



TSMO CONSORTIUM MEETING SUMMARY

Meeting Date: July 11, 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

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. USDOT CV PILOT DEPLOYMENT SITES – UPDATE

David Williams discussed the progress of the USDOT CV Pilot Deployment Sites since they began in 2015. He also gave an overview of the lessons learned and best practices derived from the deployments.

- Three CV Pilot deployments launched in 2015, sponsored by the ITS Joint Program Office (JPO):
 - Tampa (THEA),
 - New York City (NYCDOT), and
 - Wyoming (WYDOT)
- Program Goals:
 - Spur Early CV Tech Deployment
 - Connected Vehicles
 - Mobile Devices
 - Infrastructure
 - Target improvements to safety, mobility, and environment
 - Resolve issues of various deployments
 - Technical interoperability
 - Institutional arrangements
 - Governance
 - Financial sustainability
 - Will also support an impact assessment and evaluation effort toward a broader **cost-benefit assessment** of CV technologies.
- Testing interoperability of RSU/OBU equipment across pilot sites using four CV Applications
 1. Forward Collision Warning
 2. Emergency Electronic Brake Lights
 3. Intersection Movement Assist
 4. SPaT/MAP messaging to inform Red Light Violation Warning

- Controlled testing at FHWA's *Turner-Fairbank Highway Research Center (TFHRC)* prior to real-world deployment
- Phases of deployment:
 - **Phase 1** – COMPREHENSIVE DEPLOYMENT PLAN
 - **Phase 2** – DESIGN, BUILD, TEST in-vehicle, mobile device, and roadside technologies using Industry ITS Standards for interoperability
 - **Phase 3** – OPERATE, MAINTAIN pilot projects
- New York City – Emphasis on pedestrian and motorist safety (vision zero). Largest CV deployment to date, with goal to equip:
 - 3,000 cabs
 - 700 buses
 - 170 sanitation fleet delivery trucks
 - 3,000 city-owned vehicles
 - 100 personal V2I devices for pedestrians
 - 340 signalized intersections
- Wyoming (I-80) – Emphasis on safer freight operations during inclement weather. I-80 carries 32 million tons of freight per year. During winter, wind speeds can reach 30 mph with gusts reaching 65 mph. As a result, winter crash rates for freight traffic are 3-5 times higher than summer crash rates, additionally, within four years there were 200 truck blow-overs and numerous road closures along I-80. Equipment installation goals include:
 - 400 vehicles (fleet vehicles and commercial trucks)
 - 75 RSUs
 - *Primary goals: communication during inclement weather, communication of and guidance to parking availability, dynamic travel guidance*
- Tampa – Emphasis on collision reduction, congestion relief, wrong-way entry (reversible lanes on Selmon Expressway), pedestrian safety, bus operations (via TSP), and conflicts between streetcars, motorists, and pedestrians at high-volume mixed-traffic locations.
 - CV Applications include:
 - Forward collision warning
 - SPaT/MAP messaging for red-light violation warning
 - Emergency electronic brake lights
 - Intersection movement assist
 - Wrong Way Entry
 - Exit deceleration warning
 - Curve speed warning
 - Work zone warning
 - Do not pass warning
 - Speed limit warning
 - Equipment installation targets:
 - 1,000 personal vehicles
 - 10 buses; 10 trolleys
 - 500 pedestrians with a smartphone app
 - 40 RSUs along city streets

- CV Device Deployment Status (as of 6/1/2019)

Wyoming Pilot (WYDOT)	Complete	Target
WYDOT Maintenance Fleet Subsystem On-Board Unit (OBU)	25	90
Integrated Commercial Truck Subsystem OBU	0	25
Retrofit Vehicle Subsystem OBU	0	255
WYDOT Highway Patrol	0	35
Total Equipped Vehicles	25	405
Roadside Units (RSU) along I-80	75	75

Tampa Pilot (THEA)	Complete	Target
Vehicle Equipped with On-Board Unit (OBU)	924	1,000
HART Transit Bus Equipped with OBU	10	10
TECO Line Street Car Equipped with OBU	8	8
Total Equipped Vehicles	942	1,080
Roadside Units (RSU) at Downtown Intersections	44	44

New York City Pilot (NYCDOT)	Complete	Target
Taxi Equipped with Aftermarket Safety Device (ASD)	1	3,200
DCAS Fleet Equipped with ASD	0	3,200
MTA Fleet Equipped with ASD	2	700
NYCDOT Fleet Equipped with ASD	83	700
DSNY Fleet Equipped with ASD	1	170
Total Equipped Vehicles	87	8,000
Roadside Units (RSU) at Manhattan and Brooklyn Intersections and FDR Drive	112	400
Vulnerable Road User (Pedestrians/Bicyclists) Device	0	100
PED Detection System	2	10

- The Tampa CV Pilot used a major public outreach effort including toll rebates for volunteers as well as a Quick Reference Guide.
 - Various special updates were also released for volunteers and the public
 - On 5/30/2019, a special update was released to explain an over-the-air update
 - Driver's Manual was also provided to all volunteers that would explain the alert symbols, as well as basic troubleshooting of the installed equipment
- Tampa CV Pilot – Performance Measurement example
 - September Travel Data
 - Average of 1.7 million basic safety messages (BSM) per day
 - Approximately 0.9 million BSM per RSU
 - Up to 270 participants per hour, on average, at AM peak hour
- Tampa CV Pilot – Lessons Learned (from 2019 TRB Annual Meeting, January)
 - Solidify standards earlier
 - Obtain a better understanding of...
 - Available applications' maturity
 - Available RSU and OBU hardware
 - Vendors' depth and resources
 - Complete integration testing before private vehicle installs begin
 - Determine ability to use traditional ITS devices as part of solution earlier in the process
 - OBU installation – use professionals to manage effort
 - Multiple technical scans using RFPs (with on-road testing)
 - Create collaborative environment via early sourcing of suppliers
 - Early real-world testing with infrastructure in place to verify end-to-end system / application performance
 - Team spread out across USA / Europe; ensure they can support you from overseas
 - New development efforts (e.g., Over-the-Air and security) need to be piloted/tested early in the program
 - Need adequate **incentives with community** and/or **media support** to engage community
 - Recognize need for complete and experienced project team
 - During Operational Readiness Demonstration, **significant performance** issues occurred with OBU/RSU communication and applications – while the off-site testing had no issues, the live demo suffered performance deterioration
 - Project team determined significant non-THEA traffic was present over the communication lines
 - A local radio station using **HamWAN** communications was the culprit
 - **HamWAN** is a moniker associated with a technique used by amateur (Ham) radio operators that employ wireless radios in the amateur radio frequencies to provide Internet Protocol communications over a region. It operates in the 5.9GHz band used by DSRC
 - THEA conducts **random wireless monitoring (sniffer) surveys** in the CV Pilot Area to assess interference now
 - Recommends early and complete **radio spectral analysis** for any future deployment areas
 - Including full DSRC spectrum and adjacent channels
 - DSRC Interference white paper forthcoming
- For more information, visit:
 - www.tampacvpilot.com
 - <https://www.its.dot.gov/pilots/>
 - https://www.its.dot.gov/pilots/success_lessonslearned.htm

Discussion:

- Question: Have there been any pre/post studies to compare operational, safety, environmental impacts, etc. of the pilots?
 - Answer: The studies are required and are in the process of being conducted, but it may take some time before they can be published.

Following several questions and responses regarding the CV Pilot deployments, Jeremy Dilmore discussed new developments in CV communications.

CV2X vs. DSRC vs. 5G Discussion

- **DSRC** – Technology developed by USDOT originally intended for launch in 2013. It has been very well developed and devices have been set up for it. Using DSRC, messages are sent by short hops from infrastructure-to-car-to-car-to-infrastructure. The technology allows calculations to run based on conceptual situations. Many car manufacturers say the biggest prevention to using DSRC is that adding the necessary equipment and antennae to their cars will dramatically decrease their profit margin to adding DSRC. Toyota is the primary auto manufacturer pushing for DSRC.
- **CV2X** – This tech uses a different antenna type to produce longer range radio waves in the same band as DSRC waves. The standards for this have not been finalized; products are being tested but no manufacturing has occurred yet. CV2X is a cheaper option because most cars already have LTE connections which allow car manufacturers to maintain their profit margins. This tech is being pushed most heavily by Ford (along with most other auto manufacturers).
- **5G** – If 5G communications are used, the car manufacturer owns and controls all of the data being emitted and received by their vehicles; the information will not be broadcasting in open space. They will then sell that information to the government. FDOT is able to use SPaT to create equity in the relationship as car manufacturers need SPaT to “see around corners” and to allow their cars to drive more aggressively among traditional vehicles.
- FDOT has been in contact with two manufacturers (Commsignia and Savari) to discuss the units that they have developed to work with both DSRC and CV2X. The units cannot function with both simultaneously as the signals interfere with one another. To get simultaneous functionality, the antennae have to be oriented 90° from one another but such a device has not been manufactured yet; it is likely to take up to 2 years to fully develop this device and get to full production.
- Back-office is developing standards to work with CV2X that mirror the DSRC standards as closely as possible so that the back-office software can work consistently, efficiently, and smoothly with both systems. These investments in the back office are much more valuable than investments in field hardware as the hardware will be obsolete by 2021, while the back office will be useful for years on end.
- Ultimately, the marketplace for traffic / smart cities data sharing and ownership is not mature; everyone from Verizon to Comcast to Ford wants to be the one to own and control the data but nothing is as yet set in stone.

III. ITS FUNDING REQUESTS LIST

Jeremy Dilmore gave a brief update on the status of this year’s ITS Funding Requests List.

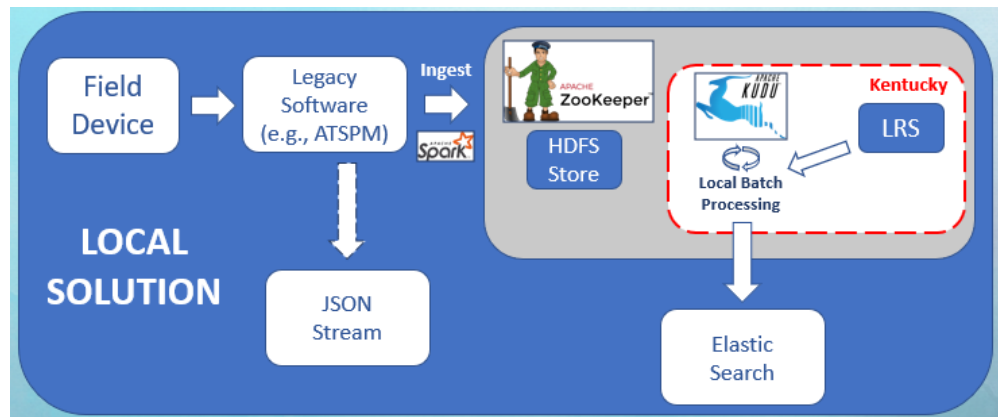
- The List has been submitted to Central Office

- State funds will be used for Pushbutton contracts to allow for more efficient processes on projects for which equipment installation standards are already in place.
- The full ITS Funding Requests is provided in the slides at the end of this meeting summary

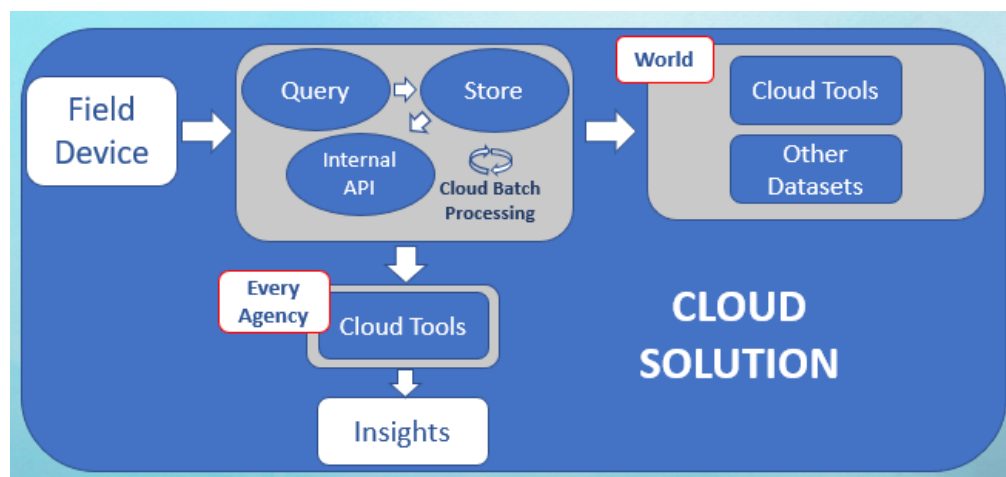
IV. MANAGING DATA – BEST PRACTICES AND FROM NCHRP CONFERENCE

Jeremy Dilmore gave a brief presentation on the outcomes of the NCHRP conference.

- NCHRP: Framework for Managing Data from Emerging Transportation Technologies to Support Decision-making
- Hosting Data options:
 - Local – currently being used by FDOT, allows for 24/7 processing of data.



- Cloud – processing in the cloud is prohibitively expensive, and to transfer and keep everything in the cloud requires complete reprogramming of current software. So until new software created to work with the cloud is produced, data will most likely be kept locally.



- Combination – Small datasets are processed using the Cloud Solution, large datasets are processed using the Local Solution. This method is used in Texas, they likely host a lot of static data in the cloud and keep the dynamic/rapidly changing data on local servers.

- When FDOT begins the process of migrating services to the cloud, data will be the last thing to move as the necessary processing software will have to be in place first. Migration will be done stepwise (the process is expected to last at least ten years).
- Data Language for Contractors – Best Practices
 - Working with Texas DOT to determine what they have found works best

Discussion:

- SunStore: Jeremy hopes to have an update for the next Consortium meeting demonstrating how spatial selection, specific time ranges, etc. can be used to extract data in the Microsoft Excel format, for easier use of the data.
- Question: How long does data need to be kept for public records purposes?
 - Answer: Three years (down from seven years). We have ample space for three years of storage, and are looking into storing data for longer using data compression to decrease the space needed. We are experimenting with HDFS products using Elastic Search to see how well extractions work with compressed data.

V. RTMC TOUR

Jeremy Dilmore gave a tour of the new RTMC building. The building is expected to open by August 1st.

VI. NEXT MEETING

- September 5, 2019
- Expected to be held at the new RTMC Building

VII. ATTACHMENTS

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

END OF SUMMARY

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



TSM&O Consortium Meeting

July 11, 2019

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TSM&O Consortium Meeting

May 2, 2019

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Welcome to the TSM&O Consortium Meeting July 11, 2019



Meeting Agenda

1. Welcome
2. CV Interoperability – CV Pilot Deployment Program
3. ITS Funding Request List
4. Managing Data – Best Practices and Lessons Learned
5. Current Initiatives
6. RTMC Tour

CV Interoperability – CV Deployment Pilot Sites

David Williams, VHB

CV Interoperability – Deployment Pilot Sites

- Three CV Pilot deployments launched in 2015, sponsored by the ITS Joint Program Office (JPO)
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 3. Resolve issues of various deployments
- Will also support an impact assessment and evaluation effort toward a broader **cost-benefit assessment** of CV technologies



CV Interoperability – Deployment Pilot Sites

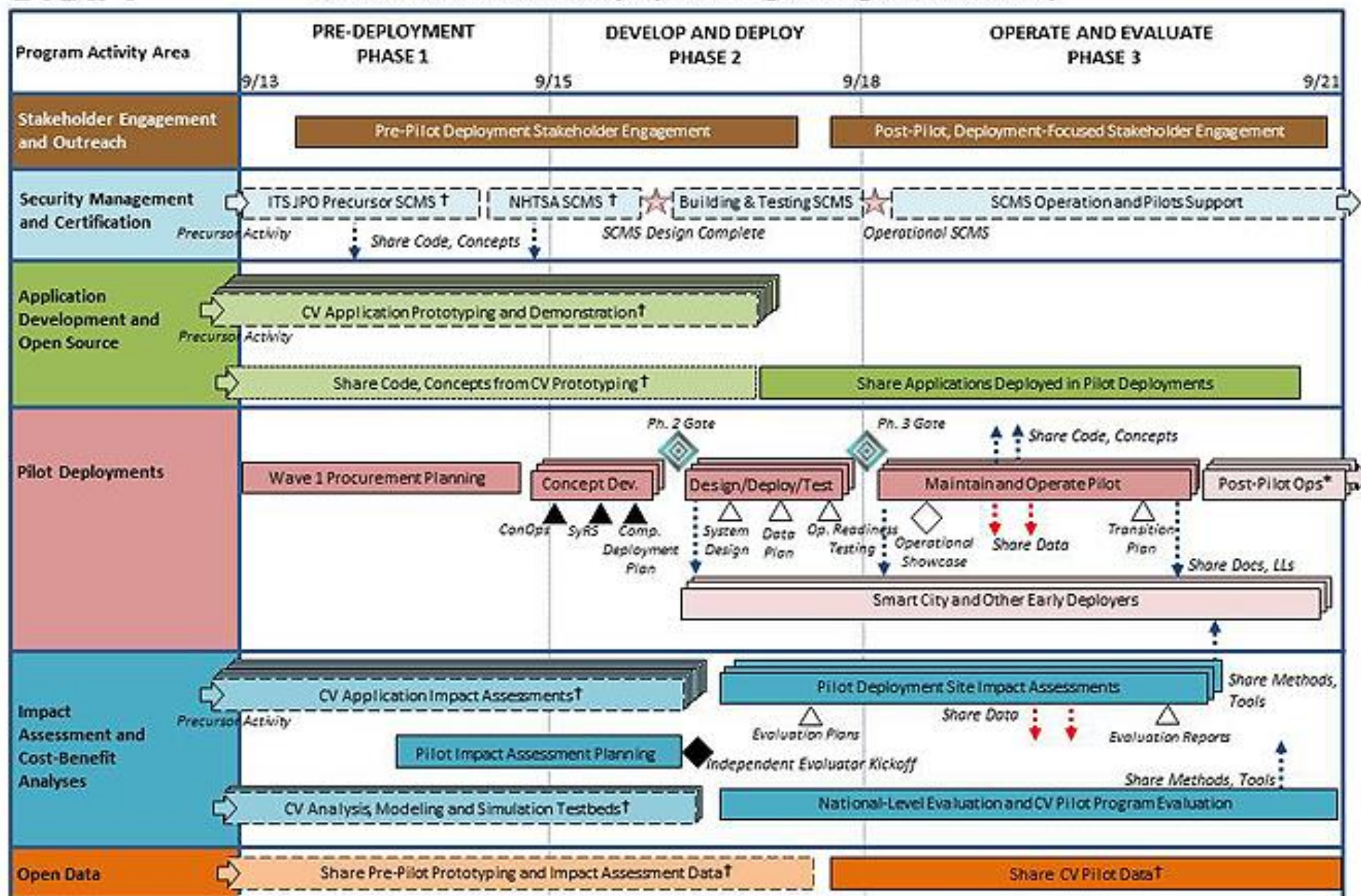


CV Interoperability – Deployment Pilot Sites

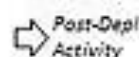
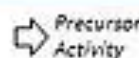
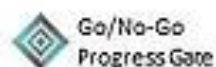
- Testing interoperability of RSU/OBU equipment across pilot sites using four CV Applications
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THEA vehicle (white car) passing stationary NYCDOT vehicle at test track without triggering forward collision warning alert.



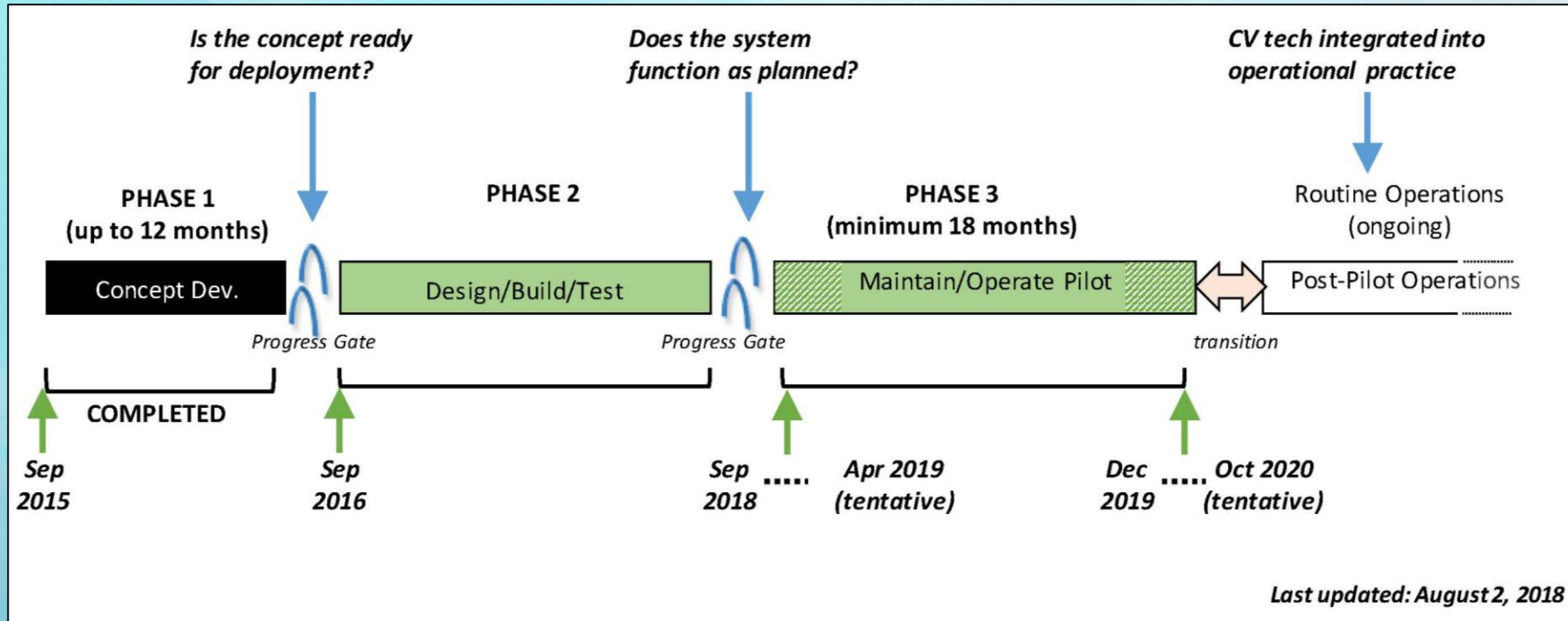
LEGEND:
 Code/Concept Feed
 Data Feed



† Coordinated CV R&D from DMA, AERIS, RWMP, V2I Safety, Data (not CV Pilot funded)

★ Applications included in routine operational practice at each site (not CV Pilot funded)

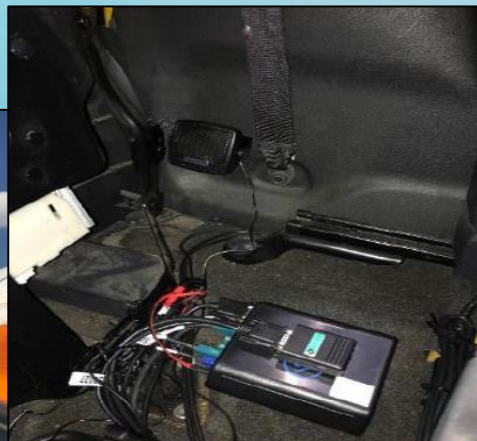
CV Interoperability – Deployment Pilot Sites



- **Phase 1 – COMPREHENSIVE DEPLOYMENT PLAN**
- **Phase 2 – DESIGN, BUILD, TEST** in-vehicle, mobile device, and roadside technologies using Industry ITS Standards for interoperability
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CV Interoperability – Deployment Pilot Sites

- **New York City** – Emphasis on pedestrian and motorist safety. Largest CV deployment to date, equipping:
 - 3,000 cabs
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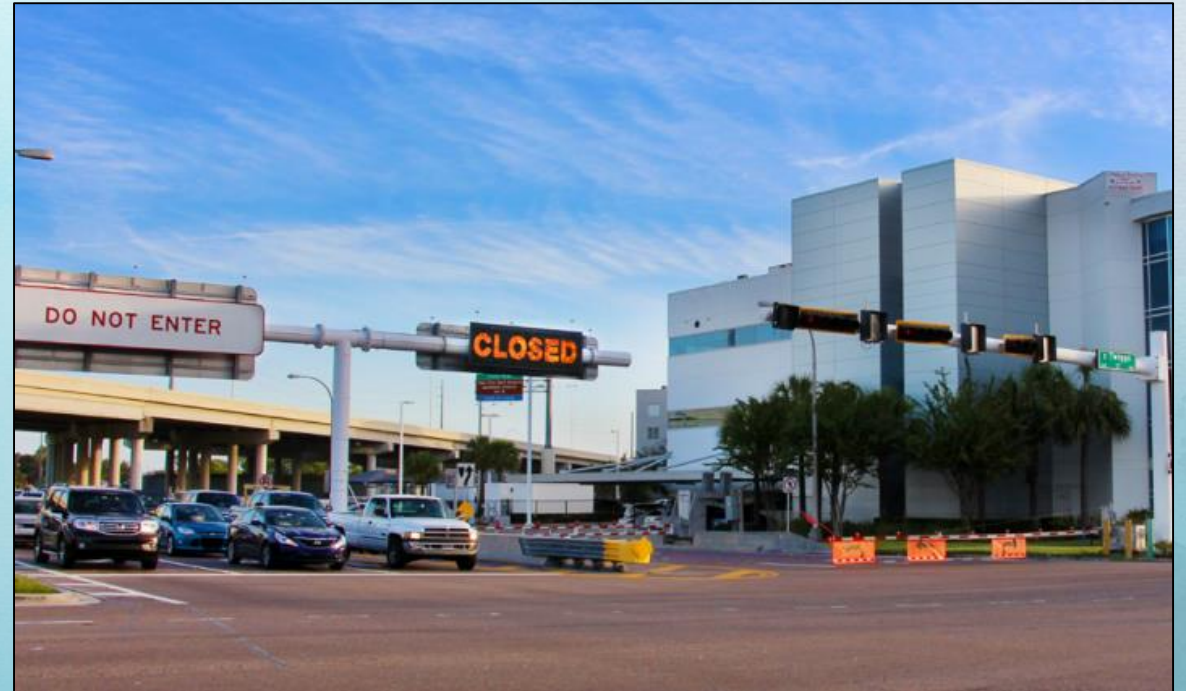
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CV Interoperability – Tampa CV Pilot

- Emphasis:
 - Collision reduction,
 - Congestion relief,
 - Wrong-way entry (reversible lanes on Selmon Expressway),
 - Pedestrian safety,
 - Bus operations (via TSP), and
 - Conflicts between streetcars, motorists, and pedestrians at high-volume mixed-traffic locations



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- CV Applications include:
 - **Forward collision warning**
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 - **Wrong Way Entry**
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 - Work zone warning
 - Do not pass warning
 - Speed limit warning

CV Interoperability – Tampa CV Pilot

- 1,000 personal vehicles
- 10 buses; 10 trolleys
- 500 pedestrians w/smartphone app
- 40 RSUs along city streets
- *OBU installed at Hillsborough Community College*



CV Device Deployment Status (as of 6/1/19)



Wyoming Pilot (WYDOT)	Complete	Target
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PILOT SITES



WYDOT



NYCDOT

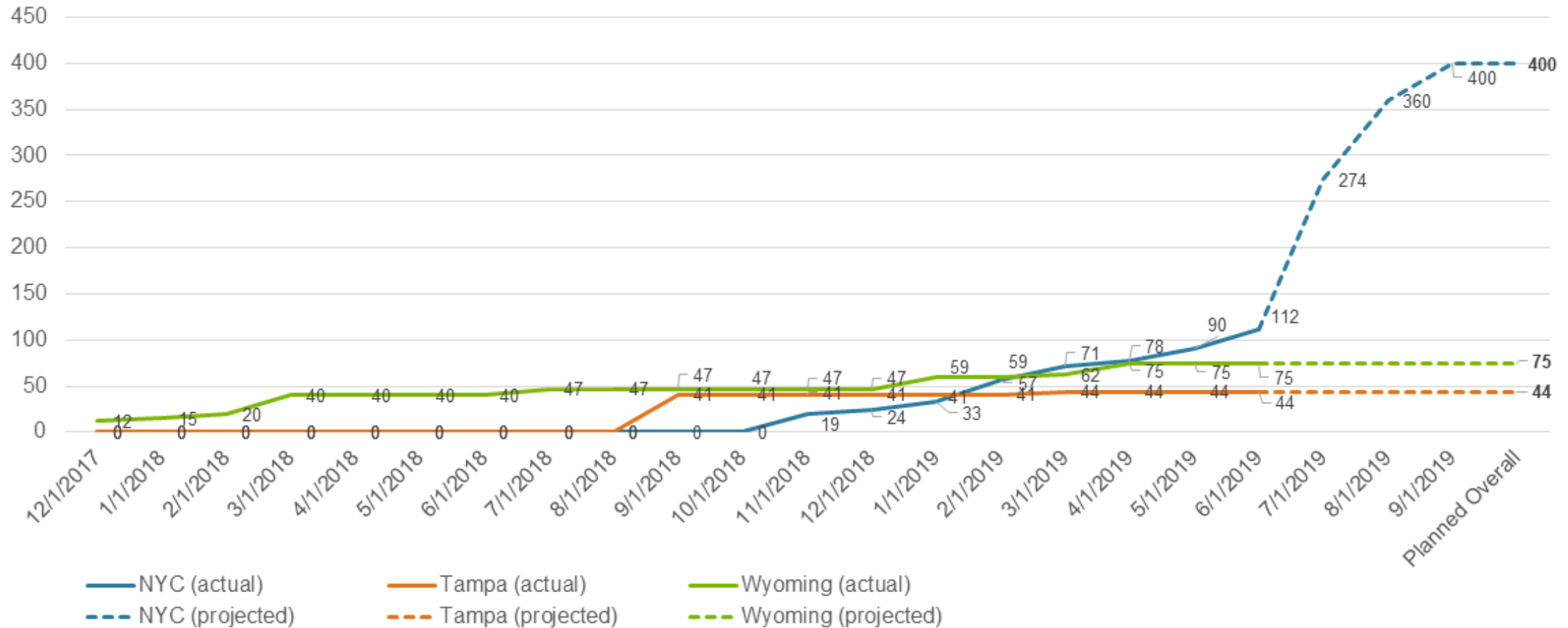


Tampa (THEA)

Installation and Operational Readiness Summary – Roadside Units (RSUs)



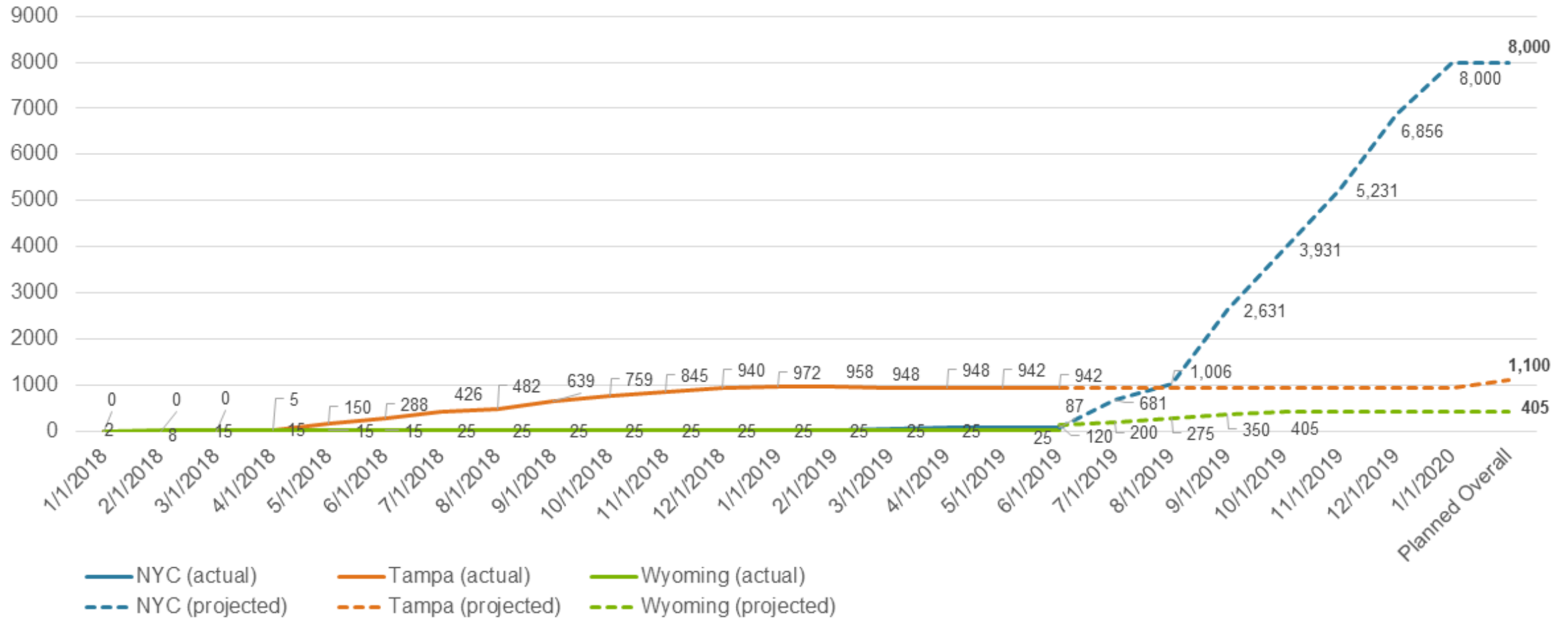
Roadside Units Deployed by CV Pilot Site by Date



Installation and Operational Readiness Summary – Onboard Units (OBUs)



Onboard Units Deployed by CV Pilot Site by Date



Tampa CV Pilot – Major Public Outreach Effort

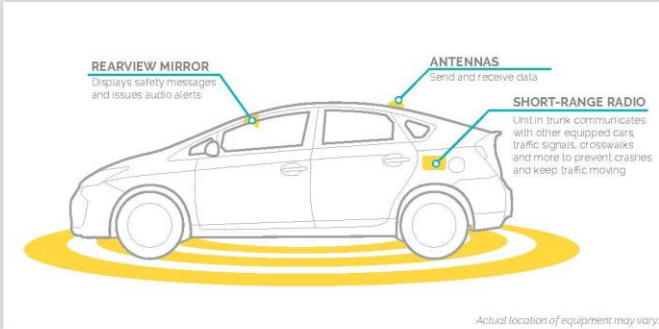


Walk. Ride. Drive. *Smarter.*

YOUR CONNECTED VEHICLE EQUIPMENT

All drivers participating in the Tampa Connected Vehicle Pilot will receive equipment enabling their cars to “talk” to other vehicles, traffic signals and more. This wireless communication can help you drive safely and keep traffic moving.

The equipment includes an enhanced rearview mirror, up to three small antennas, and a dedicated short-range communications device in the trunk. The equipment is free and yours to keep upon completion of the pilot in 2019.



REARVIEW MIRROR

You will receive a new rearview mirror that displays safety messages in certain hazardous situations. A speaker built into the mirror will issue audio alerts.



ANTENNAS

Depending on the equipment available and the type of car you drive, you will receive either one or three small antennas, which will be installed on the roof of the car. Most antennas will be attached magnetically, but some may use a safe, removable adhesive. The antennas will not damage or leave marks on your car.



SHORT-RANGE RADIO

The short-range radio is a small, rectangular device that will be attached either under the dashboard or inside the trunk or rear cargo space of your car. Dimensions may vary, but the length of the unit will not exceed 8.25 inches.



The Tampa Connected Vehicle Pilot is a research project sponsored by the U.S. Department of Transportation to test the potential safety, mobility and environmental benefits of connected vehicle technology.

Want to experience this technology in your own car? Visit TampaCVPilot.com.



3279-20180903



TYPICAL ANTENNA CONFIGURATIONS



Single antenna on the roof of a sedan



Three antennas on the roof of an SUV (near existing radio antenna)




Three antennas on the roof of a sedan (near existing radio antenna)

Note: The appearance and location of the antenna(s) on your car may vary.



3279-20180903

Tampa CV Pilot – Major Public Outreach Effort



Walk. Ride. Drive. *Smarter.*


**TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY
CONNECTED VEHICLE TOLL REBATE**

WHO GETS THE REBATE?

Every driver who participates in the Tampa Hillsborough Expressway Authority (THEA) Connected Vehicle Pilot will receive a 50 percent toll rebate on certain transactions on the Lee Roy Selmon Expressway. The rebate will appear as an adjustment to your SunPass account.

WHAT TRANSACTIONS ARE ELIGIBLE FOR THE REBATE?

The rebate applies to certain toll transactions on the Lee Roy Selmon Expressway. On the local lanes, the rebate applies only to the east toll gantry (near 78th Street), the west toll gantry (near Hyde Park Avenue) and the 50th Street/U.S. 41 interchange. The rebate also applies to all transactions on the Reversible Express Lanes.




WHEN WILL MY REBATE START?

Your toll rebate will take effect within three (3) business days of your enrollment in the program. However, rebates are issued once a month for the previous month's transactions, so it may take several weeks for your first rebate to be posted to your account.

HOW OFTEN WILL I RECEIVE A REBATE?


THEA will issue the rebate as a monthly credit to your SunPass account, typically at the end of the month.



TampaCVPilot.com | TampaCVPilot | @Tampa_CV | TampaCV

3545-2018114

- Toll rebate for volunteers
- Quick Reference Guide




SAFETY MESSAGES


Your rearview mirror may display a variety of safety messages as you drive. Please use this guide to review the meaning of each alert and how you should respond.

COLLISION AVOIDANCE


Collision avoidance alerts are designed to reduce the risk of rear-end crashes, especially during rush hour.




You are driving in a reduced speed zone. Observe the 40 mph speed limit.




Traffic is backed up ahead. Observe the 30 mph recommended speed limit, pay attention, and watch for slow or stopped vehicles that may change lanes into your path.




Traffic is backed up ahead. Observe the 20 mph recommended speed limit, pay attention, and watch for slow or stopped vehicles that may change lanes into your path.



Another connected vehicle is braking hard in traffic ahead of you. Pay attention to the vehicles in front of you and slow down if necessary.




You are at risk of a rear-end collision with the vehicle in front of you. You must brake immediately.




You are on a potential collision course with another connected vehicle coming from another direction. Pay attention, look around and proceed with caution.

WRONG WAY ENTRY PREVENTION


Wrong way entry prevention alerts are intended to prevent wrong way entry on the Lee Roy Selmon Expressway's Reversible Express Lanes.




You are approaching the downtown end of the Reversible Express Lanes in the wrong direction. Do not enter the Reversible Express Lanes.



You are going the wrong way on the Reversible Express Lanes. You must safely exit the one-way lanes. If you cannot exit safely, stop on the shoulder and call *347 (*FHP) for assistance.




You have entered a lane that is closed to traffic. Safely exit the no-travel zone.




A wrong-way driver has entered the Reversible Express Lanes ahead of you and is headed in your direction. Proceed with extreme caution.

PEDESTRIAN SAFETY




A pedestrian is present in the crosswalk ahead. Yield to the pedestrian in the crosswalk.

STREETCAR SAFETY



There is a streetcar in your projected path. Look out for the approaching streetcar and do not attempt to turn in front of it.



If you have questions or need further assistance, please call the help desk at 813-280-3405 or email us at hello@tampacvpilot.com.

Thank you for participating in the THEA Connected Vehicle Pilot!

Tampa CV Pilot – Major Public Outreach Effort

Safety Alerts Are Coming

May 30, 2019
Special Update



Big news! A new over-the-air software update has begun broadcasting from roadside units along the Selmon Expressway's Reversible Express Lanes and in the downtown Tampa deployment area.

If you have a Savari unit (more than one antenna) and are in the treatment group, your rearview mirror will be ready to display safety alerts when the update is complete.

Your equipment will download the update as you drive by. You may notice a change in the version number that appears on your mirror when the update is complete. If the process has not concluded by the end of your drive, don't worry! The update will continue the next time you start your vehicle. It may take your vehicle several passes to complete the process.

If only one antenna was installed on your vehicle, you have a SiriusXM unit and will receive the software update at a later date.

Driver's
Manual

CONNECTED
VEHICLE PILOT
— THEA —

THEA CONNECTED VEHICLE PILOT
DRIVERS MANUAL

Tampa CV Pilot – Major Public Outreach Effort



Other alerts are intended to help you avoid a crash no matter where you are driving. For example, this alert means another connected vehicle is braking hard in traffic ahead of you. You should pay close attention to the vehicles in front of you and slow down if necessary.

Note: You will only receive this warning with another connected vehicle. It will not notify you of ALL vehicles.



This alert means you are at risk of a rear-end collision with the vehicle in front of you. You need to brake immediately.

Note: You will only receive this warning with another connected vehicle. It will not notify you of ALL vehicles.



This alert means you are on a potential collision course with another connected vehicle coming from another direction, either from the side or in front of you. It may even be obstructed from your view. You should pay attention, look around and proceed with caution.



If you approach the downtown end of the Reversible Express Lanes and turn the wrong direction, you will get this alert. It means you are approaching the REL in the wrong direction. Do not enter the REL.



If you continue in the wrong direction, you will see this alert, meaning you are now going in the wrong direction on the REL. You must safely exit the one-way lanes. If you cannot exit safely, stop on the shoulder. Authorities are monitoring the on-ramps and may send someone to assist you. Once safely on the shoulder, dial *347 (*FHP) for assistance.

Tampa CV Pilot – Major Public Outreach Effort

Some lanes at the end of the downtown end of the Reversible Express Lanes are closed to all traffic at certain times of the day. If you enter a zone that's off limits, you will get this alert. If you see this alert, you must safely exit the no-travel zone.



You will also receive an alert if you are driving in the right direction on the REL and a wrong-way driver enters the roadway ahead of you. This alert means a wrong-way vehicle has entered the REL and is headed in your direction. You should proceed with extreme caution.



Safety Alerts - Wrong Way Entry Prevention — 9

SAFETY ALERTS - *Pedestrian Safety*

Another goal of the connected vehicle pilot is to improve pedestrian safety, especially at the midblock crosswalk near the Hillsborough County Courthouse on Twiggs Street. Here, roadside sensors will detect pedestrians in the crosswalk. Participating drivers will receive a warning when there is a pedestrian ahead.



When you see this alert, you should yield to the pedestrian in the crosswalk.

10 — Safety Alerts - Pedestrian Safety

Tampa CV Pilot – Major Public Outreach Effort

SAFETY ALERTS - Streetcar Safety

Along Channelside Drive, cars sometimes inadvertently turn to cross the tracks in front of an oncoming streetcar, increasing the risk of a collision. Preventing these dangerous conflicts between cars and streetcars is another goal of the pilot program.



This alert means there is a streetcar in your projected path. You should look out for the approaching streetcar and do not attempt to turn in front of it.

Troubleshooting Your Equipment

Please contact us at 813.280.3405 if you have any issues with your equipment. Below are a few tips.



When your equipment is working properly, you will see a green circle and dot alternating in the lower left corner of the rearview mirror, like a heartbeat. If the circle and dot disappear for a day or more, please contact the help desk to report the issue.



At times, the circle and dot will change to yellow to indicate a weaker GPS signal. However, your equipment is still working. You do not need to take any action.

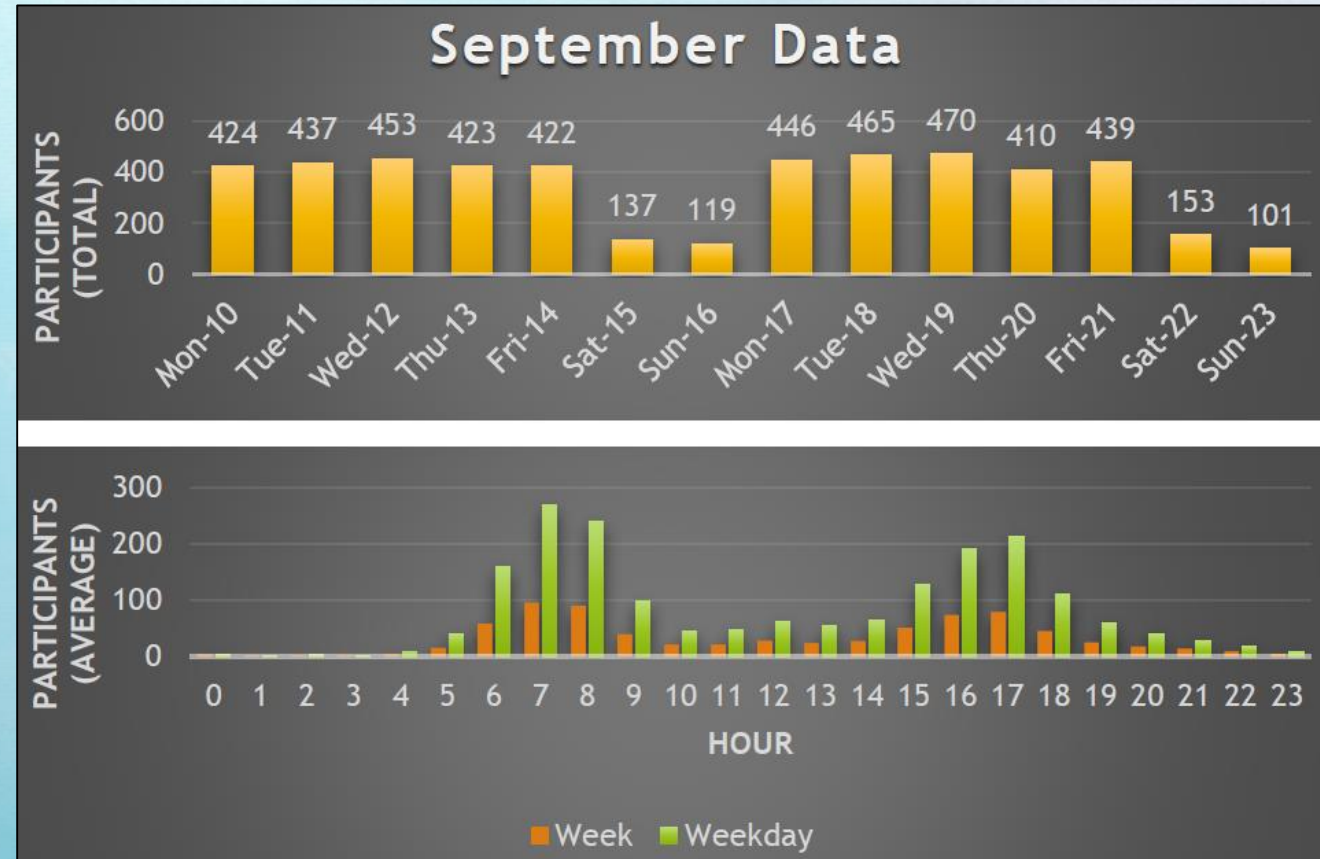


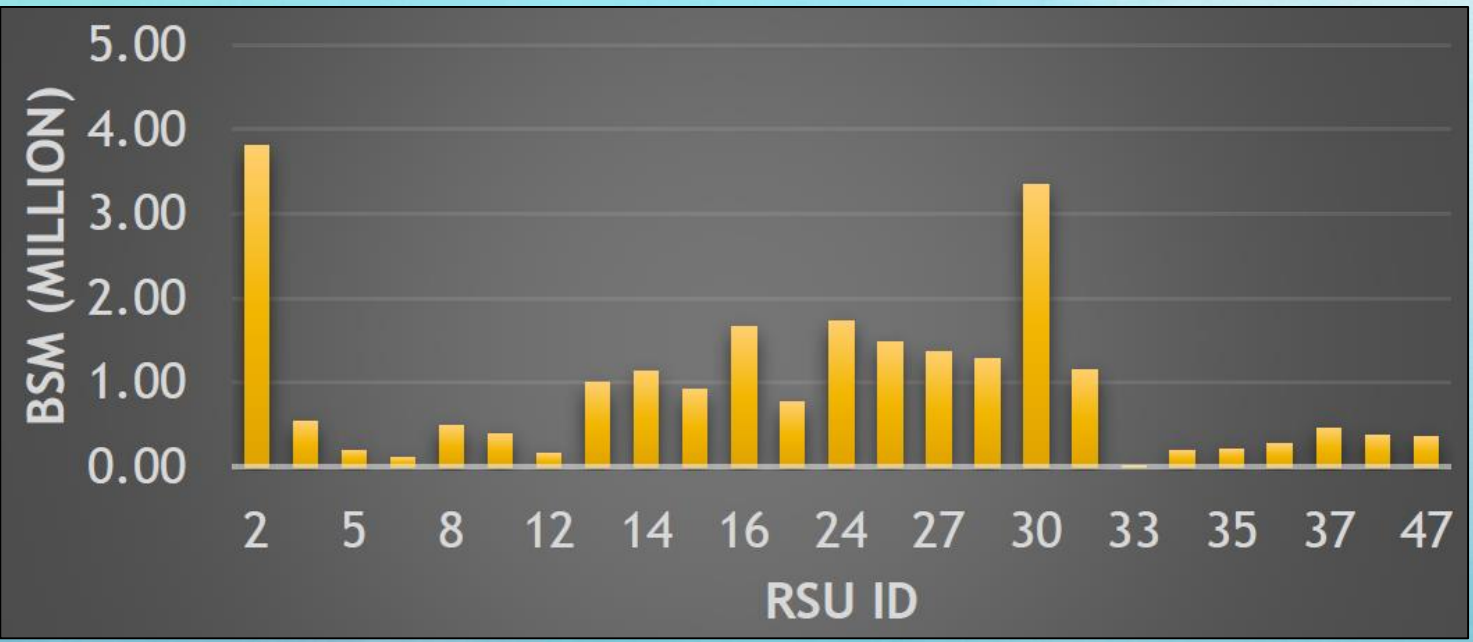
If a red exclamation point appears in the lower left corner of your mirror, like this, there is a system error. Please contact the help desk.

Tampa CV Pilot – Performance Measurement

(from 2019 TRB Annual Meeting, January)

- September Travel Data
 - Average of 1.7 million basic safety messages (BSM) per day
 - Approximately 0.9 million BSM per RSU
 - Up to 270 participants per hour, on average, at AM peak hour





Tampa CV Pilot – Lessons Learned

(from 2019 TRB Annual Meeting, January)

- Solidify standards earlier
- Obtain a better understanding of...
 - Available applications' maturity
 - Available RSU and OBU hardware
 - Vendors' depth and resources
- Complete integration testing before private vehicle installs begin
- Determine ability to use traditional ITS devices as part of solution earlier in the process
- OBU installation – use professionals to manage effort
- Multiple technical scans using RFPs (with on-road testing)

Tampa CV Pilot – Lessons Learned cont...

(from 2019 TRB Annual Meeting, January)

- Create collaborative environment via early sourcing of suppliers
- Early real-world testing with infrastructure in place to verify end-to-end system / application performance
- Team spread out across USA / Europe; ensure they can support you from overseas
- New development efforts (e.g., Over-the-Air and security) need to be piloted/tested early in the program
- Need adequate **incentives with community** and/or **media support** to engage driver/consumer community
- Recognize need for complete and experienced project team

Tampa CV Pilot – Lessons Learned cont...

(from 2019 TRB Annual Meeting, January)

- During Operational Readiness Demonstration, **significant performance** issues occurred with OBU/RSU communication and applications
 - Project team determined significant non-THEA traffic was present over the communication lines
 - A local radio station using **HamWAN** communications was the culprit



Tampa CV Pilot – Lessons Learned cont...

(from 2019 TRB Annual Meeting, January)

- THEA conducts **random wireless monitoring (sniffer) surveys** in the CV Pilot Area to assess interference now
- Recommends early and complete **radio spectral analysis** for any future deployment areas
 - Including full DSRC spectrum and adjacent channels
- DSRC Interference white paper forthcoming



Tampa CV Pilot – Recognition

- **THEA won the Best of ITS America Award (June 7, 2019)**
 - ITS America Annual Meeting attendees participated in a live vote to select the best ITS project (WyDOT CV Pilot was also in the running)



Questions?

For more information, visit:

www.tampacvpilot.com

<https://www.its.dot.gov/pilots/>

https://www.its.dot.gov/pilots/success_lessonslearned.htm

ITS Funding Request List

Jeremy Dilmore, District 5 TSM&O

Work Program Timeline

Timeline	Work Program Activity
July 1 st	Adopt TWP
July – January	Tentative Work Program (TWP) Gaming Cycle
July – September	Executive Team Policy and Funding Decisions
October 1 st	Deadline for MPO Project Priority Lists
November	<ul style="list-style-type: none"> - 1st Year of Tentative Work Program (TWP) due - CO Review of 1st Year TWP - Submittal of 1st Year TWP to Governor’s Office. - Public Hearings Held.
December	Close Gaming
January - February	Executive Review; CO/Districts respond to comments received
February	Preliminary TWP submitted to Executive Office of the Governor and the Legislature at least 14 days prior to the legislative session convening
March	<ul style="list-style-type: none"> - Florida Transportation Commission Review & Public Hearing - Tentative Work Program (TWP) provided to Legislature within 14 days of Legislative Session convening
May	<ul style="list-style-type: none"> - Approve Budget - MPO / TPOs Establish Priorities - Legislative Session ends (early May)

ITS Funding Request List

- Reviewed MPO/TPO Prioritized Projects Lists
- Asked if there were any other projects recently submitted
- Continued funding request for ITS Software Support
 - Ensures ICMS continues
- Continuing phases for major regional projects

District Ranking	FM Item # (if available)	Project Description	Phase	2020	2021	2022	2023	2024	Benefits to Department (B/C ratio or write-up)
1	436325-2	Event Management Phase 2	52	3,000,000					Relieves congestion around Daytona Speedway on FDOT roadways. Includes management of event weeks (5-6 weeks of events per year), detours for I-95 closers, and beach traffic.
			53	100,000					
			62	350,000					
			62(40)	50,000					
2	435445-1	ITS SOFTWARE SUPPORT	82(04)				250,000	250,000	Ensures ICMS continues to run.
			82(05)				250,000	250,000	
3	N/A	Lake County ITS - Initial Deployment	32	200,000					Relieves congestion on state roads/US highways in Lake County. Existing roadway is 6 lanes and signals are not interconnected
			52			965,000			
			62			100,000			
4	N/A	Pushbutton #18	52	1,000,000				Relieves congestion on state roads/US highways in Brevard County.	
5	N/A	Pushbutton #9	52	1,150,000				Relieves congestion on state roads/US highways in Orange and Osceola Counties, while improving CCTV coverage in Seminole. These closes gap on infrastructure needed for ICM that D5 is performing	
6	N/A	Pushbutton #13	52		1,500,000			Expands the ATMS into minor arterials in Osceola County, expanding the reach of ICMS	
7	N/A	LYNX AVL	32		45,000				Increase modal split through improved information
			52			1,242,000			
			82			400,000			
8	N/A	Orange County ADMS	32		45,000				Update infrastructure used for detour routing in Orange County
			52			2,500,000			
			62			250,000			
9	N/A	Pushbutton #6	52		1,094,000			Increased pedestrian safety on International Drive and better data for managing events in downtown that can impact I-4	
10	N/A	Sumter County ITS (Phase 2)	32		400,000				This will bring Hurricane evacuation routes into a redundant harden means of communication
			52			2,500,000			
			62			300,000			
11	N/A	Pushbutton #1	52			500,000		Improved data on detour routes in Brevard County	
12	N/A	Pushbutton #16	52				1,880,000	Improved data on detour routes in Orange County	

ITS Funding Request List

District Ranking	FM Item # (if available)	Project Description	Phase	2020	2021	2022	2023	2024	Benefits to Department (B/C ratio or write-up)
13	N/A	Lake County ITS - Fiber Infrastructure	32			675,000			Relieves congestion on state roads/US highways in Lake County. Existing roadway is 6 lanes and signals are not interconnected
			52				4,500,000		
			62				450,000		
14	N/A	LYNX APC installation	32				45,000		Increase modal split through improved information
			52				1,150,000		
			62				100,000		
15	N/A	Fairbanks Ave Fiber Optic Expansion - I-4 to Clay	32				30,000		Interconnects isolated signals in Winter Park to Central Florida, improving progression, reducing delay.
			52				400,000		
			62				60,000		
16	435443-4-82-01	I-4 Freeway Management and AAM	82(01)		600,000		1,000,000	1,000,000	Allows continuation of ICM operations
17	435443-5-82-01	I-95 Freeway Management and AAM	82(01)				500,000	600,000	Allows expansion of ICM operations to Brevard County
18	436353-1	High Speed Broadband for IVEDDS ITB	82(03)		60,000	60,000	60,000	60,000	Reduced response time for incidents on freeway

Managing Data – Best Practices

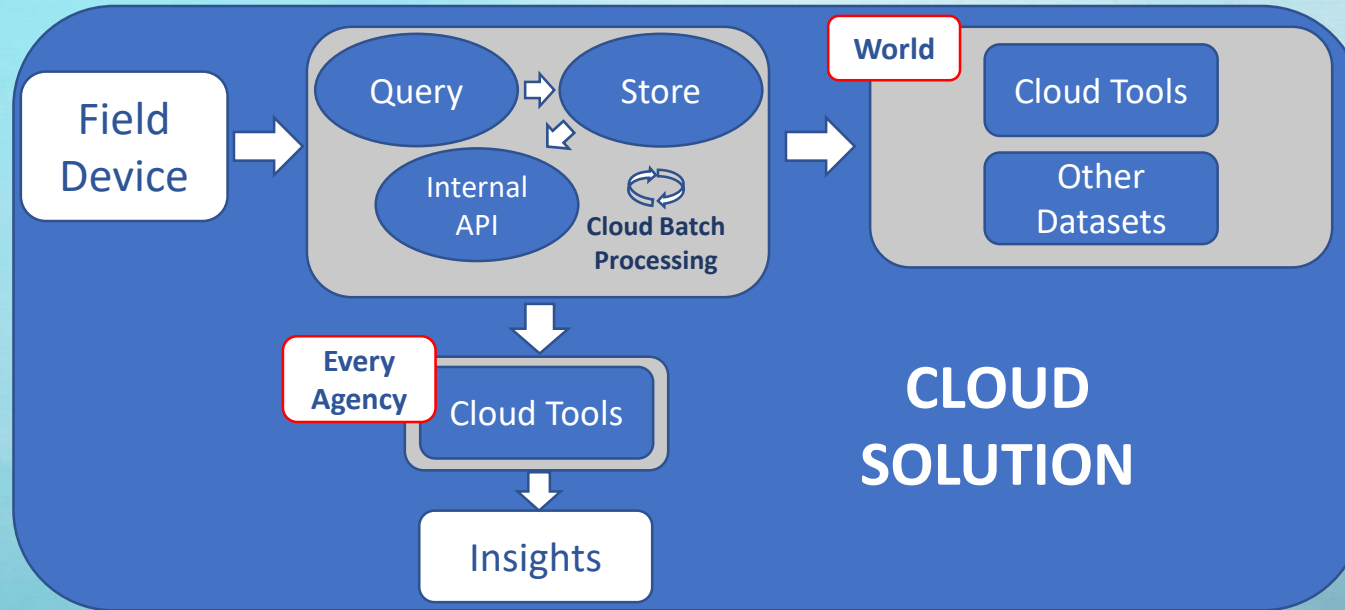
Jeremy Dilmore, District 5 TSM&O

Managing Data – Best Practices

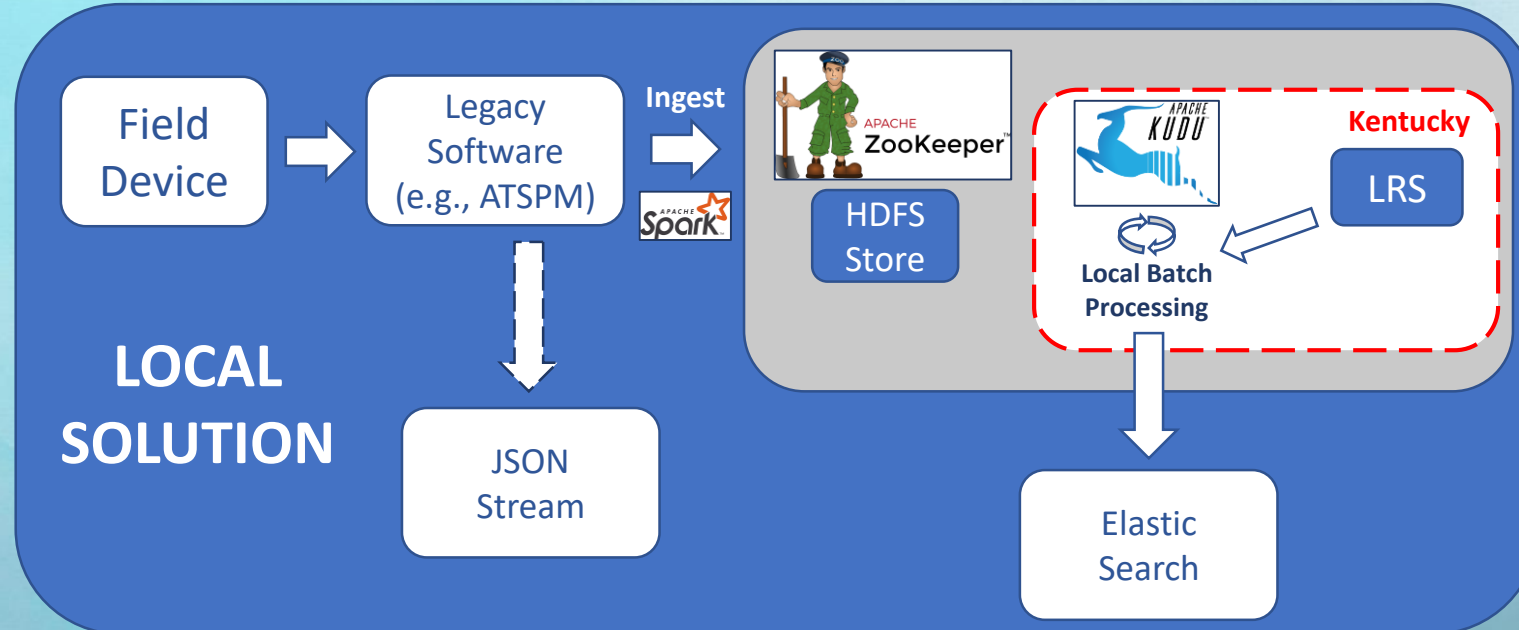
NCHRP: Framework for Managing Data from Emerging Transportation Technologies to Support Decision-making

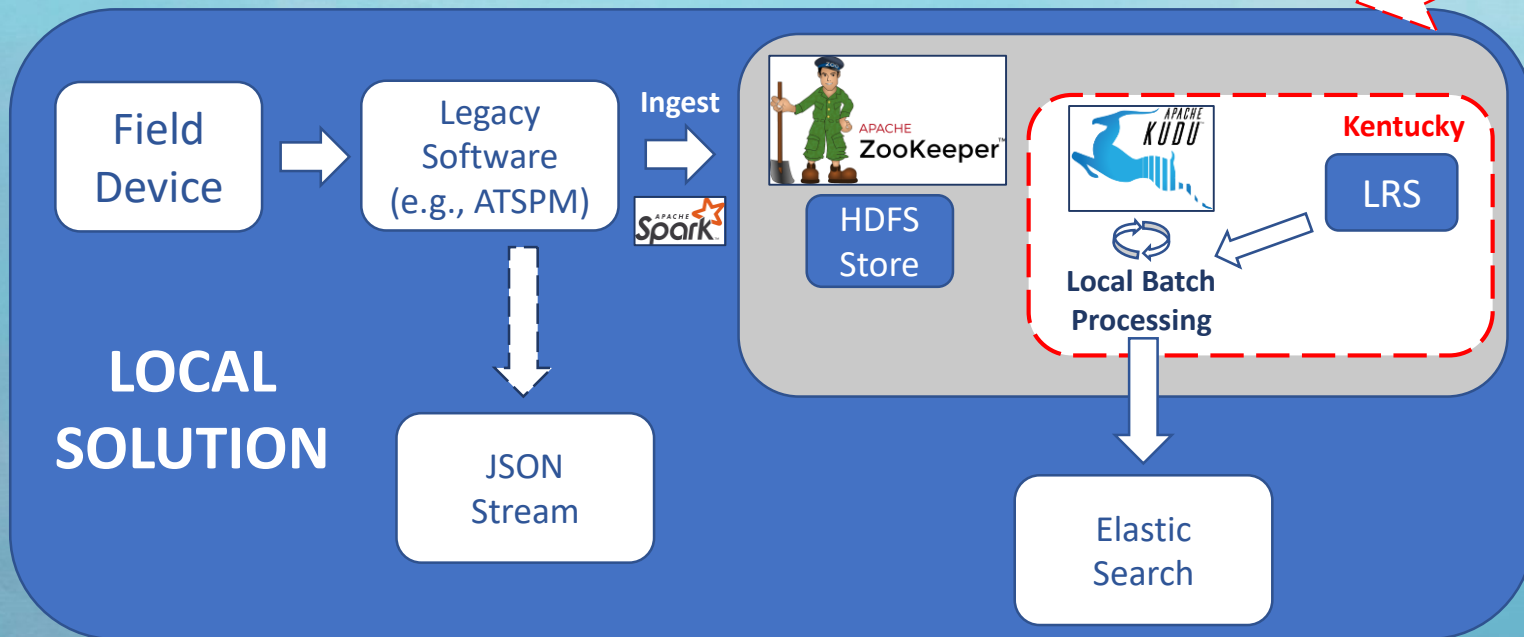
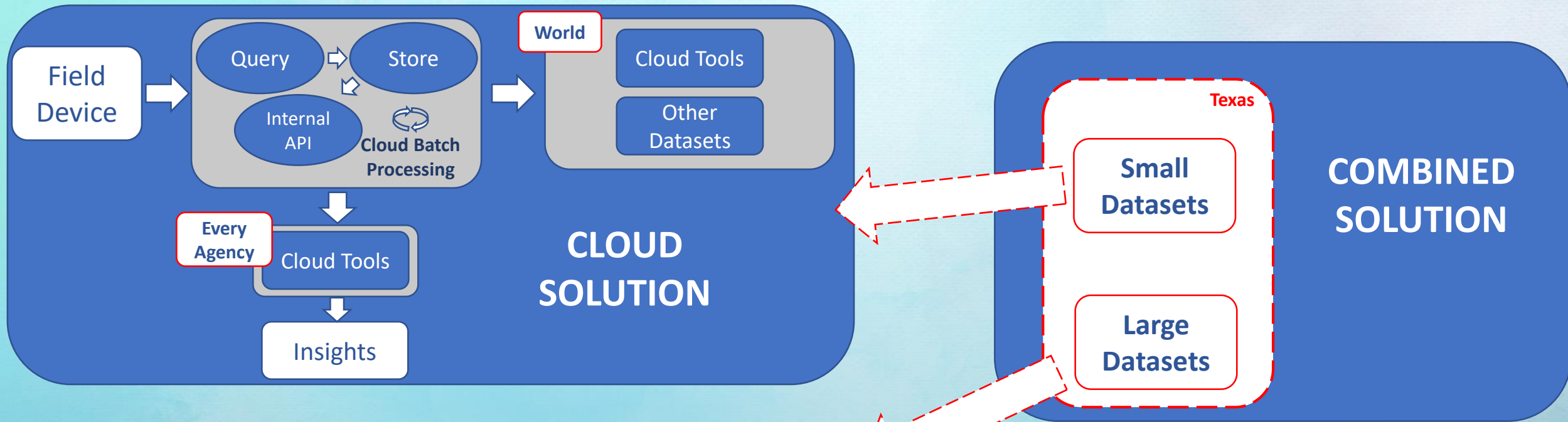
- Hosting data [next slides]
 - Cloud
 - Local
 - Combination
- Local Batch Processing via Kudu [next slides]
- Data Language for Contractors – Best Practices

Managing Data – Best Practices



Managing Data – Best Practices





Current Initiatives

Jeremy Dilmore, District 5 TSM&O

RTMC Tour

Jeremy Dilmore, District 5 TSM&O

THANK YOU!

Next Consortium – September 5, 2019



TSM&O Consortium Meeting

MEETING AGENDA

FDOT RTMC
4975 Wilson Rd.
Sanford, FL 32771

July 11, 2019
10:00 AM-12:00 PM

- 1) WELCOME
- 2) USDOT CV PILOT DEPLOYMENT SITES - UPDATE
 - David Williams, VHB
- 3) ITS FUNDING REQUEST LIST
 - Jeremy Dilmore, District Five TSM&O
- 4) DATA AGREEMENTS
 - Jeremy Dilmore, District Five TSM&O
- 5) MANAGING DATA – BEST PRACTICES FROM *NCHRP* CONFERENCE
 - Jeremy Dilmore, District Five TSM&O
- 6) CURRENT INITIATIVES
 - Jeremy Dilmore, District Five TSM&O
- 7) RTMC TOUR*
 - Jeremy Dilmore, District Five TSM&O

*Note: The agenda has been shortened to allow ample time for a tour of the building. The TSM&O Consortium Meeting, including the tour, should conclude at our regularly scheduled time.