



DVN STUDY

### NEW LIGHTING FUNCTIONS 2020-2030

To Improve Safety, Communication, Comfort, and Styling

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## Editorial

### DVN Quarterly: Lights, DA On Newly-Launched Vehicles

The auto shows are mostly suspended indefinitely on account of the pandemic, but we won't let that stop us informing you, our DVN Gold members, on the launches of new vehicle models.

After the Geneva show was canceled at the end of February, and the Paris show scrubbed in October, we took the initiative to devise other ways to scrutinise and analyse the new models' driver- and machine-vision technology and design innovations. We're grateful to automakers and suppliers' own efforts along similar lines, which have given a real boost to our efforts. Automakers have put together multi-day virtual events timed to what would have been the dates of the cancelled shows. The Bas du formulairePSA Group, for one example, created a digital facsimile of a spacious stand, with an interface that lets tire-kickers zoom in on a particular model, take a 360-degree tour of the styling, and check out the interior.

[DVN's first Quarterly Report](#) goes live today, and it covers lighting and driver assistance on, in, and around the new models launched over the last four months. We will carry on making reports like this—the next one in February, then June, then again next October—until the auto shows will resume one day, if ever they do. It's not clear when or if big, live, in-person events can safely resume, but we want to make it clear to you that we will regularly present the new worldwide models to keep you informed and up-to-date.

Don't forget the two important events coming up in the next two months: the 3<sup>rd</sup> [DVN Lidar Conference](#) on 17 November, and the [21<sup>st</sup> DVN Workshop](#) on 2 December. These events are travel-free so you can stay on top of the latest innovations in the industry all

from the comfort of your home or Office desk! You can also invite your team to make the most of our event! The presentation recordings will be online for a full week.

To stay visible and to avoid getting disconnected from the industrial community in these topsy-turvy times, we've made provisions for exhibitors to keep networking and showcasing their innovations as researchers share their latest work and practitioners discuss strategy. You're cordially invited; sign up and join in!

Sincerely yours

A handwritten signature in black ink, appearing to read "W. Frally". The signature is written in a cursive style with a large initial "W" and a long, sweeping tail.

DVN PRESIDENT

# In Depth Lighting Technology

## DVN's Takeaways From Recent Auto Launches

The first DVN Quarterly Report on recent auto launches goes live today. Some models were launched at virtual online motor shows, some in model- or marque-specific livestreamed events, and some in coordinated tie-ins with other new products. We've compiled this quick list of eight takeaway points from recent auto launches:

- **Very impressive cars considering styling, functions, and trends.**

The innovation curve keeps on growing steeper and steeper, as it seems, with innovation in functionality.



Lucid Air



Audi Q5



Mercedes-Benz S-Class



Human Horizons HiPhi X



Cadillac Lyriq concept



GAC EnPulse

- **Front lamps are growing slimmer and slimmer.**

There is a definite trend toward slit-shaped headlamps. To some degree it's fuelled by a sort of look-what-we-can-do-now exuberance as LEDs, laser diodes, light guides, and other technology expands the horizons of what's possible.



BMW 4 Series



Toyota Venza



Cadillac XT6

- **Rear lights, too, are becoming slimmer and slimmer.**

Here again, as at the front, even on large SUVs and big cars the trend is inexorably toward slimline lightstyling—probably driven by the same technical factors as the front lamps, reinforced by stylists' desire to tie together the front and rear of the car:



Infiniti QX60 Concept



Jaguar F-Pace



Porsche Panamera

- **Lights increasingly put forth and amplify brand signatures.**

3 examples: SEAT's triangular DRL signature, BMW's J-hook, and Peugeot's triple-claw

design are strongly characteristic of those brands' visual signatures.



• **New lighting functions are moving from the lab to the road.**

Message display panels, selectable-signature OLEDs, blue accent lights, matrix-effect decorations, and much, much more:



• **More and better 3D effects in the design of front and rear light units.**

We have come a very long way from the days when the only three-dimensionality of a lamp was its outer lens contour; take a look at these beautiful deepies:



• **Full-width light lines.**

Here again, light is the new chrome. We're seeing more and more linear arrays tying the left and right lights together—both at the front and at the rear:



• **Interior lighting is continuing its strong upward trajectory.**

Look at the beautiful deep blue accent lighting making the interior elements in the new Mercedes S-Class appear to float, for example, or the lightning-bolt effect in the Range Rover Evoque, or Rolls-Royce's magical Starlight headliner:



# Lighting News

## Cree Sell LED Business

LIGHTING NEWS



Cree are selling their LED business, Cree LED, to Smart Global Holdings for USD \$300m. Cree LED is one of the most powerful brands in the industry, with a product mix including high efficacy LED chips and high performance LED components.

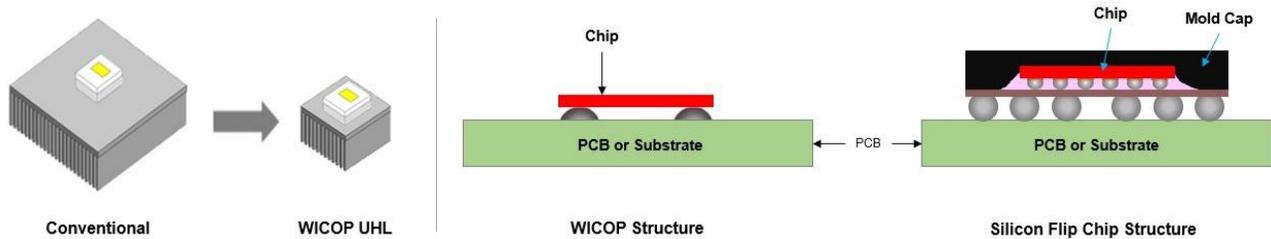


Smart Global Holdings CEO Mark Adams (photo)—who was Lumileds CEO from 2017-'19, says "As a leader in LED technology with a highly respected brand and expansive patent portfolio, Cree LED has a track record of delivering best-in-class solutions through well-established distribution and sales channels".

Smart are a global enterprise in dedicated memory, storage, and high-performance computing solutions; they've been serving in the electronics industry for over 30 years. The sale is expected to close early next year, pending regulatory approval and satisfaction of customary closing conditions. Afterward, Cree will carry on investing in the semiconductor field.

# Seoul SC's New WICOP For Even Slimmer Headlamps

## LIGHTING NEWS



Seoul Semiconductor have launched their newest WICOP UHL (Wafer Integrated Chip on PCB, Ultra High Luminance) LEDs, which can reduce headlamp power consumption up to 20% and exhibit up to 40% better heat dissipation than competing products. Seoul SC say in headlamps, WICOP UHL LEDs can allow heat sink mass to be reduced by 75%. The light emitting area is extremely small at about 0.5 mm<sup>2</sup>, which enables a slim headlamp design with high-precision optics.

WICOP is the first patented packageless LED technology developed by Seoul Semiconductor. Unlike flip chip technology that must be bonded in the semiconductor process, WICOP LEDs can be easily surface-mounted in the general substrate bonding process. Mini LEDs also use the WICOP technology with a robust structure. The new light sources will enter mass production next year.

# Lights Out for Rolls' Flying Lady

## LIGHTING NEWS



The illuminated "Spirit of Ecstasy" ornamental mascot (photo, unlit and lit) first appeared on Rolls-Royce's electric, self-driving 103EX concept car of 2016. Soon afterwards, it was offered as a €3,900 option to cap off the grille of production Rolls models.

But the decorative light falls afoul of UN Regulation 48, and Rolls-Royce will have to disconnect the figurines on vehicles in Europe and the many other countries where UN R48 applies.

The luxury automaker say they've withdrawn the option from sale and will offer customers a full refund and a replacement mascot of one kind or another as compensation for the disconnection in accord with what they are calling "a change in European Union regulations relating to lighting on cars, believed to be part to a much wider crackdown against 'light pollution'." UN Regulation 48 sets forth requirements for vehicle lights, signals, and reflectors, and does not address light pollution—with or without sneer quotes.

The self-lit "Flying Lady" ornament was offered as an option on all Rolls-Royce models including the top of the range Phantom, the previous generation of the Ghost, the Wraith models, the Dawn cabriolet, and the Cullinan off-roader.

A Rolls-Royce representative said "Sadly, we are telling our customers that we will by law have to disconnect their Spirit of Ecstasy. We are in the process of putting a package together. We shall write to make an offer of a full refund, a replacement silver-plated Spirit of Ecstasy, or another option from our list. We felt it our moral obligation. We sold this option in very good faith. We are forced to retract it now through no fault of our own."

# VW ID3 : Lighting as New Chrome

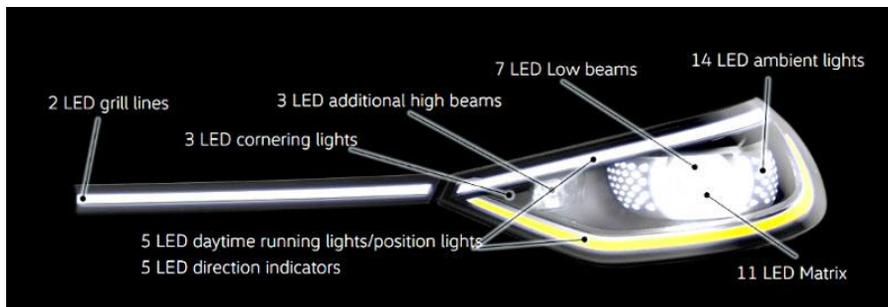
## LIGHTING NEWS



ID.3 embodies VW's philosophy that light is today's chrome, with LED lighting in multiple areas to stage the ID.3 design.

### In the front

Interactive matrix LED headlamps give out 750 lumens, and have Dynamic Light Assist mainbeam control. The ADB, glare-free high beam automatically switches on at speeds over 60 km/h and remains active without dazzling oncoming traffic.



### In the Rear

The rear of the ID.3 is divided by horizontally-arranged, slim LED tail light clusters.



In the High version, combined with the Marris light in the front, the rear light offers a Premium tail light signature with a super red light colour, a Stop light signature, two available Welcome and goodbye scenarios, and a dynamic turn signal.

More information in the [DVN report](#) «New Models July-October 2020» released today.

# Tiguan: Matrix in Front, Dynamic TI & Farewell in Rear

## LIGHTING NEWS



There are two versions, one for entry model the second one for high version

### In Front End



LED BASIC REFLECTOR



TOP LED MATRIX HEADLIGHT

OVERVIEW : HEADLIGHT VARIANTS IN THE TIGUAN

In the high version, VW offers

- IQ.Light with AFS functions (Motorway, bad weather, bending light, cornering light, city light) and Dynamic Light Assist with LED matrix 24 segments (dipped beam base light, additional main beam, matrix beam row).
- LED DRL & parking lights have a 3D signature
- Dynamic Light Assist with LED matrix (24 segments)
- Dynamic turn indicator



PRINCIPLE OF ADB, NAMED DLA, DYNAMIC LIGHT ASSIST BY VW

## In Rear End

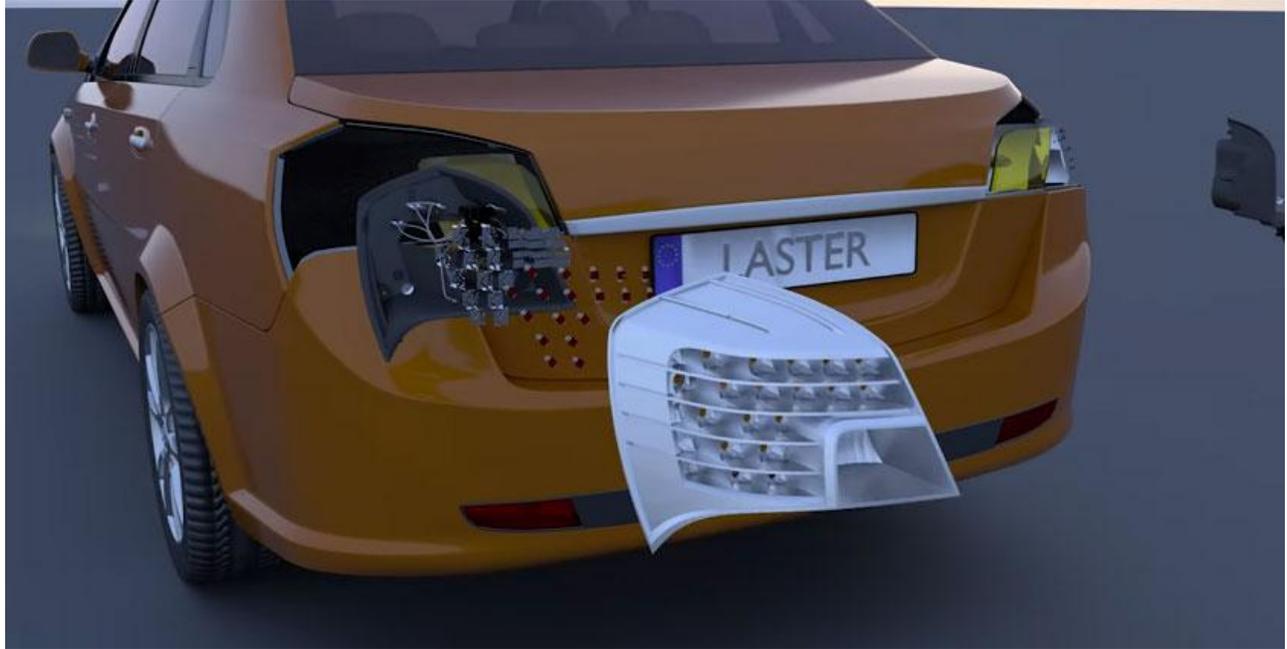


- In the high version, VW offers
- Dynamic light in tail and brake
  - Dynamic LED turn indicator vs incandescent bulb
  - Welcome/Farewell functions

More information in the [DVN report](#) «New Models July-October 2020» released today

# Laster Tech's Revenue Grows by Leaps and Bounds

## LIGHTING NEWS



Taiwanese automotive LED module manufacturer Laster Tech announced sunny operating results for last month: on strength of automotive LED module shipment volume, Laster's revenue was up 50% YoY. The consolidated revenue in Q3-20 was up 25% YoY, a record high quarterly revenue for the same period in history.

Automotive LED proliferation remains strong, and the new-car market in China gradually picked up, boosting sales to Laster's major customers. In particular, new car models entering mass production in July sold well in the Chinese market, boosting demand for Laster's LED taillight modules and bolstering the supplier's strong performance in the third quarter.

Looking ahead to the fourth quarter of this year, Laster expect their operations to continue to benefit from the brisk and accelerating shift toward LED technology in vehicle lighting and the growth of the new car sales market. Laster Tech's Shanghai plant is nearing full capacity, and the production line is currently being restarted to meet the increased demand.

# A Laser Laboratory for Andaltec Plastic Tech Centre

## LIGHTING NEWS



Andaltec, the plastics technology centre in Spain, has put in a versatile laser laboratory to allow texturing of metal surfaces, patterns, markings, and feasibility studies. The new lab will bolster Andaltec's R&D project capabilities, furthering their objective to improve the competitiveness of companies in the automotive and packaging sectors.

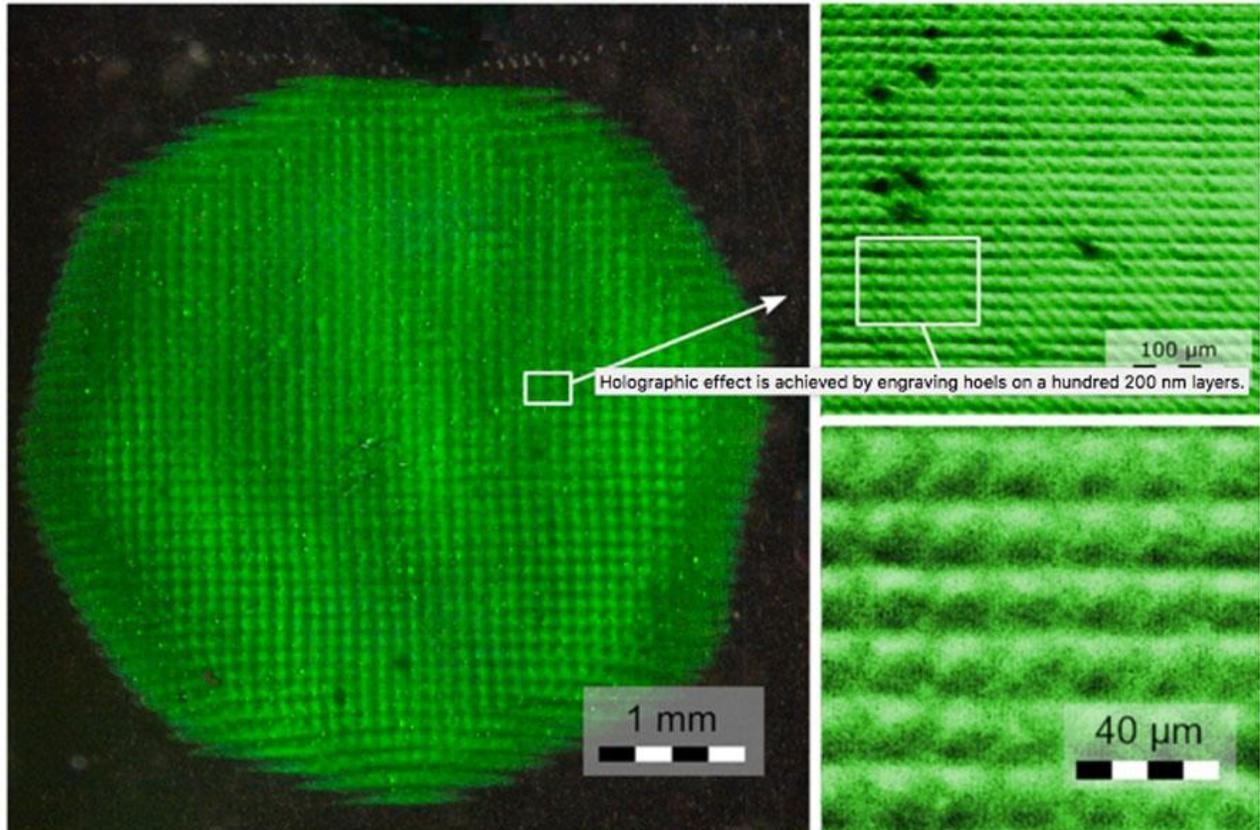
The laser laboratory, furnished by laser specialists Innova Scientific, has a pulsed laser source, an optical assembly, and the apposite peripherals. The laser source offers a pulse duration of less than 400 femtoseconds (four ten-trillionths of a second,  $4 \times 10^{-13}$  second), brief enough to perform "cold" ablation that doesn't heat up the material being ablated. This equipment can be used to provide polymers and metals with innovative surface treatments to investigate new properties in materials, such as achieving hydrophobic or hydrophilic surfaces, specific optical characteristics, or achieving anti-fog and anti-condensation surfaces.

Andaltec manager José María Navarro says "The properties of a metal or polymer reside mainly in how its surface characteristics are, so we are going to seek to perform surface treatments on the polymers themselves or on the metals that make them up using laser techniques, in order to achieve novel effects in the materials".

Andaltec will soon launch another tender, aimed at the acquisition of a multilayer film extrusion equipment and a compounder. It is equipment used for the development of new plastic materials for the packaging and agri-food sectors.

# CEA-LETI's Miniature Pixelated Hologram

LIGHTING NEWS

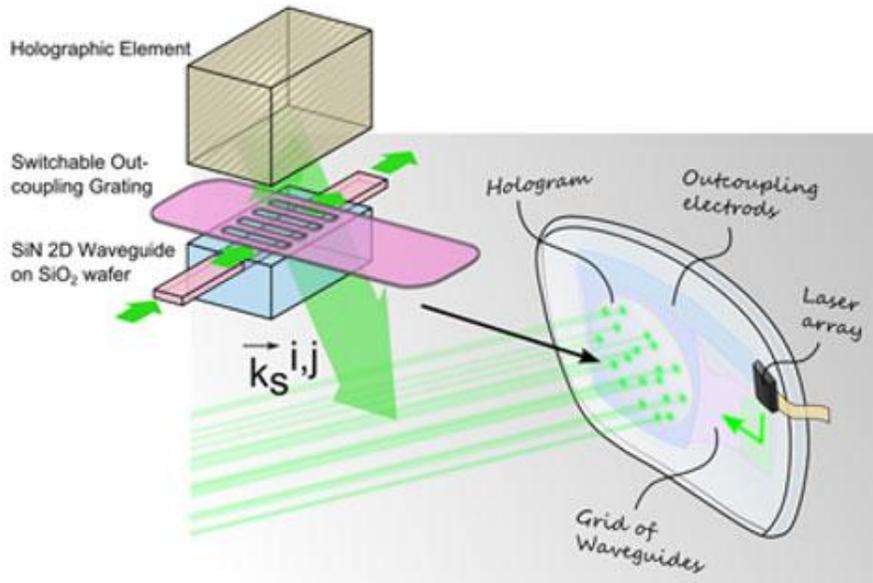


*The holographic effect is achieved by engraving hoels on a hundred 200 nm layers featuring angular disparities. © CEA-Leti.*

Could holograms one day be displayed on augmented-reality glasses? French research institute CEA-Leti say they have achieved a major step towards this aim by printing pixelated holograms on a component measuring only  $6 \times 6$  mm.

Augmented reality glasses allow viewers to observe a real scene, while viewing additional information relevant to the scene: explanatory text, instructions, diagrams, photos, advertisements, and other suchlike. CEA-Leti's ambition is to use holograms in micro- and nanophotonic manufacturing processes for AR applications and others. To avoid reducing the visual field, these holograms must be displayed in an area of a few tens of square millimetres, approximately the size of a postage stamp.

The technique involves printing on this surface holographic pixels or "hoels" to reconstruct a coherent image in the back of the eye when they're illuminated by laser microsources.



MOTIFS ARE PRINTED WITHIN A TRANSPARENT PHOTOPOLYMER VOLUME

# Driver Assistance News

## Israeli Duo Demo Automatic Lanekeeper

DRIVER ASSISTANCE NEWS



Israeli suppliers Foretellix and Mobileye have jointly launched technology to help automakers meet UN Regulation 157's performance requirements for automatic lanekeeping systems.

R157, agreed this past Summer and set to take effect this coming January, is the first binding international regulation on L<sup>3</sup> vehicle automation. It establishes stringent requirements for automated lanekeeping systems (ALKS) for passenger cars which, once activated, are in primary control of the vehicle. However, the driver can override such systems and can be requested by the system to intervene, at any moment.

ALKS can be activated under certain conditions on roads where pedestrians and cyclists are prohibited and which, by design, are equipped with a physical separation that divides the traffic moving in opposite directions. In its current form, R157 caps the operational speed of ALKS systems to a maximum of 60 km/h.

The regulation, drafted under the leadership of Germany and Japan, also includes general requirements regarding system safety and the system's failsafe response, how the driving task shall be handed over from the system to the driver, as well as emergency and minimum risk manoeuvres and other requirements.

Foretellix develop intelligent automation and analytic tools to orchestrate and monitor hundreds of millions of driving scenarios, including edge cases, providing the confidence required to allow the broad deployment of ADAS & autonomous vehicles. Mobileye are a leading innovator and supplier of vision systems for ADAS, AD, and AVs.

# Hesai PandarXT Lowers Lidar Cost

DRIVER ASSISTANCE NEWS



Chinese manufacturer Hesai have developed a 32-channel midrange lidar called PandarXT. It is aimed at robotics and low- to medium-speed autonomous driving, and is based on a new system architecture for cost-sensitive applications.

The PandarXT is designed to meet a carefully balanced performance, reliability and cost. A key role is played by several ASICs developed by Hesai themselves, which integrate the functions of dozens of printed circuit boards. The new transceiver system streamlines several complex optical assembly and matching processes in a single process, reducing costs and improving manufacturing performance, reliability and scalability.

The new sensor operates from zero distance and outputs a valid point cloud even when an object directly touches the sensor's housing. It also has millimetre-accurate measurement range. In addition, the improved reflectivity accuracy and wider dynamic range enable accurate and consistent detection of retroreflectors, low reflectivity targets and object boundaries with sudden changes in reflectivity.

# General News

## China sales : - 3% in 2020, Growth in 2021

### GENERAL NEWS



BEIJING AUTOSHOW

Overall auto sales in China are expected to drop 3% this year and return to growth next year, according to the Ministry of Industry and Information Technology, the regulator of China's industrial sectors including automobiles.

"According to institutions' forecast, the decline in auto sales and production this year will be around 3%, with sales approaching 25 million units," said Huang Libin, a spokesman for the ministry, at a press conference in Beijing Thursday.

"Next year auto sales in our country are expected continue to recover and post positive growth," he added.

In September, China's auto sales maintained growth for the sixth straight month, advancing nearly 13% from a year earlier to some 2.57 million deliveries.

# German Companies Report Optimism

GENERAL NEWS



Despite the pandemic, Brexit, political instability in the United States, and trade conflicts, German companies are quite optimistic—that's according to a survey by auditing company KPMG, in which 601 decisionmakers such as CEOs, board members, and strategy managers took part between April and June. 60% of respondents see their companies as well-positioned in the medium term. The responses of managers from twelve key industries were evaluated for their assessment of the future, their current self-assessment and the current focus of activity and investment.

The optimism after the first lockdown suggests that many companies have recognised how resilient they are, said KPMG board member Mattias Schmelzer. But the mood in the various sectors differs greatly in some cases; banks and insurance companies as well as companies from the energy and consumer goods industries are much more positive than in the previous year, but things look bleak for media, telecommunications, retail, and—above all—the automotive industry, wherein the mood has fallen continuously since the first survey in 2018 from 68% to 44%.

The drastic differences were not solely due to the pandemic, Schmelzer emphasises. It is also important which challenges these sectors have to overcome and how well they have been able to deal with trends such as digitalisation and changing customer needs.

KPMG's "Future Readiness Index 2020" also finds that three key topics are particularly important to companies: 84% say flexible working conditions and working time models were given priority as a result of the pandemic. 71% want to adapt their staff and bundle knowledge, for example by strengthening core competencies and saving jobs elsewhere. 68% attach importance to the digitalisation of their sales channels and customer communication. "Many German companies have recognised the need for action. They have to improve their adaptability", says Schmelzer.

# New CEO for Magna

## GENERAL NEWS



Canadian auto supplier Magna have named President Swamy Kotagiri (photo) as their new CEO. Starting this January, he will succeed Don Walker. "Given Swamy's role in aligning the company's strategy with the megatrends impacting new mobility and the 'car of the future', he is the right leader to take Magna forward", says William L. Young, chairman of Magna's board of directors.

Kotagiri has more than 25 years' experience in the automotive industry experience, 21 of which have been with Magna. He previously served as Magna's CTO.