



January 2023

1001 – 2023

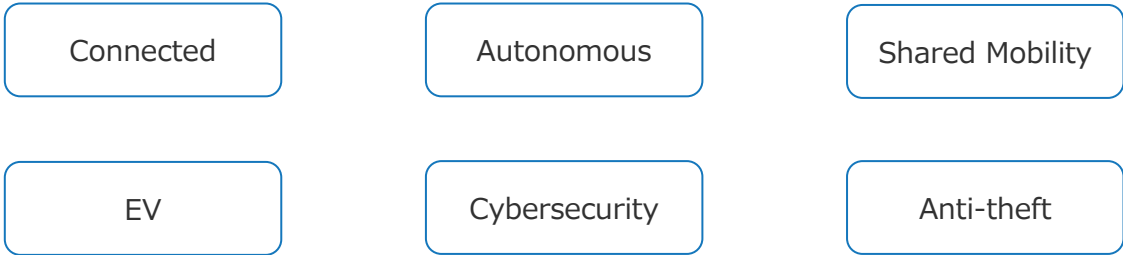
CES 2023 – FLASH REPORT

Consumer Electronics Show

About SBD Automotive

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

Our expertise:



Our role:

As our industry faces...

Uncertainty



We provide our clients with...

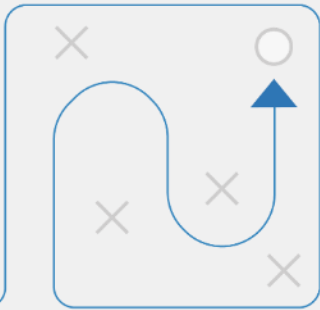
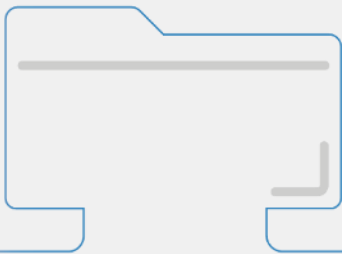
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Insight



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Seeing Beyond Data

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An introduction to CES 2023 and how it has changed over time

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Introduction

A brief introduction to the Consumer Electronics Show and this flash report



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What was CES 2023?

CES is a technology-focused trade show held annually in Las Vegas, Nevada where manufacturers, suppliers, and developers showcase their latest innovations at conferences and booths. The show has a global reach with over 115,000 attendees and 3,200 exhibitors from 140 countries.

Technologies shown at CES are generally focused on the consumer electronics sector, however in recent years the automotive sector has had an increasing presence. Automotive technologies are now a major part of the show with many key players using it to unveil their latest announcements.

CES 2023 was attended on-site by 9 members of the SBD team, including the CEO, CCO, Director - North America, Production Managers, Analysts and more.

Report Focus

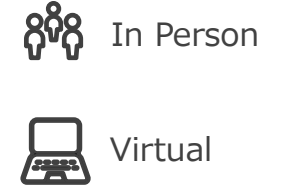
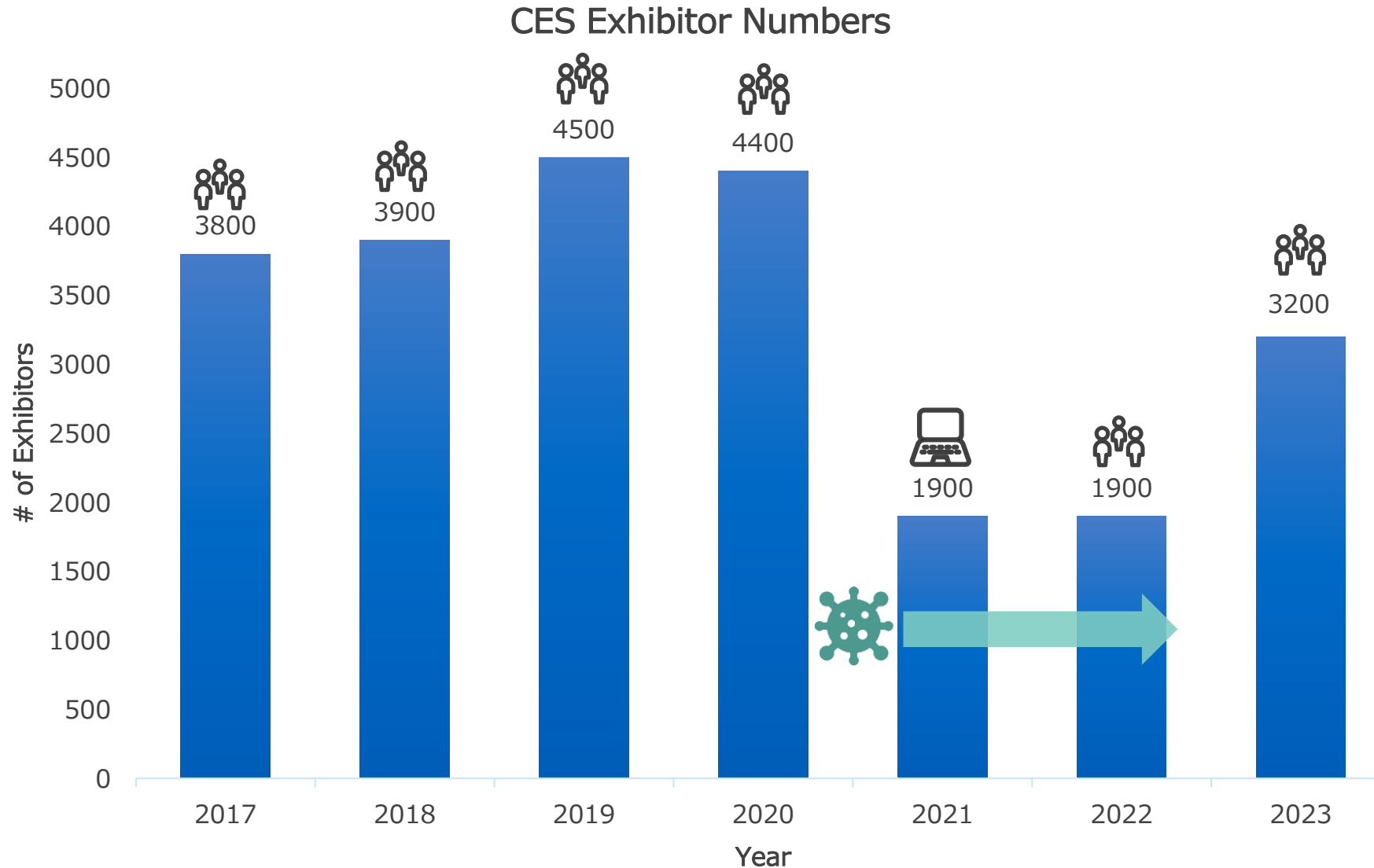
Our 2023 CES Flash Report provides a summary of the key automotive trends, research, products, and announcements from the event.



Credit: Consumer Technology Association.



Exhibitor numbers edging closer to pre-COVID levels



3,200 confirmed exhibitors as of January 5th

300+ Automotive-related exhibitors announced for a sold-out West Hall

115,000 attendees, 15% higher than anticipated



OEMs were more practical at CES 2023

Many of the exhibits included EV charging strategies, L2 fleet use cases, and implementing SDVs



2017
Perceptive
Car



2018
Personalised
Car



2019
Shy
Car



2020
Auditory
Car



2021
Augmented
Car



2022
Immersive
Car



2023
Practical
Car

Setting aside concepts meant to grab media attention, the main trend for automotive exhibitors at CES 2023 was to show practical applications. This makes use of existing technologies such as SAE L2 / L2+ as well as the upcoming realities of electric and software-defined vehicles.



CES 2023 – Insights from the show floor



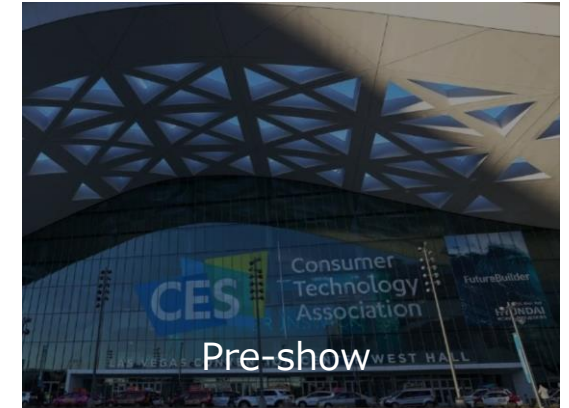
2023
Insights



Making the most of
CES 2023



Podcast



Pre-show



Day 1



Day 2



Day 3

I CES 2023 – Full Event Report

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

The CES 2023 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.

The 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 2023, with new entries released within two weeks of the event.

Find out more



Request Price



	Flash Report	Full Event Report
Pages	29	225+
Trends	✓	✓
Conferences	-	✓
Innovation Rewards	-	✓
OEM Announcements & Analysis	-	✓
Supplier Announcements & Analysis	-	✓
Start-up Announcements & Analysis	-	✓





Keynotes

An overview of BMW and Stellantis Keynotes



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Highlighted keynote: BMW

The “Dee” concept vehicle with many (future) capabilities

BMW used its keynote slot to show an evolution of its iVision concept. This concept is set launch in some form by 2024. The following are the main areas of interest:

- **Ultimate Companion**
 - The vehicle adapts to user habits and learns from previous driving destinations
 - It also provides proactive suggestions for navigation destinations and media to consume
- **New head-up display**
 - A windshield-wide head-up display
 - Replaces both infotainment and instrument cluster displays
- **Mixed reality slider**
 - Integrated touch controls into the vehicle dashboard, replacing control functions of the infotainment display
 - It displays content in five different levels: analogue, driving-related information, communication system, augmented reality projection, and virtual worlds / metaverse
- **Color-changing technology (e Ink)**
 - An evolution of the BMW iX Flow, this concept can change its exterior panels into one of 32 colors





Highlighted keynote: Stellantis

Electrification, autonomy, and software strategies featured

Stellantis CEO Carlos Tavares presented his company's vision for the future, highlighting different areas of focus, and using two vehicle concepts to demonstrate them: the RAM 1500 Revolution, and the Peugeot Inception Concept.

▪ Software

- Goal for customers will be able to complete most tasks with "one glance and one click"
- This will be delivered using 3 software platforms: STLA Brain, STLA SmartCockpit, and STLA AutoDrive, in line with Dare Forward 2030
- Stellantis will use Qualcomm's Digital Chassis, and partner with Amazon for connected experiences, Foxconn for smart cockpit
- New 'Mobilisights' business unit to monetize data and connected services

▪ Electrification

- 50% of Stellantis vehicles sales in the US market, and 100% in the European market will be BEVs by 2030
- Stellantis will introduce 75 BEV models before 2030, leveraging 4 standard platforms across the company
- Stellantis will use the Free2Move brand to manage its charging infrastructure roll-out

▪ Concept vehicles

- Peugeot shown with Hypersquare HMI concept; a tablet that replaces the steering wheel (planned for 2026)
- RAM 1500 Revolution will leverage the STLA Large screen platform





Key Takeaways

The key trends from CES 2023



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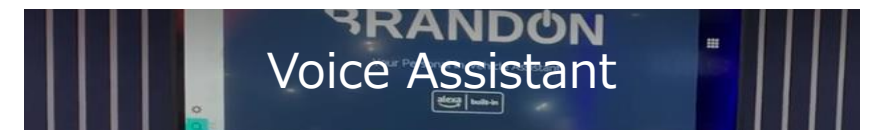
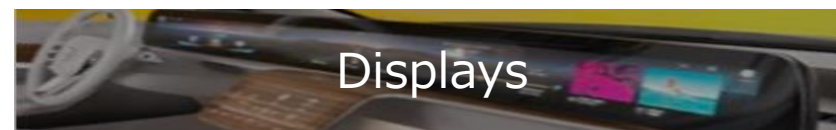
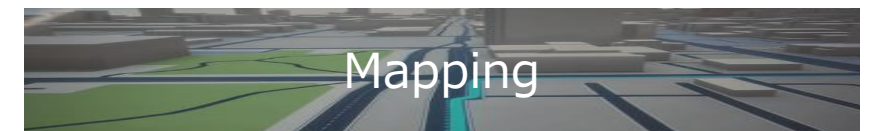


CES 2023 Top Trends

Core trends



Supporting trends





Electrification (1/2)

EVs stole the marquee for most OEMs



RAM 1500 Revolution

- At CES 2023, the introduction of many new EV models (primarily BEVs) by OEMs was a major focus, with their strategies for electrification continuing to be implemented and prominent in automotive-related announcements.
- Stellantis debuted its BEV pick-up model “RAM 1500 Revolution”. Although it is currently still a concept car, it is approaching mass production. Another concept model “Inception” was also revealed.
- Volkswagen, BMW and Afeela (new brand of Sony and Honda) also showed their newest EV concepts and prototypes with some new diversified features.

AFEELA



STELLANTIS



Useability of EV chargers comes into focus



Valeo charging station

- Several innovations were shown at CES 2023, with an aim to make EV charging easier and more convenient. This is becoming an ever-increasing trend for CES.
- Tier-1 OEMs including EVAR, Valeo and Panasonic showcased their newest technologies and products in EV charging, covering smart pole station solutions.
- Amazon also presented EV-charging-related functions, where users can use Alexa to find EV charging location information and initiate a charge with EVgo (only).
- MapBox, TomTom and WirelessCar showcased their EV routing features designed to optimize routing when charging times are considered.

amazon



Panasonic

TOMTOM



WirelessCar



Electrification (2/2)

Suppliers aim to boost EV range by lowering power consumption



Magna Morphing Surfaces



Potential weight saved from ANC (Bose)

- An EV battery's range is a major challenge to their deployment and acceptance. Suppliers unveiled unique solutions to improving the range of EVs by lowering the power consumption needed to operate them.
- ZF showed their heated seatbelt which can reduce the requirement for HVAC use, claiming that it can extend EV range by 15%. Bose showcased Road Noise Control, an ANC technology targeted at reducing the need for sound insulation, reducing weight by up to 20KG, increasing range.
- Magna unveiled their Morphing Surfaces technology. This technology allows the Mezzo Plus panel, which can be located on the front of the vehicle, to change shape and increase aerodynamic efficiency.

OEMs seek to build EV charging networks



Mercedes-Benz to expand charging network

- With electrification being a growing theme of CES over the last several years, announcements have been made regarding the expansion of electric charging infrastructure in different sectors.
- Mercedes-Benz announced plans at CES to establish its own global high-power charging network. They have already started building the first batch of charging stations in North America, and will ultimately build more than 10,000 charging stations worldwide.
- John Deere has shown their intent of electrification in their vehicle line-up by unveiling their first electric excavator. This vehicle is powered by Kreisell batteries.



Immersive Digital Cabin

Unified & integrated cockpits take center stage, powered by single SoC's



Garmin Unified Cabin Experience



Visteon Lightscape Panoramic Display

- A key theme of CES 2023 was the immersive cabin experience. Cabins on show typically had large displays, multiple screens, entertainment zones and immersive experiences such as in-vehicle gaming and augmented/virtual reality. A focus on the immersive digital cabin has been seen at CES for several years and has continued into CES 2023.
- Garmin showed their Unified Cabin Experience, showcasing technologies delivering multi-zone personalized experiences in-cabin.
- BMW i Vision Dee concept showed integrated touch displays and a full windshield head-up display.
- Visteon showcased their Lightscape Panoramic Displays, which includes a pillar-to-pillar display which can be used for entertainment such as watching videos and gaming.
- Harman showed a pre-packaged AR-capable head-up display with the ability to replace the instrument cluster.





SDV (Software-Defined Vehicles)

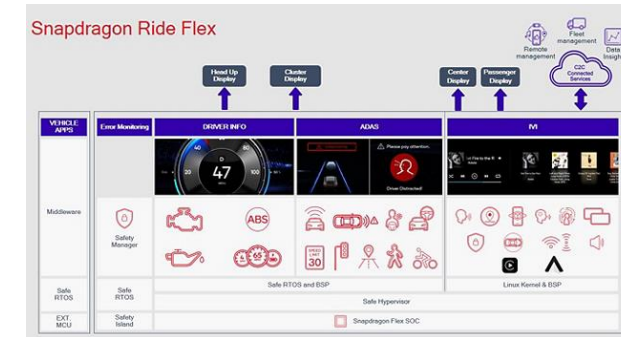
Suppliers homed in on market-ready tools and platforms for SDVs



Snapdragon Q Ride Platform

- Qualcomm announced the Q Ride Platform, which reduces the amount of 'on road' testing required by allowing the running of real-world sensor footage in a simulated environment.
- ETAS, which now manages most of Bosch's software business, announced an integrated tooling system to help OEMs conduct software-centric function development.
- Continental showcased its electronic edge computing platform, CAEdge, which can be used to create and test software functions, while BlackBerry highlighted QNX in the Cloud and IVY, two important enablers that iterate on existing mass-market software products.

More SoC and controller products to facilitate ECU consolidation, s/w updates



Snapdragon Q Ride Flex

- Qualcomm showcased Ride Flex SoC, which supports mixed-criticality workloads, allowing for digital cockpit, ADAS and automated driving (AD) capabilities to be co-implemented on the same hardware, alongside its Digital Chassis ecosystem.
- Continental demonstrated its x-Domain zonal control unit, which can be implemented to control multiple domains, which may further reduce vehicle network cost and complexity.
- Other suppliers and software vendors such as Visteon, Sonatus, Garmin, Magna, and NXP showcased evolutionary platforms for ECU consolidation.



ADAS & Autonomy

A more pragmatic approach to autonomy was demonstrated



Afeela prototype

- Despite some suppliers and mobility companies showcasing L4 vehicles, there has been a more scaled back approach to autonomy in CES 2023 as the focus has returned to delivering lower levels of autonomy such as delivering SAE L2+.
- The Afeela prototype will aim to deliver up to SAE L2+ in urban environments and SAE L3 under specific conditions.
- Mercedes-Benz announced at CES that they will introduce their SAE L2 Automatic Lane Change feature as well as a rollout of their SAE L3 DRIVE PILOT system to Nevada and California in 2023.

AFEELA



Suppliers are emphasizing their lidar innovations



Volvo EX90 Lidar

- CES 2023 brought in many lidar production companies (20+) bringing their latest products to the exhibition.
- Valeo showcased its third generation lidar products – SCALA 3 Lidar, which is selected by Stellantis to deploy on their models from 2024.
- MEMS lidars remain to be the mainstream type in the exhibition, many suppliers including MicroVision, AEye, Zvision, etc. have announced their products.



LUMINAR



InnoFusion



BOSCH





Augmented and Virtual Reality

AR & VR solutions continue to search for viable business models



FIAT Metaverse Store

- There were three different approaches to implementing Virtual Reality into the automotive sector at CES 2023, both inside and outside of the car.
- Stellantis showcased their FIAT Metaverse store, allowing consumers to explore their vehicles through the metaverse.
- The Holoride Retrofit was unveiled at CES 2023. This device provides virtual reality entertainment to any make and model of vehicles.



The HMI of augmented reality continues to mature



Harman Ready Vision

- A range of OEMs and suppliers demonstrated Augmented Reality for Navigation purposes as CES 2023.
- The BMW i Vision Dee concept featured a HUD spanning the windshield which can support Augmented Reality.
- Harman showed their Ready Vision system which can use augmented reality to display a variety of driving information onto the windshield, including turn-by-turn directions.
- Visteon showcased their SmartCore Gen 4 cockpit, capable of augmented reality navigation.



Cameras

Driver and cabin monitoring innovations to improve safety and add value



Gentex Full Display Mirror



Garmin Unified Cabin

- Several suppliers have unveiled driver and cabin monitoring solutions at CES 2023. These technologies use the driver and cabin monitoring systems to offer drowsiness and distracted driving detection as well as other value-added features.
- Harman showed their Ready Care driver monitoring system which can monitor the driver's eye activity, cognitive load and vitals. It can then classify driver behavior and initiate a personalized in-cabin response to improve safety.
- Xperi's DTS showcased their AutoSense cabin monitoring system which can identify each passenger within the cabin and identify their mood to make song recommendations etc.
- Magna's Driver Monitoring camera can be integrated behind the glass surface of the rear-view mirror.



Large new players in the dashcam market



Amazon Ring Car Cam



Bosch RideCare Companion

- Amazon and Bosch have each unveiled their dual-facing cameras as they enter the dashcam market.
- Amazon's Ring launched their dashcam at CES 2023 which includes dual-facing HD cameras. With the optional Ring Protect Go subscription, users can view a livestream and stream recorded video through LTE connectivity.
- Bosch also unveiled their RideCare companion for ride-sharing vehicles. This includes an internal camera which records the internal cabin and in case of emergency can be used to call Bosch agents for assistance through an LTE connection.





Connectivity

Gaming industry leverage their products for automotive



NVIDIA GeForce NOW

- Several OEMs have announced in-vehicle gaming applications to entertain customers during EV charging or to provide entertainment to the rear passengers.
- GM showcased a proof of concept for in-vehicle gaming with a Cadillac Lyriq.
- Sony and Honda's Afeela prototype is capable of in-vehicle gaming.
- NVIDIA announced that Hyundai Motor Group, Polestar and BYD would use their GeForce NOW cloud gaming service.
- Cariad also demonstrated their vision to bring gaming to market.

A FEELA



C A R I A D



Suppliers seek new revenue streams through in-vehicle features commercialization



Harman ready on Demand platform

- Harman showcased its ready on Demand platform, which is used for delivering audio features and upgrades in its app. Users are able to unlock and upgrade a range of audio add-ons through the purchase – another example to achieve monetization.
- Qualcomm's Snapdragon Digital Chassis includes Snapdragon Car-to-Cloud which can allow users to introduce new features and services through the cloud.
- Bose showcased their enhanced telephone audio control which can make the audio coming from the vehicles microphones much clearer. As a software driven feature, it is envisioned as a FaaS upgrade via OTA update.





Displays

Momentum is building to make use of 'dead space' in the cabin



Continental Ultrawide Display



BMW i Vision Dee windshield HUD

- Several innovative displays were shown at CES 2023 both inside and outside of the automotive sector.
- Continental introduced an ultrawide display, spanning across the whole dashboard, due to be released in 2025.
- BMW showed a concept which used the whole windshield as a HUD.
- Visteon showcased their Lightscape Panoramic Display, a pillar-to-pillar display which can support video and gaming.
- Marelli showcased their Diorama Display, a pillar-to-pillar HUD.

OEMs to deploy exterior displays in upcoming vehicles



BMW i Vision Dee

- Displays located on the exterior of the vehicles have been shown in some automotive OEM concept vehicles as well as suppliers.
- Exterior displays are located on the front and rear of the Afeela which can be used to display a variety of messages. At CES, the Afeela displays showed a variety of messages including the Afeela badge, a parking permit, the weather and sports scores.
- The BMW i Vision Dee headlights and kidney grille form a display surface which can display welcoming messages to the driver.



A FEELA





Exterior Lighting

New headlamp technology, some already in production



OP Offroad Focused Adaptive Headlights



Marelli Brake Light Screen

- Several suppliers unveiled smart lighting trends for safety, personalization and communication.
- Marelli offered a matrix style headlight design that can demonstrate the width of the vehicle, warn pedestrians/cyclists of hazards, and be used to display navigation aids on the roadway.
- Plastic Omnium showed a speed sensitive, off-road headlight projecting further the faster the vehicle travels while the inverse happens at slower the speeds such as rock-crawling.
- KYOCERA showcased advances in laser headlight technology, with an emitter that can produce both white visible light and IR from the same emitter.



Mapping

Map provider strategies diverge



HERE – UniMap Visualization

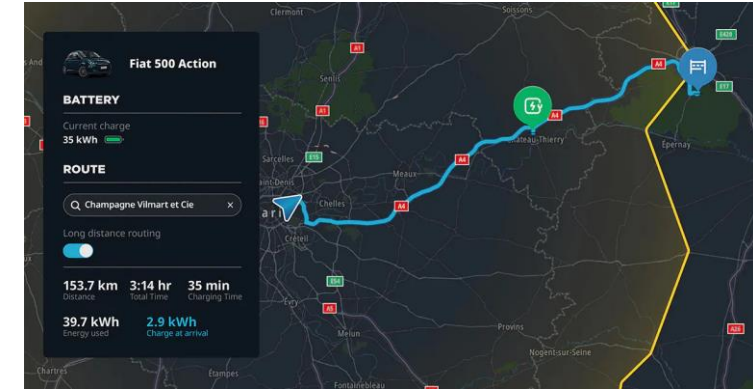


TomTom – 3D Map Visualization

- CES 2023 has shown that major map providers are pursuing different strategies towards delivering automotive maps.
- At CES 2023, HERE announced their UniMap mapping platform. The platform aims to deliver greater agility and flexibility for creating, updating and using maps as well as allowing customers to use their own datasets with the platform to create custom maps.
- Google announced that they are launching their own HD map data in vehicles with the Android Automotive Operating System. TomTom partnered with AWS, Meta and Microsoft to form the Overture Maps Foundation with the aim to provide validated open map data.
- Mapbox unveiled their 3D Live Navigation system.



Nav solutions to optimize EV charging and routing



TomTom – EV routing

- Several announcements have been made at CES which aim to make finding charge points easier while optimizing navigation to account for EV range and charging.
- WirelessCar demonstrated their Smart EV Routing feature to optimize EV charging and routing based on desired parameters.
- Mapbox announced Mapbox for EV which can predict battery range, charging locations and pay for vehicle charging.
- TomTom showcased their EV routing technology, using 'total travel time' to show the most efficient path including charging stops.





Smart Home

EV charging plays central role in smart home energy management



Schneider Electric Smart home management system & Lucid's Connected Home Charger

- Schneider Electric showcased their integrated smart home system that combines photovoltaics and smart home management, featuring an electrical box that consolidates all conduits for a streamlined electrical panel.
- Samsung's SmartThings Energy is an interactive app that allows customers to monitor their energy, water, and natural gas usage in real-time by connecting to Samsung appliances. The app aims to enhance convenience while promoting energy efficiency.

A step forward towards interoperability of smart home devices



Matter's logo shown

- Matter is an industry consortium that is aiming to create a single standard protocol for the interoperability of smart home devices, extending to other smart devices in the future.
- Almost all smart home device makers showed their devices to be compatible with Matter.
- None of the automakers are currently members of Matter but this will very likely change soon.



Sustainability

Tire technology continues its focus on sustainability and efficiency



Bridgestone BetterFuture Tire

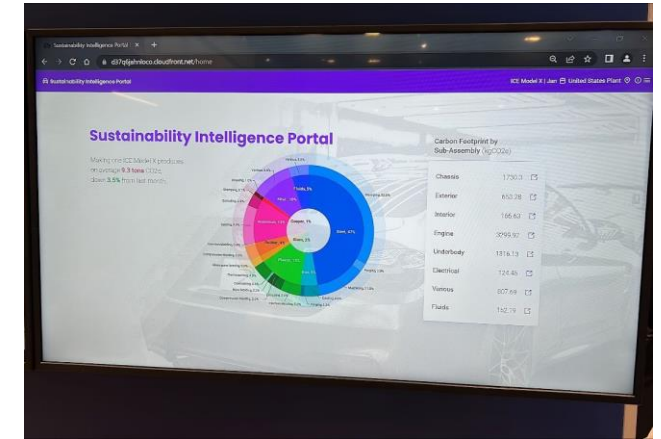
- Goodyear showcased their BetterFuture tire which is composed of 90% sustainable materials. Sustainable ingredients include recycled polyester and plant-based components.
- At CES 2023, CarbonX announced their entry into the U.S. market. One of their unique offerings is the CarbonX material, which can be incorporated into tire manufacturing as an alternative to silica and traditional carbon black. This new material presents an eco-friendly solution for manufacturers looking to create sustainable, high-performing tires.



Suppliers are experimenting with greener components & greener supply chains



OP Sustainable Materials



AWS Sustainability platform

- At CES 2023, a growing number of suppliers showcased their efforts to incorporate sustainable materials and practices into their products and supply chains.
- Plastic Omnium has prototyped new materials that incorporate 50% recycled plastic in an effort to reduce its reliance on virgin plastic.
- AWS showcased its sustainability intelligence portal. This portal can use emissions data throughout the supply chain to allow companies to optimize their supply chains from mining through to reuse/recycle to maximize sustainability.





Voice Assistant

VPAs were felt, but not a core theme



AWS Brandon

- Although VPAs were present at CES 2023, they were not a major focus as they had been in years past.
- Panasonic Automotive announced an update to its SkipGen IVI system. This update allows customers to access Siri and Alexa simultaneously while using Apple CarPlay by simply saying "Hey Siri" or "Alexa."
- The BMW i Vision Dee boasts a unique feature of an external voice system; this is considered by BMW as the most significant form of interaction for this vehicle. This allows for a seamless communication between the driver and the vehicle, even when the car is parked, and the driver is outside.

VPA's continue to integrate with infrastructure



EVgo at Alexa booth

- The integration of Alexa into EVgo charging stations across the United States allows EV drivers to easily locate charging stations based on their specific plug type and quickly determine the estimated time and distance to arrival.
- Additionally, EVgo, the first EV charging operator to offer this service, allows for voice-initiated payments, providing a seamless and convenient experience for EV drivers.



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Do you have any questions?

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