Meeting Date:	March 7, 2019 (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 Boardroom

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. 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) Automated Driving System (ADS) Demonstration Grant
- 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 per awardee
- $15 million cumulative award ceiling for all awards in a single state
- 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
  - Significant public benefit

- o Addressing Market failures
- o Economic vitality – *Buy American and Hire American*
- o Complexity of technology – SAE Level 3+ automation
- o Diversity of projects – urban, suburban, rural)
- o Transpiration-challenged populations
- o Prototypes – safe demonstration of new technology; doesn't need to be ready for market
- CFAVP Proposal: Project Delta Demonstration (formerly, "Connected Vehicle Standardization")
  - o 5 key areas
    - ▪ Interoperability Standardization
      - RSUs and OBUs do not communicate well across brands, models, software, and communication protocols
      - Looking for lower barriers to interoperability
      - Provide collected data
      - Demonstrations: deploy CV at UCF campus, Sumter County, and Pine Hills; test interoperability between different hardware
    - ▪ 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
      - Message delivery options to consider: in-mirror, in-dash, head-up, cellphone OBU emulators
      - Simulate cellphone and vehicle-based HMI at SunTrax
      - Based on simulation findings, demonstration at UCF, Sumter County, and Pine Hills
    - ▪ 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; make application a web service for geocoded video for MAP generation
      - Allow webservice to receive confirmation on MAP message and push to RSU/OBUs
      - Develop MAP message for known intersections at UCF, Sumter County, and Pine Hills
      - Mock up intersection at SunTrax using cones; update MAP message to demonstrate timing

- Deliver message to CV at UCF, Sumter County, and Pine Hills; evaluate receipt of and response to message
        ▪ Electromagnetic Interference
            • The potential risks and impacts on ADS from EMI sources are not well understood
            • Assessing risks and impacts from lightning and other sources in controlled and uncontrolled environments
            • Deploy Mobile EM Laboratory across Central Florida
        ▪ 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 get 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
    o Mostly deploying onto existing hardware so no need to procure new hardware (*Buy American* concerns)

Discussion:

- Q: Will the testing/demonstrations for this grant be tied in with I-4 Ultimate?
    o A: We are not currently working at that level of complexity, with the frequent large shifts in MOT, so we will be staying away from those areas.
- Q: Can resurfacing projects be used for demonstration purposes?
    o A: We want to do testing independent of contractor schedules, but still demonstrate the capability of the AV, which is why mock scenarios will be used.
- Q: LED lights are a significant source of EMI; how will this be considered in testing?
    o A: This will be included in the general testing, especially with the Mobile EM Laboratory to be deployed across Central Florida.
- Q: Will there be an award for the winner of the hackathon?
    o A: Yes
- Q: Do you need letters of support?
    o A: We have already received several letters of support. Per comments received from USDOT for the ATCMTD grant proposal, we are trying to avoid adding too many support letters.
- Change in grant format: We can now hand select who we choose to work with, rather than going through the competitive selection process. This change happened late in the grant application process, and because of it, the grant needs to be checked over by the Governor before final submittal.
- The grant has a cap of $15M per state and $10M per individual. We have coordinated with 3M, who are preparing the only other ADS grant application by FDOT, to ensure that

our combined cost does not exceed the $15M cap. 3M's proposal focuses on what is needed for autonomous freight vehicles, so concept and testing overlap is not a concern.

III.   CENTRAL FLORIDA MPO ALLIANCE – PRIORITIZED PROJECTS UPDATE

Eric Hill gave a presentation with updates on the Central Florida MPO Alliance (CFMPOA) Prioritized Projects.
- One year ago, CFMPOA came to the consensus that they need to add a category on TSMO projects (to be considered regional projects). The current project categories are SIS, Transit, and Trail.
    - The proposal was presented to the directors last July; they agreed to it.
    - The CFMPOA then convened and also approved the addition of the new category.
- The TSMO Consortium was tasked with developing a clear definition of a "regional TSMO project." This definition will be used by the CFMPOA to develop criteria for ranking regional TSMO projects.
- Two definitions were developed based on the Alliance's regional project definition and presented:
    1. "A regional TSMO project is a set of integrated strategies to optimize the performance of operations on existing infrastructure, serves regional transportation needs (such as access to and from the area outside the region; major activity centers in the region; major planned developments such as new retail malls, sports complexes, or employment centers; or transportation terminals) and impacts two contiguous counties in separate MPO planning areas."
    2. "A regional TSMO project <u>impacts two contiguous cities/counties in separate MPO planning areas</u> and is a set of integrated strategies to optimize the performance of operations on existing infrastructure <u>and included within project alternatives for new infrastructure projects</u>, and serves regional transportation needs (such as access to and from the area outside the region; major activity centers in the region; major planned developments such as new retail malls, sports complexes, or employment centers; or transportation terminals)."
        - <u>Additions</u> provided by *Patrick Son, Managing Director, NOCoE*
- The Consortium was also tasked with providing a member list, funding sources for TSMO projects, and minutes from the last meeting.

Discussion:
- General consensus was reached that the second definition is better than the first one. The definition will be sent to the executive directors for their approval, after the following changes to the language are made:
    - "Sports complexes" will be changed to "sports venues" to avoid limiting the definition.
    - "New retail malls" will be changed to "significant retail development" to include areas that do not fit the traditional concept of a mall (e.g. Waterford Lakes Town Center).
- Other suggestions for changes were made, but ultimately were decided against:
    - Expanding "two contiguous cities/counties in separate MPO planning areas" to include "or require the coordination of four or more organizations." This was proposed out of the concern that projects in city centers (Daytona Beach, Orlando, etc.) that have a regional impact without having a regional footprint might be overlooked.

- ▪ It was decided that "major activity centers" adequately covers the downtown areas of cities.
- The final definition agreed upon by Consortium participants is:
  - o "A regional TSMO project impacts two contiguous cities/counties in separate MPO planning areas and is a set of integrated strategies to optimize the performance of operations on existing infrastructure and included within project alternatives for new infrastructure projects, and serves regional transportation needs (such as access to and from the area outside the region; major activity centers in the region; major planned developments such as significant retail development, sports venues, or employment centers; or transportation terminals)."
- Other discussion points:
  - o Every MPO/TPO has their own internal prioritization process which has to be respected. Introducing new forms/methods should be avoided.
  - o It was suggested that a cost floor should be set for TSMO projects ($250,000). Responses included that the current executive director of FDOT is against any floor; it is difficult to find any project that will meet the definition for less than $3M; the board directive indicates that no restrictions to funding access should be created by setting a floor.

IV.   HB 311 / SB 932 – AUTONOMOUS VEHICLES

Jordan Crandall gave a brief presentation on Florida House Bill 311 and Senate Bill 932.

- Bill regarding Autonomous Vehicles was "introduced" to the Florida House and Senate separately on March 5, 2019
- The bill is only tentative and will not take effect unless passed through both the Florida House and Senate, and signed into law by Governor
- The tentative effective date is July 1st, 2019
- The Transportation & Infrastructure Subcommittee reported favorably on 3/6
- Bill Details:
  - o Replaces the term "Autonomous Vehicle" with "**Automated Driving System**" and is defined as the hardware and software that performs the dynamic driving task of an autonomous vehicle
  - o Authorizes fully autonomous vehicle to operate **regardless of presence of human operator**
  - o Provides that an "automated driving system" is deemed operator of autonomous vehicle operating with system engaged
  - o Authorizes Florida Turnpike Enterprise to fund & operate test facilities
  - o Provides a definition for "On-Demand Autonomous Vehicle Network": a passenger transportation network that uses a digital means to connect passengers to fully autonomous vehicles for-hire
  - o Provides **requirements** for operation of on-demand autonomous vehicle networks
  - o Revises registration requirements for autonomous vehicles
  - o Exempting a fully autonomous vehicle being operated with the automated driving system engaged from a prohibition on the active display of television, video, or use of wireless communications devices
  - o Requires the automated driving system of a fully autonomous vehicle to be capable of achieving a **minimal risk condition** if a failure of the system occurs. Provides a definition for "minimal risk condition"

- Discussion:
  - Q: Did the FDOT sponsor the bill, and does the FDOT want the Consortium to oppose, monitor, or support the bill?
    - A: FDOT is not taking a position on any legislation going through the Florida House & Senate.
  - Does the bill address insurance requirements?
    - No. Other legislation is in place for that. The discussion of responsibility/liability is still being refined.
  - Does the bill address infrastructure liability?
    - No, we haven't seen examples of that being addressed anywhere.
  - Does the bill discuss data-sharing?
    - No. The bill is fairly high level.
  - Note: Legally allows for someone who is unlicensed to get in autonomous vehicle alone; that person cannot take over in case of an emergency. The bill allows for the legal possibility of cars that are never meant to be taken over.

V. FUTURE PROOFING INFRASTRUCTURE FOR CAVS

Jordan Crandall presented on the report "Future Proofing Infrastructure for Connected and Automated Vehicles" made by Catapult Transport Studies in the UK (Published 02/2017).

- Suggested process for achieving CAV infrastructure: Infrastructure required for CAVs + Existing and planned infrastructure → Updated planning guidance documents → future-proofed CAV-friendly infrastructure.
- While CAV infrastructure is a vital component in taking full advantage of current available technology, changes should be iterative. Long-range planning documents may be difficult places to plan for CAVs because of the fast pace of change.
- Potential CAV Impacts:
  - Reduced number / severity of road collisions
  - Releasing Driver Time
  - Environmental Benefits
  - Reduced Congestion
  - Improved mobility for those without access to privately owned vehicles
  - Potential Impact on Public Finances
  - Potential for Disruption to Established Industries
- Planning guidance document review shows clear need for CAVs in planning and design documents. Planning bodies need to closely examine potential changes in revenue streams due to new technology.
- Infrastructure Requirements for CAVs:
  - Internal Workshops and Discussions:
    - Traffic Management Measures
      - Infrastructure outside of vehicles can provide significant benefits, especially communication of temporary obstructions or work zones
      - Possible solutions: geolocated cones and barriers

- 3 primary contenders for the V2I standard protocol are mobile data (4G or 5G); ITS-G5 (a WIFI based technology with a reserved frequency range); or a hybrid of the two
- Establish work sites standards including style, readability, barriers and cones
- Provide detailed road layout and expected vehicle behavior
- Real-time updates
- New roads and major junctions should be connected to fiber-optic and other V2I applications
- Develop "CAV Compliant First Respondents" procedure
- Develop a warning sign that can warn CAVs of danger ahead
- Research how humans can direct CAVs with hand signals
- Undertake comprehensive review of Traffic Signs Manual
- Ensure hardware is standardized and well maintained
  - Road markings
    - Maintenance of road markings may need to be improved and funding increased
    - Work with land owners to ensure private roads are checked and certified for use by CAVs
  - Safe harbor areas (hard shoulders)
    - Appropriate frequency and design
    - Measures to avoid misuse
    - Consider temporary safe harbor areas prior to traffic management measures
    - Service stations a public transport hub
    - Enabling service stations to charge CAVs
  - Car parking
    - Benefits of CAV valet parking solutions, such as parking density
    - Need automated parking guidance and standards
    - Adopt a flexible approach to car park design and planning, acknowledging the potential for less demand in future decades
  - Automated Demand Responsive Public Transport Vehicles
    - More dense places may support automated public transport vehicles with multiple occupants to avoid exacerbating congestion
    - New developments could consider such opportunities
    - Consider location and size of pick-up/drop-off zones
    - Consider segregation when appropriate
  - Crossings and Junctions
    - Intersections will need the densest network of V2I infrastructure
    - Signal controlled junctions and crossings are expected to be simplest for CAVs. Highway authorities could consider moving to signals along routes where CAVs are expected to operate
  - Impact on bridge structures

- • Platooning of heavy goods vehicles could change the loading on long span bridges
  - • Potential changes to AASHTO Guidelines
- • Discussion:
- • Q: Do all road need to have markings to work with CAVs? Some are not allowed to be marked (too narrow, etc.)
  - o A: The focus is more on heavily trafficked areas rather than small streets/residential neighborhoods. Some areas evolve faster than others, especially urban areas and places that provide connections to things like distribution centers. While the infrastructure on smaller roads to support AVs still requires development, main roads are where AVs need a lot more help in high volume situations.
- • Q: How do you plan to account for lightning and heavy rain?
  - o A: Through redundancy; by having multiple ways in which a CAV can find the same information at any given time (e.g. lane markings, strong map connection, signs, etc.).
- • Q: How will you account for temporary MOT?
  - o A: WeyMO is capable of recognizing hand signals and individuals. We are going to be trying to generate automated messaging, focusing first on large MOT shifts, then moving MOT, and VSM. We need to determine if a cam message is sufficient, or whether the mapping needs to be changed entirely with each shift in MOT.
- • Q: CAVs will need to learn how to recognize cones and other stationary objects.
  - o A: As it currently exists, autopilot usually ignores stationary objects, resulting in accidents and sometimes fatalities. This will require the development of something additional, so that CAVs can tell the difference between false and non-false positives.

VI.   DANGEROUS BY DESIGN 2019 REPORT

Jordan Crandall discussed the Dangerous by Design report, released in January 2019.

- • 2016 and 2017 had the highest number of pedestrian deaths since 1990.
- • 4 out of 5 major metropolitan areas grew more dangerous for people walking since the 2016 report.
- • Traffic deaths impact every community in the United States, but states and metropolitan areas across the southern continental United States, older adults, people of color, and people walking in low-income communities bear a higher share of this harm.
- • From 2008 to 2017, pedestrian deaths increased by 35.4%, even though walking as a share of all trips only increased by <1%
- • Florida remains the most dangerous state for pedestrians
- • Florida contains eight of the top ten most dangerous metropolitan areas for pedestrians:
  - o 1. Orlando-Kissimmee-Sanford
  - o 2. Deltona-Daytona Beach-Ormond Beach
  - o 3. Palm Bay-Melbourne-Titusville
  - o 4. North Port-Sarasota-Bradenton
  - o 5. Lakeland-Winter Haven
  - o 6. Jacksonville
  - o 8. Cape Coral-Fort Myers

- o 9. Tampa-St. Petersburg-Clearwater
- o 14. Miami-Fort Lauderdale-West Palm Beach
- Orlando-Kissimmee-Sanford's Pedestrian Danger Index score increased by 78.6. Third highest behind North Port-Sarasota-Bradenton and Bakersfield, CA.
- Individuals aged 50+ are overrepresented in pedestrian deaths.
- People of color, especially Black or African American and American Indian or Alaska Native people, are struck and killed at higher rates.
- Individuals die while walking at much higher rates in lower-income communities compared to higher-income ones.
- Possible Solutions:
  - o State Level:
    - Set performance targets that will improve safety
    - Prioritize safety over vehicle movement
    - Provide state transportation officials and engineers with the most up-to-date training and education on implementing Complete Streets
  - o State or Local Level:
    - Prioritize projects that will benefit those who suffer disproportionately
    - Embrace the flexibility provided by FHWA to design safer streets.
    - Design roads to reduce speeds wherever possible
    - Pass actionable Complete Streets policies that lay the groundwork for implementation
    - Stop referring to pedestrian fatalities as unavoidable "accidents"
    - Test out bold, creative approaches to safer street design

VII.   CURRENT INITIATIVES

Jeremy Dilmore briefly discussed current initiatives around the District.

- Vehicular Mobility
  - o UCF working on: from Purdue; Advance Loops and IMC: Knowing the approach volume with 99% accuracy and the turning movement counts with 90% accuracy should permit the simulation of turning movements with 90+% accuracy.
  - o NCHRP developing Scenario Planning using turning movement data
  - o UF and UCF working on incident detection using.
  - o UCF developing synthetic turning movements for an un-instrumented second signal based on the existing data from a first intersection
  - o Kittelson working on determining unmet demand using Bluetooth and apps such as Waze and HERE. UCF working on Demand Model Approximation (projected unmet demand).
    - Planning data needs along with density functions and ICE/SPICE can then be used to determine proposed infrastructure improvements.
  - o ICMS, Signal optimization tools will be used to create prioritized retiming with data exportable to Synchro. These can be used to develop suggested timing, TOD, and signal grouping.
  - o The end goal is to provide a roadmap where everything comes together to meet the needs of transportation professionals.

- CCTV Feeds and MVDS
    - UF is using CCTV object detection and segmentation as components in their development of object recognition and location trajectory count.
    - The use of Microwave Vehicle Detection System (MVDS) in object detection and segmentation, and its application to object recognition and location trajectory count still to be determined.
    - Incidents and near misses to be determined and brought together in a projected safety needs heat map.
    - Cisco is exploring DSRC conversion for use in CV applications (especially PSMs and BSMs).
    - Explore using an SDLC port for detection to replace conventional detection systems at intersections.
    - Cisco is in the process of determining the difference between using an ATC Controller in conjunction with the Traffic Management Data Dictionary (TMDD) and ICMS Signal-timing Optimization Tool (SOT) to develop SPaT and reduplication, as opposed to only using the ATC controller to produce SPaT and reduplication.
    - UF is using Drone Data to develop an Automated MAP Generation Application (Video Aerial to MAP). This may be used in DSRC CV applications.
    - Combining the location trajectory count with vehicular data from SunGuide, ATSPM data, and CAD integration will allow for better incident detection. This can then inform via CAD, Mutuallink, and video triggering to update SunGuide's TAM. This information may also be used in DSRC CV applications.
    - The goal is to deliver maximum functionality with minimum infrastructure; simplifying the amount of roadside equipment will lessen the maintenance needs.
- Pedestrian and Bike Demand
    - UCF is developing projected bike/ped demand using ATSPM data, detection observations, and land use data.
    - Synthetic bike and ped observations have not been assigned a researcher yet
    - Looking into constructing pedestrian kiosks from available parts rather than having them custom built. Also considering breakaway bases so that kiosks can be built in any environment.
- Transit Availability
    - Unassigned research
    - First, ride sharing movement data, route mode choice data, and transit boarding and alighting data will be collected. This will then be compared with transit demand, land use, and socioeconomic data to develop projected transit need.
    - The projected transit need along with the data findings and paratransit demand will be used to form a directed subsidy for equitable service.
    - Combining transit availability, bike/ped demand, vehicular demand, and land use will allow for UCF to develop a more complete transportation objective, which can then be used to form design criteria.
    - Transit planning is done for days without any crash or event, with certain areas never meeting planning conditions (e.g., Downtown Orlando).
        - Different amounts of variability exist, an NCHRP program to determine variability and feed into modelling systems would be useful in determining risk profiles and

projecting short term needs to long term volume demands where the AADT changes, but the reliability does not.

- RTMC – showed pictures that are two weeks old:
  - Showing some carpet down, parking lot is striped, server racks are in, cubicle space is almost complete
  - Communications coming in
  - Opening in May
- Discussion:
- Q: Have you reached out to CUTR for research support?
  - A: First, we aim to build the road map. Then we'll ask someone for a literature review. We want to avoid duplicating research that has already been done.
- Jeremy commented that we should be careful not to give work to certain organizations simply because they're local. UCF and UF research efforts were assigned because of the expertise in those institutions.
- The comment was made that it would be helpful to let the Consortium know about the priority of the work flow.

VIII.   NEXT MEETING – May 2, 2019 at Central Florida Expressway Authority

IX.   ATTACHMENTS

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

END OF SUMMARY

This summary was prepared by Amanda Johnson 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 FDOT
CENTRAL FLORIDA EXPRESSWAY AUTHORITY VISITORS LOG
MARCH 2019

	Visitor's Name	Company Name	*Person Authorizing Access**	Time In	Time Out	Visitor Badge Number
3.7.2019	M Tobin	City Orlando	M. Ikey	10⁰⁸		
3.7.2019	A. Thurain	Gannett Fleming	M. Ikey	10:08		
3.7.2019	Alan Danahar	WSP	M. Ikey	10:25		
3.7.2019	Steven Besser	SCTPO	M. Ikey	10:30		
3.7.2019			M. Ikey			
3.7.2019			M. Ikey			
3.7.2019			M. Ikey			
3.7.2019			M. Ikey			
3.7.2019			M. Ikey			
3.7.2019			M. Ikey			

"TSM&O" CONSORTIUM FDOT
CENTRAL FLORIDA EXPRESSWAY AUTHORITY VISITORS LOG
MARCH 2019

	Visitor's Name	Company Name	*Person Authorizing Access**	Time In	Time Out	Visitor Badge Number
3.7.2019	Noel Oteyra	Seminole County	M. Ikey	9:40	12:12	
3.7.2019	Brian Hutt	Lake Sumter MPO	M. Ikey	9:42		
3.7.2019	H. Walker	FTE/Jacobs	M. Ikey	9:47		
3.7.2019	Ron Pate	WSP	M. Ikey	9:50		
3.7.2019	Brent Pook	Cfx	M. Ikey	9:52		
3.7.2019	Alyssa Torres	Orange County	M. Ikey	955	1210	
3.7.2019	Michael Woods	LSMPO	M. Ikey	957		
3.7.2019	Sheryl Bradley	FDOT/HNTB	M. Ikey	9:55		
3.7.2019	Jay Williams	FDOT	M. Ikey	9:58		
3.7.2019	Rupender Dahiza	WSP	M. Ikey	10:00		

"TSM&O" CONSORTIUM FDOT
CENTRAL FLORIDA EXPRESSWAY AUTHORITY VISITORS LOG
MARCH 2019

	Visitor's Name	Company Name	*Person Authorizing Access**	Time In	Time Out	Visitor Badge Number
3.7.2019	Jon Cheney	Volusia County	M. Ikey	9:30		
3.7.2019	GERAD REIGEL	FSU	M. Ikey	9:30		
3.7.2019	Christine Lofye	OC Traffic	M. Ikey	9:50		
3.7.2019	Jerry D	FDOT	M. Ikey	8:50		
3.7.2019	Huzein El-Assar	Orange Co	M. Ikey	9:57	12:10	
3.7.2019	MASOOD MIRZ	"	M. Ikey	9:57		
3.7.2019	Benton Bonney	Orlando	M. Ikey	1000		
3.7.2019	Crystal Mercedes	Metro Plan	M. Ikey	10:05		
3.7.2019	Eric Hill	" "	M. Ikey	10:05		
3.7.2019	Colleen Nicolin	R2CTPO	M. Ikey	10-05		

"TSM&O" CONSORTIUM FDOT
CENTRAL FLORIDA EXPRESSWAY AUTHORITY VISITORS LOG
MARCH 2019

	Visitor's Name	Company Name	*Person Authorizing Access**	Time In	Time Out	Visitor Badge Number
3.7.2019	Chris Cairns	Orlando	M. Ikey	10:05		
3.7.2019	Francis Franco	Lxnx	M. Ikey	10:07		
3.7.2019	Bryan Homason	CFX	M. Ikey	10:08		
3.7.2019	Scott Arnold	City of Melbourne	M. Ikey	10:30	12:15	
3.7.2019			M. Ikey			
3.7.2019			M. Ikey			
3.7.2019			M. Ikey			
3.7.2019			M. Ikey			
3.7.2019			M. Ikey			
3.7.2019			M. Ikey			

Welcome to the
TSM&O Consortium Meeting
March 7, 2019

WiFi PW:

32186350

Transportation Systems Management & Operations

Meeting Agenda

1. Welcome

2. Automated Driving Systems (ADS) Grant Application

3. Central Florida MPO Alliance – Prioritized Projects Update

4. HB 311 / SB 932 – *Autonomous Vehicles*

5. Future Proofing Infrastructure for CAVs

6. Dangerous by Design 2019 Report

7. Current Initiatives

Transportation Systems Management & Operations

Automated Driving Systems (ADS) Grant Application Update

David Williams, VHB

Transportation Systems Management & Operations

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

- **$15,000,000** max per state

- https://www.grants.gov/web/grants/view-opportunity.html?oppId=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 – 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

- Name: **PROJECT DELTA DEMONSTRATION** `Updated`
- Five Key Areas
    1. Interoperability
    2. Human-Machine Interface (HMI)
    3. Automated MAP Message Generation
    4. Electromagnetic Interference (EMI)
    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

CFAVP
PROJECT DELTA

FDOT
2019 FDOT ADS DEMONSTRATION GRANT APPLICATION
UNITED STATES DEPARTMENT OF TRANSPORTATION
NOTICE OF FUNDING OPPORTUNITY NUMBER 693JJ319NF00801
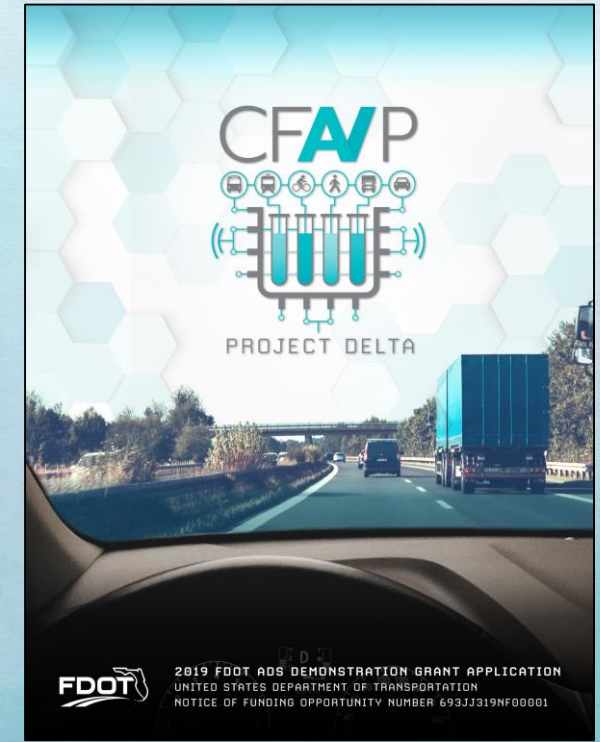
Key Area – Interoperability

- **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

- **Exhibitions(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, Sumter County, and Pine Hills ; test functionality with infrastructure hardware   **Updated**

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?
- **Exhibition(s):**
  - Simulated cell-phone and vehicle-based HMI at SunTrax
  - Demonstration at UCF, Sumter County, and Pine Hills based on simulation findings

Updated

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
- **Exhibition(s):**
  - Develop MAP message for known intersections at UCF, Sumter County, and Pine Hills
  - Mock up intersection at SunTrax using cones; update MAP message to demonstrate timing
  - Deliver message to CV at UCF, Sumter County, and Pine Hills; evaluate receipt of and response to message Updated

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

- **Exhibition(s):**
  - Deploy Mobile EM Laboratory across Central Florida **Updated**

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

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

Partners

- **State**
  - FDOT Central Office
  - FDOT District Five
  - Florida's Turnpike Enterprise

- **Local**
  - D5 County IT Supervisors
  - Sumter County

- **Academic**
  - University of Central Florida
  - University of Florida
  - Florida Polytechnic University

- **Industry Experts** Updated
  - Cisco
  - Esri
  - Professional Services Contractor

Questions?

The Project Delta Demonstration proposal and materials will be posted to CFLSmartRoads' CAV Webpage

Central Florida MPO Alliance Regional Prioritized Projects

Eric Hill, MetroPlan Orlando

Transportation Systems Management & Operations

"A regional TSMO project is a set of integrated strategies to optimize the performance of operations on existing infrastructure, serves regional transportation needs (such as access to and from the area outside the region; major activity centers in the region; major planned developments such as new retail malls, sports complexes, or employment centers; or transportation terminals) and impacts two contiguous counties in separate MPO planning areas."

"A regional TSMO project <u>impacts two contiguous cities/counties in separate MPO planning areas</u> and is a set of integrated strategies to optimize the performance of operations on existing infrastructure <u>and included within project alternatives for new infrastructure projects</u>, and serves regional transportation needs (such as access to and from the area outside the region; major activity centers in the region; major planned developments such as new retail malls, sports complexes, or employment centers; or transportation terminals)."

<u>Additions</u> provided by *Patrick Son, Managing Director, NOCoE*

FL House Bill 311 / Senate Bill 932

David Williams, VHB

Florida House Bill 311 and Senate Bill 932

- Bill regarding Autonomous Vehicles was "introduced" to the Florida House and Senate separately on March 5th 2019

- The bill is only tentative and will not take effect unless passed through both the Florida House and Senate, and signed into law by Governor

- The tentative effective date is July 1st, 2019

- House staff members of subcommittees offered an analysis following the March 5th introduction:
  - Transportation & Infrastructure Subcommittee – **Reported Favorably 3/06 (14Y 0N)**
  - Transportation & Tourism Appropriations Subcommittee – **Received 3/06**
  - State Affairs Committee – **TBD**

Transportation Systems Management & Operations

Florida House Bill 311 and Senate Bill 932

- Replaces the term "Autonomous Vehicle" with "**Automated Driving System**" and is defined as the hardware and software that performs the dynamic driving task of an autonomous vehicle

- Authorizes fully autonomous vehicle to operate **regardless of presence of human operator**

- Provides that an "automated driving system" is deemed operator of autonomous vehicle operating with system engaged

- Authorizes Florida Turnpike Enterprise to fund & operate test facilities

- Provides a definition for "On-Demand Autonomous Vehicle Network": a passenger transportation network that uses a digital means to connect passengers to fully autonomous vehicles for-hire

Transportation Systems Management & Operations

Florida House Bill 311 and Senate Bill 932

- Provides **requirements** for operation of on-demand autonomous vehicle networks

- Revises registration requirements for autonomous vehicles

- Exempting a fully autonomous vehicle being operated with the automated driving system engaged from a prohibition on the active display of television, video, or use of wireless communications devices

- Requires the automated driving system of a fully autonomous vehicle to be capable of achieving a **minimal risk condition** if a failure of the system occurs. Provides a definition for "minimal risk condition"

Florida House Bill 311 and Senate Bill 932

- To follow along, visit www.myfloridahouse.com
  - Search Bill#: "311" (HB) or "932" (SB)
  - Allows you to track bills if you set up an account

- Florida House and Senate Session Last Day – May 3rd
  - Next Consortium – May 2nd

Transportation Systems Management & Operations

Questions?

Future Proofing Infrastructure for Connected and Automated Vehicles
Catapult Transport Systems

Jordan Crandall, VHB

Transportation Systems Management & Operations

Report Overview

- Produced in the United Kingdom (UK) for the UK Department for Transport

- Published in February 2017

- Allows for a comparison of progress in North America and United Kingdom
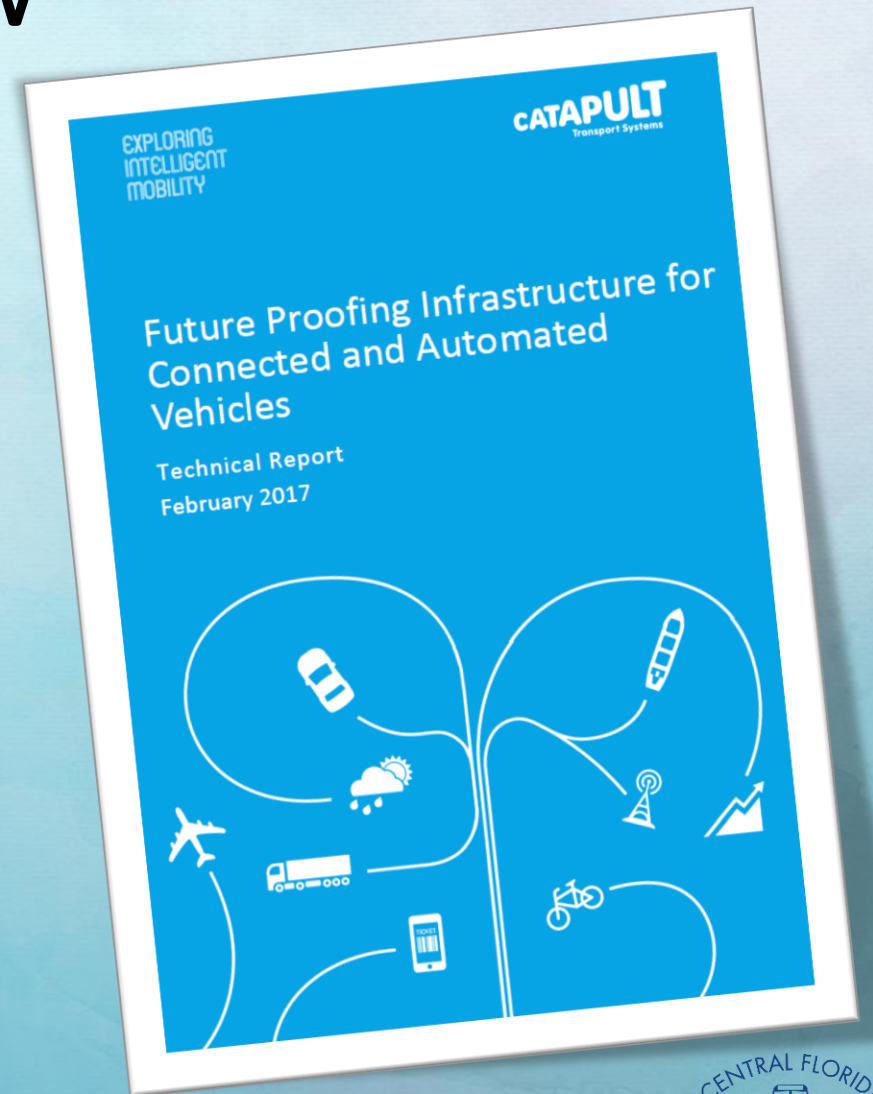
Potential CAV Impacts

- Reduced number / severity of road collisions

- Releasing Driver Time

- Environmental Benefits

- Reduced Congestion

- Improved mobility for those without access to privately owned vehicles

- Potential Impact on Public Finances

- Potential for Disruption to Established Industries

EXPLORING INTELLIGENT MOBILITY

caTaPULT
Transport Systems

Future Proofing Infrastructure for Connected and Automated Vehicles

Technical Report
February 2017

Transportation Systems Management & Operations
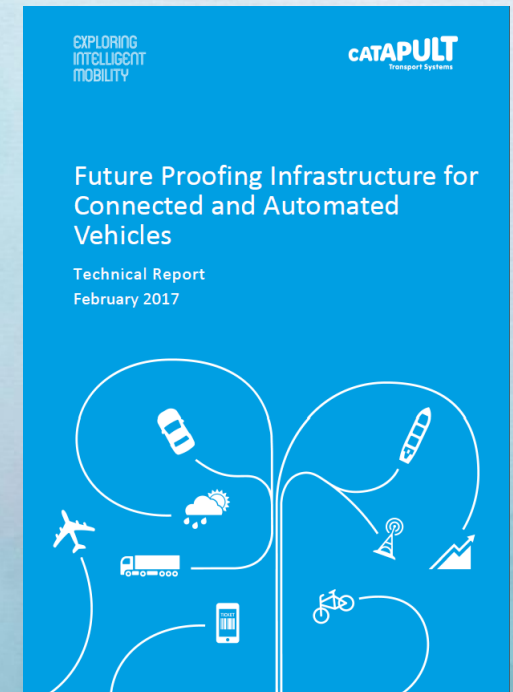
Planning Guidance Document Review

- Review of Transportation Planning Documentation and Manuals

- Clear need for CAVs in planning and design documents

- Planning bodies need to closely examine potential changes in revenue streams due to new technology

EXPLORING INTELLIGENT MOBILITY

CATAPULT Transport Systems

Future Proofing Infrastructure for Connected and Automated Vehicles

Technical Report
February 2017

Transportation Systems Management & Operations
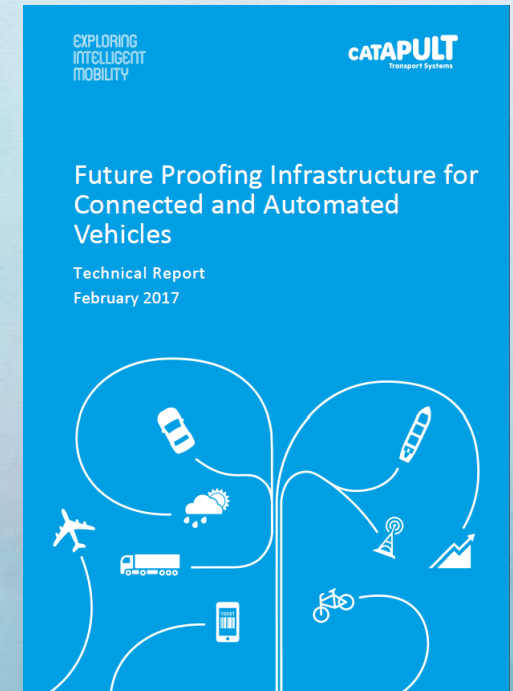
Infrastructure Requirements for CAVs

Internal Workshops and Discussions:

- Traffic Management Measures

- Road markings

- Safe harbor areas (hard shoulders)

- Role of service stations

- Car parking

- Automated Demand Responsive Public Transport Vehicles

- Crossings and Junctions

- Impact on bridge structures
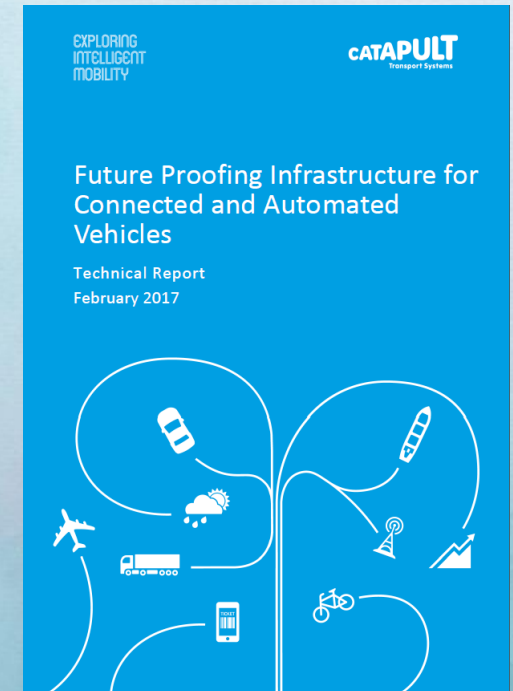
EXPLORING INTELLIGENT MOBILITY

CATAPULT Transport Systems

Future Proofing Infrastructure for Connected and Automated Vehicles

Technical Report
February 2017

Traffic Management Measures

- Infrastructure outside of vehicles can provide significant benefits, especially communication of **temporary obstructions or work zones**

- Possible solutions: geolocated cones and barriers

- 3 primary contenders for the V2I standard protocol:
  - Mobile data (4G or 5G)
  - ITS-G5 (a WiFi based technology with a reserved frequency range)
  - Hybrid of the two
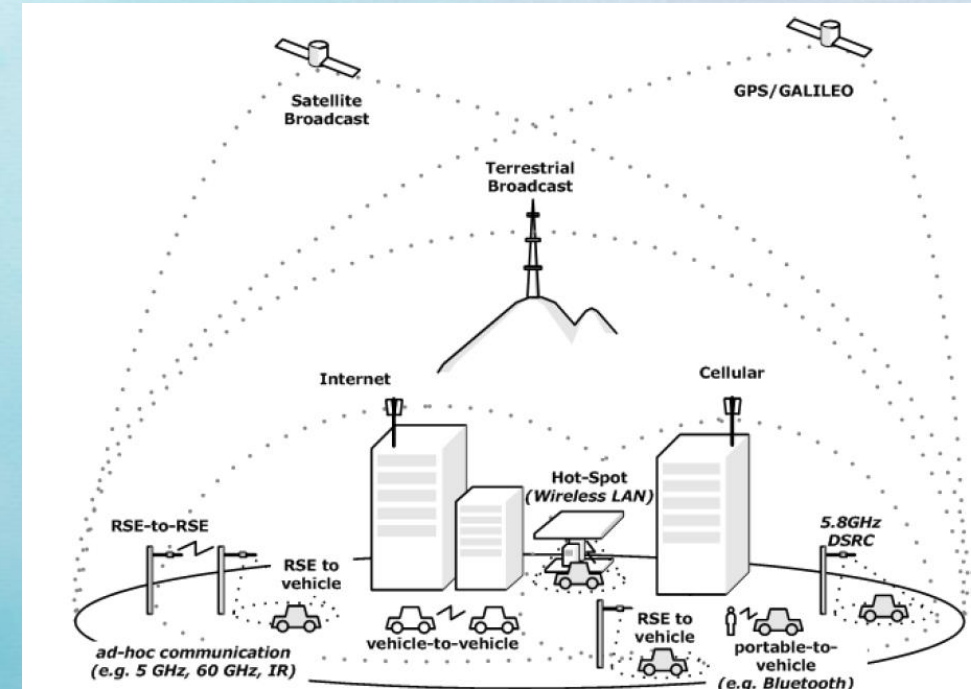
Traffic Management Measures

- Establish work sites standards including style, readability, barriers and cones

- Provide detailed road layout and expected vehicle behavior

- Real-time updates

- New roads and major junctions should be connected to fiber-optic and other V2I applications

Transportation Systems Management & Operations
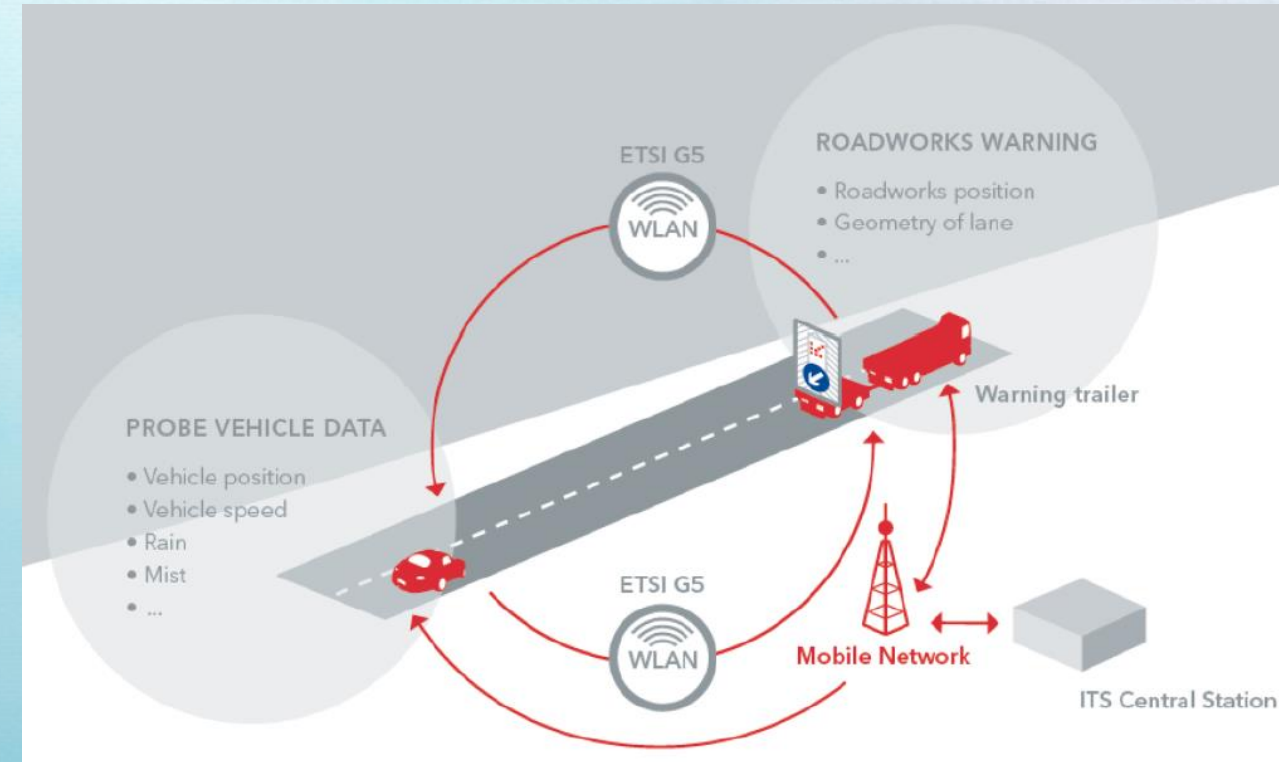
Traffic Management Measures

- Develop "CAV Compliant First Respondents" procedure

- Develop a warning sign that can warn CAVs of danger ahead

- Research how humans can direct CAVs with hand signals

- Undertake comprehensive review of Traffic Signs Manual

- Ensure hardware is standardized and well maintained

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CENTRAL FLORIDA
TSM&O
CONSORTIUM
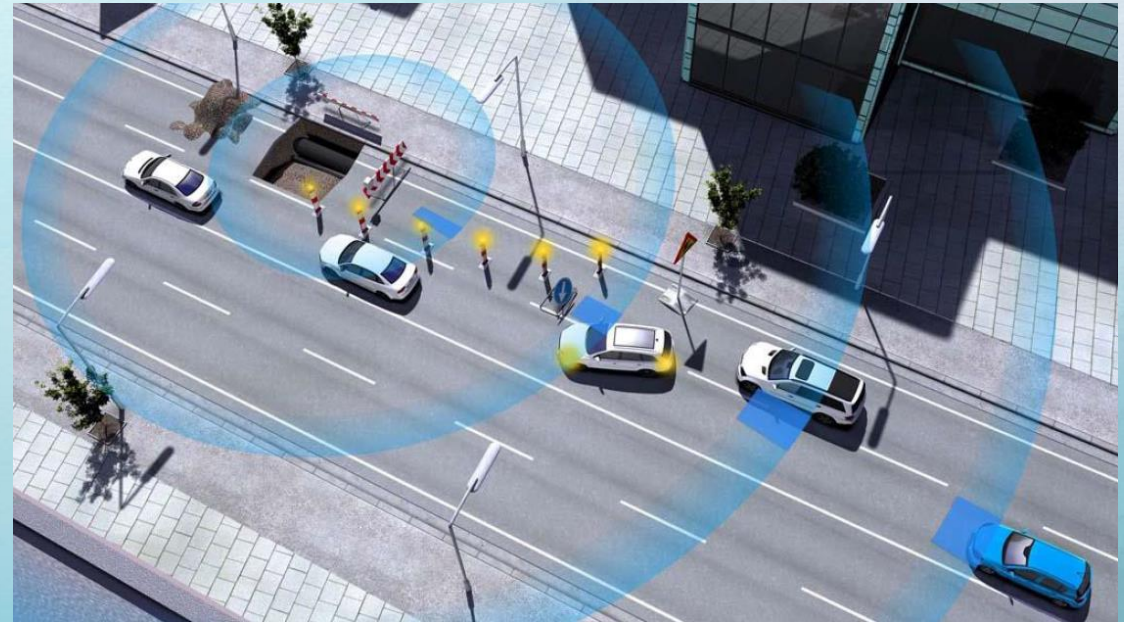
Road Markings

- Maintenance of road markings may need to be improved and funding increased
- Work with land owners to ensure private roads are checked and certified for use by CAVs

Safe Harbor Areas and Service Stations

- Appropriate frequency and design
- Measures to avoid misuse
- Consider temporary safe harbor areas prior to traffic management measures
- Service stations a public transport hub
- Enabling service stations to charge CAVs

Transportation Systems Management & Operations

Parking

- Benefits of CAV valet parking solutions, such as parking density

- Need automated parking guidance and standards

- Adopt a flexible approach to car park design and planning, acknowledging the potential for less demand in future decades

Crossings and Junctions

- Intersections will need the densest network of V2I infrastructure

- Signal controlled junctions and crossings are expected to be simplest for CAVs. Highway authorities could consider moving to signals along routes where CAVs are expected to operate

Automated Demand Responsive Public Transport

- More dense places may support automated public transport vehicles with multiple occupants to avoid exacerbating congestion

- New developments could consider such opportunities

- Consider location and size of pick-up/drop-off zones

- Consider segregation when appropriate

Bridge Structures

- Platooning of heavy goods vehicles could change the loading on long span bridges

- Potential changes to AASHTO Guidlines

Transportation Systems Management & Operations

Summary

- While CAV infrastructure is a vital component in taking full advantage of current available technology, changes should be iterative

- Long-range planning documents may be difficult places to plan for CAVs because of the fast pace of change

Transportation Systems Management & Operations

Questions?

Transportation Systems Management & Operations

Dangerous by Design 2019 (5th Edition)

- Examines the metropolitan areas and states to determine those that are most dangerous for pedestrians
  - All 50 states and the 100 largest MSAs
  - Also looks at race, income, and age
- Utilizes the "Pedestrian Danger Index"
- Developed by Smart Growth America, National Complete Streets Coalition, and other partners

2019 DANGEROUS BY DESIGN

Smart Growth America — Improving lives by improving communities | National Complete Streets Coalition

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Transportation Systems Management & Operations

CENTRAL FLORIDA CONSORTIUM — TSM&O
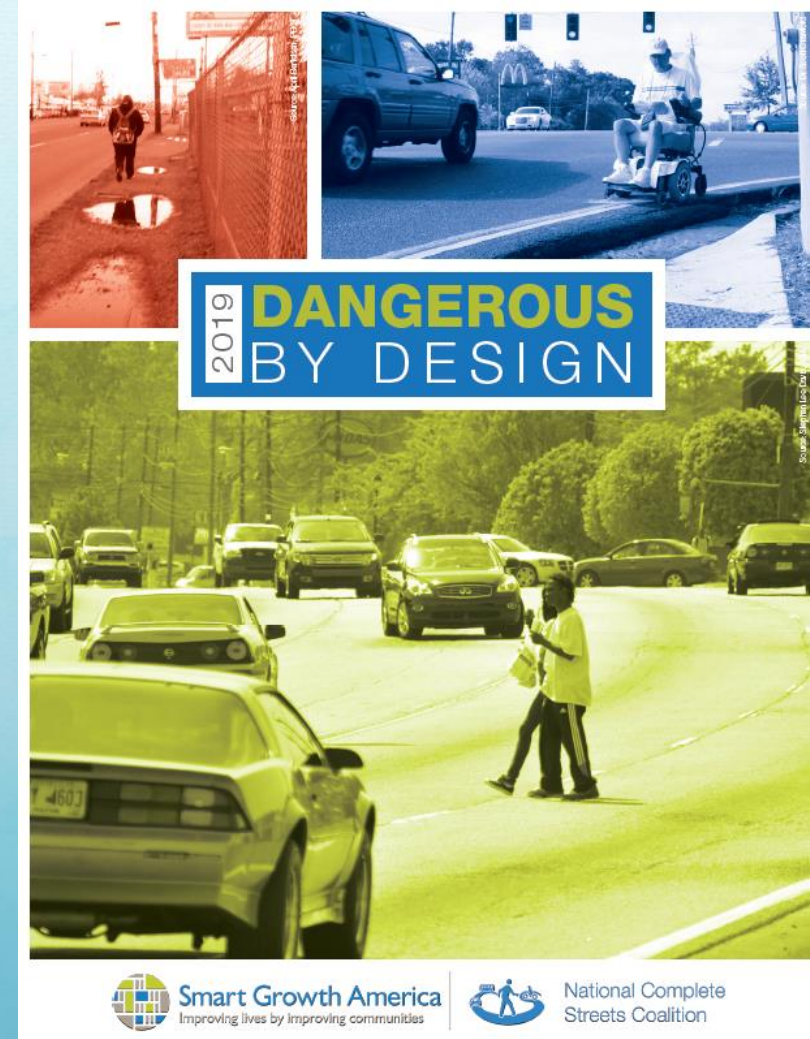
Dangerous by Design 2019

- 2016 and 2017 had the highest number of pedestrian deaths since 1990

- 4 out of 5 major metropolitan areas grew *more dangerous* for people walking since the 2016 report

- Traffic deaths impact every community in the United States, but states and metropolitan areas across the **southern** continental United States, **older adults, people of color**, and people walking in **low-income communities** bear a higher share of this harm
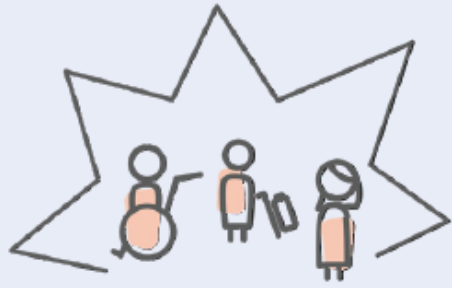
Transportation Systems Management & Operations

Pedestrian Danger Index

- Measures how deadly it is for people to walk based on the number of people struck and killed by drivers while walking, controlling for the number of people that live in that state or metro area and the share of people who walk to work

$$\frac{\text{Average annual pedestrian fatalities (2008-2017) / total population (2017)} \quad X \quad 100{,}000}{\text{Percentage of walking trips}}$$

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Transportation Systems Management & Operations

CENTRAL FLORIDA TSM&O CONSORTIUM

BY THE NUMBERS

From 2008 to 2017:

Pedestrian deaths **increased** by

↑ **35.4%**

Vehicle miles traveled **increased** by

↑ **8.1%**
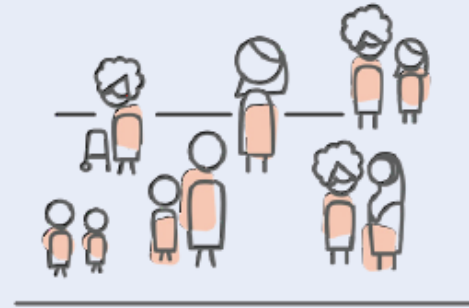
Walking as a share of all trips **increased** by

↑ **less than 1%***

*from 2009 to 2017

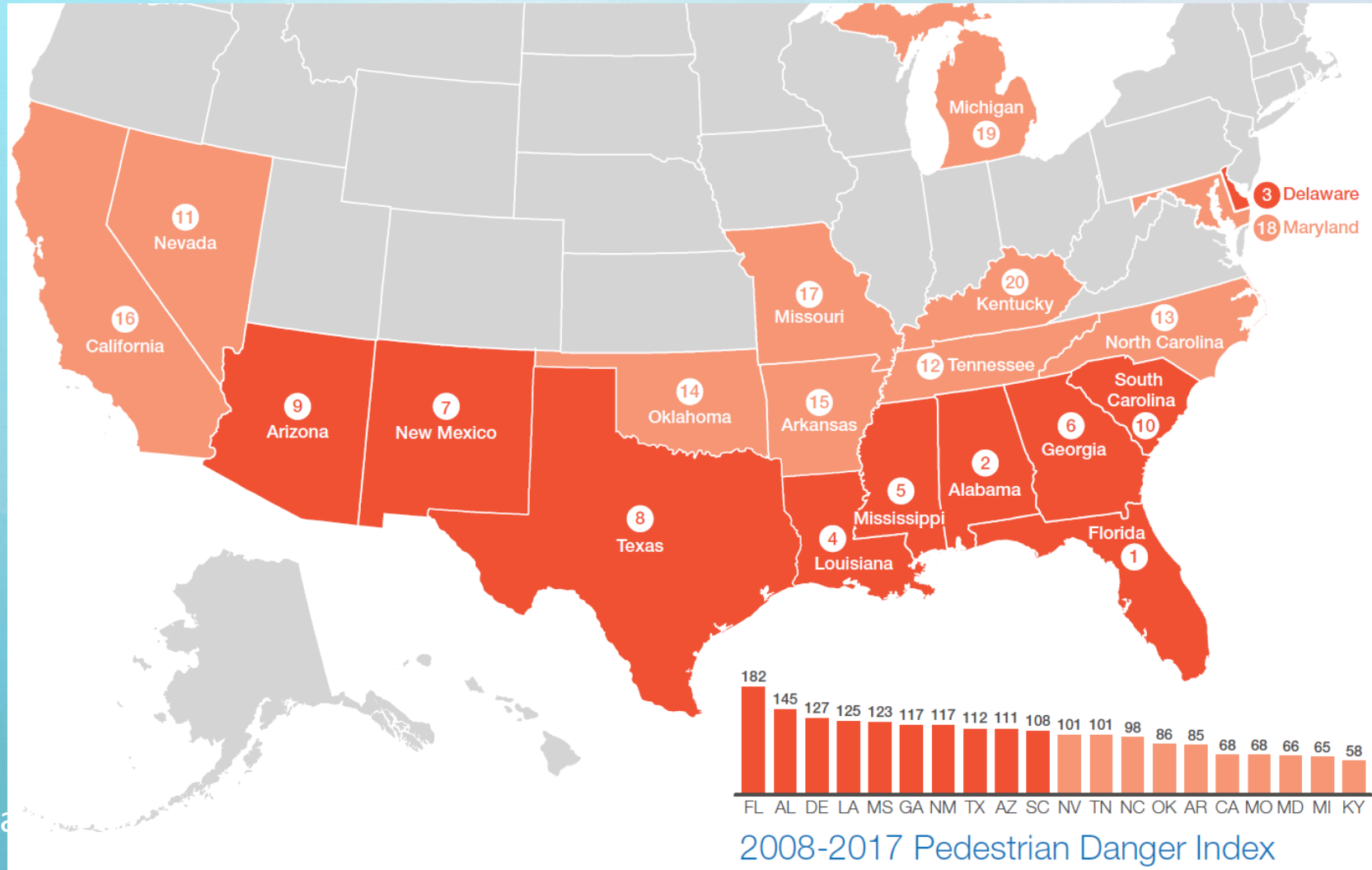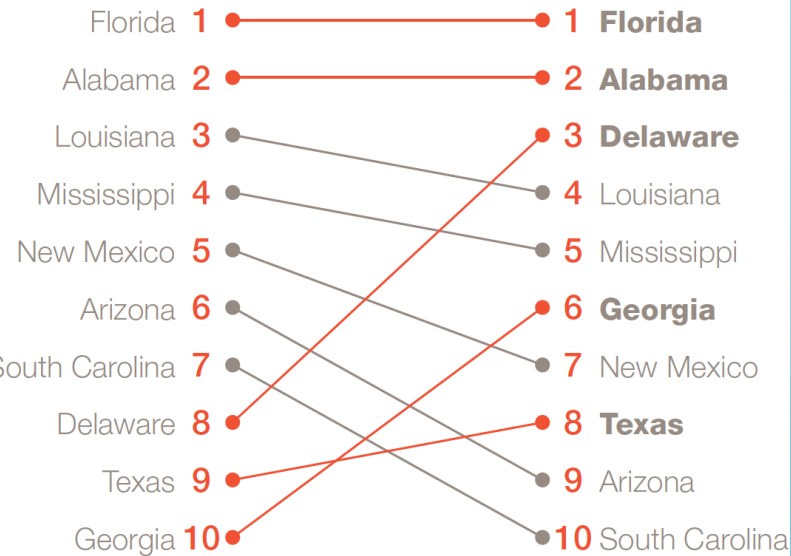Traffic deaths among motor vehicle occupants **decreased** by

↓ **6.1%**

FDOT *TSMO*
Transportation Systems Management & Operations

CENTRAL FLORIDA
TSM&O
CONSORTIUM

Pedestrian Danger Index
Most Dangerous States

Most Dangerous Metropolitan Areas

6 Jacksonville

2 Deltona-Daytona Beach-Ormond Beach

Orlando-Kissimmee-Sanford 1

3 Palm Bay-Melbourne-Titusville

Tampa-St. Petersburg-Clearwater 9

5 Lakeland-Winter Haven

North Port-Sarasota-Bradenton 4

Cape Coral-Fort Myers 8

14 Miami-Fort Lauderdale-West Palm Beach

Florida is home to the 6 most dangerous MSAs nationwide
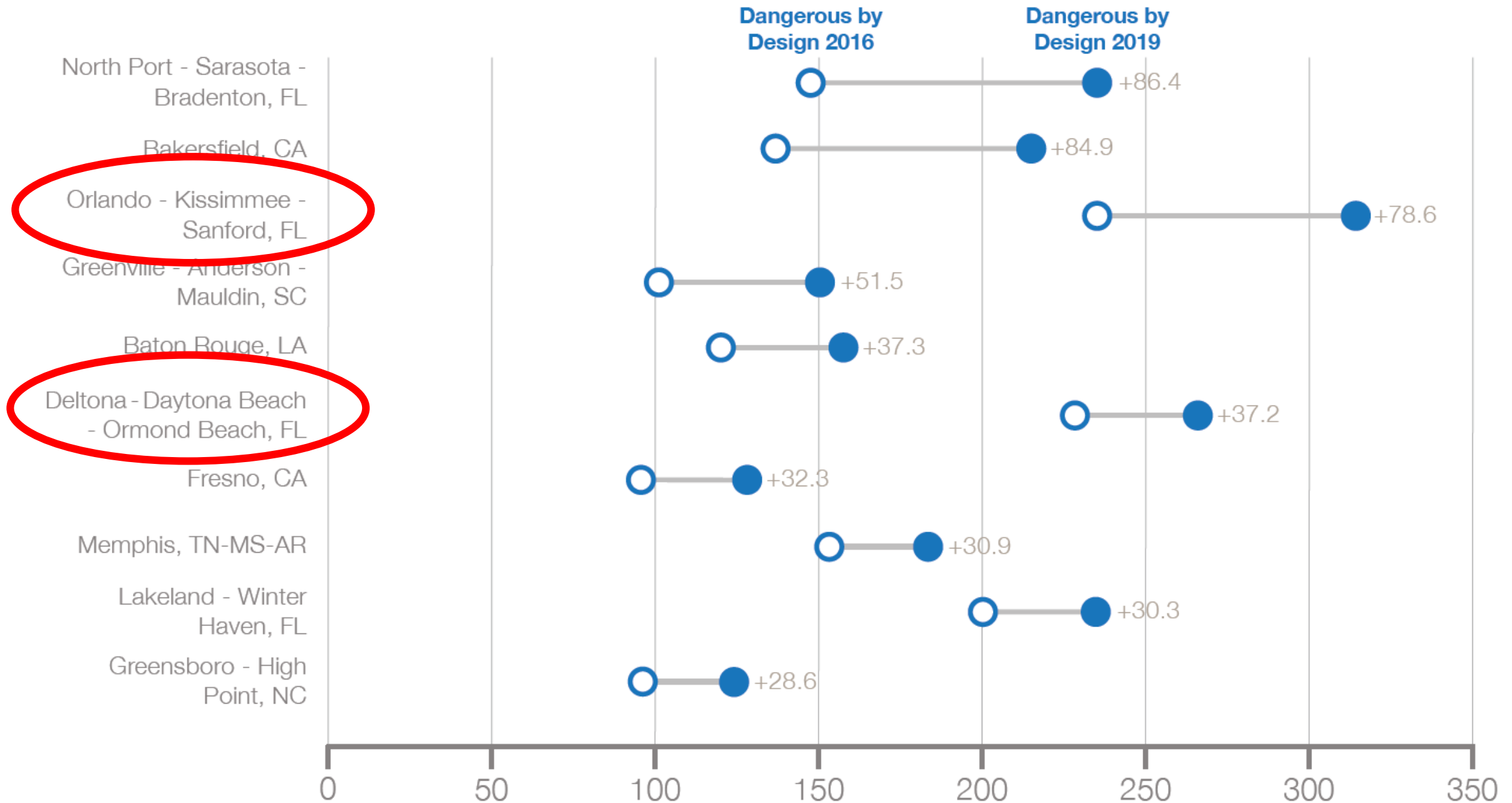
Orlando is #1

Most Dangerous Metropolitan Areas

2019 Rank	Metro Area	Pedestrian Deaths (2008-2017)	Annual Pedestrian Fatalities per 100,000	2019 Pedestrian Danger Index
1	Orlando-Kissimmee-Sanford, FL	656	2.82	313.3
2	Deltona-Daytona Beach-Ormond Beach, FL	212	3.45	265.4
3	Palm Bay-Melbourne-Titusville, FL	165	2.94	245.0
4	North Port-Sarasota-Bradenton, FL	194	2.58	234.6
5	Lakeland-Winter Haven, FL	162	2.54	230.9
6	Jacksonville, FL	419	2.94	226.2
7	Bakersfield, CA	247	2.83	217.7
8	Cape Coral-Fort Myers, FL	148	2.17	217.0

Most Dangerous Metropolitan Areas

2016 rank	Metro area	Pedestrian deaths (2005-2014)	Annual pedestrian fatalities per 100,000	2016 Pedestrian Danger Index
1	Cape Coral-Fort Myers, FL	165	2.55	**283.1**
2	Palm Bay-Melbourne-Titusville, FL	142	2.59	**235.2**
3	Orlando-Kissimmee-Sanford, FL	575	2.58	**234.7**
4	Jacksonville, FL	379	2.74	**228.7**
5	Deltona-Daytona Beach-Ormond Beach, FL	191	3.19	**228.2**
6	Lakeland-Winter Haven, FL	161	2.61	**200.6**
7	Tampa-St. Petersburg-Clearwater, FL	821	2.88	**192.0**
8	Jackson, MS	109	1.90	**189.6**

2008-2017 Pedestrian Danger Index

Metro	Index
Orlando-Kissimmee-Sanford	313
Deltona-Daytona Beach-Ormond Beach	265
Palm Bay-Melbourne-Titusville	245
North Port-Sarasota-Bradenton	235
Lakeland-Winter Haven	231
Jacksonville	226
Bakersfield	218
Cape Coral-Fort Myers	217
Tampa-St.Petersburg-Clearwater	205
Jackson	192
Memphis	184
Baton Rouge	158
Birmingham-Hoover	157
Miami-Fort Lauderdale-West Palm Beach	154
Greenville-Anderson-Mauldin	153
McAllen-Edinburg-Mission	141
Albuquerque	138
Detroit-Warren-Dearborn	135
Little Rock-North Little Rock-Conway	135
Augusta-Richmond County	134

MSAs with Largest Increases in 10-Year PDI Scores

Dangerous by Design 2016

Dangerous by Design 2019

MSA	Increase
North Port - Sarasota - Bradenton, FL	+86.4
Bakersfield, CA	+84.9
Orlando - Kissimmee - Sanford, FL	+78.6
Greenville - Anderson - Mauldin, SC	+51.5
Baton Rouge, LA	+37.3
Deltona - Daytona Beach - Ormond Beach, FL	+37.2
Fresno, CA	+32.3
Memphis, TN-MS-AR	+30.9
Lakeland - Winter Haven, FL	+30.3
Greensboro - High Point, NC	+28.6

0 50 100 150 200 250 300 350

Most Vulnerable Populations
Older Adults

- Individuals age 65 and older currently make up about 15% of the population
  - By 2050, this is expected to rise to 22 percent
- Individuals age 50 and up, and especially people age 75 and older, are **overrepresented** in deaths involving people walking

Relative Pedestrian Danger by Age
(2008-2017)

20   20.7   28

U.S. Overall: 14.8

50+   65+   75+

Transportation Systems Management & Operations
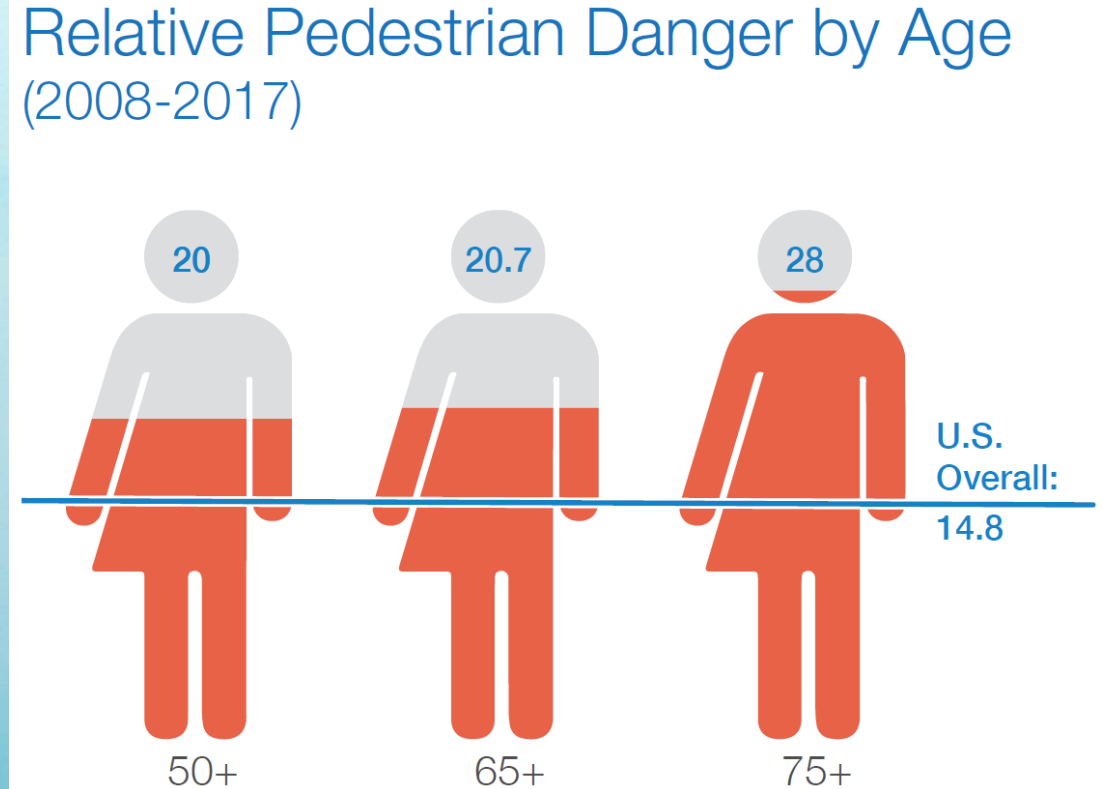
Most Vulnerable Populations
People of Color

- Drivers strike and kill people of color, especially Black or African American and American Indian or Alaska Native people, at higher rates
- Communities of color are located near more dangerous roads
- Research by the University of Nevada has shown that drivers are significantly more likely to yield to a white pedestrian in a crosswalk than to a Black or African American pedestrian

Relative Pedestrian Danger by Race and Ethnicity (2008-2017)

8.1 — Asian or Pacific Islander
12.4 — White, Non-Hispanic
13.9 — Hispanic or Latino
18.3 — Black or African American
33 — American Indian or Alaska Native

U.S. Overall: 14.8

Transportation Systems Management & Operations
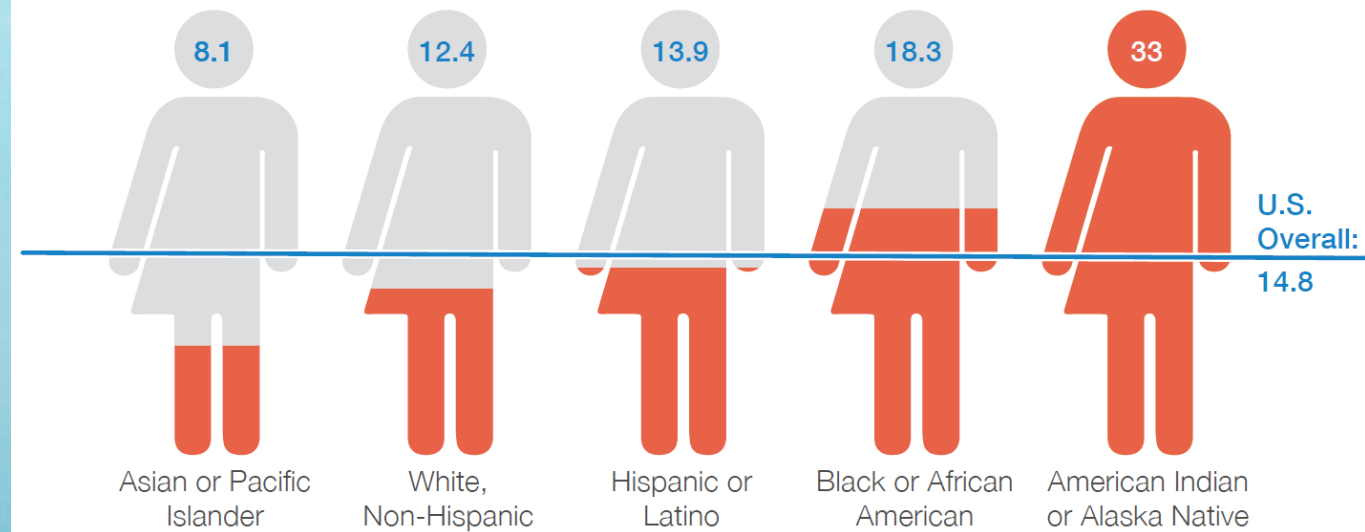
Most Vulnerable Populations
Low-Income Communities
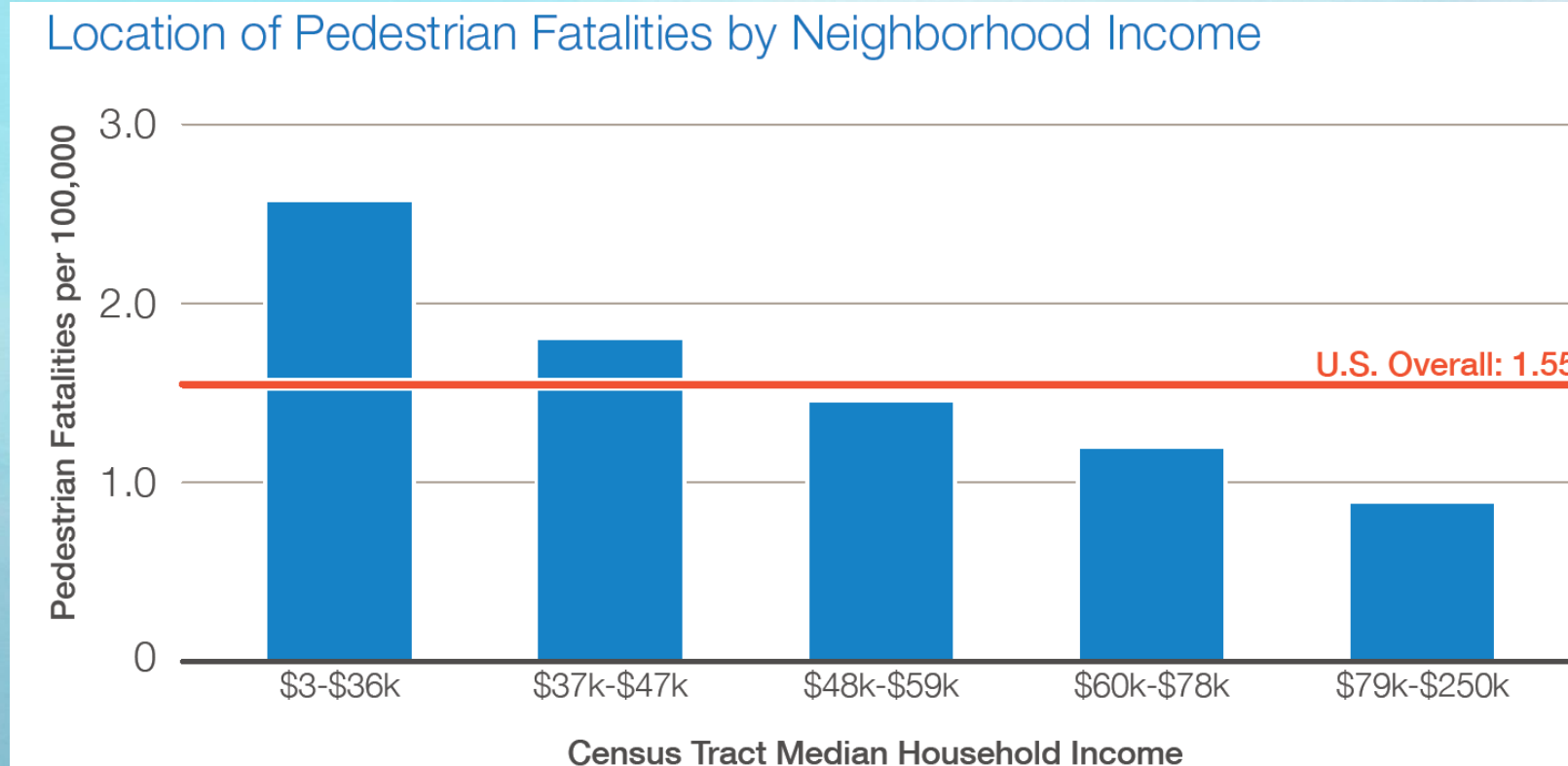
Location of Pedestrian Fatalities by Neighborhood Income

U.S. Overall: 1.55

(y-axis) Pedestrian Fatalities per 100,000

$3-$36k | $37k-$47k | $48k-$59k | $60k-$78k | $79k-$250k

Census Tract Median Household Income

Individuals die while walking at much higher rates in lower-income communities compared to higher-income ones

Transportation Systems Management & Operations

What can be done to address this problem?

State Actions

- Set performance targets that will improve safety
- Prioritize safety over vehicle movement
- Provide state transportation officials and engineers with the most up-to-date training and education on implementing Complete Streets

What can be done to address this problem?

State or Local Actions

- Prioritize projects that will benefit those who suffer disproportionately

- Embrace the flexibility provided by FHWA to design safer streets.

- Design roads to reduce speeds wherever possible

- Pass actionable Complete Streets policies that lay the groundwork for implementation

- Stop referring to pedestrian fatalities as unavoidable "accidents"

- Test out bold, creative approaches to safer street design

Transportation Systems Management & Operations

Questions?

Current Initiatives

Jeremy Dilmore, District 5 TSM&O

Research Efforts
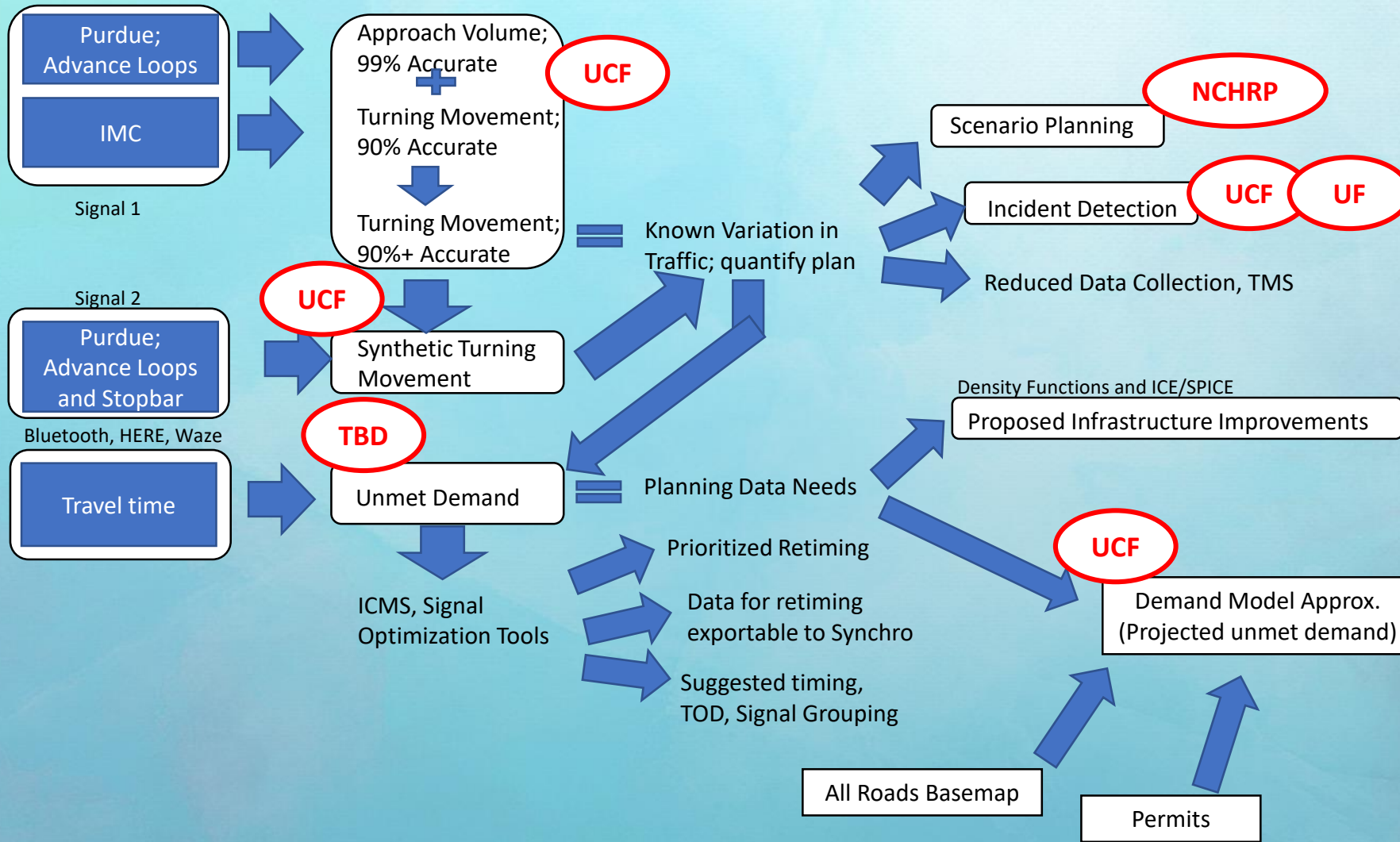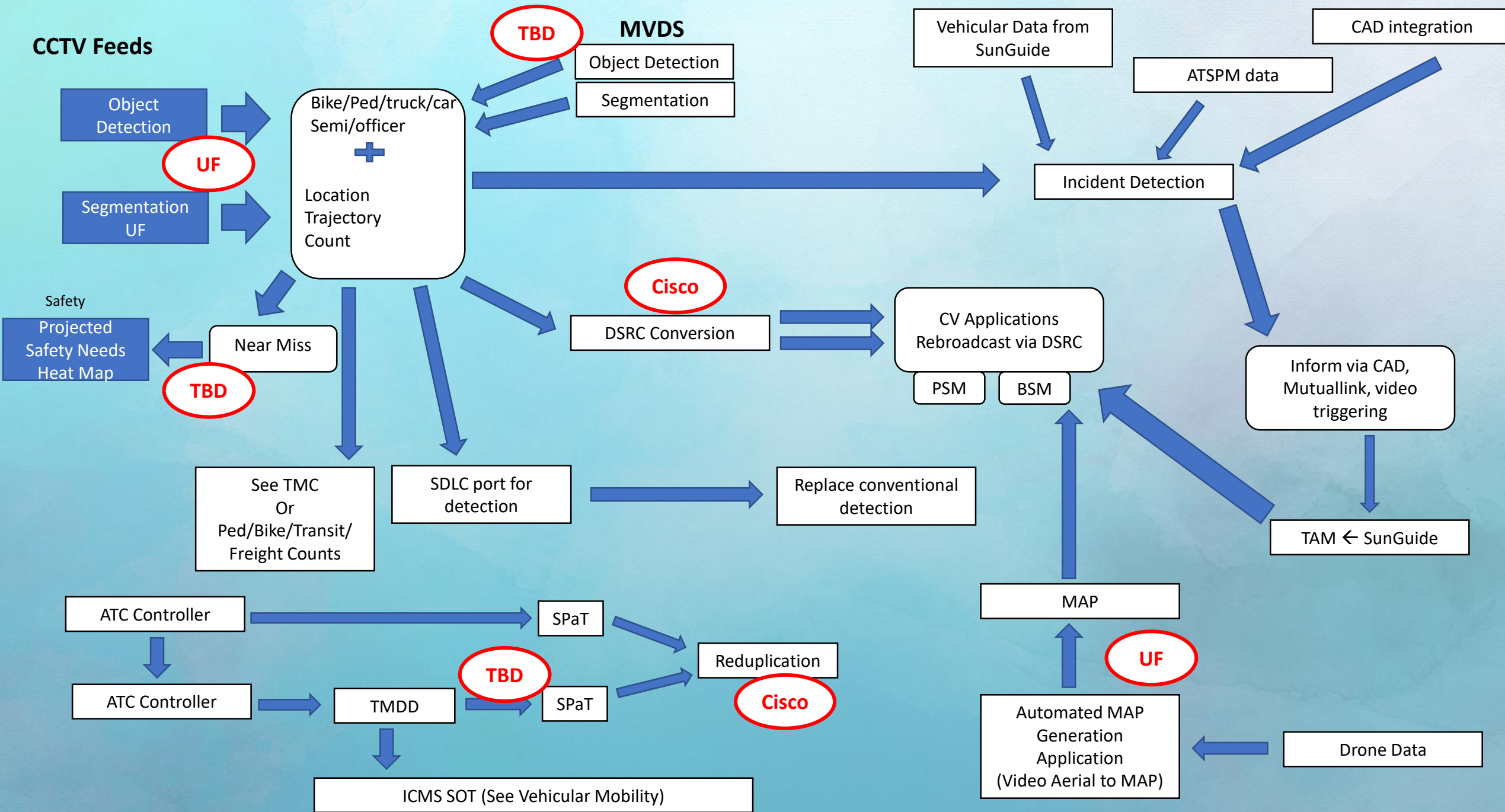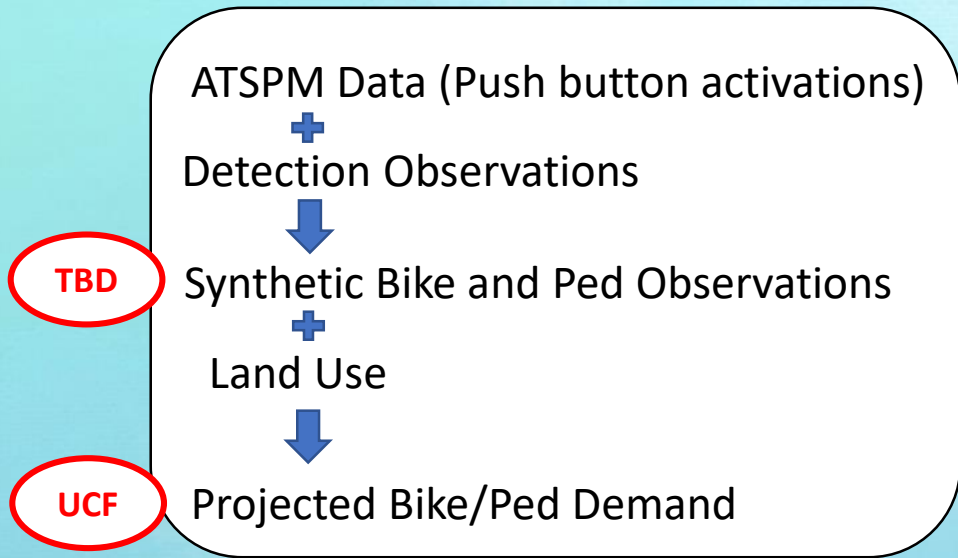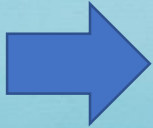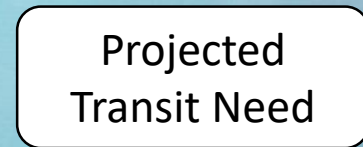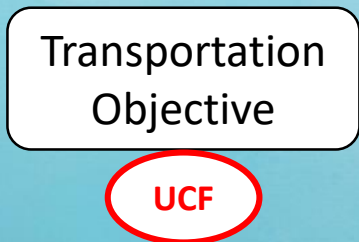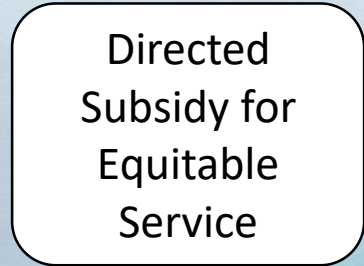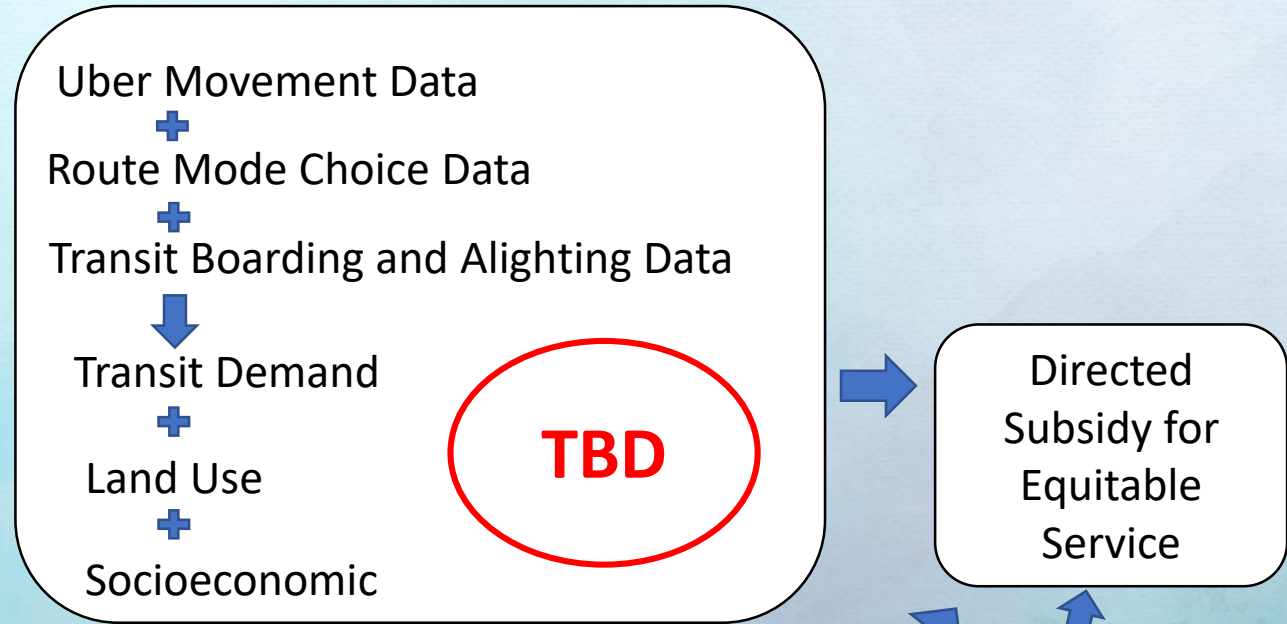
RTMC Pictures
(2 weeks old)

FDOT TSM&O
Transportation Systems Management & Operations
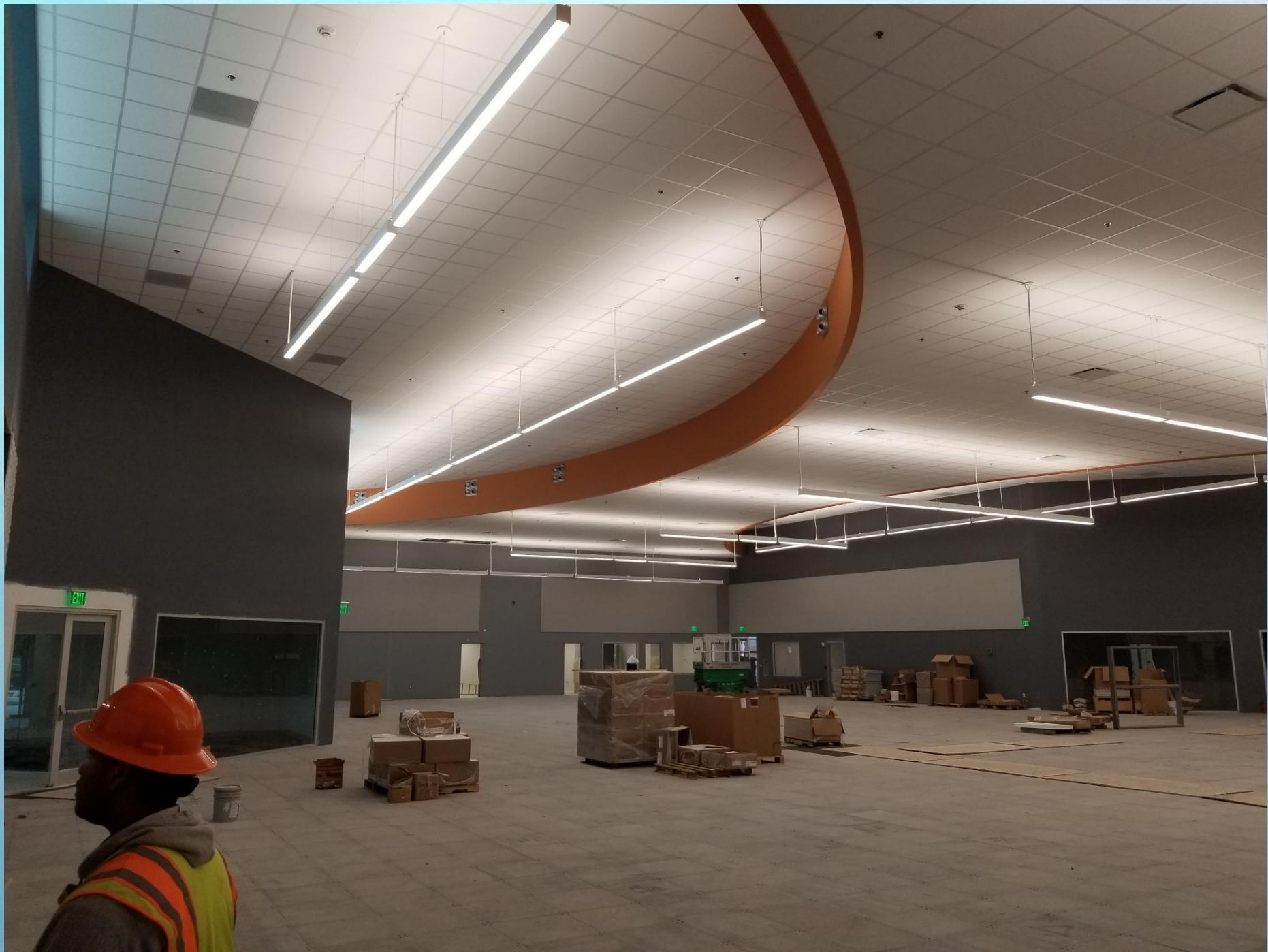
THANK YOU!

Next Consortium – May 2, 2019

TSM&O Consortium Meeting

MEETING AGENDA

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

March 7, 2019; 10:00 AM-12:00 PM

1) WELCOME

2) AUTOMATED DRIVING SYSTEMS (ADS) GRANT APPLICATION UPDATE

   - David Williams, VHB

3) CENTRAL FLORIDA MPO ALLIANCE – PRIORITIZED PROJECTS UPDATE

   - Eric Hill, MetroPlan Orlando

4) HB 311 / SB 932 – AUTONOMOUS VEHICLES

   - David Williams, VHB

5) FUTURE PROOFING INFRASTRUCTURE FOR CAVs

   - David Williams, VHB

6) DANGEROUS BY DESIGN 2019 REPORT

   - David Williams, VHB

7) CURRENT INITIATIVES

   - Jeremy Dilmore, District Five TSM&O