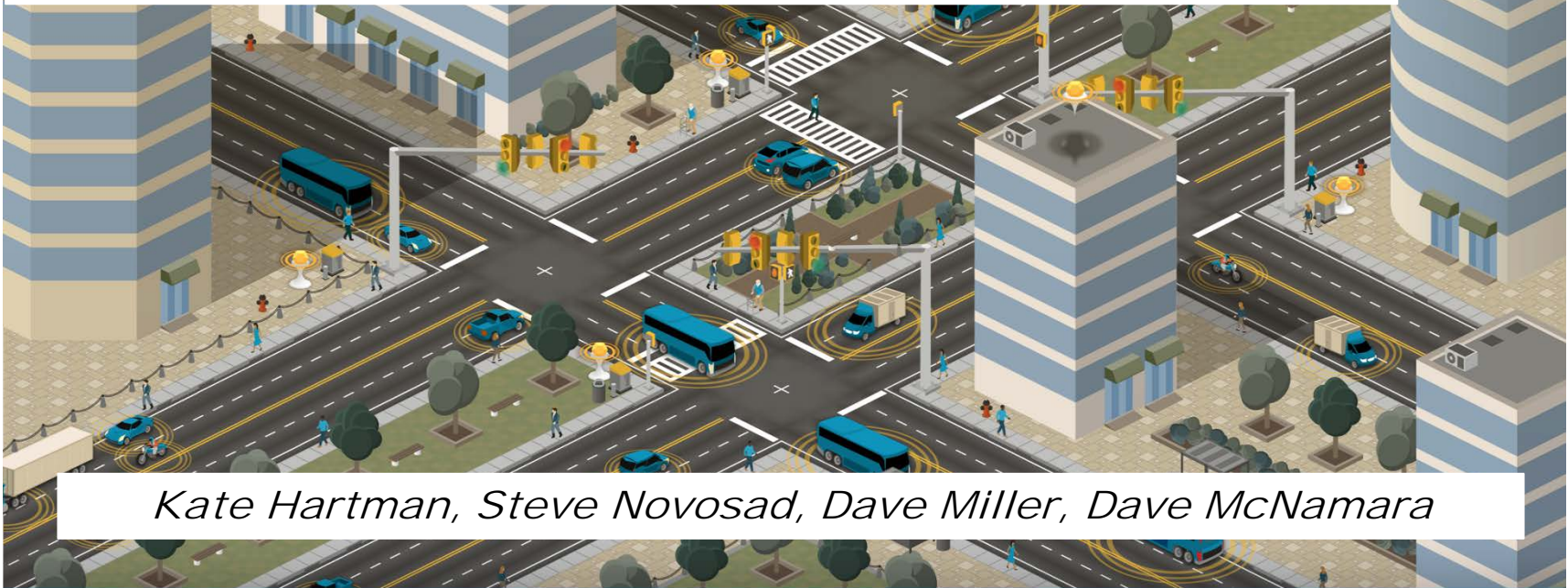




CONNECTED VEHICLE PILOT Deployment Program



Tampa (THEA) Pilot Update at the System Design Milestone



Kate Hartman, Steve Novosad, Dave Miller, Dave McNamara

ITS Joint Program Office



TODAY'S AGENDA



- Purpose of this Webinar
 - The conceptual overviews and status reports of the Tampa (THEA) pilot project, as well as the technical challenges and lessons learned of the system design process.

- Webinar Content
 - Connected Vehicle Pilot Deployment Program Overview
 - Tampa (THEA) Pilot Overview
 - System Design Overview
 - Challenges and Lessons Learned
 - Stakeholder Q&A

- 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



PILOT SITES



WYDOT



NYCDOT



Tampa (THEA)

STAY CONNECTED

- Participate in Design/Build/Test Phase Webinars/Conference Presentations from the three Pilot Sites (see website for exact dates and times)

Sep 2017	Oct 2017	Nov 2017	Dec 2017	Jan 2018	Feb 2018	Mar 2018	Apr 2018	May 2018
◆◆◆	●	◆ ◆ ◆		●		●	◆ ◆ ◆	
System Design	ITS World Congress	Application Deployment		TRB		SXSW	Operational Readiness	

◆ Public Webinars ● Conference Presentations

- Visit Program Website for Updates: <http://www.its.dot.gov/pilots>
- Contact: Kate Hartman, Program Manager, Kate.Hartman@dot.gov





Tampa (THEA) CV Pilot Deployment Concept

Steve Novosad

THEA Pilot overview



Source: HNTB

Pilot Location

- Tampa Florida metropolitan area
- THEA
 - Owns / operates Selmon Expressway
 - Owns Meridian Ave traffic signals
- West: Residential community of Brandon
- East: MacDill Air Force Base
- Study area
 - Midway of Selmon Expressway
 - Shown in red box



THEA Pilot overview



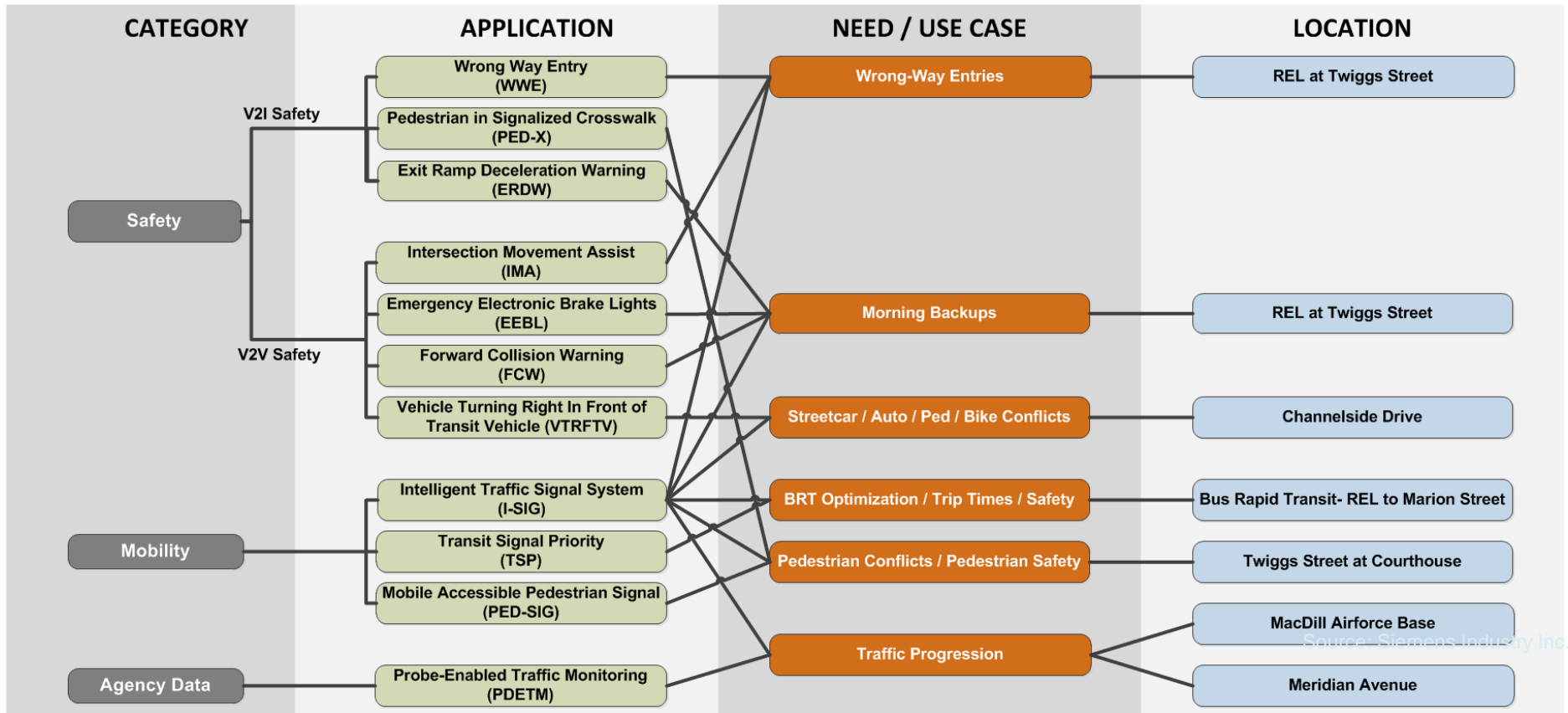
Focused Deployment Area



- 41 Roadside Units (RSUs)
- 1600 equipped passenger vehicles
- 10 equipped streetcars / trolleys
- 10 equipped transit buses
- 500 Personal Safety Devices
- 12 V2V, V2I and V2P applications
- Roadside Detection Equipment
 - Unequipped Pedestrian study data
 - Unequipped Vehicle study data
- RSU Management System
- Agency data collection



THEA Pilot overview

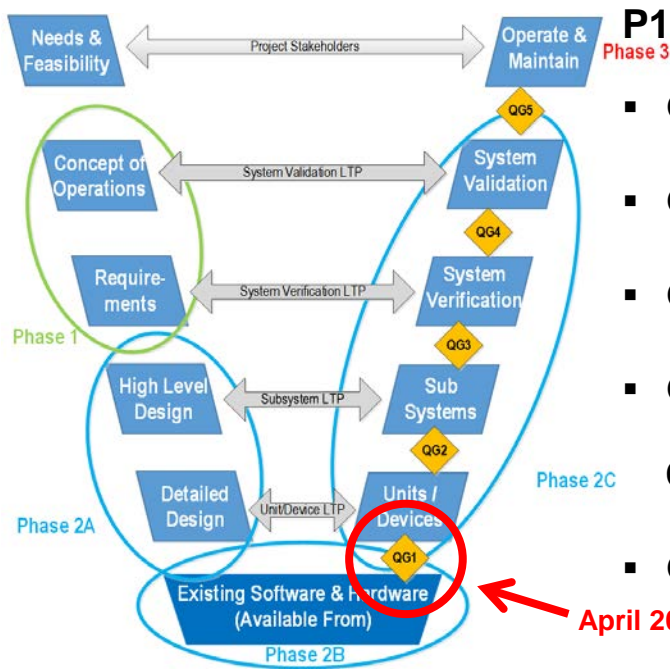




System Design Overview

Dave Miller & Dave McNamara

Work Breakdown progress



P1 Comprehensive Deployment Plan, 3.5.1.1.2

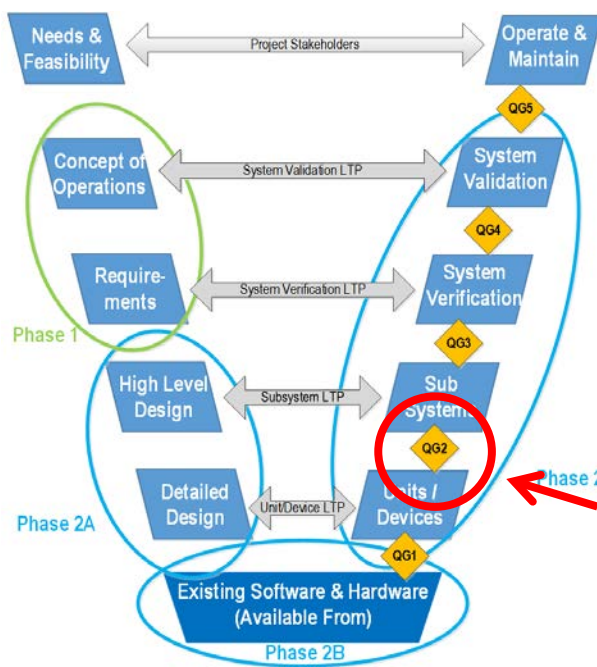
Phase 3

- QG5: LTP5, OIL, Requirements + Cost + Schedule Update, Validate CM
- QG4: LTP4, OIL, Requirements + Cost + Schedule Update, System CM
- QG3: LTP3, OIL, Requirements + Cost + Schedule Update, Subsystem CM
- QG2: LTP2, OIL, Requirements + Cost + Schedule Update, Device/ Unit CM
- QG1: LTP1, Distribution Licenses, MTP, Requirements Update per CCB

April 20, 2017



Work breakdown progress

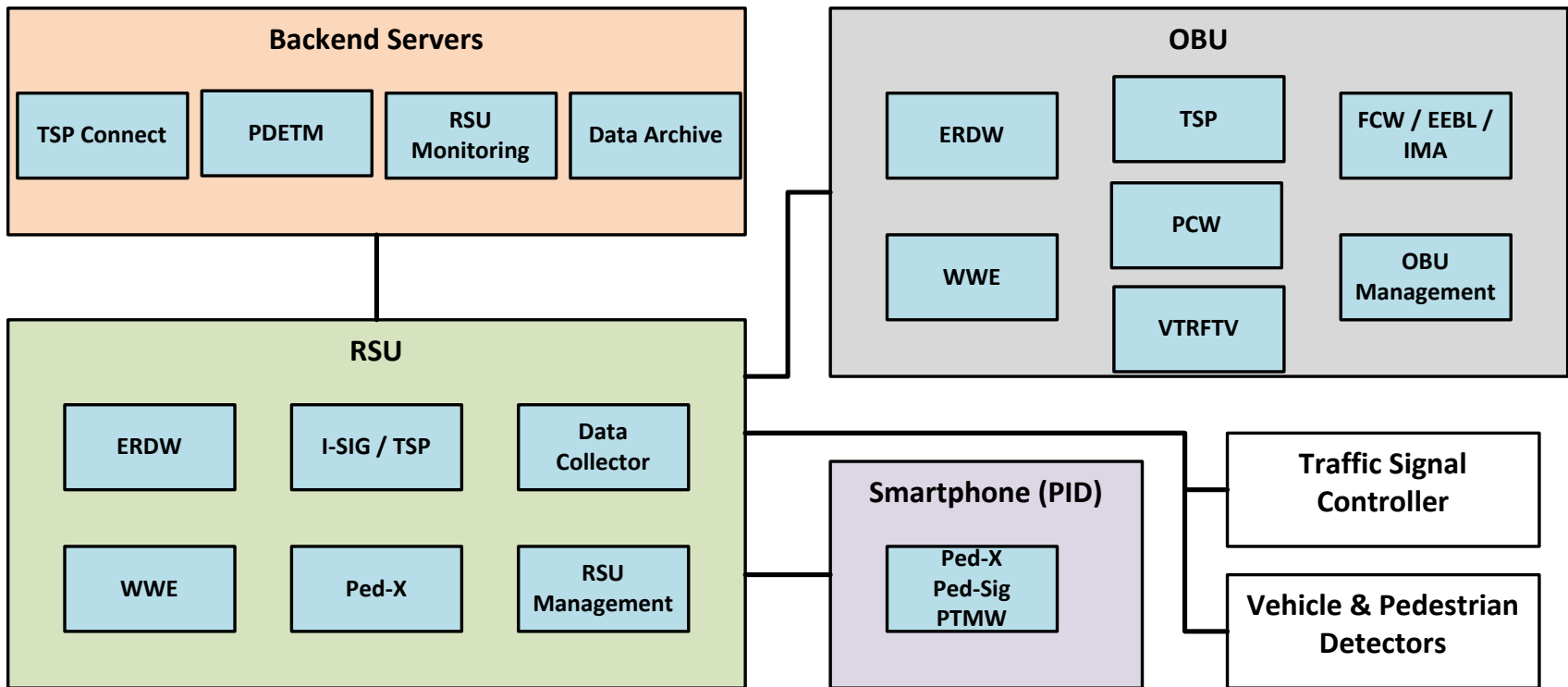


P1 Comprehensive Deployment Plan, 3.5.1.1.2

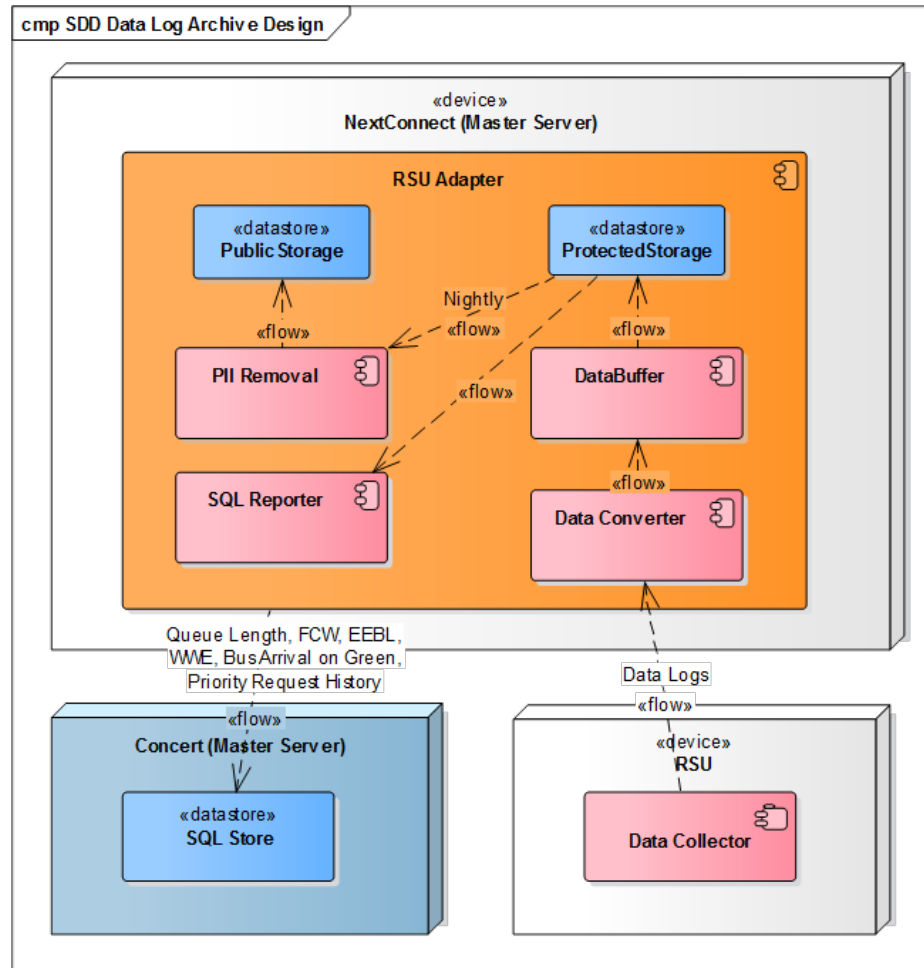
- QG5: LTP5, OIL, Requirements + Cost + Schedule Update, Validate CM
- QG4: LTP4, OIL, Requirements + Cost + Schedule Update, System CM
- QG3: LTP3, OIL, Requirements + Cost + Schedule Update, Subsystem CM
- QG2: LTP2, OIL, Requirements + Cost + Schedule Update, Device/ Unit CM
- QG1: LTP1, Distribution Licenses, MTP, Requirements Update per CCB



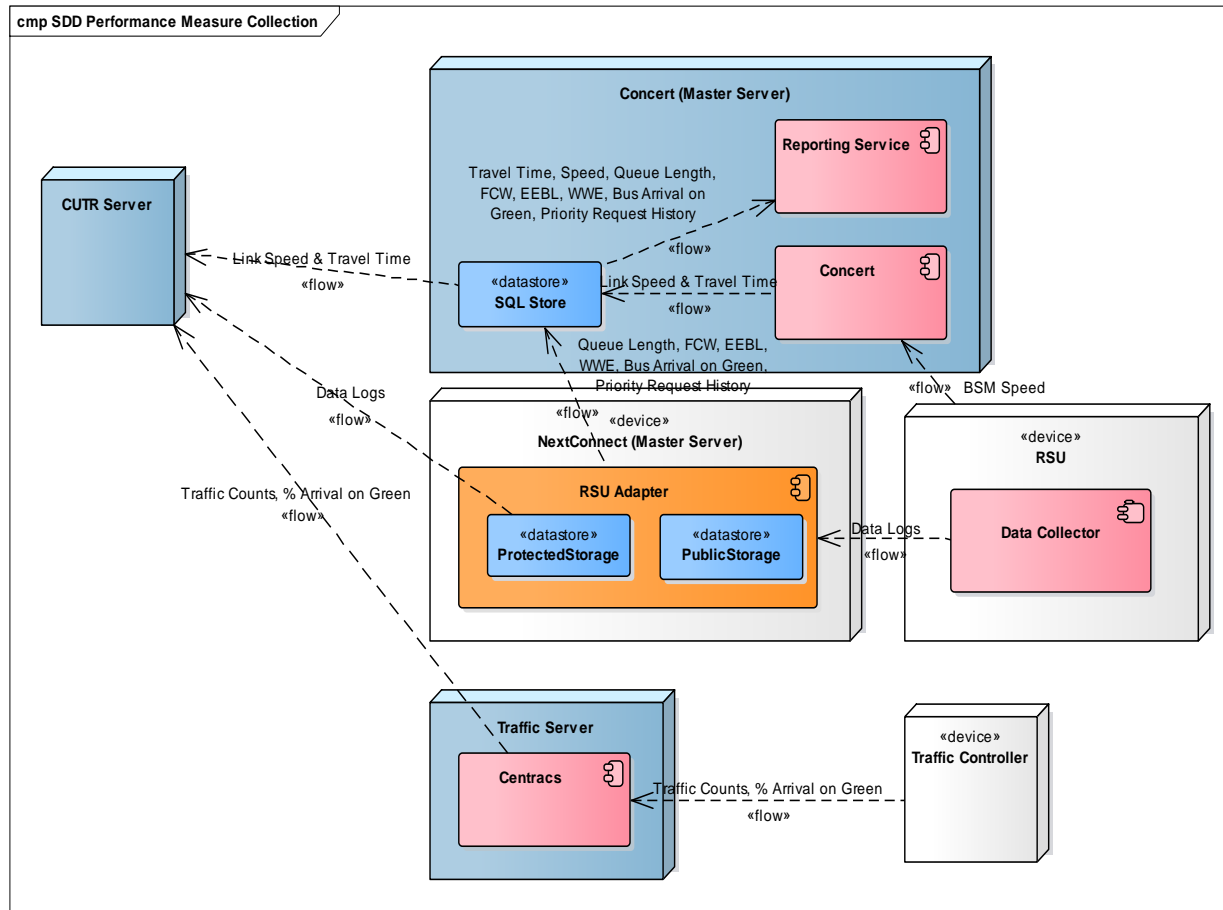
System / subsystem components



TMC Data log archive architecture



Performance measures collection



Morning Backup



Forward Collision Warning (FCW)

Emergency Electronic Brake Light (EEBL)

End of Ramp Deceleration Warning (ERDW)

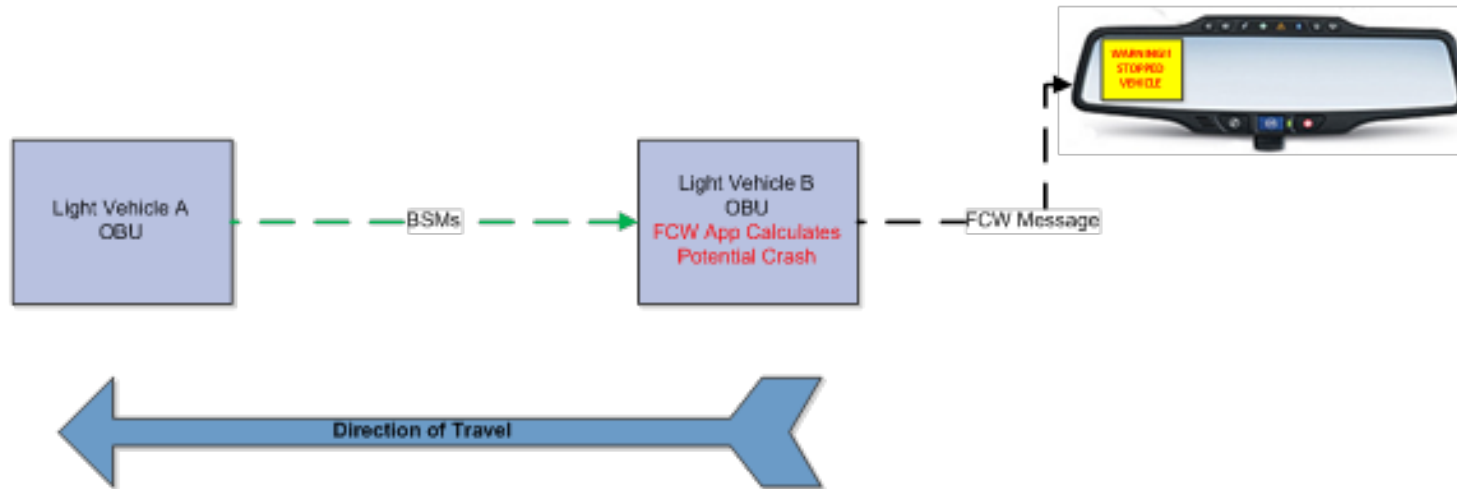
Intelligent Signal Systems (I-SIG)

PHOTO: TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY (THEA)



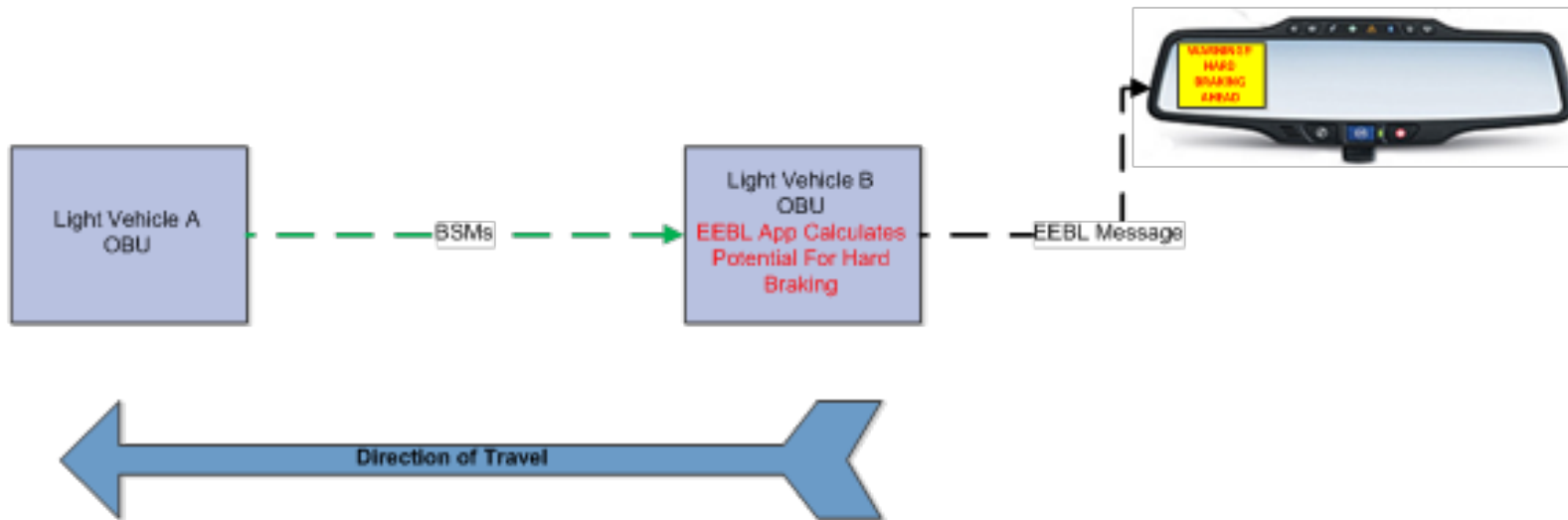


Functional Flow



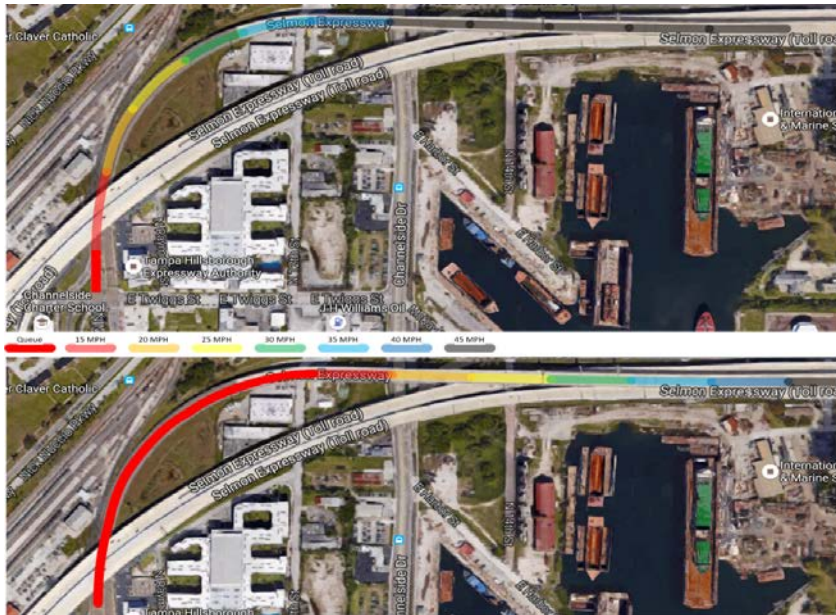


Functional Flow

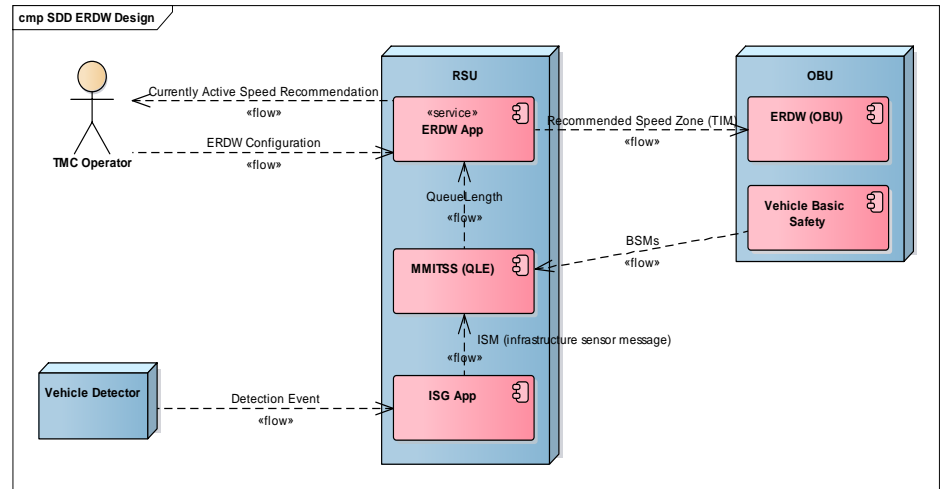




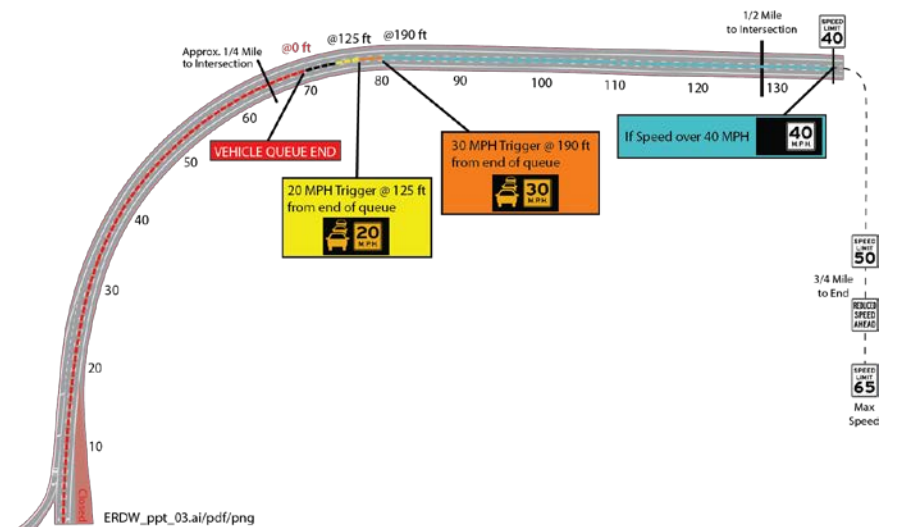
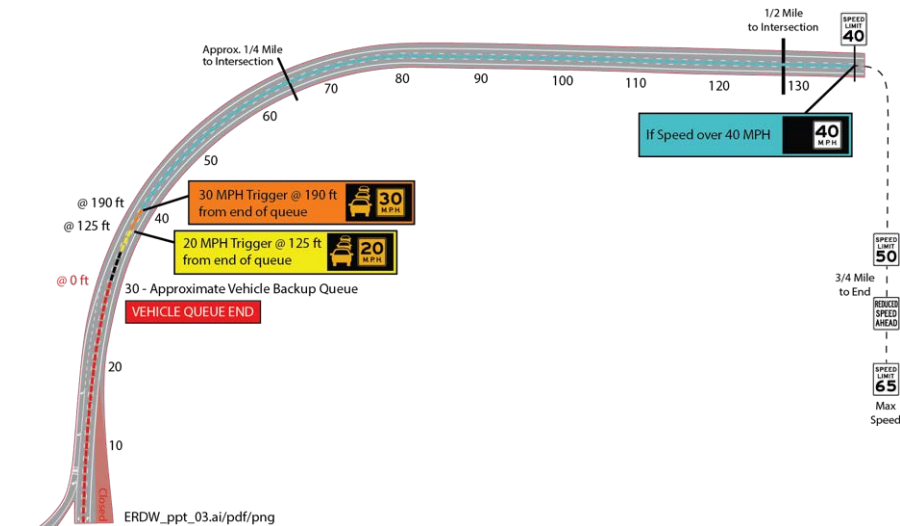
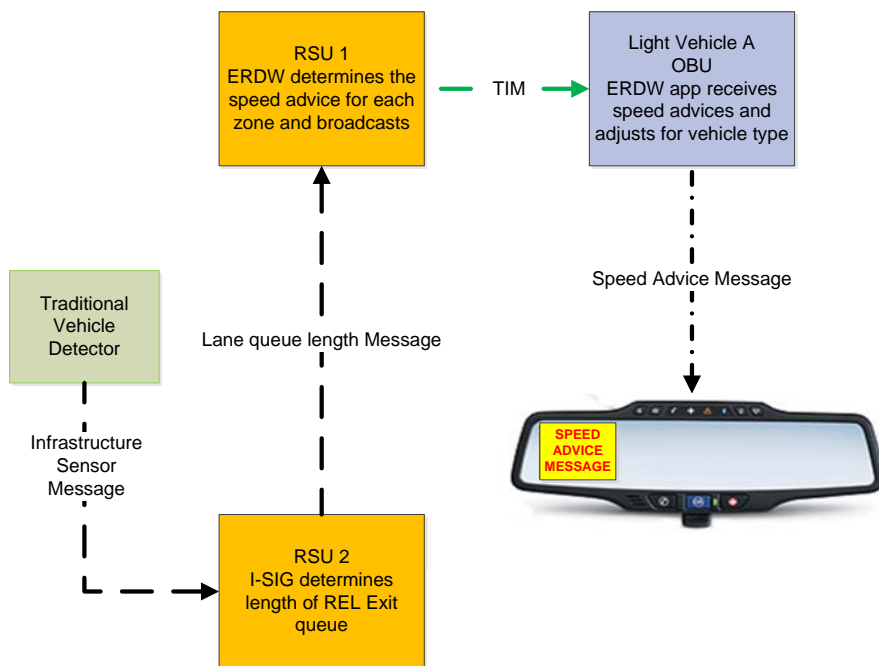
Conceptual Design



Detailed Design



ERDW



Wrong-Way Drivers



Wrong-way
Entry

Intersection
Movement
Assist (IMA)

MAP

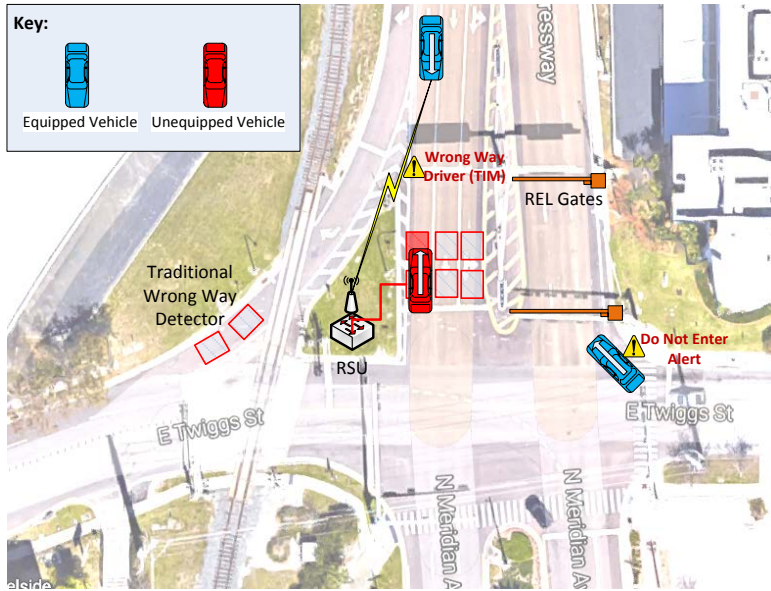
Signal Phasing
and Timing
(SPaT)

PHOTO: TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY
(THEA)

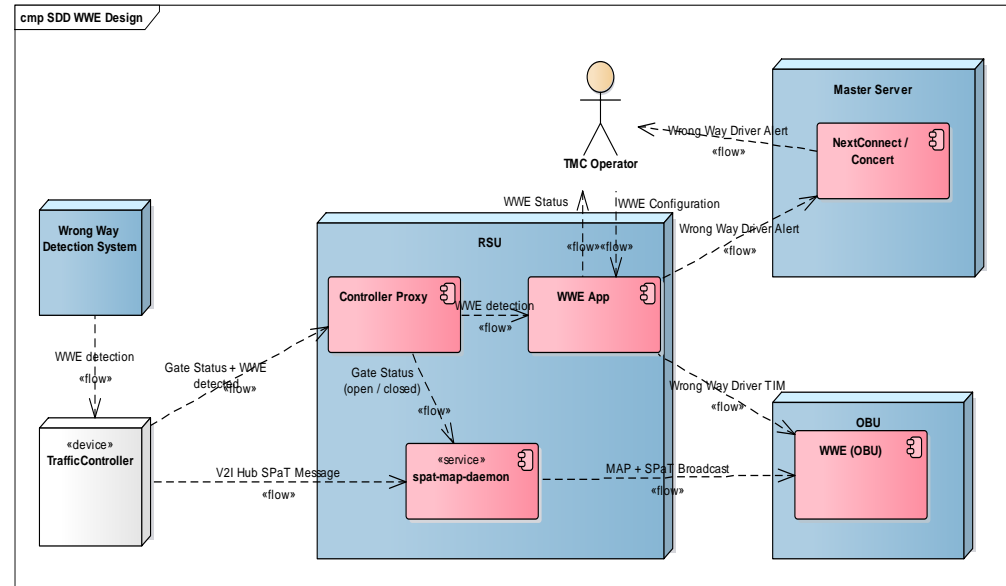


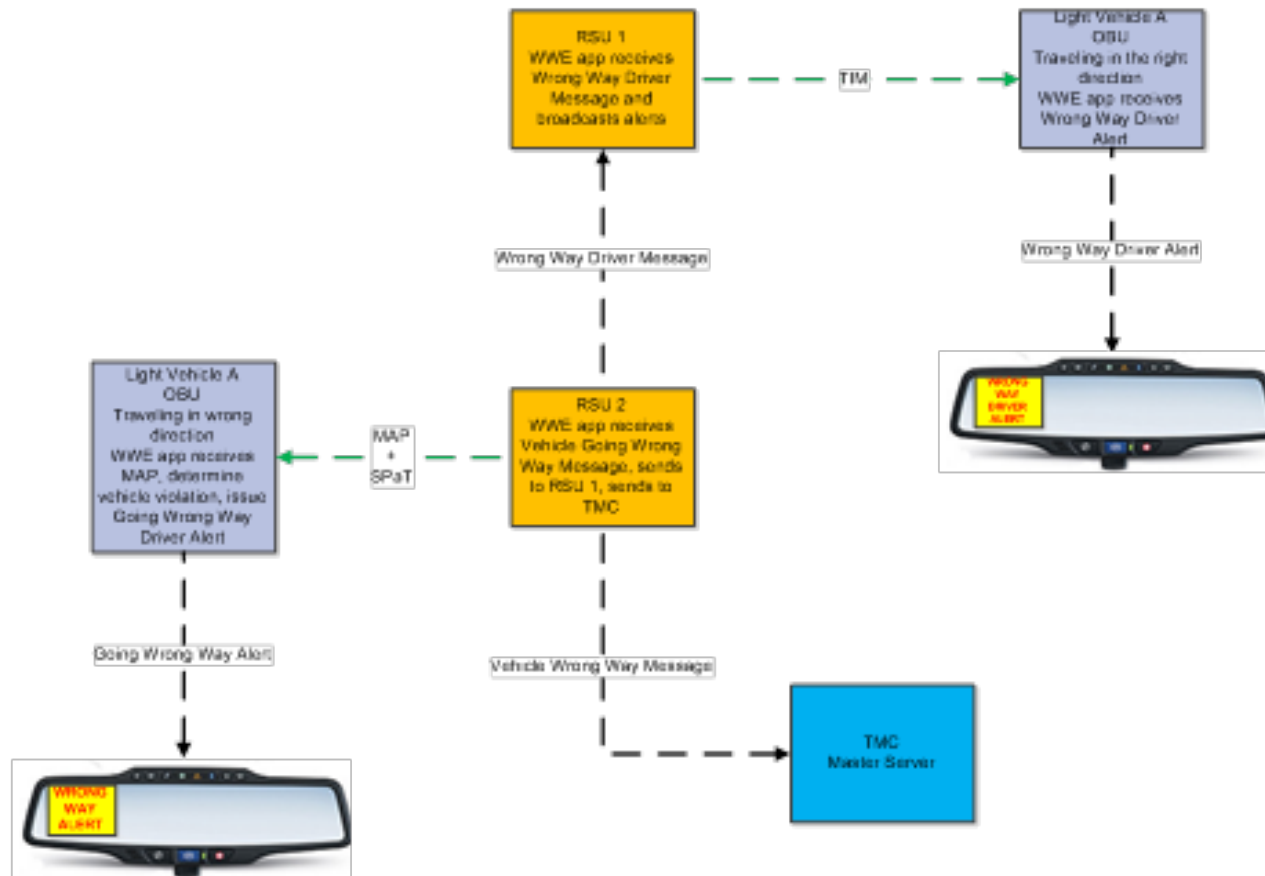


Conceptual Design



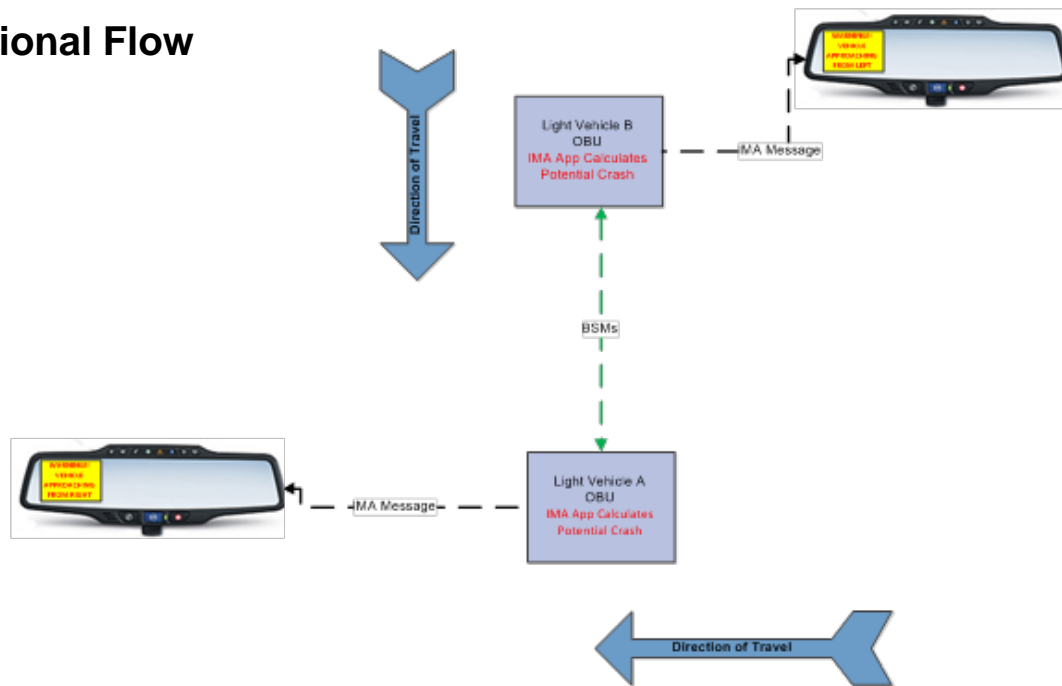
Detailed Design







Functional Flow



Pedestrian Safety



**Pedestrian in a
Signalize
Crosswalk
Warning (Ped-X)**

**Pedestrian
Collision Warning
(PCW)**

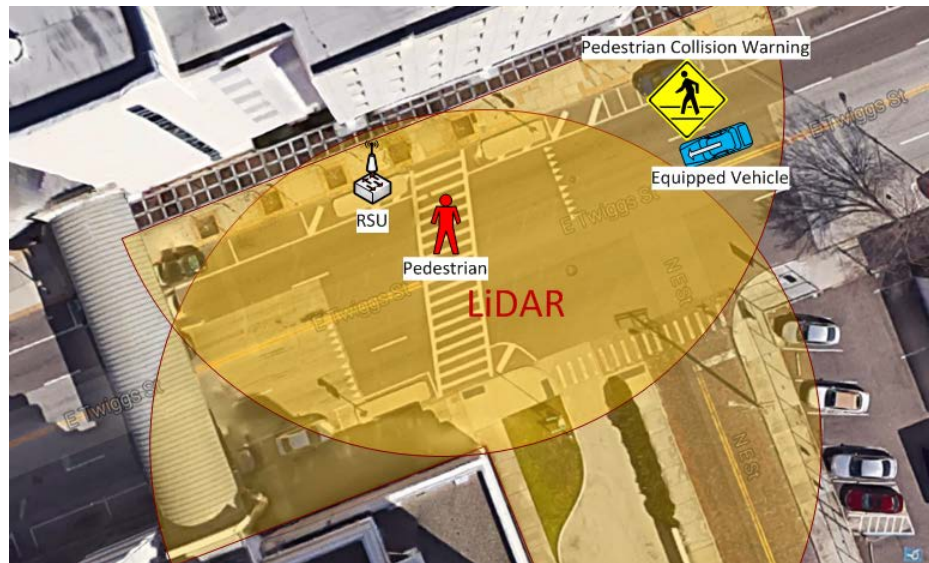
PHOTO: TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY
(THEA)



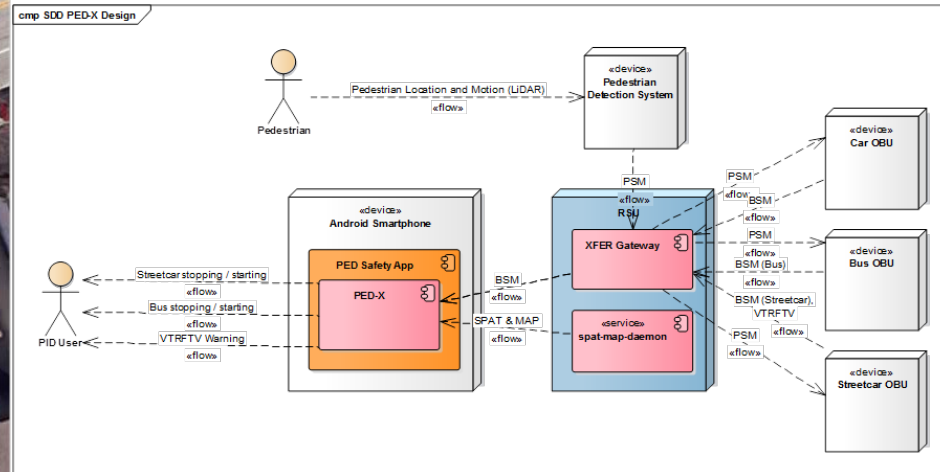
PED-X



Conceptual Design



Detailed Design



Streetcar Conflicts



**Vehicle Turning
Right in Front of
Transit Vehicle
(VTRFTV)
PTMW**

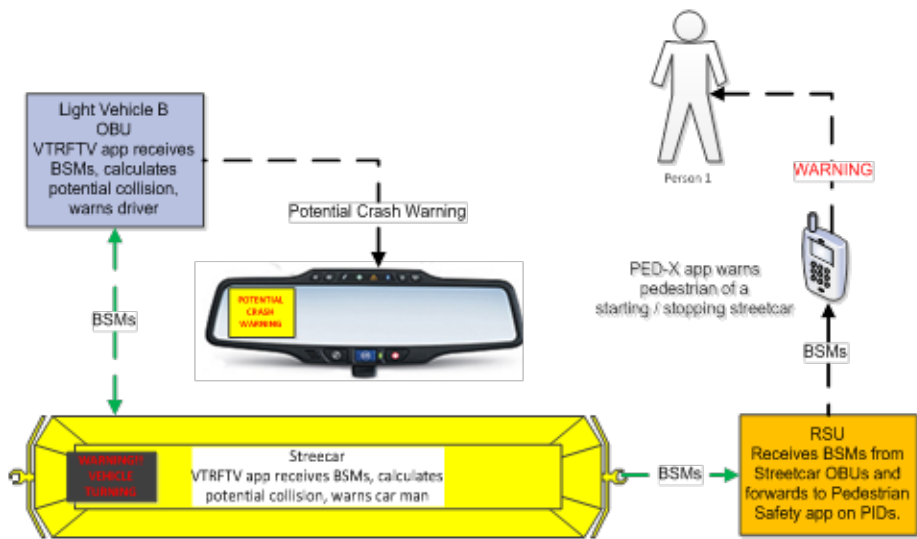


PHOTO: TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY (THEA)

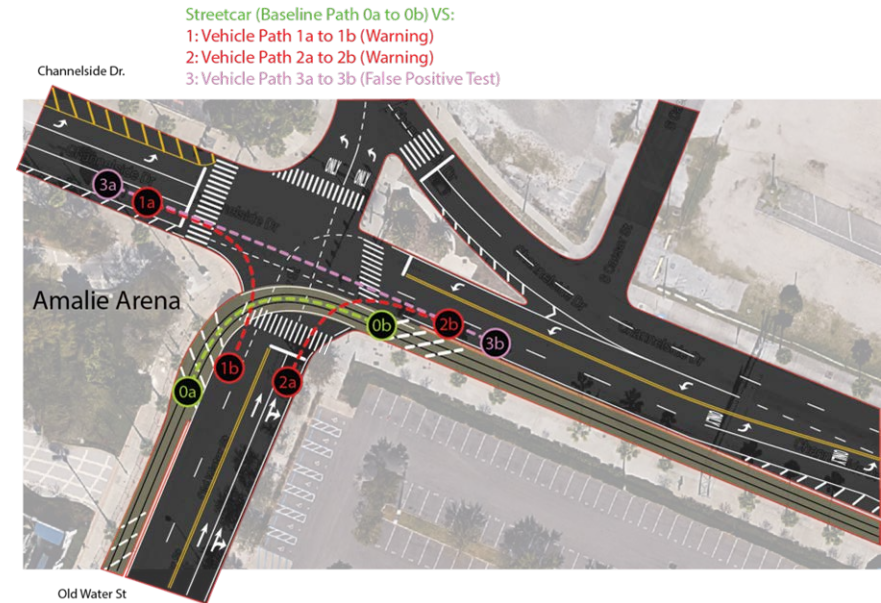
VTRFTV & PTMW



Functional Flow



Case Example



Transit Signal Priority



I-SIG

**Transit Signal
Priority (TSP)**

IMA

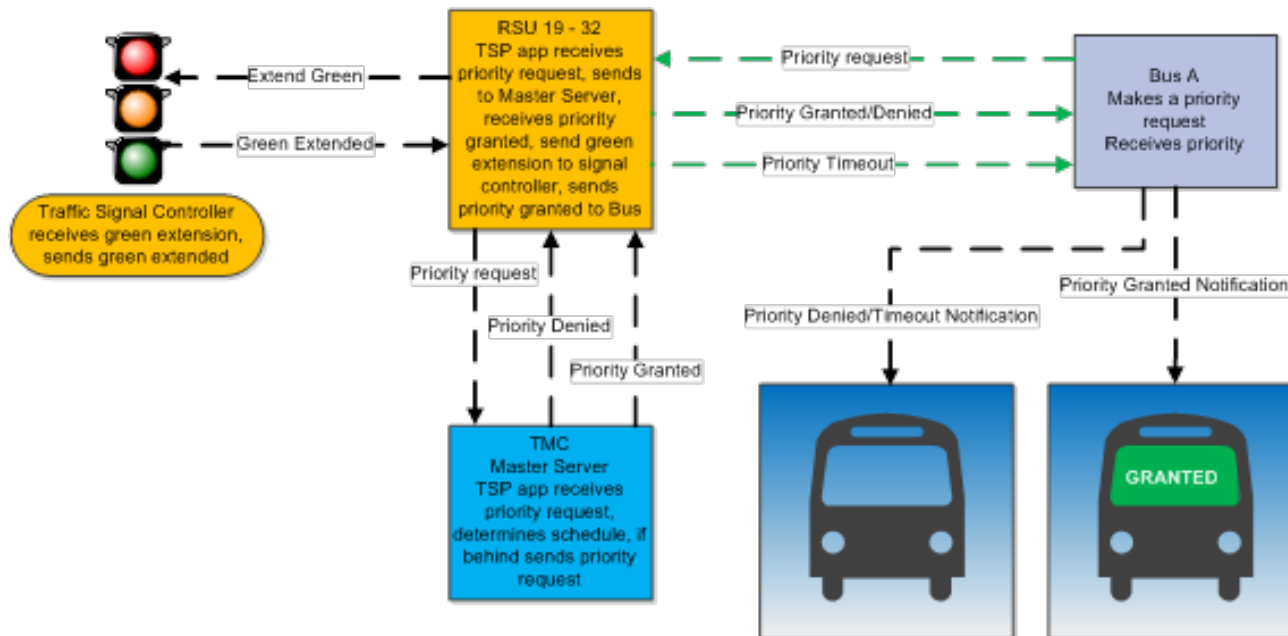
**Pedestrian
Transit
Movement
Warning
(PTMW)**

PHOTO: TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY
(THEA)

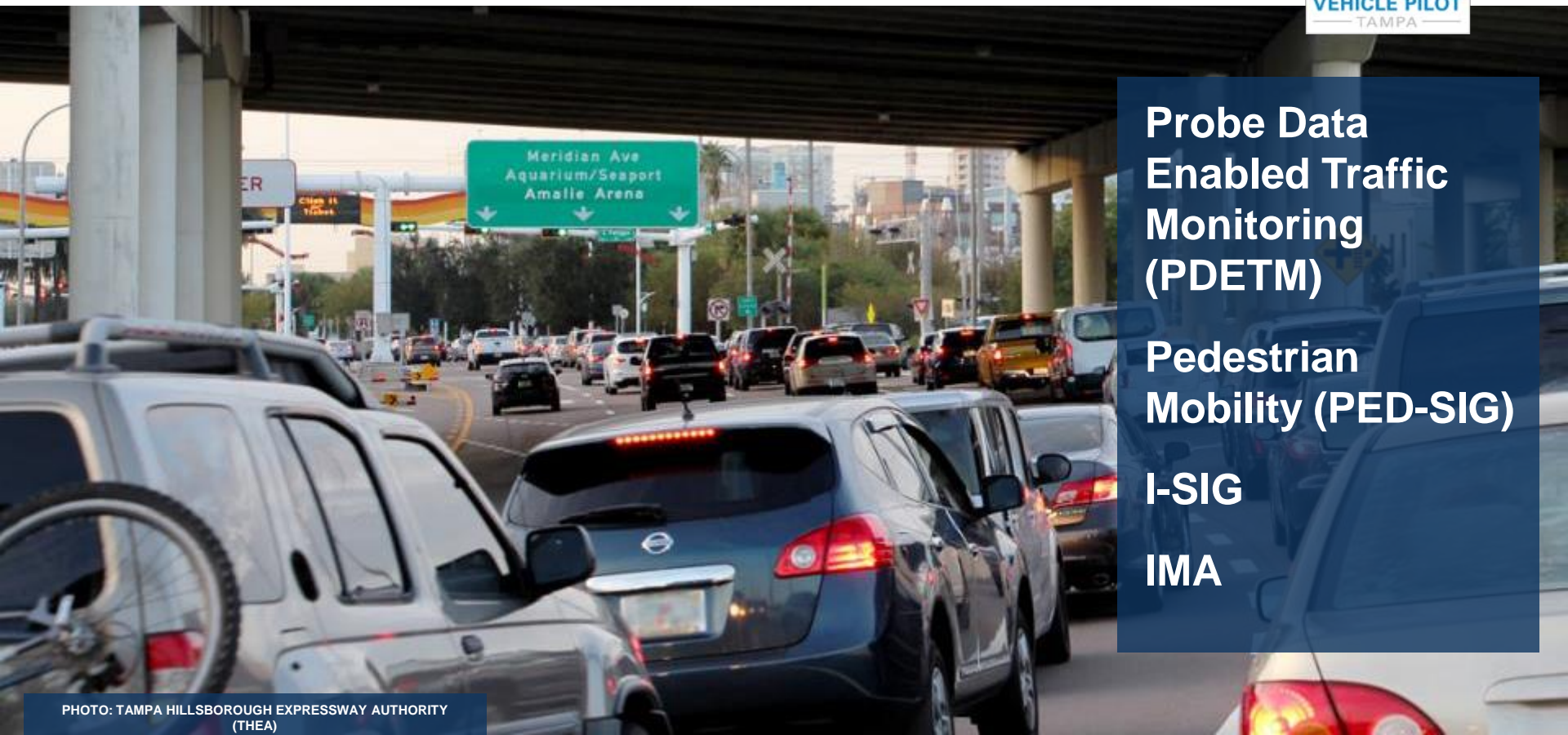




Functional Flow



Traffic Progression



**Probe Data
Enabled Traffic
Monitoring
(PDETM)**

**Pedestrian
Mobility (PED-SIG)**

I-SIG

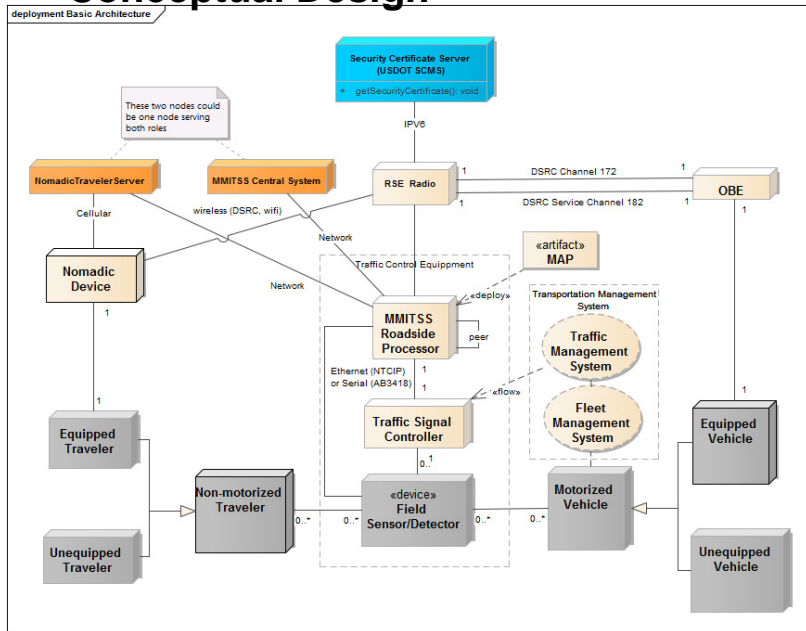
IMA

PHOTO: TAMPA HILLSBOROUGH EXPRESSWAY AUTHORITY (THEA)

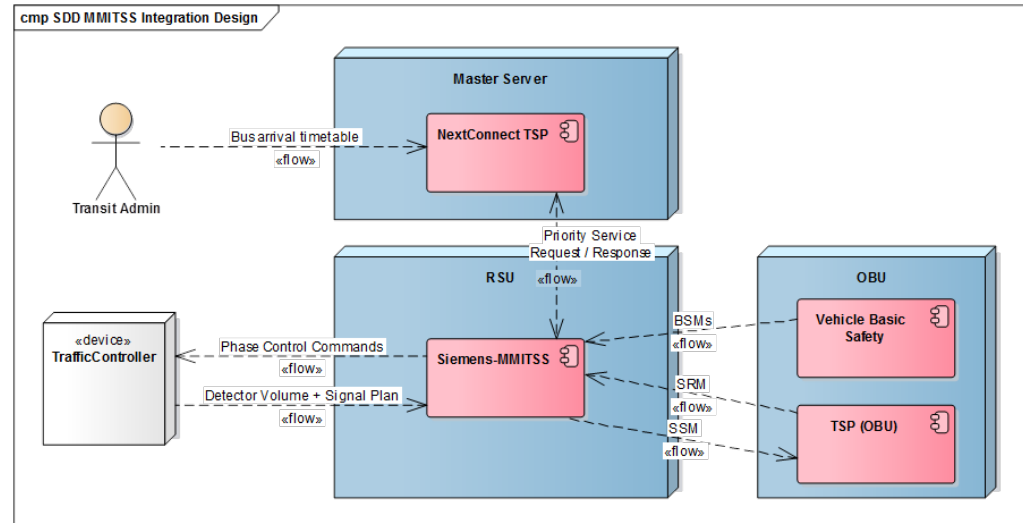
MMITSS: Traffic Progression



Conceptual Design

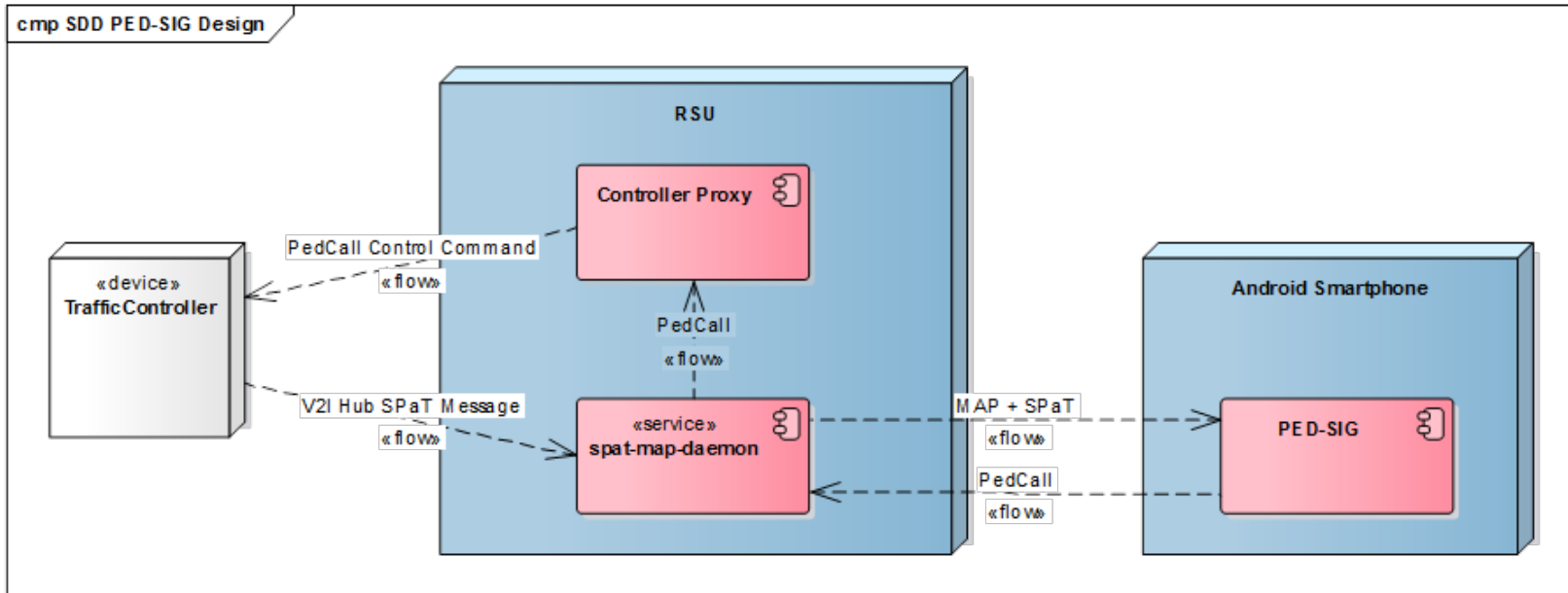


Detailed Design





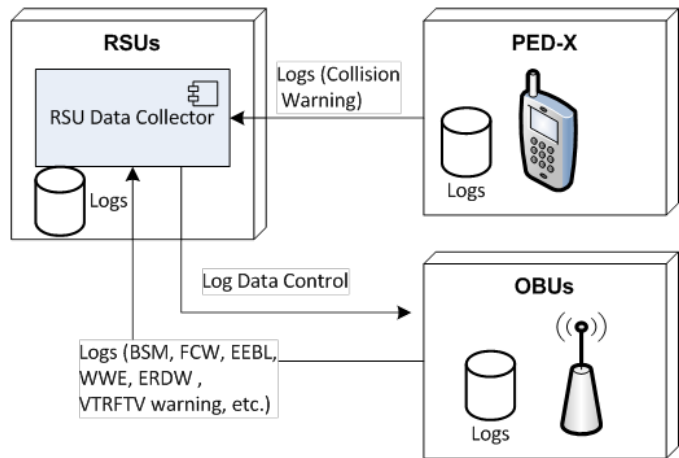
Detailed Design



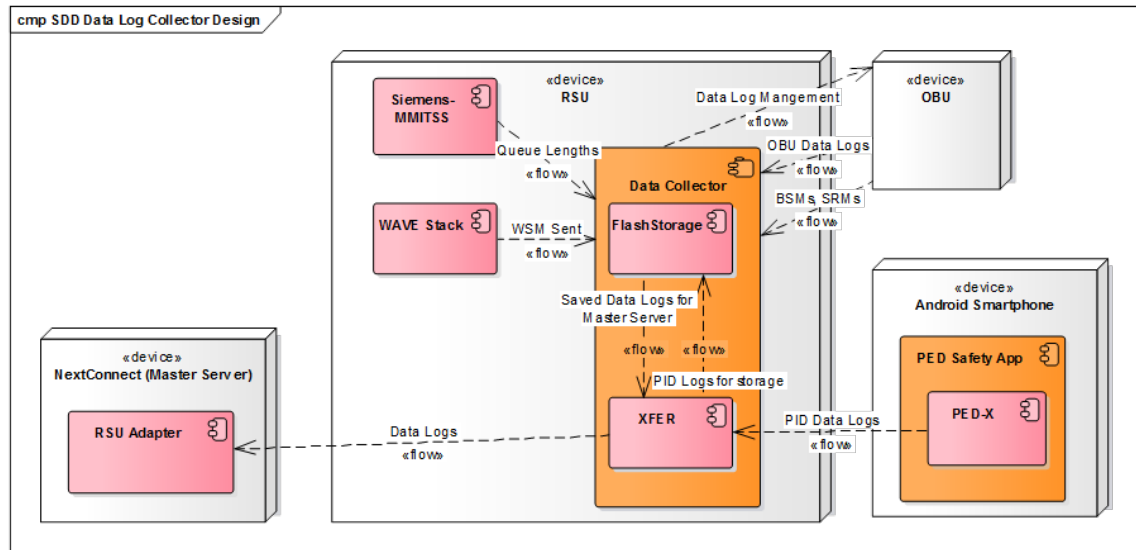
Data Log Collector



Conceptual Design



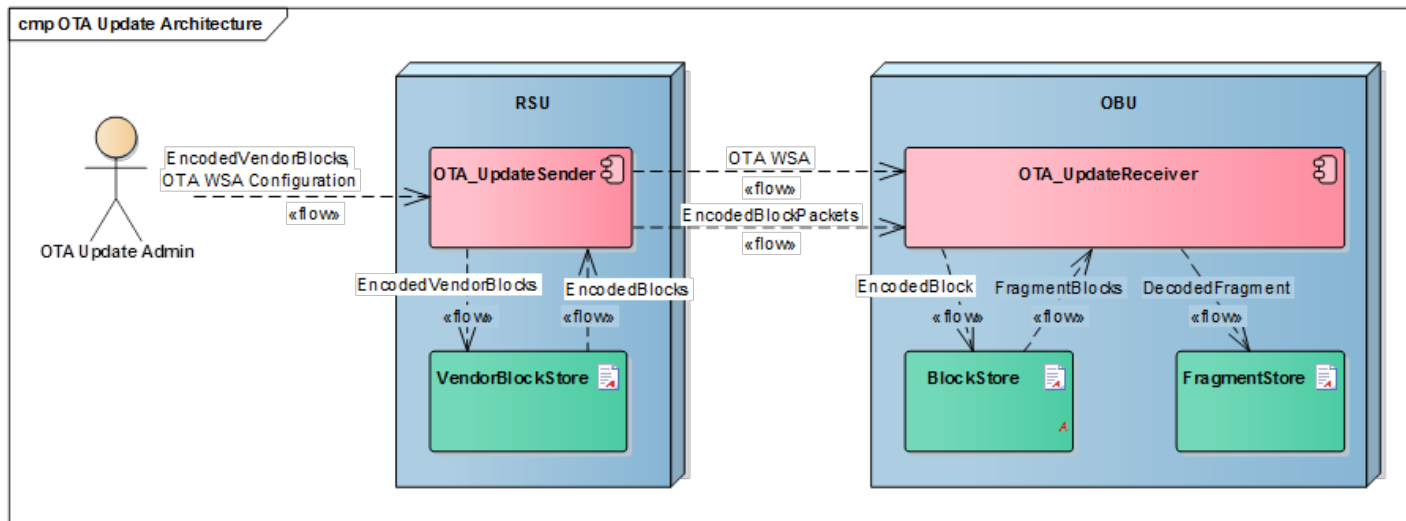
Detailed Design



Over-The-Air (OTA) Update



Concept: RSUs on REL Detailed Design





Challenges and Lessons Learned

Dave Miller & Dave McNamara

Challenges and Lessons Learned



- Program
- Infrastructure
- In-Vehicle

Program



- Manage and Perform Professional Privately Owned Vehicle Installs
- Improved Communication with Other Sites
- Security
- Ensure You are Solving Real World Problems
- Adequate CV Penetration versus Traditional ITS Detection Devices
- Better Knowledge of Apps
 - Open Source
 - Individual Vendors
- Prep Work Required to Successfully Deploy



Infrastructure



- Standards:
 - Design using standards published on Jan 1, 2017. Do not rely on unpublished standards in progress
 - If a USA standard does not exist design using international standards
 - If no standard exists, refer to USDOT V2I Hub publication
- Interoperability:
 - Pursuit of interoperability among the pilots
 - Identify common requirements that affect interoperability, such as crosswalk, before the design started.
- Certification process
 - Certification process lagged the design process
 - Mitigated by Conformance statement to self-certify missing link
- Pedestrian Detection

In-Vehicle



- Multiple tech scans using RFPs (with on the road testing) to identify promising suppliers who can meet system, cost and project timing, critical to scrutinize and select the best suppliers
- Early sourcing of suppliers is key to creating a collaborative environment
 - To understand how system requirements are implemented in the design
 - To source suppliers who are willing to participate in developing open specifications
 - Who can meet aggressive timing with quality as they have adequate development time. always aspects requiring customization of off the shelf technology/standards
- Collaboration around common specifications
- Early real-life testing with actual infrastructure in place to verify end-to-end system/application performance (OTA, data management, security, etc.)
- Distributed Team Across the Country and in Europe



In-Vehicle



- New development efforts - OTA and security - need to be piloted, i.e. tested early in the program
- Adequate incentives with community/media support engage the driver/consumer community
- Recognizing the need for a complete and experience project team - systems, infrastructure, vehicle systems, performance measurement, etc.



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 CV Pilot Sites
- Learn the Essential Steps to CV Deployment
- Engage in Technical Discussion

Visit the Pilot Site Websites for more Information:

- NYCDOT Pilot:
<https://www.cvp.nyc/>
- Tampa (THEA):
<https://www.tampacvpilot.com/>
- Wyoming DOT:
<https://wydotcwp.wyoroad.info/>

Contact for CV Pilots Program:

Kate Hartman, Program Manager

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Contact for Pilot Sites:

- Kate Hartman, WYDOT Site AOR
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- Jonathan Walker, NYCDOT Site AOR
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- Govind Vadakpat, THEA Site AOR
G.Vadakpat@dot.gov

