CONNECTED & AUTONOMOUS VEHICLES

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ACOG AND THE OCARTS REGION

- 2,085 square miles
- 47 Cities
- 6 Counties (some partial)
- 2010 Population - 1.1 Million
- 2040 Projected population - 1.6 Million

ACOG staff work on four missions:
- Economic Development
- 9-1-1 Administration
- Transportation and Planning Services (MPO)
- Water Resources
NOT A NEW IDEA...

ELECTRICITY MAY BE THE DRIVER.

2025 Autonomous vehicles
STATES WITH ENACTED AUTONOMOUS VEHICLES LEGISLATION

[Map showing states with enacted autonomous vehicles legislation and executive orders, with states colored in blue for enacted legislation and lighter blue for executive orders.]
CONNECTED VS. AUTONOMOUS VEHICLES

AUTONOMOUS VEHICLE
Operates in isolation from other vehicles using internal sensors.

CONNECTED AUTOMATED VEHICLE
Leverages autonomous and connected vehicle capabilities.

CONNECTED VEHICLE
Communicates with nearby vehicles and infrastructure.
LEVELS OF AUTOMATION FOR ON-ROAD VEHICLES

HUMAN DRIVER MONITORS DRIVING ENVIRONMENT

CRUISE CONTROL

AUTOMATED DRIVING SYSTEM MONITORS DRIVING ENVIRONMENT

TESLA AUTOPILOT

DRIVERLESS

0
NO AUTOMATION

1
DRIVER ASSISTANCE

2
PARTIAL AUTOMATION

3
CONDITIONAL AUTOMATION

4
HIGH AUTOMATION

5
FULL AUTOMATION
WHAT DO THESE CARS "SEE"?

- REAR COLLISION WARNING
- PARKING ASSISTANCE
- BLIND SPOT DETECTION
- LANE DEPARTURE WARNING
- EMERGENCY BRAKING
- PEDESTRIAN DETECTION
- COLLISION AVOIDANCE
- ADAPTIVE CRUISE CONTROL
- TRAFFIC SIGN RECOGNITION
- CROSS TRAFFIC ALERT

SURROUND VIEW
360° AWARENESS

HALO VIEW
POSSIBLE TIMELINE FOR TRANSITION

**HUMAN DRIVERS**

**TODAY**

**AUTONOMOUS + HUMAN**

5-10 YEARS

**AUTONOMOUS**

10 YEARS
ROAD CLOSED DUE TO HIGH WATER
DETOUR

NO
THRU
TRAFFIC
RECENT NEWS

• Sunday 10pm, March 18, 2018 in Tempe, AZ

• Woman walking her bike across the street was struck and killed by an autonomous vehicle operated by Uber

• The driver was distracted, looking down from the road

• The pedestrian was not crossing at a crosswalk

• Regardless, the vehicle did not detect the pedestrian, despite being equipped with LiDAR

National Transportation Safety Board investigates the car involved in the crash

Image credit: Reuters
AAA OKLAHOMA - AUTONOMOUS VEHICLE POLL (MARCH 27-28, 2018)

- Even if available in their area, **75 percent** of respondents would not ride in an autonomous (driverless) vehicle.
- **59 percent** of respondents said safety and reliability of autonomous vehicles are their greatest concerns.
- **34 percent** believe the vehicle manufacturer is responsible for liability while riding in an autonomous vehicle.
CONNECTED & AUTONOMOUS VEHICLES (CAV) CONSIDERATIONS FOR...
US DOT AUTOMATED VEHICLE POLICY
SAFETY ASSESSMENT CRITERIA

- Data Recording & Sharing
- Privacy
- System Safety
- Vehicle Cybersecurity
- Human Machine Interface
- Crashworthiness
- Consumer Education and Training
- Registration and Certification
- Post-Crash Behavior
- Federal, State and Local Laws
- Ethical Considerations
- Operational Design Domain
- Object and Event Detection and Response
- Fall Back (Minimal Risk Condition)
- Validation Methods
U.S. DEPARTMENT OF ENERGY SMART MOBILITY
SYSTEMS AND MODELING FOR ACCELERATED RESEARCH IN TRANSPORTATION CONSORTIUM

FIVE PILLARS OF PROPOSED DOE TRANSPORTATION-AS-A-SYSTEM FRAMEWORK

- MULTI-MODAL
- CONNECTION & AUTOMATION
- URBAN SCIENCE
- MOBILITY DECISION SCIENCE
- VEHICLE & INFRASTRUCTURE
CAV's will ideally limit poor driving behaviors and improve transportation safety. CAV technologies could reduce dangers of distracted driving; some estimate 80 percent vehicle crash reduction by 2040.
ACCESSIBILITY AND MOBILITY
CONGESTION MITIGATION
AIR QUALITY IMPACT

Vehicle connectivity and automation alone are projected to have between a -90% and +200% impact in greenhouse gas (GHG) emissions by 2050.

Source: U.S. Department of Energy SMART Mobility White Paper
URBAN DEVELOPMENT IMPLICATIONS
DATA REVOLUTION IN TRANSPORTATION

- Smart streets create lower incidents of conflict by increasing traveler information
  - Notification of hazardous road condition
- Today’s crash data tells us when and where crash occur
  - Better identification of causes of crashes
  - In the future, we will know more about what happened BEFORE the accident as well
- Accurate, real-time information to first responders
- Increased parental monitoring of teen drivers
DATA REVOLUTION IN TRANSPORTATION

- Planning – roadside infrastructure improvements based on data from vehicles
  - Infrastructure and behavioral safety specialists will need to plan differently
  - CAVs could dramatically reduce need for safety infrastructure
  - Misplaced planning emphasis

- Security and Privacy
...BUT IT WON'T HAPPEN OVERNIGHT

- C/AVs will not take over America's roads overnight. Deployment will occur in four phases:
  - Existing Technology - Research & Development
  - Initial deployment - Likely Freight
  - Mixed fleet
  - High penetration rate
NEXT STEPS FOR ACOG MEMBERS

• Reviewing U.S. DOT & FHWA guidance and resources
  - Strategy
  - Performance measurement and evaluation
  - Infrastructure investment
  - Planning products
  - Data collection, processing, and analysis
  - Education and Training

• Follow technology developments and pilot projects as they emerge

• Identify opportunities and barriers

• Collaborate to maximize efficient and effective implementation of CAV practices and policies
CONNECTED & AUTONOMOUS VEHICLES

ASSOCIATION OF CENTRAL OKLAHOMA GOVERNMENTS

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