



TSMO CONSORTIUM MEETING SUMMARY

Meeting Date: October 3, 2019 (Thursday) **Time:** 10:00 AM – 12:00 PM

Subject: TSMO Consortium Meeting

Meeting Location: FDOT District Five - RTMC
4975 Wilson Road
Sanford, FL 32771
Turing Conference Room

I. OVERVIEW

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

II. ORANGE COUNTY MAYOR'S TRANSPORTATION INITIATIVE

Christine Lofye, Orange County Traffic Engineering, provided an overview of the Mayor's Transportation Initiative.

- Mayor Jerry L. Demmings has identified transportation as a major issue affecting residents and visitors in Orange County. He has developed the Transportation Initiative to address issues negatively affecting the transportation network.
- The proposed program, still in the development stages and awaiting significant public engagement, would be funded by a one cent increase in the sales tax, from 6.5% to 7.5%
 - At 7.5% Orange County's sales tax would be similar to most other Florida counties
- Why a sales tax? This will introduce enough funding to make a transformational change to the Orange County transportation system
 - Projected revenues generated from one cent sales tax: **\$595.5 million annually**
 - Non-residents and tourists would account for 51% of revenue
 - Would not apply to essential food items, prescription drugs, or utilities
- Once the Transportation Initiative is thoroughly vetted by county officials, staff, and the public, the Initiative may become a referendum for public consideration
 - Public outreach has been identified as a major component of the program, with over 500 "touch points" identified over the next three months for feedback
 - There will be one town hall meeting per county commissioner district to hear from the public about their transportation priorities and what they would like to see as part of the program
 - *Listen and Learn* – Staff involved in the public outreach effort have been directed to operate in a fact-finding capacity ONLY; staff are not permitted to promote the initiative, only listen to and educate the public (see figure on next page)



- Major transportation network issues include:
 - Resurfacing – current resurfacing frequency is 12 to 15 years at ~\$175,000 per mile
 - increased frequency is necessary to keep up with lifespans and avoid higher costs
 - Traffic signals – 585 existing signals, only 15 intersection improvements budgeted; \$350,000 per traffic signal
 - Bicycle and Pedestrian Safety – sidewalk cost is \$264,000 per mile; eight new miles of sidewalk installed last year
 - County Bicycle/Pedestrian Safety Action Plan
 - Street lighting – more than 190 miles of major roadways currently unlit, with additional needs at intersections/crosswalks for pedestrian safety
 - Existing five-year program includes 85 miles to be completed
 - Mass Transit – preparing for SunRail operations transfer from FDOT to local governments; Lynx currently funded through property taxes
 - With more fuel-efficient vehicles and changing travel patterns, the gas tax has become less impactful
- Christine requested that anyone with feedback complete the online survey at www.ocfl.net/transportation

III. FDOT SUNSTORE – DATA PICKER



Keith Smith, VHB, provided a demonstration of the SunStore Data Picker, which has been published on the SunStore website.



- The Data Picker currently pulls in two datasets: Center-to-Center (C2C) data and crash data (via Signal Four Analytics). There are plans to bring in additional datasets that are already collected as part of the SunStore data environment.
- Since the Data Picker is browser-based, the program pulls in two weeks' worth of data, simply because it is too much data for the browser to function properly otherwise
- The Data picker allows you to visualize the data available; however, you can download data as you need
- The crash time data is rounded up to 15-minute periods; when the user downloads the data, however, the crash time is provided in its granular form
- If necessary, the Data Picker allows the user to de-select crash(es) that are not relevant to their particular data collection effort
- The data request may take a second because it is pinging the SunStore data platform, which will have approximately 100,000,000 records by the end of 2019
- The Data Picker does not have the ability to select more than one roadway; this was a design decision, as selecting more than one roadway would complicate the user interface and likely overwhelm or confuse the user
- C2C data is derived at the District level; not currently available at the state level
- Question: Does this include local/county roads?
 - Answer: Yes, as long as there are C2C sensors on the road, the data is available
- The Signal Four Analytics crash data is pulled down without any editing/filtering, so whatever UF provides is pulled straight into the Data Picker

- Data Picker crash data is not meant to replace Signal Four Analytics; this is just an easier way for users to visually illustrate crashes alongside C2C traffic
- Question: Are you including Signal Four crash data in parking areas?
 - Answer: Once UF performs an initial edit and approves the data, SunStore/Data Picker pulls in the data every night
 - This is not meant to be a full-depth analysis tool
- New data to be integrated with the Data Picker MAY include volume, performance measure, travel time index (TTI), and planning time index (PTI)
- Question: is there an option for a “snapshot” or PDF feature?
 - Answer: not currently, but that has been an option the development team has looked at
- Question: can you clarify “real-time”?
 - Answer: Signal Four Analytics uploads crash data every night, so that data will always be 24 hours behind. The C2C data is near-real-time. From SunStore you can pull certain datasets that are updated as close to real-time as possible.
 - The Data Picker is not meant to be a real-time operations tool.
- Question: Does it allow the user to change time format preference (6:00pm vs. 1800)
 - Answer: Not currently. This feature may be added at a later date.
 - The Data Picker does not look at the user’s computer clock to adjust timing preference.
- There is a short tutorial video linked in the bottom left of the Data Picker interface

DATE RANGES:
10/01/2019 - 11/01/2019 ✕

TIME RANGES:
07:00 - 18:00 ✕

3. Once Road Is Selected From The Above Grid, The Option To Select A Sub-Segment Of Roadway Will Become Active. Use The  Tool To Refine Roadway Selection By Drawing A Polygon. Use The  Tool To Clear And Reset The Roadway Selection.



 



4. The Beginning And Ending Mile Post Below Reflects The Roadway Selection. Users Can Update The Mileage Using The Tool In Step 3 Or Click Submit To Proceed.

BEGINNING POST:

END POST:

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 [Web Policies and Notices](#)  [Contact Us](#)

 [Statement of Agency](#)  [Tutorial](#)

Count

IV. SIGNAL ID NUMBERS

Katie King, Tushar Patel, and Jay Williams led a discussion on Signal ID numbers and potentially developing a cross-reference sheet for local agencies and the District to identify signals more easily.

- FDOT had a numbering system for signals but it doesn't line up with the numbers selected by each agency
- ATMS ID was selected because it would be familiar for each agency when using the different software. To avoid duplication, unique County/City prefix was added (e.g., BRE-, OSC-, ORL-, etc.)
- Software systems that use your ATMS ID:
 - TMDD
 - ATSPM and Cloud ATSPM
 - Signal Optimization Tool (SOT) in the Regional Integrated Corridor Management System (R-ICMS)
 - SIIA
 - MIMS eventually (through SIIA)
 - ICMM
 - SunStore collects/stores data
 - ITSQA
- Based on discussion, Orange, Seminole, and Volusia counties never change their IDs; if an ID is obsolete for whatever reason, it just sunsets
- ATMS number will be much more static than IP address
 - Side note: FDOT needs to know about IP address updates, because data feed is lost immediately until IP address is properly updated
- Jay Williams asked about the Orange County Intelight conversion.
 - Hazem indicated the same IDs are used.
- Question: will prefix affect FDOT numbering.
 - Answer: no it will not.
- Benton originally requested that the cross-walk table be added to the Exhibit A within the local agency maintenance agreement with FDOT.
 - Question: Would you like FDOT to add a lookup table to Exhibit A?
 - Answer: Yes, absolutely.
- Hazem: a demonstration of all the tools identified in list above would be useful.
 - Tushar: Agreed. Currently working on getting the demonstrable programs ready for a demonstration.
 - *ATSPM* and *Cloud ATSPM* – *ATSPM.now* is available now; *Cloud ATSPM* is in testing now
 - *SIIA* – just got through some of the requirements; developed by IBI
 - *ICMM* – Predictive model that feeds back into ICMS and SOT
 - *SunStore* – only real visual tool (via Data Picker)
 - *ITSQA* – just a backoffice component; no real visual component
 - volumes as part of Phase II Data Picker will be coming from ITSQA

V. VIDEO-AS-A-SENSOR

Lewis Stallworth presented on Bosch's *in-camera "edge" analytics solutions*.

- End-user challenges
 - prevent accidents
 - increase throughput capacity
 - detect traffic problems fast
 - get better knowledge of usage patterns
 - enforce compliant behavior
- Cameras with On-Board Intelligence
 - incident detection using in-camera analytics
 - stopped car
 - lost cargo
 - person/animal in tunnel
 - wrong way driving
 - early fire/smoke detection
 - speed change detection
 - traffic statistics collection
- Cameras with analytics processing?
 - true "edge" intelligence technology
 - each camera is a node in a distributed intelligent device network
 - no single point of failure or hardware bottleneck
 - reduced network bandwidth load
 - multipurpose device delivering video and analytics data
 - highly scalable and efficient
- Bosch is the only entity that transcodes metadata on the edge
- Intelligent Video Analytics → Camera Trainer (not artificial intelligence)
 - counting accuracy is greater than 99%
 - collect data into SQL database that can be parsed by users

Discussion

- Question: Resolution of camera at intersection – can they detect distracted driving?
 - yes, but due to privacy concerns, the video data is not shown
 - the back-office analytics will determine answer (distracted?) and provide it in a table
- Question: How well does system detect bicycles?
 - car, truck, bike, and pedestrian identification are all available out of the box
 - largest request was for bird scooters; Bosch is working on that now
- Question: Frequency of metadata?
 - real-time, but at the speed of your network
 - every frame is given metadata
 - metadata makes up about 2% of the data feed
- For more information or video, please visit <https://www.boschsecurity.com/xc/en/products/video-systems/video-analytics/>
 - Videos can also be found on Bosch's YouTube channel: <https://www.youtube.com/user/BoschSecurity>

VI. NEXT MEETING

- December 5, 2019

VII. ATTACHMENTS

- A – Sign in sheets
- B – Presentation Slides
- C – Meeting agenda
- D – Orange County Handouts
 - Transportation Fast Facts
 - Transportation Survey

END OF SUMMARY

This summary was prepared by Amanda Johnson and David Williams and is provided as a summary (not verbatim) for use by the Consortium Members. The comments do not reflect FDOT's concurrence. Please review and send comments via e-mail to dwilliams@vhb.com so they can be finalized for the files.

FDOT - REGIONAL TRANSPORTATION MANAGEMENT CENTER

VISITOR'S SIGN-IN LOG

PLEASE RETURN BADGE AND SIGN OUT WHEN LEAVING

DATE	NAME	WHO YOU REPRESENT	PHONE NUMBER **Optional**	OFFICE/PERSON VISITING	TIME IN	BADGE #	TIME OUT
10/3	Brent Poole	CFX		TSMFO	9:55	6020	
10/3	Jorge Uy	Sumter County		TSMFO	9:55	6037	12:06
10/3	Nicole Heck	Kimley Horn		TSMFO	9:55	6026	
10/3	Scott Arnold	City of Melbourne		TSMFO	10:00	6014	12:00
10/3	Aung Thurain	RICK		TSMFO	10:00	6041	12:00
10/3	Noel Oteyza	Sevinole County		TSMFO	10:00	6034	
10/3	Charles Wetzel	"		"	10:00	6024	
10/3	Ryan Cunningham	Kiffelson		"	10:00	6029	12:05
10/3	Chris Cairns	Orlando		"	10:00	6007	12:12
10/3	Christy Flickinger	FDOT		TSMFO	10:00		12:00
10/3	L. Walker	TMC		TSMFO	10:05	1	12:05
10/3	Melissa Gross	InNovo		TSMFO	10:05	6023	
10/3	Claudia Paokawikas	InNovo			10:05		
10/3	FRANCIS BRANO	GXX		TSMFO	10:10	6027	
10/3	Mike O'Han	Metric Eng		Auceleo	11:45	6019	
	KATEA MILLER	ORANGE CITY			11:50		
	ASAM NAWSTAM	ORANGE CITY					
10/3	Andrew Bell	OC Traffic		Jeremy Distmore	12:01	6022	

FDOT - REGIONAL TRANSPORTATION MANAGEMENT CENTER

VISITOR'S SIGN-IN LOG

PLEASE RETURN BADGE AND SIGN OUT WHEN LEAVING

DATE	NAME	WHO YOU REPRESENT	PHONE NUMBER <i>**Optional**</i>	OFFICE/PERSON VISITING	TIME IN	BADGE #	TIME OUT
	Kath Smith	VHB		Tim Reinhart	9:10	6028	
	Benton Bonney	Orlando		"	0905	0644	
	Christy Lofe	Orange Co.		TSMO	9:40	6010	
	Crystal Mercedes	R2CTPO		TSMO	9:40	6006	
	Steven Buster	SCTPO		TSMU	9:40	6039	12:01
	James Globig	Lake County		TSMO	9:45	6042	
	Michael Grunwald	Palm Coast		TSMO	9:45	6008	12:10
	Tyler Gibson	Palm Coast		TSMO	9:45	6005	12:10
	Jon Cheney	Volusia Co		TSMO	9:45	6017	12:05
	Mike Woods	LSMPO		TSMO	9:45	6003	12:00
	AUSSA TORRES	ORANGE COUNTY		TSMO	9:45	6035	11:45
	Lewis Stallworth	Bosch		TSMO	9:45	6025	
	Daren Greer	COTB		TSMO	9:50	6038	
	Hazem El Assar	Orange Co.		"	9:50	6045	
	MASOOD MIRZA	✓		"	"	6009	
	Hatem Abou-Senna	OCTP/UCF		TSMO	9:50	6021	
	Ron Patu	WSP		"	9:50	6002	
	Lara Bouck	Metropolitan Orlando		TSMO	9:53	6031	
	Juan Calderon	Metro Plan City		TSM	9:53	6037	
	Mark Tobin	Metro. City of Orlando		TSMO	9:53	6036	

Welcome to the TSM&O Consortium Meeting October 3, 2019



Meeting Agenda

1. Welcome
2. Orange County – Mayor’s Transportation Initiative
3. FDOT SunStore – Data Picker Demonstration
4. Signal ID Numbers
5. Bosch – Video as a Sensor
6. Current Initiatives

Mayor's Transportation Initiative



TSMO Consortium
October 3, 2019

The background of the slide is a dark blue color with a white line-art pattern of a city street grid. The grid consists of various street layouts, including straight lines, curves, and small circles representing intersections or landmarks. A horizontal orange band is positioned across the middle of the slide, containing the text.

How is TRANSPORTATION funded?

Transportation Funding Sources

Gas Tax

**Impact
Fees**

**Restricted
Sources**

**Property
Tax**

Sales Tax

The background of the slide is a dark blue color with a white line-art pattern of a city street grid. The grid consists of numerous small, irregular shapes representing buildings and blocks, connected by a network of lines representing streets. Some lines are thicker than others, suggesting major roads or highways. The overall effect is a dense, intricate map-like texture.

How is this TRANSPORTATION funding currently used?

Roadways

Resurfacing

Mass Transit



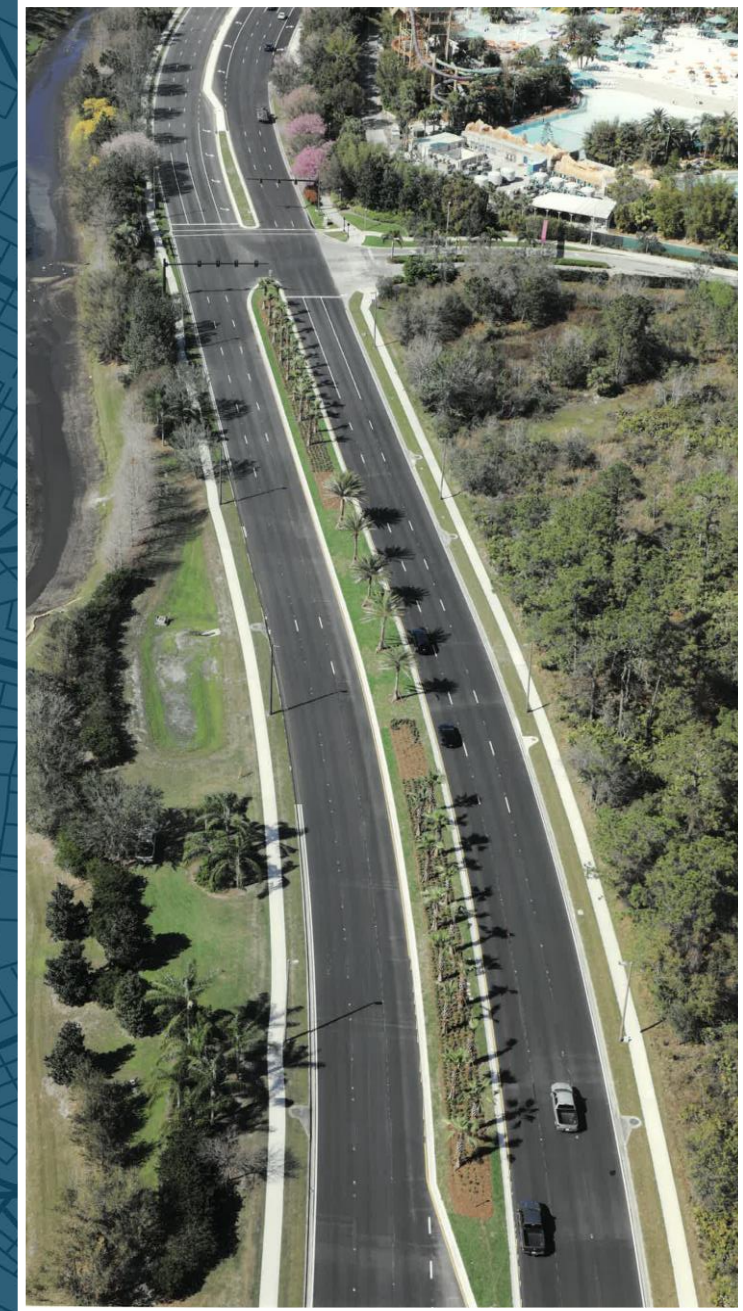
Traffic Signals/
Intersection
Improvements/
Technology

Street Lighting

Bicycle/
Pedestrian
Safety

Roadways

- 2,700 miles of County roadways
- Cost - \$3 Million per lane-mile
(\$12 Million per mile for a 4-lane roadway)
- 1 out of 4 roads are failing



Resurfacing

- Current resurfacing frequency - every 12-15 years
- Cost - \$175,000 per mile
- 185 miles of roadways resurfaced last year (270 miles needed)
- Increased frequency necessary
 - Keep up with life span
 - Avoid higher costs



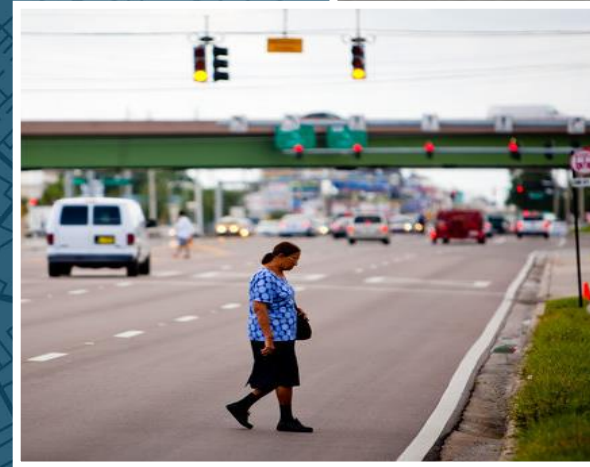
Traffic Signals/Intersection Improvements

- 585 existing traffic signals
- Cost - \$350,000 per traffic signal
- 240 miles of fiber-optic cable
- 15 intersection improvements budgeted



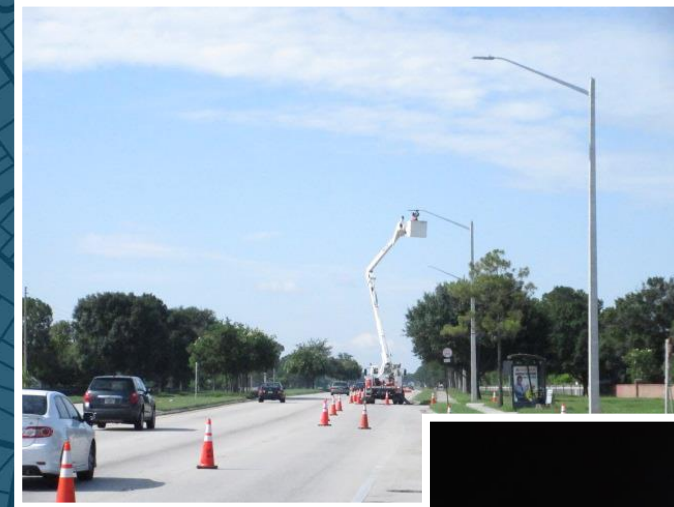
Bicycle/Pedestrian Safety

- Sidewalk Cost - \$264,000 per mile
- 8 new miles of sidewalks installed last year
- Bicycle Lanes
- Bicycle/Pedestrian Safety Action Plan



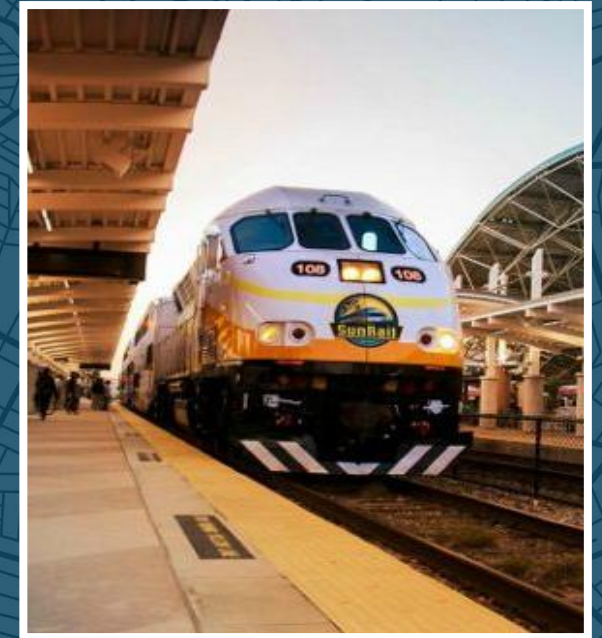
Street Lighting

- Major Roadways
- Existing 5-year program – 85 miles to be completed
- 190+ miles unlit major roadways
- Additional needs at Intersections and Crosswalks for Pedestrian Safety



Mass Transit

- LYNX currently funded utilizing Property Taxes
- SunRail operations transfer from FDOT to local governments
- Additional Mass Transit options have been studied in the past



The background of the slide is a dark blue color with a white line-art pattern of a city street grid. The grid consists of numerous small, irregular shapes representing buildings and blocks, connected by a network of lines representing streets. Some lines are thicker than others, suggesting major roads or highways. The overall effect is a dense, intricate map-like texture.

Why a transportation sales tax initiative?

Charter County and Regional Transportation System Surtax

- Sufficient revenues generated - \$595.6M annually
- Flexible use (Capital and O&M)
- Non-residents/tourists pay 51%
- Would not apply to essential food items, prescription drugs, utilities



Transportation Initiative Team



Property Taxes

10th Lowest County Government Operating Millage in the State of Florida

Central Florida Counties

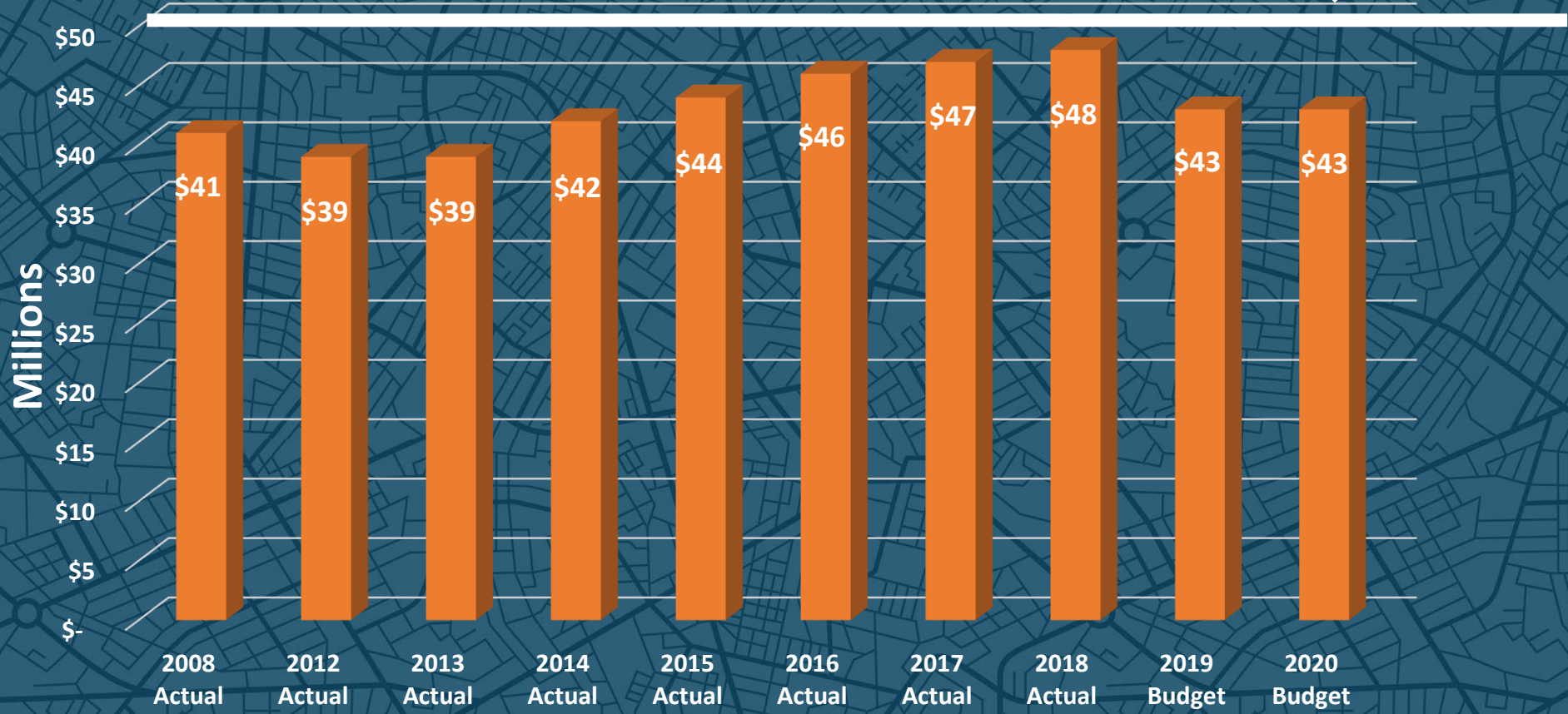
County	Operating Millage Rate
Brevard	3.9456
Orange	4.4347
Seminole	4.8751
Lake	5.1180
Volusia	5.6944
Osceola	6.7500
Polk	7.1565



½ Mill generates \$72 Million
1 Mill generates \$144 Million

Gas Taxes

Flat



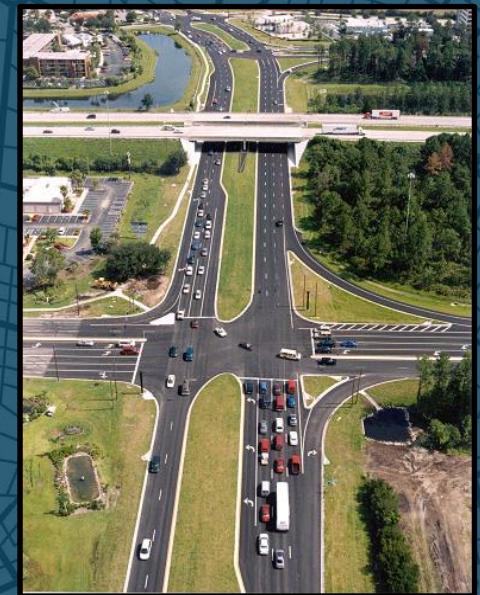
Counties Sales Surtax

County	State Tax	Local Tax	Local Tax Usage	Total Sales Tax
Orange County	6%	0.5%	0.5% School Capital Outlay	6.5%
Seminole	6%	1%	1% Local Government Infrastructure Surtax	7%
Osceola	6%	1%	1% Local Government Infrastructure Surtax 0.5% School Infrastructure Surtax	7.5%
Broward	6%	1%	1% Local Government Infrastructure Surtax	7%
Hillsborough	6%	2.5%	0.5% Local Government Infrastructure Surtax 0.5% Indigent Care and Trauma Center 1% Transportation Surtax 0.5% School Capital Outlay	8.5%
Volusia	6%	0.5%	0.5% School Infrastructure Surtax	6.5%
Palm Beach	6%	1%	1% Local Government Infrastructure Surtax	7%
Lake	6%	1%	1% Local Government Infrastructure Surtax	7%

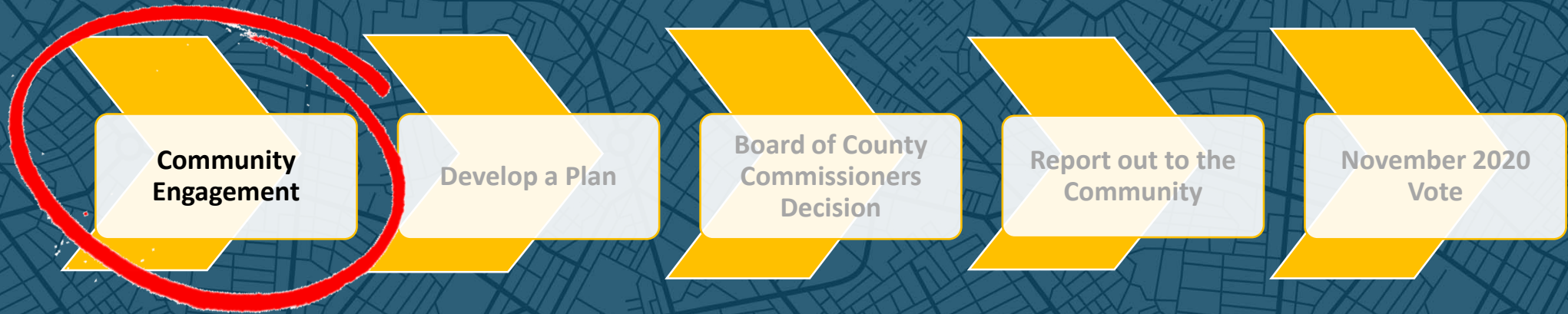
*Infrastructure Surtax - Used to finance, plan, and construct infrastructure; shared with municipalities

Potential Program Components

- Major Road Improvements
- Intersection Improvements
- Bike/Ped/ADA Improvements
- Roadway Resurfacing
- Technology & Traffic Operations
- LYNX System Enhancements
- SunRail Enhanced Service
- Other Mass Transit Needs



Next Steps



Please Join Mayor Jerry L. Demings and District 5 Commissioner Emily Bonilla for a

TRANSPORTATION TOWN HALL MEETING



Mayor Demings



Commissioner Bonilla

OCTOBER 3, 2019 | 6:30-8 P.M.

DOORS OPEN AT 6 P.M.

**GOLDENROD RECREATION CENTER/GOLDENROD PARK
4863 N. GOLDENROD ROAD, WINTER PARK, FL 32792**



**We need your input regarding the future of
Orange County transportation.**

Covered topics will include:

- Public Transportation
- Congested Roads
- Pedestrian Crossings
- Street Lights & Technology

Provide Your Input!

**Questions? Contact mayor@ocfl.net or call 407-836-7370
To RSVP, visit: www.ocfl.net/Transportation | [#OCFLtransportation](https://twitter.com/OCFLtransportation)**

Free parking is available at the facility.

We need your input on the future of
Orange County's transportation!



Take a brief survey and learn more
about transportation:
www.ocfl.net/Transportation



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TRANSPORTATION INITIATIVE

Mayor Demings Wants Your Input



Fact Facts

Meetings

Newsroom

Overview

Each week, nearly 1,600 residents move to Central Florida. This presents challenges in providing them with roads, infrastructure, mass transit, sidewalks,

At the 2019 Board of the County, Mayor Demings announced pursuing a Transportation sales tax referendum in November 2020.

For Phase I of this initiative, Mayor Demings is asking for your input by participating in upcoming community meetings and an online transportation survey. Orange County's 1.5 million residents have unique transportation needs and concerns depending on where they reside in the County – and we want to hear from you.

Over the next several months, Orange County is holding public workshops to gain input from community stakeholders, learn the priorities of residents, businesses and local leaders, and build towards a long-term solution that works for everyone.

From these community meetings, Orange County will gather feedback and develop a proposed plan to improve transportation in our community.

Upcoming Transportation Community Town Hall Meetings

Transportation Town Hall Meeting in District 8
October 3, 2019 | 6:30 P.M. - 8 P.M. (Doors Open at 6 P.M.)
Caldwell Recreation Center | Caldwell Park
4963 W. Caldwell Road Winter Park, FL 32780

Attend

Join Mayor Demings and Commissioner Brantley for the upcoming meeting and provide your input on transportation in Orange County.

[RSVP to Attend](#)

Provide Your Input!

[Take the Survey](#)

FDOT SunStore – Data Picker

Keith Smith, VHB

Signal ID Discussion

Katie King, Metric Engineering

Discussion – ATMS Signal ID

How do you select this number?

How often do you change this number?

Is it possible not to change these numbers moving forward?

Why?

- FDOT had a numbering system for signals but it doesn't line up with the numbers selected by each local agency.
- ATMS ID was selected because it would be familiar for each agency when using the different software. To avoid duplication unique County/City prefix was added (BRE-, OSC-, ORL-, etc)

Software Systems that use your ATMS ID

- TMDD
- ATSPM and Cloud ATSPM
- SOT in the R-ICMS
- SIIA
- MIMS eventually (through SIIA)
- ICMM
- SunStore collects/stores data
- ITSIQA

Signal Selection

Signal ID Press Enter to select signal

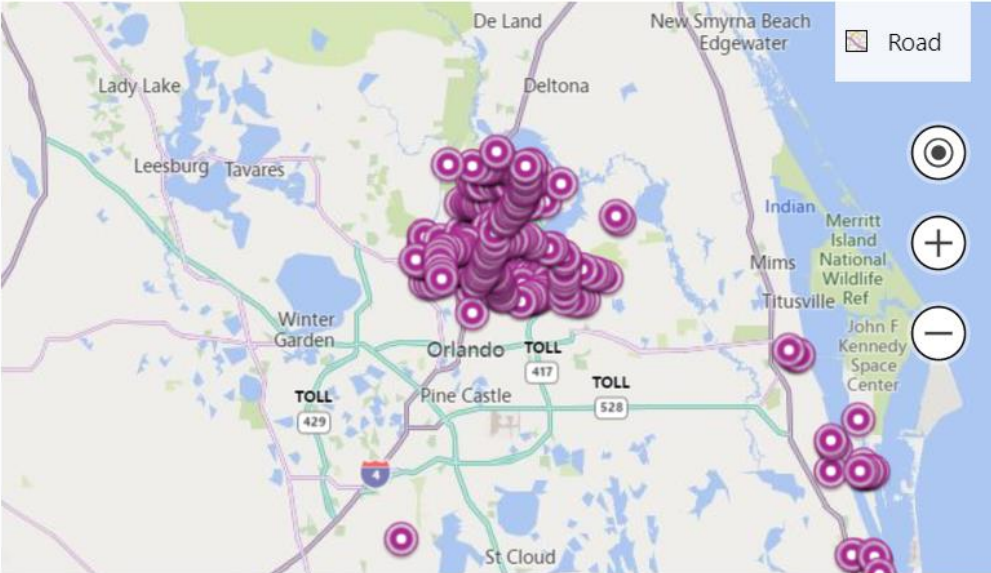
Signal List

Signal Map

Region

Metric Type

Road



The map displays a geographical area of Central Florida, including cities like Lady Lake, Leesburg, Tavares, Winter Garden, Orlando, Pine Castle, St. Cloud, De Land, Deltona, New Smyrna Beach, Edgewater, Indian Mims, Titusville, and Merritt Island. Major roads are shown, with toll roads 429, 417, and 528 labeled. A dense cluster of purple circular markers is centered around Orlando, representing signal locations. A legend in the top right corner indicates that a road symbol is used for roads. Navigation controls (home, zoom in, zoom out) are visible on the right side of the map.

What does it impact?

- Changing this number will impact historical information of the databases.
 - Essentially, it won't be able to understand that those two ID numbers are used for the same location at a different point in time.

Video-as-a-Sensor

In-camera “edge” Analytics Solutions

Lewis Stallworth

North America Business Development Manager

ITS and Smart City

Video as a sensor

End-user Challenges

- Prevent accidents
- Increase throughput capacity
- Detect traffic problems fast
- Get better knowledge of usage patterns
- Enforcing compliant behavior



Cameras with On-Board Intelligence

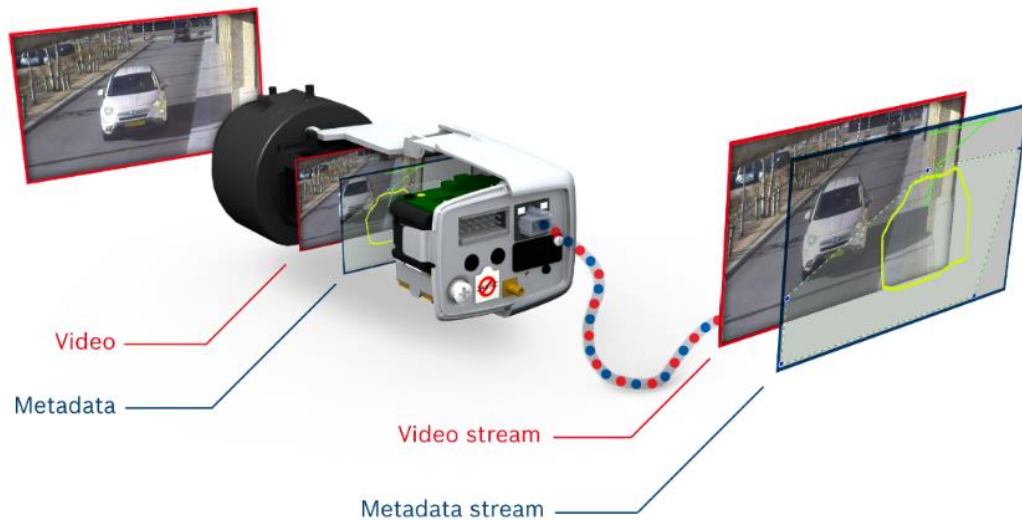
- Incident detection using in-camera analytics:
 - Stopped car
 - Lost cargo
 - Person/animal in tunnel
 - Wrong way driving
 - Early fire/smoke detection
- Speed change detection
- Traffic statistics collection

Cameras with analytics processing?

- True “edge” intelligence technology
 - Each camera is a node in a distributed intelligent device network
- No single point of failure or hardware bottleneck
- Reduced network bandwidth load
- Multipurpose device delivering video and analytics data
- Highly scalable and efficient

On-board Intelligence in Cameras – True Distributed “Edge” Intelligence

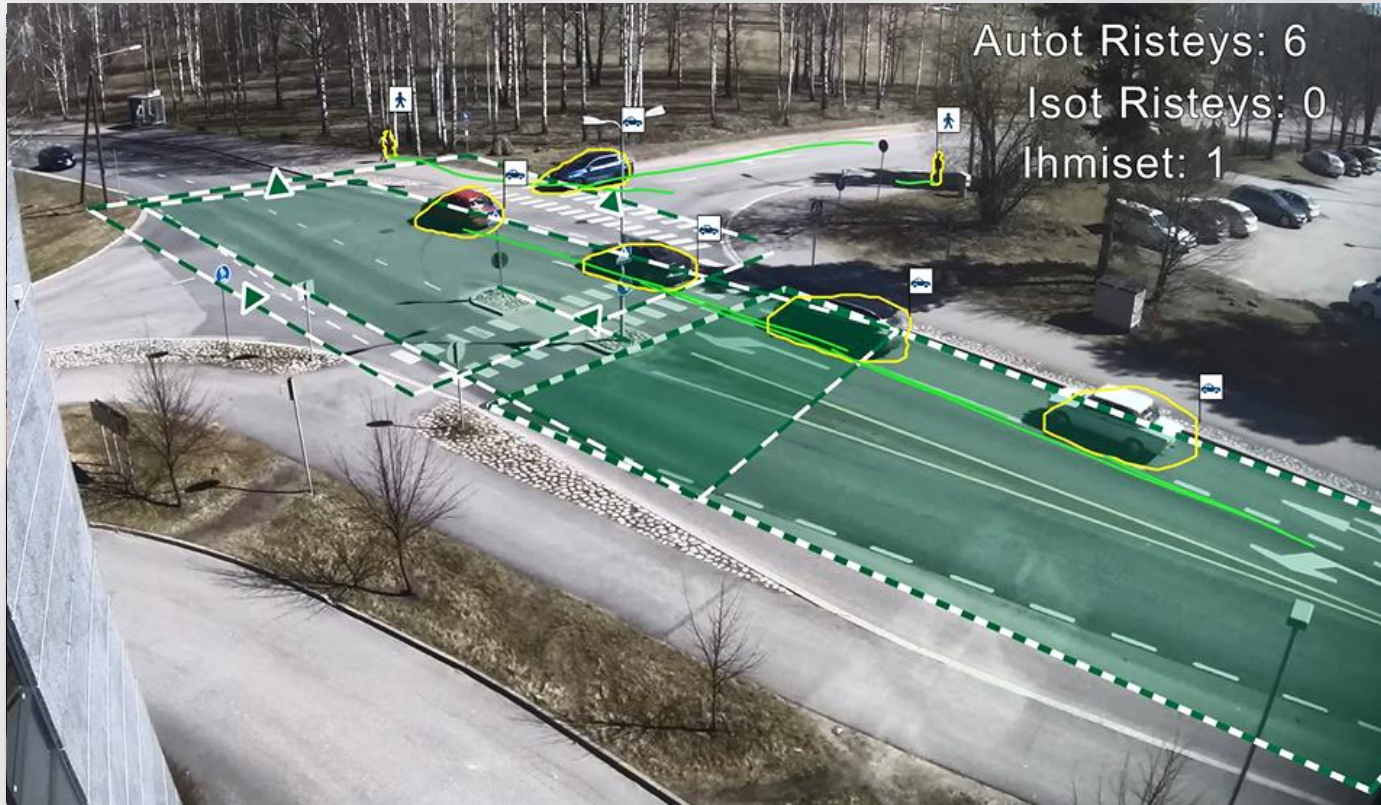
Camera as a sensor



- ▶ Intelligent Video Analytics create a base set of sensor capabilities on top of an image – “rich data”
- ▶ Intelligence adds automated incident detection
- ▶ Specialized “data only” cameras (nodes) without image output
- ▶ Cameras deliver dual purpose functionality; intelligent sensor platform to collect use case specific data plus excellent video streaming 24/7

Camera Metadata

Intelligent cameras with built-in video analytics capture the following data from a scene:



Object classification

Speed

Size

Color

Trajectory

Timestamp

Position on a map

↓
Unique object ID

Critical Safety Events Detected and Alerted



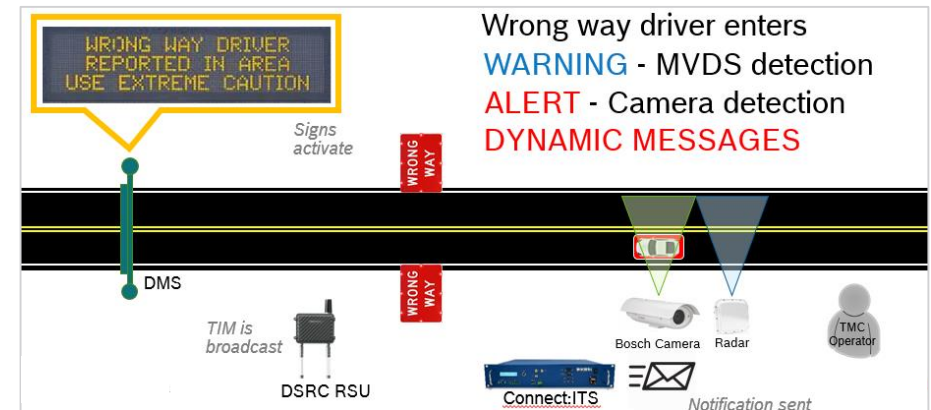
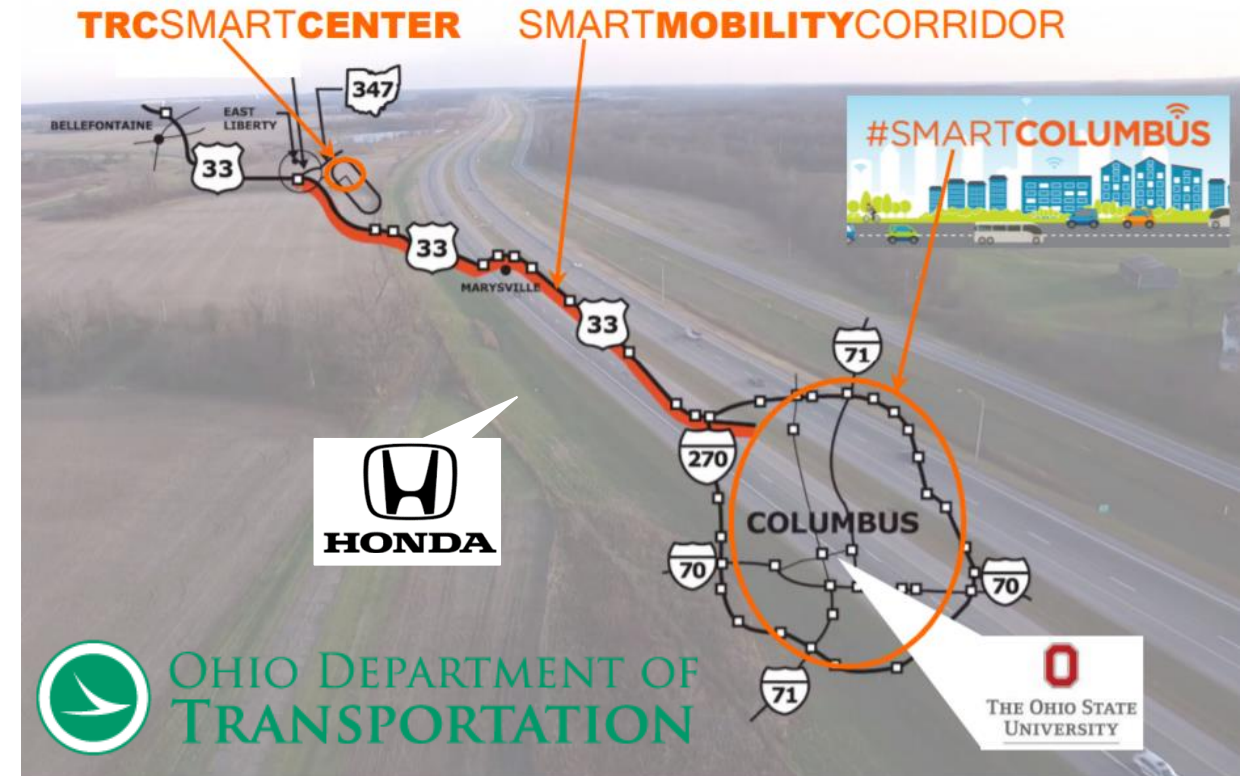
Wrong Way
Detection

Ohio DOT - US-33 Smart Mobility Corridor

- ▶ **Project Overview - US-33 Smart Mobility Corridor**
- ▶ Partnership with Drive Ohio
- ▶ 35 mile analytics technology enabled smart corridor
- ▶ Partnership: ODOT, Honda, TRC, OSU and local governments
- ▶ V2x Engineering Services by Bosch Engineering Group
- ▶ **Video Analytics Incident Detection Use Cases**

Pedestrian Safety	Pedestrian in the crosswalk, pedestrian queue at the corner, J-walking, school zone congestion
Wrong Way Detection	Detect and track wrong way driver with PTZ, notify CVs and non-CVs via dynamic messaging sign (DMS)
Queue Warning	Identify queues and communicate to CVs wireless in-vehicle messaging and non-CVs via DMS
Curve Speed Warning	Identify drivers approaching exit ramp with too high rate of speed and communicate via DMS
Cross Traffic Warning	Use warning on intersections where cross traffic is out of sight, notify CVs and non-CVs via DMS
Connected Roundabouts	Camera/analytics solution proposal under review
Red Light Violation	Advance detection and communicate to CVs, potential to trigger intersection traffic light controller
Work Zone Warning	Tracking late merge and alert driver and workers

CV – Connected vehicle
 ODOT – Ohio Department of Transportation
 TRC – Transportation Research Center
 OSU – The Ohio State University



Wrong Way Detection Solution Animation

WRONG WAY DRIVER
REPORTED IN AREA
USE EXTREME CAUTION

Signs activate

WRONG
WAY

WRONG
WAY

DMS

TIM is
broadcast



DSRC RSU



Connect:ITS



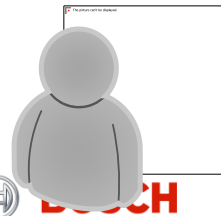
Notification sent



Camera



MVDS



BOSCH
TMC Operator

- ▶ **OK** - Correct direction driver
- Wrong way driver enters
- WARNING** - MVDS detection
- ALERT** - Camera detection

MIC IP starlight 7100i

Live Playback

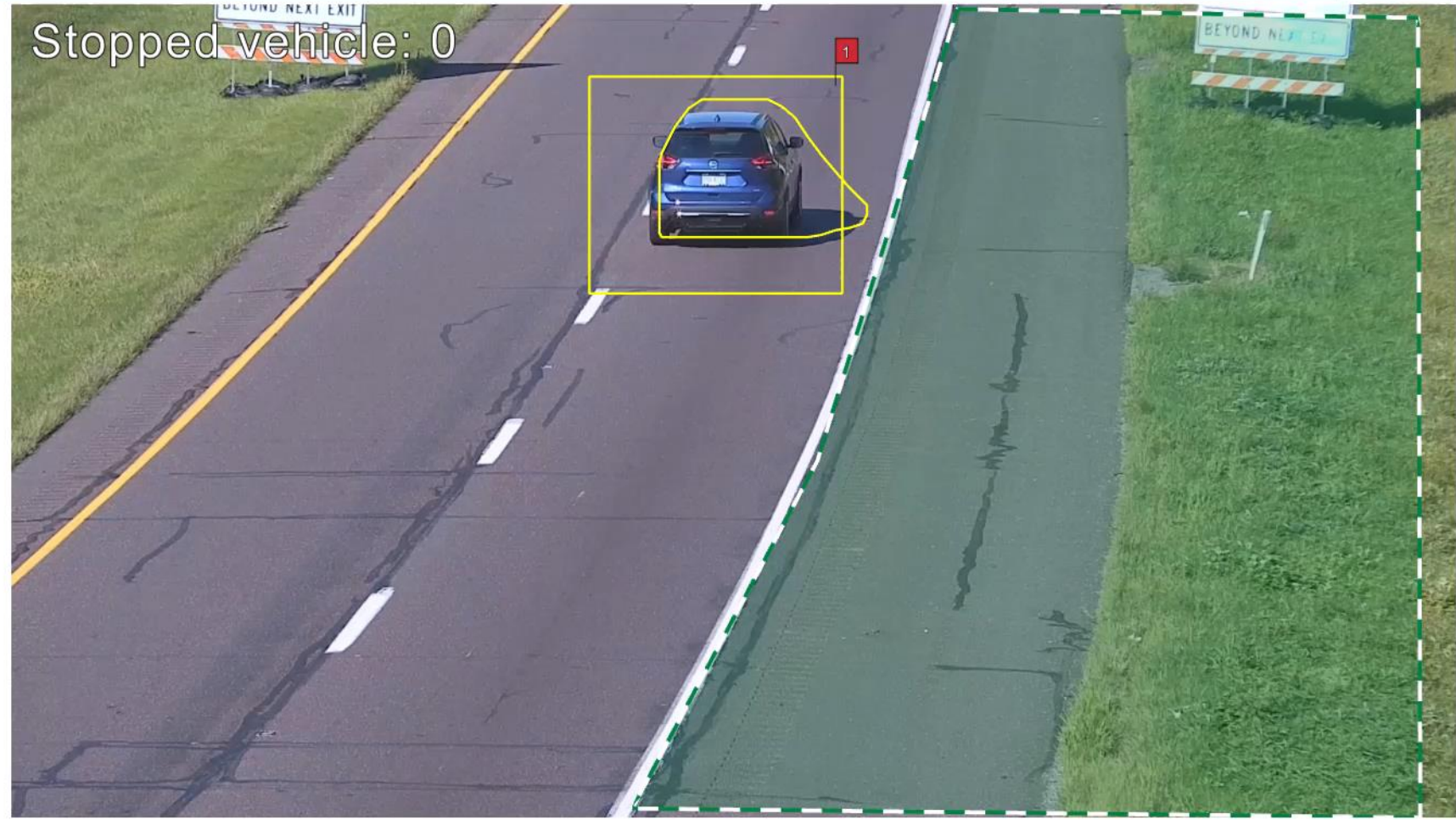
Configuration Dashboard Links Logout

Stream 1

PTZ

- Pre-positions
- 1 North East zone A
 - 2 North East zone B
 - 3 North East zone C
 - 4 North East zone D
 - 5 South West zone A
 - 6 Pre-position 6
- North East zone A

- AUX Control
- Intelligent Tracking
- Special Functions
- Scan 360°
 - Auto pan
 - Tour A
 - Tour B
 - Focus
 - Custom tour



03.09.2019 16:26:10

1


Calibrated Cameras With its Geo-coordinate Data

The screenshot displays a software interface for camera management. On the left, a map titled 'Map 1' shows an aerial view of a city block with several yellow camera icons and their fields of view. On the right, three camera viewports are shown, labeled 'Flexidome Outdoor 3', 'Flexidome Outdoor 2', and 'Flexidome Outdoor 6'. A vertical timeline on the right side of the viewports shows playback controls for 1 min and 5 min, with timestamps for Dec 12 at 7:49 am, 7:50 am, and 7:51 am. At the bottom, there are tabs for 'LIVE', 'PLAYBACK', and 'FORENSICS', along with an 'Exports' button. The Windows taskbar is visible at the very bottom.

Geo-coordinate Tracking

Positioning

Mounting position



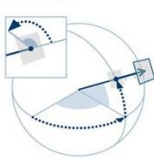
Tilt angle [°]

Roll angle [°]

Height [m]

Focal length [mm]

Coordinate system



Latitude

Longitude

Ground level [m]

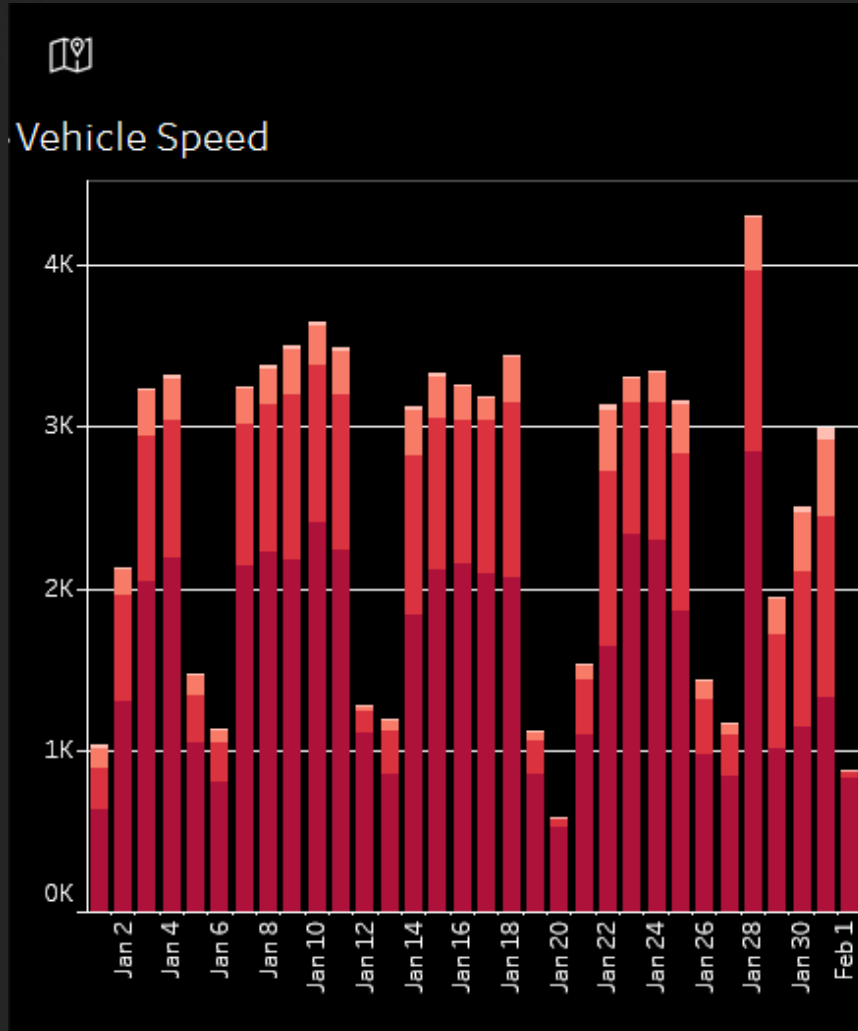
Azimuth [°]

Intelligent Video Analytics

Camera Trainer



... can enable data like this



- Vehicles over 30mph:
- Vehicles 25-30mph:
- Vehicles 20-25mph:
- Vehicles 0-20mph:

MIC Starlight 7000 HD

Turning right: 0

Going Straight: 0

Turning Left: 2

Large Obj
• Earl

D



Video as a sensor

Secure V2X Proof of Concept

BOSCH & ESCRYPT Demonstration

escrypt

SECURITY. TRUST. SUCCESS.

V2X Use Cases:

1. V2I – Red Light Warning
2. V2I – Pedestrian Detection and Warning
3. V2I – Bicycle Detection and Warning
4. V2I – No Left Hand Turn Warning
5. V2X – Disabled Roadside Vehicle Warning
6. V2X Security Credential Management System
7. V2X Application Software/Vehicle User Interface

Camera Use Cases:

2. Pedestrian in Cross-Walk detection
3. Traffic Classification (Car, Truck, Bicycle, Motorcycle)
10. Traffic Counting, speed, trajectory detection



V2X Application Software:

 **BOSCH** and *eTRANS* SYSTEMS
(integrated into dashboard and/or SmartPhone/Tablet)



V2X Security:
escrypt



Traffic Intersection



Camera:
 **BOSCH**



Road Sign
Orangetraffic+



Vehicle:
BOSCH
GM Escalade

Second Vehicle:
BOSCH
Ford F-150



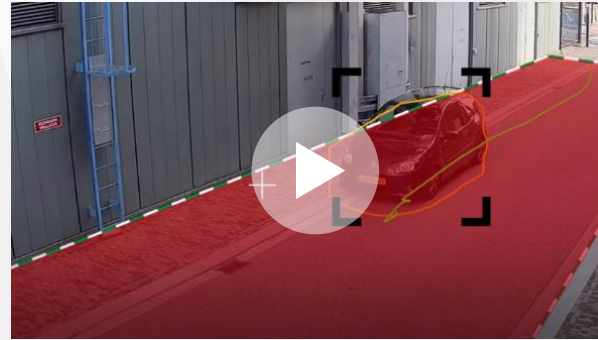
BOSCH

Traffic solutions

Video Analytics for incident detection and traffic monitoring



Automatic Incident Detection (AID)



Enforcing no-parking zones



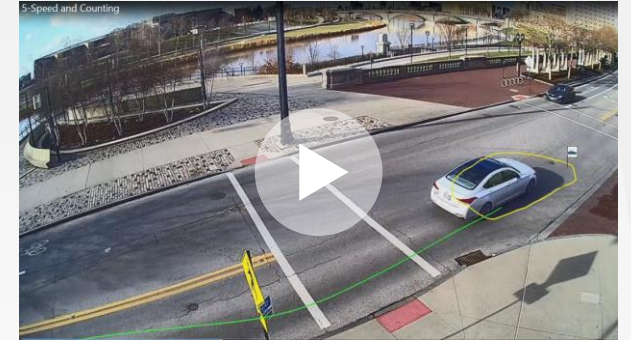
Intelligent parking



Wrong way detection



Intelligent Tracking



Speed and counting

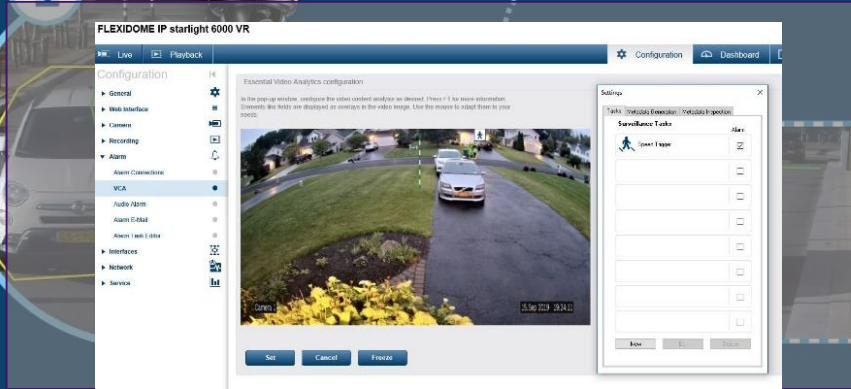
Excellent Video Plus Aggregated Data

Metadata streaming and data collection

BOSCH

CUSTOMER

1



2

BDCS translates Bosch metadata in a customer consumable format (**SQL**)

Metadata
Video Stream



NVR & VMS Client

3

SQL Database



Car
White
5 objects
54.5.2.5
23:14:35 a.m
20 km/h
Position

4

Customer specific dashboards can be created by using









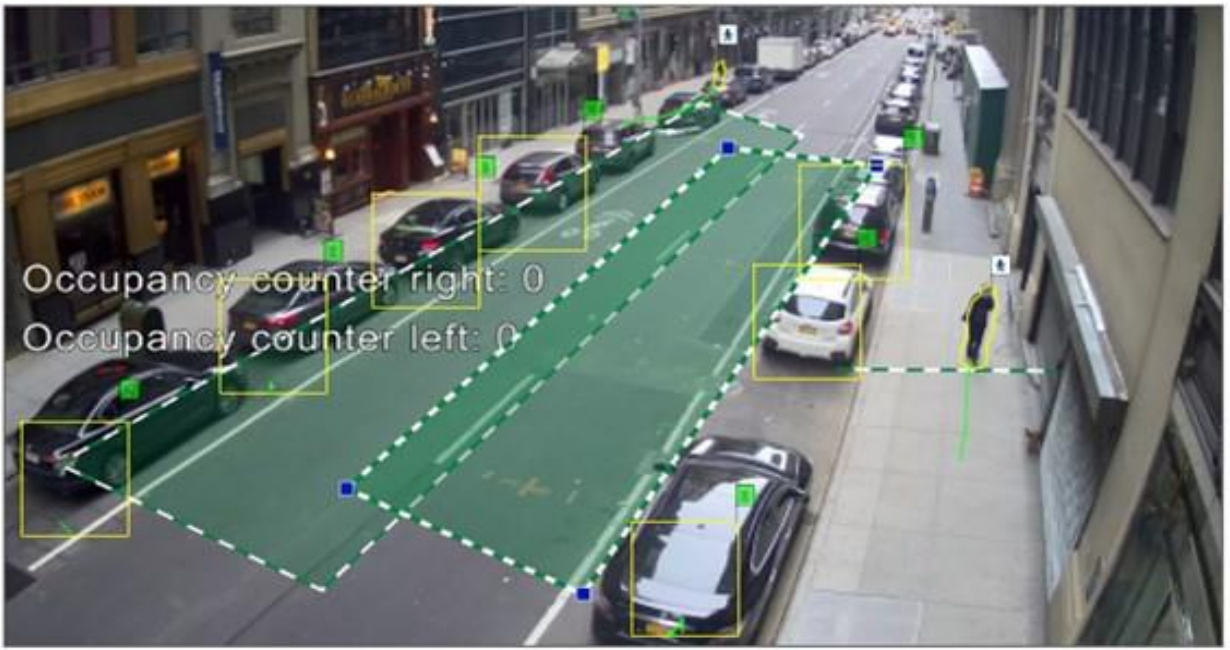
Cameras With On-Board Edge Analytics Create New Possibilities

General Camera Recording Alarm **VCA** Interfaces Network Service

Main Operation Tamper Detection Tasks Metadata Generation Metadata Inspection Scene-specific Object Detector

Task configuration

	Alarm
 Double Parking Right Count	<input checked="" type="checkbox"/>
 Double Parking Left Side Count	<input checked="" type="checkbox"/>
 OIF Left Side D-park	<input checked="" type="checkbox"/>
 OIF Right Side D-park	<input checked="" type="checkbox"/>
 Occupancy counter right	<input type="checkbox"/>
 Occupancy counter left	<input type="checkbox"/>



Occupancy counter right: 0
Occupancy counter left: 0

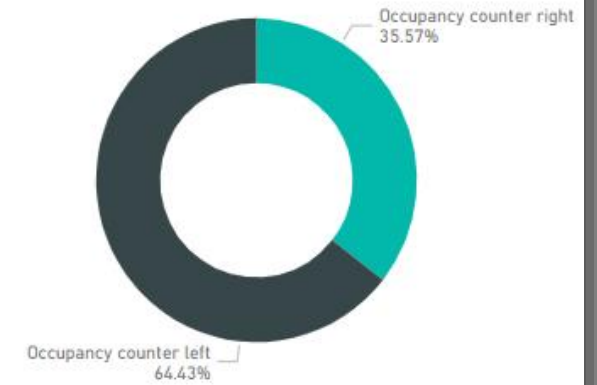
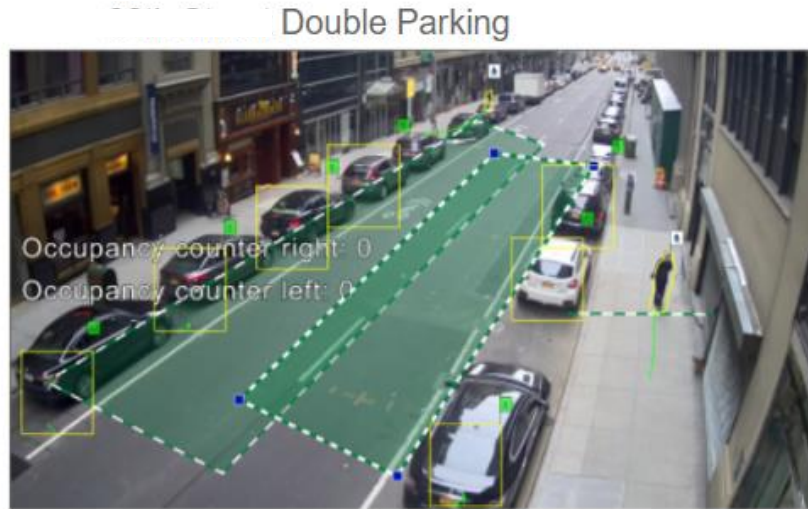
Incident Detection and Data



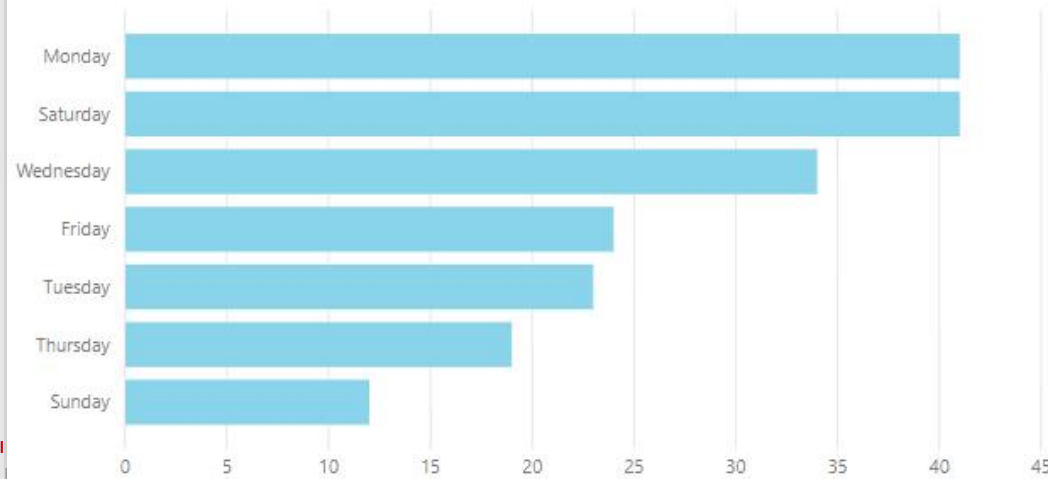
10/31/2018 11/15/2018

CounterName

- Occupancy counter left
- Occupancy counter right

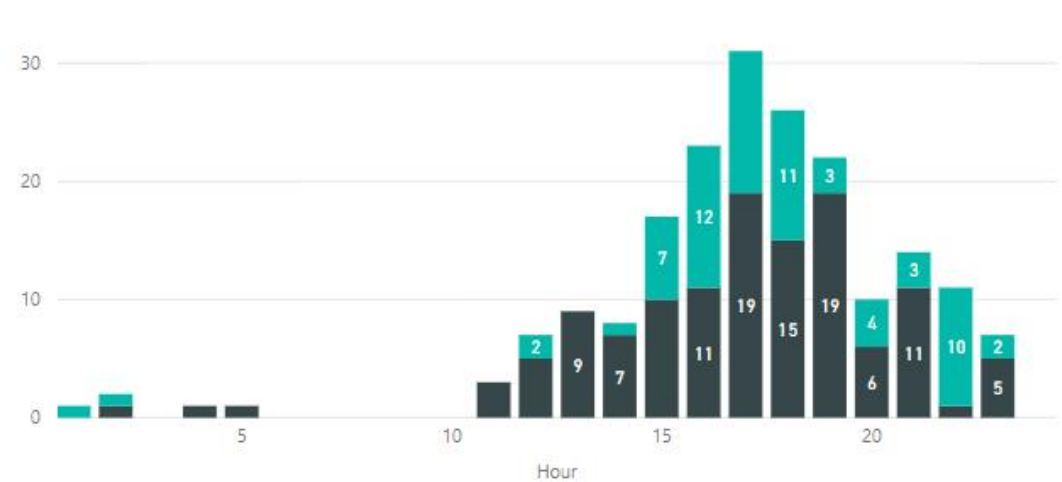


Double Parking by Weekday



Double Parking by Hour

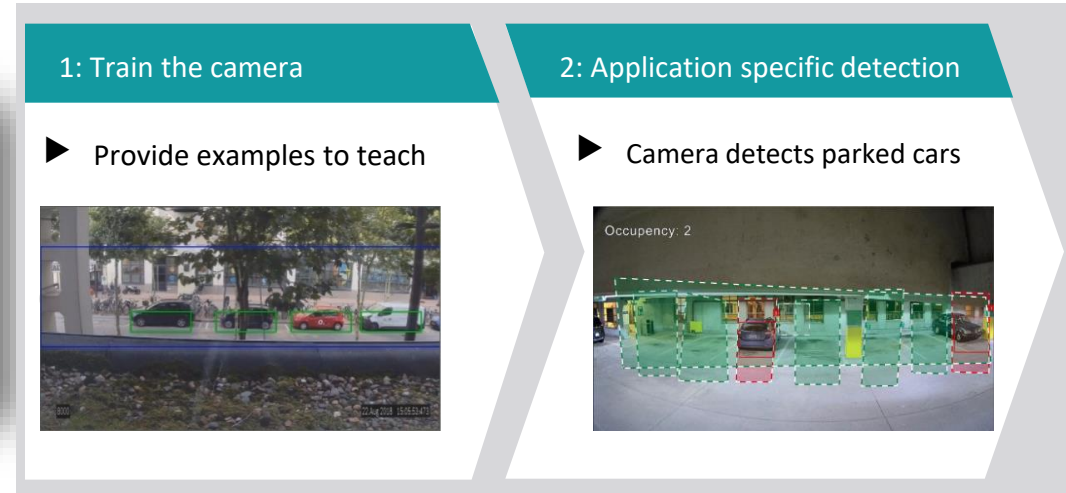
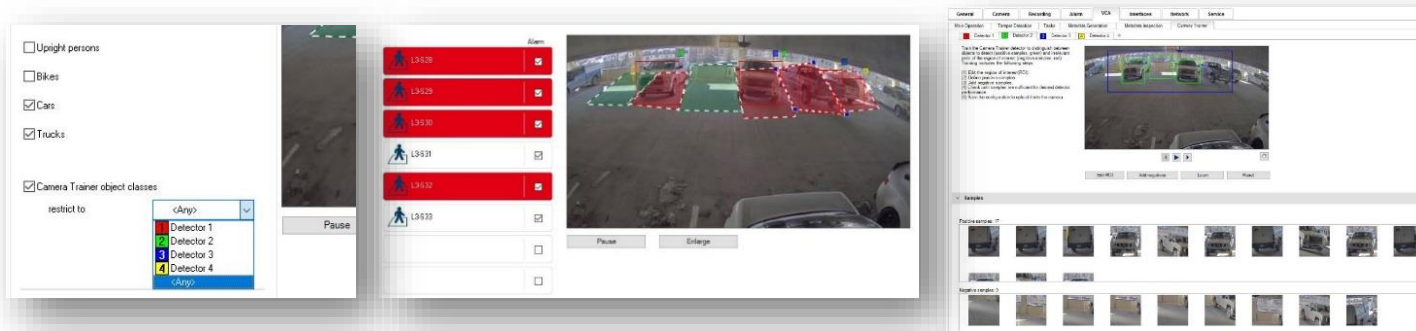
CounterName ● Occupancy counter left ● Occupancy counter right



Camera Analytics – New Capability/New Complexity

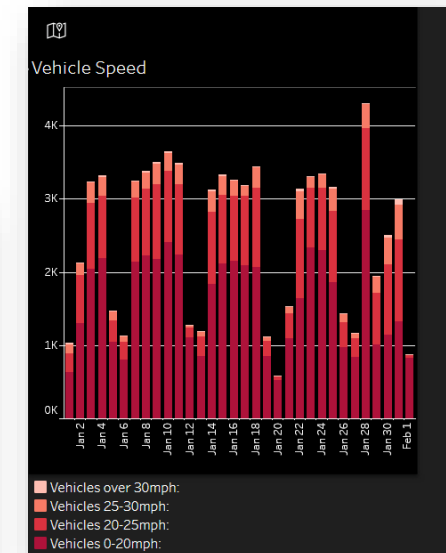
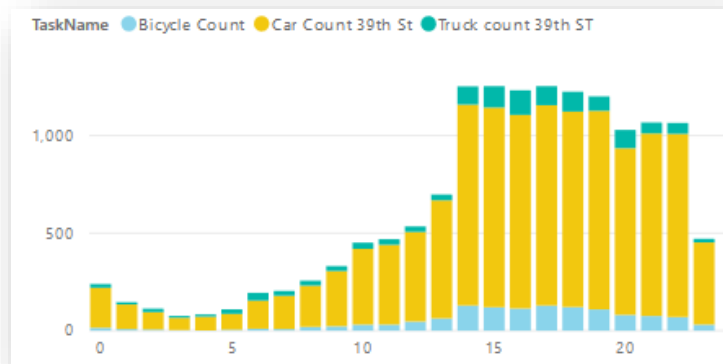
► Teach & Detect Analytics (machine learning)

- Creation of customized IVA detectors
- Requires an investment in time, not a set and forget feature!



► Data Collection Software (BDCS)

- Data collection → ready for visualization → Tableau, Microsoft Power BI, other tools
- Requires licensing and understanding of Microsoft SQL Server, storage (local or Azure Cloud), knowledge to create the visualization front-end dashboard.



New Use Cases Enabled by Machine Learning Technology

1: Train the camera

- ▶ Provide examples to teach camera.
(Car / no car)



2: Start application specific detection

- ▶ Camera detects parked cars.



Free / occupied parking spot detection

► Challenge:

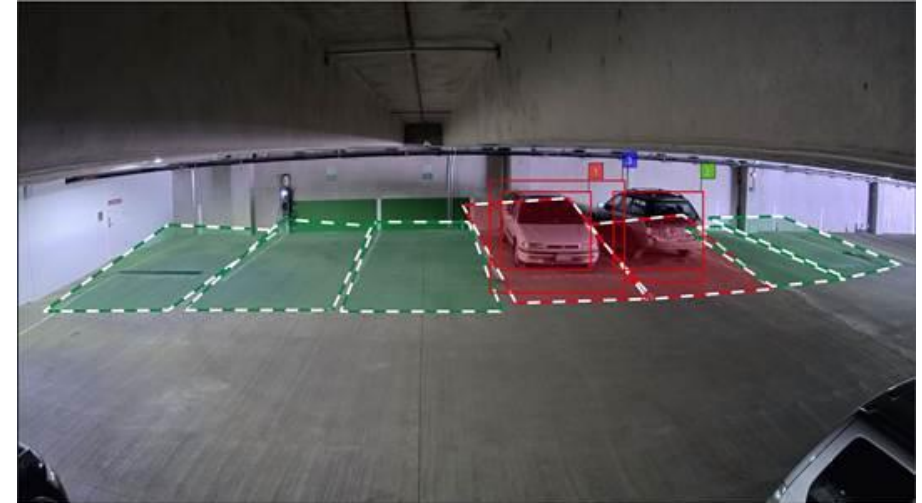
- I want to know how many parking spaces are occupied. I need reliable information to optimize traffic flow.

► Solution:

- With Camera Trainer you can teach your system to very reliably recognize occupied and free parking spots.

► Benefit:

- Be alerted when all spots are occupied and take measures.
- Save costs by not having the need to put sensors in the ground.
- By gathering statistics you have business intelligence which gives you a lot of insights.



Q&A

THANK YOU!

Next Consortium – December 5, 2019

November 28, 2019





TSM&O Consortium Meeting

MEETING AGENDA

FDOT RTMC

4975 Wilson Rd.

Sanford, FL 32771

Turing Conference Room

October 3, 2019

10:00 AM-12:00 PM

- 1) WELCOME
- 2) ORANGE COUNTY ONE-CENT SALES TAX INITIATIVE
 - Christine Lofye, Orange County
- 3) FDOT SUNSTORE DATA PICKER – DEMONSTRATION
 - Keith Smith, VHB
- 4) SIGNAL ID NUMBERS
 - Katie King, Metric Engineering
- 5) ITS FUNDING REQUEST LIST – UPDATE
 - Jeremy Dilmore, District Five TSM&O
- 6) CURRENT INITIATIVES
 - Jeremy Dilmore, District Five TSM&O
- 7) VIDEO AS A SENSOR
 - Lewis Stallworth, Bosch



TRANSPORTATION FAST FACTS



GROWTH & CONGESTION ISSUES ...

- **Extraordinary population growth.** Central Florida has been growing by a net of nearly 1,000 new residents every week. By the year 2030, projections have the regional population at 5.2 million. In addition, as one of the world's leading tourism destinations, Orange County had a record-breaking 75 million visitors in 2018.
- **Congestion continues to increase.** Central Florida commuters spent an average of 46 hours per year in traffic congestion. Traffic delays cost the typical American commuter \$960 per year.
- **Commuting times are escalating.** Parts of Orange County rank among the highest average commute times in Florida – and commute times are steadily increasing each year.
- **High influx of workers coming into Orange County.** The most recent data from the Orlando Economic Partnership shows that about half of all workers in Orange County come in from the surrounding seven counties for work – that's approximately 457,000 individuals coming into Orange County on a daily basis.

TRANSPORTATION CHALLENGES ...

- **Pedestrian safety needs to be improved.** According to the 2019 Dangerous by Design report from Smart Growth America, the Orlando-Kissimmee-Sanford area is ranked at the top of the list of the most dangerous urban areas for pedestrians.
- **Current public transit is inadequate.** LYNX bus routes do not meet the current demand, and SunRail does not run often enough.
 - LYNX has approximately 300 buses and services 2,500 square miles. Compare this to Allegheny County in Pittsburgh where the county services only 745 square miles with 700 buses.

www.ocfl.net/Transportation

#OCFLTransportation

Orange County Transportation Survey

You are invited to participate in this survey to gather information about your transportation needs and improvements in Orange County. Thank you in advance for your participation.

1. What is your Zip Code? _____

2. Select your age range.

18-24 _____

45-54 _____

65-74 _____

25-34 _____

55-64 _____

75+ _____

35-44 _____

3. What is your primary mode of transportation (to work, school, appointments, etc.)?

Automobile _____

LYNX Bus Service _____

SunRail System _____

Walking _____

Biking _____

Other _____

4. How long is your commute to work?

Less than 30 minutes _____

30 minutes to 1 hour _____

More than 1 hour _____

More than 2 hours _____

N/A _____

5. What are your current transportation challenges? (Choose ALL that apply)

Commuter time _____

Traffic congestion _____

Lack of street lights _____

Unsafe walking and/or biking conditions _____

Lack of traffic signals _____

LYNX buses do not run frequently enough _____

LYNX buses do not run late enough into the evenings/night _____

SunRail System does not run frequently enough _____

SunRail System does not run late enough into the evenings/night _____

SunRail System does not run on weekends _____

No transportation challenges _____

6. What do you believe are the top priorities for improving transportation in Orange County? (Choose your top 5)

Maintaining and repairing existing roads _____

Widening existing roads _____

Improving intersections _____

Building more sidewalks and bike lanes _____

Improving LYNX Bus service _____

Improving SunRail System _____

Building a Mass Transit System (to include buses, trains and other modes of transportation) _____

Improving traffic signal timing _____

Installing street lights _____

Increasing pedestrian safety (crosswalks, signals) _____

Increasing the number of bike/pedestrian trails (i.e., West Orange Trail, Cady Way Trail) _____