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RELATED SBD REPORTS

**538 – ADAS & Autonomy Forecast**

SBD has prepared this report to understand at a regional level the differences in penetration for various types of ADAS and the technologies supporting these features. Our forecasts provide a deeper understanding by estimating the technology and feature penetrations at an OEM level.

ADAS

ADAS & Autonomy

#534

# ADAS & Autonomy Guide

Since their arrival, automated and autonomous driving technologies have continued to advance. As these technologies allow for increasing levels of autonomy, key players in the sector - including OEMs, start-ups, and technology firms - are trialing advanced solutions. These trials are occurring alongside the steady development and release of such solutions to the public in passenger vehicles and commercial fleets.

This ecosystem is developing rapidly and will only continue to develop as its technologies become more advanced. Today, ADAS and autonomous systems are being developed, or have already launched, across multiple vehicle segments and in many industry sectors. With different OEMs and regions at different levels of maturity, and with the breadth of use cases offered by these systems, understanding the global scope of today's ADAS and autonomous offerings can quickly become overwhelming.

The ADAS Guide works as a reference point and planning baseline for the landscape of automated driving systems. It details the ADAS and autonomy offerings of three main regions while identifying the features provided by OEMs today. The guide comprehensively compares these features on a number of verticals - including their availability and pricing models - and dispels the jargon used by OEMs to describe them.

COVERAGE

GLOBAL NA CHINA EUROPE

FREQUENCY

ANNUALLY QUARTERLY ONE-OFF

PUBLICATION FORMAT

PDF POWERPOINT EXCEL ONLINE

PAGES

100+

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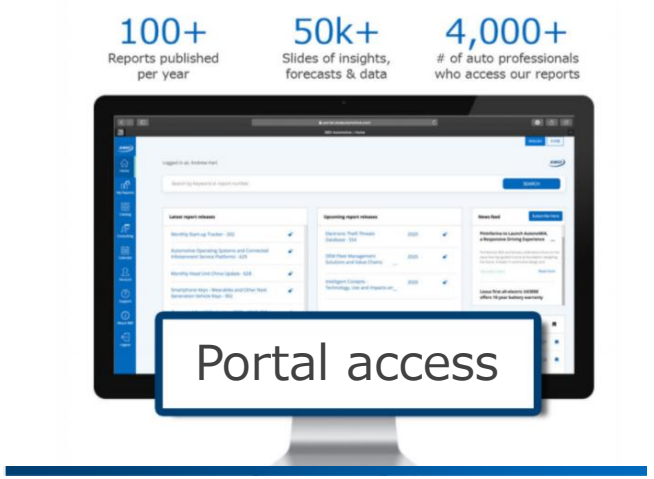
# Key questions answered

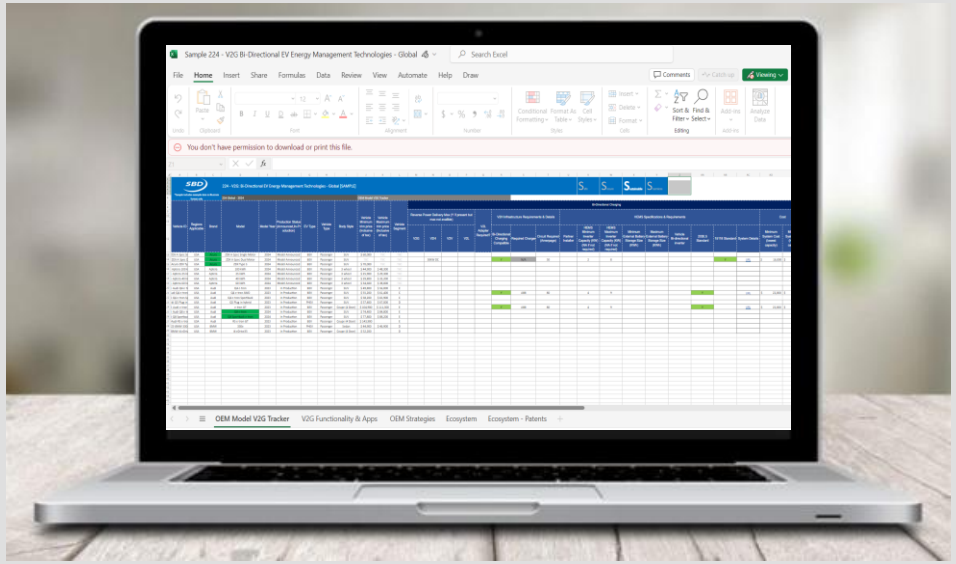
- Which OEMs provide which ADAS?
- What underlying technologies and suppliers do they rely on?
- What are the functional differences between similar features offered by each OEM?
- How aggressively are OEMs pricing and fitting ADAS across each of their models?

# This research supports

- PRODUCT PLANNERS
- C-SUITE
- MARKETING
- Engineers

# Do I have access?



## View Excel Data Sheet Sample

### ADAS & Autonomy Guide

Track ADAS technologies and assess their overall competitiveness across every major brand in the market, covering more than 17 distinct ADAS systems deployed in the market

>10,000 datapoints

>40 OEMs covered

Dashboard, Patents, ecosystem details, ranking and ADAS Jargons

Click for Sample


# ADAS & Autonomy Guide

# Contents

## 534 – ADAS & Autonomy Guide



**Total number of pages - 102**

# Introduction

# Introduction

While fully self-driving cars may still sound far-fetched, the safety impact of automation is already being felt through the lens of rapid ADAS adoption by vehicle manufacturers across the globe. ADAS systems that once would have been considered 'add-ons' for premium models are now making their way to almost every new model sold– be it a premium, volume, budget, or startup OEM.
With more advancements in sensor technology, AI and data processing, automakers are now challenged to offer a wide range of active safety features at an affordable price. This is to make safety a compelling use case for the end-user and, develop competitive advantages to tackle the competition. These advancements also go together with the regulatory developments to further the uptake of ADAS by the industry as a whole and benefit the society at large by reducing the number of road fatalities (or at least reducing the severity).

**SBD's 534 ADAS Guide** covers ADAS offerings from the automakers in various regions along with their technologies (sensor), fitment/pricing strategy, and supplier information. It draws necessary inferences from the raw data and provides actionable insights for the strategic and product planning teams to act upon The report looks at **FIVE key benefits of ADAS for automakers:**


| Section | Content |
|---|---|
| **Autonomy Bird's Eye View** | An overview of the key topics that correlate with ADAS developments |
| **Executive Summary** | High-level overview of the ADAS landscape across the regions (US, EU, China) |
| **The Basics** | A brief overview of the SAE levels of vehicle autonomy (with ADAS classification) and defining the scope of this report |
| **What's New** | Section focusing on notable OEM and industry announcements in the ADAS and autonomy space. |
| **Analysis** | An in-depth look into the data-driven market dynamics, ADAS strategy, availability trends, legislative background, among others. |
| **Summary Tables** | Each slide in this section is dedicated to a particular sensor or a combination thereof and mapped with the OEM brands along with their model-level penetration and pricing points. |
| **Ecosystem Players** | Offering, acquisition and patent insights for key non-OEM stakeholders |
| **Future Outlook** | Four OEM personas are considered against drivers and barriers into the future to understand when full benefits of ADAS will be realized |
| **Next Steps** | Can SBD help you with any unanswered questions? |

# We Listened and Invested In Our Report to Align to Your Goals

## You Said...

"I sometimes struggle to relate conclusions from research reports to the Outcomes and KPIs that we are working towards..."

"I would like to see what has recently changed within a forecast or domain to help decide if any changes to strategy need to be made..."

"I want to know where we stand 'head-to-head' against the competition on major industry trends…."

"I can find it difficult to take actionable next steps on Guides without assessing the future direction of the industry..."

"It would be helpful to identify disruptive companies and start-ups to keep an eye for partnerships in the future..."

"I would like the topics to be more 'forward looking' to help with future planning and take advantage of enabling technologies."

## We Did...

Added **BIRDS-EYE VIEW** chapter with a high-level overview of all our ADAS reports.

Enhanced **CROSS-REFERENCING** with insights from our ADAS forecast

Introduced **FUTURE OUTLOOK** chapter with motivations such as brand loyalty, and its drivers and barriers over time.

More **DATA-DRIVEN ANALYSIS** through our Summary Table, Analysis, and Executive Summary.

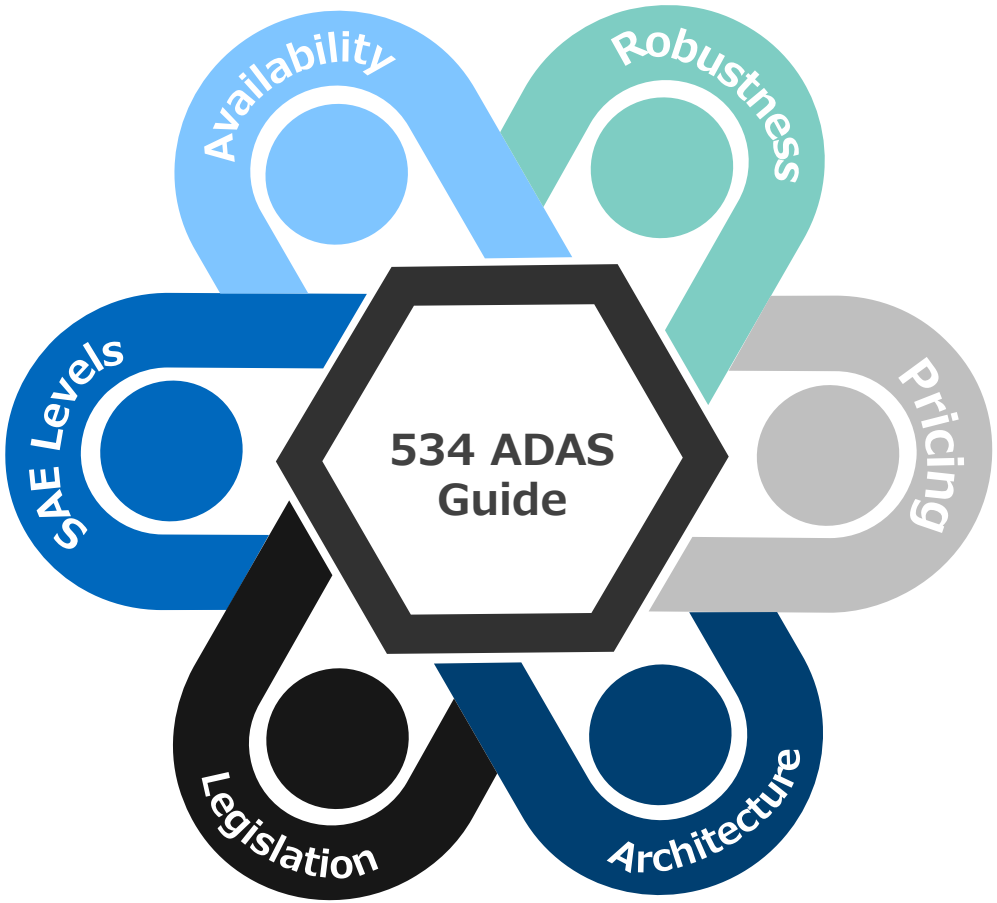
Created a SBD **ADAS ranking** and an **ECOSYSTEM** chapter with offering, acquisition, and patent insights for key non-OEM stakeholders.

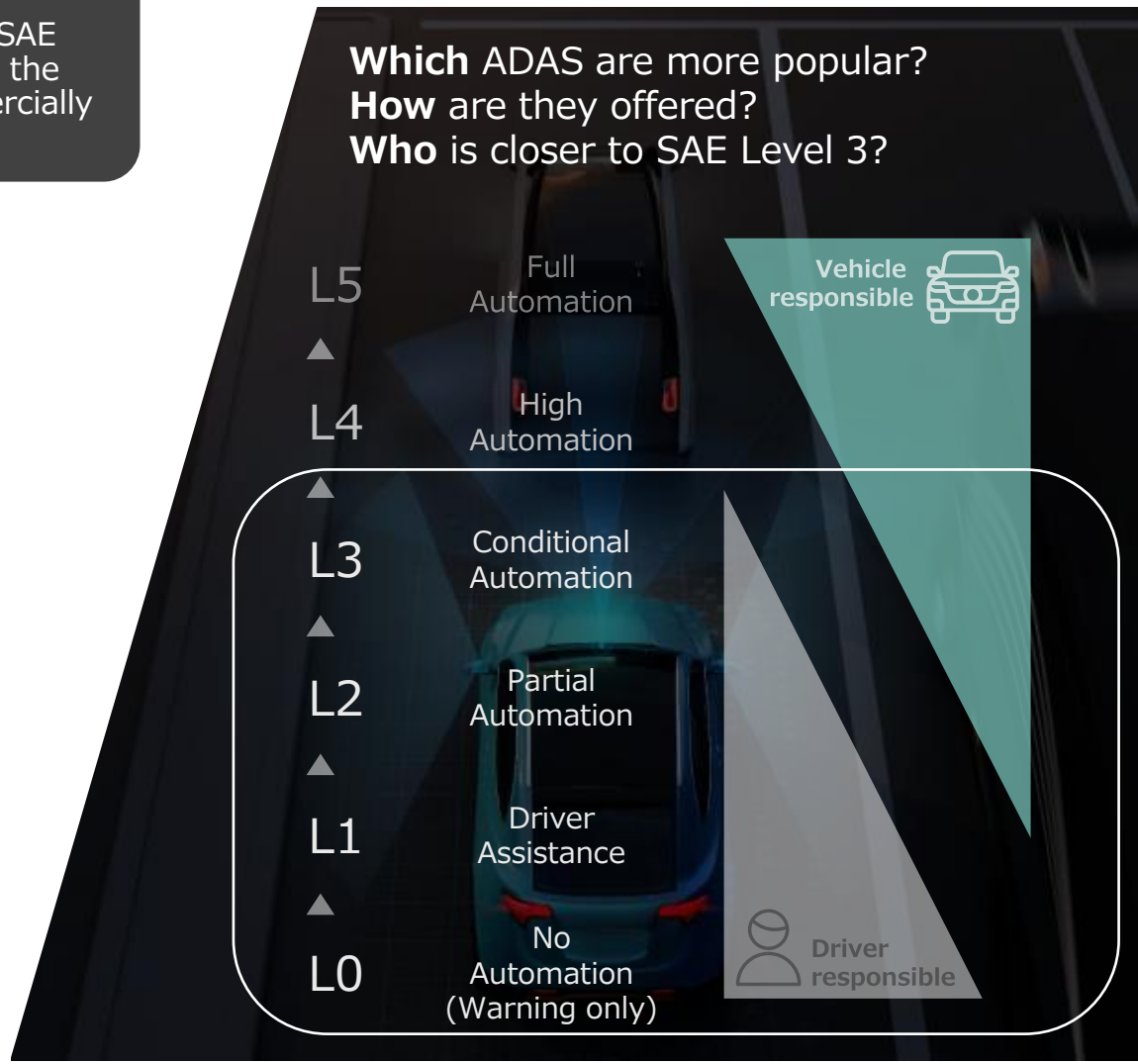
# Examples slides from the report


Request price

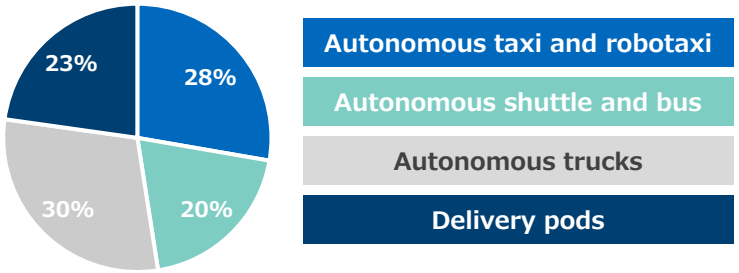
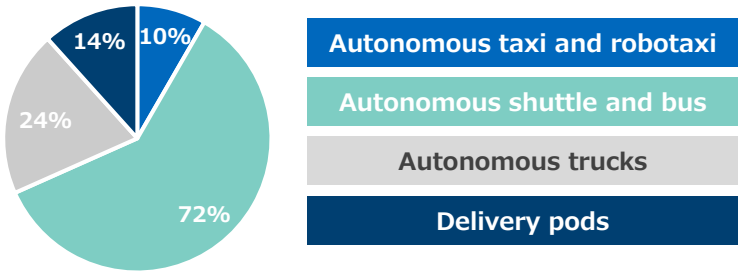
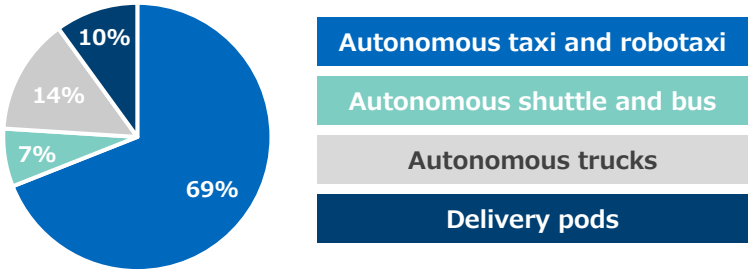
# Scope of this report

Throughout this document, the focus is on ADAS that comprises of SAE Level 0 (no automation) to SAE Level 3 features (conditional automation). The SAE Level 4 and SAE Level 5 features are not commercially available as of 2023 and are therefore beyond the scope of this report. The report covers the ADAS/automated driving features commercially available on passenger models only and excludes AV pilot trials,



# How are players deploying L4 autonomy?

| Regions | Proportion of AV pilots by vehicle type | Key takeaways |
|---|---|---|
|  |  | • **Most AV pilots** in the USA are **focused on the delivery of freight.** Both automated semi-truck and last mile delivery services have over double the relative activity as the other major markets.<br>• **Automated semi-trucks are the most common type of AV pilot** in the USA and are primarily focused in Southwestern states such as Texas, New Mexico and Arizona. **Drivers** for autonomous trucks **include the labor shortages and the long and consistent road network** which is ideal for trucks. |
|  |  | • **Shuttle services** account for **most AV pilots operating in Europe** (72%), far greater than robotaxi services.<br>• **Autonomous trucking** has a **limited level of deployment** (24%) in Europe compared to in other regions like the USA (30%). In comparison to the USA, Europe is more fragmented politically and geographically, posing a greater challenge to deployment of automated trucks which would likely have to regularly cross borders. Furthermore, Europe has a small and complex road network compared to the USA or China. |
|  |  | • AV pilots in China are **primarily focused on the movement of people**, with autonomous taxis and robotaxis accounting for almost two thirds of AV pilots in China. |

## SBD Expert Insight

Robotaxi deployment is very limited in deployment across all regions. To become profitable, robotaxi fleets need to scale whilst overcoming the technological, regulatory and operational hurdles whilst fostering an appetite for the services with consumers.

## Autonomous Strategies & Eco-system

This report examines this eco-system thoroughly, detailing the autonomous strategies of major OEMs and the key partnerships within it. Its scope extends further to highlight the technologies and regulations at the center of vehicle autonomy as well as the latest initiatives within the sector.

Learn more

# Automakers that standout in the ADAS race and poised for SAE L3

*Mercedes-Benz was the first automaker to launch SAE L3 on a commercial model in both US and Europe. It is likely to expand the offering on more models (E-Class, other EQ series models)*

*BMW is the only automaker in Europe that has got commercial approval for combining SAE Level 3 (Personal Pilot) and 'hands-off' assisted driving (Highway Assistant) on the same model*

*Zeekr will use Mobileye's SuperVision and is also developing an in-house autonomy platform powered by NVIDIA Orin SoCs hinting at a possible SAE Level 3 deployment soon*

**Brands that have already or announced the intention to launch SAE Level 3**

**SAE L3 rollout /expansion**

*Ford was the first traditional volume brand to launch 'hands-off' assisted driving in Europe. The natural progression for Ford would be to pursue SAE Level 3 however, they need to upgrade the sensor suite*

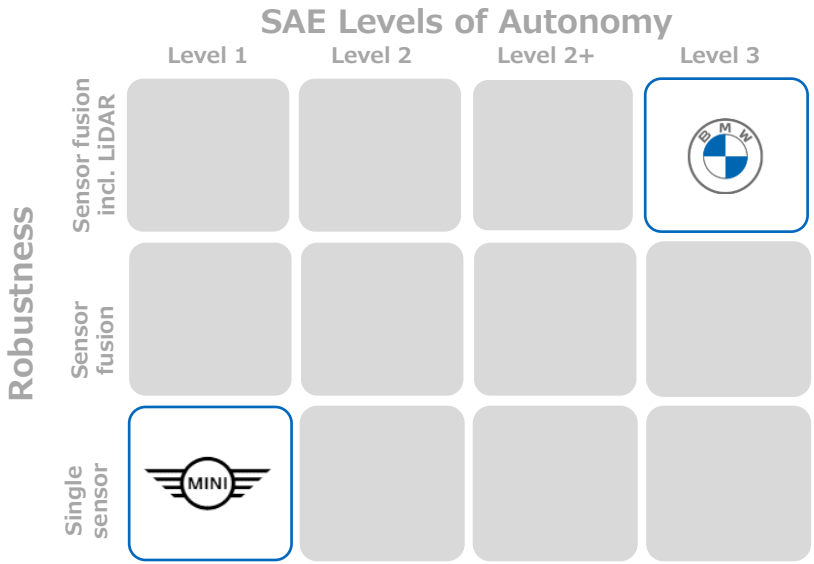
*NIO offers one of the most robust sensor fusion (trifocal camera and long-range lidar) that can support SAE Level 3 'hands-off, eyes-off' piloted driving in future*

*Audi halted plans to deploy SAE Level 3, initially announced before Mercedes-Benz's official announcement. The Audi A8 gets a robust sensor fusion (including Valeo Scala lidar) that can support piloted driving.*

**Brands with technological capabilities to support SAE L3**

# BMW Group

## SAE capability and robustness




## ADAS strategy: Today and tomorrow

- BMW models come with a diverse set of ADAS as standard fit on most models. At the same time, an upgraded sensor suite with more ADAS functionalities and optional packages is available (some models get a long-range lidar). MINI models are slowly getting more ADAS, but compared to the USA, the offerings aren't as vast in the EU.
- **A few flagship models from BMW have been approved for SAE Level 3 'Personal Pilot' in Europe (7-Series, i7).** The system allows users to engage in secondary tasks at speeds up to 60 kmph. BMW is also the first manufacturer to win approval for a combined system involving hands-off Level 2 and Level 3 features.
- The new proposed Neue Klasse architecture has **dedicated ADAS domain controllers,** suggesting more robust performance and the introduction of new features via OTA updates.

## Key technology to support ADAS

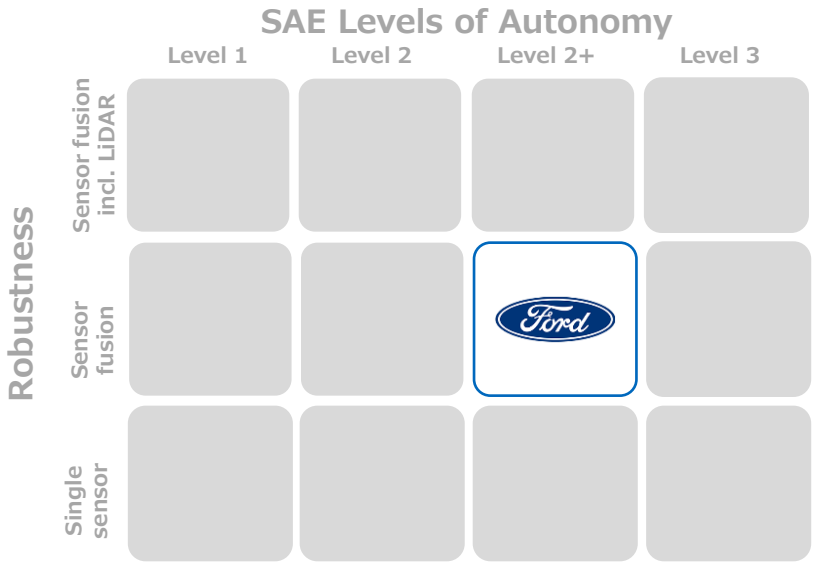
| | |
|---|---|
|  | **Mono, Surround, Rear, Trifocal, Stereo** |
|  | **Frontal and rear radars** |
|  | **Long range** |

## Summary Table

| Most advanced models in terms of ADAS | Automated Parking (SAE L2) | | | | Assisted Driving (SAE L2/L2+) | | | Piloted Driving (SAE L3) | Automated Parking (SAE 4) |
|---|---|---|---|---|---|---|---|---|---|
| | SAPA | FAPA | RP | Memory | Hands-on | Hands-off | Automatic Lane Change | Hands-off, eyes-off | AP |
| BMW iX | | ● | ● | ● | ● | | ● | | |
| BMW i7 | | ● | ● | ● | ● | ● | ● | ● | Planned |
| MINI Aceman | | | | | | | | | |

# Ford Motor Company

## SAE capability and robustness




## ADAS strategy: Today and tomorrow

- Ford was one of the first automakers to have 'hands-off' assisted driving systems in the US and Europe. After approval from the European Commission, the BlueCruise **system can be activated in more than 15 EU countries.**
- The offering is also unique in that it is offered as an annual subscription (€ 24.99/yr), aside from the standard BlueCruise hardware (post 90-day free trial). This monthly subscription model makes it easy for customers to activate BlueCruise at a time that suits their driving plans.
- Like many other legacy volume carmakers, Ford uses a **combination of radar and frontal camera with HD maps** supporting hands-off driving in designated areas.
- Having previously committed not to pursue SAE Level 3, Ford has softened their stance and is now targeting a 'hands-off, eyes-off' system with a possible addition of a long-range **lidar sensor.**

## Key technology to support ADAS

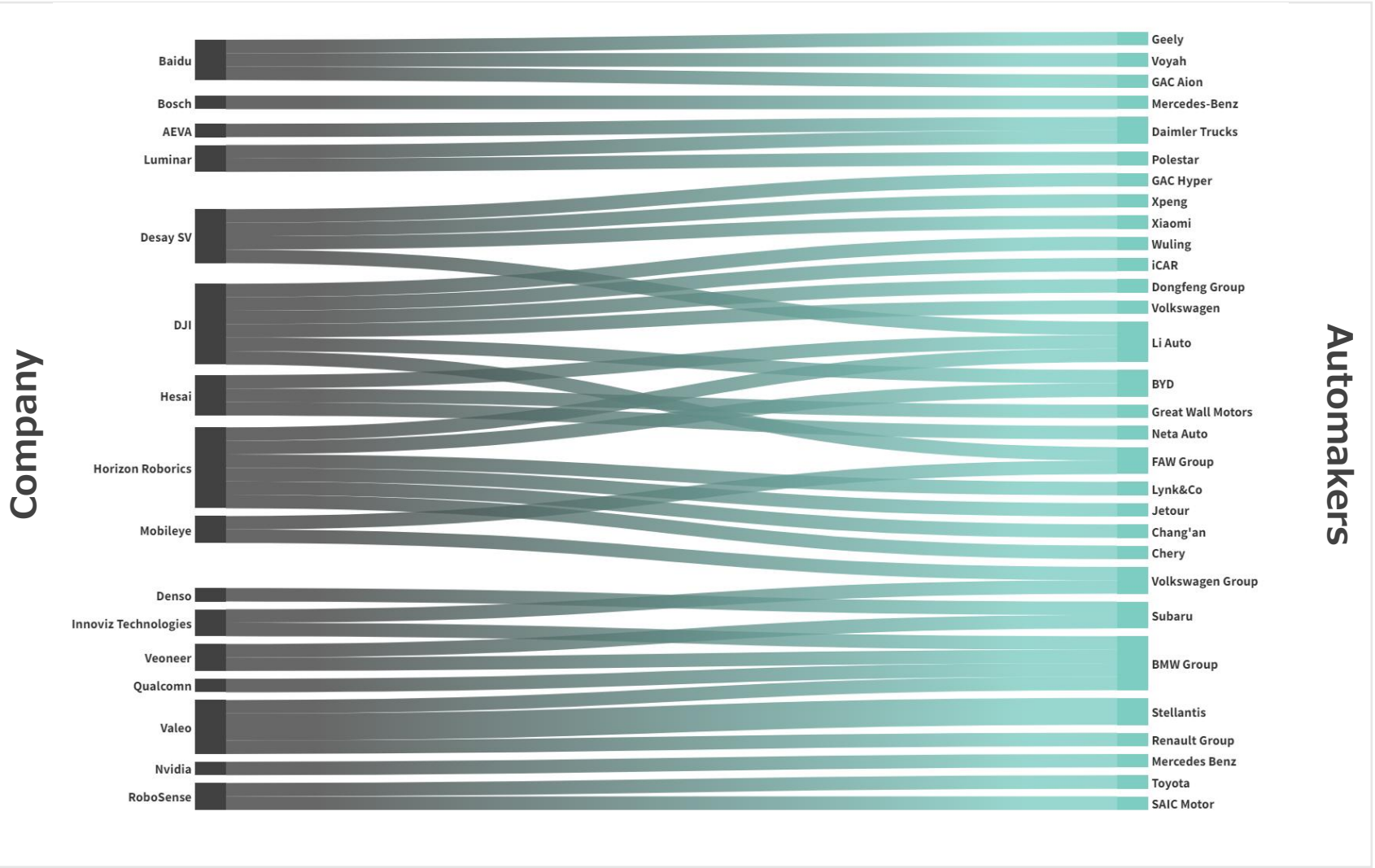
| | |
|---|---|
| | **Mono, Surround View, Front, Rear Driver-facing** |
| | **Frontal and rear radars** |
| | **NA** |

## Summary Table

| Most advanced models in terms of ADAS | Automated Parking (SAE L2) | | | | Assisted Driving (SAE L2/L2+) | | | Piloted Driving (SAE L3) | Automated Parking (SAE 4) |
|---|---|---|---|---|---|---|---|---|---|
| | SAPA | FAPA | RP | Memory | Hands-on | Hands-off | Automatic Lane Change | Hands-off, eyes-off | AP |
| Ford Mustang Mach-E | | ● | | | ● | ● | ● | | |
| Ford Kuga | | ● | | | ● | | | | |

# New players emerging in the ADAS ecosystem

***Partnerships between automakers and suppliers in the ADAS space***




- **What automakers are after?:** Some automakers are planning to develop next generation of ADAS features ground up and mostly in-house. Although the traditional suppliers may still play a big role, automakers may acquire dedicated teams (software, AI) to work alongside suppliers and co-develop the ADAS suite.
- **Tier-1 suppliers are expanding their offerings:** The traditional Tier-1s are no longer just 'parts' suppliers but are involved in joint production of ADAS/AD platforms from scratch. This involves rigorous testing, simulation, pilot trials and overall system integration
- **What type of companies are becoming preferred partners of automakers:** As brands are gearing up to launch hands-off assisted driving and some even committed SAE L3, HD map makers, lidar suppliers, AI start-ups, facial/emotion recognition software companies are growing in demand. In the future, many of these companies will likely be acquired by either automakers or Tier-1s.

*Chart Visualization Source: Flourish*

# What the Excel Version Contains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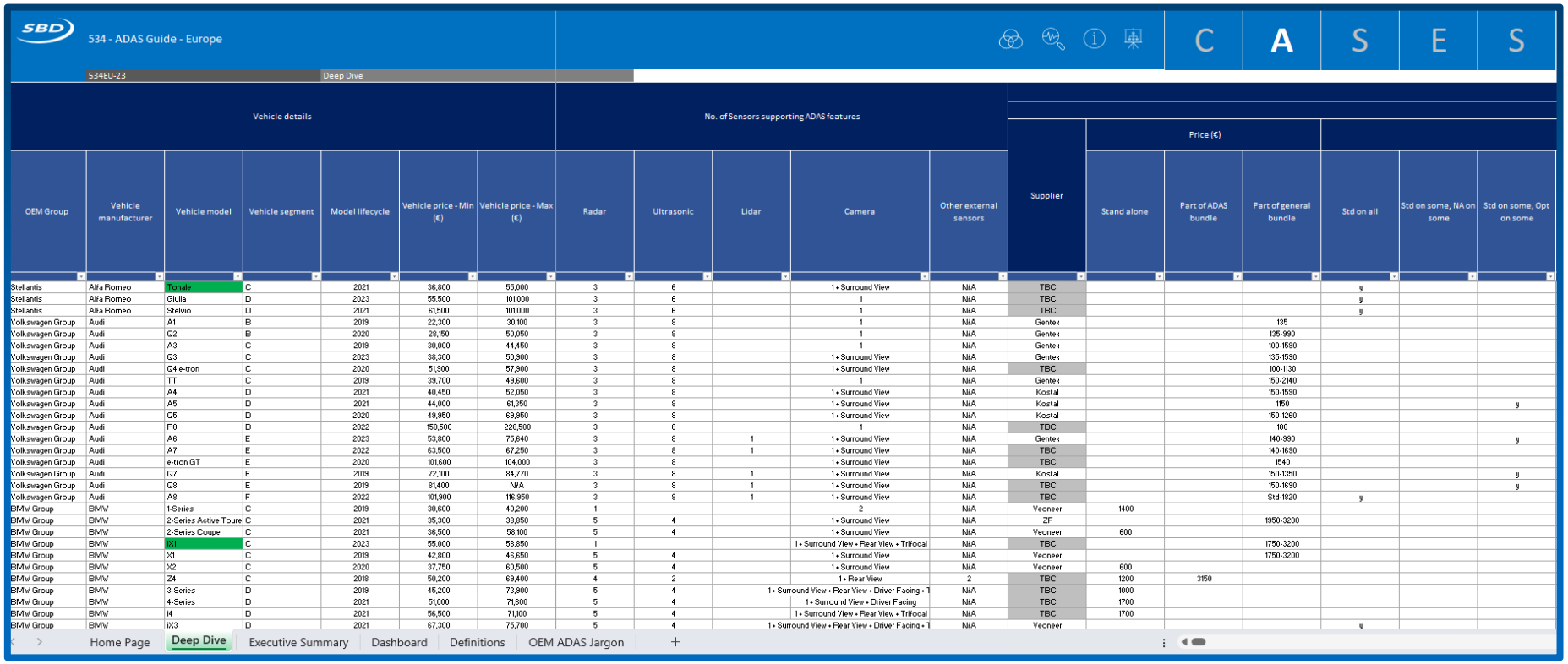
# Excel Database Includes



534 - ADAS Guide - Europe

C A S E S

534EU-23 | Deep Dive

| Vehicle details | | | | | | | No. of Sensors supporting ADAS features | | | | | Supplier | Price (€) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OEM Group | Vehicle manufacturer | Vehicle model | Vehicle segment | Model lifecycle | Vehicle price - Min (€) | Vehicle price - Max (€) | Radar | Ultrasonic | Lidar | Camera | Other external sensors | | Stand alone | Part of ADAS bundle | Part of general bundle | Std on all | Std on some, NA on some | Std on some, Opt on some |
| Stellantis | Alfa Romeo | Tonale | C | 2021 | 36,800 | 55,000 | 3 | 6 | | 1 • Surround View | N/A | TBC | | | | y | | |
| Stellantis | Alfa Romeo | Giulia | D | 2023 | 55,500 | 101,000 | 3 | 6 | | 1 | N/A | TBC | | | | y | | |
| Stellantis | Alfa Romeo | Stelvio | D | 2021 | 61,500 | 101,000 | 3 | 6 | | 1 | N/A | TBC | | | | y | | |
| Volkswagen Group | Audi | A1 | B | 2019 | 22,300 | 30,100 | 3 | 8 | | 1 | N/A | Gentex | | | 135 | | | |
| Volkswagen Group | Audi | Q2 | B | 2020 | 28,150 | 50,050 | 3 | 8 | | 1 | N/A | Gentex | | | 135-990 | | | |
| Volkswagen Group | Audi | A3 | C | 2019 | 30,000 | 44,450 | 3 | 8 | | 1 | N/A | Gentex | | | 100-1590 | | | |
| Volkswagen Group | Audi | Q3 | C | 2023 | 38,300 | 50,900 | 3 | 8 | | 1 • Surround View | N/A | Gentex | | | 135-1590 | | | |
| Volkswagen Group | Audi | Q4 e-tron | C | 2020 | 51,900 | 57,900 | 3 | 8 | | 1 • Surround View | N/A | TBC | | | 100-1130 | | | |
| Volkswagen Group | Audi | TT | C | 2019 | 33,700 | 43,600 | 3 | 8 | | 1 | N/A | Gentex | | | 150-2140 | | | |
| Volkswagen Group | Audi | A4 | D | 2021 | 40,450 | 52,050 | 3 | 8 | | 1 • Surround View | N/A | Kostal | | | 150-1590 | | | |
| Volkswagen Group | Audi | A5 | D | 2021 | 44,000 | 61,350 | 3 | 8 | | 1 • Surround View | N/A | Kostal | | | 1150 | | | y |
| Volkswagen Group | Audi | Q5 | D | 2020 | 43,950 | 63,950 | 3 | 8 | | 1 • Surround View | N/A | Kostal | | | 150-1260 | | | |
| Volkswagen Group | Audi | R8 | D | 2022 | 150,500 | 228,500 | 3 | 8 | | 1 | N/A | TBC | | | 180 | | | |
| Volkswagen Group | Audi | A6 | E | 2023 | 53,800 | 75,640 | 3 | 8 | 1 | 1 • Surround View | N/A | Gentex | | | 140-990 | | | y |
| Volkswagen Group | Audi | A7 | E | 2022 | 63,500 | 67,250 | 3 | 8 | 1 | 1 • Surround View | N/A | TBC | | | 140-1690 | | | |
| Volkswagen Group | Audi | e-tron GT | E | 2020 | 101,600 | 104,000 | 3 | 8 | | 1 • Surround View | N/A | TBC | | | 1540 | | | |
| Volkswagen Group | Audi | Q7 | E | 2019 | 72,100 | 84,770 | 3 | 8 | 1 | 1 • Surround View | N/A | Kostal | | | 150-1350 | | | y |
| Volkswagen Group | Audi | Q8 | E | 2019 | 81,400 | N/A | 3 | 8 | 1 | 1 • Surround View | N/A | TBC | | | 150-1690 | | | y |
| Volkswagen Group | Audi | A8 | F | 2022 | 101,900 | 116,950 | 3 | 8 | 1 | 1 • Surround View | N/A | TBC | | | Std-1820 | y | | |
| BMW Group | BMW | 1-Series | C | 2019 | 30,600 | 40,200 | 1 | | | 2 | N/A | Veoneer | 1400 | | | | | |
| BMW Group | BMW | 2-Series Active Toure | C | 2021 | 35,300 | 38,850 | 5 | 4 | | 1 • Surround View | N/A | ZF | | | 1950-3200 | | | |
| BMW Group | BMW | 2-Series Coupe | C | 2021 | 36,500 | 58,100 | 5 | 4 | | 1 • Surround View | N/A | Veoneer | 600 | | | | | |
| BMW Group | BMW | iX1 | C | 2023 | 55,000 | 58,850 | 1 | | | 1 • Surround View • Rear View • Trifocal | N/A | TBC | | | 1750-3200 | | | |
| BMW Group | BMW | X1 | C | 2019 | 42,800 | 46,650 | 5 | 4 | | 1 • Surround View | N/A | Veoneer | | | 1750-3200 | | | |
| BMW Group | BMW | X2 | C | 2020 | 37,750 | 60,500 | 5 | 4 | | 1 • Surround View | N/A | Veoneer | 600 | | | | | |
| BMW Group | BMW | Z4 | C | 2018 | 50,200 | 69,400 | 4 | 2 | | 1 • Rear View | 2 | TBC | 1200 | 3150 | | | | |
| BMW Group | BMW | 3-Series | D | 2019 | 45,200 | 73,900 | 5 | 4 | | 1 • Surround View • Rear View • Driver Facing • T | N/A | TBC | 1000 | | | | | |
| BMW Group | BMW | 4-Series | D | 2021 | 51,000 | 71,600 | 5 | 4 | | 1 • Surround View • Driver Facing | N/A | TBC | 1700 | | | | | |
| BMW Group | BMW | i4 | D | 2021 | 56,500 | 71,100 | 5 | 4 | | 1 • Surround View • Rear View • Trifocal | N/A | TBC | 1700 | | | | | |
| BMW Group | BMW | iX3 | D | 2021 | 67,300 | 75,700 | 5 | 4 | | 1 • Surround View • Rear View • Driver Facing • T | N/A | Veoneer | | | | y | | |

Home Page | Deep Dive | Executive Summary | Dashboard | Definitions | OEM ADAS Jargon

Excel Data Points:
**85,000+**

OEM Groups covered:
**42**

Excel Tabs:
**5**

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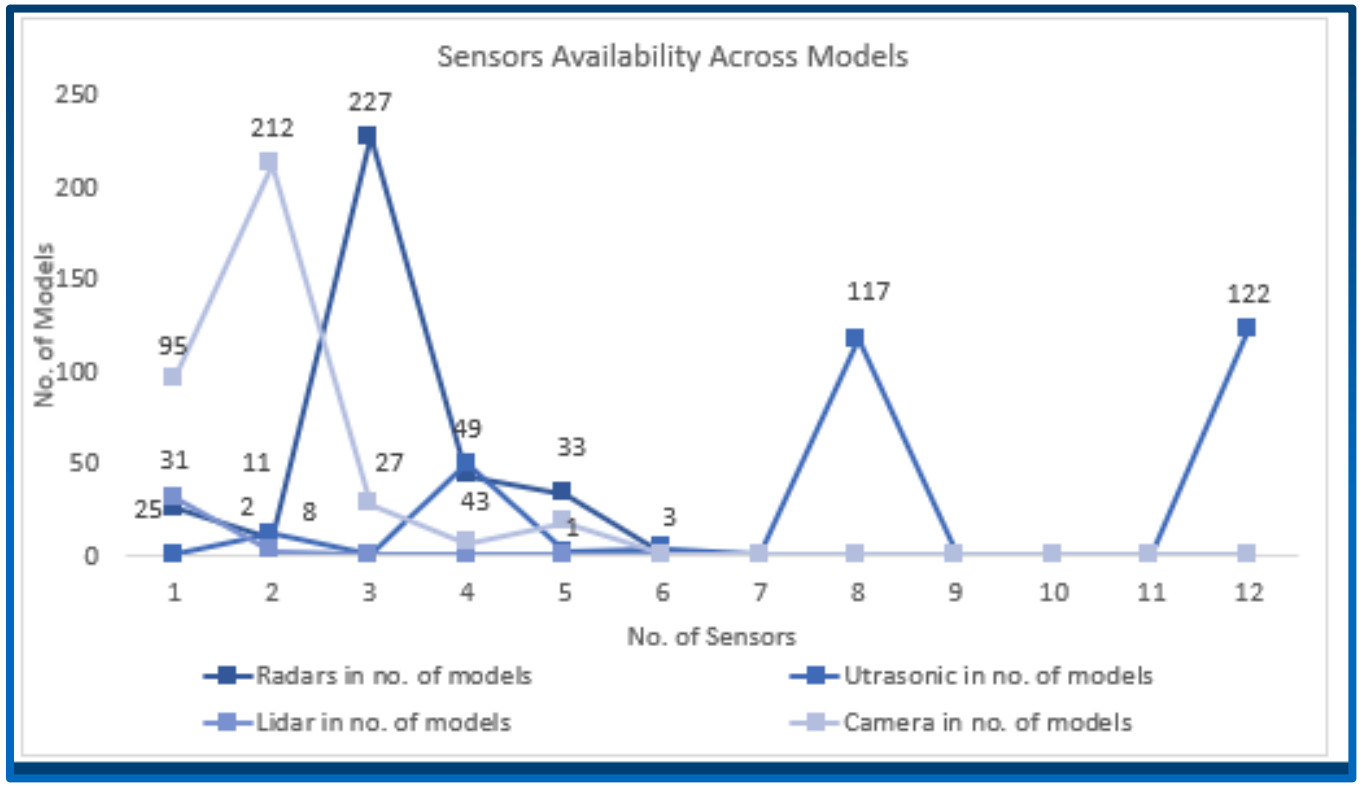


| Excel Data Points: | OEM Groups covered: | Excel Tabs: |
|---|---|---|
| **85,000+** | **42** | **5** |

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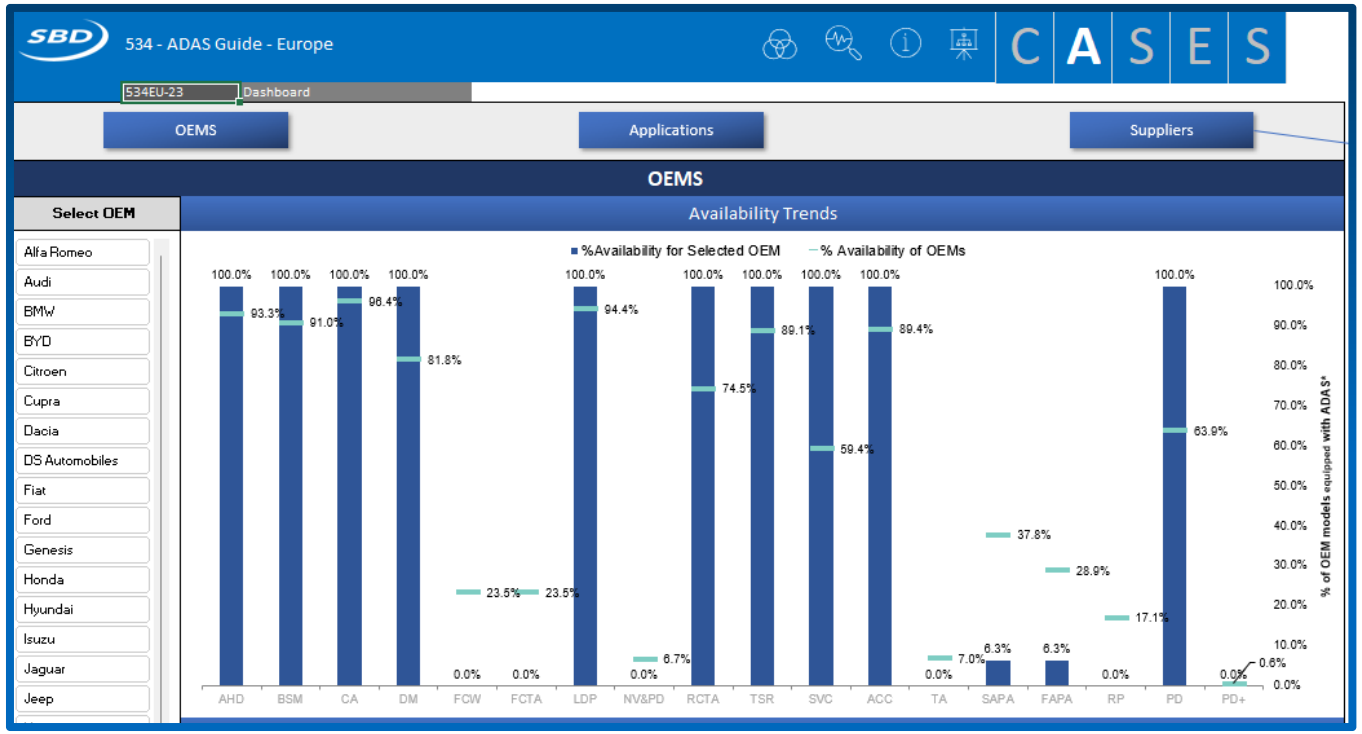


| Excel Data Points: | OEM Groups covered: | Excel Tabs: |
|---|---|---|
| **85,000+** | **42** | **5** |

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info@sbdautomotive.com

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USA | UK | Germany | India | China | Japan

**Garren Carr**
**North America**
garrencarr@sbdautomotive.com
+1 734 619 7969

**Luigi Bisbiglia**
**UK, South & West Europe**
luigibisbiglia@sbdautomotive.com
+44 1908 305102

**SBD China Sales Team**
**China**
salesChina@sbdautomotive.com
+86 18516653761

**Andrea Sroczynski**
**Germany, North & East Europe**
andreasroczynski@sbdautomotive.com
+49 211 9753153-1

**SBD Japan Sales Team**
**Japan, South Korea & Australia**
postbox@sbdautomotive.com
+81 52 253 6201