Cooperative Automated Transportation (CAT) Coalition

Peer Exchange & Outreach Working Group

Webinar

Friday Aug 02, 2019

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Webinar Agenda (all times in Eastern)

2:00 Welcome & Agenda Recap

2:05 National Strategy for Highway Automation

2:20 CAT Coalition Work Plan

2:35 MaaS and MOD Relationship to CAT

2:50 IOO Guiding Principles for Connected Infrastructure supporting CAT

2:55 Call for "Highlighted Deployment" Topics for the Next Webinar

Next webinar topic area intro and solicitation of interest

3:00 Close

Next Webinar Discussion

National Strategy for Highway Automation Overview

Overview of the National Strategy Concept

Scott Marler, Iowa DOT

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DRIVE
INNOVATION

A Vision for Highway Automation

Scott C. Marler
Iowa Department of Transportation

AGENDA

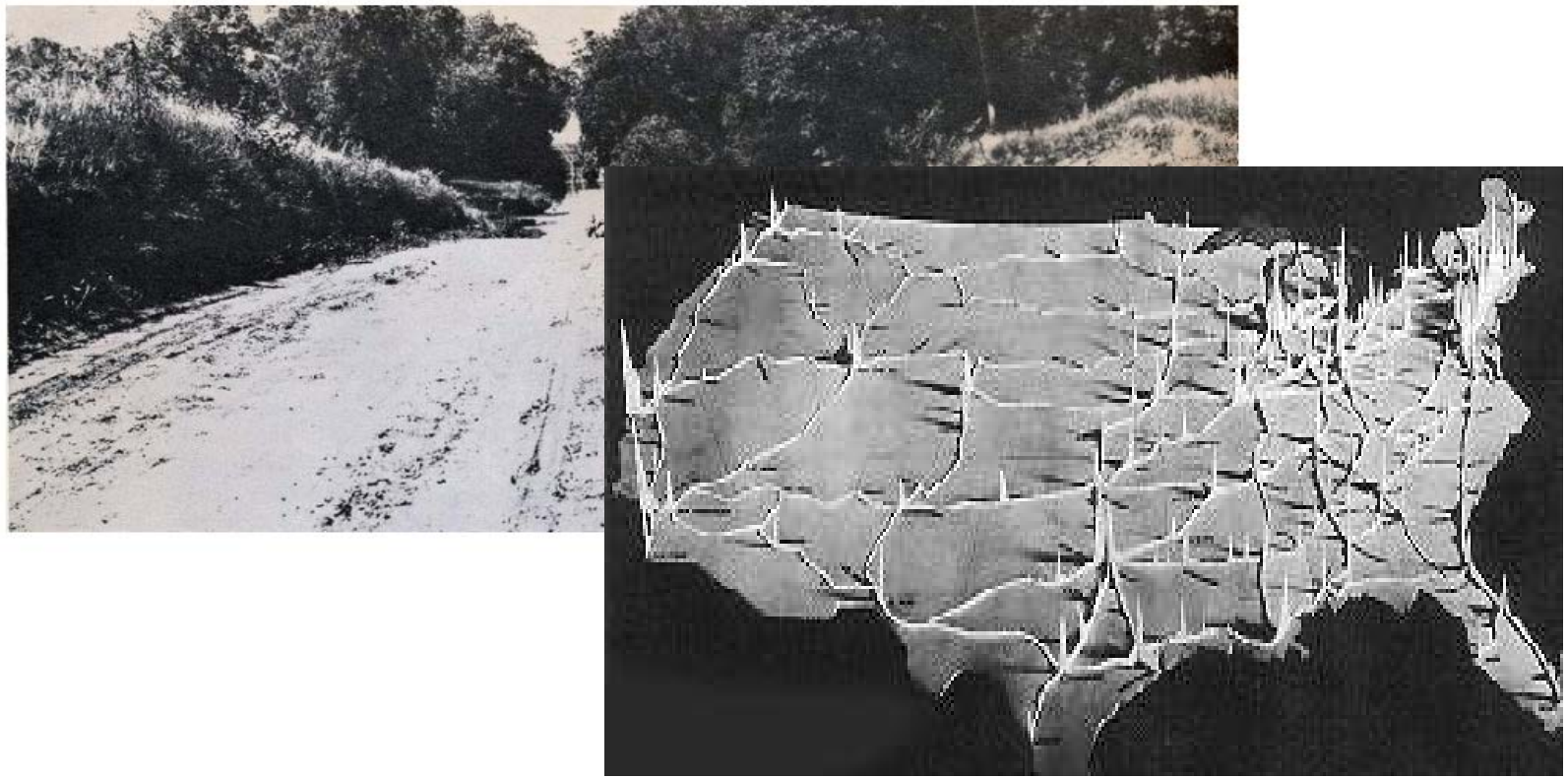
1. Background and Context

2. National Vision and Strategy

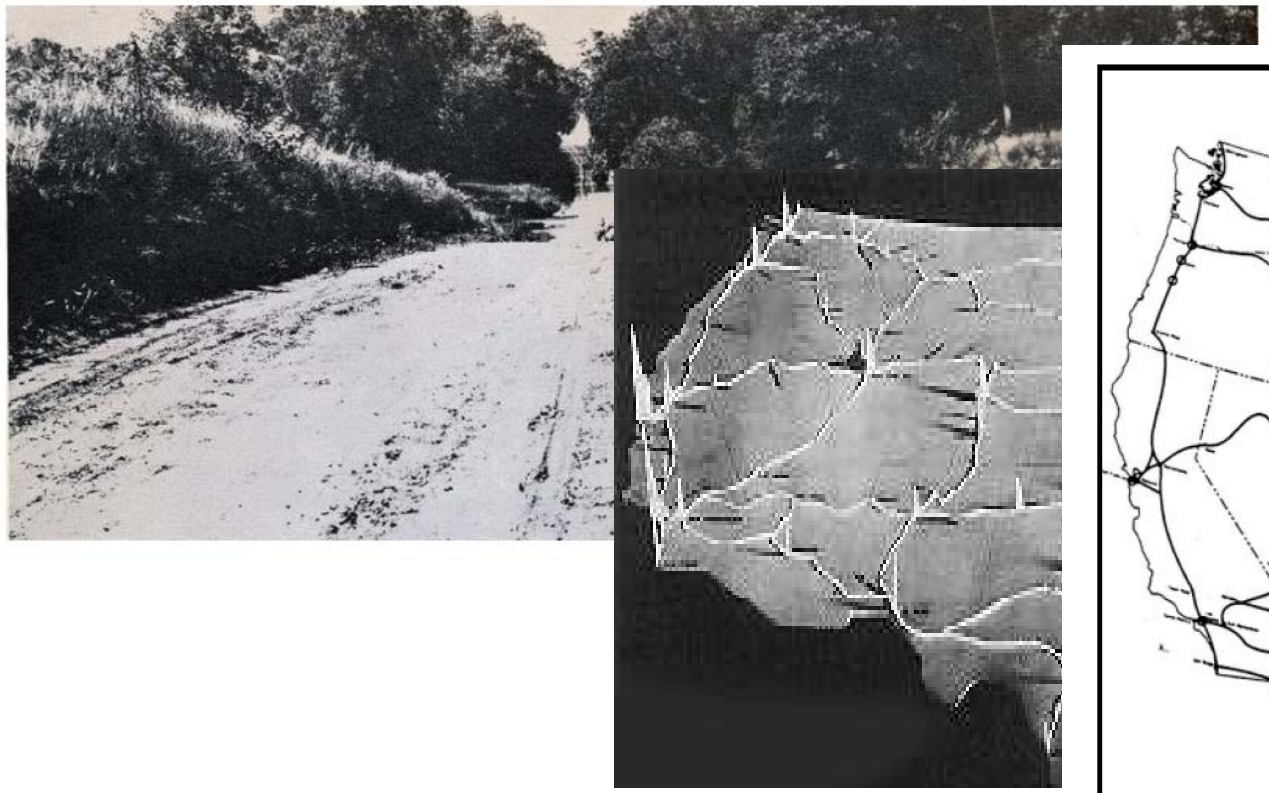
3. Next Steps

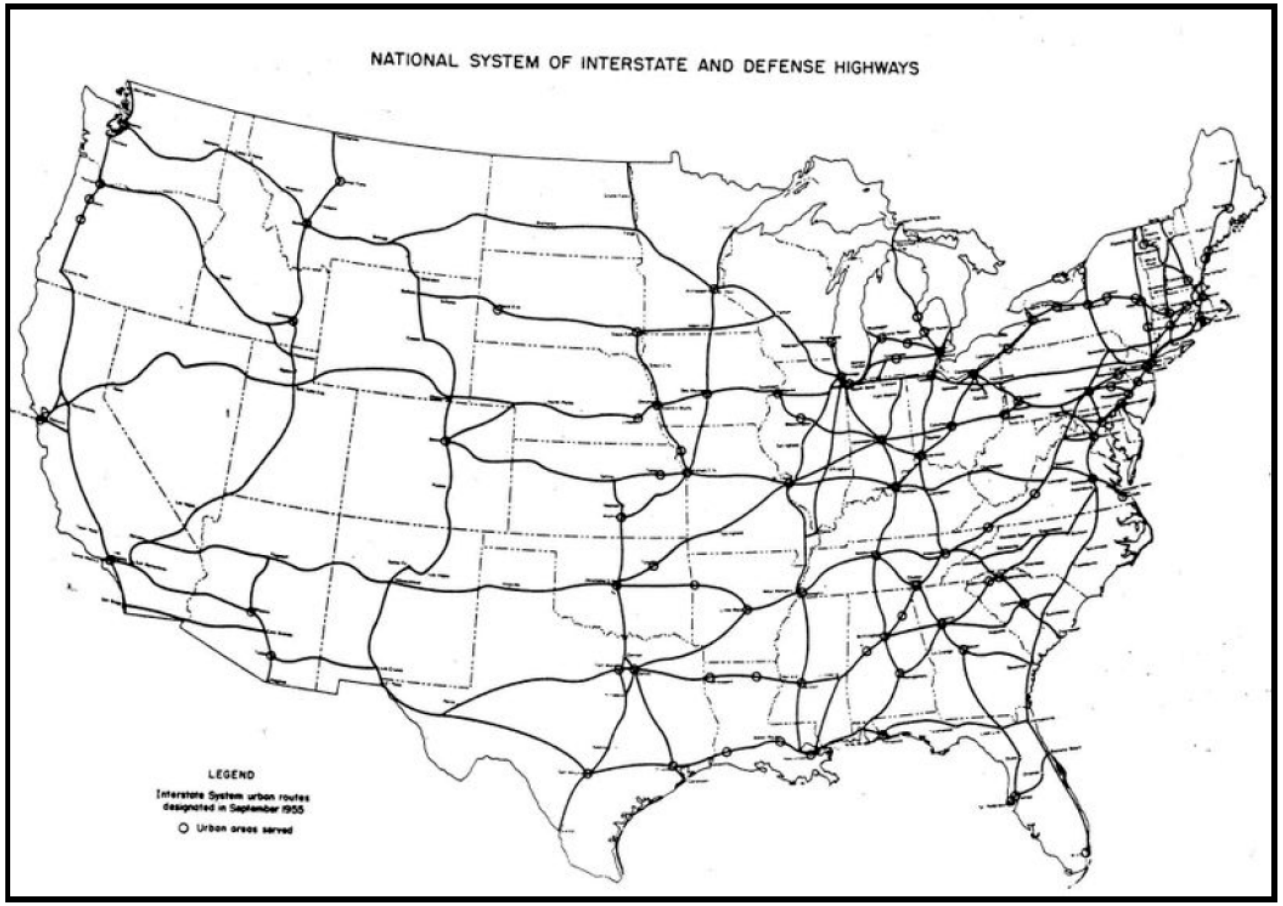
A VISION FOR HIGHWAY AUTOMATION

A VISION FOR HIGHWAY AUTOMATION



A VISION FOR HIGHWAY AUTOMATION



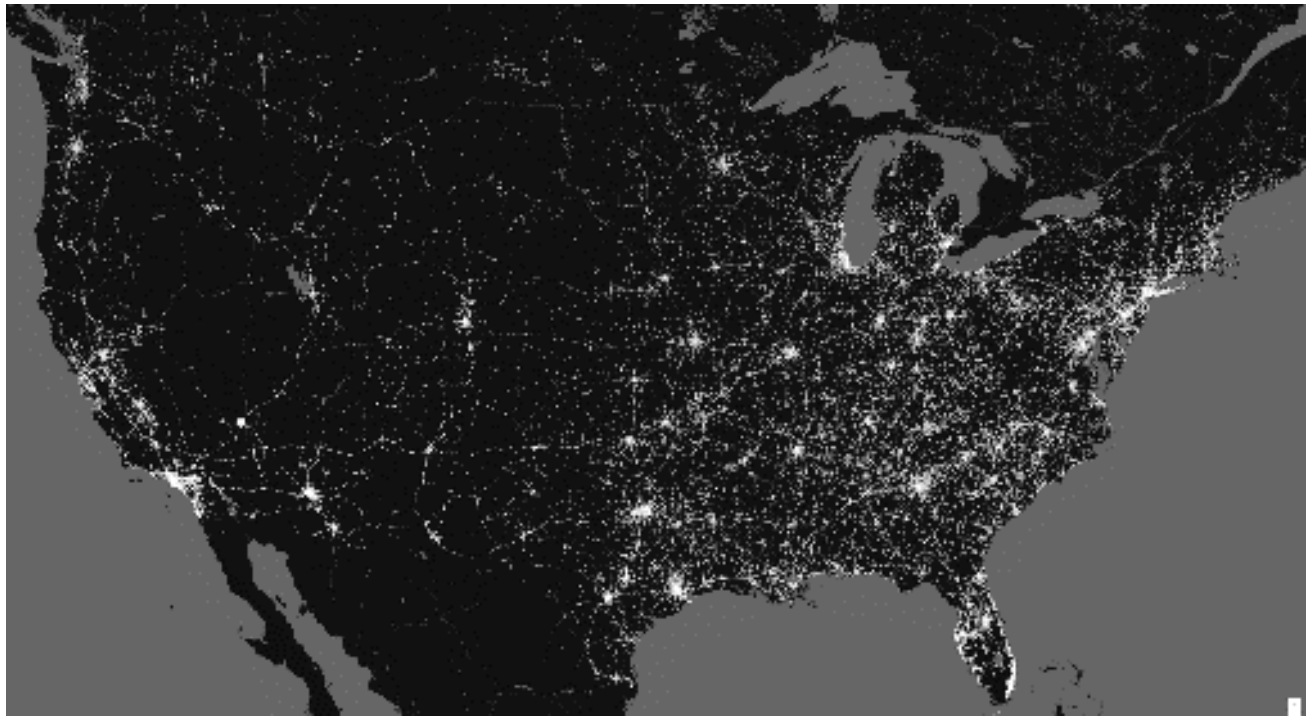


Why Highway Automation?

TRAFFIC CRASHES IMPACT HEALTH AND SAFETY

10 Year Impact (2007-2016)

- 350,409 Traffic Fatalities
- 23 million people injured
- $6 Trillion economic cost of all crashes
- 94% crashes involve human error/choice



FREIGHT MOBILITY DIRECTLY IMPACTS GLOBAL COMPETITIVENESS

➢ **10 Year Impact (2007-2016)**

- 125 billion tons shipped by truck domestically
- $105 trillion of value shipped by truck
- 145 trillion truck miles traveled
- 15 million total trucks
- 2 million tractor trailers, 1.7 million drivers
- Transports 70% of all domestic freight
- Earned $6 trillion in revenue

Average Daily Long-Haul Truck Traffic on the National Highway System: 2045

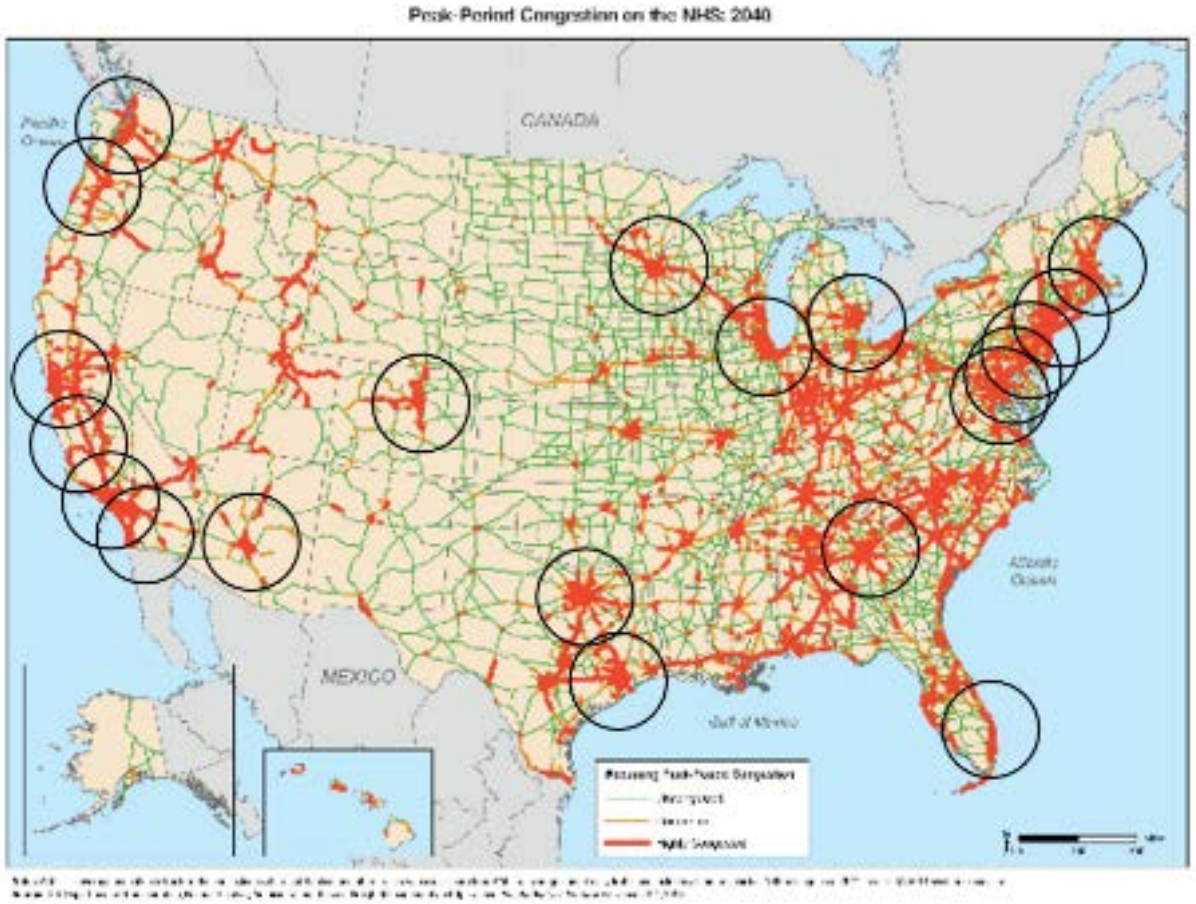
TRAFFIC CONGESTION IMPACTS GLOBAL COMPETITIVENESS

10 Year Impact (2007-2016)

- $2.7 Trillion economic costs
- Over $40 Billion costs to freight shippers

2040 Outlook

- 34% of NHS will be congested, up from 10% in 2011
- Stop and go traffic on an ***additional*** 46,000 miles of NHS



MILITARY MOBILITY IMPACTS NATIONAL SECURITY

National Goals and Strategy

A VISION FOR HIGHWAY AUTOMATION

WILDLY IMPORTANT GOAL

Make a dramatic leap toward zero deaths by deploying a world class roadway system for coast to coast highway automation readiness by 2025

COMPONENTS OF HIGHWAY AUTOMATION READINESS

NATIONAL CONSISTENCY AND INTEROPERABILITY

Physical Infrastructure &

- ✓ Structural Integrity
- ✓ Pavement
- ✓ Bridges
- ✓ Geometrics

Control, Systems Operations,

- ✓ Signing
- ✓ Striping
- ✓ Work Zones
- ✓ Maintenance
- ✓ Winter Ops
- ✓ TIM

Digital Infrastructure and

- ✓ Cybersecurity
- ✓ Digitized physical data
- ✓ V2X
- ✓ Mapping
- ✓ Analytics

State Corridor Operations

- ✓ Digital & functional interoperability

INDUSTRY DUE DILIGENCE

Results from FHWA RFI on Integration of Automated Driving Systems

- Consistent and improved Pavement Markings & Signage
- Automotive-Grade National Information System *(historic, regulatory, real-time, future)*
- Work Zone Conditions
- V2X (V2V, V2I, SPaT, emergency vehicles)
- Cybersecurity
- Pavement Condition
- Roadway Geometry

"Automotive OEMs are hungry to know what is going to be out there on the roadways that they can count on."

NATIONAL STRATEGY: 3 PHASES OF HIGHWAY AUTOMATION

Highway Automation on Full NHS & 100 Metro Networks

Metro Automation Networks

Transcontinental Freight Automation Network

PHASE 1: IMPLEMENT A FREIGHT AUTOMATION NETWORK BY 2023

Objective/Goals

- Deploy Level 3 & 4 freight automation, supported by physical & digital infrastructure improvements, data, and freight specific strategies through cities.
  - 15,000+ miles of NHS
  - Top 30 GDP Cities Connected
  - Lays foundation for Highway Automation for passenger vehicles
- Connect major freight corridors to major metro areas

WHY FREIGHT?

- Supply chain benefits and business case
- Industry adoption
  - Drivers will be critical for the foreseeable future.
- Enhanced driver safety and productivity, travel reliability
- Drivers will become more like airline pilots over the next decade, monitoring systems & the overall operation.

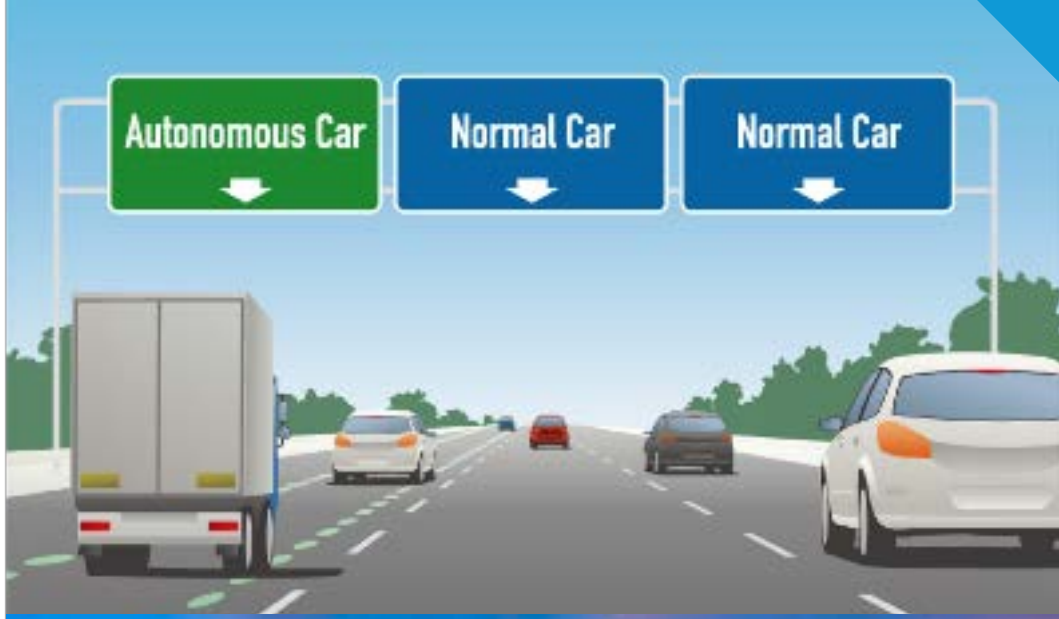
PHASE II: IMPLEMENT AUTOMATED METRO NETWORKS BY 2025

Objective

Connect urban areas to the national freight network to enable first/last mile automation and enable the implementation of a suite of future mobility services in dense urban areas

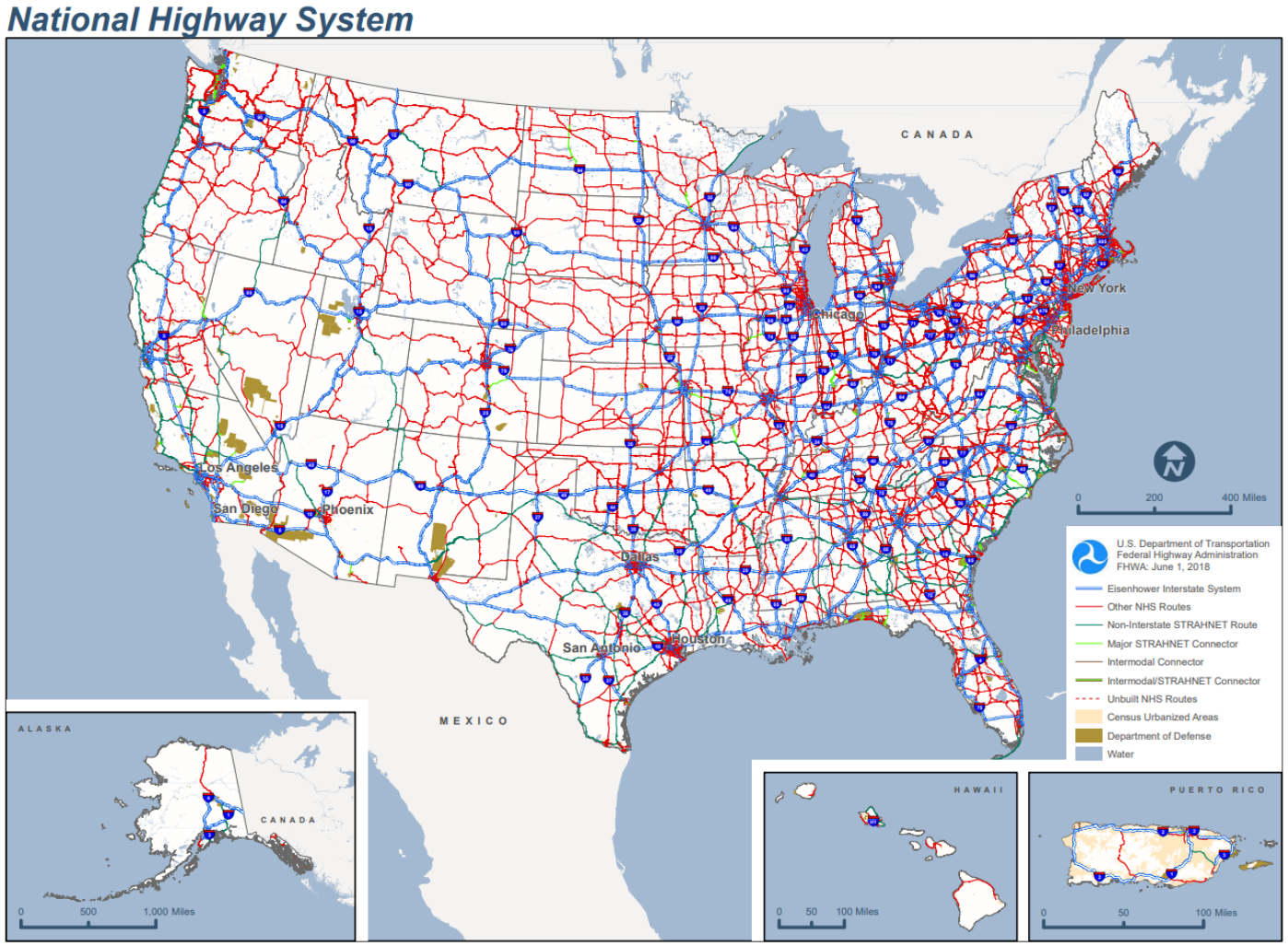
Goals

- Large scale commercial deployment of Level 4 & 5 vehicles in 30 high GDP producing cities
- Deploy new innovations in digital & physical infrastructure, data, electrification, and strategies to support automation
- Consistent standards on NHS and local roads
- Dedicated lane use for AVs and AV only zones
- Integration with Phase I Freight Automation Network



AUTOMATE THE NATIONAL HIGHWAY SYSTEM BY 2030

- Full NHS built out to minimum Highway Automation Standards
- 164,000 Miles of NHS, including 47,000 miles of Interstate
- Local roads in compliance to updated standards for automation
- 100 major Metro Automation Networks deployed using Advanced Automation strategies and AV Only Zones



Next Steps?

ITERATIVE PROGRESS

2030	**Phase III**	*Full Highway Automation on NHS and 100 major Metro deployments*
2025	**Phase II**	*30 major Metro deployments*
2023	**Phase I**	*Highway Automation on 15,000 miles of major freight corridors*
2022	**Demonstration #2: Metro**	*8 major Metro deployments*
2021	**Demonstration #1: Freight**	*Coast to coast highway automation for freight on an Interstate*

DEMONSTRATIONS

- Now - 2022
  - **Perform freight demonstrations first, aligning with the national strategy**
  - Seeking grant funding for a group of states/partners to demonstrate the feasibility of achieving the vision
    - ✓ INFRA Grants
    - ✓ BUILD
    - ✓ Economic Development
    - ✓ Others…

NEXT STEPS

- **Formalize the National Vision and Strategy via AASHTO and other partners**
  - Member states rallying around the concept – Task Force formed
  - Deliverables
    - ✓ National Vision
    - ✓ Business Case
    - ✓ Deployment and Implementation Scenarios

ADVANCING THE NATIONAL STRATEGY

Initial Components

- National Vision
- National Business Case & Goals
- Industry Analysis
- Technical & Policy Analysis
- Phased National Deployment Plan
- Implementation Plan
- Readiness Parameters – Technical, Institutional, & Policy & Regulatory
- Return on Investment Analysis
- Financial Plan
- Communications Plan
- R&D Innovation Roadmap

CAT Coalition Work Plan

Overview of the CAT Coalition and the current work plan

Roger Millar, WS DOT

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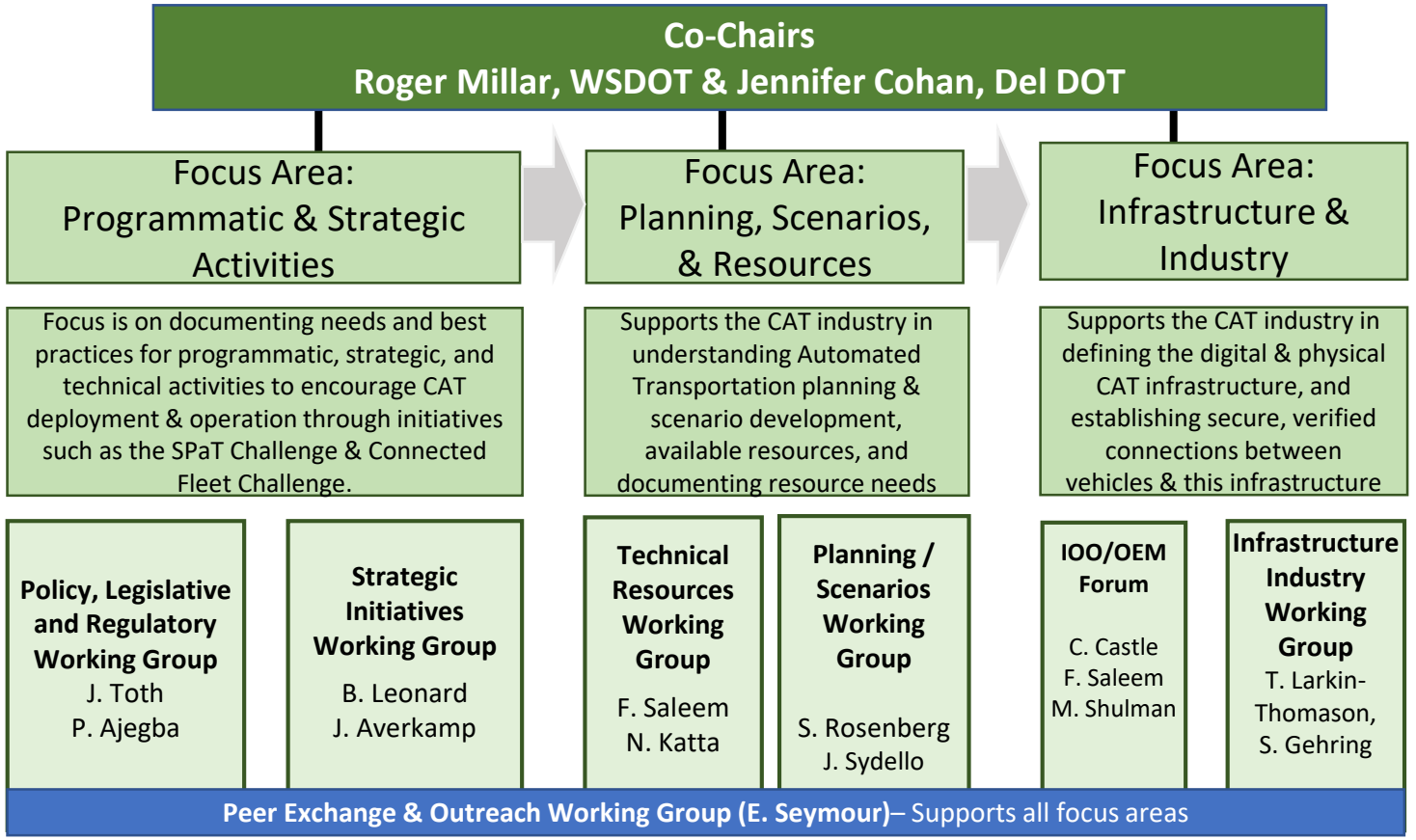
CAT Coalition Status & Work Plan

- New Coalition Co-Chairs
  - Roger Millar, WSDOT
  - Jennifer Cohan, DelDOT
- Coalition is 8 months into Year 2 (Nov 2018 – Nov 2019)
- Current Organization Chart on the Next Slide

Current Org Chart – Aug. 2019



Year 2 Work Plan - General

Summary of the Year 2 Work Plan:

There is a need to evolve the focus from solely V2I deployment details to include higher level topic areas that surfaced in the National Dialogue, that were documented in the AV 3.0 document, and that will be the focus of the National Strategy on Highway Automation developed over the coming years.

Year 2 Work Plan – Coalition Wide
6 Recommendations & Related Focus Areas

#	Recommended Year 2 Work Plan Activities	Infrastructure & Industry	Prog. & Strategic Activities	Planning Scenarios & Research
1	Harmonization with the National Dialogue on Highway Automation:	✓	✓	✓
2	Support early activities of the AASHTO CTSO National Strategy for Highway Automation:			✓
3	Continue to support the ongoing efforts of the SPaT Challenge and the Connected Fleet Challenge		✓	✓
4	Support a dialogue regarding the wireless spectrum for V2V & V2I communications:	✓	✓	✓
5	Support members in understanding and benefitting from USDOT activities and deliverables.	✓	✓	✓
6	Re-examine working group activities and continue key activities.	✓	✓	✓

Note: Peer Exchange and Outreach supports all three Focus Areas

Year 2 Work Plan – Actions for the Peer Exchange & Outreach WG

#	Recommended Year 2 Work Plan Activities	Infrastructure & Industry	Prog. & Strategic Activities	Planning Scenarios & Research
1	Harmonization with the National Dialogue on Highway Automation:	✓	✓	✓
2	Support early activities of the AASHTO CTSO National Strategy for Highway Automation:			✓
3	Continue to support the ongoing efforts of the SPaT Challenge and the Connected Fleet Challenge		✓	✓
4	Support a dialogue regarding the wireless spectrum for V2V & V2I communications:	✓	✓	✓
5	Support members in understanding and benefitting from USDOT activities and deliverables.			
6	Re-examine working group activities and continue key activities. - Sharing the findings of the restructured Coalition (Peer Exchange & Technical Assistance) - Expand notifications and promotion of webinars to attract a broader audience		✓ ✓	

Peer Exchange & Outreach

MaaS and MOD Relationship to CAT

ITE MaaS/MoD initiative

Johanna Zmud, TTI

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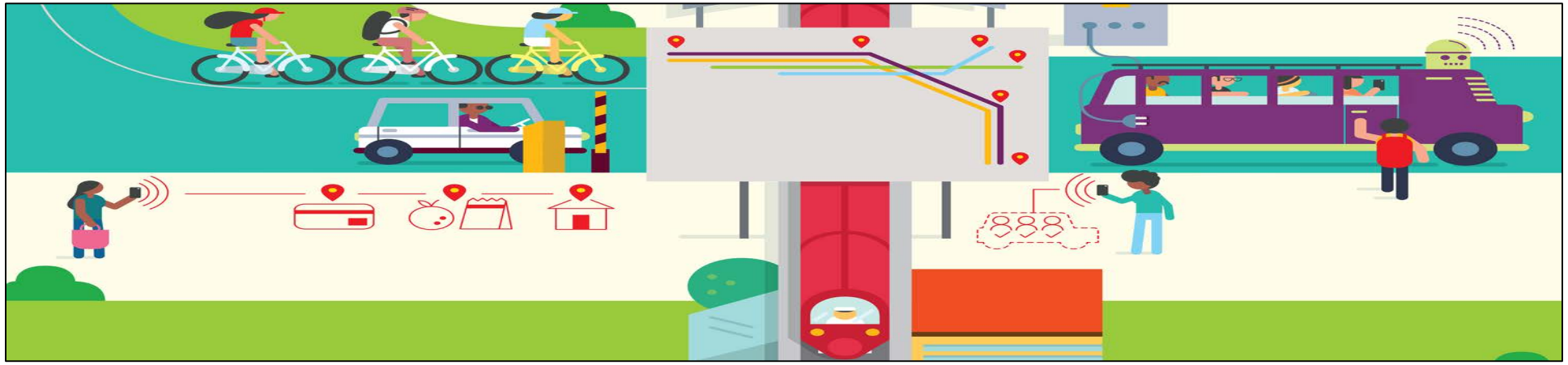
Draft Action Plan for the ITE MaaS/MOD Initiative

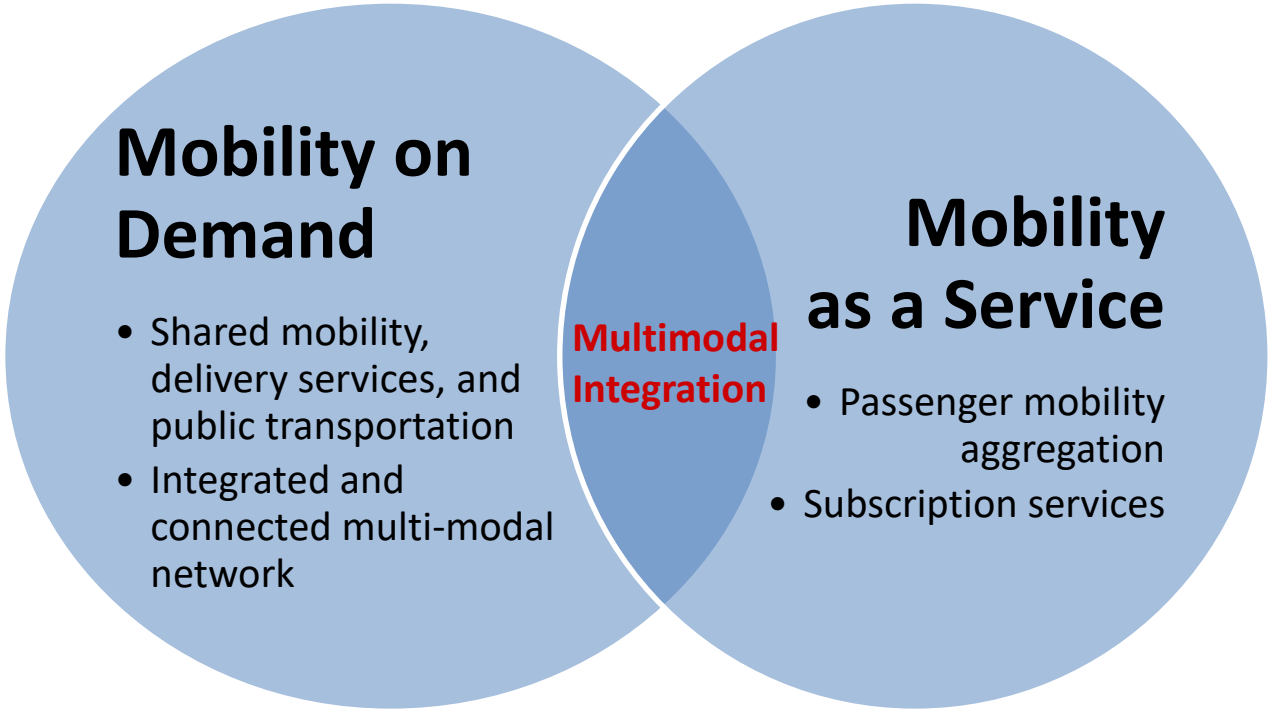


Shared mobility principles.org

Dr. Johanna Zmud
Chair, MaaS/MOD Steering Committee

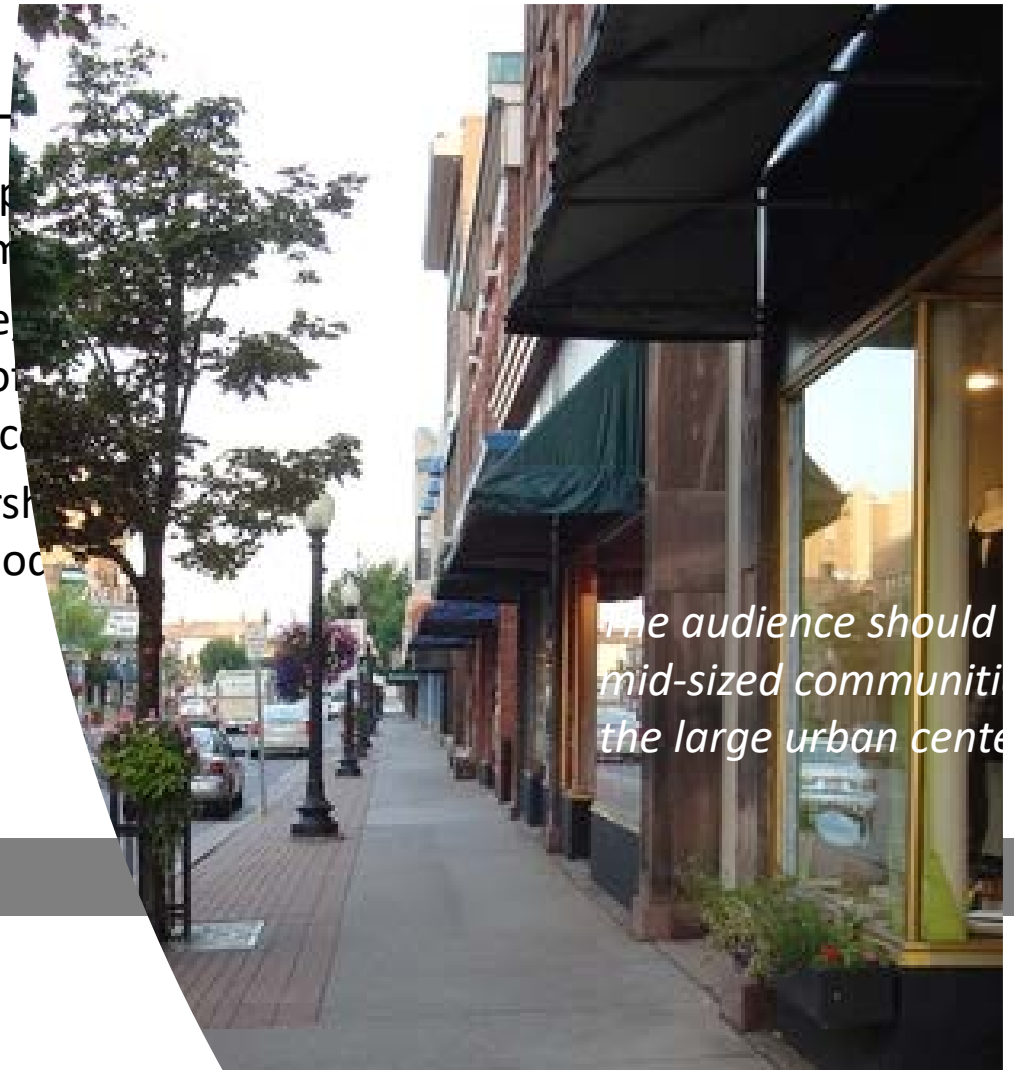
Texas A&M Transportation Institute

What is it?


Mobility on Demand
• Shared mobility, delivery services, and public transportation
• Integrated and connected multi-modal network
Multimodal Integration
Mobility as a Service
• Passenger mobility aggregation
• Subscription services

Guiding Principles

- Embrace the range of p
  for MaaS/MOD implem
- Position as a hype-free
  group for integration o
  MaaS/MOD into local c
- Empower ITE membersh
  become Lighthouse Mod



The audience should
mid-sized communiti
the large urban cente

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Vision

Ensure that ITE members are:

- ***Aware** of the potential impact of MaaS/Mod on local environment*
- ***Informed** about MaaS/Mod opportunities and challenges*
- ***Knowledgeable** about how to address those impacts in terms of the planning and design elements ITE members are implementing in their work*

Mission

Deliver the right information and tools so ITE members can continue to be active participants in engineering, planning and policy discussions about MaaS/MOD and other new mobility topics

Priority Topics

Preparing for Maas/MOD: How do cities prepare for new mobility services that have yet to operate in their jurisdictions?

Maas/MOD Impacts: What are impacts on transit use, vehicle miles traveled, parking, curbside management and what are best practices for addressing impacts?

Trends in MaaS/MOD use: What are trends in mode use across small, mid, and large-sized cities, what statistics are being compiled, and how accurate are data?

MaaS/MOD safety implications: As new mobility services often start operating outside of a local regulatory context, how can jurisdictions plan, regulate, and educate better?

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Goals

- **Inform:** Provide information about current MaaS/MOD activities and challenges, as well as future opportunities
- **Educate:** Facilitate learning and/or acquisition of skills for practitioners to assess, guide, or deliver Maa/MOD-related products and services
- **Engage:** Initiate physical gatherings or provide the digital space to enable the widest spectrum of stakeholders to discuss and debate the critical aspects of MaaS/MOD

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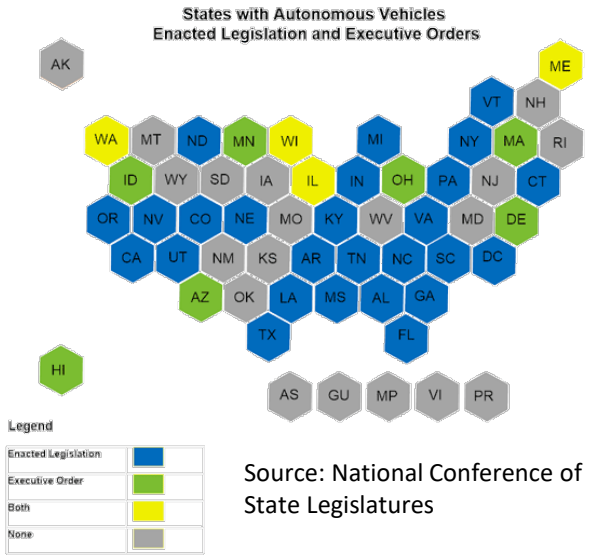
Inform



Source: National Conference of State Legislatures

- **Podcasts**
  - Trends in MaaS/MOD use (NACTO)
  - Scooter safety and how to address (CDC)
- **Online Curated Resource List**
- **Case Studies**
  - Evidence on impacts for transit
  - Examples of Maas/MOD as a paratransit solution
  - Lessons learned in negotiating with MaaS/MOD providers
  - Best practices for scooter crash data and statistics
- **Map and describe model MaaS/MOD regulations**
- **Survey ITE members current state of practice**
  - Potential joint activity with ITS-A MOD Alliance

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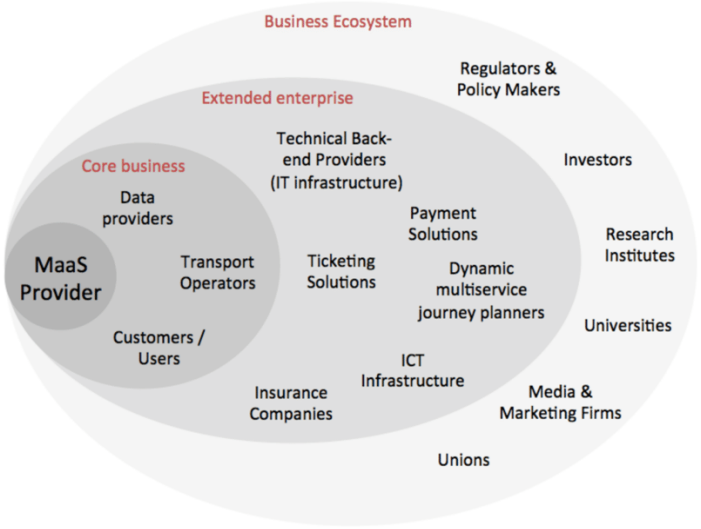
Educate



- **Webinars**
  - Scooter safety: Tracking scooter injuries, developing policy
  - MaaS/MOD applications in small and mid-sized cities
- **White Paper on MaaS/MOD Ecosystem**
- **Topic Guides**
  - New mobility services and right-of-way: where to place the new mobility options?
  - Data sharing with mobility providers: What is the state of the practice and potentially possible?
  - Mobility Inclusion: Addressing and ensuring equity in MaaS/MOD start-ups
  - Parking Generation: Changes in a MaaS/MOD context

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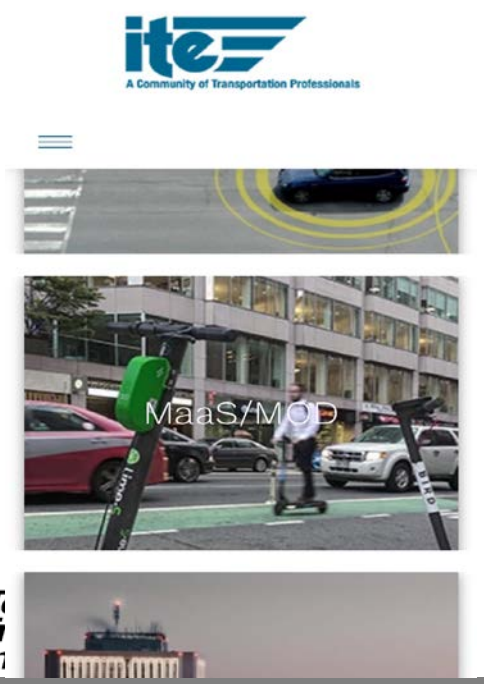
Engage



- **SC members as liaisons**
  - Mobility Hubs (Sustainability under Transportation Planning Council)
  - Micromobility (Ped/Bike under Complete Streets)
- **Discussion forum page created on ITE Community**
- **Website going live during ITE annual meeting**
- **Events**
  - Power Plenary Session
  - 3 podium sessions
  - several poster presentations
  - workshop
- **Collaborate with other initiatives/ organizations**
  - Quick Bite on MaaS with Smart Communities Initiative

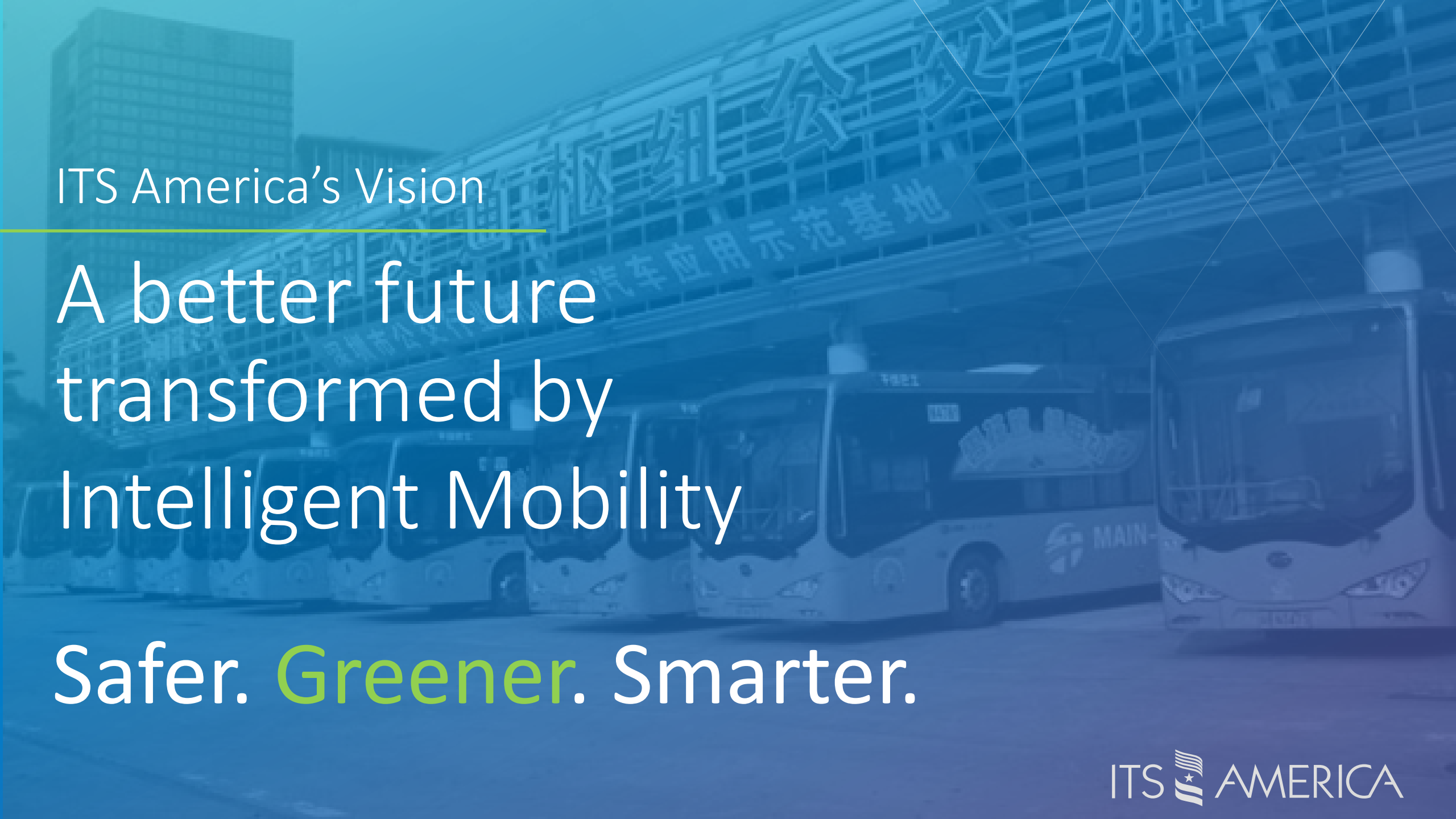
MaaS and MOD Relationship to CAT

ITS America MoD alliance

Amy Ford, ITS America

ITS AMERICA

PRESENTED BY SHAILEN P. BHATT, PRESIDENT & CEO



ITS America's Vision

A better future transformed by Intelligent Mobility

Safer. Greener. Smarter.

ITS AMERICA

SHARED MOBILITY OPTIONS

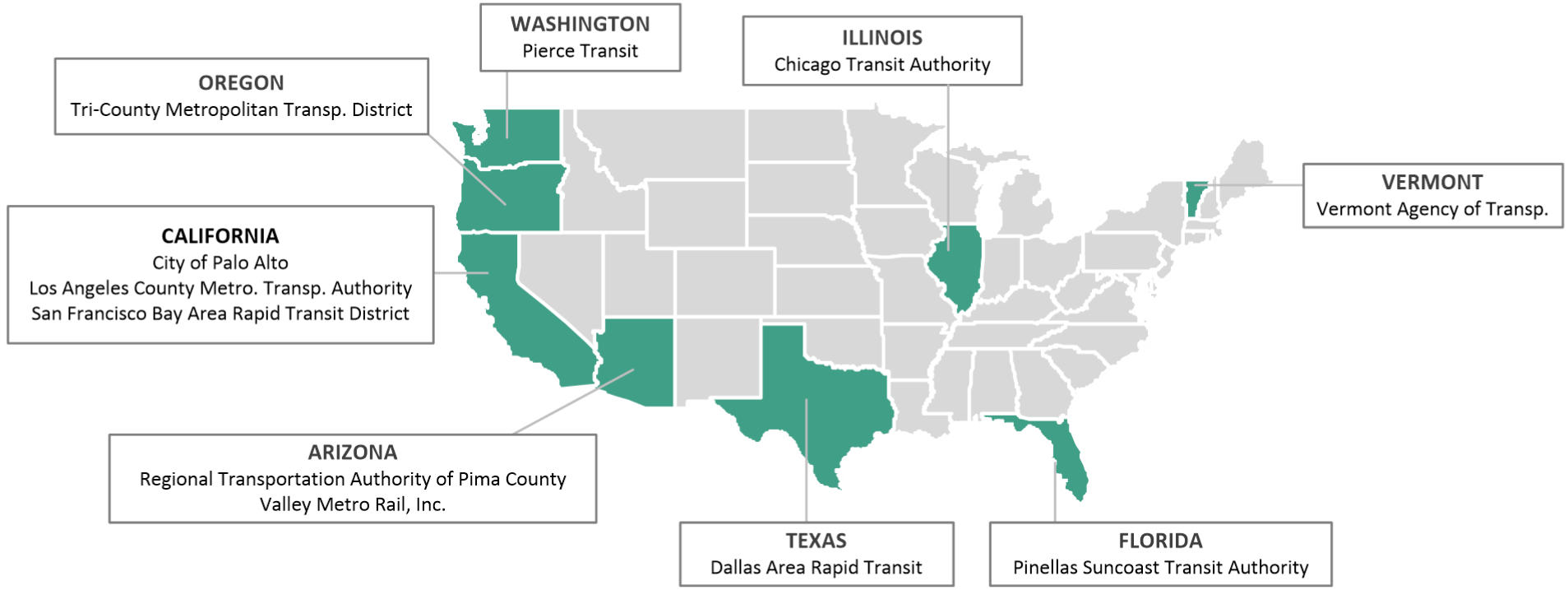
ITS AMERICA

MOD AROUND THE US

ITS AMERICA

2016 MOD Sandbox Projects

Results coming soon – "out of the box"



11 Projects: $7,931,080

FTA RESEARCH
FEDERAL TRANSIT ADMINISTRATION

MOD
MOBILITY ON DEMAND

MOD AROUND THE US

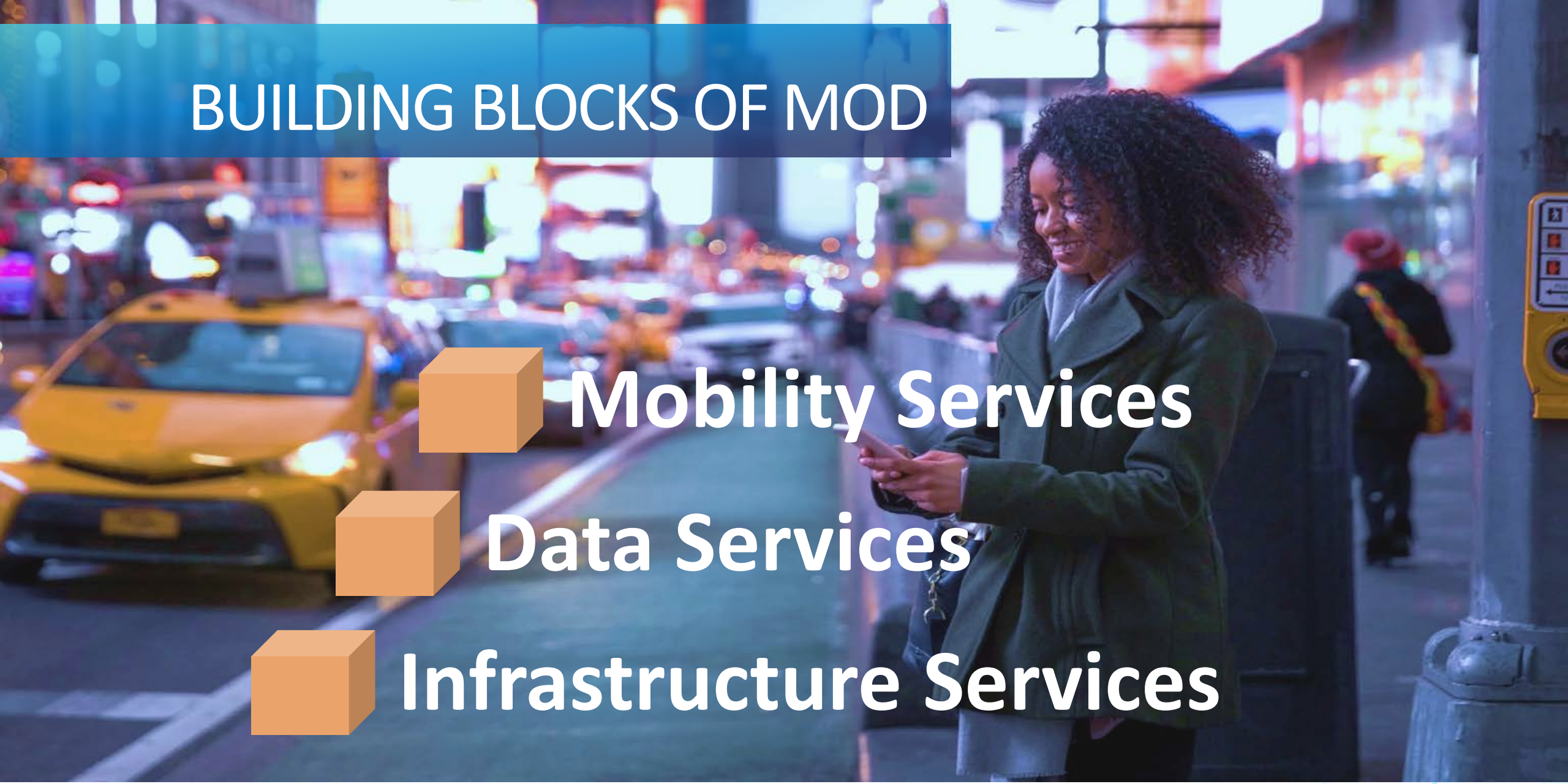
ITS AMERICA

ADVANCING SEAMLESS MOBILITY IN THE UNITED STATES

Mobility on Demand Alliance

ITS AMERICA

BUILDING BLOCKS OF MOD



- Mobility Services
- Data Services
- Infrastructure Services

BUILDING BLOCKS OF MOD

- Customer Services
- Operator Services
- Payment Services

Focus Areas

Policy Setting and Advocacy

Plenary Events

- April 3 | MOD Alliance Launch, Seattle
- June 3 | MOD Forum, Washington DC
- September 25 | MaaS Alliance MOD Alliance Insurance Workshop, Paris
- Oct 23 | MOD Alliance MaaS Alliance Singapore LTA Event
- Dec 9 | MOD Forum, Los Angeles
- Feb 2020 | MOD Alliance MaaS Alliance Insurance Workshop, East Coast, US

Work Groups and MOD Matters

- Policy | Business Models | Technology/Standards
- Data Sharing | Insurance | Congestion Pricing Secure Payments | Automation

Programs and Partnerships

- Analysis | Networks | Outreach & Engagement
- MaaS Alliance

Mobility on Demand Alliance

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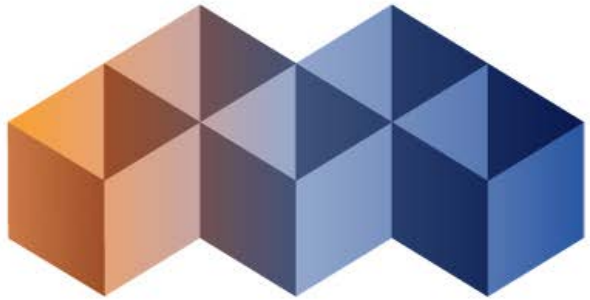

Mobility on Demand Alliance

www.modalliance.org

ITS AMERICA

IOO Guiding Principles for Connected Infrastructure supporting CAT

State perspective

Colin Castle, Michigan DOT

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IOO Guiding Principles for Connected Infrastructure supporting CAT

Local agency perspective

Faisal Saleem, Maricopa County, AZ

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Infrastructure Owner Operators (IOOs) Guiding Principles for Connected Infrastructure supporting Cooperative Automated Transportation (CAT)

August 2019 Update

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What is Cooperative Automated Transportation (CAT)?

CAT is all modes of transportation working together to improve safety, mobility, equity, and operations efficiency through interdependent vehicle and systems automation and information exchange

IOOs and Guiding Principles (GPs) for CAT Connected Infrastructure

- Guiding Principles for connected infrastructure supporting CAT are needed by IOOs to facilitate collaboration, educate the workforce, support interoperable deployments, and inform the public
- In the near term, the GPs reflect the consensus direction of the IOOs and can support impact assessment of CAV developments in a rapidly changing CAT environment
- Over the longer term, GPs are intended to give IOOs maximum institutional flexibility while working together to develop and deploy CAT strategy, standards, infrastructure, telecommunications, data exchange, best practices, and public information

GP Development Timeline

Mar 1: shared in CAT Meetings at Washington Briefing
May 8: revised with Task Force
May 21-22: First look at AASHTO Spring Meeting

ITSA Annual Mtg
AASHTO committees
Transportation Policy Forum
ITE Annual Mtg
APTA

Resolution submitted for balloting
AASHTO Annual Mtg
Task Force input to draft GP applications

Task Force and 3-party outreach
AASHTO Washington Briefing

Guiding Principles Structure and Status

- Five high-level Principles have been defined
- Each high-level Principle contains 4-5 supporting principles with additional details
- The GPs may evolve as they are reviewed by AASHTO, ITE, and ITSA stakeholder groups
  - The current version 1.0 will be used as the base for reviews
  - Comments and revisions will be tracked throughout the process

High-level Guiding Principles 1-3

- GP 1 – AUTOMATION. Support increased vehicle automation to improve traveler safety, mobility, equity, and efficiency.
- GP 2 – DATA. Achieve a connected vehicle ecosystem that enables reliable, secure V2I data exchanges in order to support cooperative automated transportation.
- GP 3 – TELECOMMUNICATIONS. Protect and utilize the 5.9 Gigahertz (GHz) spectrum designated for *"operations related to the improvement of traffic flow, traffic safety and other intelligent transportation service applications".* (FCC)

High-level Guiding Principles 4-5

- GP 4 – MULTI-MODAL OPERATIONS. Develop CAT strategies that enhance existing transportation system operational capabilities.
- GP 5 – MULTI-MODAL COLLABORATIONS. Collaborate and communicate with CAT stakeholders in the planning, testing, and demonstrations of CAT applications to support eventual interoperability and to achieve positive impacts on safety, mobility, equity, and efficiency.

Cooperative Automated Transportation (CAT) Coalition

Peer Exchange & Outreach Working Group

Call for “Highlighted Deployment” Topics for the Next Webinar

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Closing Comments

Ed Seymour, Chair

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