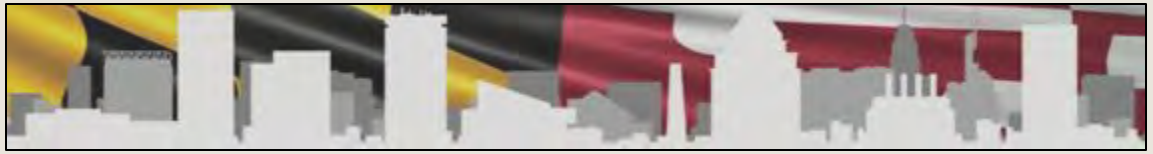
MD CAV Working Group
2025 CV Workshop

AGENDA

JOHNS HOPKINS UNIVERSITY, HOMEWOOD CAMPUS

LEVERING HALL, GLASS PAVILION

AUGUST 7, 2025

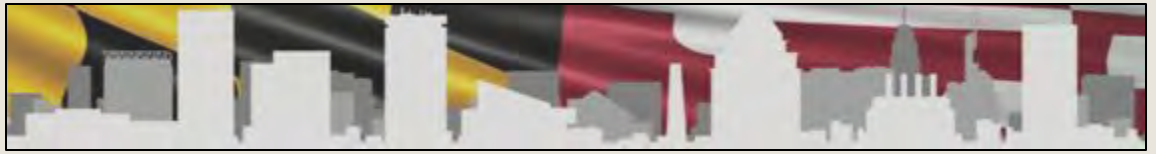


Chair, MD CAV

Christine Nizer

Administrator, Maryland Department of Transportation (MDOT), Motor Vehicle Administration (MVA)

Chair, Maryland Connected and Automated Vehicle Working Group



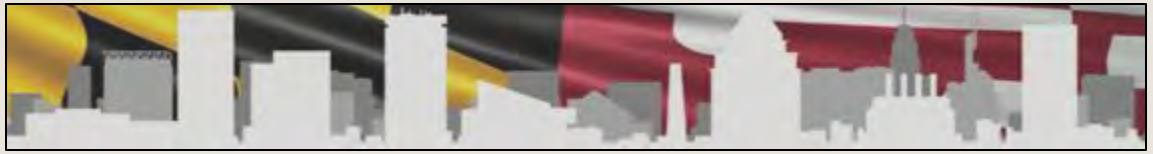
MD CAV Working Group

2025 CV Workshop AGENDA

Host

Jim Bellingham

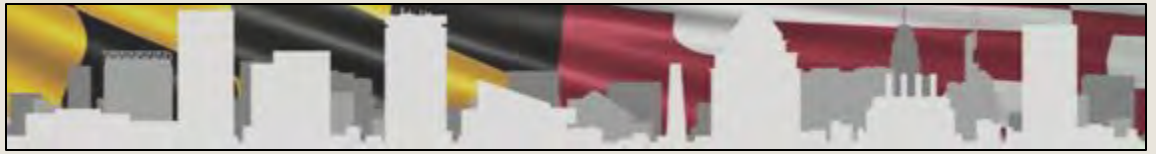
Executive Director, Johns Hopkins University, Institute for Assured Autonomy



Host

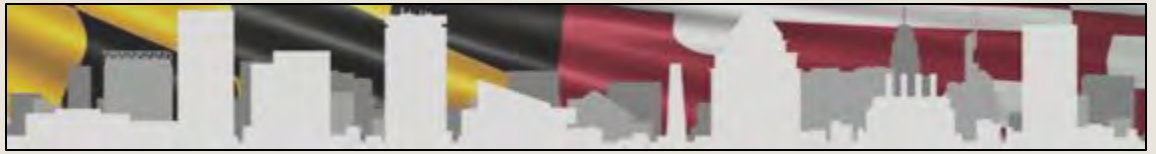
Anton Dahbura

Co-Director, Johns Hopkins University, Institute for Assured Autonomy and Executive Director, Johns Hopkins University, Information Security Institute



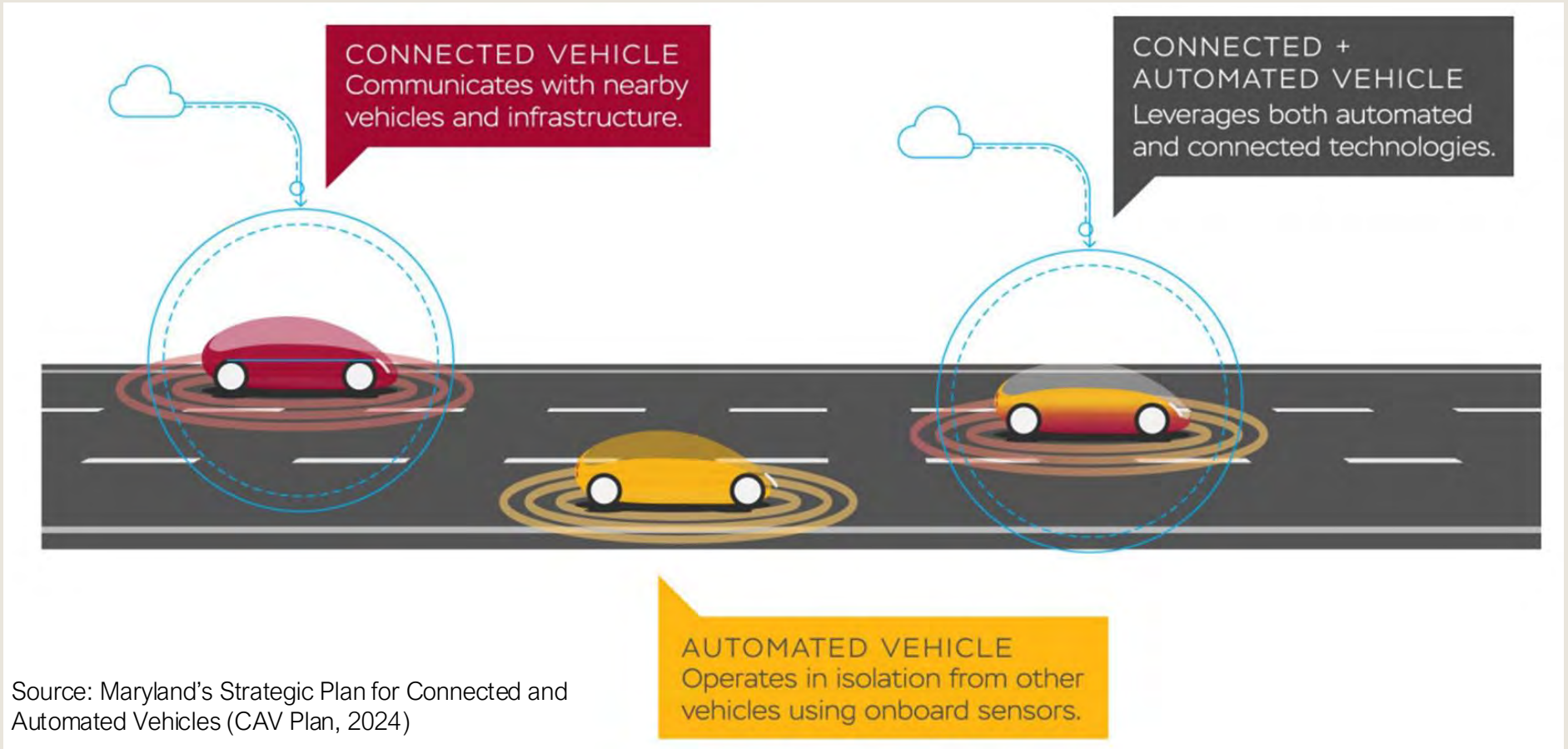
2025 CV Workshop – Sponsors

- BREAK
- PROFESSIONAL DEVELOPMENT HOURS
- NETWORKING EVENT



2025 CV Workshop

What are CAVs?

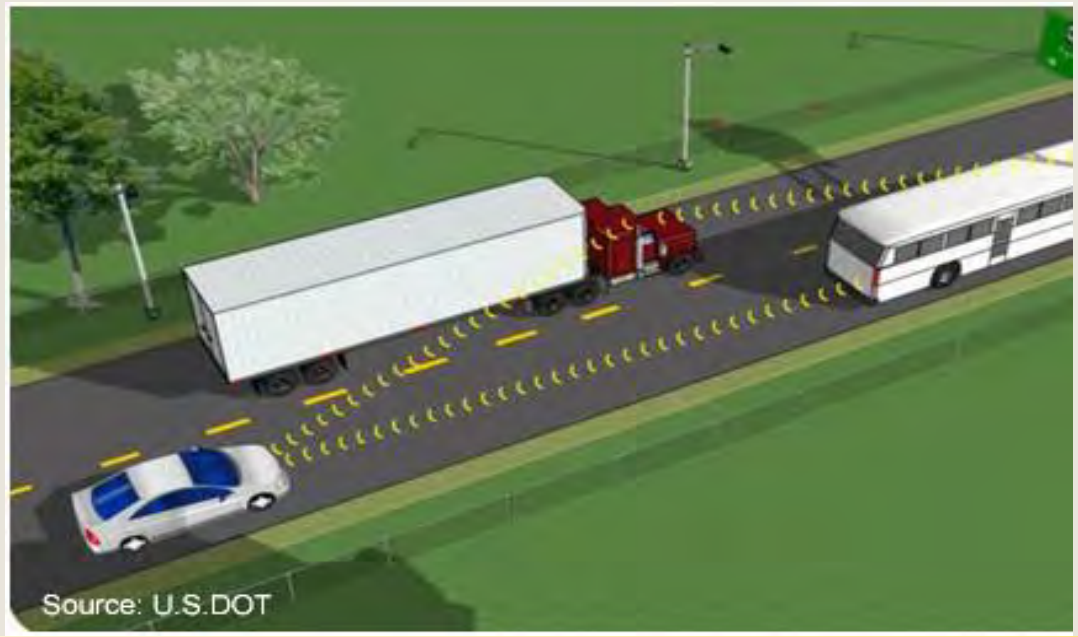


Source: Maryland's Strategic Plan for Connected and Automated Vehicles (CAV Plan, 2024)

2025 CV Workshop

What are the types of CV communications?

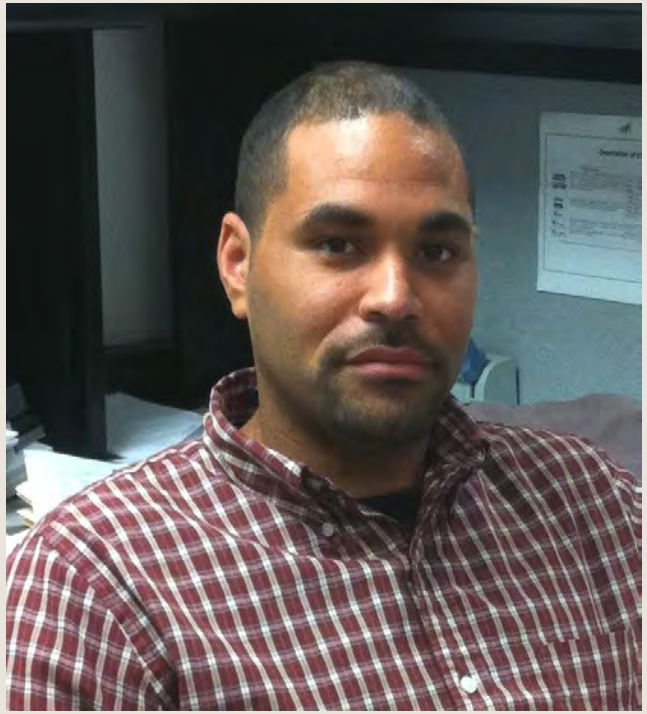
Vehicle-to-Vehicle (V2V)



Vehicle-to-Infrastructure (V2I)

Vehicle-to-Everything (V2X)

Maryland State Activity Updates

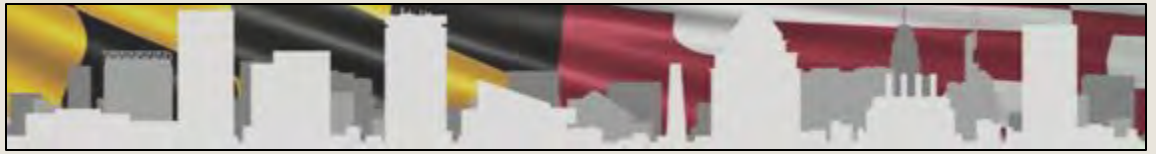


Warren Henry, P.E., PTOE

Chief, Mobility Planning and Engineering Division (MPED), Maryland Department of Transportation (MDOT), State Highway Administration (SHA), Office of Transportation Mobility and Operations (OTMO)

Coordinator, MD CAV Tech Subgroup

Chair, MD Statewide ITS Architecture Advisory Panel (IAAP)



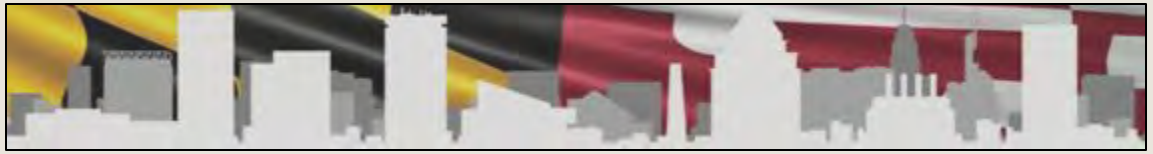
Maryland Update – State

Deployment Updates

- US-1 Innovative Technology Corridor
  - 19 BlueTOAD Spectra RSUs (TIM Messages, Highway Access Alerts, O-D, etc.)
  - 20 Comsignia RSUs (BSM, Red Light Violation Warning, Eco-Approach/Departure, EVP, etc.)
  - Four (4) OBUs for testing/evaluation purposes
  - Most units now fully operational. Looking towards public use and feedback sometime this fiscal year

- MD 214 Vulnerable Road User (VRU) Detection & Alerts
  - Fully operational, but not currently in use.
- HAAS Alerts on Emergency Response Vehicles
  - Currently in use. Public now receives alerts of ERV once safety lights are activated.

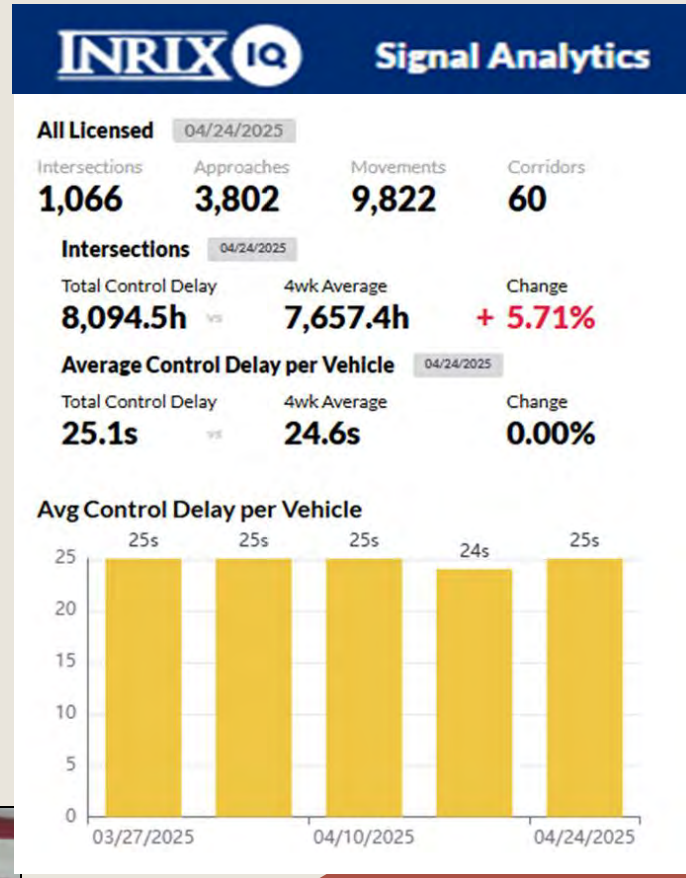
HAAS ALERT

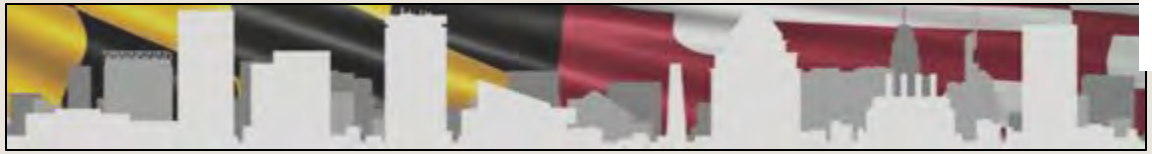


Maryland Update – State

Deployment Updates - Continued

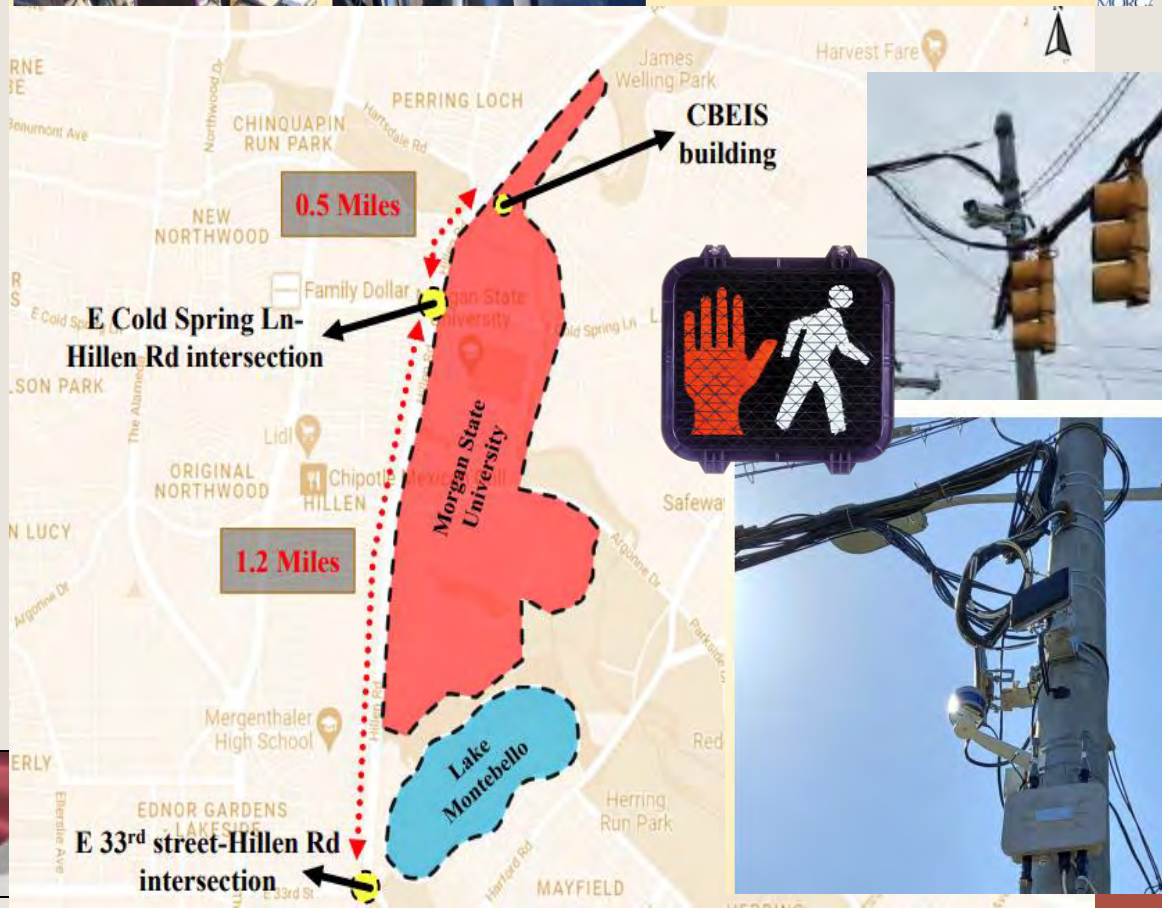
- Signal Analytics
  - Third-party Connected Vehicle (CV) data allows MDOT personnel to identify and address operational and maintenance issues on-the-fly.
- Security Credentials Management System (SCMS)
  - Over 80 devices included in ISS account (state, county, and universities)
  - Health Monitoring Dashboard
- 2025 Maryland Statewide ITS Architecture Update
  - Updated to include ARC-IT 9.3
  - Includes new CV interconnects, information flows and standards
  - Available through ITS Maryland's website – Link: (https://itsmd.org/maryland-its-architecture/)
- **Follow-up Questions?** Contact Warren Henry (whenry@mdot.maryland.gov)





CAV Testbed at MSU

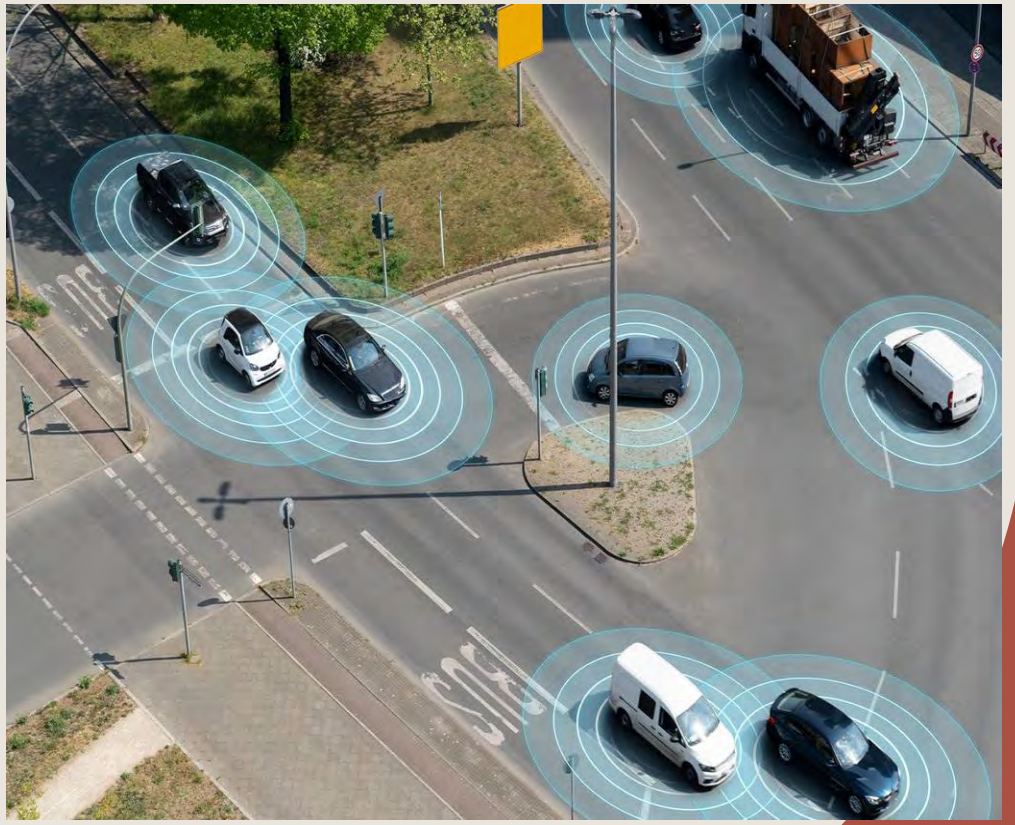
- 1.5 + Mile corridor (Hillen Road) adjacent to MSU (*between E. 33rd and E. Cold Spring in Baltimore*).
- RSU, OBU, and LiDAR technology
- BSM and SPaT
- CV Dashboard
- Investigating Vehicle to Pedestrian Conflicts using Post Encroachment Time (PET) Threshold
- Detecting out of X-walk Events using LiDAR Sensors
- Near-miss crash events (Car-Car, Car-Truck, Car-Ped, etc.)
- **Follow-up Questions?** Contact Mansoureh Jeihani, Ph.D. (mansoureh.jeihani@morgan.edu)

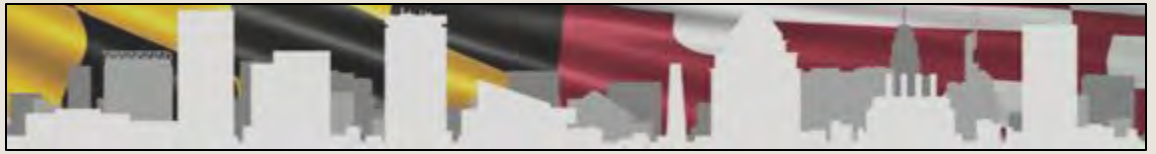


S4 Lab at JHU

- Dedicated to advancing the development and deployment of Connected Autonomous Vehicles by focusing on robust and assured Vehicle-to-Everything (V2X) communications.
- Work is central to enabling real-time situational awareness across large-scale Connected Transportation Systems.
- Combines expertise from across diverse fields, aiming to address critical challenges in networking, security, and AI/ML.
- **Follow-up Questions?** Contact Anton Dahbura (atd@hublabels.com)

JOHNS HOPKINS
INSTITUTE *for*
ASSURED AUTONOMY

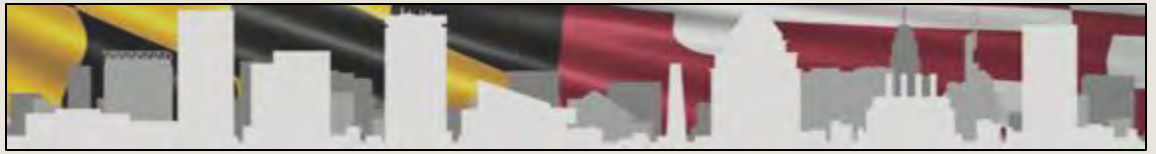




Maryland Local Activity Updates

Dwight C. Gordon

IT and Engineering Technician, Prince Georges County Advanced Traffic Management System

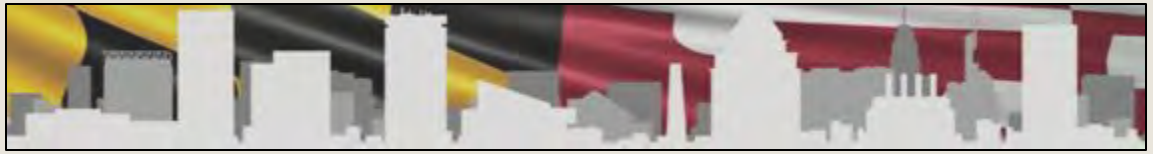


Existing Corridors with CV2X

1. Medical Center Drive
- CV2X equipment integrated with linear detection systems.
- Broadcasts MAP/SPaT messages for real-time signal phase and timing.
- Supports AI-based VRU (Vulnerable Road User) detection for enhanced pedestrian safety.

2. National Harbor (Oxon Hill)
- Actively pushes out travel incident and basic safety messages.
- Pedestrian messages broadcasted near heavy foot-traffic areas.
- Supports TSP/EVP integration for transit vehicle prioritization.

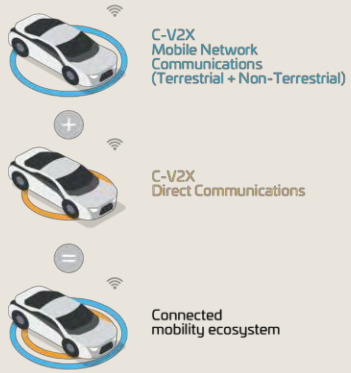
3. Marlboro Pike (Capitol Heights)
- Providing pedestrian data using LIAR and RSU detection
- MAP/SPaT connected to roadside and onboard units.
- Provides data to traffic control centers for incident response



Prince Georges
Future Development Plans

- Smart Corridor Vision

- Combine CV2X with:
  - Automated Micro-transit Shuttles
  - VRU Smart Crossings
  - Dynamic Digital Signage
  - Expanded TIM, SPaT, MAP, TSP/NEVP
  - Rapid Deployment Units for emergency zones or high-risk areas



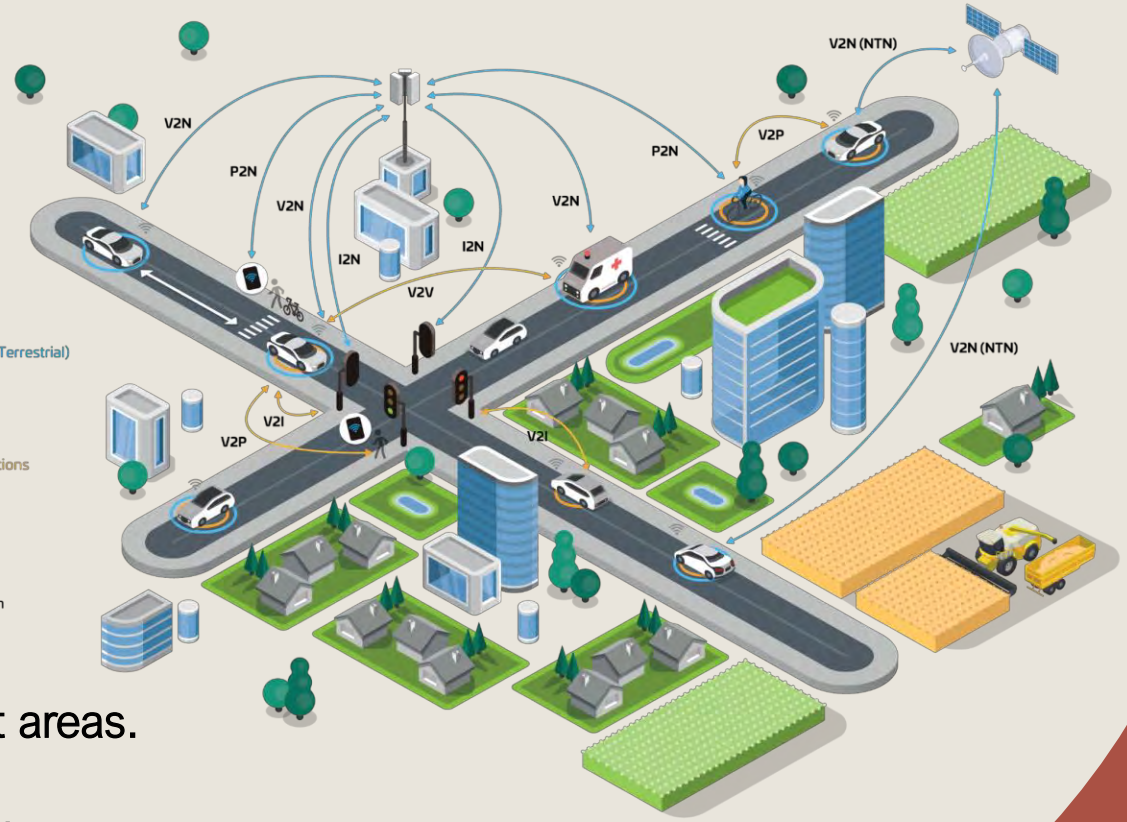
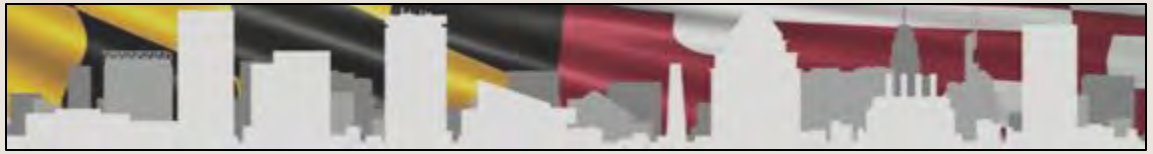


Image Source: 5GAA v2N

- Strategic Goals:
- - Create “plug-and-play” CV2X response kits for high-impact areas.
  - Expand to underserved corridors with high crash rates.
  - Integrate into countywide traffic operations center for real-time response.



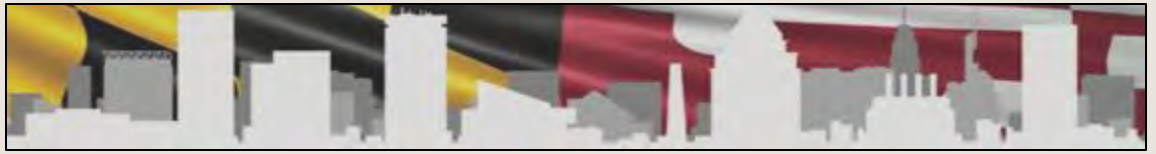
Workshop Moderator

Roxane Y. Mukai, PE, PTOE

Operations Engineer and CAV Liaison, Maryland Transportation Authority

Coordinator, MD CAV Emergency Responder Subgroup

Chair, CAV Joint Task Force, National Committee on Uniform Traffic Control Devices

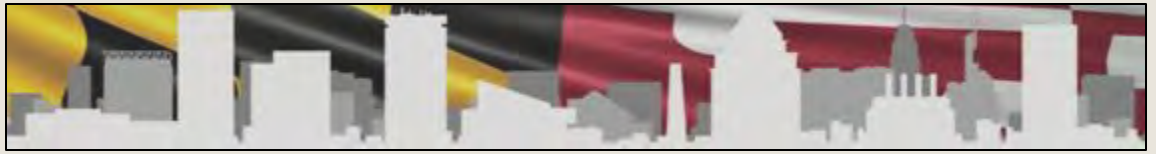


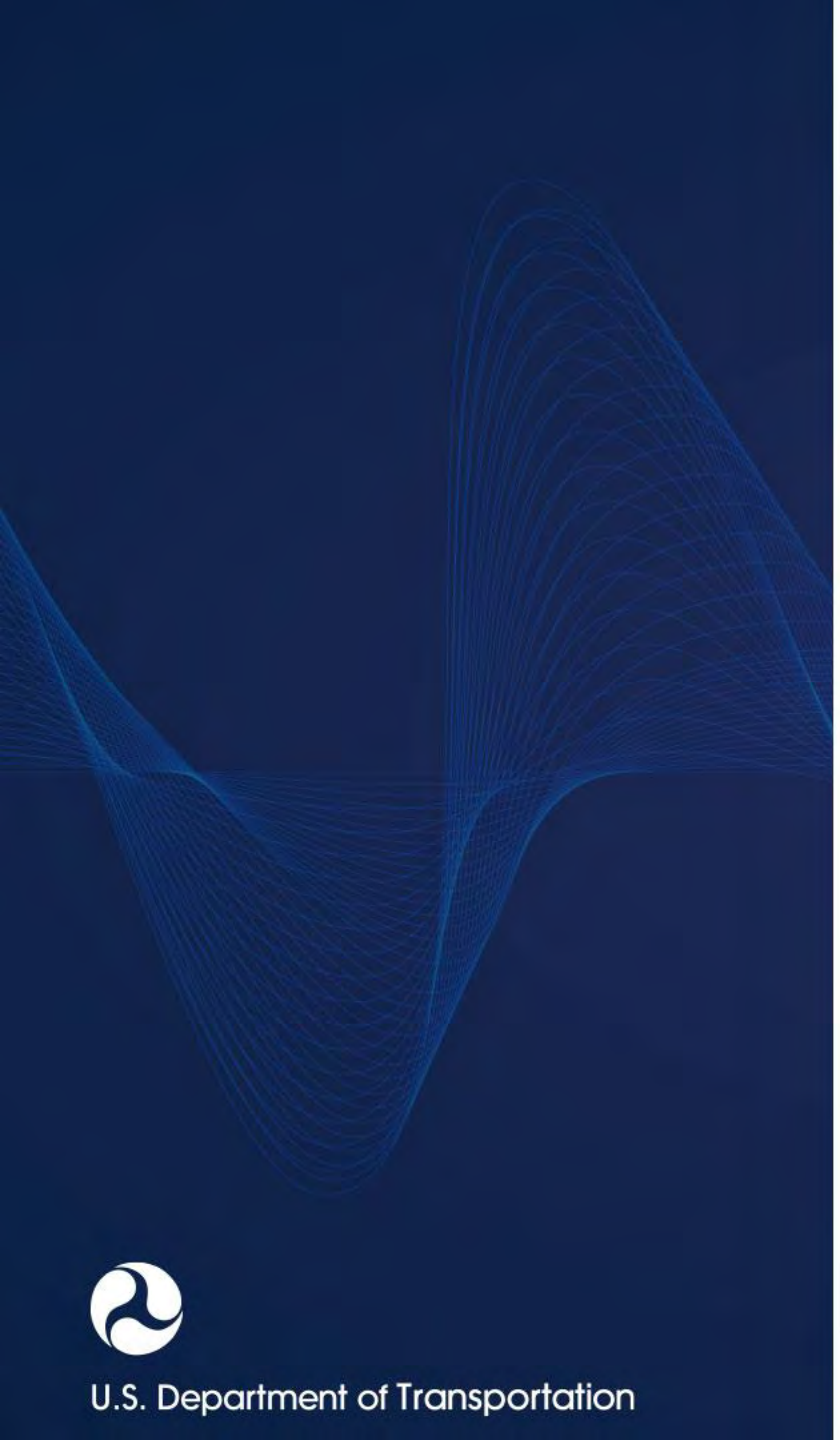
Framework

USDOT V2X

Justin Anderson

Next Generation Wireless Transportation Program Manager, United States Department of Transportation(USDOT), Intelligent Transportation Systems (ITS), Joint Program Office (JPO)





USDOT Vehicle-to-Everything (V2X) Activities and Resources

Disclaimer

Except for the statutes and regulations cited, the contents of this presentation do not have the force and effect of law and are not meant to bind the States or the public in any way. This presentation is intended only to provide information regarding existing requirements under the law or agency policies.

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Unless otherwise indicated, use of the standards referenced in this presentation is not a Federal requirement.

Agenda

- V2X Deployments
- Interoperability
- Other DOT Resources

V2X Deployments

V2X Definition

- Vehicle-to-everything (V2X) means wireless interoperable, secure communications that support intelligent transportation systems (ITS) use cases between vehicles, vulnerable road users (VRU) and infrastructure devices
- Multiple wireless technologies can be considered part of V2X, which fall under two key categories
  - Direct V2X – Wireless technologies that enable direct device-to-device communications (LTE-V2X)
  - Network V2X – Wireless technologies that require connecting to a network to enable communications between two devices (Cellular, WiFi)

ACCELERATING VEHICLE-TO-EVERYTHING (V2X) DEPLOYMENTS

Public Agency V2X Infrastructure and Fleet Deployments

Deployment is in the tri state border area of the below hwys/counties
- Dubuque County, IA (U.S. Hwy 20, 52, 61, and 151)
- Jo Davis County, IL (U.S. Hwy 20)
- Grant County, WI (U.S. Hwy 61, 161)

WA
Bellevue;
Lynnwood;
Rainier Valley, Seattle

OR
Salem

NV
Las Vegas

CA
San Diego;
Orange County;
Palo Alto;
Marysville;
Coachella Valley;
I-680, Walnut Creek/Concord/
Contra Costa County;
Fontana

HI
Nimitz and Ala Moana
Corridor, Honolulu;
Oahu;
Kauai;
Maui;
Big Island

AK
Northern Region (Fairbanks);
Central Region (Anchorage)

UT
Salt Lake County;
Utah County;
Weber County;
Logan;
Provo-Orem;
City of Orem

CO
Denver;
I-70, Limon to Utah Border;
I-70, Pena Blvd;
C470, I-25 to Golden
I-225;
I-25, Walsenburg to Wyoming Border;
I-76, Denver to Hudson
Greeley

WY
I-80, Overton to Wyoming

NE
Highway 370, Highway 31;
Highway 6, Omaha

AZ
Mohave County;
Maricopa County;
Loop 101, I-10, I-17, Phoenix;
Anthem

TX
I-45, Dallas to Houston;
College Station;
Texas Triangle - I-45, I-35, and I-10 (Dallas,
Houston, San Antonio);
Houston;
Missouri City;
Fort Bend County

KS
US-83, Thomas to Finney County

KY
Fayette County;
near London, Georgetown, and Versailles
Dixie Highway, Louisville

MN
Eden Prairie;
Plymouth

IL
Lake County

IN
Indianapolis

LA
Baton Rouge

TN
I-24 from Nashville to Murfreesboro, Memphis,
Knoxville, Johnson City, Franklin;
Chattanooga;
City of Farragut;
City of Sevierville;
Charlotte Avenue, Nashville;
MLK Blvd., Chatanooga;
3rd Street between Siskin Drive and Glenwood Drive

WI
Hwy 100 (Ryan Rd), Milwaukee County;
Madison Beltline US-18 near Park St., Madison

MI
M-1 from Adams to 7 mile, Woodward Ave from Larned to Adams, Detroit;
I-94 Connected Corridor between Detroit and Ann Arbor;
Ann Arbor (multiple);
US-12 Michigan Ave., Detroit;
I-75 Oakland County;
Southfield;
Royal Oak;
MSU Campus, East Lansing;
Mound Rd, from Sterling Heights to Warren

OH
US-33 corridor near Columbus;
US-33 in Dublin;
US-33 corridor around Marysville;
W 25th St, Kinsman Rd in Cleveland;
City of Fairlawn

AL
Tuscaloosa

GA
Metro Atlanta;
I-85, Alabama to Exit 6;
I-75, Florida to Atlanta;
I-16, Savannah to Macon;
I-20 Atlanta to exit 101;
SR 307, Savannah;
Metro Savannah;
Gwinnett County;
Henry County;
Marietta;
Peachtree Corners;
Alpharetta

FL
Tampa;
US-19, SR-60, Clearwater;
Collier County;
Broward County;
Florida Turnpike;
Gainesville (multiple);
I-75, North FL;
Key Largo to Key West;
Miami;
Orlando;
Pinellas County;
SR 758, Sarasota;
SR 434, Seminole County;
Tallahassee;
Tampa (multiple);
Jacksonville

NC
Hillborough Street,
Western Boulevard;
Avent Ferry Road, and
Gorman Street, Raleigh

VA
Smart Road, Blacksburg;
I-66, I-495, US-29, US-50 - Fairfax County

PA
Harrisburg;
Mount Pleasant;
Pittsburgh

NY
Buffalo Niagara Medical;
Campus, Buffalo;
Ithaca;
Buffalo

ME
Statewide (Augusta);
US Route 1, Town of Brunswick
and Aroostook County;
I-95, Palmyra - Carmel

NH
Manchester

MA
Boston;
Rt. 9: Wellesley to Worcester

CT
New Britain-Hartford BRT;
Berlin Turnpike, Newington

NJ
New Brunswick;
Atlantic City Expressway

DE
US-13 Smyrna;
DE-4, Newark;
Sussex County

MD
US - 1, Howard County;
I-95, Baltimore County;
US - 50, Queen Anne's, Worcester/
Dorchester/Talbot Counties;
MD - 214, Prince George's County;
MD - 124, MD - 28, Montgomery County;
MD-295, Anne Arundel County
Oxon Hill/Largo/Mitchellville/
Hyattsville/Bowie;
Perring Parkway, Baltimore

U.S. Department of Transportation

V2X Accelerator Program Goals

01

Deploy, operate, and showcase integrated, advanced interoperable deployments.

02

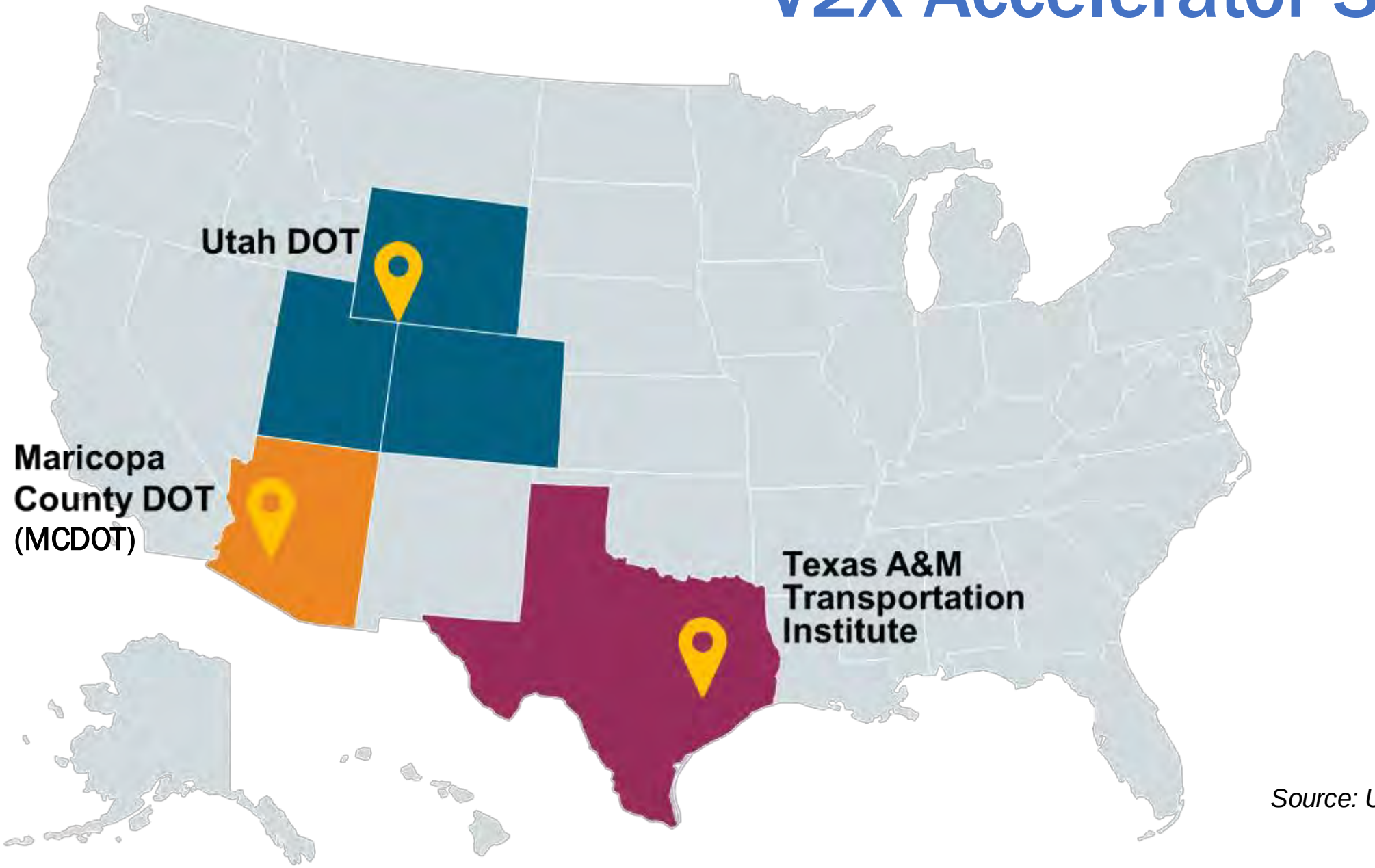
Inform and educate the ITS community and the general public regarding these impacts.

03

Support the development, evaluation, and documentation of a suitable reference implementation.

Current Structure and Anticipated Phasing

V2X Accelerator Sites



Source: USDOT

TTI Proposed Applications and Devices

Applications / Use Cases
• Signal Phase and Timing (SPaT)-enabled Intersections for VRU Identification & Protection • Roadway Flood Warning • Right Turns on Red Warning of VRU Crossing • Red Light Violation Warning • Wrong Way Driving Detection • Emergency Vehicle Response Time & Safety • Incident Management/Hurricane Evacuation • Adverse Weather Events/Flooding • Planned Construction and Special Events • Enhanced Corridor Situational Awareness • Traffic Signal Preemption and Priority • Transit Fleet Integration • Every Day a Game Day • Enhanced Highway Construction Worker Safety • Curve Speed Warning

~1,100

Roadside Units (RSUs)

1,000+ existing and 65 new units

275-300

Onboard Units (OBUs)

100 fleet vehicles, 100 private vehicles, and 75-100 bicycles

UDOT Proposed Applications and Devices

Applications / Use Cases

- Transit Signal Priority
- Emergency Vehicle Preemption
- Snowplow Preemption
- Spot Weather Impact Warning
- Curve Speed Warning
- Traveler Information Alerts
- VRU Safety System
- Disabled Vehicle Alerts
- Red Light Violation Warning
- Intersection Movement Assist
- Left Turn Assist
- Wrong-Way Driving
- Traffic Jam Alert

2,437 Roadside Units (RSUs)

1,028 existing, 659 in progress, and 750 new units

215 Onboard Units (OBUs)

115 buses, 25 snowplows, 15 emergency vehicles, 30 incident management vehicles, and 30 other fleet vehicles

20 Pedestrian Detection Systems

MCDOT Proposed Applications and Devices

Applications / Use Cases

- VRU Detection
- Emergency Vehicle Preemption
- Transit Signal Priority
- Freight Signal Priority

750 Roadside Units (RSUs)

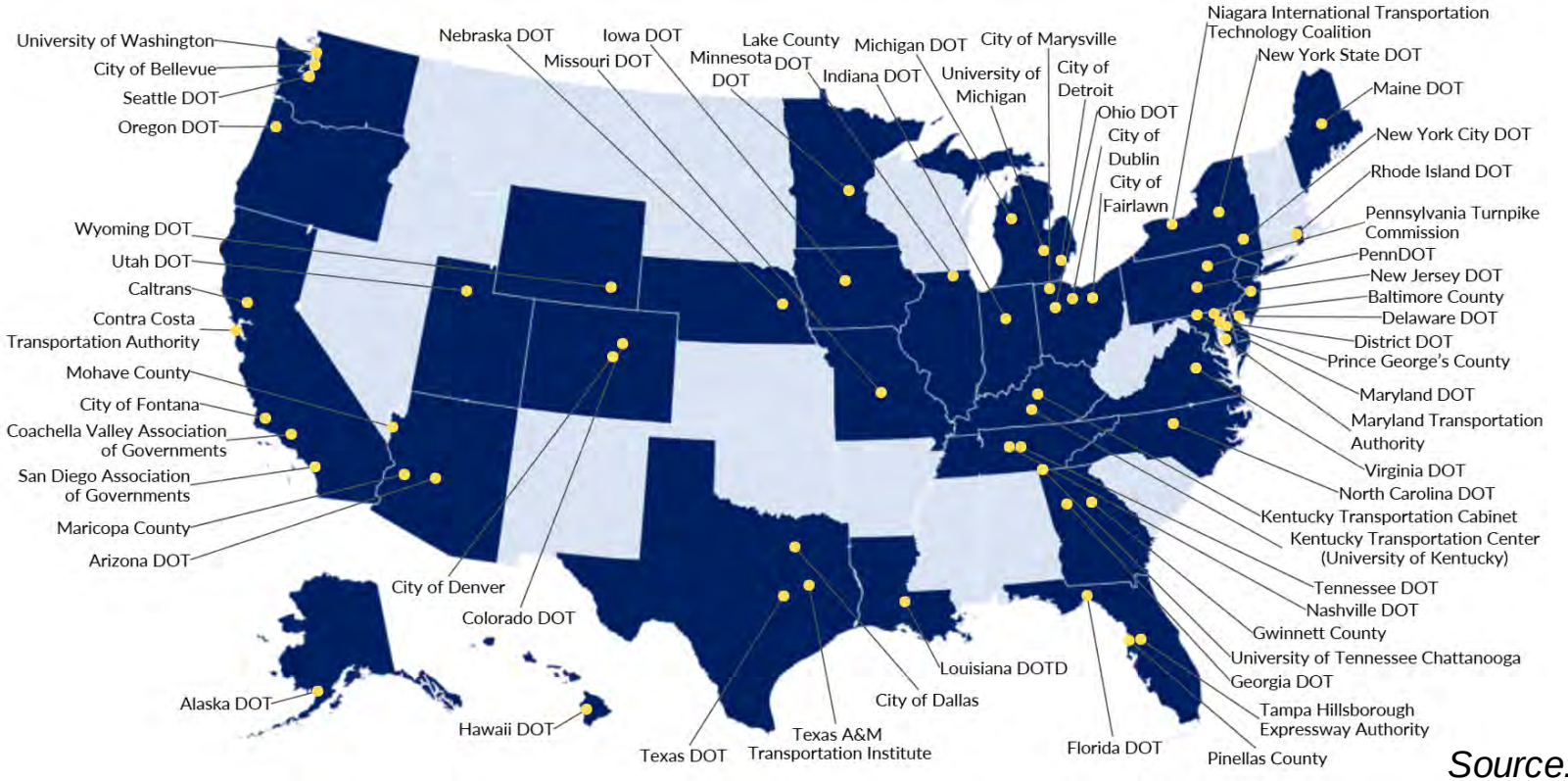
650 physical RSUs and 100 virtual RSUs

400 Onboard Units (OBUs)

All OBUs will be on fleet vehicles

Accelerating Vehicle-to-Everything (V2X) Cohort

61 agencies participating in the cohort as of July 2025



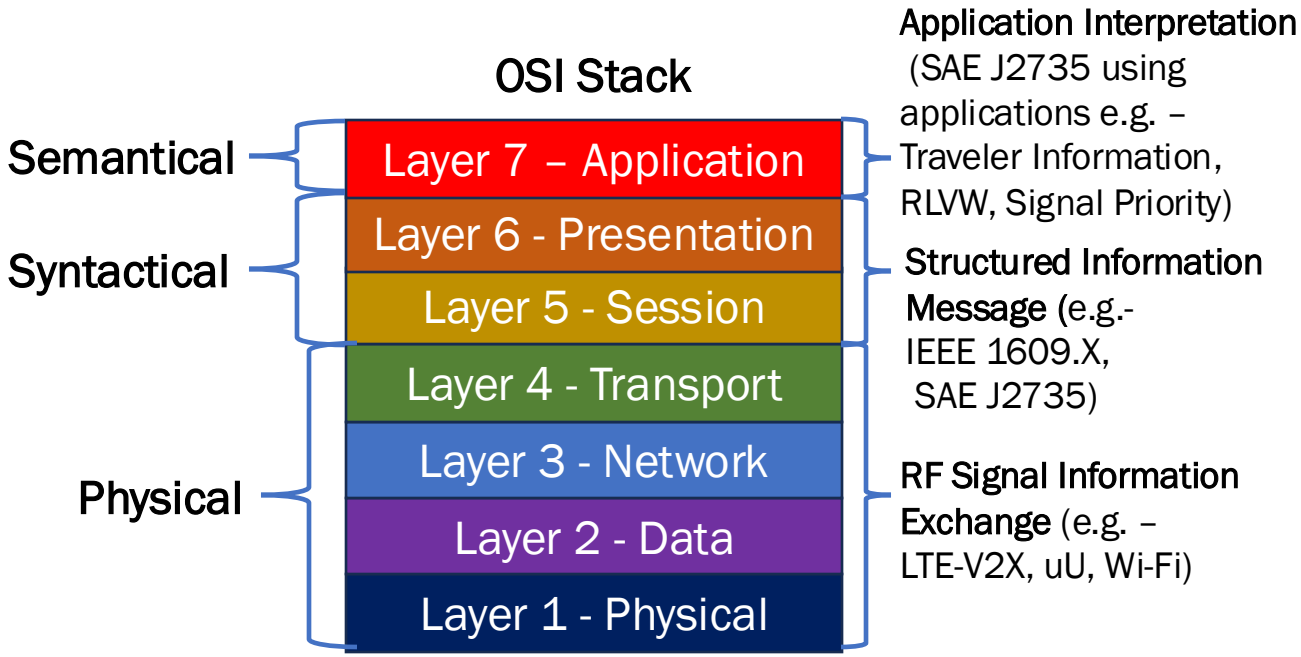
Source: USDOT

If your agency is interested in participating, contact John.Schneeberger@dot.gov

Interoperability

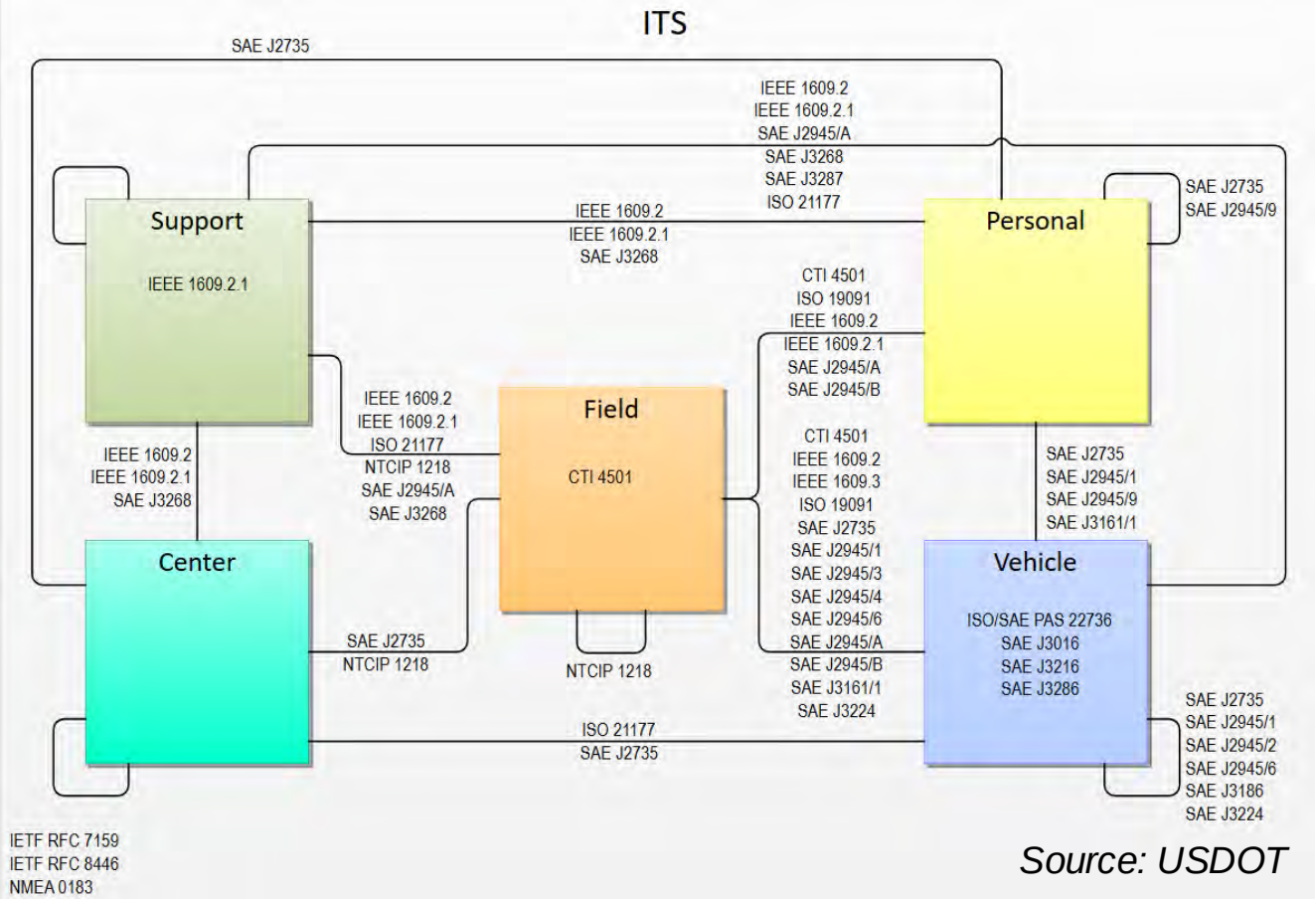
Interoperability Definitions

- **Physical Interoperability**
  - Based on the wireless technology you are using
  - LTE-V2X to LTE-V2X, uU to uU, etc.
- **Syntactical/Message Interoperability**
  - Based on the interfaces/messages you are using
  - Can have syntactical interoperability without physical interoperability
  - OmniAir certification demonstrates syntactical interoperability ~~today~~
- **Semantical/Application Interoperability**
  - Are applications interpreting messages/interfaces the same?
  - May need syntactical interoperability to support semantical interoperability



Standards and Architecture

- V2X Standards are key to developing interoperable systems
- The National ITS Architecture has been updated with a Standards Map to show the standards that define different interfaces
  - https://www.arc-it.net/html/standards/standardsmap.html



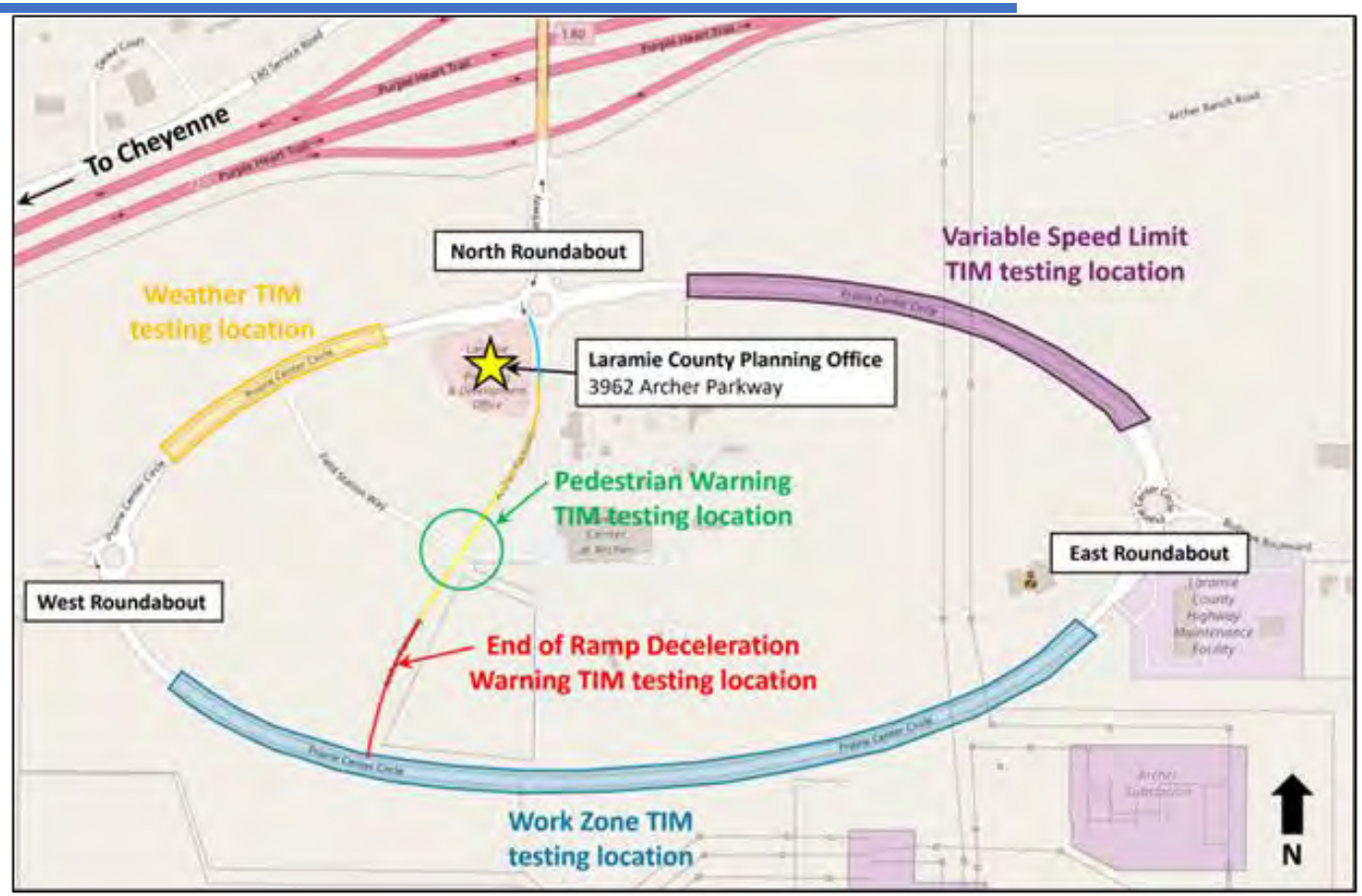
Source: USDOT

Interoperability Technical Working Group (ITWG)

- The ITWG is a forum where technical people discuss the technical challenges they are facing when deploying V2X technology
  - Meets Thursdays at 2 PM Eastern
  - Open to everyone
- Goal of this group is to identify interoperability challenges, develop guidance on how to resolve them and then work with the larger V2X industry to implement them
- If you are interested in joining, please email justin.anderson@dot.gov

Interoperability Testing and Best Practices

- Interoperability tests explore specific ITS Use Cases to understand interoperability issues
  - First test was held in Cheyenne, WY in October 2024
- Results from testing are used to create Best Practices to address issues found during testing



Source: USDOT

V2X Device Certification and Interoperability

- V2X Device Certification enables interoperability through detailed tests to ensure devices conform to V2X standards
- The OmniAir Consortium provides V2X device certification for devices today
  - They provide a list of certified devices and events each year allowing device manufacturers to come and test their devices together
- For more information visit https://omniair.org/

Other DOT Resources

Open-Source Tools

- MAP Creation Tool - https://webappopen.connectedvcs.com/isd/
- V2X Hub - https://github.com/usdot-fhwa-OPS/V2X-Hub
- Operational Data Environment - https://github.com/usdot-jpo-ode/jpo-ode
- Connected and Automated Vehicle (CAV) Telematics Tool - https://github.com/usdot-fhwa-stol/cda-telematics

Help Desk and Equipment Loan Program

- The CAV Support Services program at the USDOT provides technical support to CAV deployments and has CAV equipment that can be loaned to deployments at no cost
  - Technical support has multiple tiers from support through email to onsite technical support V2X Devices, Wireless Testing equipment and infrastructure sensors
- For more information, please email CAVSupportServices@dot.gov

Contact Information

Justin Anderson

ITS Joint Program Office (JPO)

Next Generation Wireless Communications Program Manager

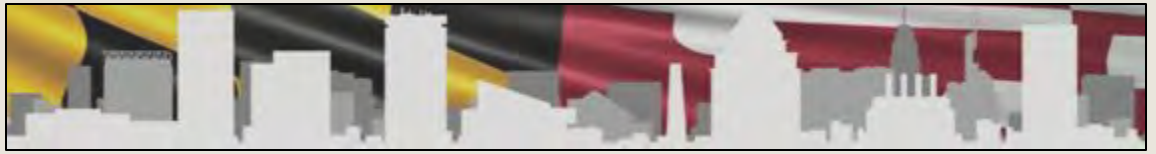
Email: justin.anderson@dot.gov

Standards

Steve Griffith

Executive Director, National Electrical Manufacturers Association (NEMA), Regulatory and Industry Affairs, Mobility Organization

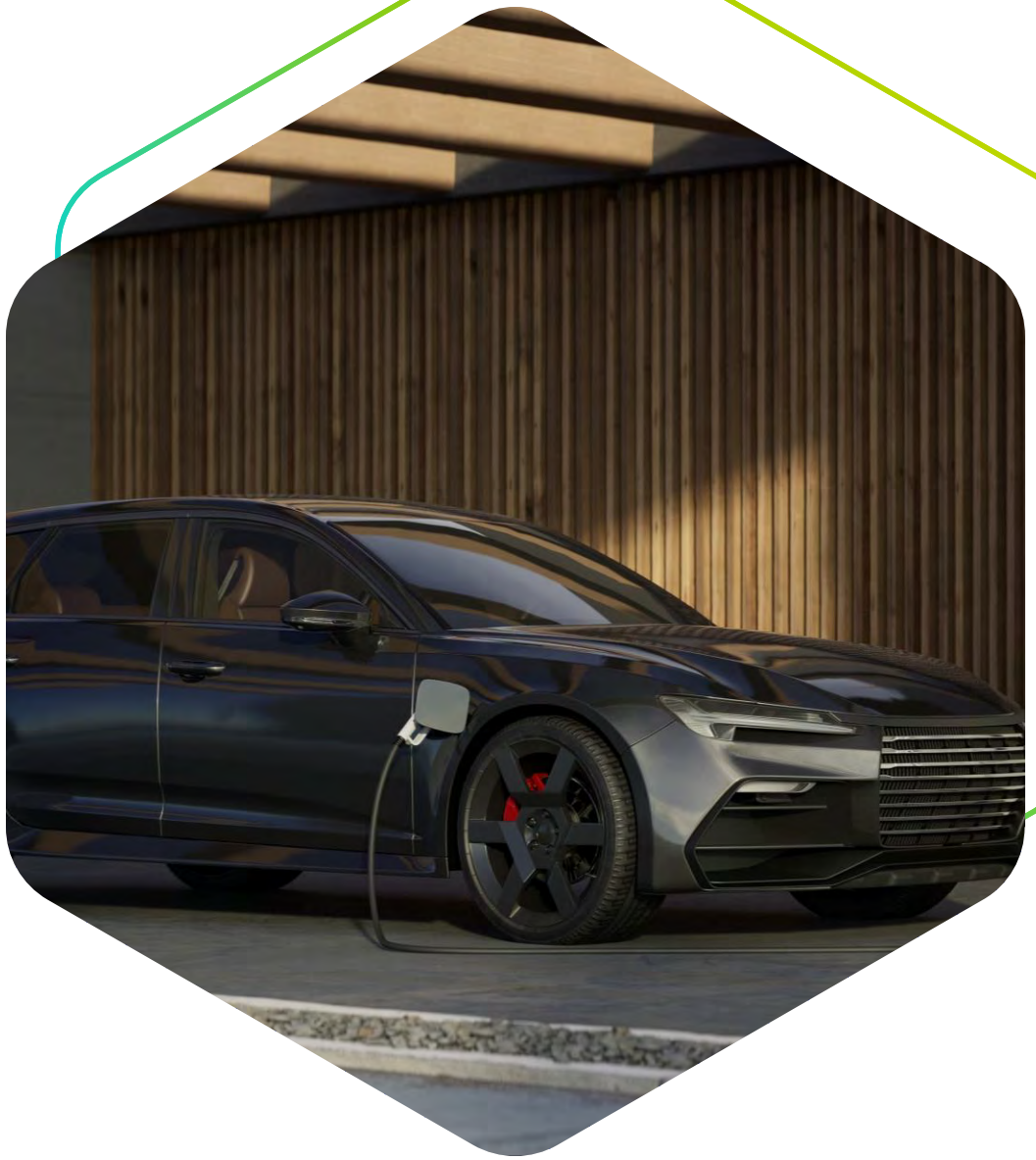
NEMA's role in Advancing Connected Vehicle Technology



NEMA: Standards/Make it American Program

MD CAV Workshop

8/7/2025



Who We Are

The National Electrical Manufacturers Association (NEMA) is proud to represent over 300 leading manufacturers of electrical equipment technologies.

Collectively, our members contribute 1% of U.S. GDP, employ nearly 460,000 Americans in every state, and generate over $250 billion annually for the U.S. economy. Learn more at www.nema.org

Make it Electric

Electroindustry Impact By the Numbers

$340B
U.S. Electroindustry Market Size

$257.6B
U.S. Electroindustry Total Economic Impact

460,000
Skilled American Jobs

$4.2B
U.S. Electroindustry Investment in Buildings and Equipment as of 2021

$74.3B
Value Added

12,500+
Establishments Across All 50 States

$51B
Labor Income Support

$86.4B
Electroindustry Exports

$184.8B
Electroindustry Imports

Make it Electric

VISION

All-Electric Future

MISSION

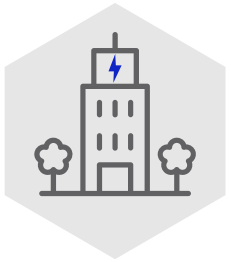
Create the ecosystem for electrification to thrive through…

MEMBER VALUE

Influence
Intelligence
Industry Standards

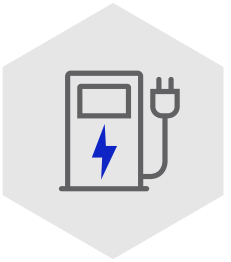
NEMA's Sector-Based Strategy

As part of our growth strategy, we focus on strategies that drive member value across four key end-market verticals: **Built Environment, Mobility, Grid,** and **Industrial/Core.**



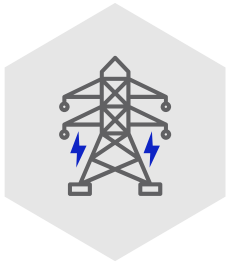
Built Environment

- Smart Lighting
- Connected Systems
- Energy Efficiency
- Health & Wellness



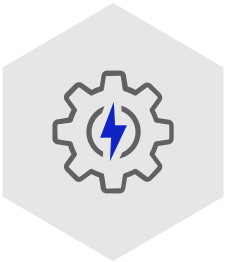
Mobility

- EVs and Charging Infrastructure
- EV Components
- Connected & Autonomous Transportation
- Bi-Directional Charging



Grid

- Renewable Energy Generation
- Energy Storage
- Demand Response
- Power Distribution
- Power Transmission



Industrial

- Industrial Automation
- Smart, Domestic Manufacturing
- E-Machinery
- Cybersecurity
- AI

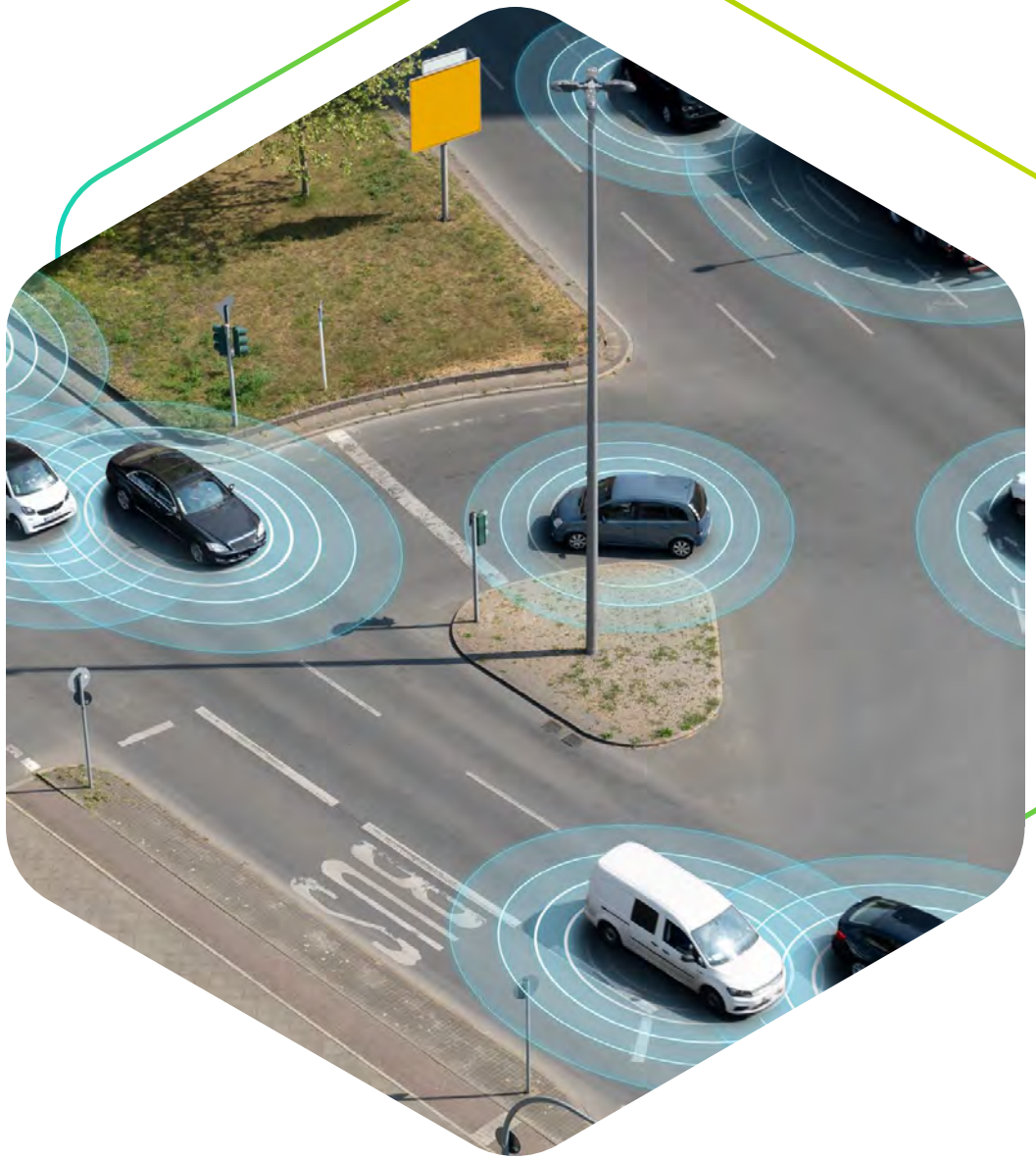
NEMA Transportation Management Standards Portfolio

- Traffic Controller Assemblies with NTCIP Requirements
- Hardware Standards for Variable and Dynamic Message Signs
- Portable Traffic Signal Systems
- Cyber and Physical Security of Intelligent Transportation Systems (ITS)
- Advanced Traffic Performance Measures

Connected Vehicle Infrastructure-Roadside Equipment (NEMA TS 10)

Standard for equipment deployed at roadside to support:

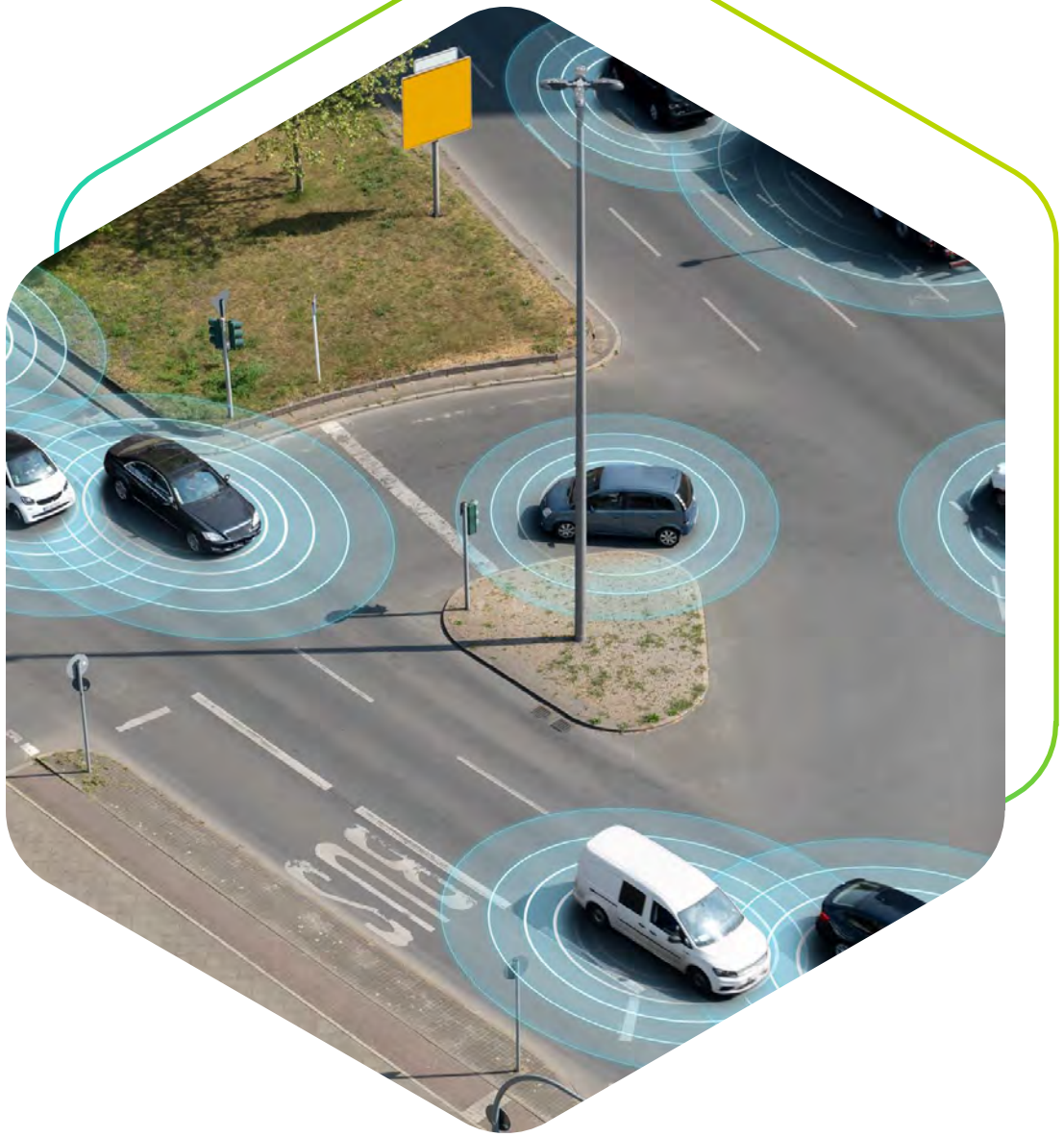
- Standardized over-the-air wireless messages, applications, and cybersecurity measures of communications with connected vehicles
- Present and future mobility
- Infrastructure Owner/Operator Procurement
- Interchangeability



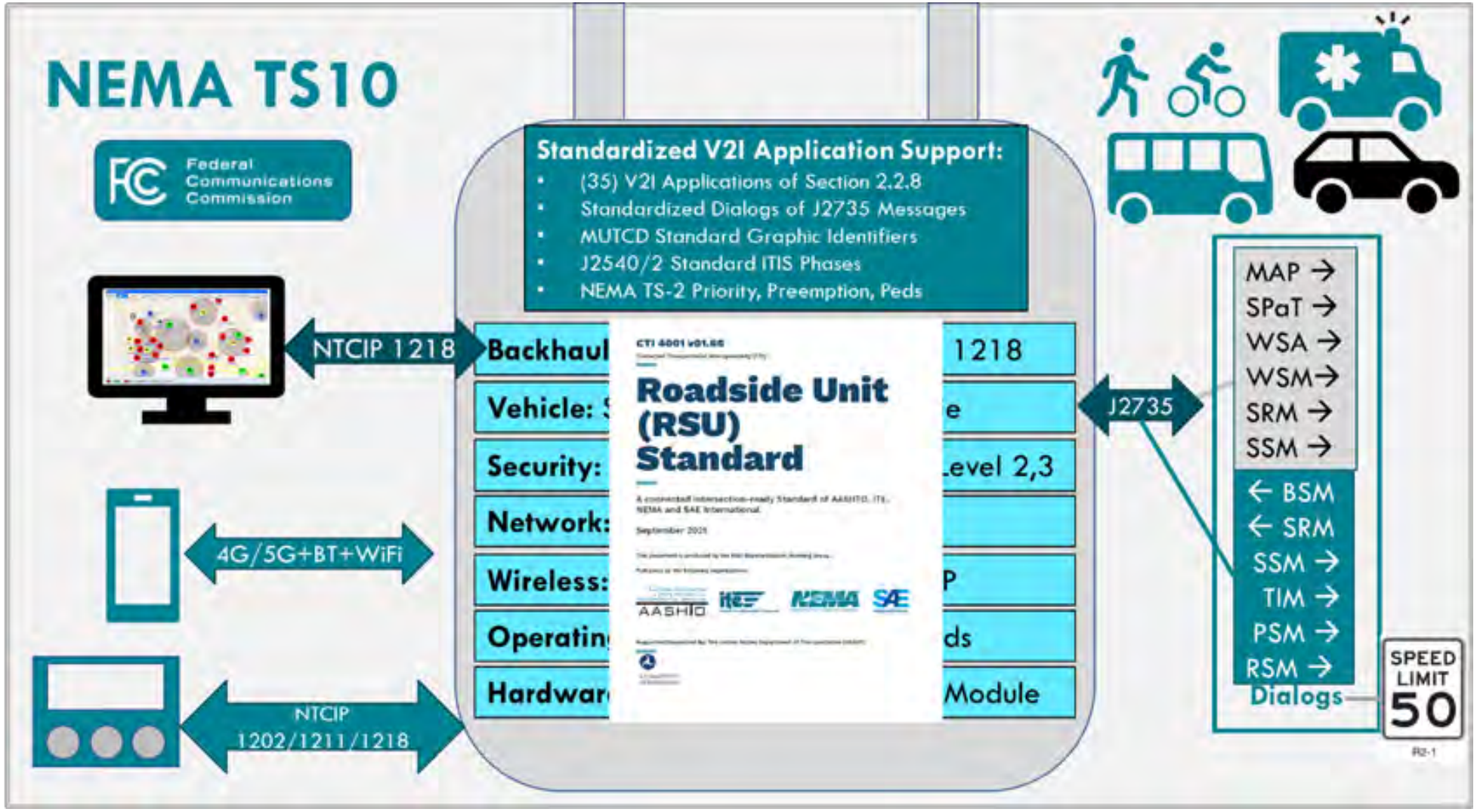
Connected Vehicle Infrastructure-Roadside Equipment (NEMA TS 10)

Gaps Addressed

- Lack of trust in Proof of Concept (PoC) security certificates
- Lack of uniformity in various interpretations of standardized messages and optional message fields
- Existing specifications not including all technologies needed by vehicles
- Roadside equipment designed only to shorter term research projects
- Challenges with AV sensors



The Connected Vehicle Standards Workspace

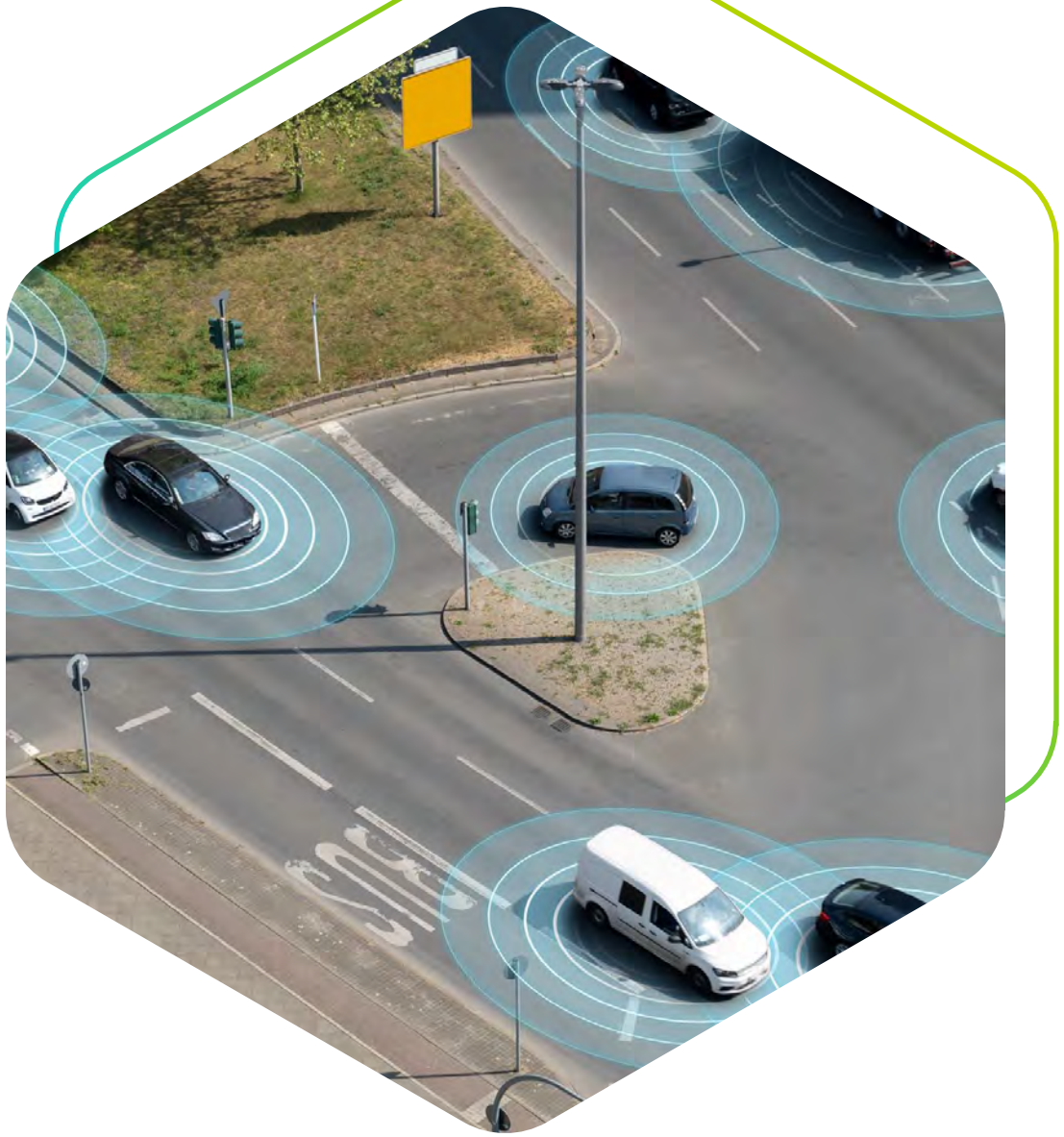


Connected Vehicle Infrastructure-Roadside Equipment (NEMA TS 10)

Applications/User Needs:

- Emergency Vehicle Preemption
- Transit Bus Signal Priority
- Red Light Violation
- Get Ready for Green
- Entering school/work zone
- Speeding in school/work zone
- Many more

Additional Security, Performance, Environmental, Physical and Related System and Radio needs



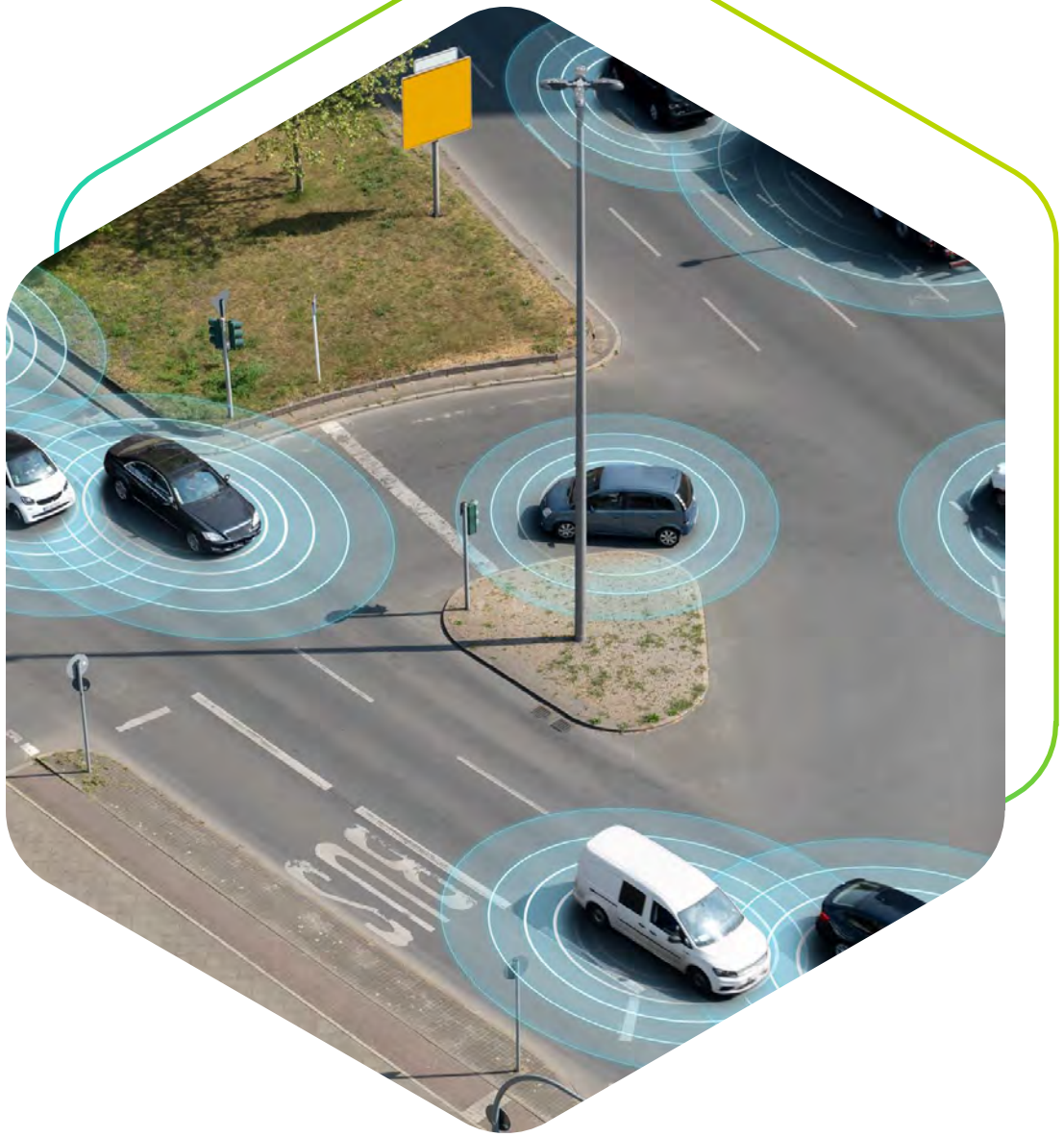
Connected Vehicle Infrastructure-Roadside Equipment (NEMA TS 10)

Functional Requirements:

- Based on user needs
- Identifies the common message format
- Traceability Matrix

Testing/Conformance Evaluation

- Requirements to validation traceability
  - Analysis
  - Inspection
  - Testing



MAKE IT AMERICAN™

Alexa Burr
alexa.burr@nema.org
202-997-6206

Corey Ruple
corey.ruple@nema.org
202-509-3003

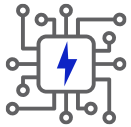
makeitamerican.org

NEMA Make It American Program

Navigating BABA and Other Domestic Content Rules

2021: Bipartisan Infrastructure Law and "Build America, Buy America Act Provisions"

- **Driving domestic manufacturing** through domestic content requirements
- **55% compliance** for manufactured products



BABA rules challenging for NEMA members

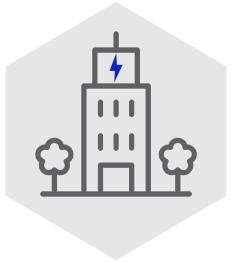
- **Billions invested by NEMA members** in jobs and resources to electrify aging infrastructure

2024: NEMA Board of Directors - Opportunity to Assist Members

- Need for **clarity and level playing field** for achieving domestic content requirements
- Navigate through the complex set of **agency-by-agency requirements**
- Desire for **tools and resources**
- Overall market need to obtain BIL funding by **demonstrating BABA conformance**

NEMA Make It American Program

Resources, Tools, Government/Key Partner Outreach, and Certification



Resource Center

- Advocacy Documents
- Roadmaps
- BABA Resources
  - On-Demand Legal 1:1 Consultation

Certification

- Option for organizations to obtain:
  - Process Certification
  - BABA Product License(s)
- NEMA-licensed "NEMA Domestic Content"

Process Standard & Product Specifications

- NEMA 70901-2024 Process Standard: BABA Supply Chain Evaluation & Assurance Process *(applies to all manufacturers)*
  - NEMA BABA Product Specification: Low Voltage Distribution Equipment
  - NEMA BABA Product Specification: Wire & Cable

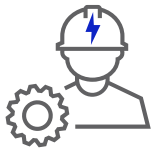
Government & Key Partner Outreach

- Federal and State agency officials
- Significant support and endorsement
- Industry leadership and government efficiency
- Public listing of NEMA-certified companies, facilities, and products

NEMA Make It American Program

Navigating BABA and Other Domestic Content Rules

Supporting & Leading Industry – leveraging role as SDO to provide clarity and performance-based approach.



Defining Good Practices – shaping what good looks like in supply chain evaluation, BABA domestic content determinations, and manufacturing through flexible, non-prescriptive standards.

Aligning with Policy Goals – supporting the administration's push for efficiency by **enabling industry-led leadership in domestic manufacturing**.

Government & Key Partner Outreach

Ongoing outreach to federal and state agencies - receiving significant enthusiasm and support

- **Federal**
  - White House
  - OMB
  - Commerce
  - DOT
  - DOE
  - EPA
  - HUD
- **State DOT agency officials (PA, CT, DE, OH, FL, TX, etc.)**

Capitol Hill Engagement

- **Surface Transportation Reauthorization**
- **Influencing FEOC language**
- **Senate EPW**
- **House Transportation & Infrastructure Committee**

NEMA Make It American Certification Program

Process & Product Certification

Organizations opt to certify a facilities **process and products** *(optional)*

Third-party expert audit to determine company's conformance to supply chain evaluation process standard and their application of product-specific criteria

Successful completion of audit(s) results in NEMA-issued **certification mark(s)** for use at facility and product level

Enhances credibility and provides confidence for both **companies and regulatory agencies**

NEMA Make It American Certification Program

Audits & Basic Requirements

Audit Service Providers (ASPs)

intertek Total Quality. Assured. SGS UL Solutions

On-site visit and review of written processes

Implementation of NEMA Process Standard (70901-2024) is foundation; required for BABA product certifications

Audit time estimates:

- 1.5 days for process standard audit at first facility (+1 day for additional facilities)
- 1.5 day for BABA product certification audit

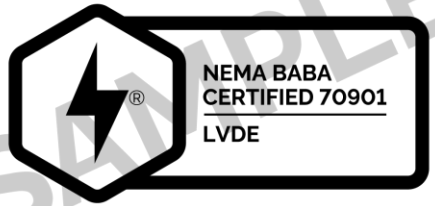
3-year certification cycle with annual surveillance audits

Program Certification & Licensing Marks

Process & Product Certification

NEMA 70901-2024 Process Certification Mark

- Supply Chain Evaluation (facility level)
- Mark Usage:
  - Facility level
  - Corporate website – *identify facility certified*



NEMA BABA Product License Marks

- BABA Product Specification Certification
- Mark Usage:
  - Corporate website
  - Marketing materials
  - Product packaging

NEMA to provide Branding Guidelines, marketing examples, recommendations, etc.

Make It American™ BABA Registry

Company	Facility City	Facility State	Facility Certification(s) and BABA Product License(s)	NEMA BABA Product License(s)
EATON Powering Business Worldwide	Cleveland	TN	NEMA-00-6	
MASTER	Lake Bluff	IL	NEMA-00-7	
Schneider Electric	Fairfield	OH	NEMA-00-4	
SIEMENS	Spartanburg	SC	NEMA-00-3	LVDE-01-01
Southwire®	Carrollton	GA	NEMA-00-1	WC-02-01
	Carrollton	GA	NEMA-00-2	WC-02-01
TESCO THE EASTERN SPECIALTY COMPANY	Bristol	PA	NEMA-00-5	LVDE-01-02

makeitamerican.org/registry

Certificates & Marketing Tools

NEMA's Make It American™ Process Certificate

NEMA's Make It American Process Certification Number:

NEMA-00-1

This certifies that the supply chain evaluation and assurance process of

Southwire Company
Building Wire Plant
3 Southwire Drive
Carrolton, GA 30119
United States of America

has been assessed by the National Electric
(NEMA) and found it to be in conformance

NEMA 7090
Compliance with Domestic Pre
for Infrastructure

This certification and the approved supply chain evaluation
and ensure conformance with domestic content calculati
America Preference and the Build Americ

Effective Date: April 24, 2025
Expiration Date: April 24, 2028
Registered Since: April 24, 2025

Certificate of Authority to use the NEMA Make It American™ BABA Product Mark

License Number: **LVDE-01-01**

The National Electrical Manufacturers Association hereby grants to:

Siemens Industry, Inc.
1320 Old Georgia Road
Roebuck, SC
United States of America

the right to use the NEMA Make It American™ BABA Product License Program Mark on Low Voltage Distribution Equipment products under the conditions indicated in the official publications of ***NEMA 70901-2024*** and ***NEMA 70901-1-2024*** standards and in accordance with the provisions of the License Agreement

In all cases where the NEMA Make It American™ BABA Product License Program Mark is applied, the NEMA BABA Mark shall be used in conjunction with this certificate number: ***LVDE-01-01***

The National Electrical Manufacturers Association reserves the right to revoke this authorization to use the NEMA Make It American™ BABA Product License Program Mark for any reason.

The scope of this license includes the following:
Product Lines: UL 67 (Panelboards); UL 891 (Switchboards); and UL 857 (Busway)

NEMA BABA CERTIFIED 70901
LVDE

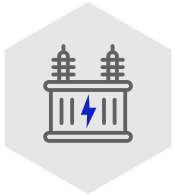
Effective Date: April 24, 2025
Expiration Date: April 24, 2028

To verify the authenticity of this license, go to www.makeitelectric.org

Alexa S. Burr
NEMA Vice President, Strategic Growth & Market Development

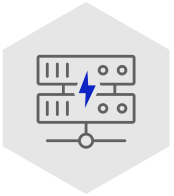
- **NEMA Certificates facilitate supply chain confidence and streamline compliance**
- **Partner with NEMA on marketing and public awareness through communications and marketing**

Future BABA Product Specification Development



Next Phase – Expected Summer 2025

- High- and Medium-Voltage Distribution Equipment (including switchgear and transformers) – ***Published July 2025***
- Grid Management & Automation
- Connected Building Systems & Controls
- Variable Frequency Drives and Drive Systems



Future Product Categories Identified for BABA Specifications

- EV Supply Equipment
- Industrial Automation Systems/Controls
- Lighting Systems
- Motor Systems
- Additional Wire & Cable (different scope than current 70901-2-2024)
- Gearmotors
- Dynamic Messaging Signs
- ITS Devices

Leveraging Make It American™ for Broader Manufacturing Sector

Scalable Across Industries: NEMA's BABA Process Standard (70901-2024) is a flexible framework suitable for any U.S. manufacturing facility seeking to demonstrate domestic content.

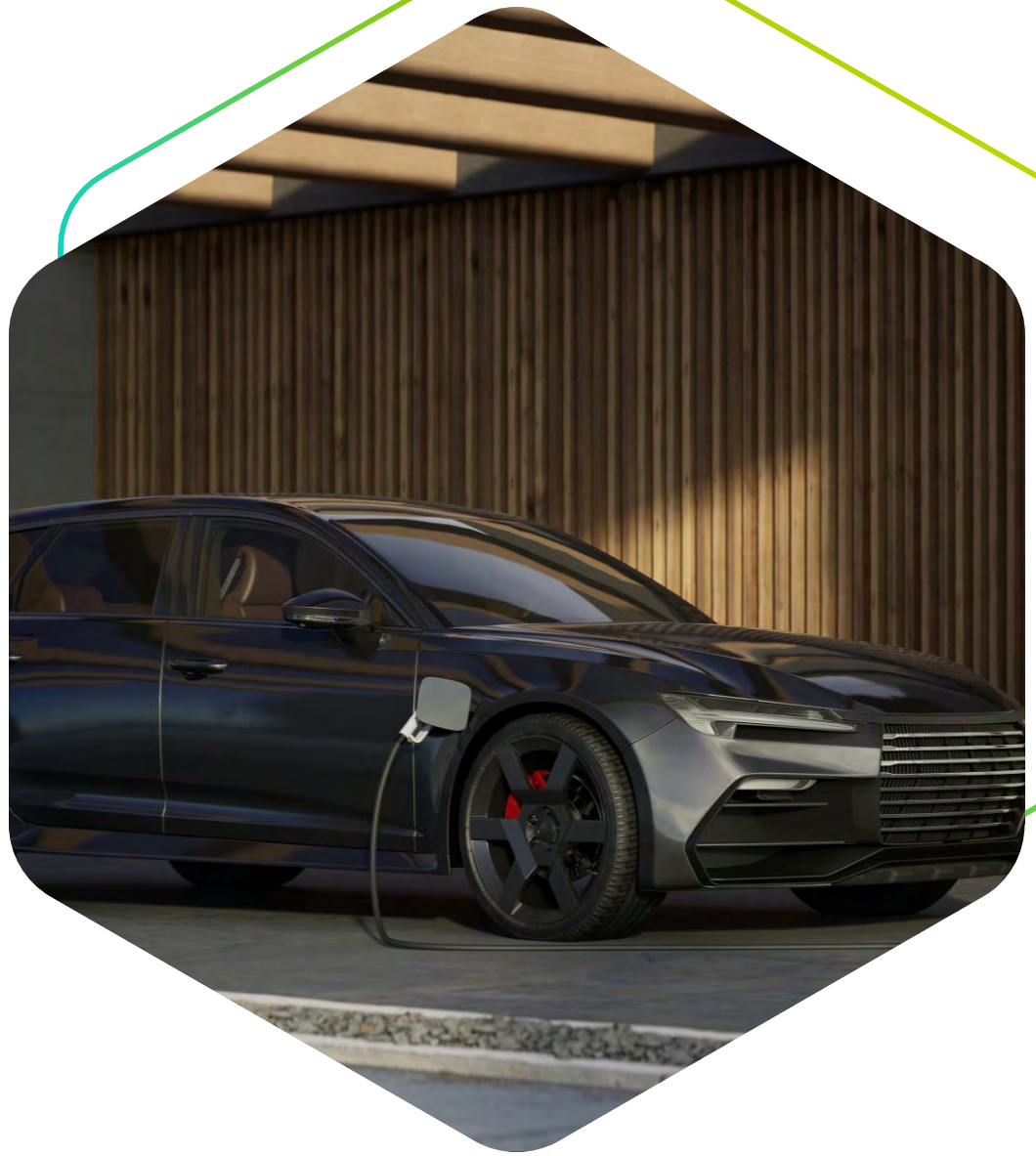
Collaborative Expansion: Forge partnerships with trade associations and manufacturers in adjacent sectors to broaden adoption and increase market penetration.

Standards Leadership: Utilize NEMA's role as a Standards Development Organization (SDO) to create new BABA product specifications tailored to diverse manufacturing categories.

Amplified Market Impact: Work with federal agencies and stakeholders to drive broader recognition and acceptance of Make It American™ certification marks across procurement and supply chains.

Contact

Steve Griffith: Executive Director, Regulatory & Industry Affairs, Mobility-
Steve.Griffith@nema.org

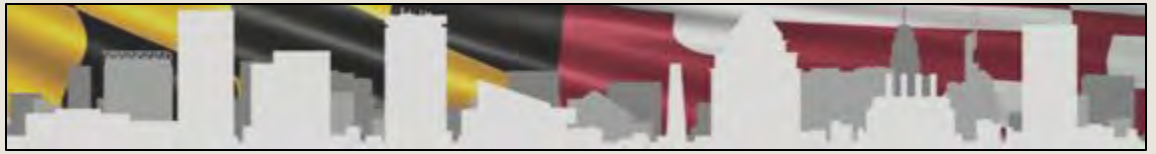


8/7/2025

Networking Break

"See you back at 3:15 pm"

JOHNS HOPKINS
INSTITUTE *for*
ASSURED AUTONOMY

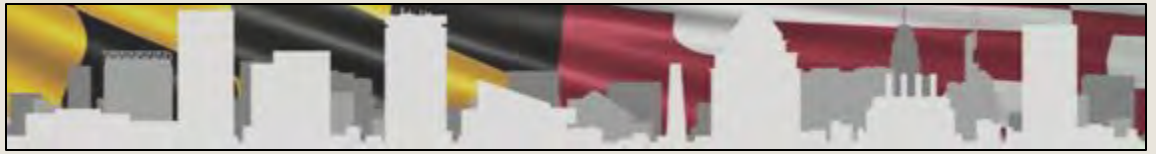


Certification

Jason M. Conley

Executive Director, Omni Air Consortium

Omni Air Certification for Connected Vehicles



OMNIAIR®
CONSORTIUM

OmniAir Consortium 101

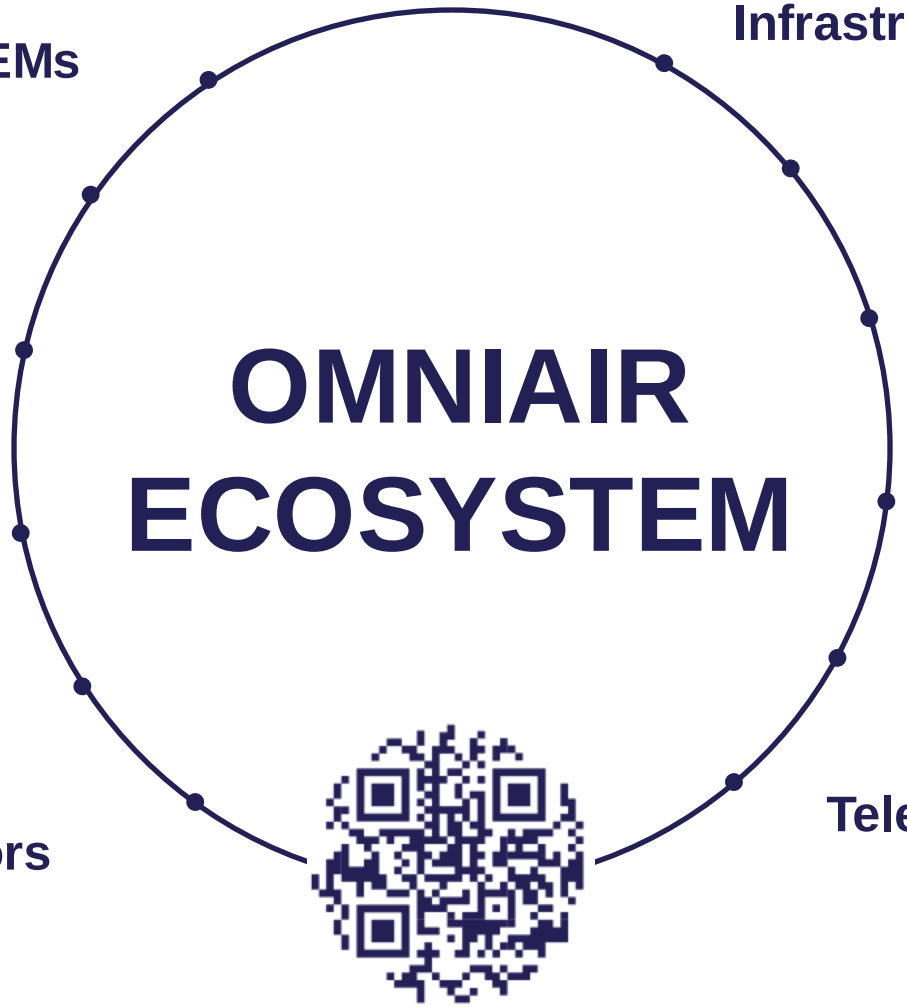
Building Trust in Technology Through Testing & Certification

August 2025

OmniAir's Mission

- Promote certification and interoperability for ITS, tolling, and connected vehicles.
- Independent, third-party testing and certification through a global network of accredited test laboratories using qualified test equipment and validated test cases.
- OmniAir Certified devices conform to industry standards and meet minimal interoperability and performance requirements.

OMNIAIR ECOSYSTEM



- Automotive OEMs
- Tier One Suppliers
- Applications & Services
- SCMS & Cybersecurity
- Semiconductors & Modules
- System Integrators
- Infrastructure Owner Operators
- Test Systems
- Test Laboratories
- Device Manufacturers
- Research Institutes
- Telecommunications Carriers

OMNIAIR CONSORTIUM

omniair.org

OMNIAIR ECOSYSTEM:

- Automotive OEMs
- Tier One Suppliers
- Chipset & Technology Component Providers
- Cybersecurity
- Tolling Devices
- Systems Integrators
- Deploying Agencies
- Test Tools
- Test Labs
- V2X Devices
- Research Institutes

SUSTAINING MEMBERS

Illinois Tollway, Accuver Wayties, ISS Integrity Security Services, ETTIFOS, neology, Star Systems, DEKRA, Keysight Technologies, TTA, kapsch, TransCore

EXECUTIVE MEMBERS

spoke, ITS Korea, SwRI, HARMAN A Samsung Company, Qualcomm, DriveOhio The Future of Smart Mobility, E-ZPass, Oregon Department of Transportation, wsp

HNTB, North Carolina Turnpike Authority, E470, TagMaster Learn From Reality, NTTA North Texas Tollway Authority, The Port Authority of NY & NJ

ASSOCIATE MEMBERS

Avery Dennison, Parsons, GDOT Georgia Department of Transportation, NoTraffic, VVDN Technologies, V2X Dynamics, Auburn University, miovision, CDM Smith listen. think. deliver., NTPJ, LG Electronics, ktl, Integral Blue

Rolling Wireless, Transportation Corridor Agencies, Battelle It can be done, unex, 中華電信 Chunghwa Telecom, Hwacom Systems Inc. Ace for Any, SAESOL TECH, YUNEX TRAFFIC, Capgemini engineering, Caltrans, Mitsubishi Electric Changes for the Better, iteris, TÜVRheinland Precisely Right.

Marben, Applied Information, Ohio Turnpike, MR CORBIN, microsec, Confidex, AUTOCRYPT, Ford, FETC, Sporton Lab., GFT, Toyota, KATECH

Vector, Hitachi Inspire the Next, Alps Alpine, KETI, Denso Crafting the Core, commsignia, ARCADIS, iTtelecom, Rohde&Schwarz, Ospirent, Cohda Wireless

Our Infrastructure Owner Operator Members

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Chair
PJ Wilkins
E-ZPass Group

Vice Chair
Steve Novosad
HNTB Corporation

Treasurer
Jeff Dailey
North Texas Tollway Authority

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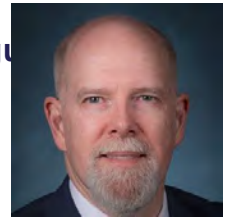
NJ Turnpike Authority

Fernando Rodrígu
DEKRA



Robert Galvin
Port Authority of New York and New Jersey

Maureen Bock
Oregon Department of Transportation

Robert Landry
TransCore

Jacob Harel
Harman

Reid Sigety
Spoke

OmniAir Working Groups

V2X Technical
Chair: Frank Perry, WSP

Certification Policy
Chair: Lauri Brady, Kapsch

Cybersecurity
Chair: Brian Romansky, ISS

Tolling and Emerging Payments
Chair: Jake Royer, EZ-Pass Group

Road Usage Charging (RUC)
Chair: Stella Joseph, HNTB

V2X Applications Testing
Chair: Tom Timcho, HNTB Corporation

Connected Infrastructure & RSU's
Chair: Nick Hegemier, DriveOhio

Plugfest Testing
Chair: Aaron Moore, ISS

Aftermarket V2X Devices
Chair: OPEN

OMNIAIR
CONSORTIUM

Certification Builds Trust

- Certification covers the entire communications protocol elements (*Scope goes beyond Radio PHY)*
- Provides assurances to stakeholders that the system or technology has been vetted
- Provides an avenue for technology to prove its validity
- Along with standardization, certification promotes **Conformance** and **Interoperability** across transportation technologies and jurisdictions

Connected Vehicle – LTE-V2X


CERTIFICATE OF COMPLIANCE / CONFORMANCE

OMNIAIR CONSORTIUM

ETTIFOS

OMNIAIR CERTIFIED

LTE-V2X-PC5-OBU

2025050601

Ettifos Co.

Model: **V2X-AIR / ETF-AIR-C02 (OBU)**

HW: **2.0** FW: **N/A** SW: **OC_1.4.1** Regulatory: **2BHJL-ETF-AIR-C02 (FCC 95L)**

for passing the requirements for this OmniAir Certification Program

Connected Vehicle: LTE-V2X OBU Release 1 Conformance

Test Specifications per 721-OA-CVCA-Scope: 761 (3GPP 36521), 762 (SAE J3161/1:2022), 763 (IEEE 1609.2), 764a (CAMP), 765 (IEEE 1609.3 WSM-WSA), 767 (SAE J3161/1), 768 (SAE J3161/1A) & BSMs (J2735:2024)

at Telecommunications Technology Association (TTA) – Seongnam, Korea (OATL LTE-V2X 2021062801)

CERTIFICATE #2025050601 Awarded this 6th day of May 2025

Tolling – RFID-MPD


CERTIFICATE OF COMPLIANCE / CONFORMANCE

OMNIAIR CONSORTIUM

kapsch

OMNIAIR CERTIFIED

Tolling RFID-MPD

2025061901

Kapsch TrafficCom

Janus MPR 2.4 Interior Reader (Single & Multi-Protocol States)

FN: 480802260 Radio: 802870 (2023jun20-050x-00) Protocol: TDM, 6B 80K, ISO-6C

HW: N/A SW: 2024aug16a-mpr24, CGC: A4-0003_aabb-mpr2na, Regulatory: JQU802870

for passing the requirements for this OmniAir Certification Program

Open-Road Tolling: RFID-MPD R1.0 Conformance & Interoperability

Test specifications per 750-MPDCA Scope & 850-Test Plan covers: **800-Conf-TDM, 801-Conf-6B80K, 802-Conf-ISO6C, 810-Tolling-ENV, 830-InOP-Device, 840-Gantry-SPD and 841a-Gantry-MPD**

at DEKRA Certification Inc., Sterling, Virginia (OATL RFID-6C Tolling 2021120201-2023042401) and SunTrax – Auburndale, Florida Field Test Site (OAFTS 2025013101).

CERTIFICATE #**2025061901** - Awarded this 19th day of June 2025

OmniAir Certification Programs

OmniAir was 1st in the world for each:

RFID Tolling:

- 6C RFID Tags and Readers (2012)
- Multi-Protocol RFID Tags and Readers (2023)

Connected Vehicles:

- DSRC OBUs & RSUs (2017)
- LTE-V2X (PC5) OBUs and RSUs (2023)
- LTE-V2X (PC5) Modules (2024)

Future Certification Programs:

- RUC and V2X Tolling Applications
- Aftermarket V2X devices
- V2X Safety Applications
- Network V2X (virtual RSUs)

Certification Services

Standards ↔ Requirements ↔ Regulatory

Working Groups ↔ Test Cases / Scopes ↔ Validation

Qualified Test Equipment (OQTE)

- Bench & Mobile

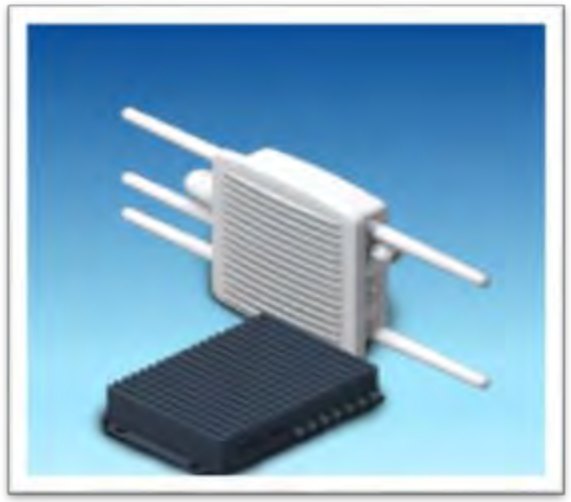
Authorized Test Laboratory (OATL)

- Qualified Bench & Field Equipment
- Test Reports

Authorized Field Test Site (OAFTS)

- Open Road Overhead Gantry
- Plaza (Low Speed / Gated)
- Qualified Field Equipment
- Reference Device (ORD)

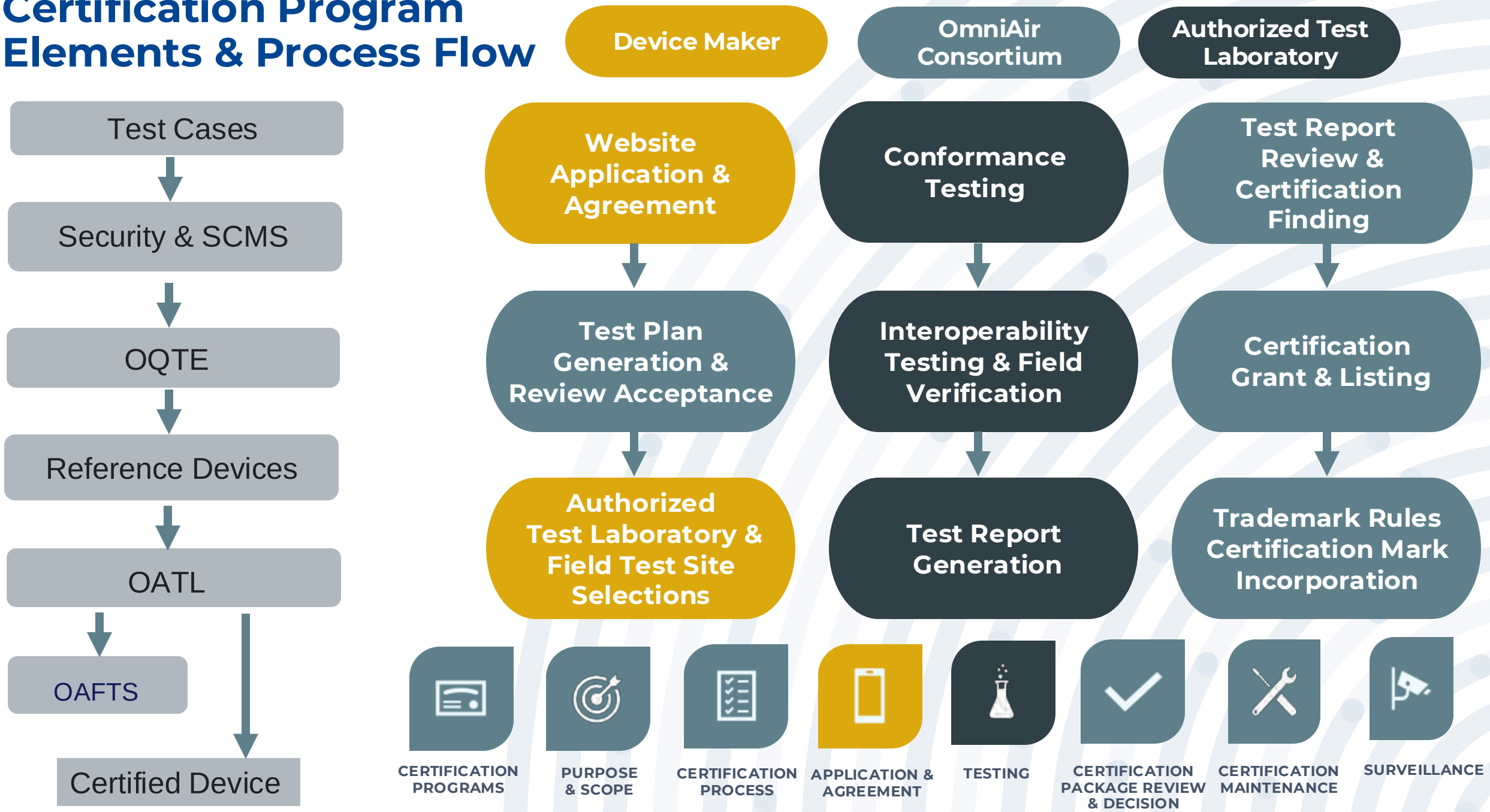
Device Certification



- Module (Global) – Radio & V2X
- LTE-V2X (C-V2X PC5)
- RFID SPD & MPD Tolling

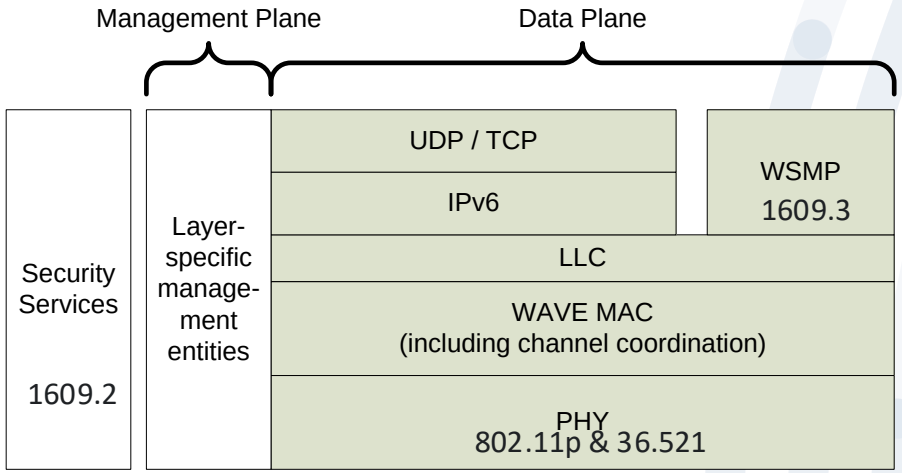
In-works: 1) V2X Applications, 2) Aftermarket Safety Devices 3) Transportation Sensor & 4) V2X Tolling (Road Usage Charging)

Certification Program Elements & Process Flow



Standards in V2X Communications

Used in Appropriate Regions



Standard	Description	OmniAir Test Spec	LTE-V2X (PC5 R14)
3GPP 36.521	PHY – WAVE MAC	759 760 → 761	√
SAE J3161 & SAE J3161/1	Radio Protocol	762	√
SAE J2735	V2X Messages Dictionary	Various	√
IEEE 1609.12 & SAE J3268	PSID Listings	Various	√
IEEE 1609.2	Security Services	763	√
IEEE 1609.2.1	SCMS Certificate Processing	764b	√
IEEE 1609.3	Network Services (WSMP, WSA & IP)	765	√
SAE J2945/1 – J3161/1 SAE J2945/1A-J3161/1A SAE J5001 SAE J3315	V2V BSM Performance Vehicle-Level Test Guidelines OBU Direct & Network V2X (starting) Aftermarket V2X Devices (AVD) (Ultralight, Light & Pro)	767 (B), 768 (F) & 769 (CL) -- In-works	√ √
SAE J2945/xx	V2V & V2I Applications	780a & b	IP
CTI 4001 CTI 4501 & 4502 NTCIP 1218	RSU Hardware Specification Connected Intersection Guidelines Object Definitions for RSUs	772 & 779 --- 785	IP -- √
SAE J3217 SAE J3217/R	V2X-Based Fee Collection Road User Charging		IP Inquiry

C-V2X Certification for OBUs, RSUs & Modules

Are based on the following standards:

Adapted 3GPP 36-521 (R14) **Radio PHY** (759 Module & 761 Device)	SAE J3161 & /1:2022/2024 **LTE-V2X Communications** (762)	IEEE 1609.2:2022 **Security Services** (763)
IEEE 1609.2.1 (CAMP):2022 **SCMS & Certificates** (764)	IEEE 1609.3:2020 **Network Services** (765)	SAE J3161/1(J2945/1 BSM)&1A:2024 **BSM Min. Performance & Loc. Accuracy Testing** (767 & 768)
SAE J2735:2024 **Message Decoding MAP** (782), **SPAT** (783) **& TIM** (786)	RSU CTI 4001:2022 (772) NTCIP1218 (785) Environmental (779)	SAE J3161/1 & /1A:2024 (I/P) **BSM Checklist Driving Test** (769)

Open Road Tolling – Single & Multi-Protocol Tags & Readers

800-OA-TSS&TP-CONF-TDM
TDM Tolling Protocol Conformance

801-OA-TSS&TP-CONF-ISO6B80k
ISO 6B-80K Tolling Protocol Conformance

802-OA-TSS&TP-CONF-ISO6C
ISO 6C Tolling Protocol Conformance

810a-OA-TSS&TP-ENV-Devices
Tolling Environmental Tests for Tags & Readers

820-OA-TSS&TP-TPP-Tags
Tag Parameter Performance
TDM, ISO 6B-80K or ISO-6C

825-OA-TSS&TP-PROG-FulFil-MPD
Programming & Fulfilment Delivery
TDM, ISO 6B-80K or ISO-6C

830-OA-TSS&TP-InOp-Devices
Device Interoperability Performance Single & Multi-Protocol Tolling Operational States involving TDM, ISO 6B-80K & ISO-6C

840-OA-TSS&TP-Gantry-SPD
Gantry Open Road Field Testing: Single-Protocol Operational Mode

841 -OA-TSS&TP-Gantry-MPD
Gantry Open Road Field Testing: Multi-Protocol Mode

841a-OA-TSS&TP-Gantry-MPD-EZPass
Gantry Open Road Field Testing: Multi-Protocol Mode per EZPass

842-OA-TSS&TP-Gantry SPDBL
Gantry Open Road Field Testing: Single-Protocol Mode Baseline

843-OA-TSS&TP-Plaza-MPD
Gantry Plaza Field Testing: Single-Protocol Mode Baseline

850-OA-TSS&TP-SPD-MPD-TestPlan
Single & Multi-Protocol Device Operation Test Plan

Model Procurement Language for RSUs (from recent DriveOhio RFP)

The RSU shall have the following requirements:

1. RSU's shall be fully compliant with IEEE 1609.2, 1609.3 and 1609.4.

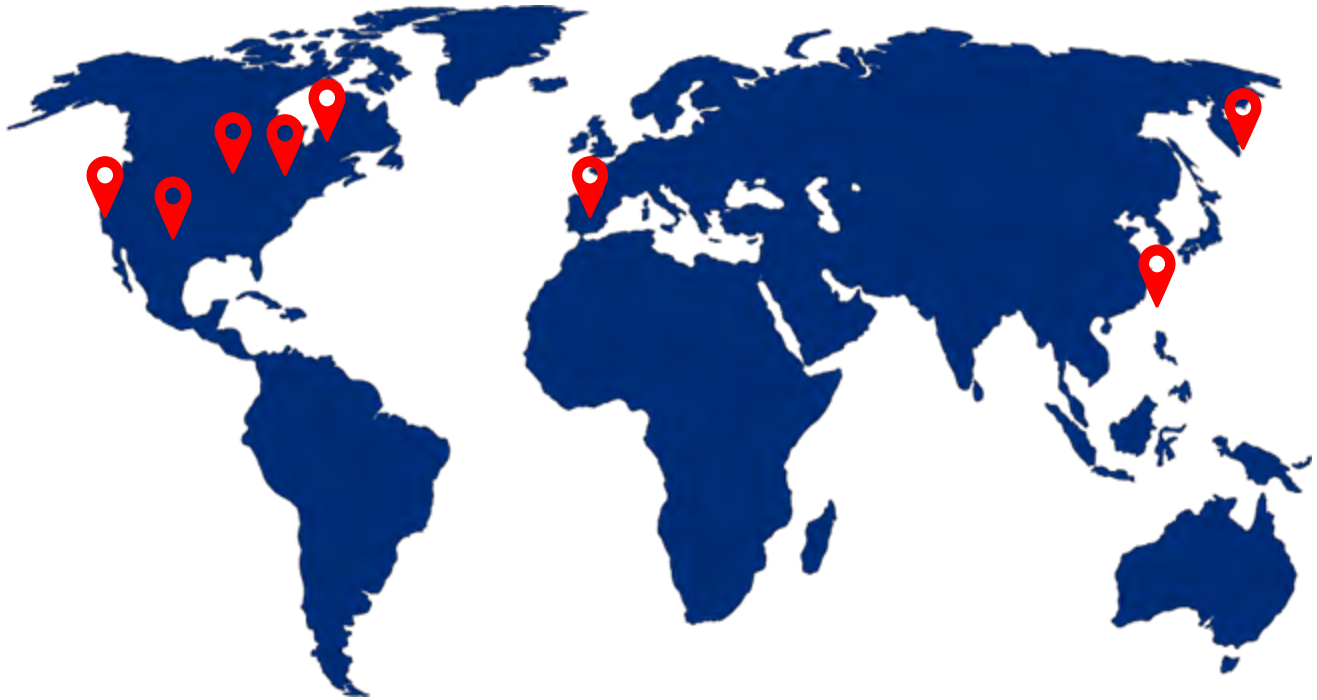
2. RSU's shall be fully compliant with SAE J3161/0 and 3GPP 36.521-1 (R14 PC5)

3. Vendors shall also be OmniAir certified for C-V2X Release 1 or show that they are actively working toward certification to become OmniAir certified for C-V2X Release 1 (LTE-V2X). Vendors must complete certification prior to any procurement activities being initiated. **Proof of certification or working toward certification letter shall be submitted with bid documents.**

4. RSU's shall be compliant with all mandatory requirements of CTI 4001 including NTCIP 1218, radio regulatory and environmental.

5. **Vendors shall submit documentation showing that they are actively developing and testing at events such as OmniAir Plugfests, etc.**

OmniAir Plugfests Around the World



Date	Location
Fall 2017	SFO & Milpitas, CA - (UL & MTC)
Spring 2018	Ypsilanti, MI (Intertek & ACM)
Fall 2018	College Station, TX - (TTA)
Spring 2019	Quebec, Canada - Transport Canada & Propulsion Quebec
Fall 2019	Malaga, Spain (DEKRA)
Spring 2020	Austin, TX (City of Austin)
Fall 2020	Global Plugfest – Austin, Novi, San Diego, Seoul, Korea
Spring 2021	Novi, Michigan (Danlaw)
Fall 2021	Columbus, OH – DriveOhio
Spring 2022	Ann Arbor, MI - (MCity)
Fall 2022	Malaga, Spain - (DEKRA)
Spring 2023	Auburndale, FL - SunTrax & (FDOT)
Fall 2023	Taipei, Taiwan - (TTIA)
Spring 2024	Ann Arbor, MI - (MCity)
Fall 2024	San Diego, CA - (Qualcomm & ITS-CA)
Spring 2025	Auburndale, FL – SunTrax (FDOT)
Fall 2025	American Center for Mobility (ACM)

TEST STATIONS

AUTOCRYPT
DEKRA
NIST NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY U.S. DEPARTMENT OF COMMERCE
ISS CERTIFICATE MANAGEMENT SERVICE
iteris
KEYSIGHT TECHNOLOGIES
leidos
MICROSEC
Ospirent
SAESOLTECH
TTA
@Wayties

DEVICES

APPLIED INFORMATION
Cohda Wireless
commsignia
DENSO Creating the Core
ETTIFOS
HITACHI Inspire the Next
indra
iTtelecom
kapsch
MIOVISION
Qualcomm
VVDN TECHNOLOGIES
YUNEX TRAFFIC
NOTRAFFIC

V2X-Based Tolling Demonstrations

Kapsch TrafficCom North America

Indra and Audi

- May 9th @ SunTrax Testing Facility, Auburndale, FL
- Part of OmniAir Plugfest
- Comparison with RFID & video-based tolling
- Tolling transactions
- Vehicle occupancy
- SAE J3217 messages

OMNIAIR CONSORTIUM

OMNIAIR PLUGFEST EST. 2017

OMNIAIR MICHIGAN PLUGFEST

THE AMERICAN CENTER FOR MOBILITY

YPSILANTI, MI • OCTOBER 6-10

HOSTED BY

SCMS MANAGER®

SECURITY CREDENTIAL MANAGEMENT SYSTEM

American Center for Mobility

OMNIAIR PLUGFEST EST. 2017

Connected Vehicle Conference and Demonstrations

Call for Speakers & Demonstrations

October 7 , 2025

OMNIAIR CONSORTIUM

SCMS MANAGER
SECURITY CREDENTIAL MANAGEMENT SYSTEM

American Center for Mobility

OMNIAIR®
CONSORTIUM

Jason Conley
Executive Director

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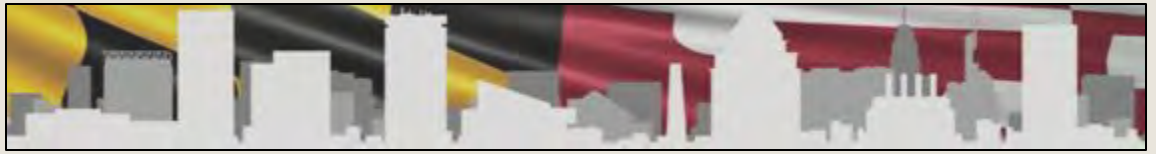
Procurement

Bobby McCurdy

Vice President of Policy and Advocacy, Intelligent Transportation Society of America (ITSA)

Driving Results: Enabling Better Procurement for CV Technologies



ITS AMERICA

Enabling Better Procurement for Connected Vehicle Technologies

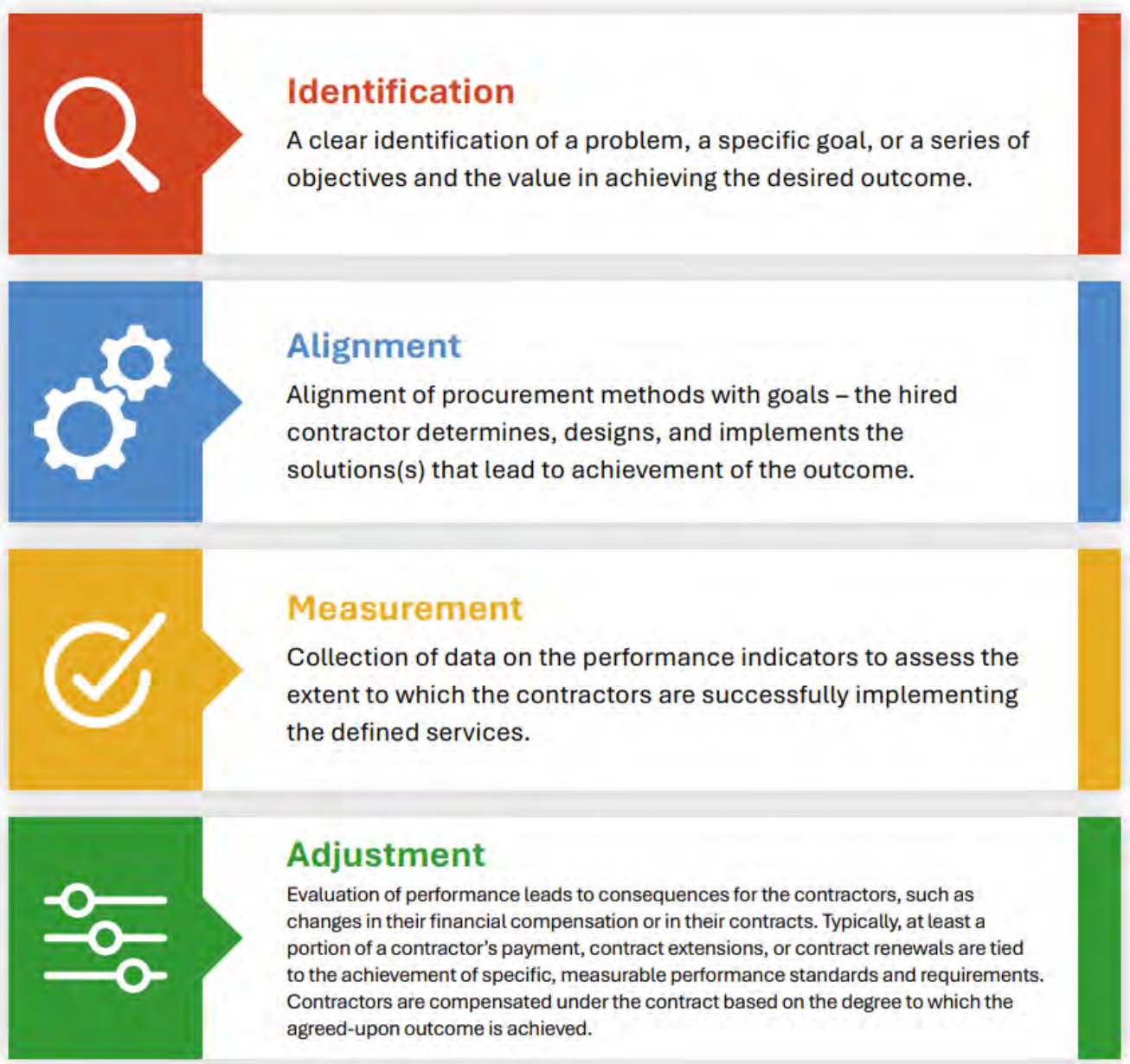
2025

What are the primary challenges to V2X Deployment Efforts?

- **Regulatory Uncertainty**
  - Spectrum
  - Funding
  - National Framework
- **Procurement**
  - Workforce and Resource limitations
  - Complexity of Performance and Safety Requirements
  - Software as a Service Cost Structure
  - Cybersecurity
  - Interoperability and Backwards Compatibility

Outcomes Based Procurement

Outcomes-based procurement is a contracting approach that focuses on achieving specific, measurable results rather than simply procuring goods or services.



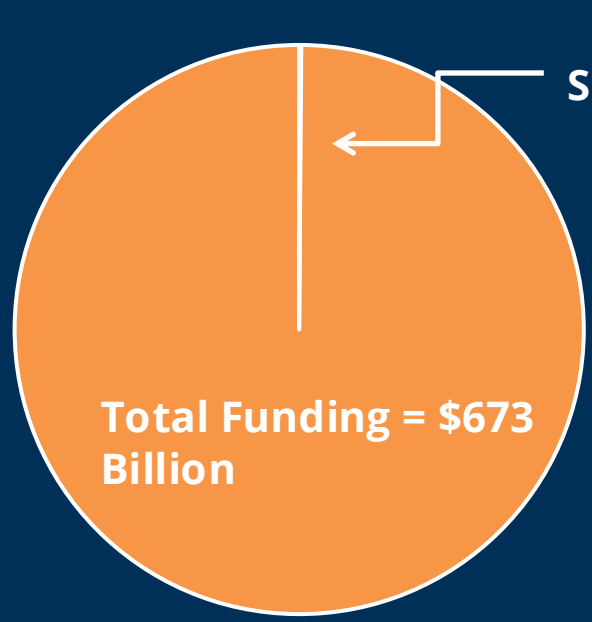
Benefits of Outcomes Based Procurement for V2X Deployment

- Reducing technical lock-in
- Reduces technical burden on procurement staff
- Real-time performance reporting
- Enabling mid-contract upgrades
- Service level agreements instead of device conformity
- Promotes interoperability
- Promotes innovation

Advocacy Priorities on Procurement

- Encourage Outcomes-Based Procurement
- Improve federal guidance on private sector collaboration
- Promote programs like Every Day Counts, the Special Experimental Projects Program, and ARPA-I
- Update federal grant criteria to better include subscription services
- Provide certain and substantial technology deployment funding

Our Current Funding Dilemma



IIJA provided $673B in surface transportation funds, but only **0.1%, or $800M,** for technology specific programs, via competitive grants.

ITS AMERICA

Bobby McCurdy:
bmccurdy@itsa.org

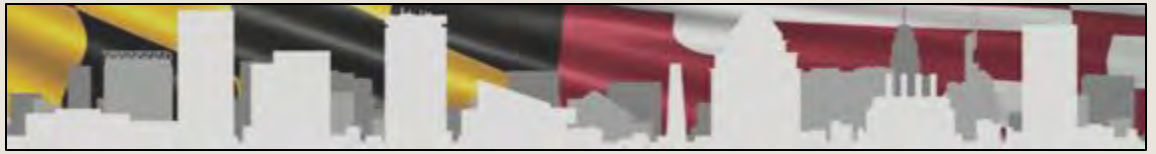
2025

Procurement

Victoria Coulter

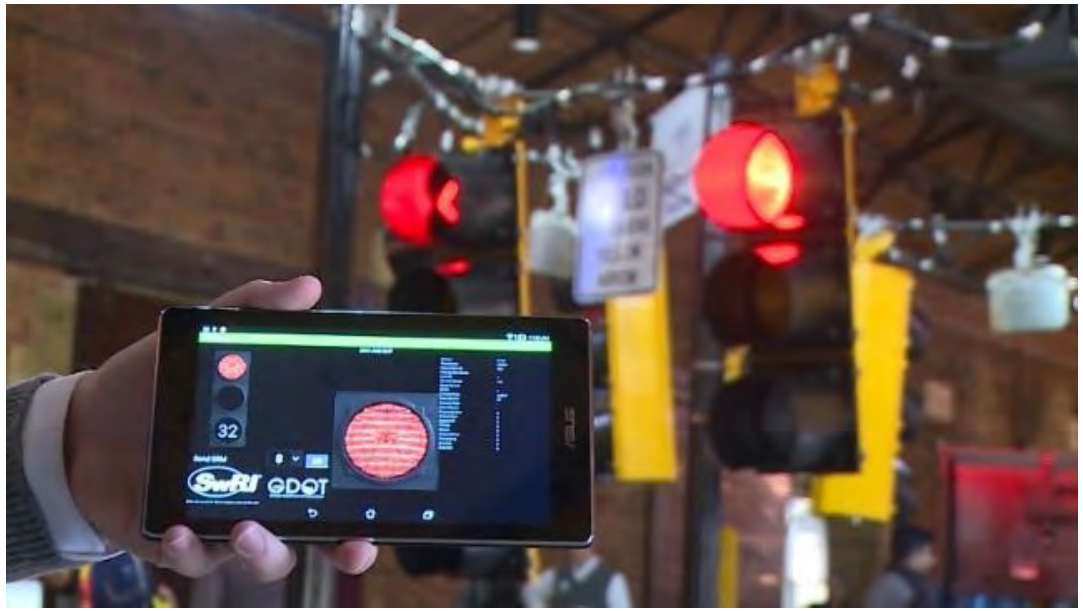
V2X Program Manager, Georgia Department of Transportation, Office of Traffic Operations, SignOps

Driving Results: Enabling Better Procurement for CV Technologies



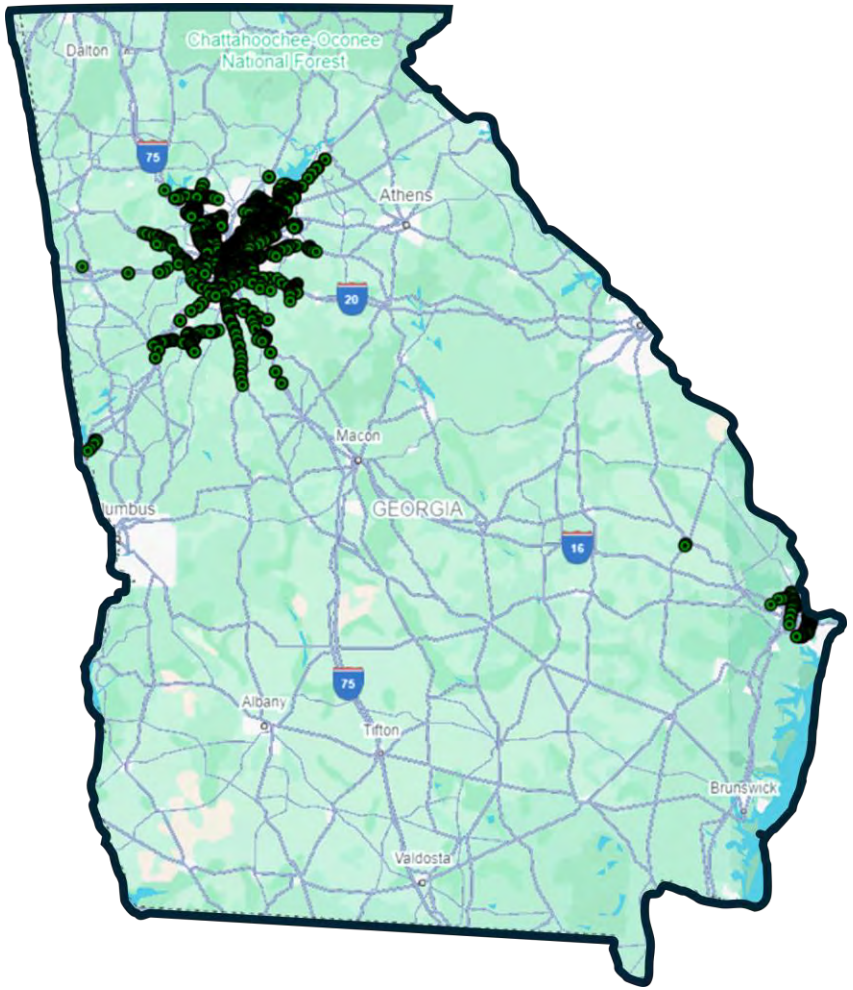
Georgia Department of Transportation

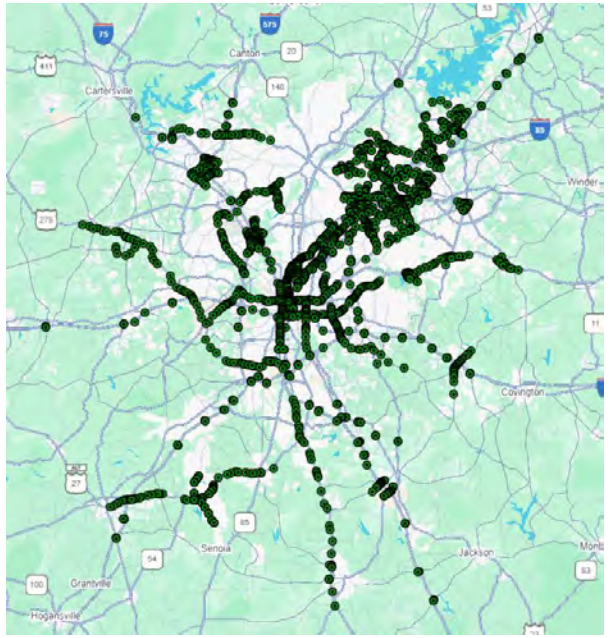
Connected Vehicle Funding

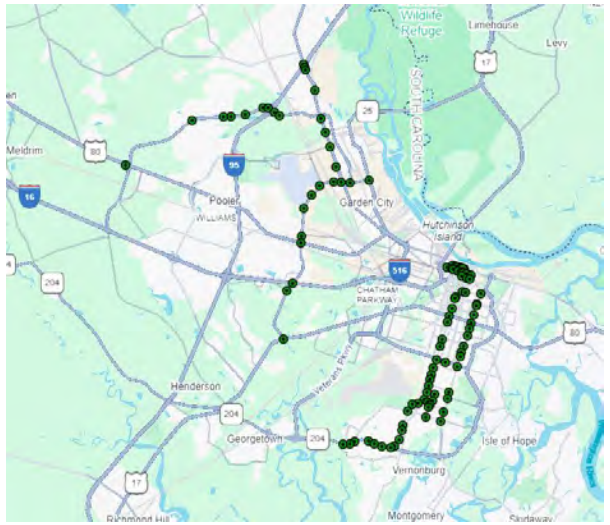


V2X Infrastructure

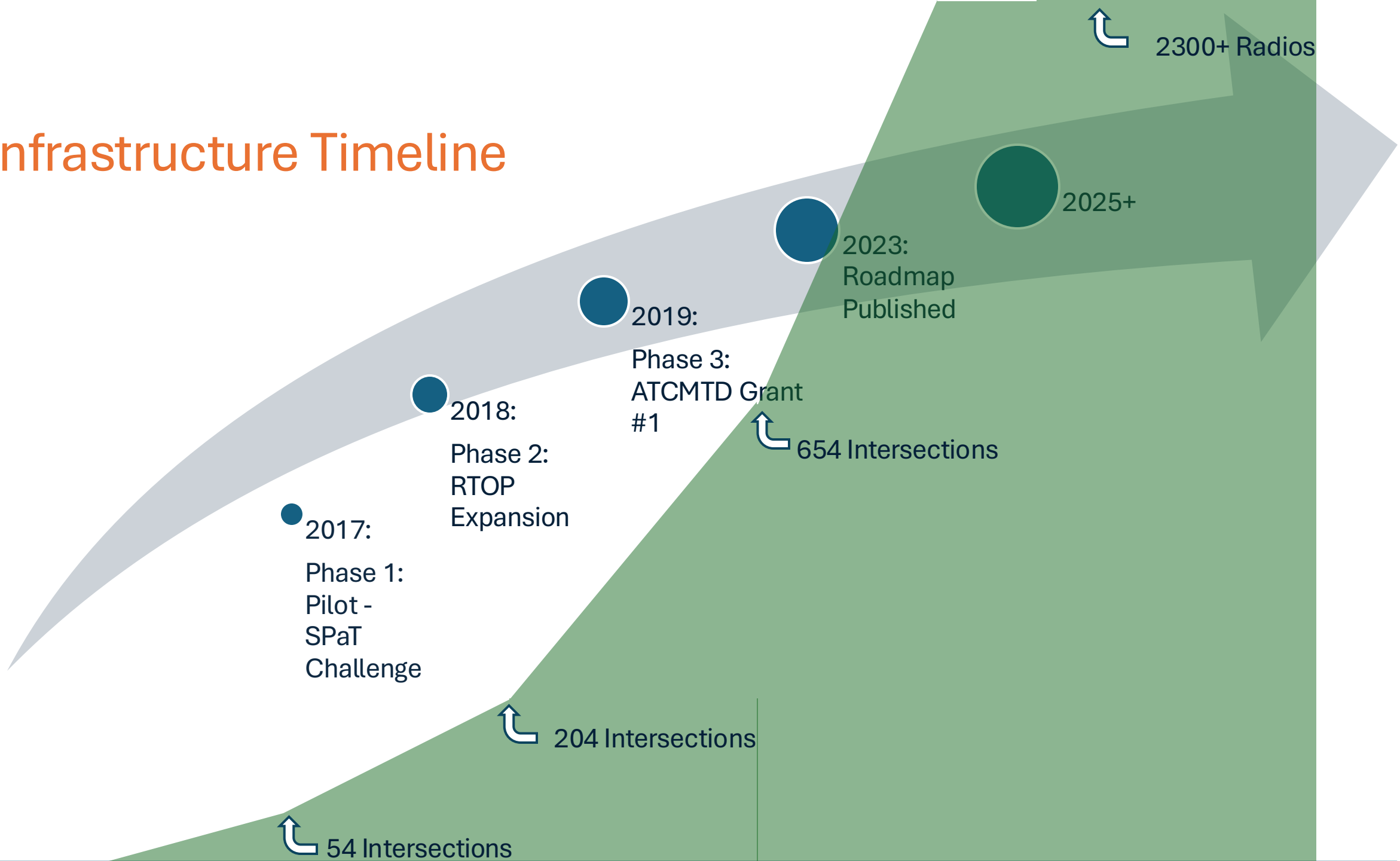
- 2300+ RSUs deployed
- Connected Intersections
- Fleet applications





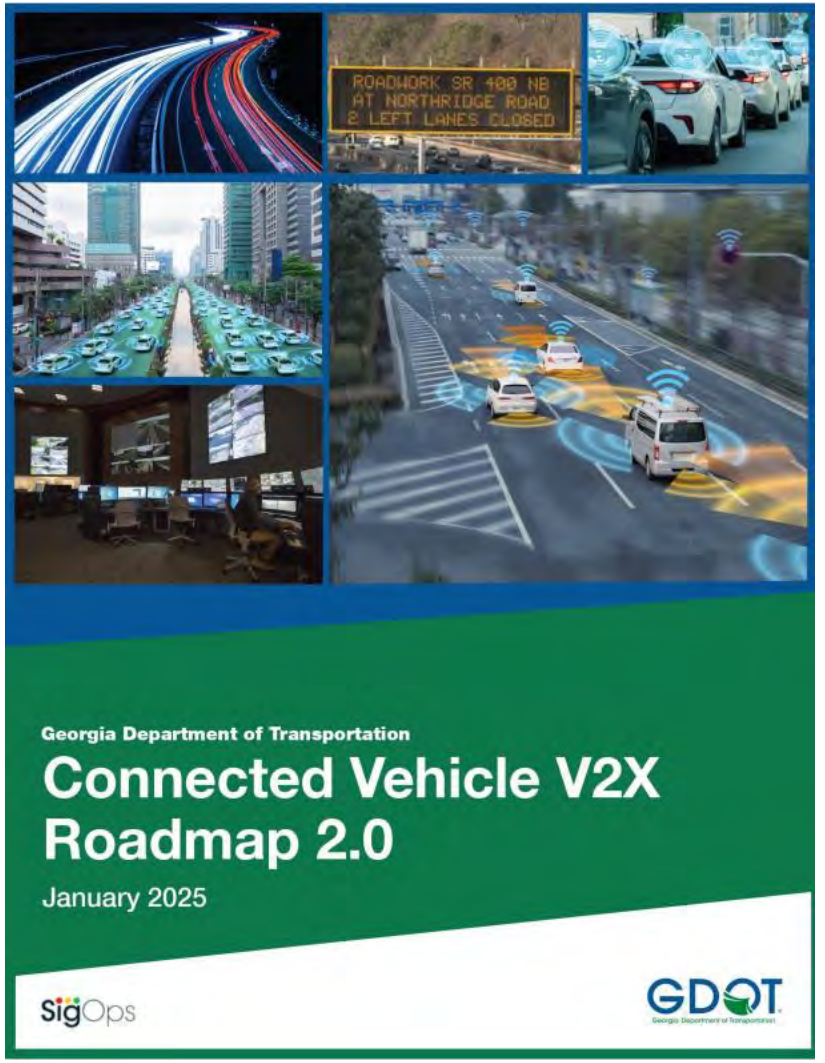


Infrastructure Timeline



GDOT V2X – Roadmap

- Deploy, operate, maintain, and innovate a statewide V2X ecosystem
  - $75M over 10 years
- Target Fleet Applications
- Participating in national efforts
- Deploying RSUs at 6500 signalized intersection on state routes in Georgia
- Deploying RSUs along interstate corridors for full V2X coverage



Federal Funding

- 23 USC 502 **(16)**

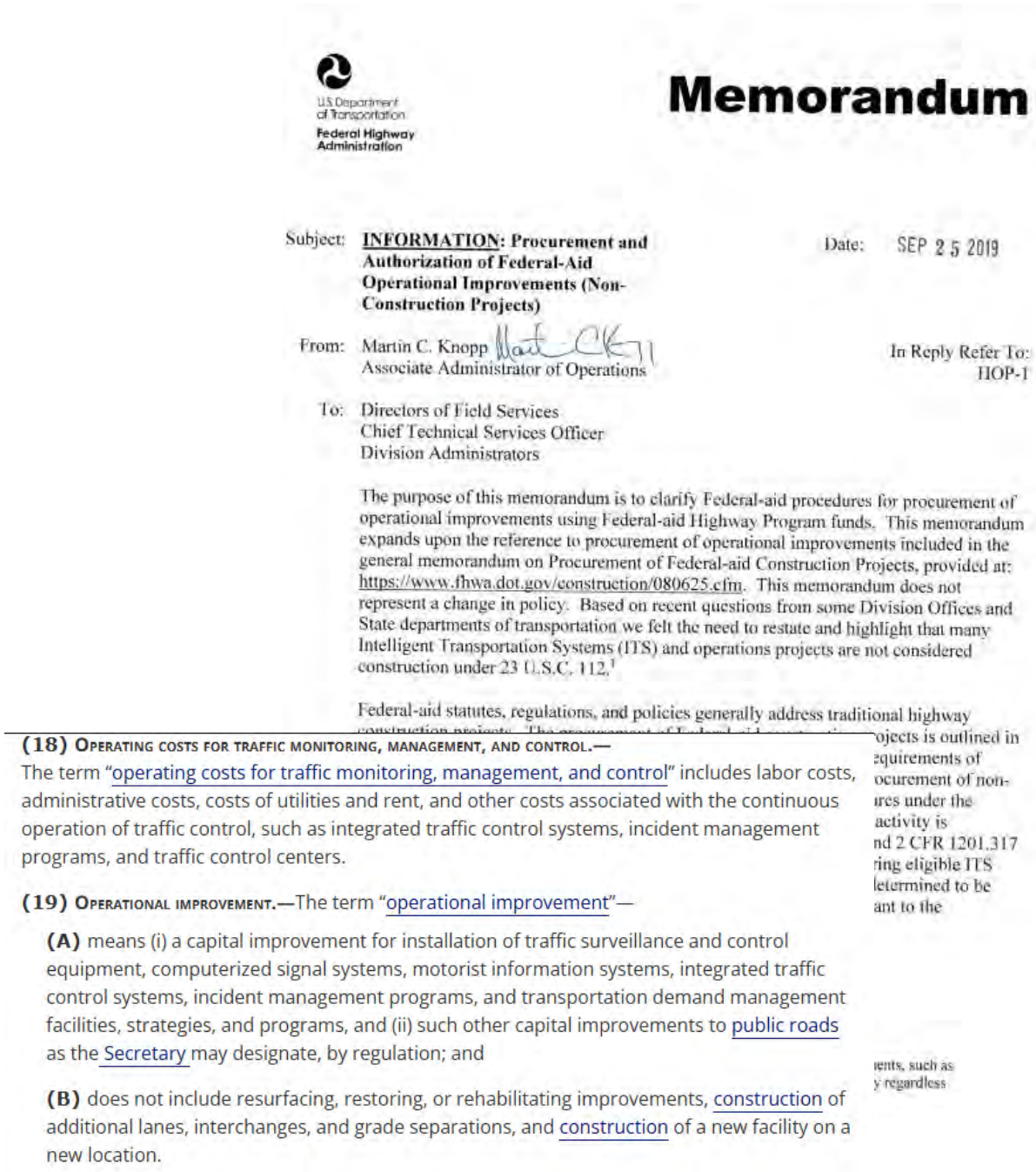
The installation and deployment of current and emerging intelligent transportation technologies, including the ability of vehicles to communicate with infrastructure, buildings, and other road users.

- 23 USC 133 **(D)**

infrastructure-based intelligent transportation systems capital improvements, including the installation of vehicle-to-infrastructure communication equipment;

- 23 USC 133 **(2)**

Operational improvements and capital and operating costs for traffic monitoring, management, and control facilities and programs.



U.S. Department of Transportation
Federal Highway Administration

Memorandum

Subject: **INFORMATION: Procurement and Authorization of Federal-Aid Operational Improvements (Non-Construction Projects)**

Date: SEP 25 2019

From: Martin C. Knopp
Associate Administrator of Operations

In Reply Refer To: HOP-1

To: Directors of Field Services
Chief Technical Services Officer
Division Administrators

The purpose of this memorandum is to clarify Federal-aid procedures for procurement of operational improvements using Federal-aid Highway Program funds. This memorandum expands upon the reference to procurement of operational improvements included in the general memorandum on Procurement of Federal-aid Construction Projects, provided at: https://www.fhwa.dot.gov/construction/080625.cfm. This memorandum does not represent a change in policy. Based on recent questions from some Division Offices and State departments of transportation we felt the need to restate and highlight that many Intelligent Transportation Systems (ITS) and operations projects are not considered construction under 23 U.S.C. 112.[1]

Federal-aid statutes, regulations, and policies generally address traditional highway

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ents, such as
y regardless

(18) OPERATING COSTS FOR TRAFFIC MONITORING, MANAGEMENT, AND CONTROL.—
The term "operating costs for traffic monitoring, management, and control" includes labor costs, administrative costs, costs of utilities and rent, and other costs associated with the continuous operation of traffic control, such as integrated traffic control systems, incident management programs, and traffic control centers.

(19) OPERATIONAL IMPROVEMENT.—The term "operational improvement"—

(A) means (i) a capital improvement for installation of traffic surveillance and control equipment, computerized signal systems, motorist information systems, integrated traffic control systems, incident management programs, and transportation demand management facilities, strategies, and programs, and (ii) such other capital improvements to public roads as the Secretary may designate, by regulation; and

(B) does not include resurfacing, restoring, or rehabilitating improvements, construction of additional lanes, interchanges, and grade separations, and construction of a new facility on a new location.

Federal Funding Examples

Program	Source	Notes
ITS Maintenance	STBG	Statewide ITS device maintenance
CV/ITS Design/Build #1 & #2	NHPP	Statewide Interstate CV, ITS infrastructure
HERO/Incident Management	NHPP	Atlanta incident management
CHAMP	STBG	Statewide incident management
511/Navigator	NHPP	Statewide ATMS software
TRIP	NHPP	Quick major incident clearance
Signals Lump	STBG	
RTOP Annual	Carbon, NHPP, STBG	
ITS Lump	State Funding	ITS Infrastructure Projects
Signal Maintenance	STBG	
Safety Lump	HSIP	Safety projects

Key Takeaways

- Start small
- Managed growth
- Leadership Engagement

THANK YOU

SigOps Powered by GDOT

Victoria Coulter, PE

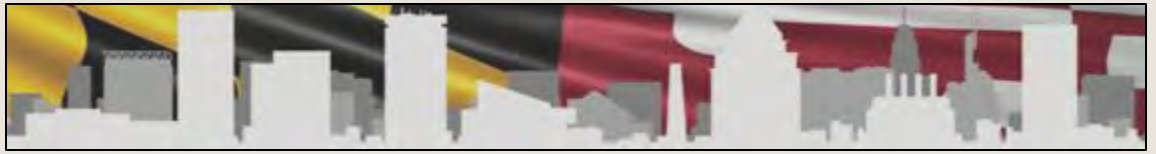
V2X Program Manager

vcoulter@dot.ga.gov

https://www.dot.ga.gov/connectedvehicles

Looking Forward: CAV in Maryland

CAVMARYLAND@MDOT.MARYLAND.GOV



Maryland DOT

STATE HIGHWAY ADMINISTRATION

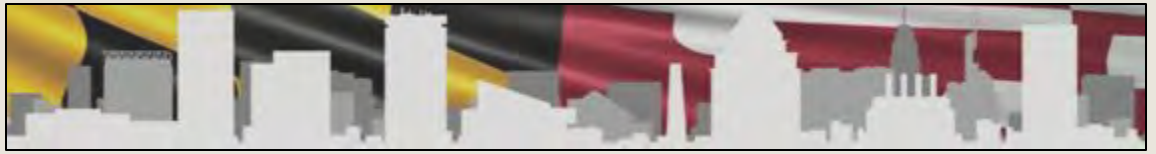
MDOT MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

- US 1 Corridor: Connected Vehicle Intersections – next phase.
- CAV Strategic Plan Update

MARYLAND TRANSPORTATION AUTHORITY

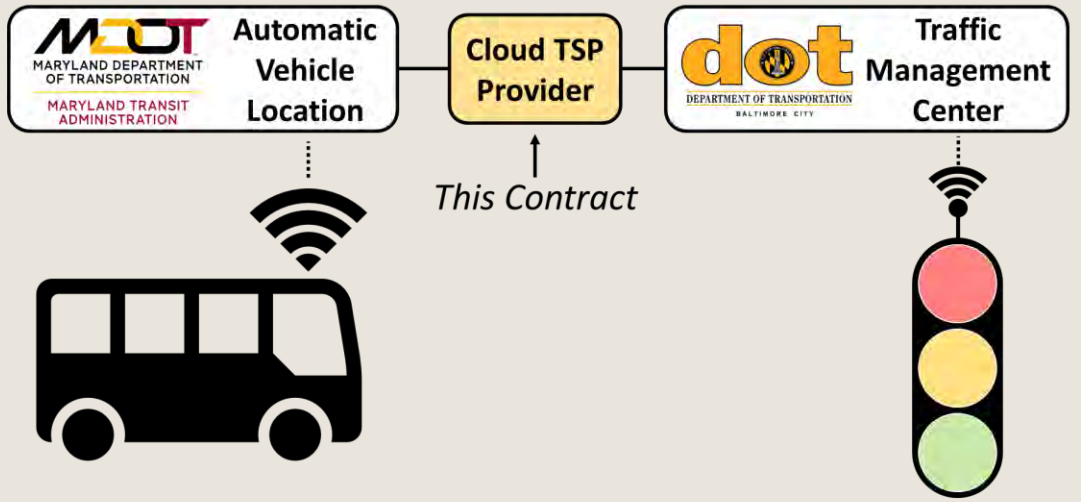
MDTA Maryland Transportation Authority

- Weather (Wind) Alerts
- Cross Jurisdiction Emergency Vehicle Pre-Emption

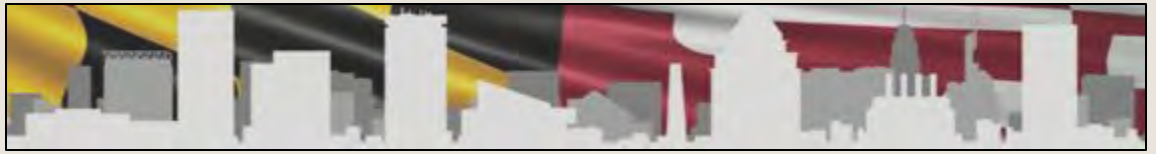


MTA SMART Transit Signal Priority (TSP)

- **Funding:** USDOT SMART grant
- **Scope:** Test Cloud TSP at 90 existing TSP intersections in Baltimore City
- **Anticipated Impacts**
  - Safety and reliability
  - Resiliency
  - Equity and access
  - Climate
  - Partnerships
  - Integration

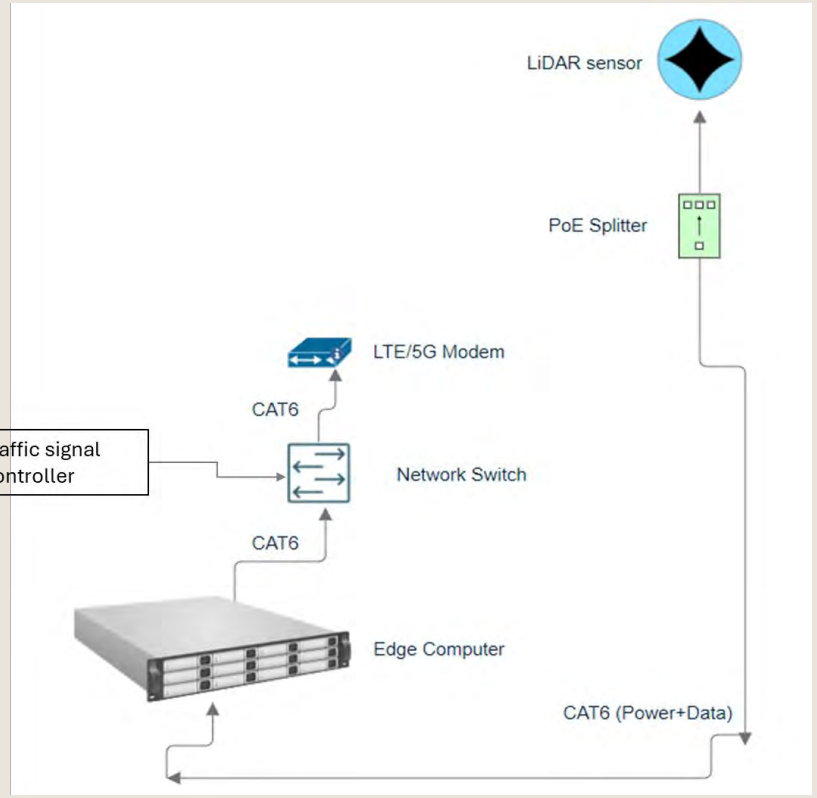


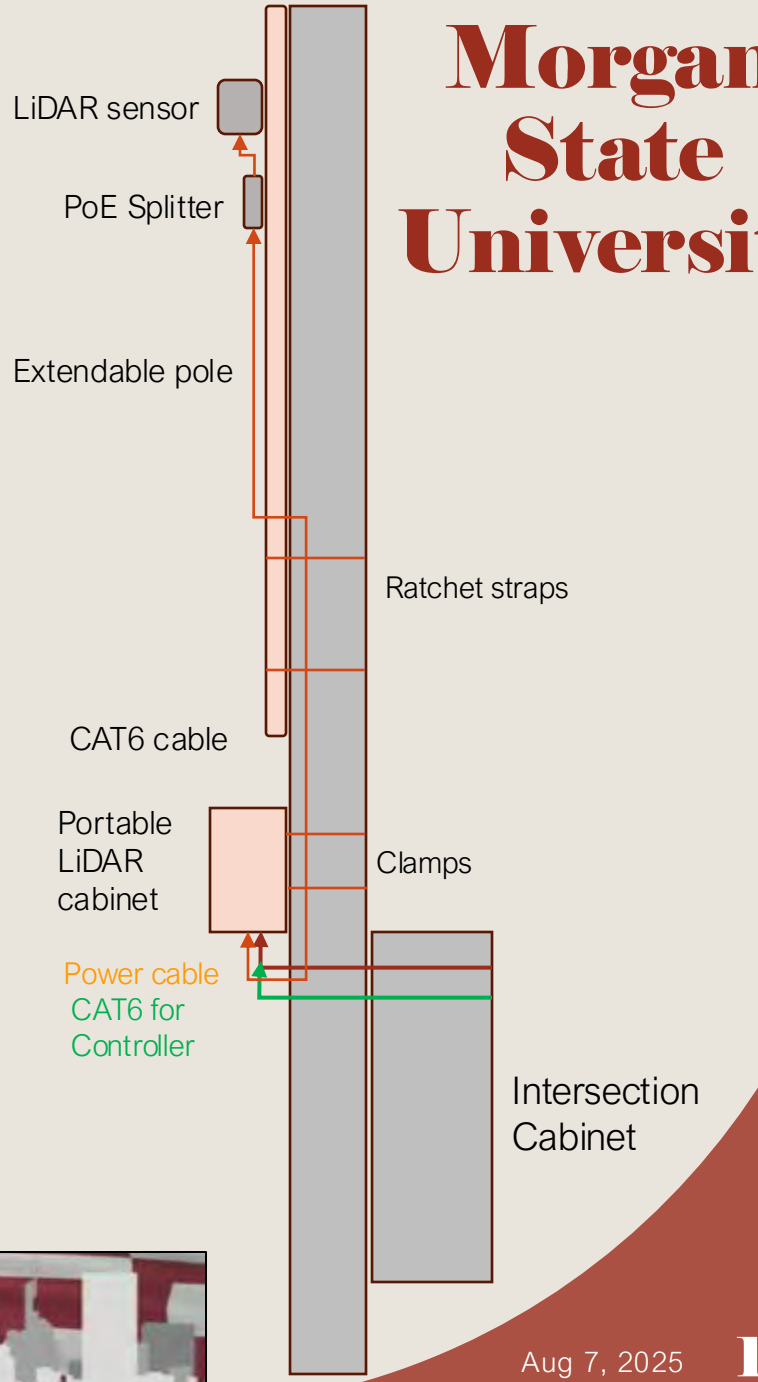
Metric	Target	Tracking Ability
Travel Time Savings	10% reduction	Current
Latency Reduction	No more than 5 sec between reported bus position and TSP activation	Only with Cloud TSP
TSP Requests	At least 50% of buses are requesting TSP	Only with Cloud TSP
Successful TSP Calls	At least 75% of TSP requests are granted	Only with Cloud TSP

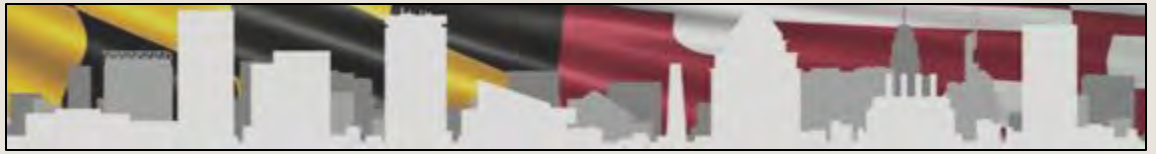


Portable LiDAR

- LiDAR sensor
- Extension pole
- Pole mounted cabinet with cooling fan
- LiDAR Edge computer
- Power supply
- Network Switch
- Cellular modem & antenna
- Power cord and CAT6 cable



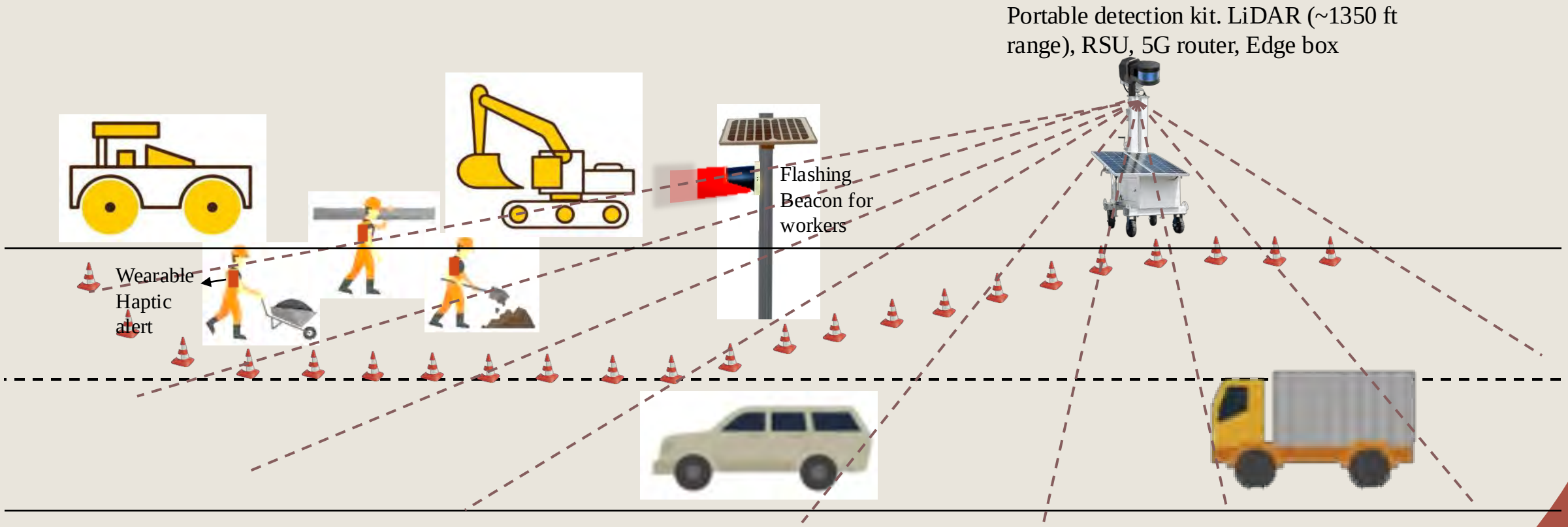




Morgan State University

Workzone Safety Project – Schematic Plan

Morgan State University



Cooperative Perception to Enhance AV-Pedestrian Safety

Research Team

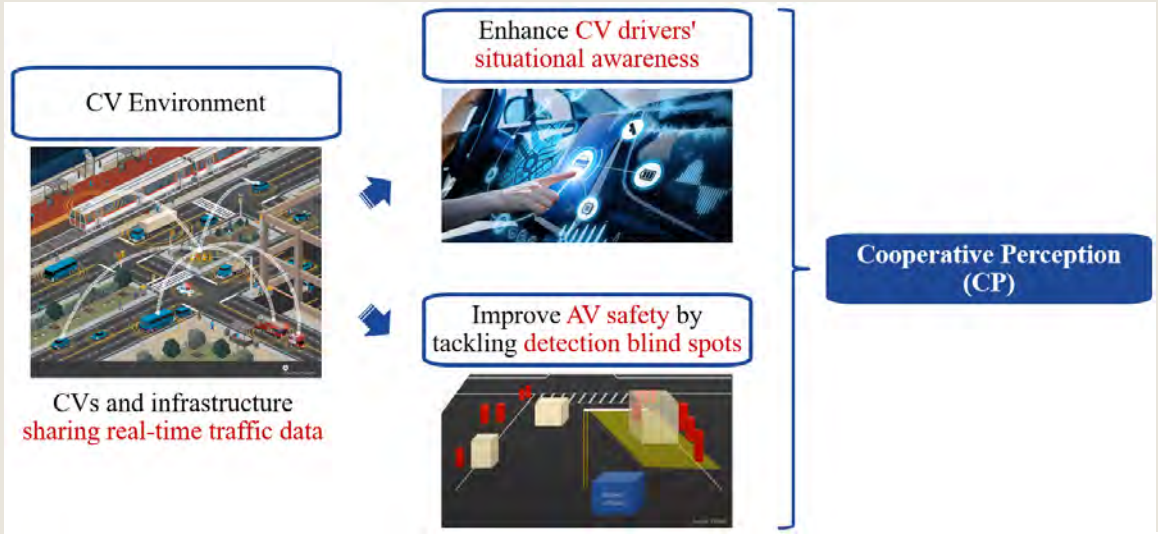
Dr. Di Yang
Assistant Professor
Morgan State University

Dr. Mansoureh Jeihani
Professor
Morgan State University

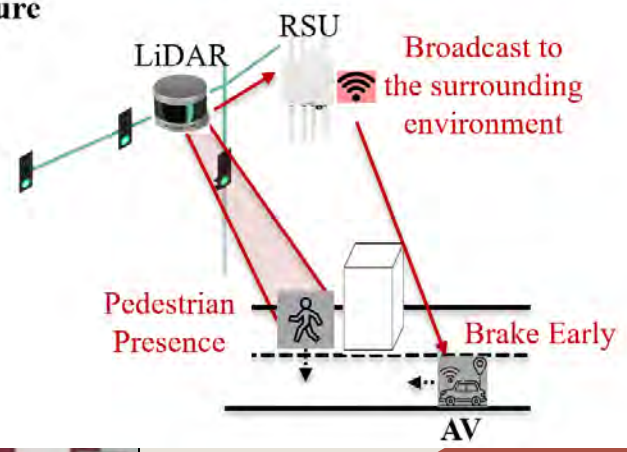
Dr. Xianfeng Yang
Associate Professor
University of Maryland

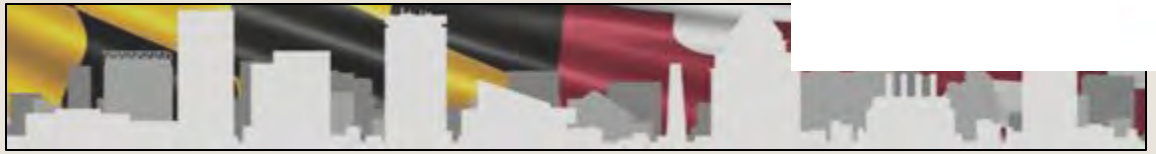
This research is supported by the U.S. DOT SMARTER Regional University Transportation Center.

Cooperative Perception and Research Design



- **Developing a new AV early-braking algorithm to enhance the safety of pedestrians occluded by obstacles**
- **Architecture**

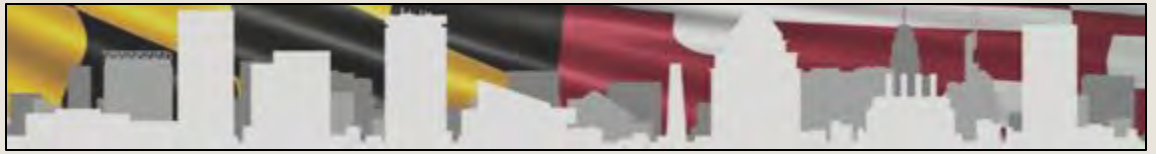


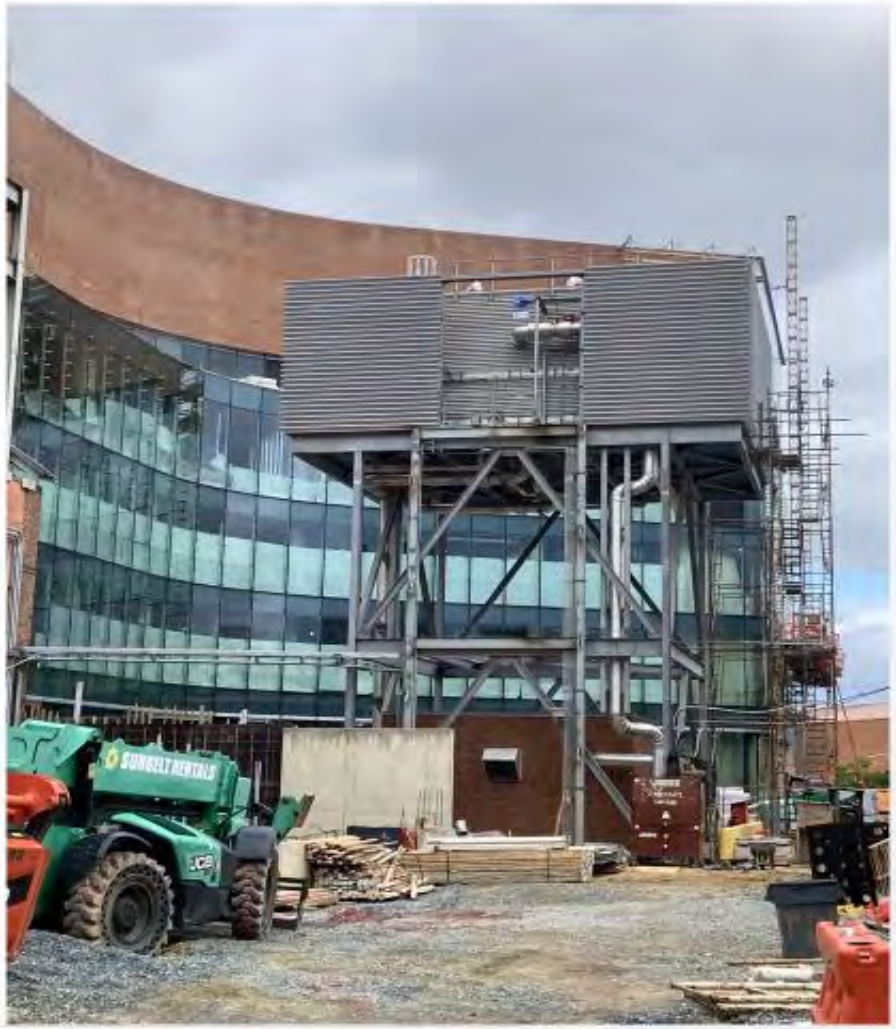


Zupnik Hall / CAV Lab Construction


LOBBY
0193
VESTIBULE
0191
CONNECTED AUTONOMOUS VEHICLE HIGHWAY SYSTEMS LAB
0359


MEETING
LEGACY DISPLAY ROOM
COMP. ROOM
DIR. OFFICE
OFFICE
HUDDLE
HUDDLE
STORAGE
STORAGE
CC
ELECTRIC
IDF
OPEN TO BELOW
FIELD SAMPLE PROCESSING LAB
LOADING
INTELLIGENT INFRASTRUCTURE LABORATORY
OPEN TO BELOW
CONNECTED AUTONOMOUS VEHICLE HIGHWAY SYSTEMS LAB
BIM / VIRTUAL DESIGN LAB
FIRE PUMP
STAIR
LAC
ALL GENDER
MK
EM POWER





Networking Event

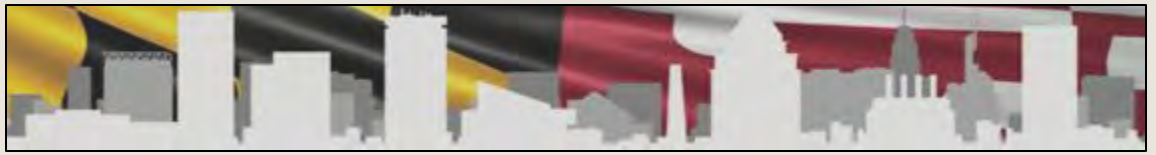
cap★site

invites you to adjourn to R House

at 301 W 29th Street

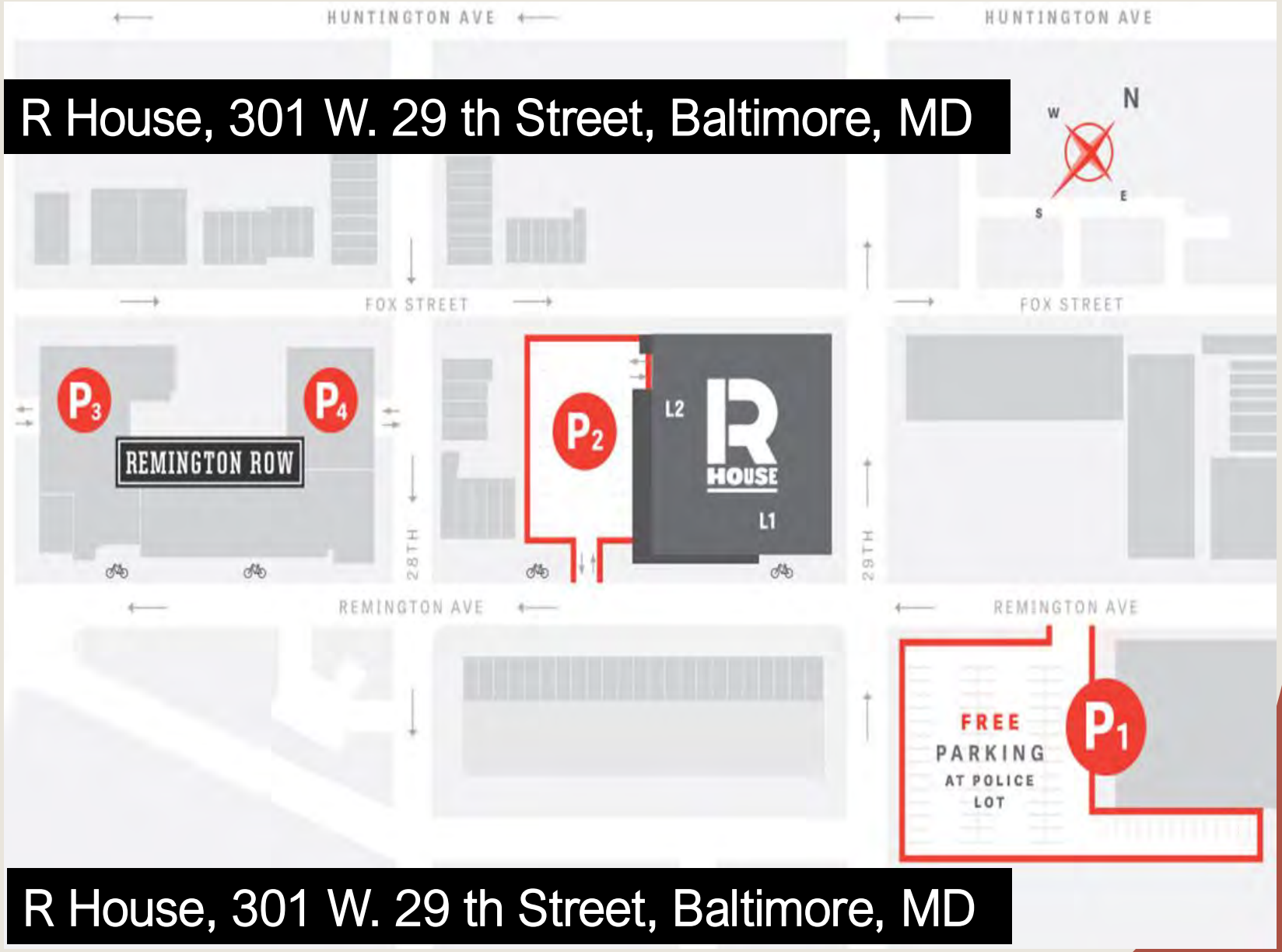
5:30-7:30 PM

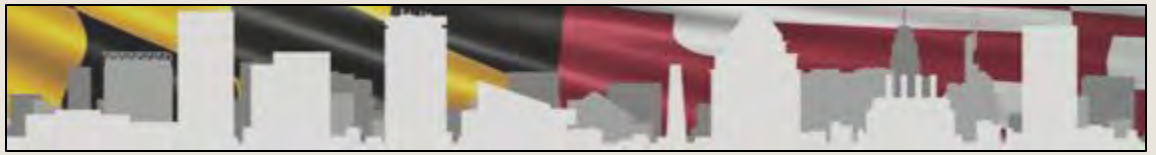
for hors d'oeuvres and conversation.



Networking Event

- 10 - minute walk.
- 5 - minute drive.
- Parking available on site (P2) or at the Adjacent Baltimore City Police lot (P1).
- Please park in visitor spaces only. Some spaces may be marked for specific users ONLY.





THANK YOU!