



## Editorial

### Coronavirus: An Opportunity To Improve Our Efficiency

I remember, after the 2008 crisis, the first DVN workshop in Stuttgart when 18 experts and managers (most of them are still in our lighting community) talked and listened with one another on the theme **"In today's crisis situation, how can lighting suppliers work differently with car makers to develop innovations in technologies and cost reduction?"**. I remember the various visionary proposals we defined together: cornering lights, automatic high beam which opened the door to ADB, the strong styling effect of LED DRLs, the lack of styling expansion with HIDs because they had the same design appearance as halogen lamps, the too complicated regulations, the great future of LEDs in main functions, the likely great future of modules, the need to pursue technologies selectively, and so on. Many of these are coming to be realised, or already have.

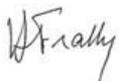
Today, with Coronavirus, we are in another kind of crisis. We're in a difficult time of constraints on all kinds of normal activity—including R&D—with social distancing, travel bans, cancelled conferences, and working at home. It seems like nothing but a nuisance, but think of the opportunities presented by a disruption in routine. We have a break from our usual thinking in terms of daily, weekly, and monthly actions and targets; we have a chance here to take a step back and think about our work in new ways and how to make the right choices.

It is an opportunity to take time to answer the questions of how best to focus investments, how to optimise our work and our job with small improvements, how to talk with our colleagues to better involve them in their jobs, how to train young engineers, and how to best make use of DVN—the Newsletters, Reports, and website. It's a good opportunity to [send us your thoughts and feedback](#) so we can continue making DVN work for you!

Meanwhile, we're working to bring you great things. This week we've got a provocative article by Daniel Stern, DVN's Chief Editor based in Canada, with a different idea for how to fix the American regulatory log jam. From next week, we'll bring you the saga of *The Wonderful story of Lighting*, written by Jean-Paul Ravier, previous Research director at Valeo and presented with more than 100 slides.

Stay healthy, look after yourselves and your family, associates, and friends. Keep your hands washed. We'll get through this together!

Sincerely yours



DVN President

# In Depth Lighting Technology

## A Modest Proposal

*By Daniel Stern, DVN Chief Editor*

Pretty much everyone in the vehicle lighting world is well aware of what veteran expert Marcin Gorzkowski accurately calls the North American "regulatory island": the world's only major market (or quite possibly of any size) not to recognise, one way or another, the UN Regulations that define the requirements, prohibitions, allowances, and norms for vehicle lighting virtually everywhere else in the world.

In 1966 when the National Traffic and Motor Vehicle Safety Act took force to enable the U.S. Government to set and administer auto safety standards, nearly 95% of new vehicles sold in the United States were made by domestic automakers. American legislators didn't have much of any incentive to think about anyone else's practices and rules, and even if they had, auto safety regulation was in its infancy worldwide. The UNECE 1958 Agreement was initially focused not on safety but on standardisation and reciprocal approval to facilitate pan-European trade. So, the U.S. regulatory system grew up in context of a domestic makers' oligopoly that no longer exists; in 2019, U.S. automakers' share of the American market was between 31% and 44%.

Up through at least the 1980s, meeting American rules instead of European or Japanese ones was largely a matter of parts-swapping: different lights, bumpers, mirrors, door structures, fuel tanks, glass and seat belts; that sort of thing, which imposed extra costs for non-American makers wanting to sell in the giant American market. That suited the domestic industry just fine, especially since it was one-sided; many countries at that time accepted American vehicles equipped in accord with the American standards.

There's been some regulatory harmonisation over the years, but as we've gradually moved beyond the parts-swapping era the amount and speed of harmonisation and regulatory update has been severely outstripped by the evolution of technology and technique on the one hand, and on the other hand the large and ever-larger car worldwide ratio of UN-spec versus U.S.-spec vehicles as more and more of the world's markets have decided to go with the UN regs.

Some years ago we published a series of articles ([one](#), [two](#), [three](#)) looking into just how and why the American legal system and the UN Regulations are fundamentally incompatible. Those articles remain accurate today, and as the pace of innovation has sped up, regulatory response in America seems to have slowed down. Let's take a look at a few examples:

- NHTSA first seriously began considering the CHMSL in 1980-'81. In October 1983, FMVSS № 108 was amended to require a CHMSL on each new passenger car from 1 September 1985. So, from first consideration to the regulation being finalised was two to three years' time, and from first consideration to the regulation's effective date was four to five years' time.
- Replaceable-bulb headlamps were first seriously considered by NHTSA in 1981, and first allowed from 1 September 1983. That's a two- to three-year timeframe.
- Visual/optical aim for headlamps was first seriously considered by NHTSA in 1994-'95, and first allowed from 1 September 1998. Here again, roughly three or four years' time from first serious consideration to first practical permission.

The latter two examples, as fundamental changes in headlamp technology proposed as allowances but not requirements, are directly comparable to today's ADB situation. But here we are about a decade out from the dawn of ADB and five years on from NHTSA's [scrutiny and study](#) of ADB-equipped cars—and all we've seen from the agency is a proposal so technically and practically problematic as to raise serious questions of intent, with no foreseeable hope of favourable resolution.

There is not much appetite at NHTSA for touching FMVSS № 108—there never has been—and as vexing as that is to those of us in the lighting community, it stands to reason; regulating crash avoidance systems like lighting is difficult, fraught, resource-intensive, and messy under the American system, which requires proof of cost-benefit before an aspect of vehicle safety can be mandated. Lighting equipment creates non-events, which cannot be calculated as to their cost, making direct cost-benefit analysis very difficult.

Clearly, perhaps now more than ever, there is no real likelihood of any significant American movement toward globalised vehicle lighting regulations. That is the reality, and we have no choice but to work within it as best we can. Is there an opportunity here? How might we make a doorway through this wall? Maybe there is: what if FMVSS № 108 were to be deleted?

It's a radical idea, sure, but one worth pondering at least as a thought exercise. The idea starts to seem less radical when we remember the precedent that has been baked into FMVSS № 108 right from its beginnings: it is a regulation originally almost completely—and still heavily—based on a snapshot of industry (SAE) standard practice as it existed when the snapshot was taken in 1967. There is nothing technically supreme about that moment over all others, it just happens to be when auto safety regulations were coming into existence. The FMVSSs came in response to a Congressional mandate to address the complicated problem of unacceptably high rates of motor vehicle traffic-related death, injury, and property damage. The mandate and accompanying public demand came to force very quickly,

requiring fast action without affording time that would have allowed the research, development, and formulation of safety standards based on best practices. Instead, safety standards had to be adopted and promulgated in a hurry to comply with the Congressionally-mandated timeframe.

FMVSS № 108 was among the first standards to take effect. It was, by necessity, written quickly, largely just a codification of existing industry practice with very few new or upgraded requirements—the notable exception being the requirement for side marker lights and reflectors. Once the hectic regulation rush settled down a few years later, NHTSA [proposed](#) a thorough revisitation and revision of the regulation based more on up-to-date knowledge, experience, and best practice rather than a mere codification of industry practice during a certain snapshot of time. That effort toward an upgraded FMVSS № 108 fizzled, though, and although the standard has been amended from time to time, many of its requirements are still based on industry practice of the past—as evidenced, for example, by the many references to SAE standards so long outdated that they are sometimes difficult to obtain.

We take this state of affairs for granted—that's just the way it is. Think about it a little, though: why could industry practice over half a century ago at *that* moment be regarded as enduringly appropriate, reasonable, and proper...but not industry practice at *this* more advanced, better-informed and -equipped moment? H'mm. Maybe it doesn't have to be this way, and maybe efforts to get an update to FMVSS № 108 should be abandoned as fruitless.

What would the topography look like in a post-108 America? NHTSA would scarcely ever have to touch the lighting standard again, so right away that's an easy win. Deletion of 108 would mesh well with a pervasive, persistent, and presently-ascendent American anti-regulation/anti-government philosophy, so that's another easy win. The basic idea would be to soften the line that presently divides industry standards from government regulations.

But what about safety? Theoretically, FMVSS № 108 exists to guarantee a minimum level of lighting performance adequate to address the need for safety. But practically, it's clearly failing to do that. Outfits like IIHS and Consumer Reports have said, right out in plain language, that FMVSS № 108 fails to guarantee adequate headlighting performance; that's why those outfits do their tests—and just look at the directly resultant trends: over their three years of existence so far, the IIHS tests have driven material improvements in headlight performance—read the latest on that elsewhere in this week's Driving Vision News.

Meanwhile, there have been zero changes to FMVSS № 108 in that time; nothing at all related to the regulation that could explain the improvements that have been realised. This suggests market-based incentives might be a stronger, more efficient tool than regulations for achieving lighting improvement in the North American context. Even NHTSA themselves showed a glimmer of acknowledging this reality when they put forth a proposal a few years ago to award NCAP points to vehicles with better headlamps and turn signals. That proposal stalled, probably on account of the current American administration's regulatory freeze and enthusiasm for de-regulation, but it is significant that NHTSA chose to pursue improvements via a market incentive (NCAP) rather than by stiffening the regulations (FMVSS).

Of course, there has to be a legal requirement of *some* kind, there can't just be zero regulation—we know [what happens](#) in the total absence of regulations, and it's neither pretty nor acceptable. So, what balance might be struck between the two unworkable extremes? Here again, we find a hint in FMVSS № 108 itself. Unlike the dimensionally-explicit mounting specifications in UN Regulations for lamps, light signals, and retro-reflectors, Standard 108 requires most devices to be mounted "as close as practicable" to (as applicable) the front, rear, and/or sides of the vehicle, and for the two lamps of a left/right pair to be mounted "as far apart as practicable". Determination of practicability is left up to the automaker, and NHTSA's official policy is not to challenge it unless it is "clearly erroneous".

So in other words, the devices have to be mounted where they should be, and the automaker will get in trouble only if the devices clearly aren't. In even simpler words, the maker has to *do it right*. That seems a vague, hands-off way to regulate, but practically—effectively—it's nowhere near as lax as it sounds; for the most part it works quite well. Even disregarding vehicles sold in substantially similar configuration in the U.S. and elsewhere (with lights placed according to the UN Regulations' dimensionally-specific requirements), most vehicles sold only in the U.S. have all their lights and retro-reflectors placed in functionally appropriate positions. Dubious notions of practicability have popped up from time to time—on rare occasion a maker has placed the front turn signals barely 30 cm apart from each other and 78 cm from the outboard edge of a vehicle 186 cm wide, or has used the repeater hole on the fender behind the front wheel for the U.S. front side marker light—but it's quite a rare occurrence.

Why? Probably because if a lighting installation contributes to a crash or safety problem but meets the applicable explicit regulatory requirement, the only recourse is for the regulation to be changed so future vehicles won't cause the same problem. But if the requirement is for the maker to *do it right*, then much more immediate and powerful recourse is available both to the government and to the consumer. The regulators can tell the automaker they did it wrong and have to fix it, and the consumer can sue the automaker for negligence. No company wants either of those things to happen, so there's strong incentive to *do it right*.

How might this do-it-right principle, already present in FMVSS № 108, be applied more broadly? The regulation could say **the lighting system must be designed, equipped, and configured appropriately for U.S. conditions, needs, and expectations; and all devices and systems must be designed, built, and tested in accord with prevailing best practices as defined in recognised technical standards as amended from time to time**. A list of such standards might include SAE J2442, UN Regulation 48, and/or JIS D-5500 for installation, and the various SAE, UN, and JIS standards for design, construction, durability, and performance of devices and systems.

This approach might seem to provoke compatibility problems, but many of them are illusory. UN Regulation 48 doesn't require side marker lights and side retro-reflectors; R149 has lower minimum intensity requirements for low beams than FMVSS № 108; turn signals and stop lamps are permitted by R148 to be smaller and dimmer than FMVSS № 108 allows, and JIS D-5500 specifies low beams for left-hand traffic, but none of those would make real problems because *U.S. conditions, needs, and expectations* include all vehicles being equipped with side markers and reflectors, right-traffic low beams giving seeing distance adequate for U.S. roadway geometry, and signal lights big and intense enough to be clearly conspicuous in very bright sunshine. And so on and on; automakers failing to cater for U.S. conditions,

needs, and expectations would expose themselves to legal liability, bad grades and ratings on consumer-orientated tests, and other unfavourable pressures.

In a very real sense, it would be a large step toward the performance-based standards NHTSA have long advocated. And lawyers, insurance groups, consumer groups, and programs like NCAP would provide layers of incentive for automakers do the whole job right. Meanwhile, drivers could have the latest and greatest lights with minimal delay. American regulatory lag, obsolescence, and misalignment would be a thing of the past, and American expertise and innovation would be much better positioned to contribute to advancing the the state of vehicle lighting technology and technique for the benefit of everyone who participates or interacts with traffic anywhere in the world.

It might seem as though some kind of miracle would be needed to bring about such a fundamental change. Maybe or not; to find out, someone (or, preferably, a formidable group of interested parties) would have to thoughtfully petition NHTSA. Such a petition, carefully phrased, could leverage the existing reality of an American de-regulatory sentiment to achieve where the current approach has failed. Who will step up? The worst they can do is say no.

# Lighting News

## WCX 2020 World Congress Expérience Canceled



The Society of Automotive Engineers, SAE, said it will cancel WCX, its annual engineering world congress, the organization's event in Detroit for automotive engineers, because of the coronavirus. Michigan Gov. Gretchen Whitmer has banned gatherings of more than 250 people in the state.

The three-day event, which attracts thousands of engineers and hundreds of exhibitors, was scheduled to take place April 21-23 at TCF Center (the former Cobo Center) in downtown Detroit. SAE officials were considering late Friday offering some of the popular speaker panels online.

« Due to concerns around the rapidly evolving coronavirus (COVID-19) pandemic, **SAE International has made the difficult decision to cancel the WCX 2020 World Congress Experience**, originally scheduled for April 21-23, in Detroit.

Before making this decision, we extensively monitored and evaluated health guidance from international health authorities, government- and corporate-imposed travel restrictions, and the recently declared State of Emergency issued by the State of Michigan.

« WCX has long been the marquee industry event for showcasing technological innovations in the world of mobility, and we are currently evaluating alternate options for how to best deliver the technical content that has been developed to registered attendees. We remain firmly committed to prioritizing the health and safety of our members, customers, partners and staff who are attending our events, and apologize for any inconvenience this cancellation has caused

## ADB developed in the Greatest French Economic Magazine



The greatest French economic newspaper «Les Echos» published in its last week-end magazine, an article considering ADB as one of the 75 «things», as places, restaurants, personalities, products and technologies we could discover in Paris.



«Les Echos» gave the opportunity to Guillaume Devauchelle, director of innovation at Valeo, to explain what is ADB and its benefit. Guillaume explains the change of automotive lighting from a component to create a powerful and uniform light to a real system with a camera, a ECU, and sometimes million of  $\mu$ LEDS able to send the photons like we need.

We could be proud that a lighting technology is present in a such ranking, and also that it is the unique technology in automotive includes in the 75 «things».

## World Headlamp from Hella



Legislation for automotive lighting still varies from region to region. In the USA, legislation only permits the classic main light functions of low beam, fog light and high beam, while in the EU dynamic light distribution up to digitally controlled glare-free high beam is permitted.

To ensure the specified light distribution, different optical systems are developed and manufactured for vehicle headlamps depending on the area they are going to be used in. Taking into account right- and left-hand traffic, up to 12 technically different types of headlamps may therefore be required

for a global vehicle model.

Hella will take a step to obviate the need for such hardware proliferation when they launch a new worldwide headlamp this summer for an automaker selling worldwide. The output from this SSL 100 headlamp module is determined by controlling it via software. The digital control can activate each pixel individually and display the entire light distribution according to the respective regional regulations. For example, just one headlamp module can now give ideal illumination of a roundabout in right- or left-hand traffic and prevent oncoming traffic from being dazzled, within whatever regulations are in force where the vehicle is being used.

Hella are working consistently on the digitalisation of light and will in future digitally cover the entire range of LED headlamps from 100 light pixels to high-resolution SSL|HD technologies with tens of thousands of light pixels. Dr. Michael Kleinkes, Hella's Global Lighting Technology Development Manager, says "With our innovative headlamp modules, we have a technical basis for implementing all lighting functions by using software and flexibly adapting them to regional requirements. This also includes additional functions such as glare-free high beam or projected orientation lines on the road".

Production of the headlamp will start in the middle of this year at the Mexican Hella plant in Irapuato, and end of the year at the Chinese Hella plant in Jiaxing.

## Light is the New Chrome: VW Design Chief



VW's ID. ROOMZZ concept car

EVs and AVs mean changes in the design of tomorrow's cars, and the same applies for lighting. For example, consider VW's futuristic ID.RROOMZZ.

This SUV prototype is the latest addition to the ID family of EVs and can be driven either in manual or autonomous "ID.Pilot" mode. ID.RROOMZZ is set to be released in China as early as next year, and will then go into series production worldwide.

The front and rear lights both extend across the entire width of the vehicle as horizontal lines. Illuminated touch-sensitive panels for opening and closing the doors function as a visual link between the front and rear of the car. "Light is the new chrome" is the memorable catchphrase of Volkswagen's Chief Designer, Klaus Bischoff. The distinctively contoured lights at the front end of the ID.RROOMZZ demonstrate exactly what this means: A double horizontal line with the illuminated Volkswagen emblem at its centre forms the striking signature light, with the top line enclosing the LED headlamps.

The rear of the ID.RROOMZZ also surprises with its innovative light design: the "ID.Honeycomb" shape, which represents sustainable mobility within the ID family, extends across the entire width of the car like a signal-red LED strip and provides all lighting functions. "This full tail lighting, in which a single component combines both taillights, is a trend in the automotive industry," says Siamak Djafarian, Head of the Molding Compounds business unit at Röhm, who supply

the Plexiglas™ material used for the rear lighting setup. "It increases design freedom, as automobile manufacturers can use complex forms and additional materials here to create eye-catching effects".

For the first time, VW are presenting a concept car with a signature taillight that can be customised using a smartphone app. "The smaller, individually controllable ID.Honeycomb elements in the taillight can form three different signature lights", as VW exterior designer Nicolas Ruhault describes it.

## Big Range of Lighting Performance in EVs



The Finnish magazine "Tekniikan Maailma" has [published](#) (paywall) an interesting article comparing six electric cars: the Audi E-tron, Hyundai Ioniq, Kia e-Soul, Mercedes EQC, Renault Zoé, and Tesla Model 3. There's a large range of performance across the six different LED headlamps. Here's a summary of the magazine writers' lighting-related comments and data about this group of cars:

- Matrix LED headlamps included on the Audi test car are an extra-cost option.

- Hyundai should have spent more money on lights, because the Ioniq's reflector-type low beams are the worst of the whole group: the beam is narrow, and even though the right lamp's asymmetrical area is fairly large, the car's own lane is not lit properly and the high beams leave the left verge of the road dark. The only plus for the Hyundai is the automatic switching of high beams, but it operates with a long delay. There are no headlight washers, the quick adjustment of lights according to the load is manual, and you can still drive with the tail lights off even in the dark when the light switch is in the 0 position.

- The Tesla's high-beam assist works occasionally too eagerly, even on areas with road lighting, but the delay in switching to high beams is too long when encountering or overtaking other cars. High beams cannot be turned on manually from the stalk; the automation is turned off in the centre menu, which is not convenient while driving. When driving the Tesla, the difference between the width of the Audi's low beams and the Mercedes's high beams is also clear.

- The Kia gives broad low-beam coverage.

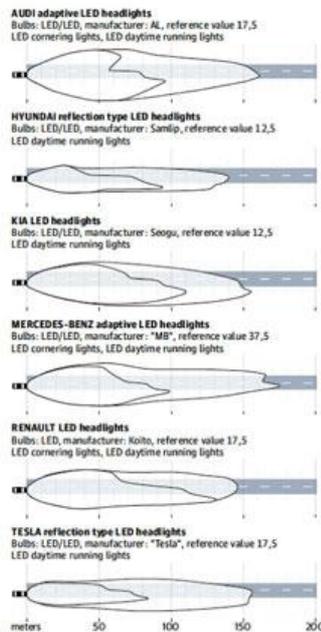
- The Renault shows the others what the low-beam range should be, but it is the only one in which the driver has to turn the high beams on manually.

- The high-beam assist taking other road users into consideration comes as standard in the Mercedes, and it is available as an option for the Audi. Both operate smoothly, and the glare prevention removes reflected light from traffic signs. However, both systems react to other cars too far in advance, the shading is often too wide, and there are delays in switching to full high beams. In the Mercedes, using high beams manually during automatic operation is difficult.

- The features related to washer fluid that are essential when driving on salted roads only work as they should in the Audi, which is the only one to have headlight washers.

VISIBILITY EQUIPMENT	Audi	Hyundai	Kia	M-B	Renault	Tesla
Automatic high beam	x	x	x	x	-	x
- with masking function	x <sup>1)</sup>	-	-	x	-	-
0 position in light switch	- <sup>2)</sup>	x	x	-	-	- <sup>2)</sup>
Rear lights on with DRL	x	-	-	-	-	-
Headlight washers/phased spray	x/x	-/-	-/-	-/-	-/-	-/-
Windshield wiper service position	x	-	-	x	x	x
Washer fluid capacity (litres)	6,0	- <sup>3)</sup>				
- found in instruction manual	x	-	-	-	-	-
Low washer fluid alert	x	x	x	x	-	x
Rear window wiper and washer	x	-	x	x	x	-
- pause/continuous wiping	x/-	-/-	x/x	x/-	x/x	-/-
- automatic switch-on when reversing	x	-	-	x	x	-
Front fog lights/with corner function	x <sup>4)/-</sup>	-/-	x/-	-/-	x/x	-/-
Cornering lights/static curve light	-/-	-/-	-/-	-/-	x/-	-/-
Rear fog lights (pcs)	1	1	1	1	1	1
- independent of front fog lights	x	x	x	x	x	x

Equipment according to test car, 1) option in test car, 2) OFF position, 3) manufacturer does not report capacity, 4) "all-weather lights"



With masking function = ADB

## ZKW's Coronavirus Precautions



ZKW have implemented a package of measures to protect their workforce from the coronavirus. From 12 March, employees will be prohibited doing business outside Europe and crisis regions until further notice. Within Europe, business trips and customer visits are to be kept to a minimum. In addition, a "home office" arrangement has been agreed with the employees in Wieselburg and Wiener Neustadt, for whoever and whenever it is technical and personally feasible.

The ZKW company restaurant in Wieselburg is now closed. "As one of the largest employers in the region, we are aware of our social responsibility. Although there are no suspected cases at ZKW, we are now taking proactive measures to minimize the risk of infection with Covid-19", says CEO Oliver Schubert.

For their international locations, ZKW have put a central office in close contact with local health authorities, specialist companies, and occupational physicians. "In coordination with all plants worldwide, we discuss the situation daily in our task forces, exchange solutions, and define necessary measures", says Schubert. Managers are asked to draw up an emergency staffing plan for their area of responsibility. Any suspected cases and abnormalities must be reported to the local task force immediately. "As an international company, we want to do everything in our power to curb the spread of the coronavirus," says Schubert.

Production at ZKW is still on schedule. The supply of parts is also guaranteed. "We are currently meeting delivery obligations to our customers on time. The [coronavirus] crisis is expected to have a negative economic impact. Damage will mainly occur if fewer cars are sold worldwide", Schubert says. ZKW are closely monitoring the supply chain in crisis regions to ensure that there are no supply bottlenecks; Schubert notes the situation in Italy could be problematic in the short to medium term, as important supplies to ZKW come from Italy.

# Driver Assistance News

## Prediction Algorithms Improve Safety



The 6,500 U.S. pedestrian deaths in 2019—an increase of 5% over 2018—and the recent accidents involving automated vehicles have heightened the call for improved detection of pedestrians and other moving obstacles. The Southwest Research Institute's new computer vision tool uses a novel deep learning algorithm to predict motion by observing real-time biomechanical movements, with the pelvic area being a key indicator for changes.

Although previous technologies could track and predict movements in a straight line, they couldn't anticipate sudden changes.

Motion prediction often uses optical-flow algorithms to predict direction and speed based on lateral motion. It's a type of computer vision pairing algorithms with cameras to track dynamic objects. The accuracy of optical flow diminishes, however, when people move in unexpected directions. To improve accuracy, the SwRI research team compared optical flow to other deep learning methods including TCNs (temporal convolutional networks) and LSTM (long short-term memory). After testing several configurations, researchers optimised a novel TCN that outperformed competing algorithms, very accurately predicting sudden changes in motion within milliseconds.

Applications for the project, called "Motion Prediction from Sparse Skeletal Features", include ADAS enhancement, automated vehicles and manufacturing robotics. The algorithms can work with a variety of camera-based systems, and datasets are also available to SwRI clients.

*SwRI's data scientists work in collaborative teams to solve problems for several industries, with their rigorous approach to machine learning system design leading to innovations in automated detection of traffic hazards.*

## Carbon Nanobots for Ice-Free Electric Eyes



Sensor surfaces that are exposed to weather need to be kept clean so that ADAS and autonomous driving systems can function safely. Canatu say their "carbon nanobots" keep critical sensor surfaces—and LED headlamps—clean in subfreezing weather.

The Finland-based technology company have developed a transparent, highly conductive heater element that does not require metallic wires to be placed in front of the sensor. These elements keep lidar sensors and cameras ice-free, thanks to carbon nanobot (CNB) heaters. Canatu VP of Sales Samuli Kohonen says the technology "can keep sensors clean in every weather and creates even and fast de-icing in extreme conditions".

Canatu's CNB heaters are made up of a resistive carbon nanobot heater surface with electrodes on the side, covered by a lens containing a thermistor temperature sensor. The company claim a 210 × 148 mm heater with 2.25 mm thick cover can warm the surface by 10 C° in 5.7 seconds, keeping the surface above freezing.

Canatu create the nanobots by feeding a proprietary blend of carbon gases into reactors. The nanobots then are deposited onto a plastic substrate. The plastic can be moulded into different 3D shapes with the nanobot-covered film either integrated in the plastic sensor covers or laminated behind glass for applications such as side mirrors or entire windshields.

EVs can make particularly good use of CNB heaters because they are "more effective from a power-consumption perspective because we are bringing heat exactly to the areas where it's needed," Kohonen says. Headlamp enclosures can benefit from the CNB heaters as well, he notes: "Traditionally, de-icing headlights wasn't a problem because of the heat from the light bulbs; now, with everybody moving to LED headlamps, there starts to be problems with ice on the headlamps."

The CNB heaters are not yet available in production vehicles, but Kohonen says several Canatu customers are road-testing the technology around the world. In late 2018, Canatu signed a non-exclusive licensing agreement with Denso to build CNB heaters.

## Elmos' New 3D ToF Imager is HMI Electric Eye



Elmos say their new E527.31 is a CMOS-based 3D ToF imager for interior and exterior vehicle applications. The power-efficient 3D imager is certified according to AEC-Q 100, and has a sleep mode in which power consumption is reduced even further to an absolute minimum.

The new imager is designed for HMI (human-machine interface) applications. Object detection in the near field of the vehicle as well as gesture detection in the exterior or interior are possible.

Typical applications in the interior of vehicles are the gesture-controlled infotainment system or the monitoring of the number of people in the car. Outside, automatic tailgates and doors controlled by gestures are on

the menu. If the imager is integrated into the B-pillar, collisions with moving and static obstacles such as bicyclists, curbs, or signposts can also be prevented. The precise detection of steps or objects and the generation of a realistic 3D image of the environment also allow the use in self-propelled robots.

The E527.31 has  $32 \times 32$  active pixels and is supplied with an optical bandpass filter for 850 nm. Customer-specific adjustments of the optical filter in the range of 850 nm to 940 nm are possible. The device controls the light source LED, VCSEL, or laser to optimise the light pulses and thus the object illumination for the application. The 3D ToF Imager provides perfect operation in all lighting conditions and in difficult weather conditions.

*Elmos develop, produce, and market semiconductors and sensors primarily for use in the automotive industry. Their components communicate, measure, regulate, and control safety, comfort, powertrain and network functions.*

# General News

## Continental Profit Falls on Vehicle Demand Slump



Continental will work harder on cost savings after posting a drop in adjusted profit and a €1.2bn net loss in 2019 as worldwide vehicle demand slumped.

Cost-cut plans will be presented in May because worldwide car production is expected to fall for the third year in row, by between two and five per cent, Continental CEO Elmar Degenhart says, adding that job cuts may be necessary. Analysts at Evercore ISI had harsh critiques for the supplier, calling Continental "a very large company which is not moving fast enough in this rapidly declining volume environment based on a legacy cost

structure designed for volume growth,"

Adjusted earnings before interest and taxes fell 22% to €3.2bn in 2019. Full-year revenue came in at €44.5bn, up slightly from €44.4bn in 2018. Continental say they expect to deliver an adjusted EBIT margin of 5.5 to 6.5 per cent this year.

Degenhart said potential supply chain disruptions caused by coronavirus travel restrictions have been avoided by switching from shipping parts to using air freight, and he expects production and logistics to normalise in the second quarter.

## New MI NA HQ for Marelli



Marelli have signed a multi-year lease to relocate their North American headquarters to Southfield, Michigan, about 24 km from Detroit. The company will occupy nearly 20,000 m<sup>2</sup> of the brownfield site at 26555 Northwestern Highway, with room to grow.

Gene Spektor, Marelli's Senior VP of North American Sales and Business Development, says "While it's important for us to be in close proximity to our automotive clients, it's just as important to ease the transition for our employees. Our new location will have minimal impact on the average

commute, and will provide employees with a modern, open and collaborative work environment".

The three-story building, which is undergoing extensive renovations, will feature modern workspaces for nearly 500 employees: 75 conference rooms, an auditorium, cafeteria, fitness room, and plenty of indoor/outdoor meeting space. Approximately 10,000 m<sup>2</sup> will be dedicated to testing and lab equipment to support R&D activities for the company's lighting, electronics, exhaust, interior, powertrain, ride dynamics, and thermal solutions business units.

Marelli currently have three other locations in the vicinity: two in Auburn Hills and one in Farmington Hills. They're planning a staggered move-in to the new facility beginning late this year, with full occupancy expected by a year from now.

## BMW Roundel Goes Digital

BMW have updated their iconic "roundel" logo for the first time in 23 years. The update, BMW say, is "better-suited to the digital age". The biggest change is that the thick outer ring goes from black to transparent, so whatever colour the logo is set against will appear in that portion.



BMW Head of Brand Management Jens Thiemer says "BMW is becoming a relationship brand; the new communication logo stands for openness and clarity". The update, he says, is "geared to the challenges and opportunities of digitalisation for brands".