ALASKA FORUM ON AUTONOMOUS VEHICLES

ITE is an international membership association of transportation professionals who work to improve mobility and safety for all transportation system users and help build smart and livable communities.

A better future transformed by intelligent mobility.

Safer. Greener. Smarter.

CURRENT CHALLENGES

REPORT CARD FOR ALASKA'S INFRASTRUCTURE 2017

TRAFFIC

6.9 BILLION HOURS
IN 2016 (US)

SAFETY

>35,000 FATALITIES IN 2016 (US)
40% INCREASE FROM 2013-2017(AK)

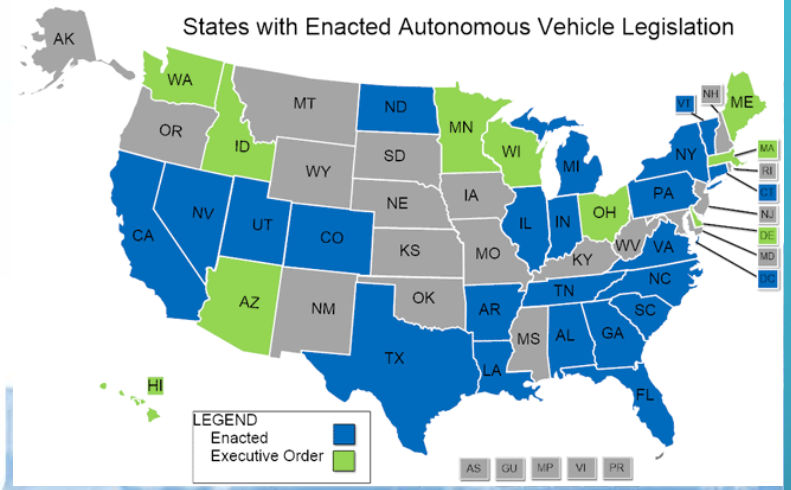
INFRASTRUCTURE

$165 BILLION PER YEAR
SPENT ON HIGHWAY
INFRASTRUCTURE (US)

SOCIO-ECONOMICS

THE AVERAGE AMERICAN
FAMILY SPENDS >$900 PER
MONTH TO OWN A CAR

ITE Alaska Section–Committee on Autonomous Vehicles



Rapidly Advancing Technology

Autonomous Vehicle (AV) technology is a fundamental shift in the human factor in transportation. Vehicles with AV technology have the potential to significantly reduce accidents, traffic congestion, environmental impacts, and pollution.

What does this mean for Alaska?

Goals of Committee

- Research the socio-economic, traffic, infrastructure, technology, environmental, and safety impacts.
- Create a guide for policymakers, and state & local agencies.
- Inform the community of the potential effects.
- To assist legislators in making wise policy decisions regarding this rapidly advancing technology.

*Image courtesy of WAYMO

Alaska Forum on Autonomous Vehicles

JUNE 8TH, 2018

Tracy Larkin-Thomason, P.E.
Nevada DOT – Deputy Director for Southern Nevada
NDOT Autonomous Vehicle Policy Framework Program

Ed Bradley
Toyota America– C/AV Program Manager
Toyota America's Connected & Automated Vehicle Program

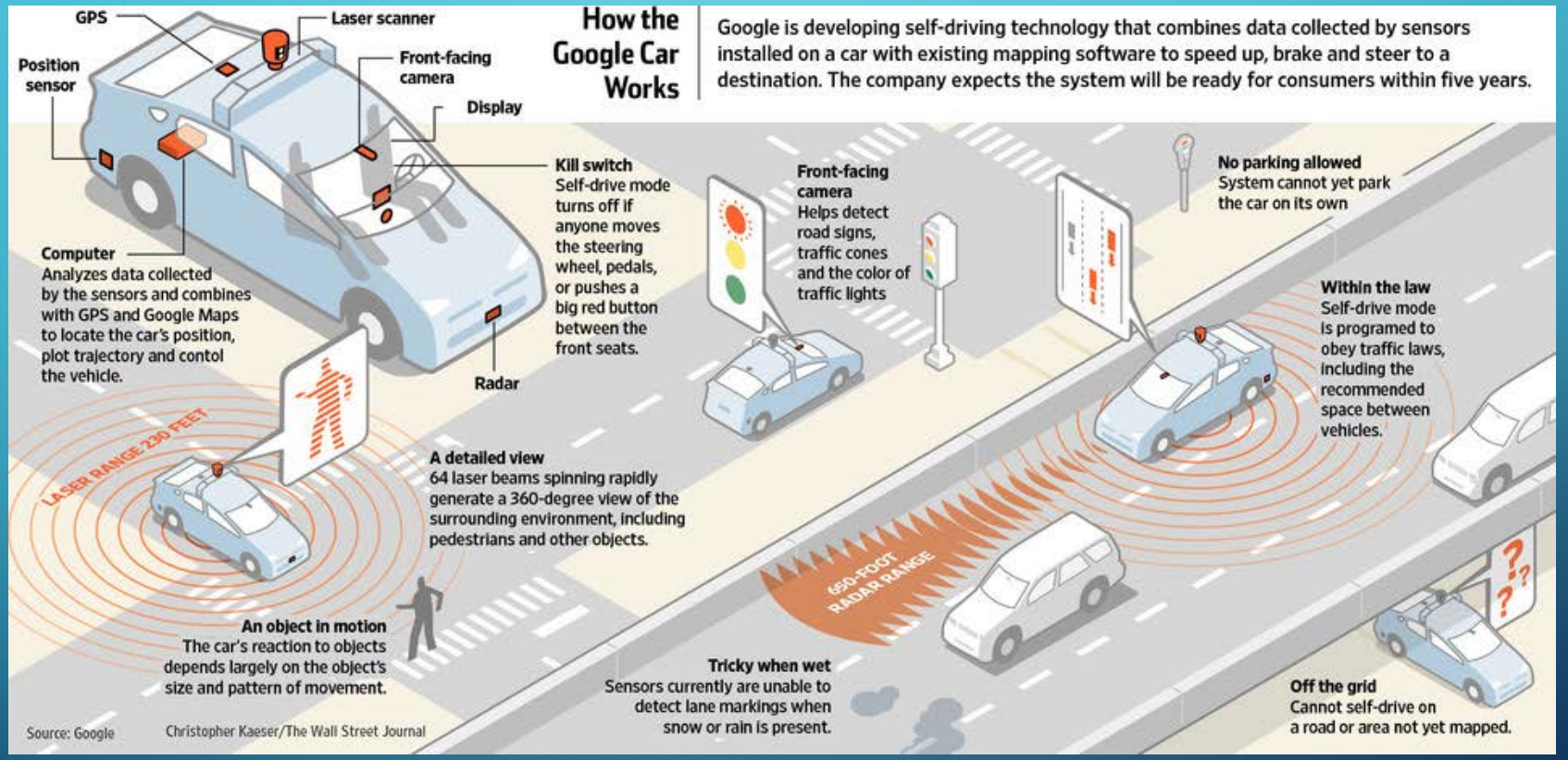
Jeff Gurney
TSF&E, P.A. – Attorney
Sue My Car Not Me: Products Liability and Accidents Involving Autonomous Vehicles

Jay Hietpas, P.E.
Minnesota DOT – Connected & Automated Vehicle Program Director
MnDOT Autonomous Shuttle Bus Pilot Project – 2017/2018 Winter Testing

Abby Morgan, PhD, P.E.
Kittelson & Associates – C/AV Program Manager
Policy, Planning, and Decision Making for Autonomous Vehicles in Alaska

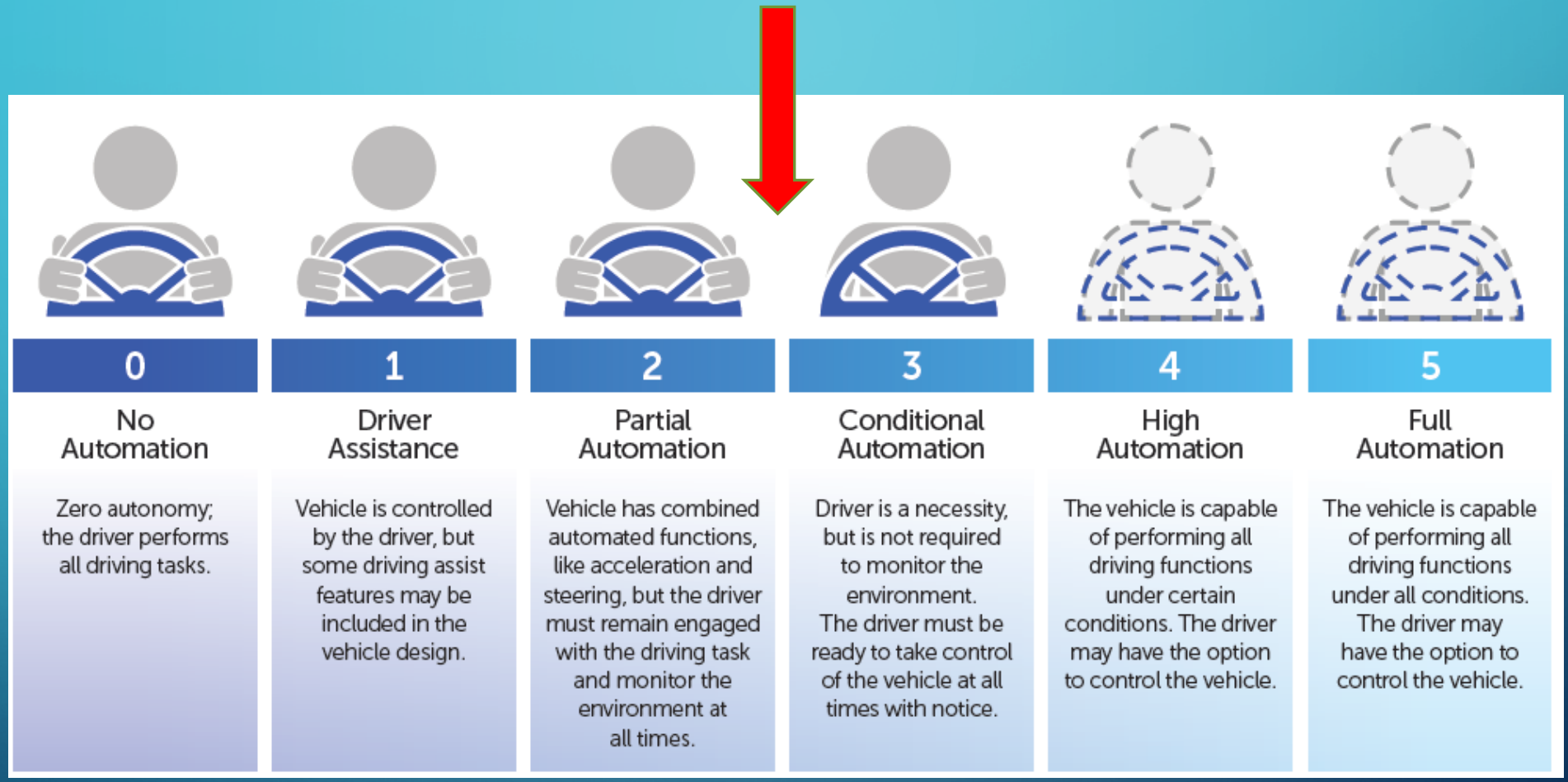
Koorosh Olyai, P.E.
Stantec – Senior Principal of Advanced Transportation Management Systems
Status of Legislation, Regulation, Guidance and more for Connected Automated Vehicles (C/AVs)

HOW C/AV'S WORK



Tracy Larkin-Thomason, P.E.

SAE LEVELS OF AUTOMATED VEHICLES



0	1	2	3	4	5
No Automation	Driver Assistance	Partial Automation	Conditional Automation	High Automation	Full Automation
Zero autonomy; the driver performs all driving tasks.	Vehicle is controlled by the driver, but some driving assist features may be included in the vehicle design.	Vehicle has combined automated functions, like acceleration and steering, but the driver must remain engaged with the driving task and monitor the environment at all times.	Driver is a necessity, but is not required to monitor the environment. The driver must be ready to take control of the vehicle at all times with notice.	The vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle.	The vehicle is capable of performing all driving functions under all conditions. The driver may have the option to control the vehicle.

Tracy Larkin-Thomason, P.E.

Nevada's journey

2011
Senate Bill 511

- Authorized AV testing and operation
- Required DMV to create regulations
  - Define insurance requirements
  - Establish minimum safety standards
  - Provide for vehicle testing
  - Restrict to specific areas

2013
Senate Bill 313

- Further defined "autonomous technology" to not need human active control/monitoring
- Established $5M liability requirement
- Established aftermarket AV conversion liability

2015

- First red AV license in the Nation
- Daimler/Freightliner (May 5th)

2016

- Center for Advanced Mobility born
- Nation's leader in the testing and development of cars that drive themselves
- First AV restricted drivers license

2017
Assembly Bill 69

- Allows the use of driver-assistive platooning on state highways
- Permits the operation of fully autonomous vehicles in the state without a human operator
- Permits the use of AV by motor carriers and taxi companies
- Defines "driver" and "driver-assistive platooning"

Tracy Larkin-Thomason, P.E.

SUCCESSFUL COLLABORATION

- Nevada's Center for Advanced Mobility (NCAM)
- Nevada Governor's Office of Economic Development (GOED)
- RTC of Southern Nevada
- RTC of Washoe County
- Nevada Department of Motor Vehicles
- Nevada Department of Transportation

Tracy Larkin-Thomason, P.E.

Mobility
on Demand

Integrates with ITS, data analytics, transit CAD/AVL, and commercial ride-share (Uber, Lyft) system

Nexar
AI dashcam app to monitor

road safety

Audi
Time-to-Green feature

Modifies driver behavior to be prepared and focused

Tracy Larkin-Thomason, P.E.

WHAT ARE THE CHALLENGES?

Snow / Ice

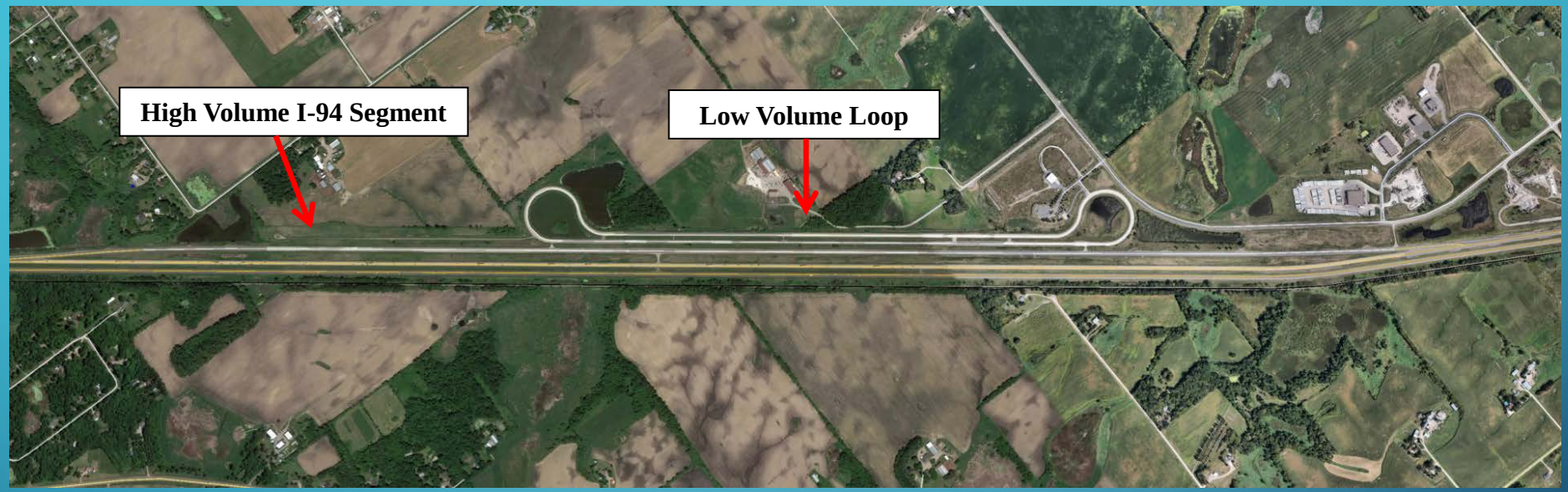
Salt

Jay Hietpas, P.E.

VIDEO

Jay Hietpas, P.E.

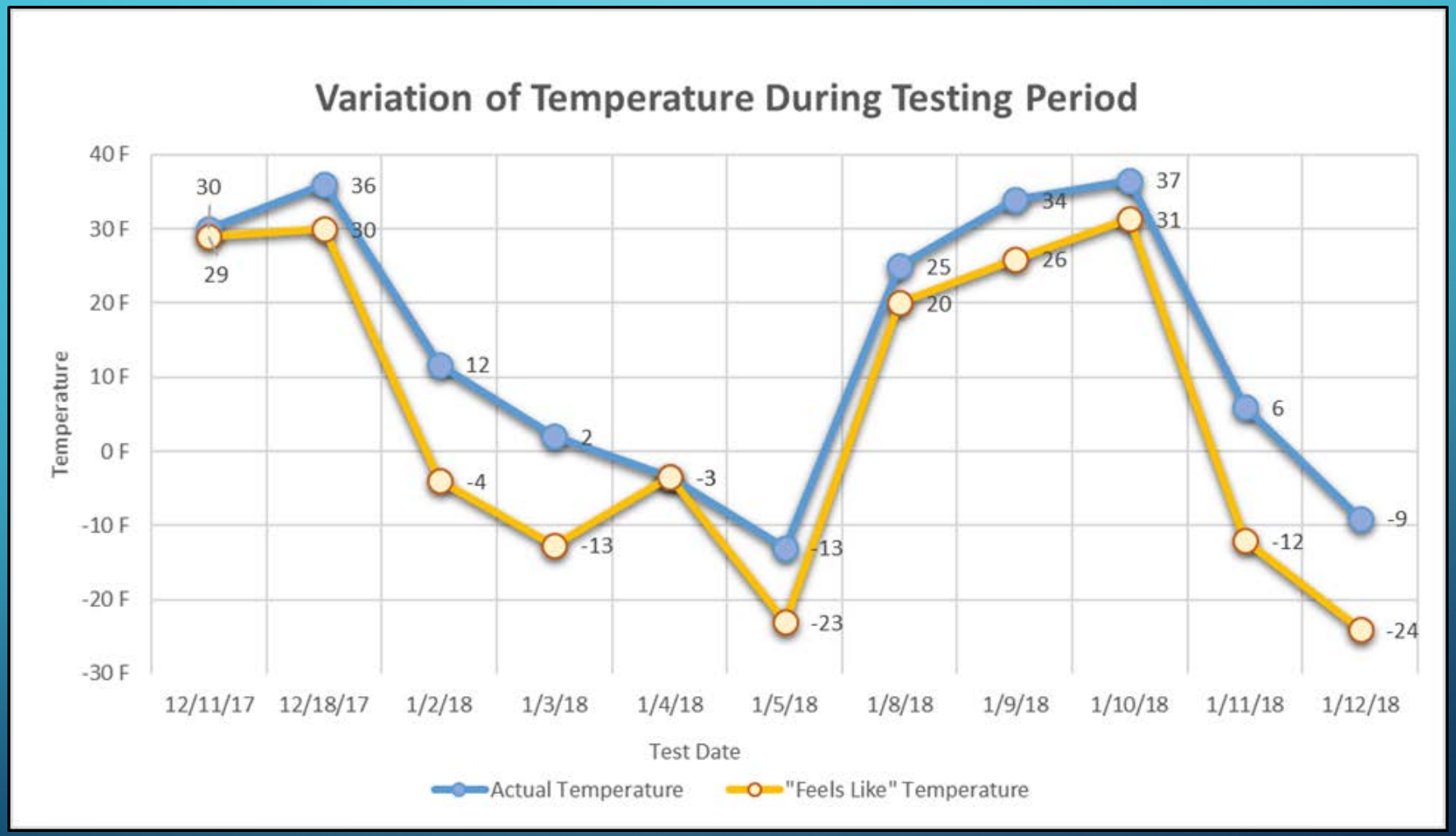
CONTROLLED TEST SITE



- MnDOT owned and operated
- Low and high speed testing available (30 – 70 MPH)
- Closed loop = 2.5 miles; I-94 high speed segment = 3.0 miles
- Enabling environment, easily accessible and readily available
- Ability to create varying test conditions
- MnDOT designated AV proving ground site

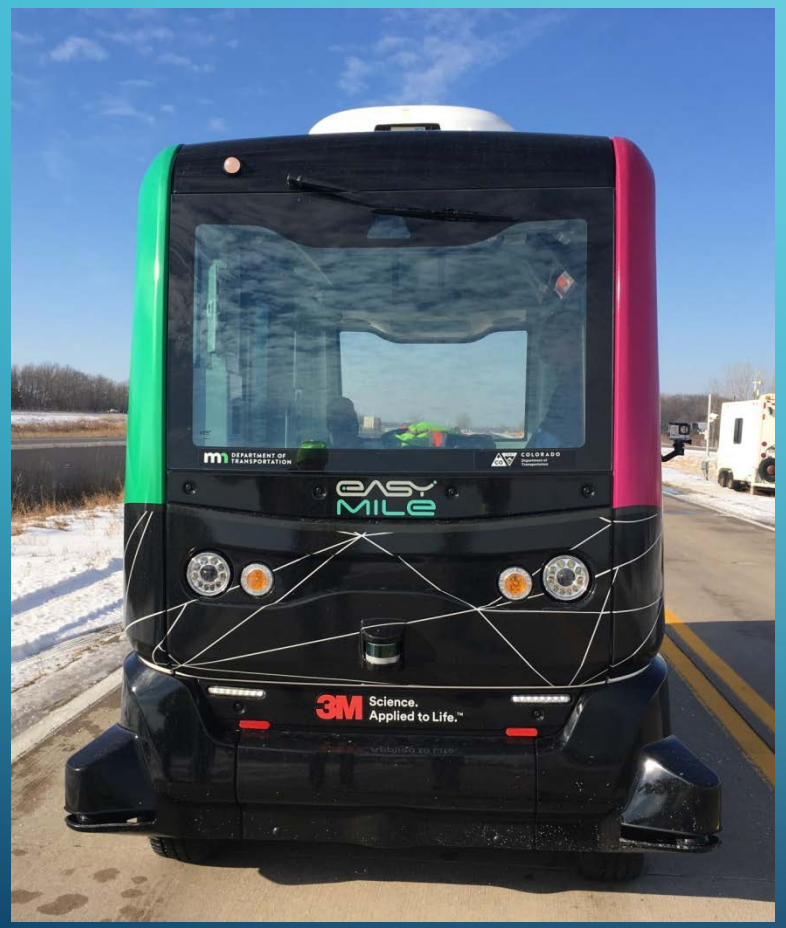
Jay Hietpas, P.E.

TEMPERATURE



Jay Hietpas, P.E.

FINDINGS – BARE PAVEMENT / CLEAR WEATHER



- Performed Well
- Solid Localization
- Able to Navigate Stops, Starts, Turns, Curves, Intersections
- Good Cars, Peds, Bikes & Obstructions Interaction
- Some Emergency Stops / Slowdowns

Jay Hietpas, P.E.

CONTROLLED TESTING CONDITIONS

Ice for Wheel Path

Ice Across Lane

Ice at Start / Stop

Ice near Intersection

Jay Hietpas, P.E.

FINDINGS – 1 INCH FRESH SNOW

- Calm Wind / Low 30s
- Performed Well - Similar to Bare Pavement
- Some Emergency Stops / Slowdowns
- Nice Interaction with Work Zone Barrel Obstructions
- Wheel Wander Observations

Jay Hietpas, P.E.

Wheel Wander Accuracy

- 3mm – 1 cm

Jay Hietpas, P.E.

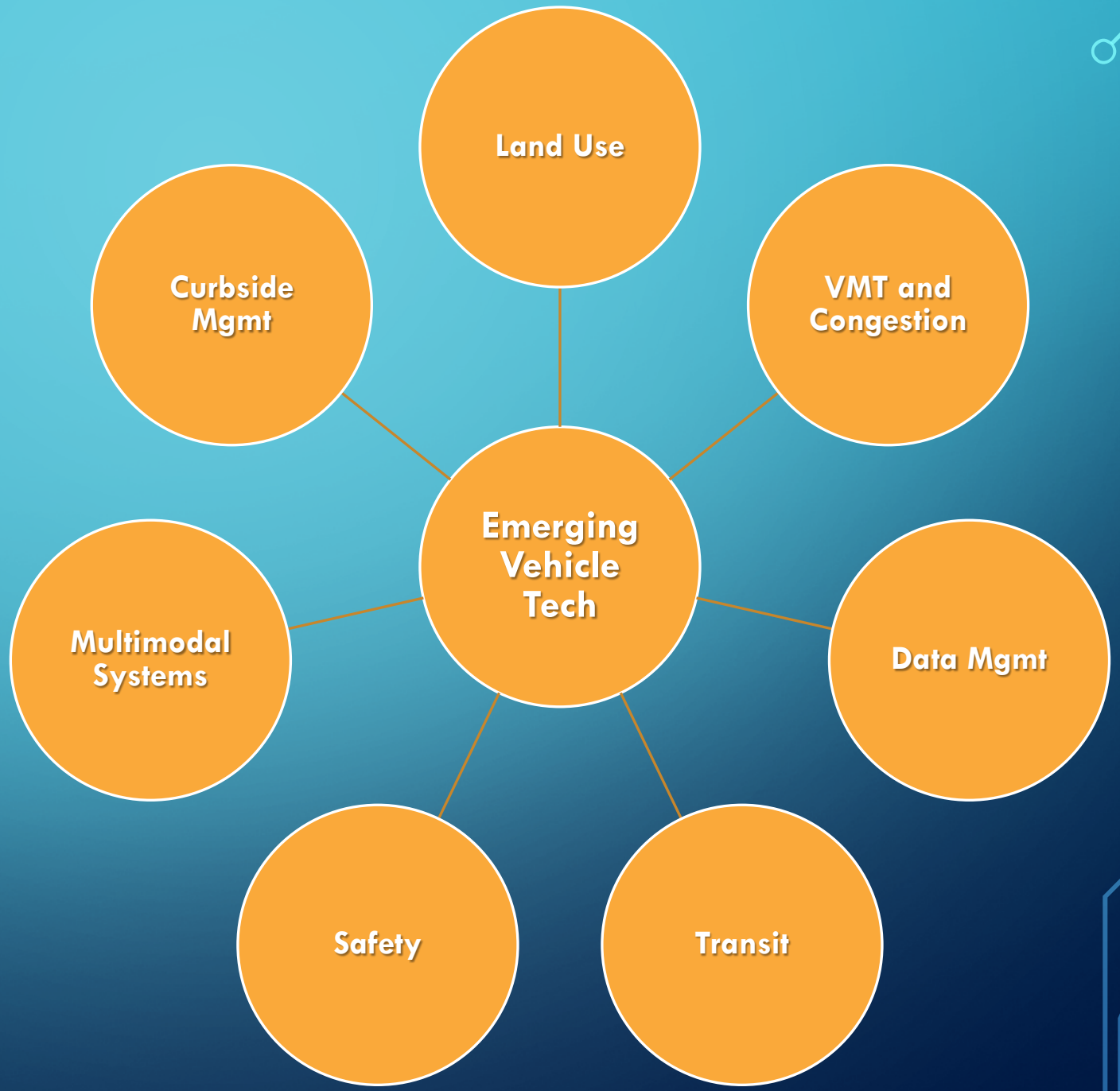
Emerging Technologies are **ACES**…

AUTOMATED
CONNECTED
ELECTRIC
SHARED

Abby Morgan, PhD, P.E.

Emerging Technologies have many impacts

Abby Morgan, PhD, P.E.



PILOT TESTING

VEHICLE TO VEHICLE

- Forward collision warning
- Distress notification

VEHICLE TO INFRASTRUCTURE

- Alerts and advisories
- Road weather warnings
- Work zone warnings

Photo: its.dot.gov/pilots

Abby Morgan, PhD, P.E.

POTENTIAL SAFETY BENEFITS

Abby Morgan, PhD, P.E.

Photo: fox13now.com

IMPROVED INCIDENT RESPONSE

Photo: AK DOT&PF

Abby Morgan, PhD, P.E.

ADVANCES IN TRAFFIC SIGNAL SYSTEMS

We will use CV data to:

- Adjust signal timing
- Request preferential treatment
- Report performance measures

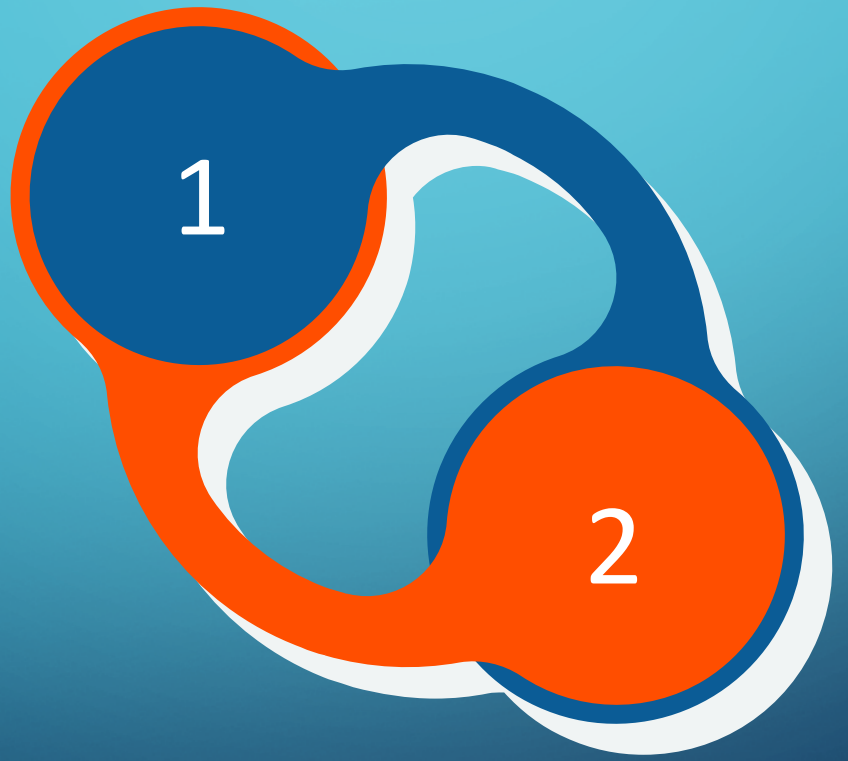
Today, we can start to:

- Program controllers that adjust signal timing cycle-by-cycle
- Operate vehicle-to-infrastructure equipment
- Convert high-resolution data into planning-level information

Abby Morgan, PhD, P.E.

Accidents Will Happen

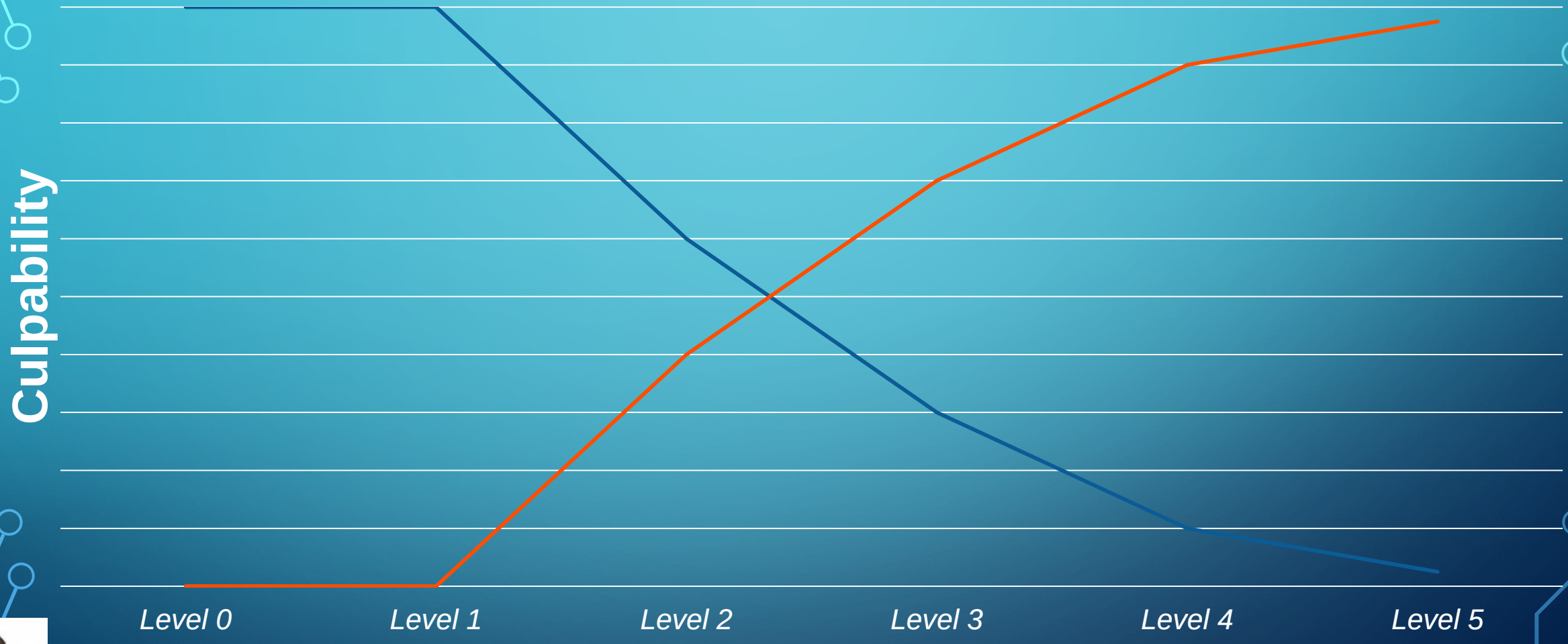
Technology is not perfect and will malfunction.



In accidents involving autonomous vehicles, aggrieved parties will seek recourse.

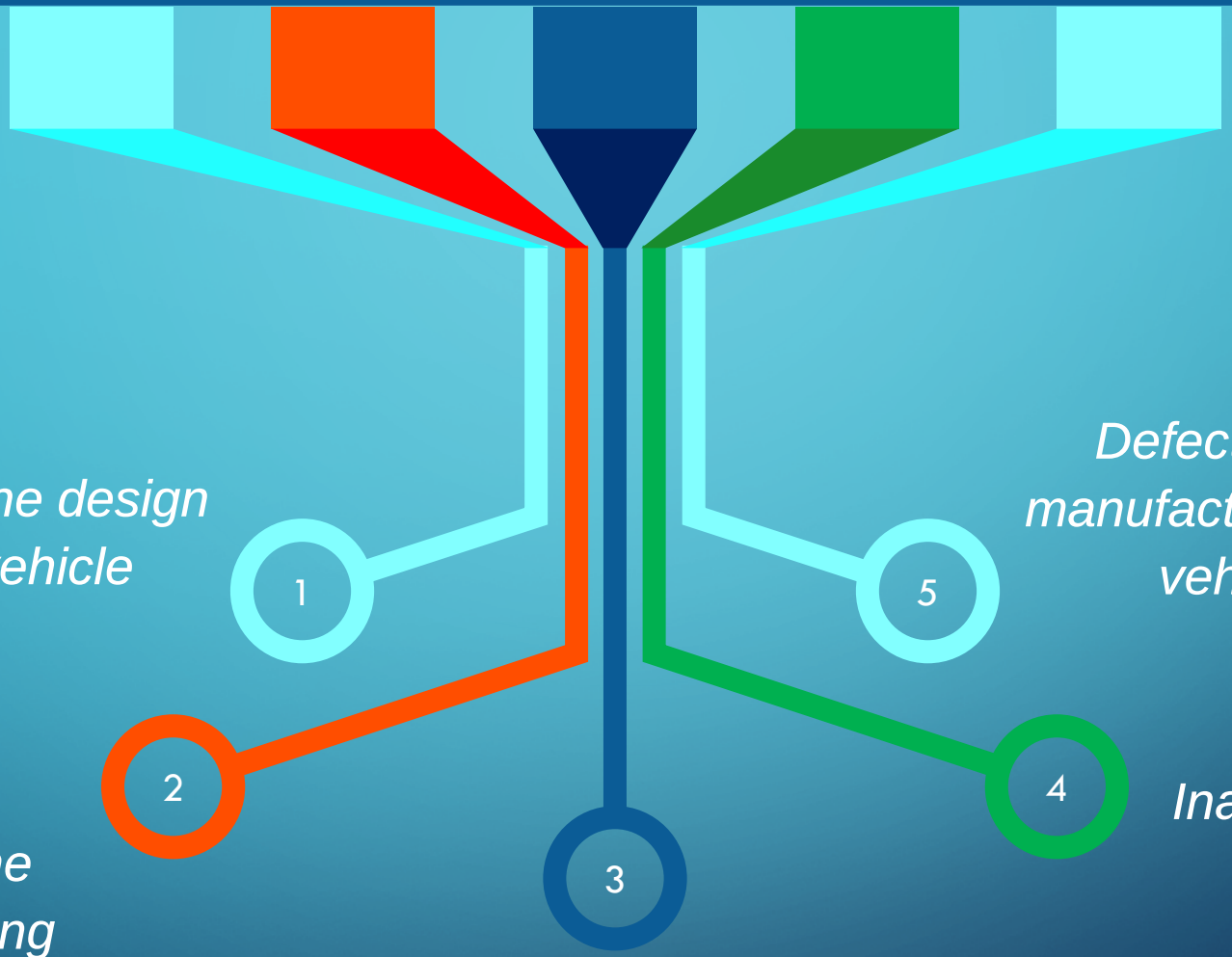
Jeff Gurney

Culpability of Driving



Jeff Gurney

How Autonomous Vehicles May Cause Accidents



Defect in the design of the vehicle

Bugs in the programming

Component failure

Inadequacy of the algorithm

Defect in the manufacture of the vehicle

Jeff Gurney

Potential At-fault Parties

- Another driver, manufacturer or person
- Component manufacturer of autonomous vehicle
- The dealership that sold the autonomous vehicle
- The autonomous technology manufacturer
- The operator and/or owner of the autonomous vehicle

Jeff Gurney

PHASE 0 – STRATEGIC PLAN (MNDOT EXAMPLE)

PHASE 1&2 – SYSTEM PLANNING AND PILOT PROGRAM

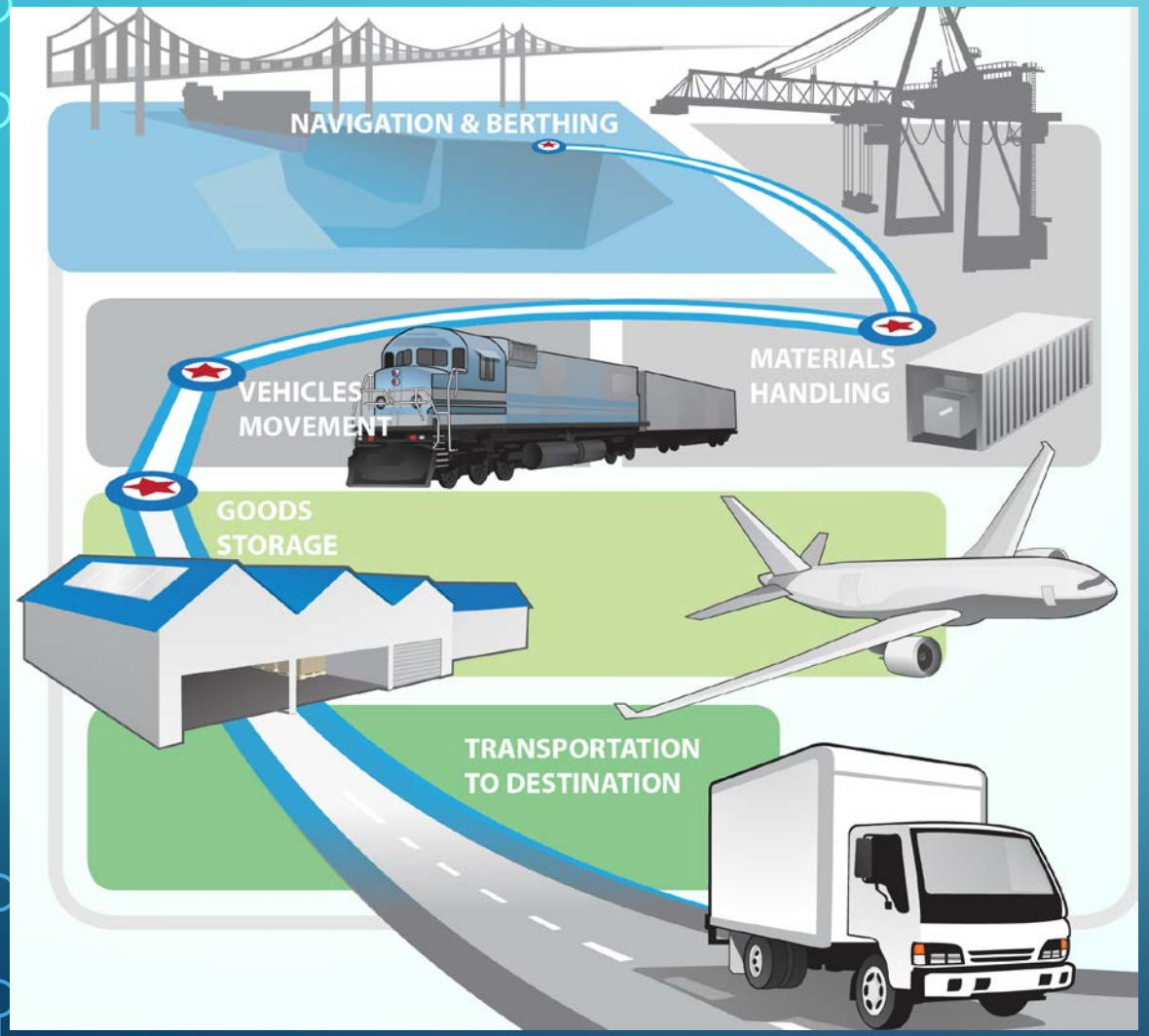


*Image courtesy of NOAA

*Image courtesy of Port of Long Beach – Automated Terminal

KEY TAKEAWAYS

- Educating policymakers and the public is key!
- C/AV Program Development – Local Champion Needed
- C/AV Workgroup and Strategic Plan are crucial steps
- Involving all transportation system stakeholders through the process is important
- Pilot programs provide valuable data to advance technology

Self-driving car crashes put a dent in consumer trust, poll says

Nearly 75 percent of Americans are too afraid to ride in a driverless vehicle

FUTURE OF TRANSPORTATION

*Images courtesy of Ford and GM

THANK YOU!!

https://sites.google.com/prod/view/akforumav18
for more info!