



— THE EASTERN
TRANSPORTATION
COALITION

CONNECTING FOR SOLUTIONS



Virtual Information Exchange: *Considerations for Digital Infrastructure - Project examples and planning for the future*

June 28, 2023

Welcome

- We are using **Zoom Webinar**
- **AUDIO (Computer):** Use your computer speakers and microphone by clicking the “Join Audio” button at the bottom left of the screen. You will be muted.
- **Alternate Audio (Phone):** Call into the meeting by dialing the phone number based on your location (provided in the confirmation email) and enter the Meeting ID at the prompt. You will be muted.
- **This web meeting is being recorded.**
- **Questions** with the audio or web? Please contact Esther via email (ekleit@kmjinc.com)

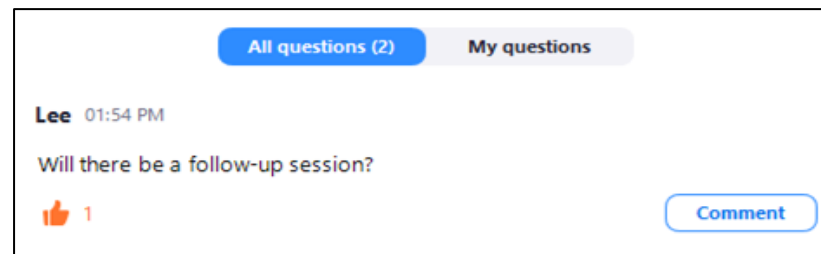


Asking Questions in the Q&A Box

- Click on the Q&A icon at the bottom of your screen



- The questions in the Q&A box will be monitored and answered either between presentations or at the end of the meeting
- You can keep track of your questions in the “My Questions” tab in the Q&A box

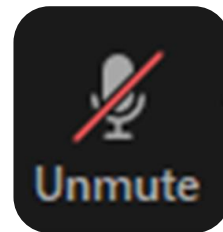


Asking Questions Verbally

- Please raise your hand (*click on the hand icon at the bottom of the screen*), and a host will unmute you.
- Please give your name and agency before asking your question



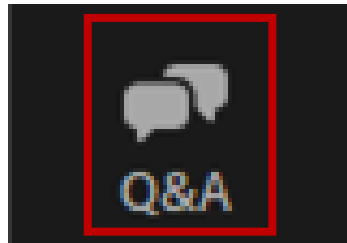
- Please mute yourself when you are finished speaking



Polling & Discussion Questions

- Please participate in the meeting!
- For any **polling** or **discussion** questions, please feel free to enter additional information or additional thoughts into the Q&A.

If you use the Q&A, please note that **poll #** for reference.



Welcome



Lisa Miller

Innovation Program Associate
The Eastern Transportation Coalition



Coalition TSMO Update – Recent & Upcoming Events

RECENT

- TSMO Strategic Planning Sessions – April 13 & May 5, 2023
- RITIS User Group Web Meeting – May 4, 2023
- Distracted Driving/Move Over Conference: *A Unified Approach to Driving Change on the Roadway* - May 8-10, 2023
- TDM Vendor Forum (*invite only*) - Volume Data - May 25, 2023
- Freight Academy (*invite only*) - June 11-16, 2023
- NAV HUB Training Session (*invite only*) - June 16, 2023
- TDM State Contract POC Web Meeting (*invite only*) - June 22, 2023

UPCOMING

- ✓ Waze/Google Bi-Annual Meeting (*invite only*) - June 29, 2023
- ✓ RITIS User Group Web Meeting – July 27, 2023
- ✓ Fall TIS Summit - TBD



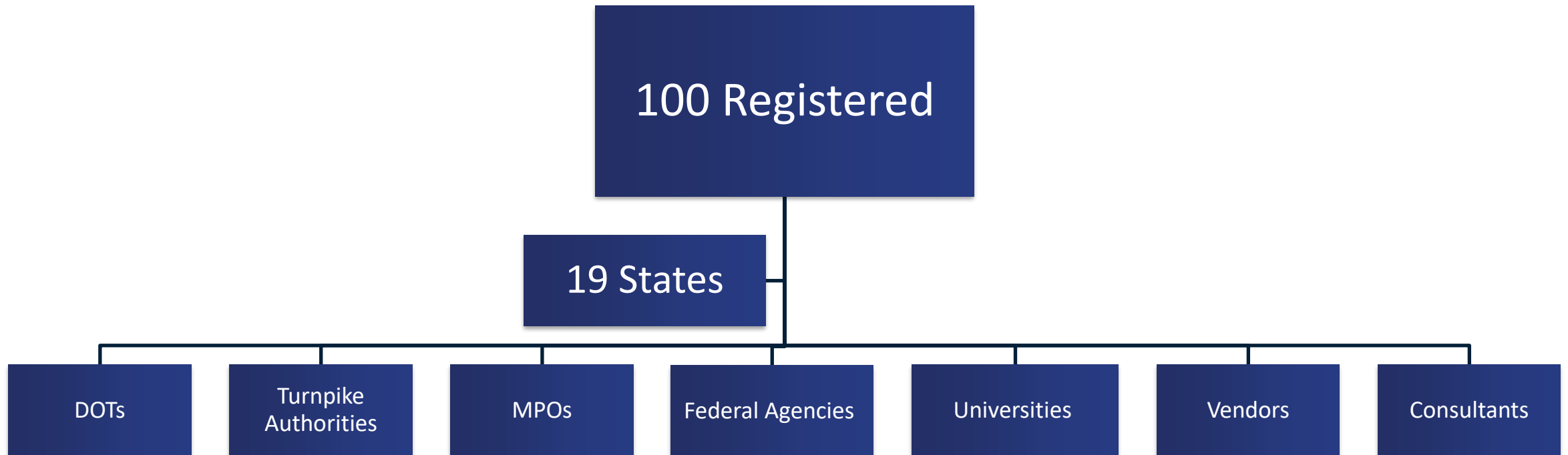
June 28, 2023

The Eastern Transportation Coalition - Virtual Information Exchange: Considerations for Digital Infrastructure



tetcoalition.org

The Eastern Transportation Coalition Sponsored Event



Agenda

Topic	Speaker
Housekeeping	Joanna Reagle, KMJ Consulting, Inc.
Welcome & Update by the Eastern Transportation Coalition Framing the Discussion	Lisa Miller, Innovation Program Associate, The Eastern Transportation Coalition
Digital Infrastructure Projects at Pennsylvania DOT	Gunnar Rhone, PE, Engineering Specialist Pennsylvania DOT
Georgia's Digital Infrastructure Corridor	Allie Kelly, Executive Director The Ray
Interactive Demo	Allie Kelly
Q&A/Discussion	Lisa Miller



Speakers



Gunnar Rhone, PE
Engineering Specialist
Pennsylvania DOT



Allie Kelly
Executive Director
The Ray



Framing the Discussion

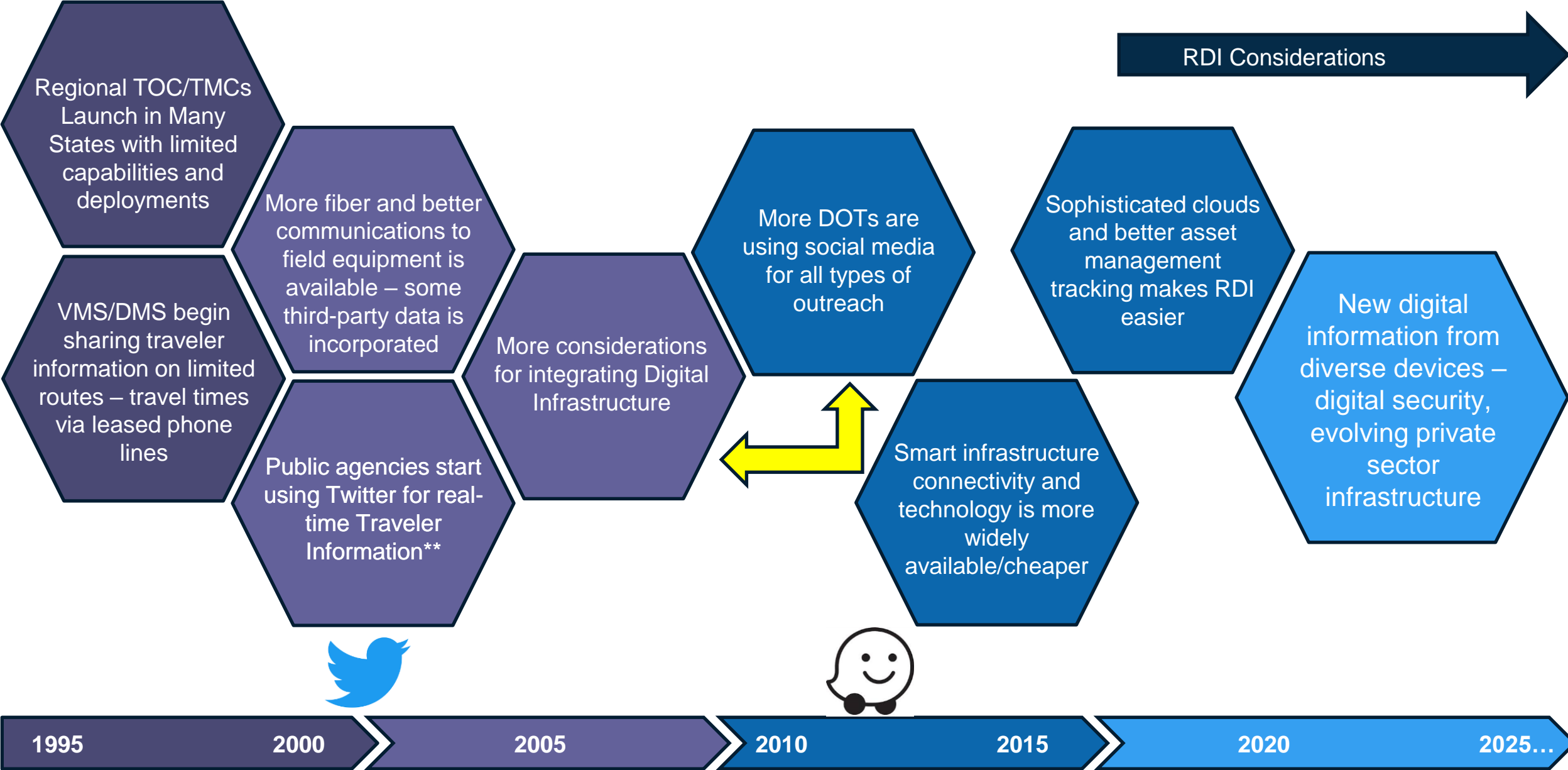


Lisa Miller

Innovation Program Associate
The Eastern Transportation Coalition



RDI Considerations 



1995 2000 2005 2010 2015 2020 2025...

Definitions for RDI

1

Roadway Digital Infrastructure (RDI) are the collective public and private technology assets that create, exchange, or use data or information to improve national transportation system outcomes by optimizing the provision of existing and new transportation services.

2

RDI are the digital representation of the roadway environment required by Automated Driving Systems, C-ITS and Advanced Road/Traffic Management System. It can be understood as the integration of multiple geo-located information layers (static maps, traffic forecasts, traveler information, V2X information, etc.)

3

RDI considers advances and rapid deployments in automation, connected technologies, mobility on demand, and sustainable and resilient technologies, a future of transportation – the digital infrastructure age – and uses technology and innovation to advance future mobility that is safer, greener, smarter, and more equitable.



RDI Collaboration Meetings



ARTS22



TRB 2023

National Roadway Digital Infrastructure Strategy Focus Group March 2023

355-National and Continental Strategy for Digital Infrastructure to Integrate Automation into Transportation

Date and Time: Wednesday, July 12, 2023: 1:30 PM - 5:00 PM

Moderator/355-National and Continental Strategy for Digital Infrastructure to Integrate Automation into Transportation	John Corbin Federal Highway Administration	View Details
Moderator/355-National and Continental Strategy for Digital Infrastructure to Integrate Automation into Transportation	Valerie Shuman Shuman Consulting Group, LLC	View Details
Moderator/355-National and Continental Strategy for Digital Infrastructure to Integrate Automation into Transportation	Julie Lorenz Burns & McDonnell - 1898 & Co.	View Details
Moderator/355-National and Continental Strategy for Digital Infrastructure to Integrate Automation into Transportation	Deepak Gopalakrishna ICF	View Details
USDOT Strategic Directions on Digital Infrastructure	Egan Smith USDOT Intelligent Transportation Systems Joint Program Office	View Details
Supply Chain & Logistics Management Considerations of Transportation Digital Infrastructure	Katie Turnbull Texas Transportation Institute	View Details

ARTS23

tetcoalition.org

RDI Document

OPERATIONAL CONCEPT

The ConOps defines four outcomes for ADS integration:

- A SAFE SYSTEM
 - EFFICIENT OPERATION
 - EQUITABLE BENEFIT
 - INTEROPERABLE SYSTEM
- OUTCOME-FOCUS FOR ADS INTEGRATION

ROADWAY ADS INTEGRATION CAPABILITIES

The needs presented in the section above describe an understanding of what should be addressed to advance ADS integration to support the use cases and accomplish the illustrative societal outcomes. However, the needs alone do not provide transportation agencies with direct actionable insights into practical actions they could take today. To support these decisions, the operational concept defines a set of capabilities to support ADS integration that, if accomplished, would address the needs and increase the readiness of the transportation industry for ADS integration.

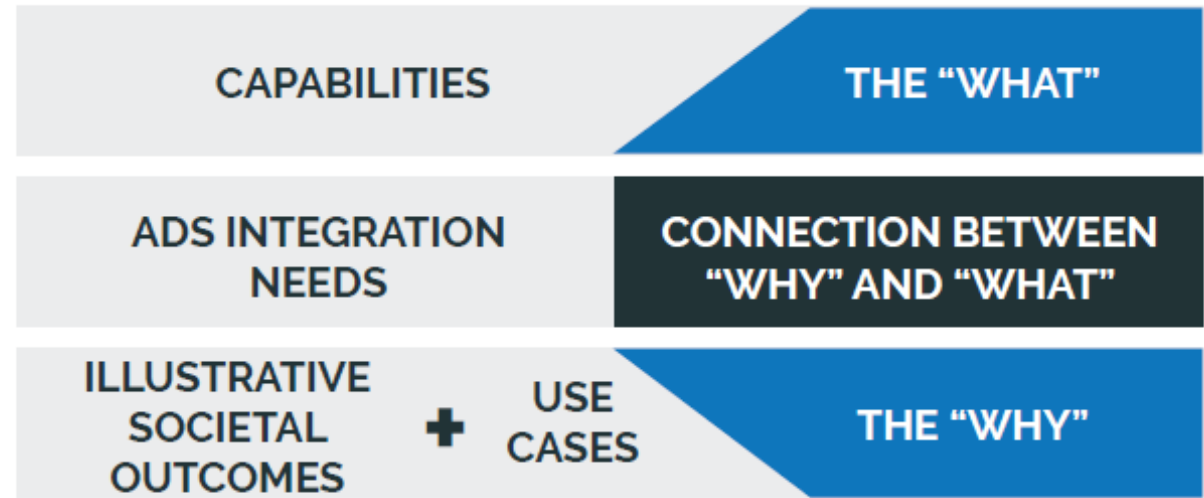


Figure 14
Capabilities Diagram
Source: FHWA

TETC SCOOP and RDI/CVTT

- Bridge Strike Mitigation through ITS Utilization
- Broadband Scorecard and Report
- Roadway Digital Infrastructure Scan Synthesis
- Regional Safety Analysis of ADAS
- Transforming Traffic Operations with AI
- CV Data Prioritization
- Incorporating CAV Data into Modeling Efforts
- OTHERS???



POLL 2

What are the primary concerns, benefits, and next steps for RDI in your area?



Digital Infrastructure Projects at Pennsylvania DOT



Gunnar Rhone, PE
Engineering Specialist
Pennsylvania DOT



TETC

DIGITAL INFRASTRUCTURE

GUNNAR RHONE, PE – PENNDOT

JUNE 28TH, 2023

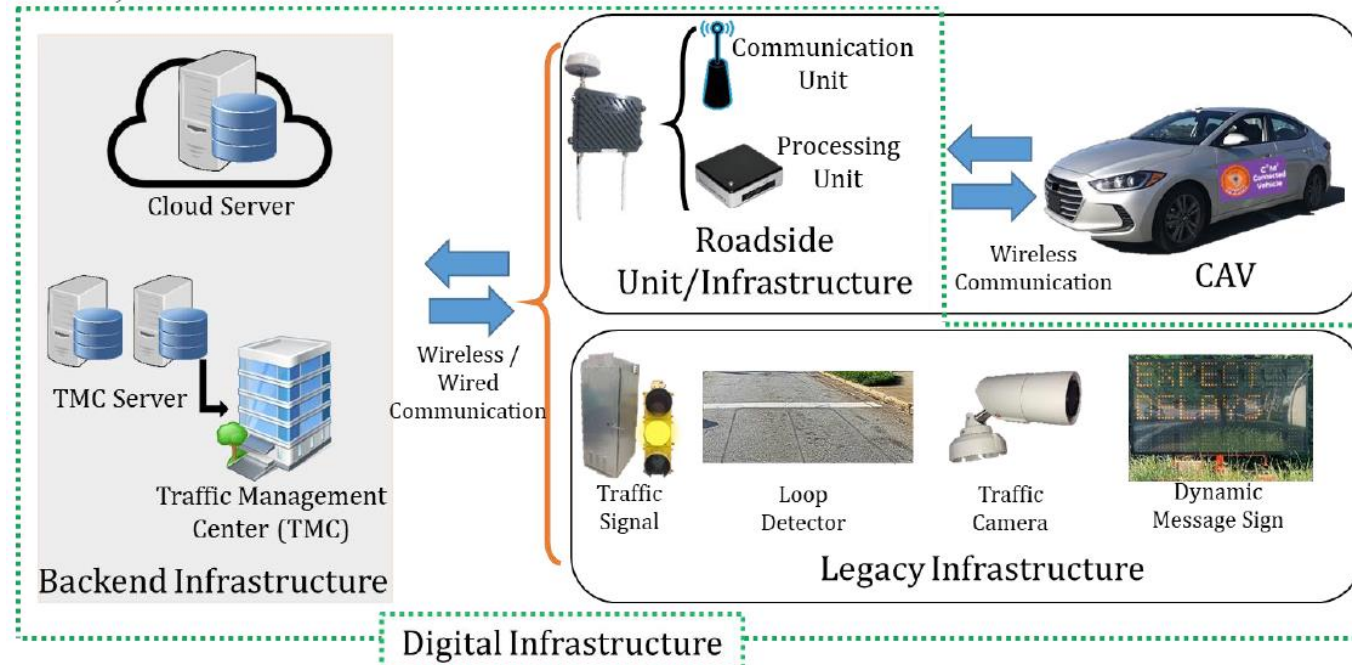
AGENDA

- What is Digital Infrastructure
- PennDOT Digital Infrastructure Projects
- Use Cases

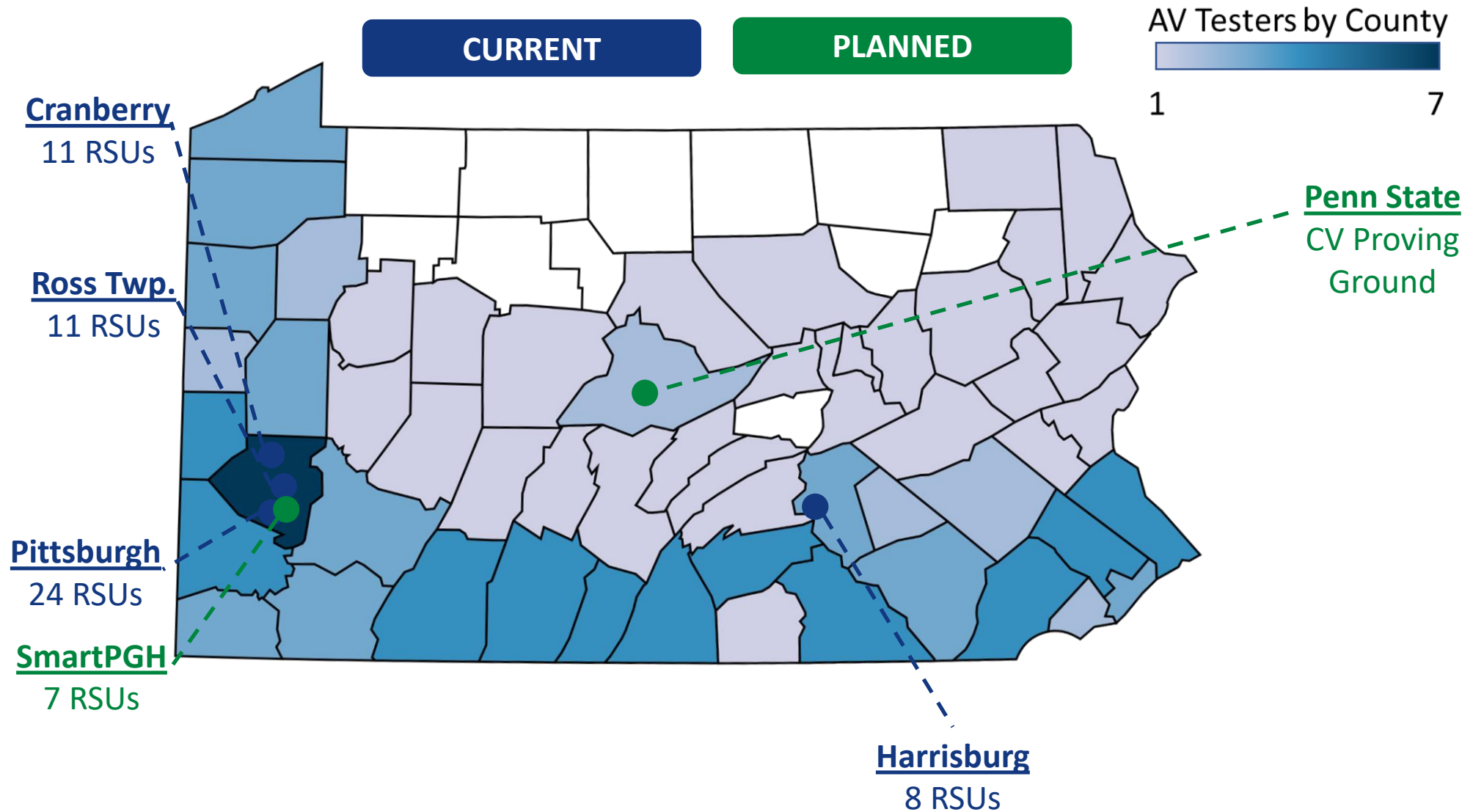


WHAT IS DIGITAL INFRASTRUCTURE?

- “Digital Infrastructure is a **term of art** defined variably across technical fields and industries. It has not been prescriptively defined by USDOT or other national groups within the context of highway automation or automated driving systems. [It] **loosely encompasses information management and telecommunication systems** that enable the **collection, transmission, administration, storage, and analytical application of diverse data** related to...the roadway network.”



CV INFRASTRUCTURE

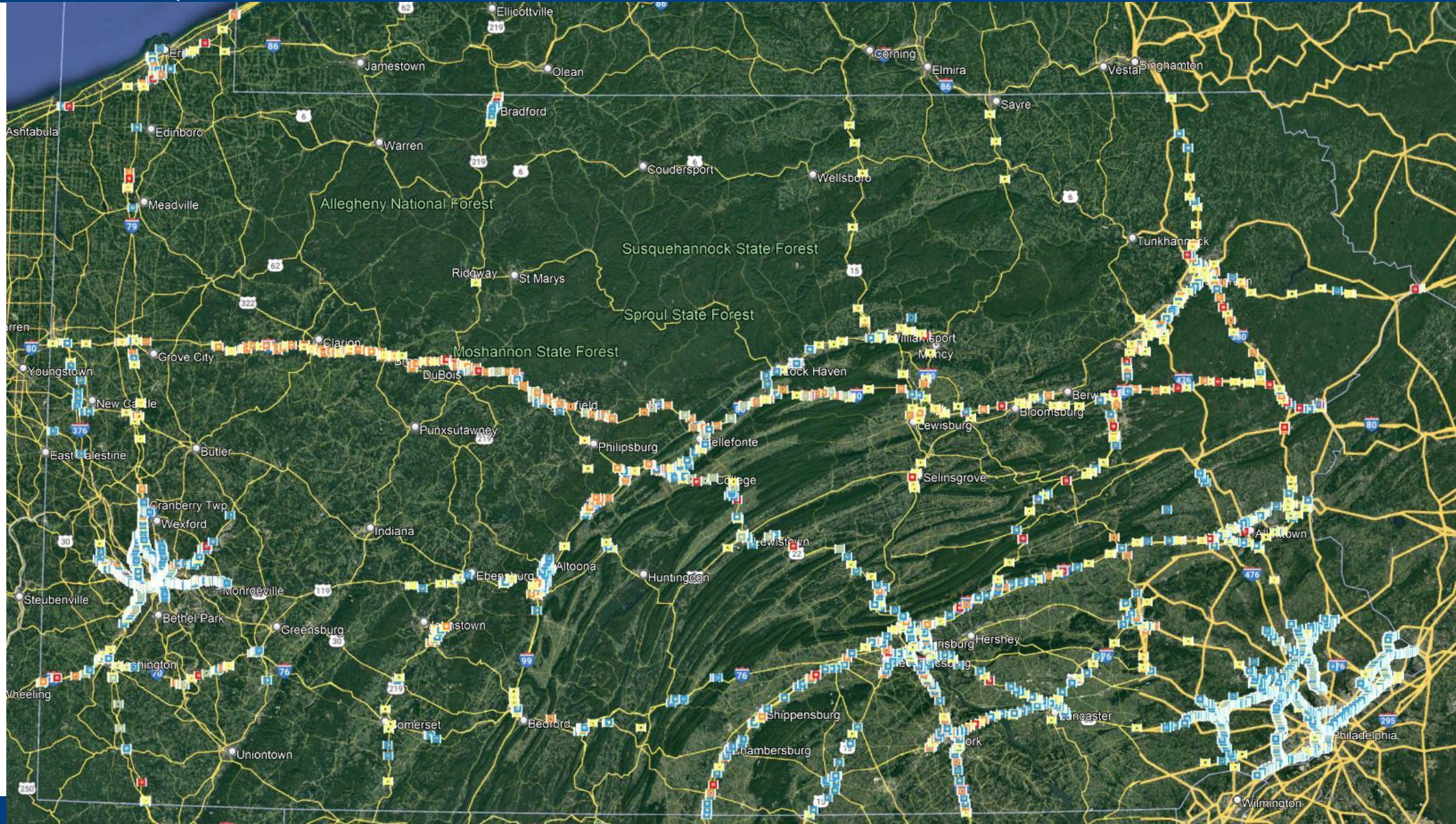


PENNDOT DIGITAL INFRASTRUCTURE PROJECTS

FIELD → COMMS → BACKEND

ITS EQUIPMENT

CAM: 1,146
DET: 894
DMS: 659
HAB: 247
HAR: 114
VSL: 72



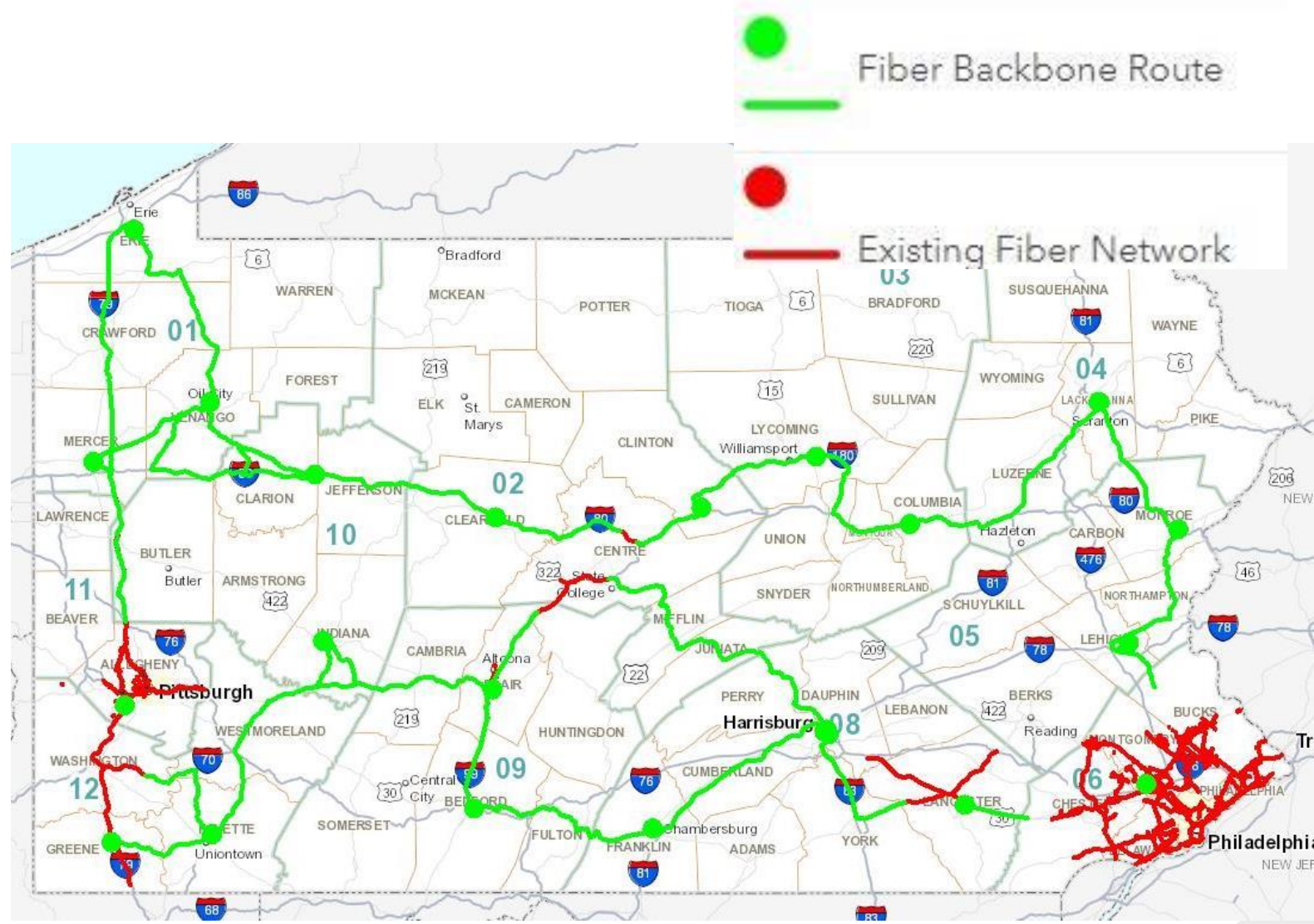
RECENT AND UPCOMING CHANGES

- No more vehicle sensors
 - Vehicle detectors, Bluetooth readers, EZ Pass readers, etc.
- Committed to using CV and other data sources
- Replacing HAR with Virtual HAR
- Existing ITS device locations make good locations to install RSUs



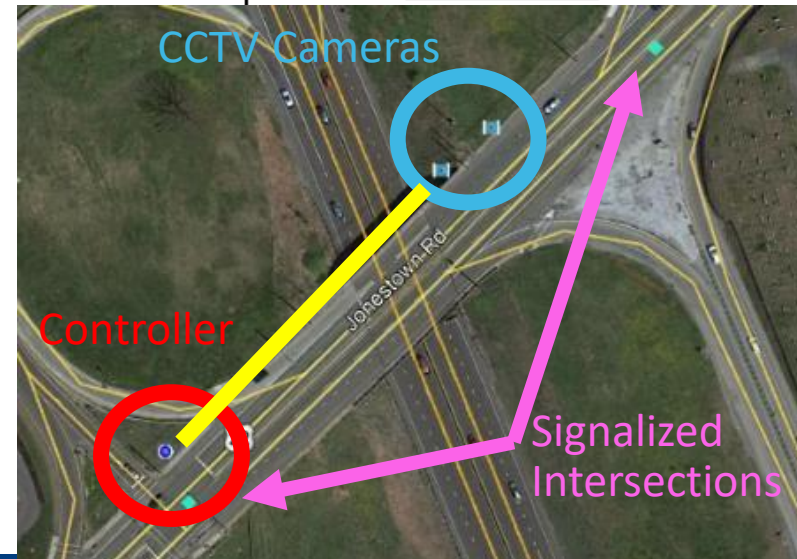
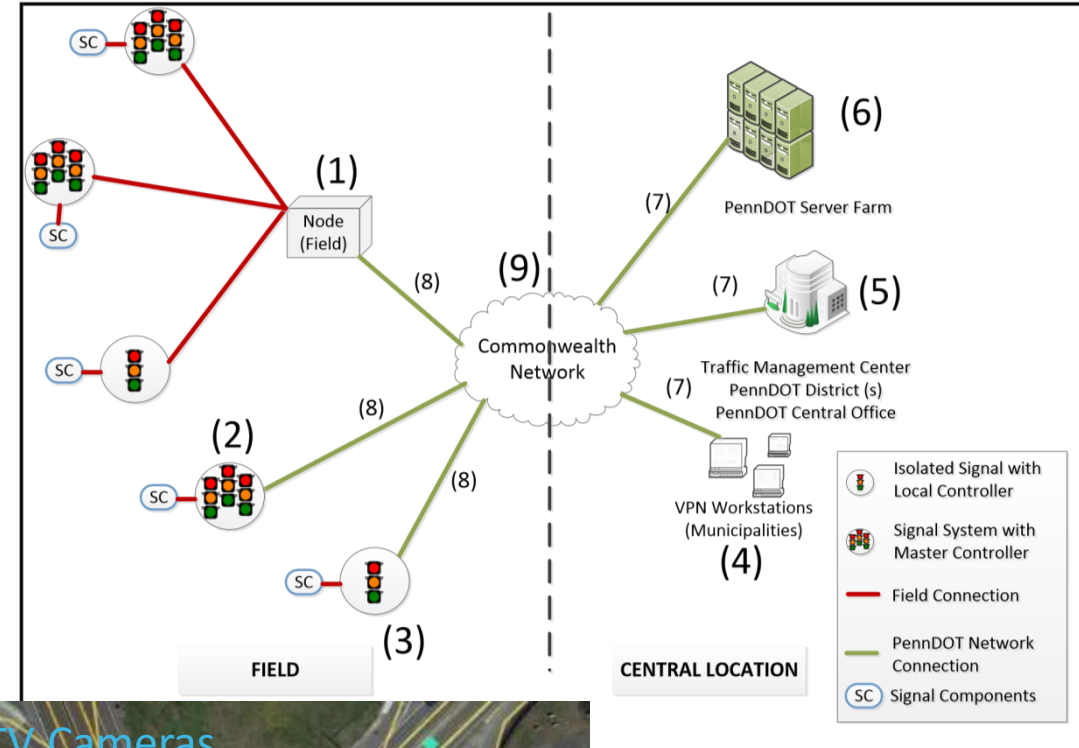
FIBER BACKBONE

- Fiber Plan completed November 2021
- Working on strike-off letter for fiber inclusion
- Not all the existing ITS devices are on interstates, so some of the backbone's best route went on some arterials
 - Based on what districts recommended
- Use cases:
 - Operational Support Model
 - Increased Data Acquisition
 - Increased Partner Coordination/Support
 - Central Situational Awareness and Coordination

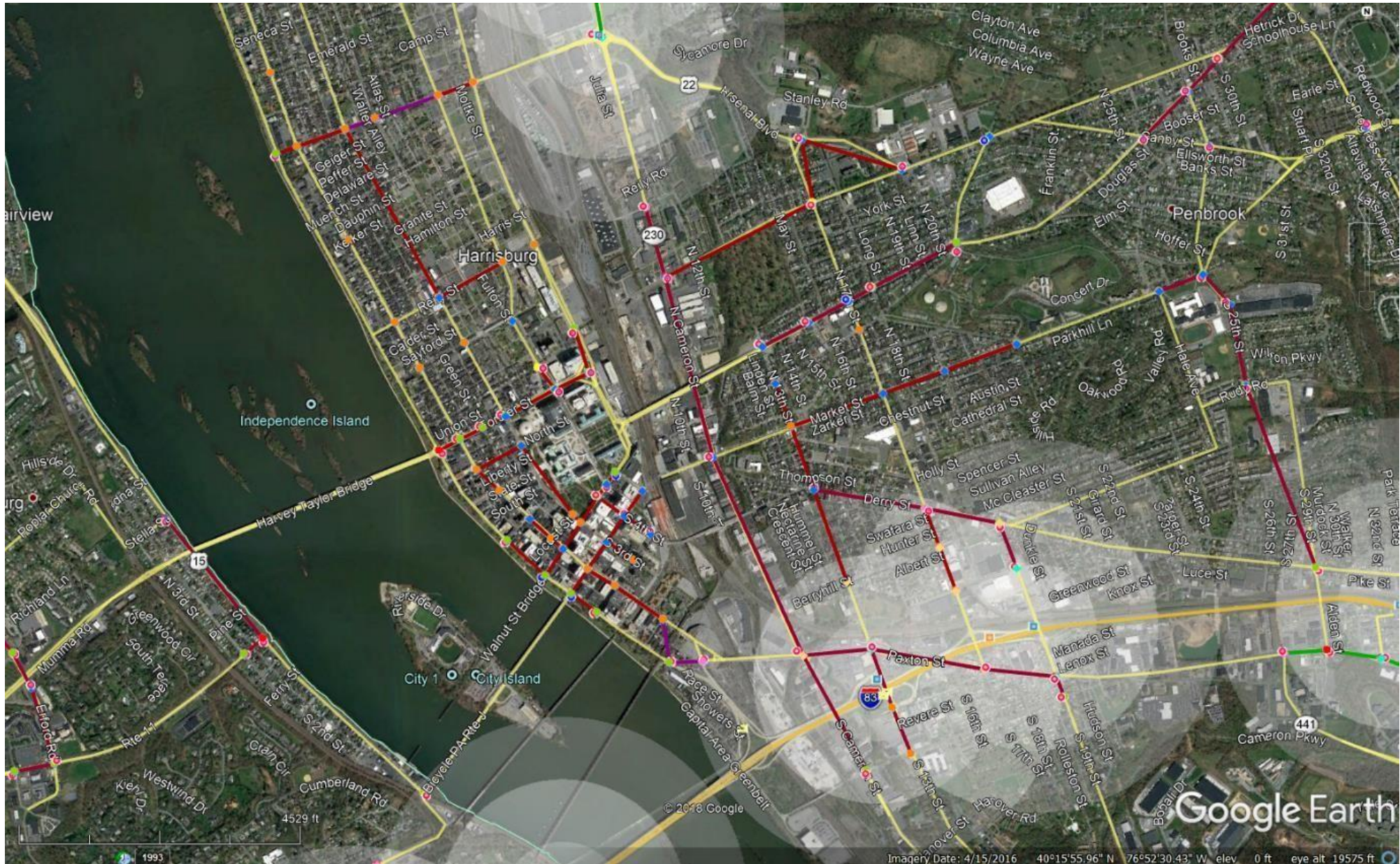


SIGNAL CONNECTIVITY

- Allows for better management of traffic signals
- Over 14,000 signals in PA
 - 4,300 located on key roadways
- Over 1,000 connected
 - Adding 400 each year
- Initially looked at several connection methods (direct fiber, 4G/5G, broadband with VPN, SDWAN)
 - Found 30 high priority signal networks to pilot connections, then expanded

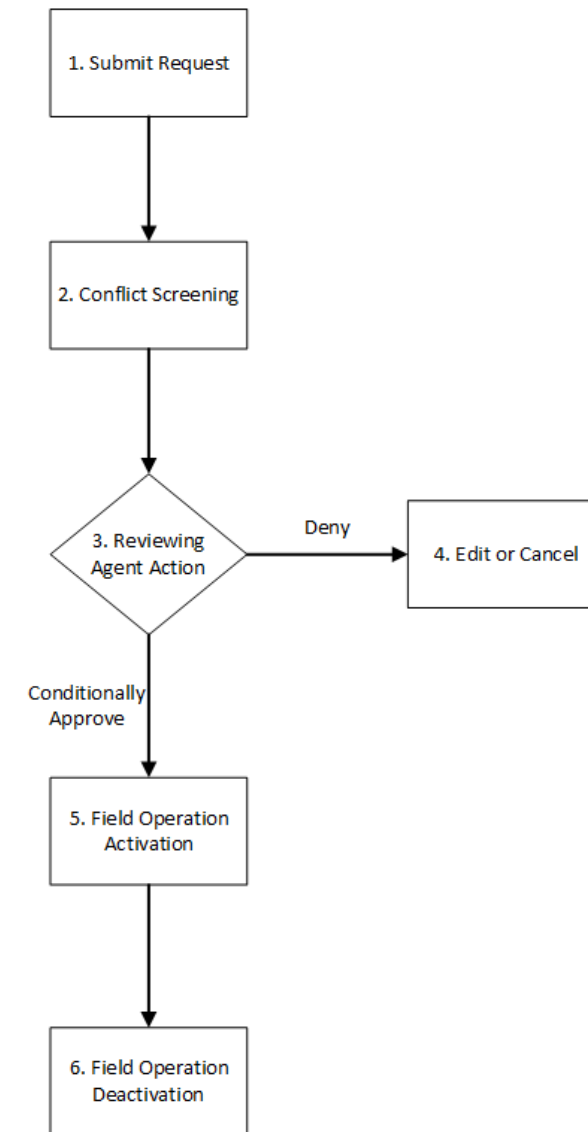


SIGNAL CONNECTIVITY - MAPPING



LANE RESERVATION SYSTEM OVERVIEW

LRS will be a web-based platform to schedule, coordinate, and track work zone activities on state highways

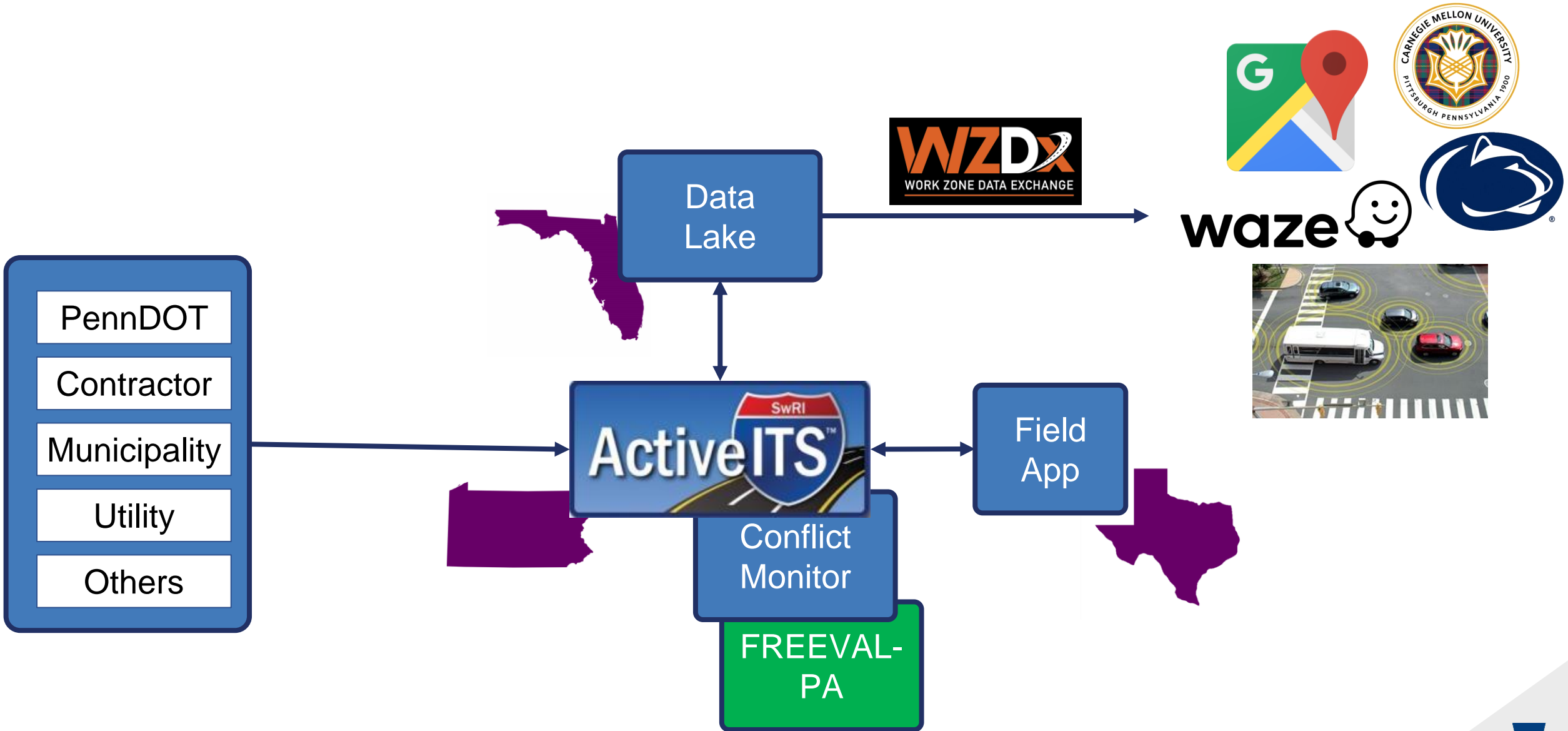


LRS OVERVIEW - PROJECT GOALS

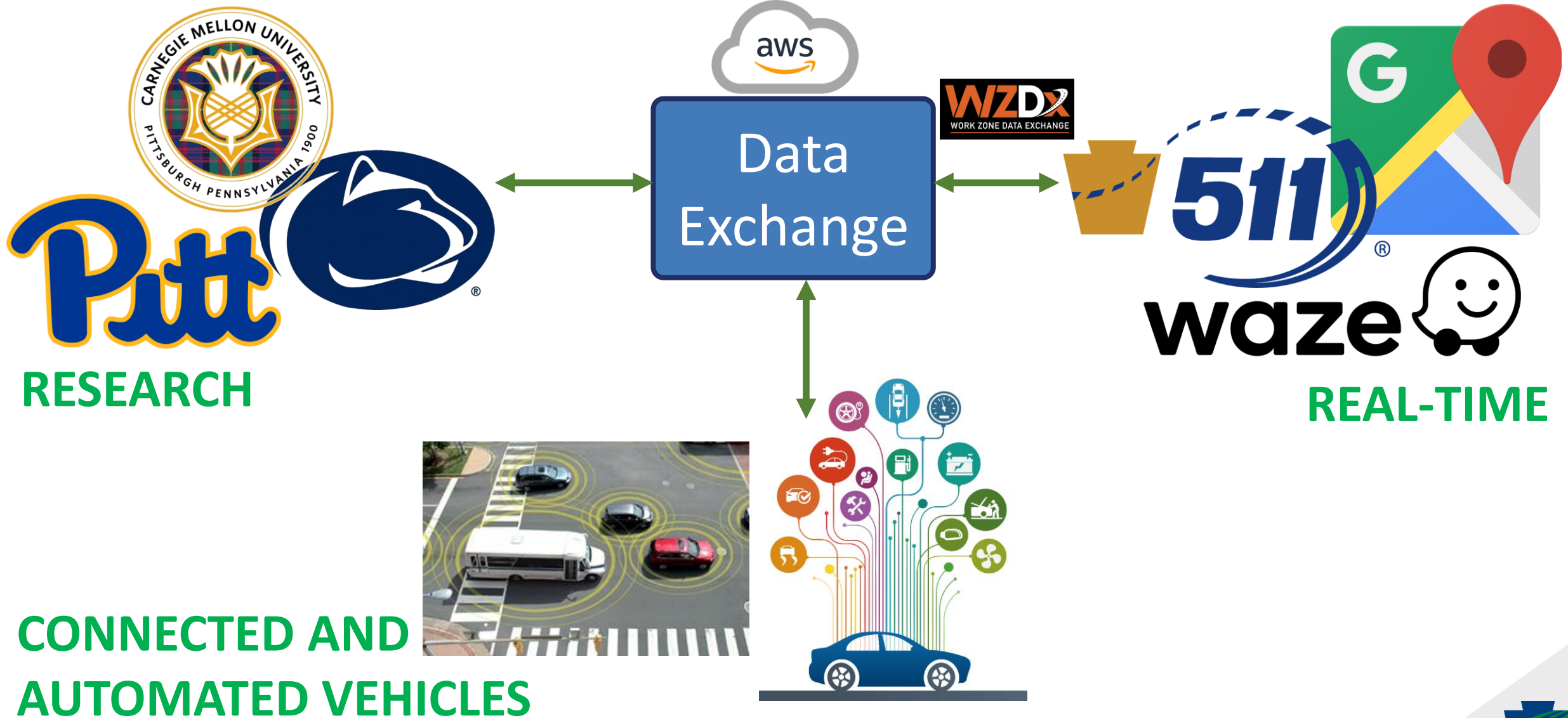
- Reduce work zone conflicts
- Reduce work zone congestion
- Improve work zone/general traffic safety
- Share work zone/incident data effectively
- Improve TMC Operations
- Standardize work zone scheduling and tracking on our roadways



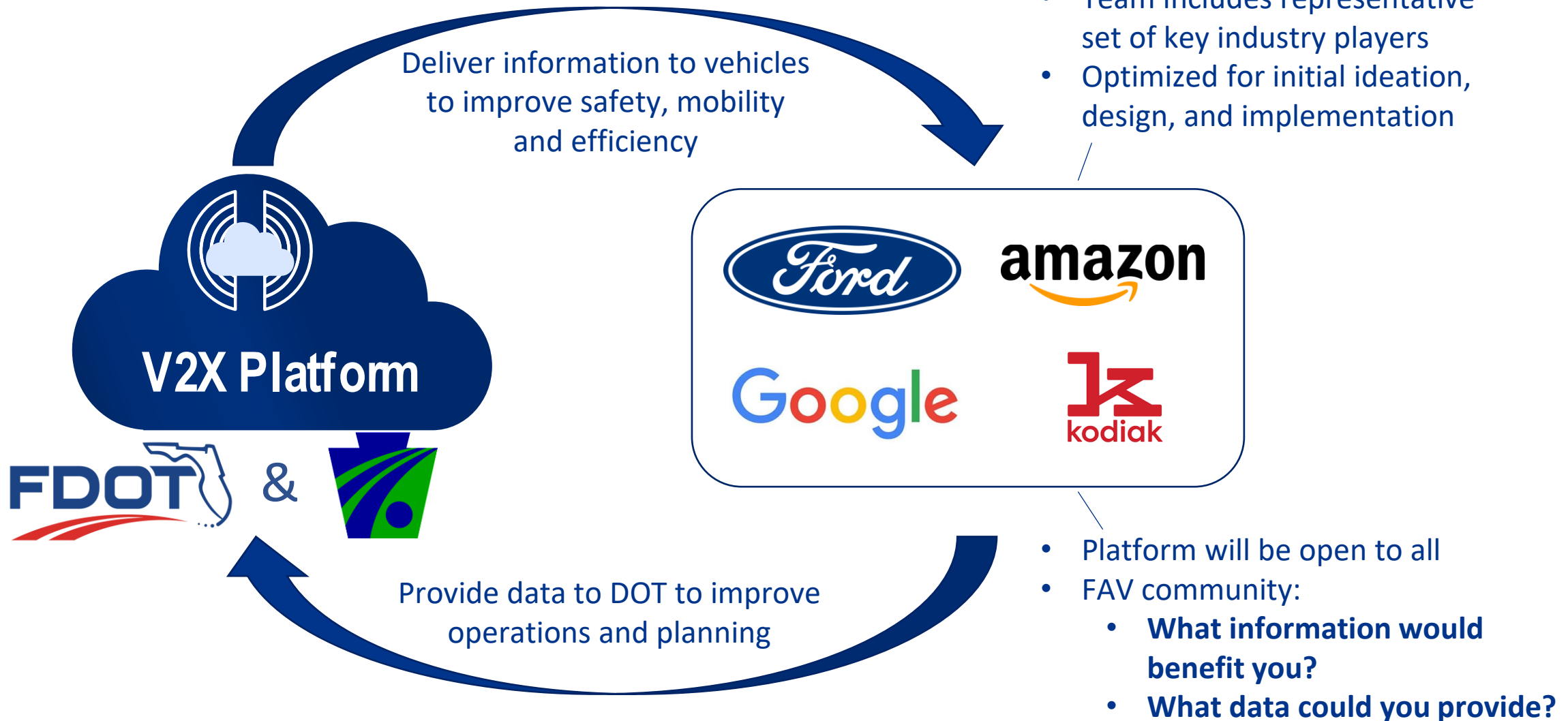
LRS AND DATA EXCHANGE HIGH LEVEL ARCHITECTURE



VEHICLE TO EVERYTHING (V2X) DATA EXCHANGE



V2X SYSTEM DESIGN



POLL 3

What is your organization's primary focus area in roadway digital infrastructure?

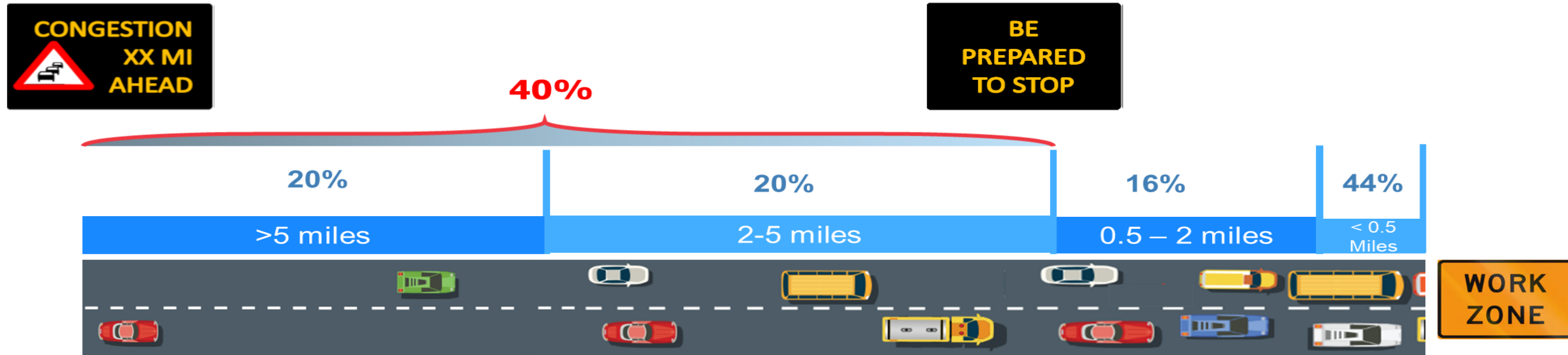


USE CASES

VIRTUAL QUEUE PROTECTION - WHERE ARE WORK ZONE CONGESTION CRASHES HAPPENING?

PennDOT TSMO Performance Program Study

1014 Crashes in Work Zone Congestion in 2021



- **Carnegie Mellon University** study found that **work zones more than 1.8 miles in length on heavily traveled roads** can increase likelihood of crash

Sources:

<https://engineering.cmu.edu/news-events/news/2022/07/15-safer-work-zones.html>)

<https://www.govtech.com/fs/pennsylvania-study-looks-at-work-zone-crashes-risk-factors>

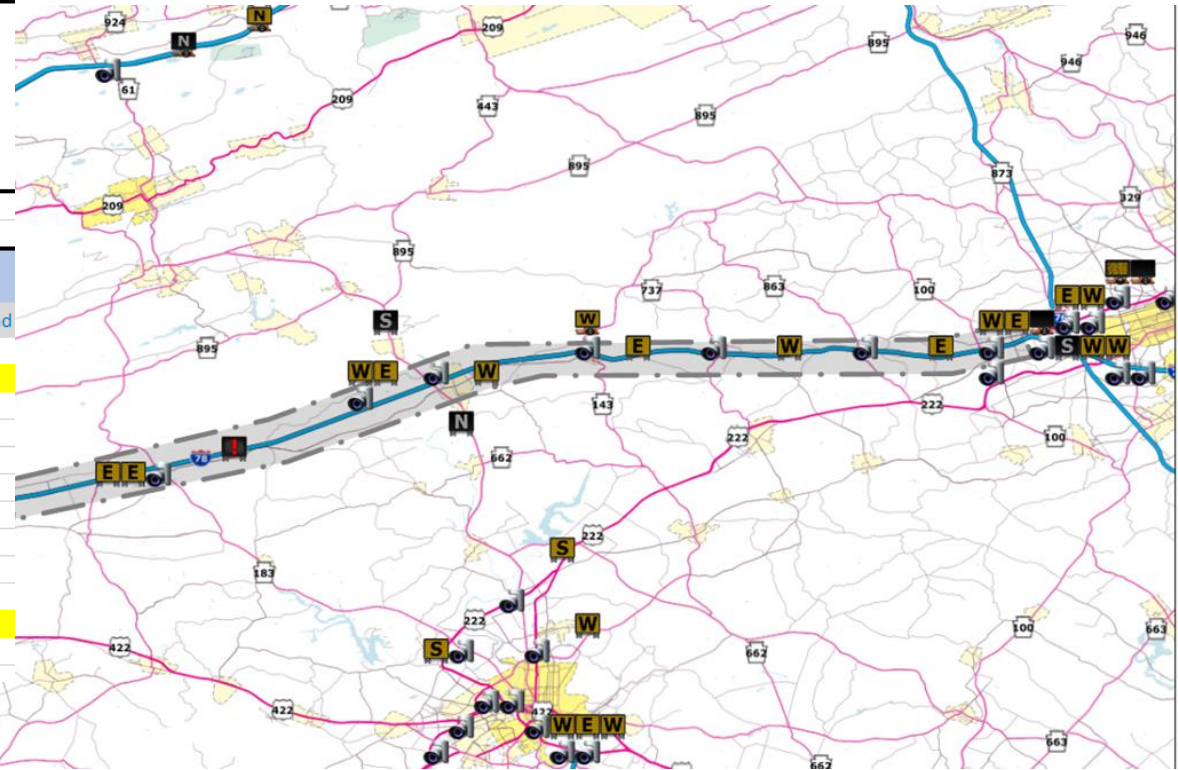


SETTING UP A VIRTUAL QUEUE PROTECTION CORRIDOR

New Corridor Request Form

Route/Coverage:	Comments, Special Requests & Notes:
Direction(s):	
District /POC:	
Use INRIX (Y or N):	

I-78 Construction Project Implementation



Device Type	OTMS Device Name	Device Location (MM)	Congestion Messaging
** The entries below this line are provided as EXAMPLES and			
			What speed, weather, or other data parameter to promote to post?
CMS	D5_80 DMS-05-111	33	<45 MPH
RWIS	DX_I80 @ exit 41	10	
Detector	DA 155 SB DET-06-003	15	
			What speed, weather, or other data parameter to promote to post?
			<25 MPH



PRELIMINARY SAFETY FACTS

I-78 Construction Project – Queue Protection and High Winds

Same 2021 6 Months BEFORE

COLLISION TYPE			CRASH SEVERITY LEVEL			SEVERITY COUNT		
	CRASHES	PCT		CRASHES	PCT		PERSONS	
HIT FIX OBJ	54	45%	FATAL	2	2%	FATALITIES	2	
REAR END	30	25%	SUSP SERIOUS	4	3%	SUSPECTED SERIOUS	5	
SAME DIR SS	16	13%	SUSP MINOR	36	30%	SUSPECTED MINOR	49	
ANGLE	12	10%	POSSIBLE INJURY	4	3%	POSSIBLE INJURY	8	
NON COLL	3	2%	UNK SEVERITY	2	2%	UNK SEVERITY	9	
OPP DIR SS	2	2%	UNK IF INJURED	3	2%	UNK IF INJURED	7	
OTHER	2	2%	PDO	70	58%			
HEAD ON	1	1%	TOTAL	121	100%			
PEDESTRIAN	1	1%						
TOTAL	121	100%						

Same 2022 6 Months AFTER

COLLISION TYPE			CRASH SEVERITY LEVEL			SEVERITY COUNT		
	CRASHES	PCT		CRASHES	PCT		PERSONS	
HIT FIX OBJ	37	35%	FATAL	1	1%	FATALITIES	1	
REAR END	29	27%	SUSP SERIOUS	3	3%	SUSPECTED SERIOUS	3	
SAME DIR SS	18	17%	SUSP MINOR	29	27%	SUSPECTED MINOR	42	
ANGLE	8	8%	POSSIBLE INJURY	2	2%	POSSIBLE INJURY	3	
OTHER	8	8%	UNK SEVERITY	4	4%	UNK SEVERITY	7	
NON COLL	2	2%	UNK IF INJURED	4	4%	UNK IF INJURED	6	
OPP DIR SS	2	2%	PDO	63	59%			
PEDESTRIAN	2	2%	TOTAL	106	100%			
TOTAL	106	100%						

- **12% decrease** in crashes
- **23% decrease** in number of injuries possible or worse
- **24% decrease** in a possible injury or worse crashes

POLL 4

What are the key areas you plan to invest in over the next five years?
(Select all that apply)



QUESTIONS?

Gunnar Rhone, PE

Engineering Specialist – Transformational Technology
Pennsylvania Department of Transportation



717.214.2997



grhone@pa.gov



Georgia's Digital Infrastructure Corridor



Allie Kelly

Executive Director

The Ray



Interactive Demo



Discussion Question

What are your agency's next steps for incorporating and further implementing RDI?

Please type your response in the Q&A



Q&A and Discussion



Lisa Miller

Innovation Program Associate
The Eastern Transportation Coalition



— THE EASTERN
TRANSPORTATION
COALITION

CONNECTING FOR SOLUTIONS



THANK YOU

Lisa Miller

Innovation Program Associate

limiller@tetcoalition.org