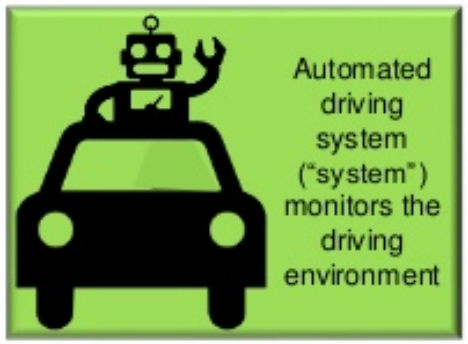
Advanced Heavy Vehicle Safety Technology

Long term vision

- Automated vehicles where vehicles never (or almost nearly) crash
  - Google car
  - Vehicle platooning

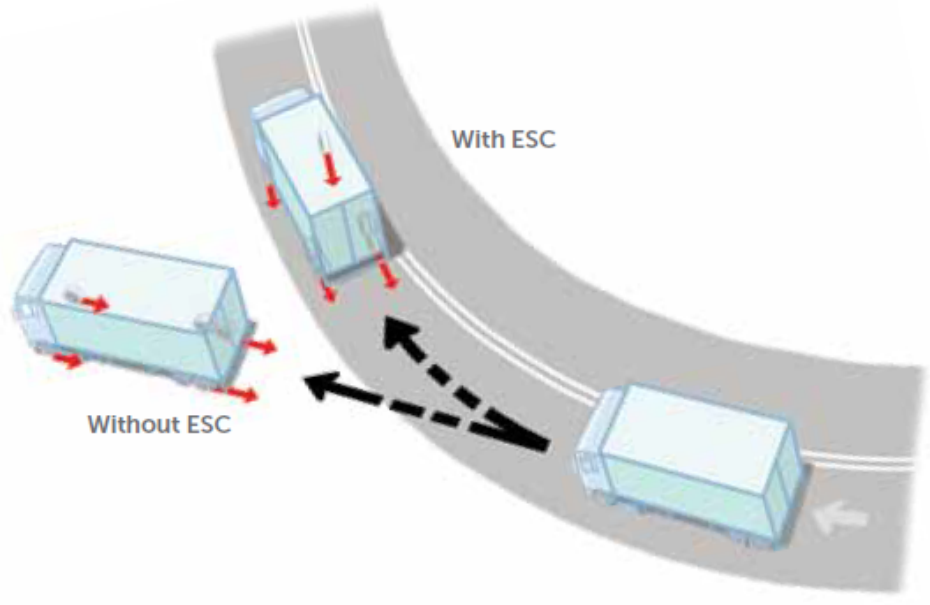
The pathway to driving automation



SAE level	Name	Execution of Steering and Acceleration/ Deceleration	*Monitoring* of Driving Environment	Fallback Performance of *Dynamic Driving Task*	System Capability *(Driving Modes)*
0	No Automation	Human driver	Human driver	Human driver	n/a
1	Driver Assistance	Human driver and system	Human driver	Human driver	Some driving modes
2	Partial Automation	**System**	Human driver	Human driver	Some driving modes
3	Conditional Automation	System	**System**	Human driver	Some driving modes
4	High Automation	System	System	**System**	Some driving modes
5	Full Automation	System	System	System	**All driving modes**

Recent past

- Electronic stability control
- Mandatory on all new cars
- Reduces single vehicle run off road crashes by 33 per cent



Recent past

- Front under-run protection
- Cabin strength

Current State

- Australia has a National Heavy Vehicle Braking Strategy
- Heavy vehicle anti-lock brakes, load proportioning valves for all new prime movers and trailers
- Electronic stability control to be required on all new heavy vehicles – consultation paper later this year

The near future – increased driver assistance for safety

- More sensors, longitudinal control, lateral control, increased object detection
- ‘Roads that cars/trucks can read’
- The ‘virtual crash barrier’

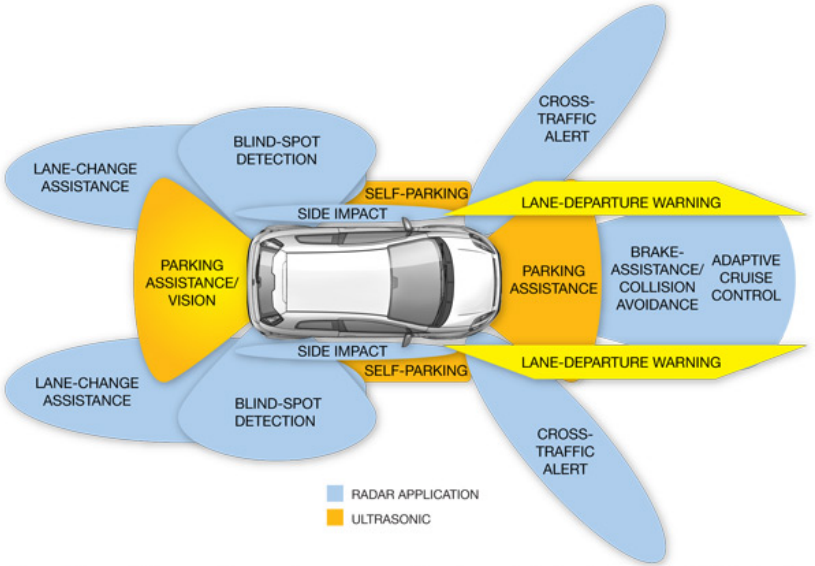


Figure 2 Several driver-assistance systems are currently using radar technology to provide blind-spot detection, parking assistance, collision avoidance, and other driver aids (courtesy Analog Devices).

Near future – understanding crash avoidance features already on vehicles

- Forward collision warning and automatic emergency braking (front crashes)
- Blind spot warning
- Rear view assist (cameras, ultrasonics, radar)
- Adaptive headlamps
- – Steering responsive
- – Automatic high beams
- Cross traffic alert – front and rear
- Night view assist
- Highway pilot – adaptive cruise with lane keeping control
- Pedestrian detection and avoidance
- Unintentional lane departure warning and prevention (active assist)

Monash University Accident Research Centre (MUARC): Crash avoidance technologies in heavy vehicles report.

- Technologies considered:
  - Electronic Stability Control
  - Autonomous Emergency Braking Systems
  - Fatigue Warning Systems
  - Lane Departure Warning Systems.
- Benefits were estimated in terms of savings of fatal, serious and minor injuries, as well as for property damage only crashes.

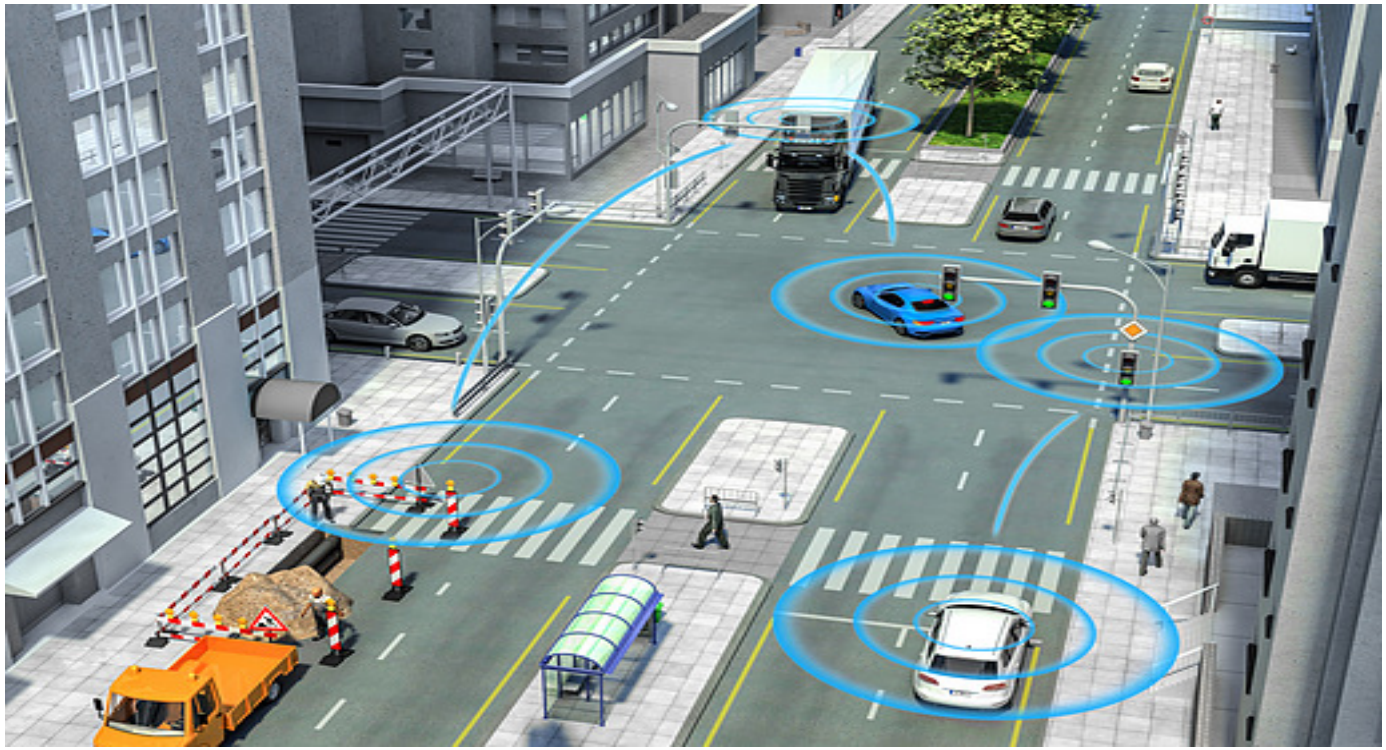
Monash University Accident Research Centre (MUARC): Crash avoidance technologies in heavy vehicles report.

- Fitment of Automated Emergency Brakes to all heavy vehicles could produce a 25 per cent fatal crash decrease

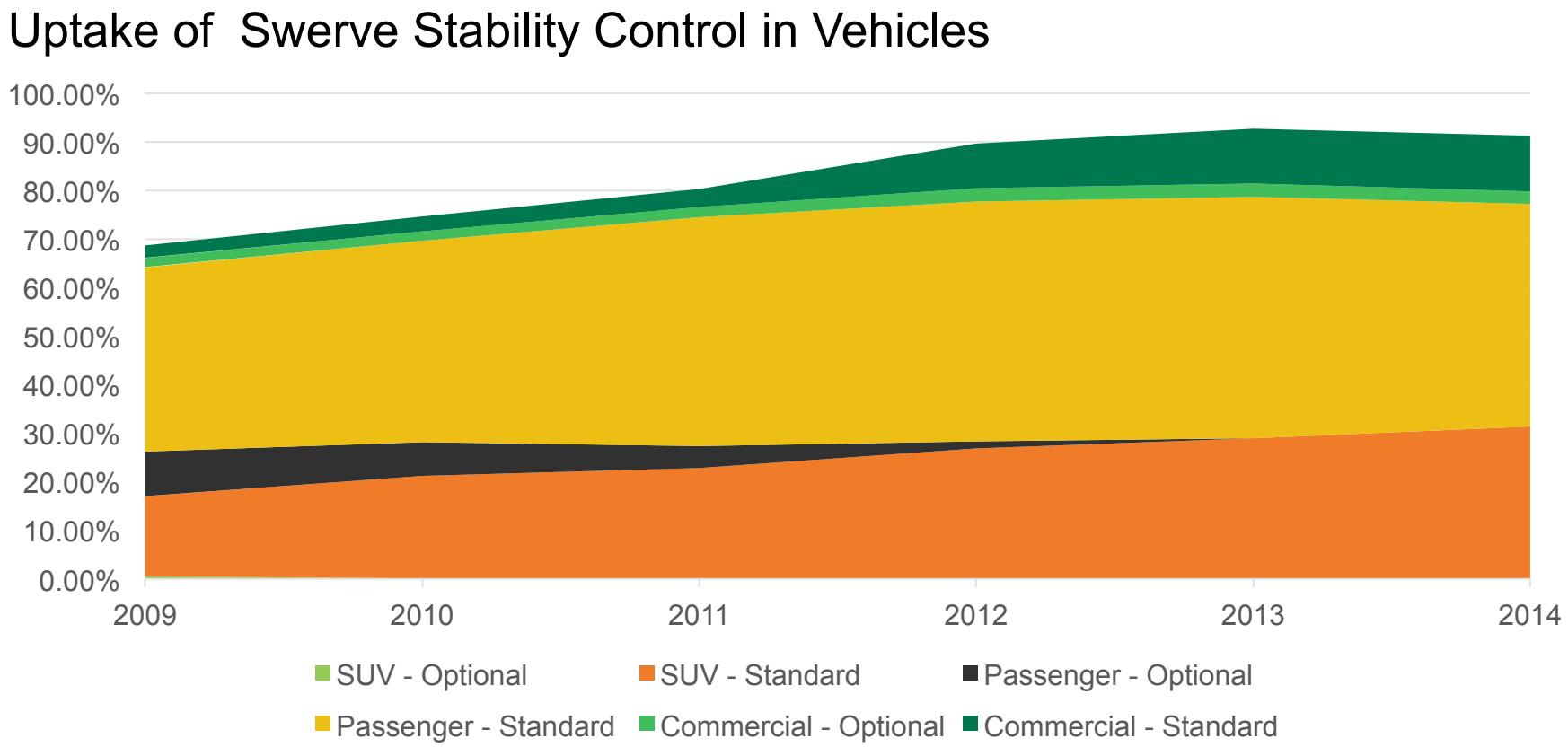
- Fitment of Lane Departure Warning, Electronic Stability Control and Fatigue Warning Systems to all heavy vehicles could each reduce fatal heavy vehicle crashes by another 4% to 6%

- Adding Autonomous Emergency Braking Systems to heavy vehicles will prevent up to a quarter of fatal crashes, which translates to $187 million.

V2X Communication

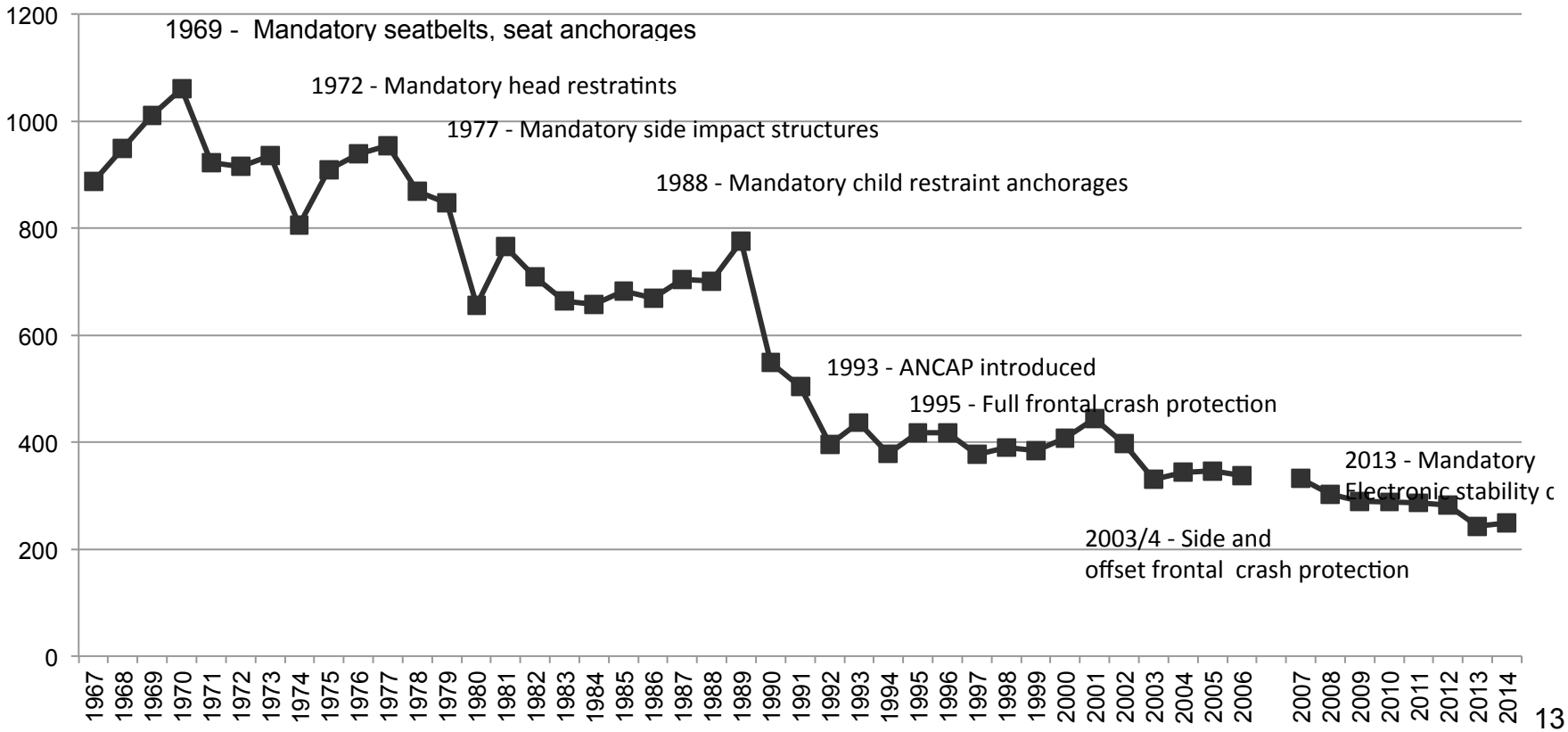


Pathway to new technologies is long

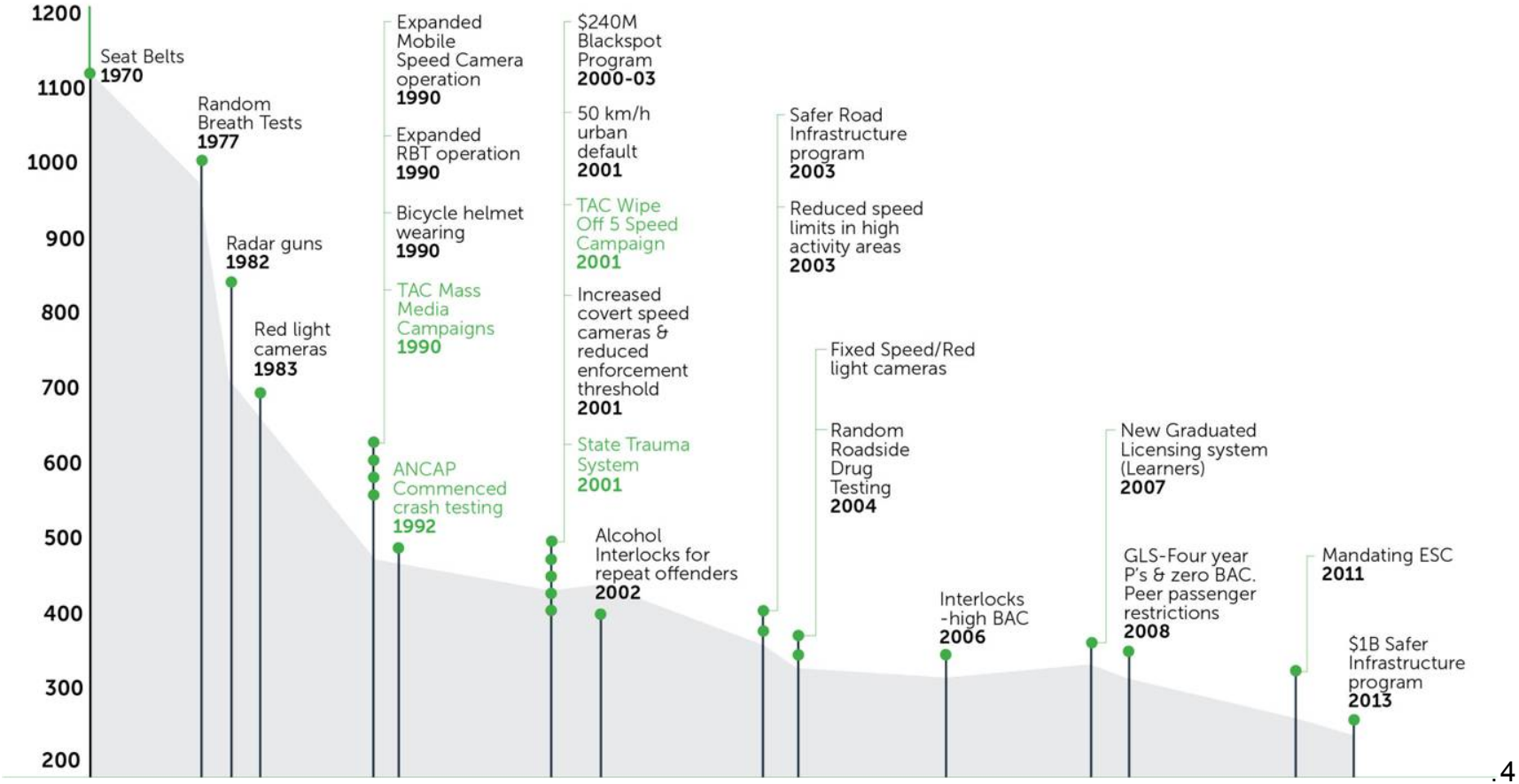


How has vehicle safety contributed?

Victorian fatalities by year



How has vehicle design safety contributed?



How does VicRoads work to influence vehicle design?

- *Safety Technologies for Heavy Vehicles and Combinations*
- Safe Wheels Save Lives Simulator
- Advocacy at the national level for new Australian Design Rules
- Contributing research to the national agenda

Regulatory push

Market pull

Victoria’s vehicle safety program in action