

Editorial

Happy Christmas—Even So!—From DVN



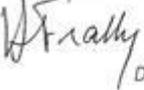
With the pandemic forcing harsh constraints that will sharply restrict everyone's holidays, all of us here at Driving Vision News wish you and your family as happy a Christmastime as possible under the circumstances! Relax and enjoy yourself to the max. Start new traditions and look forward to mixing the old ones back in once the pandemic's over.

After grand success with our two most recent DVN Workshops and our Lidar Conference, we are now working on our 22nd DVN Workshop, which we're planning for Shanghai on March 20 and 21st , and our 23rd DVN Workshop on September 28-29, 2021 for the greater Detroit area, both during auto shows. Won't it be refreshing to go to in-person events and shows again!
Even though this ending year has brought deprivations and hassles, fears and griefs, inconvenience and disruption, we are convinced that 2021 will be a promising,

eventful, and brilliant year.

We remain ever-grateful for your investment in being part of the DVN Community, and we personally and professionally wish each of you and your loved ones the happiest of holidays and a fine start for a successful and, above all, healthy New Year.

Sincerely yours

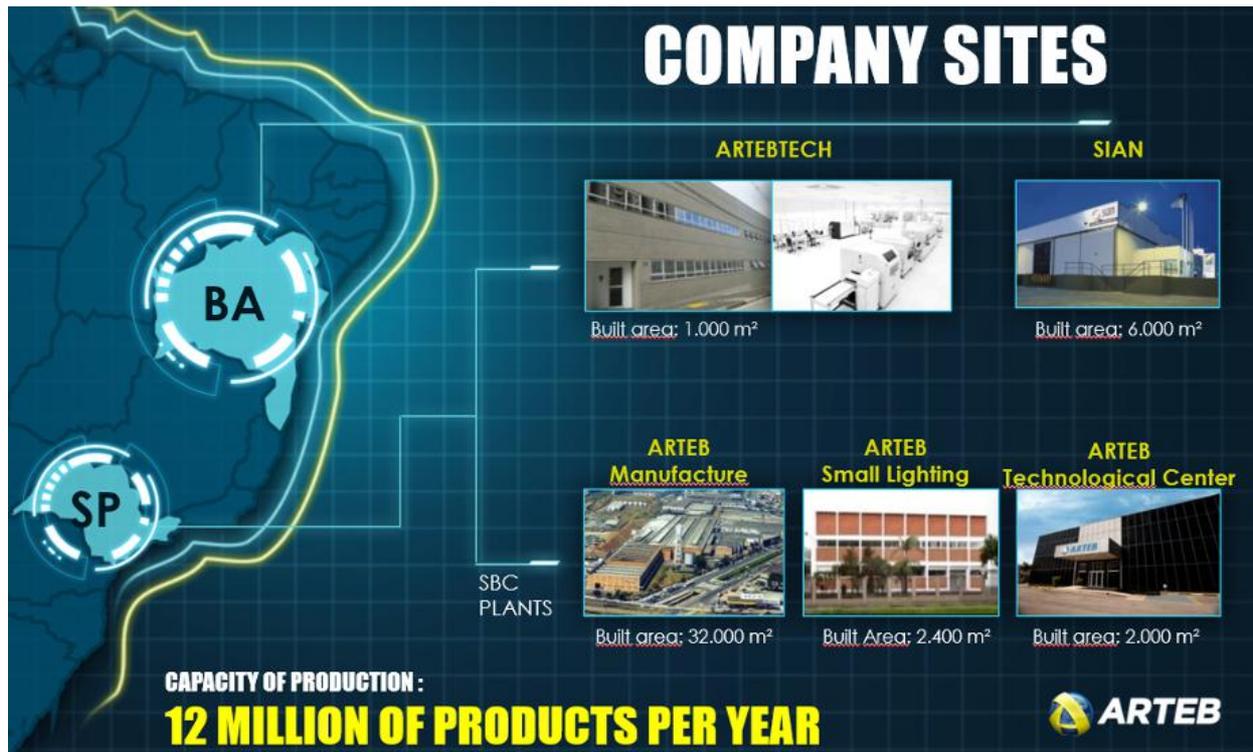


W. Frally
DVN CEO

...and the whole of the DVN team!

In Depth Lighting Technology

Arteb: «Innovation in our DNA»



Arteb was founded in 1934 by Artur Eberhardt in São Paulo. They produced their first OEM lighting equipment in 1959 for VW.

The company is now employing 1200 persons from 3 production plants, Arteb, Artebtech and Sian. These brands have a production capacity of more than 12 million lighting units per year. To support its plants with developments and advanced technologies the company count with its CTA, the Arteb Technological Center. Artebtech, the newest brand, was created for electronic systems, focused with optimized LED solutions.

Arteb is one of the largest vehicle lighting suppliers in Latin America.

Jean-Paul Ravier, in charge of building the report “Lighting in developing countries”, asked few questions to Jarbas Enzenberg, Quality and Engineering Director, Egidio Vertamatti, Executive Manager, and Carlos Moura, R&D Coordinator.



JARBAS ENZENBERG
ENGINEERING AND QUALITY DIR.



EGIDIO VERTAMATTI
EXECUTIVE MANAGER



CARLOS MOURA
R&D COORDINATOR

DVN: Could you introduce Arteb, the main shareholders, sales and market share in Brazil, facilities, and people?

Arteb: Along its 86 years, the company has remained as a pioneer supplier of high-quality products, always introducing new technologies. Today the Arteb Group is composed of three brands: Arteb, Artebtech and Sian. Located near to each other, Arteb and Artebtech are in São Paulo States. Sian is in Bahia States.

Among these brands, Arteb is the biggest, having 36000 m² in its development and production structure, which includes a manufacturing area for small components and a Technological Center (CTA). Conceived to be the strategic place for R&D, CTA has an engineering and laboratory team highly equipped with some of the best global market tools. It also has a night drive laboratory, a tunnel with a dark urban scenario where prototypes can be evaluated anytime, without worries about weather, daylight, or season conditions, since it's closed. This feature is unique in Brazil with also its laboratory for product validations, with an accreditation by a Governmental Institute (INMETRO) for a lot of automotive tests, including photometry, colorimetry, vibration and so on.

Artebtech activities, in a 1000 m² area, started in 2013 focused on electronic devices, especially conceived to promote lighting in the new era of embedded electronics. The goal is to produce sustainable solutions, with higher energy efficiency, excellence in automotive standards and best practices.

Sian started in 2002, with 6000 m² and focused to supply Ford Motor Company, with its built area besides this North America carmaker, closer as necessary and convenient from both parts in favor of successful business, something already done to other customers in the past.

DVN: What is your activity for exportation? What do you intend to do in international markets?

Arteb: Historically, we have a long presence in the international market, not only to Latin American but also to EUA, Mexico, South Africa and India. The company is opened to international market and some of its strategies include a Chinese Office and a New Business department. All these actions not only improved our products, to combine more and more competitive costs and high technologies, but also let us closer to more potential customers. Some of our news business during the last years came from such placement. We have some more strategic actions to do for the next years, but we prefer to talk about it in another opportunity, showing cases that today are confidential.

DVN: Which cooperation have you with other set makers? Have you any target for other kinds of cooperation?

Arteb: We had some cooperation in the past, but now we are more concentrated on autonomous growing, incorporating to our structure what is necessary. We are not against cooperation and partnerships, but we try to guarantee our autonomy every time that is possible, especially when new technologies, know-how and intellectual properties are involved. Such vision was on the base of Artebtech creation and it was decisive for our current moment, more prepared than ever for new lighting technologies.

DVN: Can you present some significant product realizations with a short description and photos?

Arteb: See below some achievements.

In front, beyond DRL and position lamp with LED, Arteb has explored the technology in some more functions as low and high beam.



1 BICOLOURED LENS 2 ELECTRONIC DRIVER
3 LED PROJECTOR MODULE WITH PASSIVE COOLING 4 DRL AND POSITION LAMP WITH LED

In rear, some signaling devices with optimized illuminating surface, including different optic strategies, more components with specific materials and variable finishing.



Considering that LED usage, especially high-power models for headlamps with complex electronic drivers, only now is expanding in Brazil, unfortunately some of our best examples can't be shown yet, since they are under development.

DVN: What is the level of penetration of LEDs currently in Brazil for signal and for main beams? What is your prediction for the future?

Arteb: Traditionally Brazilian market use to concentrate its LED usage on signaling devices, especially DRLs, front and rear position lamps. So, the LED penetration is not deep as we expected when Artebtech started its activities (2013), anyway this penetration is growing faster for the last 2 years, based on our current developments.

Along the last years our expectation was even more optimistic, especially due to the mandatory DRL use for vehicles produced from 2023. But this year, due to the COVID-19 impact, such implementation was reviewed and gained one year more to be implemented (2024). Anyway, some customers remained considering DRL on its future

releases, so the impact in fact exists but can vary according to each case, since there are suppliers more concentrated in signaling devices than others.

Our prediction for the future remains optimistic, because national law will turn mandatory not only DRL but also lateral turn signal lamp (ECE category 5 or 6) and emergency braking signalling devices, all of them works better with LEDs and can cover a huge number of cars.

DVN: How are you developing the electronics needed for new generation of lighting products?

Arteb: Almost 10 years ago we built Artebtech, this was our first step in such direction. We spent last years enriching Artebtech development structure, including high-level tools such as softwares, last-generation machines for assembly components and prototype building, training for the engineering team and so on.

Part of our strategies, to keep the engineering team updated, includes participation in automotive fairs and congresses, deep analysis covering recent embedded systems publications (standards, laws and papers), benchmarking, prototypes building and tests. Beside such involvement in technological aspects, we always try to balance it with the commercial factors by developing and validating strategic components suppliers. Our goal on it is to increase our competitive force, blending new technologies with attractive costs.

DVN: How do you see the future of lighting in Brazil and the future of Arteb?

Arteb: We see a great future of lighting in Brazil, our national laws and standards are designing a safer market each year. Government programs, such as Route 2030, clearly indicate the country's compromise with sustainable and safer progress. Besides this promising horizon, Arteb easily sees itself as an active player for the next years, strong enough to be a smart option for all carmakers. Some of our efforts to say that and to face challenges in an optimistic view include, beyond all we mentioned above, our newer strategies in commercial and marketing, with an updated website and a stronger presence on social media channels and automotive events. Such movements allowed a better relationship with OEM and aftermarket customers, also these improvements are continuing to help with a newer brand perception, something essential for a long-living presence in such a demanding market.

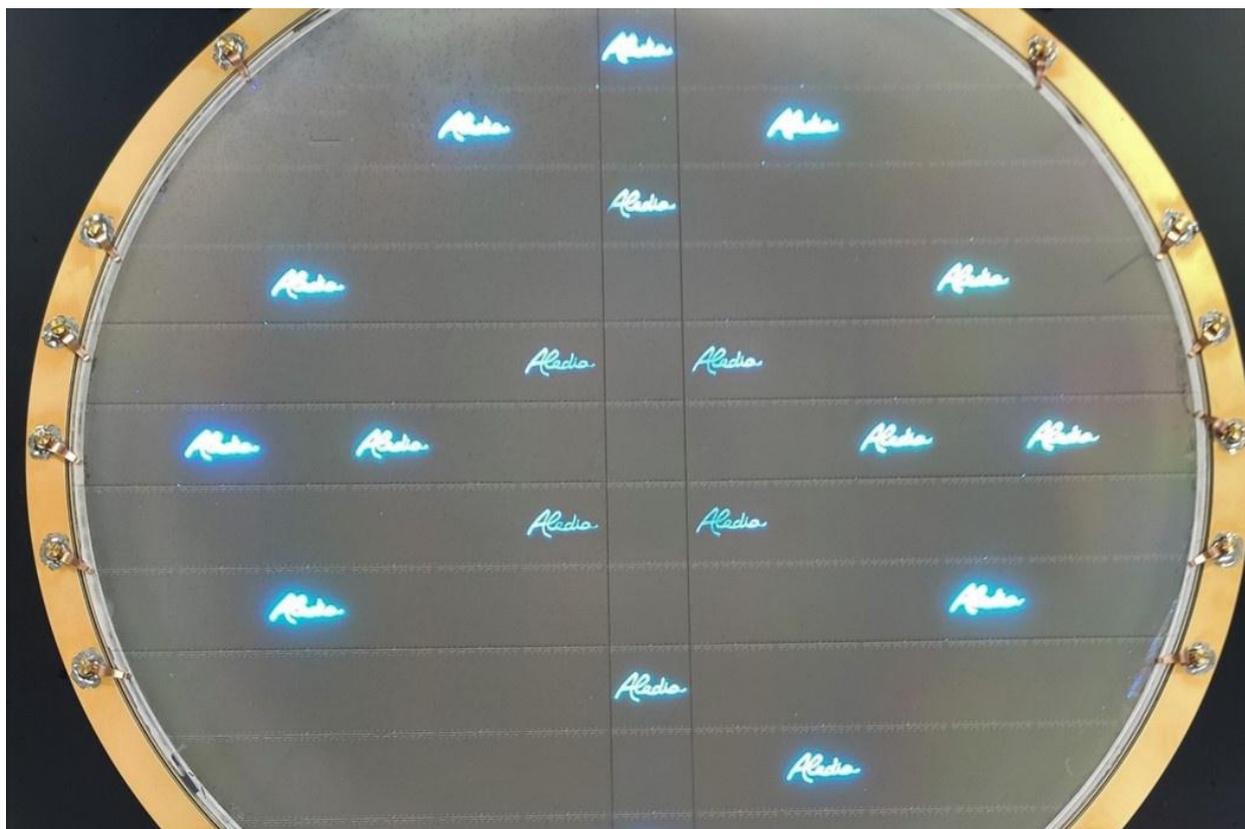
The future of lighting in Brazil is rich in possibilities and Arteb certainly will be part of it, especially because we were working and building this same market for the last 86 years. Above all, since tradition and innovation is in our DNA, we are equally prepared to face challenges, promote solutions and seize opportunities.

More of the interview will be available next month in the report "Lighting in developing countries" which will be published next month.

Lighting News

Mass-Produced μ LEDs from 300-mm Wafers?

LIGHTING NEWS



French startup Aledia have manufactured microLED chips with 300-mm silicon wafers, a world's-first achievement for the company. Aledia say the development opens up the possibility for mass-production of μ LED displays with commercially available processes and equipment.

The company, who developed their technology on 200-mm silicon wafers over the past eight years, will produce the chips on both sizes of wafer. Aledia were spun in 2012 out of CEA-LETI, a French research institute pioneering micro- and nanotechnologies, and the work on 300mm wafers has been performed by joint Aledia and CEA-LETI teams.

Aledia CEO and cofounder Giorgio Anania says "We believe producing microLEDs on large-area 300mm silicon wafers is a world's first, and opens this technology to huge potential-volume-manufacturing capabilities; thanks to Aledia's unique nanowire LED technology (3D LED), this can be done with commercially available processes and equipment, since it uses standard-thickness (780 μ m) silicon wafers".

Traditional planar 2D μ LEDs are produced by depositing flat layers of gallium nitride (GaN) crystal on sapphire wafers of 100-150mm diameter, with the majority of

production today being on 100mm wafers. Aledia's microLED technology grows GaN nanowires on top of large-area silicon. This "3D" nanowire technology does not create any of the stresses seen on 2D chips, which build up as the wafer size is increased, and so allows the use of very large wafer sizes. In addition, this silicon-based technology allows production in conventional microelectronics fabs, called silicon foundries, which can be ramped up to high volume production with extremely high yield.

Aledia's technology is protected by 197 patent families, making Aledia the leading French startup company in France in filed patents.

LG InnoTek LED Biz Exit Has Suitors Lining Up

LIGHTING NEWS



LG Innotek

According to Korean media, LG InnoTek plan to sell their LED patents and manufacturing equipment to a Chinese company. *In October, LG InnoTek revealed their intent to withdraw from the LED business—a decision made in 2019 largely on account of steep losses over 12 years' time for the LED business. Originally, LG InnoTek decided to sell the LED manufacturing equipment in China and South Korea in 2Q20. That plan was put on hold by the pandemic.

According to people asserting familiarity with the matter, manufacturers in South Korea, Taiwan and China want to purchase LG InnoTek's LED business. LG InnoTek have developed and deployed UVLEDs for a long time; their expertise and techniques mean the apposite patents are especially favoured by potential buyers. The former executive of the UV LED production base in Paju, South Korea has tried convincing engineers to make an agreement with the Chinese company.

Since LG Electronics purchased ZKW in 2018, LG InnoTek have actively worked on the LED vehicle lighting market and focused on the development of Nexlide LED module. At the beginning of 2020, LG InnoTek adjusted their vehicle lighting department, configuring it for aggressive expansion. Meanwhile, they also have developed their next-generation LED lighting module for high-end vehicles.

Varroc Buy Out Elba JV to Grow Electronics Capabilities

LIGHTING NEWS



varroc
EXCELLENCE

Varroc Lighting have bought out Elba's stake in the Varroc-Elba Electronics (VEE) joint venture. The full consolidation of VEE within Varroc Lighting Systems demonstrates the company's commitment to grow their electronic business as a key part of their strategy.



Varroc Lighting President and CEO Stephane Védie says "Varroc already design and develop all our own electronics hardware and software; the full acquisition of our joint venture and the expansion of our manufacturing capacity will further support our profitable growth".

This acquisition is the most recent expansion of Varroc Lighting's electronics business unit, which was established in 2018.

Varroc Lighting are a premier developer and manufacturer of next-generation external lighting systems and vehicle control electronics for the automotive and two-wheeler industries. Headquartered in Plymouth, Michigan, USA, the company have more than 9,500 employees worldwide with operations in 17 countries and capabilities on every continent where vehicles are produced.

New Tesla Model 3, Y Headlamps: Prepping for ADB?

LIGHTING NEWS



Tesla are upgrading Model 3 and Model Y headlamps with a new beam that looks a lot like it's built up by one or another kind of matrix or pixel technology. A 3rd-party [online video](#) compares the previous and new headlight beams. Not only do the basic low and high beam patterns show clear evidence of a pixellated or matrix build-up, but the very unusual sharply-defined fragmentary beam patterns produced when the headlamps are switched to diagnostic/adjustment mode strongly suggest the new headlamps are a crucial bit of ADB infrastructure, even if ADB functionality has not yet been enabled.

In 2018, the Tesla 3 missed the IIHS' Top Safety Pick₊ plaudit due to the performance characteristics of its headlamps, but Tesla managed an update a few months later to earn a better safety score. It is not known whether the new headlamps will also be present on cars for the US, where ADB is still not permitted and international regulations are not recognised, but the odds don't appear to be good; another 3rd-party [online video](#) found the old-type lights on a new 2021 Tesla 3 delivered in Canada—where headlamps and ADB according to UN Regulations are legal, but not required.

PACE Award Applications Open Soon

LIGHTING NEWS



The Automotive News PACE program honours superior innovation, technological advancement, and business performance among automotive suppliers.

The PACE program provides a traditional or non-traditional supplier or a startup an opportunity to show their newest and best commercialised innovations by submitting an application for evaluation by an independent panel of more than 20 judges.

2021 being their 27th year, the PACE awards have more than a quarter-century's history of recognising innovations by automotive suppliers

PACEpilot, on the other hand, is for auto suppliers' innovations that aren't yet commercialised. New last year, the PACEpilot awards are intended to recognise post-pilot/pre-commercial innovations in the automotive and future mobility realms— including product, software/IT system, or processs ideas that have the potential to revolutionise an automaker's business or products.

Applications open on 4 January.

Driver Assistance News

Mobileye Will Develop Lidar to Decrease AV Costs

DRIVER ASSISTANCE NEWS



Mobileye CEO Amnon Shashua has plans for a self-driving car system for 2025 that could use lidar sensors built in-house rather than ones bought from Luminar Technologies. Luminar say their units, which are only one part of Mobileye's broader self-driving system costs, are priced at less than USD \$1,000 each and exceed Mobileye's cost requirements while exceeding their performance requirements.

Shashua told Reuters that Mobileye's first generation of full self-driving kits, which will include Luminar's lidar units along with a range of other chips, sensors and software, will cost between \$10,000 and \$20,000. They will be targeted at robotaxis, which are commercial vehicles that can spread the cost of the system over many trips. Mobileye plan to begin rolling out a test fleet of 100 completely driverless vehicles in Tel Aviv in 2022, with other cities to follow.

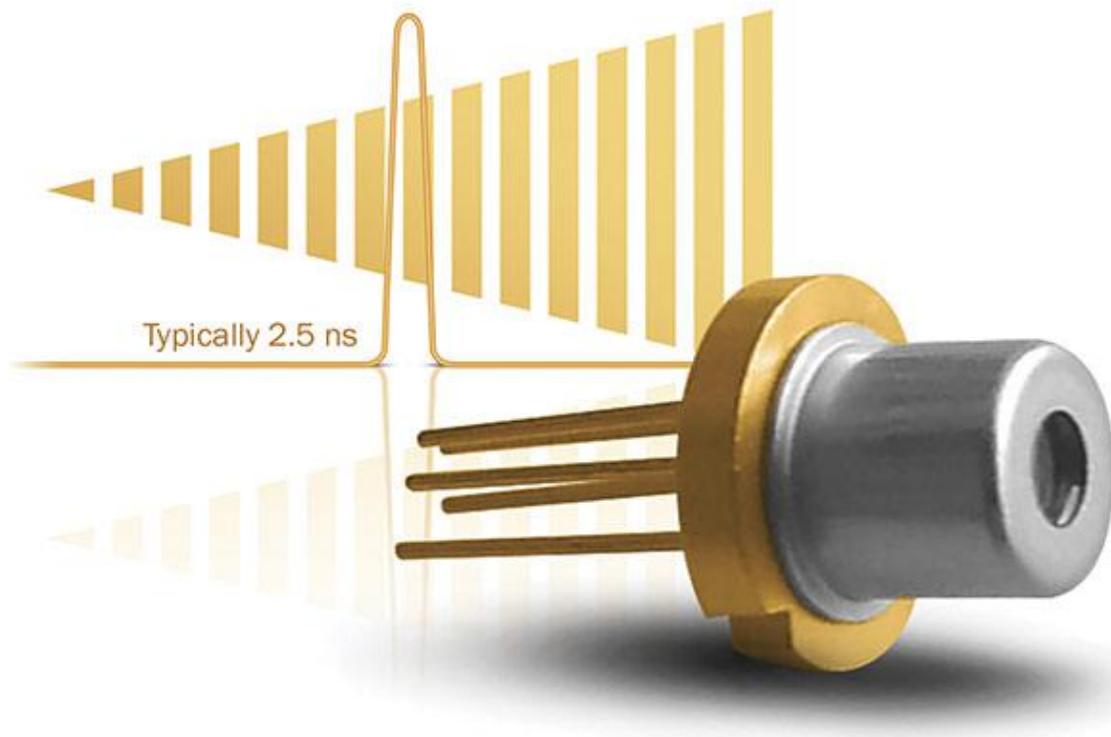
But for 2025, Mobileye are developing their own lidar sensors of the FMCW (frequency-modulated continuous-wave) type—different from Luminar's technology. Shashua says the FMCW technology will benefit from Intel's silicon photonics manufacturing expertise, will drive costs and prices lower, and that the Mobileye-built lidar, in combination with cameras and radar, will be used on consumer vehicles and could also replace Luminar's units in Mobileye-powered robotaxis: "We believe the

cost of an entire self-driving system can be in the few thousand dollar range, and that brings us into a consumer vehicle position," he said.

Mobileye have deals to supply their current camera-based driver assistance systems to BMW, Volkswagen Group, and Nissan. Those systems help with tasks such as adaptive cruise control and lanekeeping while generating and transmitting mapping data for Mobileye as they drive.

Laser Components' Comprehensive Opto Product Range

DRIVER ASSISTANCE NEWS



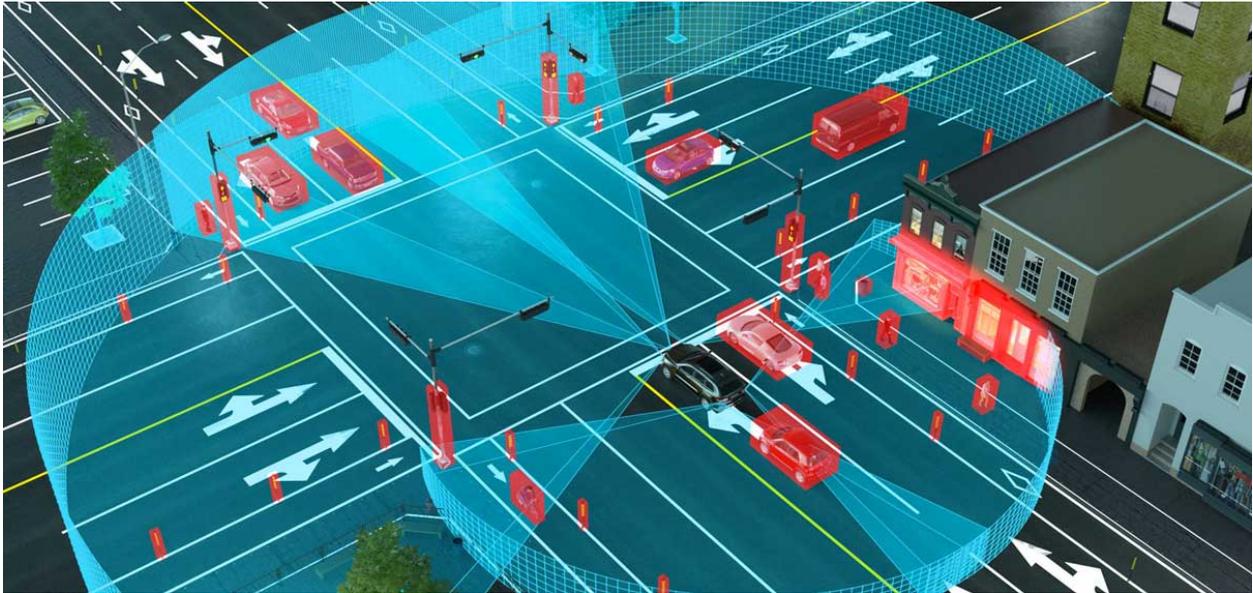
A comprehensive optoelectronics product range is offered by Laser Components—including pulsed laser diodes, VCSELs, Si-APD arrays, and CMOS SPADs for next-generation lidars. Now LC have announced cutting-edge advancements and achievements to move the sensor industry forward.

LC have been providing pulsed laser diodes and avalanche detectors for more than 20 years, and have accumulated a wealth of experience in the automotive industry. Discrete laser diode solutions for automotive lidars available on the market usually have a pulse length of 5-10 ns, so LC's QuickSwitch pulsed laser diode, with 2.5-nanosecond pulse length and 90W power is a perfect match for the automotive lidar market. The huge benefit of shorter pulses is the ability to detect with a very high resolution at short and long distances. The other benefit is that lidar can work with higher peak power which allows measurement of longer distances while still being eye-safe like a lower-power laser.

In addition to the lidar market needs, LC also provide photodiodes, including Si-APD arrays and CMOS SPADs. Linear Si-APD arrays include 8-, 12-, and 16-element arrays with $620 \times 190 \mu\text{m}$ active area per element. The advantages of APDs include their small size, high sensitivity, fast speed response, and easy evaluation electronics, which is most suitable for scanning lidar. A CMOS SPAD, on the other hand, possesses a high sensitivity but requires special electronics, so they're more suitable for flash lidar.

LeidarTech, STM Collaborate on Lidar Development

DRIVER ASSISTANCE NEWS



LeidarTech will collaborate with STMicroelectronics to develop and promote lidar solutions based on the STM's MEMS laser-beam scanning solutions and LeidarTech's sensing components and software products.

STM say their scanning solutions, designed with automotive and industrial applications in mind, are ideal for a broad range of high-performance, high-accuracy, and high-reliability applications. The companies state that the addition of STMicroelectronics to the Leidar product Ecosystem and similarly, LeidarTech's inclusion in STMicroelectronics' partner program, will maximise design agility and reduce cycle time, costs, and risk, leading to a shorter time-to-market for customers.

General News

FCA's Manley to head Stellantis American operations

GENERAL NEWS



MIKE MANLEY, NEW HEAD OF AMERICAS OPERATIONS FOR STELLANTIS

Fiat Chrysler Automobiles CEO Mike Manley will become head of Americas operations for Stellantis, the automotive group that will be formed after the merger of FCA and PSA Group, FCA Chairman John Elkann told to employees.

"Once our merger completes – hopefully soon in the new year - Mike will be asked to take up the role of head of Americas, working alongside Carlos and continuing to bring his great experience, energy and drive to making Stellantis the extraordinary company we know it will be," Elkann said.

Manley, 56, was a key figure in driving the merger forward, working with PSA CEO Carlos Tavares since late 2018 to bring the two automakers together. But, unlike Tavares and Elkann, he will not have a seat on the board of directors of Stellantis. The companies are working to close the merger by the end of the first quarter of 2021.

McGovern's Mission: Wake the Famed Cat

GENERAL NEWS



Land Rover's design director Gerry McGovern was promoted last month to chief creative officer at the brand's parent, Jaguar Land Rover. McGovern's job as Land Rover's design boss will be taken up by Massimo Frascella who will report to McGovern.

In his role as chief creative officer, McGovern will oversee design functions at the Jaguar and Land Rover brands, JLR said. McGovern, an Englishman, was appointed to lead Land Rover design in 2006. He has been credited with reviving the brand with models such as the Range Rover Evoque, the brand's best-selling model, and the Range Rover Sport. His latest model to be launched is the revival of the iconic Land Rover Defender off-roader.

Gerry McGovern wants to modernize the design of Jaguar cars and make the sports-car brand "wonderful again."

Jaguar has been criticized in the past for leaning too much on iconic designs of its illustrious heritage, although new models such as the I-Pace full-electric crossover have pushed the brand into the modern era. The brand has successfully introduced crossovers such as the F-Pace but has struggled to engage customers with its sedans as customer tastes change.

European Sales Drop in November

GENERAL NEWS



European registrations fell in November. New-car sales dropped by 14% year-on-year to 1.05 million vehicles in the European Union, Britain, and the countries of the European Free Trade Association (EFTA), industry association ACEA say.

Sales at Volkswagen Group fell 14%, with SEAT posting the worst result among the group's brands with a 25%. The core VW brand saw sales drop by 19%. Škoda sales fell 11%. Porsche was down 5% and Audi's sales were flat. PSA Group reported a drop of 12%, with Citroën their worst-performing brand during the month with its sales down 16%. Peugeot was down 11%, Opel/Vauxhall fell 10% and DS sales dropped 6%.

Fiat Chrysler sales dropped by 4%, but Jeep was a bright spot with registrations up 16%. The Fiat brand was down 8%. Renault Group's registrations fell by 14%, and Ford's registrations plunged by 24%.

Among Asian automakers, Toyota-brand sales were flat, while Hyundai plunged 26%, Kia by 13%, and Nissan by 12%.

Among premium automakers, the BMW brand's sales fell 8% while the Mercedes-Benz brand reported a 7% decline.

Are the French ready to accept AV in their daily life?

GENERAL NEWS



How do the French see the autonomous vehicle in their daily life in the future?

For what uses? How much confidence do they place in him?

To answer these questions, MACIF wished to carry out the first AV acceptance barometer with VEDECOM with a panel representative of the French population made up of 4,014 people.

The results of the 1st edition presented last week at the AUTONOMY DIGITAL 2020 show, reveal that 70% of French people express a positive attitude towards this mode of travel - 1 in 2 French people believe that the autonomous vehicle is reliable - while 88% have never seen one.

The autonomous vehicle deemed legitimate for the transport of goods and patients

On average, 6 in 10 French people rate the use of autonomous vehicles for delivering goods (63%) or transporting sick people (58%) positively during the health crisis.

In addition, the study shows that the autonomous vehicle must rhyme with accessibility and ecology since 70% of respondents to the study believe that the autonomous vehicle will be deployed only if it meets ecological standards.

In conclusion, the more the French know about autonomous vehicles, the more they plan to use it regularly as a mode of travel.