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## TSM&O CONSORTIUM MEETING SUMMARY

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**Meeting Date:** February 8, 2018 (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

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### I. OVERVIEW

The purpose of this recurring meeting is to provide an opportunity for District Five FDOT staff and regional agency partners to collaborate on the state of the TSM&O Program and ongoing efforts in District Five. Jeremy Dilmore gave a short introduction regarding the purpose of the meeting and had everyone introduce themselves for the benefit of all in attendance.

### II. BRIEF INTRODUCTION – JEREMY DILMORE, FDOT DISTRICT FIVE

Prior to the start of the Consortium Meeting, Jeremy Dilmore gave a brief description of the staff changes at FDOT District Five and Florida's Turnpike Enterprise.

- The new District Five Secretary, Mike Shannon, is highly interested in Connected and Automated Vehicle technologies, and has formed a group to focus on this topic.

### III. TSM&O STRATEGY GUIDE UPDATE – DAVID WILLIAMS, VHB

David Williams gave a brief update to Consortium members on the status of District Five TSM&O documents:

- TSM&O Strategy Guide
  - Jeremy and David will be reviewing the content and updating the Strategy Guide
  - Next draft – end of February
  - Proven TSM&O Strategies – one-pagers that will be integrated into the Strategy Guide

### IV. SIGNAL TECHNICIAN PROGRAM – DAVID WILLIAMS, VHB

David Williams provided a brief explanation of the District's efforts to improve the labor pool of available signal technicians for local, regional, and state agencies, as well as for private firms.

- During the June Consortium, local agency presenters indicated a lack of signal technicians to hire as staff
- Orange Technical College has requested a formal letter indicating the expected signal technician hires per year.
  - There are approximately 10 to 15 annual signal technician hires among the local agencies

- District Five is still awaiting information from private companies on their signal technician needs
- Eric Hill asked: What level of education do participants in the program need?
  - [After consulting with a college representative, the following Orange Technical College details were determined]:
    - Programs don't appear to require High School Diplomas or GEDs for students to take courses (there are some unidentified exceptions)
      - This may be due to programs offering dual enrollment for high school students. *The three programs considered for the new signal technician program/curriculum are all open to dual-enrollment high school students.*
    - Students must have a Diploma/GED in order to be eligible for financial aid
    - The school employs the Tests of Adult Basic Education (TABE) as the state approved assessment test
      - Students must take the TABE and achieve certain thresholds in Math, Reading, and Language
        - For example: Electronics Technology requires students to have tested at an academic skill level of Grade 10 Math, 9 Language and 9 Reading
  - Eric Hill noted that District Seven is focusing on at-risk communities, which led to the question regarding educational requirements
  - Jeremy indicated that District Seven wants to replicate District Five's effort with Orange Technical College. Vendor has relationship with a local community college.
    - Separate group looking at the same labor constraint. Lisa Price from Atkins is part of the group.

#### V. TSM&O AND THE CENTRAL FLORIDA MPO ALLIANCE UPDATE – DAVID WILLIAMS, VHB

David Williams provided a brief update on the recent TSM&O presentation to the CFMPO Alliance and District Five's effort to determine appropriate projects for their Regional Prioritized Projects List.

- How can TSM&O be presented to the Central Florida MPO Alliance?
  - Foundational understanding of TSM&O
    - Different cost model
    - Support for livability and mobility
  - Then, present them with a list of TSM&O projects
- Past, present, & future initiatives were presented to the CFMPO Alliance to demonstrate the progress in TSM&O efforts within the region
  - District 5 traffic signal re-timing (accompanied by significant Benefit-Cost Ratios provided by a recent MetroPlan Orlando study)
    - 57% of traffic signals under District Five's jurisdiction have been re-timed in the last five years
  - ITS Master Plans, ATCMTD, CFAVP, Smart Cities, Big Data, TSM&O Program
  - Automated/connected vehicle technologies
- The CFMPO Alliance members were impressed by the presentation that Jeremy gave at their last meeting, and looked forward to a follow-up presentation at their next meeting on April 13<sup>th</sup>
- Next Steps for District Five and Consortium Stakeholders
  - Develop a master list of corridors that could be used as diversion routes from the major interstates / expressways. Determine eligible routes based on various factors:
    - Total # of lanes

- Total distance of segment
- Total # of signalized intersections
- Total # of stop-controlled intersections
- Speed limit
- Special Emphasis zones (school zone, etc.)
- Determine costs to upgrade the corridor into viable diversion routes
  - Potential upgrades could encompass:
    - Controller upgrades
    - Fiber
    - Ethernet switch
    - CCTV camera verification
    - Necessary hardware for Intersection Movement Counts
- Coordinate with partner agencies to determine best candidates for CFMPOA Regional Prioritized Project List
- Goal: give District Five the ability to detect an incident and provide an alternative route with programmed response plans
- Jon Cheney asked: How long do you think it will take to do this? R2CTPO just released a call for projects, so this would have to be done by April. Going to Council with list of projects in early March. Volusia already has the event management project in place.
  - Jeremy: When we start looking at how long it will take, this is a GIS tool that already runs. The tool just needs a few adjustments. We plan to finish by the end of February, before the program planning process. This can be a scalable tool to offer to other Districts.
  - Development of a ten-year plan
    - Heavy emphasis on ten-year plan focusing on O&M. What does arterial deployment look like next? What should it look like, and how can it become statewide? District Five currently provides 90% of the proposed projects; obviously, we cannot receive 90% of the funding.
    - We're creating a tool that can be run statewide to inform the DOT process to pursue the ten-year plan. We'll be working with CFMPO Alliance to discuss their five-year plan, hoping the two plans will line up.
  - Jon Cheney stated that even FDOT projects have to be on the priority list to get funded. Jon can insert language in his submittal to the R2CTPO Board indicating support for the diversion projects being developed by FDOT, so it is not a surprise. Most of I-95 is taken care of with *event management*. The I-4 corridor from 44 to the river can be considered, however.
  - Jeremy: Automated / Connected Vehicle (AV/CV) is another component of this project list.
    - Good from a communications standpoint, with good deal of dynamic message signs to provide information ahead of CV adoption. ATC controllers, road-side unit (RSU) deployment. Hoping to get to a package that brings everything up to the level of being fully CV-ready.
  - Jeremy asked Jon if end of February would work for the list of diversion routes?
    - Jon Cheney indicated early March is the deadline to get projects on list, application by end of March. If the Department finishes the evaluation by end of February, there shouldn't be a problem.
- Holly Walker indicated Turnpike is conducting a similar review of diversion routes. First round is for incident management; it will be interesting to see the results of the two similar efforts.

- Eric Hill asked: Are we developing the list that we want the CFMPO Alliance to support and help us move along?
  - Jon Cheney replied: Yes. Strength in numbers. Central Florida list, as a regional list, has more weight, and will be forwarded to FDOT Central Office rather than District Five.
- Next CFMPO Alliance meeting – April 13, 2018
  - There will be one more TSM&O Consortium meeting (April 5, 2018) before the next Alliance meeting to explain the results of the diversion routes effort and upcoming steps
  - There will be additional coordination with Consortium stakeholders off-line as the project progresses

## VI. DISTRICT FIVE TSM&O SUPPORT – DAVID WILLIAMS, VHB

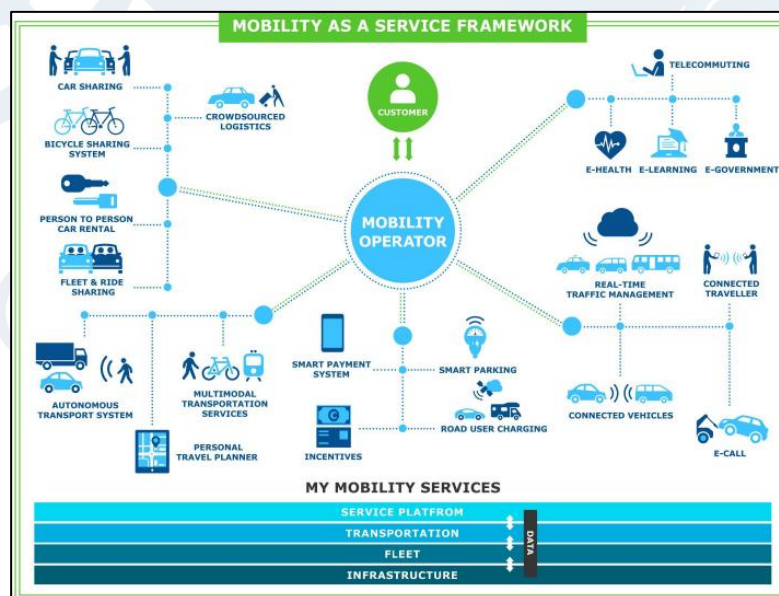
David Williams provided a brief explanation of a new TSM&O support position for District Five.

- Goal: further integrate TSM&O into the FDOT planning process
- David will be working in-house several days a week to support the TSM&O group
- Responsibilities include but are not limited to:
  - Coordination with other FDOT disciplines
  - Involvement in corridor planning studies to support TSM&O implementation
    - Maintaining an active list of current and upcoming projects, including their status, potential alternative, important dates, etc.
  - Provide guidance for using TSM&O documentation and resources

## VII. MOBILITY AS A SERVICE – DAVID WILLIAMS, VHB

David Williams gave a presentation on a recent transportation concept, Mobility as a Service (MaaS).

- Focus on mobility, not mode – what mobility options can get me from Point A to Point B?
- Single application – mobile phone application that provides users access to all available services under the MaaS program
- Single payment system – contactless, ticketless system using the mobile phone or smartcard
- Simplified trip planning – a common barrier to entry for transit is the complexity of routes and schedules for choice riders



- Central operator – pull real-time info, booking, payment/transaction, then facilitate transfer of revenues to appropriate providers
- Steps
  - Registration – one-time user registration, grants access to application (and all services)
  - Journey planning – list of services, optimal use of transport options based on user inputs
    - Users can give their preferences, such as time vs cost, which services they prefer
      - Application will take those preferences into account and provide the most appropriate trip plan based on those preferences and the requested destination
        - [Think *Google Maps* when you ask to avoid tolls, highways, etc.]
  - Booking – user makes decision, operator issues travel documents; service providers notified
  - Payment – Pay-as-you-go or subscription service; penalties/other considerations handled during transaction by operator, payment and invoicing available for businesses,
    - backend: revenue sharing between operator and provider(s)
  - Journey – operator ensures delivery of service, operator notifies user of delays and other information; operator is typically the primary customer support provider
- Benefits
  - Better service for transportation disadvantaged
  - User choice
  - Potentially cheaper for the user
  - Reduces single-occupant vehicle (SOV) miles traveled
  - Simplifies trip planning for the user – transit maps and schedules and first mile/last mile no longer barriers to entry for choice riders
- Challenges
  - MaaS operator – emerging transportation role. Usually private
  - Relationship between operator(s), providers, and end-user
    - Liabilities
    - Communication
    - Data infrastructure
    - Compensation
  - Real-time data for all services
  - Accessibility for special needs users
    - Disabilities
    - Older adults
    - No banking
    - No mobile phone
  - Consumer education and buy-in
- Regional Experience
  - ORANGES Electronic Payment Systems Field Operational Test (August 2003 to July 2004)
    - Goal to create an electronic payment system for transit, parking, tolls, and other applications
    - 1,000+ contactless cards were issued; 160 were active
    - Participants before and after the test agreed that a single payment system would be better for consumers
    - Lessons learned
      - Don't underestimate complexity

- Integration time may vary depending on the agency
- Perform periodic data checks to ensure functioning properly
- A proper roll-out, including training and education, is necessary to ensure a correctly utilized system

- Whim App
  - Helsinki, Finland
  - Standard and premium subscription options, and a pay-as-you-go option

	Whim To Go	Whim Urban	Whim Unlimited
Monthly payment	Free	49€	499€
Local public transport	Pay per ride	Unlimited Single Tickets	Unlimited Single Tickets
Taxi (5km radius)	Pay per ride	10€ per ride	Unlimited
Car	Pay per ride	49€ per day	Unlimited
City Bike	Coming spring 2018	Coming spring 2018	Coming spring 2018
Cancel anytime	✓	✓	✓
<b>Add-ons incl regional HSL</b> ▾			
<b>Add-on</b> Car subscription	✓	✓	✓
<b>Add-on</b> HSL Regional	Pay per ride	+50€ per month	+50€ per month
<b>Add-on</b> HSL Regional 3	Pay per ride	+100€ per month	+100€ per month

- Includes local transit as well as regional transit services
- Steven Bostel stated: FHWA recently sent out an expectations letter to M/TPOs regarding their upcoming LRTP updates – one of the “extras” was called *Mobility on Demand*.
  - Steven indicated it would be great if all the M/TPOs could approach it in a similar fashion for plan updates.
- David indicated this is still a fairly new concept that has grown quicker in Europe
  - Finland drafted legislation to support MaaS, opening the gates to private entities to support the idea
  - Spreading to the US
    - Regional payment system has been considered across the nation, but only recently has technology (cell phone) been available for the single application portion of MaaS
  - Several research articles are linked below:
    - [MaaS Alliance White Paper](#)
      - The MaaS Alliance is based out of Europe and had the most detailed information available regarding MaaS
    - [NADTC MaaS white paper](#)
    - [Rise of Mobility - Deloitte Article](#)
    - [Detroit Regional Payment Study](#)
    - [Chicago Regional Payment Case Study](#)
- Steven Bostel indicated that SCTPO is going through the letter and ensuring they are touching on everything FHWA wants
- Jeremy: creating route mode engine, meant to serve as a multimodal journey planner. Work done by regional transit providers. Booking information. Next fiscal year, project looking at regional

payments for system-optimal behaviors. Set aspirational goal about how to price things as a function of the behaviors that we want. Ticketing and payment side is not FDOT's role, but at municipality/transit system level.

- Is there a benefit to pricing things regionally vs a corridor/trip at a time?
  - That is what the study is trying to figure out. LRTP makes sense to look at MaaS. Ten-year view of where we are headed.
  - Integration is much easier in Europe because of data standardization and interoperability of systems. Interested in journey planning for autonomous vehicles.
  - Focus on customer, would be easier if they had a more streamlined service.
- Jon Cheney discussed prioritizing interface vs result
  - People with disabilities – more important for repeatable trips than efficiency
  - *Lighthouse of Central Florida* and other disability advocates need to be involved

### VIII. AUTOMATED VEHICLES – JEREMY DILMORE, FDOT DISTRICT FIVE

Jeremy Dilmore provided an update on Automated Vehicle technologies in the region.

- Turnpike presentation previously given to MetroPlan
- USDOT's ten automated vehicle proving ground designees
- Driver-assistive truck platooning, road safety and fuel savings pilot on Turnpike (run by Peloton); December 2017
  - How do you deal with the load, do you treat it as one or two vehicles? Oversized, permitting?
  - How will this affect bridges? Overload, vibration, worry about structural failure. Not really the case.
    - Set up geofence, spread out to 300 feet for bridges that couldn't accommodate close-together load.
  - Successful test on Turnpike; nobody realized anything was happening.
  - Ran 2 semi-trucks
  - Discussion of closeness – better fuel economy, but safety issues
  - Question: Did they test people cutting in between the trucks?
    - Jeremy: Not sure if that was tested during this effort, but the Peloton website has shown other examples where this component was tested with success
      - <https://peloton-tech.com/> - opening video showcases this feature
- SunTrax – Designed for Evolution
- Construction progress photos
- Colonial Parkway – want this to be a future technology corridor
- How is FTE preparing for this future? [video shown; will be provided to Consortium stakeholders]
- Security Credentials Management System (SCMS) – avoid fake-out havoc
  - Officially determine ID of traffic signals and vehicles
  - Proof of Concept (PoC) message security solution for vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications
  - Validate credentials distributed by USDOT
  - Uses Public Key Infrastructure (PKI)-based approach
    - Innovative method of encryption and certificate management to facilitate trusted communications
    - No personal or equipment-identifying information

- Protects the content of each message by identifying and removing misbehaving devices using chain-validation process
  - SCMS allows:
    - Enrolling of devices into the system – RSUs and OBUs
    - Certificate management – create, distribute, or revoke certificates
  - Question: How would it be implemented?
    - Jeremy: it would be part of the manufacturing process; no effect on end-user
  - USDOT Proof of Concept
    - Research work (CFR USC 20101) with Crash Avoidance Metrics Partnership (CAMP)
      - Test on 3 USDOT CV pilot projects
      - State/local maintenance and operations not eligible to enroll in the USDOT SCMS
    - Lessons learned will be used to establish national system
    - Expect to continue through 2020
  - Jeremy discussed three vendors currently working with the SCMS
    - SCMS Vendor - Integrity
      - *Currently using USDOT Root Key*
      - Re-architected SCMS for scalability
      - Jeremy has follow-up call with Colorado, Michigan, Virginia for references
    - SCMS Vendor – Trust Point/EsCrypt
      - *Not currently tied to USDOT Root Key*
      - Owned by Bosch (major Tier 1 automotive supplier)
      - Jeremy has follow-up call with Ann Arbor, Michigan for references
    - SCMS Vendor – Penta Security
      - *Not currently tied to USDOT Root Key*
      - Currently in use in South Korea
      - No relationship with RSU vendors
      - Not as far along as the other 2 vendors
  - Jeremy noted FDOT does not want separate systems for Florida regions/cities
    - Separate systems would create integration issues
- Jeremy noted that THEA is having trouble locating bike/peds via GPS; not accurate enough
  - THEA is supplementing with LiDar to make up the difference

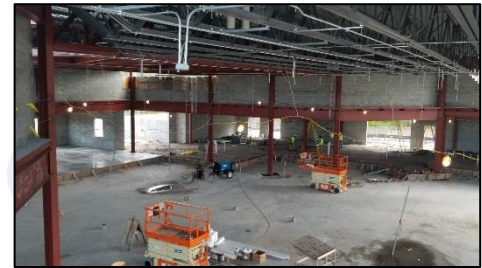
#### **IX. CURRENT INITIATIVES – JEREMY DILMORE, FDOT DISTRICT FIVE**

- UCF updates
  - SAFESIM
  - FUTURECITY
    - Multidiscipline staff
  - Jeremy is talking to UCF about the need for professionals in the future
  - UCF looking at hiring electrical and computer engineers into their transportation department so civil engineers can be more well-rounded
  - Should discuss with District Seven
- Autonomous Vehicle updates
  - CFAVP
    - Next meeting at Turnpike in late February
  - UCF campus ATCMTD



- RFP in March
- Running shuttles between dorms
- Allows for interaction with pedestrians for the University to study
- Mixed traffic – not comfortable yet
- LYNX AVMI
  - Looking at autonomous transit on LYMMO lanes downtown
  - Effort between LYNX, MetroPlan, City of Orlando
  - Not looking at it just as a project – want a sustainable program
    - how does it affect workforce, staffing levels, revenue collection? Informing policy, taking lessons learned from prior experiences. Comprehensive effort to ensure AVs will complement what we are doing now.
- The Villages
  - Voyage/Luminaire – looking at mixed traffic and on-demand service. Taxi services with an AV in shared lanes and arterial roadways.
  - Using LiDar
  - Currently mapping out the entire area
  - Launch in California first, then the Villages
  - Industry experts do not think AV technologies have advanced enough to integrate with mixed-traffic and provide on-demand services (AV taxi)
- US192 ART
  - LYNX, FDOT, and Osceola County are moving toward project implementation plan
  - Could incorporate Autonomous Rapid Transit
  - Moving toward a study phase
- UCF Connector
  - UCF is looking into a potential transit connection between the main campus (East Orlando) and the new campus (downtown Orlando) opening in 2019
    - To support movement
  - Full fleet change-out in 2020. Can they go fully automated by then?
  - Challenges
    - Will AV buses be capable of mixed-traffic integration by then?
    - Electric vehicles? Charging stations?
    - Ridership?
    - Headways?
    - Number of buses needed?
  - Learn from ATCMTD grant
- Lake Nona/Tavistock
  - Hotel, USTA sites – visitors go between. Set up shuttle service, state of the practice. Mandate is by the end of the calendar year to have an AV running on this route.
  - Outfitting vehicles with restraints for passenger safety

- Industry experts are uncomfortable with current AV shuttles technology traveling faster than 25 mph
- Regional Transportation Management Center
  - Targeting December 2018 for opening
    - May be done in November 2018
- Other
  - ITSQA – quality effort, bringing all roadways to one true dataset. This lets SunGuide know what the best data is. Auto-creates tickets when there are problems.
  - Route and Mode Choice Engine
  - ATSPM work
    - Volume Adjustment Factors
    - Volume to Travel Time Conversion
    - Incident detection and verification
    - Econolite says you must buy module for it to function properly, but you don't
  - Planning Dashboard
    - There have been some setbacks
    - API is up and running, token and role manager just about complete.
    - Website is being cleaned up, was too wordy. Something going on with the aggregator, calculating speed. Testing takes time. Hoping by end of March to be done.
  - Big Data Pilot – Operations
    - UF effort wrapping up
    - Immediately transferring into ICMS, best practice
    - Create connection over to Tableau
  - Network Labor-Sharing
    - ATCMTD should be signed off on today. This will free up Dan McDermott (FDOT Legal) to review network labor-sharing agreement
- Jon Cheney asked: any update on the TTS agreement
  - Jeremy indicated he was meeting with them Friday to find out status
  - Jon asked if anyone had been contacted by them individually
    - Charles Wetzel indicated they sent their agreement to Seminole County's legal team; Legal didn't like them and are drafting their own agreement to come up with a single County agreement.
    - Testing connected signals. No agreements in place.
  - Jeremy indicated the District is happy to help in any way they can
  - Guy 5: internal infrastructure issues to work out first.
- Charles Wetzel asked for the status of the Signal Phasing and Timing (SPaT) effort
  - Jeremy indicated the timeline is unclear. Not sure they have started yet.
- Where will consortium meetings be after the Orlando Urban Office is closed?
  - That's still uncertain, but the new RTMC's training facility is large enough to accommodate, if necessary
- Next Consortium – April 5, 2018
- **Jeremy asked that if any attendees had topics or questions they would like covered in the next Consortium to please let David or himself know about it.**



**X. ATTACHMENTS**

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

The Automated Vehicles video provided during the Consortium will be sent out separately.

**END OF SUMMARY**

*This summary was prepared by Kayla Costello 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](mailto:dwilliams@vhb.com) so they can be finalized for the files.*





# TSM&O Consortium Meeting

## February 8, 2018

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# TSM&O Consortium Meeting

## February 8, 2018

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Courtney Reynolds	RETHINK YOUR COMMUTE	



# TSM&O Consortium Meeting

## February 8, 2018

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Juan Calderon	" " "	juan.calderon@ " "

# Welcome to the TSM&O Consortium Meeting February 8, 2018



# Meeting Agenda

1. Introduction
2. TSM&O Strategy Guide – Update
3. Signal Technician Program – Update
4. TSM&O and the Central Florida MPO Alliance – Update
5. TSM&O Coordination
6. Mobility as a Service
7. Automated / Connected Vehicle Research
8. Current Initiatives



# TSM&O Strategy Guide

David Williams, VHB



Transportation Systems Management & Operations



# TSM&O Strategy Guide

- **Goal:** further integrate TSM&O into the FDOT planning process
- **Objective:** provide relevant TSM&O strategies for a given transportation issue
- Transportation issues (input) → Potential Strategies
  - Description
  - Links to relevant webpages
  - Complementary Strategies
  - Conflicting Strategies
  - Generalized Benefit-Cost





# Questions?



Transportation Systems Management & Operations



# Signal Technicians Program at Orange Technical College – Update

David Williams, VHB



Transportation Systems Management & Operations



# Signal Technician Program

- Orange Technical College has asked for a formal letter indicating the expected signal technician hires per year
  - Will establish need for a standardized 12-18 month signal technician program at the college
- Received substantial feedback from local agencies
- Awaiting feedback from private sector

Avalon Mid Florida Orlando  Westside Winter Park

**Orange Technical College**  
*Cordially Invites*  
**Program Advisory Members from all Campuses!**  
to the 2<sup>nd</sup> Annual  
District-Wide Program Advisory Committee Kickoff

To be held on the  
**Mid Florida Campus**  
**Building 1600**  
**Monday, October 16, 2017**

Breakfast will be served at 8:00 a.m. followed by a brief welcome from  
CTE Associate Superintendent, Dr. Michael Armbruster

All campus programs are invited to hold their 1<sup>st</sup> program advisory committee meeting on the  
Mid Florida Campus beginning at 9:00 a.m. immediately following the breakfast and welcome.

**Directions:**  
2900 W. Oak Ridge Rd, Orlando, FL 32809  
Mid Florida Campus is located at the corner of John Young Parkway and Oak Ridge Rd. Turn on Chancellor Drive and drive to the back of the campus. Look for the signs. Golf carts will be available if assistance is needed. Register for this event by clicking on the link:  
<https://www.surveymonkey.com/r/HJKTP2V>



OCPS Mission: To lead our student to success with the support and involvement of families and the community

# Questions?



Transportation Systems Management & Operations



# TSM&O and the Central Florida MPO Alliance (CFMPOA)

David Williams, VHB



Transportation Systems Management & Operations





# TSM&O and the Central Florida MPO Alliance

How can TSM&O be presented to the Central Florida MPO Alliance?

1. Establish foundational knowledge of TSM&O with the Alliance
2. Present a regional TSM&O project to the Alliance for their consideration



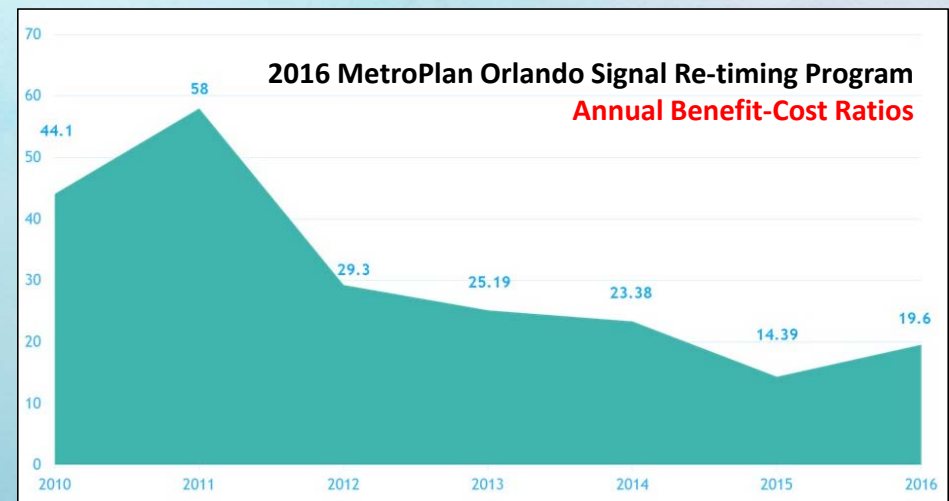
# TSM&O and the Central Florida MPO Alliance

- Foundational understanding of TSM&O
  - Different Cost Model
  - Support for Livability
  - Support for Mobility



# TSM&O and the Central Florida MPO Alliance

- Past, Present, & Future Initiatives
  - District Five Traffic Signal Re-timing
  - ITS Master Plans, ATCMTD, CFAVP, Smart Cities, Big Data, TSM&O Program
  - Automated / Connected Vehicle Technologies



# TSM&O and the Central Florida MPO Alliance

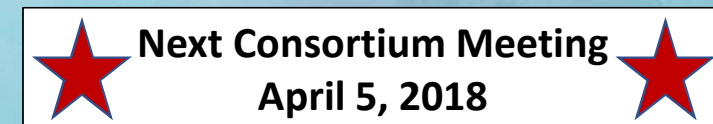
## Next Steps

1. Develop a master list of corridors that could be used as **diversion routes** from the major interstates/expressways
2. Determine **costs to upgrade** the corridors into viable diversion routes
3. Coordinate with partner agencies to **determine best candidates** for CFMPOA Regional Prioritized Projects List

Goal: give District Five ability to detect an incident and provide an alternative route with programmed response plans

# TSM&O and the Central Florida MPO Alliance

- Next CFMPOA Meeting – April 13, 2018
  - Ten-Year Plan of Regional TSM&O projects
  - Seeking approval to be incorporated into Regional Prioritized Projects List
  - Coordination towards a regional project (TBARTA MPO CCCs and CFMPOA)



# Questions?



Transportation Systems Management & Operations



# District Five TSM&O Support

David Williams, VHB



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# District Five TSM&O Support

- **Goal:** further integrate TSM&O into the FDOT planning process
- **Responsibilities:**
  - Coordination with other FDOT disciplines
  - Involvement in corridor planning studies to support TSM&O implementation
  - Provide guidance for using TSM&O documentation and resources





# Questions?



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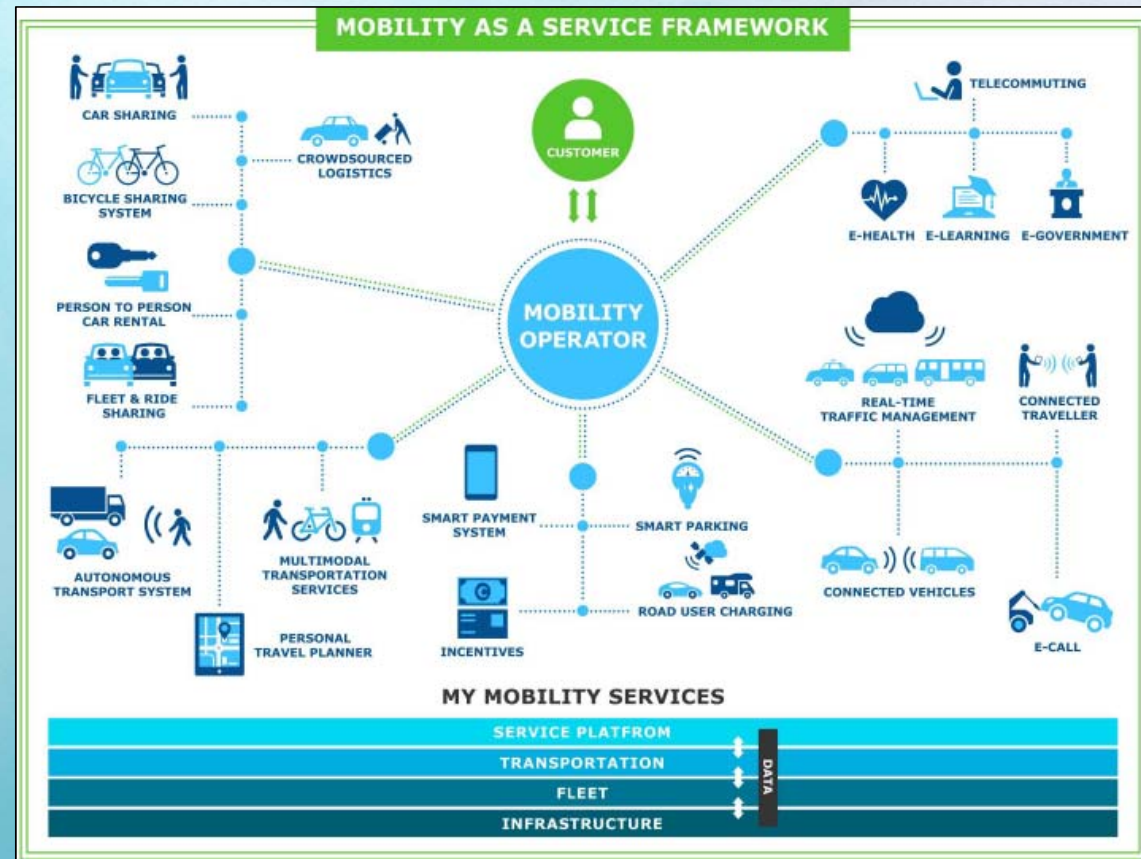


# Mobility as a Service (MaaS)

David Williams, VHB

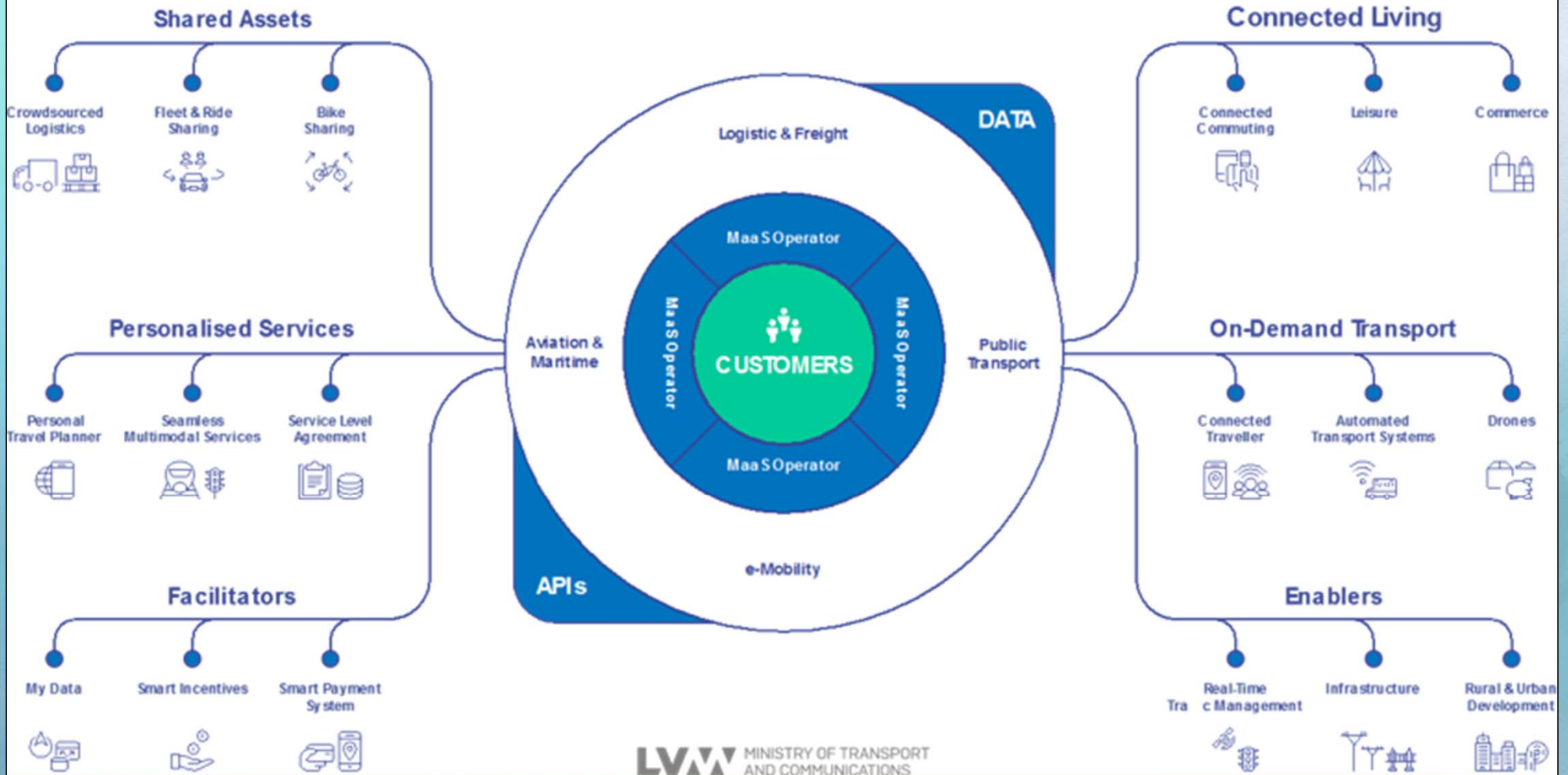
# Mobility as a Service

- Focus on mobility, not mode
- Single application
- Single payment system (ticketless)
- Simplified trip planning
- Central Operator



MaaS Ecosystem. *Bringing Mobility as a Service to the United States.* NADTC. Jan 2017.

# MOBILITY AS A SERVICE



Mobility as a Service. *Digital Services and Mobility as a Service*. Ministry of Transport and Communication, Finland. 2017.

# Mobility as a Service



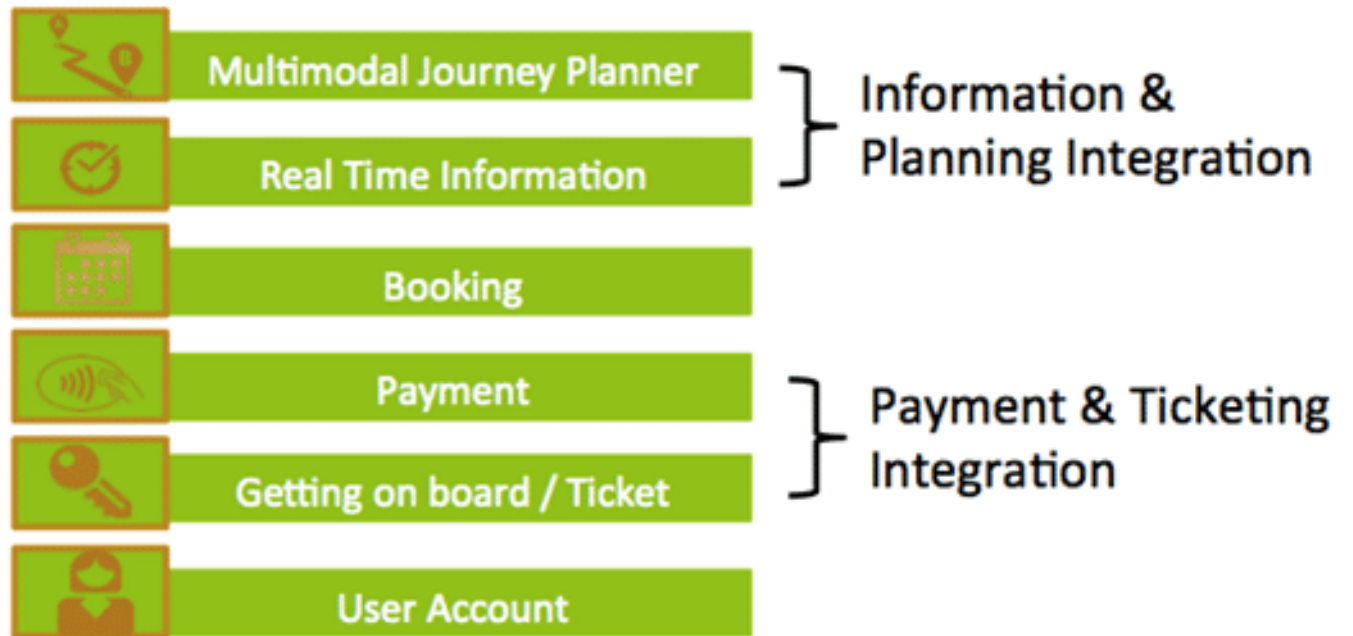
Mobility as a Service. Optimile. 2017.

# Mobility as a Service – MaaS Operator

Transport operators

MaaS Operator

Users



## Registration

- One-time user registration
- Grants access to all services

## Journey Planning

- List of services
- Optimal use of transport options based on user inputs

## Booking

- User makes decision
- Operator issues travel documents; service providers notified

## Payment

- Pay-as-you-go or subscription service; penalties / other considerations
- Payment and invoicing available for businesses
- Backend: revenue sharing between operator and provider(s)

## Journey

- Operator ensures delivery of service
- Operator notifies user of delays and other relevant info
- Operator typically responsible for customer support and interaction

# Mobility as a Service – Benefits

- Better serves the **transportation-disadvantaged**
- **User choice**
- Potentially **cheaper** for the user
- Reduces **single-occupant vehicle (SOV)** miles traveled
- **Simplifies** trip planning for the user



# Mobility as a Service – Challenges

- **MaaS Operator** – emerging transportation role
- Relationship between operator(s), providers, & end-user
  - Liabilities • Communication • Data Infrastructure • Compensation
- **Real-time data** for all services
- Accessibility for **special needs** users
  - Disabilities • Elderly • No banking • No mobile phone
- Consumer **education & buy-in**

# Mobility as a Service – Whim App

## Find your plan

Simply pay as you go or travel even smarter with a monthly plan.



### Whim to Go

0€

per month

For those who want to try Whim first or simply don't travel that much. Pay per ride, no commitment, no surcharges.



### Whim Urban

49€

per month (cancel any time)

INTRODUCTORY OFFER

For regular travellers who could use the flexibility of a taxi or car occasionally.



### Whim Unlimited

499€

per month (cancel any time)

INTRODUCTORY OFFER

Modern alternative for owning a car. At the price of owning a car you get unlimited access to public transport, taxi or a car according to your daily need.

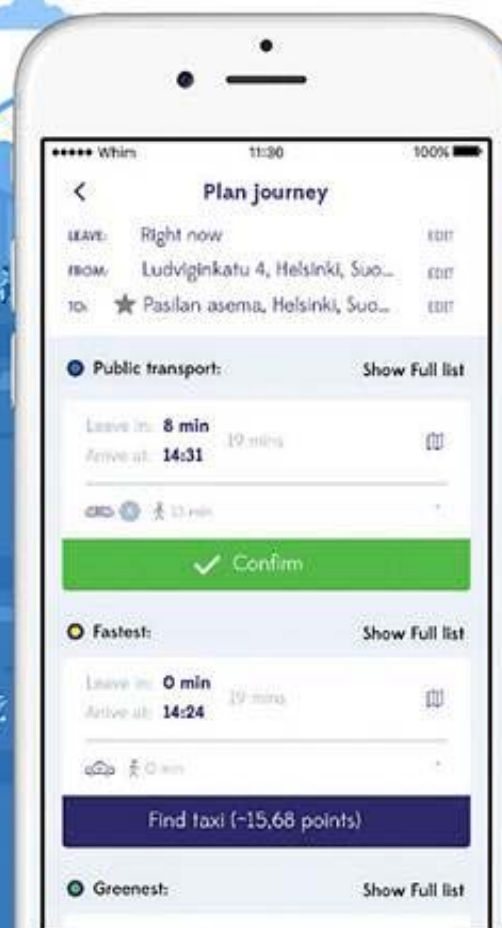
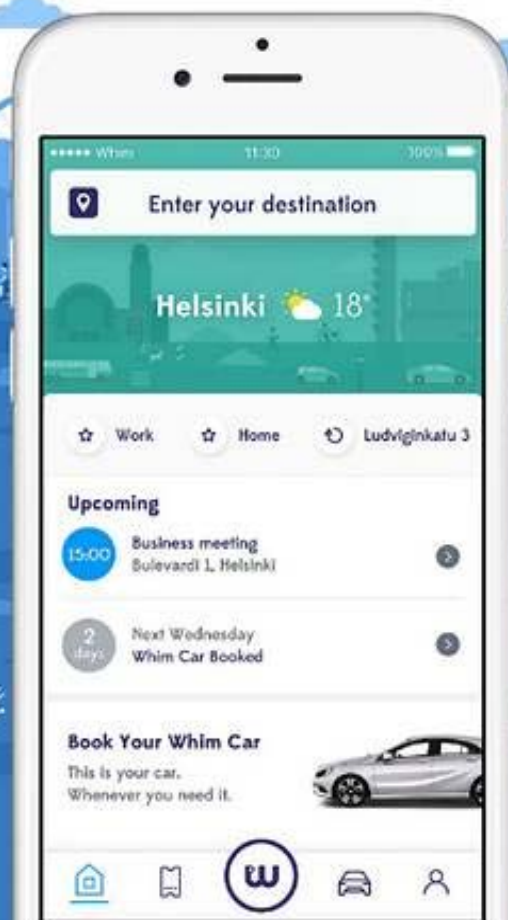
# Mobility as a Service – Whim App

	Whim To Go	Whim Urban	Whim Unlimited
Monthly payment	Free	49€	499€
Local public transport	Pay per ride	Unlimited Single Tickets	Unlimited Single Tickets
Taxi (5km radius)	Pay per ride	10€ per ride	Unlimited
Car	Pay per ride	49€ per day	Unlimited
City Bike	Coming spring 2018	Coming spring 2018	Coming spring 2018
Cancel anytime	✓	✓	✓
<b>Add-ons incl regional HSL</b> ▼			
<b>Add-on</b> Car subscription	✓	✓	✓
<b>Add-on</b> HSL Regional	Pay per ride	+50€ per month	+50€ per month
<b>Add-on</b> HSL Regional 3	Pay per ride	+100€ per month	+100€ per month

**WHIM - THE CAREFREE USE  
OF ALL TRANSPORTATION!**

**COMPARE AND  
BOOK YOUR TRIPS WITH  
A JOURNEY PLANNER.**

**CHOOSE  
A MONTHLY TRAVEL -  
OR JUST PAY-AS-YOU-GO.**



# Turnpike Update on Projects from MetroPlan



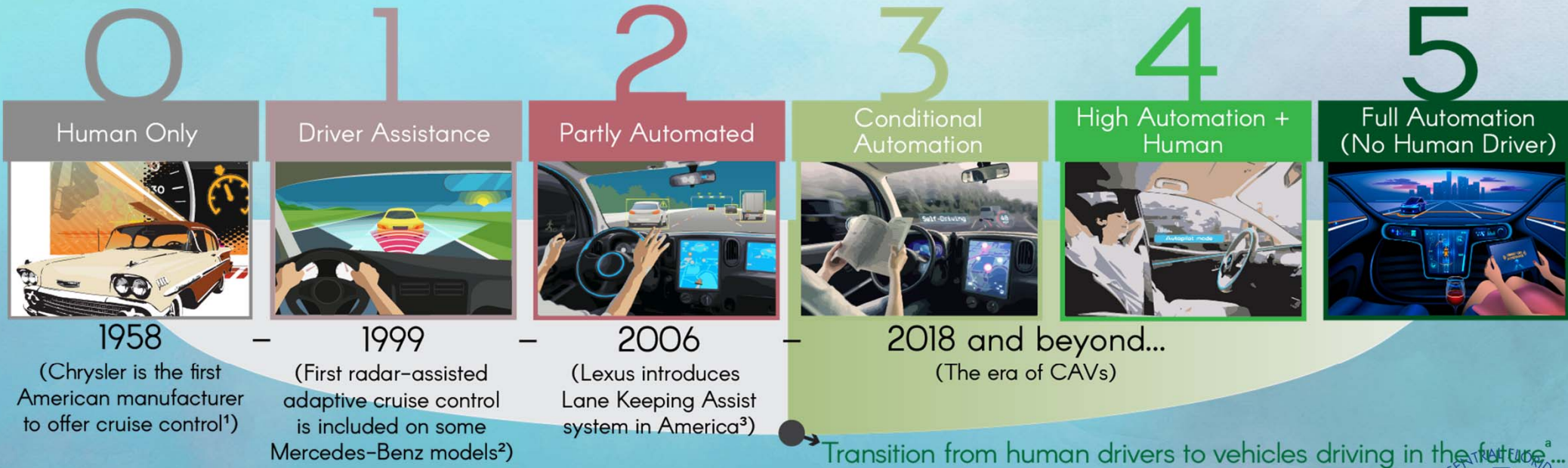
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# Work with us to plan the future!

## Past and Future Levels of Automation

Connected / Autonomous Vehicle (CAV) Level\*



\* CAV level information based on [iq.intel.com/autonomous-cars-road-ahead](http://iq.intel.com/autonomous-cars-road-ahead) and SAE International standards  
<sup>1)</sup> [roboticsandautomationnews.com/2017/06/05/saes-full-list-of-levels-for-autonomous-vehicles/12669/](http://roboticsandautomationnews.com/2017/06/05/saes-full-list-of-levels-for-autonomous-vehicles/12669/)  
<sup>2)</sup> [AutonomousVehicle.com/2017/06/05/saes-full-list-of-levels-for-autonomous-vehicles/12669/](http://AutonomousVehicle.com/2017/06/05/saes-full-list-of-levels-for-autonomous-vehicles/12669/)  
<sup>3)</sup> [AutonomousVehicle.com/2017/06/05/saes-full-list-of-levels-for-autonomous-vehicles/12669/](http://AutonomousVehicle.com/2017/06/05/saes-full-list-of-levels-for-autonomous-vehicles/12669/)

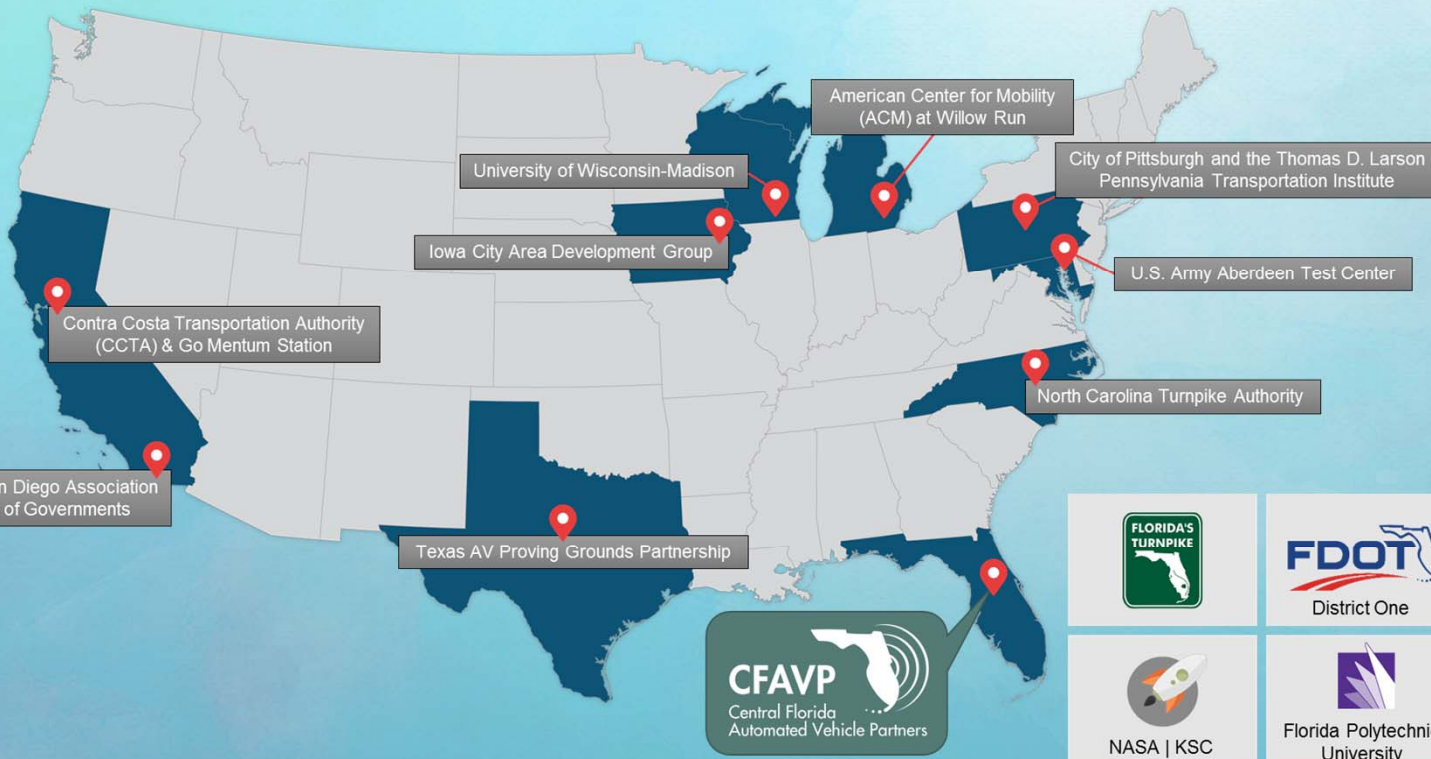
<sup>2)</sup> [Wardsauto.com/news-analysis/smart-cruise-mercedes-first-adaptive-cruise-control-system](http://Wardsauto.com/news-analysis/smart-cruise-mercedes-first-adaptive-cruise-control-system)  
<sup>3)</sup> [en.wikipedia.org/wiki/Lane\\_departure\\_warning\\_system](http://en.wikipedia.org/wiki/Lane_departure_warning_system)



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# USDOT's Ten Automated Vehicle Proving Ground Designees



**Multi-modal partnership for emerging mobility technologies and solutions**

- Research & development
- Testing
- Deployment

CentralFloridaAVPG.com



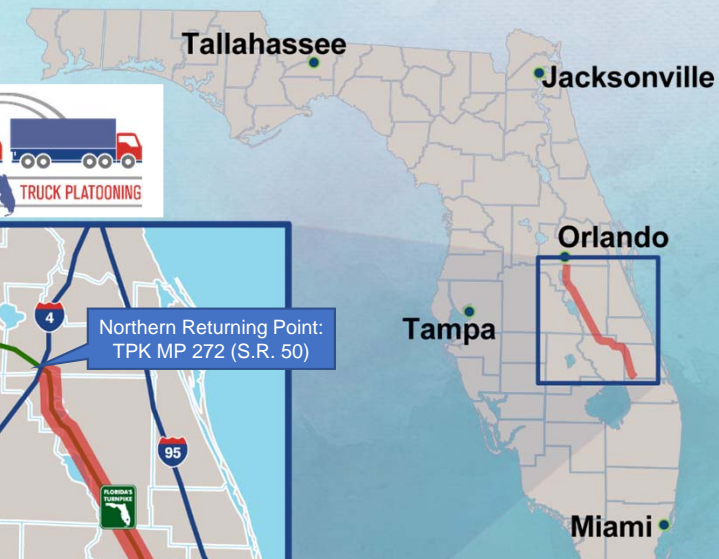
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# Driver Assistive Truck Platooning | Road Safety and Fuel Savings



## Project Location

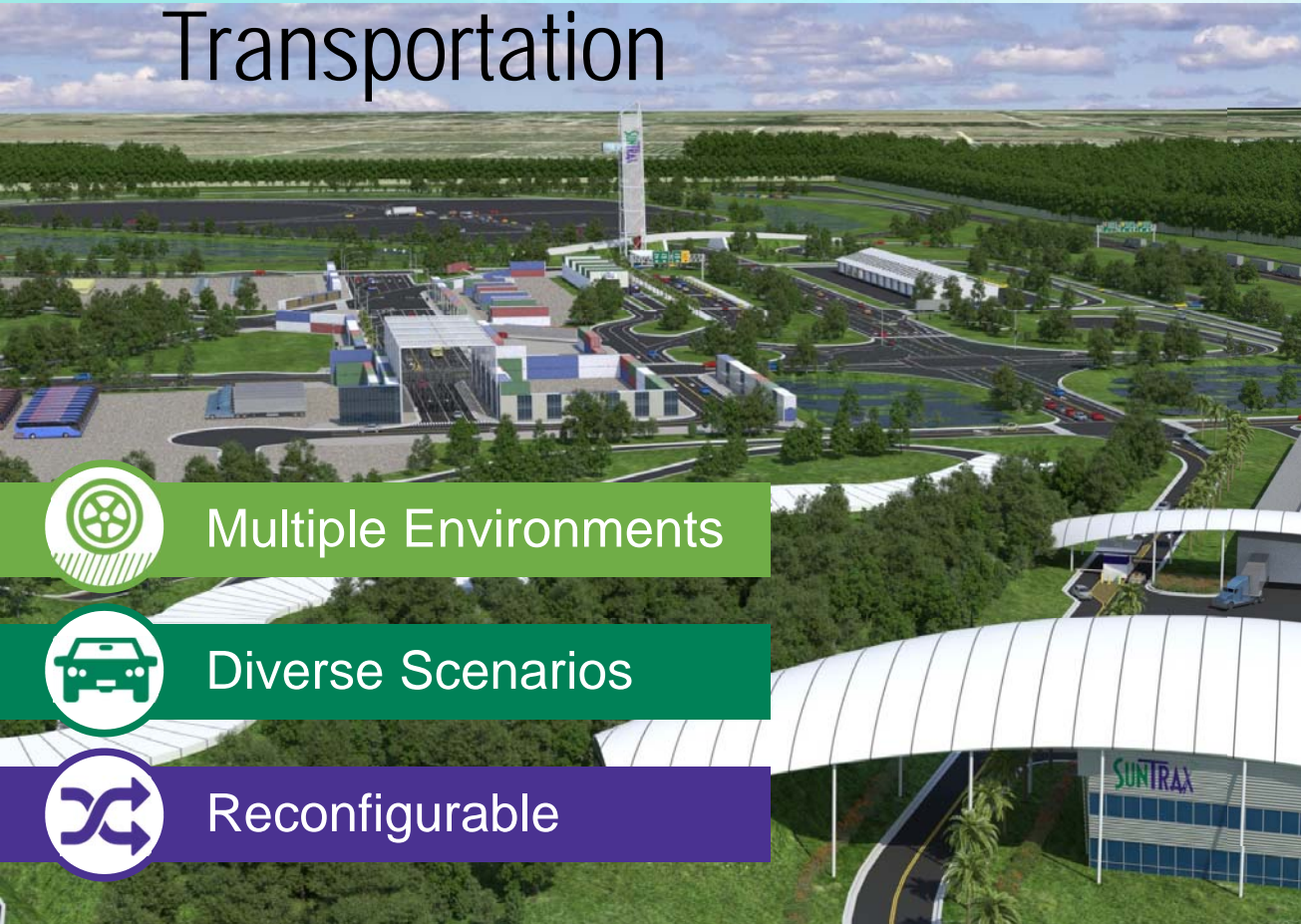


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# SunTrax | Accelerating the Future of Transportation



Multiple Environments



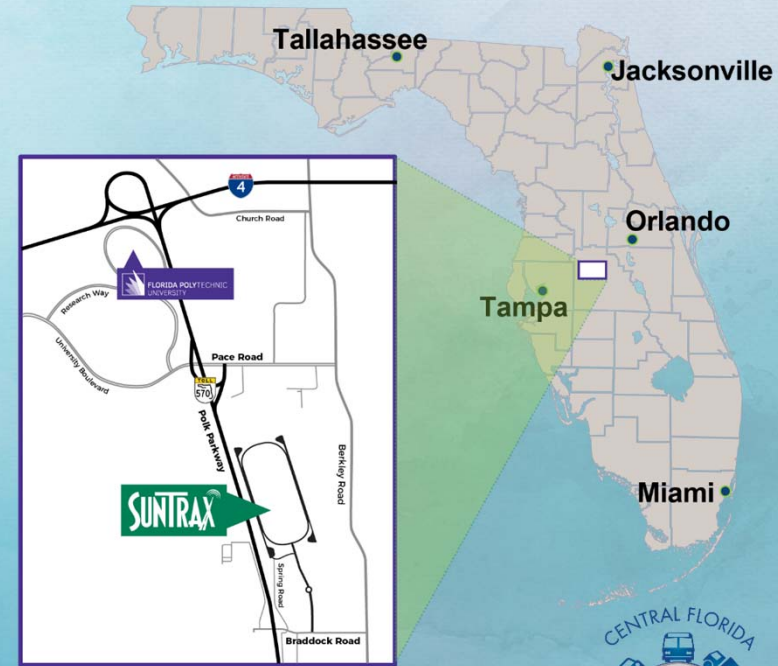
Diverse Scenarios



Reconfigurable



## Project Location



Opening Spring 2019!

operations



# SunTrax | Designed for Evolution



- 1 Main Access & Building Facilities
- 2 High Speed Oval
- 3 Dynamic Test Pad
- 4 Pick-Up/Drop-Off
- 5 Urban
- 6 Complex Suburban
- 7 Roadway Geometry Track
- 8 Environmental Test Chamber
- 9 Loop Track
- 10 Ring Track



# SunTrax Construction Progress

June 2017



October 2017



December 2017



# Colonial Parkway | Future Technology Corridor

- Reduce Congestion**
- Create Mobility Choices**
- Improve Safety**
- Enhance Evacuation Routes**
- Avoid and Minimize Environmental Impacts**

**Project Location**

**TECHNOLOGY**

**Embrace Innovative Technologies**



# How is FTE preparing for this future?



# CV Project Update



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State Traffic Engineering and Operations Office (STEEO)

# Security Credentials Management System (SCMS)



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# Agenda

- What is SCMS?
- Why SCMS is needed?
- USDOT Proof of Concept
- Vendor Presentations
- FDOT Roadmap



# What is SCMS?

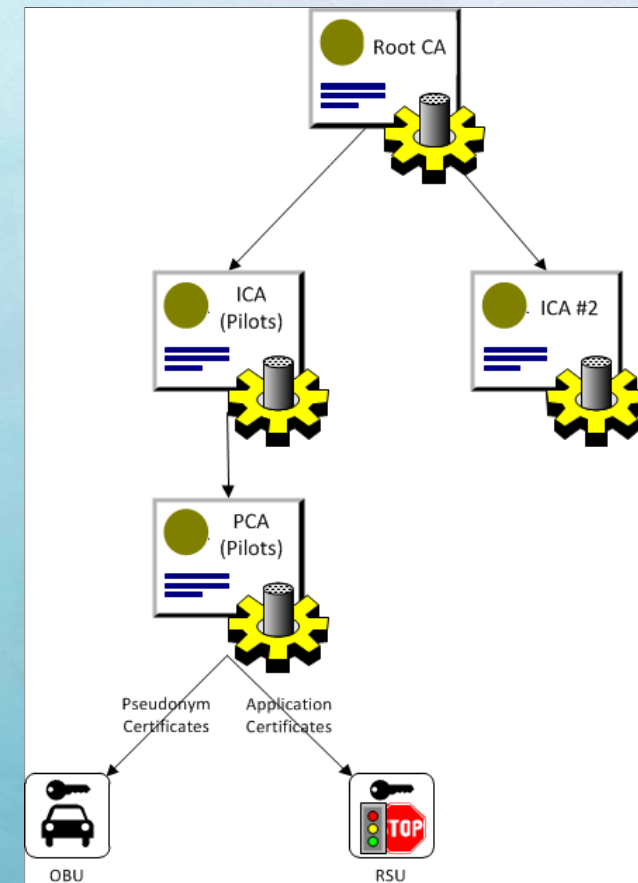


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# What is SCMS?

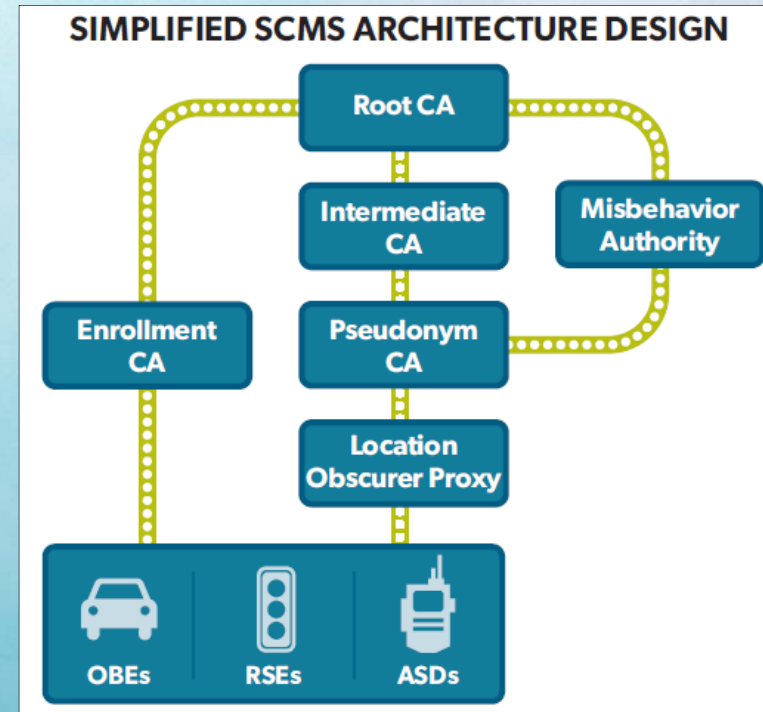
- SCMS is a **Proof of Concept (PoC) message security solution for vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication**
- Security Credential Management System (SCMS) uses **trust certificates that makes exchange of information secure and trustworthy** between:
  - Connected vehicles
  - Roadway infrastructure
  - Traffic management centers
  - Wireless mobile devices



**Note:** CA = Certification Authority; ICA = Intermediate Certification Authority; OBU = On-board Unit; RSU = Roadside Unit

# What is SCMS?

- Uses Public Key Infrastructure (PKI) based approach
  - Innovative method of **encryption and certificate management** to facilitate trusted communications
  - **No personal** or equipment-identifying **information**
  - Protects the content of each message by identifying and **removing misbehaving devices** using chain-validation process
- SCMS allows:
  - **Enrolling of devices into the system** – RSUs and OBUs
  - Certificate management – **create, distribute or revoke certificates**



Source: USDOT

**Note:** CA = Certification Authority; OBE = On-board Equipment;  
RSE = Roadside Equipment; ASD = Aftermarket Safety Device

# Why SCMS?



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# Why SCMS?

- CV applications uses vehicle information in real-time:
  - Basic Safety Messages (BSMs) provide situational awareness for devices to issue safety warnings and alerts, accepting a false message with **inaccurate data can be extremely dangerous**
  - Beyond authenticating and validating BSMs, system users need to be able to **detect and block messages that have been compromised**
- All communication modes **require a security system to trust** information exchange (safety, mobility, and others) in real-time
- **SCMS provides to the information exchange:**
  - Integrity
  - Authenticity
  - Privacy

# USDOT Proof of Concept



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# USDOT Proof of Concept

- Research work (CFR 49 USC 20101) with Crash Avoidance Metrics Partnership (CAMP)
  - Test on three USDOT CV pilot projects
  - State/local maintenance and operations **not eligible** to enroll in the USDOT SCMS
- Lessons learned will be used to facilitate the establishment of a national system by private industry
- USDOT encourage to utilize security services from a commercial supplier
  - USDOT SCMS PoC lifespan is five years (**ends in 2020**)
  - No future funding from USDOT



## **OBU:**

- OBU Enrollment Certificate
- Pseudonym Certificate (short-term)
- Identification Certificate

## **RSU:**

- RSU Enrollment Certificate
- Application Certificate

## **Misbehaving Reporting and Revocation**

# Vendor Presentations



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# FDOT SCMS Vendor Presentations

- Presentation on 12/20/2017
  - Integrity Security System (ISS) – North America  
(<https://www.ghsiss.com/>)
  - Penta Security – South Korea based firm with a branch office in North America  
(<https://www.pentasecurity.com/>)
  - Trust Point/Escrypt – North America  
(<https://www.escrypt.com/en>)



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# FDOT SCMS Vendor Presentations – ISS

- Currently developing the **PoC SCMS for CAMP**
- Follows IEEE 1609.2, SAE J2735, SAE J2945, and CAMP Vehicle Safety Communications 5 (VSC5) requirements
- Currently tied to **USDOT Root Key**
- Re-architected SCMS for scalability
- Recommendations:
  - **Continue discussion for pilot**
  - Confirm Root Key connection with GM and USDOT
  - Identify if they can get to USDOT Root Key
  - Check with references using their SCMS – **Colorado, Michigan, Virginia**
  - Verify if ISO 27001 certified for web trust
  - Confirm with USDOT on their view for the architecture

# FDOT SCMS Vendor Presentations – Trust Point/Esencrypt

- Owned by Bosch (major Tier I automotive supplier)
- Esencrypt claims that they are the **original developer of PoC** and currently serving as a trusted advisor for PoC
- Follows IEEE 1609.2, SAE J2735, SAE J2945, and CAMP VSC3 requirements
- **Not currently tied to USDOT Root Key**
- Recommendations:
  - **Continue discussion for pilot**
  - Proposes straight implementation (data center) identify if scalable
  - Identify if can access USDOT Root Key
  - Check with references using their SCMS – **Ann Arbor, MI**
  - Verify if ISO 27001 certified for web trust

# FDOT SCMS Vendor Presentations – Penta Security

- Currently in use **in South Korea**
  - Back end system located in South Korea
- Follows IEEE 1609.2, SAE J2735, SAE 2945 and CAMP VSC5 requirements
- Interoperability tested with Security Innovations
- **No relationship with RSU vendors**
- **Not currently tied to USDOT Root Key**
- Recommendations
  - **Put on hold? - Continue discussion for pilot**
  - Locate back end system in US
  - Prove relationships with US RSU vendors
  - Verify if ISO 27001 certified for web trust

# Current Initiatives

Jeremy Dilmore, District Five TSM&O



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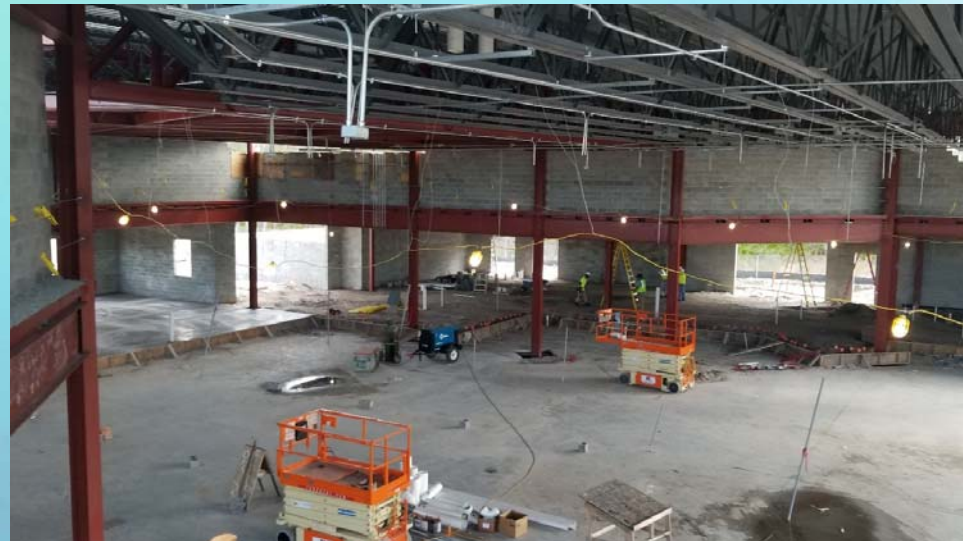
# UCF Happenings

- SAFESIM
- FUTURECITY
  - Multidiscipline staff

# Autonomous Vehicle Happens

- CFAVP
- *UCF campus ATCMTD*
- *LYNX AVMI*
- *Villages*
- *US192 ART*
- *UCF Connector*
- *Lake Nona/Tavistock*

# Transportation Management Center





# Districtwide Contract Selection

- Metric
- Gannett Fleming

# Other

- ITS IQA
- Route and Mode Choice Engine
- ATSPM work
  - Volume Adjustment Factors
  - Volume to Travel Time Conversion
  - Incident detection and verification
- Planning Dashboard
- Big Data Pilot – Operations

# THANK YOU!

## Next Consortium – April 5, 2018



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# TSM&O Consortium Meeting

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## MEETING AGENDA

D5 Urban Office  
133 S. Semoran Blvd.  
Orlando, FL 32807  
Lake Apopka B Conference Room

*February 8, 2018: 10:00 AM-12:00 PM*

- 1) WELCOME
- 2) TSM&O STRATEGY GUIDE – UPDATE
  - David Williams, VHB
- 3) SIGNAL TECHNICIAN PROGRAM AT ORANGE TECHNICAL COLLEGE – UPDATE
  - David Williams, VHB
- 4) TSM&O AND THE CENTRAL FLORIDA MPO ALLIANCE – UPDATE
  - David Williams, VHB
- 5) DISTRICT FIVE TSM&O SUPPORT
  - David Williams, VHB
- 6) MOBILITY AS A SERVICE (MaaS)
  - David Williams, VHB
- 7) AUTOMATED VEHICLES
  - Jeremy Dilmore, District Five TSM&O
- 8) CURRENT INITIATIVES
  - Jeremy Dilmore, District Five TSM&O