The Future of Road Transport and The Implications for Insurance

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Birmingham Insurance Institute

2nd November 2016

redefining / standards

Driverless Cars!

What will we cover today?

- Details of the governments work with regard to making **Connected & Autonomous Vehicles** (CAV's) a reality for the UK
- Gain an understanding of some of the Government backed consortia and why AXA & other insurers are involved in these
- Discuss possible impacts of CAV's on the current insurance market, including changes to Motor and Public/Products Liability
- How the UK Insurance industry is responding and the workings of the ABI ADIG
- Possible Timelines for the various stages of Driver assistance systems moving through to fully autonomous driving

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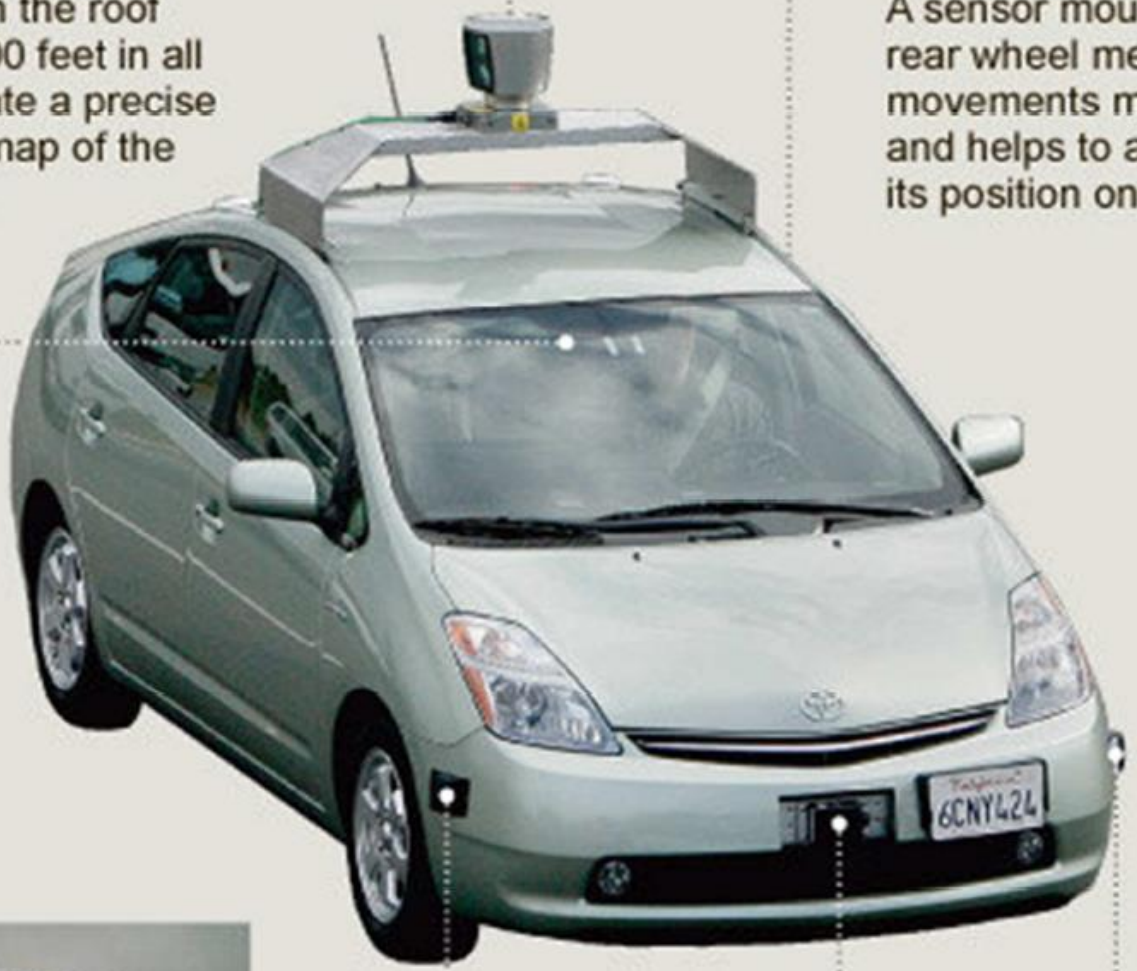
AXA

Googles Driverless Car

LIDAR
A rotating sensor on the roof scans more than 200 feet in all directions to generate a precise three-dimensional map of the car's surroundings.

POSITION ESTIMATOR
A sensor mounted on the left rear wheel measures small movements made by the car and helps to accurately locate its position on the map.

VIDEO CAMERA
A camera mounted near the rear-view mirror detects traffic lights and helps the car's onboard computers recognize moving obstacles like pedestrians and bicyclists.



RADAR
Four standard automotive radar sensors, three in front and one in the rear, help determine the positions of distant objects.

35 Million Vehicles

licensed on the road

This figure has increased every year since the end of the Second World War (except 1991)

90%

of all accidents are caused by driver error

1,700+

people died in vehicle collisions in the UK in 2013

Road traffic injuries are the leading cause of death among young people, aged 15–29 years

2,500

lives saved in the UK by 2030

£2,767

average cost claimed for car insurance

£11,292

average cost claimed for bodily injury

£16bn

annual cost to GB econonmy

46% 17-30 year olds do not hold a full driving licence

30% of traffic congestion in urban centres is the result of drivers' looking for parking

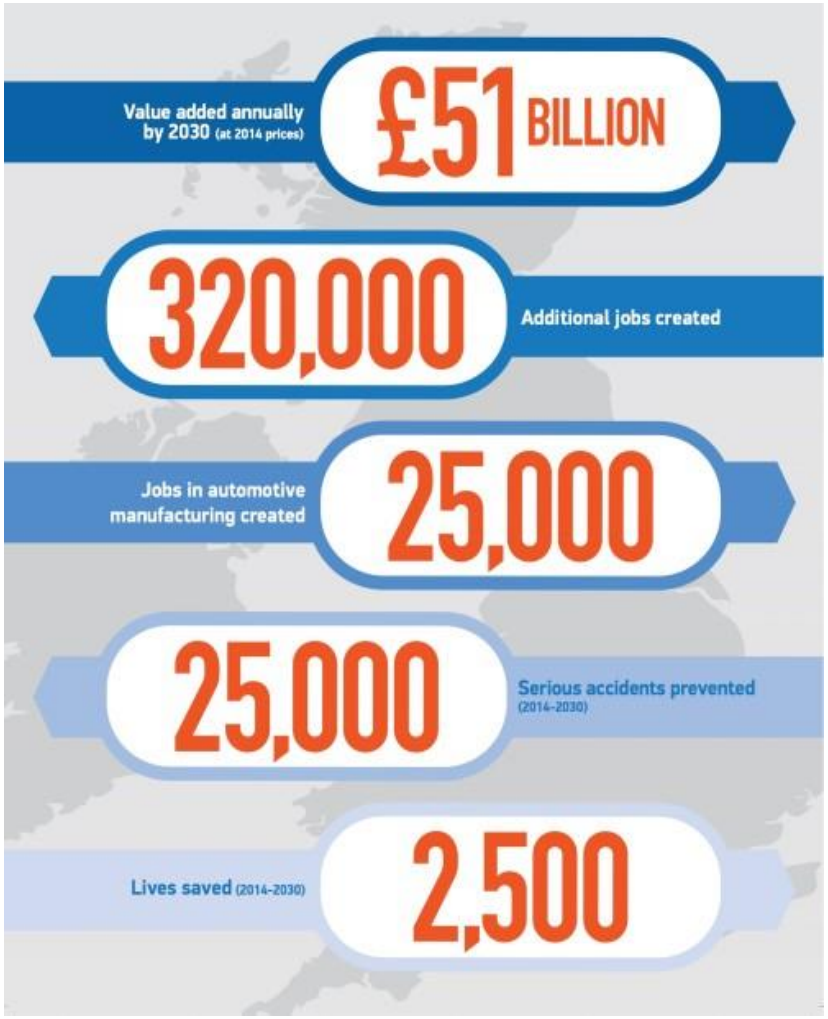
Emissions fall by 20% with smooth travel

The average driver in England can save up to 6 working weeks a year driving time

CAVs could create 320,000 additional jobs in the UK by 2030

CAVs will generate £51bn benefit per year by 2030

Projected UK Economic Overview



- The UK Will become a centre of excellence for Connected & Autonomous Driving, increasing production to 2.4 Million Vehicles per years in 2030 (currently 1.6m per year)
- Based on Current Trends it is expected that all vehicles produced in the UK by 2027 will be equipped with a level of automation that will mean the driver will not need to monitor the dynamic driving task or environment at all times but will need to be in a position to resume control throughout
- 25% penetration of fully autonomous vehicles by 2030
- Wider market impact on integrated transport, vehicles as a service, telecommunications industry, service provision, insurance, planning and public benefits
- The annual economic benefits by 2040 are projected to be more than double those in 2030 at £121 billion due to the greater number of fully autonomous vehicles on UK Roads

SMMT DRIVING THE MOTOR INDUSTRY

KPMG

Government Backed Consortia

Two Rounds of Investment so far
Our First was the Venturer Project;

- *A Bristol-based consortium exploring the feasibility of driverless cars in the UK, VENTURER has been trialling autonomous vehicles. Promising reduced pollution, congestion and accidents, the potential societal benefits are significant – and* ***the repercussions for insurers could be profound.***

VENTURER

redefining / standards

BAE SYSTEMS

brl
Bristol Robotics Laboratory

VENTURER

WILLIAMS

ATKINS

First

Testing technology plus a focus on legal and insurance implications

Milton Keynes – UK Autodrive

UNIVERSITY OF OXFORD

UNIVERSITY OF CAMBRIDGE

ARUP

JAGUAR

LAND ROVER

Ford

TATA MOTORS

Vehicle Technologies and looking at integrating vehicles into urban environments

flourish

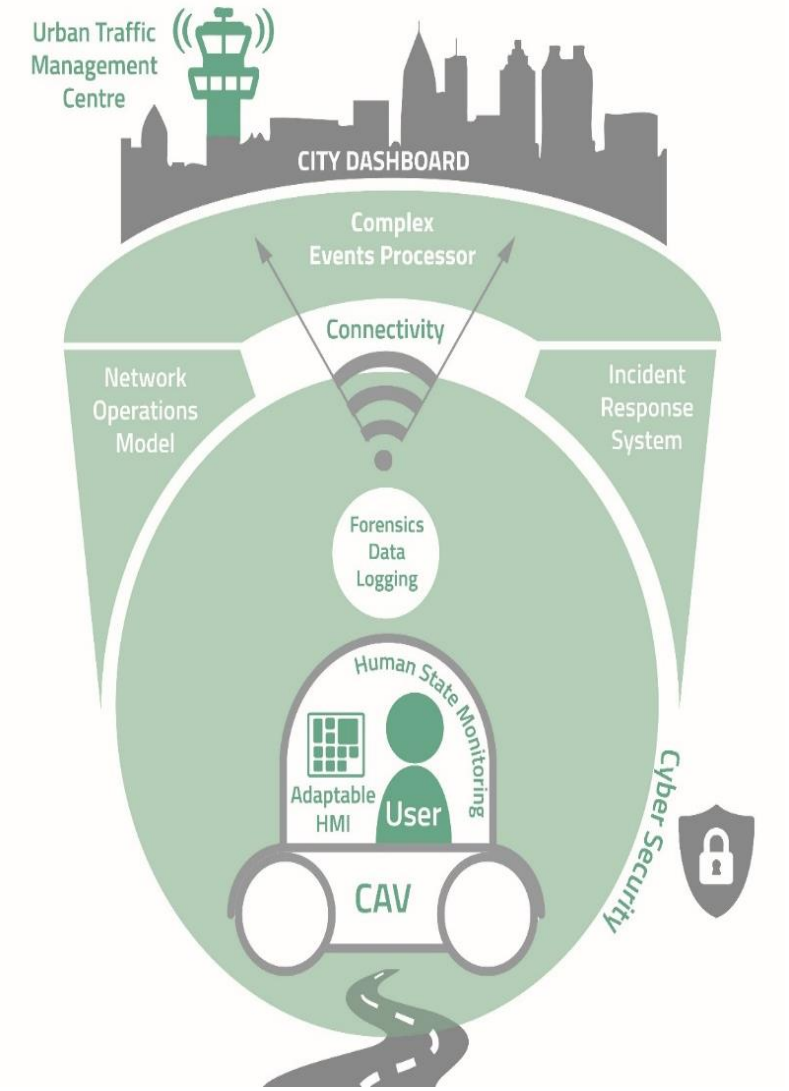
empowerment through trusted secure mobility

1. To develop an understanding and articulation of user needs and expectations of CAVs in order to maximise the mobility potential they pose.

2. To develop usable adaptive interfaces, performance certification processes and products and services that enable secure, trustworthy and private technology within CAVs.

3. To capture the data created by CAVs to develop innovative new tools and products.

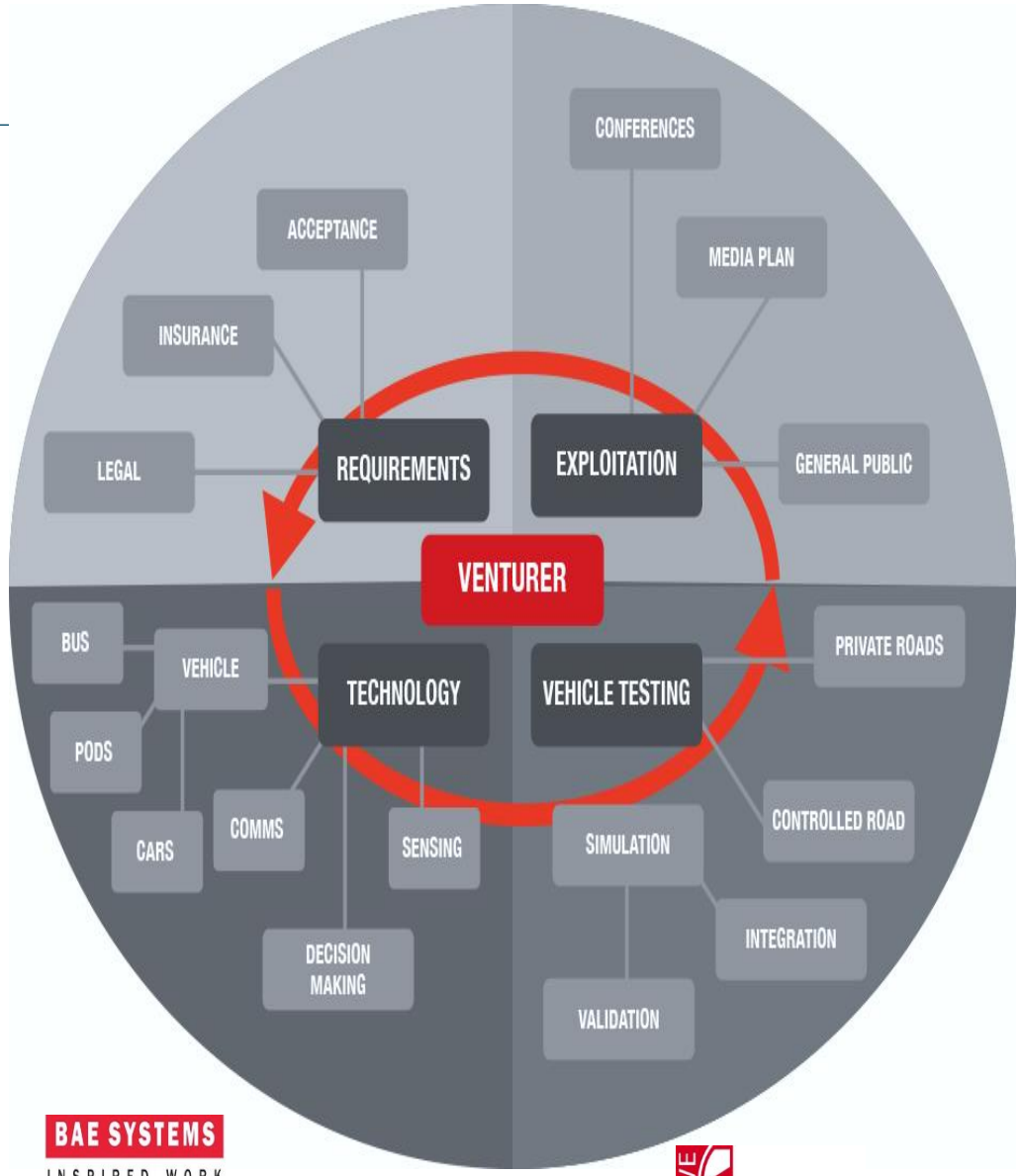
4. To leverage existing investment to expand validation and test capabilities in both urban and interurban networked environments and enhance the commercial opportunities this will deliver.



Back to Bristol & Venturer….

Venturer Approach

- Research on actual impacts
- Public policy regulation & liability
- Road & traffic scenarios of increasing complexity & risk in real-life situation
- Opinions & preferences of drivers, passengers, other road users
- Technical standards and regulations
- Vehicle technology linked to required infrastructure adaptations
- Other in-vehicle services (e.g. infotainment) and owner/user models
- Bundling with low carbon and Intelligent Mobility to deliver multiple benefits within Smart City framework



Venturer Trials

- https://youtu.be/k1JRmMA7NqU

Our Project Prospectus!

Safety

Over 90% of accidents involve driver error and we know that machines could drive more reliably than humans. By greatly reducing the opportunity for human error, AV technologies have the potential to significantly reduce the number of crashes.

Reduced congestion

Through connected and automated technologies, vehicles could drive closer together, which would increase roadway capacity without impeding safety since machines can keep minimum distances and still drive safely when compared to a human driver. We cannot keep building roads and adding lanes to meet demand, so CV/AV will be the vital next big step for increasing capacity.

Improved emissions

Vehicle platooning reduces air resistance for following vehicles, and traffic signal information could lead to more optimised speeds, two examples of ways in which emissions can be reduced.

Time

If drivers aren't driving they can be working or reading or watching television!

Equity

Anyone can use a self-driving car. Disabled, younger or older people would all have increased mobility, surely one of the greatest potential benefits of CAVs. Of course this could greatly increase demand, and potentially change our relationship with cars.

Improved road design

The improved safety could remove the need for crash barriers, which when combined with the replacement of signs with in-vehicle information could lead to our roads becoming less cluttered and more attractive.

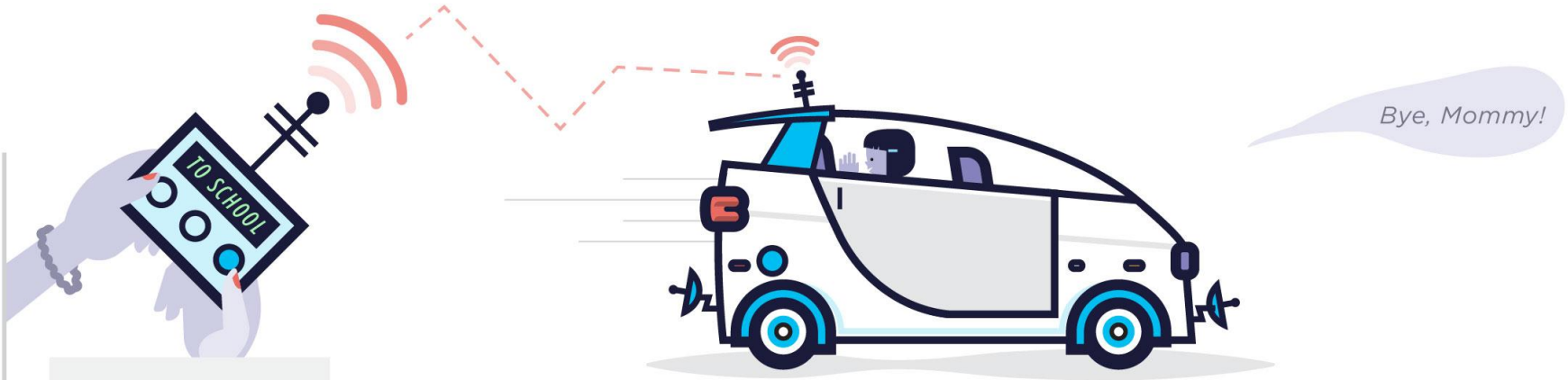
The 4 ‘T’s!

Trust

People must believe and trust the technology they are using. They must feel safe and want to use/buy new services that CAV open up to them rather than being sold solutions that are not fit for purpose or for person. CAV must be safe, secure and valued by the consumer and understanding the behaviour and emotions around CAV is an important step towards deployment.

1. Overall, consumers are skeptical about driverless cars:

nerdwallet



76%
Would not put a child into a driverless car for a trip alone

50%
would not pay extra for a driverless car

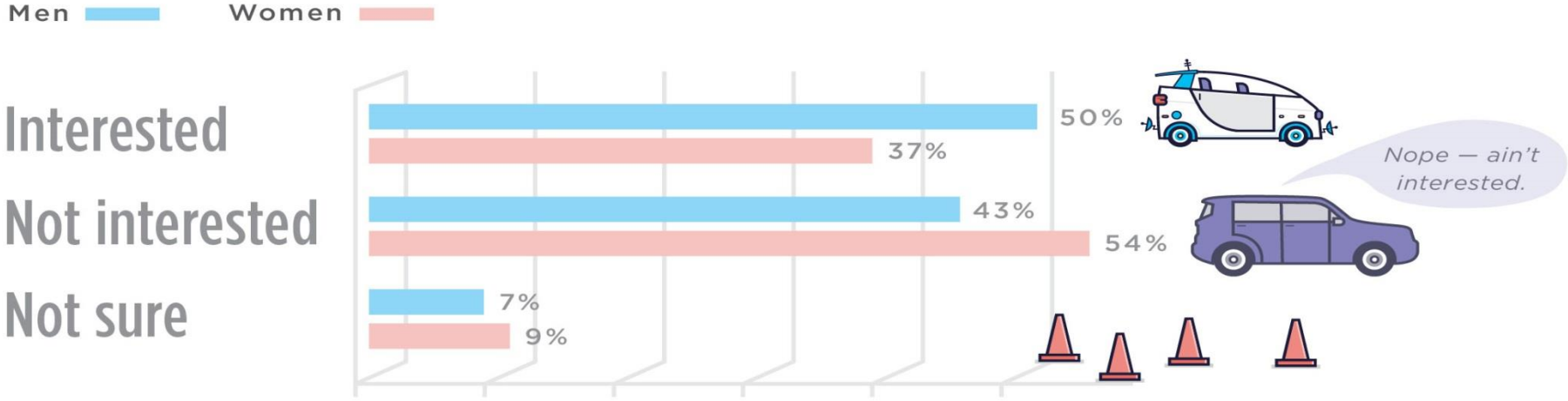
49%
Are not interested in owning a driverless car

46%
Think driverless cars will not be safe

36%
Say nothing appeals to them about a driverless car

2. Interest in owning a driverless car:

nerdwallet




S.MAIL
49718

The 4 ‘T’s!

Transport

The deployment of CAV capability has considerable ramifications on the wider transport sector and cities/communities in general. Key questions that must be addressed relate to the infrastructure investment needed, the data intelligence that can be garnered for a transport operator, and how CAV is one piece of the Smart City puzzle.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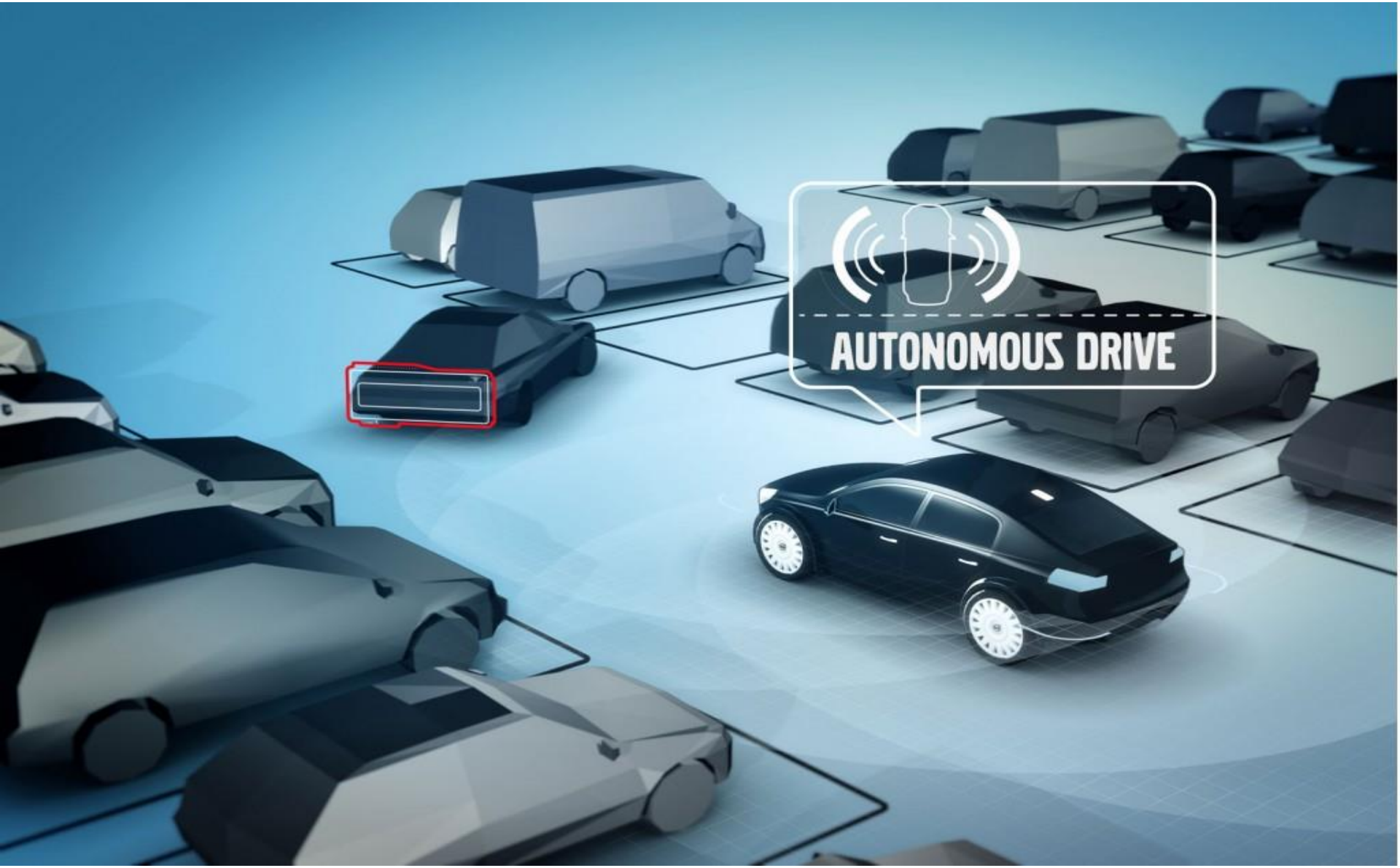

AUTONOMOUS DRIVE

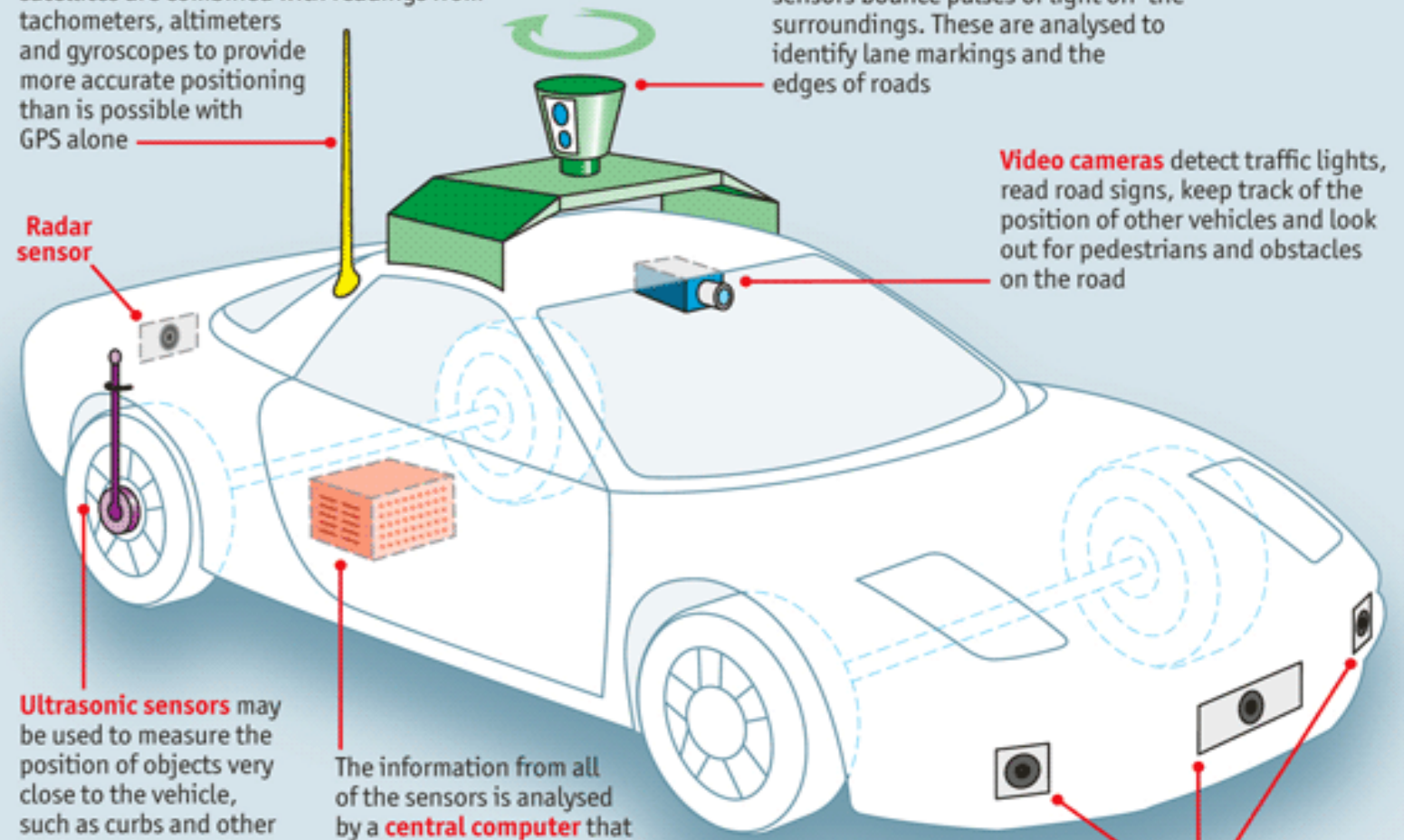
The 4 ‘T’s!

Testing

Independent validation is fundamental to emphasise the capability and safety of any solution in the CAV space. It is vital that appropriate and audited testing takes place in a controlled environment before any deployment takes place in. As the software and hardware components come from multiple vendors and integrated numerous ways, the various levels of testing required must be fully understood and integration with primary and secondary parts must be considered. The communications backbone must be robust and secure with a realistic urban backdrop. This is necessary to fully understand real life deployment issues.

Under the bonnet

How a self-driving car works



Source: *The Economist*


FALLING DOWN

Costs associated with automated technologies

Isn't this all going to be very expensive?

"There seems to be a relative consensus that the technology involved with autonomous vehicles will add significant cost to consumer vehicles placing them, initially at least, at the higher end of the market"

The Guardian – July 2014

"Consumer versions are likely to cost the same as a premium saloon or sports car initially, before they reach a more mass-market cost."

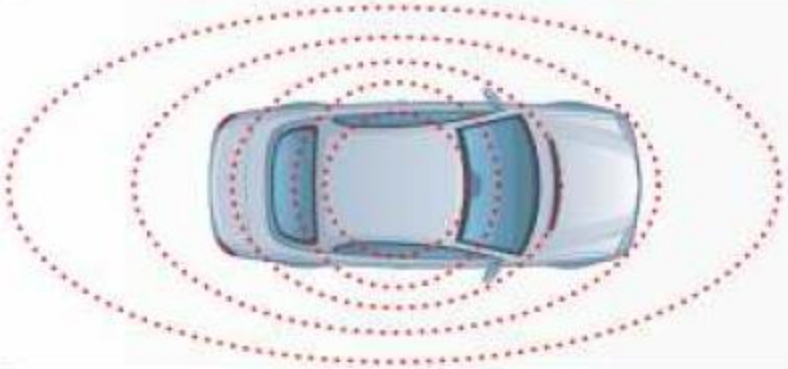
The Telegraph – February 2015

"When they do go on sale, experts predict that the cost for the technology will add between £4,000 and £7,000 to a car's price tag"

Need Conectivity as well as Autonomy!

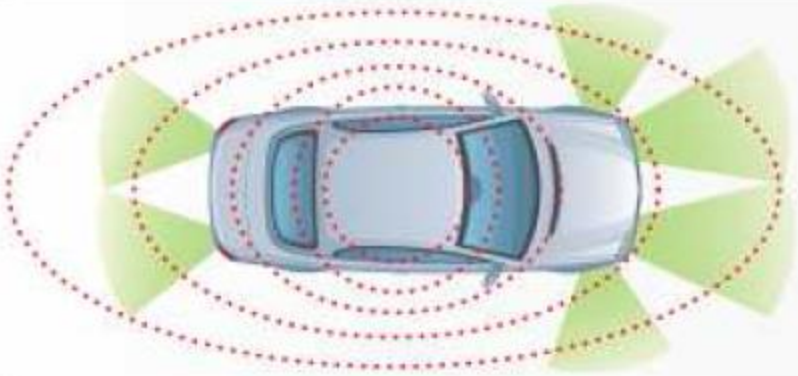
Sensor-Based Solution Only

- Cannot sufficiently mimic human senses
- Not cost-effective for mass market adoption
- Lack of adequate 360° mapping of environment in urban grids



Connected Vehicle Solution Only

- DSRC does not currently work with pedestrians, bicyclists, etc.
- DSRC-based V2I might require significant infrastructure investment
- V2V requires high market penetration to deliver value reliably

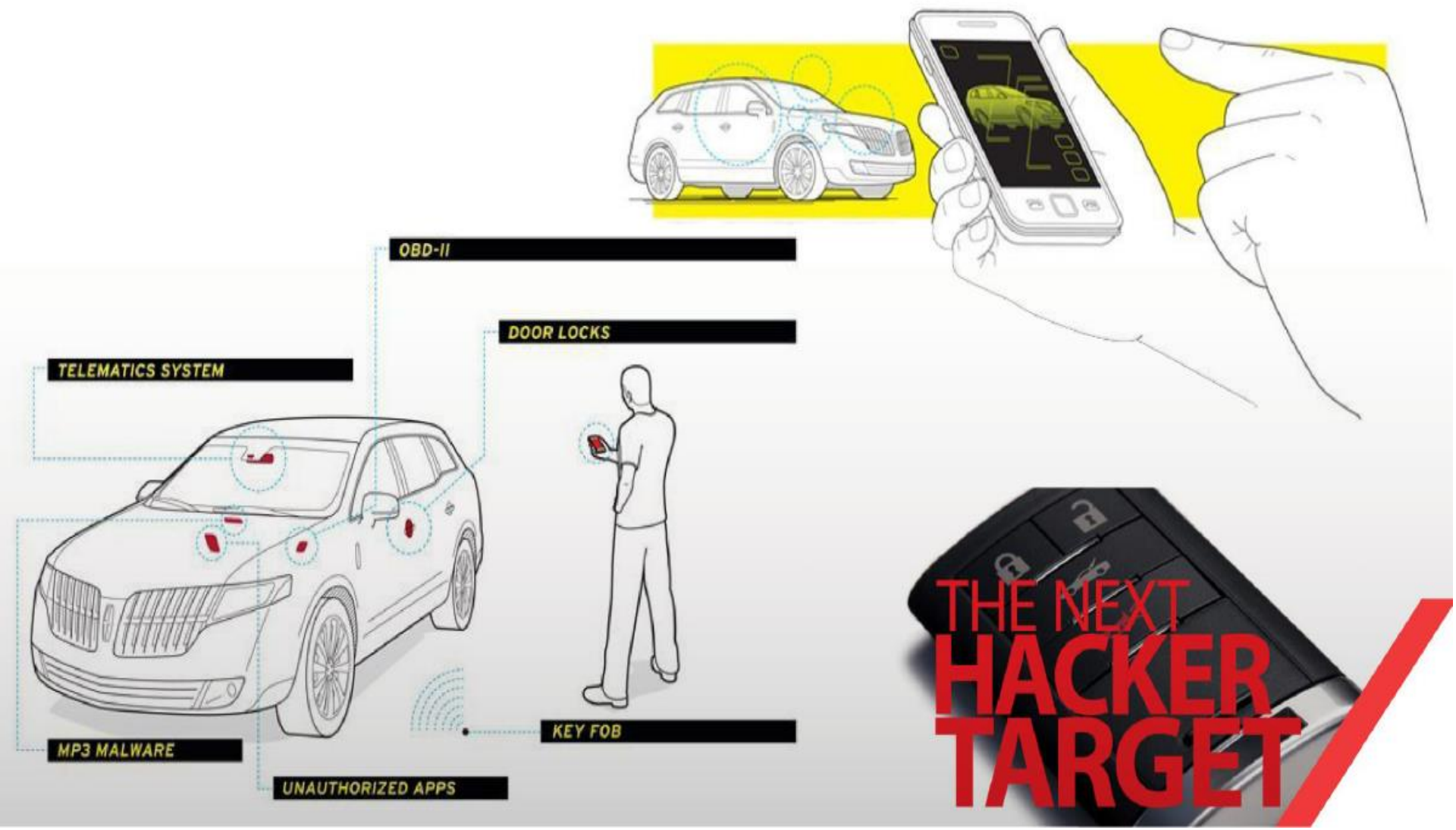


Converged Solution

- Convergence will facilitate adequate mimicking of human senses
- Convergence will reduce need for an expensive mix of sensors and reduce the need for blanket V2I investment
- Convergence will provide the necessary level of functional redundancy to ensure that the technology will work 100 percent of the time


MADE BY RSP
HACKERS

Connectivity Brings New Risks!

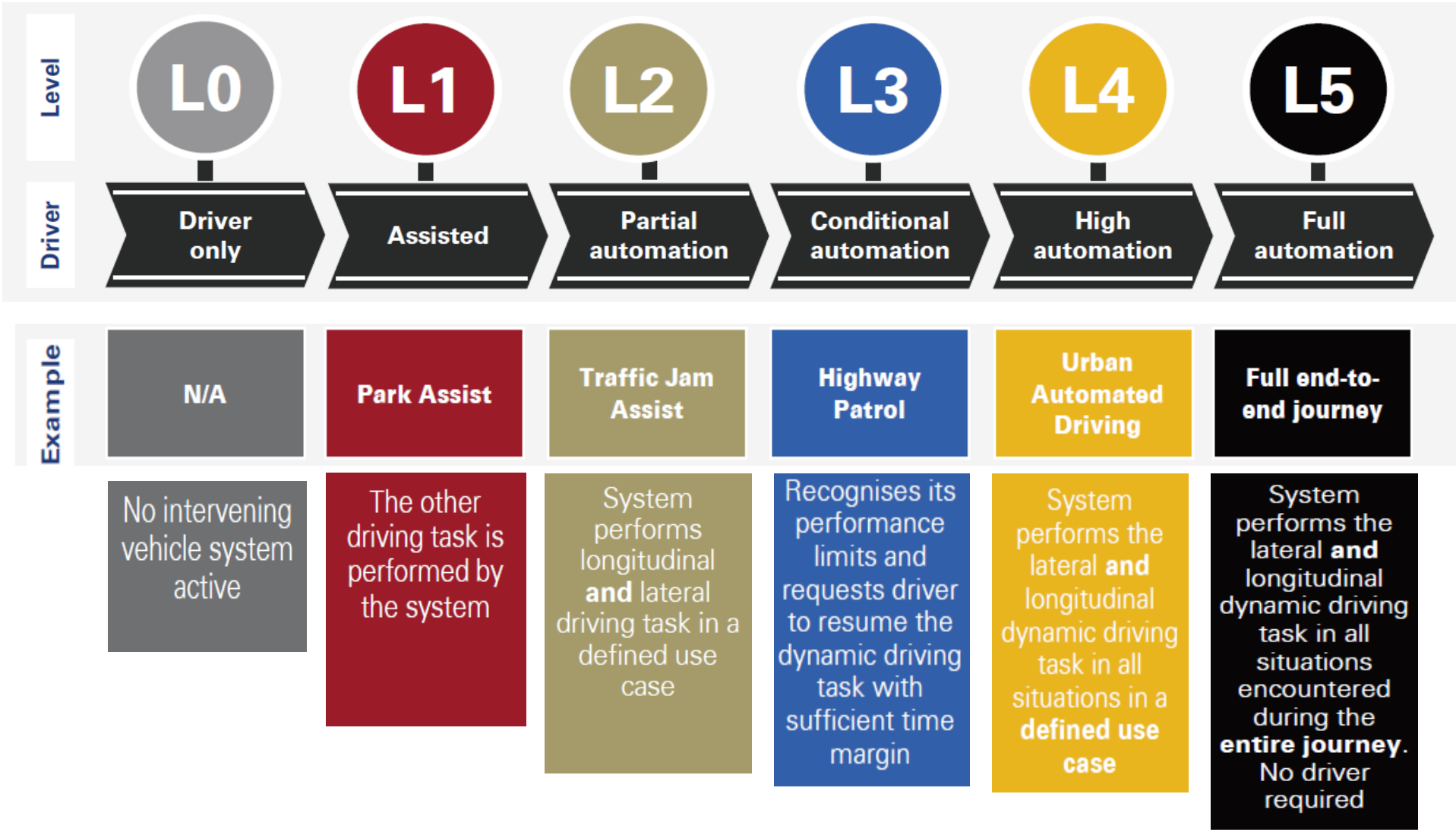


The 4 ‘T’s!

Time

CAV deployment is a question of ‘when’ rather than ‘if’. For the UK to create a competitive advantage it is necessary to continue to invest in this area. Significant growth potential exists as well as growing global competition. The UK must maximise the opportunities that regulation currently provides and aggressively target market growth in the areas of testing and validation.

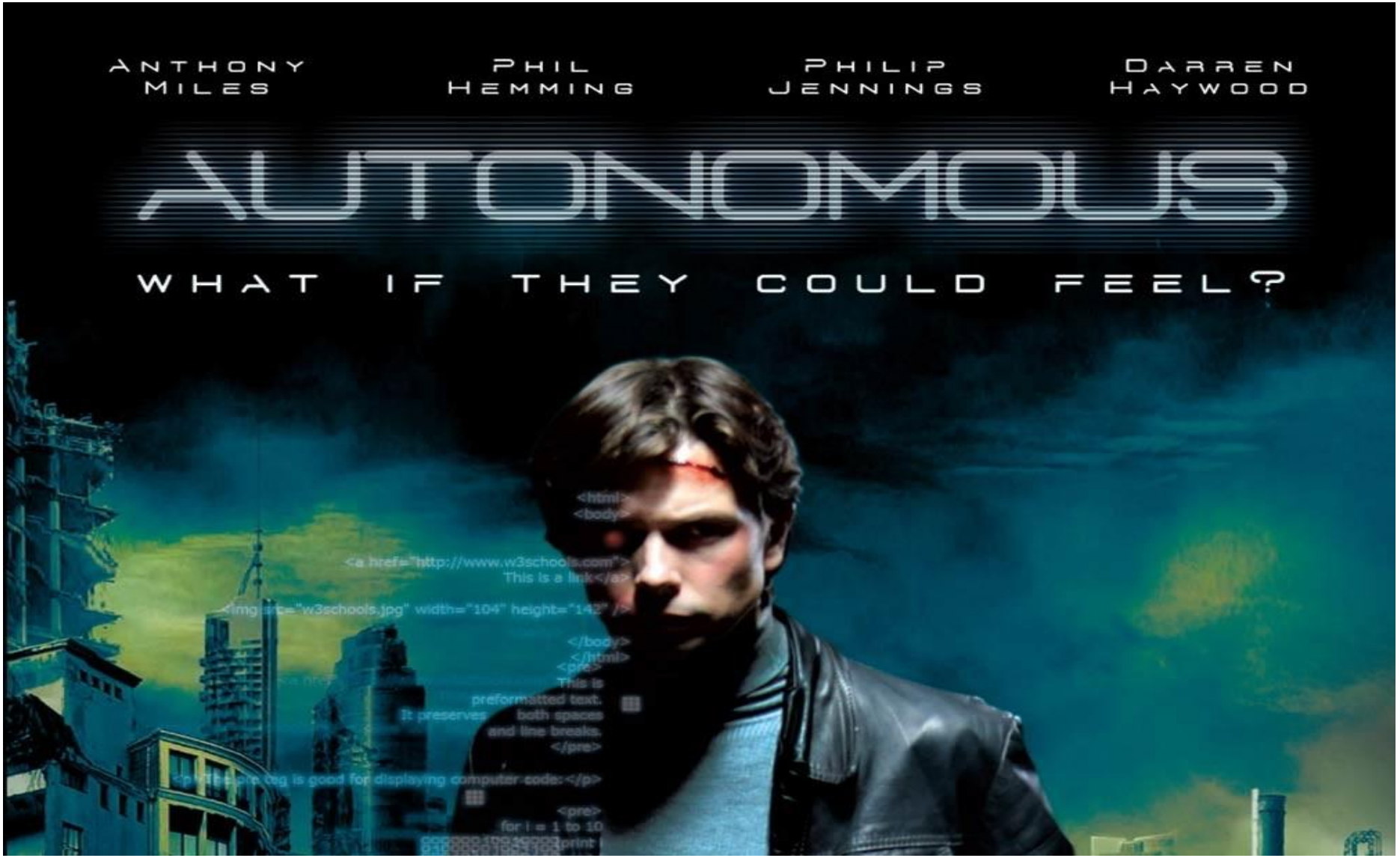
Defined Levels of Automation…



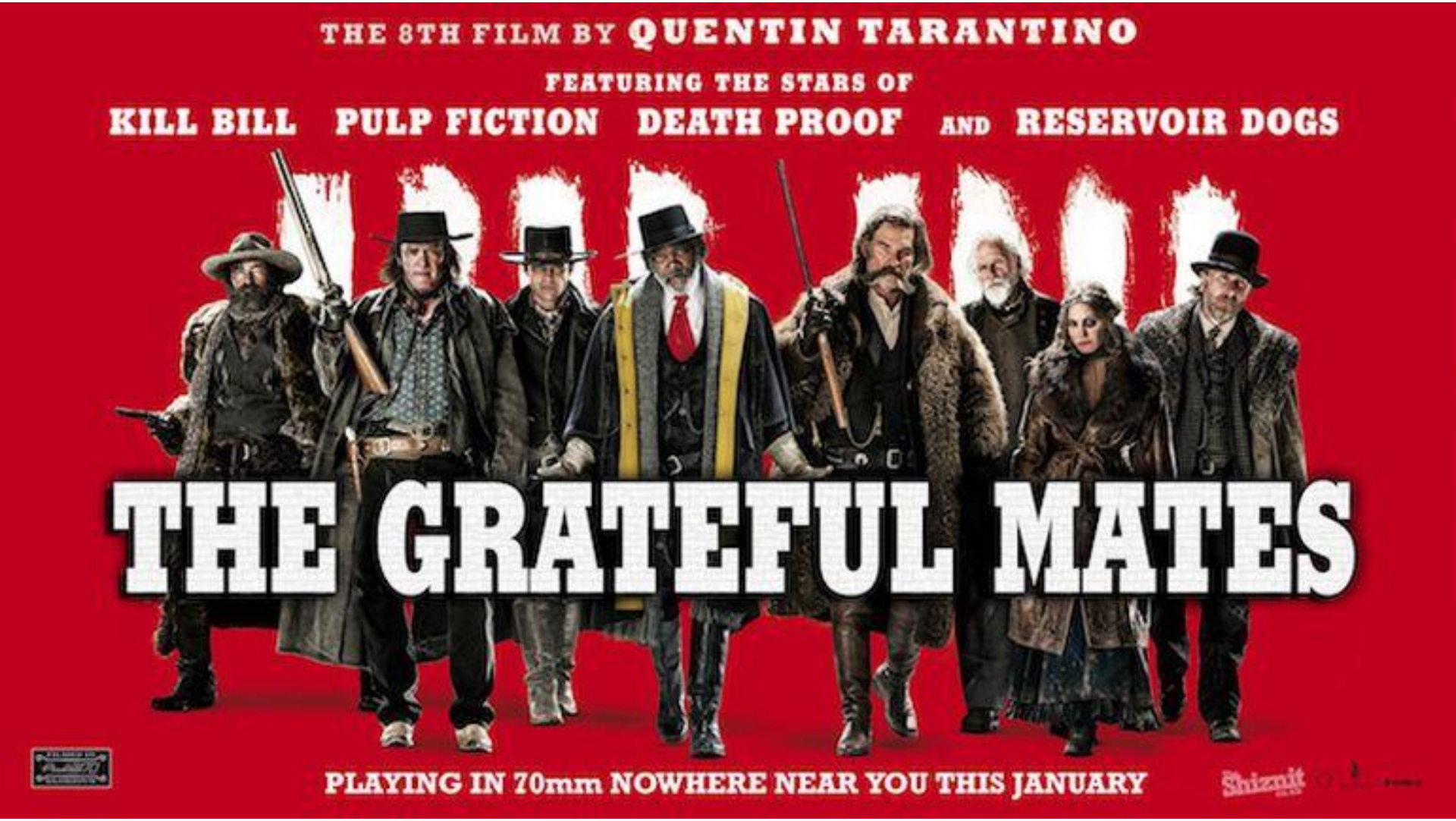
Phases of automation

When will the greatest impacts occur?

Getting the Right People involved?



ADIG


THE 8TH FILM BY QUENTIN TARANTINO
FEATURING THE STARS OF
KILL BILL PULP FICTION DEATH PROOF AND RESERVOIR DOGS
THE GRATEFUL MATES
PLAYING IN 70mm NOWHERE NEAR YOU THIS JANUARY

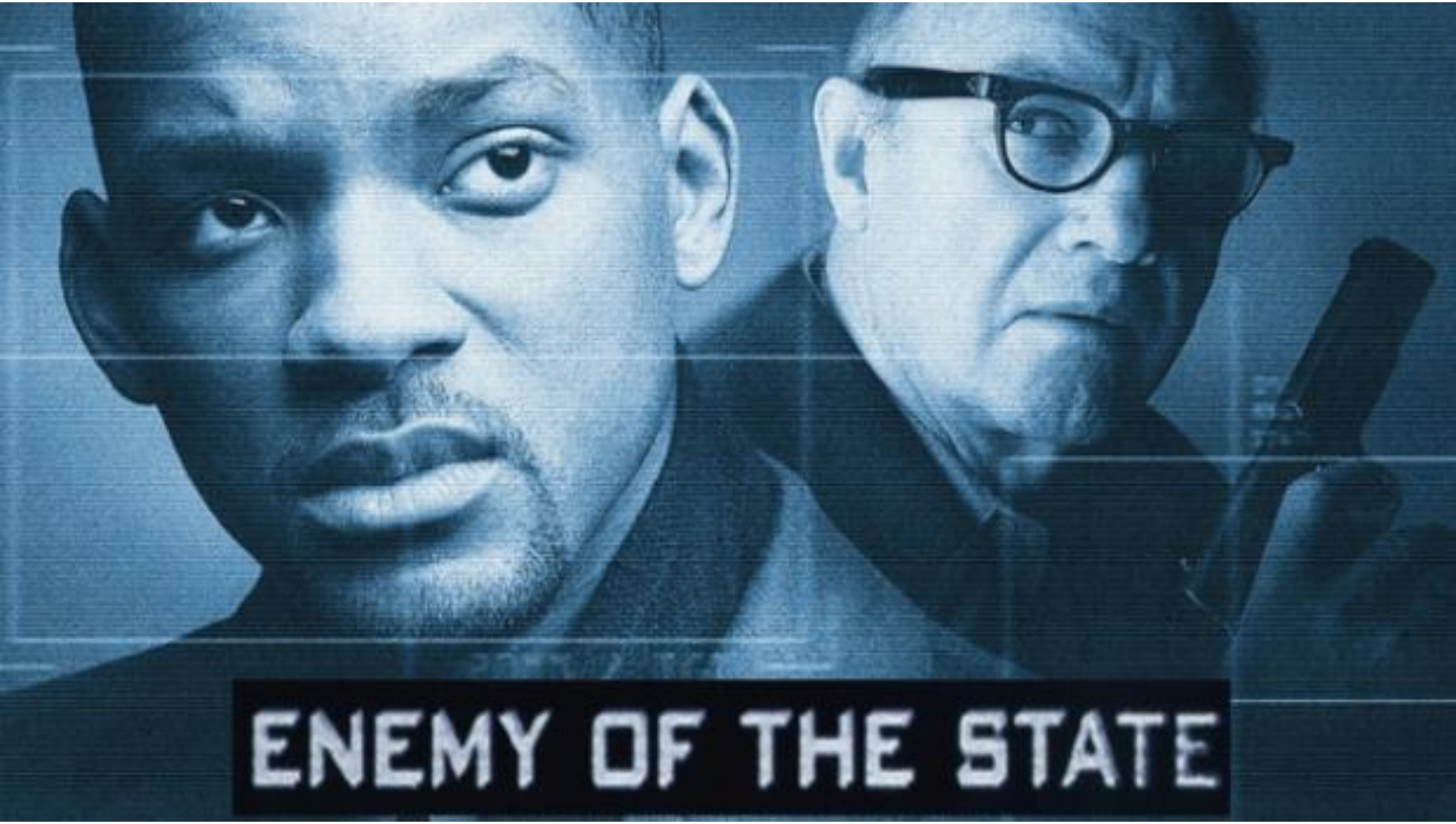
ADIG Questions for consideration

Association of British Insurers

- If not mandatory comprehensive cover, how to ensure the “innocent user/disengaged driver” does not become a new class of uninsured driver?
- Is the current wording of s.145(3) RTA (ie “use of the vehicle”) fit for purpose for the foreseeable future?
- “use” has a precise technical meaning in the context of compulsory insurance. Is operating a vehicle in an automated or autonomous mode a “use” in that established sense?
- who is the “user” when the automation is engaged – the disengaged driver, the keeper or the vehicle manufacturer?
- will it be more disruptive to bend our understanding of “use” to include operating a vehicle in an automated or autonomous mode or to distinguish clearly between the two?
- thus should operating a vehicle in an automated or autonomous mode be regarded as a distinct/new category of activity requiring compulsory insurance in addition to “use” above)?
- would creation of a distinct category in fact permit a more flexible / light touch approach to enabling provisions and subsidiary regulation (and evolution of those regulations to keep pace with future developments) than a process of reinterpretation of statute?
- would creation of a new category make clearer the need for extended compulsory insurance to provide for innocent injured third parties and injured disengaged drivers, and to provide additional rights for such drivers and their compensating insurers if a product liability claim is required, or is it unnecessary/the existing legal framework is sufficient?

Convincing the Government (s)

Regulatory Position and Consultations



Centre for Connected
& Autonomous Vehicles

Pathway to Driverless Cars:
Proposals to support advanced driver assistance systems and automated vehicle technologies

Modern Transport Bill

Modern Transport Bill

"My Ministers will ensure the United Kingdom is at the forefront of technology for new forms of transport, including autonomous and electric vehicles."

The purpose of the Bill is to:

- Cut red tape and put the right framework in place to allow innovation to flourish.
- Create the conditions that drives innovation and puts the UK at the forefront of modern global transport developments as part of the country's long term economic plan.
- Maintain and extend the UK's role as a world-leading transport manufacturing base.
- Ensure ne
at the cutti

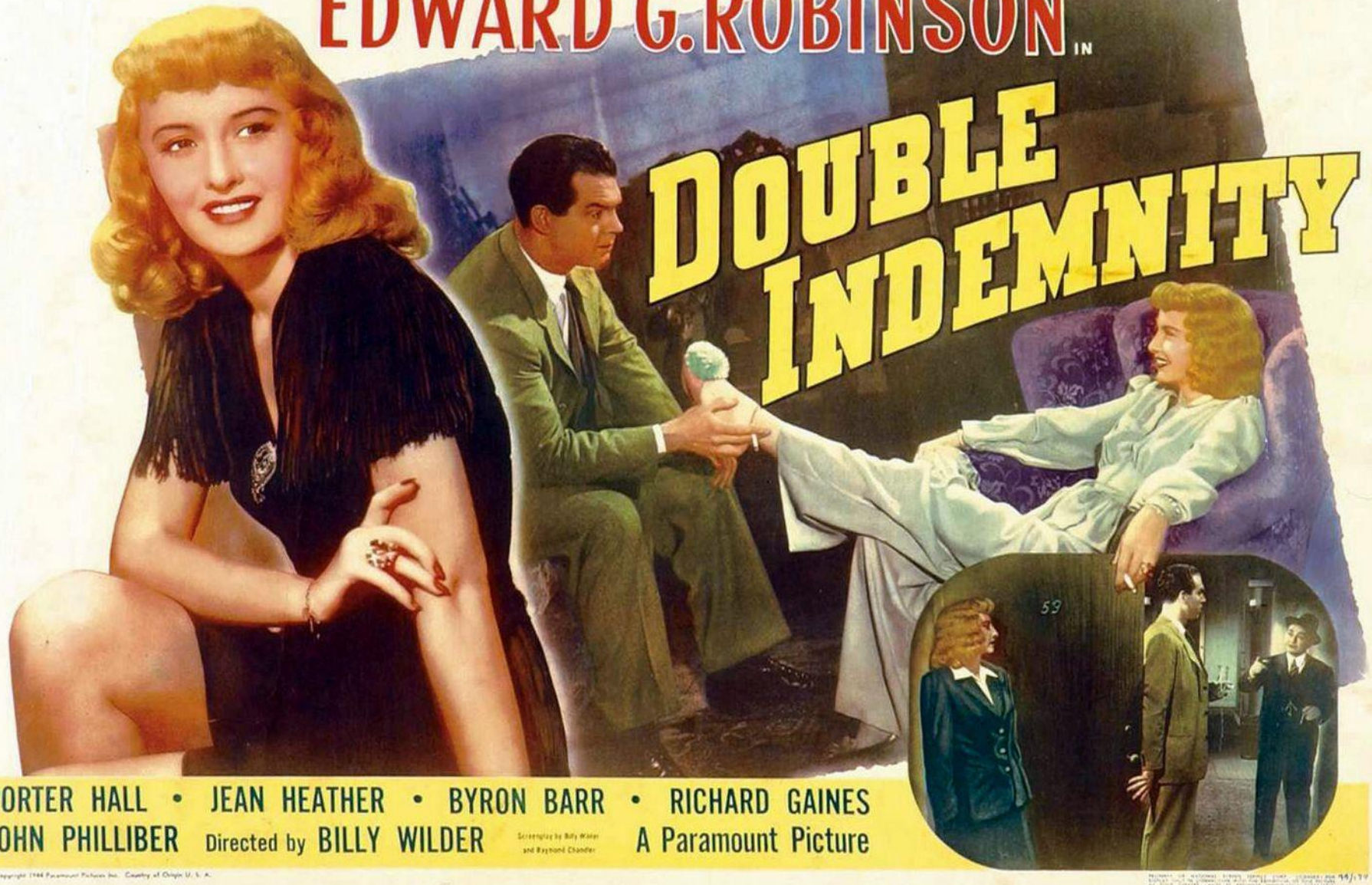
The main elements of the Bill are:

- Encouraging potential investors in autonomous vehicles, spaceplane operations and spaceports, creating highly skilled jobs and spurring innovation across the economy.
- Legislation that will put the UK at the forefront of safe technology in the autonomous vehicles industry, such as drones, and spaceplanes.
- Ensuring appropriate insurance is available to support the use of autonomous and driverless vehicles.

FRED MacMURRAY ★ BARBARA STANWYCK

EDWARD G. ROBINSON IN

DOUBLE INDEMNITY



PORTER HALL • JEAN HEATHER • BYRON BARR • RICHARD GAINES

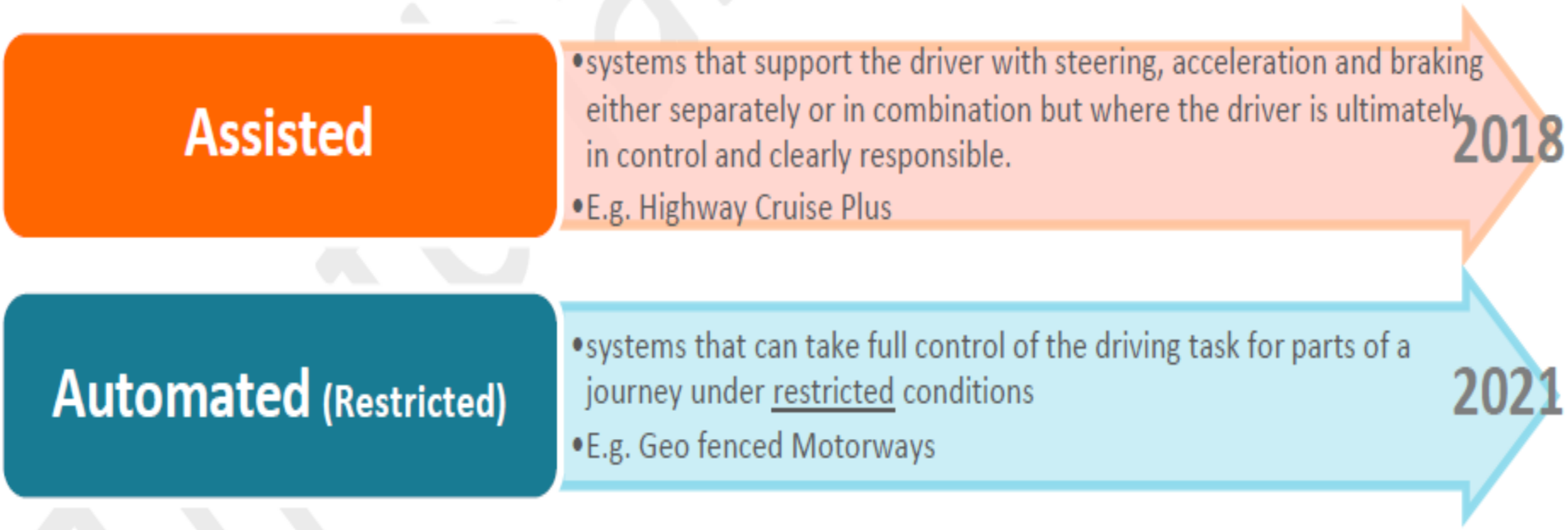
JOHN PHILLIBER Directed by BILLY WILDER Screenplay by Billy Wilder and Raymond Chandler A Paramount Picture

From ADAS to Automated Driving

SAE Level	0	1	2	3	4	5
	None	Assisted	Partial	Conditional	High	Full
Estimated Timeline	Current	Current	2016	2018	2021	2025
Control of steering, throttle, brakes	Driver	Driver & Vehicle	Vehicle	Vehicle	Vehicle	Vehicle
Monitoring of driving environment	Driver	Driver	Driver	Vehicle	Vehicle	Vehicle
Responsibility if driver fails to take control when requested	Driver	Driver	Driver	Driver	Vehicle	Vehicle
System capable in...	No capability	Some driving modes	Some driving modes	Some driving modes	Some driving modes	All driving modes

- Driver perception could be that vehicle is responsible...
- But vehicle is not responsible yet

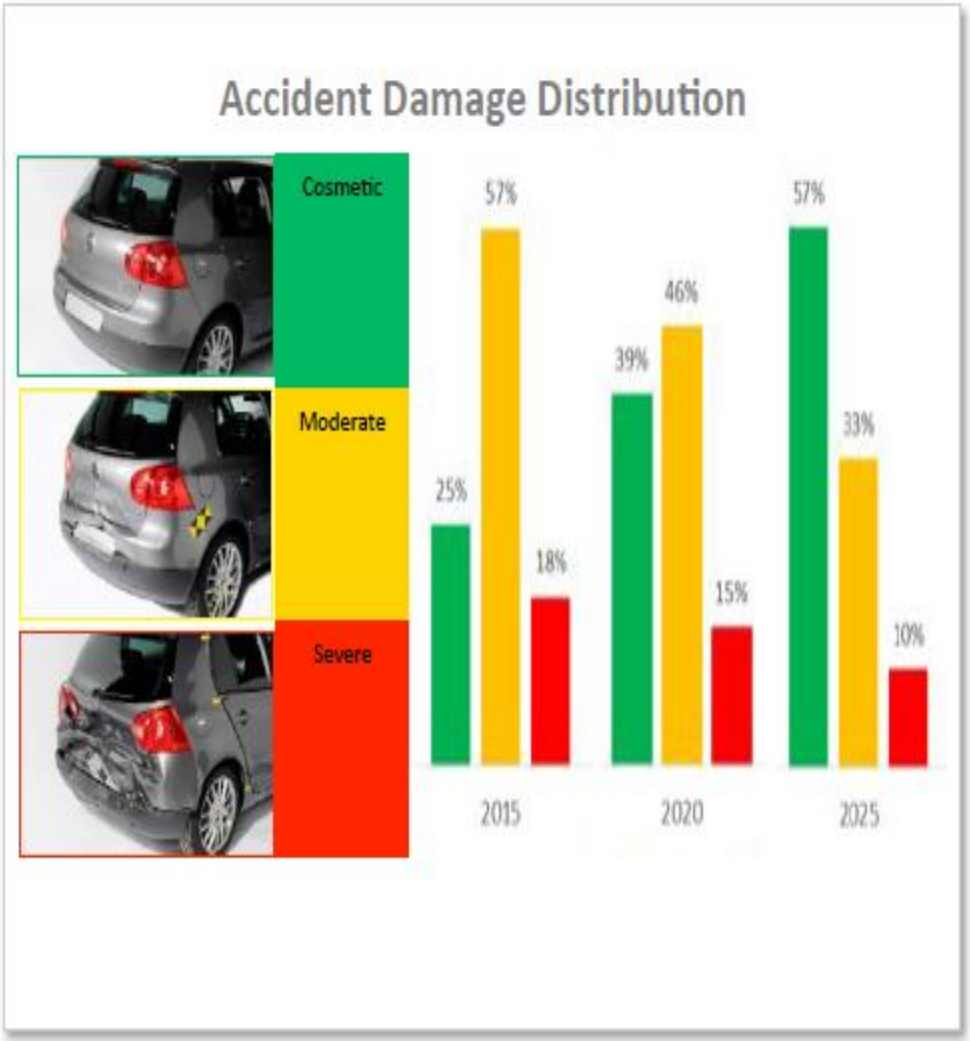
Driver Confusion = Worried Insurers!



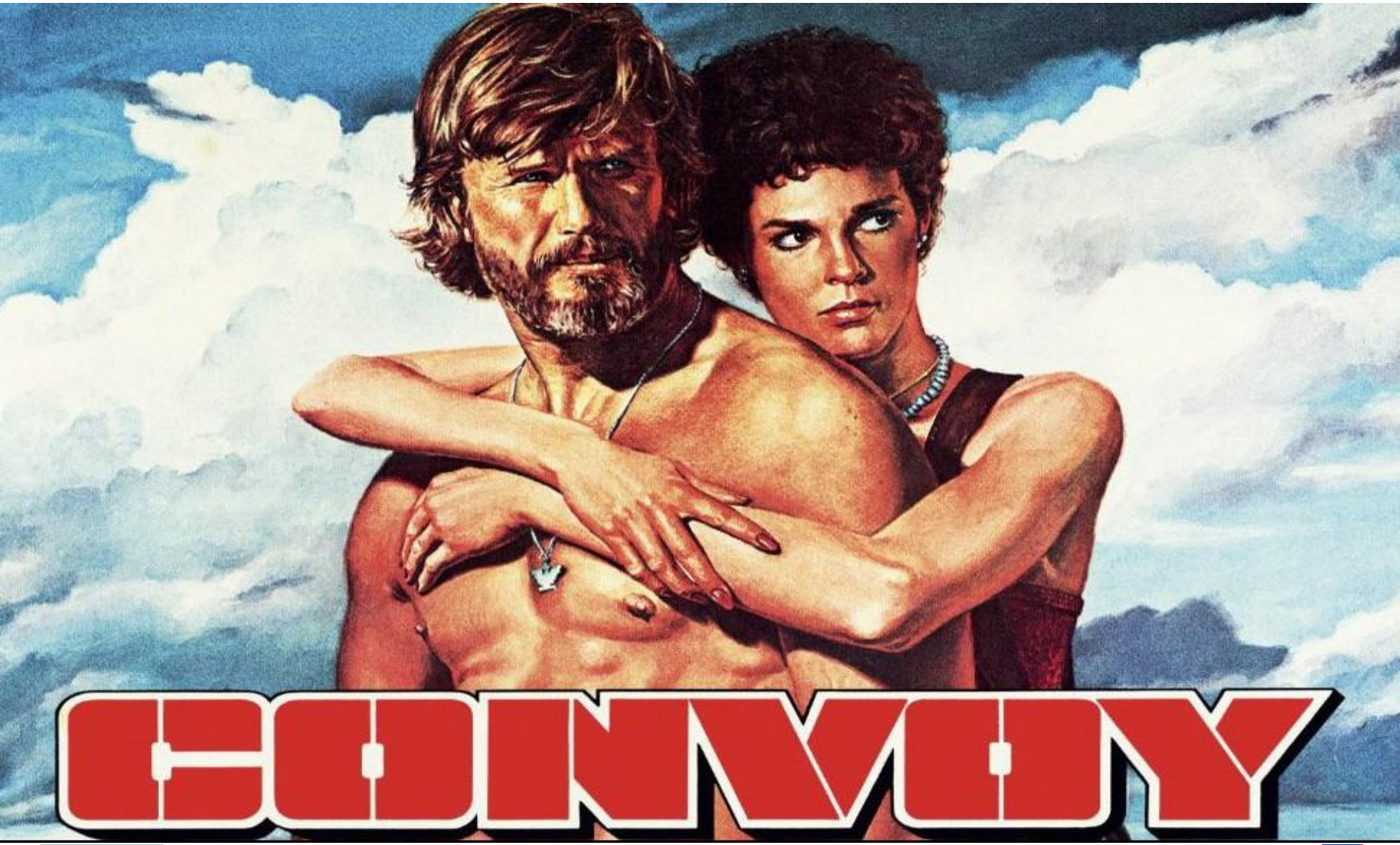
There is great confusion around driver responsibility which must be cleared up. In reality it could be described in a simplified binary definition as above. In the fullness of time a ‘Fully Automated’ category would be added where the car can not be operated at any time by the occupants, truly driverless.

Other Threats & opportunities?

Ten Year Prediction of Crash Severity



Big Ben this is Rubber Duck….



The Commercial Vehicle Space

Estimated annual cost savings

LABOUR

FUEL

INSURANCE

£1.4bn

Estimated Savings over 10 years

£33.6bn

If these savings were passed onto consumers, UK households could save the equivalent of roughly **£150 on grocery spend per annum.**

Stages of Automation

Thatcham Research
Safer cars, fewer crashes

Not *if* but *when!*

Thankyou for Listening

Social Networking!

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