# Governor's Advisory Council on Connected and Automated Vehicles

## Subcommittee on Cyber Security & Data Privacy

DEPARTMENT OF TRANSPORTATION

August 17, 2018

# Welcome and Introductions

DEPARTMENT OF TRANSPORTATION

# *Review of Executive Order & Goals*

# Governor's Executive Order Establishing the Advisory Council

**Consult** with government, stakeholders, auto & tech industry, business, labor, advocacy groups, universities, communities experiencing transportation barriers

**Prepare and submit a report** to the Governor and Legislature by **December 1, 2018**

**Advise and support** government to support **testing and deployment** of CAV

# Governor's Advisory Council on CAV

## Advisory Council

## Interagency CAV Team

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Transportation Infrastructure & Investment | Cyber Security & Data Privacy | Vehicle Registration, Driving Training, Licensing | Insurance and Liability | Traffic Regulations & Safety | Economic & Workforce Development, Business Opportunities | Accessibility and Equity | Land Use & Planning |
| Public Feedback | Public Feedback | Public Feedback | Public Feedback | Public Feedback | Public Feedback | Public Feedback | Public Feedback |

# Governor's Advisory Council on CAV

# Advisory Council Goals

1. **Brand** Minnesota as a place to test and deploy CAV
2. **Engage the public**
3. **Educate** the general public
4. **Develop actionable recommendations** to facilitate the adoption of CAV in a manner that enhances our quality of life, while providing flexibility to account for evolving technology
5. **Recommend mobility strategies**

# Interagency Team

- Policy position papers
- Branding
- Testing & Deployment
- Partnerships











# Subcommittee Goal

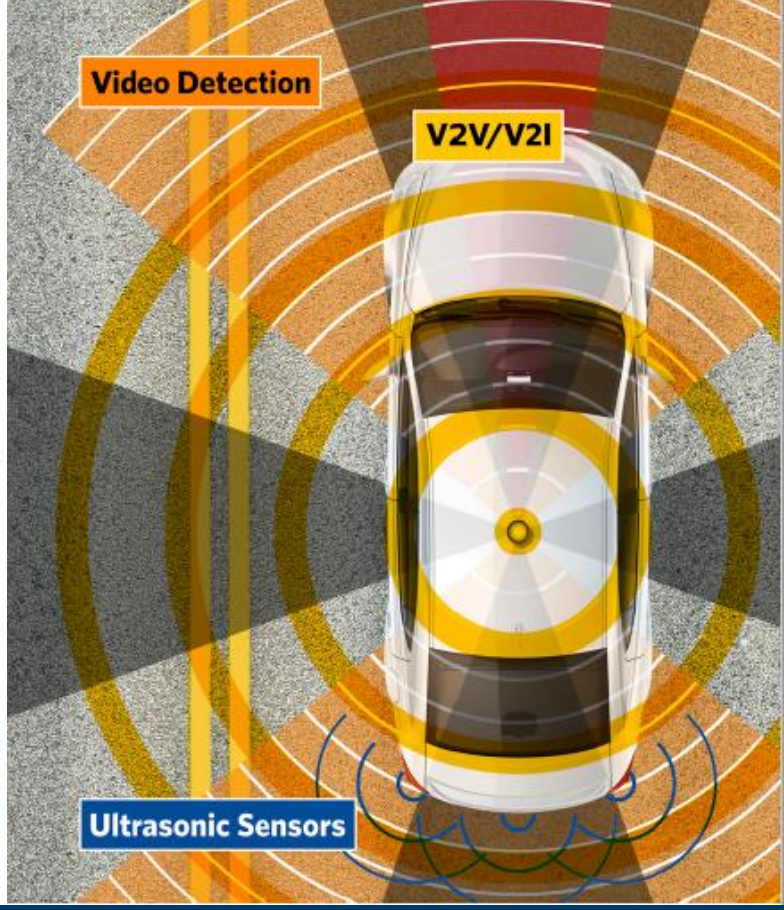
*The goal for the Cyber Security and Data Privacy Subcommittee is to formulate and recommend to the Advisory Committee key considerations for MN statutes, rules and policies related connected and autonomous vehicles' date storage, security, use and privacy.*

# Subcommittee Process

- Review agenda
- Agendas, charter and meeting notes on MnDOT website
  - http://www.dot.state.mn.us/automated/publicmeetings.html
- Outcomes
  - Clear, consensus-based or rationales for divergences recommendations for the Advisory Council
  - Subcommittee members participate in a meaningful way in developing recommendations
  - Recommendations consider the for themes of safety, risk, equity and environment
  - Recommendations consider immediate needs and longer term planning for CAV
- Next meeting: August 31 from 8:00 – 10:00 AM at MnDOT Central Office
- Presentation to the Advisory Council on September 25, 2018

# Charter Highlights

- Meetings are open to the public
- Join the subcommittee by providing your email address
- Meeting notes will be approved by liaisons and provided to subcommittee for additional comments
- Respectful discussion, opportunities to be heard and to listen
- Consensus or summary
- Meeting evaluation emailed after meeting




# Overview of Connected & Automated Vehicles
# MnDOT CAV-X Office

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Kristin White, J.D.
Connected and Automated Innovation Director

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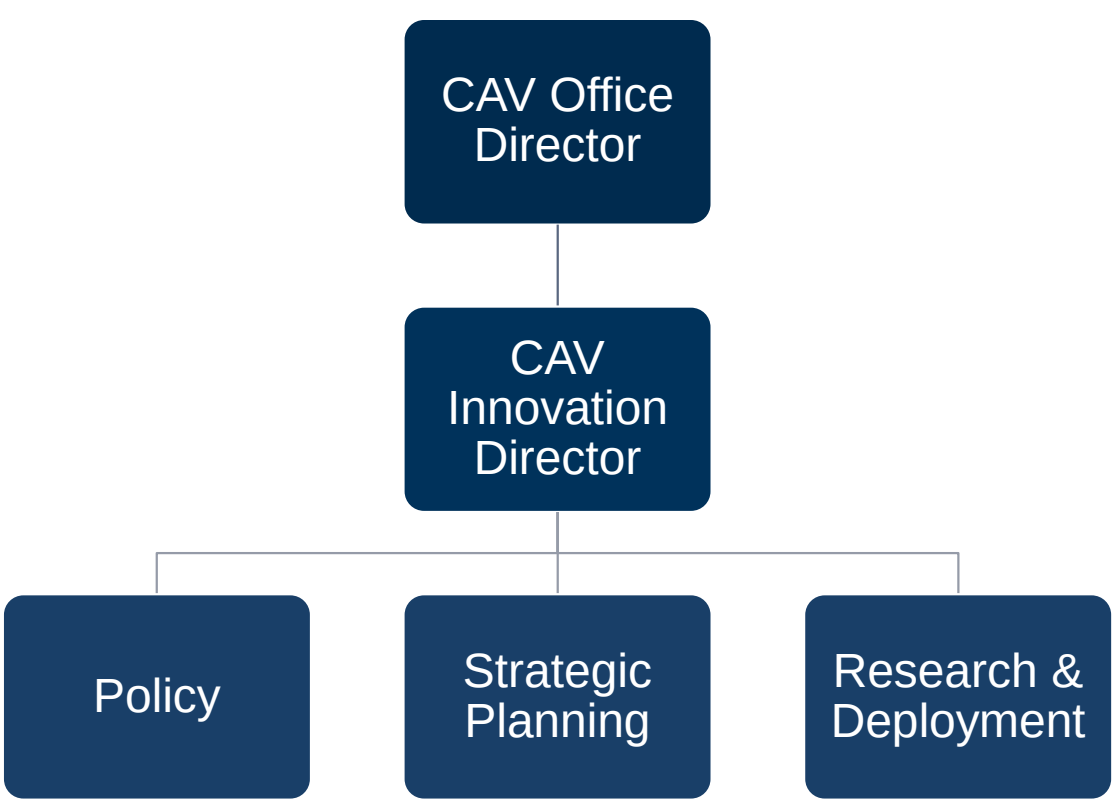
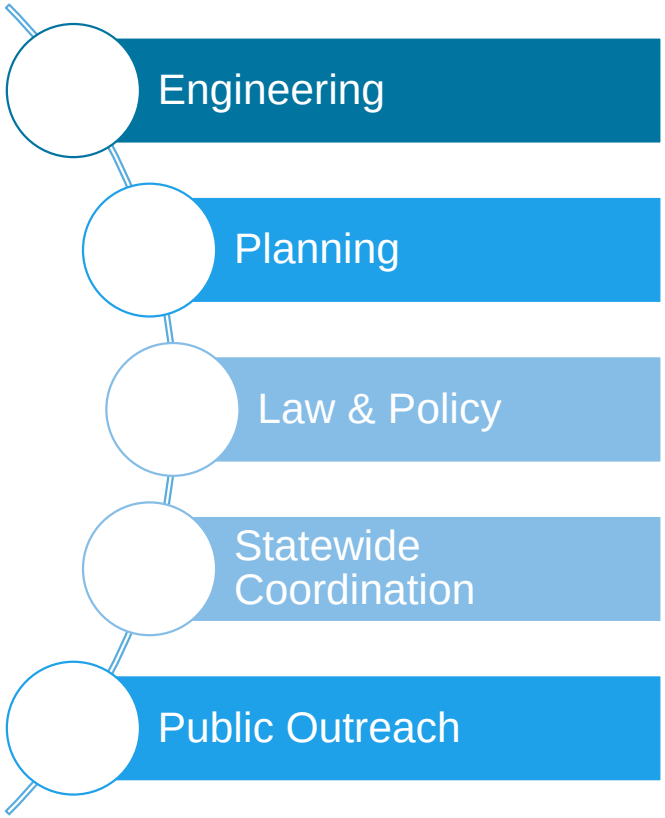
# *Who we are*

# MnDOT CAV-X Office



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# *What we're talking about*

# Connected Vehicles


Connected vehicles **“talk” to infrastructure**, including roads, traffic signals, and other vehicles electronically.

# Automated Vehicles

Automated vehicles can **take control of** some or all aspects of **driving tasks**.

| 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. |

# Society of Automotive Engineers (SAE) Levels of Automation

# Connected & Automated Vehicles

**Autonomous Vehicle**

Operates in isolation from other vehicles using internal sensors

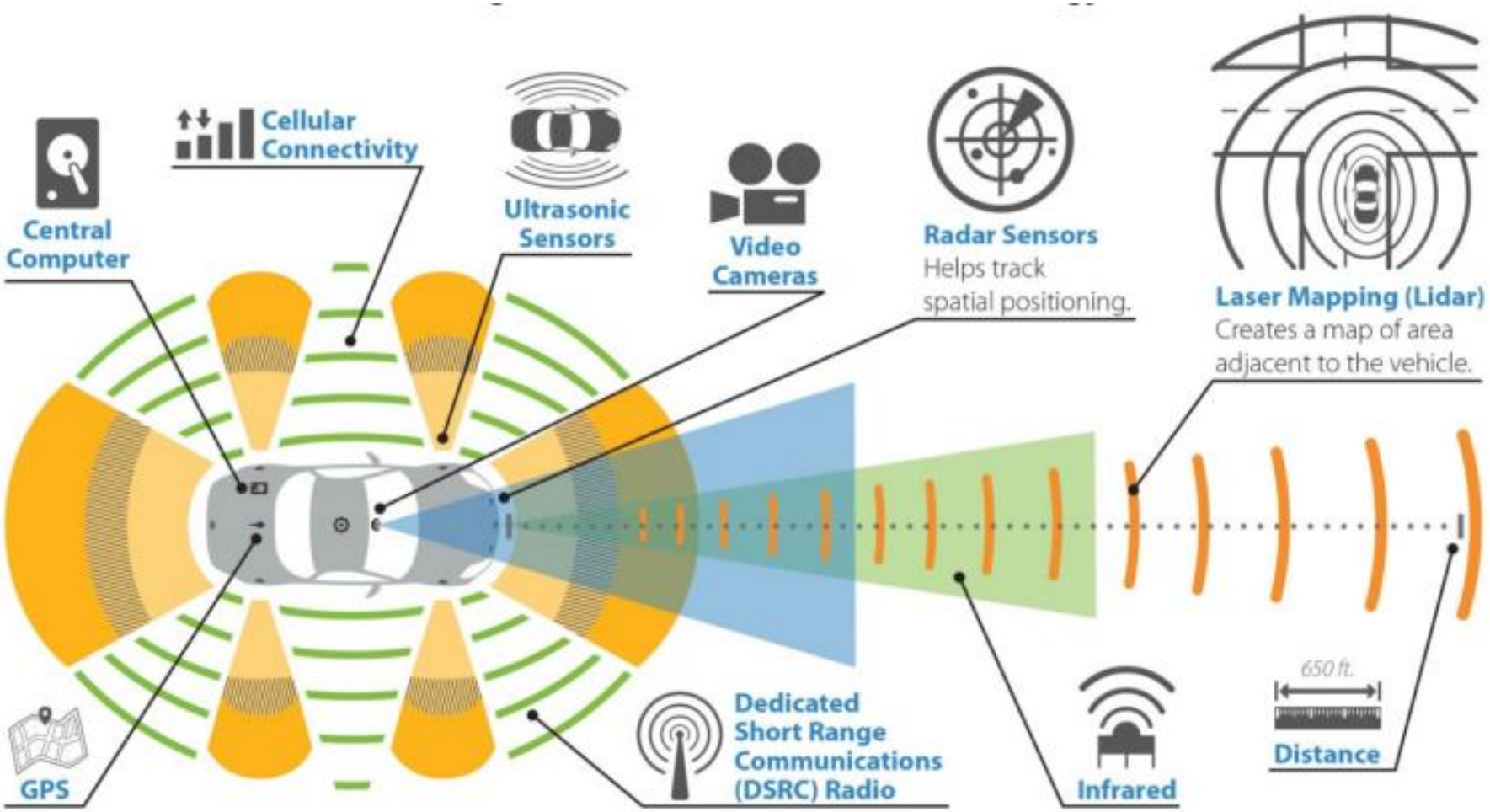
**Connected Automated Vehicle**

Leverages autonomous and connected vehicle capabilities

**Connected Vehicle**

Communicates with nearby vehicles and infrastructure

# How does it work?



# Electric Vehicles


Majority of CAV being developed on **battery, solar, or electric**-generator platforms.

# Shared Mobility

**Shared use** of a vehicle, bicycle, or other transportation mode on an **as-needed basis**

**1 account to access, plan, and pay** for private and public transportation options

# Alternative Automation


Truck Platooning


Automated Delivery

# Pieces of Automation Already Available


Lane Assist & Departure Warnings


Self-Parking


Signal Countdowns


# Thank you

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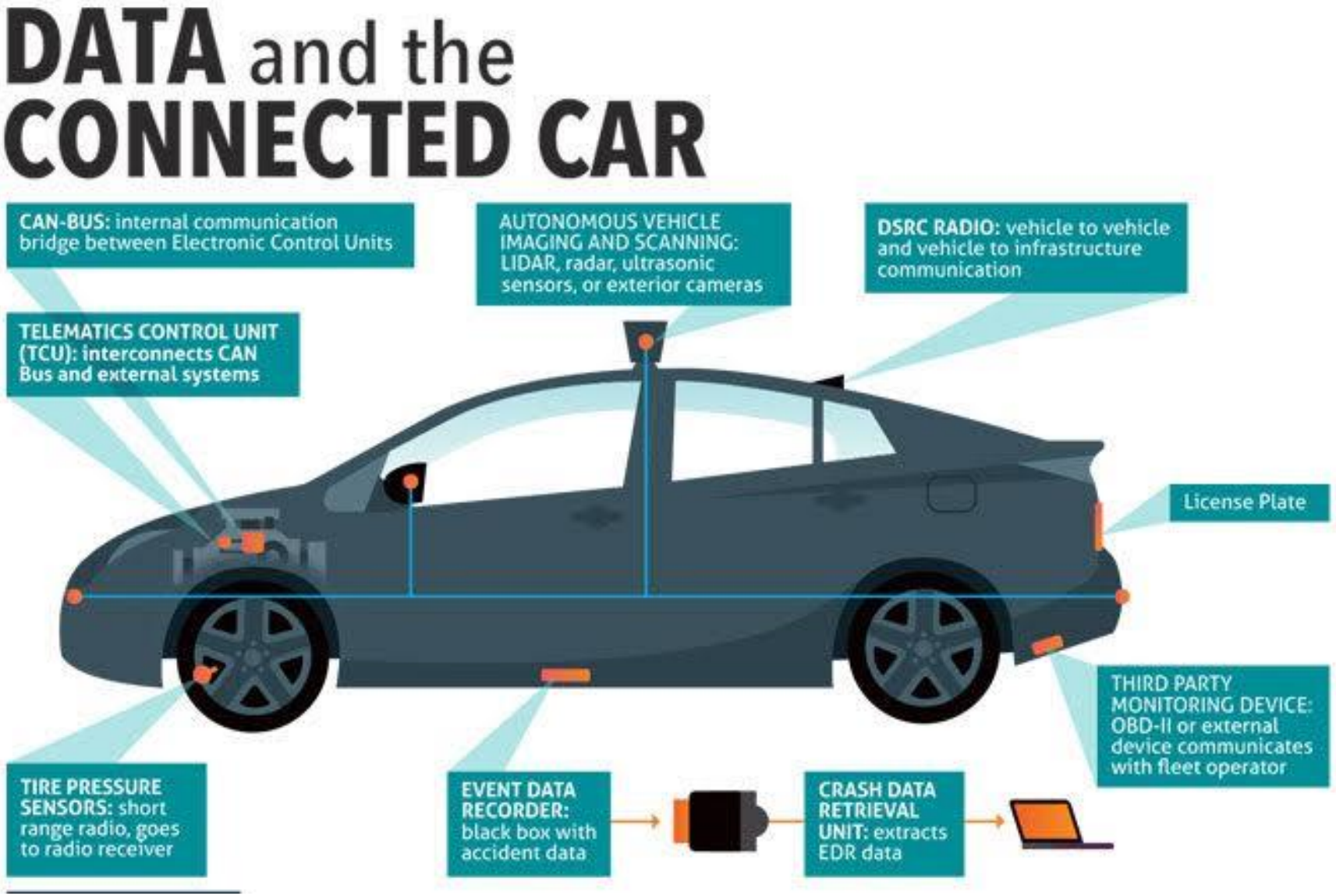
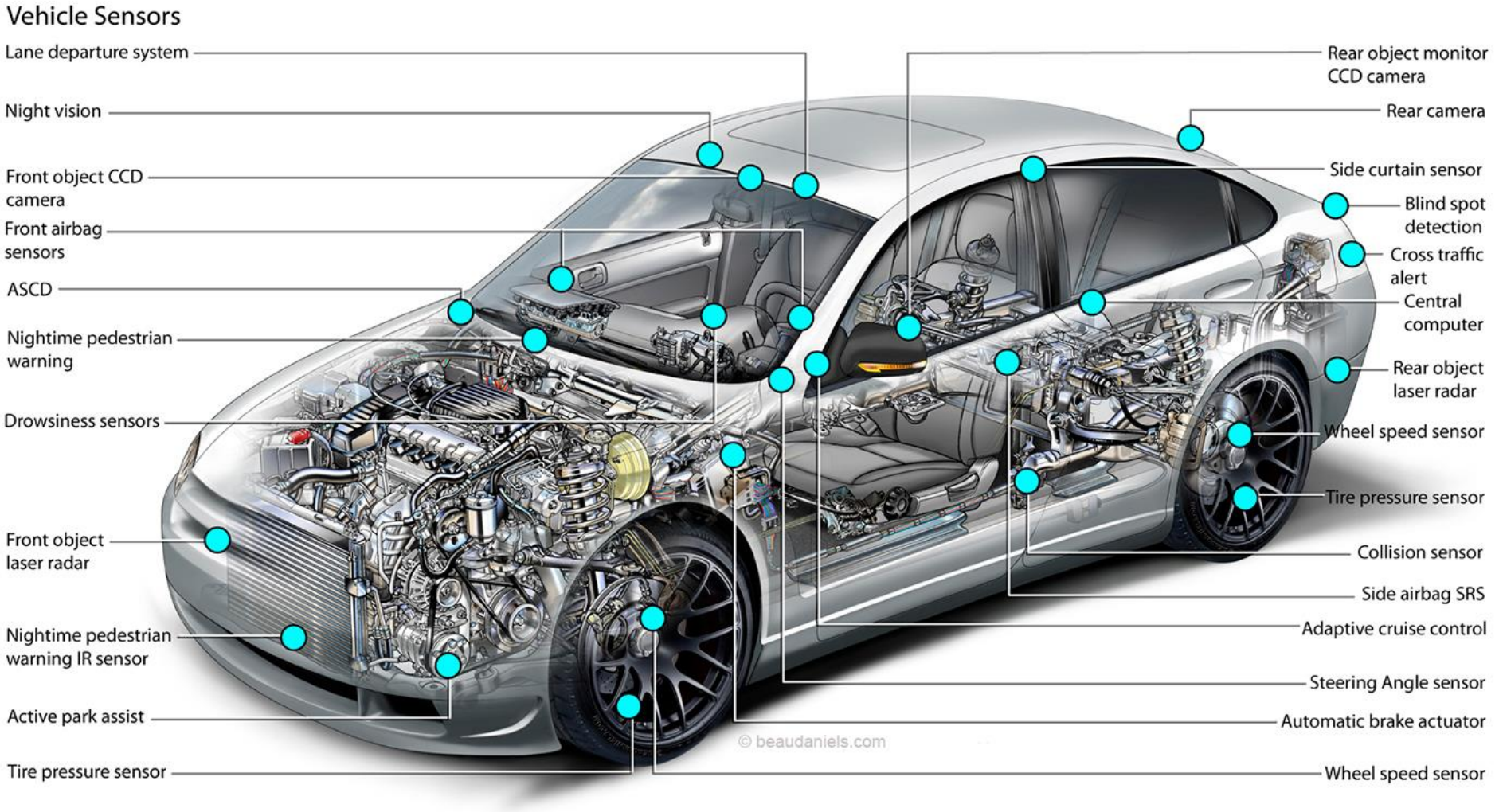
# Key CAV Issues for Cyber Security and Data Privacy

Damien Riehl

Stroz Friedberg


DATA and the
CONNECTED CAR
CAN-BUS: internal communication bridge between Electronic Control Units
AUTONOMOUS VEHICLE IMAGING AND SCANNING: LIDAR, radar, ultrasonic sensors, or exterior cameras
DSRC RADIO: vehicle to vehicle and vehicle to infrastructure communication
TELEMATICS CONTROL UNIT (TCU): interconnects CAN Bus and external systems
License Plate
THIRD PARTY MONITORING DEVICE: OBD-II or external device communicates with fleet operator
TIRE PRESSURE SENSORS: short range radio, goes to radio receiver
EVENT DATA RECORDER: black box with accident data
CRASH DATA RETRIEVAL UNIT: extracts EDR data

# Regulate me?


Vehicle Sensors
Lane departure system
Night vision
Front object CCD camera
Front airbag sensors
ASCD
Nightime pedestrian warning
Drowsiness sensors
Front object laser radar
Nightime pedestrian warning IR sensor
Active park assist
Tire pressure sensor
Rear object monitor CCD camera
Rear camera
Side curtain sensor
Blind spot detection
Cross traffic alert
Central computer
Rear object laser radar
Wheel speed sensor
Tire pressure sensor
Collision sensor
Side airbag SRS
Adaptive cruise control
Steering Angle sensor
Automatic brake actuator
Wheel speed sensor
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# Regulate me?

# CYBERSECURITY

# Cybersecurity:

- Government role in connected-car cyber preparedness?

# Cybersecurity:

- For connected infrastructure, Governmental role in ensuring that vendors' sensors and devices are secure?

# Cybersecurity:

- Require government inspection of auto and infrastructure security?
- Permit private citizens?
- Permit companies?

# Cybersecurity:

- Reporting requirements for connected autos' security vulnerabilities or attacks?

# Cybersecurity

- Require “security by design”?

# Cybersecurity

- Require encryption standards?
- Back doors?

# Cybersecurity

- Blockchain?


privacy

# Privacy

- Government role in connected cars' privacy implications?

# Privacy

- **Optimal balance:**
- Business innovation vs. proprietary info?
- Business innovation vs. privacy?

# Privacy

- Guidelines/requirements on connected-vehicle data collection, storage?

# Privacy

- GPS locations?
- Driver behavior (e.g., jackrabbit starts)
- Ride-share history (across vehicles)?
- In-car cameras?

# Privacy

- Different than privacy implications of smartphones?

# Privacy

- Statutory protections?
- Regulatory protections?

# Privacy

- Require “privacy by design”

# Privacy

- **Commercial** access to citizens' data?
- In aggregate?
- "Anonymized"?

# Privacy

- **Academic** access to citizens' data?
- In aggregate?
- "Anonymized"?

# Privacy

- Restrict or prohibit commercialization of connected auto PII?

# Privacy

- Insurers’ access?

# Privacy

- Government disclosure of:
- Vehicle-related PII collected, retained?
- Explanation how used, disclosed, handled?
- Minimization of such collection/retention?
- Retention period? Destruction period?
- Protection against unauthorized disclosure? Encryption?
- OEMs' privacy policies?
- Citizens' ability to stop PII collection?
  - Use?
  - Distribution?
  - Sale?

# Other thoughts

# Key Questions

- What is the optimal balance between business innovation and protection of proprietary information?
- What is the balance of user privacy and CAV technology benefits?
  - What policies or rules will help strike these balances?
- What happens to the large amounts of data created using this technology?
  - Recommended policy for storage of data
  - Recommended policy to ensure private user data remains private
  - Appropriate use of data (non-commercial)
  - Other
- Does blockchain offer ways to protect data and ensure accuracy?

# Review of Questions

- Are any questions missing?
- Have the themes of safety, risk, equity and environment been considered?

# Discussion

# Next Steps & Closing

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# Thank you

**Aaron Call, MnIT**

**Co-Liaison**

**Damien Riehl, Stroz Friedberg**

**Co-Liaison**