



ARTS23

The 2023 TRB Annual

Automated Road Transportation Symposium

JULY 9–13, 2023

San Francisco, CA

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VICTORIA SHEEHAN TRB EXECUTIVE DIRECTOR

On behalf of the Transportation Research Board (TRB), welcome to the 2023 Automated Road Transportation Symposium (ARTS23). We look forward to your participation in this year's activities.

The first symposium on automated vehicles was held in 2012 in Irvine, CA at the Beckman Center. Over the subsequent years the symposium has grown and evolved into ARTS, the Automated Road Transportation Symposium, a convening of global thought leaders from the industry, government, and research communities, to collaborate on the opportunities and challenges associated with automating road transportation.

ARTS23 will provide updates on the current research and development, advanced engineering progress, and field deployment results. The Symposium will also provide a strong focus on issues impacting the United States Department of Transportation (USDOT) and State Departments of Transportation resulting from road vehicle automation advancements.

Over the four days of the event, participants will hear from industry leaders during five plenaries and will be able to select from 28 breakout sessions. As in past years, the breakout sessions are organized into three specific tracks (Policy, Operations, and Safety) to assist you in finding the sessions and to allow all attendees to join the conversation and lend their voice to the dialogue. Sessions will address policy and technological issues such as human factors, regulatory environments, data exchanges, supply chain, and more.

Also, be sure to take advantage of this opportunity to network with colleagues by attending the Tuesday evening networking reception and poster session.

The Planning Committee and TRB staff are committed to making this a successful event. If there is anything we can do to assist you during the event, please don't hesitate to ask. All ARTS attendees recognize the role that automated vehicles can play in providing safer, greener, and more equitable mobility. All attendees are encouraged to take full advantage of this opportunity to come together to reflect on challenges, articulate solutions, and help plan for future successful implementation.

I would especially like to recognize and thank the 2023 Automated Road Transportation Symposium Planning Committee and the approximately 200 TRB volunteers who produced the technical program that you will be participating in this week.

The Planning Committee members are:

- Jane Lappin, Chair, TRB Committee on Vehicle-Highway Automation
- Steven Shladover, University of California at Berkeley PATH
- Valerie Shuman, Shuman Consulting Group, LLC
- Edward Straub, SAE International
- Marc Le Duc, SAE
- Egan Smith, USDOT Intelligent Transportation Systems Joint Program Office

I also want to express my appreciation to my TRB colleagues Cynthia Jones, Rich Cunard, and Freda Morgan for their efforts supporting the symposium and their commitment to making this event a success.

Finally, I would like to give a special thank you to all our patrons listed in the program, but especially our Platinum patrons, Applied Intuition, Aurora, Cavnu, Cruise LLC, dSpace, Foretellix, Lyft Autonomous, Venable LLC, and Waymo.

Enjoy the Symposium!



2023 PLANNING COMMITTEE

This conference would not have been possible without the combined efforts of many individuals and organizations.

Jane Lappin

TRB Standing Committee on Vehicle-Highway Automation

Steven Shladover

University of California at Berkeley PATH

Valerie Shuman

Shuman Consulting Group, LLC

Edward Straub

SAE International

Marc Le Duc

SAE International

Egan Smith

USDOT Intelligent Transportation Systems (ITS) Joint Program Office (JPO)

Cynthia Jones

Transportation Research Board (TRB)

The Transportation Research Board is one of seven major programs of the National Academies of Sciences, Engineering, and Medicine. The mission of the Transportation Research Board is to increase the benefits that transportation contributes to society by providing leadership in transportation innovation and progress through research and information exchange, conducted within a setting that is objective, interdisciplinary, and multimodal. The Board's varied committees, task forces, and panels annually engage about 7,000 engineers, scientists, and other transportation researchers and practitioners from the public and private sectors and academia, all of whom contribute their expertise in the public interest. The program is supported by state transportation departments, federal agencies including the component administrations of the U.S. Department of Transportation, and other organizations and individuals interested in the development of transportation.

www.TRB.org

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WELCOME FROM THE COMMITTEE CHAIR

JANE LAPPIN

CHAIR

TRB STANDING COMMITTEE ON VEHICLE-HIGHWAY AUTOMATION

Welcome to the 12th annual international TRB Automated Road Transportation Symposium (ARTS). Thank you for participating.

ARTS is unique among road vehicle automation conferences. It is produced by a couple of hundred TRB volunteers, experts in their fields, who dedicate themselves to creating balanced agendas that inform us about ongoing research, technology and business developments, public agency investments and operations, and policy formation. Our mission is to convene at the crossroad of technology, policy, operations, and research to address critical issues that require collaboration across sectors.

Every year, the ARTS program comprises a timely mix of influential speakers in plenary and breakout sessions to provide local, national, and international perspectives on AV policy and practice. We urge you to read each of the breakout session descriptions to plan your time. Each session stands alone as an expert workshop, providing good opportunities for lively, informed discussion.

The 10th edition of the Springer publication, *Lecture Notes in Mobility: Road Vehicle Automation*, edited by Gereon Meyer and Sven Beiker, will be available free to all registered ARTS23 participants. This publication comprises chapters written by organizers and speakers from the plenary and breakout sessions of the prior year's symposium. A link will be provided to download the volume.

This symposium requires many hands to produce. We are grateful for the hard work of the volunteers who have produced the ARTS23 program and the hundreds of speakers who have agreed to participate. Our thanks to the TRB staff who produce the meeting. A special thanks to SAE for their assistance this year. An even more special thanks to the USDOT for their unflagging support. Our thanks to Platinum patrons, Applied Intuition, Aurora, Cavnu, Cruise LLC, dSpace, Foretellix, Lyft Autonomous, Venable LLC, and Waymo. Thank you to our Gold patrons, the Alliance for Automotive Innovation and Southwest Research Institute; to Silver patron, STV, Inc.; and to Bronze patrons, May Mobility and Virginia Tech Transportation Institute. Their generous contributions help to keep ARTS affordable for a diverse audience.

In closing, I ask that you help us to plan ARTS24 by completing the online participant survey. We read every word.

On behalf of the TRB volunteer organizers and the ARTS23 Planning Committee (listed below),

Jane Lappin

Jane Lappin
Chair, TRB Standing Committee on Vehicle-Highway Automation

Steven Shladover
Valerie Shuman
Edward Straub
Marc Le Duc
Egan Smith
Cynthia Jones



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Omar, Product Manager at dSPACE



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KEYNOTE SPEAKERS



Ann Carlson

Chief Counsel, National Highway Traffic Safety Administration
Plenary Session 3
Wednesday, 8:00 AM–10:00 AM; Continental 4-6



Trent Victor

Director of Safety Research and Best Practices, Waymo
Plenary Session 3
Wednesday, 8:00 AM–10:00 AM; Continental 4-6



Yanbing Li

Senior Vice President of Engineering, Aurora
Plenary Session 3
Wednesday, 8:00 AM–10:00 AM; Continental 4-6



Vinn White

Senior Advisor for Innovation, U.S. Department of Transportation
Keynote, On Behalf of the Secretary of Transportation
Plenary Session 4
Thursday, 8:00 AM–9:50 AM; Continental 4-6



Dr. Robert C. Hampshire

Deputy Assistant Secretary for Research and Technology and Chief Science Officer, U.S. Department of Transportation
Current and Planned USDOT Automated Vehicles Research and Development Activities
Plenary Session 4
Thursday, 8:00 AM–9:50 AM; Continental 4-6



Aicha Evans

CEO, Zoox
A Fireside Chat with Aicha Evans
Plenary Session 5
Thursday, 10:20 AM–12:30 PM Continental 4-6

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SCHEDULE AT-A-GLANCE

Sunday, July 9

Time	Event	Location
2:00 PM–4:00 PM	Registration	East Lounge

Monday, July 10

Time	Event	Location
7:30 AM–5:00 PM	Registration	East Lounge
1:30 PM–5:00 PM	Concurrent Breakout Sessions:	
	150 – Not Another Standard Standards Workshop	Plaza B
	151 – Human Factors Consideration of Tele and Remote Operation for Automated Vehicles	Continental 1-3
	152 – Land Development as the Missing Link in AV Deployment: The Enabling Role of Real Estate, Zoning, and More	Continental 7-9
	153 – Workforce Development for 21st Century Automated Mobility	Imperial A
	154 – Policy Solutions to Scale AVs Now: Harmonizing Federal, State and Local Policy to Develop a Consensus National AV Framework	Imperial B
	155 – Interactive Traffic Management for Highly Automated Vehicles: A Multidisciplinary Challenge	Plaza A
3:00 PM–3:30 PM	Afternoon Break	East Lounge

Tuesday, July 11

Time	Event	Location
7:30 AM–5:00 PM	Registration	East Lounge
7:30 AM–8:00 AM	Continental Breakfast	East Lounge
8:00 AM–10:00 AM	Orientation/Welcome and Plenary Session 1	Continental 4-6
10:00 AM–10:25 AM	Morning Break	East Lounge
10:25 AM–11:50 AM	Plenary Session 2	Continental 4-6
11:50 AM–12:00 PM	Daily Roundup	Continental 4-6
12:00 PM–1:30 PM	Networking Luncheon	East Lounge
1:30 PM–5:00 PM	Concurrent Breakout Sessions:	
	250 – Enabling Technologies: A Peek Under the AV Hood	Imperial A
	251 – Safety-driven V&V and Assessment: The Great International Debate	Imperial B
	252 – Automation-Readiness of Cities	Continental 1-3
	253 – I Didn't Fight the Law, We all Won: Compliance to Rules of the Road	Plaza A
	254 – Developing AV Regulatory Policy for TODAY	Plaza B
	255 – Defining Energy/Emissions Measurement and Testing in the C/AV Era	Continental 7-9
3:00 PM–3:30 PM	Afternoon Break	East Lounge
5:30 PM–7:00 PM	Reception and Poster Session	East Lounge & Continental 4-6

COLOR KEY:

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SCHEDULE AT-A-GLANCE

Wednesday, July 12

Time	Event	Location
7:30 AM–5:00 PM	Registration	East Lounge
7:30 AM–8:00 AM	Continental Breakfast	East Lounge
8:00 AM–10:00 AM	Plenary Session 3	Continental 4-6
10:00 AM–10:10 AM	Daily Roundup	Continental 4-6
10:10 AM–10:30 AM	Morning Break	East Lounge
10:30 AM–12:00 PM	Concurrent Breakout Sessions:	
	330 – Use, Disuse, and Misuse of Partially Automated Driving Systems	Continental 1-3
	331 – Global Comparative Automated Mobility Indicator Map	Continental 7-9
	332 – AV Laws Around the World: Who, What, Where and Why?	Imperial A
	333 – Supporting Diversity, Equity, and Inclusion (DEI) with Automated Vehicles (AVs)	Imperial B
	334 – AVs in Rural America: What will it take to make this work?	Plaza A
	335 – Impacts of Automation in the Supply Chain: Borders, Ports, Intermodal and Last Mile	Plaza B
12:00 PM–1:30 PM	Networking Luncheon	East Lounge
1:30 PM–5:00PM	Concurrent Breakout Sessions:	
	350 – Safety Assurance	Continental 1-3
	351 – Radical Collaboration: Cities Role in Disruptive Mobility Technologies	Imperial A
	352 – Shark Tank: Some Risks That Could Slow AV Deployment	Imperial B
	353 – Choose Your Adopter: Redefining the AV Early Adoption Archetypes	Continental 7-9
	354 – Automated Freight and Trucking: Launch and Landing	Plaza A
	355 – National and Continental Strategy for Digital Infrastructure to Integrate Automation into Transportation	Plaza B
3:00 PM–3:30 PM	Afternoon Break	East Lounge
5:30 PM–7:00 PM	Concurrent Breakout Sessions:	
	371 – Data Exchanges enabling the Future of Automation: Opportunities and Challenges	Continental 7-9
	372 – Managed Lanes: Incubator for AVs	Imperial A
	373 – Where Does This Bus Go? Learning about the Future of Transit Bus Automation through Research, Pilots, and Demonstrations	Imperial B
5:30 PM–8:30 PM	374 – Fighting for Safety: Defining Good On-road Driving through Wargaming	Continental 1-3
5:30 PM–7:00 PM	TRB Committee on Innovative Public Transportation Services and Technologies (AP020)	Seacliff

Thursday, July 13

Time	Event	Location
7:30 AM–12:30 PM	Registration	East Lounge
7:30 AM–8:00 AM	Continental Breakfast	East Lounge
8:00 AM–9:50 AM	Plenary Session 4	Continental 4-6
9:50 AM–10:00 AM	Daily Roundup	Continental 4-6
10:00 AM–10:20 AM	Morning Break	East Lounge
10:20 AM–12:30 PM	Plenary Session 5	Continental 4-6
1:30 PM–3:00 PM	USDOT Listening Session	Plaza A



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Many licensure and certification agencies recognize Professional Development Hour (PDH) units toward demonstration of continuing professional competency. It is recommended that you check with your own state licensure/certification agency about their specific requirements for PDHs.


This form is for your use in maintaining a record of any PDH units you earn at the above-mentioned conference. Complete this form and retain it for your records. **Do not return it to TRB.** It is recommended that you save the full program of each lectern session or workshop you attend, in case the licensure or certification agency requests detailed information. Reporting is done on an honor basis, and individuals are responsible for maintaining their own records.

I have earned continuing-education PDHs by attending the following lectern sessions and workshops, during the above-mentioned conference. <i>(Note: Poster sessions do not qualify for PDH credits.)</i>			
Date	Start Time – End Time	Title	Hours
Total:			

Name _____ Date _____



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SUNDAY, JULY 9

2:00 PM–4:00 PM

Registration

Location: East Lounge

MONDAY, JULY 10

7:30 AM–5:00 PM

Registration

Location: East Lounge

MONDAY AFTERNOON BREAKOUT SESSIONS

1:30 PM–5:00 PM

150 – Not Another Standard Standards Workshop

Location: Plaza B

Moderating:

- Kevin Gay, Director, Head of AV Safety, Uber, Autonomous Mobility & Delivery
- Scott Schnelle, Safety Best Practices Specialist, Waymo

Session Organizers:

- Kevin Gay, Uber
- Scott Schnelle, Safety Best Practices Specialist, Waymo

Session Description:

Over the past few years there has been a dramatic increase in the number of AV safety standards that are being developed across SAE, IEEE, ISO, AVSC, UL, etc. This session will focus on making sense of the complex landscape of standardization activities through the recognition of common themes and

the discussion of overarching topics that still need addressing. The goal is to critically evaluate the ongoing efforts towards harmonization, where needed, and gaps identification. Rather than simply listing underway activities, SDO stakeholders and AV industry participants will be able to present their contribution and thinking related to themes and research questions that the group will interactively collaborate to abstract.

Goals, Objectives, and Outputs:

Overarching goal is to elicit collaboration from panel speakers and audience feedback throughout the session on a variety of topics. Identify AV safety standards that provide significant value to the industry in development and deployment of AVs, including which ones are being considered in AV regulations such as the EU ADS Type Approval guidelines, NHTSA's AV Pilot Program, etc. Identify common themes across AV standards under development and highlight the functional areas those standards address Evaluate potential discrepancies from common themes in existing standards and encourage discussion by SDO stakeholders towards resolution. Evaluate limitations of existing automotive standards, for example, what really makes it hard to apply 26262 to L4 thinking? What are the things that we should work to solve in upcoming revisions? Formulate the big questions that remain unanswered across the landscape of AV standards to inform a set of recommendations for SDOs to consider for future development

Session Agenda:

Introduction & Session Overview

Presenters: Common Standard Frameworks

Quick presentations that walk through the various AV safety frameworks or organizational structures being used to make sense of the standards landscape. This will help serve as a setup for the structure activity and team trivia.

Speakers include:

- Shawn Kimmel - Overview of SAE SharpCloud Tool
- Nick Fleming - BSI AV Standards Roadmap
- Scott Schnelle - Abstracted Standards Themes

Structured Activity: Discussion of the Common Standards Frameworks

Participants will be asked to either agree or disagree with the proposed abstracted themes.

- Are there common and unique elements from across each of the standard frameworks?
- Are there key elements missing from across all the frameworks?
- Are these frameworks a useful tool for public acceptance of AVs?
- What would make them more useful?
- What other improvements could be made for these standards or frameworks?

Panel Session: Perspectives on AV Standards Landscape Across Value Chain and Associated implementation

Panel discussion that addresses the role of participation in SDO activities in their organization and its necessity for wide-scale deployment. Practical implementation of existing standards is emphasized to evaluate the feasibility of their implementation in the value chain.

Speakers include:

- Joel Sanchez, Aurora;
- Amitai Bin-nun, Motional
- Chris Becker, Zoox

Break

Presenters: Current & Planned Activities

Quick presentations that will discuss standards developmental activities that are currently under development and activities that are planned to kick-off shortly. Speakers include:

- Chris Bartholomew - SAE ORAD and ISO liaisons
- Ed Straub - AVSC
- Simon Fürst - DIN, VDA, ISO
- Kevin Gay - IEEE AV Decision Making WG

Structured Activity: Open Research Questions

Participants will be asked to discuss key open research questions with a goal of identifying key topics that potentially are not addressed by current or planned activities.

- Identify the big questions that remain unanswered across the landscape of AV standards.
- Develop a set of recommendations for SDOs to consider for future development

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Multi-modal Perception

- Identify potential ideas for AV standards organizations to help address public acceptance of AVs.

Break

Structured Activity: AV Standards Team Trivia Game

Close Out: Summary of Session Findings

1:30 PM–5:00 PM

151 – Human Factors Consideration of Tele and Remote Operation for Automated Vehicles

Location: Continental 1-3

Moderating:

- Natasha Merat, Professor, Human Factors of Transport Systems, Institute for Transport Studies, University of Leeds
- Stacy Balk, Human Factors/Engineering Integration Division, National Highway Traffic Safety Administration

Presenters:

- Stacy Balk, Chief, Human Factors/Engineering Integration Division, National Highway Traffic Safety Administration
- Michael Oehl, Head of Research Group Human-Machine Interaction, German Aerospace Center (DLR)
- Yanbin Wu, Research Scientist, National Institute of Advanced Industrial Science and Technology

Session Description:

In this session the presenters will provide a short overview of the results from research projects and activities involving human factors challenges and opportunities of tele and remote operation for highly automated vehicles, followed by a workshop allowing workshop participants to discuss and develop future research needs in this context.

Agenda:

1:30 PM: *Introductions and aims of the session* - Natasha Merat/Stacy Balk

1:40 PM: Michael Oehl - *User-Centered Design and Evaluation of a Prototypical Workplace for the Technical Supervisor according to the German Law for Autonomous Driving*

2:00: Yanbin Wu - *Transitioning a Bus Driver to a Remote Operator: A Preliminary Study to understand the Remote Operation Task*

2:20 PM: Josh Domeyer - *ISO Activities on Remote Support of ADS*

2:40 PM: Stacy Balk *TBC*

3:00 PM–3:20 PM: *Coffee break*

3:20 PM–4:20 PM: *Breakout groups to discuss challenges and prepare research needs statements*

4:20 PM–4:50 PM: *Report back from groups*

4:50 PM: *Close and follow-on activities*

1:30 PM–5:00 PM

152 – Land Development as the Missing Link in AV Deployment: The Enabling Role of Real Estate, Zoning, and More

Location: Continental 7-9

Moderating:

- Danielle Chou, Enabling Technologies Program Manager, Federal Highway Administration
- James Fishelson, Executive Director, UC Berkeley PATH
- Gerry Tierney, Associate Principal, Director Emeritus Mobility Lab, Perkins+Will

Session Description:

From the intercontinental railroad to streetcar suburbs to the interstate highway system, land development and new transportation systems have always been inexorably linked. However, in discussions around AV deployment, private and public actors in both commercial and residential development (e.g., zoning boards, real-estate developers, retirement communities, truck stop operators, etc.) have frequently been sidelined. This session will examine how these actors can shape and encourage the deployment of a variety of different AV use cases: closed campus operations, car-free zones, connections with transit, mobility hubs, etc. Ultimately, we hope to identify how the public sector, private developers, and the AV industry can work together to enable land development that supports AV solutions in ways that are both economically viable and societally beneficial.

Agenda:

This session will include three panels followed by an interactive workshop.

Panel #1: Which Built Environments Can Enable Easi[er] Wins? (40 mins)

Panel #2: Real Estate and Zoning (40 mins)

Panel #3: AVs in the Suburbs (40 mins)

Break (10 mins)

Guided Workshop (55 mins)

This workshop will be composed of two parts: first a use-case development exercise, followed by a charette taking the form of a public hearing. The ultimate goal is to show how to practically build public support for different AV use cases, and how to integrate said AV services into a community.

1:30 PM–5:00 PM

153 – Workforce Development for 21st Century Automated Mobility

Location: Imperial A

Moderating:

- Andrea Gold, Research Engineer, University of Texas, Austin Center for Transportation Research
- Anna Wittenmyer McAuley, Graduate Research Assistant, University of Texas, Austin Center for Transportation Research
- Katie Turnbull, Senior Research Fellow, Texas A&M Transportation Institute

Presenters:

- Anna McAuley, Graduate Research Assistant, University of Texas, Austin Center for Transportation Research
- Katie Turnbull, Senior Research Fellow, Texas A&M Transportation Institute
- Justin Johnson, Director of Technology, The Plum Catalyst
- Britton H. Johnson, Kimley-Horn

Session Description:

The rapid development of automated vehicles and related applications requires new and diverse worker skill sets. Ensuring that education and training programs are available to meet these needs is critical for realizing the benefits of AVs to 21st-century mobility. Participants in this session will learn about AV workforce development activities around the country, including partnerships between the technology industry and universities, junior colleges, and technical schools. Participants will discuss the workforce needs of companies, industries, and government agencies, and the current and projected offerings of universities, junior colleges, and technical schools. Gaps in education and training will be identified, along with opportunities to address these gaps.

Agenda:

1:30 PM–1:40 PM: *Welcome and Introductions*

1:40 PM–2:30 PM: *Industry 21st-Century AV Workforce Development Activities*

2:30 PM–3:00 PM: *Questions/Answers and Discussion*

3:00 PM–3:30 PM: *Break*

3:30 PM–4:30 PM: *Public Agency and University 21st-Century AV Workforce Development Activities*

4:30 PM–4:50 PM: *Questions/Answers and Discussion*

4:50 PM–5:00 PM: *Next Steps and Follow-Up Activities*

1:30 PM–5:00 PM

154 – Policy Solutions to Scale AVs Now: Harmonizing Federal, State and Local Policy to Develop a Consensus National AV Framework

Location: Imperial B

Moderating:

- Katherine Kortum, Senior Program Officer, Transportation Research Board
- Kristin White, COO, ITS America
- Daniela Bremmer, AASHTO CAV Community of Practice

TRB Sponsors and Partner Committees:

- TRB Emerging Technology Law Standing Committee (AL040)
- TRB Vehicle-Highway Automation Committee (AHB30)
- TRB Transit and Intermodal Transportation Law Standing Committee (AJL20)
- TRB-NASEM Forum on Preparing for Automated Vehicles and Shared Mobility

Session Description:

This session will take comprehensive action to understand how we can tactically harmonize local, state, and federal policy in 2023. We will discuss actionable policy solutions needed to ensure safety, promote federal/state/local collaboration, ensure cities and states have a voice, and help industry understand what is needed from regulators to ensure a National AV Framework in 2023.

Goals

- Ensure AV stakeholders know what local, state and federal policy frameworks exist
- Hear from government and industry what is needed for common-ground solutions to harmonize local, state and federal laws
- Start to outline consensus policy recommendations, including legislative and regulatory provisions
- Outline roles and responsibilities across local, state, and federal government and industry: Who should be doing what? What should be handled at the national, state, and local level?
- Define action items and next steps to hold stakeholders accountable to progress activities and demand meaningful action. Who and what organizations will continue the work? What are the short term tactical steps in developing a framework proposal?

Agenda

1:30 PM–1:40 PM: *Welcome*

1:40 PM–1:45 PM: *Goals and Outcomes*

1:45 PM–2:05 PM: *Overview & “State of the State”: Level-Setting and Takeaways from 2022 Policy Challenges & Opportunities*

2:05 PM–2:15 PM: *USDOT AV Policy Overview*

2:15 PM–2:55 PM: *State and Local Harmonization Panel* (40 min) - Representatives from states (AASHTO), cities, and public agencies will discuss their recommendations to harmonize local, state, and federal policy and will make actionable recommendations on the top priority policy needs to advance automation.

- Elise Feldpausch, Michigan DOT (invited)
- Tilly Chang, SFCTA
- Connie Llanos, LA DOT (invited)
- Armand Shahbazian, Seattle DOT
- Q&A

2:55 PM–3:35 PM: *Tech Talks Policy Harmonization* (40 min) - Leading policy voices from the largest AV tech companies will offer their top 10 policy recommendations to harmonize local, state, and federal policy and ask for one key action from both Congress and USDOT.

- Kevin Gay, Uber
- Prashanthi Raman, Cruise
- David Quinalty, Waymo
- Ron Thaniel, Zoox (invited)
- Q&A

3:35 PM–3:50 PM: *Break*

3:50 PM–4:40 PM: *Policy Harmonization Roundtable & Conversation Circle* (50 min) - A roundtable of national AV policy experts will share their top takeaways to harmonize US AV policy, and then participants will ask questions and share ideas.

- Kristin White, ITS America
- Greg Winfree, TRB AV Forum
- Ed Straub, SAE International
- Daniela Bremmer, Washington State DOT
- John Corbin, Volpe
- Allanté Whitmore, SAFE

4:40 PM–4:50 PM: *Rapporteur's Report & Summary*

4:50 PM–5:00 PM: *Closing & Next Steps*

1:30 PM–5:00 PM

155 – Interactive Traffic Management for Highly Automated Vehicles: A Multidisciplinary Challenge

Location: Plaza A

Moderating:

- Tom Alkim, Strategic Advisor Connected & Automated Mobility, MAP tm

Session Description:

The session is aimed at discussing the role of traffic management for highly automated vehicles in specific Operational Design Domains (ODD). The topics to be addressed include traffic management measures to maintain and extend the ODDs, data exchange between traffic management centers and AVs, the role of ODD awareness, digitizing and translating traffic code and traffic regulations as

a basis for defining acceptable AV behavior and response to traffic management measures.

New for '23 is the multidisciplinary approach as a response to the '22 BO outcome "We need to seek more collaboration among stakeholders (e.g., involving vehicle manufacturers) to better frame the problems and seek better solutions."

Presenters:

- Siddhartha Khastgir, Head of Verification, University of Warwick
- Jessica Uguccioni, Head of CAM Adoption Strategy, CCAV, Department for Transport
- Mitali Bellamkonda, Senior Communications Specialist, Leidos
- Manfred Harrer, Head of ITS Services and Co-Chair CAD Working Group of CEDR, Asfinag and Conference of European Directors of Roads (CEDR)
- Tom Alkim, Strategic Advisor Connected & Automated Mobility, MAP tm

Goals, Objectives, and Outputs:

- To provide insights on the needs to develop future traffic management for automated vehicles in a multidisciplinary manner and the roles and responsibilities of the stakeholders
- To increase understanding of the digital, physical, and operational infrastructure associated with automated vehicles and traffic management and the potential of distributed ODD awareness.
- To discuss the roles and responsibilities of various stakeholders in translating traffic codes and rules into machine readable format as well as the expected and acceptable responses of the AVs to these codes and rules.
- To raise awareness on the human factors safety issues associated with operating AVs in different infrastructure situations, including traffic management.

3:00 PM–3:30 PM

Afternoon Break

Location: East Lounge

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TUESDAY, JULY 11**7:30 AM–5:00 PM****Registration**

Location: East Lounge

7:30 AM–8:00 AM**Continental Breakfast**

Location: East Lounge

8:00 AM–10:00 AM**Orientation/Welcome and Plenary Session 1**

Location: Continental 4-6

Moderating

- Jane Lappin, Chair, TRB Vehicle-Highway Automation Committee

Opening Remarks

- Jane Lappin, Chair, TRB Vehicle-Highway Automation Committee

Welcome

- Victoria Sheehan, Executive Director, Transportation Research Board
- Jeffrey Tumlin, Executive Director, San Francisco Municipal Transportation Agency

Panel Session: What the Pioneering Cities Are Learning By Hosting Truly Driverless Ride-Hailing Operations

- Moderator: Steve Shladover, University of California, Berkeley-PATH
- Julia Friedlander, Senior Manager, Automated Driving Policy, San Francisco Municipal Transportation Agency
- Marisa Walker, Executive Director, Institute of Automated Mobility, Arizona Commerce Authority

How “Duty of Care” Defines Society’s Top-Level Safety Requirement for Automated Vehicles

- Chris Gerdes, Professor of Mechanical Engineering, Stanford University

A User Centered Approach to Designing Future Self-Driving Transport Systems: Evidence from Public Trials and Engagement

- Rebecca Posner, Head of Social Behavioral Research, Centre for Connected and Autonomous Vehicles (CCAV)

Horizon Europe

- Stephane Dreher, Senior Manager - CCAM & Blockchain, ERTICO – ITS Europe

10:00 AM–10:25 AM**Morning Break**

Location: East Lounge

10:25 AM–11:50 AM

Plenary Session 2

Location: Continental 4-6

Moderating

- Ed Straub, SAE International

Towards realization of automated driving, RoAD to the L4 project in Japan

- Mr. Toshio Yokoyama, RoAD to the L4 Project Coordinator, The National Institute of Advanced Industrial Science and Technology (AIST)

Automated Driving Technology for Consumer Vehicle: Building a Path Towards Zero Collisions

- Erik Coelingh, VP Product, Zenseact

Panel Session: Implementing Best Practices for ADS Safety

- Moderator: Darcyne Foldenauer, Director, Automated Vehicle Safety Consortium (AVSC)
- Laura Fraade-Blanar, Senior Safety Researcher, Waymo
- Bonnie Lin, Safety Publications Lead, Cruise
- Daniel Bartz, Principal Engineer - Automated Driving, Volkswagen

Power of the Platform: Uber's vision for a safe, efficient, and delightful hybrid network

- Noah Zych, Global GM, Autonomous Mobility & Delivery, Uber

11:50 AM–12:00 PM

Daily Roundup

Location: Continental 4-6

Presenter:

- Valerie Shuman, Shuman Consulting Group, LLC

12:00 PM–1:30 PM

Networking Luncheon

Location: East Lounge

TUESDAY AFTERNOON BREAKOUT SESSIONS

1:30 PM–5:00 PM

250 – Enabling Technologies: A Peek Under the AV Hood

Location: Imperial A

Moderating:

- Valentin Scinteie, Product Manager, CMC Electronics
- Jim Misener, Senior Director, Product Management, QUALCOMM
- Pilli-Sihvola Eetu, Lead, Digitalisation of Transport, Carbon Neutral Solutions, VTT
- Dominique Freckmann, Director, Innovation & Technology, TE Transportation Solutions
- Robert Dingess, President, Mercer Strategic Alliance, Inc.

Session Description:

- This session will focus on the key technologies that shape the autonomous vehicles landscape.
- Whether it is for partial automation for L2/3 systems or reaching the holy grail of L4/5 systems, we will examine the components and systems available to AV architects. Our expert panelists will concentrate the discussion on the latest key technology challenges for ongoing AV development efforts and start discussing the upcoming technology requirements for next generation larger commercial deployments.

Agenda:1:30 PM–2:00 PM: *Intro & AV Landscape Update*

- Moderator: Valentin Scinteie, CMC Electronics Sven Beiker, Silicon Valley Mobility
- Daisy Wall, May Mobility

2:00 PM–2:50 PM: *Communications: Vehicle-to-Everything (V2X)*

- Moderator: Jim Misener, Qualcomm
- Jason Liu – JMC Rota
- Tim Leinmueller – DENSO
- Gene Marsh – Qualcomm

2:50 PM–3:30 PM: *Sensors, Cameras, Positioning and Sensor Fusion*

- Moderator: Eetu Pilli-Sihvola, VTT
- Tim Dawkins, Einride
- Rafel Fors, Valeo Detection Systems Inc.

3:30 PM–3:40 PM: *Break*3:40 PM–4:40 PM: *High Power Compute, AI Accelerators, System Integration, and eVTOLs (Electric Vertical Take-Off and Landing)*

- Moderator: Valentin Scinteie, CMC Electronics
- Robert Day, Arm
- Erik Coelingh, Zenseact
- Bruce Conway, TE Connectivity

4:40 PM– 5:00 PM *Overall Q&A and Wrap-Up***1:30 PM–5:00 PM****251 – Safety-driven V&V and Assessment: The Great International Debate**

Location: Imperial B

Moderating:

- Gil Amid, Chief Regulatory Affairs Officer, VP Operations and Co-Founder, Foretellix Ltd.
- Boris van Waterschoot, Senior Advisor Human Factors and Automated Driving, Dutch Road Authority (Rijkswaterstaat, RWS)
- Sagar Behere, Vice President of Safety, Foretellix Ltd.

Session Organizers:

- Gil Amid, Foretellix Ltd.
- Boris van Waterschoot, RWS (Dutch Road Authority)

Session Description:

It remains unclear how authorities should assess the safety of ADS and what corresponding metrics and information should be generated by the ADS V&V processes for supporting the assessments. Although recent regulations from UNECE provide preconditions for the arrival of ADS, relevant criteria are not yet available to determine the safety aspect. This session introduces various positions on this topic, offering the perspectives and the opinions of the authorities, and will contrast them with the opinion of ADS and solutions providers.

Goals, Objectives, and Outputs:

- Understand positions of various authorities around the world on criteria for safety assessments of ADS, what metrics are they seeking?
- Understand how various ADS developers and solution providers are thinking about safety V&V assessments and the corresponding V&V work they are doing, what safety metrics they are using.
- Understand how the efforts of Safety V&V feed into a safety assessment program for ADS by the authorities
- Understand the latest thinking on “How safe is safe enough?” for ADS and what metrics can support it?

Session Agenda:

The session is split into two main phases:

The first phase will include position statements from representatives of authorities (US and international) and representatives of ADS and solutions suppliers – see list below. Each presenter will get 7-8 minutes to present their perspectives on their approach to ADS safety Driven V&V, Assessment, and the metrics to be used.

The second phase is structured to let the audience discuss, and prepare questions for the presenters, in order to debate their positions, challenge them or bring up new ideas.

List of Speakers:

Regulators, Authorities:

- Richard Damm – President, Federal Motor Transport Authority (Kraftfahrt-Bundesamt, KBA), Germany, Chairperson of UNECE GRVA
- Rino Brouwer - Dutch Ministry of Infrastructure and Water management
- NHTSA speaker (invited)
- Espedito Rusciano - Type Approval Authority, RDW, The Netherlands
- ADS and solutions stakeholders:
- Scott Schnelle -Waymo
- Quresh Sutarwala KODIAK
- Japan – Jama (Japan Automobile Manufacturers Association) - Sato, Hideaki
- Sagar Behere – Foretellix , VP Safety , Safety Driven Validation
- Jeff Wishart – Science Foundation Arizona , ASU - SAE J3237 Safety metrics
- Ed Straub – SAE AVSC – Best practices for minimum safety report
- Arturo Tejada Ruiz – TNO , The Netherlands - competent driving behavior
- Erik Antonsson – CTO, Streetscope - Safety Assessment Measures
- VW Methods Germany project – Kirschbaum Thomas

Detailed Agenda [180 Minutes +30 minutes coffee break]:

Intro of the session, teasers, examples [10 Min]- Gil Amid

Phase 1: Position statements by each speaker:

Each panelist presents his position - 7 minutes per person.

Authorities/regulators are expected to state what they need or would like to see (Metrics, validation, testing) in order to be convinced that the ADS is validated and safe enough. Solutions suppliers are expected to state how to approach safety assessment and/or validation: what metrics are needed, how measurements of safety will impact their validation.

Coffee Break**Phase 2, Logistics** [20 minutes]

We expect the room to be a set of round tables. Each table is spending 20 minutes on one the following assignment:

Based on 'the various position statements you just heard, please prepare either:

- Challenging question to the presenter[s] (not necessarily the moderator in your table)
- A proposal on how to solve the challenge.
- A "beat the experts" report- what are the shortcomings in each approach.
- Some round tables will be preassigned to directed debate between speakers
 - list of topics:
 - Assessment vs. V&V – what is the right order and content? (Erik, Sagar)

Debate and Report Out [35 minutes]: The presenters are back on stage, each round table gets to debate the panelist or report out!

Summary and proposal for next steps [5 minutes] – Gil Amid

1:30 PM–5:00 PM**252 – Automation-Readiness of Cities**

Location: Continental 1-3

Moderating:

- Henriette Cornet, Thematic Area Leader Automated Mobility, UITP
- William Riggs, Professor, University of San Francisco

Session Organizers:

- Henriette Cornet, Thematic Area Leader Automated Mobility, UITP
- William Riggs, Professor, University of San Francisco

Session Description:

The hype about cooperative, connected, automated mobility (CCAM) solutions as a panacea for the problems of urban mobility is over, but the technology continues to develop rapidly and is further on the advance. Whether urban (transport) planners and policy makers like it or not, they need to proactively prepare and develop approaches to planning that unleash the potential benefits and limit the potential drawbacks of CCAM solutions.

This session will introduce the automation-readiness concept and linked CCAM-readiness self-assessment tool which have been developed to support

the assessment of local challenges, opportunities, risks, and requirements for the deployment of CCAM services. Both readiness guidance tools are based on key principles of the Sustainable Urban Mobility Plan (SUMP) approach and the building blocks: policy, infrastructure, traffic management, planning, capacity building and users.

The discussions will be organized in a World Café workshop format and structured around the automation-readiness conceptual building blocks. The format will foster an exchange about lessons learned, recommendations and best practices from planning for and implementing of CCAM solutions in cities.

This workshop will also provide a window into potential operational and business models for shared and automated mobility that aligns with how public entities can achieve climate conscious land use Sustainable Urban Mobility (SUMP) outcomes. These concepts will be linked to future visions for CCAM-readiness assessment in the EU, US and beyond.

Goals, Objectives, and Outputs:

- Understand needs of all stakeholders, including industries for such a tool, for progressing towards more readiness of cities
- Focus on 6 building blocks of automation readiness: policy, infrastructure, traffic management, planning, capacity building (skills, training), people (users)
- Align technological capacity with the kinds of transportation services cities want and need
- Define specific operational scenarios (including identification of key digital and physical requirements) that will support sustainable business models for public and private sector providers and sustainable urban mobility planning processes

Session Agenda:

1:30 PM–1:35 PM: *Welcome & Introduction* – Henriette Cornet, UITP

1:35 PM–1:45 PM: *Presentation of the Automation-readiness tool & the Connected Automated Driving Knowledge Base* – Stephane Dreher, ERTICO

1:45 PM–2:30 PM: *Six impulse presentations on the building blocks of AV readiness* (5-6 min each, one slide) – identifying already what is missing and what cities want out of AV technology for their transportation systems

- Traffic management – Tom Alkim, MAPtm
- People / users / stakeholders' engagement – Henriette Cornet, UITP
- Policy – Tilly Chang SFCTA [invited]
- Planning (link with SUMP) – Endre Angelvik, Ruter
- Infrastructure (PDI) – Manabu Umeda, University of Tokyo
- Capacity building / work force – Operator, e.g., Transdev or KEOLIS [tentative]

2:30 PM–3:00 PM: *Interactive activity defining priorities towards automation-readiness of cities* – William Riggs as facilitator

3:00 PM–3:30 PM: *Break*

3:30 PM–4:40 PM: *Panel discussion with industry & PT* – moderated by William Riggs, USF

10 minutes - Report results from workshop activity as an introduction to the panel discussion.

60' minutes - Panel discussion: Given the goals for sustainable urban mobility planning the design for cities to prepare for AV what are the potential operational and business models for shared and automated mobility that we can work on across the public and private sectors to achieve these positive outcomes? What do the cities need? What does the industry need?

- Prashanthi Raman, Cruise
- Kevin Gay, Uber
- Endre Angelvik, Ruter
- Patrick Gilster [invited]

4:40 PM–4:45 PM: *Wrap up* - by William Riggs

1:30 PM–5:00 PM

253 – I Didn't Fight the Law, We all Won: Compliance to Rules of the Road

Location: Plaza A

Moderating:

- Marjory S. Blumenthal, Senior Policy Researcher, RAND Corporation
- Laura Fraade-Blanar, Senior Safety Researcher, Waymo
- Amitai Bin-Nun, Senior Engineer, Motional

Session Organizers:

- Laura Fraade-Blanar, Waymo
- Amitai Bin-Nun, Motional
- Marjory S. Blumenthal, RAND Corporation

Session Description:

An AV's ability to comply with rules of the road is essential to public acceptance of the AV and its integration into urban mobility systems. This complements an AV's ability to meet federal safety standards (FMVSS) and is related to but distinct from best practices. This session aims to provide a broad understanding of the process and challenges around translating rules of the road into AV-executable behavior by combining presentations from industry and academia with a hands-on exercise.

Presenters:

- Marjory Blumenthal, Senior Policy Researcher, RAND
- Laura Fraade-Blanar, Senior Safety Researcher, Waymo
- Siddhartha Khastgir, Professor, University of Warwick
- Jessica Uguccioni, Head of CAM Adoption Strategy, Centre for Connected and Autonomous Vehicles
- Allison Drutchas, Managing Counsel, Waymo
- Daniel Bartz, Principal Engineer, VW
- Amitai Bin-Nun, Team Lead, Autonomous Vehicle Driving Policy, Motional

- Hilary Cain, Vice President - Technology, Innovation, & Mobility Policy, Alliance for Automotive Innovation
- Bonnie Lin, Staff Systems Engineer, Cruise
- Matthew Daus, President, International Association of Transportation Regulators

Goals, Objectives, and Outputs:

- Provide a broad understanding of the bases through which companies translate rules of the road into AV-executable behavior
- Discuss the difficulties and challenges with said execution, how said difficulties and challenges vary between laws, and what this means for an AV's ability to comply
- Facilitate hands-on experience using roleplay, translating a law into AV-executable language in the role of AV company compliance officer
- Respond to the rising importance of this topic, as signified by (A) more AVs take to the streets and, concomitantly, are recorded and reported being non-compliant; (B) seminal papers on AV compliance to rules of the road were published, and (C) new best practices may be arriving soon from standards-making bodies.

Session Agenda:

Welcome

Panel 1: Academic, regulator, and non-industry voices on AV compliance with rules of the road

Panel 2: Industry voices on AV compliance with rules of the road Interactive activity involving audience participation on how to translate a rule of the road into AV-executable language

1:30 PM–5:00 PM

254 – Developing AV Regulatory Policy for TODAY

Location: Plaza B

Moderating:

- Baruch Feigenbaum, Senior Managing Director, Transportation Policy, Reason Foundation
- Anita Kim, Senior Technology Policy Analyst, USDOT Volpe Transportation Center
- Marc Scribner, Senior Transportation Policy Analyst, Reason Foundation

Session Organizers:

- Baruch Feigenbaum, Reason Foundation
- Anita Kim, USDOT Volpe Transportation Center

Session Description:

This year we are focusing on policy at the federal and state level that supports AV testing and deployment in the near-term. One federal presentations and moderated discussions will focus on federal rulemakings and policy, and include a speaker from USDOT. Our state panel will focus on how states are addressing testing and deployment challenges with representatives from DOTs,

DMVs, and the private sector. Our interactive session will feature roundtable, speed-dating session designed for each table to work to solve a challenging problems in the AV policy space.

Presenters:

- Marc Scribner, Senior Transportation Policy Analyst, Reason Foundation
- Anita Kim, Senior Technology Policy Analyst, USDOT Volpe Transportation Center
- Bernard Soriano, Deputy Director, California Department of Motor Vehicles
- Jeff Brandes, President, Florida Policy Project
- Ezekiel Reyna, Emerging Technology Portfolio Project Manager, Texas Department of Transportation

Goals, Objectives, and Outputs:

- Create baseline of understanding for the current federal and state AV regulations
- Develop consensus among the audience of the problems and possible solutions for these problems
- Create research needs statements so that research is focused on solving near-term problems

Session Agenda:

1:30 PM–1:35 PM: *Introduction, Purpose*

1:35 PM–2:15 PM: *Federal Panel* (Three 15-Minute Presentations)

2:15 PM–2:45 PM: *Moderated Discussion*

2:45 PM–3:00 PM: *Break*

3:00 PM–3:45 PM: *State Panel* (4 Panelists)

3:45 PM–4:45 PM: *Interactive Activity*

4:45 PM–5:00 PM: *Research Needs Statements and Wrap-Up (Federal and State)*

1:30 PM–5:00 PM

255 – Defining Energy/Emissions Measurement and Testing in the C/AV Era

Location: Continental 7-9

Moderating:

- Danielle Chou, Enabling Technologies Program Manager, Federal Highway Administration
- Mike Duoba, Research Engineer, Argonne National Laboratory
- Kevin Stutenberg, Advanced Mobility Technology Manager, Argonne National Laboratory

Session Organizers:

- Danielle Chou
- Mike Duoba
- Kevin Stutenberg

TRB Sponsors and Partner Committees:

- TRB Vehicle-Highway Automation Committee (ACP30)
- TRB Transportation Energy Committee (AMS30)

Session Description:

The idea of fixed duty cycles for emissions and energy testing will be obsolete with the introduction of CAVs, but what might updated testing schema be? In this workshop, we will start with an introduction to historical energy-focused test processes. This will be followed by a debate about trades between virtual, lab, and on-road testing, as well as about the complexity of scenario-based testing. Participants will then form groups where each group must create a test schema for vehicles with different levels of automation and/or connectivity. Developed notional test schemas will be shared at the end of the session and distributed afterwards to interested parties.

Presenters:

- Danielle Chou, Enabling Technologies Program Manager, Federal Highway Administration
- Mike Duoba, Research Engineer, Argonne National Laboratory
- Dean Deter, VEV Simulation and SIL/HIL Engineer, Ford
- Leo Breton, Technology Development Director, Horiba
- Jace Allen, Technology Evangelist, dSPACE, Inc.

Goals, Objectives, and Outputs:

- Consider the role of virtual versus lab versus on-road testing
- Learn about nuances associated with scenario-based energy testing
- Discuss whether software updates could change an assessment (and if so, how often might assessments need to be performed?)
- Exchange ideas about how to identify/formulate scenarios (different self-identified ODDs, randomness, etc.)
- Participants will create, then share their notional test schema for vehicles of differing levels of automation and/or connectivity.

Session Agenda:

Intro comments, presentation - to set baseline understanding: general test methods now. [15 min]

Overviews: Panelists introduce themselves and each give 5 minute overview of their approach/product. [25 min]

Panel discussion (moderated by Danielle) [60 min]

- OEM: Dean Deter - Ford
- Test supplier: Leo Breton - Horiba, TBD - AVL
- Simulation: Jace Allen - Dspace
- Government: TBD
- Academia: TBD

Breakout session [60 min]

- Using intro presentation handout, participants choose a group to create notional tests

Re-convene, breakout groups brief summary results [20 min]

3:00 PM–3:30 PM

Afternoon Break

Location: East Lounge

5:30 PM–7:00 PM

Reception and Poster Session

Location: East Lounge & Continental 4-6

Moderating:

- Tammy Trimble, Research Scientist, Virginia Tech Transportation Institute

Poster Numbers, Presenters, and Titles:

1. Martin Russ, Service Areas for level 4 automated vehicles integrated with public transport – findings from Zurich, Switzerland
2. Danielle Chou, CDA collaborative testing on VOICES
3. Zhitong Huang, CDASim: an Open-Source Co-simulation Tool to Support Cooperative Driving Automation Research
4. Jianfei Chen, How real is real? Study of 3D digital twins for autonomous driving research
5. Sina Nordhoff, Why do drivers and automation disengage the automation? Results from a study among Tesla users
6. Matthew Marchese, Passenger Acceptance of Remote Intervention Following System Failure with ADS Dedicated Vehicles in Shared Mobility Applications
7. Rachel James, Developing Improved Models for Assessing the Impacts of Automation on Transportation Operations
8. Leah Kaplan, Shifting, Not Shrinking? Exploring Labor Roles in Traditional and Automated Taxi Services
9. Greg Rodriguez, Transparent AV Policymaking for Coordinated and Informed Regulation
10. Nick Reed, Self-driving but guided by people - Developing Ethical Goal Functions to optimise automated vehicle behaviour
11. Alfredo Garcia, Integrating Automated Vehicle Safety into Highway Geometric Design: Novel Challenges and Criteria for Minimal Risk Conditions
12. Xingyu Zhou, Using Human-in-the-Loop Simulations to Study Impacts of Automated Vehicle in Urban and Highway Driving
13. Xiao-Yun Lu, C-V2X Message Definitions for Integrated CDA and Active Traffic Management
14. Szu-Fu Chao, Effects of Signing and Characteristics of Partially Automated Truck Platooning on Light Vehicle Driver Behavior
15. Hao Liu, Integrating Vehicle Trajectory Planning and Arterial Traffic Management to Facilitate Eco-Approach and Departure Deployment
16. Saina Ramyar, USDOT's Cooperative Driving Automation (CDA) Freeway Applications
17. Kurt Bearinger, Let's Talk About CAV: Public Perceptions of Connected and Automated Vehicle Technology and Why They Matter

18. Yongqi Dong, Social-aware Planning and Control for Automated Vehicles based on Driving Risk Field and Model Predictive Contouring Control
19. Bryce Grame, A Simulation-Based Framework for Assessing Operational and Safety Benefits of CAVs
20. Thomas Kirschbaum, The "Risk Management Core" Explicitly considering Risk to achieve Safety: A Result from German public funded project "VV-Methods"
21. Cher Carney, Why highly automated vehicles are not self-driving
22. Lucas Bublitz, An field monitoring and incident management approach for ensuring safety in highly automated vehicle operation for SAE L3/L4
23. John Corbin, Collaboratively Integrating ADS into our Transportation Systems: Concept of Operations for Transportation Agencies
24. Natasha Merat, Studying Human Factors of Highly Automated Vehicles: Overview of the "User"-related results of the European Hi-Drive Project
25. Aliza Paz, Treasure Island Autonomous Vehicle Shuttle Pilot and AV Experience San Francisco

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WEDNESDAY, JULY 12**7:30 AM–5:00 PM****Registration**

Location: East Lounge

7:30 AM–8:00 AM**Continental Breakfast**

Location: East Lounge

8:00 AM–10:00 AM**Plenary Session 3**

Location: Continental 4-6

Moderating

- Valerie Shuman, Shuman Consulting Group, LLC

Keynote

- Ann Carlson, Chief Counsel, National Highway Traffic Safety Administration

Keynote

- Trent Victor, Director of Safety Research and Best Practices, Waymo

Keynote

- Yanbing Li, Senior Vice President of Engineering, Aurora

Economic and Workforce Benefits of AV Trucking in California

- Peter Leroe-Muñoz, General Counsel, Silicon Valley Leadership Group

Panel Session: Delivering the Goods: ADS in Freight Applications

- Moderator: Bob Kreeb, Federal Motor Carrier Safety Administration
- Mike Tien, Senior Policy Counsel, Aurora
- Richard Steiner, Head of Policy & Communications, Gatik
- Daniel Laury, CEO & Chief Product Officer, Udelv
- Michael McGhan, Commercial Growth Lead, Robotic Research Autonomous Industries

2023 AV Legislative Update – Federal and State Developments and Milestones

- Ariel Wolf, Chair, Autonomous and Connected Mobility, Venable LLP

10:00 AM–10:10 AM**Daily Roundup**

Location: Continental 4-6

Presenter:

- Valerie Shuman, Shuman Consulting Group, LLC

10:10 AM–10:30 AM

Morning Break

Location: East Lounge

WEDNESDAY MORNING BREAKOUT SESSIONS

10:30 AM–12:00 PM

330 – Use, Disuse, and Misuse of Partially Automated Driving Systems

Location: Continental 1-3

Moderating:

- Sina Nordhoff, Post-doc Researcher, Delft University of Technology, The Netherlands
- Dustin Souders, Assistant Professor, Clemson University, U.S.A.

Session Organizers:

- Sina Nordhoff, Post-doc Researcher, Delft University of Technology, The Netherlands
- Dustin Souders, Assistant Professor, Clemson University

Session Description:

The penetration rate of Advanced Driver Assistance Systems (ADAS, L1 automation), and SAE Level 2 partially automated driving systems is expected to increase given new regulations to make these systems mandatory in passenger cars. Studies have revealed that drivers become complacent with partially automated driving functions active, engaging in potentially safety-critical behaviors, such as gaming safety countermeasures and performing inappropriate activities (e.g., falling asleep after circumventing steering-wheel based driver monitoring).

Some behavior seems to be a knowing violation of intended use (e.g., weighting the steering wheel), and other behavior reflects a misunderstanding or lack of experience (e.g., using systems on roads not designed for).

Presenters:

- Sina Nordhoff, Post-doc Researcher, Delft University of Technology, The Netherlands
- Dustin Souders, Assistant Professor, Clemson University
- Pnina Gershon, Research Scientist, MIT Media Age Lab
- David LeBlanc, Associate Research Scientist, and Head of the Engineering Systems Group, University of Michigan Transportation Research Institute
- Alexandra Mueller, Senior Research Scientist, Insurance Institute for Highway Safety

Goals, Objectives, and Outputs:

The main objective of this session is to investigate how drivers use, misuse, or disuse L1/L2 automated driving functions. The role of governmental and regulatory agencies, and manufacturers will be discussed to promote safe and acceptable use of L1 and L2 automated driving systems.

The session will start with a panel discussion in which speakers present their findings on how drivers use L1/L2 functions.

Session Agenda:

Welcome 10:00 AM–10:10 AM

Panel discussion 10:10 AM–11:00 AM

- Stacy Balk, Program Manager, National Highway Traffic Safety Administration (NHTSA)
- Prina Gershon, Research Scientist, MIT Media Age Lab
- David J. LeBlanc, Associate Research Scientist, and Head of the Engineering Systems Group, University of Michigan Transportation Research Institute (UMTRI)
- Alexandra Mueller, Senior Research Scientist, Insurance Institute for Highway Safety

Brainstorming in groups 11:00 AM–11:20 AM

- What can be confidently said about actual safety of drivers' use of L1/L2 ADAS? Do the potentially safety-critical behaviors of drivers of L1/L2 cars actually compromise safety, and if so, how?
- Do we need to regulate safe and acceptable use of L1/L2 cars, and if so, how?
- How can we promote safety without compromising acceptance?
- How does overreliance by some early adopters undermine both safety and acceptance in the long run and how can we encourage a healthy equilibrium?
- What is the role of education & training in promoting safe and acceptable use? Where does this education come from/who provides it? Synthesis of results of session & future outlook

10:30 AM–12:00 PM

331 – Global Comparative Automated Mobility Indicator Map

Location: Continental 7-9

Moderating:

- Dr. Gereon Meyer; Head of Department European and International Business Development; VDI/VDE Innovation + Technik GmbH
- Dr. Sven Beiker; Managing Director; Silicon Valley Mobility, LLC

Session Organizers:

- Gereon Meyer
- Sven Beiker

Session Description:

The aim is to gather knowledge from conference attendees on policies, regulations, technology advancements, and social and environmental impacts in connected and automated mobility. Based on information gathered beforehand, attendants will individually correct, complement, and complete a pre-filled template, leading to a facilitated discussion on comparisons between countries. The results will be summarized and further elaborated to create a country-specific semi-qualitative, semi-quantitative map that serves as evidence basis

for informed decision making. A comparable activity, which could serve as input, was held at the European Conference on Connected and Automated Driving in May, 2023, in Brussels.

Presenters:

- Gereon Meyer, Head of Department European and International Business Development, VDI/VDE Innovation + Technik GmbH
- Sven Beiker, Managing Director, Silicon Valley Mobility, LLC

Goals, Objectives, and Outputs:

- To gather knowledge on current and planned policies, regulations, technology advancements, and social and environmental impacts in connected and automated mobility
- To create a country-specific semi-qualitative, semi-quantitative map of automated mobility indicators
- To support the development of innovation policies for the accelerated deployment of connected and automated mobility

Session Agenda:

Introduction: Goals, methodology and processes

Presentation of pre-filled template on relevant indicators for connected and automated mobility

Individually correct, complement, and complete information provided on the template

Facilitated round of discussions on comparisons between countries

Conclusion and encouragement to engage and contribute to the mapping and comparison exercise.

10:30 AM–12:00 PM

332 – AV Laws Around the World: Who , What , Where and Why?

Location: Imperial A

Moderating:

- Karlyn Stanley, Senior Policy Analyst, RAND Corporation

Session Organizers:

- Karlyn Stanley, Senior Policy Analyst, RAND Corporation
- Ellen Partridge

TRB Sponsors and Partner Committees:

- TRB Emerging Technology Law Committee (AJL40)

Session Description:

There ought to be a law! The need for legal brakes and/or accelerators for AV deployment has long been discussed at TRB -- laws on safety, liability, road use, training, cybersecurity, disclosure, and more. While some adamantly claim that no liability laws are needed, others are equally certain that widespread deployment of lifesaving AV technology rests on the certainty that a uniform federal law would create. This session will explore AV laws from 7 nations

(China, Japan, UK, Canada, France, Germany, Australia). Using these 7 legal regimes, we will pull out themes and consequences: Why did this nation focus on this aspect of the law affecting AVs? What was the impact on the deployment of AVs?

Presenters:

- Karlyn Stanley, Senior Policy Analyst, RAND Corporation
- Jane Doherty, Director, International Policy, Fuel Economy and Consumer Programs at NHTSA, U.S. Department of Transportation
- Henriette Cornet, CCAM Thematic Area Leader, UITP - International Association of Public Transport
- Andrew Phillips, Manager, Automated and Connected Vehicle Safety Programs, Motor Vehicle Safety, Transport Canada
- Jessica Uguccioni, Head of CAM Adoption Strategy, CCAV, Department for Transport, United Kingdom

Goals, Objectives, and Outputs:

- What legal regimes (e.g., Germany) allow the actual deployment of AVs on their roads?
- How are cybersecurity, liability, and insurance for AVs addressed in different nations?
- Is the kind of AV deployment (e.g., trucks, buses, cars, shuttles) dependent on the state of the law?
- What are the commonalities among the 7 legal regimes, and what is missing?
- What lessons can be learned from comparisons of 7 legal regimes to inform a U.S. federal AV law?

Session Agenda:

Overview of each country's AV laws by country expert (5 minutes per country)

Panel discussion comparing and contrasting key aspects of AV laws (35 minutes)

Audience interaction with questions and answers (20 minutes)

10:30 AM–12:00 PM

333 – Supporting Diversity, Equity, and Inclusion (DEI) with Automated Vehicles (AVs)

Location: Imperial B

Moderating:

- Katie Turnbull, Senior Research Fellow, Texas A&M Transportation Institute

Presenters:

- Katie Turnbull, Senior Research Fellow, Texas A&M Transportation Institute
- Katie Stevens, Head of State and Local Policy, Nuro
- Kimberly Williams, Chief Innovation Officer, Metropolitan Transit Authority of Harris County
- Sarah Searcy, Senior Advisor for Innovation, North Carolina Department of Transportation
- Allanté Whitmore, Director, Autonomous Vehicle Initiative, Securing America's Future Energy

Session Description:

Participants will learn about how automated vehicles (AVs) are supporting diversity, equity, and inclusion (DEI) in projects throughout the country. These projects focus on automated shuttles and buses, automated grocery and package delivery vehicles, and unmanned air vehicles (UAVs) or drones serving disabled individuals underrepresented groups, and disadvantaged communities. The session will share recent experiences, including insights from user surveys, technology applications, and stakeholder outreach activities. Participants will be engaged in discussing best practices, issues and opportunities in expanding applications of AVs to support DEI and to provide access to jobs, education, and healthy foods for all individuals. The information generated from the session will assist in developing further mobility options to help inform decision making, identify research needs, and support future deployments.

Agenda:

10:30 AM–10:35 AM: *Welcome and Introductions*

10:35 AM–11:50 AM: *Overview of AV Projects Supporting Diversity, Equity, and Inclusion*

- Nuro Grocery Delivery for Houston MetroLift Clients, Katie Stevens, nuro
- Minnesota's City of White Bear Lake Bear Tracks Shuttle, Thomas Johnson-Kaiser, Minnesota Department of Transportation
- Minnesota's Autonomous Rural Transit Initiative (goMARTI) Shuttle, Justin Johnson, The Pulm Catalyst
- Houston METRO's Shuttle of the Future (University District Project), Kimberly Williams, Metropolitan Transit Authority of Harris County
- CASSI in Cary, North Carolina's Bond Park: Exploring Accessibility with an Autonomous Shuttle, Sarah Searcy, North Carolina Department of Transportation
- Use Case DEI for Early Adopters, Allanté Whitmore, Securing America's Future Energy
- SINFONICA – Social INnovation to F0ster iNclusion, Cooperative, Connected and Automated Mobility in Europe, Giolia Renzi, ICOOR, DISMI University of Modena and Reggio Emilia

11:50 AM–Noon: *Interactive Discussion of Opportunities*

10:30 AM–12:00 PM

334 – AVs in Rural America: What Will it Take to Make this Work?

Location: Plaza A

Moderating:

- Cher Carney, Senior Research Associate, Driving Safety Research Institute, University of Iowa

Presenters:

- Cher Carney, Senior Research Associate, University of Iowa, Driving Safety Research Institute
- Omar Ahmad, Deputy Director, Driving Safety Research Institute, University of Iowa
- Kevin Fay, Portfolio Manager – Vehicle Platforms, AutonomouStuff (subsidiary of Hexagon)

Session Description:

The “ADS for Rural America” is a US Demonstration Grant project that utilizes a high-speed automated transit vehicle on a 47-mile route through rural roadways in Iowa. The goal of this project was to identify the challenges that rural roadways present for automated vehicles, collect data on the performance of an automated vehicle when exposed to those challenges, publicly share the data for analysis, and document our findings. Over the past 2 years, we have operated the ADS vehicle across varying weather, driving and traffic conditions.

We have finished collecting data on the performance of the automation and the trust/perception of passengers in the vehicle. We are now in the process of documenting our findings and making the data publicly available.

This session will provide details on the challenges we encountered related to getting the vehicle to operate under automation on rural roadways. Working with our technology partners, AutonomouStuff and Mandli Communications, we describe the methods and techniques we used to improve automation. This will be illustrated by 3 specific examples of what makes automation challenging on rural roadways.

This discussion will provide greater insight into the capabilities and limitations of ADS vehicles that are, and will be, utilized in demonstrations and deployment across the world.

Agenda:*Introductions and Session Overview**ADS for Rural America demonstration project description**Description of the ADS vehicle and the 47-mile rural roadway route**How automated vehicles see the world, and make decisions on what to do**Three examples of automation challenges on rural roadways and our solutions*

1. Getting an ADS vehicle to travel at speed (up to 65mph) on rural roads under automation
2. Navigating roadways with no lane markings and little or no signage under automation
3. Navigating gravel roadways under automation

*Lessons learned**Open discussion with audience and Q&A*

10:30 AM–12:00 PM

335 – Impacts of Automation in the Supply Chain: Borders, Ports, Intermodal and Last Mile

Location: Plaza B

Moderating:

- Caroline Mays, Director of Planning and Modal Programs, Texas Department of Transportation

Presenters:

- Caroline Mays, Director of Planning and Modal Programs, Texas Department of Transportation
- Jon Barela, Chief Executive Officer, The Borderplex Alliance
- Adam Campbell, Senior Manager, Safety Innovation and Impact, Gatik
- David Libatique, Deputy Executive Director, Port of Los Angeles
- Russell Laughlin, Executive Vice President, Strategic Development and Innovation, AllianceTexas

Session Description:

This session will explore recent developments in supply chain automation across freight environments: from ports and borders to intermodal facilities to last mile delivery. Industry leaders will discuss strategic goals, potential market impacts, and developments in their sector.

Agenda:

10:30 AM–10:35 AM: *Welcome and Introductions*

10:35 AM–10:45 AM: *Opening Primer: Automation in the Supply Chain*

10:45 AM–11:00 AM: *Lightning Presentations*

- Jon Barela, The Borderplex Alliance
- Adam Campbell, Gatik
- Meg Campbell, Wing
- Russell Laughlin, AllianceTexas
- David Libatique, Port of Los Angeles

11:30 AM–12:00 PM: *Moderated Discussion with Panelists on the impacts of automation on specific sectors of the supply chain*

11:30 AM–12:00 PM: *Questions/Answers with Audience*

12:00 PM -1:30 PM

Networking Luncheon

Location: East Lounge

WEDNESDAY AFTERNOON BREAKOUT SESSIONS

1:30 PM–5:00 PM

350 – Safety Assurance

Location: Continental 1-3

Moderating:

- Adrian Zlocki, Head of Automated Driving Department, fka GmbH
- Lutz Eckstein, Director, ika – Institute for Automotive Engineering, RWTH Aachen University

Presenters:

- Adrian Zlocki, Head of Automated Driving Department, fka GmbH
- Lutz Eckstein, Director, ika – Institute for Automotive Engineering, RWTH Aachen University
- Sou Kitajima, Senior Researcher, Japan Automobile Research Institute
- Edward Straub, AVSC Executive Director, SAE
- Stefan de Vries, Project Manager Connected and Automated Vehicles, Applus IDIADA Group
- Adrian Zlocki, Head of Automated Driving Department, fka GmbH
- Siddhartha Khastgir, Head of Verification & Validation, University of Warwick
- Phil Koopman, Associate Professor, Carnegie Mellon University
- Kristofer Kusano, Safety Researcher, Waymo LLC
- Helmut Schittenhelm, Manager, Daimler AG
- John Maddox, Senior Director, Safety Policy & Strategy, Zoox
- Nat Beuse, Chief Safety Officer, Aurora
- Axel Gern, Managing Director Torc EU and SVP of Engineering at Torc Robotics, Torc Robotics
- Steven Shladover, Research Engineer, University of California, Berkeley-PATH

Session Description:

In spite of many years of research, Safety Assurance of Automated Vehicles is still a field of action, discussion and harmonization in order to safely and efficiently introduce automated driving to public roads. The session will focus on progress and international exchange of ideas based on ongoing activities around the globe. It brings together relevant international experts on safety assurance and provides a platform to formulate the most urgent open questions and a research agenda. The session builds on the international safety assurance discussions of the past years. The focus of this year is on methodology for the definition of the minimum number and types of scenarios that will be needed in order to perform safety assurance for an ADS based on the diversity of its ODD and its target level of safety.

Agenda:

1:30 PM–1:40 PM: *Introduction*

1:40 PM–2:15 PM: *Safety Assurance Activity Status Updates*

- Hi-Drive – Adrian Zlockiria (fka)
- V&V Methods Final Event– Henning Mosebach (DLR)
- SAKURA – Hiroki Nakamura (Jari)
- Status update from NHTSA – Dee Williams (NHTSA) - INVITED
- Status update from AVSC – Ed Straub (AVSC)
- SUNRISE– Stefan de Vries (Idiada)

2:15 PM–3:25 PM: *Methodology for the definition of scenario needs for safety assurance*

- Introduction to safety assurance methodology and scenarios – Helmut Schittenhelm (Daimler)
- Siddartha Khastgir (Warwick University)
- Large scale scenario testing – Kristofer Kusano (Waymo)
- Safety Case Considerations for Scenario-Based Assurance – Phil Koopman (CMU)

3:25 PM–4:45 PM: *Moderated Discussion*4:45 PM–5:00 PM: *Wrap up and Outlook***1:30 PM–5:00 PM****351 – Radical Collaboration: Cities Role in Disruptive Mobility Technologies**

Location: Imperial A

Moderating:

- Karina Ricks, Partner, Cityfi
- Nico Larco, Executive Director, Urbanism Next - University of Oregon

Session Organizers:

- Karina Ricks
- Nico Larco

Session Description:

Local governments are critical to the commercial success of automated vehicle technologies. Local governments by and large control curbside policies governing where automated vehicles may be able to pick up or drop off passengers. Local government has general responsibility for traffic enforcement and policing. Local government manages zoning codes that will govern off street facilities to support automated vehicle storage, charging, loading and the like. And local governments have a critical role to play in managing the overall mobility ecosystem and associated public perception and acceptance of new and emerging mobility technologies.

And yet, collaboration between local governments and AV developers has been shallow at best.

This session will feature a number of city and county leaders from across the country and discuss their objectives for technology to align with community needs, their experiences in partnership with AV developers, and frameworks for managing and collaborating with AV developers in alignment with city goals and values.

Presenters:

- Karina Ricks, Partner, Cityfi
- Nico Larco, Executive Director, Urbanism Next
- Stephanie Dock, Autonomous Vehicles Program Manager, District Department of Transportation
- Vignesh Krishnamurthy, Deputy Commissioner, Chicago Department of Transportation
- Ramses Madou, Division Manager – Planning Policy and Sustainability, San Jose Department of Transportation
- Carlos Cruz-Casas, Chief Innovation Officer, Miami-Dade County Department of Transportation and Public Works
- Tony Geara, Deputy Chief - Mobility Innovation, City of Detroit– Office of Mobility Innovation

Goals, Objectives, and Outputs:

- Define the potential role of cities in managing positive deployment of highly automated vehicle technologies.
- Understand the city roadmap to readiness for disruptive technologies.
- Develop more productive engagement between all levels of government and innovative industries.
- Cultivate positive partnerships among stakeholders to support cities and support advancement of beneficial autonomous vehicle technology.
- Define a recommended research agenda.

Session Agenda:

Introductions, Session Goals/Agenda (10 min.)

Presentation/Discussion - Recent City Experience with AV Deployment (30 minutes)

Short presentations (5-10 minutes x 3-4 presenters)

Table Group Work (20 min.)

Mid-session check in/report out

Table Group Work (20 min)

Table Group Work - research agenda (10 min)

1:30 PM–5:00 PM

352 – Shark Tank: Some Risks That Could Slow AV Deployment

Location: Imperial B

Moderating:

- Richard Mudge, Compass Transportation and Technology

Session Description:

An open debate regarding the policy, economic, and technology implications of several AV topics with strategic implications for the economy and society. Topics for this year cover several issues that may affect the success of automated vehicles and the pace of their deployment.

Sharks:

- Richard Mudge – Moderator, President, Compass Transportation and Technology
- Alain Kornhauser – Professor Operations Research and Financial Engineering, Princeton University
- Brad Templeton – technology guru
- Ellen Partridge (invited)
- Selika Talbot, USC

Agenda:**1:30 PM–2:15 PM: *Have AVs missed the real deal by focusing on trucks and auto taxis?***

Private firms have raised billions of dollars to focus on developing intercity trucks and robo-taxis. The press spends most of their AV stories on these markets. Meanwhile, a growing number of markets exist in off-road applications, ports, truck parking, etc. Have the big firms missed real opportunities – and near-term profits?

- Selika Talbot, USC

2:15 PM–3:00 PM: *Do AVs require a friendly city or state to deploy?*

Does the pace of AV deployment depend on state or local political support? Most of the new deployments involve partnerships between an AV deployment and a state or city partner. Recent examples: State of Arizona and Waymo; San Francisco, Cruise and Waymo and state of California; State of Michigan and Cavnue. How do plans to deploy trucks on the Interstate differ? Do we need national legislation and regulations before we can move forward on a large scale?

- Mark Scribner, Senior Transportation Policy Analyst, Reason Foundation

3:00 PM–3:45 PM: *Is China the Future of AVs?*

China is very active in the AV market, with press reports of several deployments underway. Is China more the future of AVs than the US or Europe? Should we care? What is wrong is this simply speeds faster deployment of AVs? What can/should we do about this?

- Bin Ran, Vilas Distinguished Achievement Professor, University of Wisconsin

3:45 PM–4:30 PM: *Will AVs increase energy use: myth or reality?*

There have been competing studies on this topic. A related question is whether or not AVs will increase VMT. Do AVs encourage EVs (a possible way to reduce petroleum use and probably energy use). Will a negative answer regarding energy use (or a belief) slow AV deployment?

- Sven Beiker, Silicon Valley Mobility

1:30 PM–5:00 PM

353 – Choose Your Adopter: Redefining the AV Early Adoption Archetypes

Location: Continental 7-9

Moderating:

- Allanté Whitmore, Director, AV Initiative, SAFE
- Leah Kaplan, PhD Candidate, George Washington University

Presenters:

- Allanté Whitmore, Director, AV Initiative, SAFE
- Leah Kaplan, PhD Candidate, George Washington University
- Jerry He, Executive Director, CARTS
- Kim Watts, Program Manager, Passenger Transportation, Coalition for Reimagined Mobility
- Daisy Wall, Director of Government Business, May Mobility
- Marc Klein, Senior Vice President, Strategic Accounts and Smart Cities, Beep
- Giulia Renzi, ICOOR (Interuniversity Consortium for Optimization and Operations Research), DISMI University of Modena and Reggio Emilia

Session Description:

Visualize an early adopter of AVs. You probably see a young, highly educated, high earning individual in an urban area, as does most academic or market research. Is this a given? This workshop examines who can be an early adopter and why. To whom an innovation is introduced is important. When mobility providers tailor offerings to a specific early adopter profile, they exclude other potential early adopters and limit their use cases. This not only constrains scalability because of a biased depiction of demand, but also raises the issue of equity. We explore this via presentations and an interactive game with prizes.

Agenda:

[10 Minutes] *Session Introduction*

[10 Minutes] Johanna Zmud - *Primer/Re-Education on Theory of Diffusion of Innovation and the Scale of Adoption*

[75 Minutes] *Panel Presentations & Discussion*

- Private AV Company Piloting/Deployed catering to traditional Early Adopters
- AV Company Piloting Nontraditional Adopters
- Early Adopter Demographic and Behavioral Researcher

[15 Minutes] *Break*

[30-45 Minutes] *Choose Your Own Adopter Activity*

[15 Minutes] *Summary/Give out Prizes*

1:30 PM–5:00 PM

354 – Automated Freight and Trucking: Launch and Landing

Location: Plaza A

Moderating:

- Andrew Krum, Group Leader – Human Factors and Advanced Systems Testing, Virginia Tech Transportation Institute
- Joshua Cregger, Technology Policy Analyst, USDOT Volpe Transportation Center
- William (Billy) Hwang, Research Scientist, Texas A&M Transportation Institute

Session Organizers:

- Andrew Krum
- Joshua Cregger
- William (Billy) Hwang

Session Description:

Automated freight movement has garnered a lot of attention as a practical use case with ready demand for automation in simpler operating environments with repeated routes. Automation in freight road transport will take off where it improves efficiency, meaning safe and reliable delivery of more loads on less equipment. This session will explore how light/medium-duty vehicles, heavy-duty trucks, and other vehicle configurations move around roads and sites that cover a range of locations and use cases, including on/off-highway retail, fleet yard, distribution centers, and hubs that involve some challenging interactions with pedestrians and manually operated vehicles both on public roads and at private facilities.

Goals, Objectives, and Outputs:

- Real freight examples will be discussed by freight operators and developers that are deploying driverless operations on surface streets in retail, between distribution centers, and off and on exits near highways.
- Panels will discuss the solutions they have found to make deployment successful and the challenges ahead where broad collaboration is needed to deliver at the next level.
- Technical, safety, training and network issues will be discussed across multiple freight operation use cases.

Session Agenda:

1:30 PM–2:40 PM: **Panel 1: Interstate Highway Automation Hub Operations**

Opening: “State of the ADS Industry”

- Richard Bishop, Principal, Automated Driving Strategy & Partnerships

This panel will explore the operations at hubs and yards that ensure safety around staff and vehicles as well as ensure safe and reliable operations on the highways.

- Moderator: Andrew Krum, Group Leader, Virginia Tech Transportation Institute

Panelists:

- Thomas (Tom) Kelly, Program Manager: ADS, Electronic Inspections, & Roadside Safety Technologies, USDOT-FMCSA

- John Sova, Roadside Inspection Specialist, CVSA
- Dan Goff, Head of External Affairs, Kodiak Robotics
- Kendra Phillips, VP Service Delivery, Aurora Innovation

10-Minute Break

2:50 PM–3:50 PM: **Panel 2: ADS in Local Goods Movement Applications: Partnerships, Service Models, and Lessons Learned**

This panel will discuss private-sector experiences and learnings from middle-mile and last-mile goods movement applications in ADS-equipped vehicles as well as an outlook and future directions for activity in this space.

- Moderator: Joshua Cregger, Technology Policy Analyst, US DOT Volpe National Transportation Systems Center

Panelists:

- Manaswini Condoor, Senior Manager, Autonomous Ground Transportation, Walmart
- Carter Stern, Director of Government Relations, Cruise
- Rich Steiner, Head of Policy and Communications, Gatik

10-Minute Break

4:00 PM–5:00 PM: **Panel 3: Multimodal Freight Automation**

This panel will discuss interactions and engagement between states and the private sector in the delivery of infrastructure that will continue the growth of AV freight. Panelists will focus on partnerships between State DOTs and the private sector to plan the multimodal transportation system of the future, which will need to consider the intersection of AV trucks with other automated facilities and modes in the supply chain.

- Moderator: Billy Hwang, Research Scientist, Texas A&M Transportation Institute

Panelists:

- Paul Avery, Technical Specialist Emerging Technologies, Global Transportation Innovation, AECOM
- Jordan Coleman, General Counsel and VP of Policy, Kodiak Robotics
- Eric Fredericks, Freight Policy Manager, California State Transportation Agency
- Zeke Reyna, Emerging Technology Portfolio Project Manager, Texas Department of Transportation

1:30 PM–5:00 PM

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

Location: Plaza B

Moderating:

- John Corbin, Transportation Automation Program Manager, Federal Highway Administration
- Valerie Shuman, Principal, Shuman Consulting Group, LLC
- Julie Lorenz, Principal Consultant, Burns & McDonnell - 1898 & Co.
- Deepak Gopalakrishna, Vice President, ICF

Session Organizers:

- John Corbin Transportation Automation Program Manager USDOT Federal Highway Administration
- Mark Mockett Innovative Research General Engineer USDOT Volpe Transportation Center

TRB Sponsors and Partner Committees:

- TRB ITS Committee (ACP15)
- TRB Regional TSMO Committee (ACP10)
- TRB Committee on Information Systems and Technology (AED30)
- ASCE CAV Impacts Committee
- ITS America Smart Infrastructure Standing Advisory Committee
- ITS America Digital Infrastructure Working Group

Session Description:

The session will accelerate consensus on the substance and context of transportation digital infrastructure strategy and will encompass the holistic automation of transportation network infrastructure systems for people, goods, energy, information, and finance. An innovative session design will actively engage participants to define and prioritize critical issues to be addressed strategically within a national and continental transportation network topology. Issues will be tentatively aligned with an evolution framework that encompasses and integrates technological, institutional, and policy architectures. Outcomes will be integrated into sustained transportation digital infrastructure strategy implementation within an actively collaborating global community and an adaptable national business case.

Goals, Objectives, and Outputs:

- Create a global community to advance and coordinate national and continental scale deployment of transportation digital infrastructure.
- Conceptually define alternative institutional and procedural models and approaches to safely, sustainably, and equitably enable broad transportation automation at national and continental scale.
- Advance understanding of national economic and security business case considerations and associated strategies to evolve political-industrial complexes.
- Integrate the emerging US National Roadway Digital Infrastructure Strategy into a holistic prospective approach to civic and economic intelligent infrastructure.
- Correlate transport vehicle-infrastructure cloud and connectivity capabilities to accelerated automation in manufacturing, agricultural, retail, and other economic functions.
- Evolve the broader architectural principles to sustain development of national and continental roadway network digital infrastructure across technical, institutional, and policy facets of integration.

Session Agenda:***Getting Started******Session Welcome and Overview*** (10 minutes)

- Moderator: John Corbin, USDOT FHWA
- Call to Order and Opening Remarks – Egan Smith, Acting Director, USDOT ITS Joint Program Office
- Viewing the Landscape & Setting the Table

Panel: Overview and brief comparison of current initiatives as they relate to digital infrastructure to advance transportation automation (30 minutes)

- Moderator: Valerie Shuman, Shuman Consulting Group, LLC
- USDOT Highly Automated Systems Safety Center of Excellence – Rob Heilman, Director
- ITS America – Kristin White, Chief Operating Officer
- American Association of State Highway and Transportation Officials – King Gee, Director of Safety and Mobility (invited)
- European Union and European Commission - Gzim Ocakoglu, First Counsellor, Mobility & Transport (invited)
- United Kingdom Department for Transport – Gary Crockford, Connected Roads Policy Lead (invited)
- International Road Federation – Bin Ran, University of Wisconsin, Director of Connected Automated Transportation Program

Participants: Two-minute (maximum) “pop-up” updates from other national and international organizations as well as US state and local agencies. (30 minutes)***Quick Stretch Break*** [5 min]

- Possible breakout table ad hoc redistribution
- Context for Digital Infrastructure Enabling and Leveraging Automation

Panel & Large Group Discussion: Examples of Business Case and Application Context for National Transportation Digital Infrastructure Strategy (60 minutes)

Moderator: Julie Lorenz, Burns & McDonnell - 1898 & Co.

- Supply Chain & Logistics Management Considerations of Transportation Digital Infrastructure - Katie Turnbull, Executive Director, Texas Transportation Institute
- National Roadway Digital Infrastructure for Military Mobility and Emergency Response – John Contestabile, Director of Public Safety Solutions, Skyline Technologies (invited)
- National Roadway-Automation Integration, Connectivity, & Electrification – David Knight, Chief Executive Officer, Terbine
- Digital Infrastructure Architectural Concepts for Integrating Automated Air Mobility – Hivanjli Sharma, Aerospace Research Engineer, NASA
- Roadway Digital Infrastructure and Building Information Modeling in Automation – Morgan Kessler, Highway Infrastructure Research Engineer, USDOT Federal Highway Administration

Participants: Breakout table discussions to recognize actions to further develop and communicate the business case & application context. (40 minutes)***Paths Forward***

Panel: Mechanisms to Evolve and Advance National Strategy (30 minutes)

- Moderator: Deepak Gopalakrishna, ICF
- National Collaborative Strategic Research & Development of Transportation Digital Infrastructure – Victoria Sheehan, Executive Director, Transportation Research Board
- Evolving National Roadway Digital Infrastructure for Automation through Catalyzing Prototypes and Seed Corridors – Tracy Larkin Thomason, Director, Nevada Department of Transportation -National Institutions for Sustained Collaboration in Advancing Digital Infrastructure and Automation –Martin Russ, Managing Director, AustriaTech

Pre-Adjournment Synopsis (5 minutes) – Deepak Gopalakrishna

Soft Adjournment to Debrief Stations

3:00 PM–3:30 PM

Afternoon Break

Location: East Lounge

WEDNESDAY EVENING BREAKOUT SESSIONS

5:30 PM–7:00 PM

371 – Data Exchanges Enabling the Future of Automation: Opportunities and Challenges

Location: Continental 7-9

Moderating:

- Molly Behan, Engineer, USDOT Volpe Transportation Center
- Zorica Cvijovic, Connected Vehicle Strategist, Trihydro Corporation

Session Organizers:

- Molly Behan - USDOT, Volpe Transportation Center
- Zorica Cvijovic, PhD - Trihydro Corporation
- Virginia Lingham, P.E. - ICF
- Safak Ercisli, PE, PMP - Leidos
- Barry Einsig - Econolite
- Billy Hwang - Texas A&M Transportation Institute
- Renee Autumn Ray - Hayden.ai
- Edward Straub, DM - SAE
- Glenn N Havinoviski, PE - JMT
- Wolfgang Backhaus - Rupprecht Consult
- Zeb Bowden, PhD - VTTI

TRB Sponsors and Partner Committees:

- TRB Transit Management and Performance Committee (AP020)
- TRB Regional Transportation Systems Management and Operations Committee on (ACP10)
- TRB Intelligent Transportation Systems Committee on (ACP15)
- TRB Information Systems and Technology Committee (AED30)

Session Description:

We are in an era of data explosion, which has resulted in today's transportation technologies generating unprecedented amounts of data. In an attempt to harness this data, there has also been a recent growth of data exchanges. How can we strike a balance between harmonizing data outputs and not burdening IOOs with an overwhelming number of data specifications? This workshop session will highlight the success of, and challenges posed by data exchanges from various stakeholder perspectives. Additionally, it will attempt to gain consensus on roles and responsibilities of various stakeholder groups. The session will engage the audience to share their unique perspective/experience on the topic.

Presenters:

- Molly Behan, Engineer, USDOT Volpe Transportation Center
- Zorica Cvijovic, Connected Vehicle Strategist, Trihydro Corporation
- Tom Maguire, San Francisco Municipal Transportation Agency
- David Lucas, Traffic Technology Branch Manager, Maricopa County Department of Transportation
- Shane Zumpf, Senior Vice President and Software Architect, Trihydro Corporation
- Vaibhav Ghadiok, Chief Technology Officer and Co-Founder, Hayden AI

Goals, Objectives, and Outputs:

Raise concerns over the data exchanges, including:

- Saturation, Duplication, Interoperability, Security, and Standardization
- How do these challenges vary between stakeholder groups?
- Pose discussion questions to the audience, such as:
- What is the role of the Federal Government in respect to data exchanges? (e.g., developer, convener, etc.)
- What challenges are OEMs facing? What challenges are IOOs facing? How can data exchanges meet the needs of all stakeholders?
- Map rationale behind challenges
- What are the datasets 'worth' exchanging for different users?
- How do we map challenges to opportunities to support the effectiveness of data exchanges in enabling automation?
- How do data exchanges relate to 'Digital Infrastructure'?

Session Agenda:

Welcome (the session overview, agenda and objectives)

Public Agency / Policy perspective -- 30 minutes (10 minutes for intro presentations, 20 minutes for moderated discussion)

Panelists share current experiences and challenges including developing policy around data exchanges, the process of the implementation and challenges, needs for private partnership, data ownership, data sharing with 3rd parties.

- Moderator: Molly Behan (USDOT)
- John Corbin (USDOT – FHWA)
- Tom Maguire (Open Mobility Foundation)
- Chuck Felice (Utah DOT) - pending
- David E. Lucas (Maricopa County Department of Transportation) - confirmed

Private Sector / Practice perspective – 30 minutes (10 minutes for intro presentations, 20 minutes for moderated discussion)

Panelists share current experiences and challenges with the implementation of data exchange - what went well and what does not work – interactive roundtable.

- Moderator: Zorica Cvijovic (Trihydro)
- Shane Zumpf (Trihydro) – confirmed
- Eric Kolb (Google) – confirmed
- TBD OEM
- Vaibhav Ghadiok (Hayden AI) – confirmed

5:30 PM–7:00 PM

372 – Managed Lanes: Incubator for AVs

Location: Imperial A

Moderating:

- Glenn Havinoviski, PE, Vice President and Director of Intelligent Transportation Systems, JMT
- Zifeng (Lilian) Wu, PE PhD, Engineer, Kittelson Associates
- Nick Wood, PE, Associate Research Engineer, Texas A&M Transportation Institute

Session Organizers:

- Glenn Havinoviski, JMT (proposer / CONTACT #1)
- Sonika Sethi, Leidos (CONTACT #2)
- Nick Wood, TTI
- Jim Misener, Qualcomm
- Nawal Nazir, PNNL,
- Abby Morgan, Kittelson Associates
- Zifeng (Lilian) Wu, Kittelson Associates
- Benazir Portal, Kittelson Associates
- Tim Haile, Contra Costra Transportation Authority
- Melanie Chen, Beijing Jiaotong University
- Katy Linburg, Carma Technology

TRB Sponsors and Partner Committees:

- TRB Managed Lanes Committee (ACP35)

Session Description:

This session will provide both practitioners and the general audience with an overview of how managed lane facilities including limited-access, arterial and multi-modal corridors serve as an opportunity to deploy vehicle automation, including lessons learned from both historic and recent initiatives, conclusions from research case studies, along with an overview of several new projects both completed and underway.

Presenters:

- Glenn Havinoviski, Vice President and Director of Intelligent Transportation Systems, Johnson, Mirmiran & Thompson, Inc. (JMT)
- Zifeng (Lilian) Wu, Engineer, Kittelson Associates
- Jim Misener, Senior Director, Product Management, Qualcomm

- Tim Haile, Executive Director, Contra Costa Transportation Authority
- Sonika Sethi, Senior Transportation Planner & Program Manager, Leidos Surface Transportation Solutions
- Mark de la Vergne, Vice President of External Affairs and Project Development, Cavnue
- Jennifer Davenport, Senior Vice President, Strategic Programs, BEEP

Goals, Objectives, and Outputs:

- Examine current AV activities and initiatives in managed lanes facilities (including limited-access and arterial for multi-modal vehicles)
- Provide a historical perspective and lessons learned from past and current vehicle automation initiatives, and how those may benefit future initiatives
- Identify achievable, short-term opportunities to integrate vehicle automation activities with managed lane facilities (traveler attitudes, use cases, operational policies, etc.)
- Identify potential research demonstrating how mobility, safety and environment benefits of vehicle automation and managed lanes (freeway or arterial) can be enhanced through the combination of both activities

Session Agenda**Introductory** (3 min) – Glenn Havinoviski - JMT (session chair)

- Initial Attitude Survey – Can vehicle automation be enhanced through use of managed lane facilities?

Presentation Session (60 min) –

- Moderator: Zifeng (Lilian) Wu, Kittelson Assoc, lwu@kittelson.com
- Flashback! AHS Program and Lessons Learned - Jim Misener (Qualcomm)
- Connected, Cooperative, Autonomous and People-Centered Mobility – Tim Haile (Contra Costa Transportation Authority)
- Express Lanes CAV Testing – Sonika Sethi (Leidos)
- Accelerating Autonomous Freight with Dedicated Infrastructure – Mark DeLaVergne (Cavnue)
- Automated Shuttle Initiatives – Jennifer Davenport (Beep)

Transition (Glenn Havinoviski) – (2 min)

- Thinking Cap Survey – What travel services could benefit from automation?

Lightning Round (20 min): Lessons Learned and What's Next? Nick Wood (TTI) - Discussant

- Questions for speakers #1-6 from Discussant and the Audience, each speaker has 30 seconds to respond to each question.

Wrap-Up (5 min) - Glenn Havinoviski (JMT)

- Repeat question from Initial Attitude Survey and compare responses "before" and "after"
- Survey - What research do you believe is needed before investing in vehicle automation within managed lane facilities?
- Final Thoughts

5:30 PM–7:00 PM

373 – Where Does This Bus Go? Learning about the Future of Transit Bus Automation through Research, Pilots, and Demonstrations

Location: Imperial B

Moderating:

- Steve Mortensen, Senior ITS Engineer, Federal Transit Administration
- Anthony Carr, Special Assistant to Associate Administrator, Federal Transit Administration

Session Organizers:

- Steven Mortensen, Senior ITS Engineer, Federal Transit Administration (FTA)
- Joshua Cregger, Technology Policy Analyst, USDOT Volpe Transportation Center
- Kelsey Cooper, Policy Analyst, USDOT Volpe Transportation Center

Session Description:

The transit industry is undergoing rapid changes due to advancements in technology particularly with advent of driving automation technologies. This session provides an update on FTA's Strategic Transit Automation Research (STAR) Plan and explores transit bus automation research, pilot projects, and demonstrations that have been funded and managed by the Federal Transit Administration (FTA), including those that have been completed, are ongoing, or are in planning stages.

Presenters:

- Steven Mortensen, Senior ITS Engineer, Federal Transit Administration
- Anthony Carr, Special Assistant to Associate Administrator, Federal Transit Administration
- Omar Ahmad, Deputy Director, Driving Safety Research Institute, University of Iowa
- Nick Pilipowskyj, Vice President of Operations, Perrone Robotics
- Bryan Brillhart, VP of Strategic Partnerships, RRAI (Robotic Research Autonomous Industries)
- Les Brown, Transportation Director, ICF
- Elliot Martin, Research and Development Engineer, University of California, Berkeley
- Joshua Cregger, Technology Policy Analyst, USDOT Volpe Transportation Center
- Kelsey Cooper, Policy Analyst, USDOT Volpe Transportation Center
- Steven Mortensen, Senior ITS Engineer, Federal Transit Administration

Goals, Objectives, and Outputs:

Transit bus automation could deliver many potential benefits, but transit agencies need additional research and practical information to make informed deployment decisions. To support the development and deployment of automated bus transit services and to advance transit readiness for automation and help move the transit industry forward, FTA developed the STAR Plan, which outlines FTA's research agenda on transit bus automation technologies.

As part of carrying out the STAR plan, FTA has supported multiple integrated demonstrations and developed strategic partnerships with transit agencies interested in this area. FTA and its partners have engaged in this work to help determine the potential benefits and costs of transit bus automation, and to provide transit agencies with the resources, guidance, and tools they need to make informed deployment decisions.

In this session, FTA will discuss its proposed, updated STAR Plan to raise awareness among transit stakeholders. The session also builds on research that FTA has conducted and pilots and demonstrations that it has supported. Key takeaways include understanding the latest advances and developments in automated transit bus technologies and pilot projects, and findings and lessons learned from FTA-supported research, pilots, and demonstration projects.

Session Agenda:

1:30-1:45 PM: *Welcome, Update on FTA's Transit Bus Automation Research, and Introduction to the Proposed, Updated STAR Plan*

- Steven Mortensen, FTA

1:45-2:50 PM: *Panel: "Transit Bus Automation Pilot & Demonstration Projects"*

- Moderator: FTA Staff

Panelists:

- Ann Foss, City of Arlington
- Omar Ahmad, University of Iowa
- Nicholas Pilipowskyj, Perrone Robotics
- Bryan Brillhart, RRAI (Robotic Research Autonomous Industries)
- Les Brown, ICF
- Elliot Martin, UC Berkeley Transportation Sustainability Research Center

2:50-3:00: *Enabling Research and State of the Industry*

- Joshua Cregger, USDOT Volpe Transportation Center
- Kelsey Cooper, USDOT Volpe Transportation Center

3:00 PM: *Next Steps and Closing Comments*

- Steven Mortensen, FTA

5:30 PM–8:30 PM

374 – Fighting for Safety: Defining Good On-road Driving through Wargaming

Location: Continental 1-3

Moderating:

- Laura Fraade-Blanar, Senior Safety Researcher, Waymo
- Julie Evans, Transportation Engineer and Policy Analyst, MITRE
- Marjory Blumenthal, Senior Adjunct Policy Researcher, RAND Corporation
- Amitai Bin-Nun, Team Lead, Autonomous Vehicle Driving Policy, Motional
- Kevin Gay, Director, Head of Safety, Uber
- William Joel Sánchez, Safety Standards Engineer, Aurora
- Rob Heilman, Executive Director, Highly Automated Systems Safety Center of Excellence, USDOT

Session Organizers:

- Laura Fraade-Blanar

Session Description:

War games simulate real world scenarios at the political, operational, and tactical levels to explore how planning and choices can affect outcomes. Last year we held the first AV-focused war game focused on measurement of AV safety. This year we will apply wargaming methodology to the challenge of defining and measuring good driving behavior. We will first apprise participants of the current state-of-the-art around good driving behavior for AVs and then engage with these issues using roleplay, guided negotiation, chance-based activities, and other gaming methods.

Presenters:

- Laura Fraade-Blanar, Senior Safety Researcher, Waymo
- Julie Evans, Transportation Engineer and Policy Analyst, Mitre
- Amitai Bin-Nun, Team Lead, Autonomous Vehicle Driving Policy, Motional
- Kevin Gay, Director, Head of Safety, Autonomous Vehicles, Uber
- Joel Sánchez, Safety Standards Engineer, Aurora
- Rob Heilman, Executive Director, Highly Automated Systems Safety Center of Excellence, USDOT

Goals, Objectives, and Outputs:

- Discuss the current state of on-road driving behavior research and best practices
- Explore the ways different stakeholder groups may view the importance of and the utility of different elements of good on-road driving behavior. Note the tools at each stakeholder group's disposal to act on their view
- Facilitate a guided, but open and interactive activity where attendees can explore different ways of measuring driving behavior and assess how well that reflects their own stakeholder goal.
- Build on last year's success in encouraging engagement in a given topic through gaming methods.

5:30 PM–7:00 PM**TRB Committee on Innovative Public Transportation Services and Technologies (AP020)**

Location: Seacliff

THURSDAY, JULY 13**7:30 AM–12:30 PM****Registration**

Location: East Lounge

7:30 AM–8:00 AM**Continental Breakfast**

Location: East Lounge

8:00 AM–9:50 AM**Plenary Session 4**

Location: Continental 4-6

Moderating

- Egan Smith, USDOT Intelligent Transportation Systems (ITS) Joint Program Office (JPO)

Keynote, On Behalf of the Secretary of Transportation

- Vinn White, Senior Advisor for Innovation, U.S. Department of Transportation

Keynote: Current and Planned USDOT Automated Vehicles Research and Development Activities

- Dr. Robert C. Hampshire, Deputy Assistant Secretary for Research and Technology and Chief Science Officer, U.S. Department of Transportation

Panel Discussion: EU Regulation

- Moderator: Guido di Pasquale, Managing Director, PAVE Europe
- Maria Cristina Galassi, On Behalf of the Secretary of Transportation, European Commission - DG Grow
- Jessica Uguccioni, Head of CAM Adoption Strategy, Centre for Connected and Autonomous Vehicles
- Elsa Lanaud, Ministry of Ecological Transition, France
- Richard Damm, President, Federal Motor Transport Authority (Kraftfahrt-Bundesamt, KBA), Germany

Panel Discussion: Infrastructure Issues/Opportunities

- Moderator: John Corbin, FHWA
- Erika Kemp, Director of Strategic Planning Division, Texas Department of Transportation
- Jen Duthie, Senior Innovation Manager, Cintra
- Sue Bai, Chief Engineer, Chief of Data Business, Digital Service Development Division, Honda Motor Company

9:50 AM–10:00 AM

Daily Roundup

Location: Continental 4-6

Presenter:

- Valerie Shuman, Shuman Consulting Group, LLC

10:00 AM–10:20 AM

Morning Break

Location: East Lounge

10:20 AM–12:30 PM

Plenary Session 5

Location: Continental 4-6

Moderating

- Jane Lappin, Chair, TRB Committee on Vehicle-Highway Automation

A Fireside Chat with Aicha Evans

- Aicha Evans, CEO, Zoox

Panel Session: How should Automated Driving be Regulated in the U.S.?

- Moderator: Steve Shladover, University of California, Berkeley-PATH
- William Wallace, Associate Director, Safety Policy, Consumer Reports
- Bernard Soriano, Deputy Director, California DMV
- Hilary Cain, Vice President-Technology, Innovation, and Mobility Policy, Alliance for Automotive Innovation

Panel Session: Capital's Role in the AV Revolution

- Moderator: John Casesa, Senior Managing Director, Guggenheim Partners
- Tyler Duvall, CEO and Co-Founder, Cavnue
- Don Burnette, CEO and Co-Founder, Kodiak Robotics
- Jeff Miller, Founder and Managing Partner, LMNT Ventures
- Bobby Stevenson, Co-Director of Private Investing, Franklin Templeton

Panel Session: Leading Business Journalists' Perspectives on the AV Industry

- Moderator: Jane Lappin, Chair, TRB Vehicle-Highway Automation Committee
- Pete Bigelow, Senior Reporter, Automotive News
- Alan Ohnsman, Senior Editor, Forbes
- David Welch, Bureau Chief, Bloomberg

12:30 PM

ARTS23 Adjourns

1:30 PM–3:00 PM

USDOT Listening Session

Location: Plaza A

Plenary Q&A

Share your questions with our plenary speakers
using this Vevox QR code:



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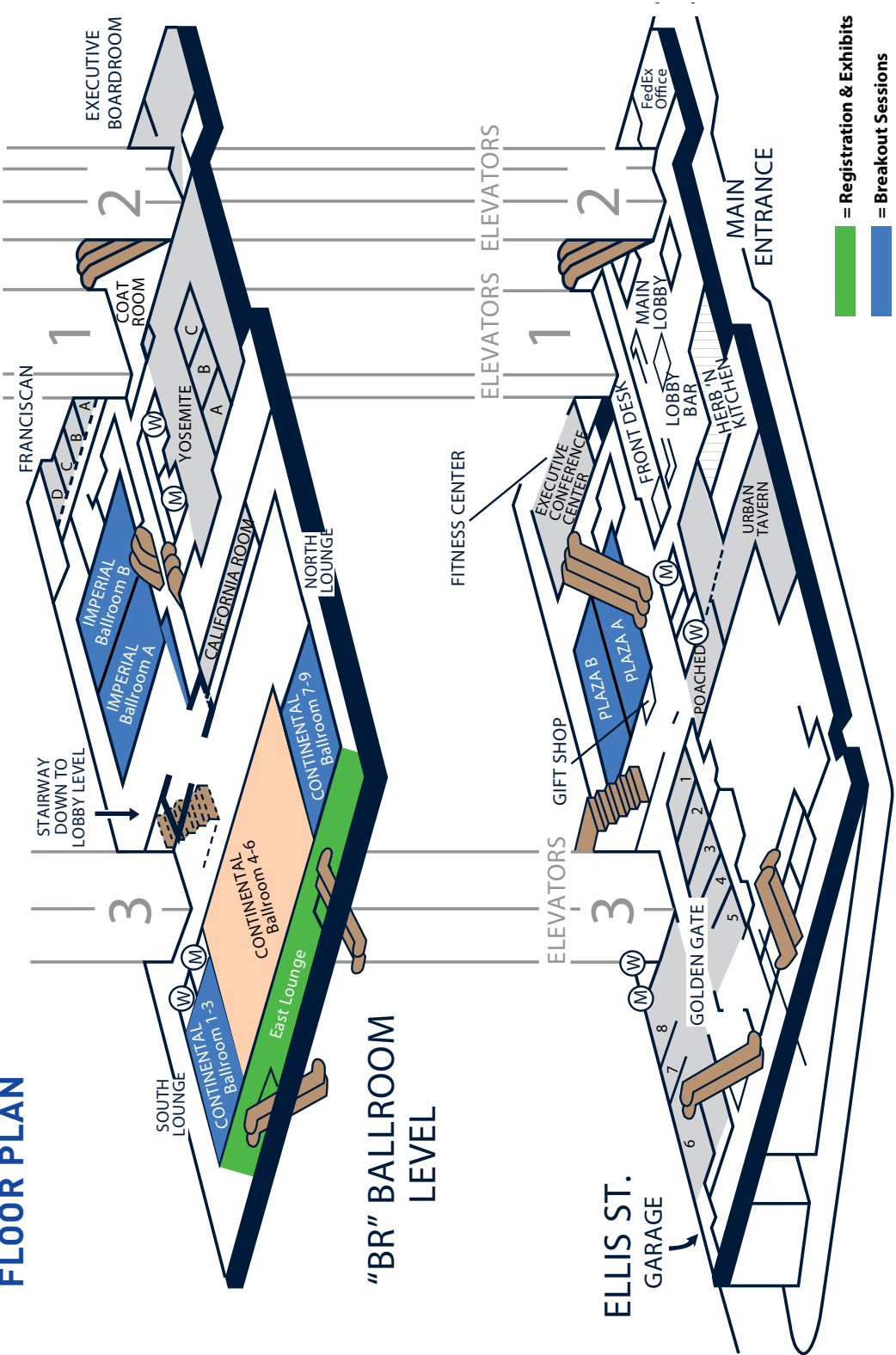
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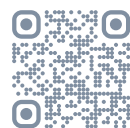


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