CENTRAL FLORIDA TSM&O CONSORTIUM MEETING SUMMARY

Meeting Date: February 9, 2023 (Thursday) **Time**: 10:00 AM – 12:00 PM

Subject: TSM&O Consortium Meeting

Meeting Location: Teleconference

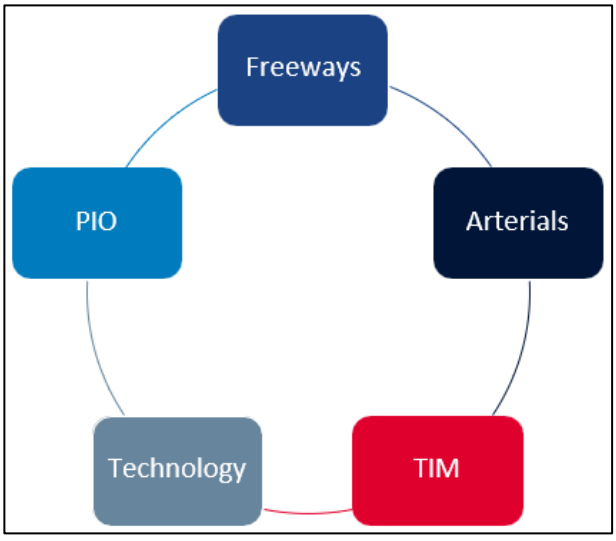
I. OVERVIEW

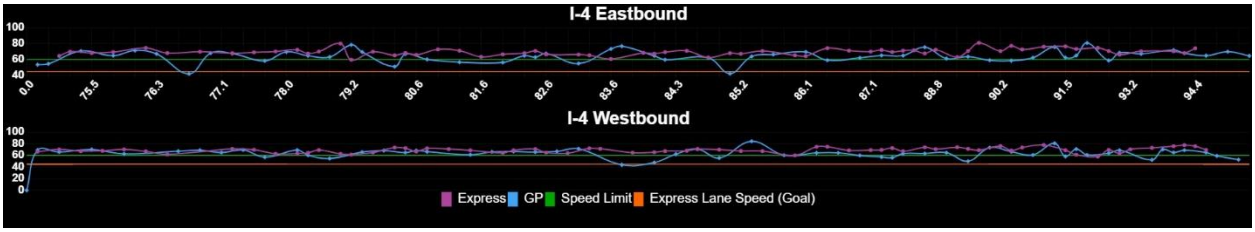
The purpose of this recurring meeting is to provide an opportunity for District Five FDOT staff and local/regional agency partners to collaborate on the state of the TSM&O Program and ongoing efforts in Central Florida. Jeremy Dilmore gave a short introduction and outlined the meeting agenda.

II. ICM OPERATIONS

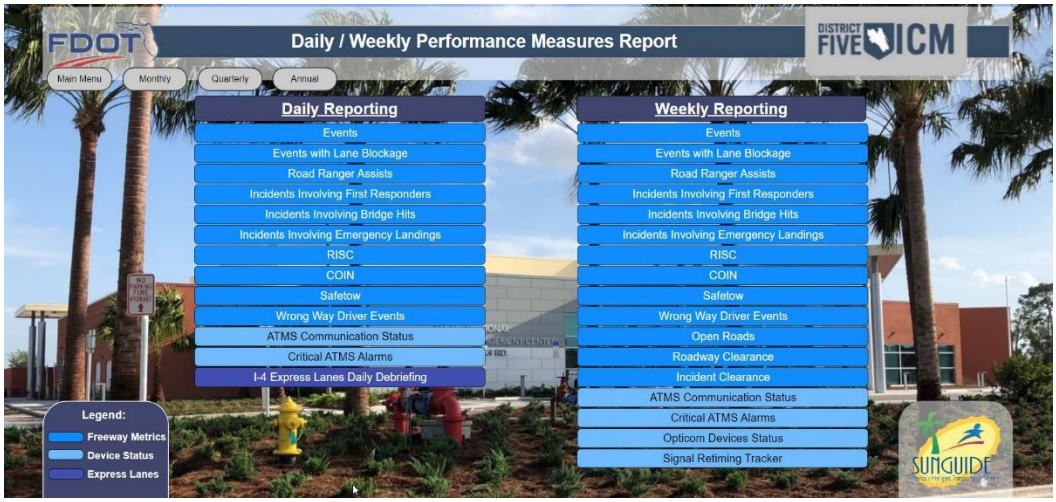
Dale Cody presented on the District Five Integrated Corridor Management (ICM) work efforts.

- Goal – leveraging Central Florida TSM&O infrastructure investments to improve safety and mobility, and actively managing the multimodal system
- Primary focus areas: I-4, I-95, I-4 Express Lanes, and CFX
    - 11,379 centerline miles of freeway
    - 672 signalized intersections across 243 miles of arterials, and expanding (Brevard, Orange, Osceola, Seminole, Volusia, and part of Lake County)
- This is one of the largest ICM programs in the nation
    - 4x the number of arterial diversions in San Diego
- Arterial team is led by Manny Rodriguez
- What we've done so far
    - D5 SELS
        - Static Tolling currently
    - MVDS QA using ITSIQA
    - Emergency Access Gate (EAG) remote control software
    - Link between MIMS and SICE maintenance software created (waiting to be turned on)
    - Created I-4 speed graph for quick monitoring





- Dynamic tolling is right around the corner
- The minimum speed goal for the express lanes is 40mph
- Developed 8+ special event plans
    - Memorializes event plans that are already in place (e.g., Daytona 500)
- Major Incident Evaluation (MIE)
    - Engineering meets Operations, Operations meetings Engineering
- The use of Drones for TIM
    - The TIM Program Manager and 5 operators are licensed drone pilots
    - Ability to capture a complete overview of the scene to assist in recovery efforts
    - TIM Program Manager has a drone in his vehicle for on-site use
- Expanding ICM diversion footprints into Brevard and Lake Counties
- ICM Arterial Ops – here to serve our local partners
- Every crash = ~$127,136
    - Every minute saved in incident clearance reduces potential for secondary crashes
- Not all performance reporting screens were presented in the PowerPoint slides
    - There are roughly 80 to 100 screens' worth of data for operators and planners to use
- Looking to develop 2 marketing TSM&O videos for college students and recent high school graduates
- Highlights for Q2 FY23
    - Total savings due to reduction of secondary crashes less than 60-minutes goal
        - $127,136 * 333 = $42,336,288
    - Arterial corridor managers provided a value of over $2.1 million per year
    - ICM team managed over 33,080 events including over 4,476 with lane blockages
- Since start of contract
    - # of Freeway events managed = over 140,000
    - # of Arterial events managed = over 3,000
    - # of Road Ranger assists = over 91,000
- Preparing for ramp signals; will coordinate with locals prior to turning on ramp meter signals



- P

erforman

ce Measurement of Operations
    - Developed method for QC of Operator/Shift performance – Real-time/Post Review
    - Working to enhance the process with
        - Real-time automated operator event grading
        - Post-process for review that involves the QC reviewer's judgment
- Safety/Operations Improvements
    - Operations complimenting engineering, and vice versa
    - Identifying needs for TSM&O while providing value-add studies
        - Short term – pushbutton/maintenance contractor for Safety (e.g., WWD) and TSM&O solutions today
        - Medium term – PLEMO 3R scoping feedback (over 60 projects to date) for Smart Scopes
            - Making sure operational needs are captured in upcoming projects
        - Long term – planning for capacity needs

Capital Improvements	Study	Concept	Design	Construction
South Street Improvements	NA	Complete	Complete	Pending
Huey Improvements	NA	Complete	Complete	Pending
Grand National Improvements	NA	Complete	Ongoing	Pending
Long and Easy	NA	Complete	Ongoing	Pending
SR 408 & I-4 EB	NA	Complete	Ongoing	Pending
Express Lanes Wayfinding/Signing Improvements	NA	Ongoing	Pending	Pending
Titusville Wireless Concept	NA	Complete	Pending	Pending
SR 60 near US 441, FTE or Peavine Rd	Ongoing	TBD	TBD	TBD
SR 482 & Greenbriar Pkwy Study	Ongoing	TBD	TBD	TBD
SR 50 High Crash Section (Orange)	Ongoing	TBD	TBD	TBD
SR 50 High Crash Section (Lake)	Ongoing	TBD	TBD	TBD
SR 436 High Crash Section	Ongoing	TBD	TBD	TBD
SR 551 High Crash Section	Ongoing	TBD	TBD	TBD
US 92 High Crash Section	Ongoing	TBD	TBD	TBD
MIE 22-27: I-95 SB at Mile Marker 260A Study Request	Ongoing	TBD	TBD	TBD
MIE 22-33: US-192 at Town Center Blvd. Study Request	Ongoing	TBD	TBD	TBD
MIE 22-XX: EB I-4 off Ramp @ Amelia Study Request	Ongoing	TBD	TBD	TBD

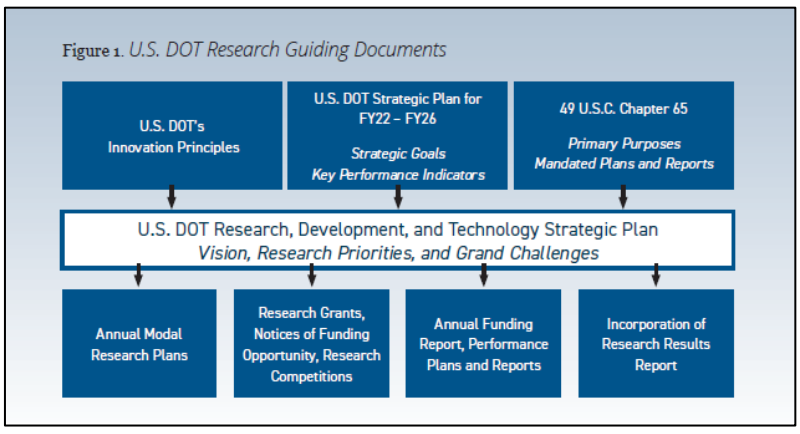
- Arterial Road Rangers
    - Deployment started July 1, 2022; plan developed by UF research team
    - Ongoing improvements to increase utilization
        - Static Road Rangers versus roaming Road Rangers
            - Determined roaming Road Rangers can make bigger impact
- Technology
    - ITSIQA – updated based on D5 architecture changes
    - Queue Warning System – Looks at detector volume and occupancy and automates DMS messages for congestion
    - Weather Advisory System – automated DMS response plans for weather events using national weather service API
    - SIIA & MIMS
        - Fields added for local agencies that wanted to use SIIA for inventory purposes
        - Shared asset table between both programs for improved inventory auditing
    - D5 CPED – uses UCF crash prediction tool to show areas to monitor with increased

conditions for incidents to occur
  - Arterial Incident Detection (UF) – uses machine learning and ATSPM detector data to identify incidents on arterials; will pilot effectiveness of the two corridors then see if it should be expanded
  - Trafficvision – piloting on Ops floor; freeway video analytics being tested on 50 cameras
  - Ramp It Up – in development; agencies will be contacted prior to turning on ramp signals
    - Combines metrics from Queue Warning System looking at the head and tail of queue from an incident
  - Smart Work Zone Barrels – developing system which can be placed on work zone barrels
    - Localize barrels to identify if they are in the roadway or on the shoulder
    - Currently establishing power requirements and location precise requirements
- Discussion:
  - When do you anticipate agencies getting access to Power BI dashboards?
    - We are currently transitioning to Kafka database; it depends on when we finalize transfer over to Kafka
  - Eric Hill asked to connect Dale's team with the MPO's Congestion Management Plan (CMP) team to help with telling the story of TSMO to decisionmakers
  - Eric asked to connect Dale's team with the MetroPlan Orlando Master Plan update
    - ICM needs to be included
  - Eric also asked for a public-facing dashboard to illustrate the value of TSMO

III. USDOT RESEARCH, DEVELOPMENT, TECHNOLOGY STRATEGIC PLAN

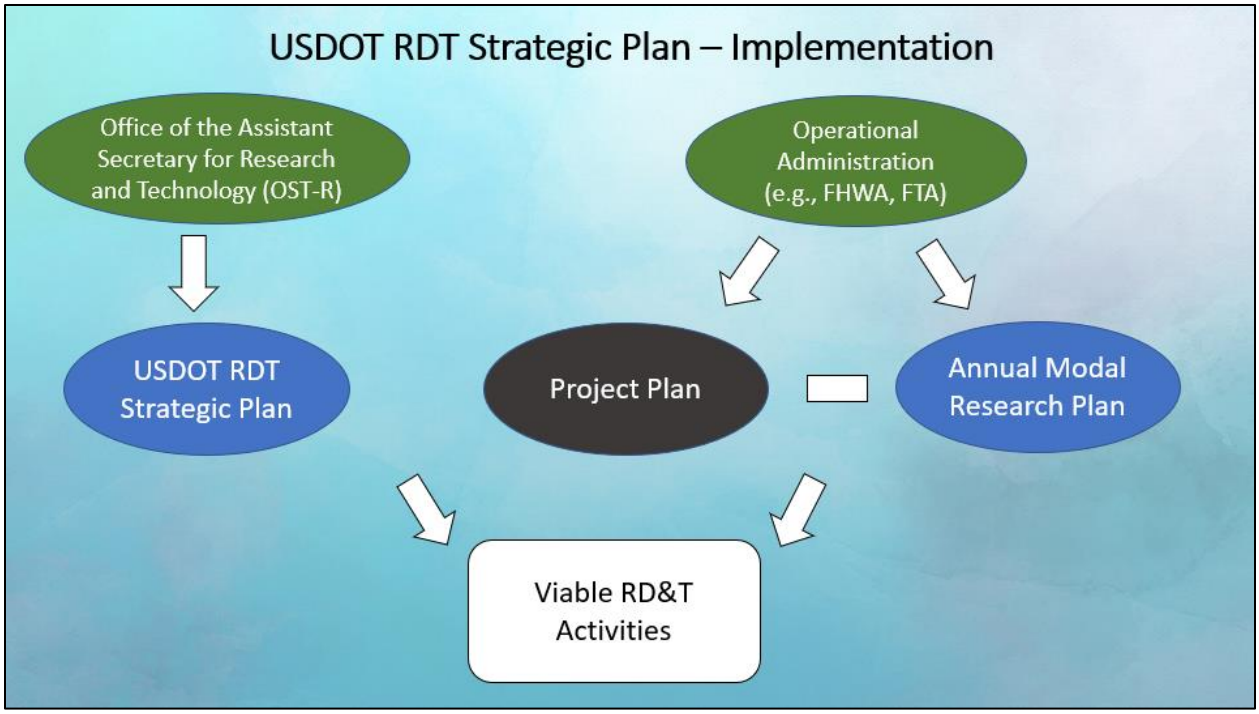
David Williams briefly summarized the *USDOT Research, Development, and Technology Strategic Plan (FY 2022-2026)*.

- The Strategic Plan is intended to guide Federal transportation research, development, and technology deployment activities
- More than $5 billion in research activities funded through the Bipartisan Infrastructure Bill (BIL)
- The Strategic Plan focuses on activities that address grand challenges relating to Zero Fatalities, Resilient Supply Chains, Equitable Mobility for All, Net-Zero Emissions, and Future Transportation System-of-Systems. The USDOT's research guiding documents inform the various grants, research plans, and performance plans developed by the USDOT



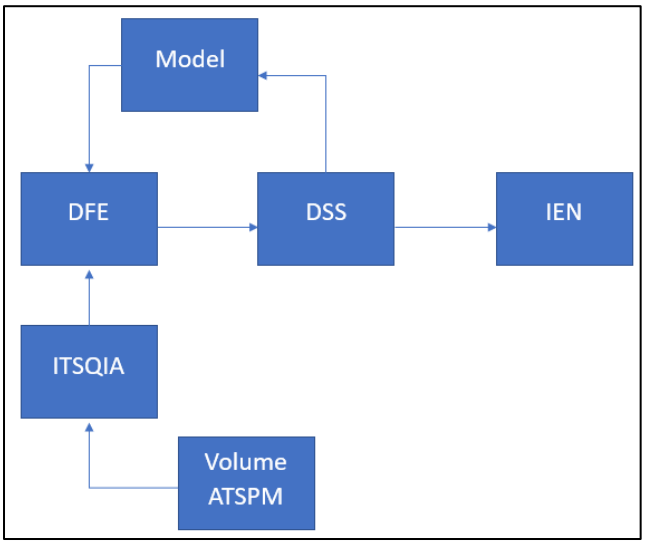
- The Strategic Plan is structured in 4 chapters:
    - Chapter 1 – Introduction
    - Chapter 2 – Research Priorities, Objectives, Strategies
    - Chapter 3 – Technology Transfer and Deployment
    - Chapter 4 – Implementation
- Research Priorities, Objectives, and Strategies
    - Safety
        - In 2021, there were nearly 43,000 fatalities (~118 per day) related to motor vehicle crashes
        - Safe System Approach – mindset that it is unacceptable to allow deaths and serious injuries to occur on roadways
        - Consider five elements – Safe Road Users, Safe Vehicles, Safe Speeds, Safe Roads, and Post-crash care
        - Critical Research Topics include
            - Operator Fatigue, distraction, performance
            - Safety equity analysis
            - Safety infrastructure countermeasures
            - Speed Management
            - Vehicle and aircraft safety, automation, and connectivity
            - Vulnerable road user safety
    - Economic Strength and Global Competitiveness
        - Research should support effective investments to improvement durability, sustainability, and resilience, and provide workers and businesses with reliable access to jobs, resources, and markets
        - Critical Research Topics include
            - Freight environment and equity impacts
            - Freight infrastructure resilience
            - Freight planning
            - Freight and logistics workforce needs
            - Supply chain data and logistics
            - Truck Platooning
            - Urban freight delivery
    - Equity
        - USDOT goal to expand accessibility and mobility to underserved communities
        - Critical Research Topics include
            - Assistive and accessible mobility innovations
            - Equity, affordability, and accessibility analysis
            - Environmental justice
            - Mobility justice and resilience
            - Transportation planning and land use
            - Alternative traffic safety enforcement strategies
    - Climate and Sustainability
        - Transportation accounts for the largest portion (27%) of total US greenhouse gas

emissions
        - The USDOT goal is substantially reduce transportation-related GHG and build more resilient and sustainable transportation systems
        - Critical Research Topics include
            - EV and Infrastructure Development
            - Electric Aircraft Design and Operation
            - Battery Safety, Performance, Production, Recycling, and Disposal
            - Rapid Charging Infrastructure and Electrification of Road Systems
            - Smart Power Grids
            - Sustainable & recyclable infrastructure
            - Alternative fuel production, storage, and transport
    - Transformation
        - USDOT goal to establish the Future Transportation System-of-Systems
            - People-centered, safe, data-driven, intelligent, integrated and interoperable, sustainably powered, secure and resilient, adaptive and dynamic, and connected
        - Critical Research Topics include
            - Advanced Materials
            - Automation
            - Cybersecurity
            - Digital System Architecture
            - Machine Learning
            - Open Data Platforms
            - Sensor Technology
- Technology Transfer (T2) and Development
    - Federal agencies should ensure that research and development results are widely available to scientists, innovators, and the public
    - The T2 program seeks to "…accelerate the commercialization and deployment of beneficial transportation technologies"
    - T2 Program priorities include targeting technology transfer from the start of every project, leveraging research investments elsewhere, accelerating commercialization, identifying leading-edge technologies and products that can be manufactured stateside, and advancing interagency approaches to innovation and solicitations
- Implementation
    - Key Performance Indicators
        - # of collaborative research and development agreements
        - # of patents and copyrights
        - # of technology transfer license agreements
        - # of contracts awarded through Small Business Innovation Research (SBIR)
        - # of success stories (evidence of societal benefits)
        - # of funded agreements with deployment demonstrations



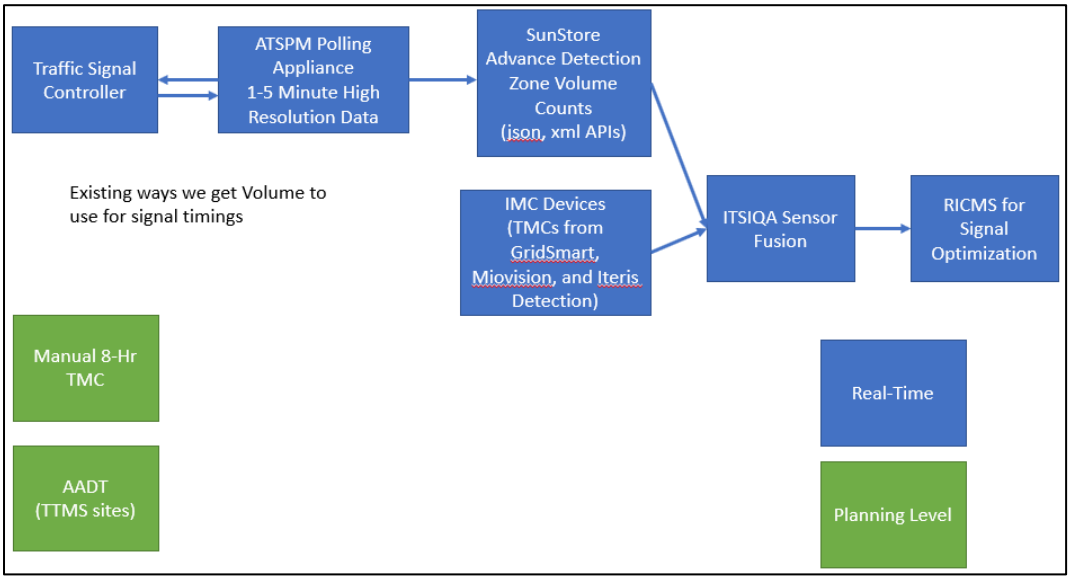
IV. HIGH-DEFINITION ENGINEERING INTERSECTION DATA VIA INTEGRATIVE MODELING

Katie King briefly discussed the upcoming High-Definition Engineering Intersection Data via Integrative Modeling (HEIDI) project, also known as District Five Digital Twin Procurement

- Primary RICMS Components
  - 

    - IEN – information exchange network
- Identifying key datasets that we need
- Digital Twin is a data replica of our transportation network

- Existing methods for getting volume to use toward signal timings



- What are some of the District's current issues?
    - Detection has errors; these errors differ
        - Device level (e.g., accuracy of video versus loops)
        - Network
    - Availability
- What are our needs?
    - Improved stability and accuracy
    - Improved availability
- The proposed architecture as to how HEIDI fits into the primary RICMS Components will be left open

V. ROADWAY FUNCTIONAL CLASSIFICATION AND GPS ROUTING

Garrett Popovich briefly discussed how the functional classification impacts GPS routing systems.

- Each GPS application has its own proprietary algorithm for navigating users on the roadway
- Each GPS application has stated they use roadway functional classification in their algorithm
    - GPS applications update roadway classifications based on the Functional Classification a roadway provides
    - The functional classification affects roadway prioritization on GPS applications, which plays into the GPS algorithm
- It is very important that the functional classification is appropriate, as navigation systems utilize that data
- Traffic Operations has recently received a larger volume of traffic complaints that seem to be tied to this issue
- Requirements for changes include
    - MUTCD-approved signs
    - Functional classification roadway change

VI. TRAINING – UPDATE

David Williams gave a summary of the recent and ongoing training efforts in District Five.

- Recently held the Synchro/Tru-Traffic training in person and online
  - This training is typically held once per year, but can potentially have more frequent TEAMS calls to offer up additional training, as needed
  - Certificates are available on the SharePoint now
  - Training was recorded so it should be uploaded to FLEX shortly
- The STROZ training platform is available for use
  - Fully operational traffic signal for technician training
  - Please reach out to Tricia Ballard, Lauren Pearson, or David Williams to schedule time
- District Five hosted Workforce Development Training sessions over the past several months in lab and classroom formats; these training sessions were open to local agency staff on a first-come, first-served based
- Orange Technical College – Traffic Signal Technician Program
  - Held meeting August 2022 with OTC staff regarding a signal technician program
  - OTC requested letters of support from agencies stating their need
    - Six agencies responded, resulting in an anticipated need of 29 signal technician hires over the next two years
- FLEX Portal is also available with a variety of trainings, modules, and how-to videos for entry-level and advanced personnel

VII. CURRENT INITIATIVES

David Williams, Katie King, and Tricia Ballard briefly provided an update on the current work efforts throughout District Five.

- TSMCA Update – ongoing coordination between FDOT Central Office, D5, and FACERS. The next FACERS meeting is February 17th, with Central Office expected to attend
- CFLSmartRoads – the CFLSmartRoads landing page has gotten some updates to improve user navigation
- CV Update –
  - Emergency Vehicle Preemption – The Signal Request Message (SRM) is used to activate the EVP, but it also becomes a record
    - First responders want to maintain their privacy
    - Proposed Solution: use SRM to activate EVP, but then drop the data item
      - Adhering to national best practices while tailoring to our region's needs
  - On-board Unit (OBU) Testing – final testing underway; moving through SRM issues/concerns
  - Hoping to deploy in vehicles within next few months
- Intelight – releasing new version of ATMS in March
  - This would address TMDD concerns without breaking RICMS connections
- RICMS – next model update in progress
  - This will likely be more than a beta version at this point
- Data Consortium

  - There have been some updates at local agencies regarding acquisition of data handling, trip planners, etc.
  - Seems like a lot of common themes among Central Florida agencies
  - Would make sense to have a smaller group devoted to data management
  - David is working on coordinating this now
- Smart Signals
  - Internal guidance document created to train our signal staff on Smart Signal design
  - If locals are seeing gaps with their technicians being able to maintain the signals, they are asked to let District staff know
- Signal Design – D5 established new internal process for Signal Operating Plans
  - Seen a fair amount of issues with SOPs
  - After 60% plans, will hold internal meesting to review SOPs
    - Designers (FDOT or consultant staff)
    - Traffic Ops staff
    - Do locals want us to discuss anything else during these meetings?
- PedSafe II – design ongoing
- AV Shuttle – electrical charging upgrades amendment fully executed; working on permit process to start construction
- Kiosks at UCF – Held field visit to determine how to make kiosks more user-friendly; prototype in development
- Smart Work Zone – Advanced Smart Work Zone Information (AWZI) trailers; districtwide SWZ ConOps in development
- Event Management – verification camera for blankout sign installation ongoing
- I-75 CCTV camera improvements – designs finalized for additional CCTV cameras to cover gaps on I-75; will provide real-time verification of TPAS displays
- Districtwide MAP – organization and development of districtwide CV repository for storage of all working and published MAP files is complete
  - Team is collecting all MAP and FCC files from previous deployments
  - Team is also building new MAPs for the BlueMAC unit swapouts at 300 locations around the District

VIII. NEXT MEETING

- April 13, 2022

IX. ATTACHMENTS

- A – Presentation Slides
- B – Meeting agenda

END OF SUMMARY

This summary was prepared by 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 the meeting summary can be finalized.*

Welcome to the TSM&O Consortium Meeting

February 9, 2023

FDOT TSM&O
Transportation Systems Management & Operations

Transportation Systems Management & Operations

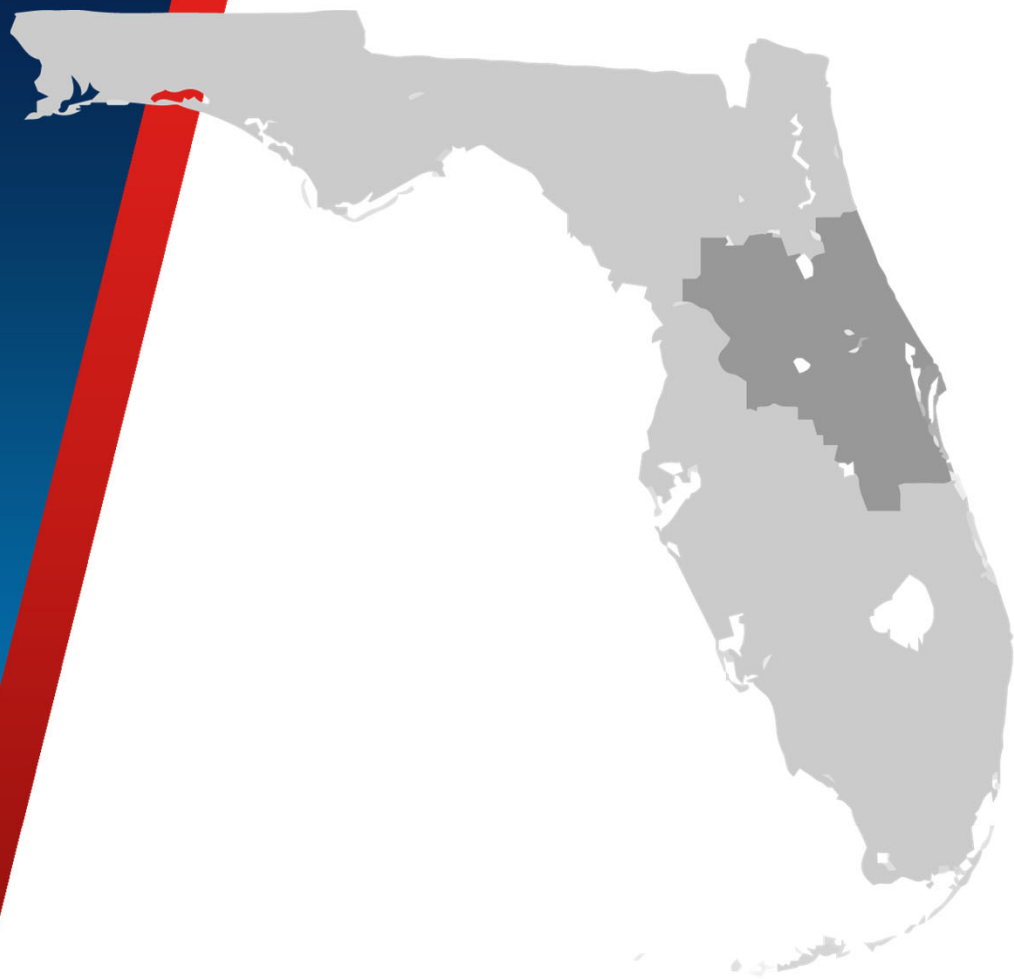
CENTRAL FLORIDA TSM&O CONSORTIUM

Meeting Agenda

1. Welcome
2. ICM Operations
3. USDOT Research, Development, Technology Strategic Plan
4. TMC and DSS Using Third-Party Data
5. Roadway Functional Classification and GPS Routing
6. Training – Update
7. Current Initiatives

TSM&O Consortium Meeting

February 9, 2023



Integrated Corridor Management (ICM)

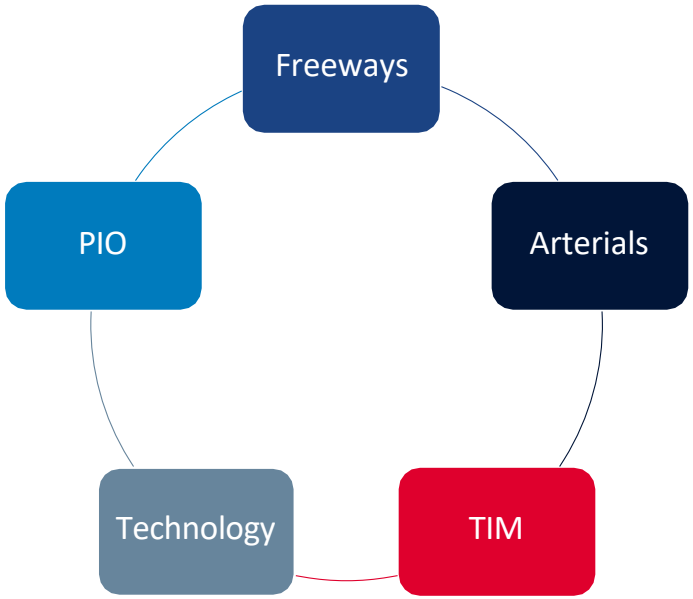
- Goal
  - Leveraging Central Florida TSM&O infrastructure investments to improve safety, mobility, and by actively managing the multimodal system
- Primary Focus Areas

I-4 EXPRESS

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

  - 11,379 CL Miles of Freeway
  - 672 Signalized Intersections across 243 Miles of Arterials, and expanding (Brevard, Orange, Osceola, Seminole, Volusia, and part of Lake County)
- Results to Date
  - One of the largest ICM Programs in the Nation
  - Four times the arterial diversions than San Diego

DISTRICT FIVE ICM



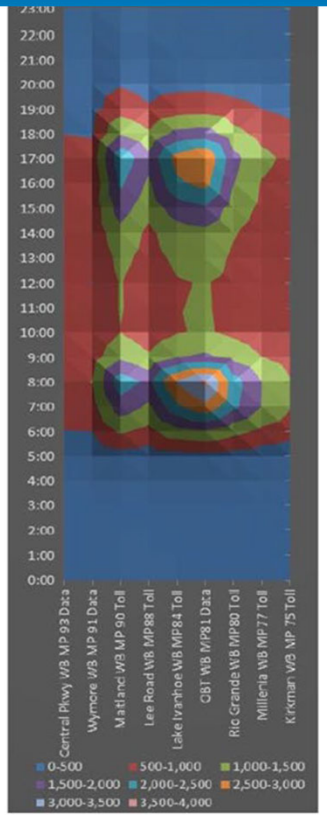
Express Lanes – Preparation

- I-4 Express Lanes
  - D5 SELS
  - Emergency Access Gate (EAG) Training:
    - Fire and Rescue - Orange County, Orlando, Seminole County, Maitland, and Winter Park
    - Law Enforcement - Florida Highway Patrol, Seminole County Sheriff's Office, Orange County Sheriff's Office, and Orlando Police Department
    - Road Rangers/ Asset Maintenance
  - First Responder tours
  - Simulated incidents
  - Location stickers
  - After-Action reviews of I-4 Express Lane incidents.
  - Stand Pipe GEO locations provided to first responders.
  - Coordination with first responders to integrate corridor into CAD

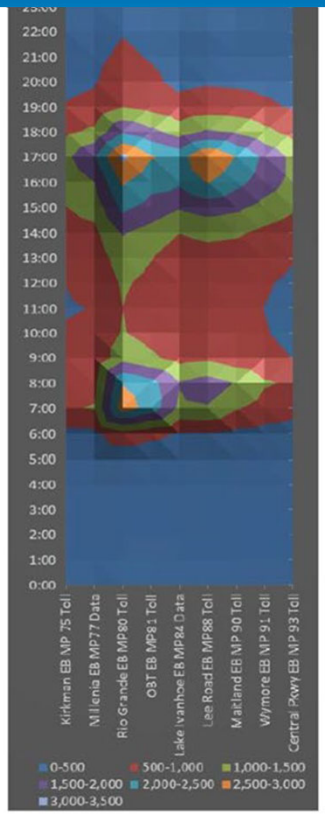
Express Lanes - Reporting

- Daily Debriefing report
  - Event Summary
  - Peak Period Toll Amounts per Trip
  - Peak Period Toll Amounts per Trip per segment (more dialed in)
  - Volume Report (Example shown below)
  - Lane blocking events
  - System & Device Availability
- Provide a daily report of the EAGs
  - Daily opening and closes to validate remote access

Express Lanes Westbound FTE Volume



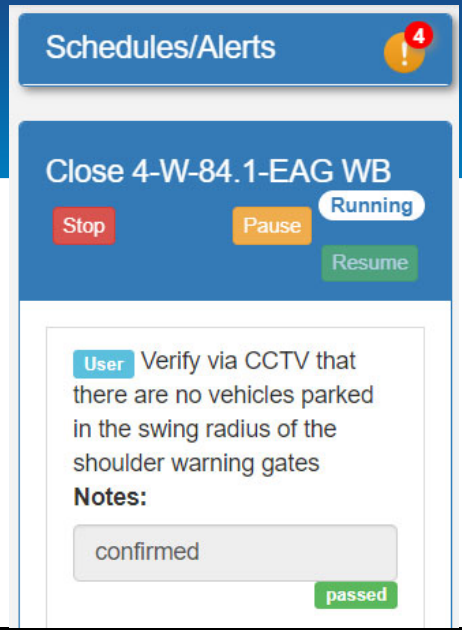
Express Lanes Eastbound FTE Volume

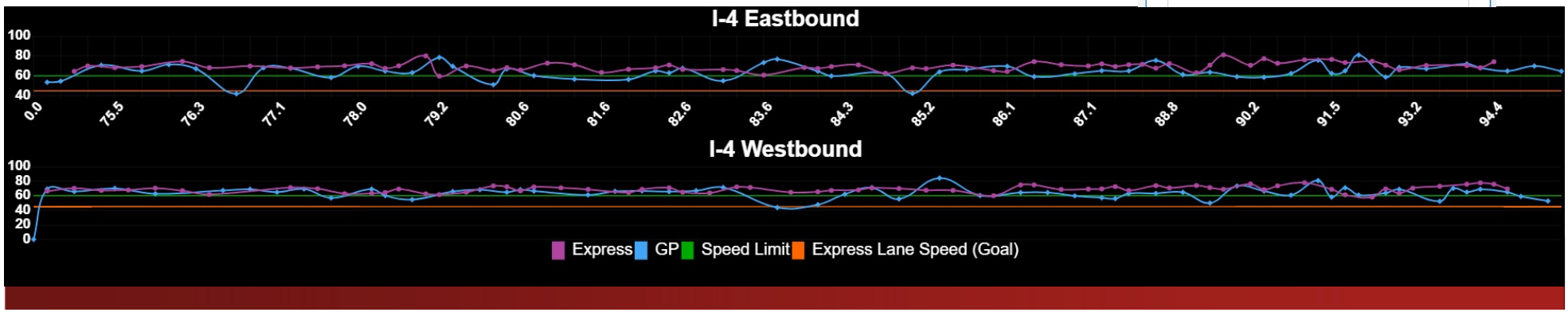


metric

Express Lanes - Technology

- **What we've done so far:**
  - D5 SELS
    - Static Tolling Currently
  - MVDS QA using ITSIQA
  - Emergency Access Gate remote control software
  - Link between MIMS and SICE maintenance software created (Waiting to be turned on)
  - Created I-4 Speed Graph for quick monitoring

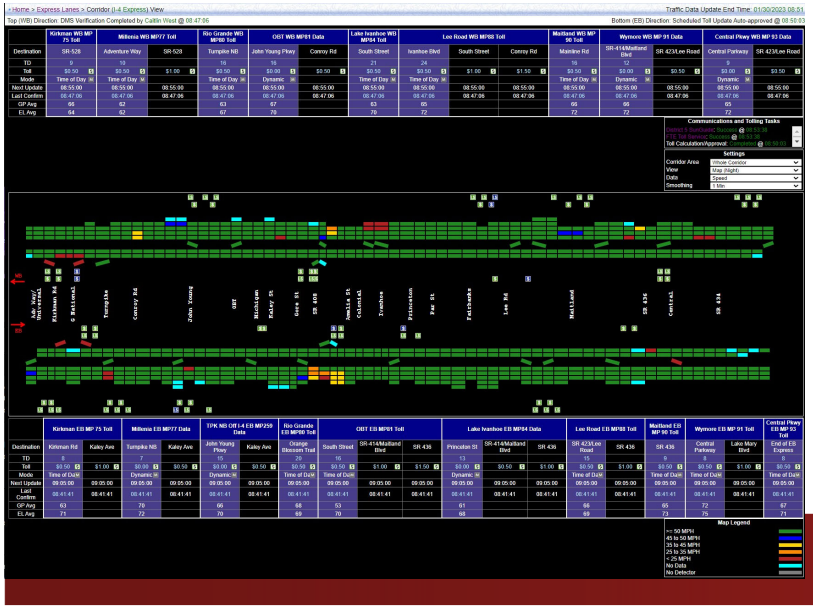


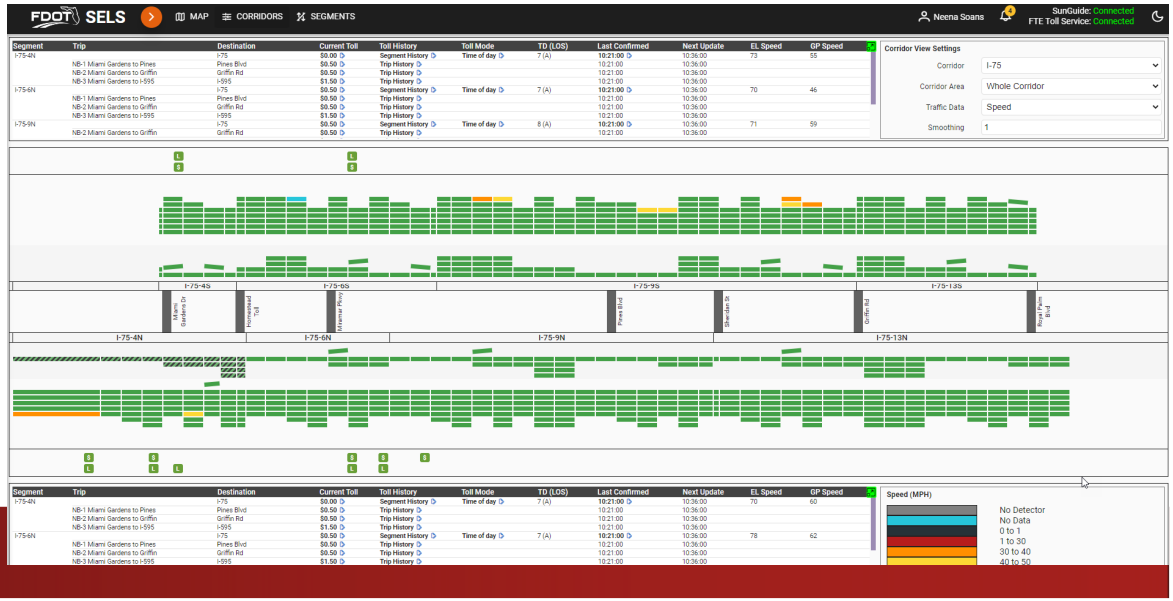


metric

Express Lanes - Technology

- What's coming next:
  - D5 SELS
    - Dynamic Tolling
  - Replace SELS with NG SELS
- CCTV enhancement to EAG software to swing CCTV and view





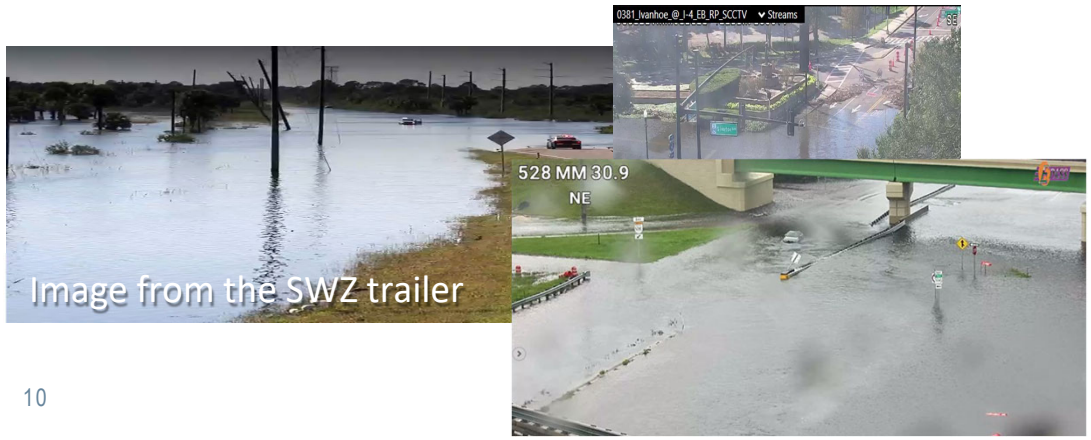
Wekiva Parkway

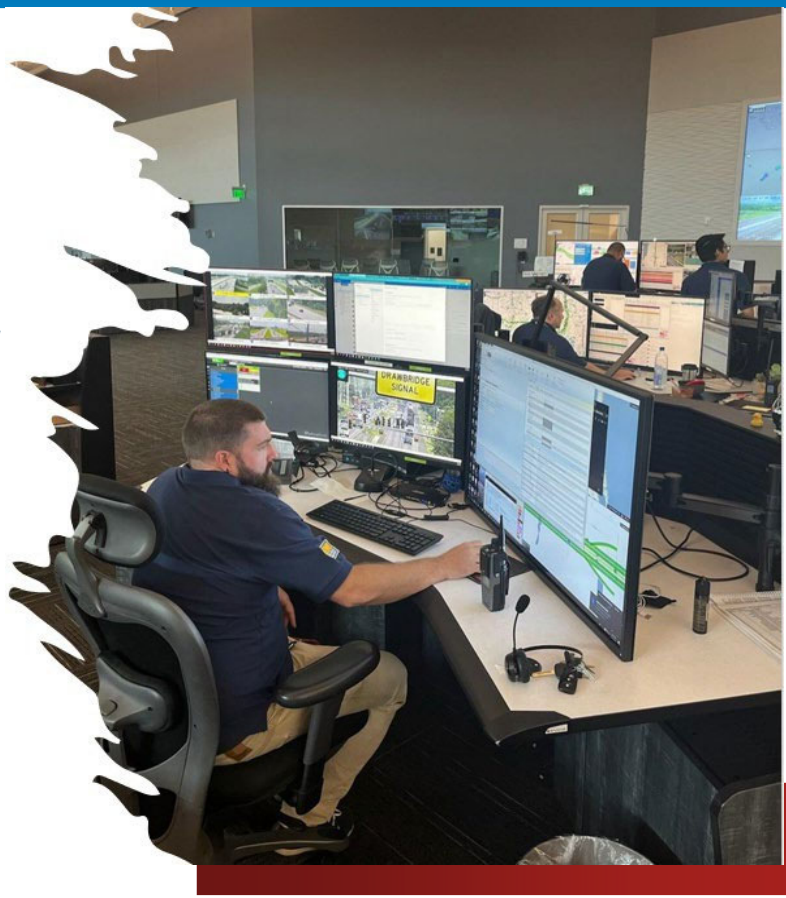
- Wekiva Parkway continues attracting new drivers and commuters, **achieving 5.6 million trips since July 2022**
- **23 of the 25-mile Parkway already open**
- **Construction completion in 2023 with landscaping and operations and maintenance work to then commence**
- There was a 13.5 percent growth in drivers between November and December 2022 on Wekiva Parkway.
- Soon State Roads 429 and 417 will join at Interstate 4, completing long-awaited Central Florida Beltway
- Section 8 ramp opening in October 2022
  - More than dozen news stories published with Orlando media
- More than 210 news stories published about Wekiva Parkway since October 2022 (and new I-4 westbound ramp to S.R. 429 southbound)

metric

Traffic Incident Management

- Developed 8+ Special Event Plans (Orlando, Daytona, etc.)
  - Arterial Team Develop(s) Timings as Needed
- TIM Specialist in the RTMC
  - Each specialist has an emergency responder/dispatch center background
  - Each specialist coordinates directly with the corresponding agencies during crashes and roadway incidents.

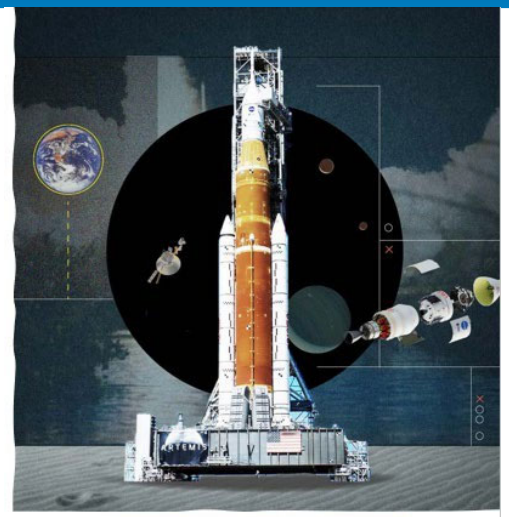




metric

Traffic Incident Management

- Special Event Management – Artemis 1 Launch
  - Agency coordination for Artemis 1 launch include
    - Brevard County Emergency Management, Law Enforcement and Sheriff's Office, Fire Chief and ESF 4/10 (fire and hazmat), State Emergency Support, Florida Department of Transportation District 5, Virtually the Brevard County Tourism Office and Port Officials, National Weather Service, and the Coast Guard.
  - A specialized support team was strategically placed:
    - TIM Program Manager, Mike Hudson, will take lead in the coordination of traffic management the day of the event with the support of the TIM Specialist, Ryan Albin
    - RTMC Supervisor/RTMC Staff, along with IT staff supported the effort
    - Arterial Corridor managers provided real-time arterial changes, as needed
    - Sheryl Bradley and Garret Popovich, provided support of GIS mapping, google, and Waze

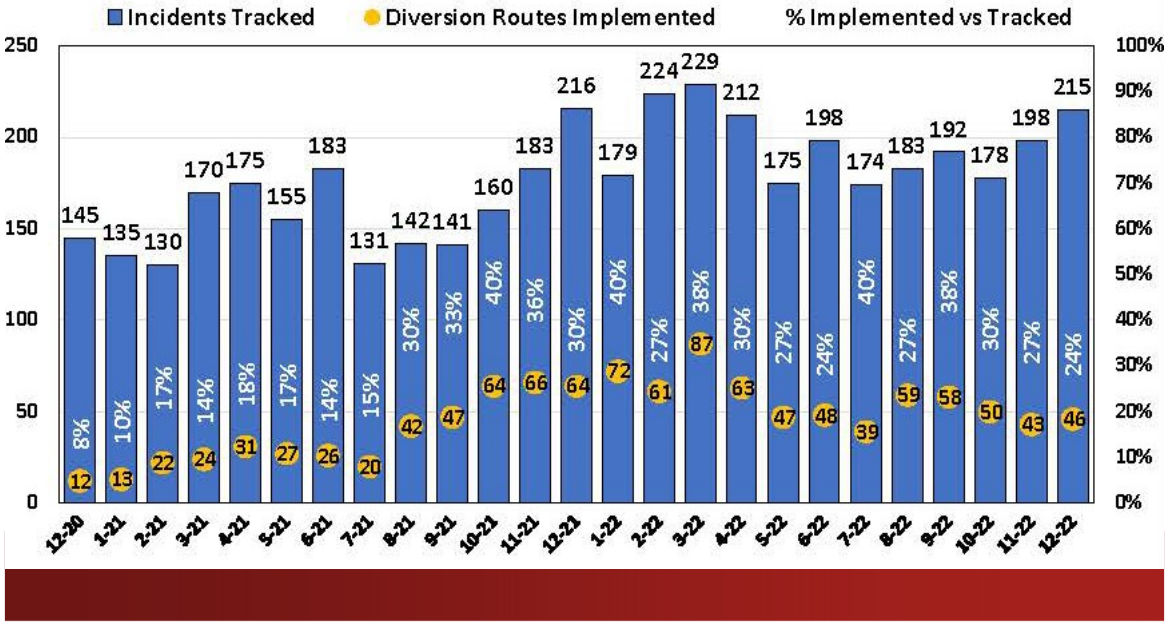


Traffic Incident Management

- Major Incident Evaluation (MIE)
  - Provides overview of major incidents that include a fatality
  - MIE's are sorted by roadway section number
  - Provides beneficial information that can be provided to the studies office (Capital Improvements)
- The Use of Drones for TIM
  - TIM Program Manager and 5 operators are licensed pilots
  - Ability to capture a complete overview of the scene to assist in recovery efforts
  - TIM Program Manager has a drone in his vehicle for on-site use

ICM Arterial Operations (in partnership with LMAs)

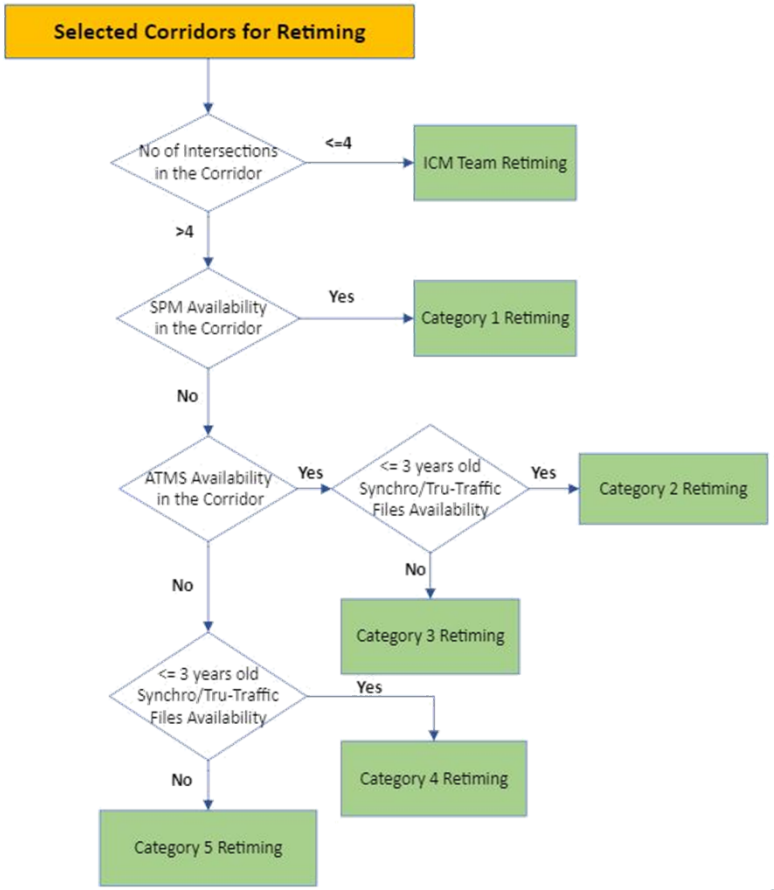
- Signal Retiming Engineer, 5 Corridor Managers, Analyst, Field Technician, 2 Arterial Operators
- Monitor arterials in real-time (0600-1900) and during special events (on-call)
  - ATMS platforms, CMS, SPM, HERE, INRIX, RTMC Map
- Implement pre-planned alternative (diversion) route timing plans based on non-recurring congestion
  - Review alternate route db programming monthly
  - Test alternate routes semi-annually
- Expanding footprint to I-95 and a portions of Lake County
  - 96% Brevard and 98% Volusia On-Boarded (Connected)
  - Work with Agencies on integrating/grooming ATMS
- Address special needs (Brightline closures, Ramp Signals, R-ICMS, etc.)
- Additional services to the LMAs as requested
  - EVP and TSP integration
  - Database Conversions
  - Timing Changes/Support
- Conduct field investigations related to signals
- Address citizen complaints
- Report equipment status, alarms, and performance



metric

ICM Arterial Operations - Retiming

- Corridor Selection
  - Prioritization model with input and weighting for 14 factors (mobility, safety, detection status, and local input being key)
- Type of Retiming
  - Full Retiming
  - Reduced scope for:
    - ATMS connectivity
    - Previous Synchro/Tru-Traffic files
    - SPM
  - Timing Lite
  - Internal ICM staff for small corridors
- Corridor Assignment
  - Metric
  - Iteris
  - Faller, Davis
  - VHB
  - TEDS/Stanley (data collection)
- Close coordination with RTMC is key to effective program



metric

Performance Measures

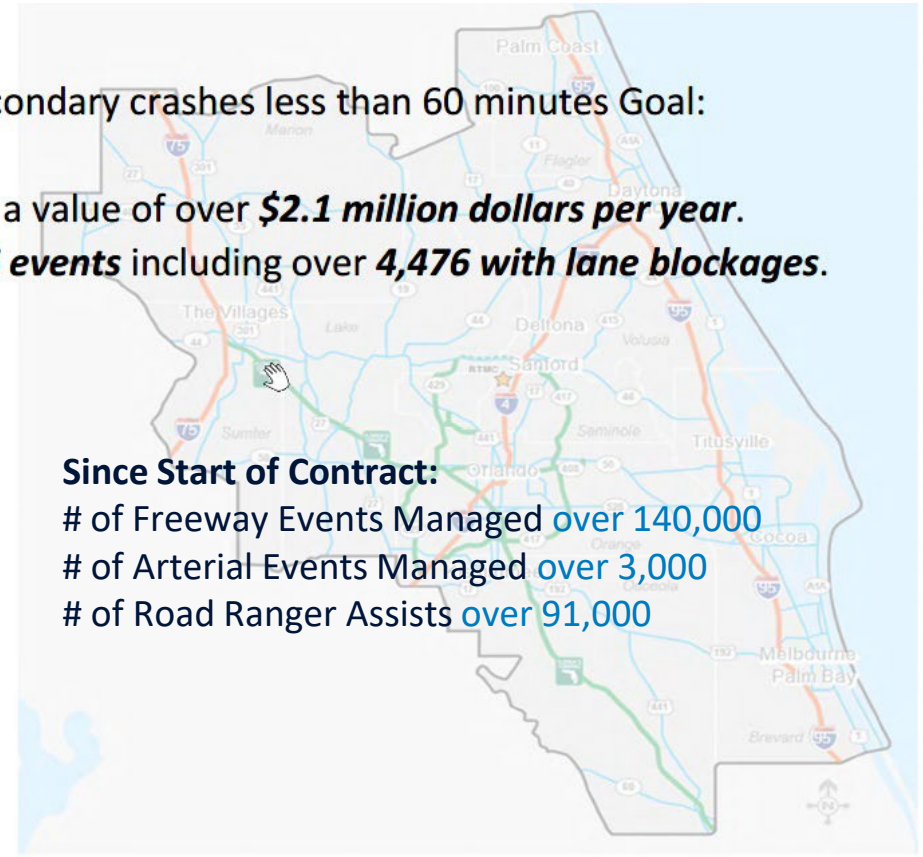
Highlights for Quarter 2 FY 2023:

- Total savings due to reduction of secondary crashes less than 60 minutes Goal: $127,136 * 333 = ***$42,336,288***
- Arterial corridor managers provided a value of over ***$2.1 million dollars per year***.
- The ICM team managed over ***33,086 events*** including over ***4,476 with lane blockages***.

FDOT DISTRICT FIVE ICM

Table 1, Value Assumptions

Activity/Performance Measures	Calculation Breakdown		Total Annual Savings ($)
1. Implementation of Diversion Routes -Peak Hours			703,367
Delay Savings (Freeway, veh-hr) (See Appx A & B)	16,916.1		
Delay Savings (Arterials, veh-hr) (See Appx A & B)	10,304.0		
Total Delay Savings during Peak Hours in 2021 (veh-hr)		27,220.1	
[3]Average Occupancy during Peak Hours		1.7	
[2]Hourly Rate ($, Median Wage, 2019)		15.2	
2. Implementation of Diversion Routes -Off-Peak Hours			363,104
Delay Savings (Freeway, veh-hr) (See Appx A & B)	8,832.0		
Delay Savings (Arterials, veh-hr) (See Appx A & B)	6,098.3		
Total Delay Savings during Off-Peak Hours in 2021 (veh-hr)		14,930.3	
[3]Average Occupancy during Off-Peak Hours		1.6	
Hourly Rate ($, Median Wage, 2019)		15.2	
3. Identification of Critical Detector Failure			889,926
[4]Delay for Detector Failure Per Intersection Per Day (hour)	8.2		
Reduction of Time due to Identification of the Issue (day)	7		
Approx. Number of Critical Detector Failures Identified (2021)	600		
Total Delay Savings in 2021 (veh-hr)		34,440	
Average Occupancy		1.7	
Hourly Rate ($, Median Wage, 2019)		15.2	
4. In-house Corridor Retiming			85,980
Total Number of Intersections Retime (2021-2022)		20	
Cost Per Intersection ($)		4,299	
5. Workforce Development			83,900
[5]Annual Cost Per Trainee		1,678	
Number of Trainees		50	
6. Secondary Crash Reduction			Not enumerated
7. Emission Reduction			Not enumerated
8. Fuel Consumption Reduction			Not enumerated
9. Emergency Response Time Reduction			Not enumerated
Total			$2,126,277



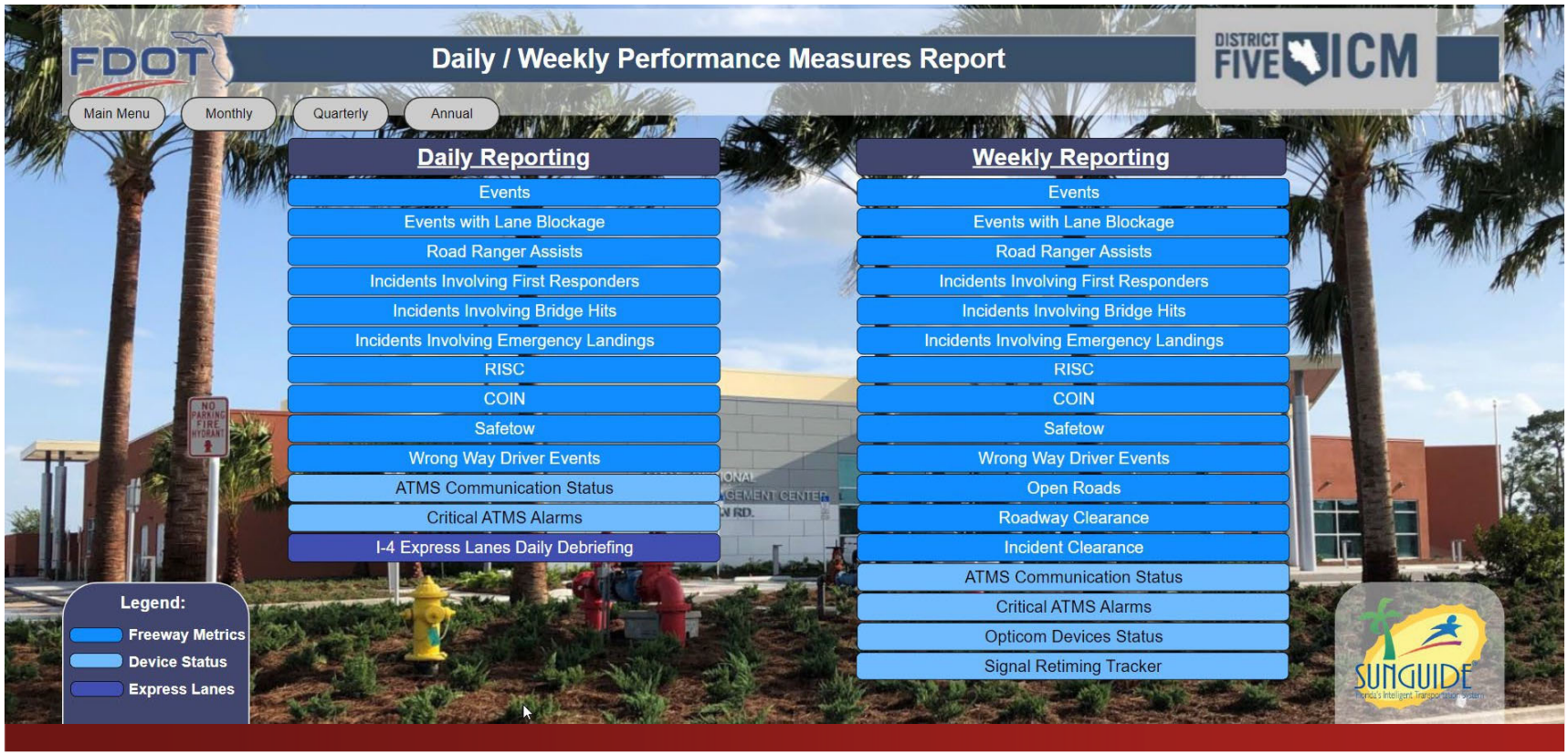
Since Start of Contract:

# of Freeway Events Managed over 140,000

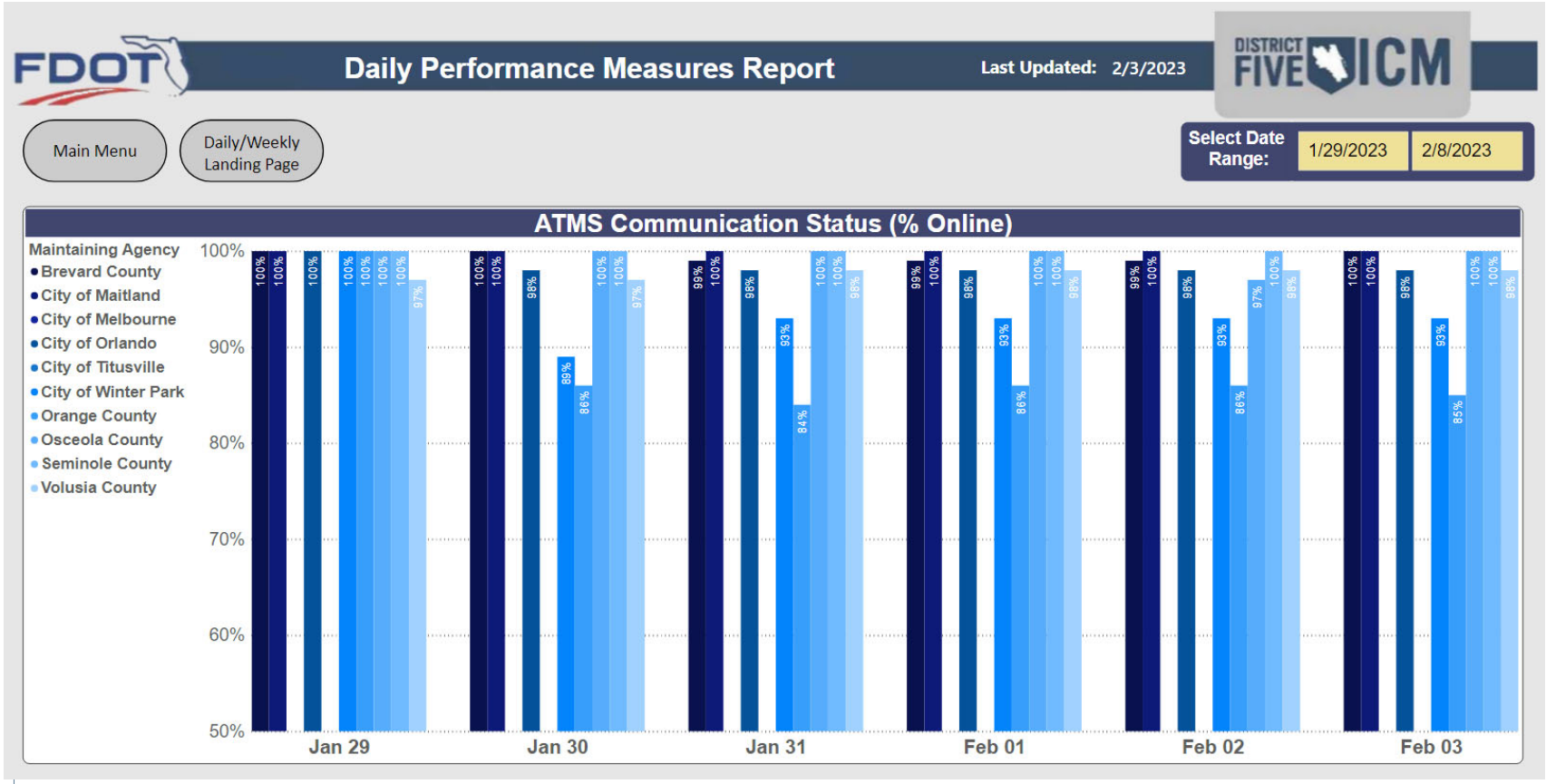
# of Arterial Events Managed over 3,000

# of Road Ranger Assists over 91,000

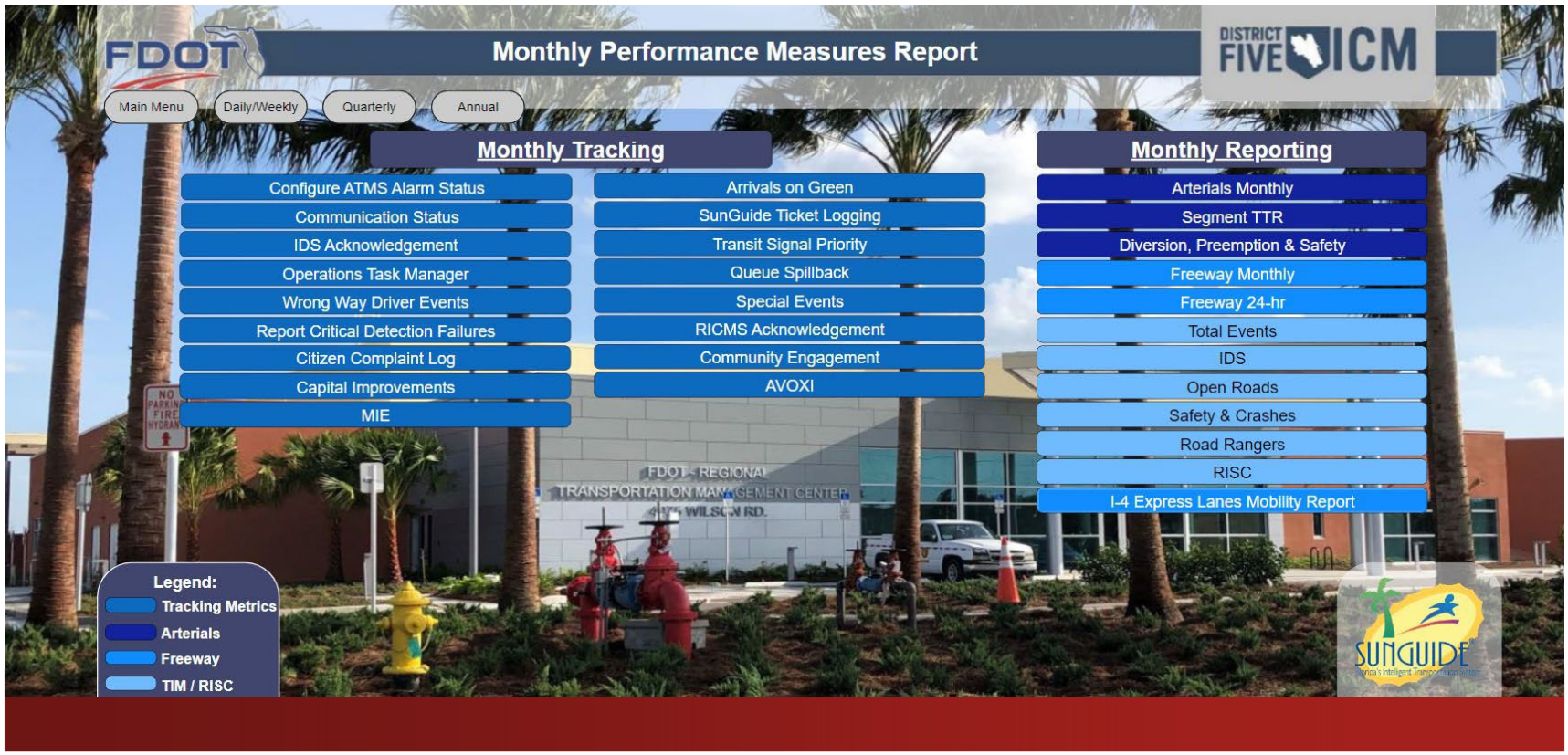
Performance Measure - Reporting



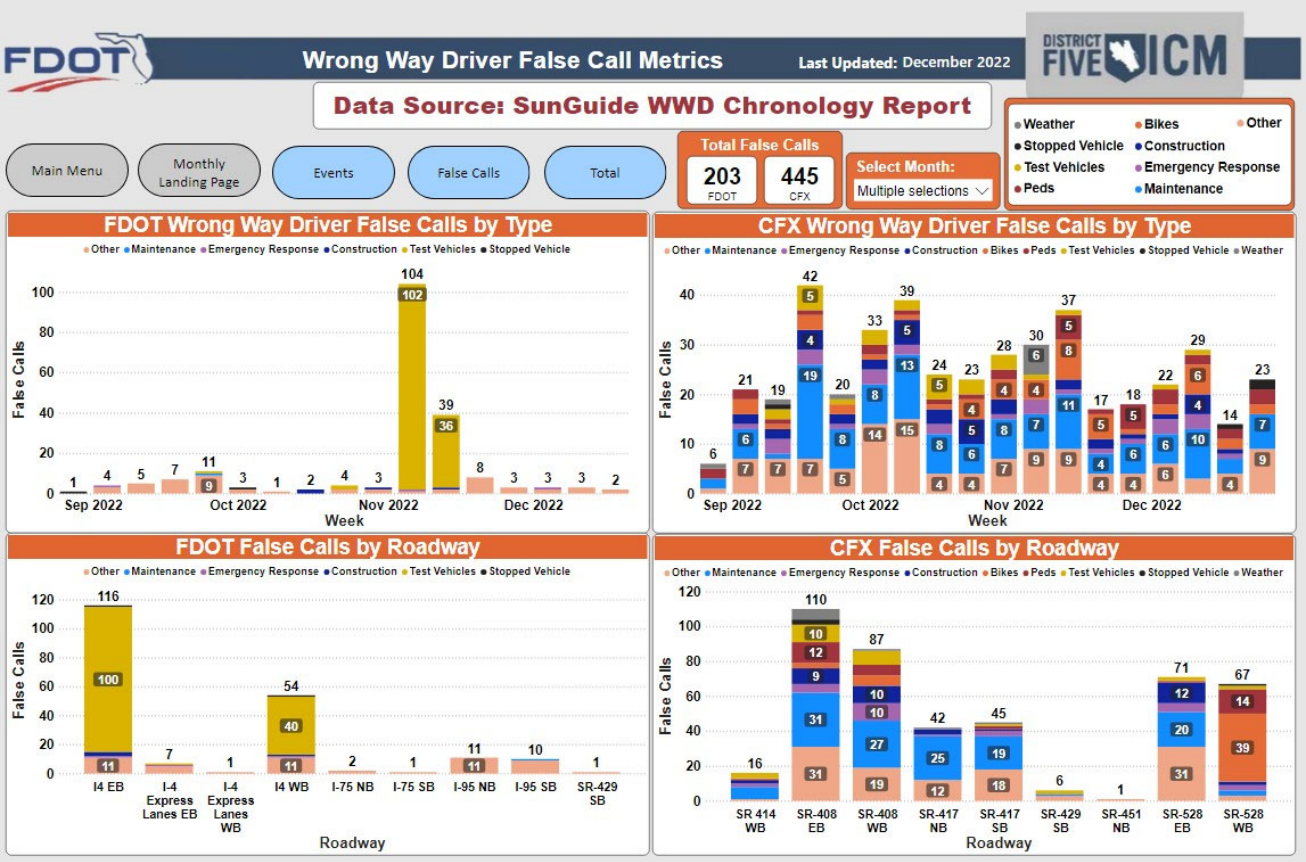
Performance Measure - Reporting



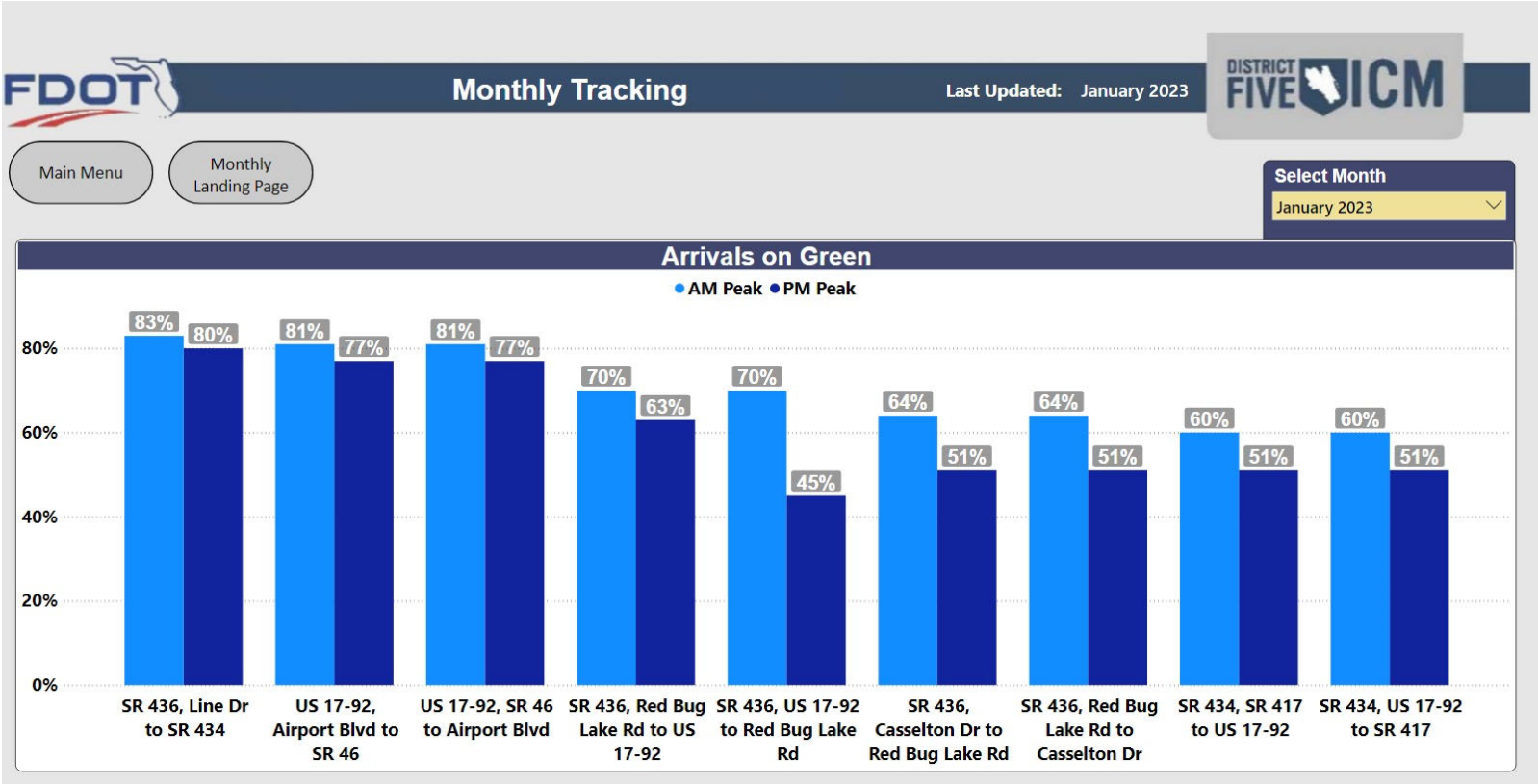
Performance Measure - Reporting



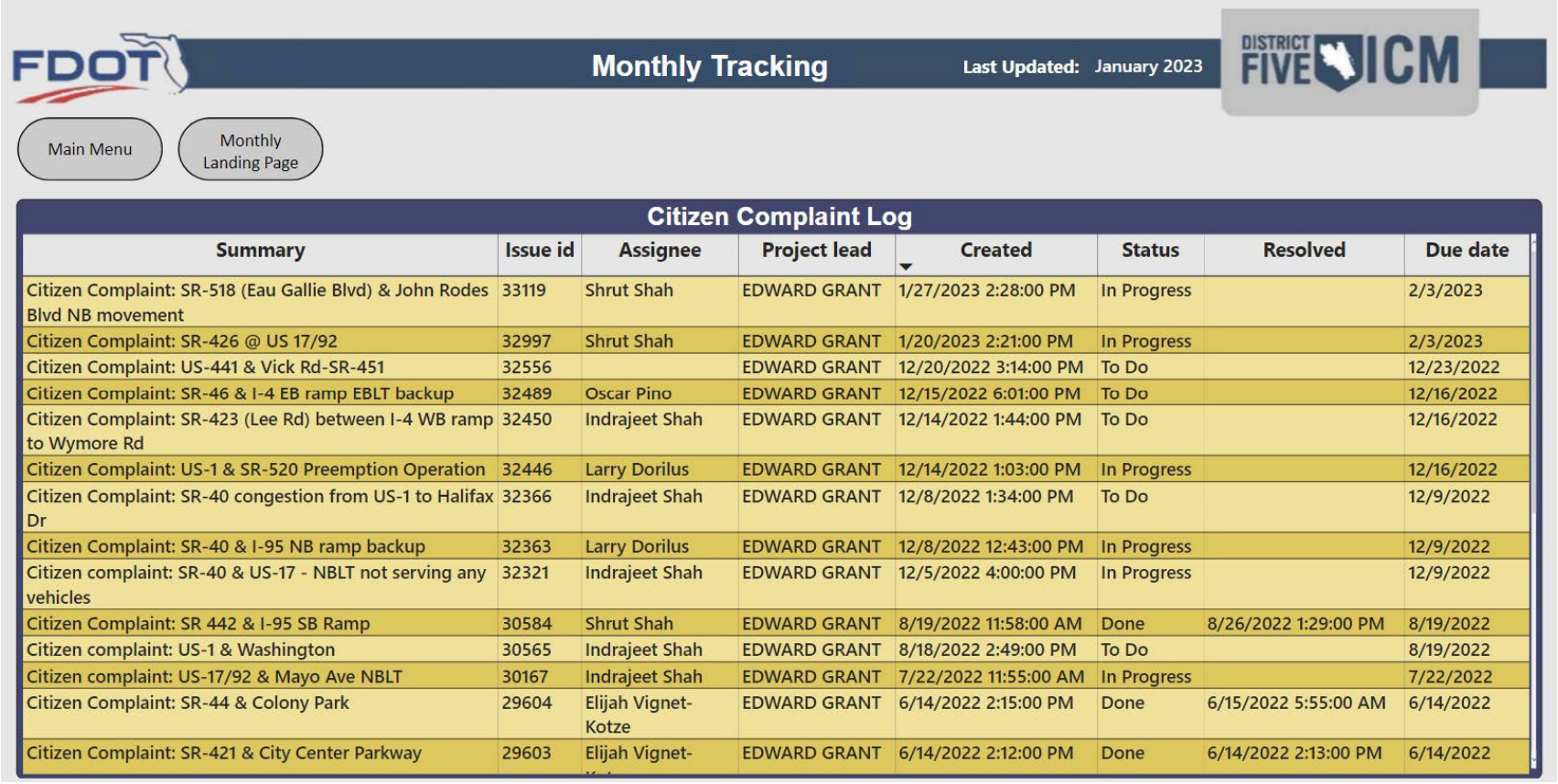
Performance Measure - Reporting



Performance Measure - Reporting



Performance Measure - Reporting



FDOT

Monthly Tracking

Last Updated: January 2023

DISTRICT FIVE ICM

Main Menu | Monthly Landing Page

Citizen Complaint Log

Summary	Issue id	Assignee	Project lead	Created	Status	Resolved	Due date
Citizen Complaint: SR-518 (Eau Gallie Blvd) & John Rodes Blvd NB movement	33119	Shrut Shah	EDWARD GRANT	1/27/2023 2:28:00 PM	In Progress		2/3/2023
Citizen Complaint: SR-426 @ US 17/92	32997	Shrut Shah	EDWARD GRANT	1/20/2023 2:21:00 PM	In Progress		2/3/2023
Citizen Complaint: US-441 & Vick Rd-SR-451	32556		EDWARD GRANT	12/20/2022 3:14:00 PM	To Do		12/23/2022
Citizen Complaint: SR-46 & I-4 EB ramp EBLT backup	32489	Oscar Pino	EDWARD GRANT	12/15/2022 6:01:00 PM	To Do		12/16/2022
Citizen Complaint: SR-423 (Lee Rd) between I-4 WB ramp to Wymore Rd	32450	Indrajeet Shah	EDWARD GRANT	12/14/2022 1:44:00 PM	To Do		12/16/2022
Citizen Complaint: US-1 & SR-520 Preemption Operation	32446	Larry Dorilus	EDWARD GRANT	12/14/2022 1:03:00 PM	In Progress		12/16/2022
Citizen Complaint: SR-40 congestion from US-1 to Halifax Dr	32366	Indrajeet Shah	EDWARD GRANT	12/8/2022 1:34:00 PM	To Do		12/9/2022
Citizen Complaint: SR-40 & I-95 NB ramp backup	32363	Larry Dorilus	EDWARD GRANT	12/8/2022 12:43:00 PM	In Progress		12/9/2022
Citizen complaint: SR-40 & US-17 - NBLT not serving any vehicles	32321	Indrajeet Shah	EDWARD GRANT	12/5/2022 4:00:00 PM	In Progress		12/9/2022
Citizen Complaint: SR 442 & I-95 SB Ramp	30584	Shrut Shah	EDWARD GRANT	8/19/2022 11:58:00 AM	Done	8/26/2022 1:29:00 PM	8/19/2022
Citizen complaint: US-1 & Washington	30565	Indrajeet Shah	EDWARD GRANT	8/18/2022 2:49:00 PM	To Do		8/19/2022
Citizen complaint: US-17/92 & Mayo Ave NBLT	30167	Indrajeet Shah	EDWARD GRANT	7/22/2022 11:55:00 AM	In Progress		7/22/2022
Citizen Complaint: SR-44 & Colony Park	29604	Elijah Vignet-Kotze	EDWARD GRANT	6/14/2022 2:15:00 PM	Done	6/15/2022 5:55:00 AM	6/14/2022
Citizen Complaint: SR-421 & City Center Parkway	29603	Elijah Vignet-	EDWARD GRANT	6/14/2022 2:12:00 PM	Done	6/14/2022 2:13:00 PM	6/14/2022

Performance Measure - Reporting

Performance Measure – Operations

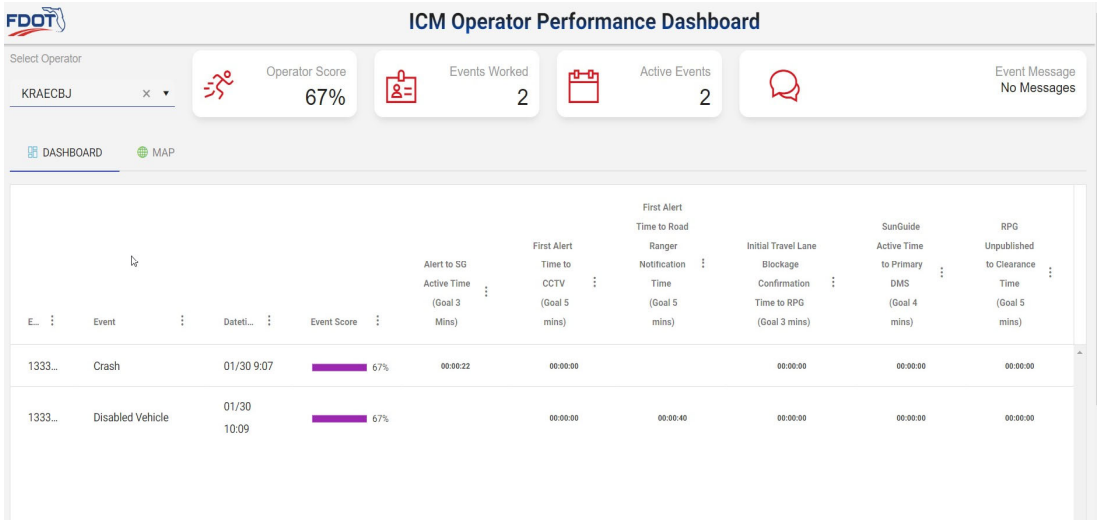
- Developed Method for QC of Operator/Shift performance – Real-Time/Post Review
- Working to enhance the process with
  - Real-time automated operator event grading
  - Post-Process for review that involves the QC reviewer's judgement

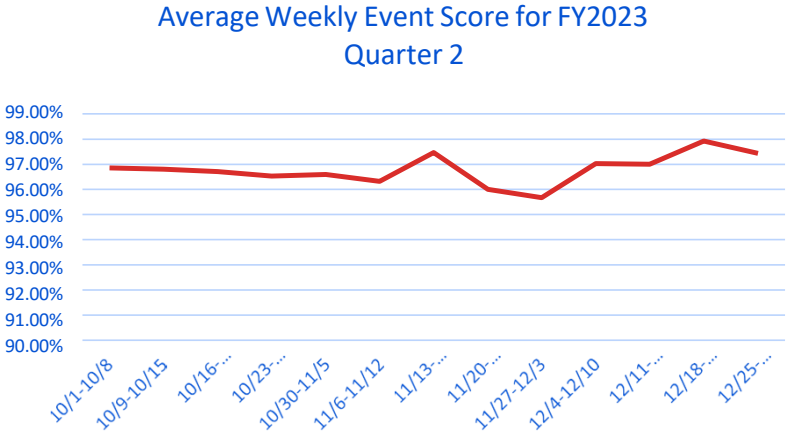
Row Labels	# of Events	Average Score	Min Score	Max Score
6:00AM-2:00PM	66	97.27%	72.73%	100.00%
2:00PM-10:00PM	165	97.76%	69.23%	100.00%
10:00PM-6:00AM	55	98.59%	80.00%	100.00%
Grand Total	286	97.81%	69.23%	100.00%

Avoxi:

Calls Reviewed	Acceptable
150	150

Calls	Unanswered	Avg Wait time	Avg Talk time
1174	11	12s	57s





Safety/Operations Improvements – Ops Complimenting Engineering and Vice Versa

Identifying operational needs for TSM&O while providing value add studies:

- Short term - Push button/Maintenance Contractor for Safety (i.e. WWD) and TSMO solutions today
- Medium term – PLEMO 3R scoping feedback (Over 60 projects to date) for Smart Scopes
  - Making sure operational needs are captured in upcoming projects
- Long term - Planning (for capacity needs)

Capital Improvements	Study	Concept	Design	Construction
South Street Improvements	NA	Complete	Complete	Pending
Huey Improvements	NA	Complete	Complete	Pending
Grand National Improvements	NA	Complete	Ongoing	Pending
Long and Easy	NA	Complete	Ongoing	Pending
SR 408 & I-4 EB	NA	Complete	Ongoing	Pending
Express Lanes Wayfinding/Signing Improvements	NA	Ongoing	Pending	Pending
Titusville Wireless Concept	NA	Complete	Pending	Pending
SR 60 near US 441, FTE or Peavine Rd	Ongoing	TBD	TBD	TBD
SR 482 & Greenbriar Pkwy Study	Ongoing	TBD	TBD	TBD
SR 50 High Crash Section (Orange)	Ongoing	TBD	TBD	TBD
SR 50 High Crash Section (Lake)	Ongoing	TBD	TBD	TBD
SR 436 High Crash Section	Ongoing	TBD	TBD	TBD
SR 551 High Crash Section	Ongoing	TBD	TBD	TBD
US 92 High Crash Section	Ongoing	TBD	TBD	TBD
MIE 22-27: I-95 SB at Mile Marker 260A Study Request	Ongoing	TBD	TBD	TBD
MIE 22-33: US-192 at Town Center Blvd. Study Request	Ongoing	TBD	TBD	TBD
MIE 22-XX: EB I-4 off Ramp @ Amelia Study Request	Ongoing	TBD	TBD	TBD

Community Engagement/Performance Measure Reporting

- For 2022, there were 1,244 news stories about I-4 Express with an earned media value equivalency of more than $102 million for the year.
- Community Engagement
  - In-person (door-to-door, community and local events) and digital
  - Stakeholder presentations and briefings
  - Business and community partnerships
- Industry Updates
  - Bimonthly articles for the TSM&O Disseminator
  - Quarterly articles for the Florida TIM Responder
- Monthly
  - I-4 Express Monthly Mobility Reports
  - Web performance, social media impressions, media coverage, community engagement
    - Website views – 5,243
    - New newsfeed subscribers – 53
    - Media coverage stories – 29
    - Media audience 1,120,449
    - Brochure display locations – 239
    - Twitter impressions – 16,500
    - YouTube impressions – 53,300

Workforce Development

Course Topic	Duration	Venue	Intended Audience	Class Recording Available?
Basic Traffic Signal Cabinet and Field Equipment Orientation	1 day	Lab	Signal Technicians	PPT & Recording
Traffic Signal Timing Basics	1 day	Classroom	Signal Technicians	PPT & Recording
Traffic Signal Controller Programming	1 day	Lab	Signal Technicians	PPT & Recording
CMS and TSP Orientation	1 day	Classroom	Signal Technicians	PPT & Recording
SIIA and NOEMI Orientation	1 day	Classroom	Signal Technicians	PPT & Recording
ATMS Monitoring and Programing	1 day	Lab	Signal Technicians	NA
Video Detection Setup - Iteris	1 day	Lab or Classroom	Signal Technicians	NA
Video Detection Setup - Gridsmart	1 day	Lab or Classroom	Signal Technicians	NA
Video Detection Setup - Econolite	1 day	Lab or Classroom	Signal Technicians	NA
Travel Time System Platforms	1 day	Classroom	Engineers & Signal Technicians	PPT & Recording
SPM Orientation	1 day	Classroom	Engineers	
ICM Orientation and Real-Time Operations	1 day	RTMC	Engineers	
Traffic Signal Timing using Synchro and Tru-Traffic	2 days	Classroom	Engineers	
Intro to Traffic Signals	1 day	Virtual	Engineers & Signal Technicians	
Traffic Operations and ITS Orientation		UCF Classroom	Future employees	

- UCF Classes (400+ Attendees, 20+ Engineers have come on board)
- SHRP2 Training
- TSM&O Videos
- Const. Career Days
- Operations Modules
- ...and Counting

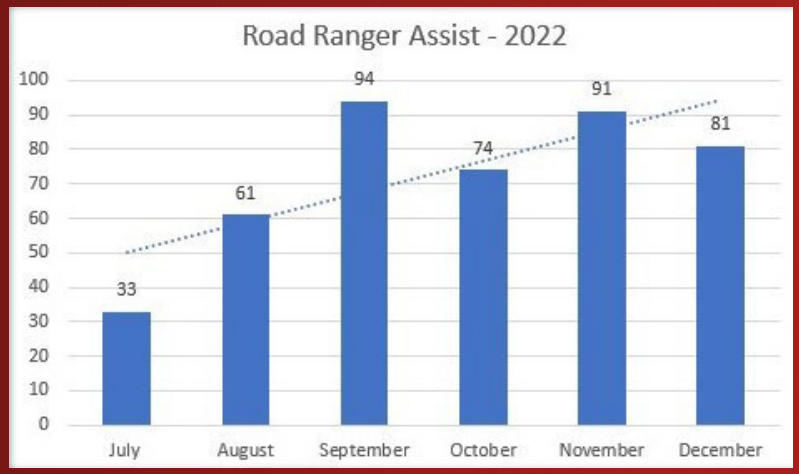
metric

Arterial Road Rangers

- Deployed research
- Deployment started July 1, 2022
- Plan developed by UF research team
- Ongoing improvements to increase utilization
  - Changed to versus roaming mode from staged

Arterial Road Ranger Assists between July 2022 & December 2023 = 434 Road Ranger Assists Excel spreadsheet attached with SunGuide® report

July	**33**
August	61
September	94
October	74
November	91
December	81



Technology – ITSIQA

- Utilizing ITSIQA
- Being updated based on changes in D5 architecture
- Travel Time and Speed
  - Comparisons done with HERE and Inrix data
  - Update for new BlueTOAD API
  - Base Map conflation underway to bring as much HERE roadways as possible
- Volume
  - Freeway –
    - Expand the confidence interval of detector friends' concept in from the I-4 Express MVDS calibration work
    - Bring in PTMS sites for quality checks
  - Arterials –
    - 1 Hour and 1 Minute Output
    - Combine IMC and ATSPM for quality improvements

Technology – Queue Warning System and Weather Advisory System

- Queue Warning System
  - Looks and detector volume and occupancy and automates DMS messages for congestion.

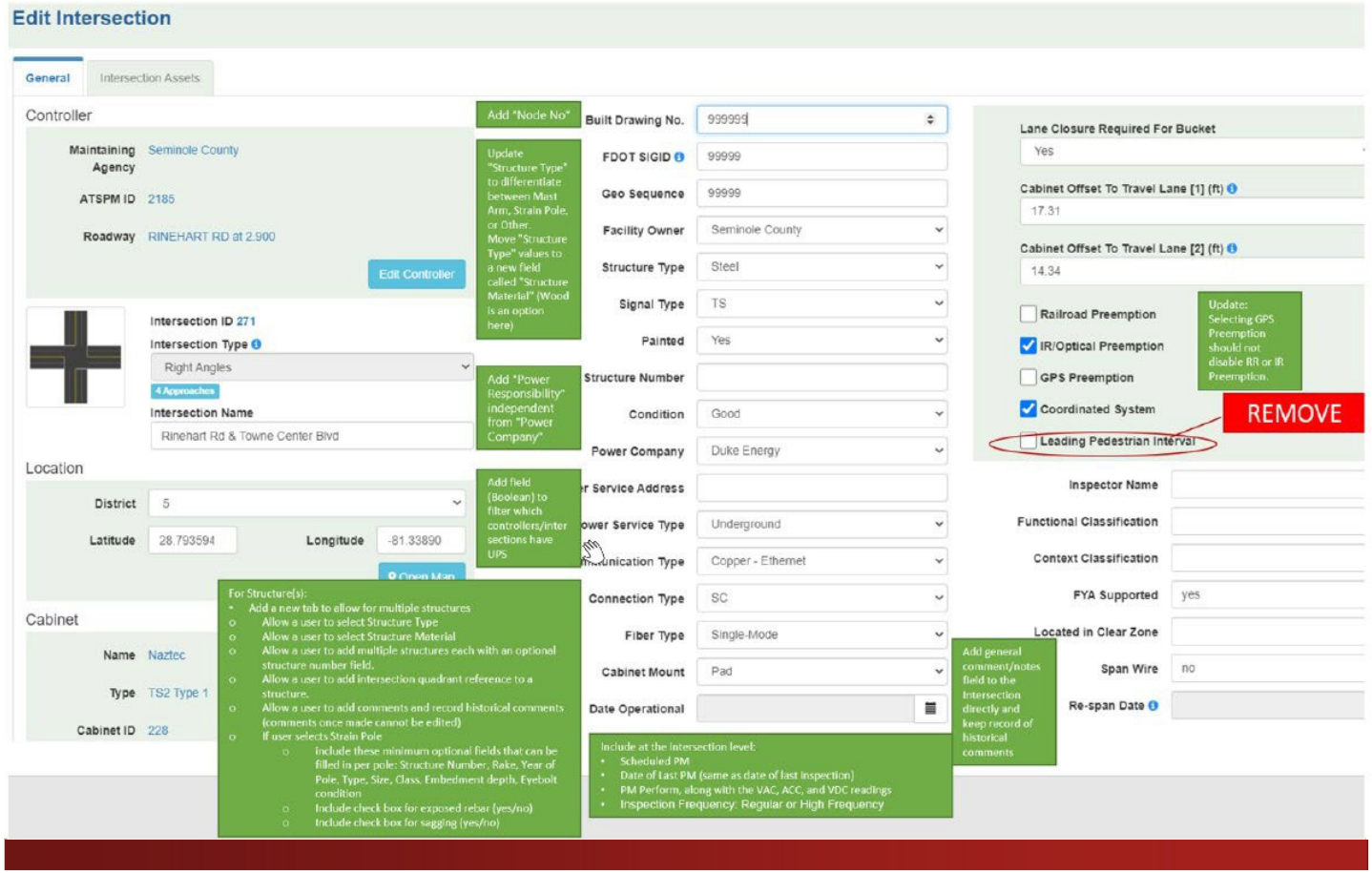
- Weather Advisory System
  - Automates DMS response plans for weather events using the national weather service API.
  - Focuses on major weather events watches and warnings for Hurricanes, Tropical Storms, Tornado, Fog, and Freeze.

metric

Technology – SIIA and MIMS

- MIMS and SIIA Enhancement
  - Fields have been added for local agencies that wanted to use SIIA for local inventory
    - Populating inventory into SIIA database (Arterial Operations and ITS Maintenance Team)
  - Shared asset table between both programs for improved inventory auditing
  - Improved contract group functions to align with the TSMCA, Exhibit E
  - Major SIIA update to release in February
    - Additional fields for local agency tracking needs (Seminole and Osceola)
      - Initial meeting with held with Orange County to begin identifying if additional enhancements to support their use is needed.
      - Please reach out to Katie.King@dot.state.fl.us if you plan to use SIIA for inventory and have any local agency needs to discuss.
    - New pedestrian geometry, assets, and detection inventory features
    - Structures maintenance data tracking
    - Change history
    - Collecting, Predicted, and Configured detector data fields

Technology – SIIA and MIMS

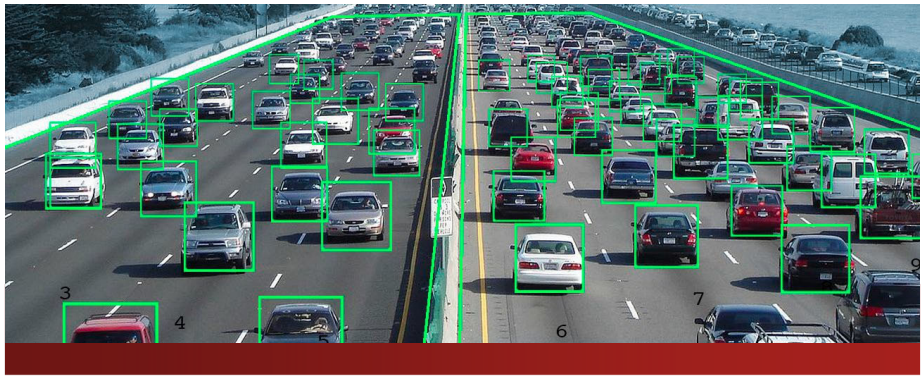


metric

Technology – Automated Incident Detection

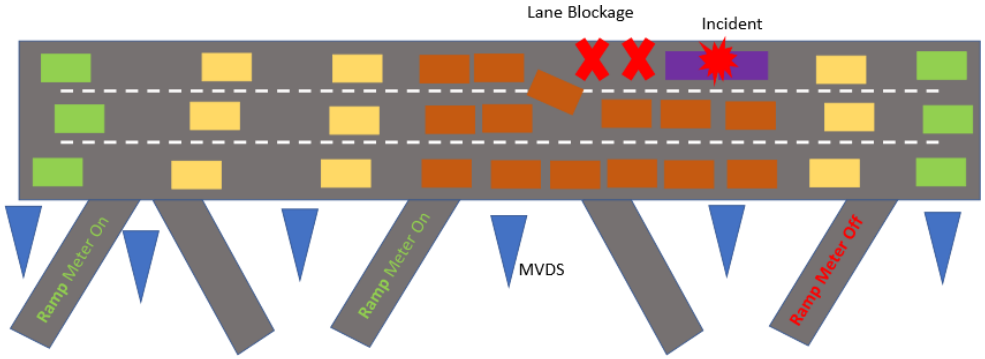
Ongoing Research

- D5 CPED - Developed by John Hope
  - Uses UCF crash prediction tool to show areas to monitor with increased conditions for incidents to occur
  - UCF tool went offline we're migrating to FDOT hosting to resolve this
- UF – Arterial Incident Detection
  - Uses Machine Learning and ATSPM detector data to identify incidents on arterials
  - Code came over from UF a few weeks ago
  - Will pilot effectiveness of the two corridors then see if it should be expanded
- Trafficvision (Currently Piloting on the Floor)
  - Freeway video analytics being tested on 50 cameras
  - SunGuide interface to bring in incident alerts under development
- DERQ (Offered to Pilot on the Floor)
  - TAPS-LA Grant Osceola County pilot in deployment stage
  - DERQ pilot of freeway capabilities being coordinated currently



Technology – Ramp Signals

- Ramp It Up (In-Development)
  - Agencies to be contacted prior to turning on
  - SOP and SOGs Developed
  - Combines metrics from Queue Warning System looking at the head and tail of queue from an incident.
  - CCTV cameras in the area (Incident, Tail, Ramp)
  - Volume Threshold so Arterial operator can select metering rate



Technology – Connected Vehicles

- OBUs and TIMs –
  - Initial set of CV safety related TIM messages agreed to with OBU vendor
  - Temporary solution until SunGuide is updated to handle ITIS code standards
  - ICM SOGs and SOPs being updated to include CV TIM guidance

CV safety related TIM messages

Event Type	Message Template	ITIS Codes		Images	Sounds	Notes
Wrong Way Driver	WRONG WAY	12310		R1-5a wrong way.png 	OBU_warning_01.wav	
		WRONG WAY				
Wrong Way Driver	DO NOT ENTER	12314		R1-5 do not enter.png 	OBU_warning_01.wav	
		DO NOT ENTER				
Evacuation	HURRICANE EVACUATION ROUTE	5122	8468	EM-1 hurricane evacuation route.png 	OBU_tone.01.wav	
		HURRICANE	EVACUTION ROUTE			

Technology – Connected Vehicles

CV safety related TIM messages

Event Type	Message Template	ITIS Codes		Images	Sounds	Notes
Weather	CAUTION HIGH WINDS	6916	5123	caution high winds.png 	OBU_tone.01.wav	Note: Alert means an event has occurred and is near which would be the high wind event, . The second ITIS Code 5123, 5124, and 5127 would be used depending on wind type. All would use the same sign.
		ALERT	HURRICANE FORCE WINDS			
			5124			
			TROPICAL STORM			
			5127			
			STRONG WINDS			
Visibility	CAUTION REDUCED VISIBILITY	6916	5383	reduced visibility.png 	OBU_tone.01.wav	
		ALERT	VISIBILITY REDUCED			
			5377			
			DENSE FOG			
Scheduled or Emergency Road Work	ROAD CLOSED AHEAD	769		road closed.png 	OBU_tone.01.wav	
		CLOSED TO TRAFFIC				

Technology – Connected Vehicles

CV safety related TIM messages

Event Type	Message Template	ITIS Codes			Images	Sounds	Notes
Scheduled or Emergency Road Work	ROAD WORK AHEAD	1025	13569		W20-1 road work ahead.png 	OBU_tone.01.wav	
		ROAD WORK	AHEAD				
		[redacted]					
Congestion	WARNING QUEUE OR TRAFFIC	6915	257		W3-4 Be Prepared to Stop.png 	OBU_tone.01.wav	Alternate would be to use ITIS Code Phrase: 7201 "Be Prepared to Stop" for all heavy traffic or Queue Warning related TIMs in SunGuide
		WARNING	STOPPED TRAFFIC				
		[redacted]	258				
			STOP AND GO TRAFFIC				
			260				
			HEAVY TRAFFIC				
			262				
			LONG QUEUES				
			263				
			TRAFFIC CONGESTION				
Crash	ACCIDENT AHEAD	513	13569		OBU - Accident Ahead Signage_SLOW_Crash Ahead.png 	OBU_tone.01.wav	
		ACCIDENT	AHEAD				
		[redacted]					

metric

Technology – Connected Vehicles

CV safety related TIM messages

Event Type	Message Template	ITIS Codes	Images	Sounds	Notes
Debris on Roadway	DEBRIS ON ROADWAY	1284 DEBRIS ON ROADWAY	debris on roadway.png 	OBU_tone.01.wav	
Flooding	Road Flooded	6916 ALERT 1301 FLOODING	road closed.png 	OBU_tone.01.wav	
Lane Blockage	Right Lane Blocked Ahead	8196 RIGHT-LANE 775 BLOCKED 13569 AHEAD	merge right ahead.png 	OBU_tone.01.wav	
Lane Blockage	Left Lane Blocked Ahead	8195 LEFT-LANE 775 BLOCKED 13569 AHEAD	merge left ahead.png 	OBU_tone.01.wav	

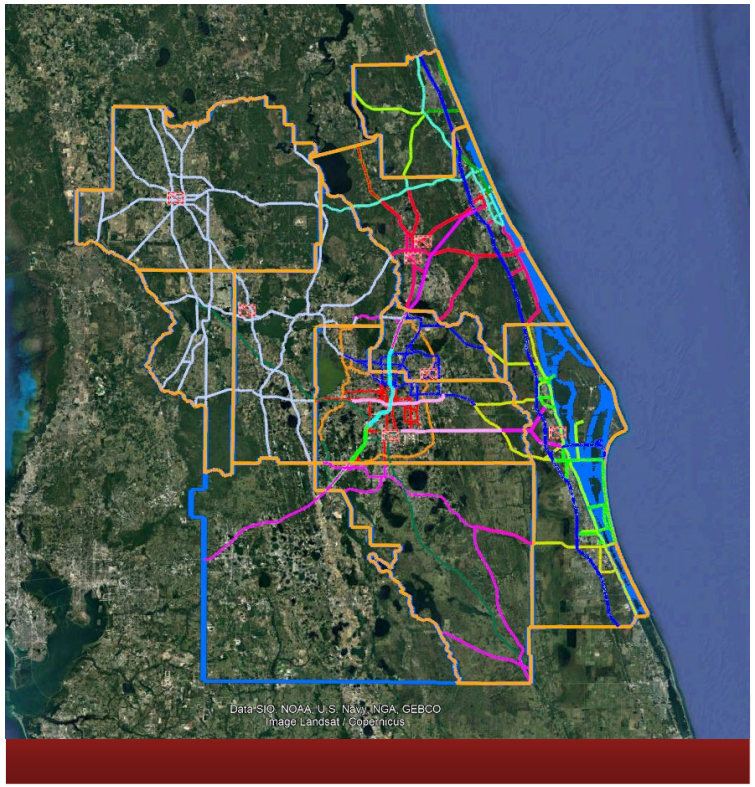
Smart Work Zone Barrels

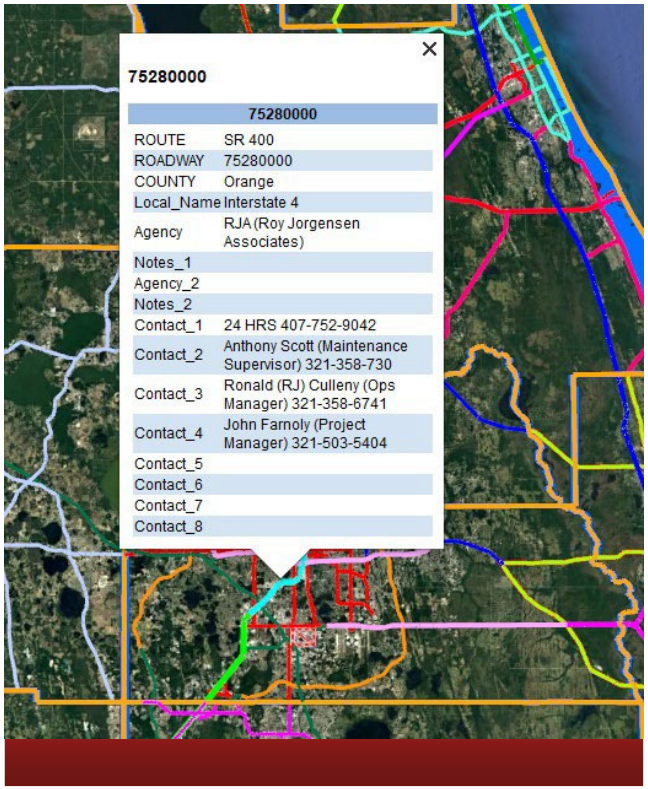
Ongoing Research

- Developing a system which can be placed on Work Zone barrels
- Localize Barrels to identify if they are in the roadway or on the shoulder
- Currently establishing power requirements and location precise requirements

Technology – Map of Asset Maintenance Zones

- Asset Management Contact information via Google Earth
  - Provides operations with a map of asset maintenance zones per county
  - Provides construction contacts for easy access
  - Provides operations with details of the roadway and limits





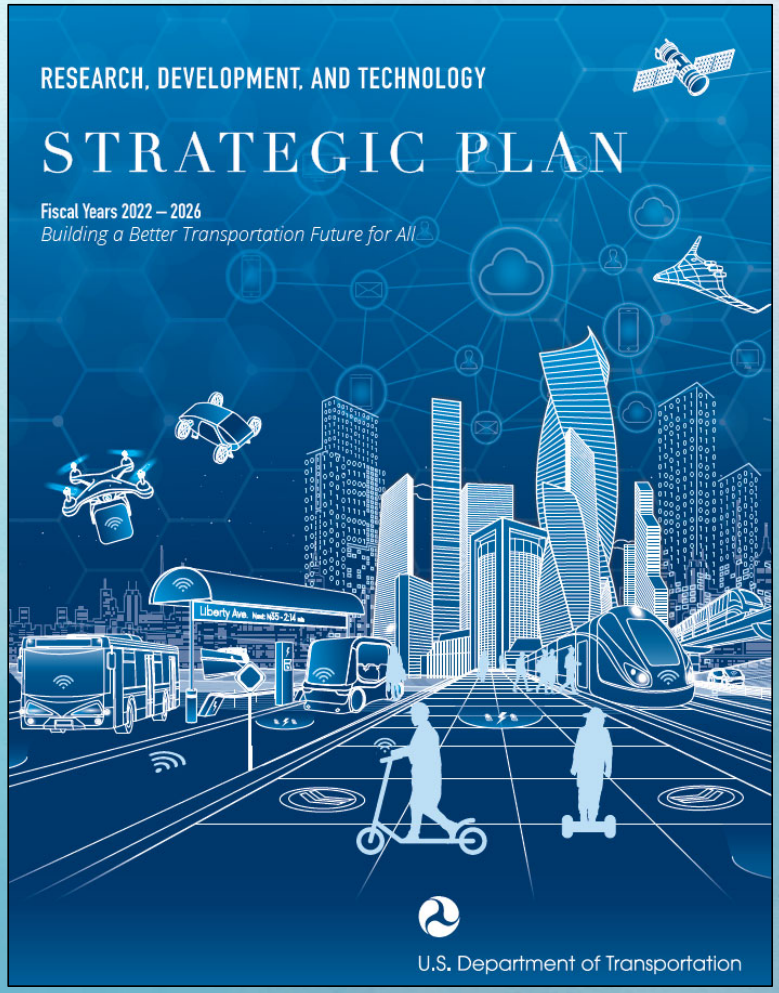
Thank you!

USDOT Research, Development, and Technology Strategic Plan (FY22-26)

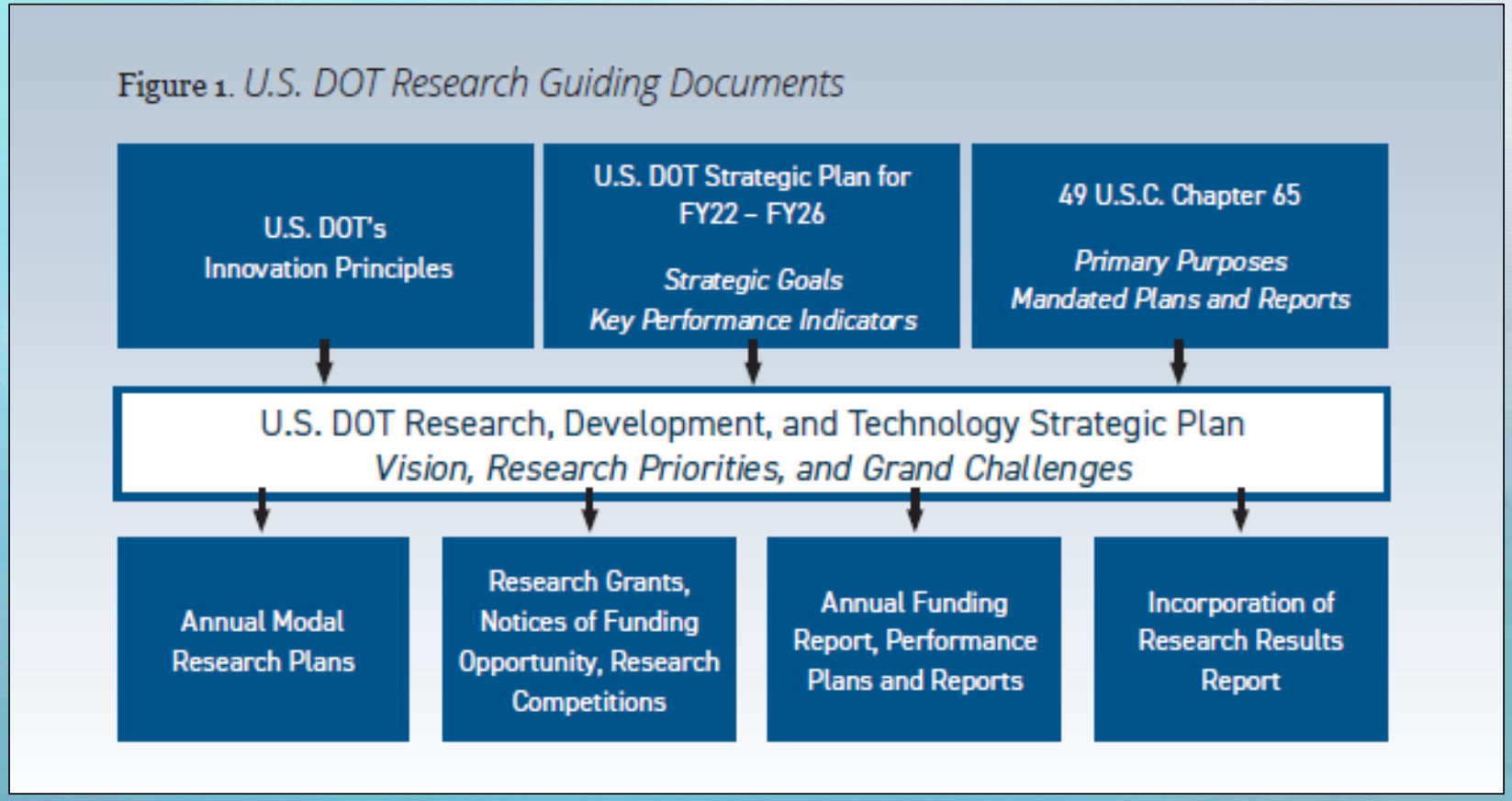
David Williams, VHB

USDOT Research, Development, and Technology Strategic Plan

- The RD&T Strategic Plan will guide Federal transportation research, development, and technology deployment activities.
  - More than $5 billion in research activities funded through the Bipartisan Infrastructure Bill (BIL)
- Addressing grand challenges to achieve:
  - Zero Fatalities
  - Resilient Supply Chains
  - Equitable Mobility for All
  - Net-Zero Emissions
  - Future Transportation System-of-Systems



USDOT Research, Development, and Technology Strategic Plan



USDOT Research, Development, and Technology Strategic Plan

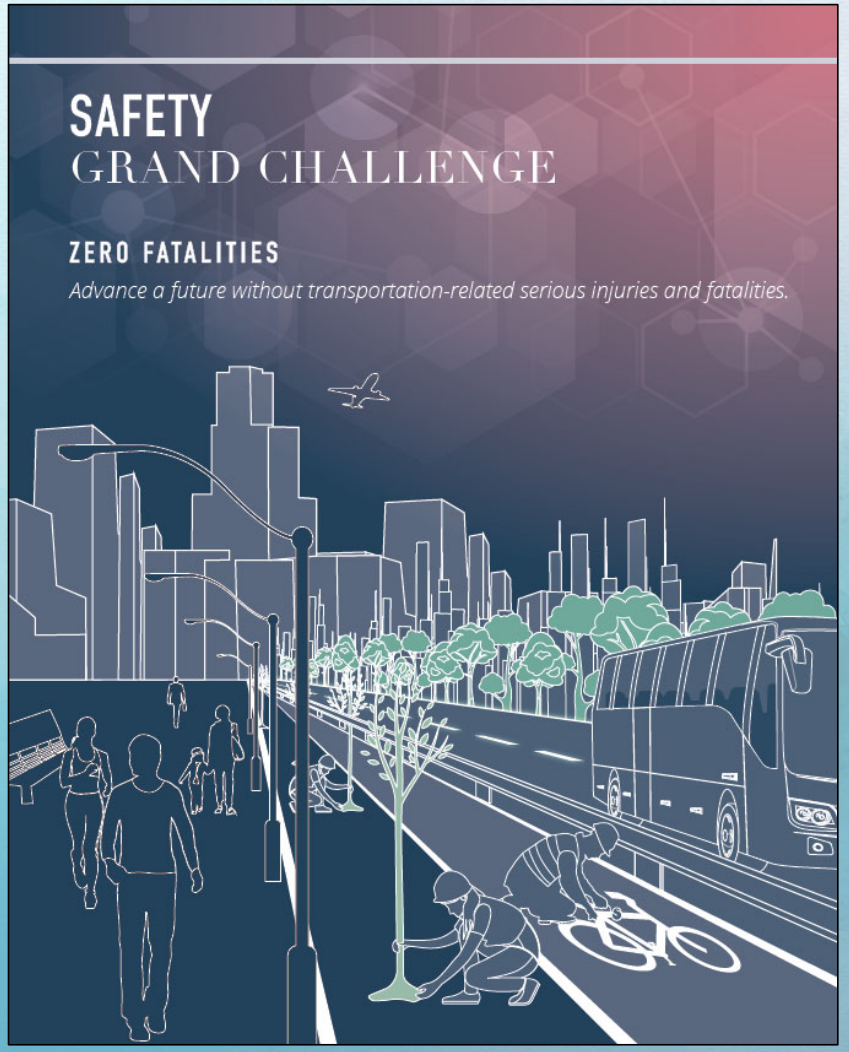
- Structure of the Strategic Plan
  - **Chapter 2** – Research Priorities, Objectives, Strategies
  - **Chapter 3** – Technology Transfer and Deployment
  - **Chapter 4** – Implementation

Table 1. *Strategic Goals, Research Priorities, and Grand Challenges*

STRATEGIC GOALS	RESEARCH PRIORITIES	GRAND CHALLENGES
Safety	• Human Factors • Data-Driven System Safety • Cybersecurity	**Zero Fatalities:** Advance a future without transportation-related serious injuries and fatalities.
Economic Strength and Global Competitiveness	• Resilient Supply Chains • Advanced Asset Management • System Performance • Create Pathways to Good Quality Jobs	**Resilient Supply Chains:** Create a multi-modal freight system that can withstand and rapidly recover from severe disruptions.
Equity	• Equity and Accessibility Assessment • Mobility Innovation	**Equitable Mobility for All:** Create an equitable transportation system that provides safe, affordable, accessible, and convenient mobility options for all users.
Climate and Sustainability	• Decarbonization • Sustainable and Resilient Infrastructure	**Net-Zero Emissions:** Create a transportation system that supports an economy with net-zero greenhouse gas emissions.
Transformation	• Integrated System-of-Systems • Data-Driven Insight • New and Novel Technologies	**The Future Transportation System-of-Systems:** Develop connected intelligent infrastructure that provides people-centered mobility.

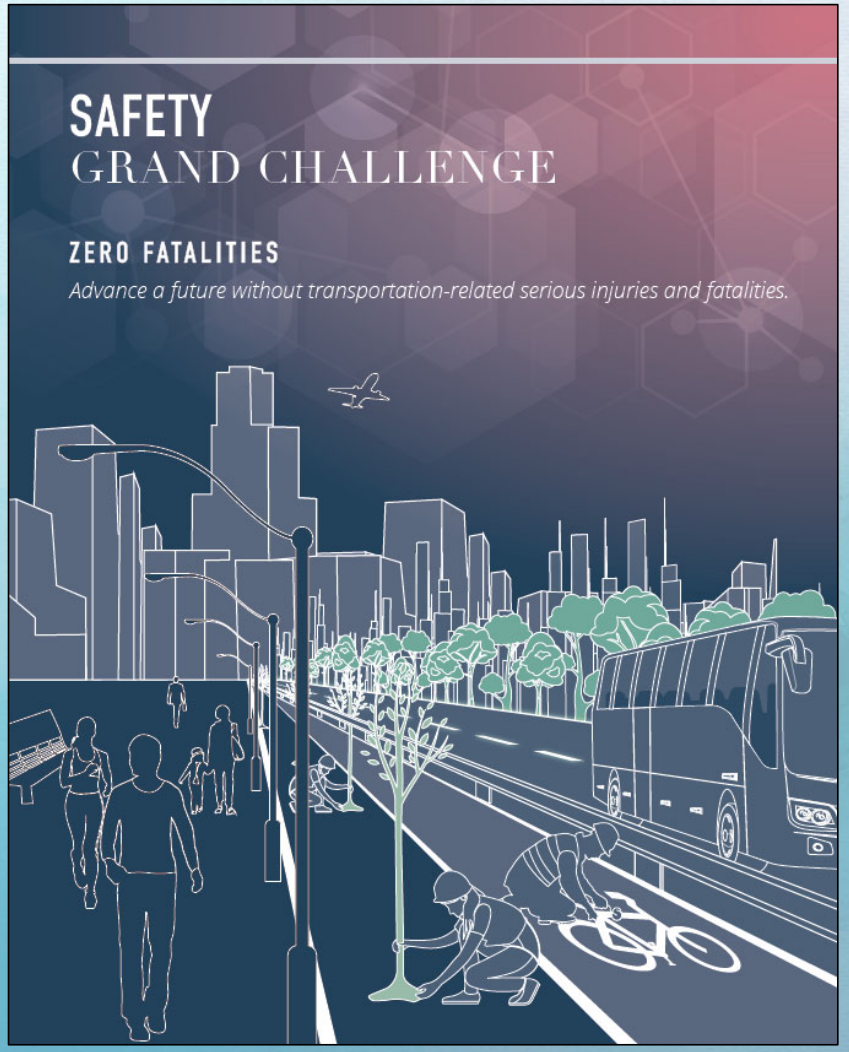
Chapter 2 – Research Priorities, Objectives, and Strategies

- In 2021, there were 42,915 fatalities related to motor vehicle crashes (~118 fatalities per day)
- **Safe System Approach**



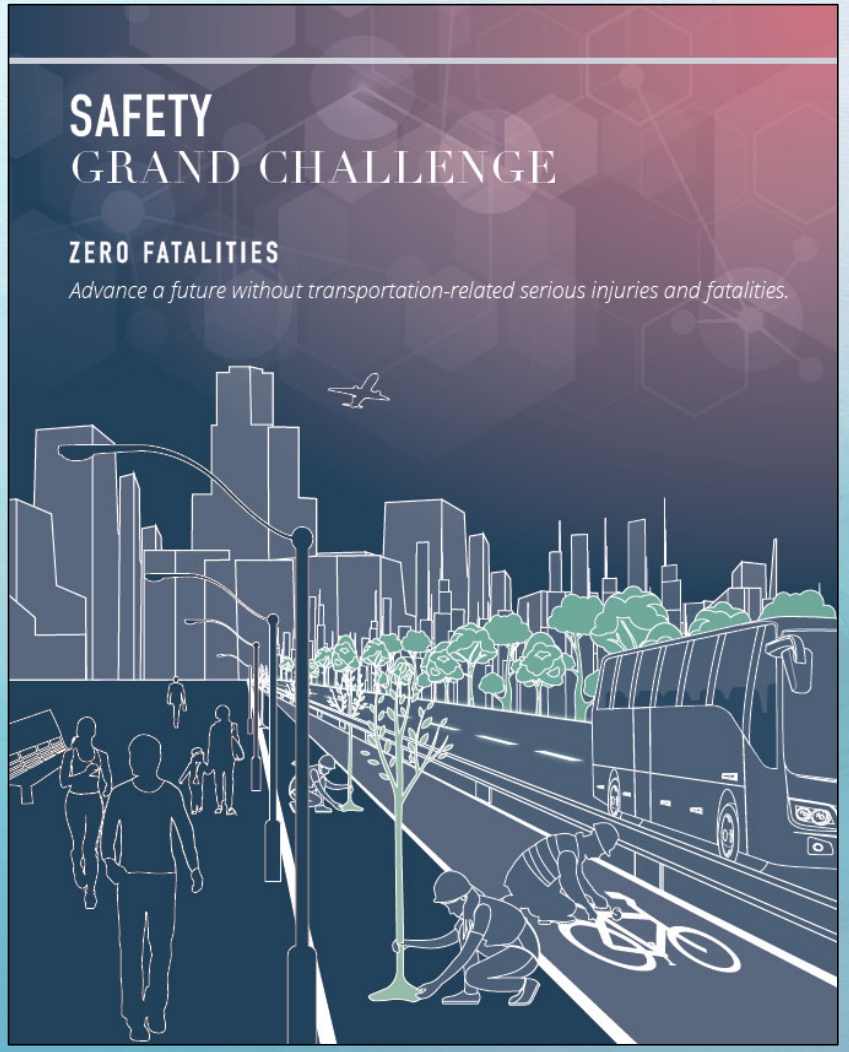
Chapter 2 – Research Priorities, Objectives, and Strategies

- Critical Research Topics
  - Operator fatigue, distraction, performance
  - Safety equity analysis
  - Safety infrastructure countermeasures
  - Safety risk analysis methods
  - Speed management
  - Vehicle and aircraft safety, automation, and connectivity
  - Vulnerable road user safety



Chapter 2 – Research Priorities, Objectives, and Strategies

RESEARCH PRIORITIES	RESEARCH OBJECTIVES
Human Factors	· **Safety Culture and Behavior:** Improve the understanding of attitudes and behaviors toward transportation system safety and support changes to reduce unsafe behaviors and promote safe travel. · **Human-Technology Interactions:** Improve the understanding of how human interactions with technology can affect transportation safety to support the development and use of safer technologies and designs.
Data-Driven System Safety	· **Safe Design:** Evaluate the safety performance of infrastructure design and develop and promote the use of effective safety countermeasures. · **Safety Data:** Develop new methods and tools for safety data collection, management, analysis, and evaluation. · **Safe Technology:** Advance transportation safety by evaluating the safety of existing transportation technologies and supporting the safe integration of emerging technologies. · **Hazardous Material Safety:** Conduct research to improve the safety of hazardous materials transportation.
Cybersecurity	· **Cybersecurity Risk Analysis:** Assess cybersecurity risks to connected digital systems. · **Cybersecurity Standards:** Support the development and use of cybersecurity standards and best practices.



Chapter 2 – Research Priorities, Objectives, and Strategies

- Research in this topic supports effective investments to
  - Improve durability, sustainability, and resilience of transportation assets, and
  - Provide workers and businesses with reliable access to jobs, resources, and markets

Chapter 2 – Research Priorities, Objectives, and Strategies

Table 3. *Economic Strength and Global Competitiveness Research Priorities and Objectives*

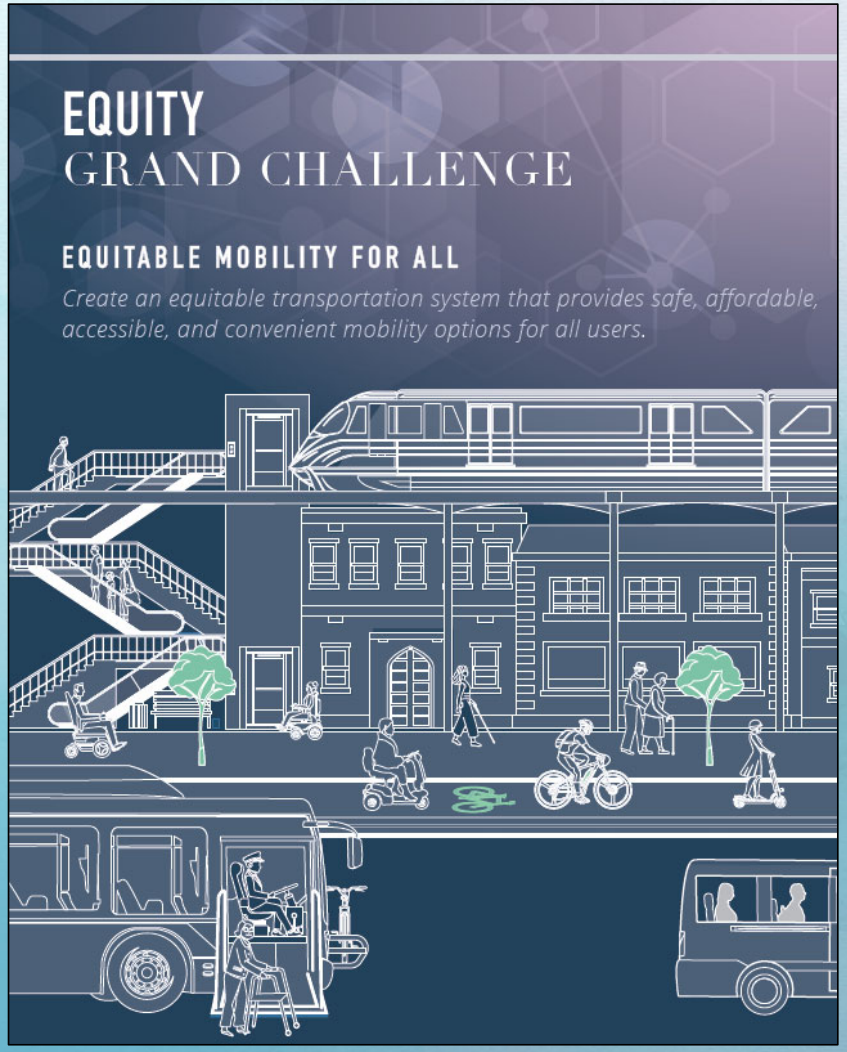
RESEARCH PRIORITIES	RESEARCH OBJECTIVES
Resilient Supply Chains	• **Freight Planning and Performance:** Develop data and tools to assess freight system performance and support performance-based freight planning and policies. • **Freight Safety and Operations:** Identify and promote tools and practices to improve freight system safety, reliability, and resilience.
Advanced Asset Management	• **Advanced Materials and Structures:** Develop tools, technologies, and guidance to improve infrastructure durability, longevity, and sustainability through innovative materials and structures. • **Asset Management and Inspection:** Advance methods and technologies to inspect, preserve, and maintain infrastructure conditions.
System Performance	• **Performance-Based Planning:** Advance the use of tools and best practices in performance-based transportation planning, policy, and programming. • **Accelerated Project Delivery:** Build the capacity of public agencies to use innovative construction and financing methods to accelerate the delivery and improve the quality of transportation infrastructure. • **Transportation System Management and Operations:** Identify and promote strategies to strengthen the management and operation of multimodal transportation systems.
Creating Pathways to Good Quality Jobs	• **Collect Data and Share Best Practices:** Evaluate and advance best practices concerning workplace equity, job quality, the impacts of new technology on workers, successful training programs, and the role of unions in creating high quality transportation jobs. • **Create High-Quality Jobs and Career Pathways:** Support the creation of good jobs with the choice to join a union through training, capacity building, and registered apprentice programs.

Chapter 2 – Research Priorities, Objectives, and Strategies

- Critical Research Topics
  - Freight environment and equity impacts
  - Freight infrastructure resilience
  - Freight planning
  - Freight and logistics workforce needs
  - Supply chain data and logistics
  - Truck Platooning
  - Urban freight delivery

Chapter 2 – Research Priorities, Objectives, and Strategies

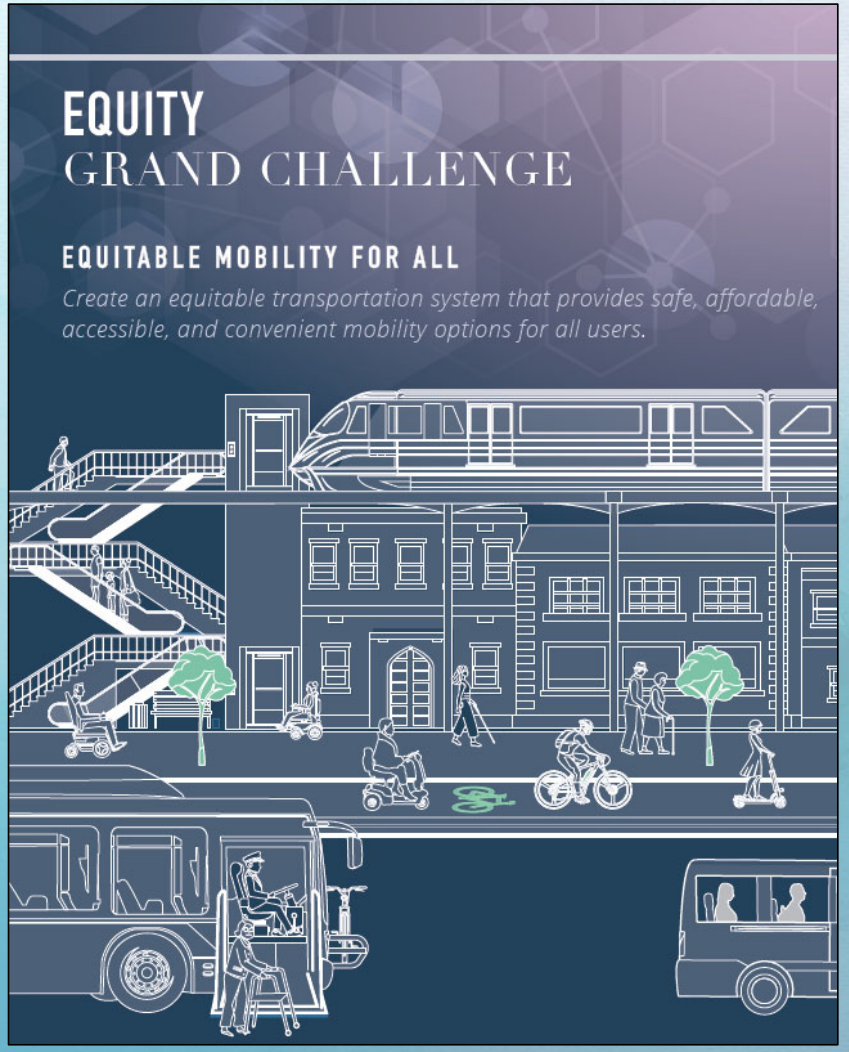
- USDOT goal to expand accessibility & mobility to underserved communities
  - People with Disabilities
  - Older Americans
  - Rural and Disadvantaged Communities
- Equity RD&T activities include assessing equity and accessibility, and developing and promoting innovative, equitable, accessible mobility services and technologies



Chapter 2 – Research Priorities, Objectives, and Strategies

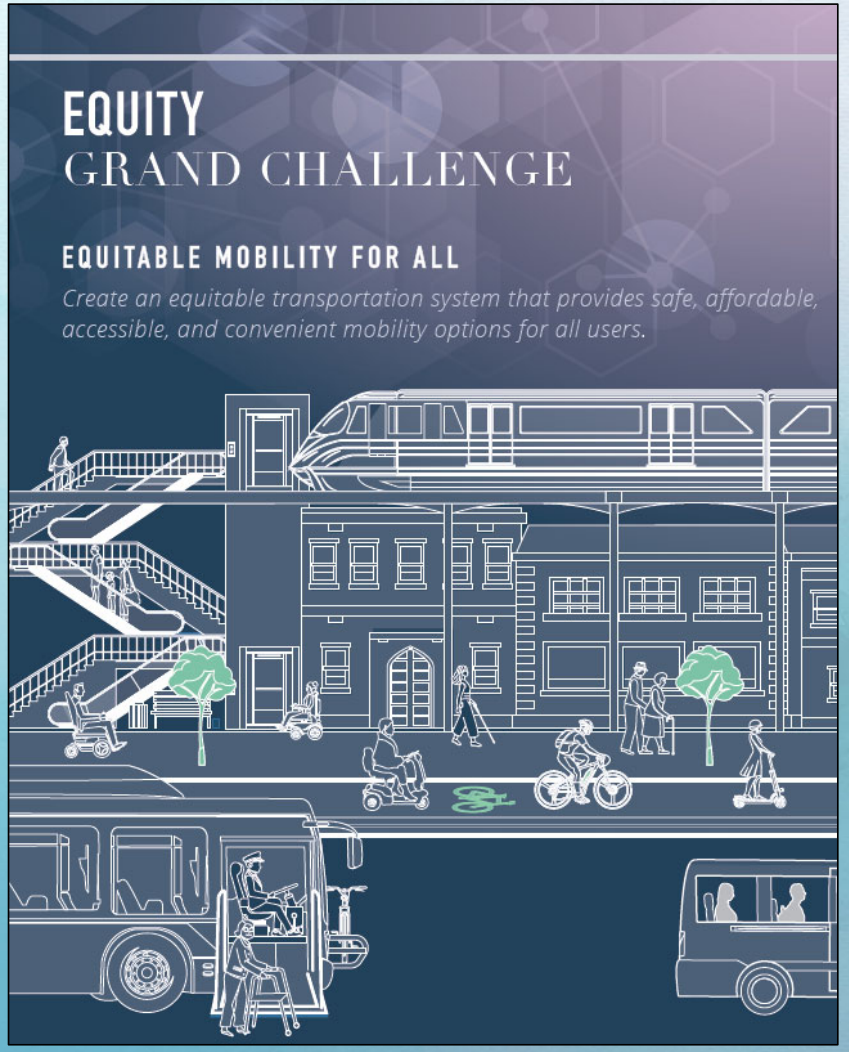
Table 4. *Equity Research Priorities and Objectives*

RESEARCH PRIORITIES	RESEARCH OBJECTIVES
Equity and Accessibility Assessment	· **Equity and Accessibility Assessment:** Develop data, tools, and research to evaluate and advance the equity and accessibility of transportation systems, projects, jobs, and policies.
Mobility Innovation	· **Mobility Innovation:** Evaluate innovative mobility technologies and services to improve the accessibility, equity, and sustainability of transportation.
Wealth Creation	· **Wealth Creation:** Provide technical assistance to small, disadvantaged businesses, Historically Black Colleges and Universities, and Minority Serving Institutions to navigate U.S. DOT research opportunities and the contracting process, gain awareness of upcoming contract opportunities, and enhance their core competencies and skills.

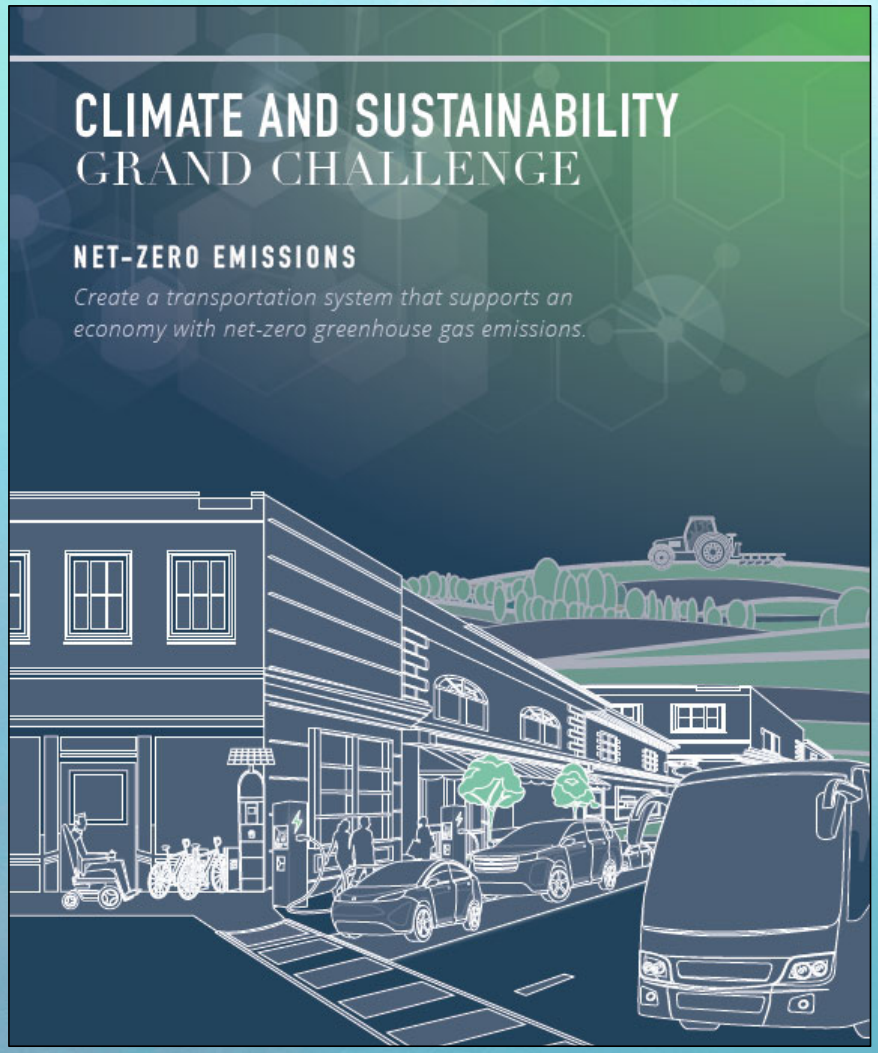


Chapter 2 – Research Priorities, Objectives, and Strategies

- Critical Research Topics
  - Assistive and accessible mobility innovations
  - Equity, affordability, and accessibility analysis
  - Environmental justice
  - Mobility justice and resilience
  - Transportation planning and land use
  - Alternative traffic safety enforcement strategies



Chapter 2 – Research Priorities, Objectives, and Strategies



- Transportation accounts for the largest portion (27%) of total U.S. GHG emissions
- USDOT Aim
  - Substantially reduce transportation-related GHG
  - Build more resilient and sustainable transportation systems

Chapter 2 – Research Priorities, Objectives, and Strategies

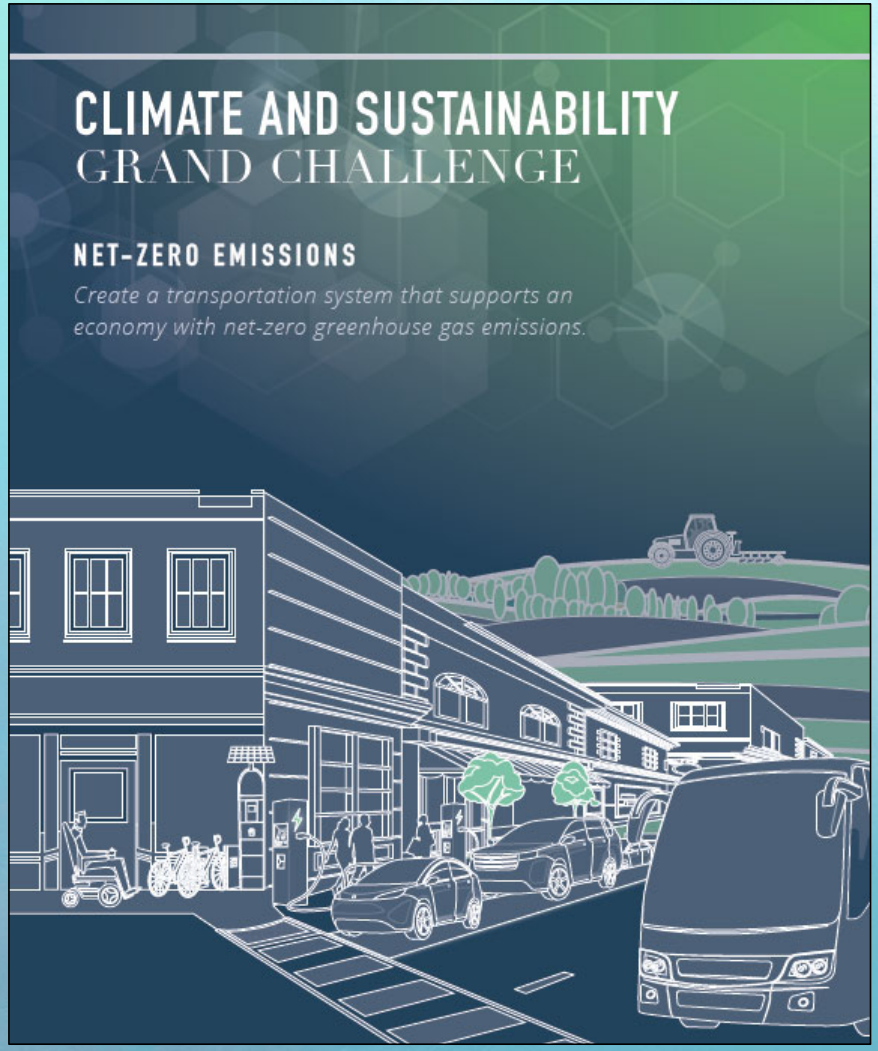
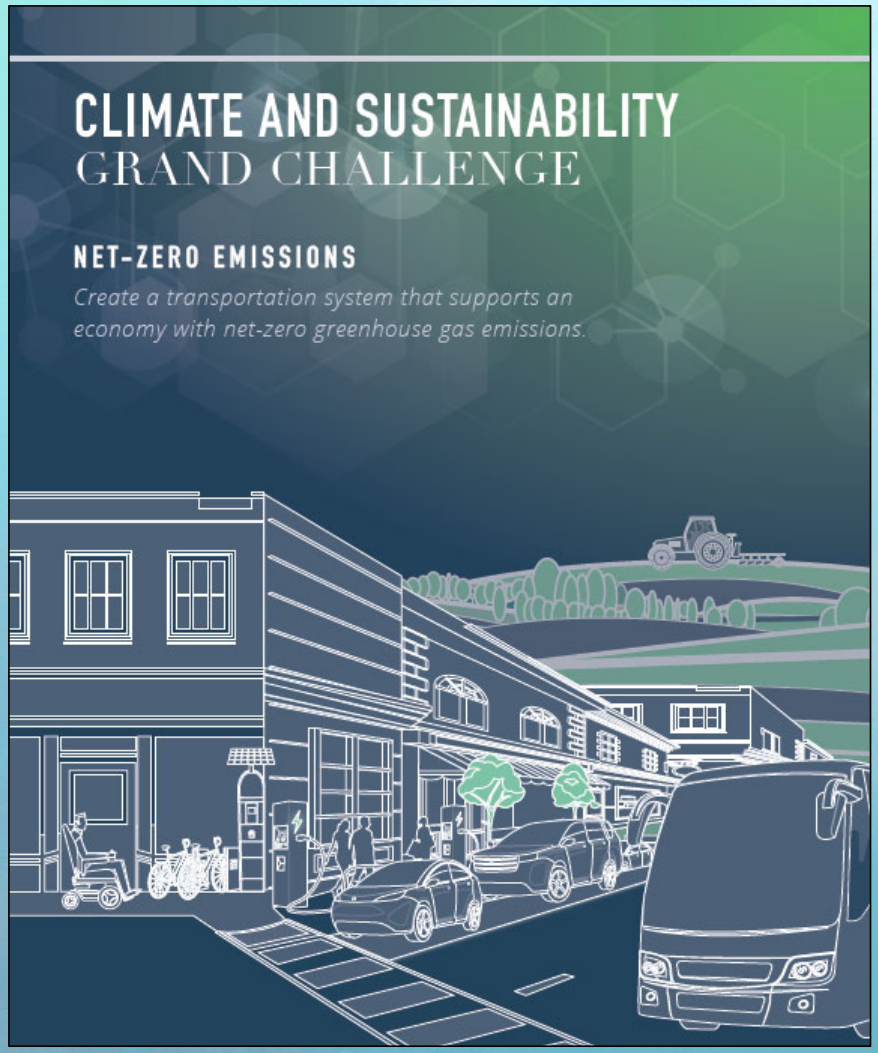


Table 5. *Climate and Sustainability Research Priorities and Objectives*

RESEARCH PRIORITIES	RESEARCH OBJECTIVES
Decarbonization	· **Electrification:** Conduct research to support expanded access and use of electric-powered transportation and supporting infrastructure to reduce emissions. · **Alternative Fuels:** Advance the development and deployment of alternative fuel technologies. · **Embodied Carbon:** Reduce carbon emissions associated with the extraction and manufacture of construction materials and the construction and maintenance of infrastructure.
Sustainable and Resilient Infrastructure	· **Environmental Analysis and Mitigation:** Develop and promote the use of tools and data to improve understanding of the environmental impacts of transportation projects and activities and to evaluate mitigation strategies. · **Climate Resilience:** Develop and deploy methods to assess and mitigate the risks to transportation system performance posed by climate change.

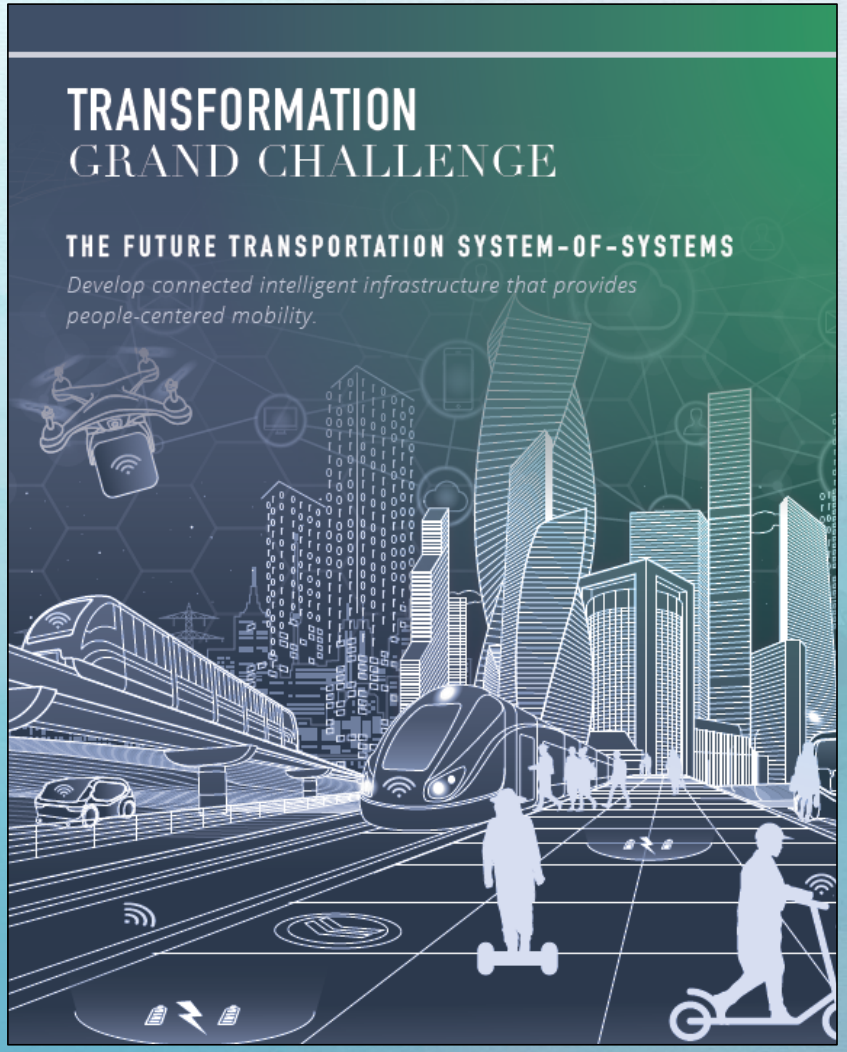
Chapter 2 – Research Priorities, Objectives, and Strategies



- Critical Research Topics
  - EV and Infrastructure Development
  - Electric Aircraft Design and Operation
  - Battery Safety, Performance, Production, Recycling, and Disposal
  - **Rapid Charging Infrastructure** and Electrification of Road Systems
  - Smart Power Grids
  - Sustainable & recyclable infrastructure
  - Alternative fuel production, storage, and transport

Chapter 2 – Research Priorities, Objectives, and Strategies

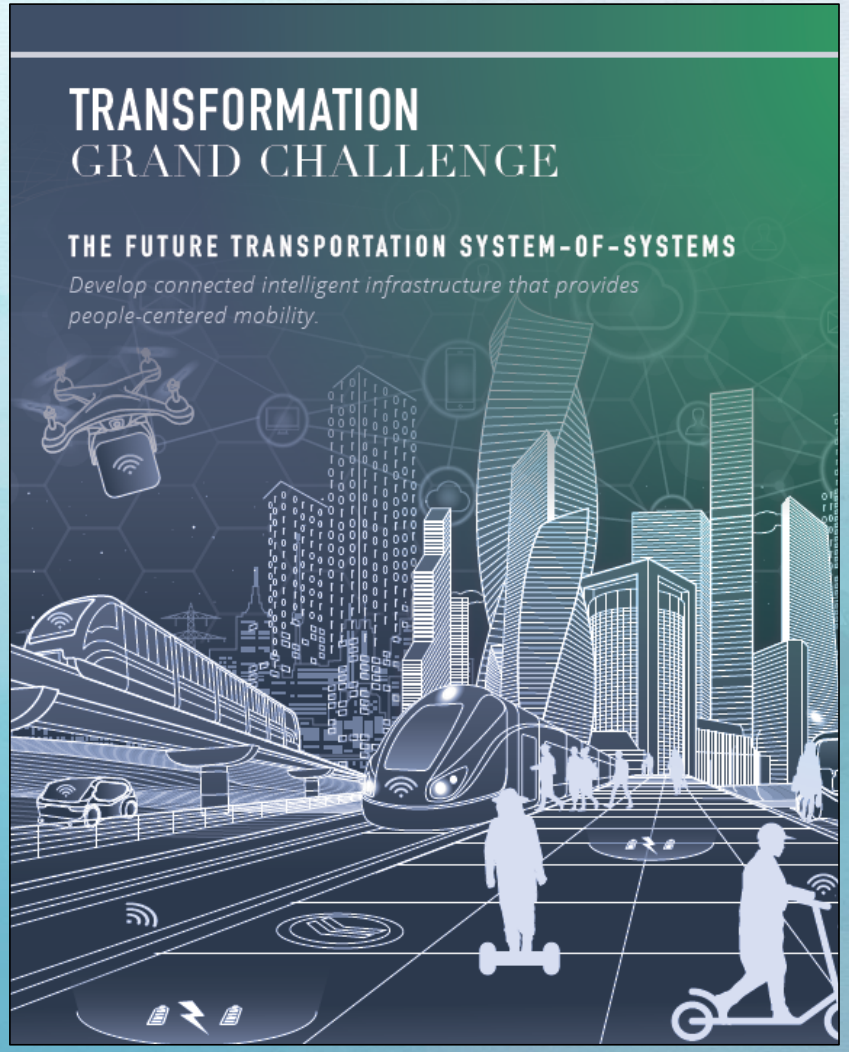
- System of Systems
  - People-centered
  - Safe
  - Data-driven
  - Intelligent
  - Integrated and interoperable
  - Sustainably powered
  - Secure and resilient
  - Adaptive and dynamic
  - Connected



Chapter 2 – Research Priorities, Objectives, and Strategies

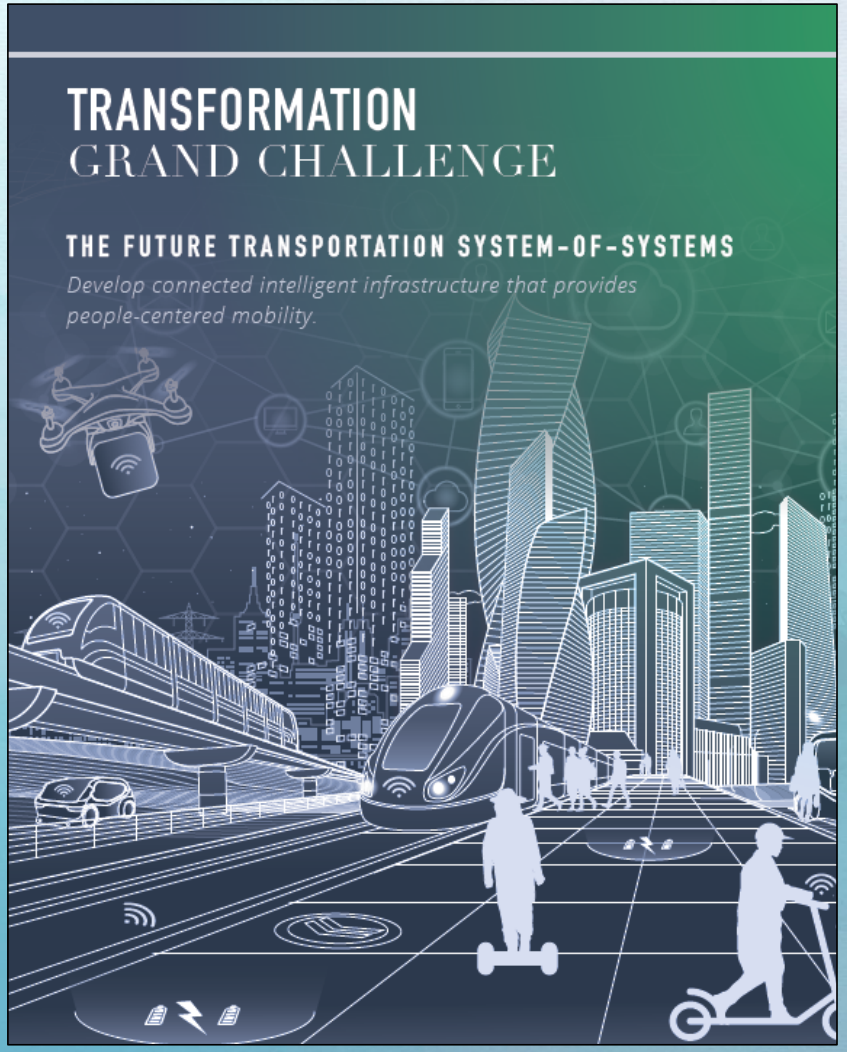
Table 6. *Transformation Research Priorities and Objectives*

RESEARCH PRIORITIES	RESEARCH OBJECTIVES
Integrated System-of-Systems	• **System Architecture:** Develop technologies and consensus standards to support interoperability, data-sharing, and security across the transportation system-of-systems to produce an integrated multimodal user experience. • **Digital Infrastructure:** Develop the technology, concept of operations, and standards to establish a fully functional, reliable, and secure foundation of transportation system digital infrastructure. • **Connectivity:** Leverage and advance network connectivity and services across transportation systems, infrastructure, cloud and data service providers, and information and communications technology to improve the safety and efficiency of the transportation system, while improving equity and environmental outcomes.
Data-Driven Insight	• **Data Science:** Harness advanced data collection and data processing capabilities to create timely, accurate, credible, and accessible information to support transportation operations and decision-making. • **Strategic Foresight:** Assess, anticipate, and plan for changes to the transportation system.
New and Novel Technologies	• **Automation:** Support the development and responsible deployment of automated technologies that improve the safety, efficiency, equity, and accessibility of transportation. • **Advanced Aviation Systems:** Support the safe integration of emerging aviation technologies and business models into the National Airspace System (NAS).



Chapter 2 – Research Priorities, Objectives, and Strategies

- Critical Research Topics
  - Advanced Materials
  - Automation
  - Cybersecurity
  - Digital System Architecture
  - Machine Learning
  - Open Data Platforms
  - Sensor Technology



Technology Transfer (T2) and Development

- Federal agencies should ensure that R&D results are made widely available to the public, scientists, and innovators
- The T2 Program seeks to
  - "advance the economic, transportation, and national security interests of the nation through partnerships with diverse innovators to **accelerate the commercialization and deployment** of beneficial transportation technologies"

Technology Transfer (T2) and Development

- T2 Program Priorities
  - Launch research programs targeting T2 from the outset of the project
  - Fully leverage research investments in demos/deployments
  - Accelerate commercialization and deployment of innovations
  - Identify leading-edge technologies/products that can be manufactured in USA
  - Advance interagency approaches to innovation and solicitations

Technology Transfer (T2) and Development

- T2 Program Priorities
  - Launch research programs targeting T2 from the outset of the project
  - Fully leverage research investments in demos/deployments
  - Accelerate commercialization and deployment of innovations
  - Identify leading-edge technologies/products that can be manufactured in USA
  - Advance interagency approaches to innovation and solicitations

EXAMPLE: Alameda County Transit's Hydrogen Fuel Cell Bus Longevity Study

Technology Transfer (T2) and Development

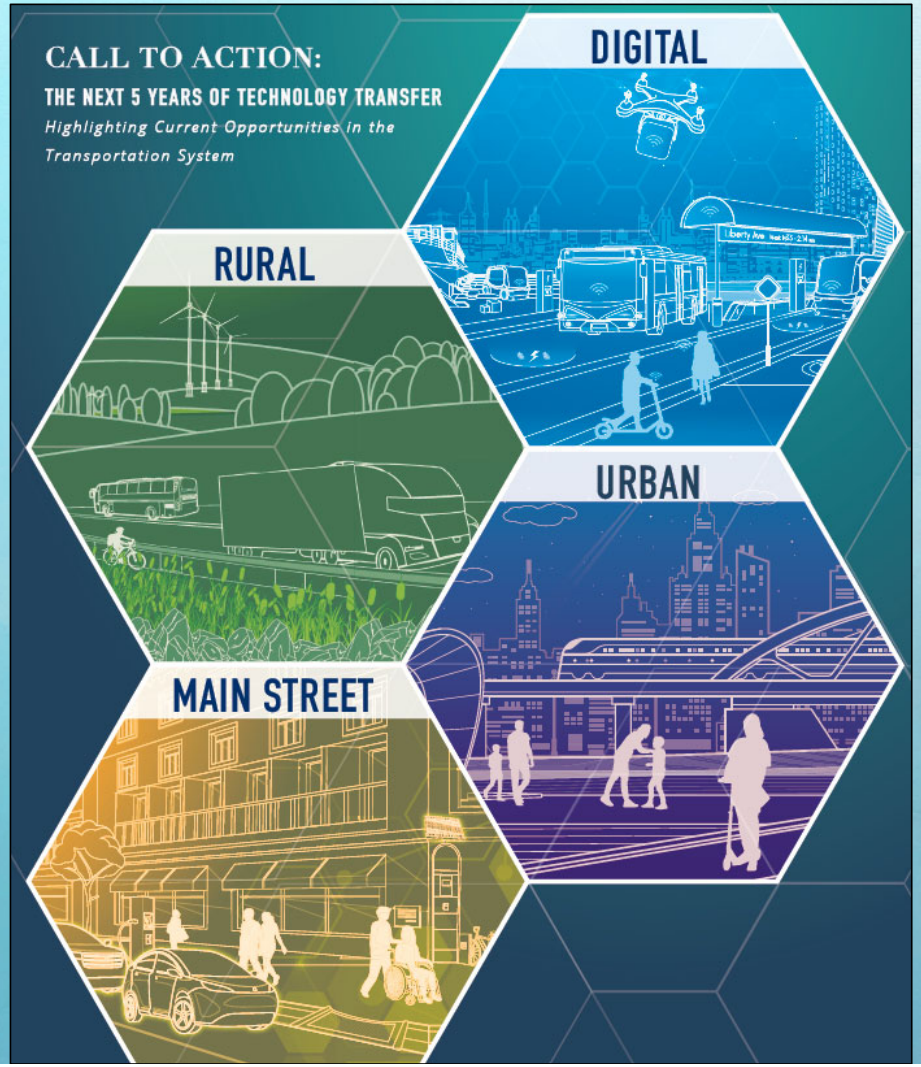
Table 7. *T2 Priorities and Objectives*

T2 PRIORITIES	2022-2026 OBJECTIVES
Ensure research investments are fully leveraged through the demonstration and deployment of the resulting products and technologies	• **Research Planning:** Require that T2 performance measures be incorporated into research project lifecycle planning at an early stage. • **Early-Stage Identification:** In partnership with the modes, identify potential research and lab efforts ripe for demonstration. • **AMRP Linkage:** Ensure that the deployment opportunities are connected with AMRPs.
Accelerate technology commercialization and deployment of transportation innovations	• **Technology Coordination:** Develop a centralized function to institute structured channels to commercialize transportation innovations. • **Communicate Successes:** Continually improve mechanisms to share promising research, outcomes of demonstration projects, and available patents and licenses for scalability. • **Investor Outreach:** Host investor/T2 events to raise awareness of viable technologies. • **Process Improvement:** Create processes that align statutory requirements with Federal public access and open science mandates to increase research uses.
Identify leading-edge transportation technologies or products that could be manufactured in the United States	• **Domestic technology scans:** Identify U.S. government-funded technologies and products that are market-ready for domestic commercialization and deployment. • **Encourage Domestic Production:** Work with stakeholders to initiate and expand U.S production pipelines for technology efforts.
Advance coordinated interagency approaches to innovation and research solicitations with the goal of reducing barriers to program participation and streamlining access to funding opportunities	• **Partnership Development:** Create novel, cross-agency approaches to solicitations that meet multi-agency goals and outcomes. • **Expanded Outreach:** Continue to engage communities, partners, and consort on upcoming opportunities.

Technology Transfer (T2) and Development

- Key Innovation Programs authorized under BIL
  - Strengthening Mobility and Revolutionizing Transportation (SMART) Grants
  - Advanced Transportation Technologies & Innovative Mobility Deployment (ATTIMD)
  - Advanced Research Projects Agency-Infrastructure (ARPA-I)
  - Open Research Initiative
  - Nontraditional and Emerging Transportation Technology (NETT) Council
  - Transportation Resilience & Adaptation Centers of Excellence (TRACE) Grant
  - Department-wide research funding

Technology Transfer (T2) and Development



Technology Transfer (T2) and Development

DIGITAL – ILLUSTRATIVE TECHNOLOGY TRANSFER APPLICATIONS

ADVANCING DATA TOOLS AND TECHNOLOGY TO IMPROVE OPERATIONAL EFFICIENCY, COLLABORATION AND PUBLIC ENGAGEMENT

Data Sharing systems and processes that collect, share, and integrate transportation, housing, and health data across agencies.

Digital Public Engagement tools that support equitable community engagement in infrastructure planning and delivery.

Simulation Tools to model the transportation system to optimize traffic flow and consider priorities like pedestrian movement, accessibility, and school routes.

Modeling tools for planning and infrastructure decisions like housing, transit-oriented development, and economic development.

Open Data protocols and systems that enable data-driven integration by asset owners, transportation operators, and community organizations.

Resilient Connectivity to support current and future transportation needs.

RURAL – ILLUSTRATIVE TECHNOLOGY TRANSFER APPLICATIONS

INNOVATIVE APPROACHES TO MAKE RURAL TRANSPORTATION SAFER AND MORE SUSTAINABLE

Uncrewed Aircraft Systems for delivery of medical supplies or emergency medical equipment to improve emergency response and post-crash care in remote areas.

Automated Crash Attenuators to improve the safety and efficiency of highway maintenance activities.

Trucking Parking Information Systems to enable on-demand reservation services to improve truck driver safety, security, and quality-of-life.

Roadway Friction Data Collection to systemically identify potential high friction surface treatment installations to reduce roadway departure crashes.

Carbon Sinks in highway right-of-way for carbon mitigation and preservation of natural habitat can help to remove carbon, improve noise pollution and air quality, and reduce risk of flooding and erosion.

Renewable Energy Generation on highway right-of-way to add generation capacity and support transportation-oriented microgrids.

Technology Transfer (T2) and Development

MAIN STREET – ILLUSTRATIVE TECHNOLOGY TRANSFER APPLICATIONS

MULTIMODAL TECHNOLOGY SOLUTIONS TO IMPROVE SAFETY, EQUITY, AND SUSTAINABILITY

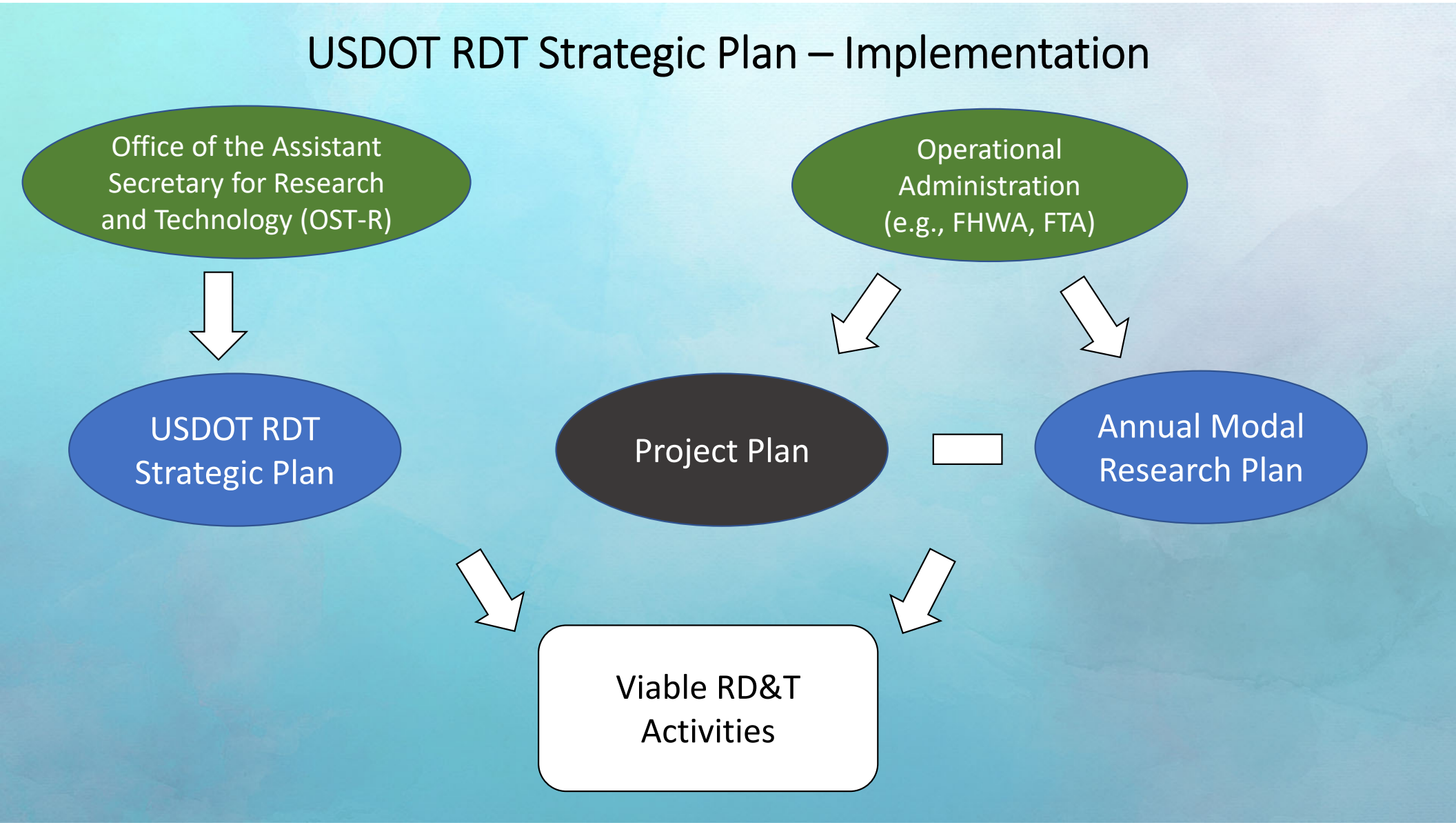
- **E-cargo Bike Delivery** to reduce emissions and curbside congestion associated with last-mile delivery.
- **Mode-Agnostic Mobility Accounts** to get people where they need to go without the need to own or operate a car.
- **Dynamic Use of Curb Space** enabled by open data standards for freight deliveries, passenger pick-up and drop-off, transit, and parking.
- **Sensor Technologies** mounted on multipurpose datahub pole attachments, including environmental sensors for air quality and lidar to support safe travel by non-motorized users.
- **Micro-Charging Stations** for e-bikes and e-scooters to improve usability, reduce operational costs, and spur economic development.
- **Automated Enforcement** deployed equitably and applied appropriately to roads with the greatest risk of harm due to speeding, can provide significant safety benefits and save lives.
- **Adaptable Smart Infrastructure** to facilitate on-demand conversion of right-of-way for pedestrians and cyclists and after-school play zones.

URBAN – ILLUSTRATIVE TECHNOLOGY TRANSFER APPLICATIONS

SMART SOLUTIONS TO MAKE CITIES CLEANER, SAFER, AND MORE EFFICIENT

- **Demand-Responsive Transit Routing** that aligns service provision with real-time system demand, commute patterns, events, and traffic patterns.
- **Off-Peak Electric Charging** using parking facilities and public space to charge transit, e-mobility, and freight fleets.
- **Chemical Sensors** to detect hazardous materials, gas leaks, or other unsafe conditions, along with integrated response systems.
- **Accessibility Data Collection** using standardized metrics that allow for integration with mapping and routing services and help prioritize infrastructure redesign and repair.
- **Environmental and Infrastructure Condition Mapping** to facilitate non-car commute patterns prioritized for safety, air quality, temperature, and light.
- **Dynamic Traffic Management Systems** that respond to non-recurring congestion related to crashes, events, street closures, and weather.
- **Traffic Signalization Systems** that integrate with transit and emergency vehicle routing to improve service and decrease response times, reduce conflicts, and alleviate congestion.

USDOT RDT Strategic Plan – Implementation



USDOT RDT Strategic Plan – Implementation

Table 9. *Transformation Key Performance Indicators*

STRATEGIC OBJECTIVE	KEY PERFORMANCE INDICATOR
Matching research and policy to advance breakthroughs: Foster breakthrough discoveries and new knowledge through high-risk, high-reward research driven by policy objectives.	Double the number of research and deployment projects centered on breakthrough discoveries that introduce new technologies or approaches not currently deployed in the transportation system.
Experimentation: Identify new ideas, new innovations, and new possibilities. Evaluate the opportunities and risks so the Department can support public benefits.	By 2026, support 25 novel data and technology approaches related to artificial intelligence, cybersecurity, and infrastructure resilience in communities across the U.S.
Collaboration and Competitiveness: Work with diverse stakeholders to share noteworthy practices and accelerate the adoption of worthwhile technologies.	By 2026, create a digital forum to engage 10,000 transportation professionals to share best practices and use cases on smart cities and communities, technology, and data in transportation.
Flexibility and Adaptability: Design flexibility into transportation system investments to accommodate and respond to changing needs and capabilities to provide long-term benefits.	By 2026, support 25 projects that build data and technology systems for transportation planning and infrastructure operation that serve as interoperable platforms that can engage with various tools, technologies, and approaches.

FDOT TSM&O
Transportation Systems Management & Operations

CENTRAL FLORIDA TSM&O CONSORTIUM

USDOT RDT Strategic Plan – Implementation

Table 10. *Logic Model for Research Development and Deployment*

	INPUTS	ACTIVITIES	OUTPUTS	OUTCOMES
R&D Development	• Legislation • Funding • Technical expertise • Collaborative partnerships • Lab facilities • R&D baseline data • Stakeholder engagement	• Stakeholder analysis • Content development • Methods development • Experimentation • Data collection • Analysis • Technology testing • Development coordination • Evaluation coordination	• Inventions • Hardware • Software • Processes • Methods • Publications • Data, databases • Copyrights • Patent filings	• Improved knowledge • Improved processes • Invention value added • Project goals met, as measured by evaluation (e.g., improved safety)
T2 Deployment	• Review of relevant T2 cases • Plan for deployment funding • Gather T2 baseline data • Continuous stakeholder engagement	• T2 plan development, including user and champion identification • T2 outreach materials development • Securing deployment funds and support • Training • Deployment coordination • Evaluation coordination	• Publications • Newsletters • Briefs • Website downloads • Outreach events • Demonstrations • Licenses • Success stories • Voluntary consensus standards	• Increased user awareness and knowledge (measured by citations, downloads, licenses, success stories, etc.) • Increased usage (measured by interview, surveys, tracking systems, royalties, etc.) • Project goals met, as measured by evaluation (e.g., improved safety)

FDOT TSM&O
Transportation Systems Management & Operations

CENTRAL FLORIDA TSM&O CONSORTIUM

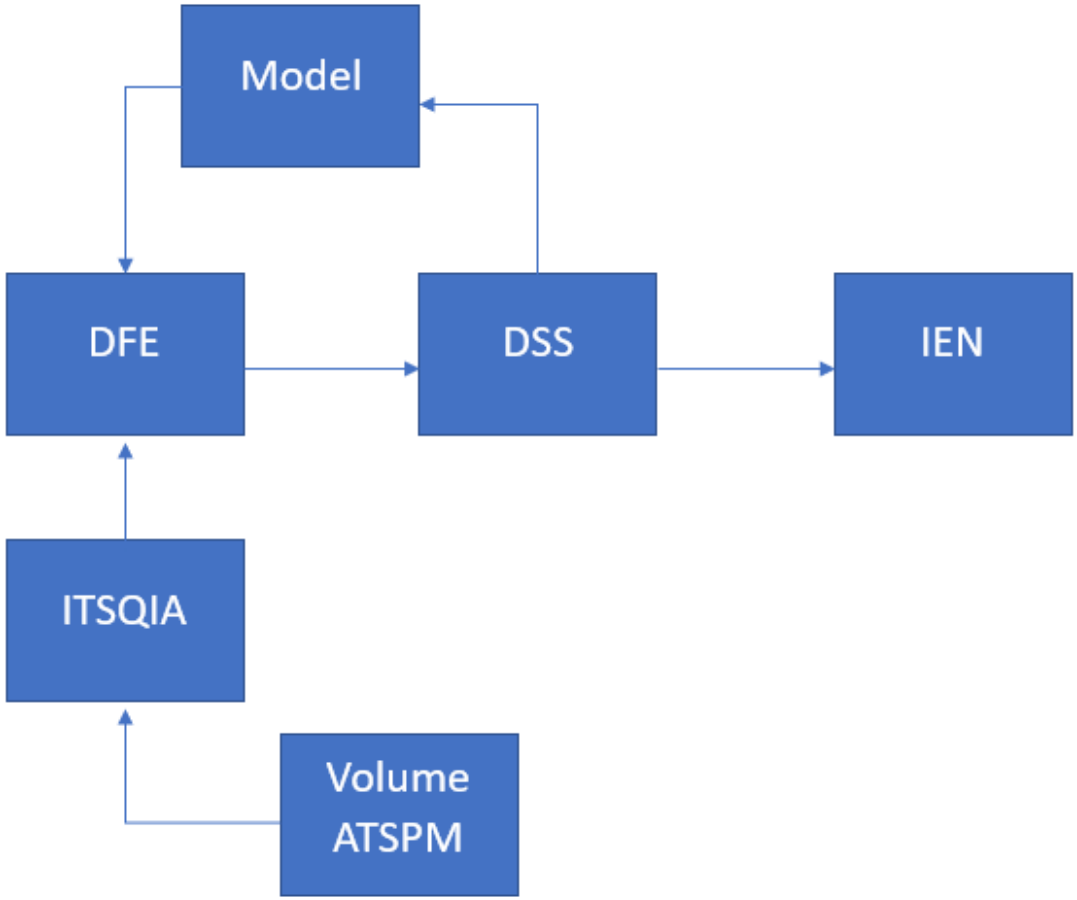
Questions?

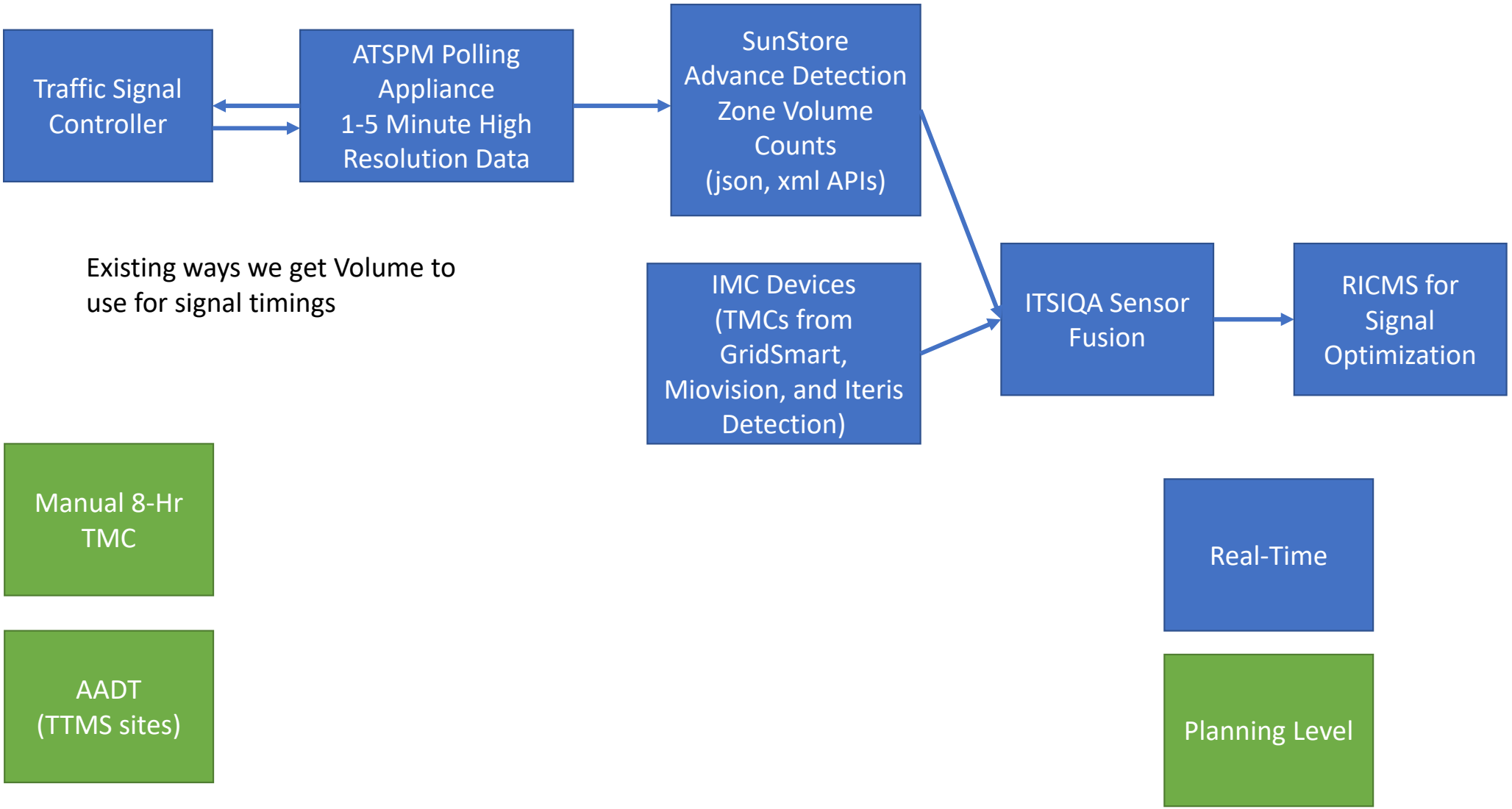
High-definition Engineering Intersection Data via Integrative modeling

HEIDI

Aka the D5 Digital Twin Procurement

Primary RICMS Components




Traffic Signal Controller
ATSPM Polling Appliance 1-5 Minute High Resolution Data
SunStore Advance Detection Zone Volume Counts (json, xml APIs)
IMC Devices (TMCs from GridSmart, Miovision, and Iteris Detection)
ITSIQA Sensor Fusion
RICMS for Signal Optimization
Existing ways we get Volume to use for signal timings
Manual 8-Hr TMC
AADT (TTMS sites)
Real-Time
Planning Level

What are our current issues?

- Detection has errors
  - These errors differ
    - Device level (for example accuracy of video versus loops)
    - Network
- Availability

What are our needs?

- Improved stability and accuracy
- Improved availability

3 Phase Procurement:

1st Phase: Configuration and Demo

- Sub-area analysis
  - Level of accuracy
  - Measurement parameters'
  - Specify test plan
- Demo to be deployed on 2 corridors:
  - Urban Corridor: Lake Mary Blvd
  - Rural Corridor: Sumter County
- Up to 12 months
- Update frequency requirement: anything more than 15min old we are not interested in. 3min-5min will be used for scoring criteria
- If vendor fails to meet Demo criteria, then the contract will be terminated

2nd Phase: Scalability - district wide

- What is defined as District-wide that will be made available in scale out

3rd Phase: Provide Service

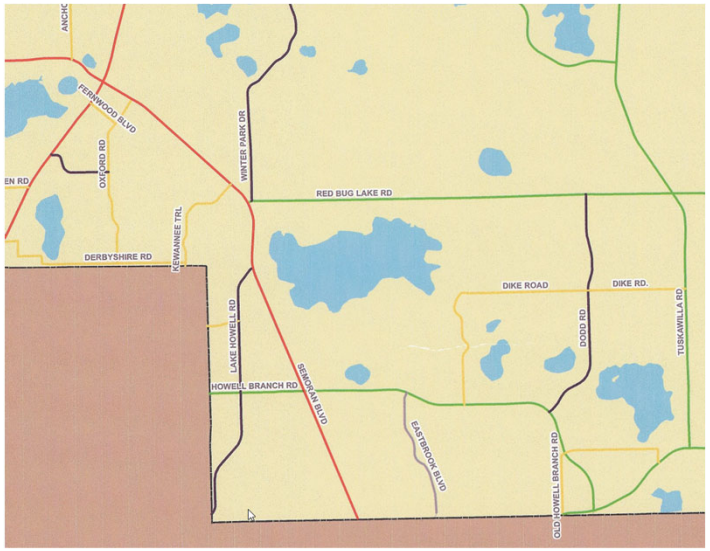
It will be advertised this fiscal year. Trying to finish RFP development end of this month.

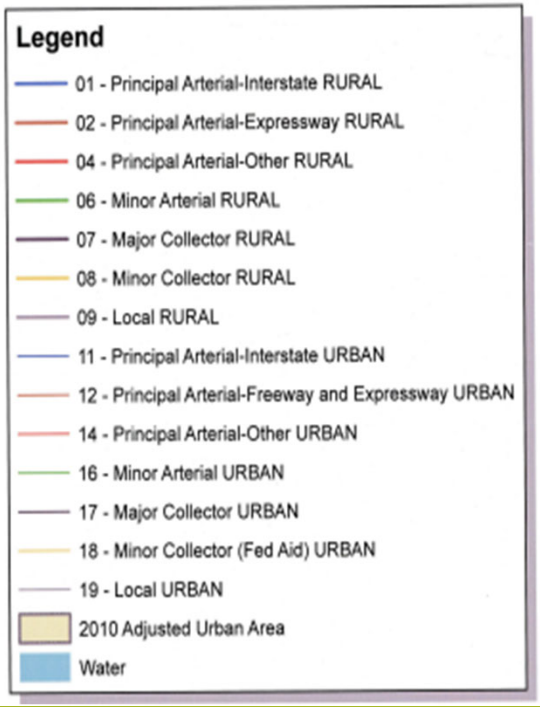
ROADWAY FUNCTIONAL CLASSIFICATION

And how it affects GPS routing

Functional Classification

- GPS Applications update roadway classifications based on the Functional Classification a roadway provided.
- This affects roadway prioritization
- Plays into GPS algorithm





Requirements for Changes

- MUTCD Approved Signs
- Functional Classification Roadway Change

Training at District Five

David Williams, VHB

Training Efforts at District Five

- Recently held Synchro/Tru-Traffic training in person and online
  - 20 people attended in person; 10 attended via TEAMS
  - Typically held once a year, but can potentially have more frequent TEAMS calls to offer up additional training, as needed
  - Certificates are available on the SharePoint now
  - Training was recorded so it should be uploaded to FLEX shortly

Training Efforts at District Five

- The **STROZ training platform** is available for use
  - Fully operational traffic signal for technician training
  - Please reach out to Tricia, Lauren, or David to schedule time

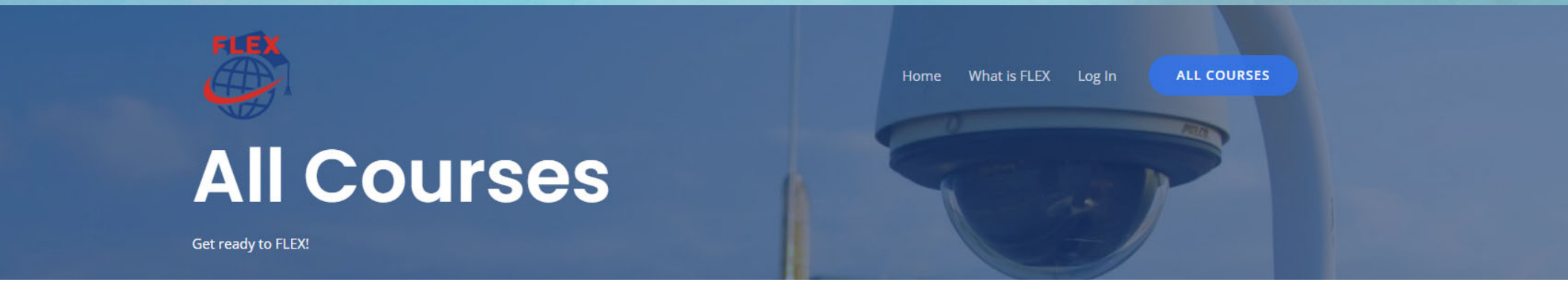
- District Five hosted **Workforce Development Training** sessions over the past several months (lab and classroom), open to locals
  - Trainings included basic cabinet/field equipment, signal timing, ATMS monitoring, SIIA and NOEMI use, and video detection

Training Efforts at District Five

- Orange Technical College – *Traffic Signal Technician Program*
  - Held meeting in August with OTC regarding a signal tech program
  - Requested letters of support from agencies stating their need
  - Six respondent agencies
    - 29 signal technician hires were anticipated over the next two years

Training Efforts at District Five

- The FLEX Portal also has a variety of trainings, modules, and how-to videos for entry-level and advanced personnel



Questions?

Taking Time to FLEX – What's new in Training

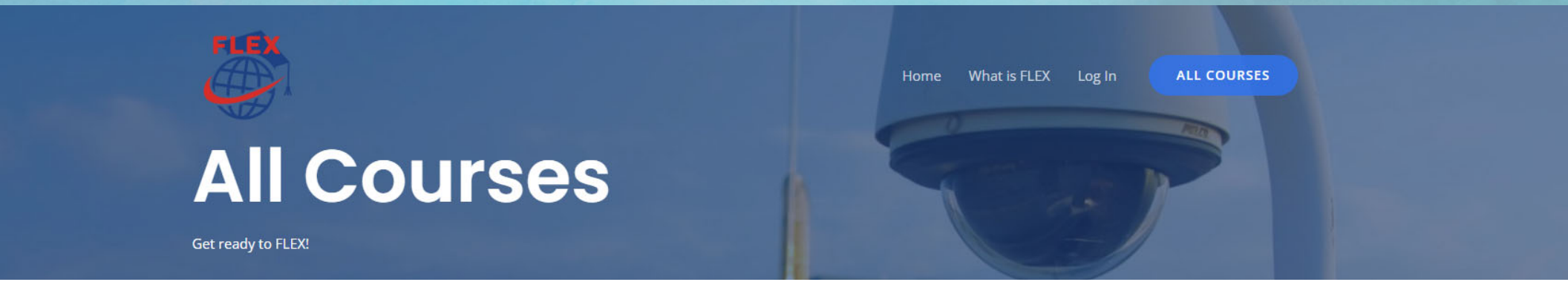
David Williams, VHB

TSM&O Focused Learning Education and Experiences (FLEX)

- Types of training in FLEX Portal
  - TSM&O concepts
  - TSM&O applications
  - Field equipment
  - How-to training videos
- FLEX Portal is available with a **free** account

What's New?

- New courses available
  - Computer Security Awareness
  - I-4 Express Gate
  - Drones and Traffic Management (workshop)



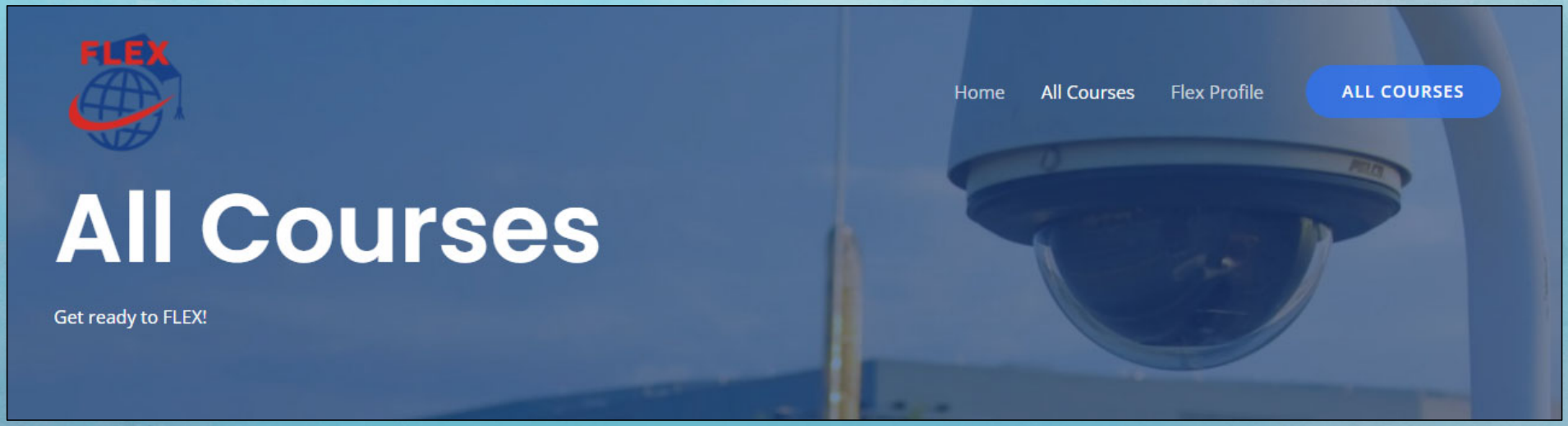
TSM&O Focused Learning Education and Experiences (FLEX)

- Active Users – 408
- Courses Completed – 325
- Most Popular Course – *Traffic Signal Training (A)*

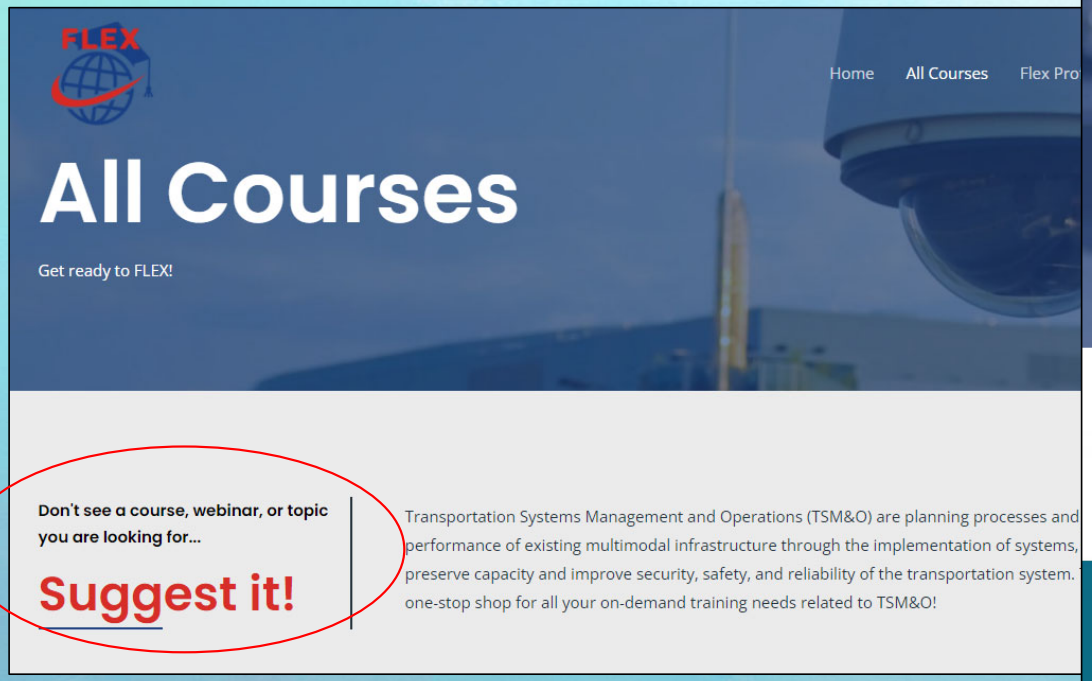
- Troubleshooting – *Request Support* button
- For more information, visit: https://elearning.cflsmartroads.com/
  - Google: "FDOT FLEX Portal"

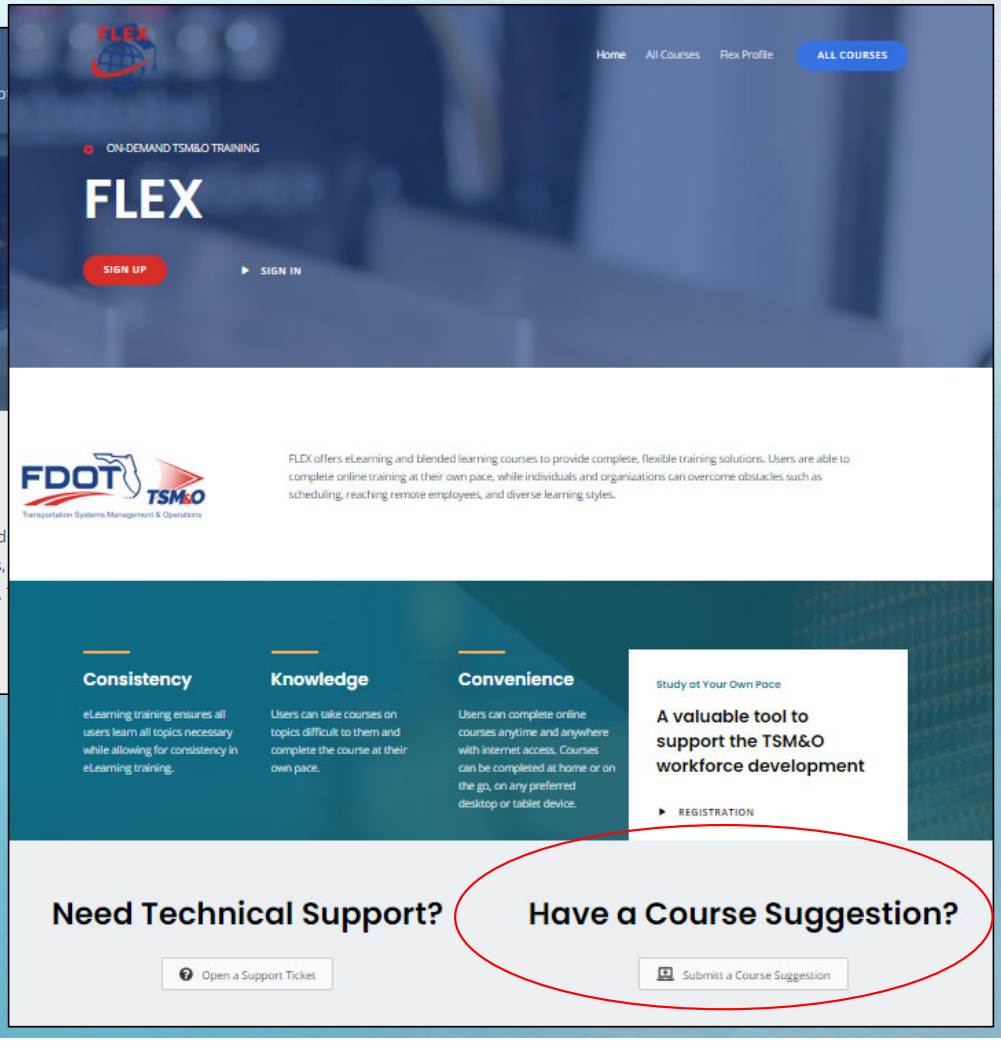
Courses Coming Soon to FLEX Portal

- SunGuide 101
- Active Alert

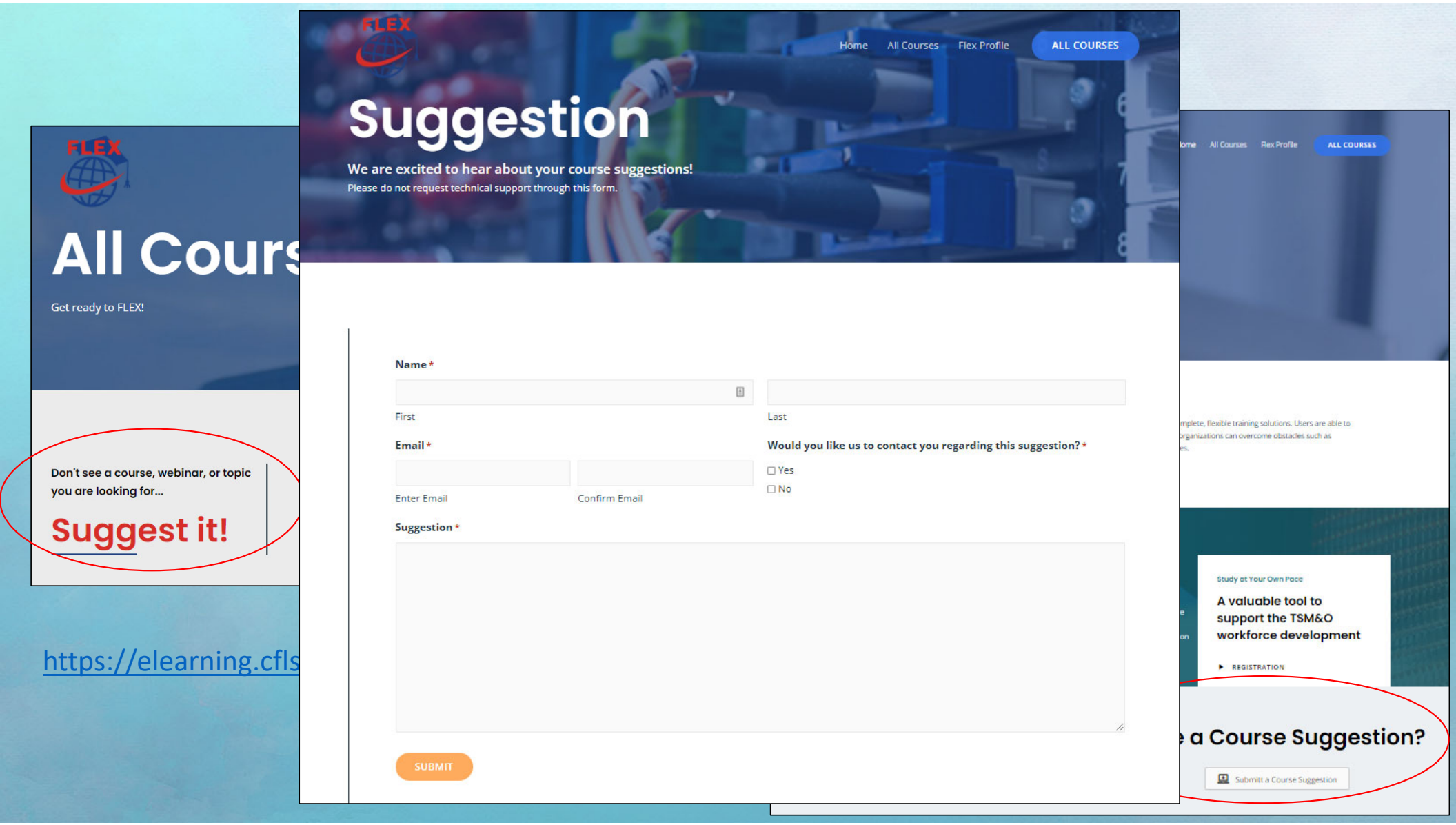


Have a Suggested Training?





https://elearning.cflsmartroads.com/flex-suggestions/


All Cours
Get ready to FLEX!
Don't see a course, webinar, or topic you are looking for...
Suggest it!
https://elearning.cfls
Suggestion
We are excited to hear about your course suggestions!
Please do not request technical support through this form.
Home
All Courses
Flex Profile
ALL COURSES
Name *
First
Last
Email *
Enter Email
Confirm Email
Would you like us to contact you regarding this suggestion? *
Yes
No
Suggestion *
SUBMIT
Study at Your Own Pace
A valuable tool to support the TSM&O workforce development
REGISTRATION
a Course Suggestion?
Submitt a Course Suggestion

Current Initiatives

Current Initiatives

- TSMCA Update
  - Ongoing coordination between FDOT Central Office, D5, and FACERS
  - Another round of comments were sent back to CO
  - Next FACERS meeting is February 17th

- CFLSmartRoads updates

Current Initiatives

- CV Update – EVP
  - Signal Request Message (SRM)
  - First Responders want to maintain their privacy
  - Proposed Solution: Use SRM to activate the EVP, then drop the data item
  - Adhering to national best practices while refining to our region

- OBU Testing
  - Final testing underway; moving through SRM issues/concerns
  - Hoping to deploy in vehicles within next few months

Current Initiatives

- Intelight – releasing new version of ATMS in March
- RICMS – next model update in progress
- Data Consortium

Current Initiatives

- Smart Signals
  - Internal guidance document created to train our signal staff on Smart Signal design
  - If you are seeing gaps with your technicians being able to maintain the signals, please let us know
- Signal Design
  - D5 established new internal process for Signal Operating Plans

Current Initiatives

- PedSafe II – design ongoing
- AV Shuttle
  - Electrical charging upgrades amendment fully executed
  - Working on permit process to start construction
- Kiosks at UCF
  - Held field visit to assess how to make kiosks more user-friendly
  - Prototype in development

Current Initiatives

- Smart Work Zone
  - Advanced Smart Work Zone Information (AWZI) trailers
  - Districtwide SWZ ConOps in development
- Event Management
  - Verification camera for Blankout sign installation ongoing
- I-75 CCTV Camera Improvements
- Districtwide MAP

THANK YOU!

Next Consortium – April 6, 2023

TSM&O Consortium Meeting

MEETING AGENDA

Teleconference or
FDOT District 5 RTMC (4975 Wilson Rd, Sanford, FL 32771)

February 9, 2023
10:00 AM-12:00 PM

1) WELCOME
2) ICM OPERATIONS
   - Dale Cody, Metric Engineering
3) USDOT RESEARCH, DEVELOPMENT, AND TECHNOLOGY STRATEGIC PLAN FY22-26
   - David Williams, VHB
4) TMC AND DSS USING THIRD-PARTY DATA
   - Katie King, Metric Engineering
5) ROADWAY FUNCTIONAL CLASSIFICATIONS AND GPS ROUTING
   - Garrett Popovich, AECOM
6) TRAINING – UPDATE
   - David Williams, VHB
7) CURRENT INITIATIVES
   - Tushar Patel, District Five TSM&O
   - David Williams, VHB