Some of the many companies working on AVs

**VEHICLE STARTUPS**
- olli
- EASY MILE
- RDM GROUP
- NAUYA
- TESLA

**OEMs**
- GM
- Volkswagen
- Nissan
- Ford
- Toyota
- Volvo
- Jaguar
- Land Rover

**TECH COMPANIES**
- NVIDIA
- Alibaba Group
- nuTonomy
- OXBOTICA
- Baidu
- Apple

**SPECIFIC COMPONENTS COMPANIES**
- Delphi
- Velodyne
- Nauto
- Qualcomm
- Mobileye

**UNIVERSITIES**
- Carnegie Mellon University
- University of Cambridge
- Texas A&M University
- TU Delft
- University of Leeds
- Massachusetts Institute of Technology
- Berkeley
- University of Oxford
- ETH Zürich
- University of Michigan
- Stanford University
- The Open University
Mobility as a Service (MaaS) is also a developing market
What is the range of possible business models?

- **Personal Mobility**
  - Owned AVs
  - Shared AVs (SAVs)

- **Transit**
  - On Demand Services
  - Automated High-Capacity Transit

- **Logistics**
  - Automated Delivery Drones
  - Autonomous Freight
Where are AV R&D or pilot programs happening?

- Google/Waymo
  - Mountain View, California
- San Diego Association of Governments
  - San Diego, California
- Uber
  - Pittsburgh, Pennsylvania
- nuTonomy
  - Singapore
- CityMobil2
  - Brussels, Belgium
- American Center of Mobility
  - Detroit, Michigan
- U.S. Army Aberdeen Test Center
  - Maryland
- Mcity
  - Detroit, Michigan
- 2getthere
  - Utrecht, Netherlands
- EasyMile
  - Paris, France
- UK AutoDrive
  - Milton Keynes, UK
- Texas AV Proving Grounds Partnership
  - Texas
- University of Wisconsin-Madison
  - Madison, Wisconsin
- GoMentum Station
  - Concord, California
- Iowa City Area Development Group
  - Iowa
- Central Florida Automated Vehicle Partners
  - Florida
- N. Carolina Turnpike Authority
  - North Carolina
- Delphi
  - Singapore
- American Center of Mobility
  - Michigan
- Central Florida Automated Vehicle Partners
  - Florida
- University of Wisconsin-Madison
  - Wisconsin
- Texas AV Proving Grounds Partnership
  - Texas
- University of Wisconsin-Madison
  - Wisconsin
- GoMentum Station
  - Concord, California
- Iowa City Area Development Group
  - Iowa
- Central Florida Automated Vehicle Partners
  - Florida
- University of Wisconsin-Madison
  - Wisconsin
- Texas AV Proving Grounds Partnership
  - Texas
Goals: potential positive outcomes for cities

Safety
- Reduced crashes, injuries and fatalities

Economic
- Job creation, economic development

Social
- Improved accessibility and public health for all

Environment
- Reduce emissions, energy use and GHG, increase open space and green infrastructure

Roadspace
- Reallocate road space for more productive uses

Parking
- Repurpose parking, reduce burden and impact of parking construction

Data
- Shared, real-time data for improved operations, predictive analytics and decision-making
Potential Impacts – and Opportunities – for Transit Agencies

Impact: Automated cars disrupt the mobility landscape
- Consumers flock to purchase their own automated cars
- Automated cars increase congestion, increase VMT
- Car companies roll out automated mobility services
  - Ridesharing (Uber, Lyft) is an early example
- Transit ridership could spiral downward, especially on low productivity routes

Opportunity: Transit agencies become mobility companies
- Expand technology and service portfolio: find the best solutions to meet the needs of the community
  - Serve low-productivity areas with on-demand, flexible route service
  - Use road pricing to generate income and shape services to meet societal needs
  - More income to spend on arterial service / core routes
- Safety benefits & driver stress reduction – crash detection and avoidance
Academic and research entities come together with government and industry professionals to exchange ideas and insights to expedite the future of automated vehicles.

834 COMPANIES REPRESENTED

NEARLY 100 academic/research institutions

17 MAJOR AUTO MANUFACTURERS including Ford, Mercedes, Nissan and Volkswagen

MORE THAN 55 federal and state government entities

11+ INDUSTRIES REPRESENTED...

- Supplier/OEM
- Government
- Insurance
- Academy/Research
- Manufacturer
- Association
- Media
- R&D
- Financial
- Consultant
- End User

...AND STILL GROWING
Agenda at a Glance

- **Tuesday, July 11**
  - Morning: Plenary Sessions
  - **Afternoon: Breakout Sessions**
  - Evening: Reception and Poster Sessions

- **Wednesday, July 12**
  - Morning: Plenary Sessions
  - **Afternoon: Breakout Sessions**
  - Evening: Reception and Poster Sessions

- **Thursday, July 13**
  - Plenary Sessions
  - Breakout Session Presentations
  - Closing Comments
  - US Department of Transportation Listening Session
Breakout Sessions: A Sampling from 2016

• Breakout 1: Public Transport and Shared Mobility
• Breakout 8: Traffic Signal Control with Connected and Automated Vehicles (CAVs)
• Breakout 11: Early Implementation Alternatives for Automated Vehicles
• Breakout 12: "AV-Ready" Cities or "City-Ready AVs?"
• Breakout 13: Challenges/Opportunities for Deploying Automated Vehicles on Freeways and Managed Lanes
• Breakout 14: Reducing Conflict Between Vulnerable Road Users and Automated Vehicles
• Breakout 17: Policy Making for Automated Vehicles: A Proactive Approach for Government
• Breakout 20: Physical Infrastructure, Work Zones, and Digital Infrastructure
Public Transport & Shared Mobility Breakout

Breakout Session Agenda Summary:

- ‘Quick Burst’ presentations: Updates on research, projects, pilot programs, testing sites
- Presentations: Program updates and funding opportunities
- ‘Shark Tank’: What it takes to launch a successful AV pilot program
- Panel: Integration of public and private models
- Panel: What is public transportation in the future?
- Workshop: Policy implications and research needs for public transport and shared mobility

Moderators and Panelists

- Susan Shaheen, UCB TSRC
- Dan Fagnant, General Motors
- Randell Iwasaki, CCTA
- Justin Holmes, Zipcar
- Robbert Lohmann, 2getthere
- Matthew George, Bridj
- Adriano Alessandrini, Univ. of Florence
- Chris Kopp, HNTB
- Chris Augenstein, VTA
- Gary Hsueh, Arup
- Vincent Valdes, FTA
- Kevin Dopart, ITS JPO
- Michael McGurrin, Noblis
- James Fishelson, Univ. of Michigan
- Will Baumgardner, Arup
- Doug Grettman, Kimley-Horn
- Katherine Kortum, TRB
- Tom Voege, OECD
- Jonathan Matus, Zendrive
- Habib Shamshkhou, Stantec
- Emily Castor, Lyft
- Barbara Laurenson, MTC
- Michael Scrudato, Munich Re
- John Mirisch, Mayor of Beverly Hills
- Stan Young, NREL/ATRA
- Sam Lott, Texas Southern Univ.
- Jerome Lutin, NJ Transit (ret.)
- Mark Mindorff, DARTS

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Public Transport & Shared Mobility Breakout

Summary of Key Findings/Lessons Learned:

- Automated vehicles, if shared, will begin to blur the lines between public and private transportation and deliver efficient and affordable public transportation to meet societal needs – improving access to jobs and healthcare.

- Deployment opportunities for Shared Automated Vehicles for first/last mile connections, underserved populations, and areas lacking quality transit service – a much broader market than most people think.

- Cities and sites are different, so Shared Automated Vehicle deployments need to be tailored to varying technical, cultural, and legal contexts.

- Technology could help improve safety with today’s buses and reduce insurance costs (Washington State Insurance Pool study example).
Public Transport & Shared Mobility Breakout

Summary of Key Findings/Lessons Learned, continued:

• There is strong interest at the local level to **test and deploy** Shared Automated Vehicles

• **Pilot programs**, enabled by public-private partnerships, are encouraging private shared services to adapt and expand their functionality to meet the needs of public transit users
  - One system in the Netherlands has been operating as part of the public transit system for 18 years!

• There are many **competitive federal funding opportunities** that highlight the role of Shared Automated Vehicles in public transportation

• Significant thought is required in **setting and adapting policies** at all levels of government to support the use of automation and Shared Automated Vehicles in public transportation
Key Facts for 2017

www.automatedvehiclessymposium.org

July 11-13, 2017 (Tuesday-Thursday)

Hilton San Francisco Union Square

Public Transport & Shared Mobility Breakout planning: Gary Hsueh: gary.hsueh@arup.com