CCMTA | CCATM

Canadian Council of Motor Transport Administrators

Conseil canadien des administrateurs en transport motorisé

BIENVENUE ASSEMBLÉE ANNUELLE 2018 DU CCATM

WELCOME TO THE 2018 CCMTA ANNUAL MEETING

QUÉBEC

Canadian Vehicle Manufacturers' Association
Association canadienne des constructeurs de véhicules

Global Automakers of Canada

AUTOMATED AND CONNECTED VEHICLES AND THE FUTURE

CCMTA Education Session
June 3, 2018

WHO WE ARE

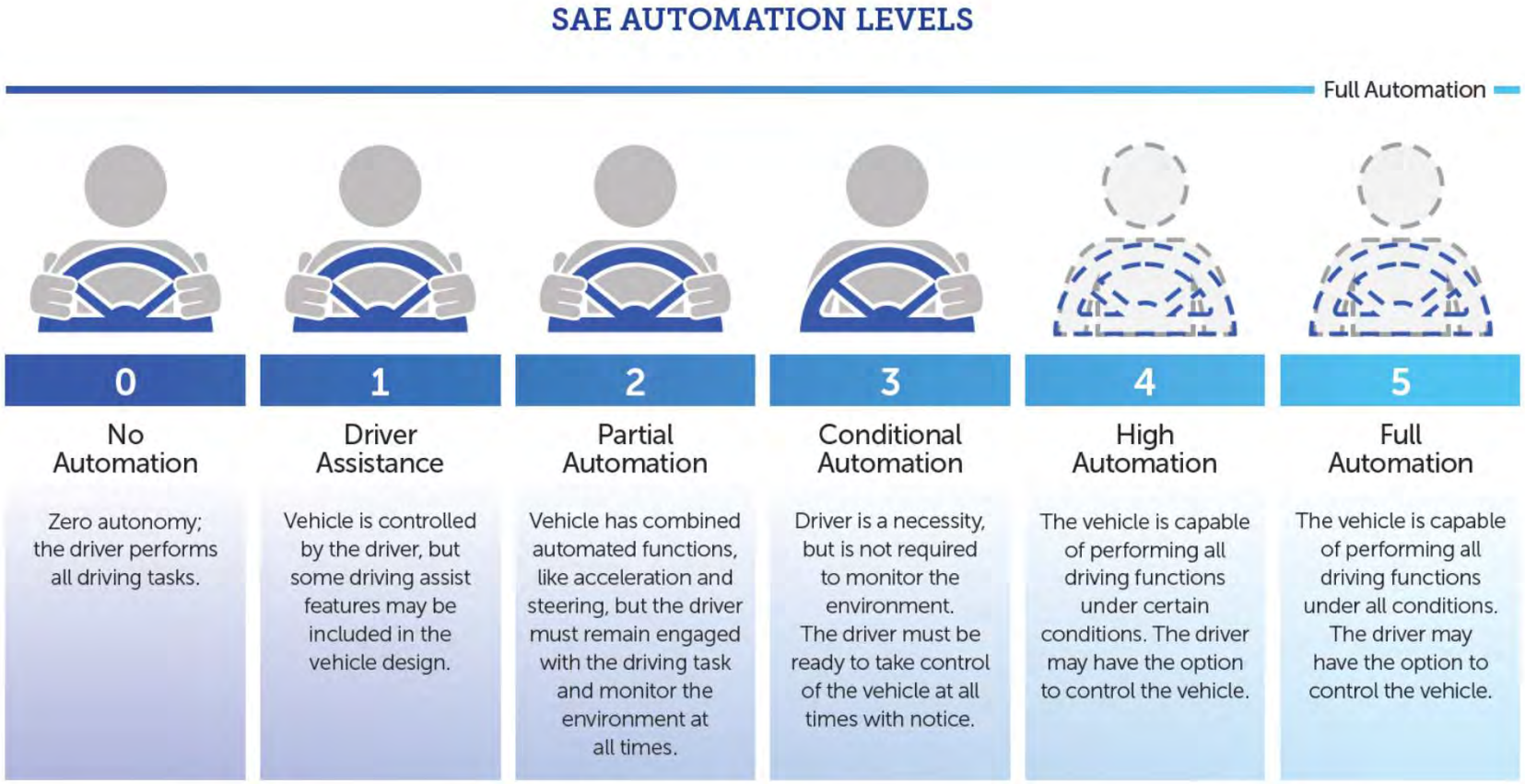
Canadian Vehicle Manufacturers' Association

The Canadian Vehicle Manufacturers' Association is the industry association that has represented Canada's leading manufacturers of light and heavy duty motor vehicles for more than 90 years. Its membership includes Fiat Chrysler Automobiles (FCA) Canada, Inc.; Ford Motor Company of Canada, Limited and General Motors of Canada Company. Collectively its members account for approximately 60% of vehicles produced in Canada, operate 5 vehicle assembly plants as well as engine and components plants, and have over 1,300 dealerships. 130,000 jobs are directly tied to vehicle assembly in Canada. Direct and indirect jobs associated with vehicle manufacturing are estimated at over 500,000

Global Automakers of Canada

We are the national industry association representing the Canadian interests of 15 leading international automakers. Our members directly and indirectly employ more than 77,000 Canadians in vehicle manufacturing, sales, distribution, parts, service, finance and head office operations from coast to coast. In 2017 the member companies of the GAC sold 1,160,446 vehicles representing 57% of the Canadian automotive market and supported over 60% of Canada's 3,331 new vehicle dealerships. Over 60% of the members' 2017 new vehicle sales were manufactured in the NAFTA region.

WHAT ARE AVs? (SAE J3016)



https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/13069a-ads2.0_090617_v9a_tag.pdf

WHY DEPLOY AVs?

Improved safety for all road users through collision avoidance

- 2016 – 1,898 fatalities and 160,315 injuries in Canada[1]
- Research shows vast number of vehicle crashes tied to human error[2]
- Collision avoidance benefits drivers, passengers, cyclists and pedestrians equally.

Ride Sharing and Automated Taxis

- Potential to increase vehicle utilization in persons carried and time on road (versus parked) as well as
- Potential to reduce fuel consumption and GHG emissions

Increased accessibility

- For the elderly or the disabled, and for those for whom vehicle ownership is not practical

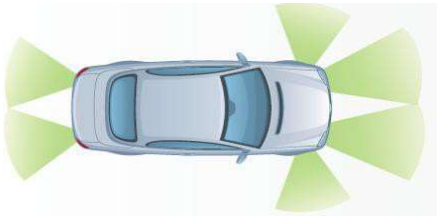
“Last mile” option for efficient public transit.

1 Canadian Motor Vehicle Traffic Collision Statistics: 2016
2 U.S. NHTSA, 94 percent of serious crashes are due to human error, www.nhtsa.gov/technology-innovation/automated-vehicles-safety

AUTOMATED AND CONNECTED TECHNOLOGIES OVERVIEW

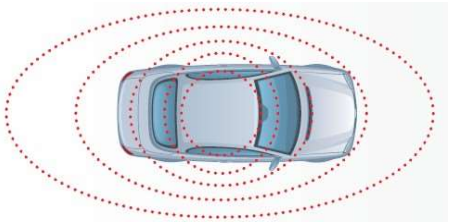
Two distinct but complimentary streams of technological innovation occurring simultaneously

1. Vehicle resident crash avoidance systems which provide warnings and/or limited automated control of safety features
2. V2V, V2I and V2X communications which can support crash avoidance applications



Automated Driving Systems

- "Sense-Plan-Act"; self contained, no communication with other road users or infrastructure
- Considerations: Does not require infrastructure; no road data sharing of traffic, obstacles or events; crash avoidance limited to line-of-sight.



Connected Vehicle Technologies - V2V, V2I, V2X

- Wireless communication in real time to other road users (vehicles, cyclists, pedestrians) and infrastructure through
- Two contending* technologies: DRSC (802.11p), and C-V2X (5G)
- Considerations: effectiveness scales with deployment, customer acceptance, infrastructure readiness, governance issues (rules of access, cybersecurity, privacy etc.)

**interoperability between DSRC/C-V2X being researched and tested as best case outcome*

Rand Corporation, *Autonomous Vehicle Technology, A Guide for Policy Makers*, 2014, http://www.rand.org/pubs/research_reports/RR443-1.html
KPMG and CAR, *Self-driving cars: The next revolution, 2012*, http://cargroup.org/?module=Publications&event=View&pubID=87

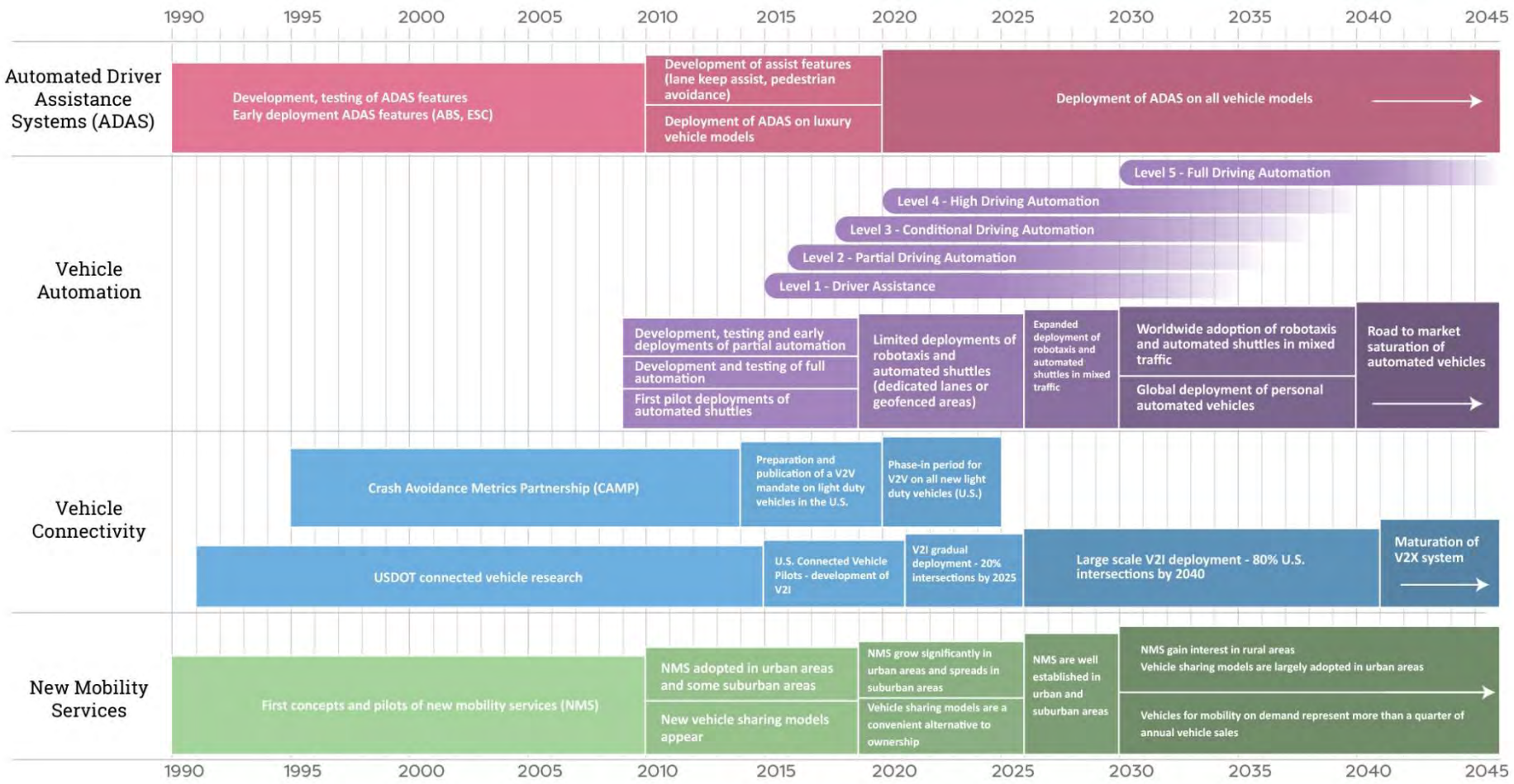
CONNECTED VEHICLES – STATUS (NORTH AMERICA)

Effective V2X communications require technology with low latency and high bandwidth to accommodate message volume in a reliable and secure environment.

	802.11p – DSRC	C-V2X (5G)
Technology	802.11p (adapted from 802.11a wireless) Priority on safety messaging for V2X	5G technology Capable of safety messaging, with additional capability for infotainment
Spectrum	5.9 GHz allocation reserved for ITS (75 MHz bandwidth 5.850-5.925 GHz) with 10 Hz channels	Can operate in 5.9 GHz ITS spectrum (not currently licensed to) and cellular spectrum
Installation	Vehicles and Roadside Units (RSUs)	Vehicles and cellular network (network independent RSU possible)
Performance	Up to 27Mb/s data rate (currently) ~500m by line of sight Low latency (2ms) for safety messages No lag owing to Basic Service Set (BSS) association and authentication “handoff” before data exchange Performance drops in node-congested areas Proven highly secure protocol Data packet losses minimal at any speed.	Bandwidth challenges (traffic and business model) Up to 20 Gb/s (20,000 Mb/s) theoretical ~ 1-1.5km by line of sight Ultra low-latency 1ms latency More easily handles additional data nodes, less interference Rev 15 (upcoming) - more throughput for sensor data, reduced doppler effect up to 500kph
Deployment model	OEMS, communities, governments and businesses (“Free” data exchange)	OEMs, cellular service providers, governments and businesses (business model uncertain)
Readiness	Fully qualified, ready for widescale deployment today, with a regulated mandate.	Demonstration phase – deployment in of chips as early as 2019 (Ref: Qualcomm 9150 C-V2X) Two or more years for regulatory qualification and start of widescale deployment
Key Stakeholders	802.11p suppliers, auto OEMs	5GAA members including cellular service providers, 5G suppliers and OEMs

PATHWAY TO AVs

Outlook: Several OEMs have publically stated Level 3 (Audi A8-2018/2019) and Level 4 (GM-2019, Toyota-2020 and Ford-2021)



https://www.cargroup.org/roadmap-for-automotive-technology-advancement/ , June 2017

COLLABORATION

Vehicle OEMs have a long history of collaborative efforts

- Academia
  - Suppliers
    - Standards Organizations (SAE, ISO, etc)
      - Tech companies
        - Government
          - Cross-sectoral industry groups and associations

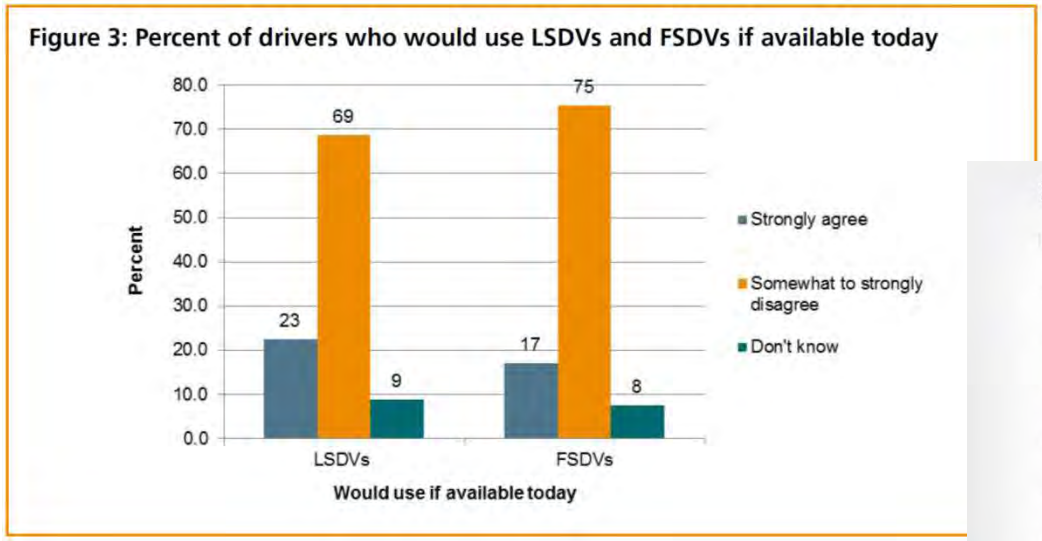
A GREAT DEAL OF CROSS-SECTORAL WORK REMAINS

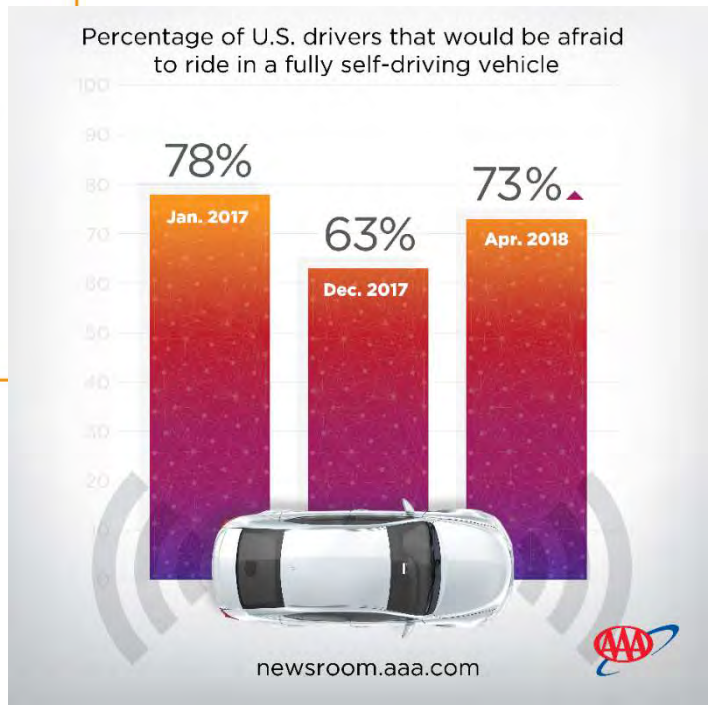
- **Privacy Protection and Data Ownership**
- **Cybersecurity**
- **Safety by Design**
- **Risks from Liability**
- **Spectrum and DSRC**
- **Insurance**
- **Other Risks**
  Human/machine interface, standards and regulations, provincial laws
- **Continuing research to maximize benefits and reduce risks**
  - Machine learning optimization and “Explainable AI”, Cloud data management, quantum encryption and “white hat hacking”
  - Driver distraction and engagement, etc.

Building success in these areas leads to <u>confidence in the technology</u> and <u>establishes trust</u> in those parties who are accountable for safe vehicles and safe roads
➔ CONSUMER ACCEPTANCE

CONSUMER ATTITUDES TO AVs

Consumer education and awareness of the capabilities but also limitations are key to acceptance. Once they know the limitations, they are less likely to be fearful of them.





Sources:
Automated Vehicles: Driver Knowledge, Attitudes, and Practices (16J)
Fact Sheet: Vehicle Technology Survey – Phase IIIB, May 2018, American Automobile Association

HOW TO PREPARE FOR AVs TOGETHER

- Automated vehicle technology is **rapidly evolving**
  - Flexibility and nimbleness are key to rapid advancement
  - Pre-mature or overly prescriptive regulatory standards stifles innovation with potential to create a technology bias that may not be in the best interest of public safety.

- Engage stakeholders early and often: we want to work collaboratively with regulators on an environment that will support development and deployment of AVs in an safe and effective manner.
  - Coordinate efforts to remove barriers to innovation
  - Increase education to enhance public acceptance
  - Establish and use at all times a common language based on established terms.

- Consistency and collaboration: within Canada and outside of Canada
  - Avoid patchwork of regulatory approaches, jurisdictional guidelines aligned with fed policy
  - Alignment with US federal and state guidelines / policy (shared borders)

Actions Needed:

1. Issue TC Federal Framework, equivalent to NHTSA Automated Driving System 2.0
2. Followed by engagement with Manufacturers & other entities (MOEs), maintain CCMTA Jurisdictional Guidelines in DRAFT status until the overriding Framework is published and MOE consultations are completed

Canadian Vehicle
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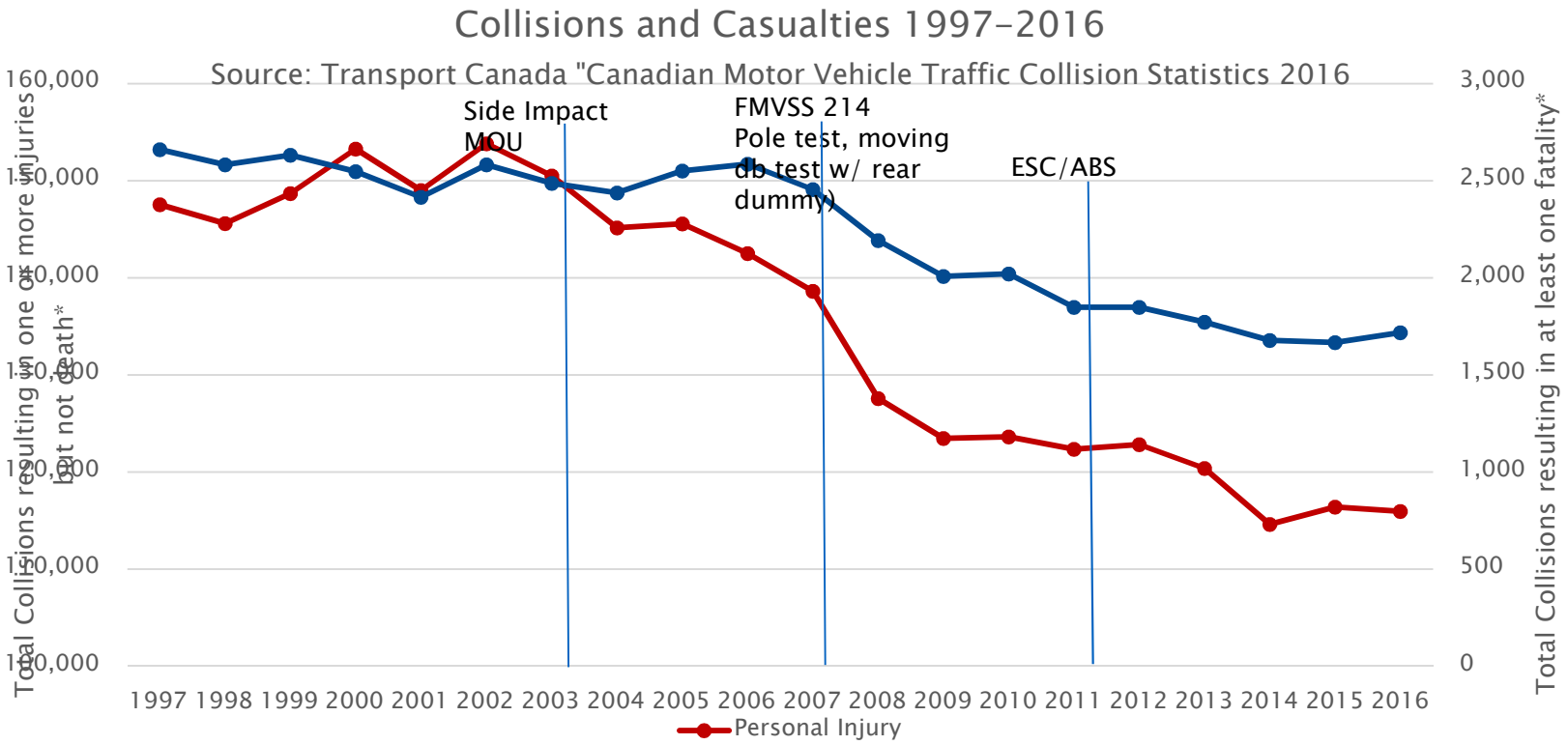
BACK UP SLIDES

WHY DEPLOY AVs?

- Occupant protection systems are important but passive systems achieving increasingly marginal gains to occupant



*within 30 days of the collision, except in Quebec before

CRASH AVOIDANCE TECHNOLOGIES SAVE LIVES

IIHS HLDI

Real-world benefits of crash avoidance technologies

HLDI and IIHS study the effects of crash avoidance features by comparing rates of police-reported crashes and insurance claims for vehicles with and without the technologies. (May 2018)

iihs.org

Blind spot detection

- ▼ 14% Lane-change crashes
- ▼ 23% Lane-change crashes with injuries
- ▼ 7% Claim rates for damage to other vehicles
- ▼ 8% Claim rates for injuries to people in other vehicles

Rear automatic braking

- ▼ 62% Backing crashes
- ▼ 12% Claim rates for damage to the insured vehicle
- ▼ 30% Claim rates for damage to other vehicles

Rearview cameras

- ▼ 17% Backing crashes

Rear cross-traffic alert

- ▼ 22% Backing crashes

Added costs

Lower crash rates are a clear benefit of these technologies, but some features can lead to higher repair costs in the crashes that do happen. That's because sensors and other components are often located on the vehicle's exterior. For example, in the case of forward collision warning without autobrake, the average payment per claim for damage to the insured vehicle goes up $109 for vehicles equipped with the feature.

Forward collision warning

- ▼ 27% Front-to-rear crashes
- ▼ 20% Front-to-rear crashes with injuries
- ▼ 9% Claim rates for damage to other vehicles
- ▼ 16% Claim rates for injuries to people in other vehicles

Forward collision warning plus autobrake

- ▼ 50% Front-to-rear crashes
- ▼ 56% Front-to-rear crashes with injuries
- ▼ 13% Claim rates for damage to other vehicles
- ▼ 23% Claim rates for injuries to people in other vehicles

Lane departure warning

- ▼ 11% Single-vehicle, sideswipe and head-on crashes
- ▼ 21% Injury crashes of the same types

https://bit.ly/2smcdU0

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