Florida's Connected and Automated Vehicles (CAV) Past, Present, and Future

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FDOT's Vital Few Elements

Safety

Mobility

Innovation

Workforce

Vision Zero

2019 Florida Fatalities

TRAFFIC FATALITIES
3,179

BIKE FATALITIES
155

PEDESTRIAN FATALITIES
732

MOTORCYCLE FATALITIES
548

Florida Department of Highway Safety and Motor Vehicles 11/9/2020

Improving Safety

Reducing Congestion

Using Technology

FDOT's CAV Business Plan Focus Areas

1| Policies and Governance

2| Program Funding

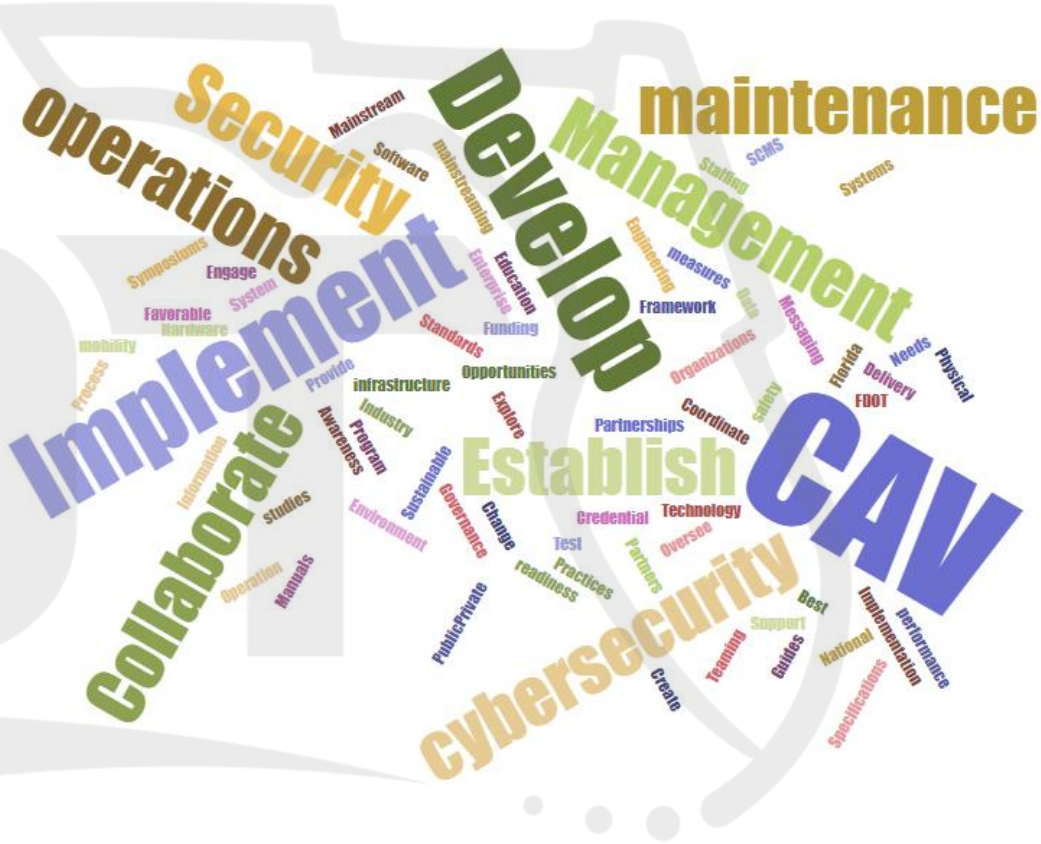
3| Education and Outreach

4| Industry Outreach and Partnerships

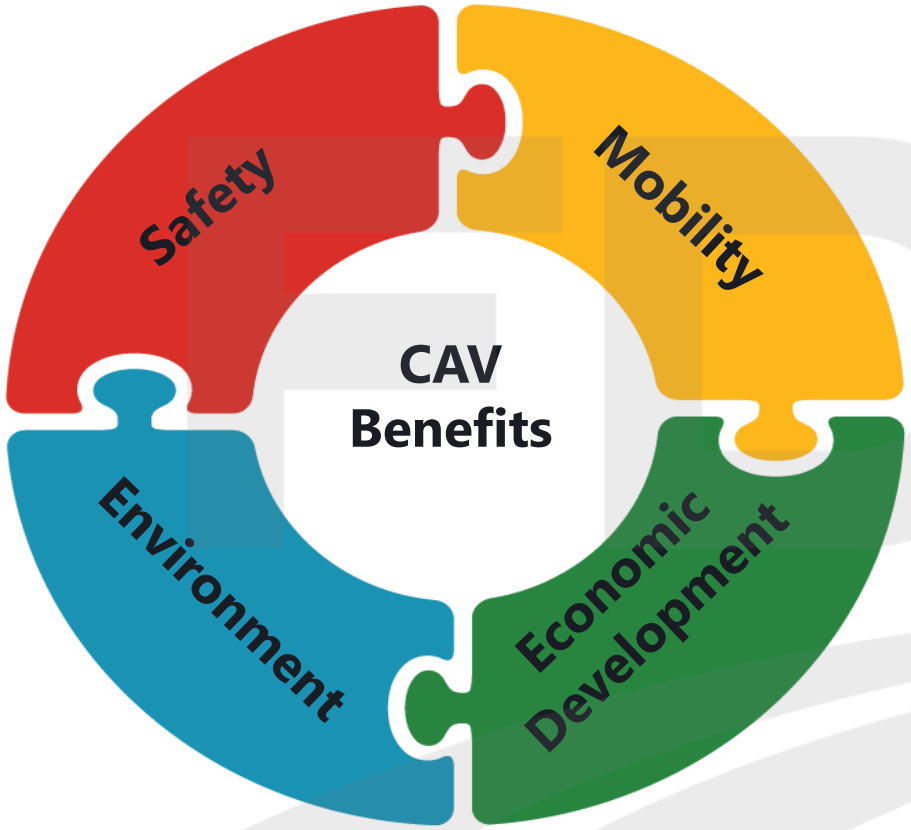
5| Technical Standards and Specifications Development

6| Implementation Readiness

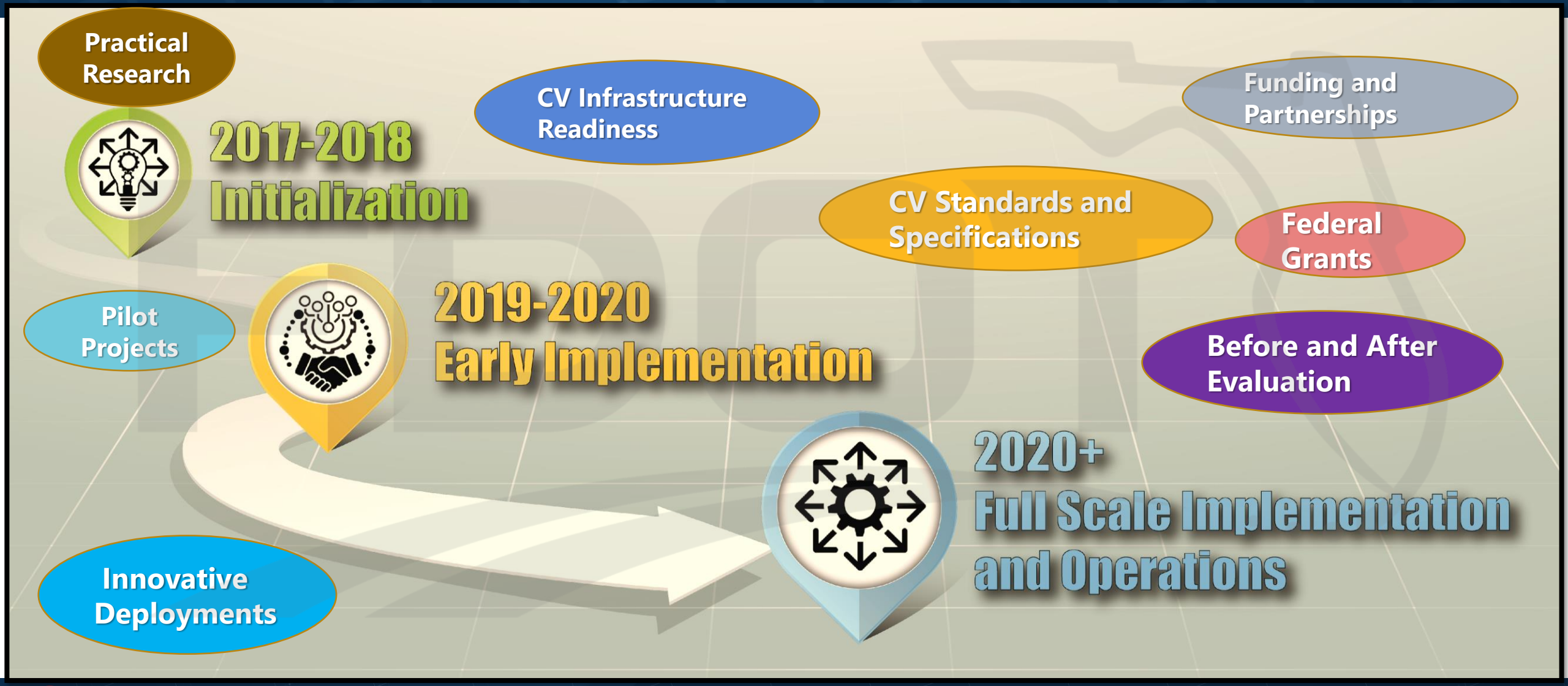
7| Deployment and Implementation



CAV Deployments



Implementation Roadmap



Vital Few Safety Elements

- Vital Few Safety Elements
  - Ped/Bike SBIs
    - Enhance Crossings
    - Target Speeds
    - Separated Bicycle Facilities
  - Lane Departure SBIs
    - Enhancing Visibility
    - Education and Enforcement
    - Emerging Technologies
  - Intersection SBIs
    - Public Engagement
    - Systems Approach
    - Maintain Signals on Strategic Systems

SBI - Single Best Idea

Vital Few Mobility Elements

Vital Few Mobility Elements

- Enhance/Leverage Existing Practices
- New Mobility Initiatives
- More Funding Flexibility
- Education/Outreach/ Partnerships

Florida is Open for Implementation

- Planning
- Policy Procedures
- Program
- Project
- Partnership
- Performance

CAV Project Selection Criteria

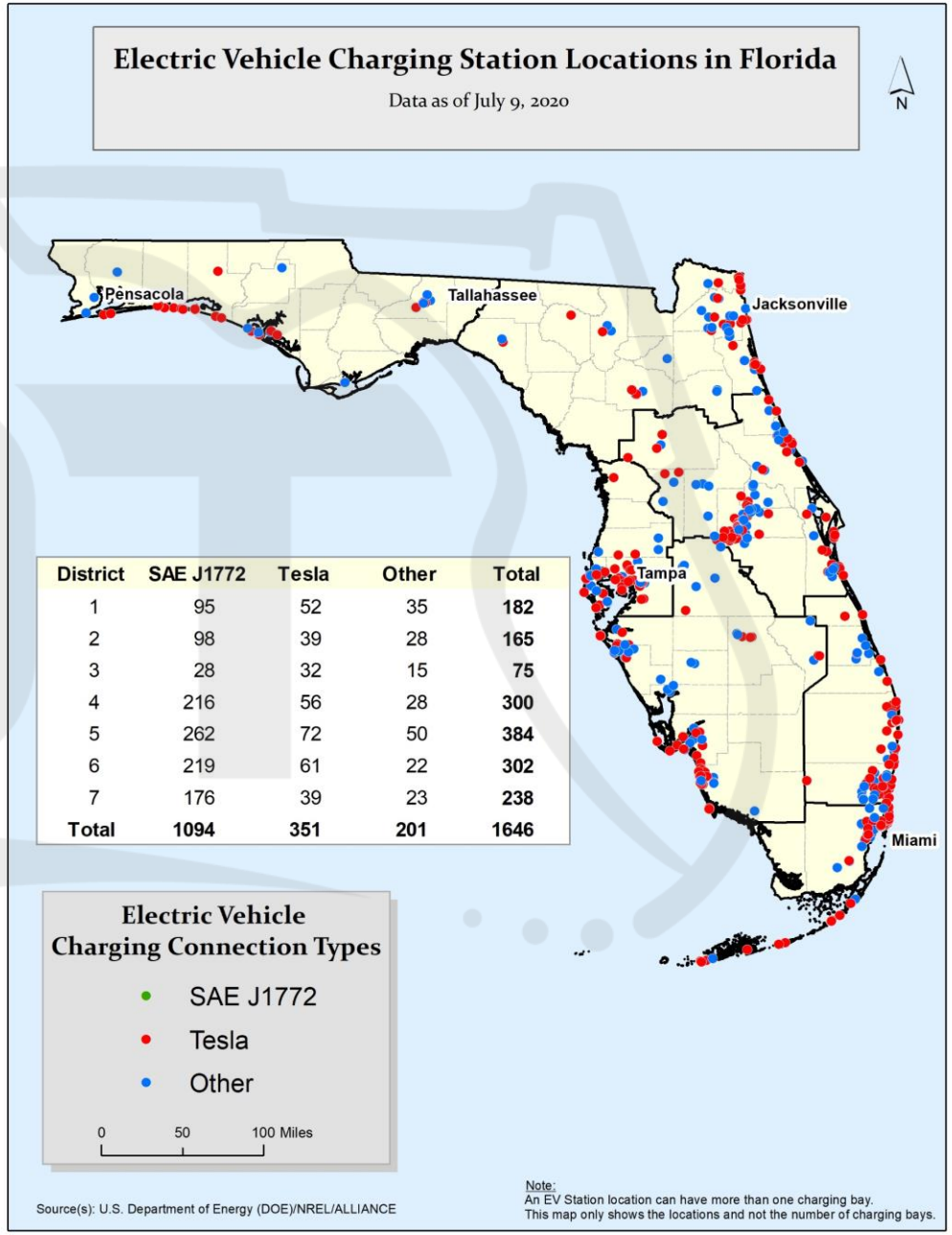
- Accelerate CAV Program
- Safety
- Mobility
- Efficiency and Reliability
- Feasibility
- Funds
- Benefit/Cost
- Data and Security
- Operations and Maintenance
- Project Evaluation

Electric Vehicles (EVs) and EV Infrastructure

326,644 plug-in electric vehicle (PEV) sales occurred in the United States for 2019.

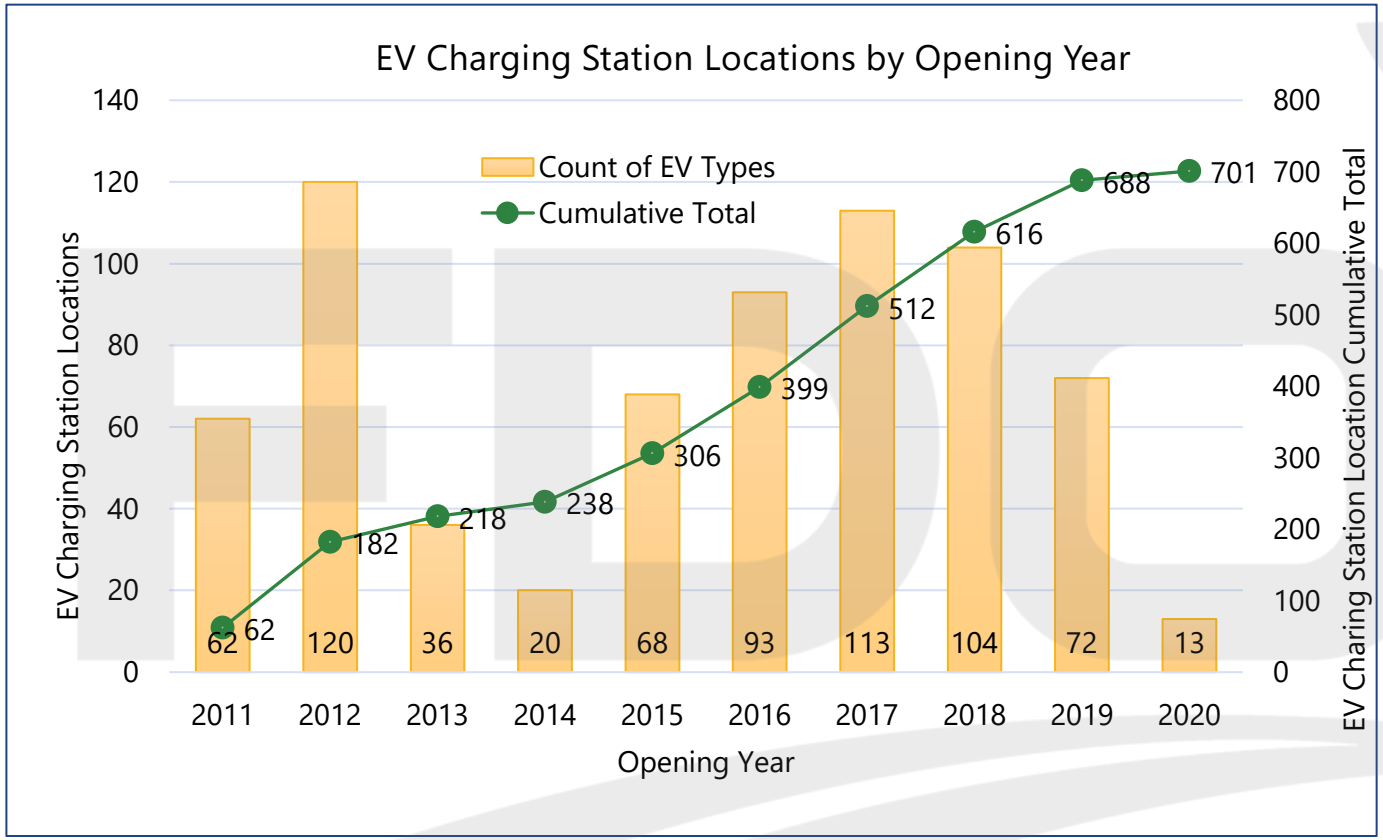
Florida has **more than 60,000 registered EVs**.

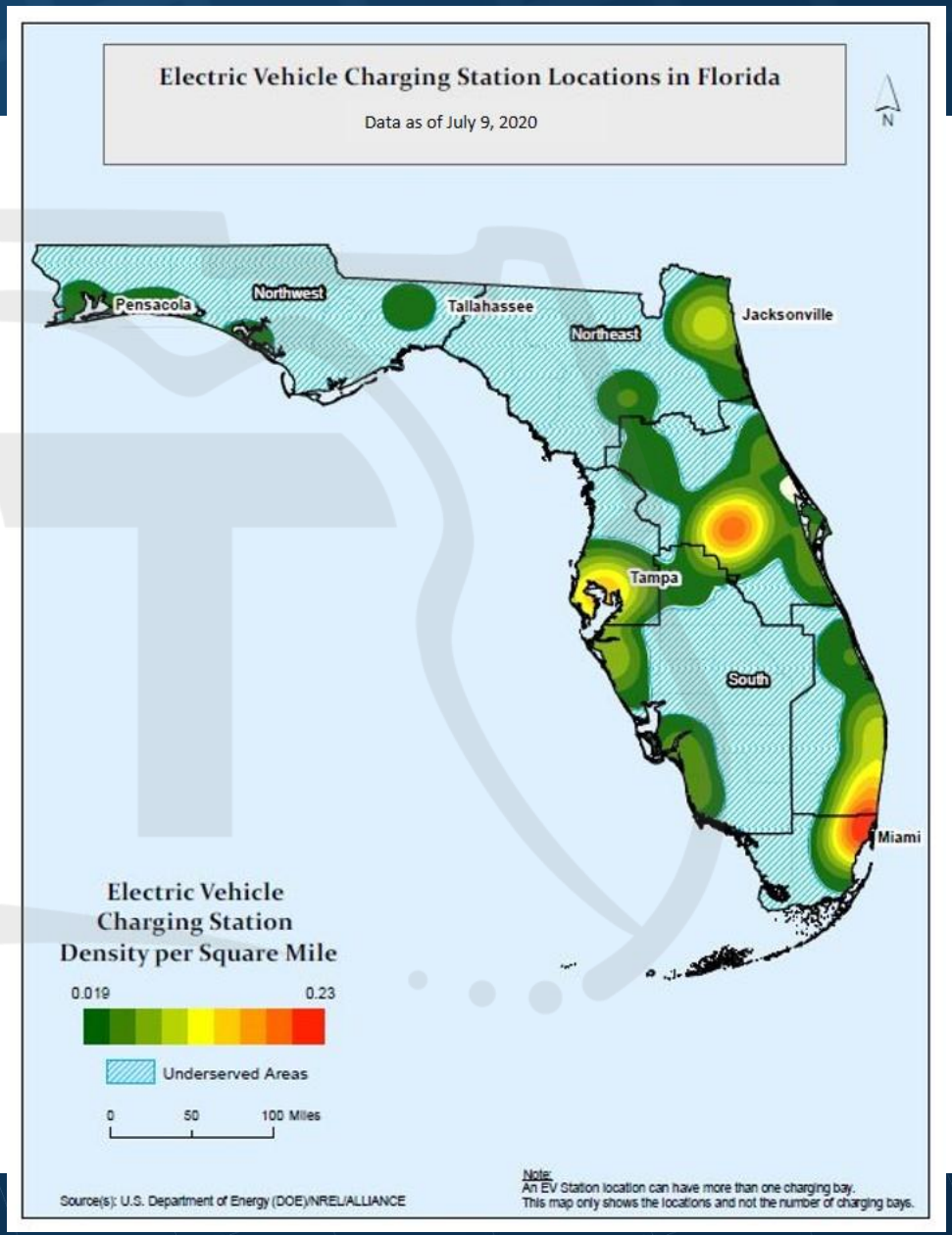
By 2040, Florida will need an additional 20,000 Level 2 public charging stations.



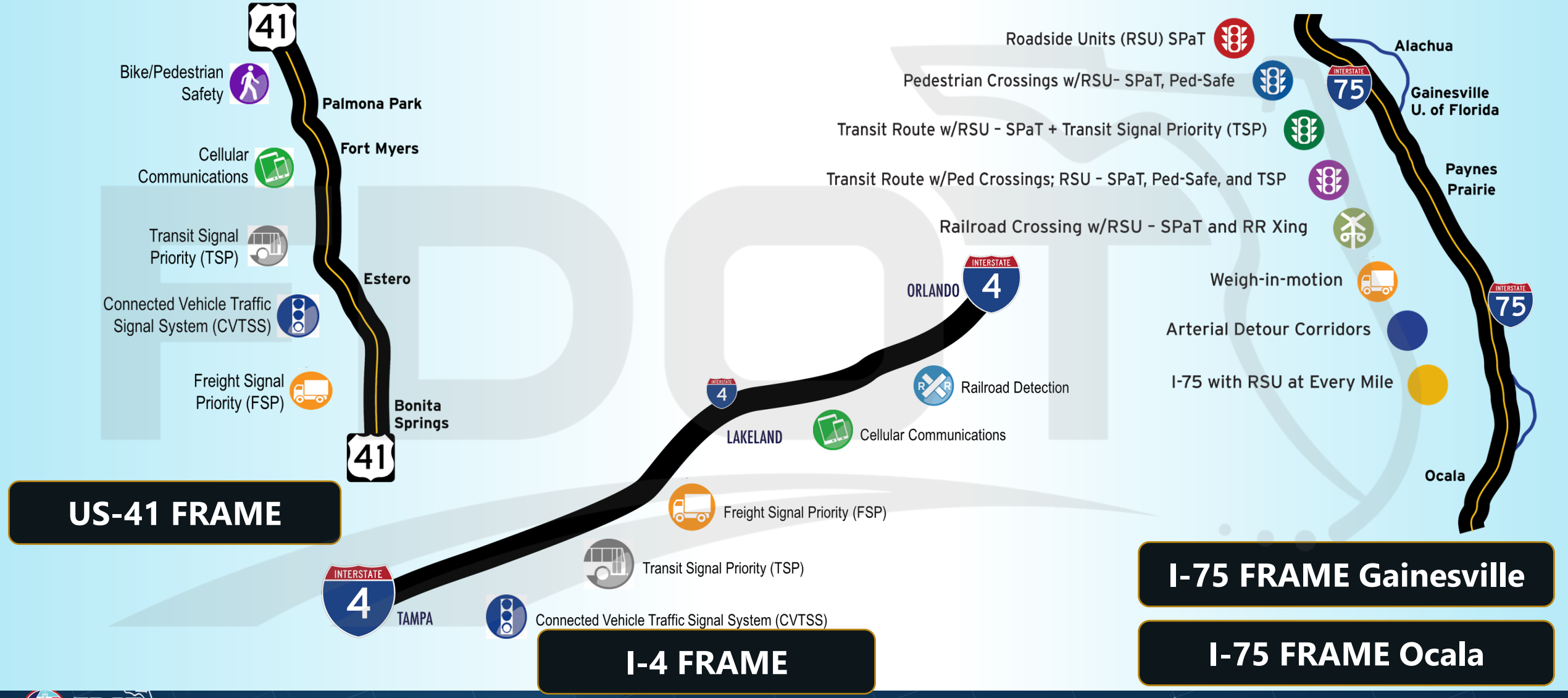
District	SAE J1772	Tesla	Other	Total
1	95	52	35	**182**
2	98	39	28	**165**
3	28	32	15	**75**
4	216	56	28	**300**
5	262	72	50	**384**
6	219	61	22	**302**
7	176	39	23	**238**
Total	**1094**	**351**	**201**	**1646**

Florida's Electric Vehicle Charging Station Locations

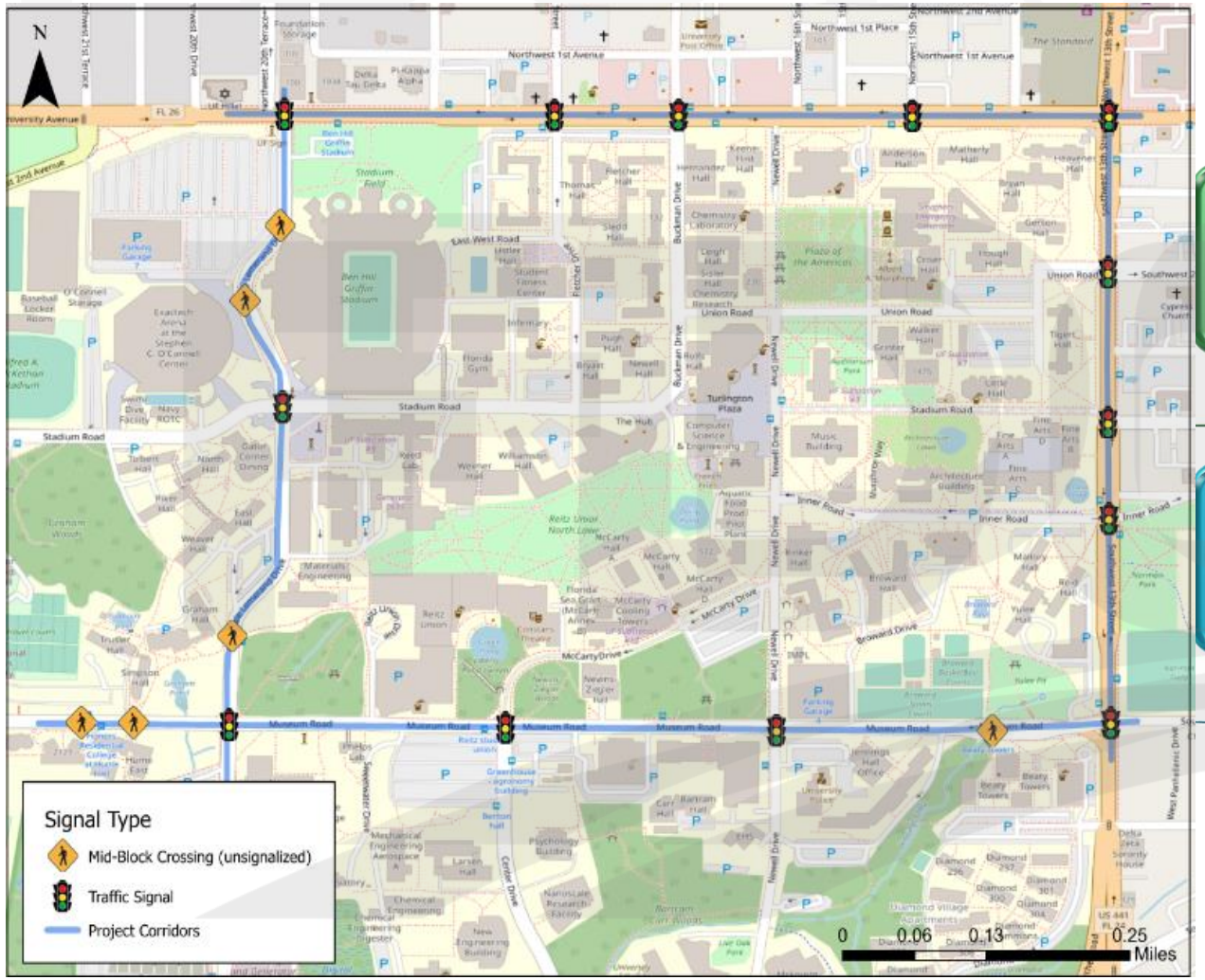




Florida's Regional Advanced Mobility Elements (FRAME) Projects



Gainesville Bike-Ped Project



13 Signalized Intersections

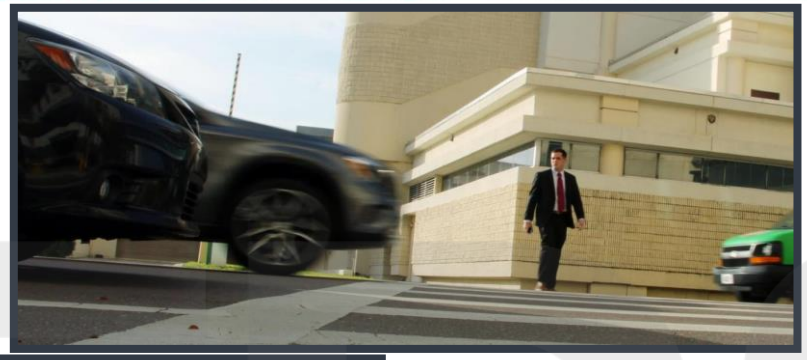
6 Mid-block Crossings

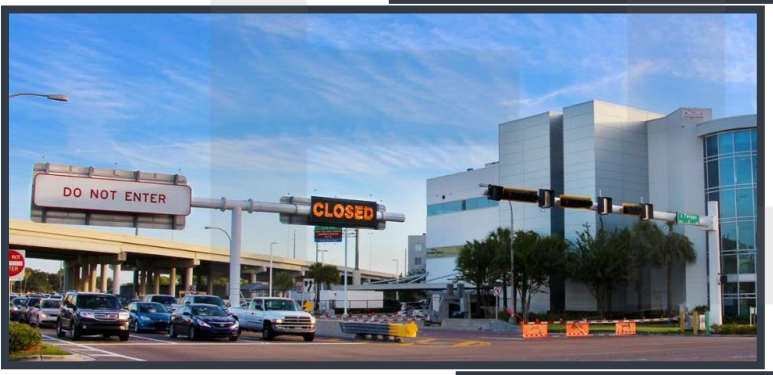
Gainesville Signal Phase and Timing (SPaT) Project

Autonomous Shuttles

- Autonomous shuttles could provide
- **Neighborhood access** to larger capacity transit routes
- **Safety and mobility** for
  - Elderly
  - Disabled
  - Low Income
- **Accessibility** to common destinations
  - Grocery stores
  - Post office
  - Medical offices
  - Retirement communities
- FDOT funded the Gainesville AV Shuttle

Tampa Hillsborough Expressway Authority (THEA) Connected Vehicle (CV) Applications





V2V - Vehicle to Vehicle
V2I - Vehicle to Infrastructure

	Applications
V2I	End of Ramp Deceleration Warning (ERDW)
V2V	Emergency Electronic Brake Light (EEBL)
V2V	Forward Collision Warning (FCW)
V2V	Intersection Movement Assist (IMA)
V2I	Intelligent Traffic Signal System (I-SIG)
V2I	Probe Date Enabled Traffic Monitoring (PDETM)
V2I	Transit Signal Priority (TSP)
V2V	Vehicle Turning Right in Front of a Transit Vehicle (VTRFTV)
V2I	Wrong Way Entry
V2I	Pedestrian Collision Warning (PCW)

Vehicle-to-Everything Data Exchange Platform

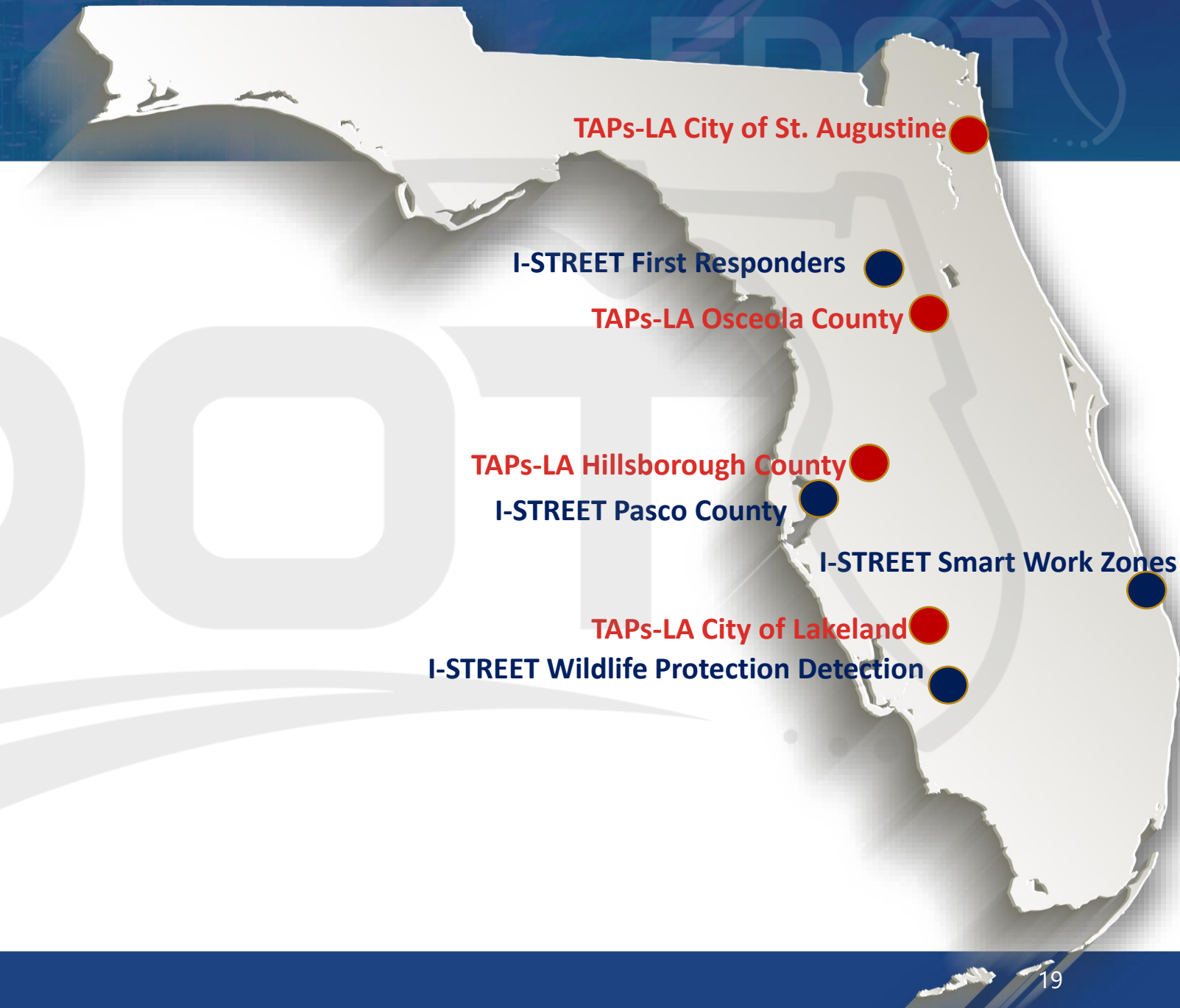
Security Credential Management System

Image Source: Google

Other Outreach Initiatives

Technology
Application
Partnerships for **L**ocal
Agencies

TAPs-LA



Test Facilities in Florida

1. Main Entry Campus
2. Workshops & Warehouses
3. Roadway Geometry Track
4. Loop Tracks
5. High-Speed Oval
6. Urban / Suburban
7. Pick-Up / Drop-Off
8. Sensor Test Chamber
9. Braking & Handling
10. Technology Pad

National Outreach Efforts

- Institution of Transportation Engineers
- ITS World Congress
- CV Pooled Fund Study
- Eastern Transportation Coalition
- Transportation Research Board
- American Association State Highway Transportation Officials
- National Cooperative Highway Research Program
- National Operations Center of Excellence
- Connected Vehicle Pooled Fund Study

CAV Training

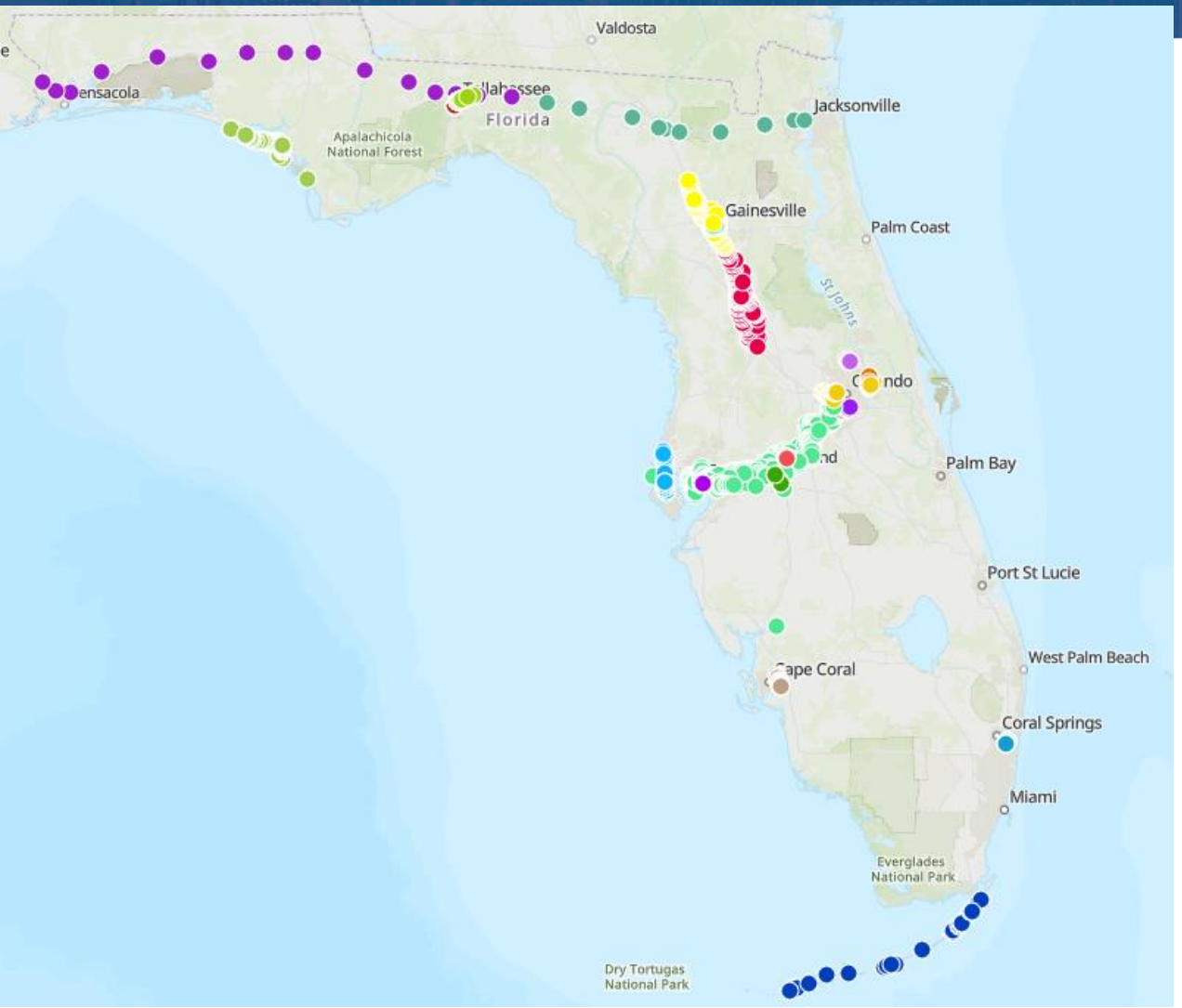
Lessons

Lesson 1 – Introduction
Lesson 2 – Background of Connected Vehicles
Lesson 3 – National Initiatives, Resources, and Efforts
Lesson 4 – Florida's CAV Initiatives
Lesson 5 – Impacts of CV
Lesson 6 – Technology
Lesson 7 – Cybersecurity
Lesson 8 – Implementation
Lesson 9 – Data Platforms
Lesson 10 – Signalized Arterial Impacts
Lesson 11 – Lessons Learned
Lesson 12 – Planned Efforts
Lesson 13 – Questions / Answers and Discussion

6

4 hours of training to the FDOT Transportation Systems Management and Operations (TSM&O) Program Engineers on November 4th

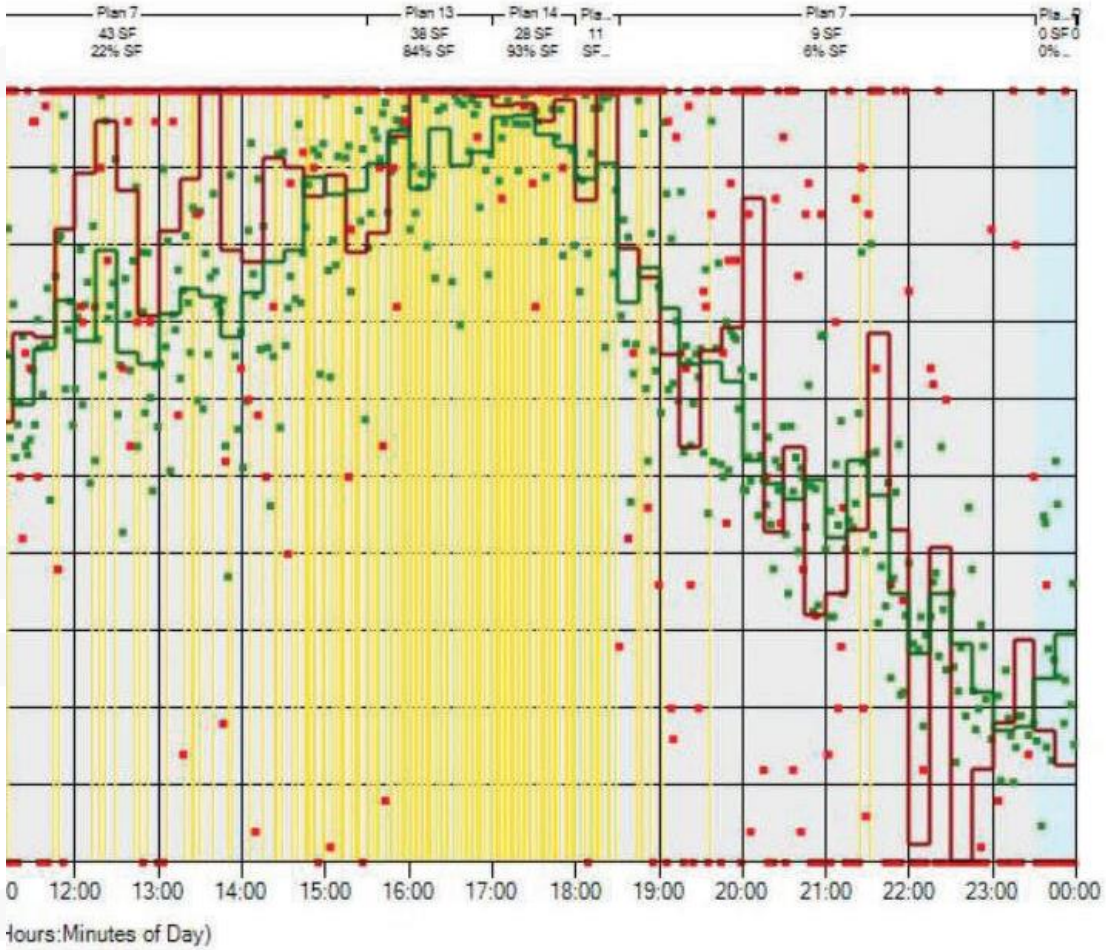
Roadside Unit (RSU) Dashboard



- Tracks the RSU status by project phase
  - Design/Implementation
  - Operational
  - Planning
  - Testing
- Considers the communication type
  - Dedicated Short Range Communication (DSRC)
  - Cellular Vehicle-to-Everything (C-V2X)
  - Both
- Available only internally to FDOT

Traffic Signal Quality Data and Retiming

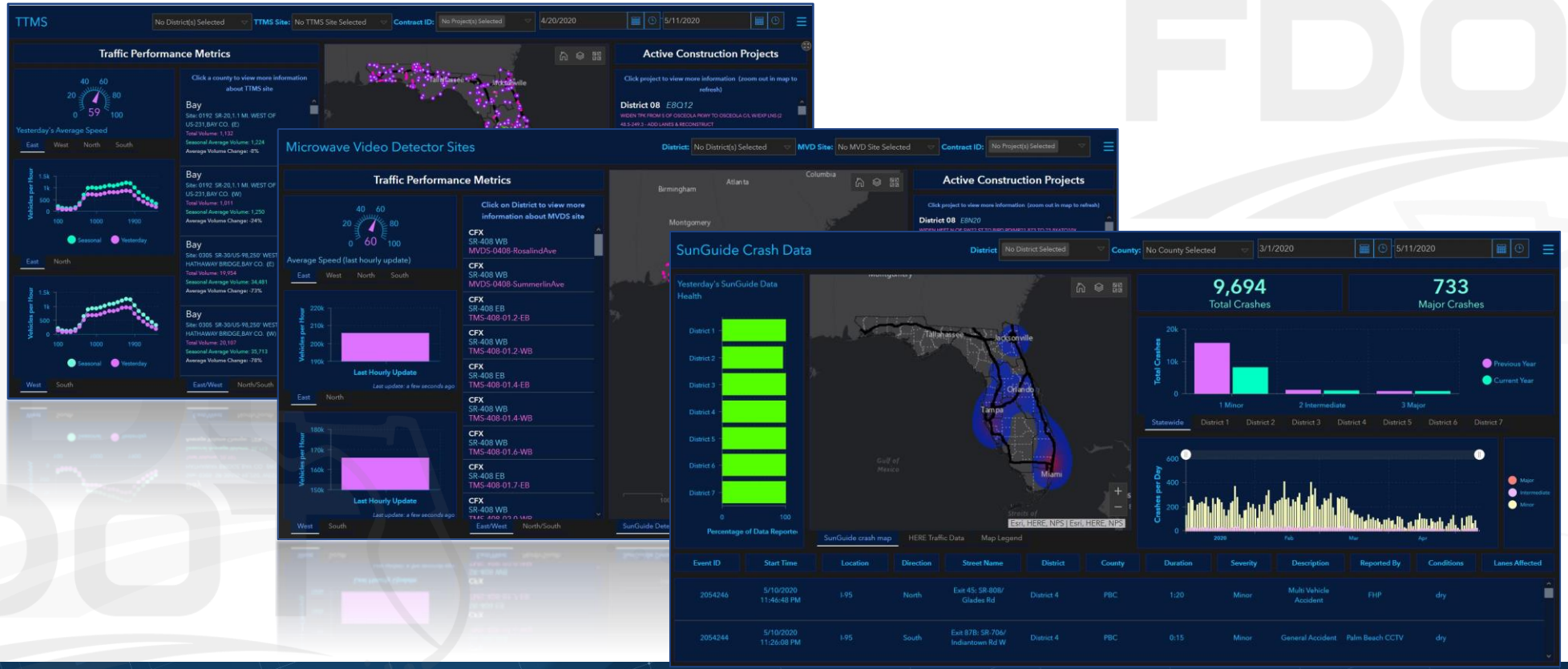
- Traffic simulation models mostly rely on **historical data**
- **Lack of ongoing performance monitoring** means agencies are plagued with citizen complaints
- In Florida, traffic signals are retimed **three to five years**
- **Updated data** help to refine models and improve simulation
- Signal performance measures help with signal timing and to **proactively manage** safety and mobility goals



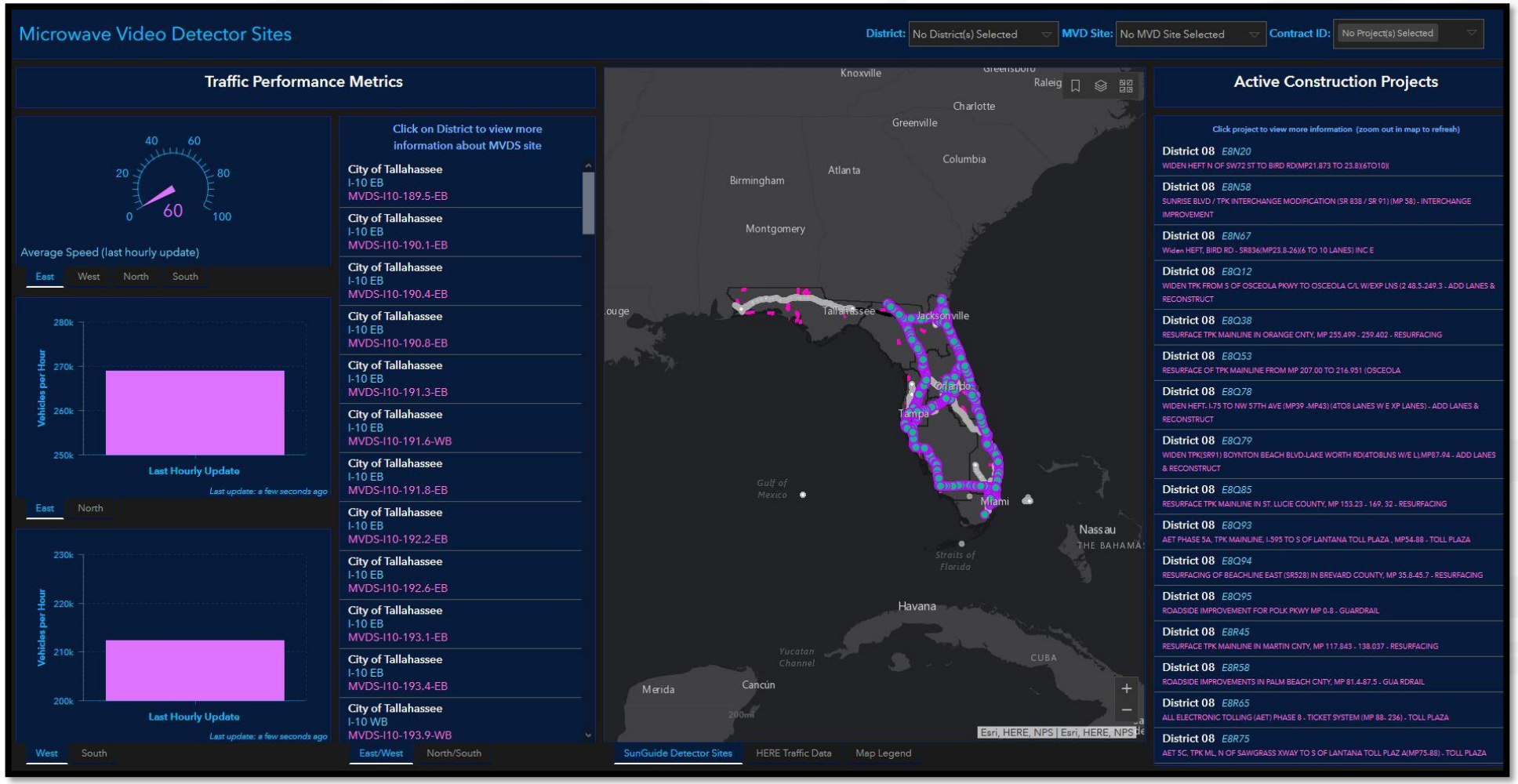
Source: FHWA - ATSPM

Traffic Monitoring and Analysis Dashboards

FDOT is exploring dashboards to monitor traffic volume and crashes; could be of potential use with future models and simulations

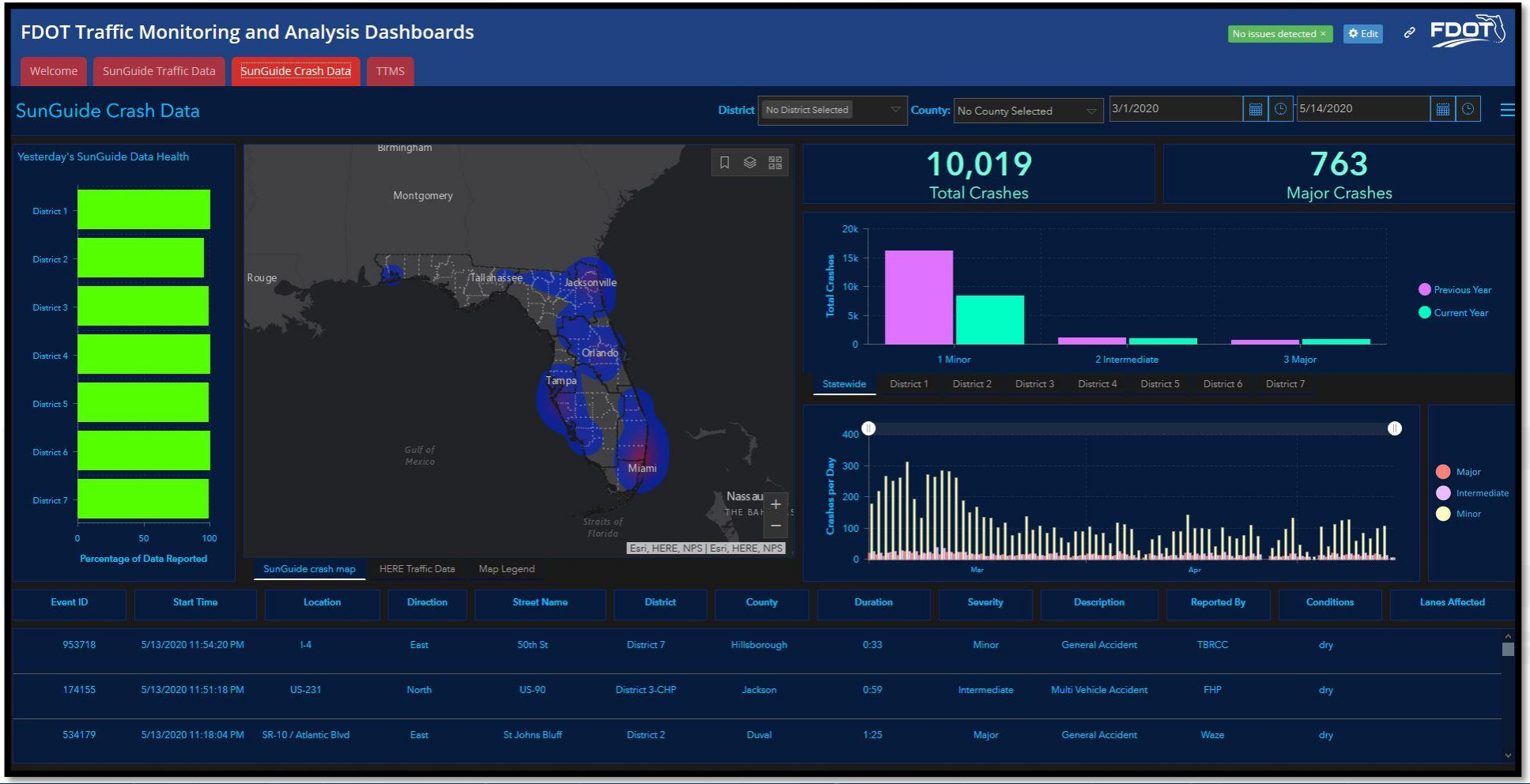


Example: SunGuide® Traffic Data Dashboard Tab



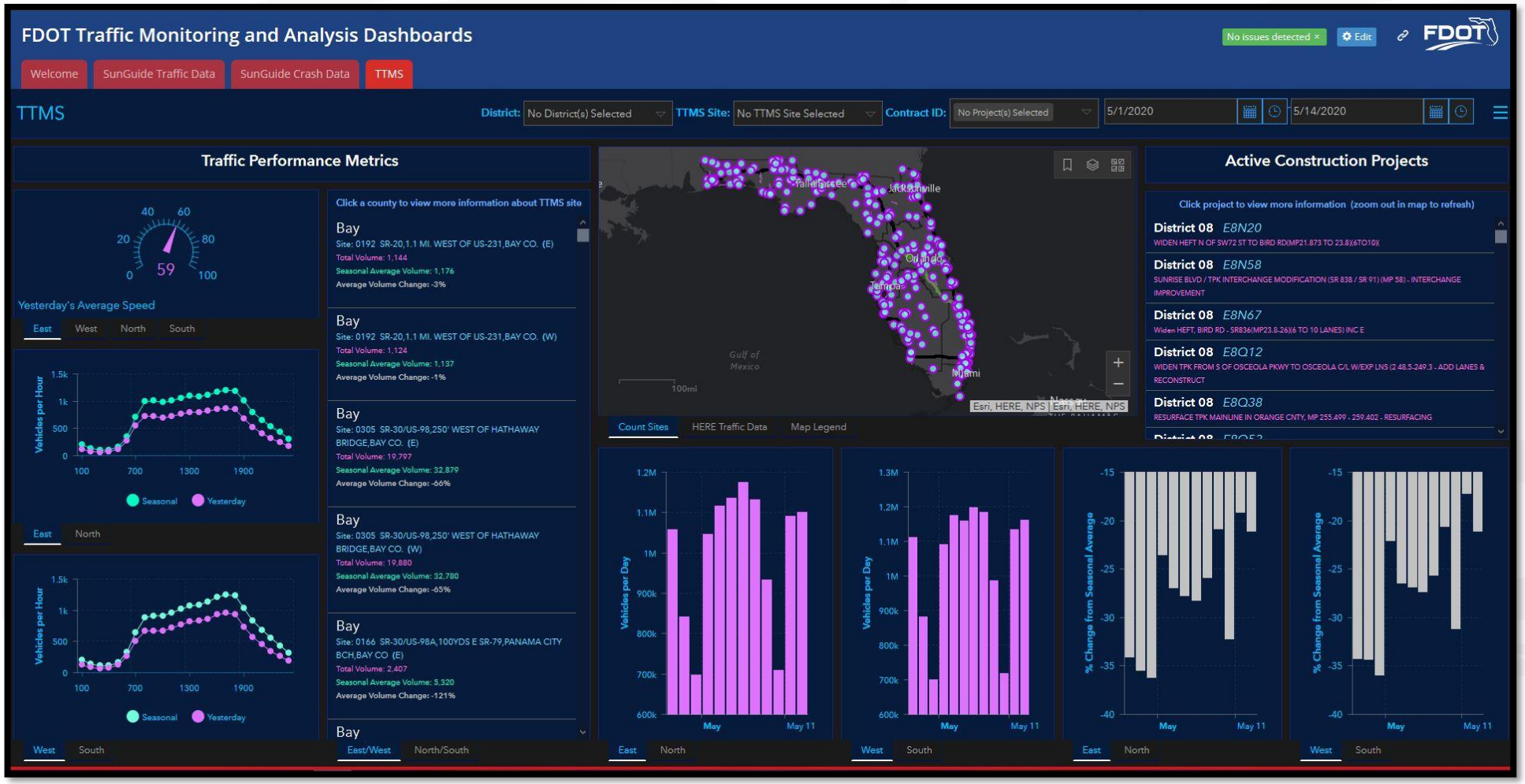
- Contains **data from MVDS**
- Provided by a **real-time** data feed and **updated every hour**

Example: SunGuide® Crash Data Dashboard Tab



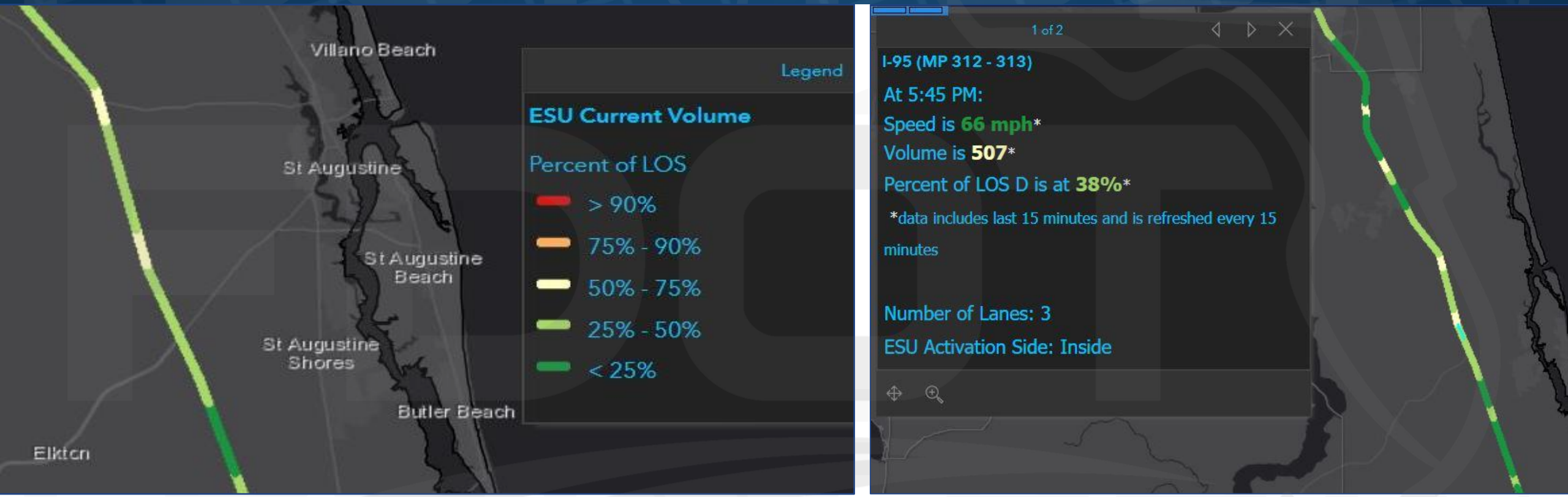
- **Data from SunGuide**
- Updated **every morning**
- Data is current as of **midnight the previous day**

Example: Telemetry Traffic Monitoring Site (TTMS) Dashboard Tab



- **Provides TTMS volume and speed data**
- Updated **daily**
- Data is current as of **midnight the previous day**

Emergency Shoulder Use Dashboard

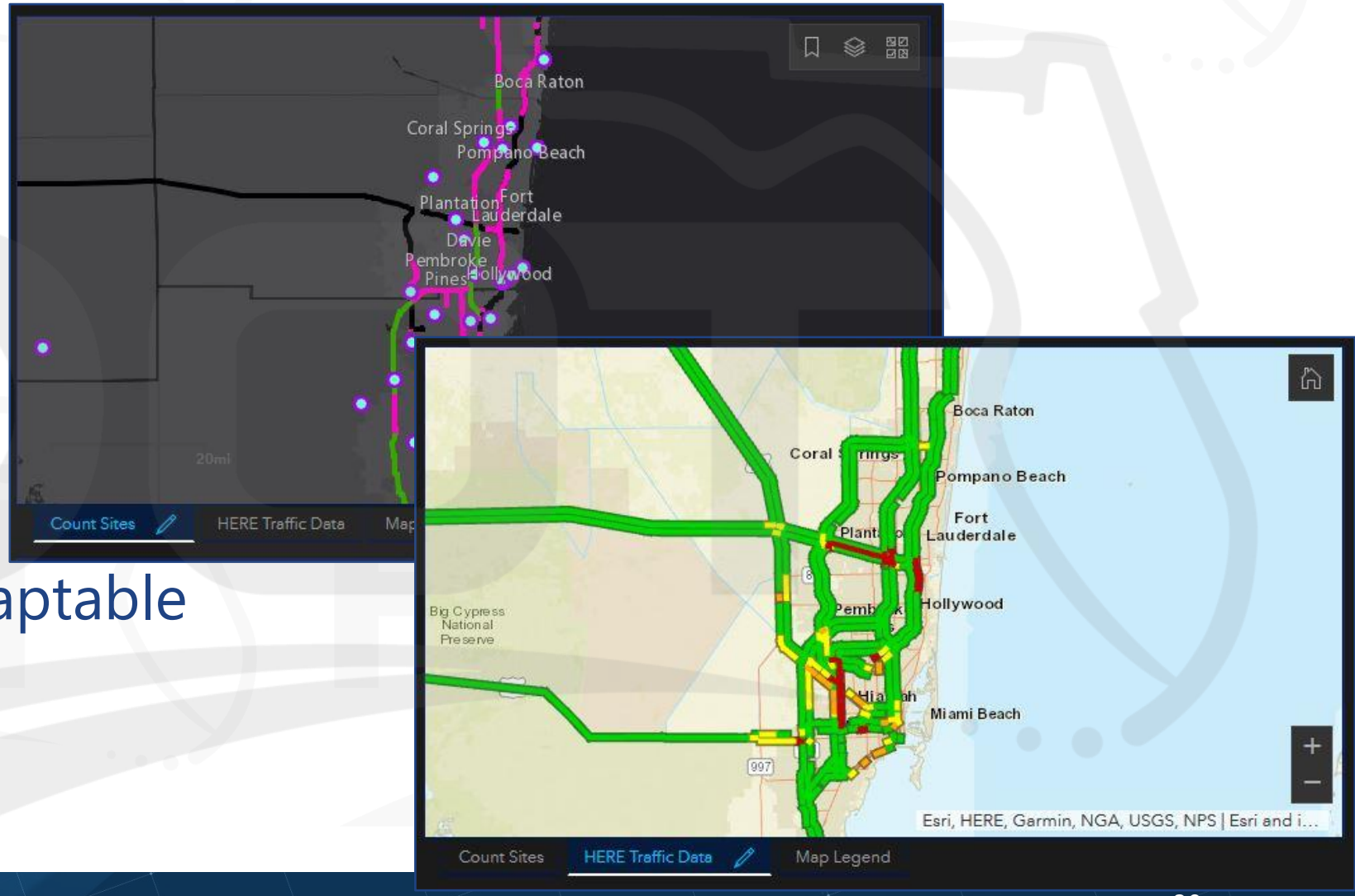


- The level of service (LOS) is based on LOS D depending on the speed
- This data included the previous 15 minutes and refreshed every 15 minutes

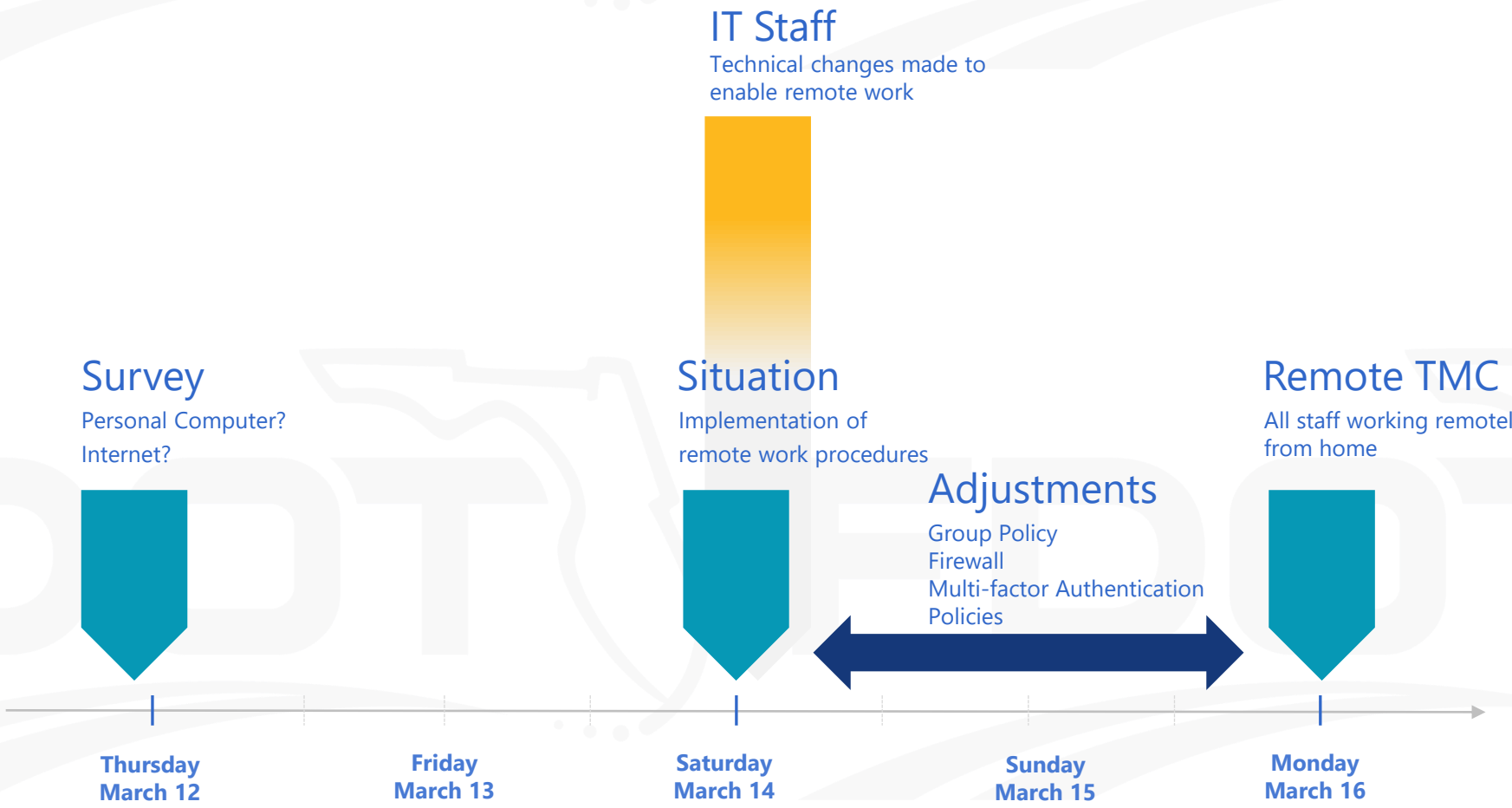
Advantages of In-House Dashboards

Benefits of developing dashboards in-house

- Readily **available and consistent** data
- **Cost savings**
- **Efficiency**
- **Customizable** and adaptable



TMC ~ Rapid Response: COVID



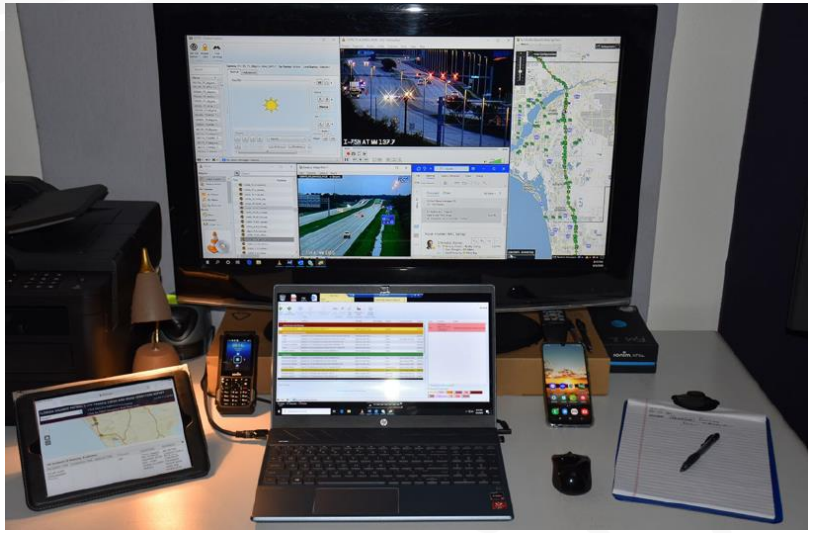
Agility and Resilience in the Face of Continuous Change

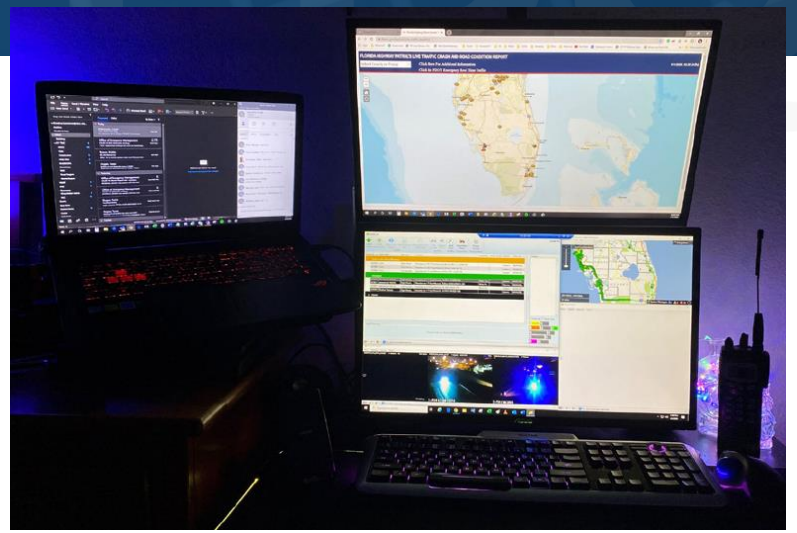
- On-call number for the operators
- Surplus computers and monitors
- Creativity and innovation for monitors
- Computer Logoff and Reboot desktop shortcuts
- Microsoft Skype and Teams for communication

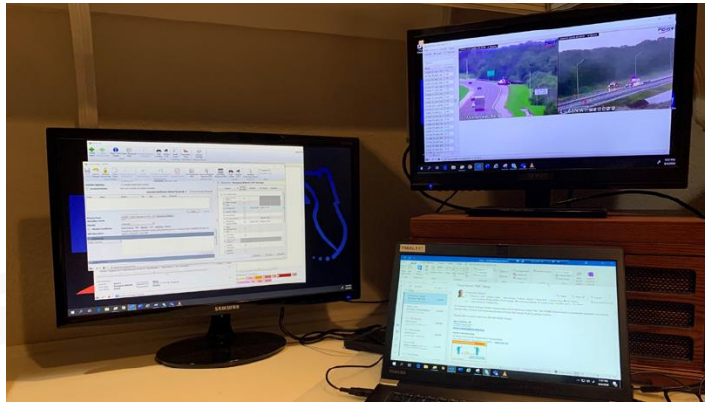
The Operator's Perspective

- The size of screens was a challenge for inventory
- Compartmentalized operations
  - Someone handled calls
  - Supervisors handled radios
  - Everyone used Skype to communicate
- Improved collaboration
- Able to run major events without issues
- Operators became creative

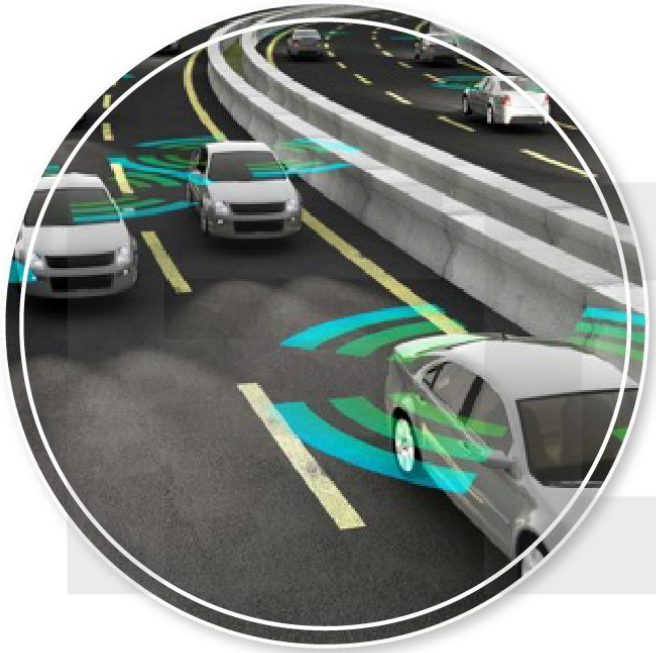
Creativity and Innovation







The Future is Here



Connected &
Automated Vehicles

Urban Data
Proliferation

Smart Cities
& Communities

Thank you. Questions?

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