



CONNECTED VEHICLE PILOT Deployment Program



Tampa (THEA) Concept of Operations



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ITS Joint Program Office



TODAY'S AGENDA



- Purpose of this Webinar
 - To share the Concept Development Activities from the Tampa (THEA) Pilot site the stakeholders of connected vehicle technologies.

- Webinar Content
 - Connected Vehicle Pilot Deployment Program Overview (*Govind Vadakpat*)
 - THEA Concept of Operations (*THEA Team*)
 - Stakeholder Q&A (*Govind Vadakpat & THEA Team*)
 - How to Stay Connected (*Govind Vadakpat*)

- Webinar Protocol
 - Please mute your phone during the entire webinar
 - You are welcome to ask questions via chatbox at the Q&A Section
 - The webinar recording and the presentation material will be posted on the CV Pilots website



CONNECTED VEHICLE PILOT DEPLOYMENT PROGRAM

PROGRAM GOALS

Spur Early CV Tech Deployment



Wirelessly Connected Vehicles



Mobile Devices



Infrastructure

Measure Deployment Benefits



Safety



Mobility



Environment

Resolve Deployment Issues



Technical



Institutional



Financial

PILOT SITES



ICF/Wyoming



New York City



Tampa (THEA)

PUBLIC WEBINARS

- To provide all interested parties a sense of the key issues targeted at each site, the conceptual approach, and what they have learned from working in-depth with key stakeholders in the Concept Development Phase

Feb 2016	Mar 2016	Apr 2016	May 2016	Jun 2016	Jul 2016	Aug 2016
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Concept of Operations Webinars

Performance Measurement Webinars

Comprehensive Deployment Plan Webinars



U.S. Department of Transportation



Site Orientation and Key Issues

Tampa (THEA)
Tampa Hillsborough
Expressway Authority

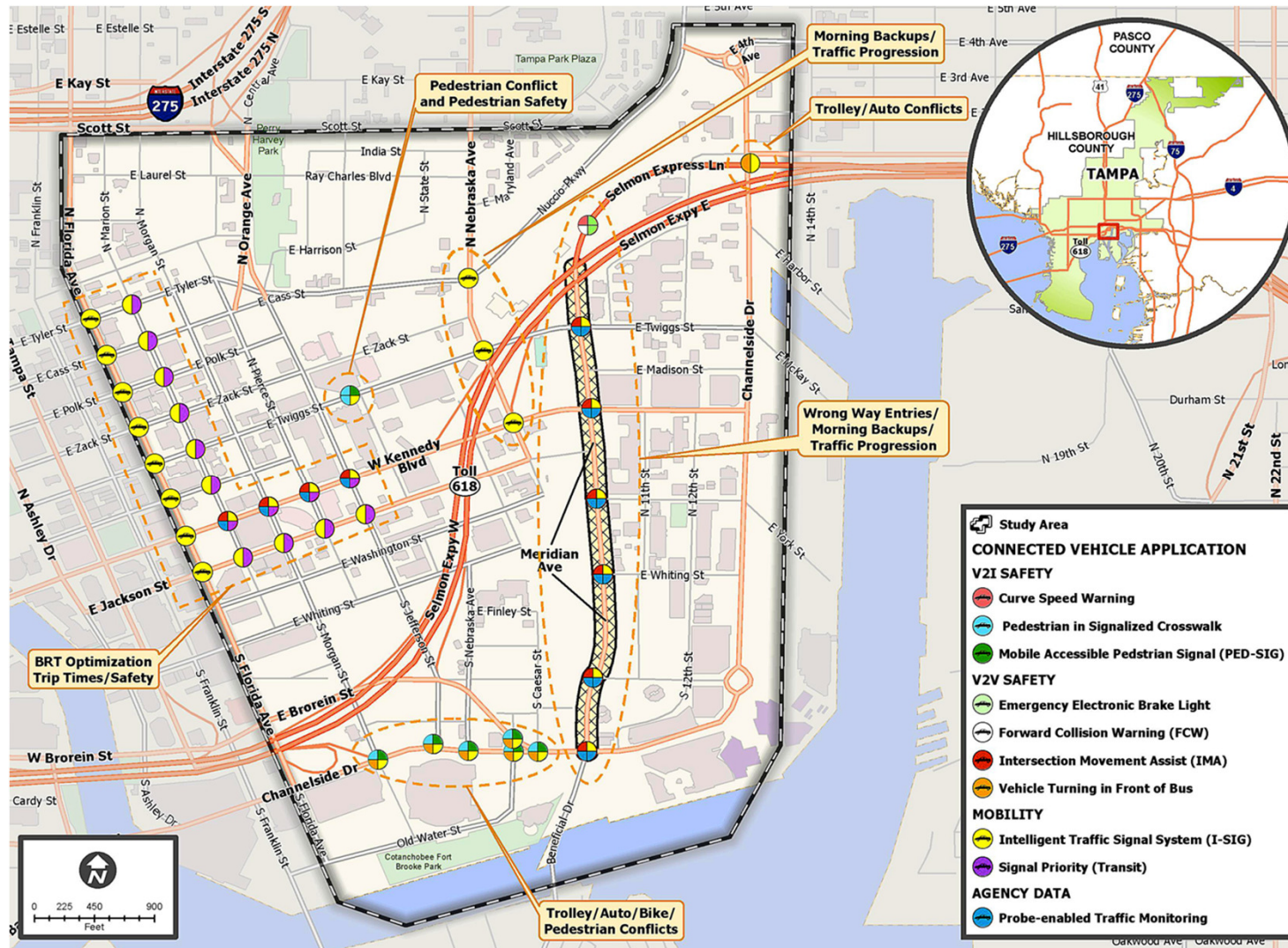
Bob Frey – THEA Program Manager

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Expected Impact Area



Where will CV be deployed?



Why This Geographic Region



- THEA Owns and Operates the Leroy Selmon Expressway
- THEA Owns and Operates Meridian Avenue
- Substantial Commuting Into Downtown
- Commuters Through Downtown (MacDill Air Force Base)
- City of Tampa Staff Co-Located at THEA Traffic Management Center
- High Pedestrian Traffic
- Significant Interaction Between Light Vehicles, Transit, and Pedestrians
- Specific Known Problem Areas

Deployment Approach



- Six Use Cases
 - Morning Backups And Congestion
 - Wrong-Way Entries
 - Pedestrian Safety
 - Transit Signal Priority Optimization And Safety
 - TECO Line Streetcar Conflicts
 - Enhanced Signal Coordination And Traffic Progression

MORNING BACKUPS AND CONGESTION



Intersection of Twiggs Street and Meridian Avenue at Reversible Express Lanes Entrance/Exit



ISSUES AND NEEDS

- Queue backup on curve
- Poor traffic flow on signalized arterials
- Back-to-back right turns

WRONG-WAY ENTRIES



Entry/Exit Points Along Selmon Expressway and Reversible Express Lanes (REL)



ISSUES AND NEEDS

- Wrong-way REL entry leads to serious incidents

PEDESTRIAN SAFETY



Midblock of Twiggs Street at Hillsborough County Courthouse

ISSUES AND NEEDS

- Pedestrian struck-by incidents
- Midblock crossing with no protected left turn at signal
- Pedestrians crossing at unmarked locations



TRANSIT SIGNAL PRIORITY OPTIMIZATION AND SAFETY



**Express Route through Downtown City Streets to
Marion Street Transit Station**



ISSUES AND NEEDS

- **Poor traffic flow on signalized arterials**
- **Passenger vehicles blocking access to transit stops**

TECO LINE STREETCAR CONFLICTS



ISSUES AND NEEDS

- Safety concerns and incidents due to streetcar, pedestrian, vehicle, cyclist conflicts
 - Afternoon peak alternate routes
 - Planned special events

ENHANCED SIGNAL COORDINATION AND TRAFFIC PROGRESSION



ISSUES AND NEEDS

- Morning backups and congestion
- Planned special events backups and congestion
- MacDill Air Force Base controlled access points congestion





Deployment Concept Overview

Tampa (THEA)
Tampa Hillsborough
Expressway Authority

Steve Novosad – System Development Lead
Dave Miller – Integration Lead

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Approach



- 6 Use Cases Created
- Each Use Case Integrates Two or More USDOT Connected Vehicle Applications
- Use Cases Cover More Than a Single Location
- Use Case Coverage can Overlap

Morning Backups And Congestion



Target Area

Intersection of Twiggs Street and Meridian Avenue at Reversible Express Lanes Entrance/Exit



Avoid Crashes due to Back-to-back Right Turns



V2V Safety: FCW and EEBL

Reduce Queue Backup on Curve



Curve Speed Warning (CSW)

Improve Signal Timing Progression



Intelligent Traffic Signal System (I-SIG)

Performance Measures

- Number of Alerts
- Number of Incidents
- Queuing/Position on Curve
- Traffic Speed
- Queue length
- Wait time
- Percent on Green



Wrong-Way Incidents



Target Area

Entry/Exit Points Along
Selmon and Reversible
Express Lanes (REL)



Improve Safety at the
Entry/Exit Point

Effectively Control
Reversible Express Lane

Signal Control at *Express
Lane Entries*



Intersection
Movement
Assist (IMA)



Probe Enabled
Traffic
Monitoring



Intelligent
Traffic Signal
System (I-SIG)

Performance Measures

- Number of Alerts
- Number of Incidents
- Percent on Green
- Red Light Running

Pedestrian Safety



Target Area

Midblock of Twiggs Street at
Hillsborough County
Courthouse



Improve *Pedestrian Safety at Unmarked Crossing Locations*



Pedestrian in Signalized Crosswalk Warning

Provide *Pedestrian Crossing Signal Timing*



Mobile Accessible Pedestrian Signal (PED I-SIG) and I-SIG



Performance Measures

- Number of Alerts Drivers
- Number of Alerts Pedestrians
- Number of Incidents
- Pedestrian Wait Time
- Vehicle Wait Time



Transit Signal Priority, Optimization And Safety



Target Area

Express Route through
Downtown City Streets to
Marion Street Transit Station

Improve Signal Timing
Progression



Intelligent
Traffic Signal
System (I-SIG)

Improve Bus On-
schedule Performance



Transit Signal
Priority (TSP)



Performance Measures

- Queue length
- Wait time
- Percent on Green

TECO Line Streetcar Conflicts



Target Area

- Adamo Drive (SR 60)/ Channelside Drive
- Amalie Arena/Channelside Drive Area

Avoid Potential Vehicle Conflicts



Vehicle Turning Right in Front of Bus Warning

Improve Signal Timing for Special Events



Intelligent Traffic Signal System (I-SIG)

Performance Measures

- Number of Alerts – Trolley Operators
- Number of Alerts – Pedestrians
- Number of Incidents



Enhanced Signal Coordination And Traffic Progression



Target Area

- Along Twiggs Street from Selmon to Marion Street
- Along Meridian Avenue from REL to Channelside Drive

Effectively Monitor Peak Queuing and Congestion



Probe Enabled Traffic Monitoring

Improve Traffic Progression



Intelligent Traffic Signal System (I-SIG)

Performance Measures

- Queue length
- Wait time
- Percent on Green
- Red Light Running



What makes all this work?



- Basic Connected Vehicle elements
 - Vehicle On-Board Units (OBUs)
 - Roadside Units (RSUs)
 - Wireless Communication Technologies
 - Integration of Applications
 - Connected Vehicle Systems Engineering Architecture (CVRIA)
 - Data Management
 - Security
- THEA Traffic Management Center
- Existing Traffic Control System
- Stakeholder Cooperation
 - THEA
 - CoT
 - HART
 - MAFB



Stakeholder Engagement Summary

Tampa (THEA)
Tampa Hillsborough
Expressway Authority

Steve Johnson – Program Management Lead

TAMPA HILLSBOROUGH
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Stakeholder Engagement - Who we talked to



- Team Member/Partner Stakeholders
 - THEA and consultants
 - City of Tampa
 - Hillsborough Area Regional Transit (HART)
- Non Team Member Partner Stakeholders
 - FDOT District Seven
 - Hillsborough County
 - Hillsborough County Sheriff
 - City of Tampa Police
 - Florida Highway Patrol
 - MacDill AFB
- General Stakeholders
 - Tampa Bay Port Authority & Cruise Terminal, Amalie Arena (Tampa Bay Lightning), Tampa Downtown Partnership, Tampa Chamber of Commerce, Tampa Convention Center, Hillsborough County Circuit Court, and others.

Stakeholder Engagement – What We Heard



➤ From Partner Stakeholders

- ❖ Excitement and Pride in the award and Tampa being a technology leader
- ❖ Validated that our use cases selected were on target
- ❖ Concerns as to interim effect on operations
 - Training, Interruptions, Installation and Maintenance, Liability

➤ From Non Partner Stakeholders

- ❖ Validated that our use cases selected were on target
- ❖ Mixed perceptions of what CV Pilot was all about
 - Autonomous Vehicle (AV) vs. Connected Vehicle (CV)
- ❖ Concerns about cost – misconception that we may be offering a referendum for taxes to fund Pilot
- ❖ Concerns for Privacy and Anonymity

Stakeholder Engagement – What We Learned



➤ From Partner Stakeholders

- ❖ Gleaned information that allowed us to refine our use cases and CV Applications for better synergy among use cases and multiple sites.
- ❖ Better understanding of the operations and the Pilot's impact to our partners
- ❖ Reinforced the need to build a sustainability model for post-pilot continuity and expansion of operations.
- ❖ That Florida is out in front in creating a legislative/regulatory environment for advancing AV/CV Applications.

➤ From Non Partner Stakeholders

- ❖ Need for early outreach and education to provide dissemination of accurate information about Connected Vehicles and the Pilot:
 - ❖ Alleviate concerns about cost
 - ❖ Alleviate Privacy Information Concerns
- ❖ Previous Pilots experienced participant difficulties

Stakeholder Engagement – Where We Go From Here



- So the ConOps is done, Now What Do We Do With It?
 - What the ConOps does in terms of setting the tone for the remainder of the Phase 1 activities.
 - Builds common consensus on which partners/stakeholders can base their understanding of what to expect from the pilot, build MOU's and other operational interoperability documents.
 - Provides the structure from which we create the standards and specifications to ensure vendors understand and comply with system requirements
 - The ConOps is the foundational document for Phase 1.
 - Teams will build System Requirements from validated user needs in the ConOps.
 - And we will create a full scale plan to deploy the system in phase 2
- But the ConOps is a “Living” document.
 - It will be continually reviewed and updated throughout phase 1 and phase 2
 - It will incorporate lessons learned and adjust for new developments in available technology.

Stakeholder Q&A



- Please keep your phone muted
- Please use chatbox to ask questions
- Questions will be answered in the order in which they were received

STAY CONNECTED



Join us for the *Getting Ready for Deployment Series*

- Discover more about the 2015 CV Pilot Sites
- Learn the Essential Steps to CV Deployment
- Engage in Technical Discussion



Website: <http://www.its.dot.gov/pilots>

Twitter: [@ITSJPODirector](https://twitter.com/ITSJPODirector)

Facebook:

<https://www.facebook.com/DOTRITA>

Contact for CV Pilots Program:

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Public ConOps Webinars:

- [ICF/Wyoming Pilot Site](#)
2/5/2016, 1:00 – 2:00 pm EST
- [Tampa \(THEA\) Pilot Site](#)
2/8/2016, 2:00 – 3:00 pm EST
- [NYC Pilot Site](#)
TBD

Please visit the CV pilots website for the recording and the briefing material of the previous webinars.