WASHINGTON STATE
AUTONOMOUS VEHICLE
WORK GROUP

Washington State Transportation Commission

AV Work Group Executive Committee Meeting

June 24, 2020

Washington State Transportation Commission

Agenda

WASHINGTON STATE AUTONOMOUS VEHICLE WORK GROUP

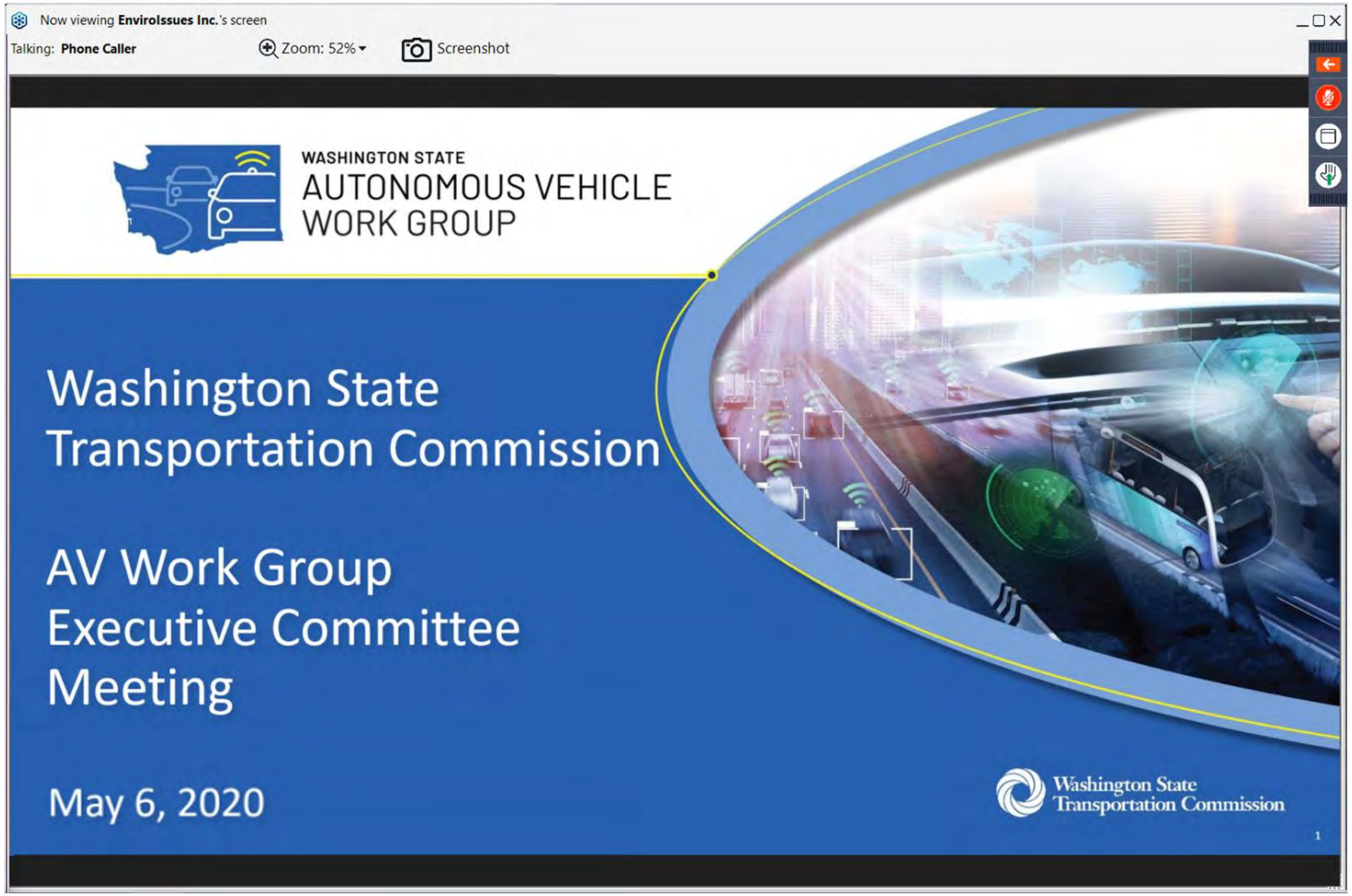
TIME	DESCRIPTION	
9:00	**Welcome, Introductions & Overview of Virtual Meeting Operations**	**Jim Restucci**, Interim Chair, AV Work Group Executive Committee **Ara Swanson**, EnviroIssues
9:05	**Work Group Future Path**	**Scott Shogan**, Vice President, WSP USA
9:55	**ULC Model AV Bill**	**Michele Radosevich**, Partner, Davis Wright Tremaine
10:25	**AV Industry Panel – Testing and Deployments Across the Country**	**Rachelle Celebrezze**, Senior Manager, Government Affairs, Cruise LLC **David Woessner**, Executive Vice President, LM Industries Group, Inc. **Joe Moye**, CEO, Beep
11:50	**Executive Committee Member Items**	*Open forum for members*
11:55	**Closing Remarks**	**Jim Restucci**, Interim Chair, AV Work Group Executive Committee
12:00	ADJOURN	

Overview of Virtual Meeting Operations

WASHINGTON STATE AUTONOMOUS VEHICLE WORK GROUP

Washington State Transportation Commission

Virtual Meeting Operations – GoTo Meeting Webinar



Click to expand control panel and access "Questions/Chat" Box

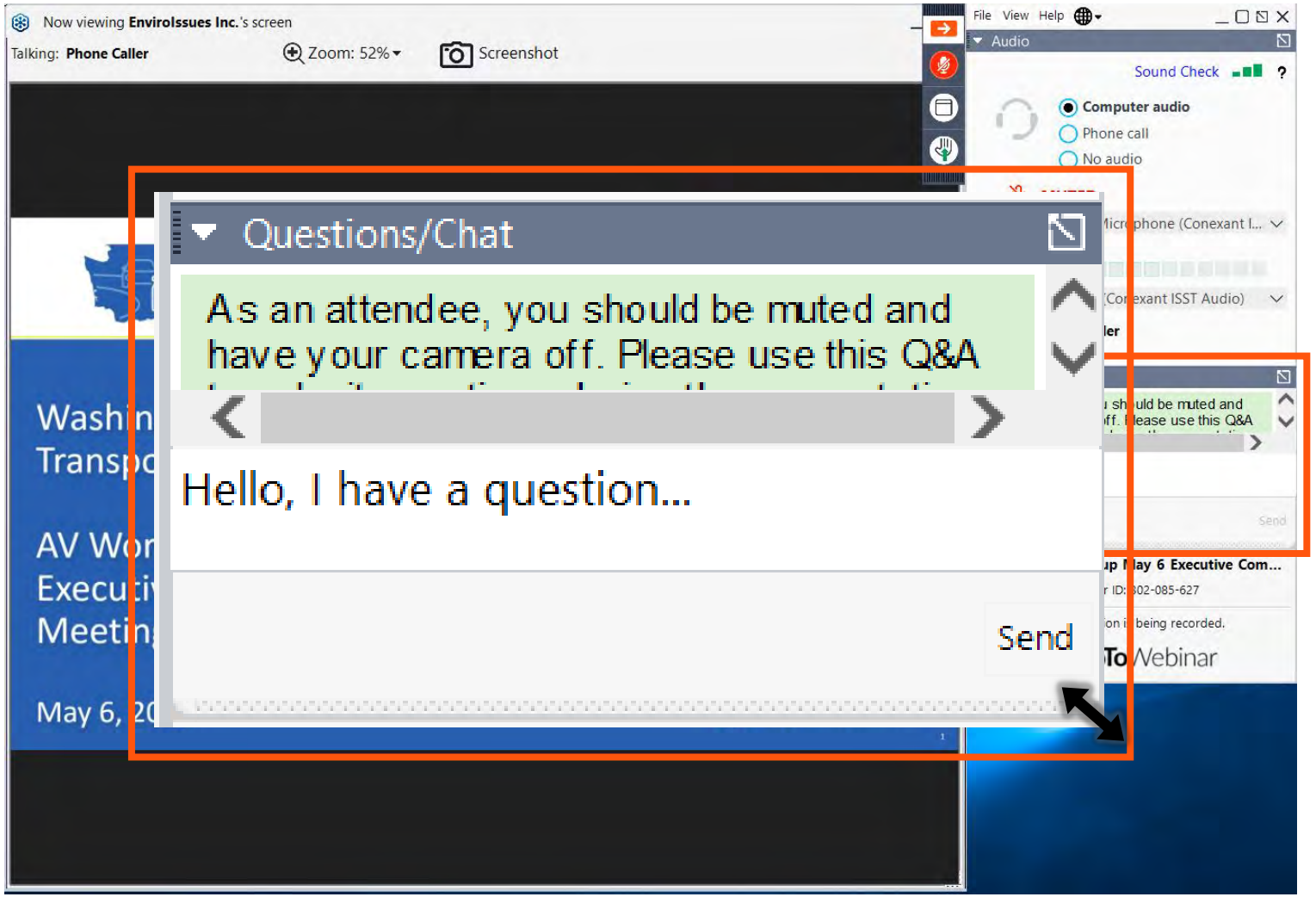
Ensure that you are muted (button should be red)

or

If dialing in by phone (button should be red)

- As an attendee, you should be muted and have your camera off.
- Questions and comments will be accepted through the "Questions/Chat" box.

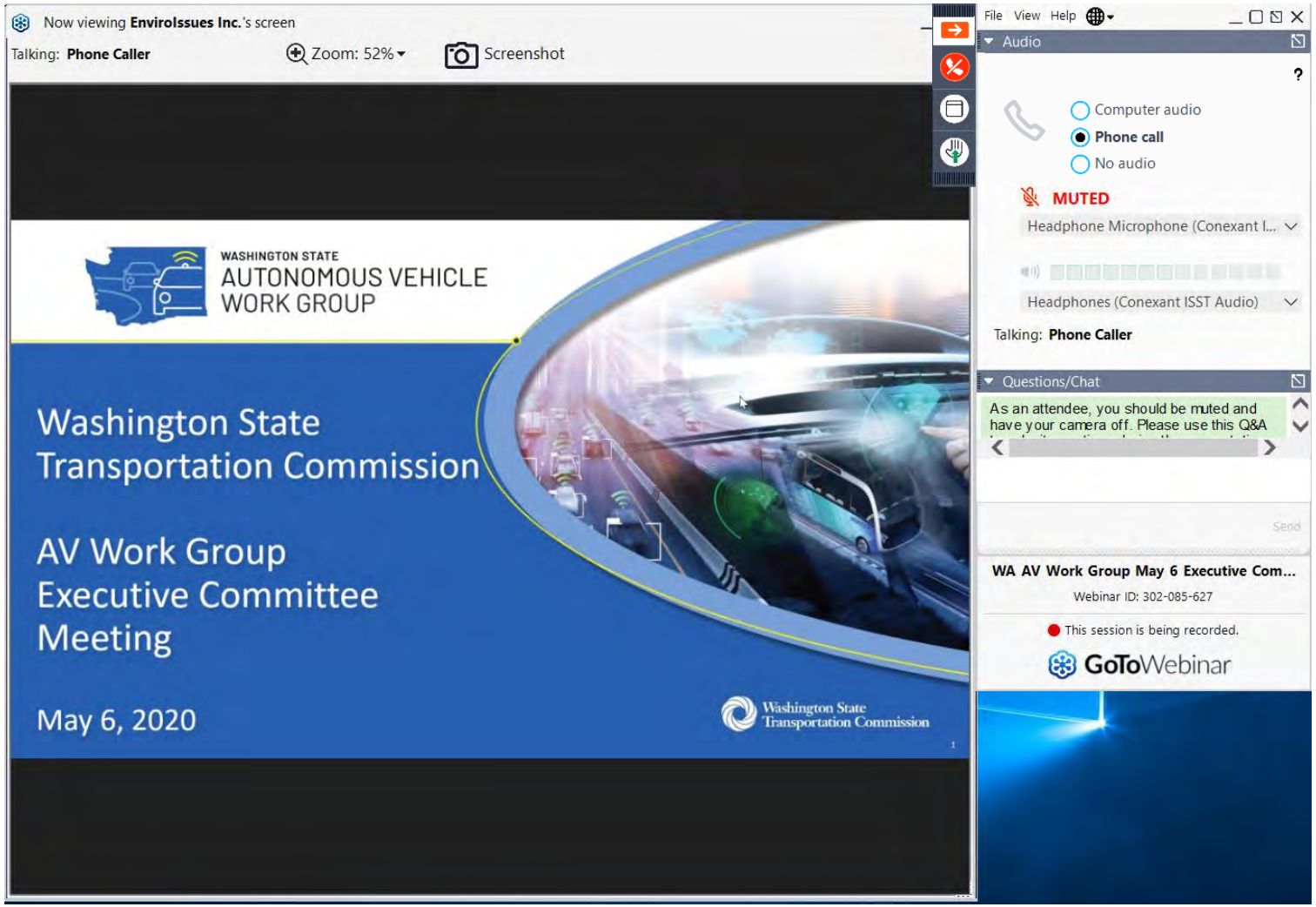
Virtual Meeting Operations – GoTo Meeting Webinar



QUESTIONS/CHAT BOX

- Attendees can type questions to meeting organizers.
- Organizers will read questions aloud during the Q&A period of each presentation.
- Organizers may also answer questions directly in Questions/Chat box. Drag and expand the box to see additional questions and responses.

Virtual Meeting Operations – GoTo Meeting Webinar



CALL-IN PARTICIPANTS

- Call-in participants can still access audio controls and the Questions/Chat box if viewing the presentation online.
- For those who are not viewing the presentation online, phone lines can be muted and unmuted by pressing *6
- When not speaking, please ensure phone line is muted

Work Session

Alignment of Policy Goals and Work Group Initiatives

WASHINGTON STATE AUTONOMOUS VEHICLE WORK GROUP

Washington State Transportation Commission

Question of the Executive Committee

Given the legal purview of this Autonomous Vehicle Work Group and the sunset date of 2023, what does the Executive Committee (EC) wish to focus on for the duration of the group, and what role do the Cooperative Automated Transportation (CAT) policy goals adopted by the EC play in guiding that direction?

Definitions

AUTONOMOUS VEHICLE

- Utilizes automated driving system for some/all driving tasks
- Not operated in direct coordination with other system users
- Self-sufficient in terms of systems and sensors
- “Automated Vehicle” is broader term where vehicle may also be connected/coordinated with other system users

Definitions

COOPERATIVE AUTOMATED TRANSPORTATION (CAT)

- Confluence of automated, connected, electrified and shared mobility
- Contributes towards a safe and efficient transportation system
- Emphasizes public transit, active transportation, and economic vitality of communities
- CAT is about more than just vehicles; it includes:
  - Modes
  - Systems
  - Applications

Legislative Mandate – Work Group Charge

- Following developments in AV technology and related policies.
- Exploring approaches to modify state policy, rules and laws to further public safety and prepare for the emergence of AV technology.
- Sharing information on AV technology and policies with interested stakeholders.
- The WSTC must develop and provide recommendations based upon the input from the Work Group each year.
- Legislation is in force through December 31, 2023

CAT Policy Goals

- **Policy framework developed by Infrastructure & Systems subcommittee**
  - » Extensive input and feedback over the course of 2019
- **Recommendation to the Executive Committee:**
  - » Adopt the 8 policy goals developed by the subcommittee
  - » Encourage development of a statewide CAT policy framework that encompasses input from other subcommittees
- **Recommendations endorsed by both the EC and WSTC in late 2019**

Adopted CAT Policy Goals

- **#1 Organize for Innovation:** Enable organizational change that empowers officials to be flexible, accelerate decision-making, and adapt to changing technology.
- **#2 Shared Mobility:** Encourage and incentivize shared mobility, including an emphasis on high occupancy and shared modes for moving people and goods.
- **#3 Economic Vitality and Livability:** Create resilient and efficient regional networks and empower local agencies to create resilient, multimodal local networks.
- **#4 Infrastructure and Context Sensitive Street Design:** Promote durable, physical and digital networks that accommodate the movement of people and goods in ways that are appropriate for the context.

(continued) Adopted CAT Policy Goals

(continued)

- **#5 Land Use:** Encourage land use development patterns that support multimodal connectivity to efficient local and regional networks.
- **#6 Equity:** Work with marginalized communities to increase access to desirable mobility options.
- **#7 Safety:** Increase the safety of transportation systems and infrastructure to support the safe movement of people and goods.
- **#8 Environment:** Reduce the local and cumulative environmental impacts of mobility to improve air and water quality, energy conservation and mitigate climate change.

Use of the Policy Framework

- **PROPOSAL:** use the adopted CAT policy goals as a framework for action
  - » Prioritize overarching approaches and suggested actions
  - » Provide direction to subcommittees to help guide activities
- Factors to consider in establishing priorities:
  - » What can be realistically done in the remaining time of the work group?
  - » What is most needed to get Washington State out of the “starting blocks”?
  - » What are the minimum objectives you feel the Work Group must achieve?
  - » Is it too early to attempt to understand regulatory needs in particular policy areas?

Live Polling Exercise

Work Session facilitator will conduct a live polling exercise with Executive Committee members to identify priorities and direction for the Work Group's path moving forward

Next Steps

- Synthesize input from polling and discussion to provide subcommittee feedback and direction
- Update roadmap to reflect direction
- Factor priorities into future meeting topics

Q & A

Please type questions into the “Questions/Chat” box in the presentation window.

If invited to speak, unmute yourself:

Computer Participants:		Click to unmute computer audio		
Phone Participants:		Click to unmute phone audio	or	Press ***6** on phone keypad

Washington Autonomous Vehicle Work Group

June 24, 2020

UNIFORM AUTOMATED OPERATION OF VEHICLES ACT

Michele Radosevich
Uniform Law Commission
920 Fifth Avenue, Suite 3300
Seattle, Washington 98104
(206) 757-8124
micheleradosevich@dwt.com

What is the ULC?

- Uniform Law Commission (ULC)
  - Non-profit, non-partisan organization formed in 1892
  - Commissioners are volunteer attorneys appointed by the states
  - Funded by state appropriations (~75%), publishing royalties (~15%), and grants (~10%)
  - ULC drafts legislation on topics where uniformity among the states is desirable and practical
  - Drafting meetings are open to any interested party – get involved!
  - Legislative staff based in Chicago headquarters

Background on the UAOVA

- 2014: Study Committee on State Regulation of Driverless Cars
- 2017: Highly Automated Vehicles Drafting Committee
- After two years of drafting, the Highly Automated Vehicles Drafting Committee finalized the Uniform Automated Operation of Vehicles Act
- 2019: Uniform Law Commission formally adopted the Uniform Automated Operation of Vehicles Act at the Commission's Annual Meeting

Scope of the UAOVA

- UAOVA does cover:
  - The deployment of automated vehicles on roads held open to the public.
    - Traffic laws and enforcement
    - Vehicle registration
    - Driver licensing, and
    - Resolves potential conflicts with existing state motor vehicle laws
- UAOVA does not cover:
  - Testing of aspirational automated vehicles for the purposes of research and development;
  - Remote driving, in which a human drives a vehicle while outside of or far from it;
  - Vehicle features that merely assist a human driver. Even if these features brake, steer, and accelerate, they are still designed with the expectation that a human driver will monitor the road.

Structure of the Uniform Act

- Early in the drafting process, the Committee considered whether to:
  - Create a new legal framework for automated vehicles to wholly supplant existing vehicle codes;
  - Adopt a model vehicle code applicable to all motor vehicles and then amend it to explicitly address automated vehicles; or
  - Draft a hybrid act to map an existing vehicle code onto automated vehicles.

Structure of the Uniform Act

- Overlay approach
  - The motor vehicle code of any enacting state continues to apply
  - Laws that apply to automobiles continue to apply to vehicles with automated driving systems without change, *except to the extent this Act effects a change*
  - The principle change is an additional requirement for registration that there be someone who comes forward and takes legal responsibility for the vehicle's ability to comply with the rules of the road in the enacting jurisdiction

Three Key Points

Automated driving…

1. Will likely be very diverse
2. Implicates many legal topics and policy issues
3. Will involve federal, state, and local governments

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The Uniform Act…

1. Contemplates this diversity
2. Focuses on a typical state vehicle code
3. Respects established state and federal roles in vehicle safety

Three Key Points

Automated driving…

1. **Will likely be very diverse**

The Uniform Act…

1. **Contemplates this diversity**

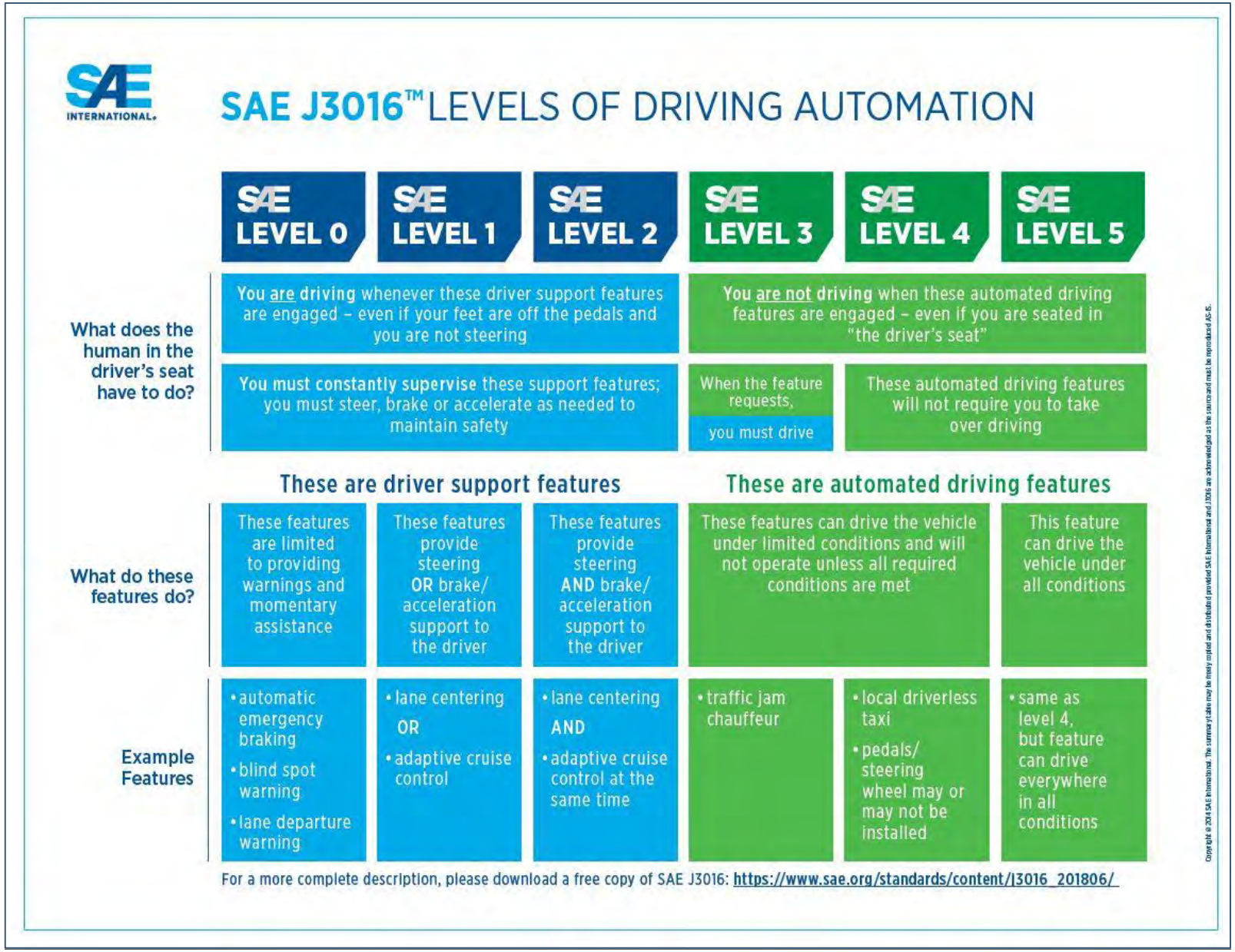
Diversity of Automated Driving

Types of Trips

- You may need to drive if prompted in order to maintain safety
- You may want to drive if prompted in order to reach your destination
- You will not need to drive for any reason

Types of Vehicles

- Vehicles you can drive
- Vehicles you can’t drive



The Uniform Automated Operation of Vehicles Act applies only to SAE Levels 3-5

Types of Vehicle Features

Assisted Driving Features

- **L0:** You're driving
- **L1:** You're driving, but you're assisted with either steering or speed
- **L2:** You're driving, but you're assisted with both steering and speed

Automated Driving Features

- **L3:** You're not driving, but in order to maintain safety you will need to drive if prompted
- **L4a:** You're not driving, but in order to travel somewhere you may need to drive if prompted
- **L4b:** You're not driving, but you can't travel everywhere
- **L5:** You're not driving, and you can travel everywhere

Some Automated Driving Models

- Original manufacturer owns vehicles and offers rides
- Another company modifies vehicles and offers rides
- Fleet operator buys vehicles and offers rides
- Individuals buy vehicles and offer rides
- Individuals buy vehicles with subscriptions for features
- Individuals buy vehicles with unrestricted use of features
- Individuals buy vehicles and modify them

Three Key Points

Automated driving…

2. **Implicates many legal topics and policy issues**

The Uniform Act…

2. **Focuses on a typical state vehicle code**

Three Key Points

Automated driving…

3. **Will involve federal, state, and local governments**

The Uniform Act…

3. **Respects established state and federal roles in vehicle safety**

CURRENT ROLES IN VEHICLE SAFETY

Production Modification Maintenance Operation

Federal Government

State Governments

Federal Motor Vehicle Safety Standards (FMVSS)
Investigations for Noncompliance and Defects
Regulatory Recalls

FMVSS-Compatible Vehicle Standards
Products Liability Law
Vehicle Registration
Vehicle Inspections
Roadworthiness
Rules of the Road
Driver Licensing

Manufacturer

Owner

Driver

UNDER THE UNIFORM ACT

Production Modification Maintenance Operation

Federal Government *State Governments*

Federal Motor Vehicle Safety Standards (FMVSS)
Investigations for Noncompliance and Defects
Regulatory Recalls

FMVSS-Compatible Vehicle Standards
Products Liability Law
Vehicle Registration
Vehicle Inspections
Roadworthiness
Rules of the Road
Driver Licensing

Manufacturer *Owner* **ADP**

Automated Driving Providers

- Who is the “driver” of an automated vehicle under automated operation?
  - Under the Uniform Act, the **automated driving provider** or **ADP** is the legal driver of an automated vehicle under automated operation.
  - An ADP declares itself to the state and designates the automated vehicles for which it will act as the legal driver.
  - Once an ADP designates an automated vehicle for which it will act as the legal driver, that automated vehicle becomes an **associated automated vehicle**.
  - The ADP might be an automated driving system developer, a vehicle manufacturer, a data provider, a fleet operator, or another kind of market participant that has yet to emerge.

Automated Driving Providers

- Only an **associated automated vehicle** – i.e. an automated vehicle that is designated by an automated driving provider – may be registered in an enacting state.
- Once the automated vehicle has been associated with an ADP, the UAOVA adopts a state's existing motor vehicle registration process.
- In this way, the Act uses the motor vehicle registration framework that already exists in states – and that applies to both conventional and automated vehicles – to incentivize self-identification by automated driving providers.
- By harnessing an existing framework, the Act also seeks to respect and empower state motor vehicle agencies.

Scope of the Uniform Act

- We did not attempt to rewrite the law of products liability
  - Drafting committee participants included automobile manufacturers, parties developing automated driving systems, trial lawyers, insurance industry representatives, etc.
  - Fair level of consensus that – at least for the time being – the existing legal system likely can cover problems that arise in initial deployments which are likely to be in the fleet model
  - The drafting committee opted not to try to take on tort reform or adopt or change the law of products liability as it relates to these vehicles

Scope of the Uniform Act

- To the extent UAOVA focuses on any sort of responsibility or liability, it is limited to responsibility for violations of the motor vehicle code and the direct consequences under the motor vehicle code.
- Who gets the speeding ticket?
  - If the automated vehicle is under automated operation, the automated driving provider will get the speeding ticket under this act.
  - If the automated vehicle is *not* under automated operation, the human driver will get the speeding ticket.

Questions?

Michele Radosevich
Uniform Law Commission
(206) 757-8124
micheleradosevich@dwt.com

AV Industry Panel – Testing and Deployments Across the Country

Rachelle Celebrezze, Cruise
David Woessner, LM Industries Group
Joe Moye, Beep

WASHINGTON STATE AUTONOMOUS VEHICLE WORK GROUP

Washington State Transportation Commission

An Introduction to Cruise

Rachelle Celebrezze, Senior Manager of Government Affairs

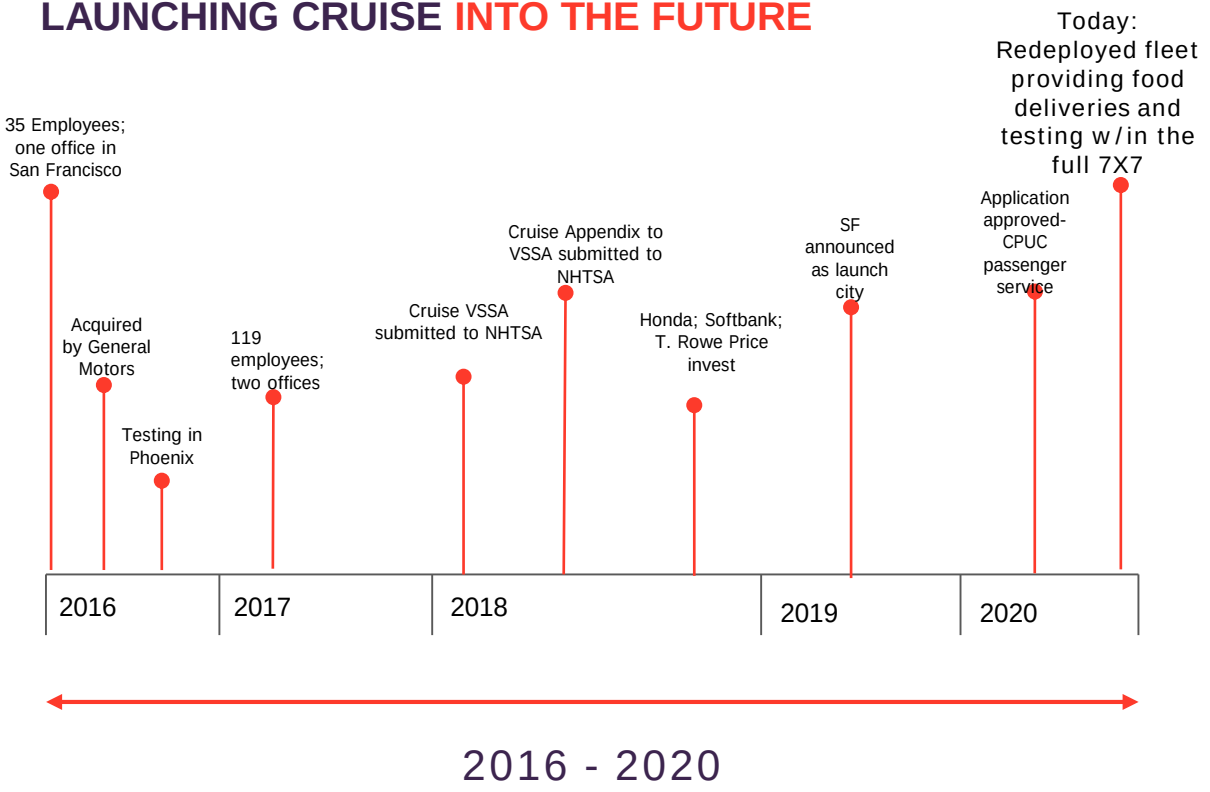
June 24, 2020

“To build the world’s most advanced autonomous vehicles to safely connect people to the places, things, and experiences they care about.”

A SELF-DRIVING CAR COMPANY

- **Founded** In 2013
- Partnership with **General Motors** In 2016
- **Headquartered** In San Francisco
- **Testing** In San Francisco, Phoenix and Detroit
- **Offices** in San Francisco, Phoenix and Bellevue

LAUNCHING CRUISE INTO THE FUTURE



Moving beyond the car

Our Product: Seamless Integration

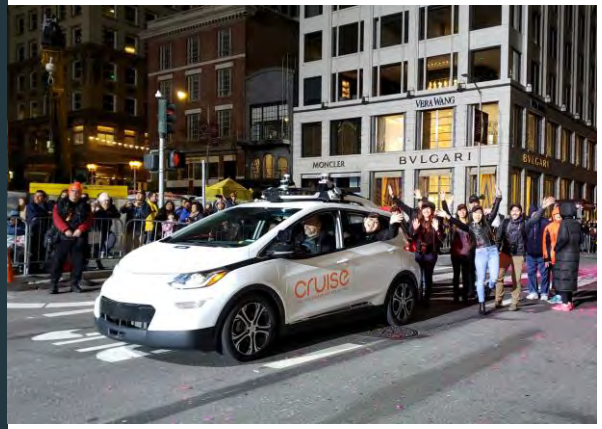
Safety Design from the Ground Up

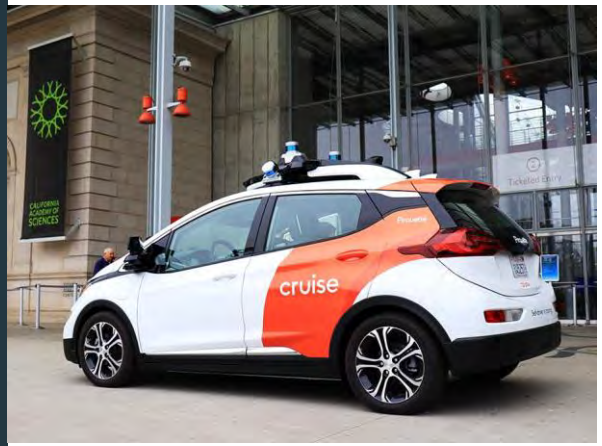
Fully electric vehicle

3 Layers of Testing:

- Real world
- Simulations
- Closed course

Winning the tech race *and* the trust race





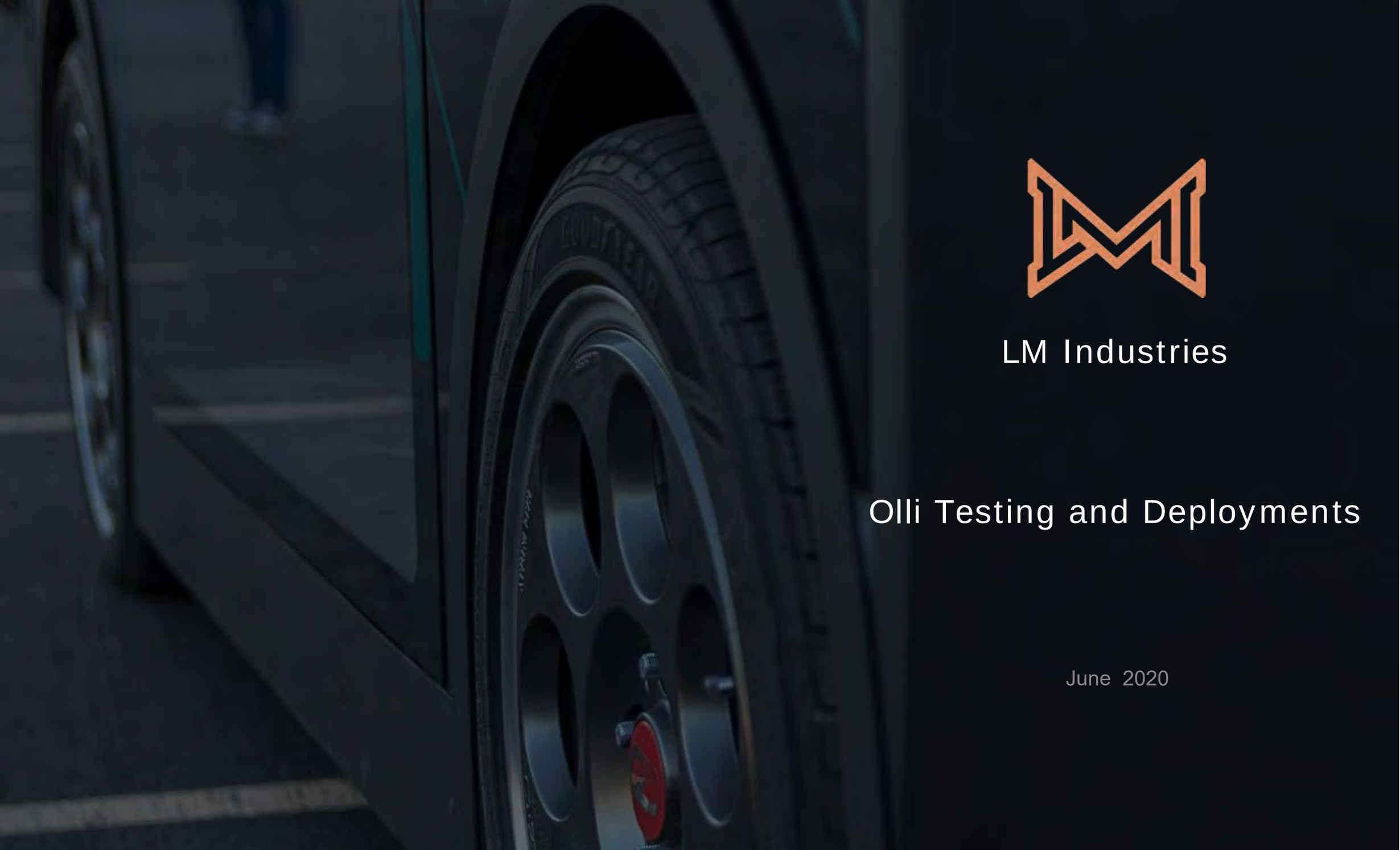
Cruise Guiding AV Regulatory Framework Principles: Considerations for Washington

- **Clear Path to Deployment:** Laws and regulations should explicitly authorize deployment of fully self-driving vehicles and remove existing roadblocks that assume a human driver behind the wheel.
- **Testing in Real-World Environment:** Ensure that testing is permitted in domains that match where deployments will ultimately occur.
- **Statewide Applicability:** One unified, statewide framework to avoid a patchwork of regulations which create conflict, complicate compliance, and delay testing and deployment.
- **Service-Neutral Approach:** Ensure that framework allows for both the transport of persons and the delivery of goods in autonomous vehicles.
- **Technology-Neutral Approach**: Governments are encouraged to allow new technology to mature and avoid overly prescriptive approaches that could inadvertently constrain progress, innovation and impact.

Thank you

For more information, contact:

Rachelle.Celebrezze@getcruise.com



LM Industries

Olli Testing and Deployments

June 2020

LMI has built a leading autonomous platform, Olli, enabled by our microfactory in Knoxville, TN

Our Microfactory

Knoxville, TN Microfactory

EFFICIENCY

Low operating cost and fast time to market with premium battle tested products

COLLABORATION

Efficient engagement with users and operators

INTEGRATION

Leveraging an open technology ecosystem across the world

FIRST MOVER

Shaping and challenging regulatory frameworks

Olli is a platform for true flexible mobility

PLATFORM

- Open architecture and tech integration
- Upgradeable and connected
- Accessibility-focused design
- Sustainable

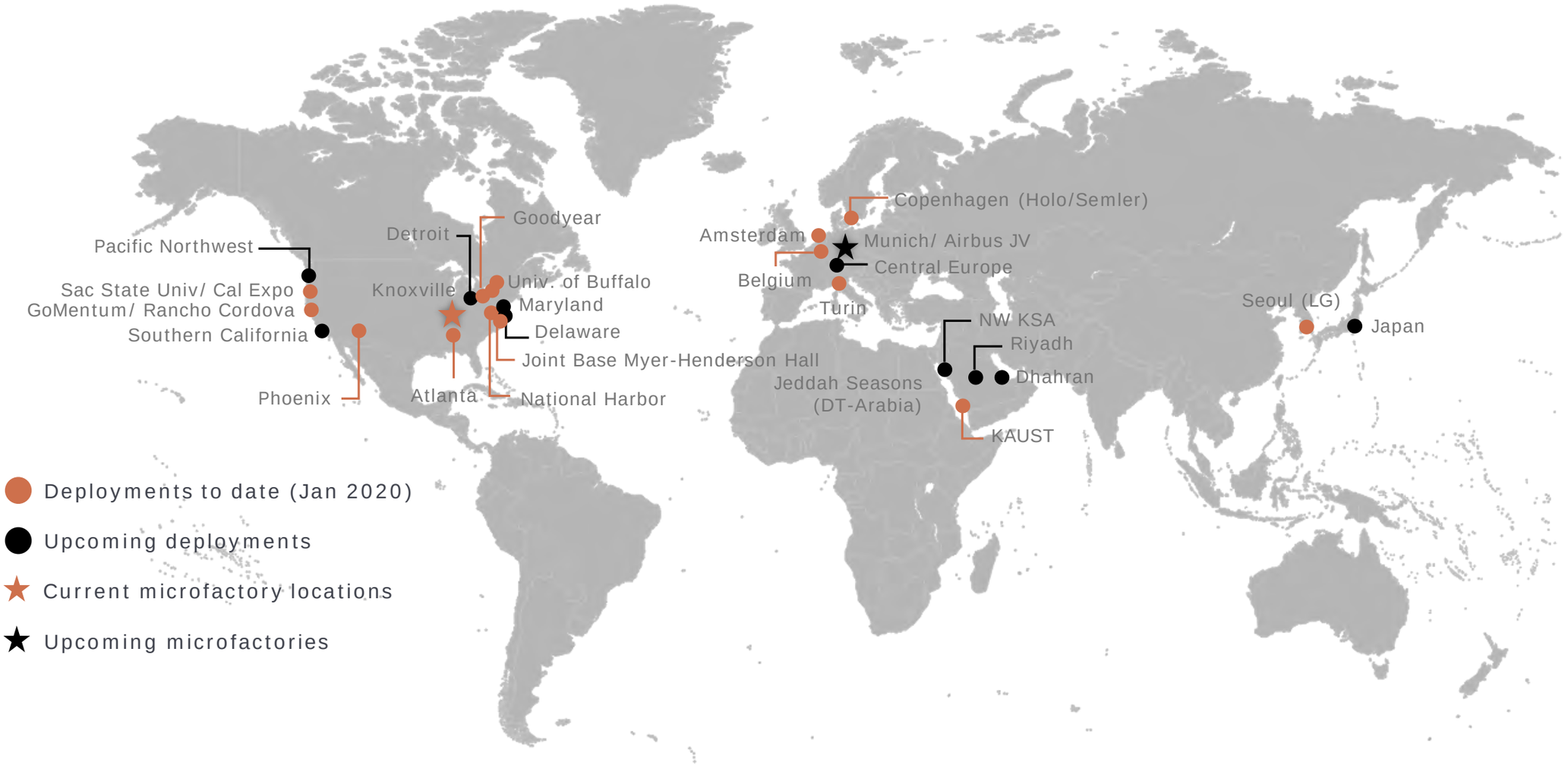
FEATURES

- Level 4+ autonomy
- Integrated sensor suite
- Battery electric
- 25mph max speed
- Extensive testing and validation

Olli 2.0

Seamless riding experience, comfort and productivity

Olli is deployed in key markets across the world



State supported University Research

Buffalo, New York

PRIVATE USE ONLY

Partner: University of Buffalo
Launch Date: 09/04/2018

Local Motors partnered with the University at Buffalo and the State of New York to implement and customize Olli for mobility testing and sustainability strategies. The Olli deployment showcases how campuses, states, and others can invest in and explore the future of transportation.

The University at Buffalo leverages Olli for autonomous vehicle education and mapping while also testing the shuttles for campus transportation. The project, which is being co-managed by the New York State Energy Research and Development Authority and the New York State Department of Transportation, supports Governor Andrew M. Cuomo's clean energy goal to reduce greenhouse gas emissions 40 percent by 2030.

State funded alternative mobility pilot

Holdfast Bay, Australia

COMPLETED

Partner: South Australia's Department of Planning, Transport and Infrastructure
Launch Date: 01/17/2019

Local Motors deployed a six-month trial of Olli, partnering with SAGE Automation's Matilda, an accessible, connected smart transit hub. The trial was supported by the South Australian Government's Future Mobility Lab Fund to demonstrate the role of automated shuttle buses providing a last-mile connection.

Olli ran along a busy beachfront thoroughfare, shared with pedestrians and bicyclists, connecting at each end of the route with Matilda bus stops. The purpose of the trial was to demonstrate these technologies while gathering feedback from community members in order to improve mobility solutions for all.

Strategic partnering to develop new technology

Akron, Ohio

PRIVATE USE ONLY

Partner: The Goodyear Tire & Rubber Company
Launch Date: 02/14/2019

Goodyear has added Olli to its testing fleet to conduct ongoing tire testing and advanced mobility evaluation at various locations, including the University of Michigan's Mcity Test Facility, the public-private research and development site with about 16 acres of roads and traffic infrastructure.

Local Motors has also selected Goodyear tires for exclusive fitment on its Olli vehicles and was featured at the 2019 Geneva International Motor Show.

Initial Olli fleet challenge deployment

Sacramento State

COMPLETED

Partner: Sacramento State
Launch Date: 02/21/2019

Two Olli shuttles deployed at Sacramento State as a result of the university competing in and winning an Olli Fleet Challenge for presenting a best-use scenario for the eight-person vehicle.

Sacramento State's entry, developed in cooperation with the Sacramento Area Council of Governments (SACOG), was selected by a panel of judges as the most viable among the field of entries due in part to its proposed use and the population of riders it served. California Congresswoman Doris Matsui, who served as a judge on the panel, stated that she was pleased that a technology designed to teach the public about autonomy was able to run in an educational setting.

Expansion of Sacramento Fleet Challenge

Sacramento, CA

COMPLETED

Partner: SMUD, Cal Expo and the California State Fair
Launch Date: 04/05/2019

Cal Expo, in partnership with the Sacramento Municipal Utility District (SMUD), deployed two Olli as part of its vision to expose the capabilities of autonomous vehicles and demonstrate the value associated with the electrification of the transportation sector to a diverse set of guests. Olli operated throughout the summer during its multiple events, including the 2019 California State Fair, transporting guests from the parking lot to multiple expo entrances.

Continued and expanded collaboration with US DOD

Arlington, Virginia

COMPLETED

Partner: Joint Base Myer-Henderson Hall
Launch Date: 06/19/2019

Joint Base Myer-Henderson Hall, an Army and Marine Corps joint base adjacent to Arlington National Cemetery, deployed a fleet of Olli for a three-month trial, as a result of being named the winner of the Greater Washington Olli Fleet Challenge. The challenge, launched by Local Motors, asked entrants to propose use-cases for the electric, self-driving shuttle.

The base provided a unique scenario for Olli, transporting personnel to a variety of stops, including the community center, dining options, a health clinic and barracks. Since most servicemembers do not bring a personal car to the base, Olli was able to provide value to those who serve us.

Continued expansion of Sacramento Fleet Challenge

Rancho Cordova, California

COMPLETED

Partner: The City of Rancho Cordova
Launch Date: 08/07/2019

As part of a three-month pilot project primarily funded by the Sacramento Area Council of Governments (SACOG), with funding assistance from the City of Rancho Cordova, Olli operated at White Rock Corporate Campus, a large business park that is home to 1,600 employees.

Campus employees, as well as the general public, were transported in this first city to test a business use for Olli, keeping Rancho Cordova at the forefront of smart mobility and a leader in the region in intelligent transportation and its rapidly developing technology.

Consortium of partners to investigate next gen tech

Peachtree Corners, Georgia

COMPLETED

Partner: Curiosity Lab
Launch Date: 10/01/2019

The winner of Local Motors' Atlanta Olli Fleet Challenge, the City of Peachtree Corners, competed against several other municipalities, campuses and districts to propose a short-term, local use for Olli. Each entry was evaluated by a local panel of judges who selected Peachtree Corners due to its meaningful investment in Curiosity Lab at Peachtree Corners, an economic development initiative owned and funded by the City.

Olli operated on a dedicated 1.5-mile-long autonomous vehicle test track, providing a smart, safe, sustainable transportation option to residents, employees and visitors of the technology park.

The winner of Local Motors' Atlanta Olli Fleet Challenge, the City of Peachtree Corners competed against several other municipalities, campuses and districts to propose a short-term, local use for Olli. Each entry was evaluated by a local panel of judges who selected Peachtree Corners due to its meaningful investment in Curiosity Lab at Peachtree Corners, an economic development initiative owned and funded by the City.

Fleet testing for future large-scale transit deployment

Concord, California

PRIVATE USE ONLY

Partner: AAA Northern California and the Contra Costa Transportation Authority
Launch Date: 10/16/2019

Local Motors, AAA Northern California and the Contra Costa Transportation Authority (CCTA) are testing an innovative solution to the “first mile, last mile” challenge that many commuters in the San Francisco Bay Area and across the country face on a daily basis. Testing is taking place at GoMentum Station in Contra Costa County, with future plans for deployment near transit stations around Northern California.

Phase 3 of public road testing with private citizens

National Harbor, Maryland

OPEN TO PUBLIC

Partner: Maryland Department of Transportation
Launch Date: 10/22/2019

Local Motors, in partnership with the Maryland Department of Transportation (MDOT), has expanded the testing of Olli to public roads in National Harbor. Due to a landmark local permit, Olli is collecting imperative insights to help solve Maryland's most pressing transportation challenges such as traffic congestion, accessibility, and environmental concerns like pollution.

As Olli operates, Local Motors' engineers are collecting and analyzing data in real-time from scenarios such as intersection crossing, and interactions with pedestrians. The route serves as an alternative transportation option to the residents and employees of National Harbor as well as visiting tourists, carrying them to harbor attractions and commerce centers.

Living lab environments to develop smart solutions

Thuwal, Saudi Arabia

OPEN TO PUBLIC

Partner: King Abdullah University of Science and Technology
Launch Date: 12/11/2019

King Abdullah University of Science and Technology (KAUST) introduced self-driving shuttles onto its university campus to pioneer the adoption of autonomous vehicles into the Kingdom of Saudi Arabia. The pilot project establishes KAUST as a leader in the fields of the future, including eco-friendly transportation and mobility research.

Olli travels along an almost two-mile loop, comfortably transporting students, faculty and visitors to multiple stops across the campus, making KAUST a leading smart city in the region.

Preparing for public road homologation

Turin, Italy

OPEN TO PUBLIC

Partner: City of Turin, Torino City Lab, Reale Mutua and Gruppo Iren
Launch Date: 01/16/2020

In Turin, Olli's adventure begins with a trial period that will last four months, during which the shuttle will provide transport services within the ITC-ILO campus. Bringing Olli to the Piedmont capital, the first deployment of its kind in Italy, is the result of collaboration at the international level between the City of Turin, ITC-ILO, Reale Mutua and Local Motors. Through May, employees and guests of the UN ITC-ILO campus will be able to take a ride on Olli, while the self-driving vehicle can gather valuable data and insight from operating in real urban conditions.

Outcomes and Considerations

Outcomes

- Since Olli Demo Day in April 2018 with Olli 1.0, the various pilots and deployments have led to various product improvements to Olli 2.0
- Testing and pilots have lead to a better understanding of customer and consumer preferences and requirements
- Data has been collected and shared with various state and federal agencies - Local Motors was recently named to the NHTSA AV Test initiative

Olli 2.0

Considerations

- Working with federal and state regulators to remove unnecessary barriers to testing and deployment on public roads
- Working with federal and state legislators to develop or change relevant laws where current laws cause unnecessary barriers to testing and deployment on public roads
- Collaborating with many stakeholders to collect and share data to educate the general public (AV Test Initiative)

Legislation and Regulation


BUILD THE FUTURE


beep
Autonomous Mobility Solutions
www.go-beep.com
beep

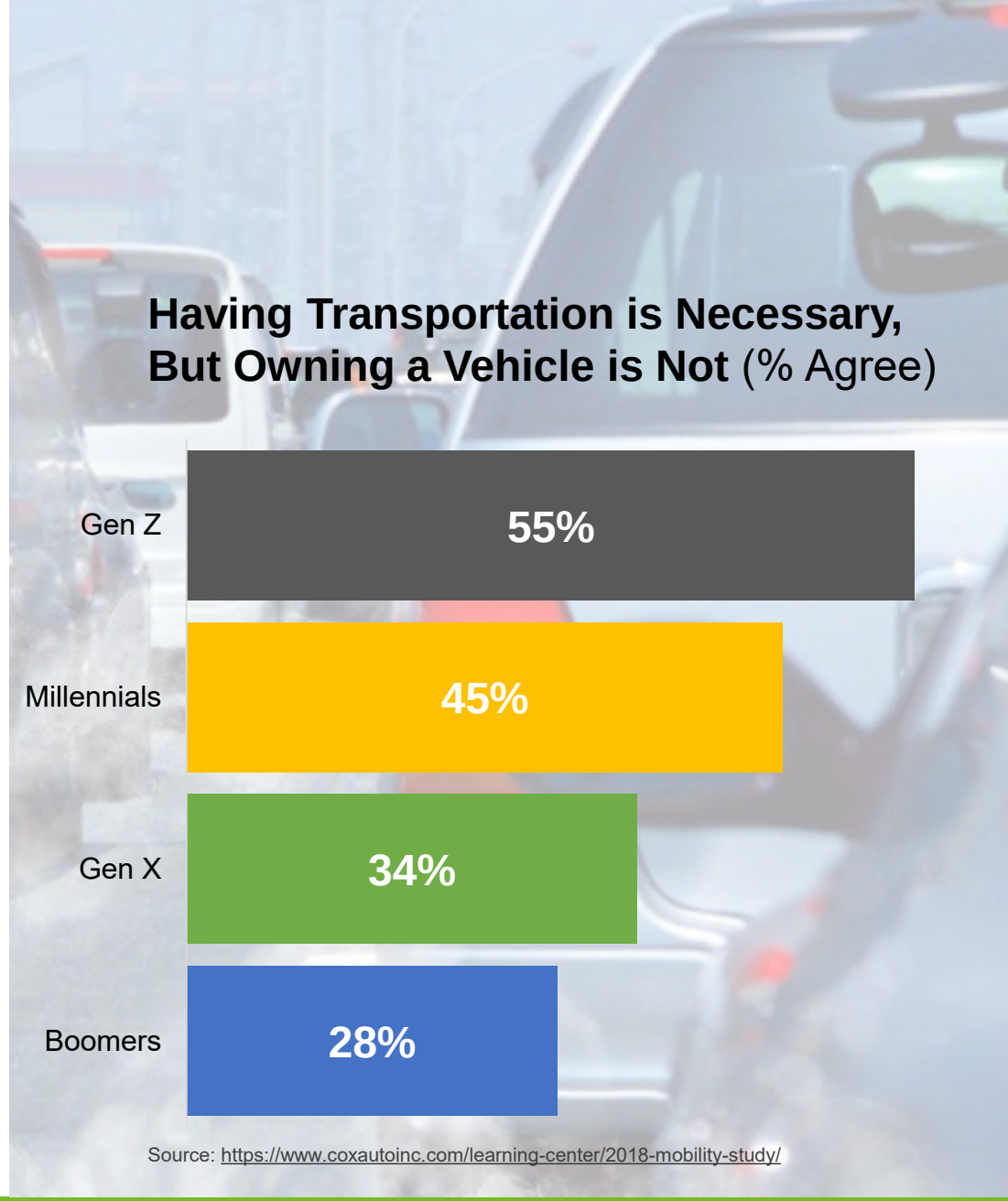
MEET BEEP

Under contract with the largest public and private community planned AV shuttle deployments in North America

- **Controlled speed, electric, fixed route, multi-passenger autonomous Mobility as a Service solutions provider** offering fully managed services to both private and public communities
- **Privately held** – Orlando, FL
- Built and led by a **proven executive team** of technology entrepreneurs and fleet management executives
- **Unique service offerings** including innovative technology and processes to manage, operate and maintain AV fleets
- **Proven solutions designed by transportation specialists** to ensure safe and secure implementation of mobility offerings consumed as-a-service or purchased as an asset with a complete suite of managed services
- **First distributor and dealer for autonomous vehicles** in the US

THE OPPORTUNITY

- Urbanization is driving more integrated town center and “live-work-play” communities
- Alternative means of transportation to personal vehicles is becoming the generational norm
- Human error causes 85% of all accidents, distractions only getting worse (Safety)
- City Centers are suffering from traffic congestion and parking shortages
- Uber and Lyft have created ride share category but only added to the congestion
- Eco-conscious population is demanding electric mobility options



Source: https://www.coxautoinc.com/learning-center/2018-mobility-study/

OUR SOLUTION

- Provide turnkey autonomous mobility solutions for the controlled speed, multi-passenger, first and last mile use cases
- Deliver a complete suite of software enabled services, infrastructure and vehicles
- Provide a safe, reliable, high-quality rider experience in a disruptive, shared advertising revenue model
- Expand use cases and form factors with new OEM relationships in a vehicle agnostic model
- Build a scalable, dynamic route service thus optimizing assets and deploying true on-demand mobility

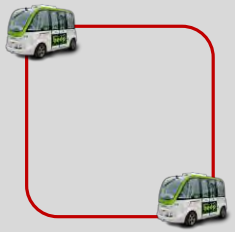
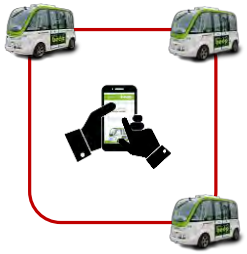
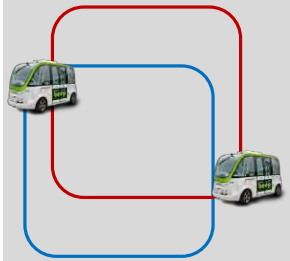
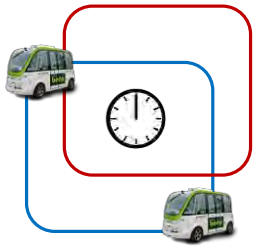
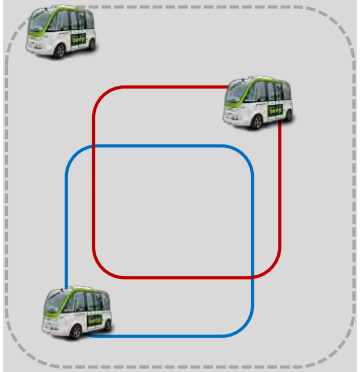
SOFTWARE ENABLED SERVICES

BEEP AUTONOMOUS EVOLUTION

Beep is focused on the controlled speed, multi passenger autonomous market to become the world-wide leader in successful AV deployments for environments that can be deployed today and expanded with the evolution of technology and regulations.

5 Stages of CONT. SPEED SHUTTLE Autonomy

Shared Mobility

1 Fixed Route	2 Hailing	3 Variable Routes	4 Route Orchestration	5 Fully Autonomous
• Fixed schedule & route • Attendant aboard	• Ride hailing & scheduling	• Multiple routes mapped; enable asset optimization	• Fleet orchestration (work, school, lunch, yoga, dinner, etc.)	• Speed of traffic < 35MPH • Variable routes in geofence • No attendant
				
Today				

BEEP COMMAND CENTER

CONTINUOUS MONITORING

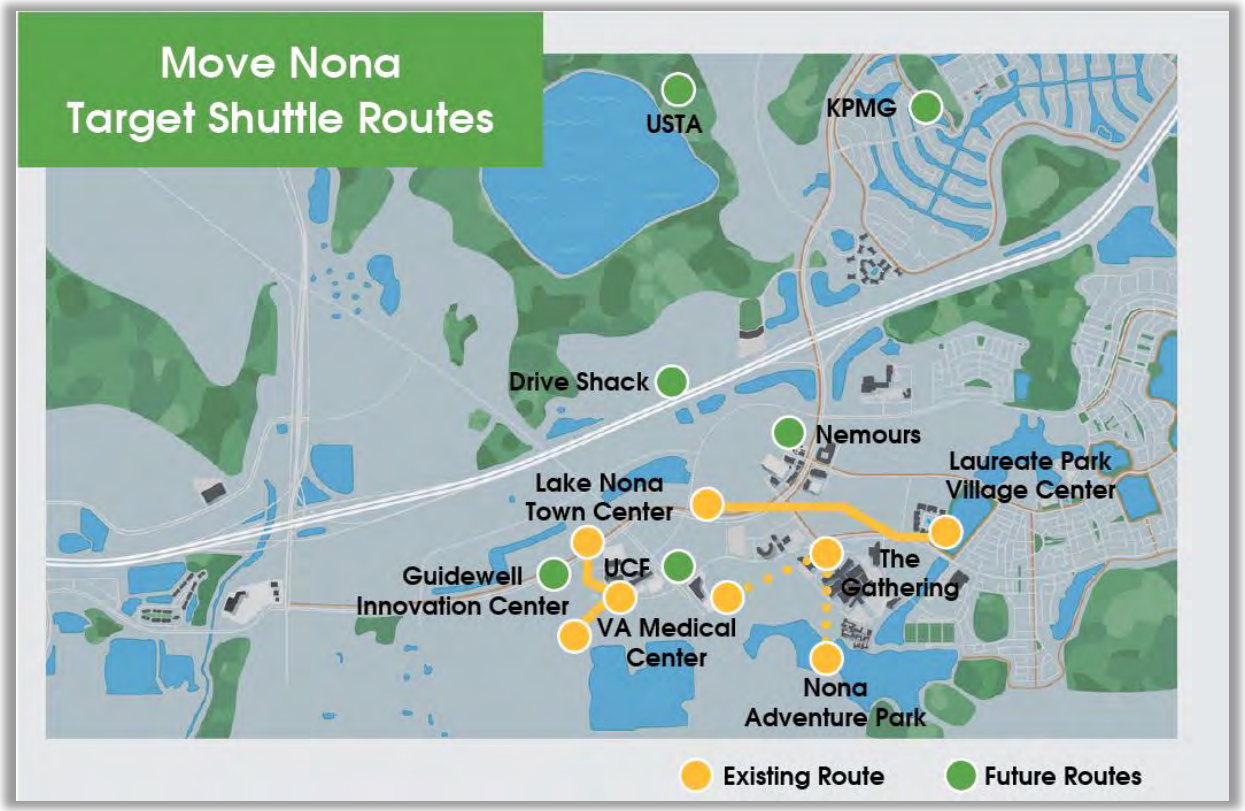
MONITORING
Real-time video and electronic supervision of the shuttle and passengers to ensure performance, safety, and security

RESPONSIVE
Proactive service management and immediate incident resolution

SECURE
World-class cyber security safeguards for fleets and monitoring platform

EFFICIENT
Real-time data analysis to improve vehicle performance and enhance passenger experience

ANCHOR CLIENT



Move Nona Mobility Network Plan:

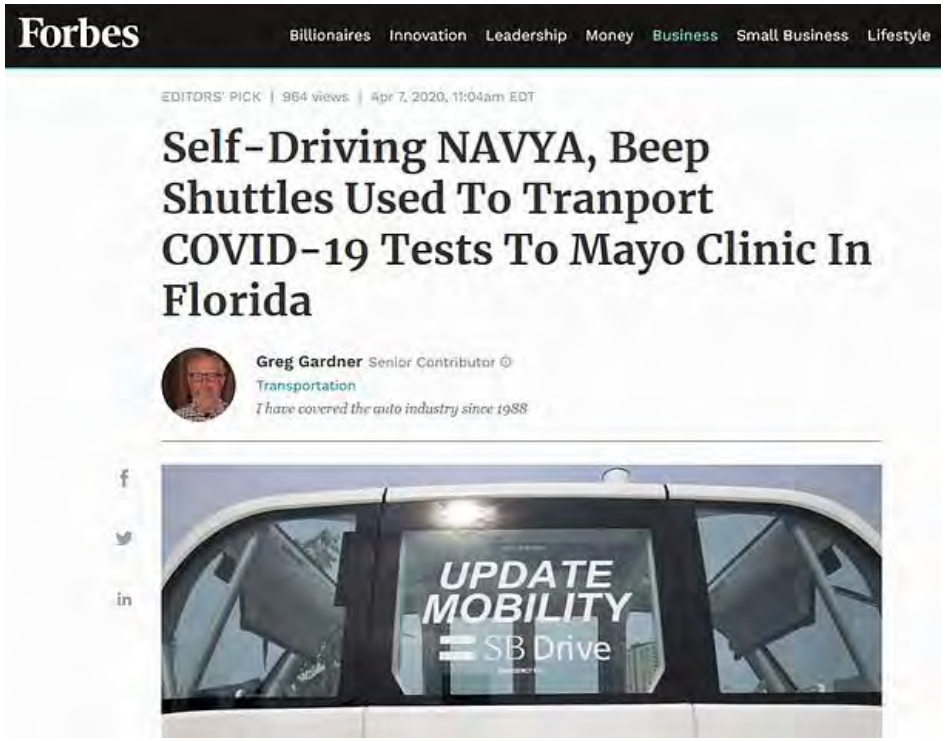
- 8 shuttles in service currently, expanding to +12 by year end; Mixed traffic deployments
- 22+ miles of multi-model paths by end of 2022

Business Drivers:

- Provide a safe and reliable alternative to personal transportation for access to all services
- Reduce community road congestion and parking requirements – Enhance safety
- Increase real estate values by attracting new businesses, residents and visitors
- Further advance the Lake Nona brand for technology leadership and innovation
- Impact Lake Nona commitment to the reduction of carbon emissions

BEEP AND JTA TRANSPORT COVID-19 TESTS

- **7-Day deployment:** public-private partnership between Beep, JTA, and Mayo Clinic provided for safe, successful, and expedited deployment on March 30
- **Project scope:** autonomous shuttle with no attendant onboard transports COVID-19 tests collected from drive-thru testing site to another building for processing on a closed campus
- **Fully autonomous:** remote operator initiates shuttle's journey from testing site to the drop-off location, while on-ground support equipped with wireless e-stop staff monitors shuttle on route
- **Objectives:** frees up Mayo Clinic staff for frontline work who would otherwise transport samples and removes a level of human interaction



MAYO CLINIC

Autonomous Mobility Solutions

CRITICAL SUCCESS FACTORS

People

Process

Technology

- Proactive community and emergency responder engagement **increased community awareness, enthusiasm and adoption**
- **Key hires** provided critical knowledge and on the ground support for deployment and operations
- Leveraged **industry and supplier expertise** to scale our operations
- Implemented a PMO for **delivery process and discipline to achieve safe and successful launches**
- **Created customer onboarding process** and developed **deployment methodology and artifacts**
- Established **Beep Command Center** to monitor shuttle health and enable **development of support protocols** that can scale as the business grows

LESSONS LEARNED

Engage early and often with local, state and federal regulatory bodies

Understand and leverage all available sources of funding; public / private partnerships are on the rise with impressive community outcomes

Skilled attendants, commissioning, and maintenance resources are limited

Shuttle and infrastructure technology requires more maturity and ubiquitous availability for safe autonomous operation at scale

Support operations and SLAs must be designed for customer facing impact


beep
Autonomous Mobility Solutions
www.go-beep.com
beep

Executive Committee Member Items

Open Forum

WASHINGTON STATE AUTONOMOUS VEHICLE WORK GROUP

Washington State Transportation Commission

Executive Committee Member Items – Open Forum

Please type questions into the “Questions/Chat” box in the presentation window.

If invited to speak, unmute yourself:

Computer Participants:		Click to unmute computer audio		
Phone Participants:		Click to unmute phone audio	or	Press ***6** on phone keypad

Closing Remarks

WASHINGTON STATE
AUTONOMOUS VEHICLE
WORK GROUP

Washington State
Transportation Commission

Closing Remarks

- **Recap Today's Meeting:**
  - » Action Items
  - » Agreements / Decisions

- **Upcoming Meetings:**
  - » September 24th – Executive Committee Meeting
  - » November 12th – Executive Committee meeting

Thank You!

WASHINGTON STATE
AUTONOMOUS VEHICLE
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Washington State
Transportation Commission