



Trucks that Refuse to Crash

Driver Assistance and Automation Technology

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Presentation to



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Automated Commercial Vehicles

- How do trucks differ from cars?
- How smart do automated vehicles need to be?
- What are the levels of automation?
- Will the technology gain wide acceptance?
- Will people want to be subservient to vehicles?

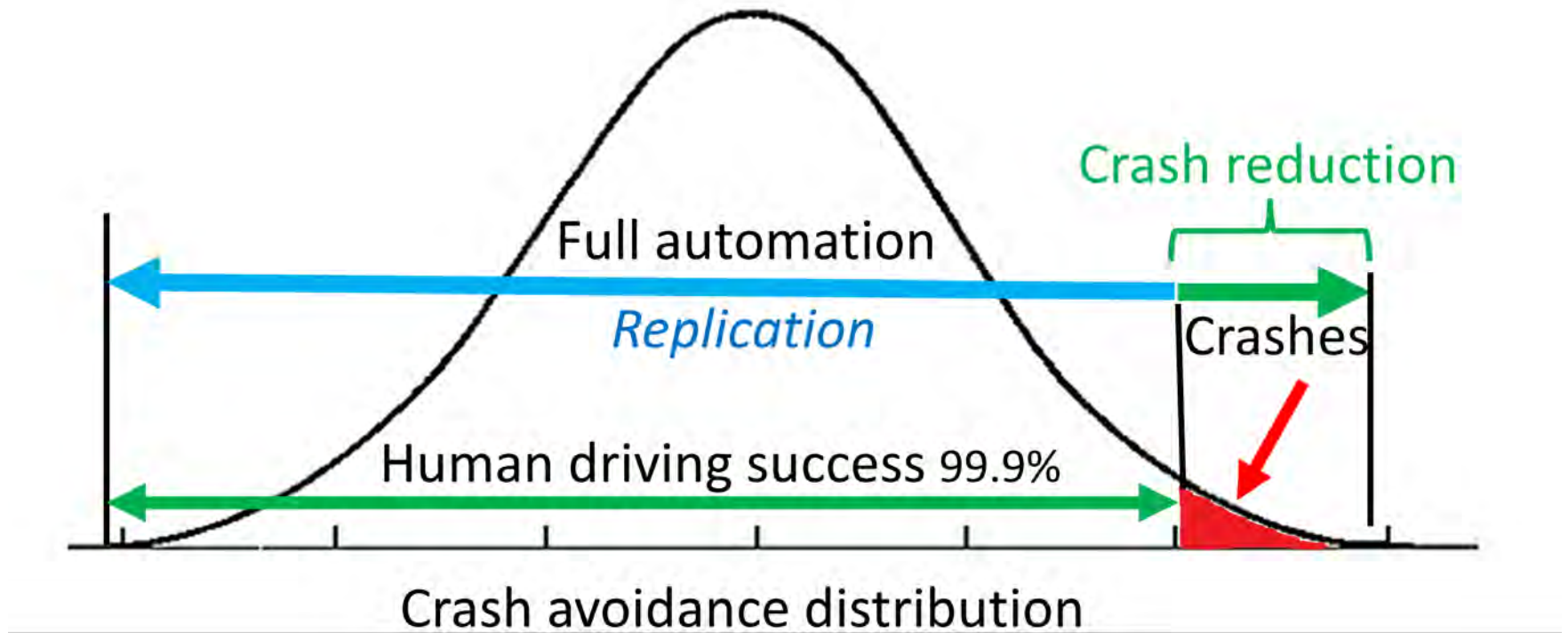
Automated Driving Levels (SAE J3016)

Level 0	No automation
Level 1	Driver Assist - adaptive cruise control, auto windshield wipers, automatic lights, anything that supports the driver (e.g. ESC, V2V)
Level 2	Partial Automation - hands off and feet off but eyes on. <i>Driver is responsible - Low speed congested traffic</i>
Level 3	Conditional Automation - hands off feet off eyes off – shared dual control but <i>driver is responsible</i>
Level 4	High Automation – Vehicle controls all aspects of the dynamic driving task but some modes may involve the driver
Level 5	Full Automation - complete machine control – Driver has no responsibility at all.

The Complexity of Human



Replicating the human

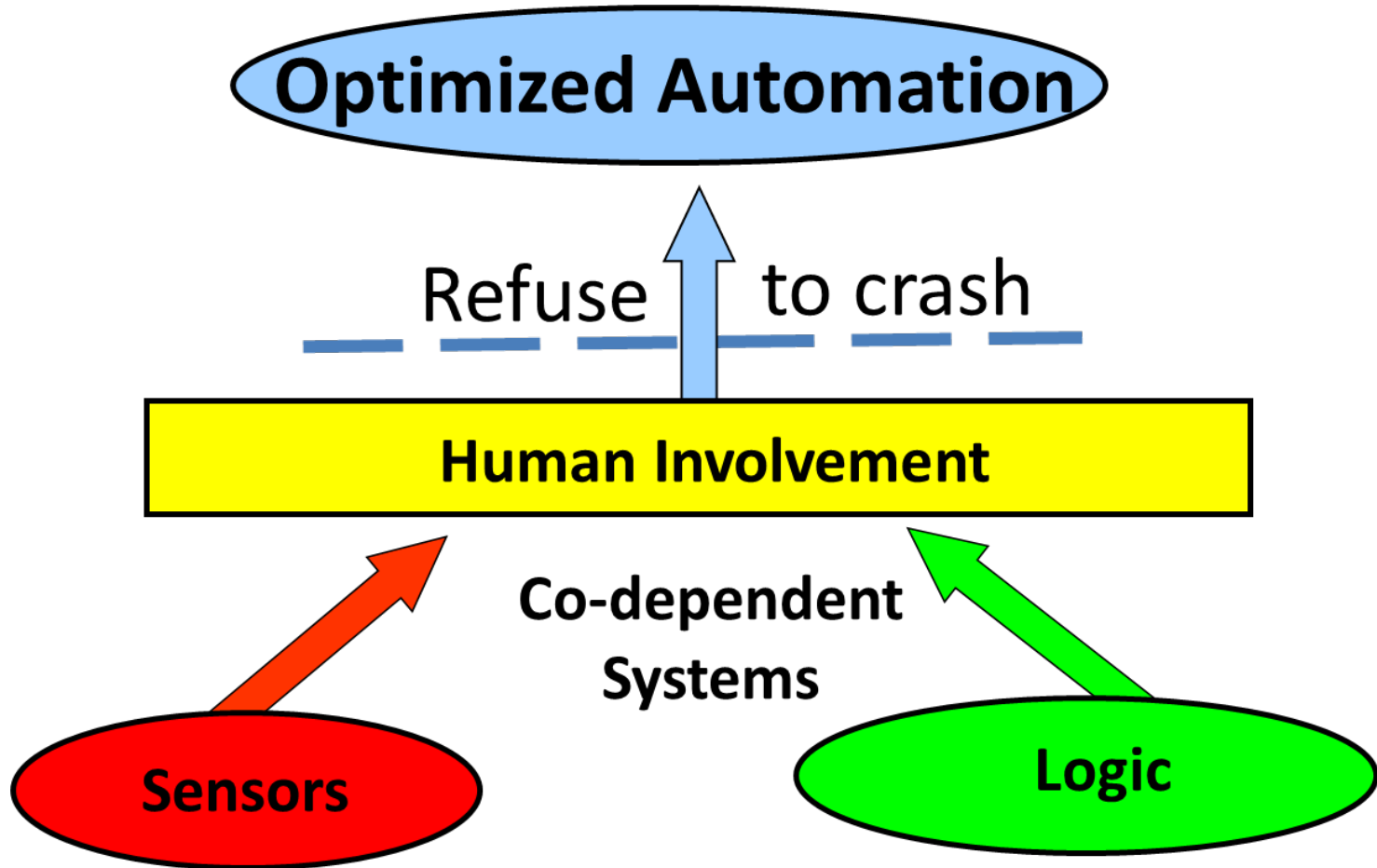


The challenge of driverless vehicles

- Driverless vehicles are a first world indulgence, a captivating and seductive idea
- A revolution in artificial intelligence is required
- Connected vehicles will need to be in place
- Sensor, logic and control systems greatly increase vehicle complexity – failure risk and unintended consequence are high

Driverless vehicles represent one of our greatest engineering challenges

Eliminating Crashes



Alternative strategy

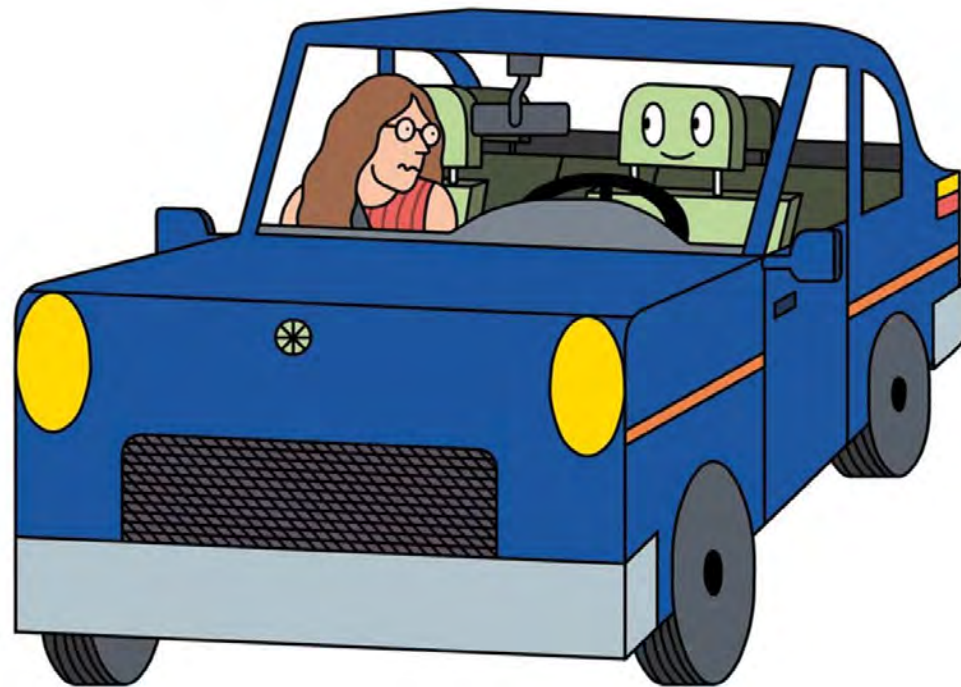
Vehicles refusing to crash

- Eliminating crash occurrence through automated intervention
- Maintains focus on safety – chasing the driverless vehicle dream distracts from safety
- Retains human perception, anticipation and intuition – cannot yet be replicated
- Provides early and increasing safety benefits
- Let crash refusal strategies lead to automation

New York Times Editorial

(THE EDITORIAL BOARD OCT. 14, 2017)

Would You Buy a Self-Driving Future From These Guys?



New York Times Editorial

(THE EDITORIAL BOARD OCT. 14, 2017)

- “The hype around automated cars is belied by the struggles these machines have...”
- “...auto and tech lobbyists, have proposed bipartisan bills that would let industry roll out automated cars more quickly by exempting them from existing safety regulations.”
- “A bill passed by the House last month would let manufacturers sell up to 25,000 automated cars a year without meeting all federal safety standards, and up to 100,000 cars after three years.”

New York Times Editorial

(THE EDITORIAL BOARD OCT. 14, 2017)

- “States and cities that wish to regulate self-driving cars will also be disappointed. The House and Senate bills, as a further boon to industry, would prohibit such action.”

Conclusions

- US Federal politicians have embraced the self driving cars at the expense of safety
- Failure to understand the magnitude and complexity of developing these vehicles is lost on many in the legislature.
- Developing vehicles that refuse to crash prioritizes safety and provides a path to driverless vehicles.



Thank You

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