



IHS Markit™

AUTOMOTIVE

Autonomous Driving: The Short Term Impact

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*It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is most **adaptable** to change.*

Charles Darwin

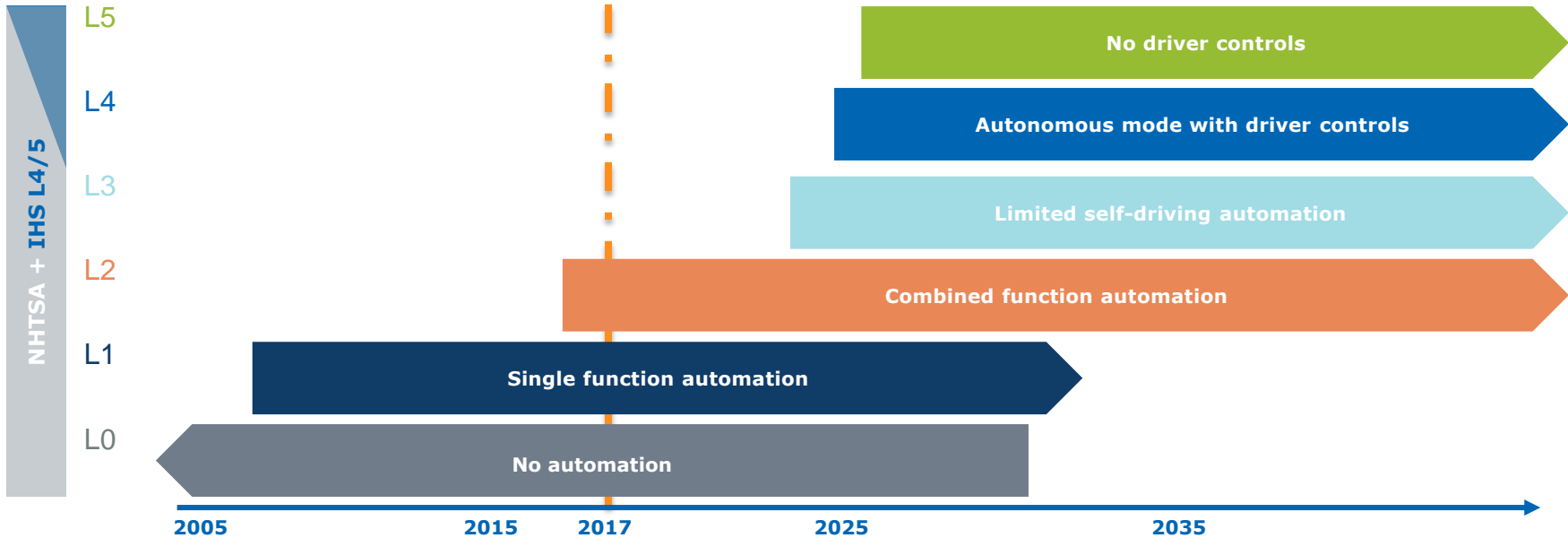
Agenda

- Where are we now?
- Enabling Technologies
- Component Pricing
- Market Dynamics
- 2017?
- Q&A

The Big Picture

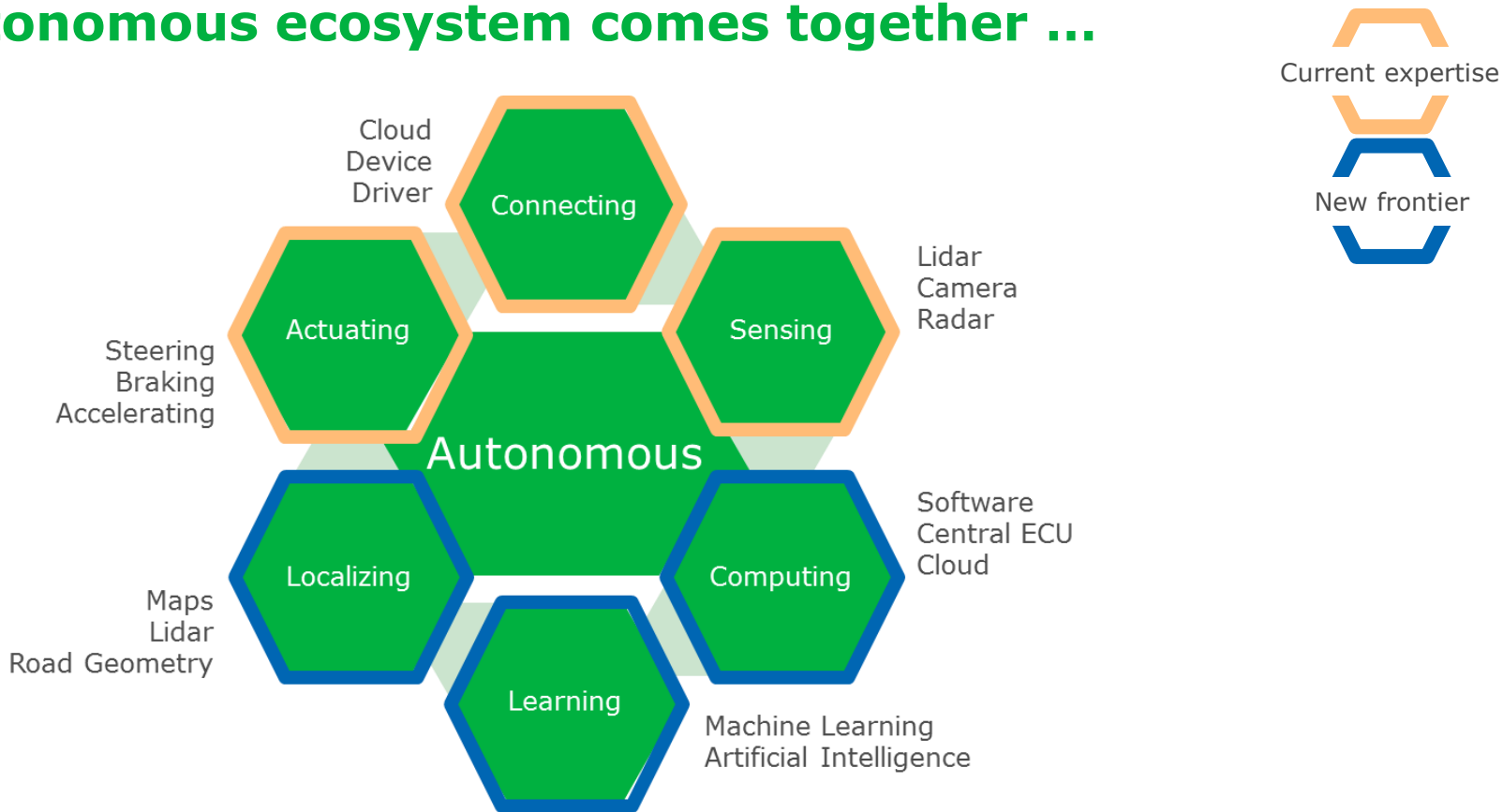


So where are we now?

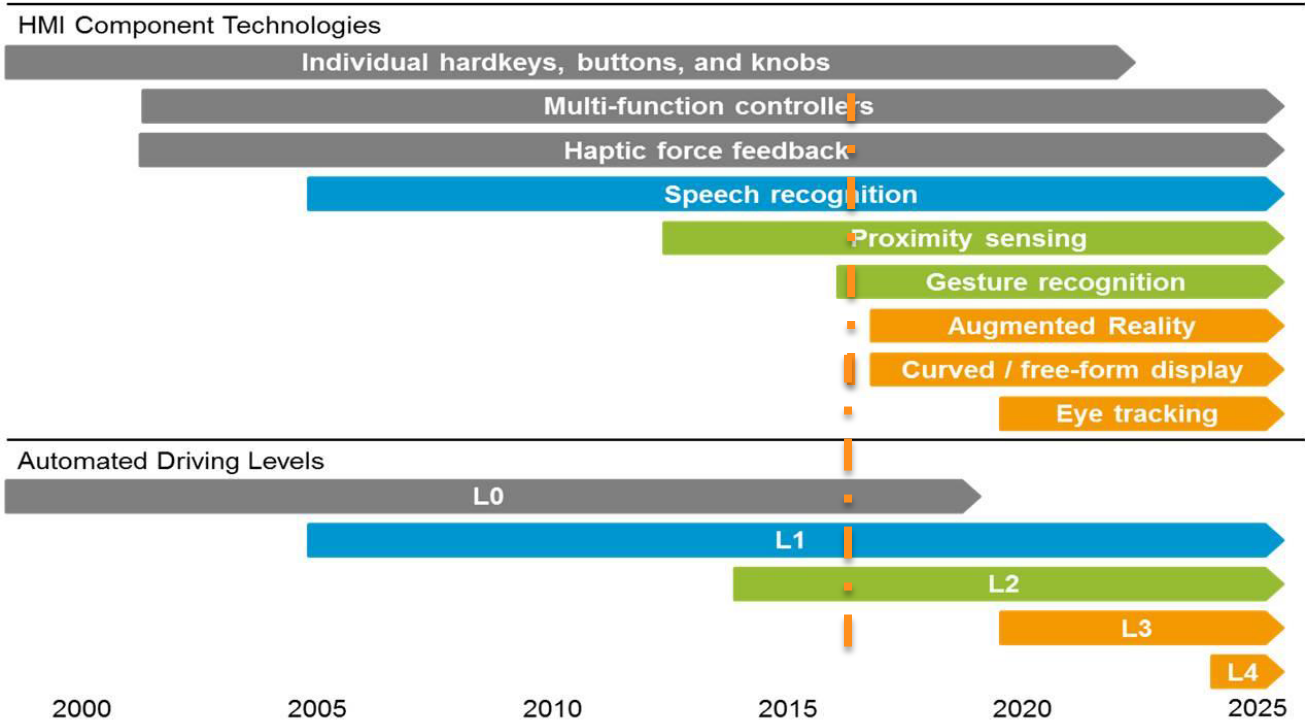


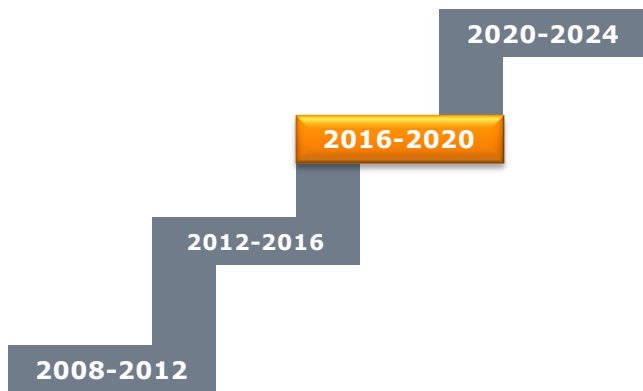
Enabling Technologies

The autonomous ecosystem comes together ...



Developments in autonomy to shape UI





Human-Centric Inputs

- Speech recognition
- Gesture recognition
- Driver monitoring

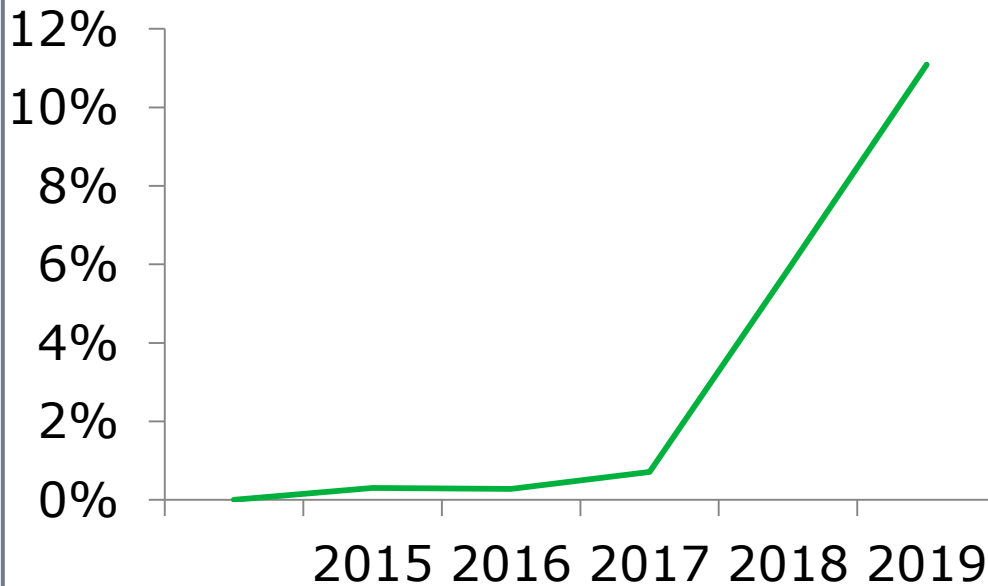
Display Applications

- Rearview e-Mirrors
- Side view e-Mirrors
- HVAC, passenger, door, etc.

Display Technologies

- Curved displays
- AMOLED displays
- Augmented reality HUD

Facial monitoring world fitment rate



Source: IHS Markit

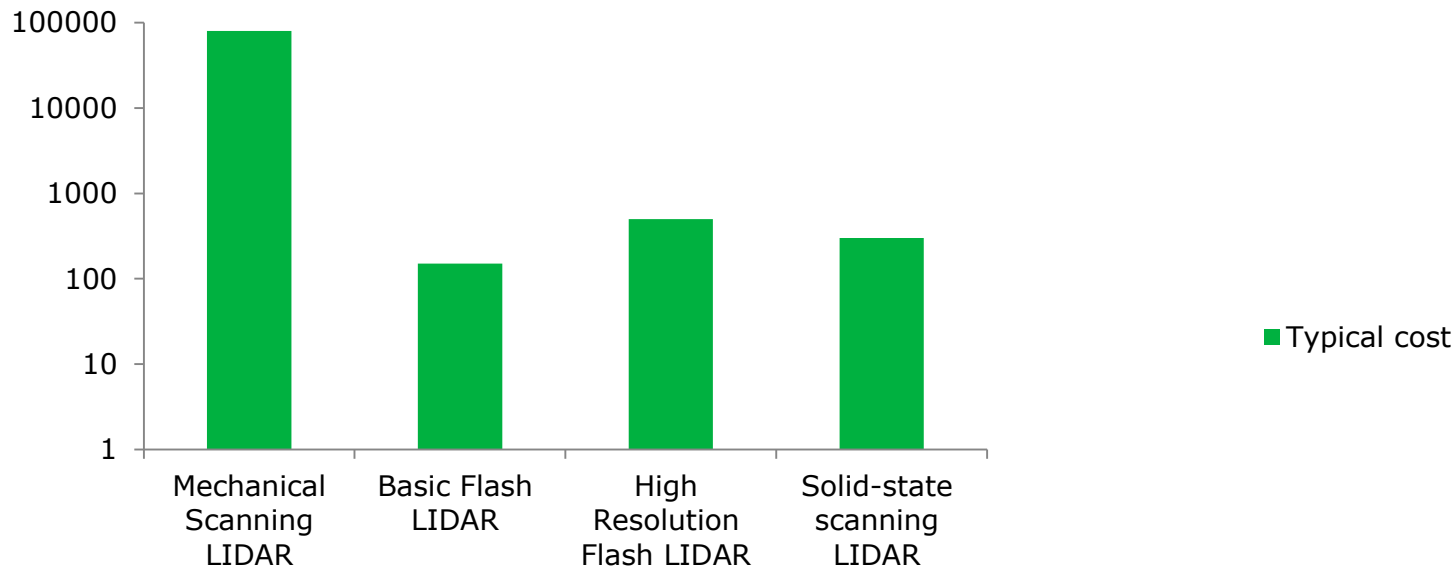
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Assessing drivers mental state, cognitive load and attention levels will becoming increasingly important.

Regionally, Japan is forecast to see the highest fitment rates of facial monitoring, followed by North America

High performance solid-state LIDARs: a key to system cost reduction

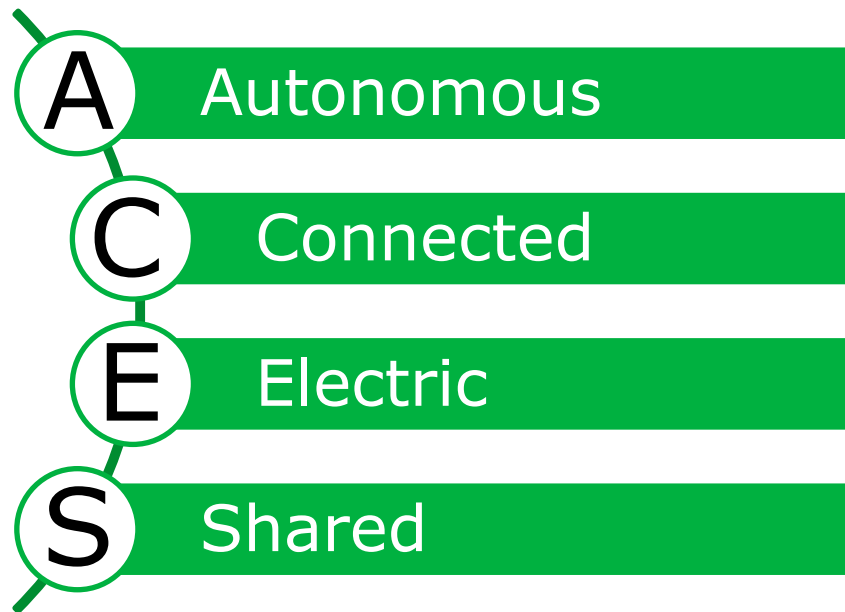
Typical cost



Wider Change

Mobility manifesting

- Automaker sub-brands become the home for new technologies
 - BMW **i**
 - Mercedes-Benz **EQ**
 - VW **ID** concept vehicles
- Companies establish standalone mobility units
 - Google **Waymo**
 - GM **Maven**
 - BMW **ReachNow**
 - VW **Moia**
 - Daimler **car2go**
 - Geely / Volvo **Lynk & Co.**



Testing and Pilot schemes

Location	Initiated by
UK – Milton Keynes	Government
UK London 'Gateway project'	Government
US- Pittsburgh	Uber
Sweden- Gothenburg	Volvo
Germany – Autobahn	BMW, Audi, Mercedes-Benz

Adaptation of infrastructure

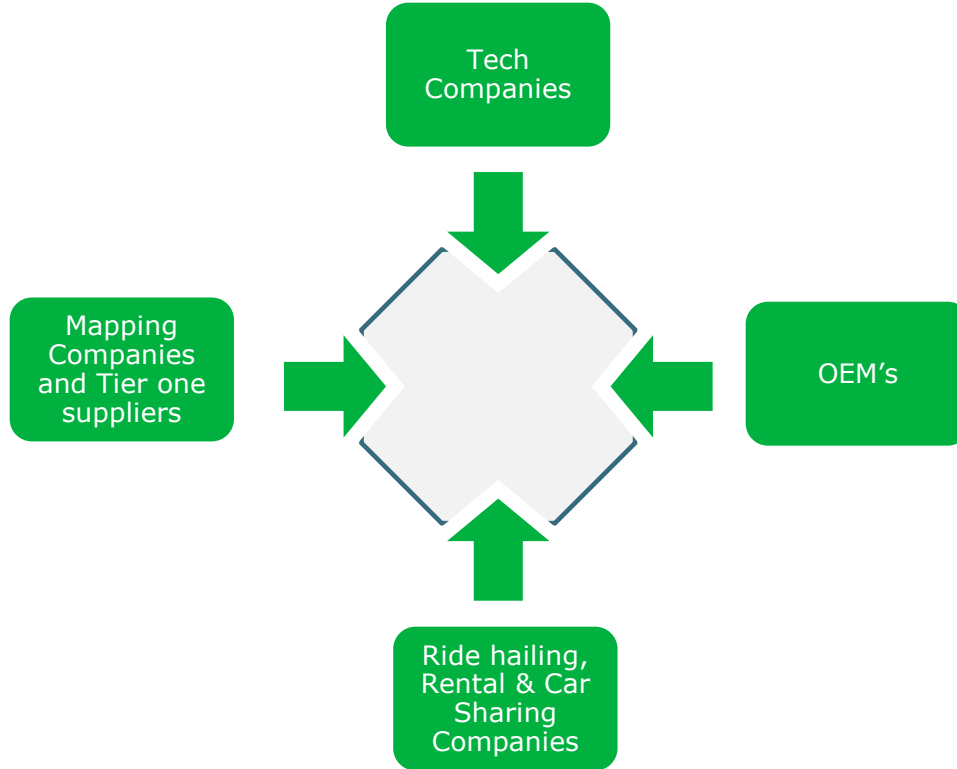
- Dedicated autonomous driving lanes
- Road signals and signs

Education of drivers

- Addressing safety concerns.
- How to interact with autonomous vehicles

Market Dynamics

Strategic partnerships



Recent strategic partnerships/acquisitions

- Uber and Volvo
- HERE- expanded consortium of ownership
- Autoliv/Volvo- Zenuity
- Nvidia/ Multiple OEM's
- Bosch/TomTom



Regulation

Regulatory activity is already influential, but it becomes one of the most important market forces for ADAS

NCAP

US NCAP adding 7+ new ADAS in 2018

Euro NCAP continues to move forward on new AEB features

Little-to-no activity from other countries

Voluntary agreements

US commitment for standard AEB by 2022

Will effectively make AEB standard everywhere in a few years, with rare local model exceptions

What is next?

Standards and guidance

ISO 26262 + ASIL

New automated vehicle guidelines expected in US

Steady progress on cybersecurity and driver distraction guidance in US

Sharing economy

Open question everywhere today

Even China allowed ride-hailing services in legal grey zone

Regulation likely to be defined by the current market

Guidance will shape the future of automotive technology, regulatory decisions will affect how the sharing economy evolves

2017 Automotive Technology Foresight

Autonomy & AI

Sensor advances, artificial intelligence, innovative interiors and platform development towards public deployment

Electronic Architectures

Sensor fusion ECUs and central ADAS domain controllers will drive further advances in autonomy, reduce cost and save weight

ACES

Creation of further sub brands and further development of standalone mobility units.

2017
Foresight

New Automotive UX

Developments in UI technologies, design, or service models aim to reinvent the automotive UX

Collaboration and M&A

OEMs acquiring new competencies, more supplier consolidation possible, achieving scale in data and services

Disruptors

Mobility providers & start-ups push OEMs and suppliers to diversify products and business models

Thank you!



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