



# Editorial

## DVN-I E-Workshop: Success Pending!

As you're probably aware, a year ago DVN expanded the scope of our activity by launching DVN-Interior, or DVN-I. With the ongoing ACES revolution—**autonomous, connected, electric, and shared** vehicles—mobility use cases are changing drastically. Car interiors are becoming a bona fide living space, and therefore a real product differentiator, allowing drivers and occupants to do all sorts of activities not previously compatible with driving or riding in a car. Relaxing, working, phoning, reading, all catered for with amenities including smarter and more capable lighting systems. Thanks to all these new usages, car interiors are one of the strongest growing pieces of the vehicle, introducing millions of new technologies, apps, and features.

Since last year's launch, DVN-I members receive a newsletter every two weeks and a report every quarter. These newsletters and reports, like the DVN items you're familiar with, have gone from strength to strength. Now comes the inaugural DVN-I Workshop! On 24 September, the **e-Workshop on Smart Interiors** will get under way, dedicated to new technologies for interior and mobility. We've built a fantastic roster of presenters and lecturers, exhibitions and opportunities, and we're very excited at the opportunity to try out a bunch of new technology and techniques for virtual gathering. We think it's going to be just as big a success as every previous in-person DVN Workshop. 120 attendees are already registered among which representatives from Audi, BMW, Geely Auto, Mercedes, PSA, Volvo, Koito, Marelli, Valeo, Faurecia, and we expect a total of more than 200 attendees.

An especially nifty part of the online conference will be the virtual exhibition booths showing innovative technologies and products during the online workshop and for a week afterward while the website will stay open. [See here](#) for a presentation of what a virtual booth looks like. Register [here](#) to attend and see the conference program [here](#).

The online conference will start with three keynote presentations from Valeo CTO Geoffrey Bouquot on Smart Technology for Smart Interiors; Faurecia CTO Christophe Aufrère on Cockpit of the Future, and Dave Muyres, Mobility Futurist and Streetscope VP, on future mobility's challenges. Watch [HERE](#) to see Valeo CTO Geoffrey Bouquot pitch presentation.

The technical sessions' rubrics are Interior as a System; Any Surface Becomes Functional; Seating; Interior Design; and Simulation and Software, Electronics. 20 lectures will be presented by managers and experts from automakers, suppliers, research and expertise groups, and industry alliances including Audi, BMW, Honda, Adient, Covestro, Dräxlmeier, Faurecia, Future Lighting Technologies, Hella, Marelli, Osram Continental, Recticel, Sensata, Texas Instruments, Valeo, Weisplas, Yole, ZF, EPIC, and ISELED.

I'm personally and professionally looking forward to virtually meeting you at the workshop!

Sincerely yours

A handwritten signature in black ink, appearing to read "D. Frally". The signature is written in a cursive, slightly slanted style.

DVN PRESIDENT

# In Depth Lighting Technology

## You Really Must Have the New DVN Study. Here's Why.

The new DVN Study **New Lighting Functions 2020–2030** describes in 125 detailed pages how safety, communication, comfort, and styling with light can most feasibly be improved in context of today's and tomorrow's realities on the ground around the world. It's now available for purchase.

The main reason you should buy this study is to have the most current, complete information on new ideas, functions, use cases, and variables that will form the future of vehicle lighting. There are going to be numerous changes—some quite fundamental—to just about every part of the vehicle lighting toolbox, value chain, and world. And not just in some far-off future; the changes are here and accelerating. Everyone must prepare now—despite 2020's challenges.

That's the primary main reason to buy the study, but it's not the only reason. Here are more:

- It's prefaced by one of the great minds of vehicle lighting regulation—the Chairman of GRE—who explains how to manage regulatory issues, and by an industrial head of innovation, who presents the challenges of new lighting functions in the next decade;
- It presents in detail the new exterior and interior lighting functions to improve safety, comfort and styling, considering the regulatory implications;
- It provides a working answer to three key variables: car demand in the coming months and years considering the pandemic; the shape and size of the overall vehicle lighting market in medium and long terms, and the influence of lighting in fatalities today and in the future with new lighting functions.
- It's packed with relevant, new information efficiently presented as 11 best bets built by eight experts, each with more than 30 years' experience in lighting.



### LIST OF COMPANIES INTERVIEWED FOR THE STUDY

These best bets form the position of DVN after extensive interviews with 35 companies including automakers, lighting suppliers, research institutes, and consortiums involved in lighting. Some of these best bets are broad-stroke descriptions of major goals and

trends; others are key challenges and opportunities.

For example, one of them centres on vulnerable road users and the evolution of lighting to drive down the unacceptably high rate at which they're killed and injured in traffic at night. Another looks at the future of a certain technological category and its applicability to new exterior and interior lighting functions using HR resolution from matrix, DMD,  $\mu$ LED, MLA . Another explores differences of styling imposed by brands as decorative illuminations, considering regulation and still another develops evolution of digitalization and personalization for new safety and styling features.. That's just a quick description of four examples out of a list of eleven!



#### THE 8 EXPERTS WHO BUILT THE STUDY

This study, made by 8 automotive lighting experts, each with more than 30 years experience, will materially help lighting and driver-vision decisionmakers to build and optimise their long-term strategies and plans, while simultaneously helping specifiers, researchers, engineers, designers, stylists, and regulators focus and target their work efforts. The study was built because all of us at DVN are convinced that new functions will be the main challenge of vehicle lighting in the next decade.

More information about price and contents [following this link](#)

[Contact DVN's Salomon Berner](#) to buy your copy or buy directly [HERE](#) .

**Here's the table of main contents to whet your appetite:**

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Road Traffic Fatalities by Region

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Lighting functions and new communication functions for safety

Communication functions: Description, Interest and Challenges

**Chapter 7: Overview of technologies for new safety and communication lighting functions**

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# Lighting News

## VISION Congress Rescheduled to March 17th & 18th, 2021

### LIGHTING NEWS

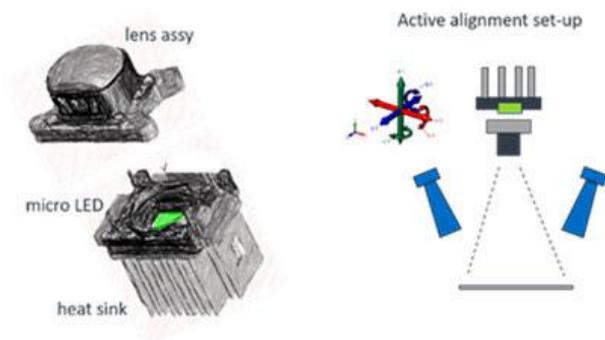
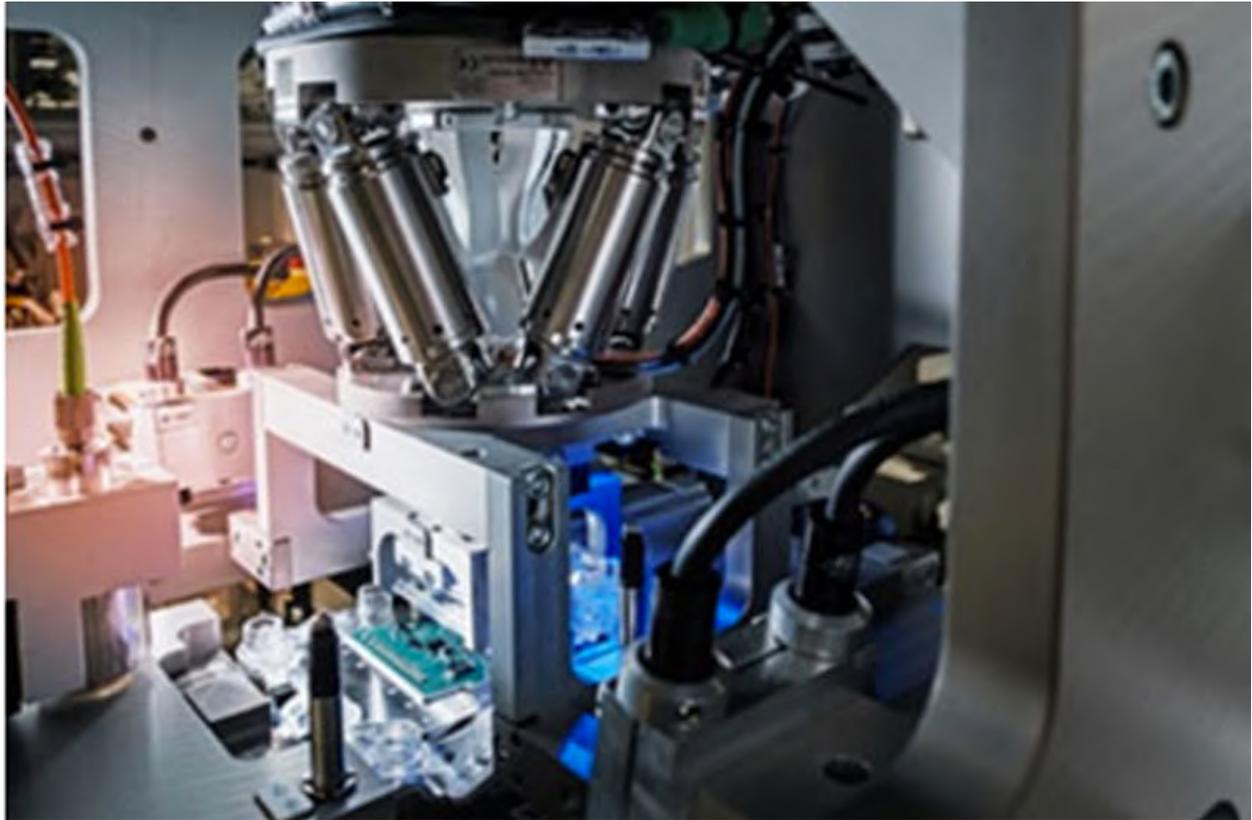
A promotional banner for the SIA VISION 2020 conference. The background is dark with light trails from a car at night. A red speech bubble in the top right corner contains the text '7 - 8 OCTOBER 2020'. The main text includes 'International Conference and Exhibition', 'SIA VISION 2020', 'Vehicle and Infrastructure Safety Improvement in Adverse Conditions', 'NIGHT DRIVE TEST AT MORTEFONTAINE PRIVATE TRACK', 'CITÉ DES SCIENCES ET DE L'INDUSTRIE // PARIS - FRANCE', and the SIA logo with the text 'SOCIÉTÉ DES INGÉNIEURS DE L'AUTOMOBILE'.

Due to growing concerns and new measures taken by governments and companies regarding the COVID-19, and after consulting the conference's Steering Committee, the VISION organization decided that "SIA VISION Conference" initially planned on October 7<sup>th</sup> & 8<sup>th</sup>, 2020 will be rescheduled to **March 17<sup>th</sup> & 18<sup>th</sup>, 2021** in the same venue, same exhibition hall and same set-up.

The organization could have decided to digitalize the conference but it is convinced of the importance of keeping SIA VISION as a face-to-face event as we are more than confident that it will be a great opportunity for all to meet again, exchange and network after this difficult and long time

# IMS: Experts in Automatic Light Module Assembly Lines

## LIGHTING NEWS



Two technologies are presently at the top of the heap in HD projection:  $\mu$ LED and DMD.

$\mu$ LED (microLED) is based on thousands of individually programmable LEDs, produced by suppliers including Lumileds, Nichia, and Osram. Digital Micromirror Devices (DMD) have up to a million individually-aimable micromirrors; the basis is the Digital Light Processing technology from Texas Instruments.

Until recent, assembly of light modules often was based on straightforward builds. No high-accuracy assembly was needed, as tolerances were in the 0.1 mm range.

For HD light modules, however, a completely new way of assembly is necessary to have the optimal result. This new way allows fast assembly even with accuracies well below 5  $\mu$ m. It means manoeuvring the lens-set in the adhesive until the optimal projected image is realised. During the manipulation of the lens package, the light source is switched on and the projection is automatically analysed with high-resolution cameras. In several steps—microaccurate movements of the lens set relative to the

light source or vice versa—the optimal image quality is determined. Once this is found, the glue is cured. Result is an optimised light module with accuracy fixed over its lifetime.

*IMS, expert in this kind of assembly work, make automated assembly lines for light modules for headlamps, and build assembly machines for e.g. matrix light modules,  $\mu$ LED modules, and DMD based modules.*

# Tiny, Teeny LEDs For New Automotive Applications

LIGHTING NEWS



Micro- and miniLEDs are two technologies to enable new vehicle lighting functions. Many suppliers are working on these technologies. Osram demonstrated their Eviyos headlamp module with 2,048 pixels last year, and are developing a new version with up to 25,600 pixels based on microLED technology. Nichia and Infineon are developing a microLED-based headlamp featuring 16,000 pixel as well, and late last year Valeo were testing their four-kilopixel headlamp, jointly developed with Cree.

Automakers are increasingly opting for (or at least experimenting with) high-resolution and local dimming technologies for automotive display to provide higher brightness and better contrast ratio. Some choose miniLED-based packages matched with drive ICs to achieve high-resolution, locally-dimming displays.

# EOI to Expand MiniLED Automotive Display Business

LIGHTING NEWS



EOI (Excellence Optoelectronics) have received orders for miniLED automotive displays. The supplier will continue to expand their miniLED display portfolio of automotive dashboards, head up displays, and fine-pitch LED video walls. EOI began miniLED display development in 2018, and set up a new facility in Taiwan for mini- and microLED display production. The company have sent samples of their miniLED display product to a leading automaker for interior display applications. The LED chips favoured by EOI are from Epistar and HPO.

Alongside the mini- and microLED work, EOI carry on delivering tail light modules for Tesla Models 3 and Y; in July and August, EOI's revenues were driven by their Tesla work. Although delivery was delayed due to the pandemic, EOI now say shipments are back on schedule.

# Hella Bolster Software Competencies

## LIGHTING NEWS



Hella are further expanding their global software competencies with a new operation they're calling the Global Software House, to be managed by the supplier's Berlin subsidiary Aglaia. The new operation will take global responsibility for coördinating software activities across the company and develop new, digitalised business models.

Hella currently employ around 2,000 software experts worldwide, particularly in the field of embedded software, for example in functional development for sensors, steering electronics and lighting control.

"The future of the automobile is largely decided by software developers. By 2030, the market for software and electronics in vehicles will almost double," says Hella CEO Dr. Rolf Breidenbach. "This does not even take into account the diverse, far-reaching applications of digitalisation and software in production and administration. This presents Hella with great opportunities, but also new challenges."

By founding the Global Software House, Hella's initial aim is to reduce the emerging complexities surrounding software development. The new organisational unit will align the development activities across the company in software and define uniform, cross-divisional process standards and methods. The associated support functions, such as purchasing, quality and legal, are also united in the Global Software House. To begin with, employees of the Global Software House and the regional Software House satellites, for example at the company headquarters in Lippstadt and in Romania and India, will be primarily recruited from parts of the existing Hella reporting staff.

Among other aims, the Global Software House's second step is to accelerate the development of new software-based business models by offering software as a standalone product which could be applied in lighting control, software solutions for automated driving and cloud services.

# Lucid's Lidars for ADAS and ADB

## LIGHTING NEWS



Lucid have unveiled production details of their LucidAir electric vehicle. It features cutting-edge technologies including lidar-embedded ADAS and advanced headlighting.

The Lucid Air's ADAS suite is called Lucid DreamDrive, which is a platform combining comprehensive sensor suite with a Driver Monitoring System (DMS). According to Lucid Motors, it is the first system of its kind to offer 32 sensors, covering vision, radar, and ultrasonics, plus high-resolution lidar, in an EV. The system works alongside the standard DMS and geofenced HD mapping to provide L<sup>2</sup> and L<sup>3</sup> driver assistance technologies.

The headlamps use a microlens array system comprising thousands of light pixels, which Lucid call "light channels". They say digital steering of the light is possible by digitally switching light channels in different directions, implying ADB capabilities from the lighting system developed in-house by Lucid.

The Lucid Air will be available in North America and other markets starting sometime next year.

# Automotive Safety: In Car and On Road

## LIGHTING NEWS



Millions of lives are lost every year due to road traffic collisions—a figure called an outrage by the UN World Health Organization's Director-General Tedros Adhanom Ghebreyesus, speaking at the Road Safety Conference in Sweden last February: "It is an unacceptable price to pay for mobility".

According to WHO figures, approximately 1.35 million people still die in road crashes each year; on average 3,700 people lose their lives every day on the roads. An additional 20-50 million suffer non-fatal injuries, often resulting in long-term disabilities.

Driver error is a factor in virtually all crashes—one reason why automation has been held up as a potential giant boost for safety.

To estimate how many crashes might continue to occur if self-driving cars are designed to make the same decisions about risk that humans do, researchers at IIHS (the U.S. Insurance Institute for Highway Safety) examined more than 5,000 police-reported crashes from the National Motor Vehicle Crash Causation Survey. Collected by the National Highway Traffic Safety Administration, this sample is representative of crashes in the U.S. in which at least one vehicle was towed away, and emergency medical services were called to the scene.

The IIHS team reviewed the case files and separated the driver-related factors that contributed to the crashes into 5 categories:

- **Sensing and perceiving errors (23% of crashes) included things like impeded visibility, and failing to recognize hazards in time to avoid them.**
- Incapacitation (10%) involved driver impairment by alcohol or drugs, medical conditions, or fatigue/falling asleep at the wheel.
- Predicting errors occurred when drivers misjudged a gap in traffic, incorrectly estimated how fast another vehicle was going, or made an incorrect assumption about what another road user was going to do.
- Planning and deciding errors included driving too fast or slowly for the road conditions, driving aggressively, and following too closely the vehicle ahead.
- Execution and performance errors included inadequate or incorrect evasive maneuvers, overcompensation, and other car-control mistakes.

# Driver Assistance News

## Lidars, Cameras, Radars are All Needed: Volvo CEO

DRIVER ASSISTANCE NEWS



Volvo CEO Hakan Samuelsson (photo) shares some recent thoughts about ADAS and AV, and his considered opinion on what's needed for a safe, performant automated vehicle sensor suite differs to that of notoriously lidar-dismissive Tesla CEO Elon Musk:

"To be really safe, you need lidar, cameras and radars and they have to be sensor fused into a centralised vision computing system. Our SPA2 architecture was designed for this. Now that Zenuity is a stand-alone unit within Volvo it is fully concentrating on that next-generation autonomous driving and ADAS. However, all functionality will not be available on day one. It also might not initially work in all types of weather, but the system will get smarter and smarter as time goes by because of over-the-air updates.

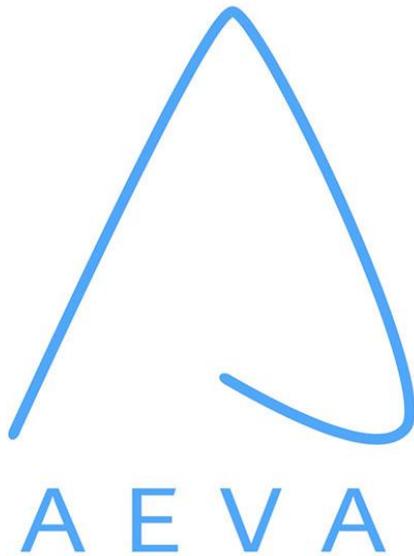


"What's more important than Level 3, 4, and 5 is what you write in the car's owner's manual. If you want to sell something that offers unsupervised driving, it has to be safer than a normal car. This is something the new cars will be designed for when it comes to their computing platform, hardware and devices. The question is when exactly will the software be ready. That is something we will come back to later, but it's coming because I'm absolutely convinced it's a very attractive product that would make a premium car much more valuable.

"When it comes to autonomous driving we have Nvidia processors; Luminar are an important partner for lidar; and now we are working with Waymo on robo-taxis. Partnerships are absolutely the right way to go. If you don't have the competence you shouldn't even try. We have enough to do with our core business."

# ZF, Aeva in Self-Drive Sensor Pact

DRIVER ASSISTANCE NEWS



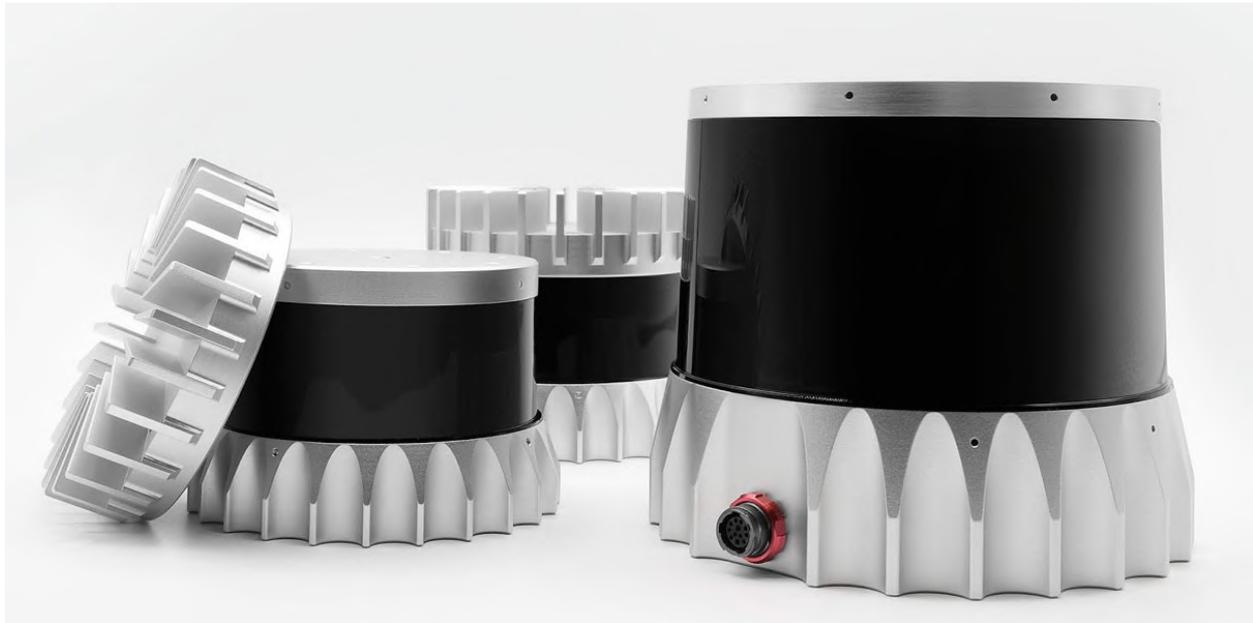
ZF Friedrichshafen and Silicon Valley startup Aeva are partnering on lidar for self-driving vehicles.

Dozens of companies have been working to reduce lidar sensors' cost to enable mass production. Aeva's sensor uses frequency-modulated continuous wave technology—FMCW, for short—which can also detect the speed of distant objects, discerning stationary ones like trees from moving objects like bikes.

Under the partnership, Aeva will be responsible for core sensing functionality, performance and algorithms. ZF will produce an automotive-grade sensor. The companies aim to produce the sensors by 2023 or 2024, Aeva CEO Soroush Salehian says: "As we've come down from autonomous overall hype, and we're actually getting down to business, there's a clear focus on creating products that are going to be commercially viable in the short term". One of Aeva's major technology developments was designing an FMCW lidar that could be built using standard silicon semiconductor equipment and processes rather than costlier methods.

# Ouster Raise Funds for Lidar Development

DRIVER ASSISTANCE NEWS



Lidar sensor producer Ouster have raised USD \$42m in new investment to fund product development and further accelerate worldwide sales. After launching their second generation of high-resolution lidar sensors last January, Ouster's 12-month revenue has grown by 62%, with Q3 bookings up 209% YoY.

The company unveiled two new lidar sensors earlier this year. Their semiconductor-based technology replaces complex legacy analog architecture and cuts the price of automotive lidars.

In response to strong global demand, Ouster have opened offices in Paris, Hamburg, Frankfurt, Hong Kong, and Suzhou to expand their global sales and customer service capabilities.

# General News

## Top 10 Automaker Groups

### GENERAL NEWS



Volkswagen and Toyota have a sizable lead over the rest of their peers.

<b>Automaker</b>	<b>2019 Revenue \$bn</b>
Volkswagen	\$290
Toyota	\$272
Ford	\$156
Honda	\$143
General Motors	\$137
Fiat Chrysler	\$122
BMW	\$117
Daimler	\$105
Nissan	\$92
Hyundai	\$91

The Volkswagen Group holds a comprehensive portfolio of brands and services, and has been the world's largest automaker, by sales, for the past three years. Their numerous brands reported the following results for 2019:

<b>Brand</b>	<b>Sales</b>	<b>Revenue \$bn</b>
VW	3,677,000	\$99
Audi & Lamborghini & Ducati	1,200,000	\$63
Škoda	1,062,000	\$22
SEAT	667,000	\$13
Porsche	277,000	\$30
Bentley	12,000	\$2.3

Volkswagen Group delivered just short of 11 million vehicles in 2019, exceeding their 2018 deliveries by 1.3% and setting a new record for the group. While 49% of these vehicles were produced in Europe, the group operates a global production network with a significant presence in Asia with 38%.

Toyota operate a much more concentrated brand portfolio, with Toyota and Lexus being their two most prominent names. A testament to Toyota's global influence is their relatively balanced breakdown of 2019 revenues by regional market: 30% in North America, 25% in Japan, 18% in Asia, and 12% in Europe.

While automobiles represent the core business for these companies, many of them have alternative revenue sources. Honda produce motorcycles, boat engines, lawn mowers, generators, and personal jets. Porsche take a different approach with their accessories and licensing subsidiary, Porsche Design. Since 2003, a variety of lifestyle goods including eyewear, smartphones, and watches have been sold under the Porsche name. Tesla make additional revenues by selling carbon credits to other automakers that fail to meet government-imposed quotas on EV sales.

# German Auto Production Rose This Summer

## GENERAL NEWS



The German auto industry has recovered for the third month in a row from the slump in production caused by the pandemic. Production in July rose by 6.9% over June. According to the Federal Statistical Office, the year-on-year comparison shows that the crisis is still severe. Compared to the same month last year, total production in July was down by 10%. The pre-crisis level is still clearly lower; compared to February, the month before the restrictions began, total production is 10.8% lower.

A survey by the Ifo Institute in German industrial companies also suggests that production will continue to rise. According to a statement also published on Monday, an indicator for production expectations determined by the Munich Research Institute rose to 15.4 points in August, after 14.3 points the month before.

The Federal Ministry of Economics also assumes that the catching-up process will continue in the coming months. This is supported by a better mood in companies and the reduced short-time work. However, the ministry's experts also expect the recovery in industry to take some time.

Liechtenstein-based VP Bank's Chief Economist Thomas Gitzel expects "strong growth" in the overall economy in the third quarter. In contrast, the strong economic recovery in China, an important trading partner, is providing a glimmer of hope. "The German companies can at least rely on orders from Asia", Gitzel says.

# Automakers Focus Their Forces

## GENERAL NEWS



Renault are partially withdrawing from China, Mitsubishi are leaving Europe, and Honda seem ready to do the same. While car manufacturers have long made it a rule to be present in many countries to take advantage of the size effect, now they're feeling a need to change their global ambitions. They withdraw from certain areas or reduce the field to limit the risks. The need to finance investments in EV and AV forces them to concentrate their resources where they generate the most profits.

These recent decisions illustrate a fundamental trend in the global automotive industry, the desire of a growing number of players to leave certain areas of the globe or downsize, to concentrate their forces where it is most relevant to them.

For decades, the dominant strategy among manufacturers was that of saturation: cover all segments and all geographies. General Motors or Volkswagen were excellent illustrations of this. But in recent years, investment needs have jumped with EVs and AVs. To maintain key investments, companies are cutting their costs and concentrating their resources on the countries that generate the most profits.

Manufacturers also have had to contend with the advent of the Chinese market, which in a few years has become the world's largest market. Industrialists who until then had shared their efforts between Europe and the United States had to deal with the emergence of this third pole.

In some cases, brands limit risk and reduce investment. This is the case in Latin America, Turkey, and Russia—markets with great potential, but where sales are unpredictably volatile.

Another option is to form an alliance with another industrialist. The "leader follower" strategy implemented by the Renault-Nissan team, for example, which will see the former develop and manufacture the Micra in Europe on behalf of the latter. The agreement between Ford and Volkswagen, which should make it easier for Ford to develop electric cars for Europe, goes in the same direction, like the one between Honda and General Motors for North America.

# Peugeot 5008 Gets New Lights, ADAS, AD Features

GENERAL NEWS



Peugeot have given their midsize 5008 SUV a midcycle facelift that focuses on the driving experience, with more sophisticated assistance features and a larger central screen.

New assistance and safety technologies include night vision, which can detect pedestrians or animals up to 250 metres ahead of the car, and Drive Assist Plus which takes control of the vehicle on the highway and in stop-and-go traffic, as long as the driver's hands remain on the wheel.

The front end of the 5008 now has a frameless grille with that extends to the headlamps and wraps round the front fenders. Lighting has been enhanced with a new fog mode that strategically dims the headlamps to minimise glare and backdazzle when the rear fog light is turned on.

The new 5008 becomes available in a couple of months.