



Institute
and Faculty
of Actuaries



Emerging Risks & Opportunities

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Giro 2016

Dublin



What do we mean by Emerging Risk?

An issue that is perceived to be potentially significant but which may not be fully understood or allowed for in insurance terms and conditions, pricing, reserving or capital setting.

– Lloyd's

...Think of it as an opportunity.

**AUTONOMOUS
VEHICLES**

BIG DATA

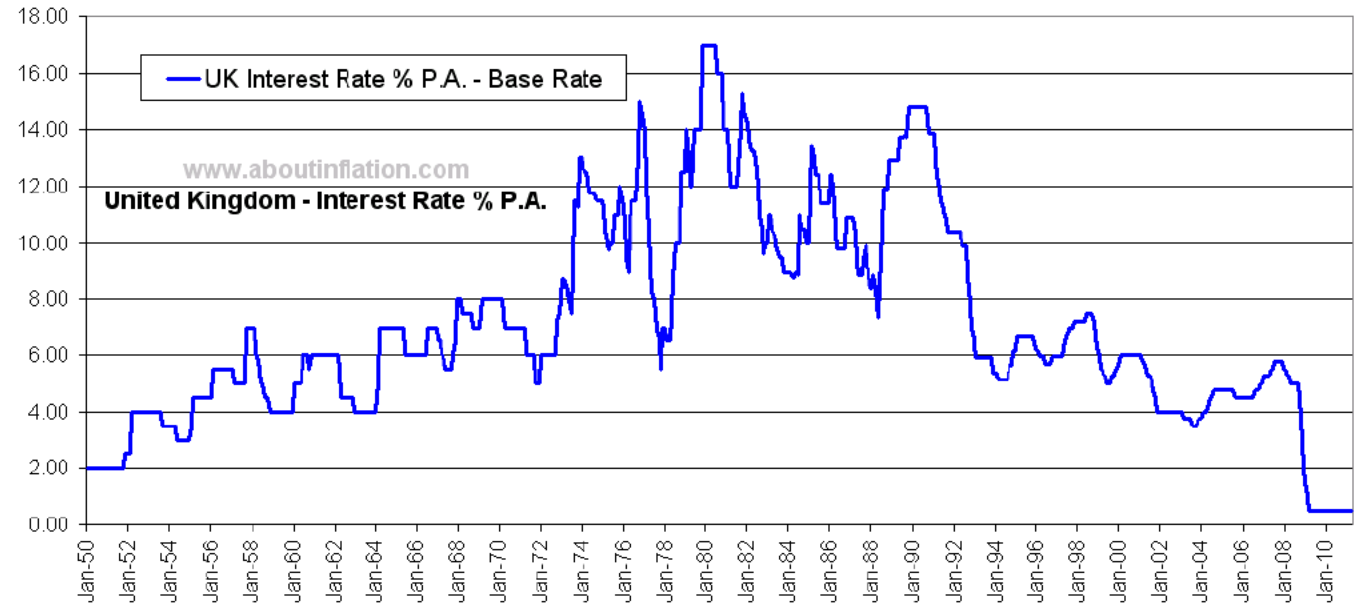
ECONOMY

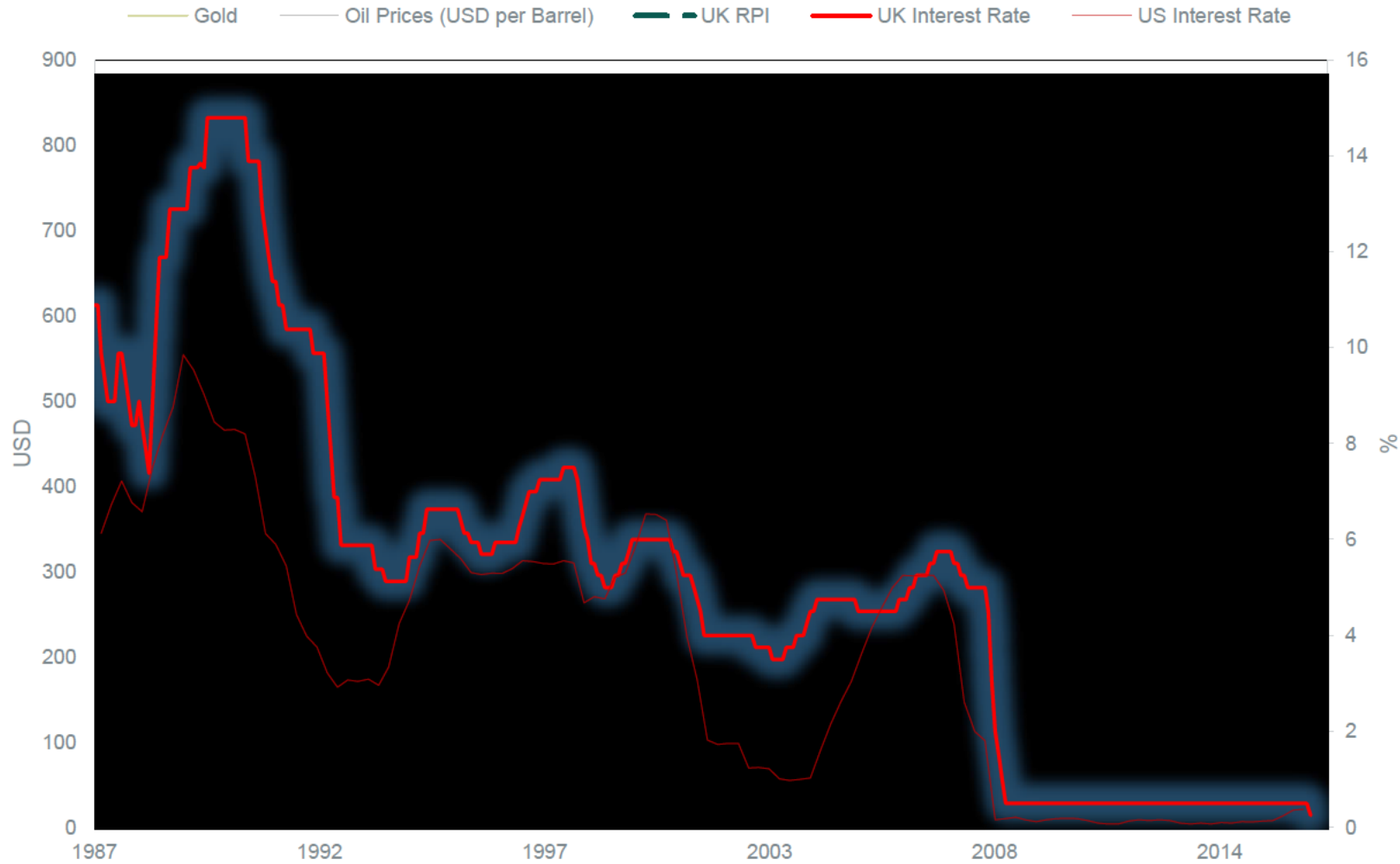
The economic outlook

Interesting Times Ahead

- Low Interest Rates
- Low Oil Prices
- Gold back in favour
- Emerging Economies
- Brexit
- Urbanisation
- Political Landscape – Trump, North Korea, Middle East, tensions between the Western world and Russia

How should we react to low interest rates?





**Consistent
increase in
inflation**

Implications on Capital

- Decrease in investment return on reserves could lead to more activity in the legacy market
- Lower cost of capital
- Alternative capital
- Increase in mergers and acquisitions as companies try to achieve economies of scale
- Mergers & acquisitions continue to keep the market preoccupied although actual completed transaction well down from 2016.

What Brexit might look like...



Implications on the Insurance Industry

- Impact on capital coming to London but too early to tell
- Possibly lower cost of capital for Foreign Investors..but risk of fragmentation
- Alternative capital
- Lloyd's to move operations elsewhere?

“...it does represent a new opportunity and it will be exciting to see how London responds”

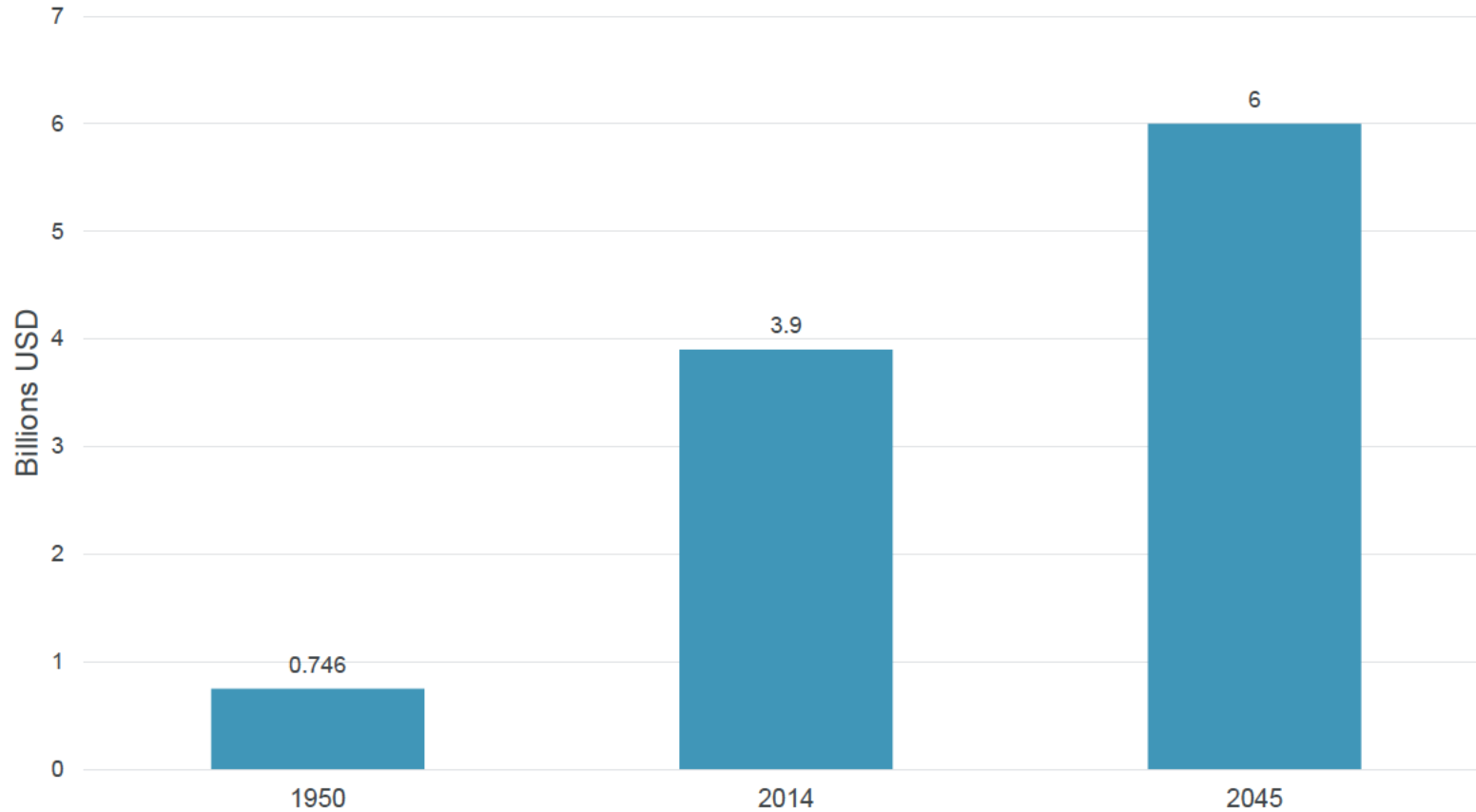
“...If we are not able to access the single market, either through passporting rights or other means, the inevitable consequences for Lloyd's—and indeed other insurance organisations—will be that we will transact the business onshore in the EU—and that obviously will have an impact on London.”

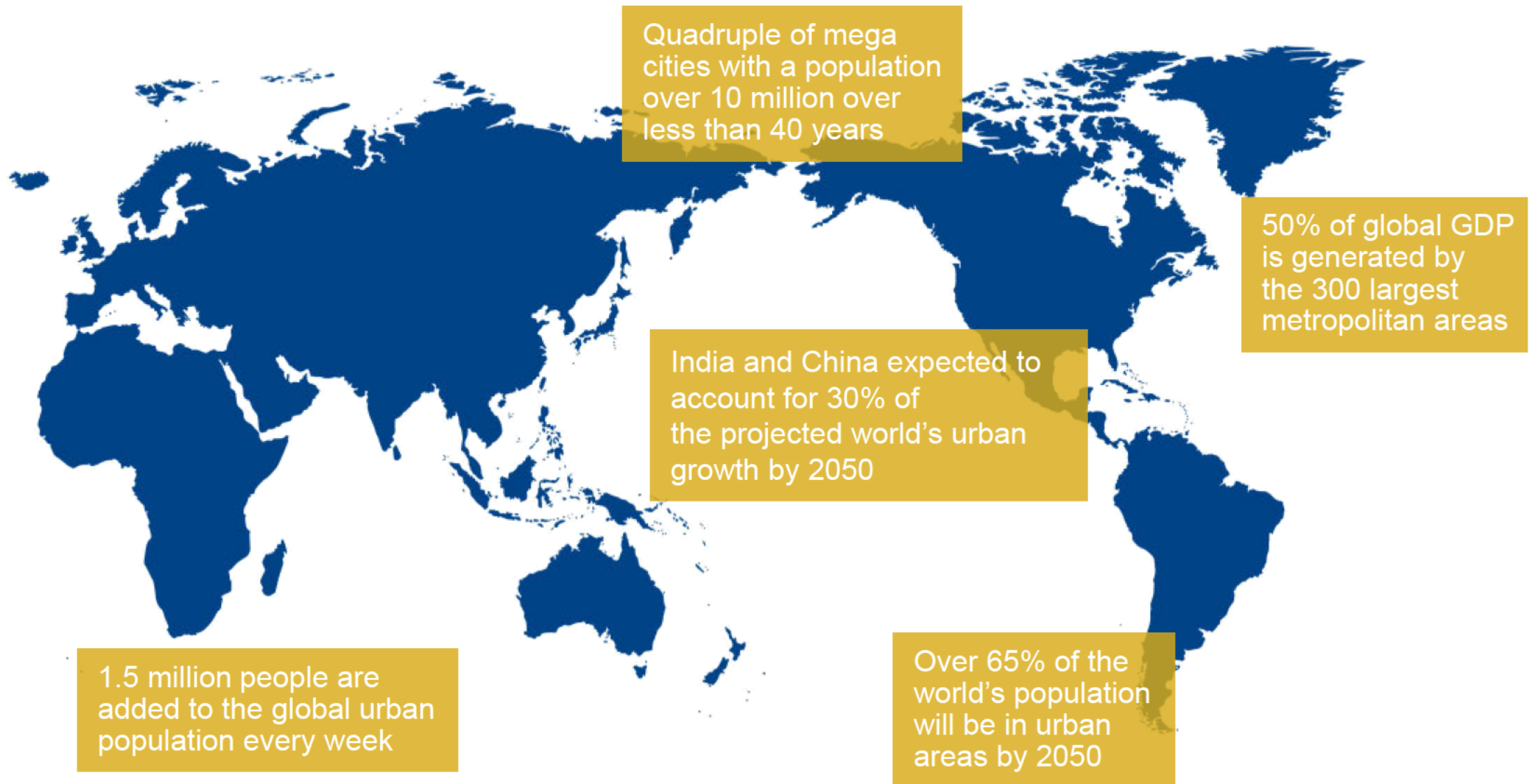
– John Nelson, Chairman of Lloyd's



Urbanisation

Global Urban Population









For the Insurance Industry

- Electric power supply and distribution
- Transportation infrastructure (roads, railroad, airports, ports)
- Water supply and sewage
- Communications infrastructure
- Many opportunities for the insurance industry to help people get on with their lives
- Suggestion during 2015 WEF in Davos to spend \$90 trillion redesigning all the cities so they don't need cars.....but



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Autonomous Cars

Ger Bradley



What are they?

A vision from 1957

Playing scrabble while your car is driving itself on the Turnpike.

As early as 1956 the Central Power and Light Company inserted this ‘inspired’ advertisement in leading US newspapers.

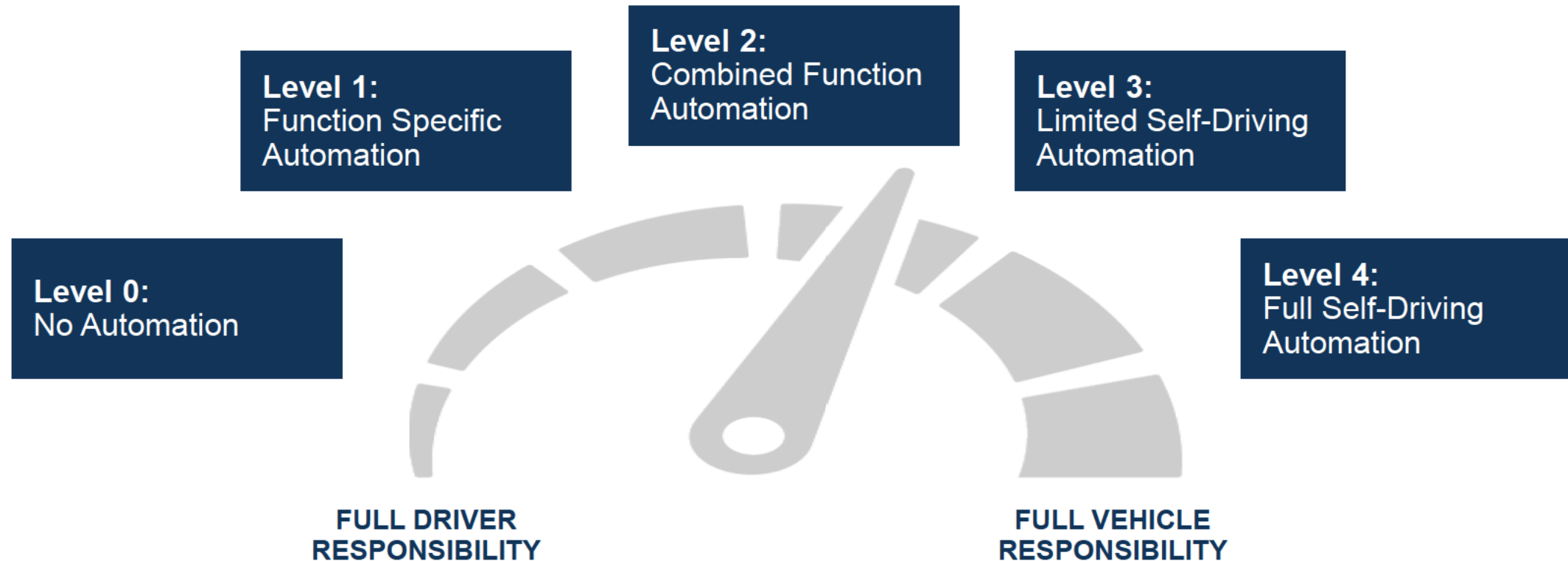
“Electricity may be the driver”

Autonomous Cars: What are they?

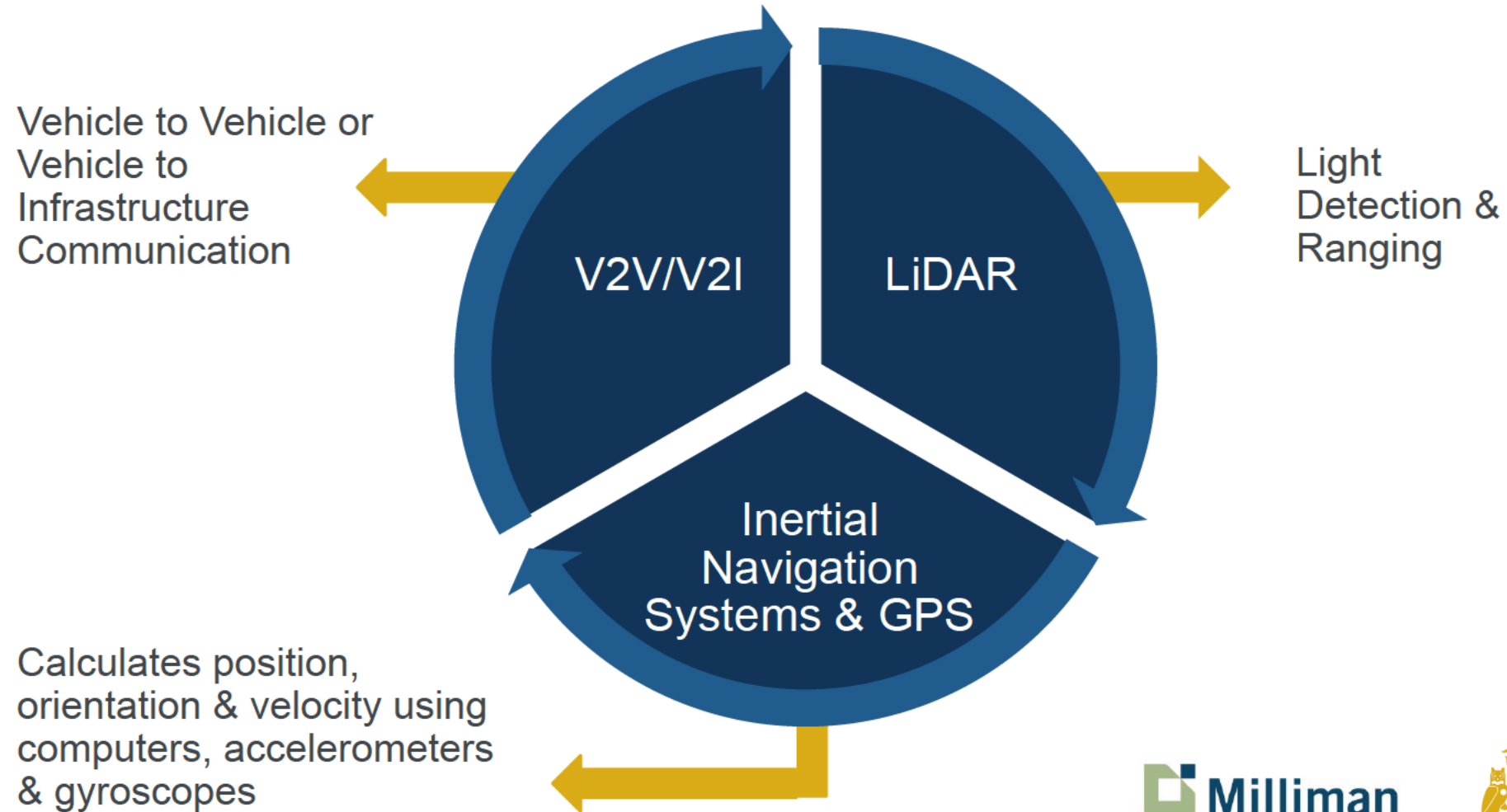
Definition: A robotic vehicle that is designed to travel between destinations without a human operator.

Levels of Autonomous

The National Highway Traffic Safety Administration defines vehicle automation according to following five levels, what are they?



3 Main Technologies will work together for AVs



Vehicle to Vehicle

V2V Function comprises a wireless network where automobiles send messages to each other with information about what they're doing.

This data would include:

- Speed
- Location
- Direction of travel
- Braking
- Loss of stability

Stats

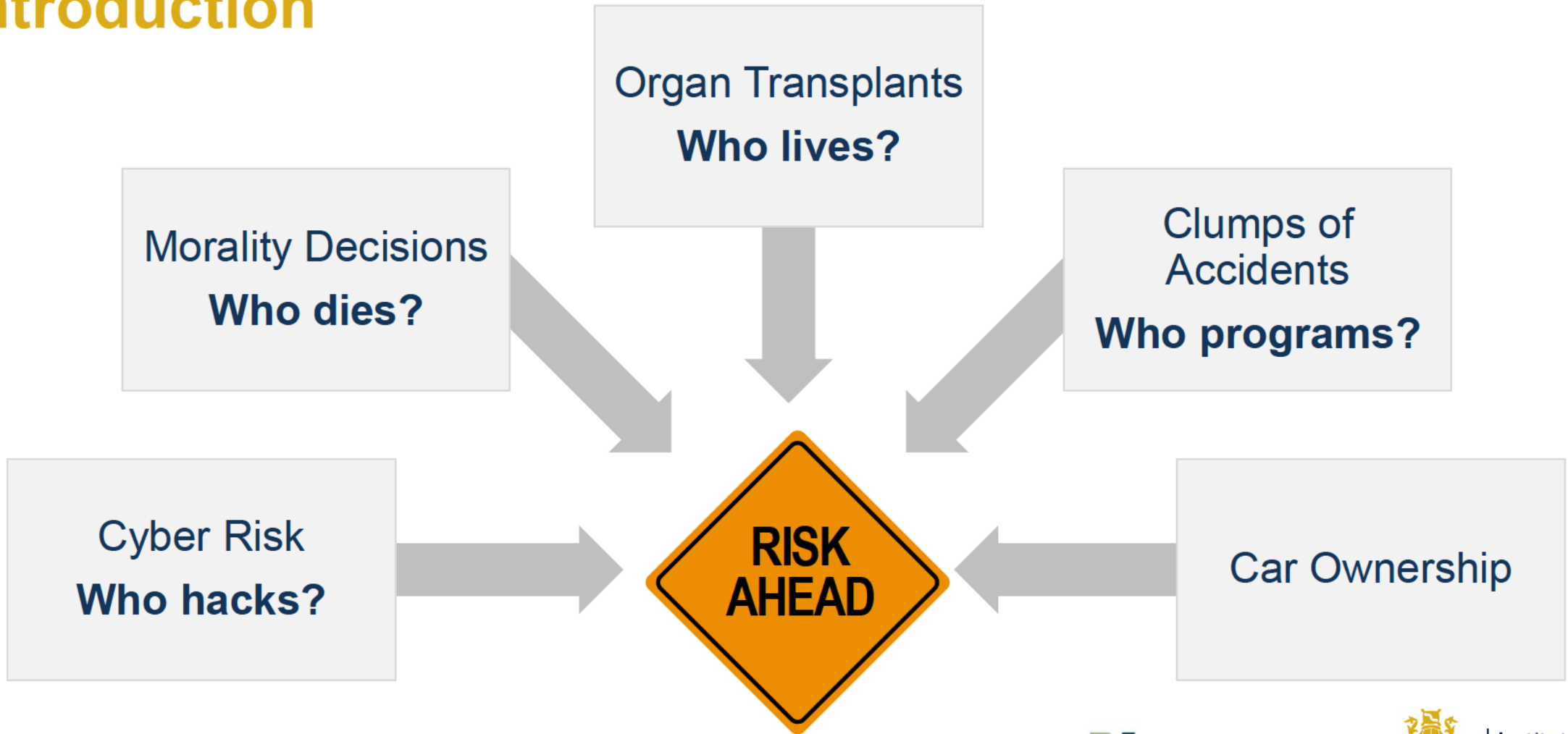
Stats

- In 2015, **1.25m** road death fatalities worldwide
- **94%** of accidents are human error
- Biggest single killer of young people
- Even imperfect technology can reduce these numbers substantially
- However crashes that do occur might be much more serious – e.g. clumps of crashes due to a software bug



Risks

Introduction



Change

(or go out of business)

Change

- How can we help as actuaries
- Data will be the key
- But what data
- New Products

Risks & Rating Factors

	← “Old”	→ “New”
Demographic Factors	<ul style="list-style-type: none">• Where you live• Age/Gender• Credit Score• Profession	<ul style="list-style-type: none">• Where you live – quality of satellite imagery coverage• GPS maps
Car related Factors	<ul style="list-style-type: none">• Make• Model• Type• Size• Age• Likelihood of Theft	<ul style="list-style-type: none">• Who is the software engineer?• Cyber security 55% risk• Hacking• Make• Model
Personal Driving Habits	<ul style="list-style-type: none">• Driving Activity• Driving History	<ul style="list-style-type: none">• ???

Liability

Liability Issues

Software and Other Updates Should they be necessary?

Mandatory?

Who is responsible for
availability/installation?

Crash Responsibility Vehicle designer or manufacturer?

Software designer or manufacturer?

Vehicle operator?

Passenger?

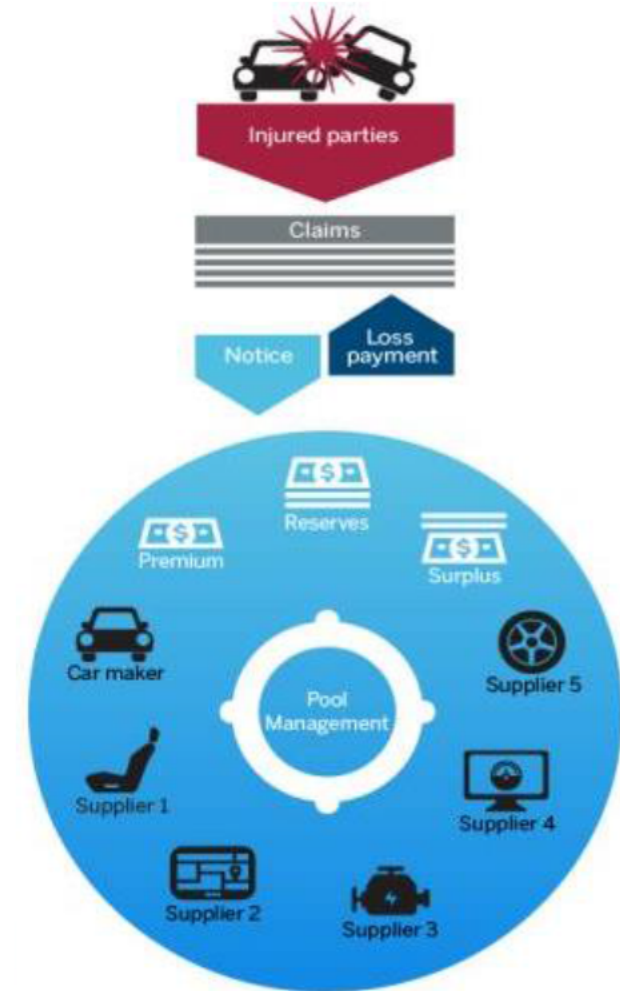
Jurisdiction?

Inclement Weather

Who is responsible for
inability to function in
severe weather?

One Solution to Liability Issues: SPLASH Pooling?

- Create an insurance pool for each autonomous carmaker—a Supplier Product Liability Autonomous Share (SPLASH) pool
- SPLASH pool funded by carmaker and all suppliers
- Funding is commensurate with expected losses
- Losses paid directly from the fund
- Eliminates manufacturer's role of managing indemnification from the supplier



Next Steps

The future of agriculture...?

- While it may look ordinary, the New Holland NH Drive revealed August 2016 is a fully autonomous tractor
- Monitored and controlled remotely by the farmer's tablet
- Although the technology for the tractor is complete, not likely to hit market for at least two years, until there is more definition regarding legal and liability issues



Nvidia and Baidu partner on a 'top-to-bottom' platform for self-driving cars



The Mercedes Driverless Truck

It can...

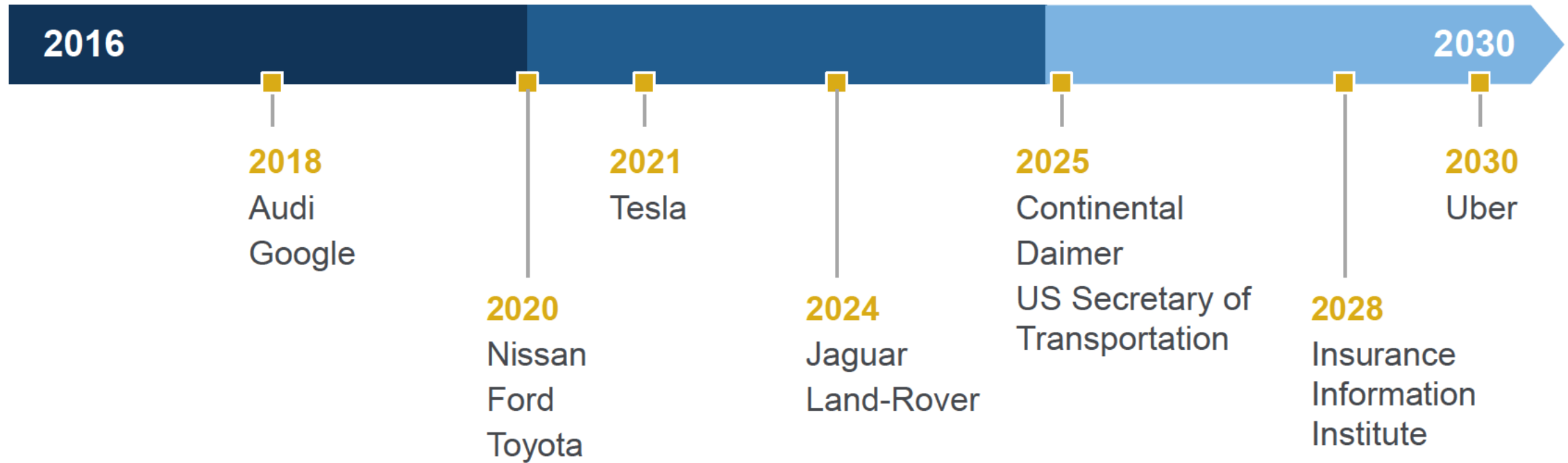
- Allow drivers text/talk/watch Youtube
- Detect vehicles in front
- Steer through curves/turns
- Start count-down when driver needs to steer



It can't...

- Overtake slower cars
- Change lanes
- Exit highways
- Park
- Work in cities
- Work on roads with insufficient markings

Estimate of when driverless cars will come to market



UK Connected Intelligent Transport Environment (CITE)

- Eight projects have been awarded £20 million in funding to develop the next generation of autonomous vehicles.
- Jaguar and Land Rover is investing in a 41 mile 'living laboratory' project on UK roads to develop new Connected and Autonomous Vehicle (CAV) technologies.
- The test corridor includes 41 miles of roads around Coventry and Solihull and be used to evaluate new systems in real-world driving conditions.

UK: 3 years to pave the way for introduction of AVs

£20m of government funding for “Introducing Driverless Cars to UK roads” initiative

Yielded three projects:



**Milton Keynes & Coventry |
Autodrive Project**
Lutz pods drive in pedestrian zones
Max speed 15 mph
Electronic AV



Greenwich | Gateway Project
Gateway shuttles
Electronic AV
Local tour with drop-off points



Bristol | Venturer Project
Venturer consortium will investigate
congestion & safety

A Final Thought

Not everyone is quite so optimistic.

“We are still operating in an era when car makers are recalling millions of vehicles for the simplest of technology failures: ignition switches, floor mats and air bags”

– Robert Hartwig, Insurance Information Institute president, in speaking to *The Wall Street Journal*

Samsung Galaxy Note 7 – Beautiful...



Samsung Galaxy Note7 set to be recalled over fire risk



....Data Science...is now the art of automation!

Big Data

An iceberg floating in the ocean. The tip of the iceberg is above the water line, and the much larger base is submerged below the water line. The text 'What we know...' is written in white over the sky above the tip, and 'The rest...' is written in white over the submerged part.

What we know...

The rest...

- Big data brings new challenges
- Consideration should be given to the well known “5V” definition:
 - ✓ Volume
 - ✓ Variety
 - ✓ Velocity
 - ✓ Veracity
 - ✓ Value

What are we waiting for...

- 2016: Rolls-Royce to use Microsoft IoT and analytics tools for jet engine predictive maintenance
- They have been using big data for a while to analyse the failure of engines
- Not just about collecting a vast amount of data but having the foresight to use intelligent data



Opportunities and Threats

Technological advances in data analytics and storage combined with a significant increase in available data	Data storage uncontrolled and too expensive
A sea change in competitive advantage	New entrants seize competitive advantage
Improvement in segment analysis will considerably change underwriting and pricing with more focussed marketing and retention of customers	Current analysis subject to anti selection by new smarter methods
Distribution could evolve with a concentration on customer needs rather the product	New entrants dominate distribution
Claims management	New entrants exploit faster and gain expense advantage

Predictive Analytics

Two classes of how this could help:

- Med Mal
- Marine Hull





Challenges

- Challenges for actuaries
 - Predictive modelling and advanced analytics – get coding
 - Training in advanced statistics and programming skills
 - Alternative resources: Masters and PhDs from statistics, computer sciences as well as economics and financial mathematics already equipped with the requisite knowledge

...Think of it as an opportunity.

“The pessimist sees difficulty in every opportunity. The optimist sees the opportunity in every difficulty.”

– Winston Churchill

“The pessimist sees difficulty in every opportunity. The actuary sees the opportunity in every difficulty.”

Veekash Badal

*Milliman
September 2016*

Questions

Veekash Badal & Ger Bradley
Milliman