



DVN STUDY

NEW LIGHTING FUNCTIONS 2020-2030

To Improve Safety, Communication, Comfort, and Styling

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Editorial

Farewell And Thank You, Geoff Draper!

At the online December 2nd DVN Workshop, longtime vehicle lighting rock star Geoff Draper announced his successor as GTB President, Valter Genone.

Geoff's impending retirement is well-earned; his achievements in this field are many and storied. We've got an interview with him this week; he shares thoughts on his 12 years at GTB's helm, his views on the challenges we face, and his departing messages to the DVN community.

We personally and professionally thank Geoff for his stellar job at GTB, and for his relentless drive to advance the state of the art and—surely more than anyone in recent memory—the state of vehicle lighting regulations throughout most of the world. We wish him and his wife Ann many delightful years minus the stress and strain of dealing with flights to far-flung meetings, and without the frustration of intransigent regulators certain their ideas are right and the international consensus is wrong. Geoff, relax and enjoy doing whatever you want—you certainly deserve it!

Two points of important DVN information:

- Today the [DVN Report](#) on Audi's lighting is released. This report emphasises the wonderful lighting innovations from Audi and describes the individual vehicles in Audi's model range, with a detailed scrutiny of front, rear, and interior lighting on each model.
- I believe that Lighting will play an exciting part in shaping the Future of Automotive Driving. The fine-grained, scholarly DVN Study on *New Lighting Functions 2020-2030*, thoughtfully built by eight senior automotive lighting experts, will help you orienting your company strategic choices—Truly, I think this is my greatest work at DVN. The new lighting functions now in development and coming onstream will also be the main challenges we face in the next decade; if you haven't yet done so, [hurry and get](#) your

copy. For orders received before the end of this year 2020, we will send you 2 beautiful paper copies of this study for your company VIPs.

Sincerely yours



W. Frally
DYN CEO

In Depth Lighting Technology

Draper On Draper: Parting Thoughts of a Lighting Luminary



Geoff Draper started his career when sealed beams were actively being developed. Decades on, he heads for well-earned retirement having positioned and configured GTB for central relevance and steered a complete overhaul of the U.N. Regulations on lighting—tasks it's difficult to imagine anyone else could have done quite so adroitly. As he's soon to be spending quite a lot less time talking about car lights, we're honoured to get his thoughts on a career defined by grand achievements.

DVN: Geoff, congratulations on the great job you have done since your arrival at the head of GTB. How do you feel about leaving your GTB family?

Geoff Draper: I have mixed emotions. Contributing to the work of GTB has been an important focus for me during the past 30 years, and I have been fortunate to have the chance to dedicate my time in retirement to leading GTB for the last 12 years. You will have heard me joking about GTB being my hobby, but it has been a wonderful intellectual challenge and at the same time I have travelled to many parts of the world to increase awareness of GTB. I have developed satisfying personal and professional relationships with regulators and with members of the global lighting family.

Leaving that family was not an easy decision and I know that it will take me time to adapt to full retirement, but I am not feeling sad. My emotion is one of happiness because I have been part of the process to reposition GTB for its important long-term mission. I leave GTB with a solid organisational structure and fit for the future with a newly elected President. Valter Genone starts his mandate on 1 January 2021 and I wish him every success.

DVN: What achievements are you proudest of?

Geoff Draper: As the newly elected GTB President, my first priority was to lead the transformation of GTB into an association that would meet all the requirements to become an NGO with special consultative status awarded by the UN ECOSOC. This was a priority to enable GTB to continue to fully contribute at the UN World forum (WP29 and GRE).

To achieve the NGO status, it was necessary to completely modernise GTB, based upon the creation of a legal association with a new statute and by-laws. We established our association under Italian law in 2011, created a completely new organisational structure, and welcomed new national members from China, Taiwan, and Korea. Our NGO status was confirmed in 2014, and in 2017 we launched our important Strategy Group, currently consisting of 26 senior company executives from Asia, Europe, and the USA, that advises GTB on work priorities and is now sponsoring independent research.

The new status of GTB as an NGO gave us a stronger position at the UN in Geneva and it gave us the credibility to propose a major simplification of the UN Regulations. GTB is the main contributor to the simplification of the UN regulations and provides the secretariat for the GRE Simplification Group. GTB is also involved, through our Chinese member C-GTB, in the simplification of the GB standards.

As lighting technology development gained momentum, the lack of international harmonisation of regulations was presenting barriers to innovation. This led me to take the opportunity to increase the international awareness of GTB by working closely with DVN and by contributing to conferences such as ISAL, IFAL, ALE, and the ACEA Sino-Europe Conference. We also took the opportunity of the presence of GTB in WP29 to establish contacts with government representatives.

I am proud to have guided GTB through this important reorganisation, but I could not have done this without the support of the GTB Members, their delegations, and my colleagues in the Administrative Committee.



GTB EXPERTS AT THE LAST FACE-TO-FACE MEETING IN KOREA – NOVEMBER 2019

DVN: You spent 12 years leading GTB. What were your relations like with the members during the four sessions per year that you spent with them?

Geoff Draper: Firstly, I should explain that GTB is an association of associations, so its members are the 18 national and international associations that each nominate one representative to form the General Assembly. The member associations then have delegates who contribute as experts to the work of GTB committees and working groups. The President is directly accountable to the General Assembly.

There were many difficult debates and objections to resolve as the reform of GTB progressed. As you would expect, the most challenging debates took place in the General Assembly that is responsible for the budget, the statute, and by-laws.

To be honest, it took me some time to learn how to lead a democratic association where the President does not have the same authority as a senior executive would have in a company. Coming from industry I found this particularly challenging as I took difficult and unpopular decisions, and I was obliged to justify my actions to the member delegations. I recall on a couple of occasions being described as a dictator!

Of course, changes in any organisation make people nervous as they do not always understand that it is particularly important that an association, involving competing companies, has to take extreme care to ensure compliance with international competition laws.

I am pleased to say that my relationship with the members and their delegations was friendly and transparent, with everyone encouraged to share their expertise and opinion. On many occasions we argued and eventually found compromises, but there were some issues on which the committees could not reach a consensus and I had to use my casting vote—that was not always appreciated. However, I would like to thank everyone for their strong support and their positive contribution to all the committees and working groups.

DVN: What is the greatest challenge GTB has to manage?

Geoff Draper: The political influences on regulatory policy, and the massive changes in the automotive industry to respond to the environmental, demographic, and automated driving issues, will be the major challenges for GTB.

It is clear that rapid innovation in the automotive lighting and signalling sector will continue and the current regulations will need to be adapted accordingly. However, an industry consensus will be essential to convince regulators at WP29 (including the USA and China) that globally harmonised technical requirements are required if technical barriers to innovation are to be avoided. GTB is well placed to develop the proposals for the technical requirements and by contributing to the work of GRE.

The Covid pandemic has introduced another challenge because the success of GTB depends upon the close networking of its experts who successfully work together despite cultural or language differences. A virtual session cannot be a substitute for the face-to-face meetings where the family feeling of GTB is developed and reinforced with the social evening routinely held during each session. Here GTB has a challenge to reinstate the live sessions as soon as the health considerations will allow.

DVN: Your central message at the 21st DVN Workshop was that governments—China and the USA, especially—must be encouraged to actively contribute to the development of the technical requirements in a common forum. How might that be possible?

Geoff Draper: I believe that GTB and the NGOs representing industrial stakeholders, must jointly develop and submit a proposal to WP29 for a pragmatic approach, to separate the need to develop globally harmonised technical requirements from the politics of the UN 1958 and 1998 agreements. We all know that several efforts to develop GTRs under the UN 1998 agreement have failed and there is no appetite of industry or governments to make another attempt.

As I explained in the DVN Workshop's regulatory session, Korea and India do not support the reciprocal type approval provisions in the UN 1958 agreement. However, they have already set a precedent by routinely updating their national regulations with the latest technical amendments developed by GRE. This should be part of the rationale of the proposal to WP29, that the work to develop globally harmonised technical requirements should be the responsibility of a GRE informal group ideally jointly chaired by China and USA, with the secretariat provided by GTB.

DVN: After half a century working in lighting, what is your message to the lighting community?

Geoff Draper: GTB has played a key role since 1952 to assist the development of good regulation to support innovation and the improvement of road safety. Now as the pace of automotive lighting innovation increases, the role of GTB becomes even more important.

GTB is unique and the spirit of a global lighting family is something very precious that must be continually encouraged. Obviously, as I am now leaving GTB, the new Administrative Committee (President Valter Genone, Vice President Bart Terburg, and Secretary General Davide Puglisi) will decide how GTB will move forward and I know that they will succeed.

Now, as I leave the lighting family, I would like to express my sincere appreciation for the support that everyone has given me.

Lighting News

Grote: Quality Award and Interview

LIGHTING NEWS

Grote®

US-based commercial vehicle lighting supplier Grote have won a Master of Quality Supplier Award from Daimler Trucks North America (DTNA). Grote Industries President and CEO Dominic Grote kindly shared his thoughts with us:



DVN: Firstly, congratulations on your Master of Quality Supplier Award from DTNA! Will you tell us about yourself?

Dominic Grote: I'm the President and CEO of Grote Industries, a role I've held since 2009. Prior to this position, I've held several positions in Sales and Marketing, as well as Product Development, going back to 1993.

DVN: And tell us about your company.

Dominic Grote: Grote Industries started as a chemical company over 100 years ago. Innovation has been at the core of who we are since that time. In 1922 we introduced the first injection-moulded plastic products in the United States. That was quickly followed by the introduction of the first fully automatic plastic injection molding machine with the world's first retro-reflective reflector in 1929. One of our notable industry firsts was to introduce the world's first LED marker light in 1989. We have continued to innovate, right up to this year with the launch of our heated LED headlamps in October. Grote serve four core markets: on-highway, trailer body builder, off-highway, and the aftermarket—providing visibility system solutions to some of the best customers in the world. Today, we are a fourth-generation family-owned business and the way we operate continues to reflect our core values. We have approximately 1,500 team members globally with headquarters in the city of Madison, Indiana, and operations in Canada, Germany, Mexico, and China.

DVN: What makes Grote unique? How do you stand out from your competitors?

Dominic Grote: We are passionate about what we do and that passion, along with our commitment to quality, is what really separates us from the competition. It starts with our innovation and carries through to our quality and the relationships we have with our customers. After 119 years, you can say we have learned how to listen to our customers and become a trusted partner in achieving success. We treat them like an extension of our family.

DVN: How did you win this DTNA award? What did you do better than other suppliers?

Dominic Grote: Receiving this award is really like getting a full review of how we operate our business. It's not solely about the quality of our products. It's about how we do business. It's the whole customer experience we provide to Daimler and our team performed exceptionally in 2019.

DVN: How do you see the growth of Grote in the next years?

Dominic Grote: We are continuing to grow, both with existing and new products and into new markets and regions. We have opportunities in Asia and Europe, where we expect to see growth in addition to our core North American market.

DVN: Are you involved in the new technologies and functions?

Dominic Grote: While I cannot elaborate on specifics about new products, I can assure you we are continuing to innovate. We led the technology transition from incandescent to solid state lighting in the commercial vehicle markets. The next major transition that Grote is engaged in will be to the smart connected truck and trailer. We are always looking for ways new technologies can be leveraged to create products and services that improve the safety and operation of the equipment that's core to our customers' business. We have exciting things lined up for 2021 and beyond.

Koito Gear Up to Exhibit at CES21

LIGHTING NEWS



Koito, in collaboration with their subsidiary North American Lighting, will be exhibiting advanced lighting products at the online CES 2021. Koito's Sensor Lighting Solution concept will be on display; it's Koito's latest way of putting together next-generation lighting systems including headlighting, communication, and smart sensor functions which will operate in concert with smart street lights to play a significant role in safety, security, and comfort in our future smart mobility society.

Sensor Lighting Solution will join Koito's impressive list of CES presentations, including:



Dual View Machine Vision, an advanced headlamp system with enhanced visibility for both the driver and the camera...



- BladeScan ADB (a CES 2020 Innovation Award recipient), the world's first photometric control technology for early detection of pedestrians with minimised shadow areas...

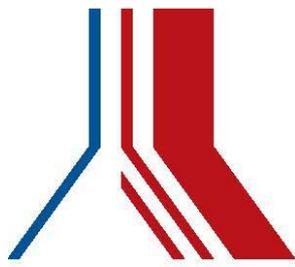


- Smart Sensor, a compact sensor+camera module essential for AVs, with a self-cleaning system which maximizes the sensing performance even in harsh weather, and...

- Smart Street Lights: the sensor and the communication lamp installed in street lights enhances security and safety in a smart city by linking to vehicles.

Instrument Systems' Precise μ LED Array Measurement

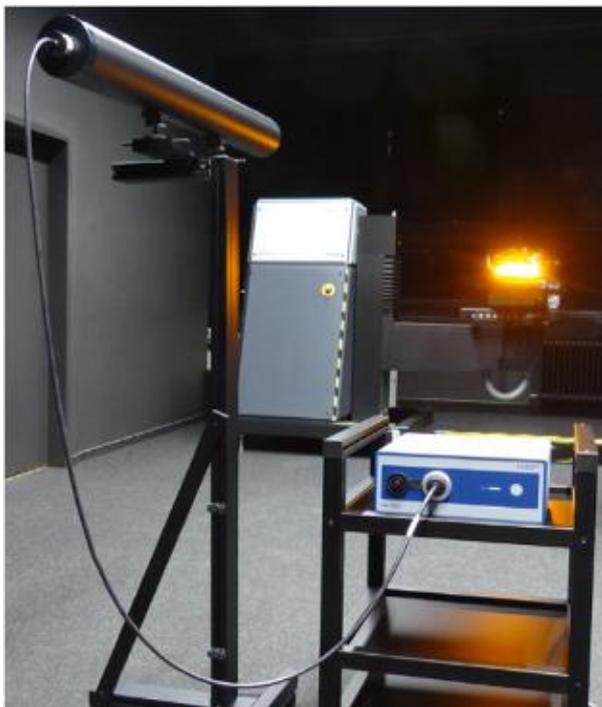
LIGHTING NEWS



Instrument Systems

KONICA MINOLTA Group

With their Optronik line, Instrument Systems have developed a portfolio of application-tailored measuring instruments and systems that have proven themselves over the years in the light channels of international automotive manufacturers.



Based on high-performance AMS goniophotometers, Instrument Systems' all-in-one systems provide fast, positionally accurate measurement of the spatial radiation properties of exterior vehicle lighting. Through modular combination of further measuring instruments, the respective system is matched to the individual test object and its measurement requirements.

The portfolio of accessories includes photometers for a range of measurement distances, imaging photometers, retroreflectometers, spectroradiometers, and tristimulus colourimeters and luminance meters (e.g., for license plate illumination)

In their product approval process, many technological leaders in automotive manufacturing worldwide have placed their trust in the accurate and stable measurements produced by this system—particularly for new types of headlight such as pulswidth modulated light sources and full LED headlamps.

Project Solaris: ZKW Develop High-Performance Material

LIGHTING NEWS



ZKW, alongside the Vienna University of Technology and the Materials Center Leoben, are researching self-healing solders with a high load-bearing capacity for potential application in connecting high-power LEDs and other power semiconductors in the automotive industry.

ZKW CEO Oliver Schubert says "Our goal with this high-performance connection technology is to optimise the failsafe reliability of our electronic products". The research is being done under the ægis of Project Solaris, which is being funded by the FFG grant agency and the Ministry of Technology, as part of the Production of the Future program.

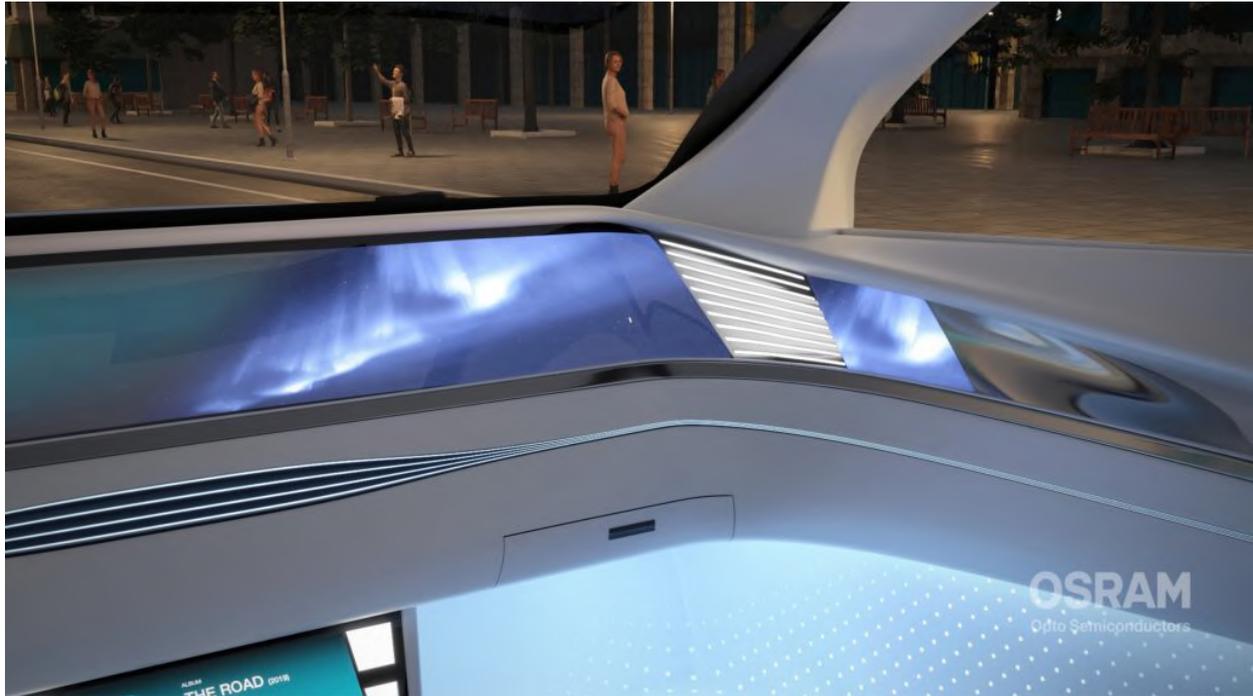
The increasing number of electronic components in today's and tomorrow's vehicles must withstand punishing conditions like large temperature fluctuations and strong vibrations. The goal of the Solaris project is to develop a solder material with self-healing properties. This can be achieved by partially melting the solder at operating temperature, causing any incipient cracks to close and reducing mechanical tension. "Non-eutectic alloys could be the key to success, thanks to their self-healing properties" Schubert notes. A eutectic alloy is one that melts and solidifies at a single temperature lower than the melting points of its separate constituents or of any other mixture of them, so a non-eutectic alloy has the opposite of this property.

Presently, tin-silver-copper solder is used to connect electronic components to printed circuit boards using soft soldering. However, the power density and usage temperature increase for semiconductor components, along with the required service life. Components must withstand cycles in a temperature range from -40°C to $+140^{\circ}\text{C}$. Commonly available solders only withstand operating temperatures up to 120°C , while present-day high-power LEDs or power transistors cannot withstand 140°C . Soft solder materials are not able to handle the high thermal and mechanical loads.

In addition, ZKW are working with partners to jointly research computer-supported simulations intended to predict the service life for the new solder material. Test assemblies are simulated and manufactured for testing in order to expose them to loads at extreme conditions until they fail. These tests can be used to test models and predict the expected service life. The Vienna University of Technology provides support through basic research, and completes thermodynamic calculations.

Colour-Accurate Osram Ostune LEDs for Auto Interior Lighting

LIGHTING NEWS



Car interiors are becoming increasingly important in the latest generation of vehicles and are undergoing a fundamental image change, leading to corresponding effects on design and integrated applications. The Ostune LED family from Osram Opto Semiconductors now brings technological advancement and insights from the general lighting industry to the car.

The first two products cover a wide colour temperature range and enable automakers to offer distinctive light variants for their ambient lighting, from bluish cool white to reddish warm white. The new LEDs offer a CRI (colour rendering index) of over 90, well above most LEDs available for automotive applications.

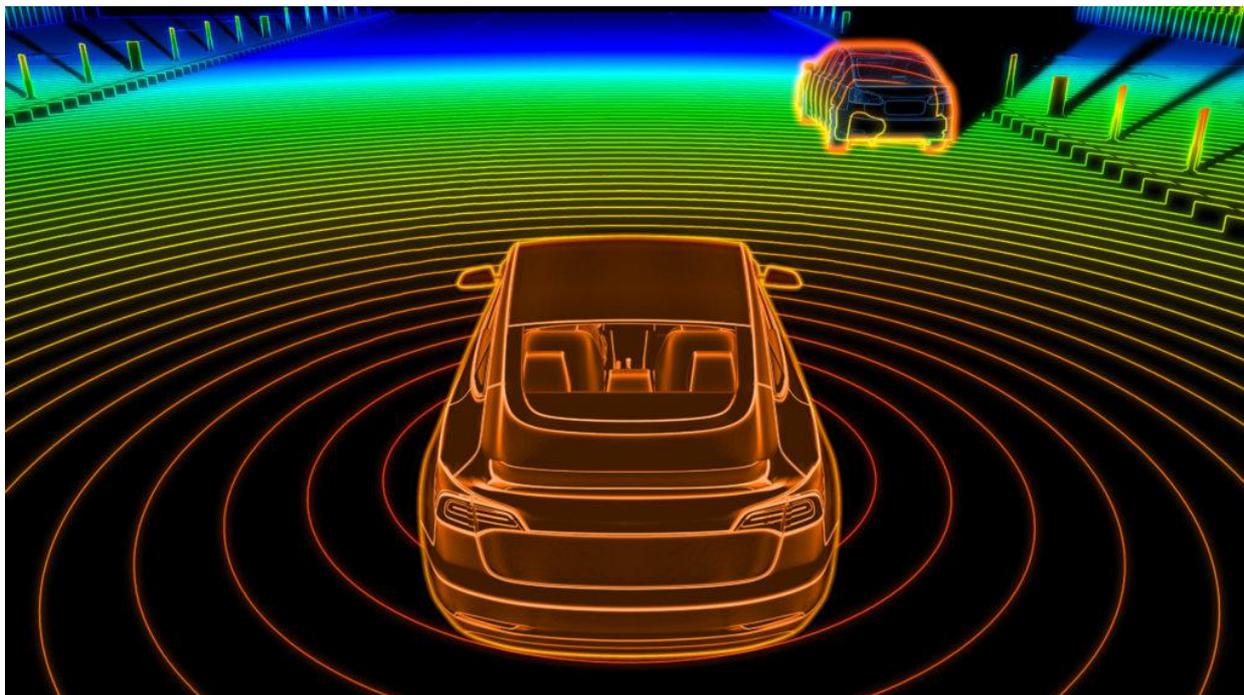
Ostune E1608 and E3030 extend Osram's broad portfolio for automotive interior lighting by offering a wide colour temperature range from 2700K to 6500K. In addition, they provide customers an energy-efficient, space-saving alternative to conventional technologies for applications ranging from cozy interior lighting and reading lights to mirror and footwell lighting.

With the Ostune LEDs' broad colour range and ability to choose from many small bins, customers can easily and very precisely define their desired white tone and make it a fixed design element across vehicles, while the new LEDs' compactness— $1.6 \times 0.8 \times 0.6$ mm for the E1608, and $3.0 \times 3.0 \times 0.65$ mm for the E3030—makes them easy to integrate into every element of a modern vehicle interior. The E1608 covers the lower brightness range up to over 7 lumens, while the E3030 serves the upper range to over 70 lumens.

Driver Assistance News

dSPACE and LeddarTech unite to develop LiDAR for AVs

DRIVER ASSISTANCE NEWS



dSPACE a developer of technologies for connected, autonomous electrically-powered vehicles, and LeddarTech, a developer of level 1-5 ADAS and AD sensing technology, have entered into a partnership to work on lidar technologies for autonomous driving. The partners are intending to provide high-precision simulation models and interfaces for lidar sensors, enabling OEMs and suppliers to integrate lidar innovations into ready-for-application solutions more quickly.

The cooperation will support the emulation of new LeddarTech laser sensors in simulation solutions at an early development stage. dSPACE will provide simulation models for testing and validation, as well as the sensor simulation environment for validating camera, lidar and radar sensors throughout the development process – accelerating customers projects.

The dSPACE simulation solution generates point clouds in real time to simulate objects. The simulation models help determine the most effective positioning of the sensor on the vehicle (“sweet spot”), as well as the sensor limits (“corner cases”). LeddarTech will be able to incorporate dSPACE’s sensor models into its development projects.

Magna's Advanced AV Camera System

DRIVER ASSISTANCE NEWS



Magna's latest AV camera system technology is a fifth-generation item including the related software in one unit. It's based on Mobileye's EyeQ5 system-on-chip device.

Magna say their new technology will reduce the cost of adding camera-based ADAS features, such as adaptive cruise control, automatic emergency braking, and pedestrian detection, and thus make its way into more vehicles. It also performs 50% better than Magna's previous system that used Mobileye's EyeQ4.

Magna Senior VP Sharath Reddy says the new camera package offers full-colour capability which will allow it to detect green lights and emergency vehicles, and its 120°, eight-megapixel optical path makes it more reliable for the ADAS systems that require its input. The improved vision will enable features required to pass Euro NCAP 2022 and 2024 safety tests, as well as L²⁺ autonomous driving functions such as Magna's Highway Pilot and Highway Chauffeur technologies. Reddy says Magna are in development with a major European premium automaker, with series production beginning very soon.

Future Euro NCAP test procedures also are affecting other Magna R&D work. Magna's suite of ADAS system components and partners include Lidar (with Innoviz), radar (with Uhnder) and ultrasonic sensors (with Murata). The company also are working on driver-monitoring technologies.

AVs Will Be On the Market by 2030: VW CEO

DRIVER ASSISTANCE NEWS



Volkswagen Group CEO Herbert Diess (photo) expects autonomous vehicles to be ready for sale between 2025 and 2030. He cited the improving performance of computer chips needed in autonomous cars while developments in artificial intelligence are also speeding the process.

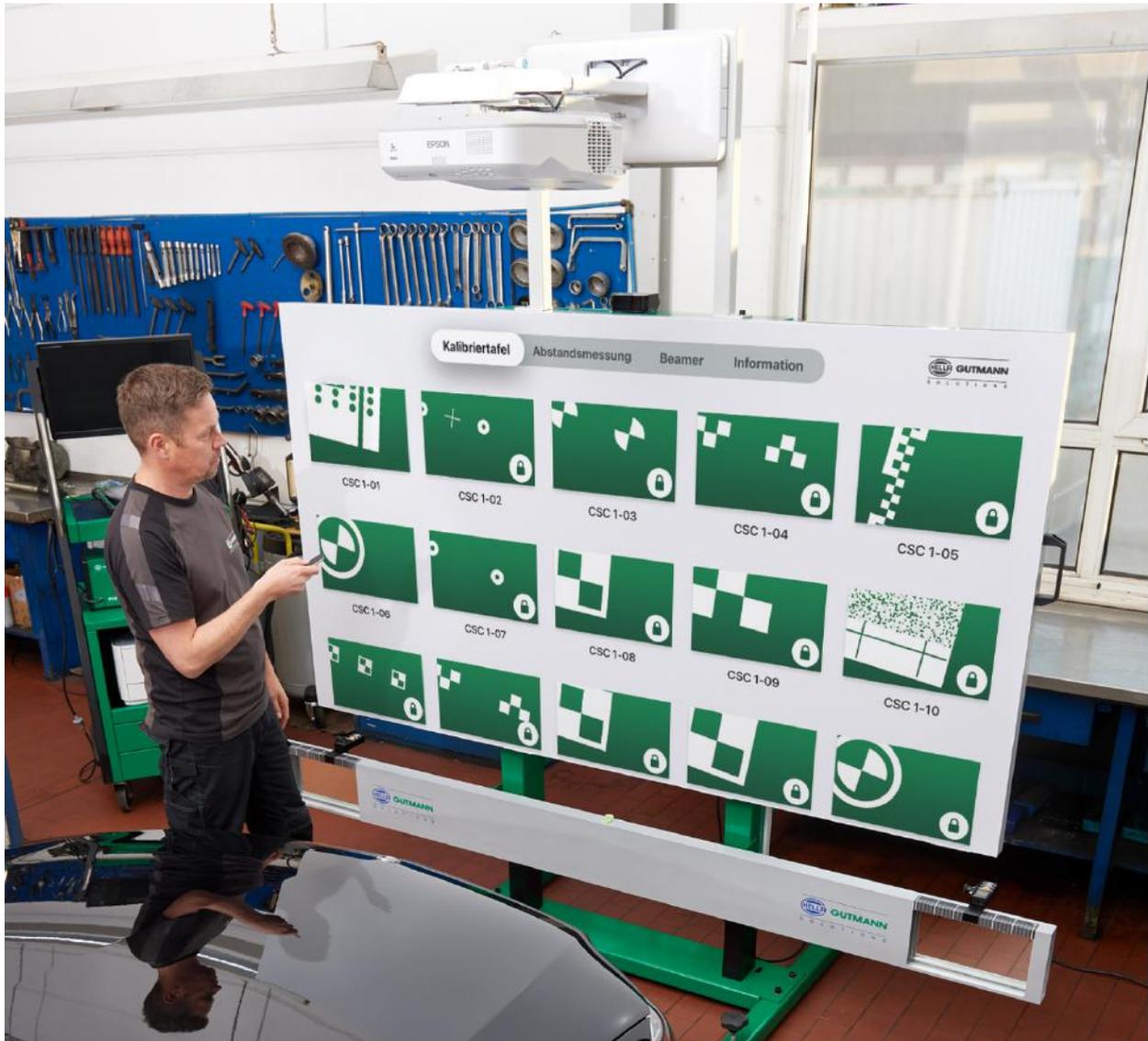
"It is foreseeable that the systems will soon be able to master even the complex situations of autonomous driving," Diess said. Bas du formulaire

VW are increasing the amount of money they're spending on technologies for EVs and AVs to more than €70bn, up from €60bn a year ago.

The investment includes spending on the software organization, whose goal is to build a proprietary software stack that will be deployed in Audi's Artemis project to develop an advanced, self-driving electric vehicle.

Hella Gutmann's Tool for Field Calibration of ADAS

DRIVER ASSISTANCE NEWS



The number and variety of ADAS that need to be calibrated after a car repair is growing rapidly, so Hella Gutmann's modular CSC Tool is adding numerous targets and reflectors for cameras and lidar and radar sensors.

For the static front camera calibrations of the 26 most common car brands in Europe alone, 21 manufacturer-specific targets are currently required—that's a lot of sensitive measurement technology that needs to be well and cleanly accommodated in the workshop. The CSC Tool Digital is an easier, more compact alternative: The large-format calibration targets for front cameras are provided digitally by Hella Gutmann and are projected onto the screen of the CSC-Tool via the associated short-distance beamer. This creates a second advantage: the digital targets are available more quickly after their specifications are published, so new vehicle models can be calibrated even earlier.

The digital targets can be obtained flexibly via the CSC Tool Digital app, which can be downloaded from the Apple App Store. The included Apple TV box at the top of the screen then transfers the calibration targets to the beamer. The control and selection of the required target is simply done by remote control. In addition, the digital system

can be used multifunctionally by switching from the CSC Tool Digital app to the Hella Academy app or to any other apps from the App Store.

For the necessary alignment of the targets to the geometrical driving axis of the vehicle, the wheel sensors with line laser from the CSC Tool SE are used. Height adjustment and distance measurement are more elegant with the CSC Tool Digital: Two electromechanical lifting columns take over the height adjustment of the screen at the push of a button. A special wheel sensor and a new laser rangefinder deliver the actual values directly to the screen, supported by an app. All other calibrations, such as those of the front radar, laser scanner (lidar) and environmental systems, are performed in the same way as with the CSC tool SE.

General News

Lincoln Wins Owner-Satisfaction Race on Luxury Brands

GENERAL NEWS



There was but a two-point spread among Lexus, Mercedes-Benz, Cadillac, Infiniti, Porsche and Lincoln. "I've never seen it this close," Chris Sutton, J.D. Power's vice president-auto retailing.

With a score of 827, Lincoln ranks highest in the J.D. Power 2020 U.S. Sales Satisfaction Index study.

But in the premium brand category, Toyota's luxury brand Lexus and Mercedes-Benz are right behind Lincoln, tying for second with scores of 826.

And in a three-way tie for third, Cadillac, Infiniti and Porsche all score 825.

The SSI study measures satisfaction with the sales experience among new-vehicle buyers and rejecters.

- Buyer satisfaction is based on six factors, in order of importance: delivery process (28%), dealer personnel (21%), working out the deal (19%), paperwork completion (19%), dealership facility (10%) and dealership website (4%).

- Rejecter satisfaction is based on five factors: salesperson (28%), price (27%), negotiation (18%), dealership facility (14%) and variety of inventory (13%).

The study is based on responses from 35,816 buyers who purchased or leased their new vehicle from January through June.

Delivery includes various elements, including how well dealership personnel familiarize customers with their newly purchased vehicles.

Mini ranks highest in sales satisfaction among mass-market brands with a score of

824, followed by GMC (804) Buick (803), Ford (798) and Subaru (793). Fiat and Chrysler tied for last at 756.

Because buying a vehicle is a relatively complicated transaction, doing parts of it digitally presents challenges, Sutton says. "It is important for dealers to have a process realizing that most customers are going to have questions. They are not going to sail through it without questions."