PTOLEMUS
Consulting Group

OEM READINESS FOR AUTONOMOUS VEHICLES

Global Study



FREE ABSTRACT

16 car makers investigated in North America, Europe and Asia

The first global roadmap of OEMs' deployment of driverless cars

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What you will find in this OEM AV Readiness abstract

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With automation, tech companies are climbing to the top of the pyramid over car makers



Dear reader,

All OEMs and technology companies that had announced hard AV launch dates have postponed them or stopped communicating about them altogether.

Already burdened with lowering demand and increased investments in electrification, car makers are being forced to adopt unconventional strategies for automation.

From merging their AV programmes with key competitors, to entirely foregoing L4 AV development, we have seen everything in a few months.

All of this is prompted by the prohibitive costs of AV development and testing but also the increased uncertainty of success. **Launching driverless cars will require more than a CEO injunction and billions of investment!**

AI is not the forte of car makers

There is a clear reason why OEMs have invested several billion dollars in Silicon Valley start-ups such as Cruise and Argo and why pure technology players such as Waymo have a clear lead in the domain.

OEMs specialise in building cars and not perception/ vision neural networks or other AI algorithms.

It is therefore imperative to understand the key technical complexities being faced by OEMs to figure out when and where AVs will actually be deployed.

That exactly is the point of this report, which attempts to respond to the *Who? When?*, and *Where?* questions with regards to OEMs and tech giants.

How will things play out?

Launching an AV programme will require tackling most if not all edge cases, which means relentless simulation and real world testing prior to launch. Data-centric players definitely have an advantage compared to others.

This also means that scaling up AV deployment across geographies will not be immediate even post-launch as significant local level testing will be required.

As highlighted in our recent AV Tech Global Study, **robotaxis will be the entry point for AVs**. We believe Elon Musk's claim of passenger cars achieving SAE level 4 capability through merely vision based-perception alone will not happen, both for technical and regulatory limitations.

How will the safety requirements for AVs evolve?

With the first car crashes, the safety debate has moved from theory to practice. So do the demands on OEMs, which receive inordinate scrutiny for every AV accident and fatality.

An AV system just being on a par with a driver assisted with L2+/L3 ADAS will not suffice. Hence we believe a zero-collision goal for AVs (as adopted by many players) is the right approach.

Who will win the race to bring AVs to market?

Our detailed analysis and technology assessment of 16 major AV programmes in this report will give you a lucid picture of where the world stands.

To write this report, **PTOLEMUS** has leveraged its **4 years of experience in tracking the AV industry, publishing the most comprehensive report on the subject in 2017* .**

In this 360-page study, you will find:

- An analysis of the AV building blocks and the value chain
- In-depth profiles of 16 OEM / tech company-led AV programmes
- **A ranking and estimation of the AV launch timeline for each OEM**
- A technology deep-dive to understand how the key AV building blocks work

This research, along with our **AV Tech Suppliers Global Study** aims to bring a fact-based evaluation of the road towards AVs.

As consultants, we also look forward to help you shape your **next AV technology and go-to market strategy** in this swiftly evolving AV landscape.

Sincerely,

Frederic Bruneteau

Managing Director

Source: PTOLEMUS - Note: AV: Autonomous vehicle OEM: Original equipment manufacturer SAE: Society of automotive engineers ADAS: Advanced driver assistance system * Autonomous Vehicle Global Study (2017)

This study is the first bottom-up snapshot and forecast of OEMs deployment of AVs



The first bottom-up investigation of 16 car manufacturers AV programmes

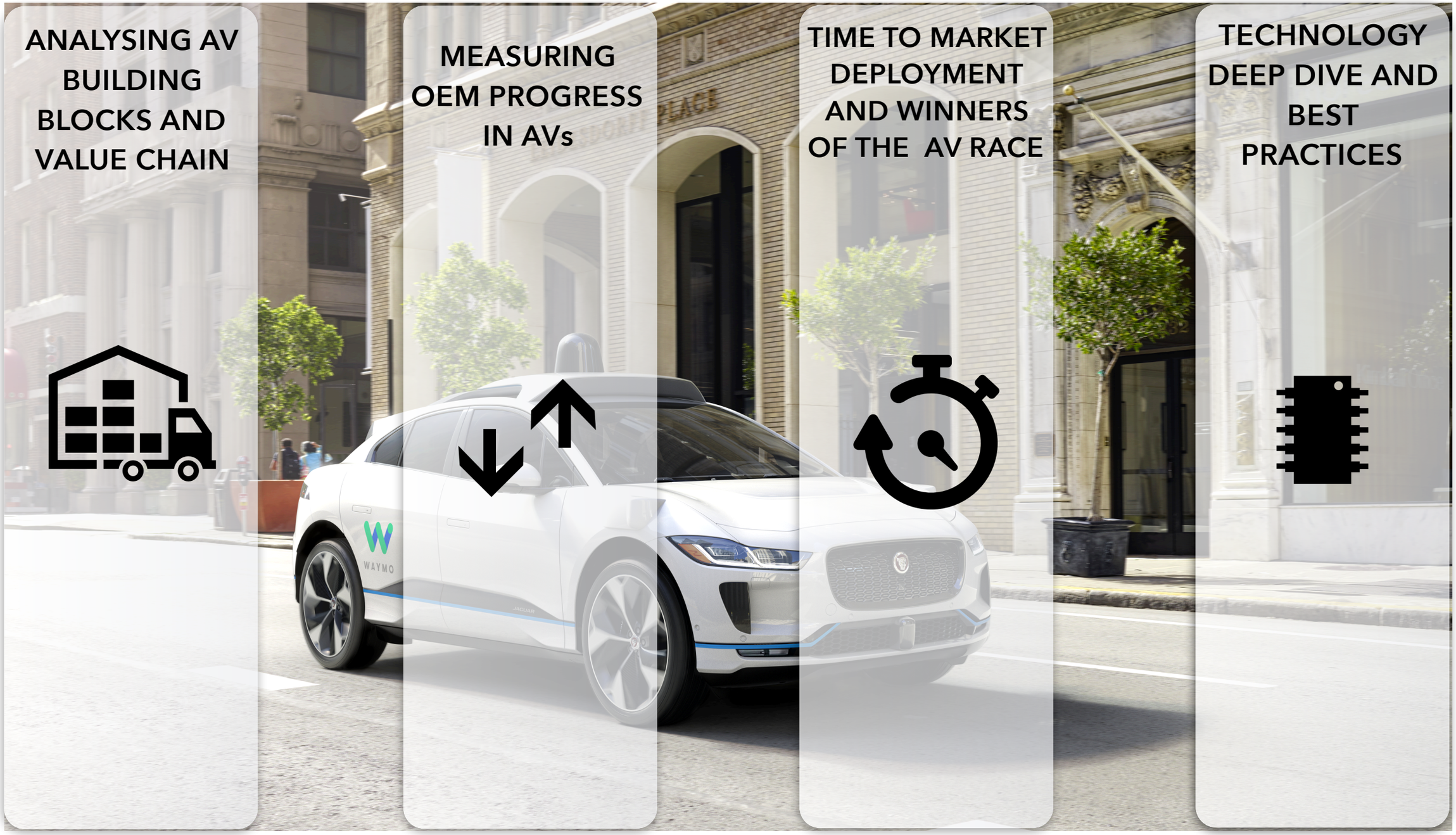
- **Based on 10 years of experience in strategy consulting in mobility & automation**, it leverages:
  - In-depth **interviews with OEMs and tier-1s** and technology players
  - Desk and primary research by a team of consultants and analysts
  - **Insights from 140 consulting assignments** on mobility markets, technology and strategy

- **The report provides 16 in-depth profiles on OEM and tech company AV programmes, covering 54 brands:**
  - Dedicated resources and maturity
  - Strengths and weaknesses
  - Degree of advancement measured in 7 key AV building blocks

- It provides **a deep dive into the technology, best practices and 7 building blocks used by OEMs** including:
  - Sensor stacks utilised
  - Computing hardware developed
  - Perception prediction and planning systems used
  - Contextualisation and positioning
  - Simulation and testing
  - Security
  - Cloud layer/ data centre
  - Overall trends and best practices

- **A bottom-up timeline for market deployment of AVs is provided across 3 regions and 2 car segments:**
  - North America, Europe and Asia
  - Passenger cars and robo-taxis

The OEM AV readiness study is the first in-depth analysis of car makers' progress in AVs and deployment roadmap



OEMs will lag behind technology giants in launching AVs

Will AVs ever exist?

- **Yes**, **they actually already exist in certain areas** such as Phoenix, Arizona and Las Vegas, Nevada and all areas where automated shuttles operate
- So it is a question of extending their operating domain to a sufficient level so that they generate value to both passengers and service providers
- However, PTOLEMUS research indicates that **all OEMs have overestimated their readiness and L4 launch date by an average of 2 years!**

How will we get there?

- **Traditional OEMs are struggling in their machine learning (ML) strategy due to the considerable hurdles:**
  - ML techniques for perception demand massive training datasets
  - The cost and time associated with manual data labelling and AI training are prohibitive at scale
- Advanced players in data science and unsupervised learning such as Waymo, Cruise and Zoox will be the first to achieve L4 AV market readiness
- On an industry-wide level, this is prompting OEMs to:
  - **Partner or purchase technology-oriented start-ups** e.g. Argo AI and Cruise Automation
  - Establish **strategic partnerships** with other OEMs such as BMW and Daimler, or Ford and Volkswagen
  - Or **give up in-house development of L4 AVs due to the complexity / large investments required** and license solutions from tech players (e.g. FCA with Aurora or Honda with Cruise)
- To handle AV computational challenges, the remaining OEMs are now choosing to customise their SoCs or even fabricate their in-house chip (ASIC) tailored to the needs of their AV platform, instead of using Nvidia's or MobilEye's turnkey computing solutions

How to be first?

- Many **OEMs will target L4 directly for robo-taxi implementation and skip L3 automation deployment** due to safety, liability and regulatory reasons, as established by the AV Tech Global Study
- **Robo-taxis will be launched first in the US** (California & Arizona) where the most advanced players are testing their vehicles (Waymo, Cruise, Zoox, …).
- **We do not believe that vision only AV perception systems will reach the level of accuracy required** by regulators in the near future and that having multiple redundancies in perception would be critical
- We therefore expect L4 autonomous passenger cars to be at least 7 years away based on the cost of the perception sensor stack as determined by our AV Tech report
- **Even after the first L4 AV services are launched, scaling across regions will be a slow process**
  - Every region will need significant testing within the local environment
  - The L4 testing footprint today will be one of the factors driving market shares locally in the future

Note: ML: Machine Learning SoC: System on Chip; ASIC: Application Specific Integrated Circuit
For more information on our consulting services, contact AV@ptolemus.com

American OEMs clearly lead the way while their European counterparts are partnering up to stay relevant

Waymo is leading

- We believe that **Waymo has a 2-3 year lead over everyone else due to:**
  - A hands-on approach to hardware with development of in-house sensors and chips (TPU)
  - Advantage in deep learning thanks to Google
  - Sizeable resources:
    - ✓ In time: 10+ years
    - ✓ In capital: over **$6 billion** in R&D
    - ✓ In testing: over **16 million real world km** and **16 billion simulated km driven to date**

Tesla has taken the wrong route

- As a manufacturer of premium passenger cars, Tesla is the only OEM that aims at using a vision-reliant AV suite to make the solution affordable
  - On one hand, its 500,000-strong fleet can harvest vast number of real world edge cases
  - However its cost constrained sensor stack determines its AV safety policy that aims to be only slightly better than the average human being
- We do not see Tesla reaching its stated goals in the near future:
  - From a technical level, as vision-only perception is bound to have high error rates
  - From a regulatory standpoint, a "good enough" solution will not be authorised

US OEMs have invested in their bets in specialised start-ups

- GM has acquired Cruise Automation and is leading the race for L4 AVs amongst traditional OEMs
- Ford has a controlling stake in Argo AI which is scaling its program and plans to launch its production-ready AV robotaxi in 2021

European OEMs are partnering up to tackle automation

- Volkswagen has partnered with Ford and bought a stake in Argo AI
- Daimler and BMW are cooperating in the development of L4 features for passenger cars
- Renault and Nissan have signed an agreement with Waymo to explore driverless mobility services
- FCA, besides providing the Chrysler Pacifica to Waymo, has partnered with Aurora to develop self driving commercial vehicles
- PSA has given up L4 development for the time being and will focus efforts on L3 in partnership with AIMotive
- Volvo provides Uber ATG with its XC90 and has a JV with Veoneer (Zenuity) to develop L4 AVs. It will skip L3 development due to safety issues

China is catching up but lags behind the US

- Baidu is leading development followed by Pony AI and AutoX who all do testing in the US as well
- China is not open to independent deployment of OEM AV programmes. It mandates external players to build JVs or source from local software suppliers e.g. in HD mapping
- We expect traditional OEMs to partner up with local leaders such as Baidu and license its software stack rather than test and deploy their own AV initiatives being implemented elsewhere
- This policy also ensures that pure-play AV technology platform companies in the West e.g. Waymo and Aurora, will find it extremely difficult to enter the Chinese AV market

Note: TPU: Tensor processing unit For more information on our consulting services, contact AV@ptolemus.com

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A. Introduction to the ADAS / AV landscape and value chain

- The 5 levels of automation
- What is at stake
- The AV value chain

B. Autonomous vehicle architecture and building blocks

2. Factors driving the development and deployment of AVs

A. PESTEL analysis

B. Country analysis for AV testing and regulation:

- USA
- Germany
- France
- UK
- China

C. Effect of GDPR on AV programmes

3. OEMs' progress in the building blocks of automation

Detailed OEM profiles including:

- Progress on each building block
- OEM specific timeline for AV deployment
- 16 groups covered
  - ✓ Baidu
  - ✓ BMW
  - ✓ Daimler
  - ✓ Fiat Chrysler (FCA)
  - ✓ Ford
  - ✓ GM
  - ✓ Nissan
  - ✓ PSA
  - ✓ Renault
  - ✓ Tesla
  - ✓ Toyota
  - ✓ Uber
  - ✓ Volvo
  - ✓ VW
  - ✓ Waymo
  - ✓ Zoox

4. OEM AV deployment date & ranking

Implied timeline for AV deployment and which OEM launches first

- Across geographies:
  - ✓ US
  - ✓ Asia
  - ✓ EU
- By vehicle category:
  - ✓ Robotaxis
  - ✓ Private passenger cars

5. Appendix and technology primer

KPIs & best practices used to assess progress on 7 building blocks:

- Sensor stacks utilised
- Computing hardware developed
- Perception prediction and planning systems used
- Contextualisation
- Simulation and testing
- Security
- Cloud layer/ data centre

The reports responds to questions such as:

Are disengagement rates a good criteria to measure competence of AVs?

Which OEM is leading the race in AV market deployment and for which regions?

How mature are OEMs' current AV programmes?

When will level 3 cars be launched?

Will robo-taxis appear before private cars?

When will fully autonomous cars emerge?

How does the presence of tech giants affect OEMs and the AV value chain?

Will end to end AV systems ever get better than modular systems?

What are the best practices to employ in development of AV sub-systems?

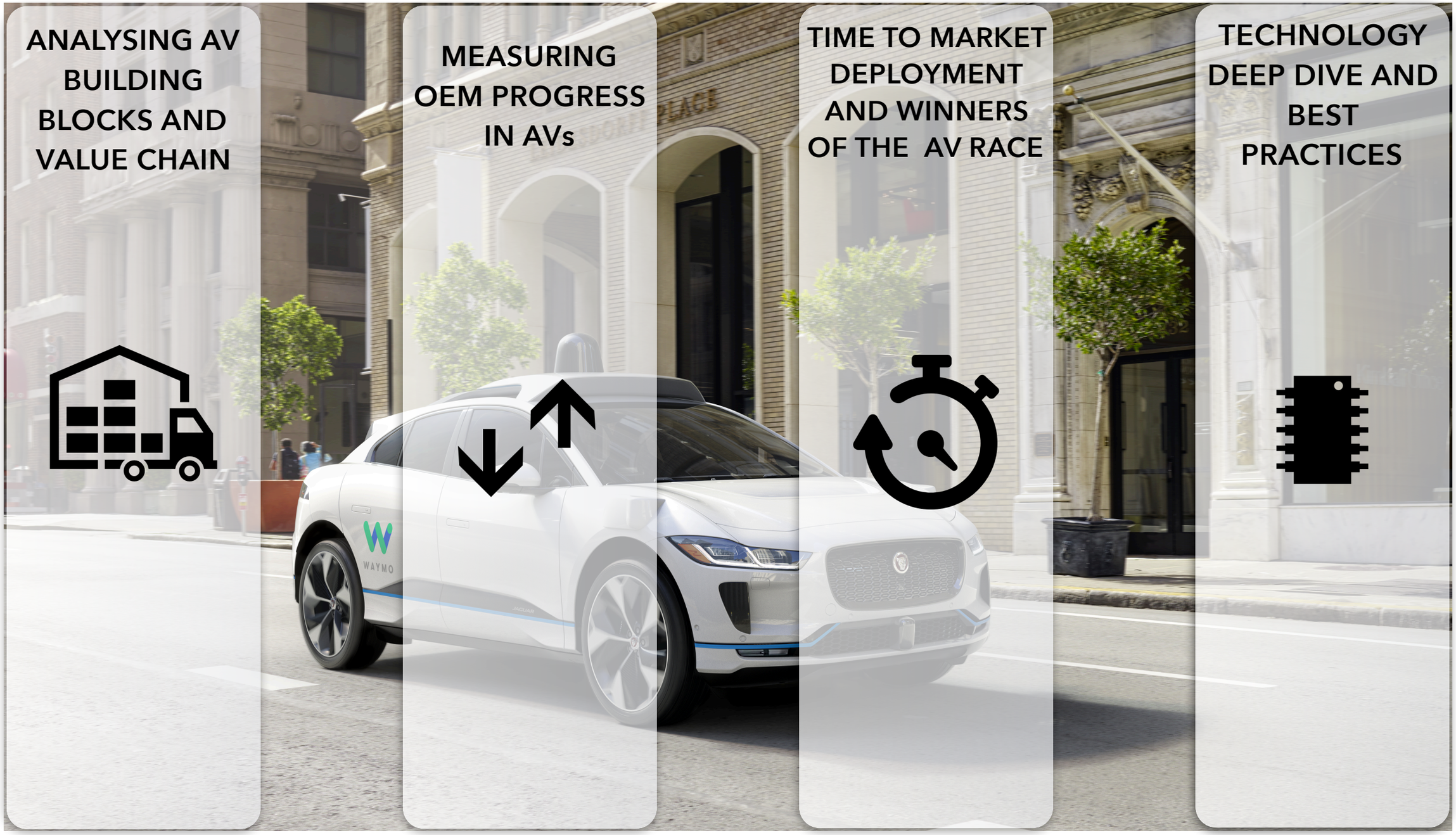
Should OEMs develop sub-systems in-house vs. using suppliers?

How will present and future trends in autonomy affect your company's strategy?

What are the key machine learning techniques being utilised?



The report is the first reality check of OEMs' CEO statements, focussing on the following key areas:

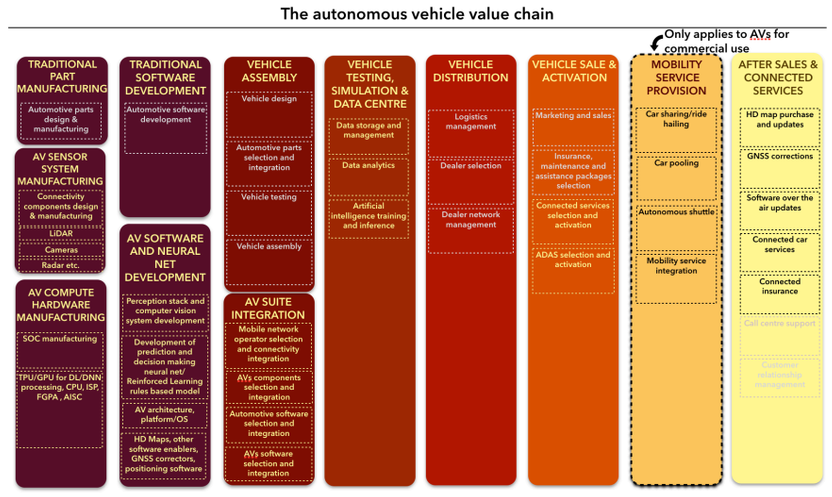


Understand which technology building blocks OEMs will use and what role each will play

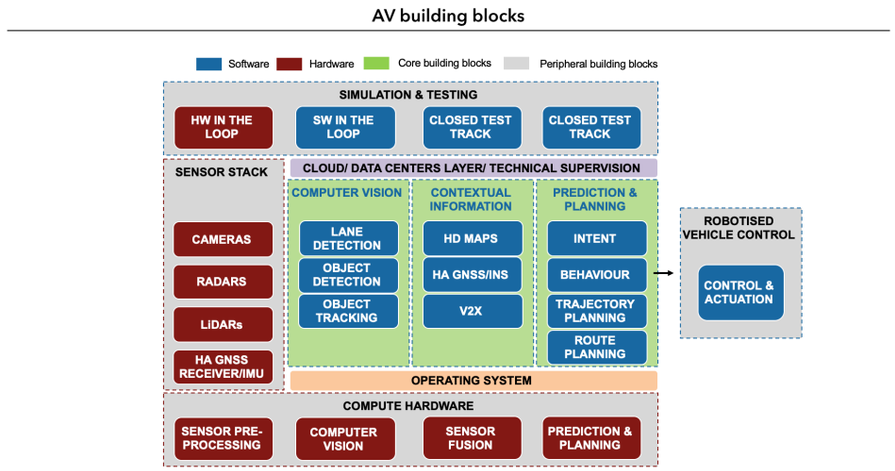
ANALYSING AV BUILDING BLOCKS AND VALUE CHAIN



AV value chain and key stakeholders



Building blocks of an AV programme



Key benefits

- Map out stakeholders who you can potentially partner with
- Understand which OEM is most vertically integrated
- Understand which building blocks will differentiate AV programmes

Compare 16 auto groups, covering 54 brands, and track the progress made in their respective AV programmes

MEASURING OEM PROGRESS IN AVs









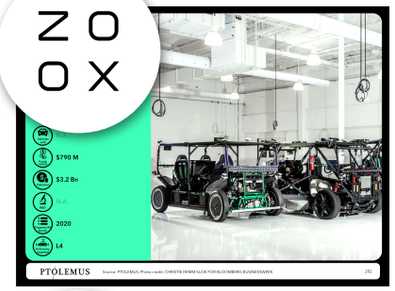






















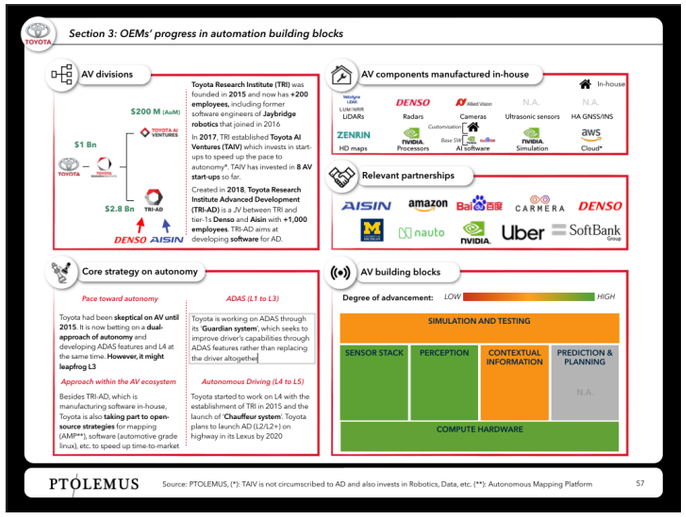




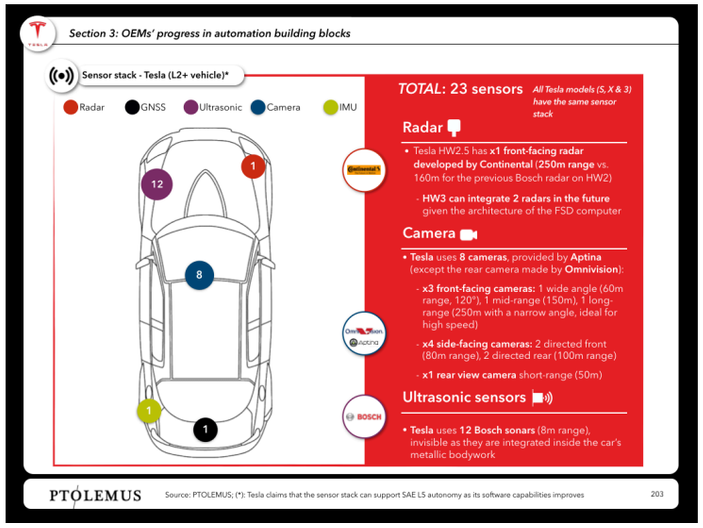
Learn about each OEM's strategy and benchmark your programmes against competitors

MEASURING OEM PROGRESS IN AVs

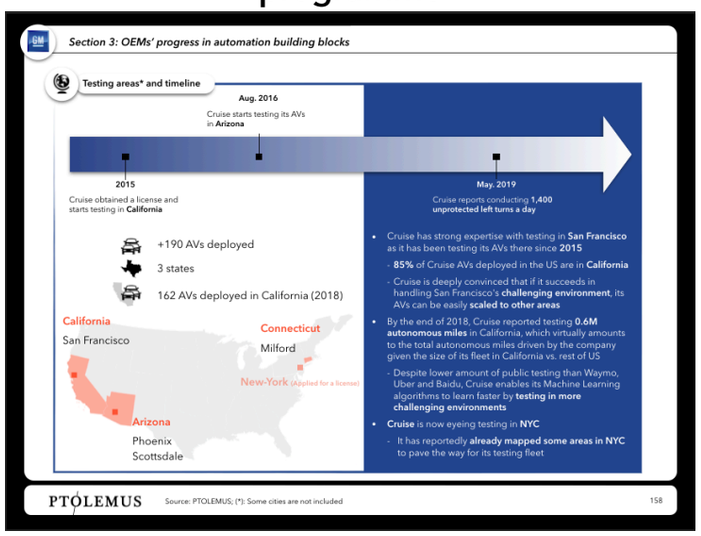
AV programme overview and progress for each building block



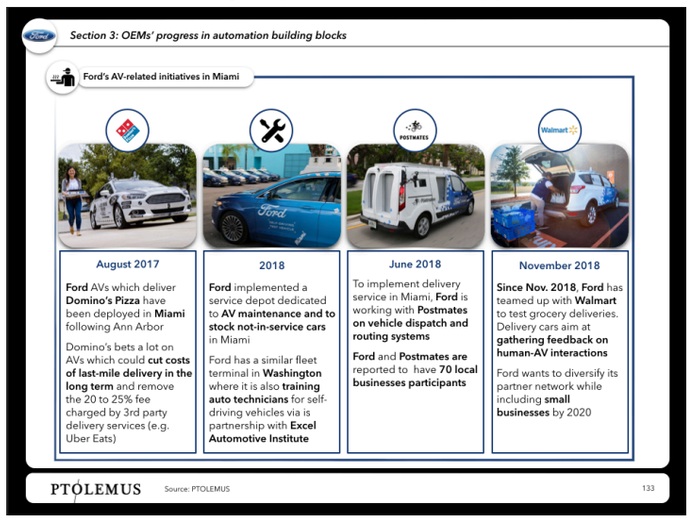
Sensor stack utilised by the OEM



Details on testing areas and timeline of the AV programme



Key programme specifics, partners and AV deployment strategy

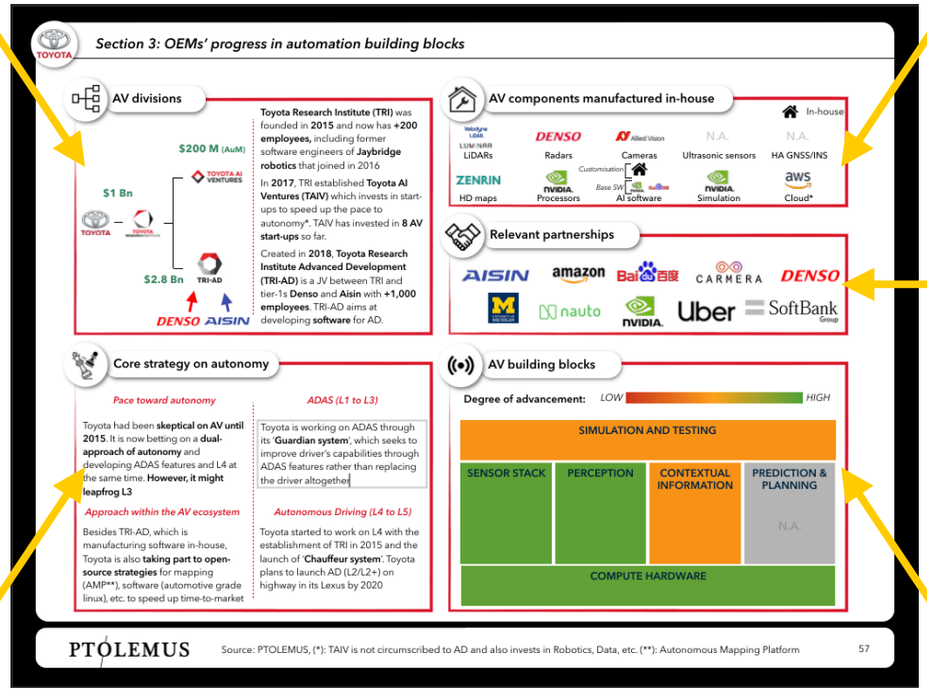


Obtain a holistic picture of each OEM's AV programme

MEASURING OEM PROGRESS IN AVs

Specifics about the structure and funding of the L4 AV programme of the OEM

Suppliers used for AV programme including the sensor stack, HD maps, processors, simulation and cloud service providers



Relevant partnerships for AV programme

OEM group strategy towards different levels of SAE automation

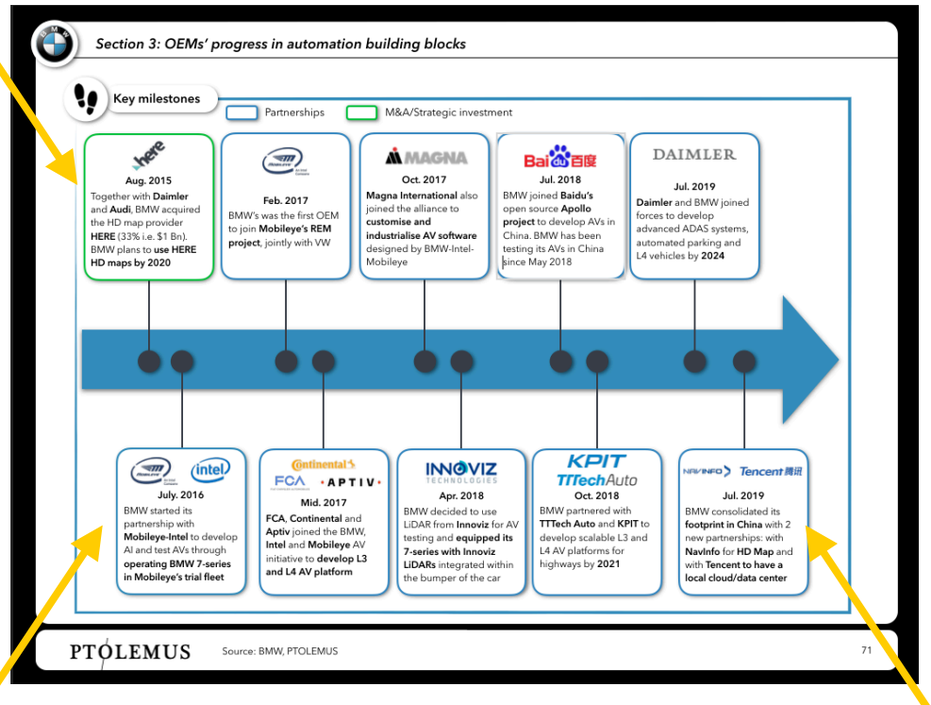
PTOLEMUS' building block rating for AV programme on its degree of advancement

A timeline is provided for key milestones achieved by each OEM

MEASURING OEM PROGRESS IN AVs

Milestones include a chronological account of details and achievements for each OEM and includes such information as, key mergers and acquisitions, strategic partnerships, technical associations with suppliers and achievements to date

Milestone : Key acquisition



Milestone : Strategic partnership

Milestone : Partnership for key geography

Find the list of key AV related acquisitions made by the OEM and the key solution provided by the targets

MEASURING OEM PROGRESS IN AVs

The profiles also include highlighted acquisitions that PTOLEMUS deems significant to each OEM's AV programme, and includes investment and strategic partnership information, segmented by partnership/alliance.

Target: investment in technical start-up



Target: strategic partnership

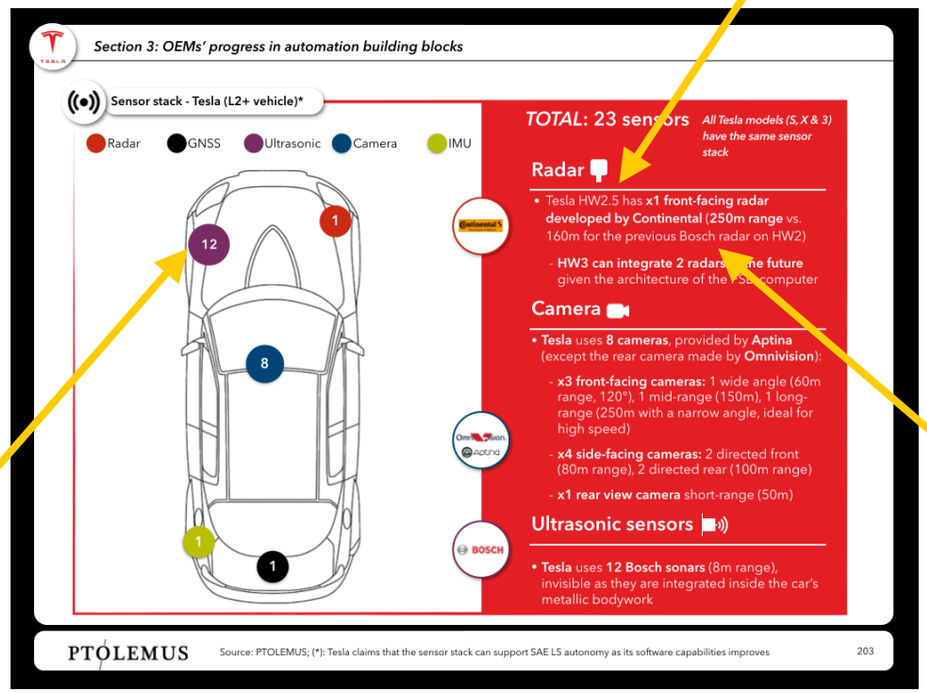
Target: investment in data platform

Understand the perception suite and the sensor stack utilised by the OEM for its AV platform

MEASURING OEM PROGRESS IN AVs

The profiles include a detailed breakdown of the number, type, specification, brand and application of sensors used by each OEM.

Sensor type



Number of sensors utilised in AV platform

Description of sensor application, specific to manufacturer

Understand the key commercial tie-ups and use cases of the most advanced OEMs

MEASURING OEM PROGRESS IN AVs

Key initiatives are included, detailing locations, activities and results of activities initiated by each OEM for the purposes of developing and rolling-out their AV programmes

Commercial partner



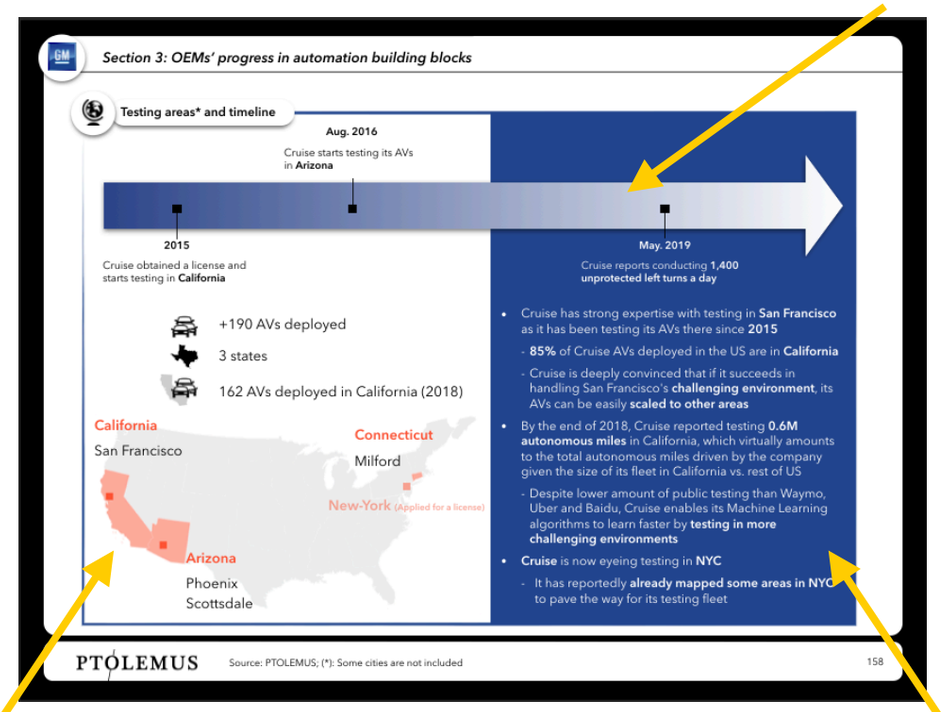
Description of partnership

Understand the testing geography and milestones achieved by 16 OEMs

MEASURING OEM PROGRESS IN AVs

An appraisal of each OEMs testing timeline and milestones are included for each group and details specific testing developments, location and scale of deployment and specific details of the deployments to date, including next steps

Testing timeline and milestones



Testing geography and number of vehicles deployed

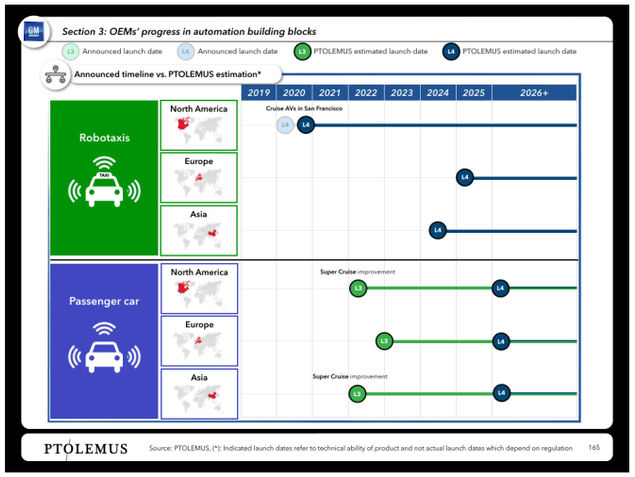
Testing specific developments

We offer the first global, bottom-up OEM roll-out roadmap

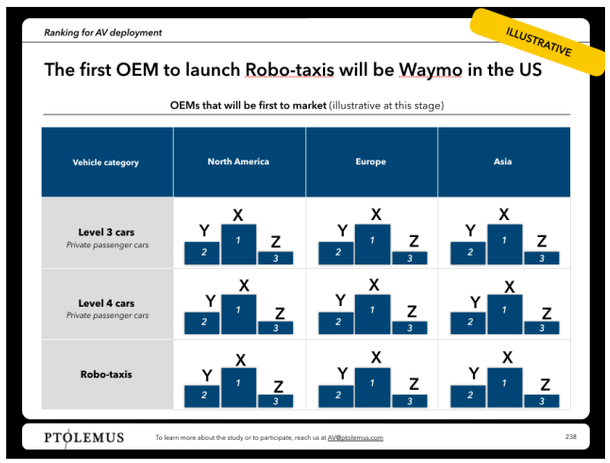
TIME TO MARKET DEPLOYMENT AND WINNERS OF THE AV RACE

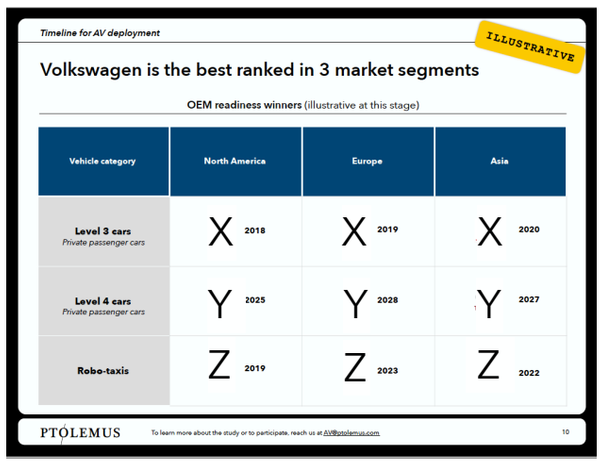


Estimated time-to-market for different OEMs based on our analysis



Ranking of OEMs and who will launch first in each region and AV segment





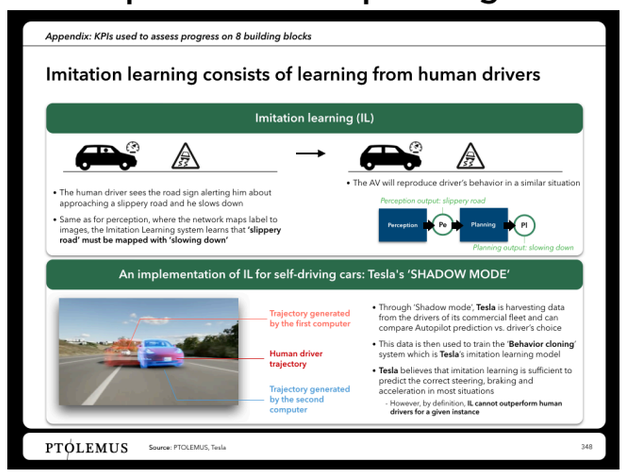
Key benefits

- Understand when and where AVs will truly start affecting your business
- Understand which OEM or tech player might make sense to partner with and for which geography

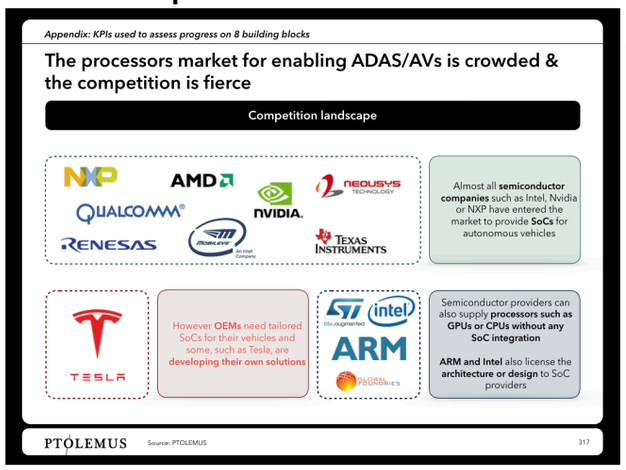
We highlight the best technology practices derived from the analysis of 16 groups

TECHNOLOGY DEEP DIVE AND BEST PRACTICES

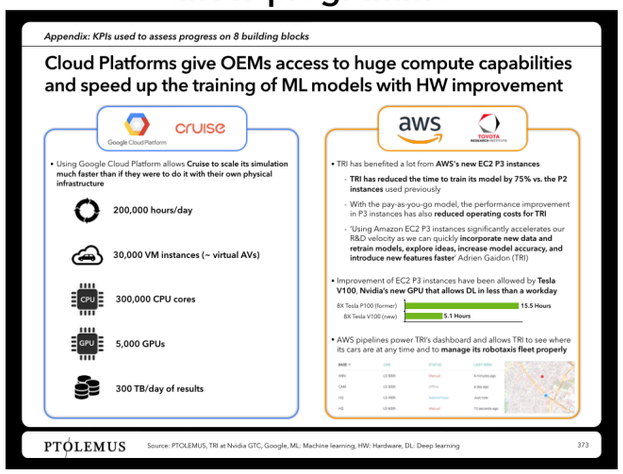
Techniques used for perception, prediction and planning



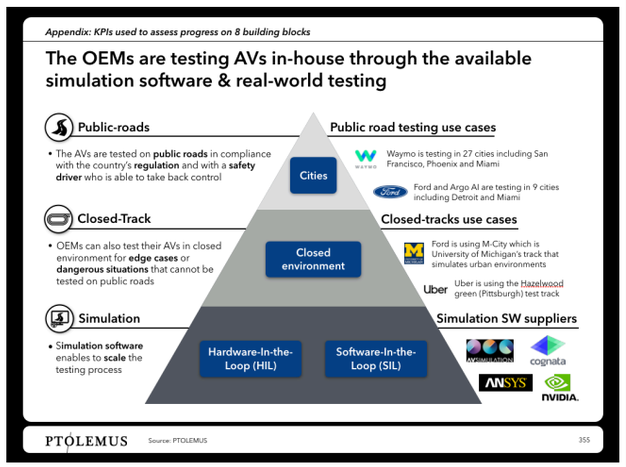
Sensor and computing hardware requirements for an AV



Analysis of cloud solution providers for an AV programme



Testing and simulation strategies



Detailed building block analysis provided for

- AV perception sensor stack
- Contextual interpretation and positioning
- AV processing/ compute hardware
- AI techniques utilised for perception, prediction and planning
- Testing and simulation
- Security
- Cloud and data centre layer

The study comes with a single, worldwide company licence



The first bottom-up investigation of 16 car manufacturers' AV programmes

	Full Study			Additional workshop
Contents	• **360-page analysis** of OEM readiness to deliver AVs • **Architecture and value chain** of the AV industry • **16 detailed OEM/tech company AV programme profiles** including AV strategy, our assessment of the advancement achieved in each key building block • **Timeline and ranking of OEMs AV market deployment** across different geographies and vehicle segments • **Technology primer and best practices** of 7 key building blocks for an AV program			• The full study presented to your board or strategy team • Half-day workshop at your office*
Company-wide licence	**Less than 100 employees** **€ 2,950** *Approx. $3,300*	**100-10,000 employees** **€ 3,950** *Approx. $4,400*	**Over 10,000 employees** **€ 5,950** *Approx. $6,600*	**€ 2,000** *Approx. $2,350*

For more information, customisation of the report and to order the study or enquire about our new subscription model, contact AV@ptolemus.com

Note: Prices in Euros excluding VAT (VAT only applicable to clients located in Belgium) - * Conditions apply

The report mentions more than 90 companies across the AV space (1/2)

Industry	Company	Country
AI for supply chain	**Scale.ai**	Canada
Automotive OEM	**Alliance Renault-Nissan**	France
Automotive OEM	**Audi**	Germany
Automotive OEM	**BMW**	Germany
Automotive OEM	**Daimler**	Germany
Automotive OEM	**FCA**	Italy
Automotive OEM	**Ford**	USA
Automotive OEM	**General Motors**	USA
Automotive OEM	**Honda**	Japan
Automotive OEM	**Hyundai**	South Korea
Automotive OEM	**Infiniti**	Japan
Automotive OEM	**Jaguar Land Rover**	UK
Automotive OEM	**Porsche**	Germany
Automotive OEM	**PSA**	France
Automotive OEM	**Rolls-Royce**	UK
Automotive OEM	**Tesla**	USA

Industry	Company	Country
Automotive OEM	**Toyota**	Japan
Automotive OEM	**Volvo**	Sweden
Automotive OEM	**VW**	Germany
Autonomous shuttle provider	**EasyMile**	France
Computing	**NTT Data**	Japan
Embedded software provider	**Elektrobit**	Germany
Geospatial data & analytics	**Maxar Technologies**	USA
HD map provider	**Carmera**	USA
HD map provider	**Civil Maps**	USA
HD map provider	**Dynamic Map Platform (DMP)**	Japan
HD map provider	**HERE**	Germany
HD map provider	**Mapbox**	USA
HD map provider	**NavInfo**	China
HD map provider	**Netradyne**	USA
HD map provider	**TomTom**	Netherlands
HD map provider	**Ushr**	USA

Industry	Company	Country
HD map provider	**Zenrin**	Japan
INS systems	**Aceinna**	USA
INS systems	**SBG Systems**	France
LiDAR & software provider	**Innoviz Technologies**	Israel
LiDAR & software provider	**Quanergy**	USA
LiDAR provider	**Blackmore**	USA
LiDAR provider	**Luminar**	USA
LiDAR provider	**Velodyne**	USA
Mobility services	**Lyft**	USA
Mobility services	**Uber**	USA
OS and software provider	**QNX**	Canada
Part manufacturer	**Magna International**	Canada
Part manufacturer	**ZF**	Germany
Positioning solutions provider	**Trimble**	USA
Positioning systems & Telematics	**GMV**	Spain
Processor and software provider	**Mobileye**	Israel

The report mentions more than 90 companies across the AV space (2/2)

Industry	Company	Country
Semiconductor & telecommunication	**Qualcomm**	USA
Semiconductor company	**AMD**	USA
Semiconductor company	**ARM**	UK
Semiconductor company	**Broadcom**	USA
Semiconductor company	**Global Foundries**	USA
Semiconductor company	**Infineon**	Germany
Semiconductor company	**Intel**	USA
Semiconductor company	**Nvidia**	USA
Semiconductor company	**NXP**	Netherlands
Semiconductor company	**Renesas**	Japan
Semiconductor company	**STMicroelectronics**	Italy
Semiconductor company	**Texas Instruments**	USA
Semiconductor company	**U-Blox**	Switzerland
Semiconductor company	**Xilinx**	China
Tech company	**AID**	Germany
Tech company	**Alphabet**	USA
Tech company	**Amazon**	USA
Tech company	**Apple**	USA
Tech company	**Argo AI**	USA
Tech company	**Aurora**	USA
Tech company	**Baidu**	China
Tech company	**Cruise**	USA
Tech company	**Drive.ai**	USA
Tech company	**Microsoft**	USA
Tech company	**Samsung**	South Korea
Tech company	**TRI-AD**	Japan
Tech company	**Voyage**	USA
Tech company	**Waymo**	USA
Tech company	**Yandex**	Russia
Tech company	**ZOOX**	USA
Technology integrator	**Aptiv**	USA
Telecom operator	**SK Telecom**	South Korea
Telecommunication & network	**Huawei**	China
Tier-1	**Bosch**	Germany
Tier-1	**Continental**	Germany
Tier-1	**Denso**	Japan
Tier-1	**Harman**	USA
Tier-1	**Pioneer**	Japan
Tier-1	**Valeo**	France
Tier-1	**Veoneer**	Sweden

The first strategy consulting & research firm entirely focused on augmented mobility & automation

Strategy consulting services

- **Strategy definition**
- **Investment assistance**
- **Procurement strategy**
- **Innovation management**
- **Business development**
- **Project management**

Market research services

- **Off-the-shelf reports**
- **Subscription services**
- **Custom market research**

Fields of expertise

Mobility services	Car pooling Car sharing MAAS	Micro-mobility Ride hailing Shared mobility	Smart parking Tax refund
Vehicle services	bCall eCall FMS SVT / SVR	Tracking VRM In-car Wi-Fi Parking	Navigation Speed cameras Traffic information
New energies	BEV EV charging Fuel cards	Fuel cells Hydrogen	PHEV Vehicle-to-grid
Usage-based charging	Car As A Service Electronic Toll Collection	Mobility-as-a-Service Road charging	UBI / PAYD Vehicle rental Vehicle leasing
Vehicle data & analytics	AI CAN-bus Crowd-sourcing Data protection	Driving behaviour OBD Predictive analytics	Remote diagnostics xFCD
Vehicle automation	ADAS Autonomous vehicles	AV technologies (LiDARS, radars, cameras, etc.)	Robo-taxis Shuttles
Enabling technologies	HD maps Positioning (GNSS / WiFi / cellular)	M2M / connectivity Smartphones Sensors	Telematics devices V2X

Our clients are across the mobility ecosystem

Analytics, maps & applications providers

AAA, arity, BMJ Group, CarPay Diem, CCC Information Services Inc., Cognizant, Coyote, Dynamic Map Platform, Google, here, ESRI, Increment P, RMS, LexisNexis, PASCO, sas, sentiance, tdf, TomTom, Towers Watson, TrueMotion, Verisk Analytics, wejo, ZENRIN

Automotive manufacturers & suppliers

AGC, Audi, Bosch, Bridgestone, Continental, Cox Automotive, Daimler, Delphi, Directed, Ford, Harman, Hino, Honda, intel, Isuzu, Mazda, Michelin, Mitsubishi Motors, nauya, Nissan, Pioneer, Qualcomm, QOROS, Renault, Scania, Sierra Wireless, Suzuki, Telit, Toyota

Mobile telecom operators

AT&T, SFR, SK telecom, Sprint, Telekom Austria Group, Telefónica, verizon, vodafone

Fleet & fuel, ITS & regulators

abertis, ALD Automotive, ARAL, ARVAL BNP Paribas Group, autostrade, AVIS, Axxès, bp, Brisa, CGI, DKV, Edenred, EFKON, egis, eni, Euromaster, ew, European Commission, FLEETCOR, kapsch, OMV, mouchel, Nomad Digital, Norbit, Routex, Shell, SICK, Sofico, Telepass, Thales, T-Systems, Toll Collect, service on the road, VITRONIC machine vision people, wex, zipcar

Telematics solution providers

Air, Airbiquity, ARKAN, arvento Mobile Systems, DAN LAW, DigiCore, Cambridge Mobile Telematics, drivefactor, drust, Eliocity, FleetComplete, Fleetmatics, LoJack, mobile devices, OCTO, HIMEX, IMS, META SYSTEM, SafeFleet, simobil, SISTEMA, ORION, Quartix, Queclink, Scope Technologies, Tantalum, VIASAT, Watchstone.

Device & location suppliers

ANDREW, cnes Centre National d'Études Spatiales, LOCATION SMART, Navizon, NOKIA Connecting People, gmv, HUAWEI, SAMSUNG, ThalesAlenia Space, Telespazio, DEVERYWARE, SYSNAV Navigation Solutions, TruePosition

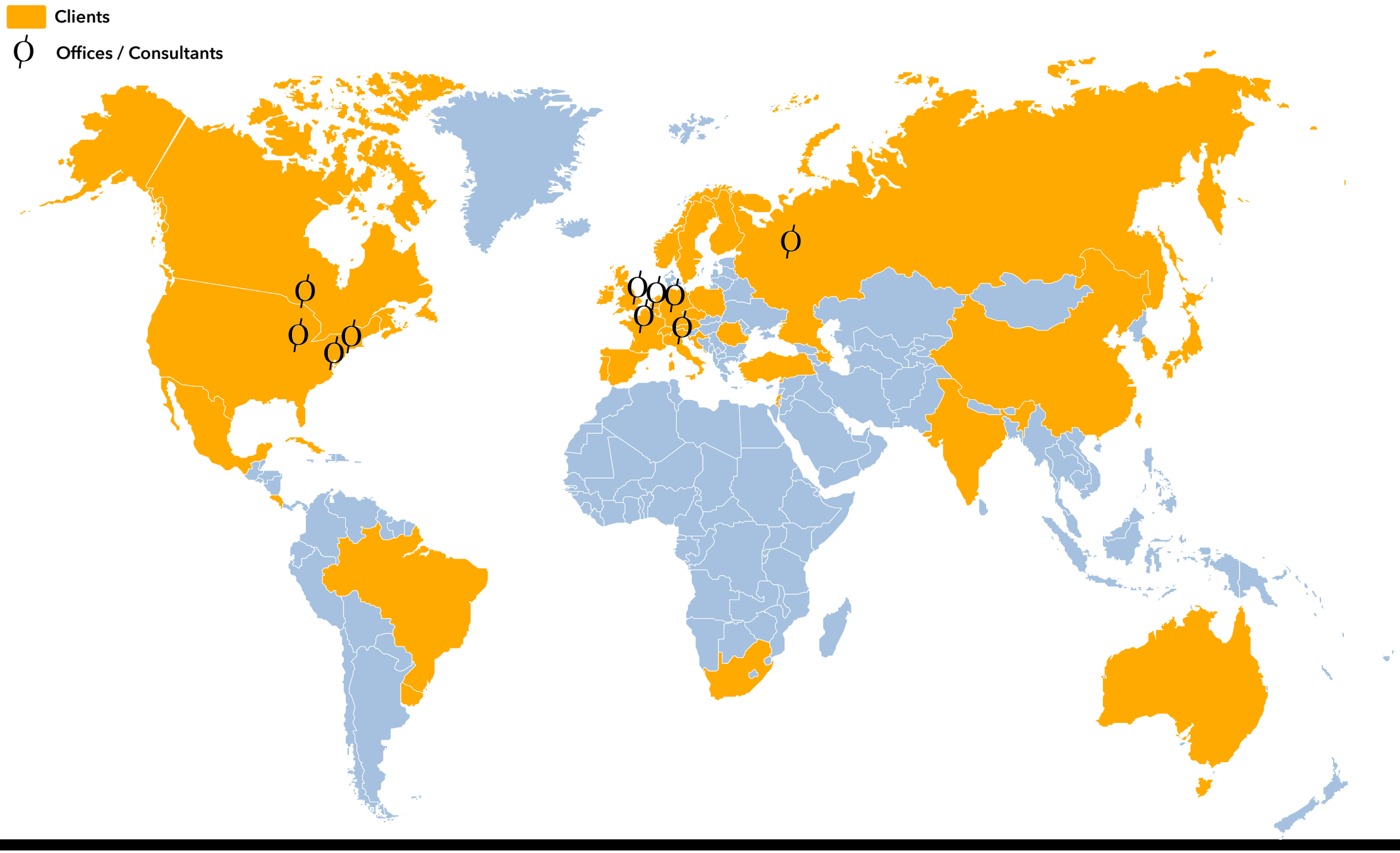
Insurers, aggregators & assistance providers

AAA Insurance, ADMIRAL, Agero, Aioi Nissay Dowa Insurance, MS&AD Insurance Group, Allianz Global Assistance, Allstate, You're in good hands., American Family Insurance, AVIVA, AXA, Baloise Insurance, carrot, COVEA, Crédit Agricole Assurances, Desjardins, europ assistance, Farmers Insurance, FIA, GENERALI, The Hartford, IAG Insurance Australia Group, intact Insurance, Inter Mutuelles Assistance, Ингосстрах Ingosstrakh, HUK, Liberty Mutual, MACIF, Matmut, MENORA Insurance Ltd, MONDIAL ASSISTANCE, Munich RE, Sompo Japan, Nationwide, OUT SURANCE, PROMUTUEL Assurance, RAC, RSA, smile direct, SOCIETE GENERALE, State Farm, Swiss Re, telesure, Tokio Marine, youi, ZURICH

Banks & private equity investors

Amadeus Capital, Amundi Asset Management, BainCapital, Bank of America Merrill Lynch, BARCLAYS, The Baupost Group, Cinven, citigroup, CVC, DISRUPTIVE Capital Finance, Hellman & Friedman, J.P.Morgan, Goldman Sachs, INTEK GROUP, INVESTCORP, Hutton Collins Partners LLP, Leonardo & Co., Montezemolo & Partners, New Amsterdam Growth Capital LLC, NOMURA, RENOVA GROUP, PAMPLONA Capital Management, SILVERLAKE, TIME For Growth, THOMA BRAVO

Our team of 25 consultants, experts & analysts with 15 nationalities serves our clients worldwide



The Autonomous Club (TAC) has become a successful platform to shape the future of autonomy in Europe

Status

International, non-profit association created by PTOLEMUS and Lysios Public Affairs

Scope

- Connected & autonomous vehicles
- All topics at the crossing of technology, business, & regulatory domains

THE AUTONOMOUS CLUB



Recent speakers

3M, 5G PPP, ACEA, AXA, BMW, BXL, CNIL., CoVea, here, European Commission, European Parliament, ISSY, Keolis

Key objectives

Think tank	Networking	Research consortium creation
Contribution to the debate	Insights	Vision

Recent subjects

- Who will control & access connected autonomous vehicle data?
- Status of the Autonomous Vehicle market and key implications
- Fostering a European-wide liability framework for AVs
- Is V2X required to make AVs a success?

Members

CoVea, OCTO, Discovery, Keolis, Verisk Analytics, wejo

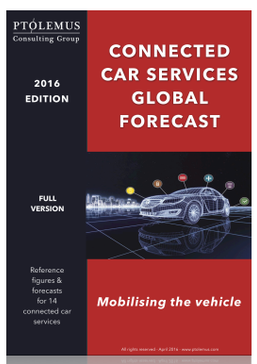
PTOLEMUS brings unparalleled depth of knowledge in mobility and automation

AUTONOMOUS DRIVING

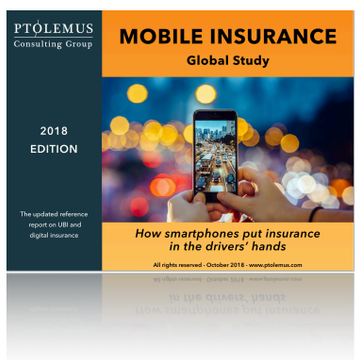




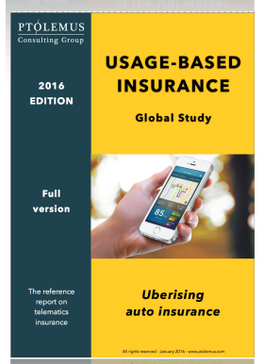
CONNECTED CAR



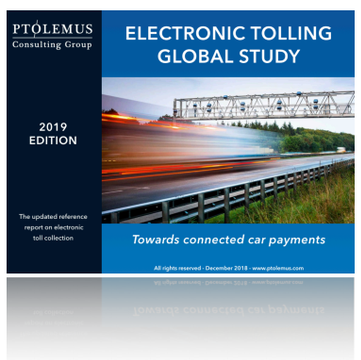
DIGITAL INSURANCE

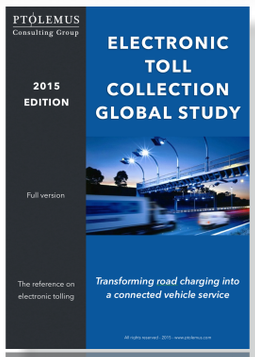




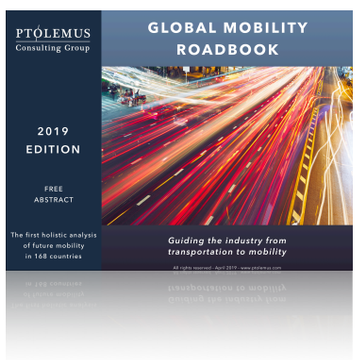


ELECTRONIC TOLLING





MOBILITY







FLEET MANAGEMENT





PTOLEMUS can help your organisation define and achieve its AV strategy in fast moving times

- **Strategy definition**
  - Future vision in mobility and AV
  - Board coaching
  - Market entry strategy
  - Strategy shaping workshops
  - Impact of ADAS & AVs on the business
- **Innovation strategy**
  - Market assessment on mobility and AV
  - Product definition
  - Go-to-market strategy for each SAE Level
  - Data analytics strategy
  - AV tech evaluation
- **Investment assistance**
  - M&A strategy
  - Commercial due diligence
  - Technology due diligence
  - Feasibility studies
  - AV & ADAS market sizing
  - Business case development
  - Cost benefit analyses
  - Post-merger integration
- **Innovation delivery**
  - Proof of concept design & launch
  - Architecture definition
  - Project management
- **Procurement**
  - Sourcing strategy
  - Specifications
  - Supplier selection
  - Assistance to tenders
- **Business development**
  - Partnership strategy definition
  - Assistance to tender response



PTOLEMUS

Consulting Group

10 years of experience in shaping future mobility

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