January 2025

3000a – 25

CES 2025 Flash Report

CES 2025

About SBD Automotive

Management & technology consultants to the automotive industry for over 20 years

Our expertise:

Connected	Autonomous	Shared Mobility
EV	Cybersecurity	Anti-theft

Our role:

As our industry faces...

We provide our clients with...

Uncertainty ▶ **Data** ▶ **Insight** ▶ **Advice**
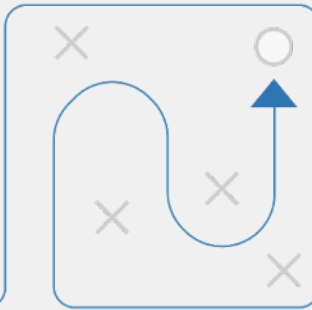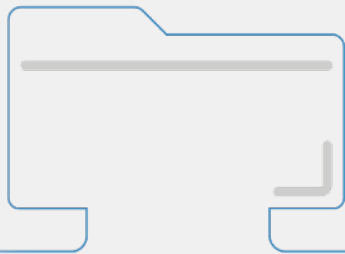
Seeing Beyond Data
Turning data into actionable advice

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Consulting Services

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3000a – CES 2025 Flash Report

Customer Feedback
Provide your feedback to SBD regarding this report

Introduction to CES 2025

Introduction to, and highlights of, CES 2025

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Unsettled automotive market but stronger electronics demand

Introduction and background to CES 2025

CES is held every year, in the Las Vegas Convention Center and other venues around the city. Vehicle manufacturers and suppliers, technology companies, consumer electronics companies and software providers attend and exhibit at CES every year.

Compared with market conditions at the time of CES 2024, the automotive market in the USA has continued to be positive but the European and Asia Pacific markets are slightly less favorable. Generally, new vehicle sales in 2024 compared to 2023 are similar or slightly lower.

Coming into CES 2025, consumer buying power has decreased in several markets (Europe and Asia Pacific in particular), leading to luxury brands being slightly more exposed. For example, within the Volkswagen Group, Skoda and Seat have all increased deliveries in 2024 compared to 2023 but Audi, Bentley and Porsche have not met prior year figures. Mercedes-Benz has also seen a drop in deliveries and not met prior year figures.

In contrast, potentially because of the 2024 Paris Olympic Games and European Cup (soccer), sales of televisions increased in the European and American markets compared with 2023. Hisense and TCL have both reported 2023 as a positive sales year for televisions in the North American market.

Overarching trends from previous years of CES

2019
Shy
Car

2020
Auditory
Car

2021
Augmented
Car
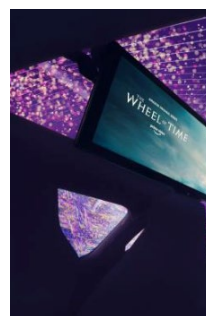
2022
Immersive
Car

2023
Practical
Car

2024
Conversational
Car

2025
Virtual
Car

CES Premium Event Report

The CES Premium Event Report provides comprehensive insights into the full scope of what the Las Vegas event offers the automotive industry taking a deep dive into its reveals and trends, alongside key talking points, announcements and in-depth analysis.

Learn more ➲
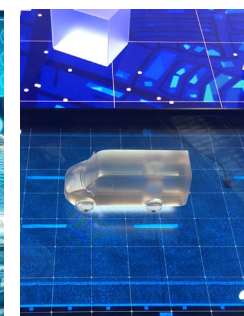
How did CES 2025 compare to previous years?

	❄ 2021	2022	2023	2024	2025
Number of attendees	59k (online)	🔻 50k	🔺 115k	🔺 130k	🔺 141k
Number of exhibitors	1.9k	🔺 2.2k	🔺 3.2k	🔺 4k	🔺 4.5k
Total Number of OEMs exhibiting	5	🔺 8	🔺 14	🔻 11	🔻 9
Number of media attendees	<2k	🔺 ~2k	🔺 4.8k	🔺 5k	🔺 6k
Number of startups exhibiting	0.7k	🔺 0.8k	🔺 1k	🔺 1.4k	▬ 1.4k
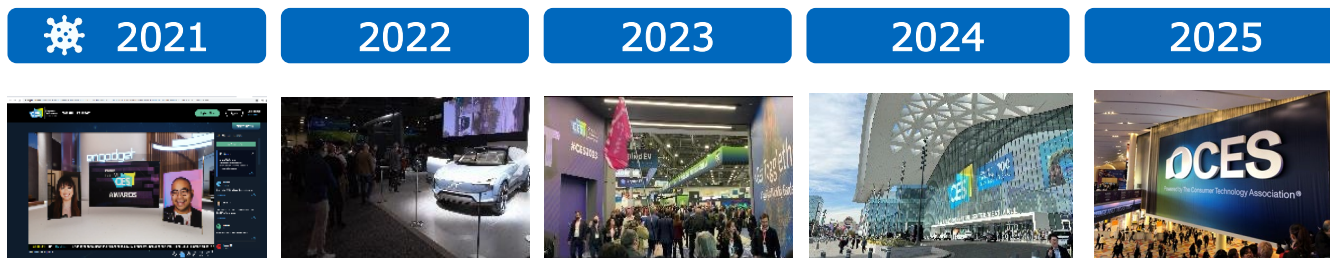
2025 Highlights

BMW
Panoramic iDrive

Honda
0 Concept
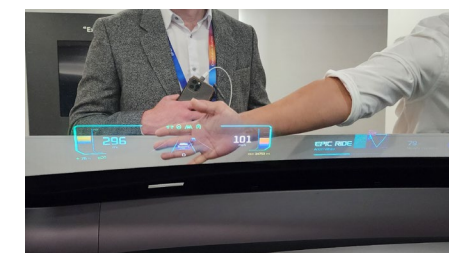
Mobis
Holographic display

Scout
Traveler

What impressed the SBD team the most?
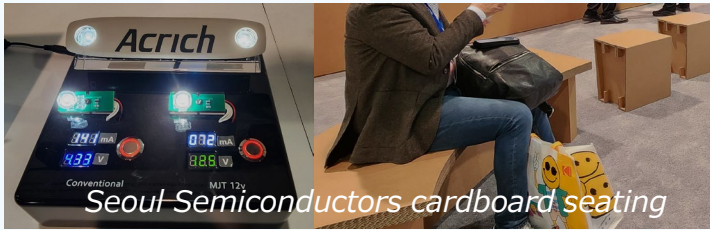
Seoul Semiconductors cardboard seating

"Seoul Semiconductors showcased energy-efficient 12V LEDs that uses half the mA compared to 5V LEDs. A sunlight-mimicking LED used in Volvo interiors allows for nicer interior colors. Seoul Semiconductor's commitment to sustainability was evident in the cardboard seating at their booth." - **Andrew Wilczynski**

Toyota Woven Planet Press Conference

"Akio Toyoda's visionary update on Phase 1 of Woven City campus with 2,000 residents moving in later this year. Commitments have been made to innovation & sustainable investments including personal mobility devices, companionship and autonomous vehicles. The initiative shares many hallmarks of the industry's new 4S Mobility initiative with a focus on achieving positive mobility outcomes for society." *-Jeffrey Hannah*

Honda 0 Series

"It is refreshing to see that Honda have made incremental and practical updates to last year's Zero Series concepts. Elements of the cockpit look production ready and appear to be similar to Afeela." - **Mike Levet**

BMW Panoramic iDrive

"CES 2025 highlighted the exciting potential of technologies like AR HUDs and AI but also underscored the critical need for careful evaluation of their real-world impact and value amidst pressure to avoid FOMO-driven decisions." - **James Alford**

FIH Pillar-to-Pillar Display
Scout Interior

"In CES 2025, emphasis was given to the emotional connection between consumers and their vehicles. OEMs and solution developers displayed pillar to pillar displays, AR HUDs and gen AI based virtual personal assistant in an avatar. However, some theme based solutions used buttons, knobs and gesture recognition reinforcing consumer value based design." – *Varun Krishna Murthy*
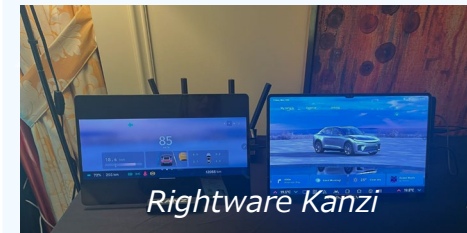
Rightware Kanzi
Gentex DMS

"It was refreshing to see more well thought out finished products this year. Whereas past years demos and products were more gimmicky and not fully polished. The needs of OEMs were addressed and more practical products and use cases were discussed and shown this year." – Taylor Leone

4S Mobility launches at CES

4S Mobility was launched at SBD Automotive's 2nd annual OEM breakfast at CES in Las Vegas. This exclusive event, attended by over 150 automotive executives from more than 20 automakers, introduced a universal framework centered on Safe, Secure, Seamless, and Sustainable mobility, aimed at driving industry-wide transformation.

This year's program was led SBD Automotive, alongside a panel of prominent industry leaders, including Kristen Siemen, Former Chief Sustainability Officer at GM, and Håkan Samuelsson, Former CEO of Volvo Cars, as well as visionaries from AWS, HERE Technologies, and Magna International.

The four pillars of 4S Mobility serve as a universal language of outcome-focused success for original equipment manufacturers (OEMs), suppliers, policymakers, non-governmental organizations (NGOs), and technology providers, ensuring alignment across the industry and promoting long-term growth:

Safe Mobility

People should never risk their life or health to travel

Sustainable Mobility

People should never need to compromise future generations to travel

Secure Mobility

People should never feel threatened or attacked while traveling

Seamless Mobility

People should never feel that traveling is difficult or inconvenient

CES 2025 – Full Event Report

Get your copy of the full, in-depth CES Event Report

The CES 2025 Premium Event Report is part of a 3-part **Premium Event Report Series**. It provides comprehensive insights into the full scope of what the Las Vegas event offers the automotive industry, taking a deep dive into its reveals and trends, alongside key talking points, announcements and in-depth analysis.

The Premium Event Reports Series works to understand the implications of these reveals for the industry at large. This report series spans several events taking place over the year, including CES 2025, with new entries released within two weeks of the event.

Find out more →]   Request Price 🔓

	Flash Report	Full Event Report
Pages	20+	100+
Trends	✓	✓
Conferences	-	✓
Innovation Awards	-	✓
OEM Announcements & Analysis	-	✓
Supplier Announcements & Analysis	-	✓
Start-up Announcements & Analysis	-	✓

CES 2025 Trends

The key trends from CES 2025

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The top trends of CES 2025

1. Head-Up Displays

TFT-LCD based systems and **projector and holographic systems**

BMW Panoramic iDrive

Mobis Holographic AR HUD

First International Computer AR HUD

2. Artificial Intelligence

Artificial intelligence for autonomy and **artificial intelligence compute.**

Nvidia Cosmos foundation model for virtual AI development

HERE SceneXtract for autonomous driving scene creation

Hailo-8 AI processor that can accompany an SoC

3. Software-Defined Vehicles

ECU consolidation and **software tool chains**

Intel Automotive Development Environment

QNX collaboration with TTTech Auto to develop vehicle software platform

Qualcomm and NXP partnership

4. Occupant Monitoring

Occupant monitoring software and **in-vehicle sensors**

Gentex infrared occupant monitoring camera

Emotion3D occupant monitoring software

Omnivision and Panasonic in-cabin monitoring

Key trend 1: A variety of head up display technologies

TFT-LCD Based HUD

TCL HUD

BMW Panoramic iDrive

TFT-LCD HUDs were exhibited at CES 2025. HUDs based on TFT-LCD screen technology were shown on the BMW Neue Klasse concept, as part of the BMW Panoromic iDrive, and on the upcoming Sony Honda Afeela.

TCL exhibited a single HUD assembly containing three individual TFT-LCD screens that are reflected onto the windshield. The three screens a positioned across the full width of the cockpit.

Both the TCL and BMW Panoramic iDrive HUDs have a dark area of the windshield to reduce glare from sunlight. The dark area helps ensure the HUD is still visible in direct sunlight and create contrast in images.

Takeaway(s)

HUDs based on the reflection of TFT-LCD screens will likely start to be replaced by projector based and holographic systems in the next 3-4 years. At CES 2025, ZEISS and MOBIS were looking for partners to implement their holographic HUD technology.

Projector and Holographic HUD

Mobis Holographic HUD

BRYTN Booth

HUDs based on projector and holographic technology were also exhibited. Hyundai Mobis and ZEISS Microoptics presented a holographic HUD developed in collaboration.

The holographic systems presented require optical layers to be applied to the windshield. These layers are required to reflect light back to the driver.

First International Computer (FIC) demonstrated a HUD based on laser beam scanning, an alternative to holographic technology. FIC demonstrated how the technology could be used on vertical windscreens in commercial vehicles.


Takeaway(s)

Projector based HUDs have superior image contrast, which is important if AR lane level AD and ADAS information is to be shown on the windshield. The size of a projector-based HUD unit can be around one liter, compared with equivalent TFT-LCD systems, which are 7-13 liters.

Key trend 2: More focused uses of AI at CES 2025

AI for Autonomy

NVIDIA Cosmos

HERE SceneXtract
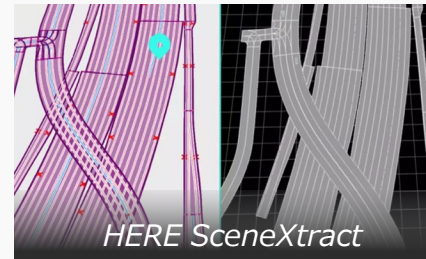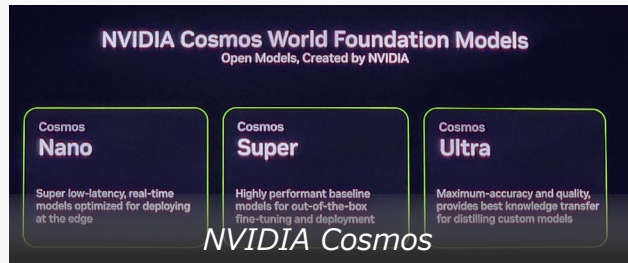
At CES 2025, companies demonstrated how AI can create virtual scenes and scenarios that represent real-world environments. The creation of virtual scenes allows the behavior of autonomous systems be tested in these environments virtually.

HERE Technologies announced SceneXtract, an AI solution that finds and renders real-world situations from their mapping data for the virtual testing of automated and autonomous systems.

Nvidia announced Cosmos, a world foundation model, that can play a role in scaling real-world simulation for the purposes of training machine learning models.

Takeaway(s)

For automakers, a cautious approach to autonomy remains likely. Technology like Nvidia Cosmos may help development of L2+ and L3 systems. Automakers should consider how AI file formats are converted to testing software formats. Conversion may be time-consuming.

AI Compute

HAILO AI Processor

NVIDIA Thor Processor
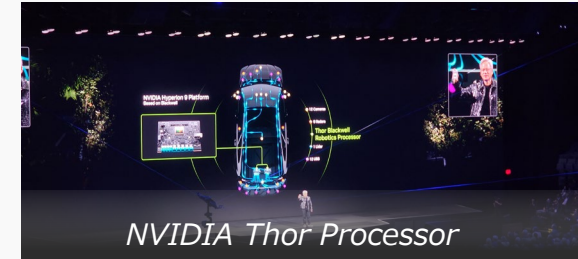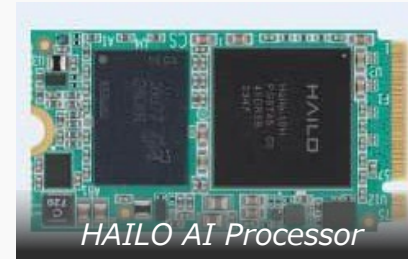
Artificial Intelligence models can be trained off-vehicle using large datasets. This training process requires s significant computing power. Less power is required to run the model on-vehicle once the model has been trained.

At CES 2025, HAILO exhibited edge AI chips with the appropriate computing power, but better thermal efficiency compared to some other chipsets.

Intel highlighted new automotive SoCs in their keynote.

Takeaway(s)

AI is requiring high computing power, which is counter acting automakers' efforts to improve efficiency to benefit electric range. One of the differences between NVIDIA processors and HAILO processor is the amount of heat created and therefore the amount of energy required.

Key trend 3: Software toolchains help increase hardware uptake

ECU Consolidation

Snapdragon Booth

Intel Booth

Intel highlighted new automotive SoCs in their keynote. Intel now offer a whole-vehicle platform (computer vision and safety critical systems included) alongside their Automotive Virtual Development Environment. The Virtual Development Environment was co-developed with Amazon Web Services.
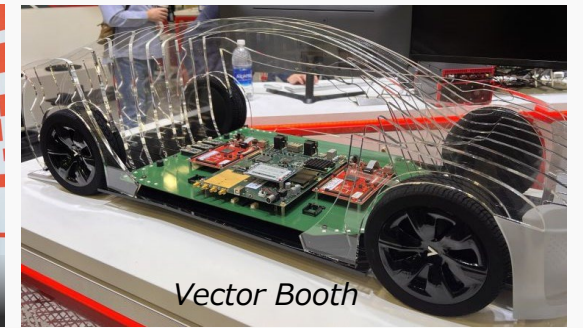
Qualcomm and NXP are working "up" the software stack to improve the performance and stickiness of their chipsets, evidenced clearly by NXP's acquisition of TTech Auto.

Software Tool Chains

QNX Booth

Vector Booth

QNX presented pre-integrated digital cockpit software reference framework designed for developing advanced automotive cockpit systems. It combines safety-critical QNX applications with Linux and Android Automotive.

Red Hat announced the addition of certified mixed criticality-functional safety sub systems to the Red-Hat In-Vehicle Operating system. The OS is based on Linux.

ETAS presented tools that allow testing and development of software, with a focus on middleware as the critical part of SDV development.

Takeaway(s)

Automakers are still "figuring out" SDVs in part because there's no reference platform or standardised toolchain. Consolidation of processors and computing is still in early phases, but more products are becoming available to support automakers that wish to consolidate ECUs.

Takeaway(s)

Automakers must decide if they want to invest in their own proprietary design for chipset and software or to try to adopt an emerging toolchain and middleware that allows them to properly consolidate ECU functions within zonal or central compute systems.
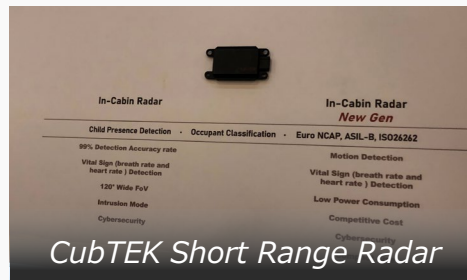
Key trend 4: Sensor fusion for occupant monitoring

In-vehicle sensors

Gentex Occupant Monitoring

CubTEK Short Range Radar

Most driver monitoring systems on the market use RGB cameras. RGB cameras have limitations, however. RGB cameras cannot see through objects and may not be suitable for biometric authentication.

Gentex exhibited a mirror and overhead mounted camera system. Depending on use case, both RGB and IR cameras can be provided. The Gentex solutions can detect airborne contaminants using IR.

CubTEK exhibited an in-vehicle short range millimeter radar mounted in the roof. Radars do not collect personal information, unlike a camera.

Occupant monitoring software

LG Occupant Monitoring

Emotion3D Occupant monitoring

In-vehicle hardware is required to gather data on the driver and passenger. Software is then required to interpret this data. Compliance with EuroNCAP, GSR II and China GB/T requirements is the main driver, but additional features may be added in the future.

LG demonstrated driver monitoring using Intel cabin sensing technology. The system can track eye movement, heart rate, stress levels. It can also detect if the person is too close to the steering wheel, seat belt position (On/Off) or distracted.

Emotion3D demonstrated their occupant-monitoring software that can meet regulatory requirements and in addition, recognize gestures and emotions.

Takeaway(s)

RGB cameras may not give sufficient information for biometric authentication and payment. RGB cameras may therefore be fused with an IR camera, like the Gentex demonstration, or by radar, like CubTEK demonstration. IR cameras are used in the consumer electronics industry.

Takeaway(s)

Companies are able to provide software to interpret data from occupant monitoring cameras. LG software is able to determine if the driver is wearing sunglasses, is drinking and their heart rate. EMotion3D demonstrated gesture recognition capabilities.

Other supporting trends from CES 2025

5.

Lighting

OLEDWorks exhibited a range of OLED rear light panels. OLEDWorks supply rear lights for the Audi A5 and S5.

OPMobility demonstrated a Rivian adaptive high beam front light cluster for the USA market. Regulations have recently been amended to allow such systems in the USA.

6.

Shift left

Siemens demonstrated a virtual vehicle development platform and announced multi year discounts (up to 90%) on software for startups

Elektrobit presented a cloud-based development platform for virtual testing and validation. Elektrobit claim that the tool allows OEMs to "shift left" their decision making.

7.

Optics

ZEISS demonstrated how optical layers can be applied to screens to reflect light. The layer can be used to reflect light into a camera.

Metaoptics are a Singapore based startup that have developed glass wafer lenses. The lenses can be used for projectors and facial recognition cameras.

8.

Automation
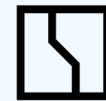
Zeekr announced plans for the mass delivery of the Zeekr RT. The RT is the brand's first mass produced autonomous vehicle.

John Deere exhibited an updated autonomous system. Labor shortages are driving the development of this technology.

Other supporting trends from CES 2025

9. Personalization

Togg have partnered with HERE Technologies to provide EV-specific routing, taking driver behavior into consideration. The solution provides suggestions and personalized POIs.

Great Motors presented an interface that allows users to use on-screen and in-air gestures to control content and personalize where the content is displayed (move between screens).

10. Connected Safety

Bosch have partnered with SiriusXM. The partnership enables Bosch to offer an off-the-shelf wrong-way driver alert system to its OEM partners.

Aiden have collaborated with HERE Technologies and HAAS Alert to bring more comprehensive privacy controls to connected features.

11. Vehicle AI

SoundhoundAI demonstrated a new in-vehicle voice commerce platform. SoundHound Chat AI was also presented based on the NVIDIA DRIVE AG platform.

Tweddle Group announced AVA, a personalized AI in-vehicle voice assistant. Tweddle claim it is able to answer questions about the specific vehicle model and trim.

12. Startups

Provizio presented a radar sensor with onboard intelligence, powered by NVIDIA DRIVE AGX. This sensor is aimed at SAE L3 and higher autonomy.

Tsingcar presented an in-cabin ultra wide band radar with life detection. Tsingcar claim the system can detect movement and breath.

Historical trends and OEM approaches

How did CES 2025 compare to last year?

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How CES trends have developed year on year.

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2023

2024

2025

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2 Displays and AR HUD	2 Displays and AR HUD
3 Automated driving and Sensors	3 Artificial Intelligence
4 SDV architecture and Software	4 Occupant monitoring
5 Artificial Intelligence	5 Automated driving and Sensors
6 Fleet services	6 Electric Vehicles and Charging

2023: 6 Sustainability

2024: 6 Occupant monitoring

Automaker approaches to CES attendance. Consistent or casual?

Consistent approach

HONDA — New global EV lineup - Zero Series. — **HONDA** — Updated interior of Zero Series and exterior lighting changes

BMW — i Vision Dee concept — **BMW** — Development of Augmented reality experiences and LLM integration for future models — **BMW** — Panoramic iDrive HUD on Neue Klasse

AFEELA Sony Honda Mobility — Afeela concept car revealed — **AFEELA** Sony Honda Mobility — Afeela media bar and L3 autonomy capabilities — **AFEELA** Sony Honda Mobility — Afeela pre-orders and feature subscription details

2023 → **2024** → **2025** →

Casual approach

KIA — Announced platform beyond vehicle plan — **SUZUKI** — Automaker debut at CES

VINFAST — VF6, VF7, and VF9 under development — **VINFAST** — Pickup truck concept — Intelligent driving domain controller and 800volt solutions

Mercedes — Announced charging network in USA. — **Mercedes** — North America premiere of Concept CLA Class — **Mercedes** — Mercedes-Benz NA – meeting room only

Next Steps

How SBD Automotive can help

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How we help

Consulting Support - Bespoke projects covering nearly all major automotive processes

Research Support

Fast access to data, forecasting and consumer insight

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Strategy Consulting

Insightful planning support for navigating the industry

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Technical Consulting

Assessing and contextualizing disruptive tech domains

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Testing Support

Access to experienced UX, performance and pen test experts

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How we help

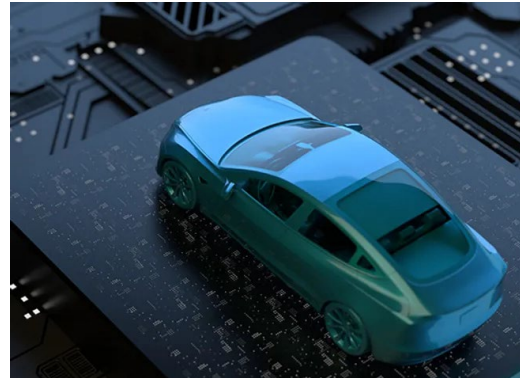**Off-the-shelf Research Reports** – Fast access to the latest automotive research

CES 2025 Premium Event

24th January 2025

Deep dive into CES 2025. This report provides comprehensive insights into of the Las Vegas event with a focus on automotive.

Learn more ▶

E/E Architecture Guide

Right decisions on E/E architecture leads to increased vehicle safety, security, and system usability

Learn more ▶

AI for Automotive Guide

December 2024

With Generative AI making significant inroads, advertising and digital industries, it is critical to identify and futurecast the impact of this technology to the automotive value chain.

Learn more ▶

EV Guide

SBD's EV Guide provides insight into the current situation for mass-produced passenger and light commercial EVs, their features.

Learn more ▶

SBD Automotive's CES Coverage

SBD Automotive's CES toolbox

- Get a head-start on CES 2025 with SBD Automotive   **Available Now**

- SBD Automotive's CES 2025 Tour Guide   **Available Now**

- SBD Automotive's 2025 CES Flash Report   *Available Now*

- SBD Automotive's 2025 Premium CES Report   *Coming soon*
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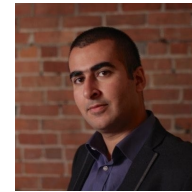
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