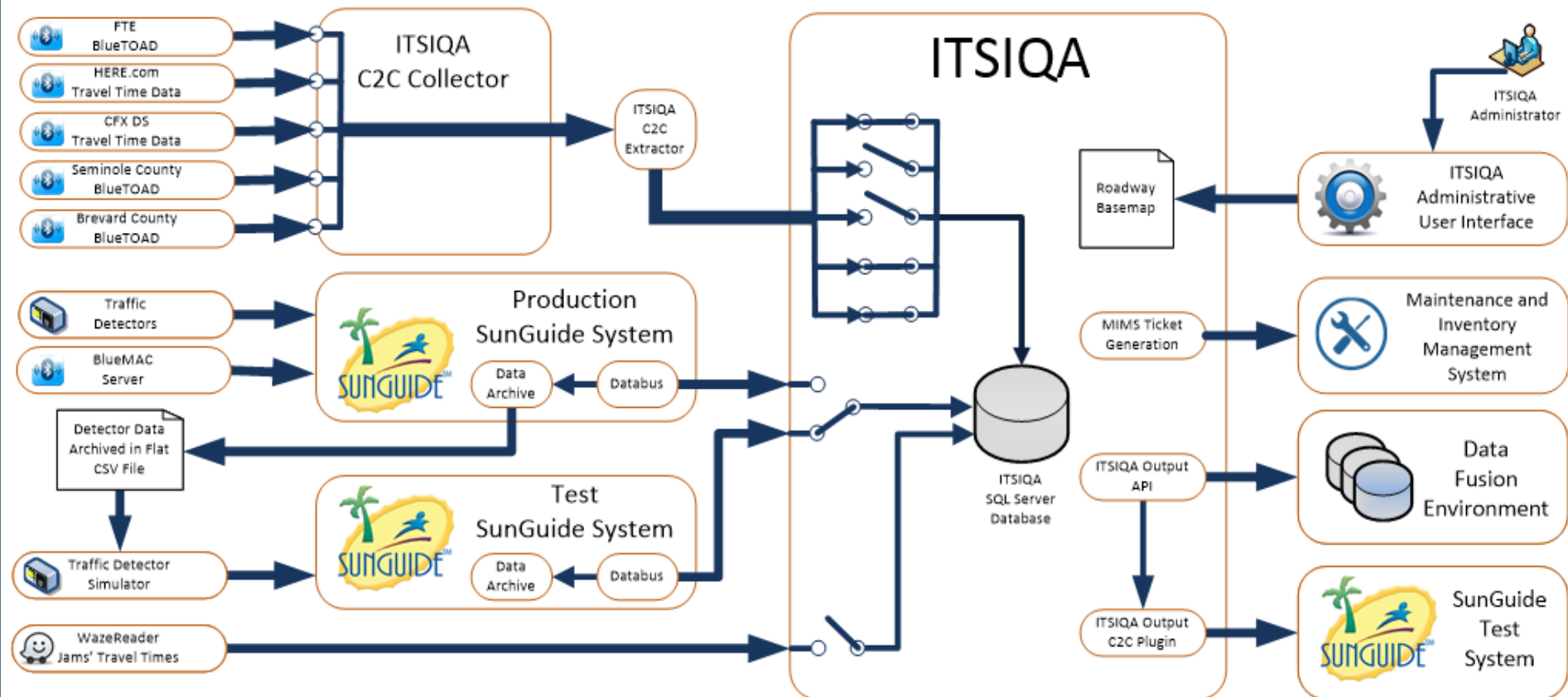
Agency	Time	Point of Contact	Items Pending Approval	Items Rejected	Items Approved
Seminole County	6:01PM	Darren Wilson 407-354-8746 Pete Varasquez 407-833-8577			Flush Plan Set 6x
FDOT	6:03 PM	Owen Kittleton 386-980-7122			DMS 75N248 DMS 75N245
Orange County		Tom Castanza 407-341-3411	Flush Plan Set 6x		
Orange County		Tom Castanza 407-341-3411	Flush Plan Set 8x		

Current Issues

- TMDD Signal Interface
- Source Code Sharing Request
- Data & Model Availability

ITS Input Quality Assurance - AECOM

- First Real-time operational system in the journey
- Connects data sources to apps



ITS Input Quality Assurance - AECOM

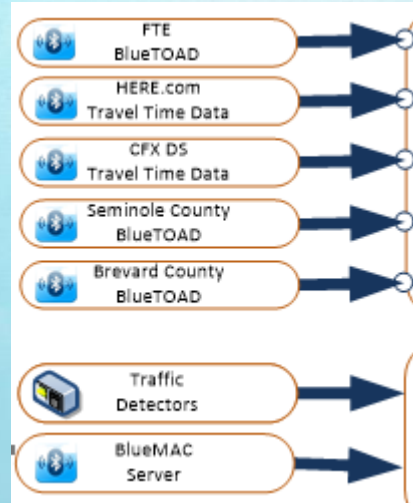
Velocity of Data



Veracity of Data



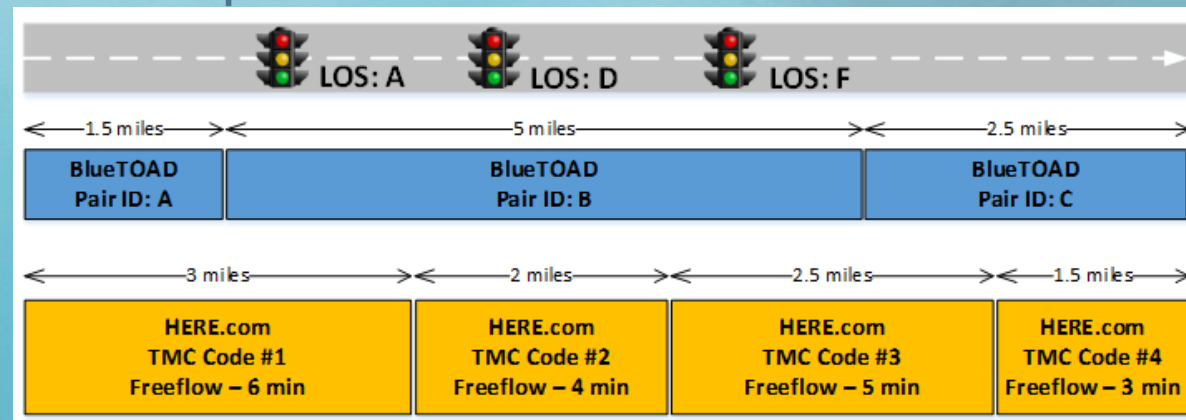
- Multiple data sources overlapping



- Quality Control
- Filtering



- Spatial Normalization
- Temporal Normalization



Get Data Right MEOW

Volume of Data



Variety of Data



- Collect once, Share often
 - Multiple Projects
 - Multiple Users
- Multiple Technologies



Other Work

- Signal Inventory
- MMA/MDP
- Route and Mode Choice
- OBU Emulator



A white speech bubble with rounded corners and a tail pointing to the right, containing the text "Let's Talk!". The bubble is positioned to the left of a white outline of a human head in profile, facing left. The background is a solid green color.

Let's Talk!

Integrated Corridor Management System

★ Incident Response Plan(s) Available ★

Operations	Map Layers
Dashboards	<input type="checkbox"/> Traffic
Reports	<input type="checkbox"/> Transit
Response Plans	<input type="checkbox"/> ITS Devices
Corridor Optimization	<input type="checkbox"/> Signals
Data Retrieval	More Sources...

Information Feed

- 📄 **17:21 11/21/2016**
 @James Smith
 Added 10 sec to the suggested NB split for Belt Line at Greenville....
- 🚦 **17:56 11/21/2016**
 New Corridor Recommendation for US 17/92.
- 📍 **16:05 11/21/2016**
 Citrus Bowl at Camping World Stadium

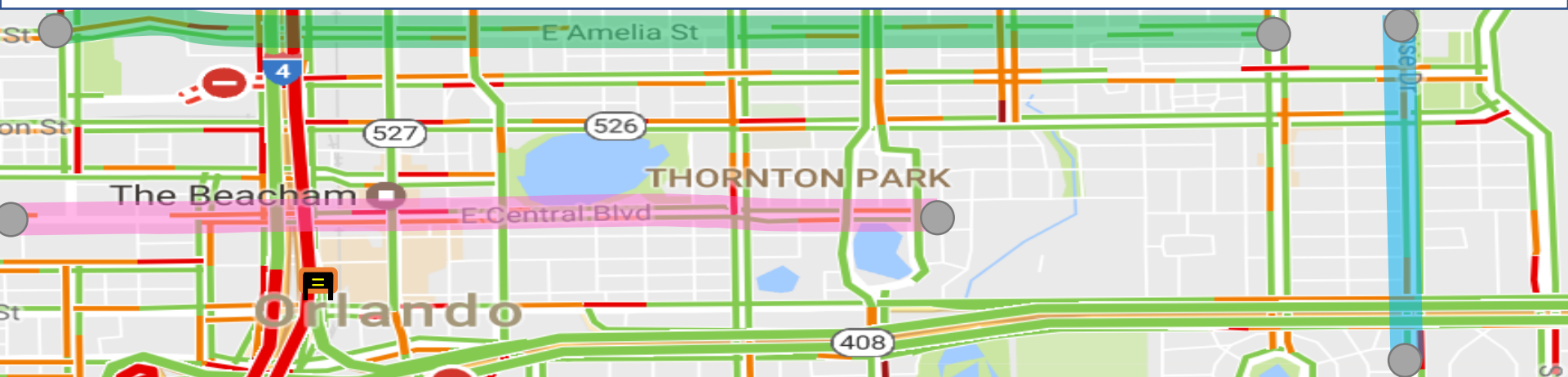
Corridor Optimization Strategy Recommendations

Corridor	Requested By	Analysis date/time pattern	Fit Improvement	Applicability	LOS	Delay	Agencies
● E Amelia St	System (rejected)	24/7 all days from 11/1-1/19	5%	8%	B → A	7 min → 3.3 min	FDOT
● E Central Blvd	System (modified)	4-7 PM weekdays from 11/1-1/19	9%	12%	C → B	9 min → 7.2 min	Seminole, Volusia
● E Central Blvd	Engineer A	4-7 PM weekdays from 11/1-1/19	6%	14%	B → B	14 min → 13.2 min	City of Orlando, Orange County
Primrose Dr	Operator X	6-9 AM weekends from 11/1-1/19	7%	9%	A → A	4.4 min → 4.6 min	FDOT, City of Daytona

Request New Analysis

SHOW ALL CORRIDORS

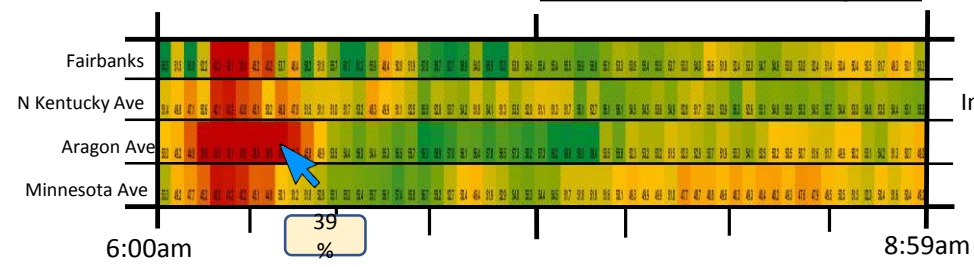
GO TO CORRIDOR



Corridor Recommendation – US 17-92 – by System – 24/7 all days from 11/1-1/19

Percent change in performance metric: **FIT Improvement %** ▼

Day/Time Pattern: **M-AM** ▼



TOD Pattern Details

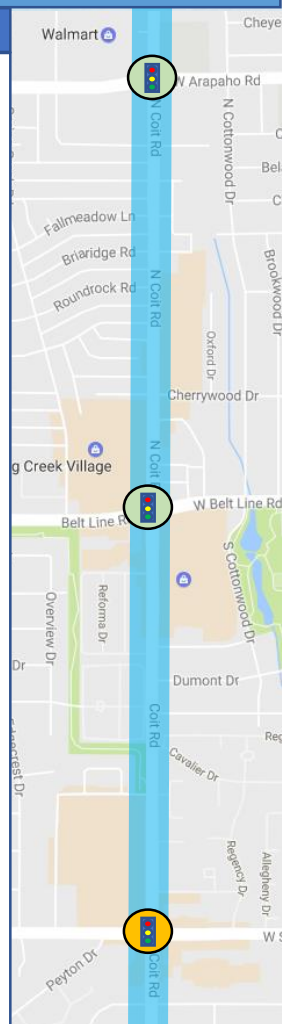
Legend:

- Improvement (Green)
- No Change (Yellow)
- Worse (Red)

Time Window: **Monday 6:00AM-10:00**

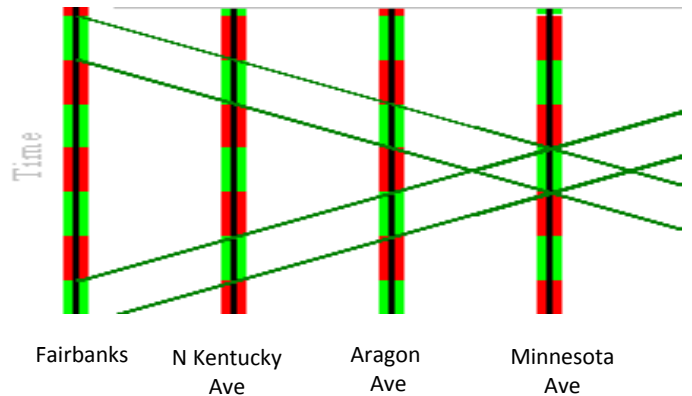
Plan Sets:

- 7Y
- 8X



Intersection	Fit Improvement	Applicability	LOS AVG LOS WORST	Delay AVG (min) Delay WORST (min)	Agencies	Action
US 17-92 (Aggregated):	9%	58%	B → A C → B	34.4 → 28.3 44.4 → 38.3	(multiple)	OFFSET DETAIL
Fairbanks (Master)	7%	70%	C → B F → D	7 → 3.3 2 → 5.3	FDOT	DETAIL
N Kentucky Ave	11%	68%	B → B B → B	9 → 7.2 11 → 9.2	City of Orlando	DETAIL
Aragon Ave	8%	81%	A → A A → A	14 → 13.2 17 → 16.2	City of Orlando	DETAIL
Minnesota Ave	9%	45%	B → A C → B	4.4 → 4.6 4 → 6.6	Orange County	

Corridor Offset Recommendation – US 17-92 – 24/7 all days from 11/1-1/19



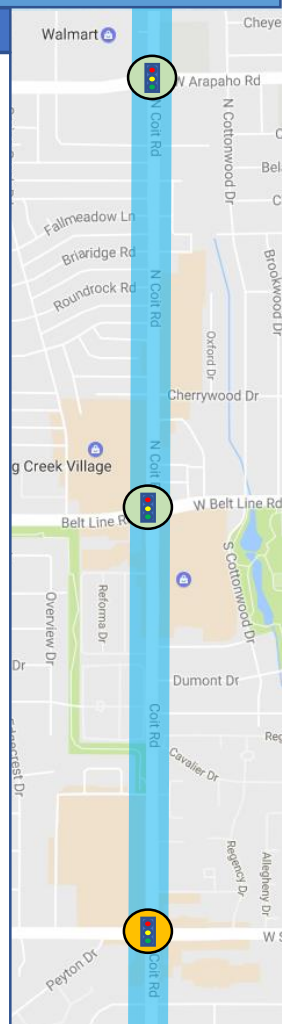
Corridor Timing Plan Set: Plan Set ▼
8X

Plan Set 8X Details
 Cycle Length: 120 Sec
 Master Controller: Fairbanks
 Active times:
 • MTW 6:30AM – 9:30AM
 • TF 6:00AM-9:00AM

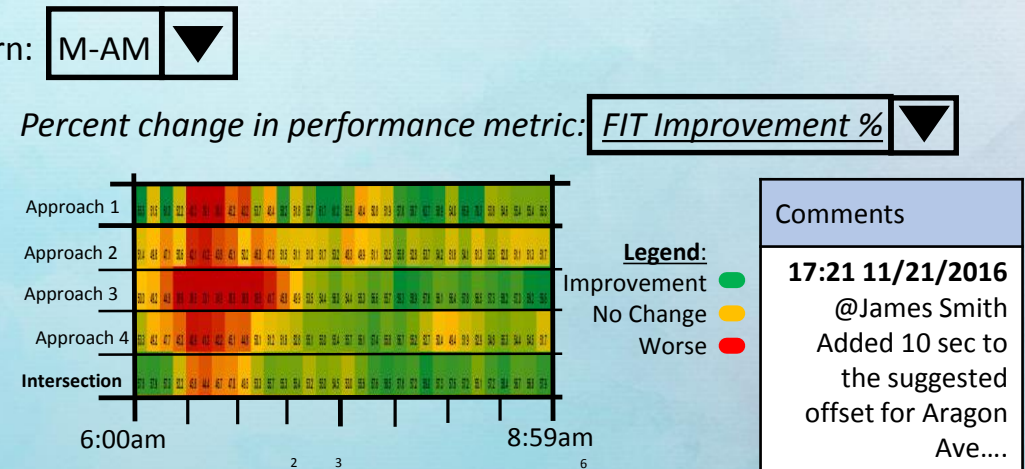
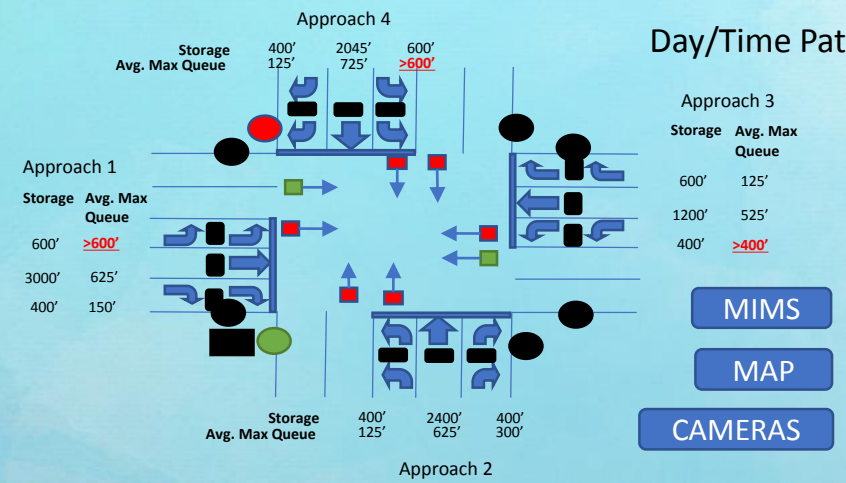
Intersection	Offset (second)	Fit Improvement	Applicability	Agencies
Fairbanks (Master)	<u>0</u>	7%	70%	FDOT
N Kentucky Ave	<u>10</u>	11%	68%	City of Orlando
Aragon Ave	<u>25</u>	8%	81%	City of Orlando
Minnesota Ave	<u>15</u>	9%	45%	Orange County

Comments

17:21 11/21/2016
 @James Smith
 Added 10 sec to the suggested offset for Aragon Ave....

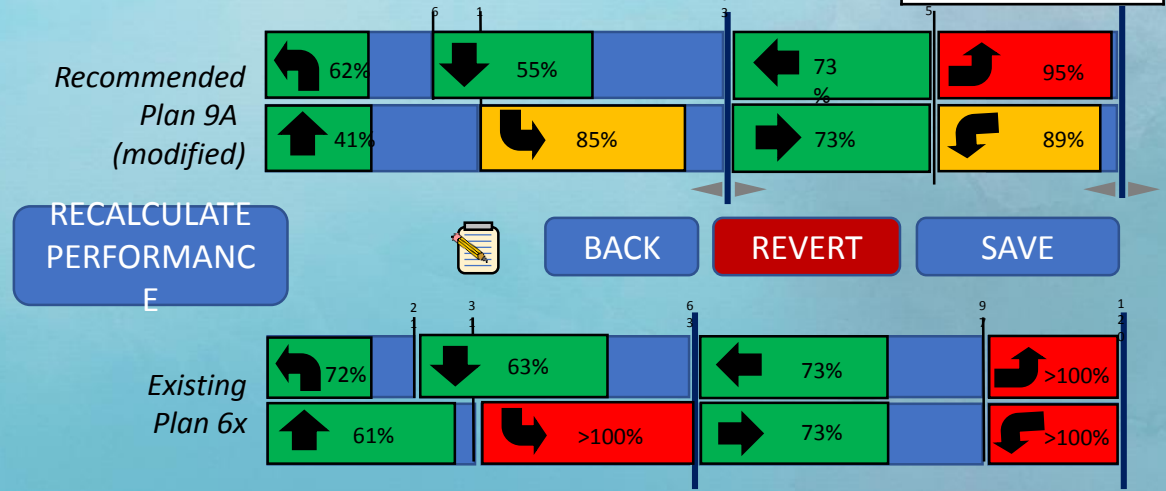


RECALCULATE PERFORMANCE METRICS
📝
BACK
REVERT
SAVE



New Recommended Timing Plans	Fit Improvement	Applicability
COIT ROAD @ BELT LINE:	11%	100%
PLAN 8x	12%	34%
PLAN 8Y	9%	26%
PLAN 9A Version history	12%	40%

Existing Timing Plans	Fit Improvement	Applicability
PLAN 6x	8%	42%
PLAN 6Y	9%	22%
PLAN 7A	7%	36%



Integrated Corridor Management System I-4 Incident Response Plan Available

Operations	Map Layers
Dashboards	<input type="checkbox"/> Traffic
Reports	<input type="checkbox"/> Transit
Response Plans	<input type="checkbox"/> ITS Devices
Corridor Optimization	<input type="checkbox"/> Signals
Data Retrieval	More Sources...

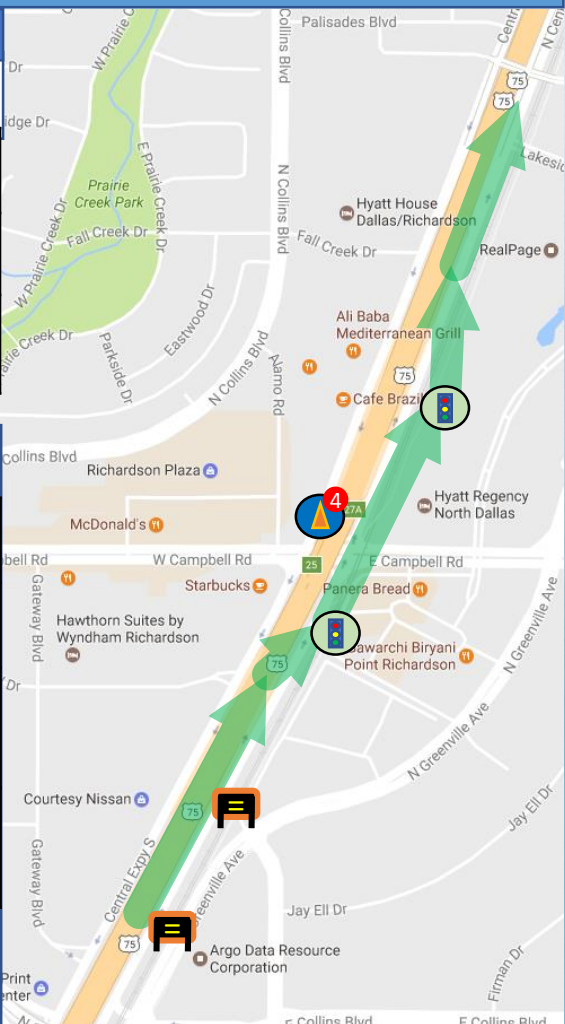
Information Feed

- ✎ **17:21 11/21/2016**
 @James Smith
 Added 10 sec to the suggested NB split for Belt Line at Greenville....
- 📍 **17:56 11/21/2016**
 New Corridor Recommendation for US 17/92.
- 📍 **16:05 11/21/2016**
 Crus Bowl at Camping World Stadium

Limited Access Roadway Incident - Corridor Diversion Response Plan

Incident on US-75 at Campbell Road – 17:21 11/21/2016 - 4 blocked lanes

Response Plan	MOE Improvement	TVT Improvement	Timing Plans Needed	Agencies
<u>Diversion to frontage road</u>	5%	4%	3	Seminole, Volusia
<u>Diversion to US 17-92</u>	4%	3.5%	8	FDOT, Seminole, Volusia



Incident on US-75 at Campbell Road – Diversion to Frontage road response plan

<input checked="" type="checkbox"/>	Response Plan Item	Status	Item Detail	Agency
<input checked="" type="checkbox"/>	Flush Plan Set (3 signals)	Ready	Flush Plan Set 6x	Seminole
<input checked="" type="checkbox"/>	DMS 75N245	Active		FDOT
<input checked="" type="checkbox"/>	DMS 75N248	Active		FDOT

[BACK](#)
[RESPONSE PLAN SCHEMATIC](#)
[APPROVAL STATUS](#)
[REJECT](#)
[APPROVE](#)



Corridor Diversion - Flush Plan Set Details – I-4 Frontage Rd near Fairbanks

BACK

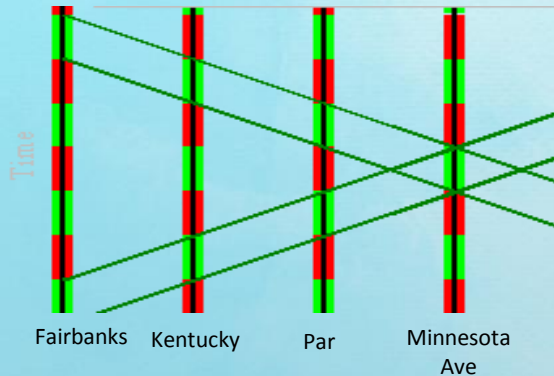
Flush Plan Set 6x:

Cycle Length: 300 Sec

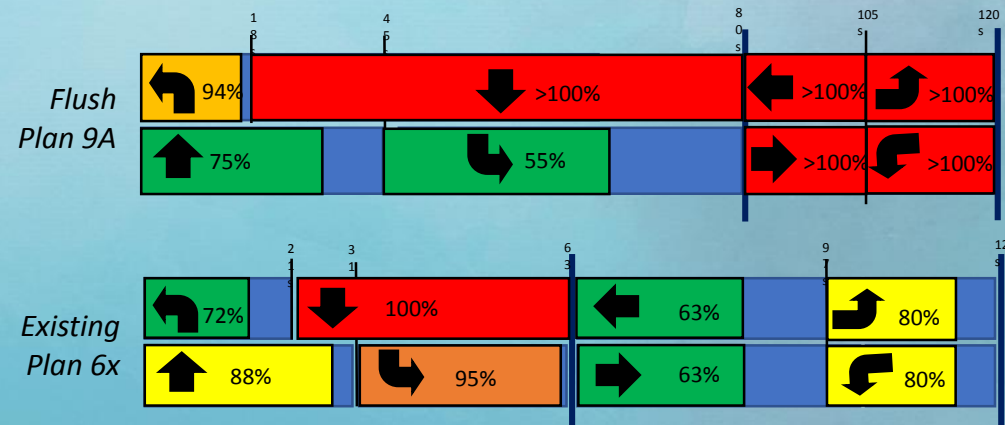
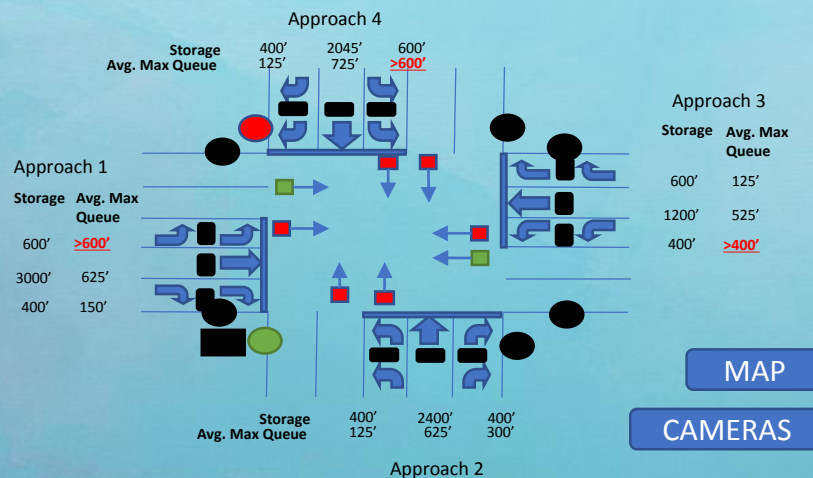
Master Controller: Fairbanks

Overall MOE

Improvement: 34%



Intersection	Existing Cycle Length	Existing Offset	New Cycle Length	New Offset	MOE Improvement
Frontage and Fairbanks (master)	120	0	300	0	12%
Frontage and Kennedy	120	23	300	100	9%
Frontage and Par	120	53	300	80	12%
Frontage and Minnesota	120	53	300	80	12%

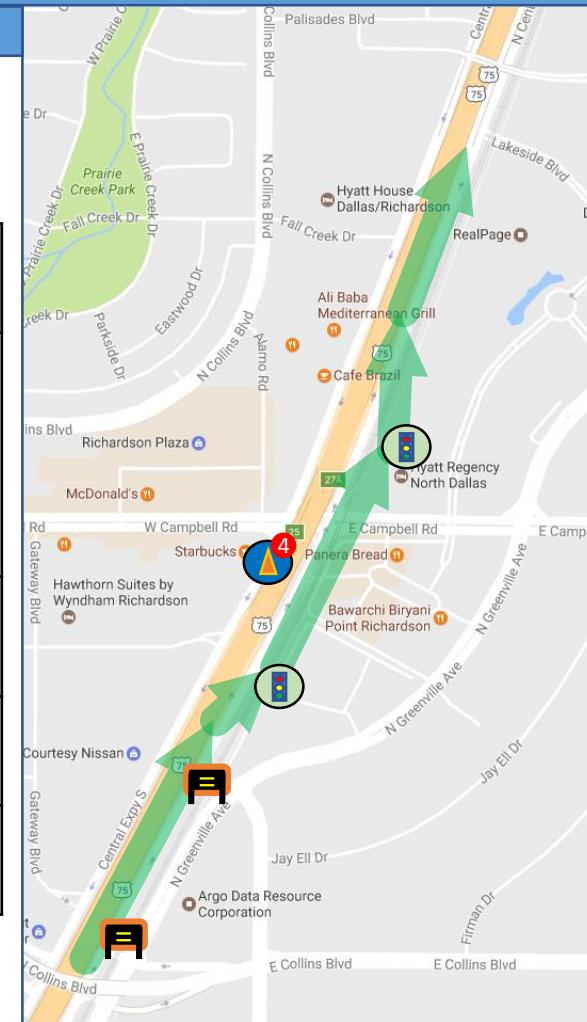




Limited Access Roadway Incident - Corridor Diversion Response Plan – Approval Status

BACK

Agency	Time	Point of Contact	Items Pending Approval	Items Rejected	Items Approved
<u>Seminole County</u>	<u>6:01PM</u>	<u>Darren Wilson</u> 407-354-8746 <u>Pete Varasquez</u> 407-833-8577			Flush Plan Set 6x
<u>FDOT</u>	<u>6:03 PM</u>	<u>Owen Kittleton</u> 386-980-7122			DMS 75N248 DMS 75N245
<u>Orange County</u>		<u>Tom Castanza</u> 407-341-3411	<u>Flush Plan Set 6x</u>		
<u>Orange County</u>		<u>Tom Castanza</u> 407-341-3411	<u>Flush Plan Set 8x</u>		



Integrated Corridor Management System ★ Incident Response Plan Available ★

Operations	Map Layers
Dashboards	<input type="checkbox"/> Traffic
Reports	<input type="checkbox"/> Transit
Response Plans	<input type="checkbox"/> ITS Devices
Corridor Optimization	<input type="checkbox"/> Signals
Data Retrieval	More Sources...

Information Feed

- 📝 **17:21 11/21/2016**
 @James Smith
 Added 10 sec to the suggested NB split for Belt Line at Greenville....
- 📍 **17:56 11/21/2016**
 New Corridor Recommendation for US 17/92.
- 📍 **16:05 11/21/2016**
 Crus Bowl at Camping World Stadium



Arterial Roadway Incident Response Plan

Incident at US-92 and Par – 14:21 11/22/2016
2 blocked lanes eastbound

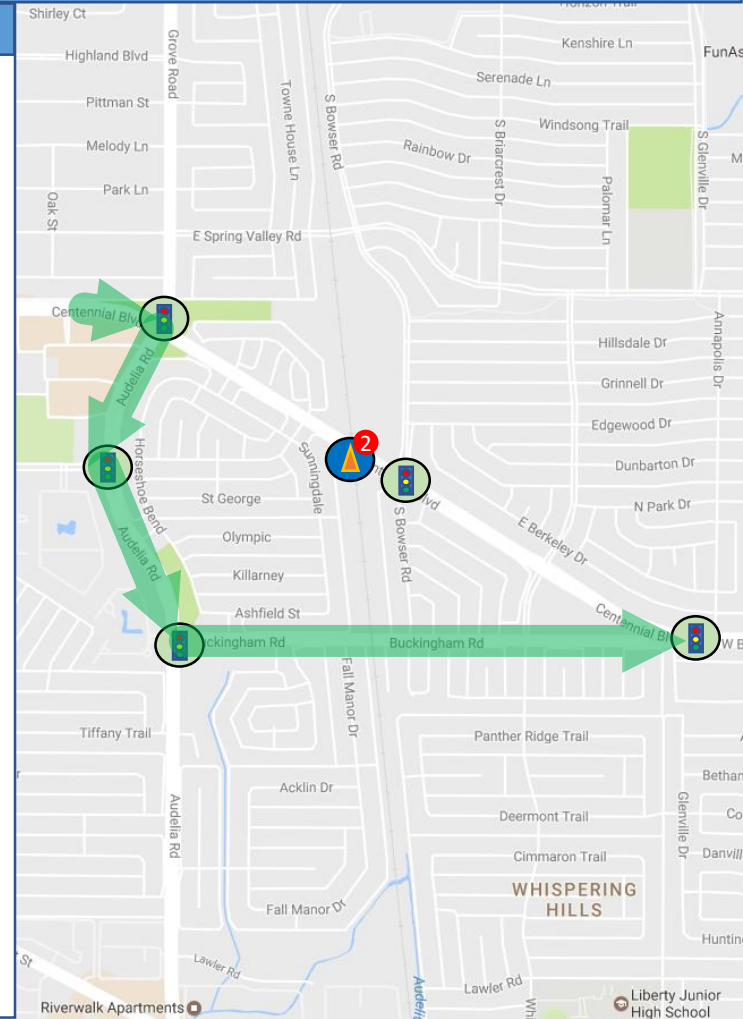
Response Plan	MOE Improvement	TVT Improvement	Timing Plans Needed	Agencies
<u>Dynamic Plan Set 1</u>	15%	17%	4	Seminole, Volusia
<u>Dynamic Plan Set 2</u>	9%	3.5%	8	Seminole, Volusia
<u>Dynamic Plan Set 3</u>	6%	4%	5	FDOT, Seminole, Volusia
<u>Dynamic Plan Set 4</u>	11%	10%	5	FDOT

BACK

APPROVAL STATUS

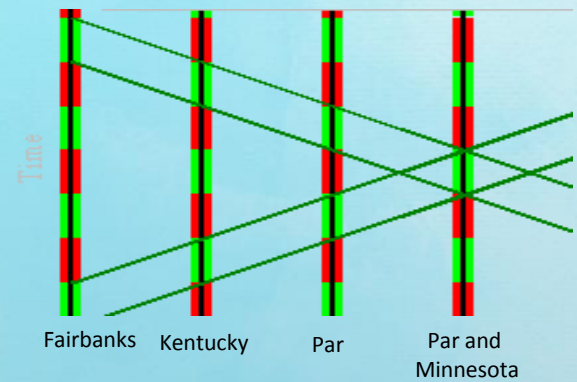
REJECT

APPROVE

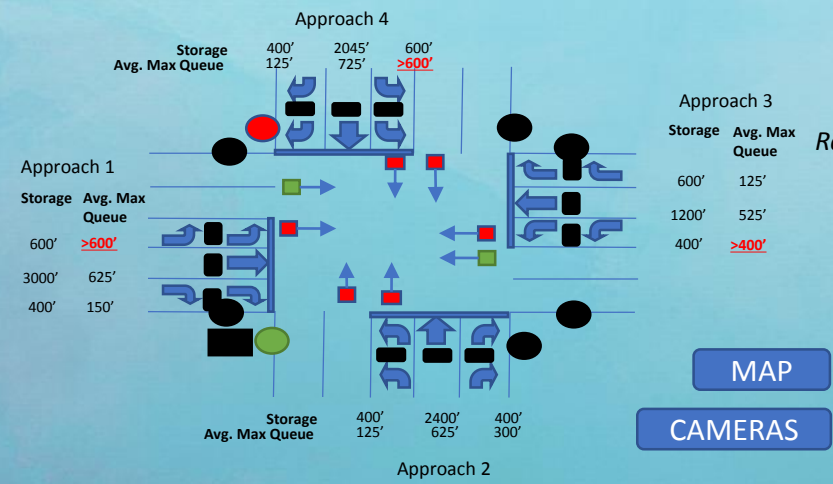


[BACK](#)

Dynamic Plan Set 1:
 Cycle Length: 300 Sec
 Master Controllers:
 • Fairbanks
 • Par and Minnesota
 Overall MOE Improvement: 34%



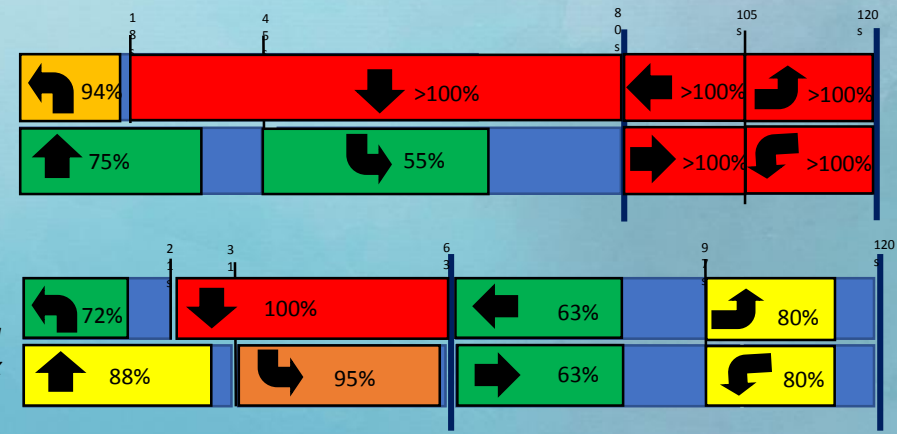
Intersection	Existing Cycle Length	Existing Offset	New Cycle Length	New Offset	MOE Improvement
Frontage and Fairbanks (master)	120	0	120	0	12%
Frontage and Kennedy	120	23	120	100	9%
Frontage and Par	120	53	120	80	12%
Par and Minnesota	160	11	160	11	12%



[MAP](#)
[CAMERAS](#)

Recommended Plan 9A

Existing Plan 6x





Executive Workshop Connected and Automated Vehicles (CAV) Business Plan JANUARY 16, 2019

State Traffic Engineering & Operations Office

Trey Tillander, P.E., Director, Traffic Engineering & Operations Office

Raj Ponnaluri, PhD, P.E., PTOE, PMP, Connected and Automated Vehicles Engineer

Agenda

Purpose and Vision

Content

Implementation

Status

Next Steps

CAV Business Plan Purpose and Vision

Purpose

» Move CAV from initialization and pilot projects to full-scale implementation and operations to **achieve safety, mobility, and economic development objectives.**

Vision

» Drive towards Vision Zero with a **fatality-free** roadway network and a **congestion-free** transportation system in Florida using **CAV technologies.**

SAFETY



MOBILITY



**ECONOMIC
DEVELOPMENT**



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

Roles and Responsibilities

Policies and Governance

Program Funding

Education and Outreach

Industry Outreach and Partnerships

Technical Standards and Specifications Development

Implementation Readiness

Deployment and Implementation

	Policies and Governance	Program Funding	Education and Outreach	Industry Outreach and Partnerships	Technical Standards and Specifications Development	Implementation Readiness	Deployment and Implementation
Design							
Districts 1-7 and FTE		●	●			●	●
Environmental Management	●					●	
Freight Logistics and Passenger Operations	●	●	●	●			●
Leadership Team	●	●		●			
Legislative Programs	●			●			
Planning	●	●	●				
Program Management					●		
Traffic Engineering and Operations	●	●	●	●	●	●	●
Transportation Technology	●		●	●	●	●	
Work Program and Budget		●					

CAV Implementation Roadmap



2017-2018
Initialization



2019-2020
Early Implementation



2020+
Full Scale Implementation
and Operations



2017-2018 Initialization

TASKS UNDERWAY

-  *Policies and Governance*
-  *Program Funding*
-  *Education and Outreach*
-  *Industry Outreach and Partnerships*
-  *Technical Standards and Specifications Development*
-  *Implementation Readiness*
-  *Deployment and Implementation*



2019-2020 Early Implementation

RECURRING TASKS

-  *Policies and Governance*
-  *Program Funding*

PLANNED TASKS

-  *Education and Outreach*
-  *Industry Outreach and Partnerships*
-  *Technical Standards and Specifications Development*
-  *Implementation Readiness*
-  *Deployment and Implementation*



2020+ Full-Scale Implementation and Operations

RECURRING TASKS

-  *Policies and Governance*
-  *Program Funding*
-  *Education and Outreach*
-  *Industry Outreach and Partnerships*
-  *Technical Standards and Specifications Development*
-  *Implementation Readiness*

PLANNED TASKS

-  *Deployment and Implementation*



Policies and Governance

- *Perform Coordination for Technology, Data Governance, and Policies*
- *Implement and Maintain the CAV Business Plan*
- *Oversee CAV Program Delivery and Messaging*
- *Collaborate with the Office of Transportation Technology to Develop an Enterprise Operation Change Management Framework*



Program Funding

- *Establish Sustainable CAV Implementation and O&M Funding*
- *Track the role of CAV in the TSM&O Cost Feasible Plan*
- *Study CAV Implementation and O&M Best Practices, and Staffing Needs*



Education and Outreach

- *Develop CAV Information*
- *Implement CAV Awareness Outreach*
- *Support Florida Automated Vehicles (FAV) Summit and Other National AV Symposiums*
- *Explore Teaming with Organizations to Collaborate on CAV Education*



Industry Outreach and Partnerships

- *Engage, Establish Favorable Environment for, and Create Public-Private Partnerships*
- *Provide Opportunities for Industry Partners to Test Hardware and Software*



Technical Standards and Specifications Development

- *Develop Systems Engineering Process for CAV*
- *Implement Security Credential Management System (SCMS), Cybersecurity and Physical Security*
- *Mainstream CAV into FDOT Standards and Specifications, Guides, and Manuals*



Implementation Readiness

- *Use and Apply USDOT Implementation Tools*
- *Develop CAV-Related Items for TERL Processes*
- *Develop CAV Infrastructure Deployment Plan*
- *Address RTMC Needs for Data Usage/Storage*
- *Analyze CAV Safety Elements/SHSP Focus Areas*
- *Prepare for Communication Options*
- *Develop Decision Support Systems*



Deployment and Implementation

- *Implement Statewide CAV Deployment Plan*
- *Incorporate CAV into RTMC Operations*
- *Develop Standard Operating Procedures*
- *Develop and Implement Updates to SunGuide® Software and DIVAS*
- *Develop Benefit-Cost (B/C) Ratios (In-Field or Proxy) for CAV Applications*

NOTE: Traffic Engineering Research Laboratory (TERL)
Regional Transportation Management Center (RTMC)
Strategic Highway Safety Plan (SHSP)
Data Integration and Video Aggregation Systems (DIVAS)

CAV Business Plan Status



1st Draft FDOT Review: 08/20/2018

» FDOT

2nd Draft FDOT Review: 09/16/2018
Out for Industry Review: 10/10/2018

» ASCE	» FSITE	» MPOAC
» FACERS	» FTA	» TEAMFL
» FHWA	» FTBA	» Universities
» FICE	» ITS Florida	

Next Steps

The CAV BP is a living document...

- » Drawing upon the support of the TSM&O Leadership Team
- » Supporting Districts by implementing the Business Plan
- » Deploying CAV projects with the end goal to significantly improve safety, mobility, and economic development.



Moving Forward

- » Questions?
- » Request the adoption of **Florida's Connected and Automated Vehicles Business Plan**

SAFETY



MOBILITY



ECONOMIC DEVELOPMENT

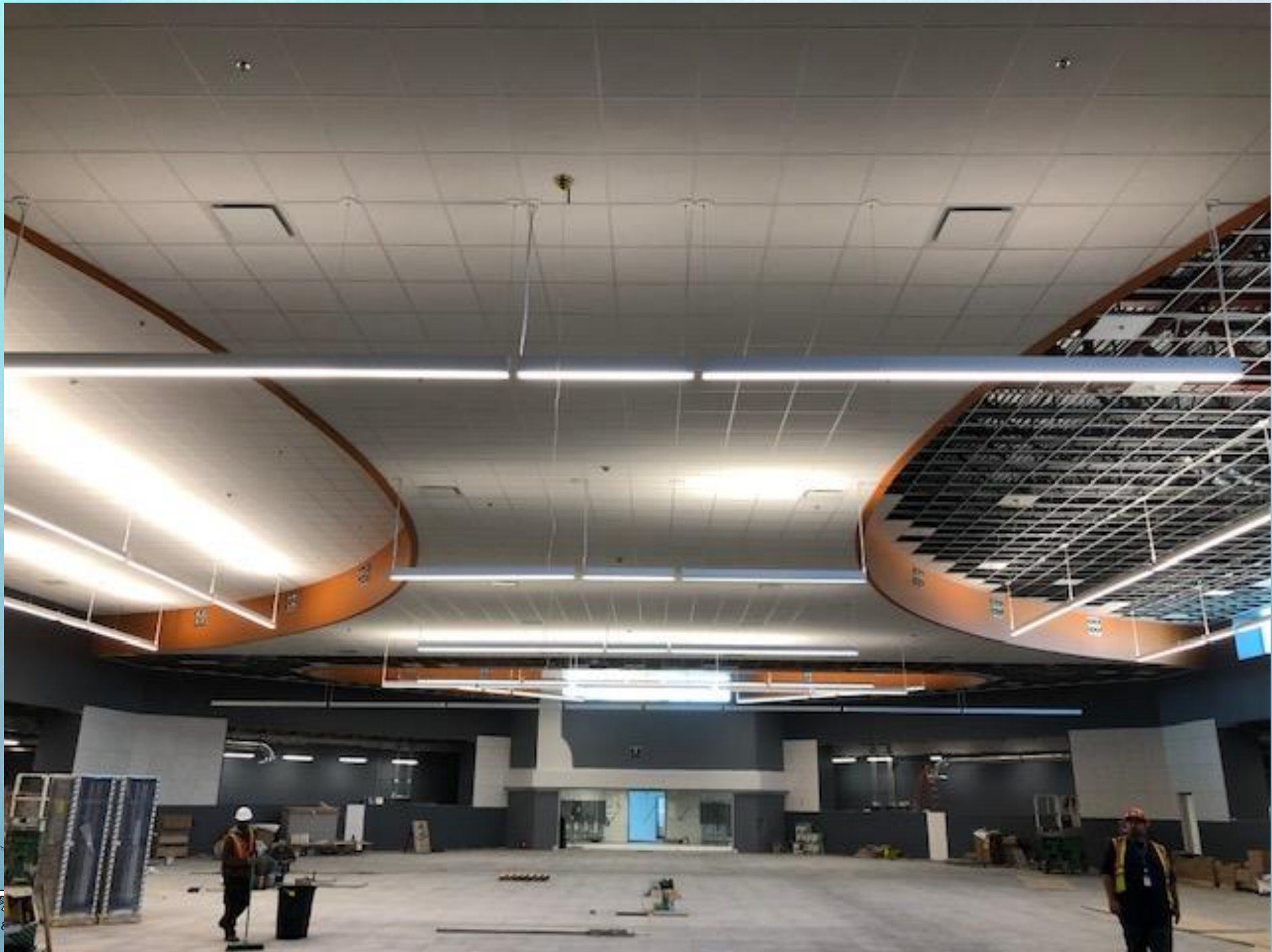


Current Initiatives

Jeremy Dilmore, District 5 TSM&O

Current Initiatives

- New DOD Requirement – no Chinese cameras by 2020
- Plans for a Push-Button Contract (lessons learned from MetroPlan Orlando)
- Traffic Signal Data Collection (How this speaks to ATSPM)
- Ongoing research efforts in Operations and Safety
- Rebranding ATCMTD for greater visibility
- Central Office Available Funding for CAV
- AV Transit Shuttle Status
- Route Mode Choice
- RTMC Update (pictures)



THANK YOU!

Next Consortium – March 7, 2019



TSM&O Consortium Meeting

MEETING AGENDA

Central Florida Expressway Authority
4974 Orl Tower Rd
Orlando, FL 32807
CFX Boardroom

January 24, 2019; 10:00 AM-12:00 PM

- 1) WELCOME
- 2) UPDATES TO WWW.CFLSMARTROADS.COM
 - David Williams, VHB
- 3) AUTOMATED DRIVING SYSTEMS (ADS) GRANT APPLICATION
 - David Williams, VHB
- 4) BUILDING A BUSINESS CASE FOR TSM&O
 - Jordan Crandall, VHB
- 5) DATA DOWNLOAD TOOL DEMONSTRATION
 - Jeremy Dilmore, District Five TSM&O
- 6) INTEGRATED CORRIDOR MANAGEMENT DOCUMENTATION
 - Jeremy Dilmore, District Five TSM&O
- 7) CAV BUSINESS PLAN – EXECUTIVE WORKSHOP
 - Jeremy Dilmore, District Five TSM&O
- 8) CURRENT INITIATIVES
 - Jeremy Dilmore, District Five TSM&O
 - Eric Hill, MetroPlan Orlando