Flash Memory Summit

# Straightening the Curve on Cyberthreats to Autonomous Vehicles

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35 YEARS OF NAND FLASH MEMORY INNOVATION

# Introduction



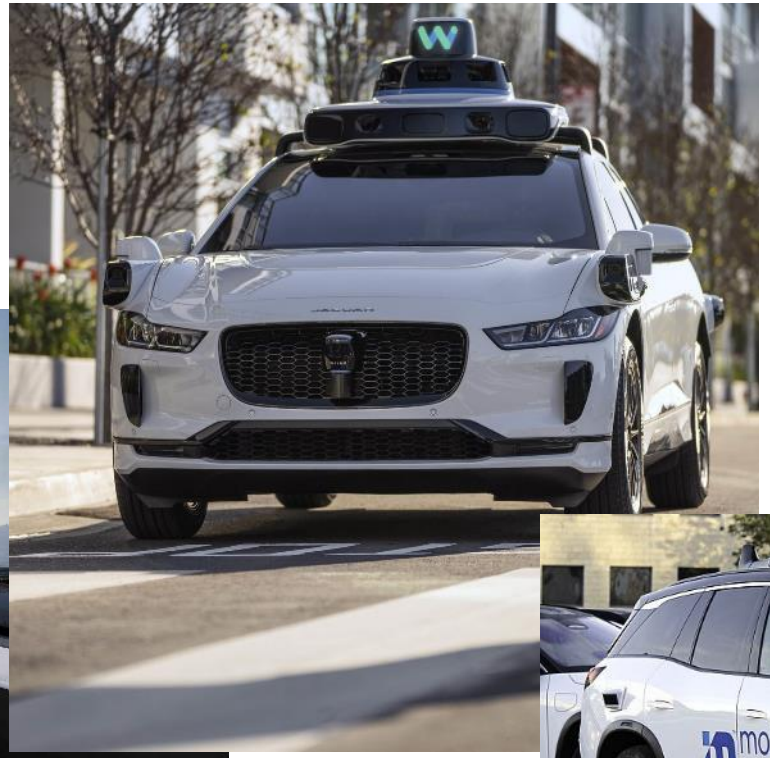
- Jim Sweeney
- Doctorate in Cybersecurity, emphasis on Critical Infrastructure
- Cybersecurity Engineer for Exida, LLC
- Background in emergency management, planning, mitigation, and response

# Gone Are The Days…..

# Enter The Future…



# Where Are We Headed…


- Autonomous vehicle mark
- Data Collection
- Ext esses
- extension of the driver

# Inherent Hurdles with AVs

- Emerging Technology / Sensor convergence
- A variety of technologies being used without full understanding the security risks
- Supply chain outsourcing
- Complexity

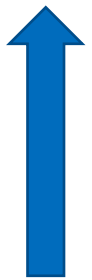
# Main Components of AVs

***SENSORS***

***DATA PROCESSING***

***POWER***

***FLASH STORAGE***



***Topic of this presentation***

# Cyber Threats - Goals



- Gain access to control components
  - Mass shut down of vehicles
  - Remote control of vehicles
  - Targeted attack
- Gain access to data
- The UNKNOWN

# Cyber Threats - Access

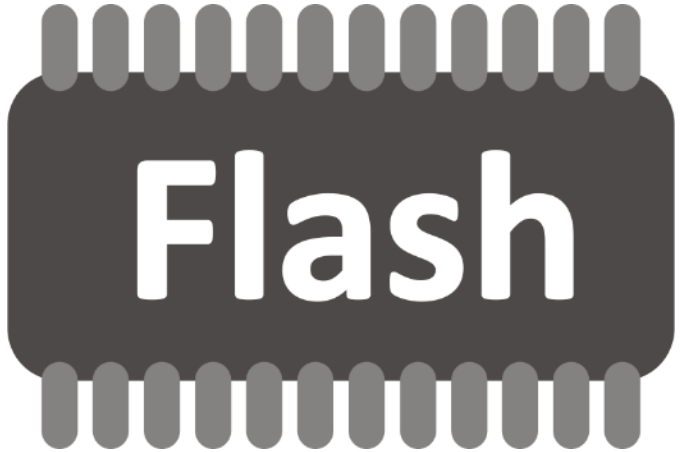

- Sensor Integrity
  - Global Positioning System (GPS)
  - Inertial Measurement Units (IMU)
  - Engine Control
  - Tire-pressure Monitor Systems (TPMS)
  - Light Detection and Ranging (LiDAR)
  - Camera
- Flash Memory Data
  - Tampering
  - Spoofing
  - Extrapolation
  - Immediate vs Reconnaissance
- Unknown

# Flash Storage



- Operating Systems
- Supporting Software Images
- High Precision Mapping
- Record Storage



# Exploitation



- Helps accomplish the goal
  - Slow, Control, Stop, Target
- Data
  - Tamper / Spoof
  - Reconnaissance

# Identifying the Threats



- Threat Models
  - STRIDE
  - PASTA
  - Attack Trees
- Tools
  - CVSS
  - Commercial Threat Modeling Tool (Microsoft, ArchX)

# Mitigation Strategies

- Secure Boot
- Device Identity and Authentication
- Secure Communications
- Secure Update
- Hardware Protection Mechanisms
- Encryption

# QUESTIONS???