

Autonomous Vehicles Now and into the future

John Calabro— COO TAG
October 2018

Opinion Poll. What's first?

Steering Wheel Free Car (legal to drive)?



Landing on Mars?



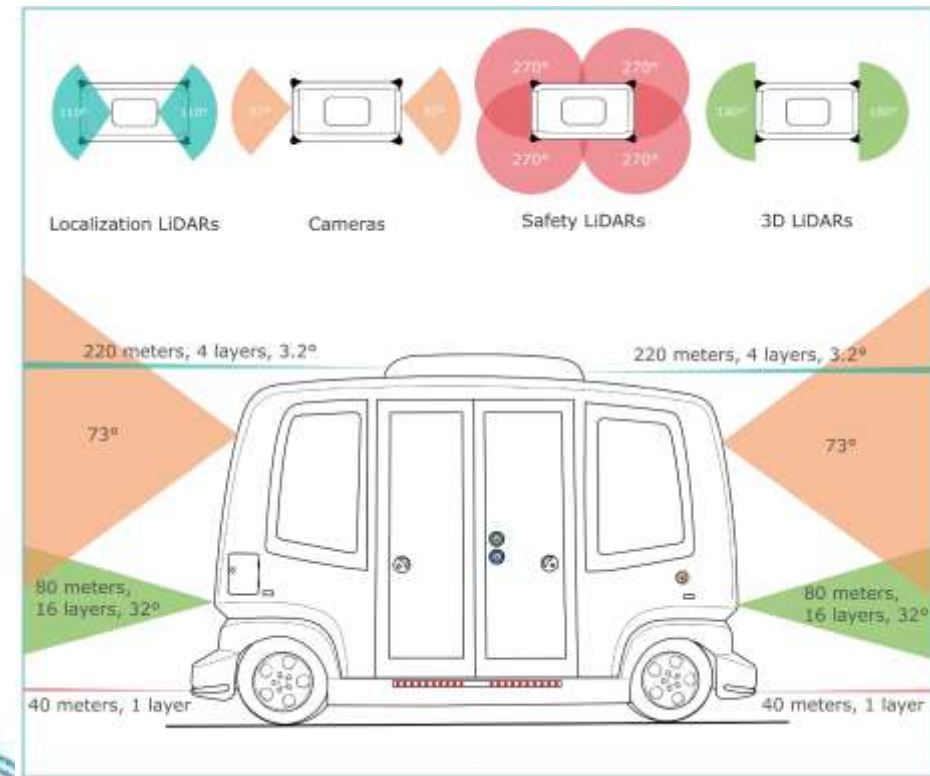
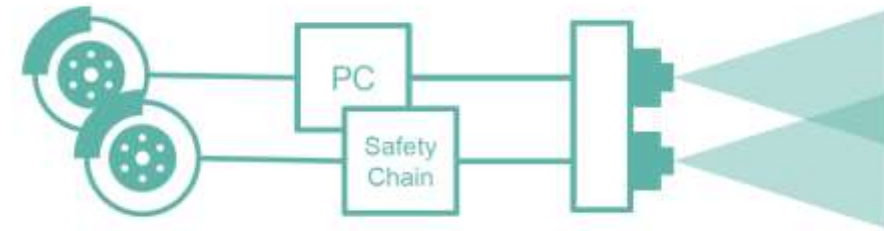
TAG and Easymile

- Easymile – French Tech company
- Two trials in South Australia (TAG as operator)
 - Playford
 - Renmark



TAG and Easymile

- Redundant coverage by sensors
- Independent Obstacle detection function
- Fail-safe and redundant braking system
- Redundant industry-grade emergency buttons



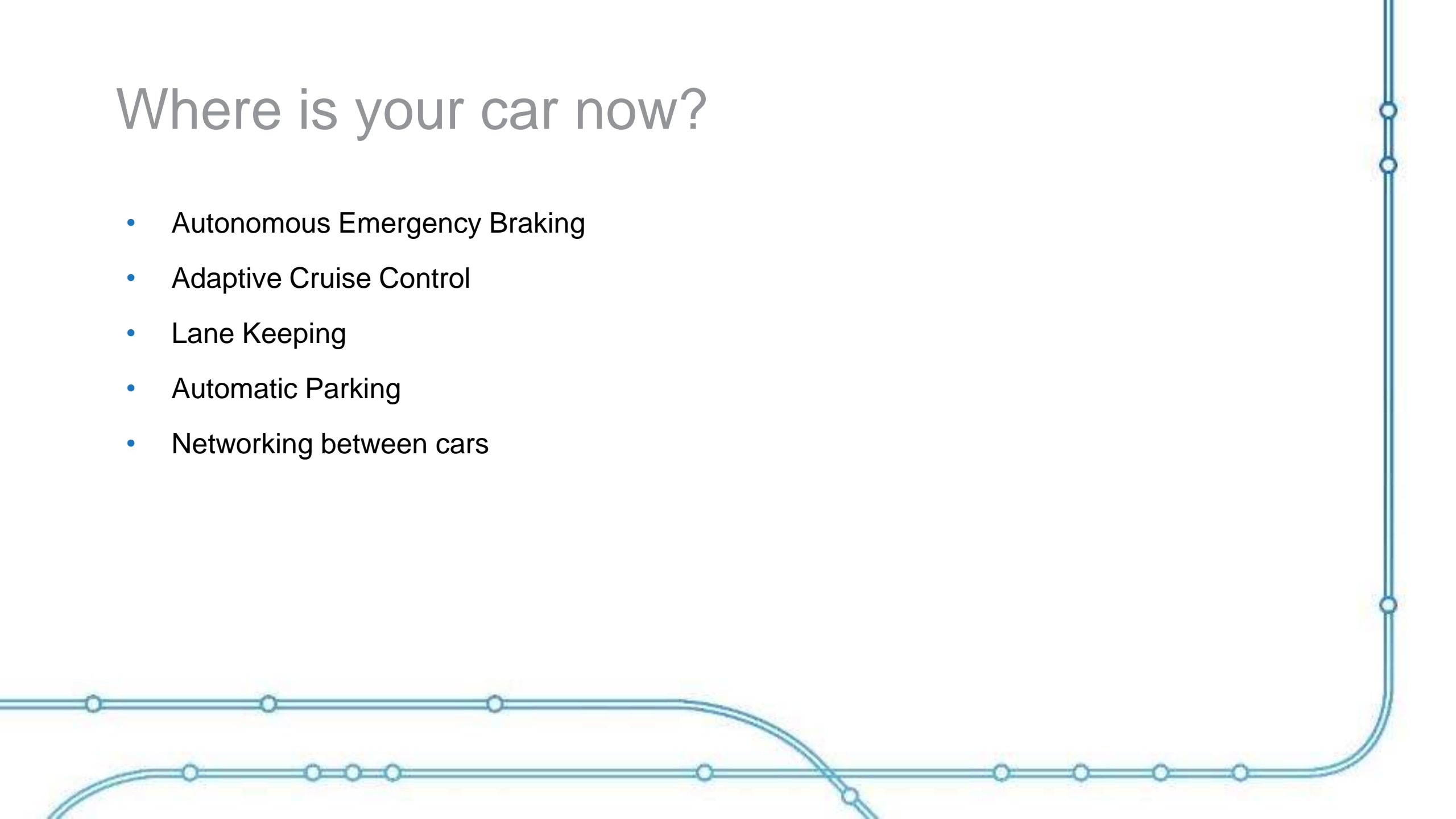
TAG and Easymile

- Operational since 2015
- One fully autonomous application in Toulouse.



Where is your car now?

- Autonomous Emergency Braking
- Adaptive Cruise Control
- Lane Keeping
- Automatic Parking
- Networking between cars

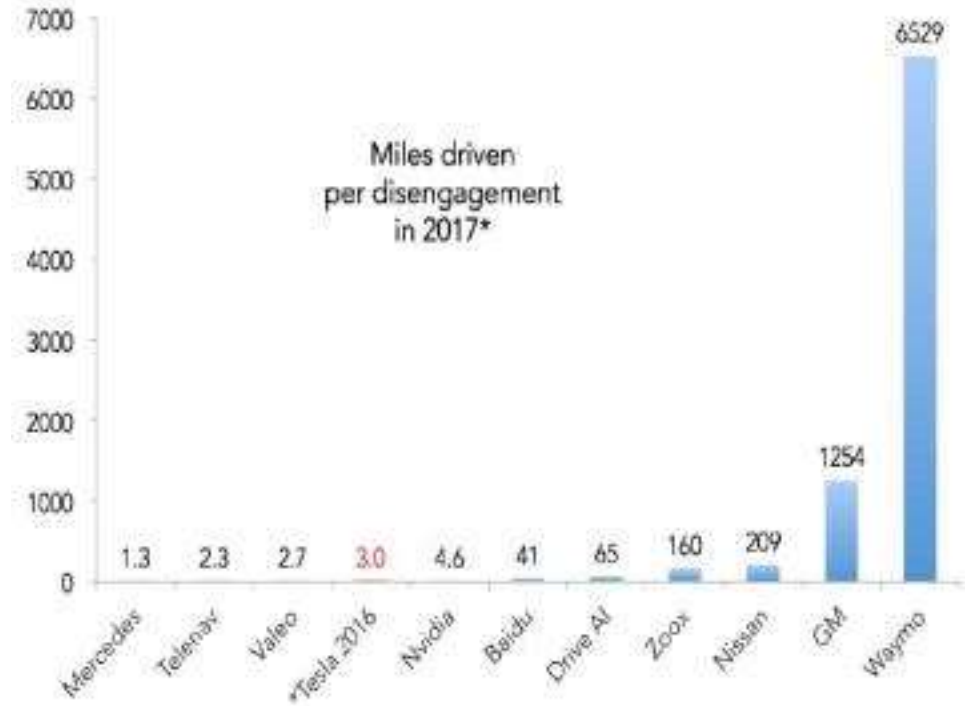


So we are almost there right?



Where is Autonomous Technology now?

- Tesla claims it already has the hardware needed for full autonomous driving
- GM Executive on Elon Musk's hardware claim – 'I think he's full of crap.'



Hype?

Gartner Hype Cycle for Emerging Technologies, 2017



gartner.com/SmarterWithGartner

Source: Gartner (July 2017)
© 2017 Gartner, Inc. and/or its affiliates. All rights reserved.

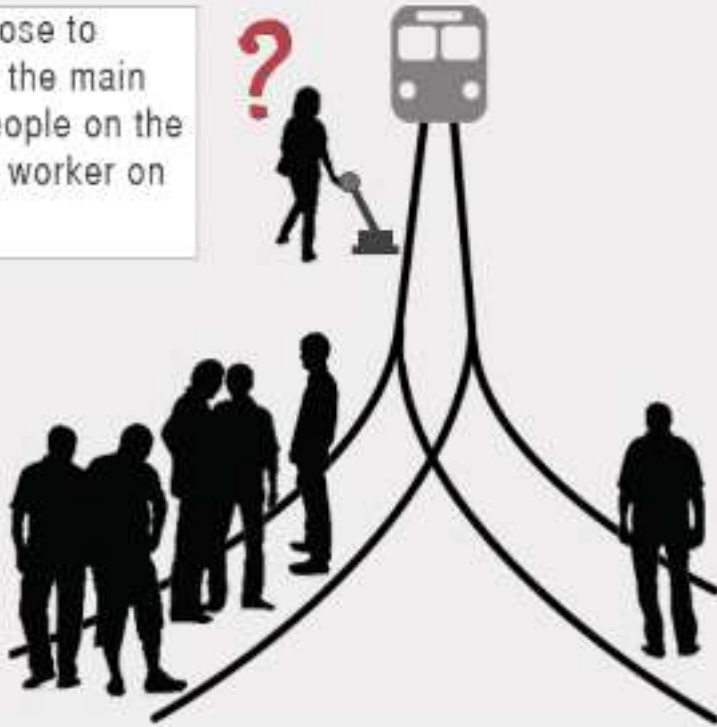
Gartner

Source: Gartner

Autonomous Vehicles and Ethics

The trolley problem

The person can choose to divert the tram from the main track, saving five people on the track, but killing the worker on the other track.



theconversation.com

images adapted from shutterstock.com



Global
wired

Autonomous Vehicles and Ethics

You're approaching a pedestrian crossing. The autonomous system is working but the brakes fail. A crash is unavoidable.




A car programmed to harm the fewest possible people would swerve into a wall, injuring you, rather than hit the three pedestrians.

Do you agree with this decision?

Source ABC

Autonomous Vehicles and Ethics

**You're approaching road works. Your child is in the car.
Pedestrians walk into the free lane without looking.**



With no time to brake, a car programmed to harm the fewest possible people would hit the road works. That would injure you and your child, but save the pedestrians.

Would you buy a car that makes this decision?

Source ABC

Autonomous Vehicles and Ethics

You're driving through an intersection when three pedestrians cross illegally in front of you.



A car programmed to harm the fewest possible people would save the jaywalkers. With traffic in the other lane, it would have to swerve onto the footpath and injure you and a bystander.

Do you agree with this decision?

Source ABC

Autonomous Vehicles and Ethics and Star Trek



Impacts driving uptake

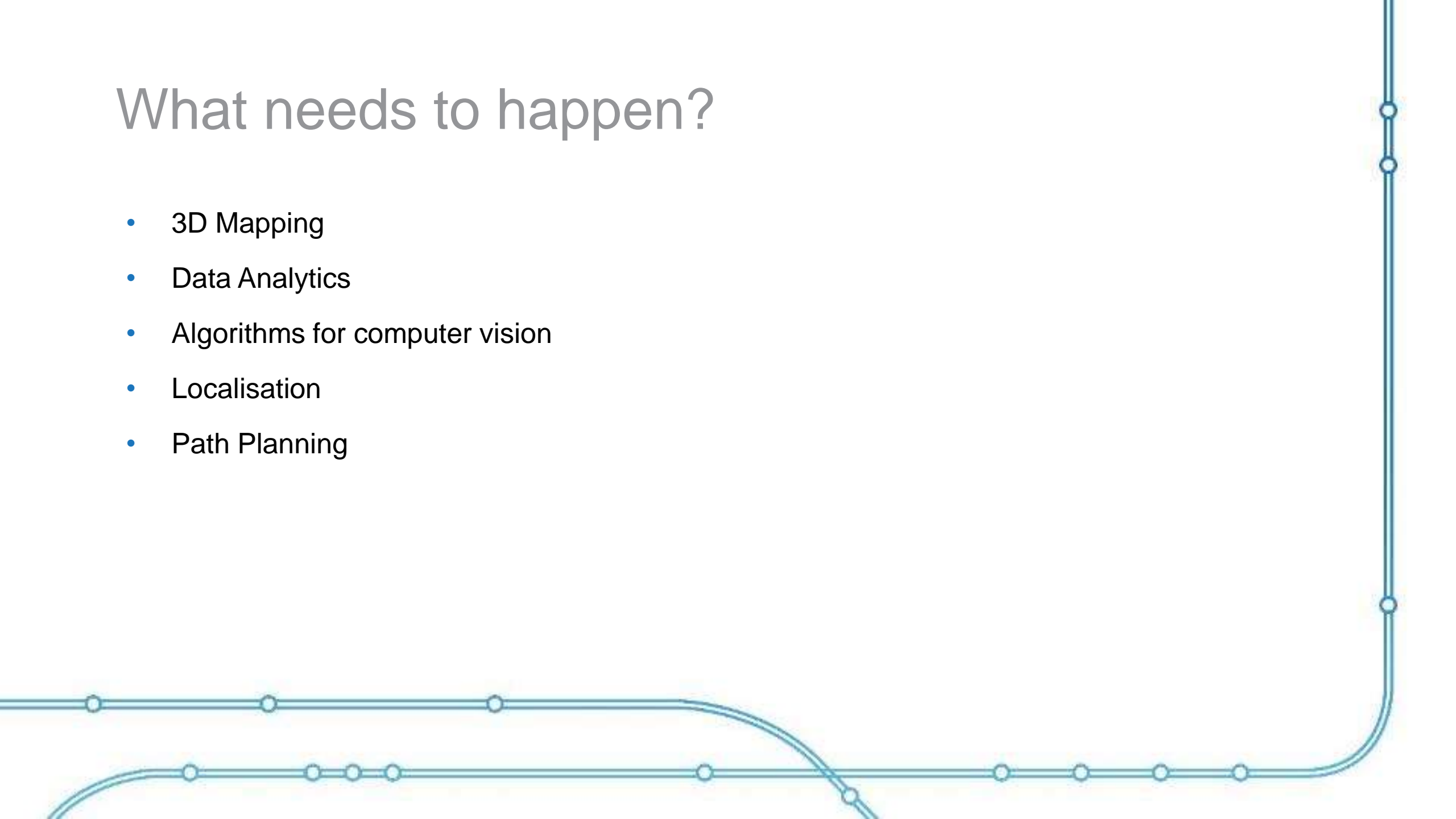
- Regulations
 - Number of rules need to change, including the insurance industry
- Cost of technology
 - Hardware/sensors is currently expensive and cost to keep software safe from system hacking
 - Watch the 'Cyber ninja' kid hack the 'Internet of Things' (IOT)
- Readiness of technology
 - Deep learning and AI will be required to actually predict all road users



Source: Gartner

What needs to happen?

- 3D Mapping
- Data Analytics
- Algorithms for computer vision
- Localisation
- Path Planning



How will 'Autonomy' being introduced?

- Safety features that are proven to work better than humans
- The list of driver assistance aids will grow to the point where they can 'take over' in certain circumstances
- Gradual adoption on segments of road that are 'mapped' and autonomous systems deemed more reliable than humans
- In PT:
 - Due to technology limitations, ethical decisions to be programmed and the public's lack of confidence in the technology, bus drivers will still have a role in the foreseeable future
 - Transition from driver to oversight/safety/customer service role before being removed from traffic driving situations

So, what's first?



Ask this guy, he is trying to do both!



Contacts

John Calabro

Chief Operations Officer

johnrcalabro@tagroup.net.au

+61 425 605 749