CAVs
The Future is Now

Dr. John McCarthy

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Why Bother?

safety

efficiency

mobility

productivity

Technology develops more quickly than we realise….
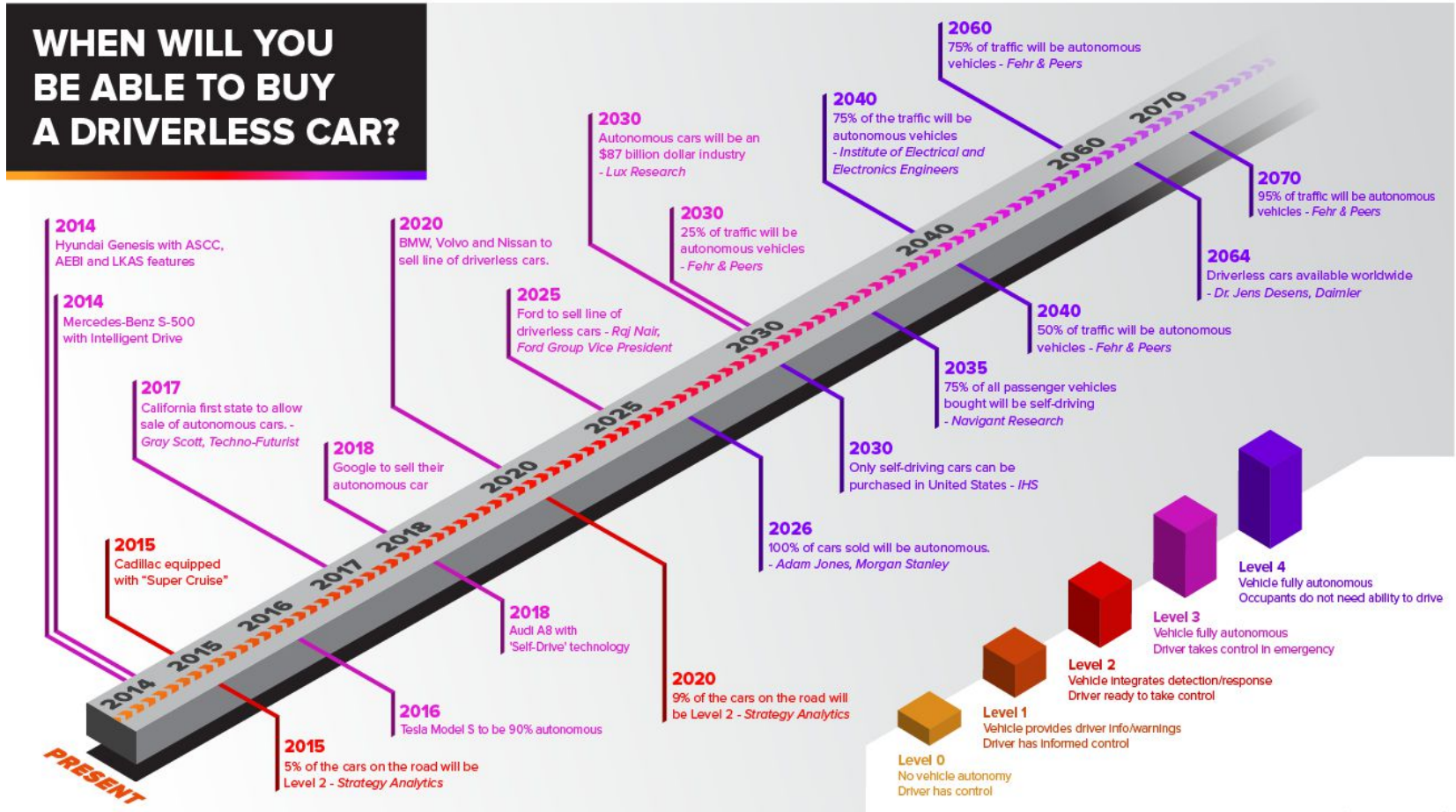
Huge amount of Investment in CAVs:

Courtesy of CBI

Not a Question of 'If', It's a Question of 'When'

WHEN WILL YOU BE ABLE TO BUY A DRIVERLESS CAR?

2014 — Hyundai Genesis with ASCC, AEB1 and LKAS features

2014 — Mercedes-Benz S-500 with Intelligent Drive

2017 — California first state to allow sale of autonomous cars. - *Gray Scott, Techno-Futurist*

2018 — Google to sell their autonomous car

2015 — Cadillac equipped with "Super Cruise"

2015 — 5% of the cars on the road will be Level 2 - *Strategy Analytics*

2016 — Tesla Model S to be 90% autonomous

2018 — Audi A8 with 'Self-Drive' technology

2020 — BMW, Volvo and Nissan to sell line of driverless cars.

2025 — Ford to sell line of driverless cars - *Raj Nair, Ford Group Vice President*

2020 — 9% of the cars on the road will be Level 2 - *Strategy Analytics*

2026 — 100% of cars sold will be autonomous. - *Adam Jones, Morgan Stanley*

2030 — Autonomous cars will be an $87 billion dollar industry - *Lux Research*

2030 — 25% of traffic will be autonomous vehicles - *Fehr & Peers*

2030 — Only self-driving cars can be purchased in United States - *IHS*

2035 — 75% of all passenger vehicles bought will be self-driving - *Navigant Research*

2040 — 75% of the traffic will be autonomous vehicles - *Institute of Electrical and Electronics Engineers*

2040 — 50% of traffic will be autonomous vehicles - *Fehr & Peers*

2060 — 75% of traffic will be autonomous vehicles - *Fehr & Peers*

2064 — Driverless cars available worldwide - *Dr. Jens Desens, Daimler*

2070 — 95% of traffic will be autonomous vehicles - *Fehr & Peers*

Level 0 — No vehicle autonomy. Driver has control.

Level 1 — Vehicle provides driver info/warnings. Driver has informed control.

Level 2 — Vehicle integrates detection/response. Driver ready to take control.

Level 3 — Vehicle fully autonomous. Driver takes control in emergency.

Level 4 — Vehicle fully autonomous. Occupants do not need ability to drive.

Sources: Mercedes-Benz, GM News, Strategy Analytics, Automotive News, Nissan News, Navigant Research, Volvo News, Fehr & Peers, Lux Research, IHS

mojomotors

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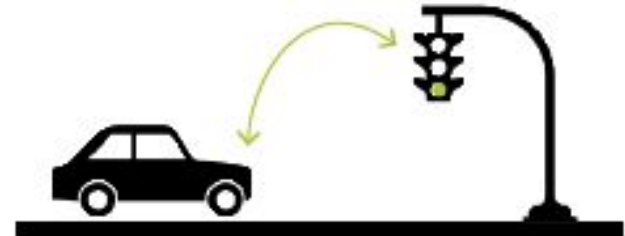# Connected and Autonomous Vehicles (CAVs)

There will be a dependency on:

- Physical Infrastructure

- Digital Infrastructure

- Clients needs

V2V: Vehicle to Vehicle
Each vehicle is a node with the ability to send and receive critical safety + mobility information to other vehicles.

V2I: Vehicle to Infrastructure
Vehicles are able to send and receive information to surrounding infrastructure such as traffic signals and road sensors.
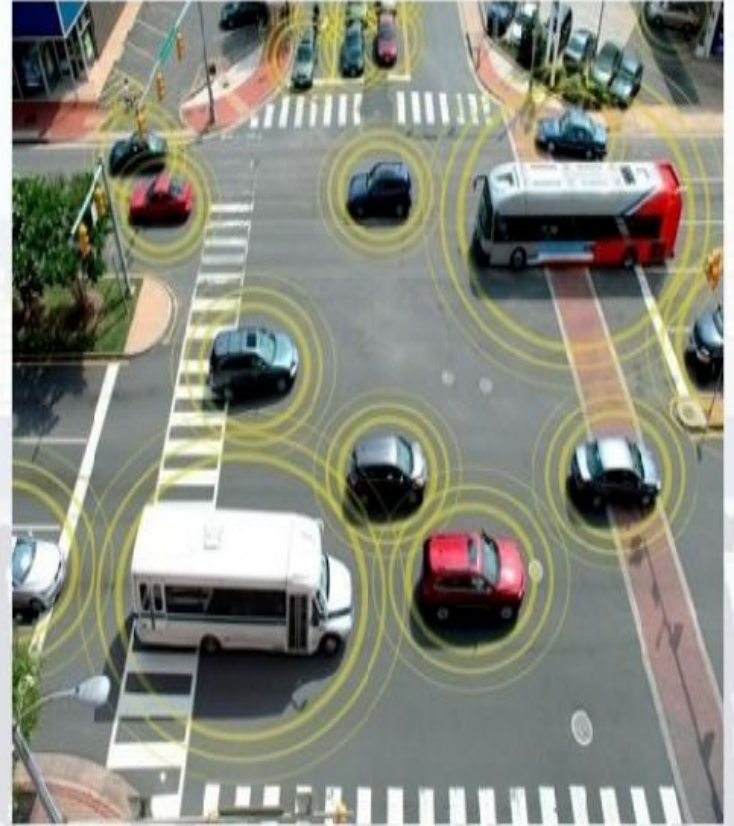
V2X: Vehicle to Everything
Vehicles can communicate with other vehicles, infrastructure and other users of the public right-of-way for a safer, more efficient transportation network.

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Re-Imagine our Environment

We will have to change our
relationship with our
urban landscape:

- Road and Footpath Design

- Shared services

- Public Transport +
  Walking/Cycling

Courtesy of Highways Intelligence

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Data is the new Gold – it requires Leadership

~10000000 bytes of data per vehicle a day from a CAV:

- Guidance on where data from/to CAVs sits

- Standardised data approaches around access to data

- Clarity on the role and use of encrypted data in a CAV

- Standards of consent and breaches of policy

- Investment in Governance, Risk and Compliance

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Cyber Security – Protect the assets

- $6trillion economic cost predicted annually by 2021

- Global ransomware damage to exceed $5billion this year

CAVs will be attacked via hackers

- There is a need for a robust framework to be developed

- Standards and approval criteria must be developed

- CAVs as a critical infrastructure?

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Independent CAVs - A Doomsday scenario

- Congestion reduction requires collective engagement

- OEMs focus is on the vehicle, not on the roads

- Network Optimisation and Efficiency is at risk

CAVs require a SYSTEM based approach

- There is a need for a policy on 'collective engagement'

- A consolidated Technical approach must be developed

- Interoperability and integration principles need clarity

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Possible 'Short to Medium Term' Next Steps:

- **Create**:
  - A Strategic Policy and Roadmap for CVs and AVs
  - A Technical Experts panel to guide investment

- **Review**:
  - Network Requirements and User needs and behaviours
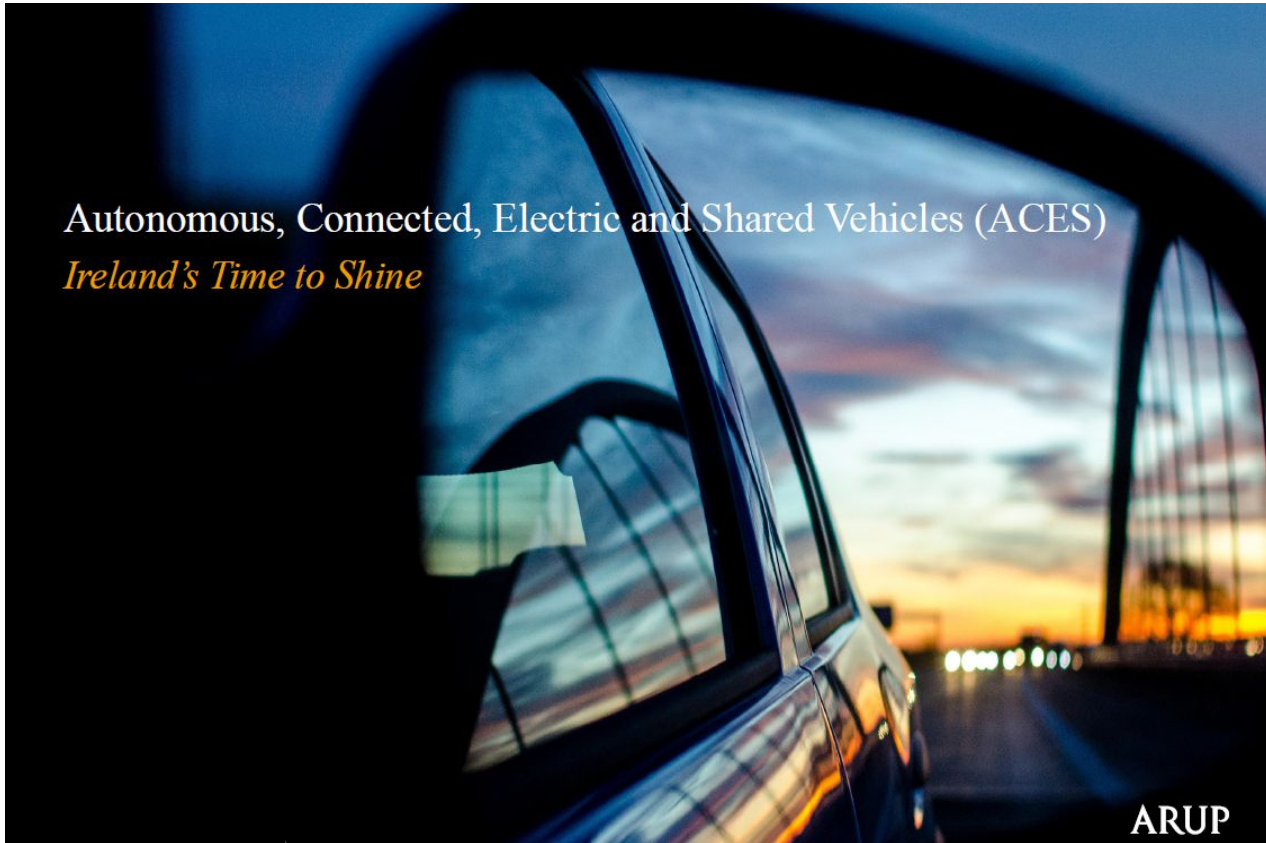 - Data availability from public bodies

- **Define**:
  - A clear test regime and deployment requirements
  - A suite of KPIs for Physical and Digital Infrastructure

- <u>**Build**</u>:
  - A Connected Corridor – State to State and City to City
  - An Integrated Mobility City Zone – all transport modes aligned
  - A Vision for adoption Globally – be a World Leader

Autonomous, Connected, Electric and Shared Vehicles (ACES)

Ireland's Time to Shine

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Design for the future….

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Thank you

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