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Tue, 18 January 2022 Weekly Newsletter NEWSLETTER #734

Editorial

CES '22: Small, But Still The Biggest!

Was it worth to travel to the reduced CES during Covid times? For me, a clear YES. I found a lot of surprising innovations and inspiring contacts. Of course, the difference to normal times (or is this the new norm?) was visible everywhere. Less than 25% of the 2020 visitor volume; a third of the major-hall floor space was empty, and for the first time ever no transport problems appeared.

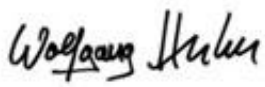
I started my CES tour in the quiet North Hall, which was the crowded and loud automotive hall in 2020. This year, robotics, sensors, and software solutions dominated. The greater area of Berlin had a nice combined booth for science and small enterprises—for example, the interesting startup Automotive-AI showed their AV test simulations. **Elmos** had a display close by in the Westgate Hotel where they presented lighting electronics, gesture recognition, lidar, and a super simple reversing detection including object sorting (drive over or stop) with only four ultrasonic sensors.

In the Central Hall the entertainment and smart home business has still its home turf. **Bosch** showed some connected mobility technology. **Samsung** had a huge booth where you had register yourself to a waiting list before entering—my waiting time was 140 minutes even in a half-empty hall!. They had a nice automotive AR (augmented reality) display showing where you could go for shopping, and navigation and warning information were visible in the huge head up display over the whole windscreen. A mood-scanner for driver and

passenger, using smart watch and passenger monitoring sensor information, creates a personal mood-related interior environment with several stimulations. Micro LED for TV was demonstrated. **Panasonic** showed an “Illuminarium” which placed visitors into into a safari experience. HiFi, TV, and mobile phone company **Sony** had a most surprising booth—learn more about it in this week's In Depth article.

The walk to the huge new West Hall wended over the nearly empty open-air space. In the far west edge of this plaza **BMW** had an astonishing display, showing a car named iX Flow which changes its exterior paint colour. The West Hall held most of the automotive exhibitors including **OLEDWorks**, **Docter Optics**, and about ten lidar companies you saw in the **DVN CES Report** last week (did you already download your copy?).

All in all, it was a smaller, quieter CES—yet still big enough to be the biggest tech event on the planet!



Wolfgang Huhn
DVN Senior Advisor

In Depth Lighting Technology

CES 2022: My Collection of Unexpected Highlights

by Wolfgang Huhn, DVN Senior Advisor

Sony

The first surprise in the Central Hall of the Las Vegas Convention Center (the biggest in the US) for me was the Sony booth. I expected nice TVs, cameras, mobile phones and HiFi equipment and found two electrical vehicles, a sedan named Vision S1 and an SUV Vision S2.

The white S1 looked really ready for production, and a 40-sensor concept makes it ready for L^3. The lighting elements show modern, slim design. The edge-to-edge lines in front and rear form a logo in a way that could even be ok for strict UN Regulations, but the old-fashioned multi-point CHMSL doesn't fit into the clean-line concept in my opinion.

The second surprise was at the same both. Sony showed a nanosatellite called Star Sphere. It contains a camera that users can operate using a simulator. The key feature is a highly flexible altitude control, enabling users to capture and record Earth and stars using a broad range of camerawork options.

A PRIVATE SATELLITE FOR A FEW MINUTES—COOL! THIS IS CES.

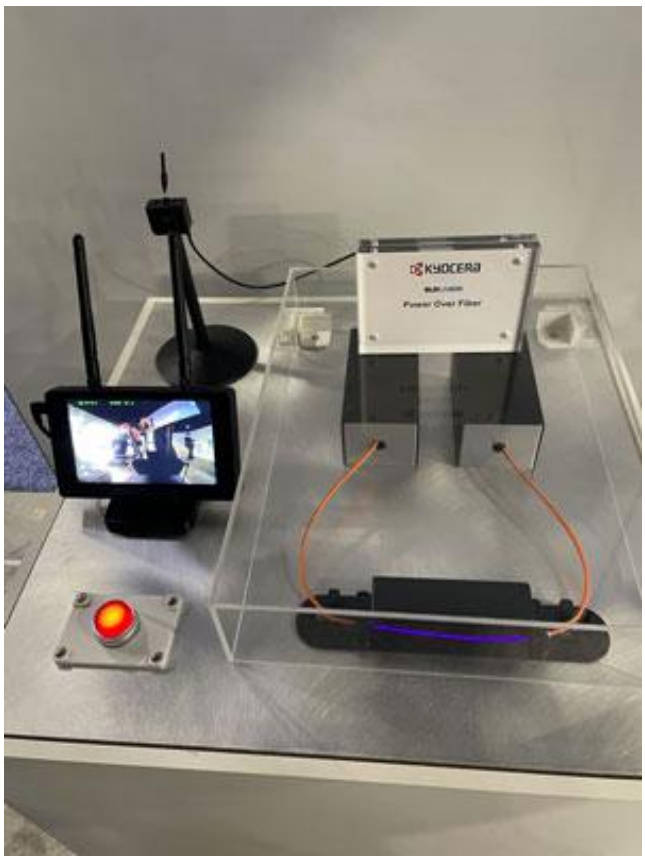
BMW

The next surprise was waiting at the plaza in front of the BMW booth: The colour-changing iX Flow concept car. Building on the principle of the e-ink of e-book readers, BMW covered the whole exterior of the iX Flow. The colour of the whole car changed from white to nearly black (It was dark grey I would say). Also, some extra effects e. g. on the wheel covers where shown, which you see in the videos.

VinFast

Vin what? The biggest booth in the West Hall was booked by a Vietnamese brand internationally totally unknown before the CES. VinFast had 5 EVs on display, from the midsized VF 5 to the luxury VF 9. All had a brand signature built by light stripes of the front and rear position lights which form a V around the chrome VinFast logo. In the interior the PRND switches stand out, and one pushbutton for each function in the centre console is really unusual. Market entry in the US is close.

Kyocera SLD Laser



The night drive event of KSLD was outstanding. A bus shuttle brought around 70 guests in a half-hour ride to the desert, where KSLD prepared a camp with a food truck, bar, tables and seats, and umbrella heaters which were really necessary at about 2 °C. The main demo was a ride with a professional driver on a race truck with 750 hp V8 through a track which includes a steep hill in high speed to demonstrate the range and width of the mounted laser headlamp system. Wow! Other displays were demonstrated like a “moon vehicle” with laser communication, and drones lighting the scene described in the DVN CES report you should download.

But the most surprising display I found indoor at the KSLD booth: power over fibre. A laser was used (no surprise here) to transport energy over a fibre to operate a camera and a display, showing the visitor’s astonished faces. Of course, the efficiency is not yet very high (I guess 10 per cent) but this is ok for a first mockup. Another unexpected innovation at CES 2022.

Las Vegas Loop

Another nice surprise was the new transport system called Las Vegas Loop. A tunnel connects the West Hall entrance with the North Hall at Central Plaza and the South Hall. The subway is made of Tesla Model 3 cars with a "driver" and three passengers, which travel through the tunnel to a subway-station-like load and unload point under the North Hall. Not very efficient, and there were traffic jams, but I guess in coming years there will autonomous cars running through the tunnels and not only from Tesla.

I am looking forward to CES 2023. Hopefully without Covid restrictions!

Click here to get mors pics or video from CES

Lighting News

Brighter Might Not Be Better on Emergency Vehicles

LIGHTING NEWS

Secondary crashes are a top cause of roadside deaths among firefighters, police officers, emergency medical technicians, and other first responders. Conventional wisdom on emergency vehicle lighting is that higher intensity improve conspicuity and safety. But a **new study** concludes that's not necessarily so. Researchers investigated the effects of light colour, intensity, modulation, and flash rates on driver behaviour while meeting and passing a traffic incident scene after dark. Brighter lights were judged more glaring—no news there—but only marginally more visible than lower-intensity lights. And highly-retroflective markings may actually decrease drivers' ability to see first responders working adjacent to their vehicles.

Volunteers drove a closed-course traffic incident scene at night. Two blue, white, yellow, or red lights were mounted on tripods about as far apart as the left and right edge of the rear of a fire truck. A silhouette cutout of a firefighter wearing a high-visibility safety vest was positioned adjacent to the lights. The researchers tested 14 combinations of lamp colour, intensity, pattern, flash rate, and presence of reflective markings next to the lights, measuring vehicle distance to the lights and the distance at which drivers could distinguish the silhouette of a firefighter. They also administered a survey after the driver completed the course. None of the variables tested had a significant effect on ratings of overall visibility

of the road scene, but certain factors, alone or in combination, proved interesting:

Study participants consistently judged higher intensity lights as more glaring but only marginally more visible than lights of lower intensity; lower-intensity lights were entirely conspicuous. The researchers say using lower intensities at night would reduce glare without affecting conspicuity of stationary vehicles in nighttime blocking mode.

Drivers' rated visibility of lights appeared to be related to the perceived saturation of their colour; blue and red lights had the greatest perceived saturation and were judged to be brighter than white and yellow lights of the same intensity. Blue and white lights were rated as most glaring. Yellow and red lights were least glaring. This data suggests red lights for stationary blocking operations may offer the best combination of high conspicuity and low glare. None of the variables tested caused drivers to move their vehicles either toward or away from the lights, so this test did not affirm or refute a "moth to flame" effect.

When fluorescent and reflective markings were present, drivers did not see the firefighter silhouette until they were closer to it. This was the most unexpected finding of the study. Of the four setups tested, high intensity lights with no markings produced the best (longest) detection distance. High-intensity lights combined with high visibility markings yielded the worst (shortest) detection distance. It appears to be a matter of inadvertent camouflage of the emergency worker by dint of their retroreflective garments degrading the negative contrast by which they would otherwise be effectively seen earlier. This suggests high intensity lights combined with high visibility markings—that more-is-better approach again—may make it more difficult for drivers to see responders on foot at night, even when the responders wear high-viz vests. Further research is planned to determine if lower-grade retroreflective markings will help improve the conspicuity of emergency personnel operating near emergency vehicles and traffic.

*Renowned vehicle lighting researcher and study lead author **John Bullough**, who is Program Director of Population Health Science and Policy at the Icahn Scool of Medicine, says the reflective-markings issue was not expected, and there'll be research this year to take a closer look at that.*

Hella Sales Burdened by Supply Bottlenecks

LIGHTING NEWS

The currency and portfolio-adjusted sales of the Hella Group fell accordingly in the first half-year (June until November 2021) by 2.6 per cent to € 3bn, while sales declined by 2 per cent.

	2021-'22	2020-'21	Change
Sales, €bn	3.04	3.10	- 2%
EBIT margin	4.9%	3%	+1.9%

Due to the reduced sales volumes and increasing cost pressure, the adjusted earnings before interest and taxes (adjusted EBIT) fell to €156m in the first six months; the adjusted EBIT margin is at 4.9 per cent.

CEO Dr. Rolf Breidenbach says "At present, there are great challenges in the market environment. Due to the massive bottlenecks in the global supply and logistics chains, the global light vehicle production sustained a drastic collapse in the second fiscal quarter in particular. Despite these adverse conditions, however, we performed well overall. Our Automotive segment continued to develop significantly better than the overall market, which underscores our strong strategic orientation in this area". Despite a decline in sales, the Automotive segment posted stronger development than the overall market.

Forecast for the full fiscal year 2021/2022
For fiscal year 2021/2022 (1 June 2021 until 31 May 2022), Hella anticipate currency and portfolio-adjusted sales of around €6bn and an EBIT margin adjusted for structural measures and portfolio effects of around 3.5 to 5 per cent. Especially with a view to the third quarter of the fiscal year, they foresee major challenges with lower production volumes and further increasing cost burdens in light of the ongoing shortage of materials and components.

2022 Detroit Auto Show Slated for September

LIGHTING NEWS

The 2022 North American International Auto Show is scheduled for 14-25 September in both Detroit's Huntington Place convention center and around downtown Detroit with indoor and outdoor interactive displays.

The first two days, 14 and 15 September, will be press and tech days. Then on 16 September will come the annual Charity Preview, which raises millions of dollars for Detroit-area nonprofits. Public days will run from the 17th to the 25th.

Assuming the event happens, it will be the first since January 2019.

OLEDWorks at CES: Newest OLED Tech

LIGHTING NEWS

New automotive OLEDs will be 10 times brighter and allow finer segmentation. That's what OLEDWorks have been, well, working toward, and the primary feature of their booth was the first showing of their new automotive demonstrator showing the latest advances in OLED lighting, including deep red OLED taillights and amber OLED panels for turn signals.

Previous models of OLEDWorks' automotive panels had 40-60 segments per panel, but the panels showcased this year had up to 600 segments. As the number of segments increases, OLED panels can display increasingly complex images and symbols—and therefore more comprehensive information—to nearby vehicles, effectively increasing safety on the road.

AMS-Osram's Leadership in Optical Solutions

LIGHTING NEWS

AMS Osram deliver industrial capacity in sensors and light technologies that serve for customers worldwide. In 2020, the company generated USD $5.5bn in combined revenues with technology areas of consumer electronics, automotive, industry, and medical solutions. Of tens of thousands of employees, about 5,500 are engineers.

In automotive, the company have established their business in three sectors:
• ADB headlighting—they've shipped samples of their Eviyos 2.0 product to leading automakers;
• Edge-emitting laser (EEL), the world’s first lidar solution for major autonomous driving brands (ADAS/autonomous driving sectors will likely be major markets for lidar systems)
• Consumer electronic products, including eye tracking, 3D sensing, and micro projectors (RGB laser and Micro LED) for metaverse devices.

Daniel Escamilla is Purchasing Veep at Luxit

LIGHTING NEWS

Luxit Group, a new integration of Myotek, Sea Link, and two other companies we described last week, have announced that veteran purchasing professional Daniel Escamilla,25 years of experience in the automotive and automotive lighting industries**,** has joined the company as vice president of purchasing. Escamilla joins Luxit after serving in a variety of purchasing leadership positions for Marelli, Automotive Lighting, Valeo, and Nissan. He holds a master's degree in management and business administration fromUniversità degli Studi di Torino in Italy, and a bachelor's degree in mechanical engineering from Instituto Politecnico Nacional in Mexico City.

Unveiled: 2024 Chevrolet Silverado EV

LIGHTING NEWS

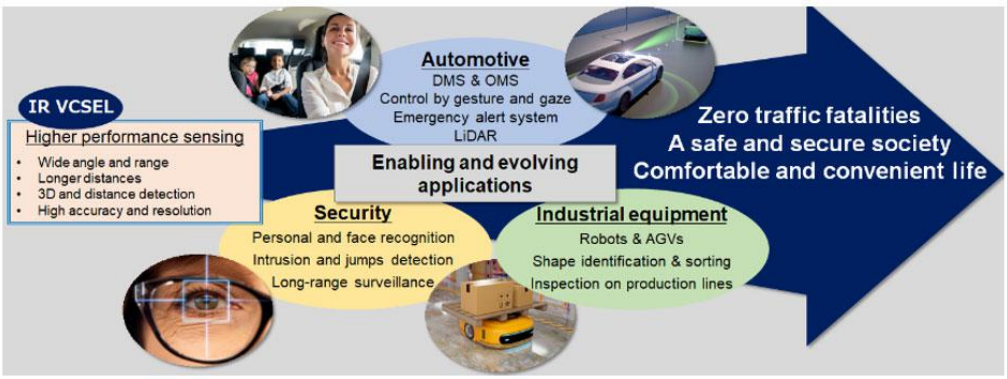
GM have taken wraps off two versions of their 2024 Chevrolet Silverado EV. The new pickup's January 5 online debut, also the start of customer reservations, disappointed those who had expected to see the truck live at CES 2022, on the Las Vegas stage with CEO Mary Barra.

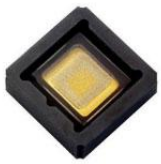
Enabling the truck's UX is Chevrolet's first application of Ultifi, a new Linux-based software platform developed in-house at GM. Ultifi separates the vehicle's software from the hardware to enable rapid and frequent software updates; over-the-air (OTA) capability is expected when production begins a GM's 'Factory Zero' complex in Detroit in 2023.

Driver Assistance News

Stanley's High-Power IR VCSEL

DRIVER ASSISTANCE NEWS





Stanley Electric have started mass production and shipment of a high-power infrared VCSELcompliant automotive quality standard AEC-Q102, for the world's first in-vehicle sensing device using an infrared VCSEL.
The product was developed in cooperation with Lumentum, a global leader in design and manufacturing of high-performance infrared VCSEL arrays.

Infrared sensors have long been used in a variety of applications, and in recent years their performance has rapidly increased. The use of driver monitoring systems to prevent driver-caused traffic accidents is increasing, and occupant monitoring systems to reduce the risk to passengers inside the vehicle are also becoming more common. Infrared LEDs are used in many of these applications. In the future, the increasing sophistication of automated driving and ADAS will require even higher performance sensing, creating new areas that cannot be achieved with the infrared LEDs that have been used to date.

LeddarTech for Safer, More Efficient Mobility

DRIVER ASSISTANCE NEWS

Here are some highlights from LeddarTech CEO Charles Boulanger (photo)**:**

• LeddarVision is a raw-data sensor fusion and perception platform that generates a comprehensive 3D environmental model with cost-effective, multisensor support for camera, radar and lidar configurations and that is scalable to support all vehicle automation levels. LeddarVision solves object-level fusion deficiencies of camera & radar in ADAS systems (autonomy levels 2 and 2+) and enables optimised perception performance for further autonomy (levels 3 to 5) with the fusion of camera, radar & lidar sensors.

• A second key offering is a versatile lidar development platform based on the LeddarEngine, comprised of lidar SoCs and signal processing software, and LeddarSteer, a game-changing solid-state digital beam steering technology. This platform provides components, software and tools that enable lidar developers and suppliers to develop automotive-grade lidar sensors to the specific requirements of automakers.

• Several years ago, LeddarTech established the Leddar Ecosystem, which comprises world-class partners, suppliers and collaborators to support LeddarTech customers in their development of automotive sensing solutions for ADAS and AV applications. In tandem with LeddarTech, the consortium provides additional technical expertise, components, software and services leveraging a hardware-agnostic platform that is open and scalable. Its members are prequalified for integration with LeddarTech's LeddarEngine and LeddarVision platforms.

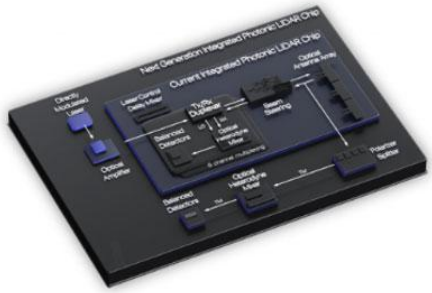
• The automotive industry has entered its most significant evolution of the last

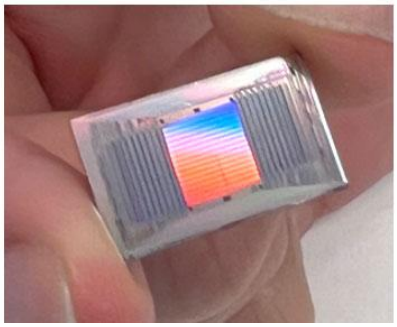
100 years due to innovations in technology and software. Cars today are essentially data on wheels, increasingly software-defined and silicone-intensive, with features that evolve rapidly to integrate advances in technology.

LeddarTech are well positioned for this, with special expertise in enabling unique software-based sensing and perception solutions that provide the necessary flexibility to scale and adapt the hardware for the evolution of ADAS and for the gradual progression towards autonomous vehicles.

$15m Series-A Funding for Voyant Photonics' New Lidar

DRIVER ASSISTANCE NEWS





Voyant Photonics, a firm who describe themselves as creating a new category of lidar sensors machine perception, have raised $15.4m in a Series A funding round. Voyant's lidar systems contain thousands of optical components fabricated on a single semiconductor chip, which is said to radically reduce the size and manufacturing complexity of lidar. According to Voyant, this will enable its customers to integrate an effective and exponentially more scalable lidar system than previously possible.

By leveraging commercially available and scalable semiconductor fabrication processes that combine thousands of optical and electrical components onto a single chip, Voyant can mass-produce an FMCW (frequency-modulated continuous-wave) lidar system similarly to how computer chips are made.

Cofounders Chris Phare and Steven Miller had been working on lidar chips for years at Columbia University's Lipson Nanophotonics Group when they decided to commercialise their technology and launched Voyant Photonics; Phare predicts "We will soon be selling lidar systems for a few hundred dollars and longer-term will sell them for less than a hundred dollars at scale".

Voyant's devices comprise a complete lidar system in a field-deployable package, using the firm’s techniques for on-chip digital beam steering, optical signal processing, and laser control.
Miller explains "Now we can make lidar systems on semiconductor chips, we can make them better and less expensive with every development cycle, similar to Moore's Law for computer chips. While the excellent performance of our first lidar chips surprised even us, this is just the beginning. Just like with computer chips and camera sensors, every design iteration will get better".

Magna Buy AV Startup Optimus Ride

DRIVER ASSISTANCE NEWS

Magna have acquired the technology, IP, and assets of Optimus Ride, a Boston-based startup who were trying to commercialise electric autonomous shuttles. As part of the deal, Magna have hired more than 120 Optimus Ride employees; beyond that, terms of the agreement were not disclosed.

Optimus Ride CEO Sean Harrington will not make the jump over to Magna and the AV startup will cease its operations.

Magna aim to leverage the tech and expertise from Optimus Ride to beef up their own ADAS efforts.

Magna president John O'Hara says "Growing our engineering bench strength in sensing hardware and software helps accelerate our path forward in a rapidly growing ADAS market".

The former Optimus Ride engineers will remain in Boston. Magna will use this new team to establish a Boston-based engineering centre, which in turn could help the company attract more software and robotics talent.

Global ADAS Market Could Be Worth $75bn by '30: Report

DRIVER ASSISTANCE NEWS

A Research and Markets study says the global ADAS market will grow from $27bn in 2021 to $75bn in 2030, at a CAGR of 12 per cent. Safety features are an important prerequisite for automotive customers across the world, and governments are mandating ADAS features.

Demand for luxury vehicles will further strengthen the demand for ADAS during the forecast period. Higher growth rates have been observed in developing countries such as China and India, among others. The standard of living has also improved in developing countries, along with a considerable rise in spending power. Too, the ADAS market in North America is projected to witness significant growth during the forecast period due to the higher penetration of ADAS features in most vehicles there.

Hesai, Lumentum Partner on New Lidar

DRIVER ASSISTANCE NEWS

Hesai, who specialise in lidar sensors, and Lumentum, whose expertise is in VCSEL (vertical-cavity surface-emitting laser) arrays for 3D sensing and other applications, have partnered for hybrid solid-state directional lidar ADAS technology development.

Conventional lidar approaches have been challenged by high costs and poor manufacturability. Incorporating VCSEL array light sources can significantly improve lidar cost competitiveness and scalability. Hesai CEO Dr. David Li says Lumentum have "been the global leader in VCSELs for consumer electronics. As the automotive industry transitions from the testing phase for AVs to mass volume production phase for ADAS applications, cost and manufacturability are the biggest challenges the industry faces; we are pleased to be collaborating with Lumentum on our hybrid solid-state lidar AT128 for ADAS applications, which contains an all-VCSEL-based design to achieve high-affordability, and automotive grade reliability and consistency requirements".

And Lumentum president and CEO Alan Lowe says he and his company are "excited to leverage our leading-edge multi-junction VCSEL array capabilities and manufacturing scale in working with Hesai to help enable innovative, cost-effective, and high-volume lidar solutions".

Over the past few years, more than a billion Lumentum VCSEL arrays have been deployed in mobile, consumer electronics, industrial, and other applications creating significant manufacturing economies of scale. At the same time, Lumentum's advancements in VCSEL array technology have resulted in record-breaking peak optical power densities and efficiencies, making Lumentum's VCSEL arrays suitable for high-performance ADAS and AV applications.

Hesai's AT128 is a hybrid solid-state directional lidar that features a 200m range at 10 per cent reflectivity, high point density (>1.5M points per second), and compact size. Each AT128 incorporates 128 of Lumentum's high-power multi-junction VCSEL arrays emitting at 905 nm.

General News

Aptiv Will Buy Wind River for $4.3bn

GENERAL NEWS

Automotive technology supplier Aptiv have agreed to buy software firm Wind River from private equity firm TPG Capital for USD $4.3bn.

Wind River make software for companies in the aerospace, defence, and automotive sectors. The company's 2021 revenue was about $400m. Aptiv say they will finance the deal through a combination of cash and debt.

Wind River's expertise is in technology and expertise to enable the deployment of safe, secure, and reliable IoT systems. The company will operate as a standalone business within Aptiv.

2021 U.S. light-vehicle sales

GENERAL NEWS

TOYOTA RAV4

In a chaotic year when demand for new vehicles greatly outstripped supply, some automakers had plenty to crow about as others experienced humbling lows. General Motors' 90-year streak as the top-selling automaker in the U.S. ended at the hands of Toyota, while Kia topped 700,000 sales for the first time.

Brand	2021 sales	Change
Toyota	2,027,000	10%
Ford	1,804,000	–6%
Chevrolet	1,422,000	–18%
Honda	1,309,000	8%
Nissan	919,000	12%
Jeep	778,000	–2%
Hyundai	738,000	19%
Kia	701,000	20%
Ram	647,000	3.60%
Subaru	583,000	–4%

Pickups

Brand	2021 sales	Change
Ford F-Series	726,004	–8%
Ram pickup	569,388	1%
Chevrolet Silverado	519,774	–11%
Toyota Tacoma	252,520	6%
GMC Sierra	248,924	–2%