How the U.S. Department of Transportation is Addressing Roadway Safety through Vehicle-to-Everything Technology and Artificial Intelligence

presented by:
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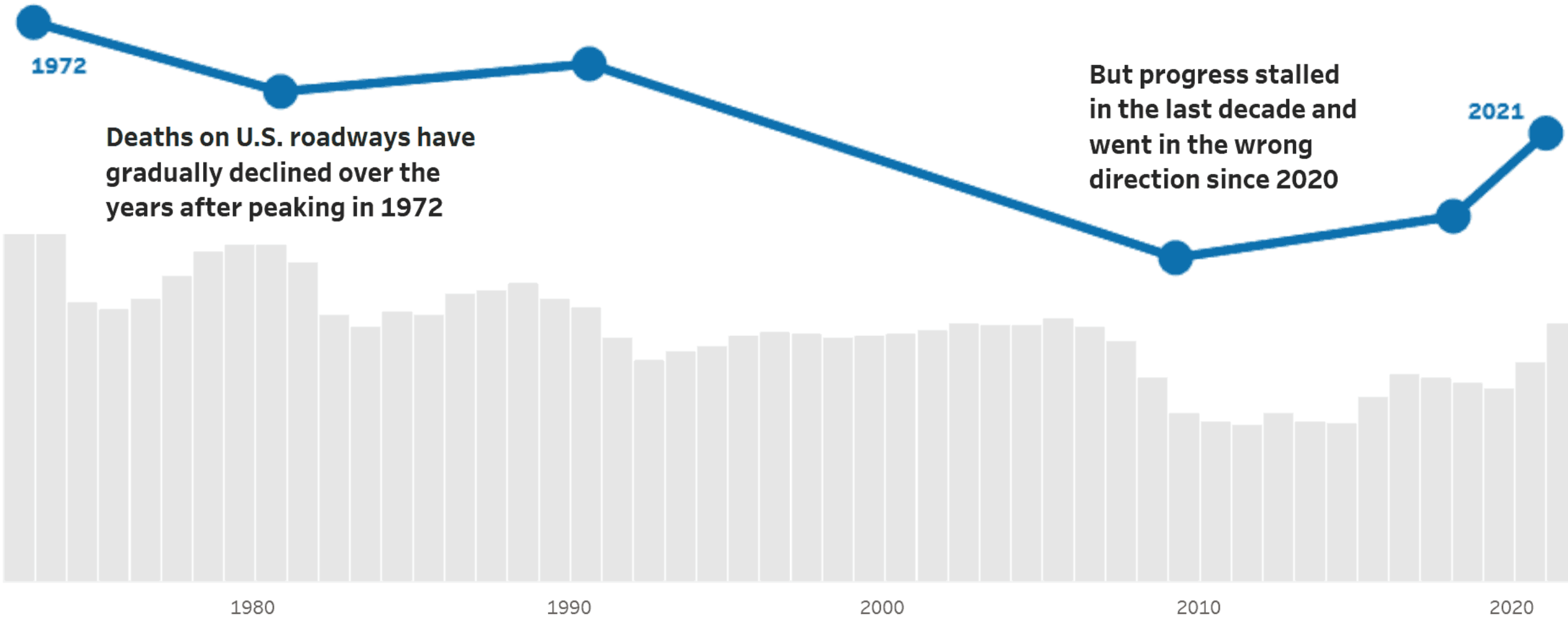
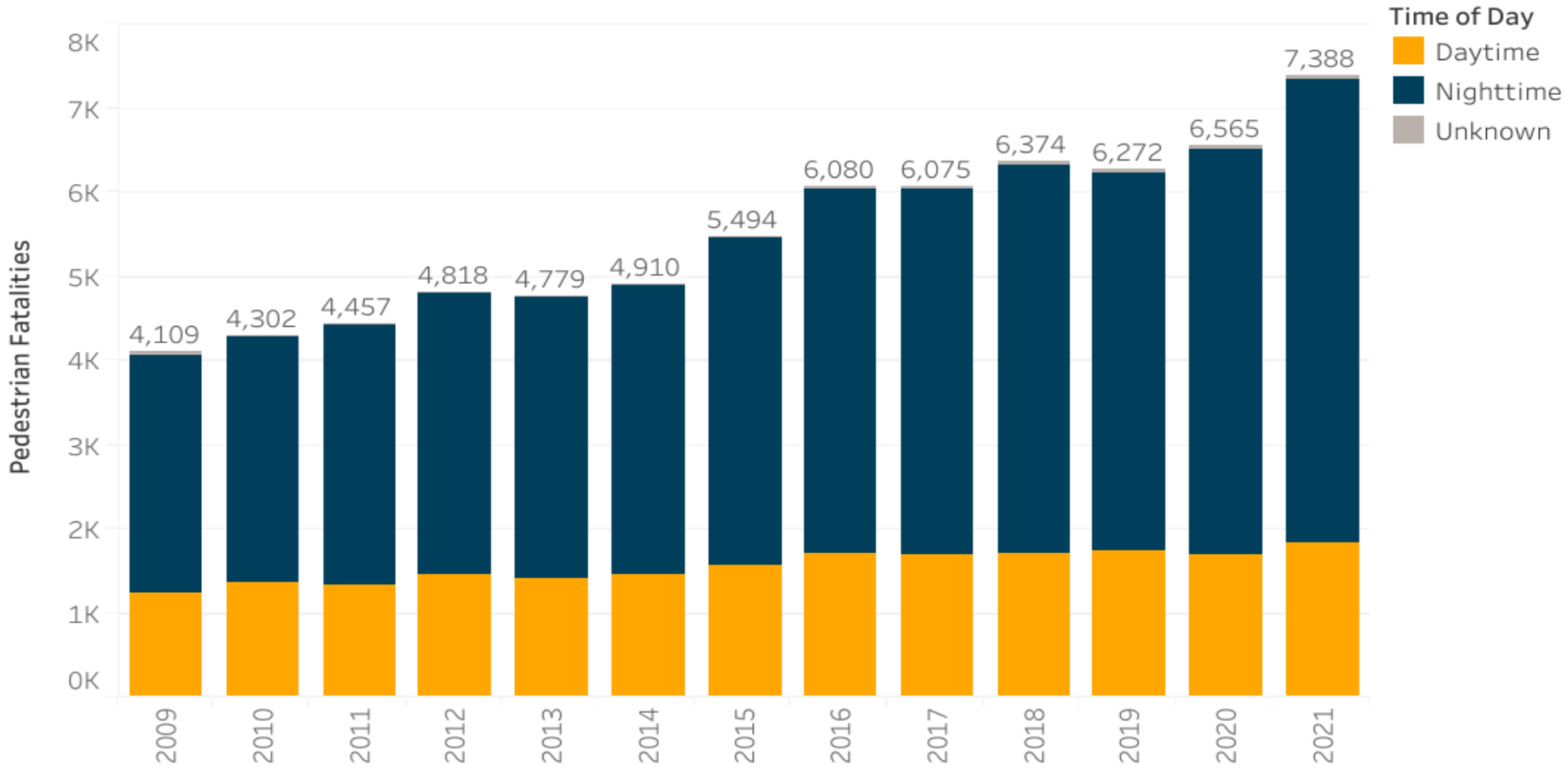
U.S. Department of Transportation
Intelligent Transportation Systems Joint Program Office

A National Problem



U.S. Vulnerable Road User Crashes Increasing



(Source: NHTSA Fatality Analysis Reporting System (FARS))

Intelligent Transportation Systems and the USDOT Safe System Approach

ITS and Safe Road Users

- Bike & Pedestrian Safety Systems

ITS and Post-Crash Care

- Traffic Incident Management (TIM)
- Emergency Vehicle Preemption
- UAS for Crash Reconstruction

ITS and Safe Vehicles

- Connected Vehicles (CV)
- Advanced Driver Assistance Systems (ADAS)
- Automated Vehicles (AV)

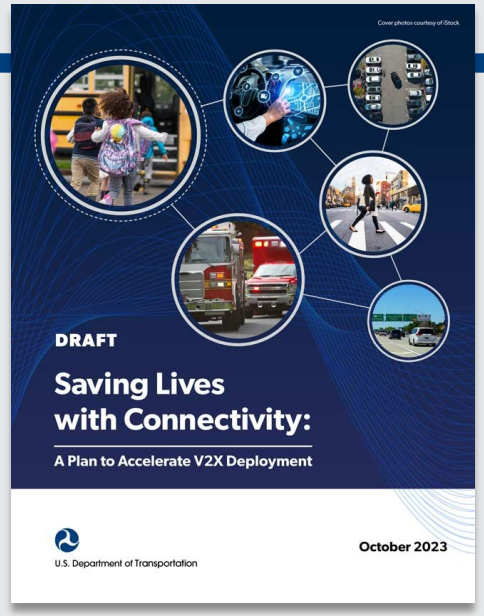
ITS and Safe Roads

- Active Traffic Management (ATM)
- Smart Work Zone Technologies
- Intersection Collision Warning Systems
- Road Weather Warning Systems

ITS and Safe Speeds

- Speed Safety Cameras
- Variable Speed Limits
- Automated Work Zone Speed Enforcement

V2X Deployment



DRAFT: Saving Lives with Connectivity: A Plan to Accelerate V2X Deployment

Collected feedback through January 31, 2024

Saving Lives with Connectivity: Accelerating Vehicle-to-Everything (V2X) Deployment Notice of Funding Opportunity

Closed January 17, 2024

Reactions to the Draft Plan – Common Themes

What do you like about the draft Plan?

- Timeline and targets are measurable and attainable/reasonable
- Plan recognizes that 5.9 GHz is crucial, but also recognizes multi-spectrum approaches will be needed

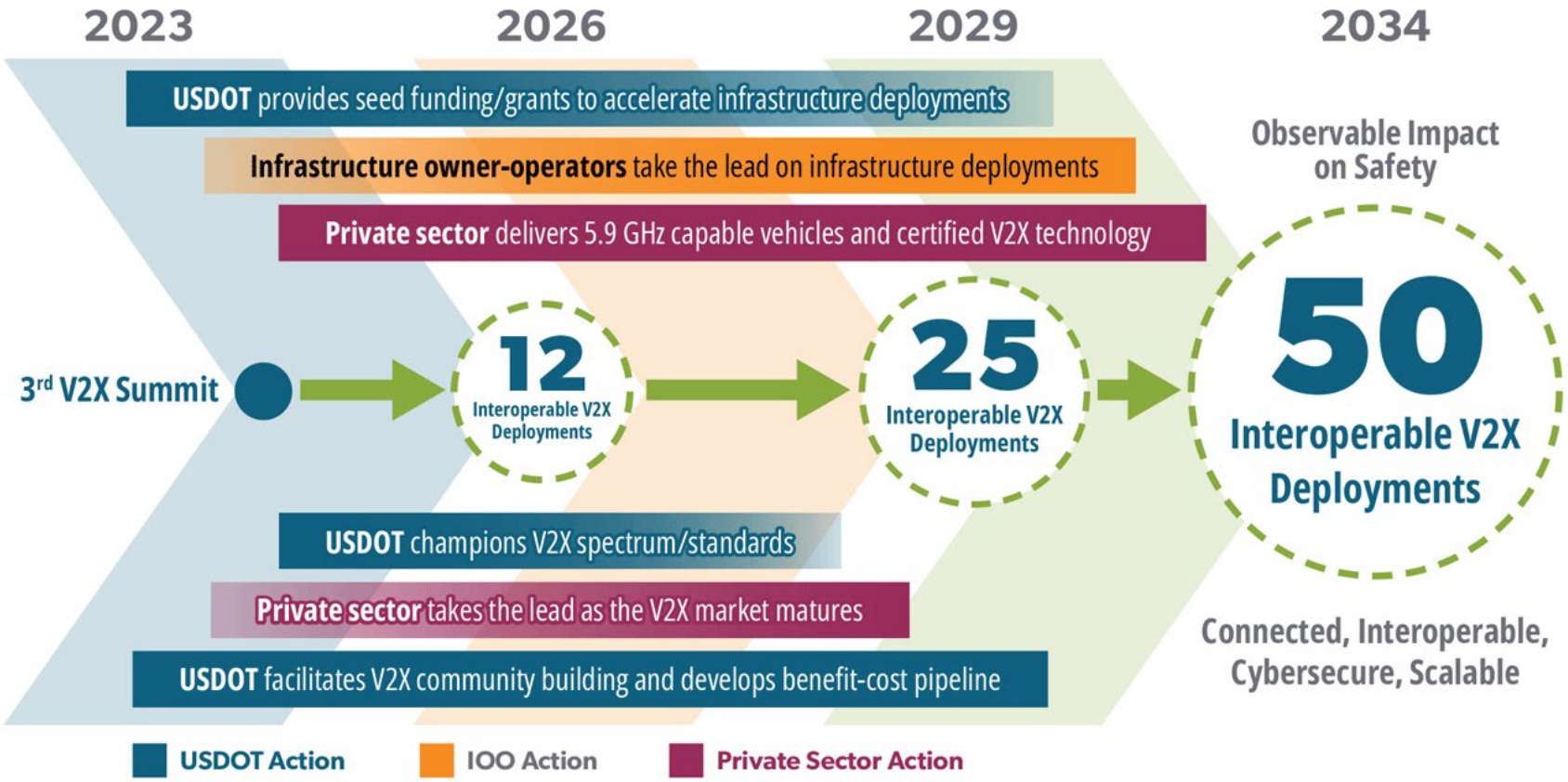
What resources do you feel are needed to help deploy V2X technologies at scale?

- Need consistent funding over time, and mechanisms to access this funding
- Clear rule-making to reduce uncertainty

What is missing in the draft Plan -- or what would you change?

- Needs more focus how aftermarket suppliers and OEMs engage and are incentivized to participate
- Would prefer to see a more “complete” federal plan with united front

Accelerating V2X Deployment is a Crucial Step Toward Saving Lives with Connectivity

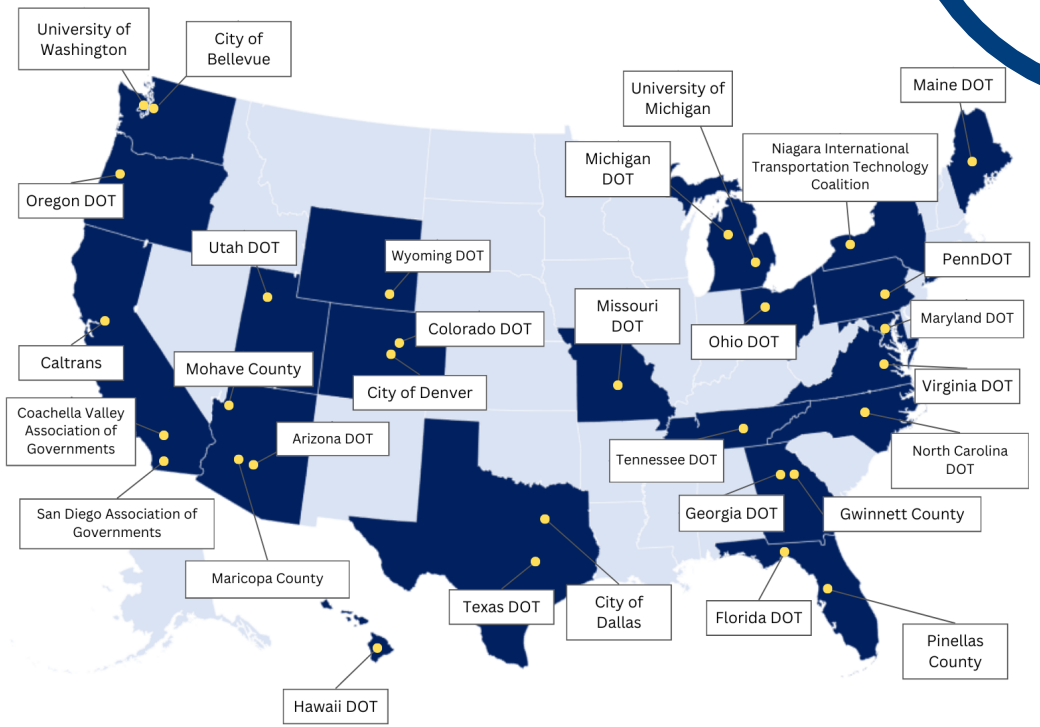


V2X Community Stakeholder Groups

Accelerating V2X Cohort

ITS PROFESSIONAL CAPACITY BUILDING

- 30+ active deployer local and state agencies.
- Collaborating to accelerate the adoption and deployment of interoperable V2X technologies.
- Sharing their experiences, challenges, best practices, and documentation.
- Addressing technical implementation questions among cohort members.

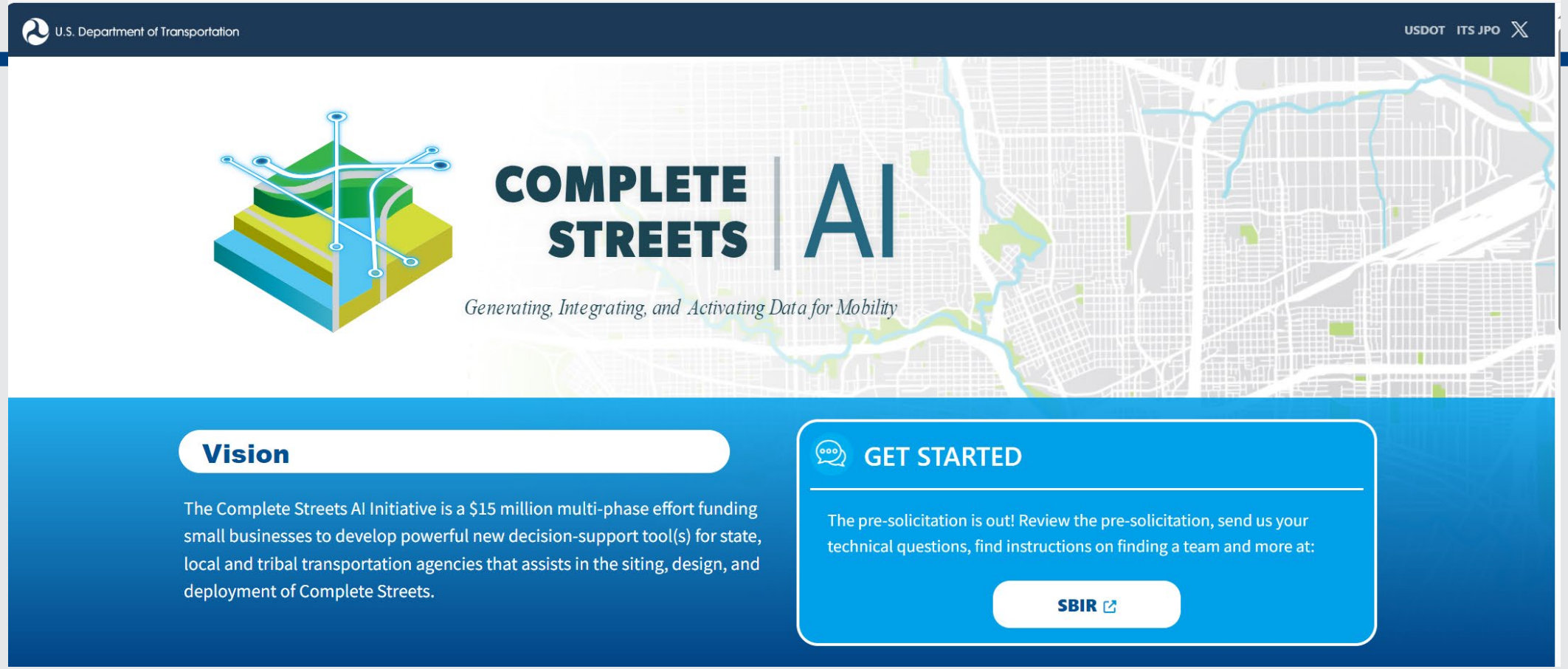


Source: USDOT

The Artificial Intelligence (AI) Executive Order advances an urgent and coordinated, Federal Government-wide approach to development and use of safe, secure, and trustworthy AI

Safe, Secure, Trustworthy

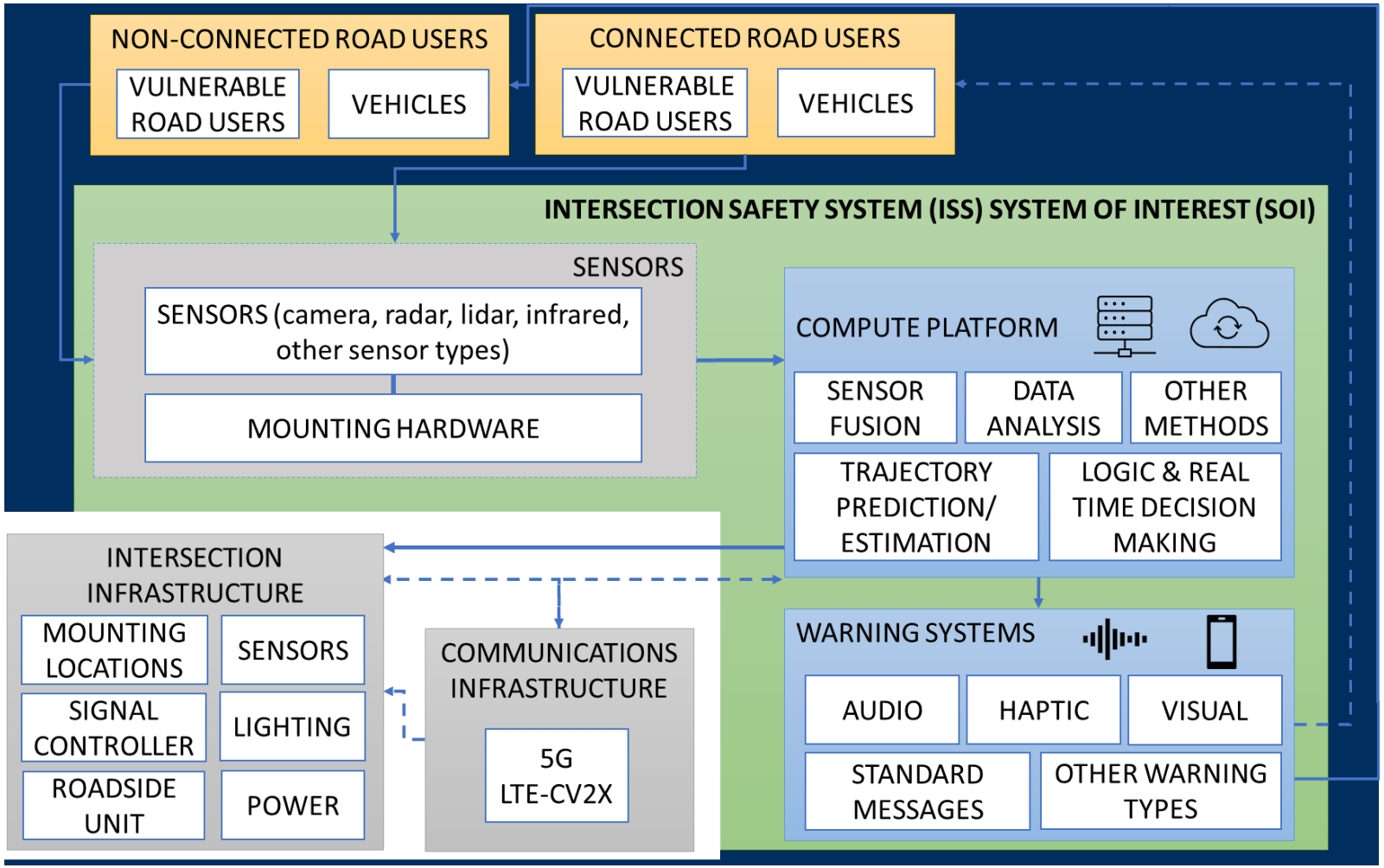
AI and Complete Streets



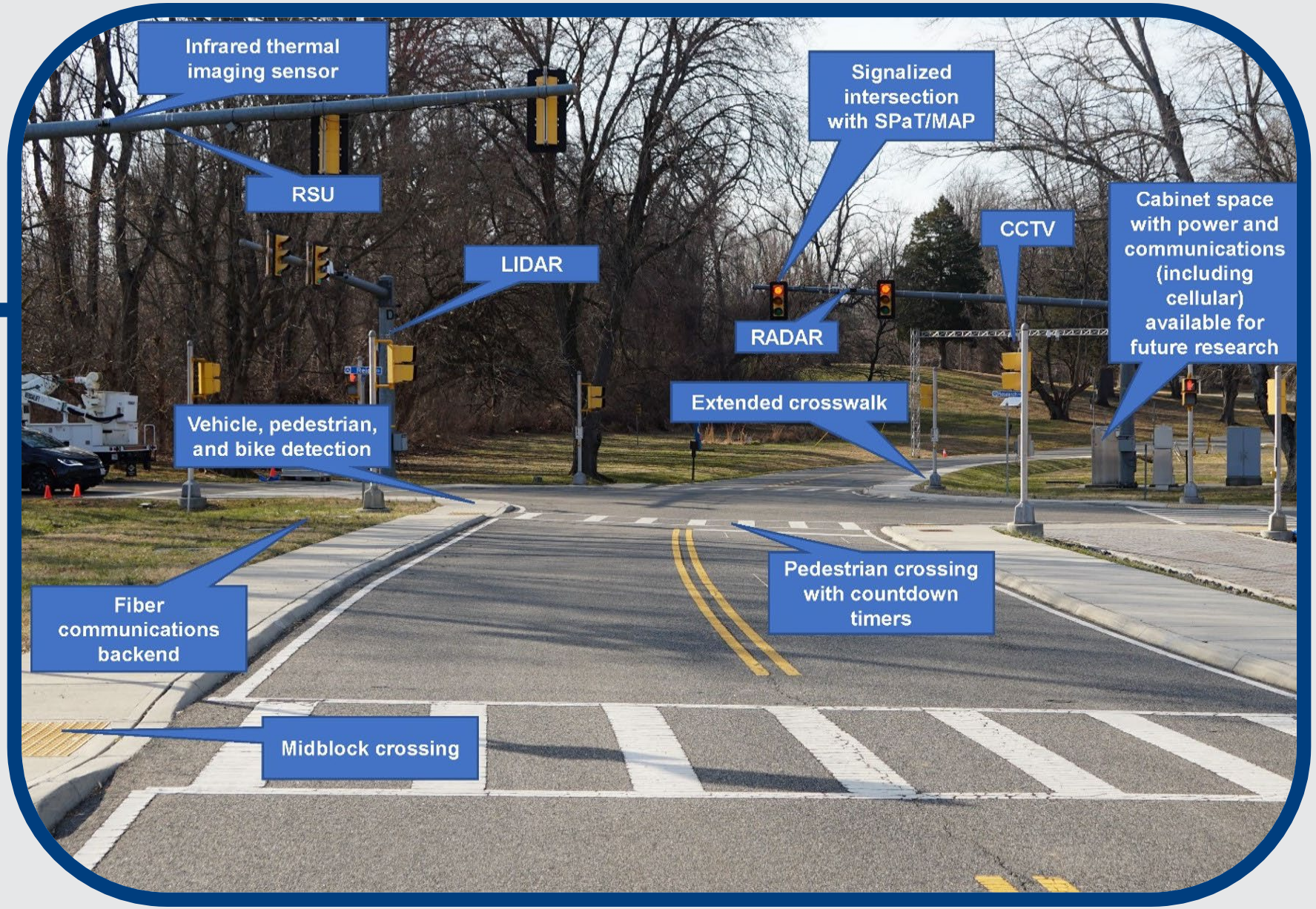
Video Credit: Federal Highway Administration

Intersection Safety System

Legend:
Required flow
Optional flow

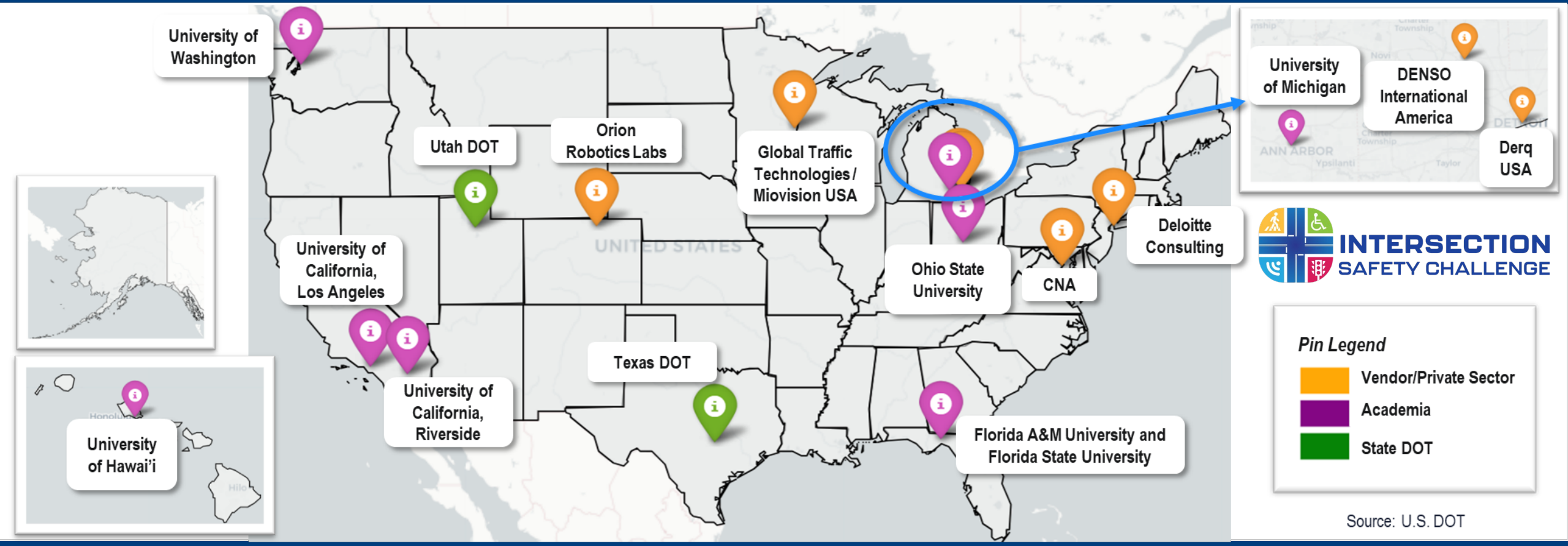


Sensor Fusion



Intersection Safety Challenge Stage 1A Winners*

** Names represent Concept Paper submission Lead Entities that may be part of a larger team*



Programs Coordination – Key Themes

- To develop overarching strategic directions
- To expedite the V2X deployment, especially on the infrastructure side
- To conduct testing needed to answer V2X wireless communications related questions

- (Getting ready) To answer “So What?” questions
- To develop, test out, and demonstration selected use cases
- To coordinate with supporting areas (analysis, modeling and simulation, standards & architecture, etc.)

Program Mission

Address cross-modal research needs affecting vehicle automation systems and supporting areas through:

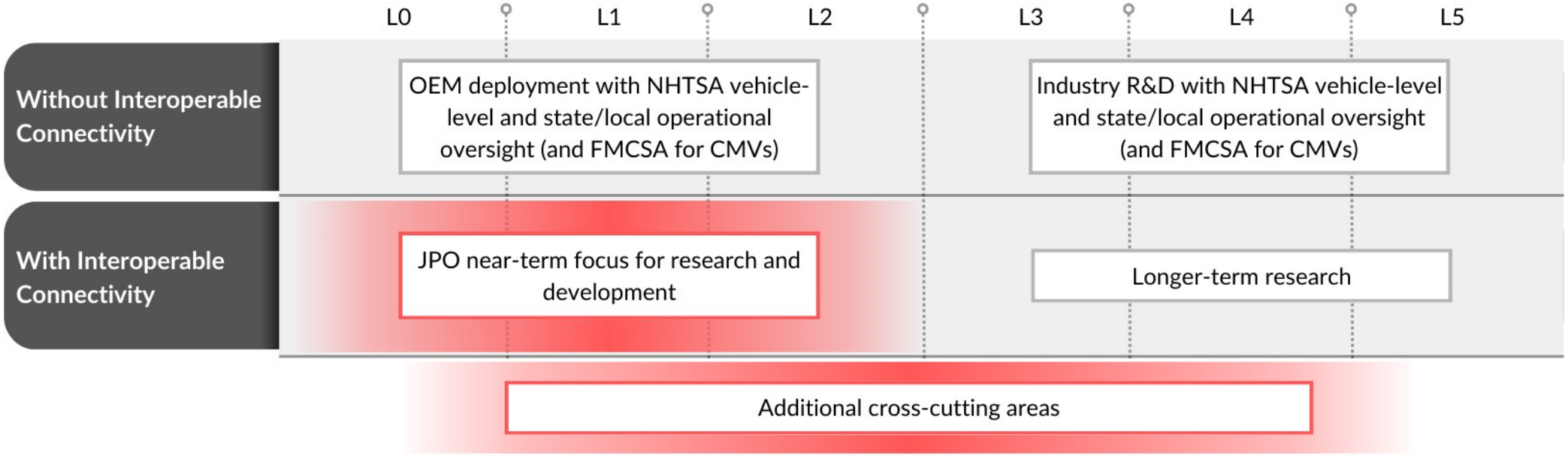
Identifying interoperable standards and information needed by the private and public sector for **cooperative driving automation.**

Conducting **human factors** studies to understand and realize safe and effective automation for all users.

Pursuing standards-based **digital infrastructure** platforms to support interoperable automation connectivity.

Automation Program Scope

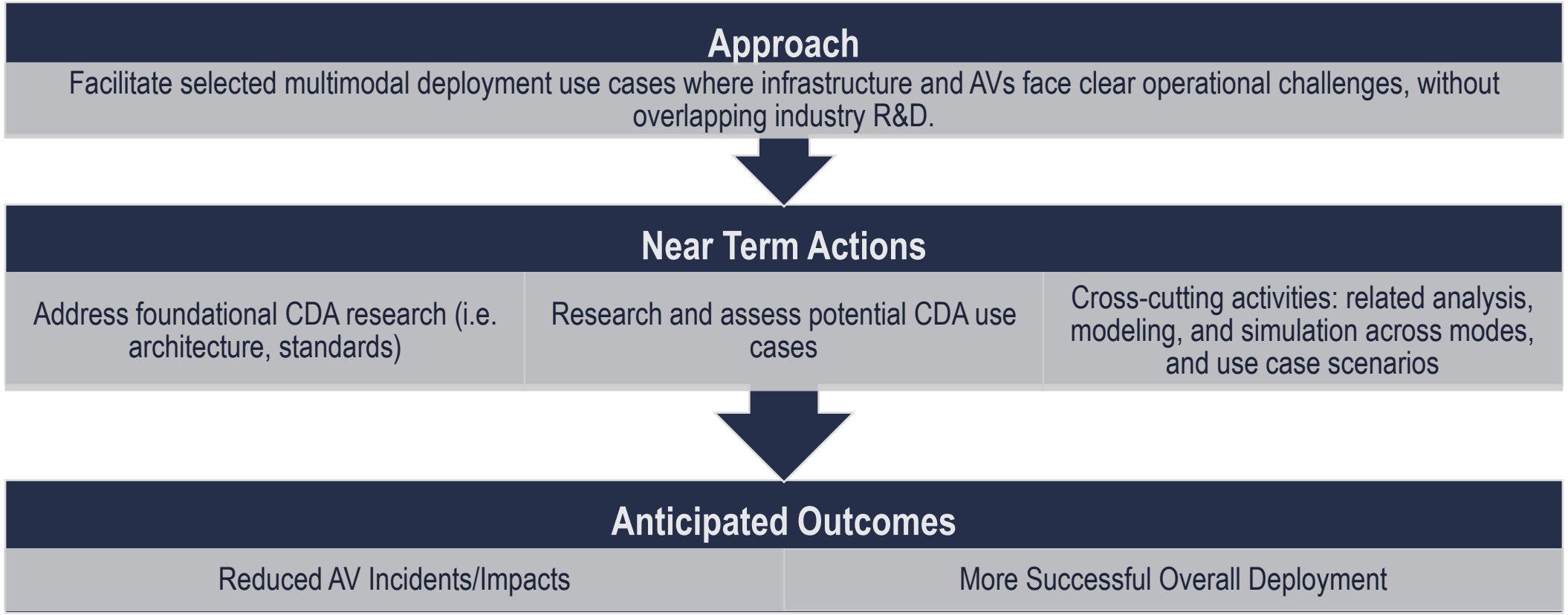
Cover vehicle and infrastructure automation technologies at all automation levels (*SAE International J3016 Level 0 to 5*) with and without interoperable connectivity. Likely greater involvement in certain areas, in the near term.



Automation Program Research Schedule

PROGRAM TRACK	SUBTRACK	FY23 - FY24	FY25	FY26	FY27	FY28
Program Management and Communications		Program Plan Management, Communications, Oversight, and Impact Assessment △Program Plan & Roadmap	△Annual Updates	△Annual Updates	△Annual Updates	△Annual Updates
Cooperative Driving Automation (CDA)	Foundation	Concept, Design & Prototype Planning	Standards Development and Updates		Prototypes and Accelerator Evaluation	
	Use Cases	CDA Research on Use Cases		CDA Field Demonstrations		
	Supporting Activities	Benefit Estimation and Other Supporting Activities				
Human Factors	Understanding Technology	Understanding Use of Vehicle Automation Technology in the Roadway Environment				
	Driver Engagement	Driver Attentional Engagement with Automation (L0-L2)				
	Interface Design	Automation Interface Design and Assessment				
	Interactions with All Users	Automation Interactions with All Users in the Roadway Environment				
Digital Infrastructure	Plan and Management	Plan Development and Management				
	Digital Infrastructure Development	Architecture, Specifications, Standards, Integrated Management Systems & Prototypical Deployment Designs			Digital Infrastructure Implementation	
	Communications	Stakeholder Engagement and Community				
Cross-Cutting Activities		Data				
		Standards & Architecture				
		Professional Capacity Building (PCB)				

Program Focus Area - Cooperative Driving Automation (CDA)



Program Focus Area – Humans Factors

Approach

Build understanding of safety-related human factors issues at all AV levels including interactions in varying environments (multimodal, freight, urban mix, etc.).

Near Term Actions

Research understanding, trust, and use of all automation levels.	Assess attentional engagement at lower automation levels.	Examine current and emerging human interfaces to automation systems.	Research design and operations of automation with all external road users.

Anticipated Outcomes

Enhanced Safety In and Around AV Deployments	Reduced Problem Interactions

Program Focus Area – Digital Infrastructure

Approach

Support infrastructure owner operators (IOO)s in nationally consistent foundational digital information standards.

Near Term Actions

Develop strategies and partnerships.	Address near-term deployment prospects.	Research associated costs and benefits.

Anticipated Outcomes

Validated deployment scenario assumptions.	Accelerated deployment.

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Source: USDOT

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