ADVANCED DRIVER ASSISTANCE SYSTEMS, CONNECTED VEHICLE AND DRIVING AUTOMATION STANDARDS

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ACES Policies and Standards Breakout Session
Wednesday, November 15
Addressing Industry Transformation Through Standards

- Wireless Charging
- Driver-Vehicle Interface
- Electronics System Reliability
- Driving Automation Systems
- Active Safety
- Functional Safety
- Connected Vehicles
- Shared Mobility
- EV/Hybrid/FC Vehicle & Battery
- Vehicle Electronics Cyber Security
- Intelligent Transport Systems
- Mobility for Persons with Disabilities
SAE Global Ground Vehicle Standards in a Nutshell

- 8,375 Standards Published
- 1,817 Standards Maintained
- 491 WIP Standards

9,933 Committee Members
609 Technical Committees
2,898 Companies
Criteria for Standards Development

- Enhance safety
- Create common language
- Facilitate trade through reduced regulations
- Harmonize global markets
- Improve the environment
- Increase productivity of processes
- Permit common interfaces
- Promote uniform testing or performance
- Reduce costs
Automotive Technology Evolution

ADAS
- Lane Departure Warning & Assist
- Parking Assistance
- Blind Spot Detection
- Adaptive Cruise Control

Connected (V2X & I2X)
- Signal Phase & Timing
- Real-Time Travel Info
- Safety Alerts & Warnings
- Weather Info
- Road Data
- Location Data

Automated (AI, Machine Interfaces & Learning, Automation, Cyber)
- Lidar (light detection and ranging)
- Rear Camera
- Video Cameras
- GPS (global positioning system)
- Ultrasonic Sensors
- Adaptive Sensors
- Central Computer
- Radar Sensors
Key Focus Areas for Standards

- **Security**
  - J3061 & J3101

- **Safety**
  - J1626/2 & J3092

- **Interoperability**
  - J2735 & J2953

- **Vehicle System & Performance Requirements**
  - J2945/1 & J3155

- **Guidelines & Recommended Practices**
  - J3018 & J3088

- **Driver Interface / Human Factors**
  - J2399 & J2808

- **Test & Verification Methods**
  - J3045 & J3029
Standards focus has shifted from Passive Safety to collision mitigation:

- Electronic Stability Control
- Traction Control
- Adaptive Cruise Control
- Forward Collision Warning
- Rear Collision Warning
- Lane Departure Warning
- Crash Imminent Braking
- Blind Spot Detection
- Adaptive Headlight
ADAS Standards

J3063™
Active Safety System Terms & Definitions

J2399™
Adaptive Cruise Control (ACC) Operating Characteristics and User Interface

J2802™
Blind Spot Monitoring System Operating Characteristics & User Interface

J3116™
Active Safety Pedestrian Test Mannequin Recommendation

J3029™
Forward Collision Warning & Mitigation Vehicle Test Procedure – T&B
ADAS Standards

ADAS Related Documents – Work In-Process

- **J3088 WIP**: Active Safety Systems Sensors
- **J3087 WIP**: Automatic Emergency Braking Performance Assessment Test Methods
- **J3122 WIP**: Active Safety Test Target Correlation
- **J3157 WIP**: Active Safety Bicyclist Test Targets Task Force - New

Safety and Human Factors Standards Related to ADAS

- **J3045™**: Truck & Bus Lane Departure Warning Systems Test Procedure
- **J3048™**: Driver-Vehicle Interface Considerations for Lane Keeping Assistance Systems
- **J2988™**: Guidelines for Speech Input & Audible Output in Driver Vehicle Interface
- **J2400™**: Human Factors in Forward Collision Warning Systems Operating Characteristics & User Interface
- **J2831™**: Development of Design & Engineering Recommendations for In-Vehicle Alphanumeric Messages
- **J2972™**: Definition of Hands-Free Operation of a Person to Person Wireless Communication System or Device
- **J2399™**: Adaptive Cruise Control Operating Characteristics & User Interface
- **J2808™**: Road/Lane Departure Warning Systems: Information for the Human Interface
- **J3077™**: Definitions and Data Sources for the Driver Vehicle Interface (DVI)
SAE Standards to Support Connected Vehicle Technologies

Focus Areas for Standards
✓ Mobile Devices
✓ Road Side Equipment
✓ Traffic Information Management
✓ Systems and Data Back Haul
✓ Service Providers
✓ IoT
✓ DSRC and LTE Communications
✓ Road Weather
✓ Curve Warning
✓ Traveler Information
✓ Work Zone Warning
✓ Maps
✓ Adaptive Signal Control
✓ Platooning
✓ Disabled/Vulnerable Road Users

Examples of Driver Alerts
• Forward Collision Warning
• Emergency Electronic Brake Light
• Intersection Movement Assist
• Blind Spot Warning
• Weather Warnings
• Lane Change Warning
• Do Not Pass Warning
• Right Turn in Front
• Signal Phase and Timing
• Curve Speed Warning
• Vulnerable Road Users
If all vehicles were broadcasting the Basic Safety Message (BSM) defined in **J2735**™ and transmitted according to **J2945/1**™ an in-vehicle alert could have prevented this car crash.

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Original video: https://www.facebook.com/video.php?v=...
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Safety and Human Factors Standards Related to Connected Vehicles

- **J2395™**: ITS In-Vehicle Message Priority
- **J2831™**: Development of Design & Engineering Recommendations for In-Vehicle Alphanumeric Messages
- **J2988™**: Guidelines for Speech Input & Audible Output in Driver Vehicle Interface
- **J2944™**: Operational Definitions of Driving Performance Measures & Statistics
SAE Driving Automation Standards

**J3016™**
Taxonomy and Definitions for Terms Related to On-Road Motor Vehicle Automated Driving Systems

**J3114™**
Human Factors Definitions for Automated Driving and Related Research Topics

**J3018™**
Guidelines for Safe On-Road Testing of SAE Level 3, 4, and 5 Prototype Automated Driving Systems (ADS)
Vehicle Cyber Security Systems Engineering Committee
- J3061™: Cybersecurity Recommended Practice for Cyber-Physical Vehicle Systems

Truck and Bus Controls and Communications Network Committee
- J1139™: Serial Control and Communications – Heavy Duty Vehicle Network

Vehicle Electrical Systems Security
- J2101 WIP: Requirements for Hardware Protected Security for Ground Vehicle Applications
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WEBINAR: Preparing the Energy Grid for Electrified and Autonomous Vehicles

Wednesday, December 13, 2017 at 12:00 Noon U.S. EST

Mercedes-Benz Energy Americas
James Karavakis, Business Development

National Renewable Energy Laboratory (NREL)
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