

## Editorial

### Regulatory Sessions At 2020 DVN Workshops

**Guest editorial by GTB President Geoff Draper**

I started leading the regulatory sessions in 2012 at the USA Workshop. Since then we have held 15 sessions in China, Europe, India, Japan, Korea, and America, and I am beginning to prepare my contribution for the 2020 DVN Workshops. Initial interest in the topic was not very high, yet there were many complaints from industry that regulations were blocking innovation. As we progressed, we discussed how regulations could be changed to facilitate innovation and we agreed on the need to develop global technical requirements applicable in all regions. Panel sessions at DVN Workshops gathered representatives from industry and government, and we focussed on building consensus to start activity, under the umbrella of the UNECE World Forum for Harmonization of Vehicle Regulations (WP.29) to develop Global Technical Regulations according to the 1998 Agreement.

Our efforts reached a climax at the DVN 2018 Tokyo Workshop, where I was honoured to lead a session that included important speeches from Mr. Hiroyuki Inomata (Japanese Ministry of Land, Infrastructure, Transport and Tourism), Chairman of WP.29-AC3; and Mr. Michel Loccufier (Belgian Federal Public Service Mobility and Transport), Chairman of GRE. There were also written contributions from Mr. Aleksander Lazarevic, of the EC, and Mr. He Yuntang representing the Chinese position. These interesting and important contributions were followed by a panel session with input of experts from Belgium, China, European Commission, India, Japan, Korea, and the USA. The outcome of the session is summarised below:



#### Consensus following DVN Workshop Tokyo – June 2018

- It is time to start working on globally harmonised technical requirements
- Globally harmonised technical requirements shall be the future basis for lighting and light-signalling regulation.
- New technologies need to have globally harmonised technical requirements available for application in all markets
- Concerns about committing resources to this major task because of the previous failed attempts.

#### Participants

- Korean vehicle manufacturers
- Japanese Automobile Parts Industry Association (JAPIA)
- India (ARAI)
- Chinese Lighting manufacturer
- Japanese Automotive Manufacturers Association (JAMA)
- Japanese Government (MLIT and Chair of WP29- AC3 (Administrative Committee for the UN 1998 Agreement)
- UNECE - GRE Chairman

#### Written statements from:

- China (CATARC)
- American Automotive Policy Council (representing Fiat Chrysler Automobile, Ford Motor Company and General Motors Company)
- The European Commission

Since the 2018 Tokyo Workshop, the debate about the need to develop Global Technical Regulations has moved to the UN in Geneva where it is a permanent part of the GRE agenda. However, progress is slow due to political issues associated with American reluctance to adopt Global Technical Regulations in the U.S. Federal Motor Vehicle Safety Standards. This is making other government and industry representatives nervous about investing their resources into the activity if the USA is not going to implement the outcome.

In conclusion, the DVN workshops have provided an effective forum to support GTB initiatives to develop global technical requirements to remove regulatory barriers, and now it is time that our regulatory sessions start to concentrate on other issues of interest to our lighting family.

I would like to pick up the theme of a DVN editorial from this past August, where he encouraged you to "Please Raise Your Voice To DVN!". Please let us have your suggestions, as soon as possible, for subjects you would like us to address in the Regulatory Sessions of the 2020 DVN Workshops. This will give me time to organise the sessions and invite the appropriate experts.

Sincerely yours,

Geoff Draper, GTB President



*Don't miss the article on CEA-Leti with the interview of Dr. Simoens, strategic program director of LETI's Chip-Scale lidar*

## In Depth Lighting Technology

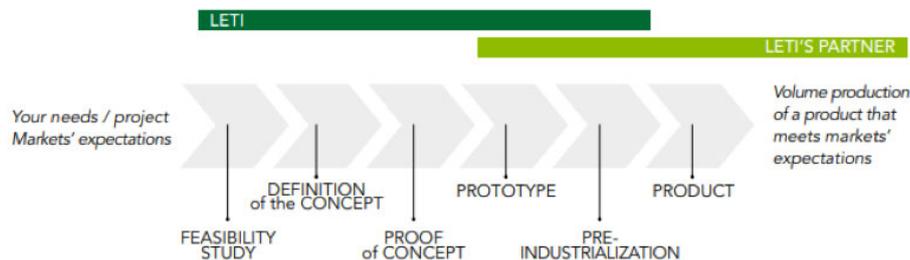
### CEA-LETI: Building your Future Photonics products NOW



CEA-Leti, founded in 1967, is a French technology research institute focused on micro- and nanotechnologies. Their optics and photonics division, which now comprises over 300 people and more than 500 patents, was created in 1978 to cater for sectors including the automotive industry. This aligns with CEA-Leti's broader work of bridging research and production of semiconductor technologies, from concepts to prototyping. They've got 10,000 m2 of cleanroom space, and their portfolio of more than 2,760 patents, some 40 percent of which are under licence agreements, demonstrates the institute's ability to bolster industrial partners' competitive positions.



CEA-Leti's pre-industrialisation facilities include a new dedicated photonics platform wherein multidisciplinary teams apply expertise in visible, infrared, and THz imaging; displays, solid-state lighting, optical data communications, and optical sensors. Their customised innovation projects provide proof-of-concept and prototyping capabilities, and always incorporate mass-production considerations and constraints to ensure fast technology transfer and reduced time-to-market.



Artificial intelligence has an increasingly important role in the automotive world, from customer support to easing traffic congestion: cars are coming to be packed with real-time features that depend on AI, including speech and gesture recognition and eye tracking. A Cloud-only approach won't suffice in this context; AI will also require local support. To meet this need, CEA-Leti researchers are developing neuro-inspired hardware combining a new design and advanced technologies like spike coding and OxRAM non-volatile memory. Innovative smart sensor approaches being explored include new kinds of transducers; analog and digital filtering, sensor fusion, and AI-based decisionmaking.

CEA-Leti's focus on lidar includes a strategic industrial partnership program, launched in 2018, to develop agile, affordable, compact lidar systems mixing innovative components and intelligent data processing including low-power data fusion. Recent additions to their technology equipment include a fully integrated silicon photonics optical phased array capable of steering laser light beams, and highly sensitive single photon avalanche diodes (SPADs) with advanced CMOS technology (in partnership with STMicroelectronics)

The institute's location in the "imaging valley" area of Grenoble, France, puts them amidst over 1000 people at a dozen leading industrial companies and startups developing microelectronics and photonics solutions. These include STMicroelectronics, Soitec, Lynred, Aledia, Microoled, Mirsense, and eLichens. In addition, expertise and assistance flow to and from institute offices in Silicon Valley and Tokyo.

CEA-Leti's startup program, another avenue for accelerating innovation, has launched 65 new enterprises so far, two of which have emerged as IR imaging leaders: Sofradir and Ulis, who merged in 2018 to form Lynred.

**CEA-Leti's François Simoens**



François Simoens received his PhD in electronics from the French Pierre & Marie Curie University in the field of particle-accelerating cavities. After seven years of research in the accelerator field at CEA Saclay, he joined CEA-Leti in Grenoble in 2003. He was first involved in the development of the sub-millimetre PACS focal plane array for the ESA Herschel satellite, then in uncooled infrared bolometer technology with the French company Ulis. In 2005 he took up as program manager and expert in infrared and THz detection. From 2015 to 2018 he served as marketing and strategy manager for imaging technologies and systems developed at Leti, from X-ray to FIR. Now he acts as strategic program director of LETI's Chip-Scale lidar program. He graciously granted DVN an exclusive interview:

DVN: Tell us about Leti, will you please?

François Simoens: Leti (Laboratoire d'Électronique et de Technologie de l'Information) was founded in 1967 within the technology research branch of the French Alternative Energies and Atomic Energy Commission, CEA. Through Leti, the CEA has opened itself to industry with a brand-new format that seeks to enhance the competitiveness of our partners. These bilateral projects, inside and outside our laboratories, encourage innovation in all the participating organisations.

**DVN: What are Leti's main activities?**

**F.S.:** Leti is a technology research institute that unites more than 19,000 researchers in pursuit of pioneering micro- and nanotechnologies. Invention and prototyping of differentiating application solutions is in our DNA, and we apply those skills to help ensure that our partners can compete effectively in a wide range of markets. Our micro- and nano-technology development efforts build on the scientific excellence of our teams, in response to the major social challenges facing the world of today and tomorrow.

**DVN: Who are Leti's main customers?**

**F.S.:** Leti count more than 250 active bilateral industrial partners. We build long-term relationships with our industrial partners—global companies, small/medium enterprises (SMEs) and startups—in activities that range from healthcare to energy to transport to information and communications technologies. Some companies require confidentiality, but among our key partners are STmicroelectronics, Soitec, and Applied Materials in the hardware sector, and system providers Renault and Valeo.

**DVN: Can you describe some of Leti's big achievements?**

**F.S.:** One of our most visible accomplishments is the number of startups that have emerged from our programs. Leti-created companies include Soitec, Sofradir, and more recently the startups Aledia and Scintil, who have transferred technologies to fabs and foundries—like through-silicon via technology to STmicroelectronics and Pixel Level Packaging technology for thermal-infrared imagers to Ulis. But as a general rule, our main achievements are providing differentiation to our industrial partners.

**DVN: Narrowing in, what Leti activities could be interesting for ADAS and lighting?**

**F.S.:** We're extremely active in miniaturising, integrating, and improving the energy efficiency of photonics components and systems of high interest for ADAS and lighting. Our optics and photonics division activities include areas like all-wavelength imaging sensors (visible, infrared, THz), displays, and solid-state lighting. One recent example is a new generation of photonic  $\mu$ LED arrays, and Leti have also launched a strategic program—that I coordinate—to demonstrate low-cost smart chip-scale lidar using a combination of silicon photonics and embedded computing technologies.

As is the case with our longstanding microelectronics work, the principal criteria driving Leti's photonic developments are miniaturisation, integration, and energy efficiency. Our internal roadmaps target development of photonic technologies, devices, and systems that address society's major challenges, particularly the cultivation of an innovative and secure society, resource efficiency, and wellbeing. Our R&D projects merge fundamental research with advanced technological and industrial developments. We interrelate nanosciences with material sciences, optics, electronics and micro- and nanofabrication, and are always mindful of the need for quick technology transfer and time to market.

**DVN: What can you tell us about Innovation Days on June 24 to 28? How did it go?**

**F.S.:** This year, Leti Innovation Days focused on exploring the power of distributed artificial intelligence, also called "Edge AI"—discovering the deep technology breakthroughs that will empower the implementation of artificial intelligence at the point of use. This event generated very fruitful exchanges with the numerous participants. Their feedback is that they appreciated the proposed AI tutorial and the 11 technical workshops, as well as the two days of industry leaders' presentations on AI-related opportunities & technologies.

# LIGHTING NEWS

## Lighting, DA Tech Prevents Crashes: UMTRI Study

UMTRI, the University of Michigan Transportation Research Institute, has published a rigorous study of lighting and driver-assist technology. GM gave UMTRI information about the safety system content of over 3.7 million vehicles—20 different 2013-'17 GM models. These data were matched to police-report data from vehicles involved in crashes using 10 state crash databases, so UMTRI could scrutinise the practical effectiveness of 15 active safety and advanced lighting systems.



Results indicated Automatic Emergency Braking reduced rear-end collisions by 46%; Lane Keeping Assist with Lane Departure Warning reduced crashes related to lane departure by 20%; Lane Change Alert with Side Blind Zone Alert reduced lane change crashes by 26%; Reverse Automatic Braking reduced backing crashes by 81%; High/low beam selection and HID headlamps provided 35% and 21% reductions, respectively, in nighttime pedestrian/bicyclist/animal crashes relative to halogen headlights—with a 49% reduction when offered together. .

One interesting point, though: those same kinds of crashes were estimated to be a statistically-insignificant 17% lower with swivelling ("articulating") HID headlamps versus fixed halogen lamps. It is also noteworthy that the crash data-based demonstration of HID headlamps' superior safety performance is the first of its kind—and it comes as HID headlamps are quickly becoming a thing of the past, rendered obsolete by LED headlamps with a wider range of performance levels compared to HID systems.

**"(...) generally, the wide variety of GM safety systems evaluated [in this study] provide further widespread evidence of the substantial safety benefit opportunities afforded by these systems."** (from the abstract of the study)

The 33-page study, "Analysis of the Field Effectiveness of General Motors Production Active Safety and Advanced Headlighting Systems", can be [downloaded](#) free of charge.

## Myotek Expand US Manufacturing Capacity



Myotek are a US-based supplier of innovative LED vehicle lighting, including cleverly-designed DRLs, high-power spot lights, and multifunction fog lamps giving unusually high performance, for the world's automakers. Now they're expanding their U.S. manufacturing capacity in response to customer demand and to further their ongoing efforts toward optimal vertical integration.

Last year, Myotek began investing substantial money and effort to add over 20,000 m<sup>2</sup> (220,000 square feet) of manufacturing space near vehicle assembly hubs in the U.S. states of Michigan, Tennessee, and Pennsylvania. CEO Eric Showalter says they're working quickly to broaden and bolster their supply chain with "a combination of in-sourcing and on-shoring strategies, both in response to growing demand for our products and to allow us to adapt quickly to changing trade policies and market conditions", adding that "In addition to expanding our U.S.-based assembly capabilities, we have made significant investment in expanding our engineering division and test laboratory with advanced simulation tools and metrology equipment. We are especially proud of our ability to manufacture our own printed circuit board assemblies in-house".

Currently, Myotek's U.S.-based manufacturing capabilities include custom injection moulding for both small- and high-volume part runs; automotive lighting assembly; custom module assembly; automated UV and thermal cure paint coating; in-line moulding and metallising; sputter coating metallisation; insert moulding; ultrasonic welding; foil stamping and electronics manufacturing.

As described in a [DVN Report](#), Myotek also make lamps at facilities in Taiwan and China when doing so makes sense for customer service and cost considerations.

## LED Package Suppliers Ranked By Market Dominance

Market intelligence provider TrendForce have ranked the world's LED package suppliers.

Here's how they stacked up in 2018:

- 1: Osram
- 2: Nichia
- 3: Lumileds
- 4: Stanley
- 5: Seoul Semiconductor
- 6: Dominant
- 7: Samsung
- 8: Everlight
- 9: Cree
- 10: Citizen

According to LEDInside, worldwide automotive LED revenue is forecast to register a CAGR of 7% over the 2018-'23 timeframe. Despite the sustained decline in car sales, there are more and more LEDs in more and more vehicle lighting devices. This trend gives every indication of persisting, and it will cause the revenue of automotive LED products to maintain a growth trend in future years, with global automotive LED revenue forecast of USD \$3.17bn in 2019.

Alongside the big three—Osram, Nichia, and Lumileds—a growing list of suppliers are competing for a share of the automotive LED market. Examples abound: Seoul Semiconductors' range of LEDs addresses light quality and human-centric lighting demand trends (e.g., with their SunLike range). Dominant have been expanding their presence in tail lights and ambient lights, and saw a 10% automotive revenue growth in 2018. Everlight, the only Taiwan-based supplier on the list, turned in revenue figures of roughly \$48m in the automotive sector, putting them in the No. 8 slot globally. And Cree and other suppliers are actively establishing their place in the market, with significant revenue growth resulting.



Suppliers are releasing LED products with RGB or better specifications for use in interior ambient lights within cars, in accord with the current intelligent lighting trend. The emergence of ambient lights may also bring up revenue for LEDs used in decorative lights for car interiors with a CAGR of 10% during that same 2018-'23 period.

## Everlight, Dräxlmaier Join ISELED Alliance



Taiwan-based LED supplier Everlight and German automotive component supplier Dräxlmaier have joined the ISELED Alliance, an ecosystem for innovative in-vehicle digital LED lighting, with partners working together to create a complete solution including hardware and software. The core concept integrates a smart LED driver with three-colour LEDs into a tiny package, which reduces costs, simplifies control, and expands the functionality of LED lighting and display solutions.

Following ISELED's official debut, initially there were five members in Autumn 2016. Since then, the count has increased to 28 companies. The entire value chain is now covered in order to establish ISELED as a standard solution for the automotive industry.

Robert Kraus is CEO of Inova Semiconductors, one of the founders of the ISELED Alliance. He says "The broad spectrum of the alliance's members gives ISELED technology ever greater dynamism and enormously expands its potential range of applications—far beyond the original idea of automotive interior lighting. With our new ILaS bus concept (ISELED Light and Sensor Network) based on the ISELED protocol, not only LED elements, but also other components such as matrix LED lights, sensors and actuators can in future be controlled in large numbers via a simple two-wire connection, which is not possible in this form with today's common buses such as LIN and CAN".

## Blickfeld's Long-Range MEMS Lidar



German sensor developer Blickfeld have launched a new a MEMS-based solid-state lidar for the detection of objects up to 250 metres away.

Blickfeld say their Cube Range sensor is a robust, powerful 3D solid-state lidar for the mass market, with tight resolution of 0.18° and a range of 150 m with 10% reflection; up to 250 m with higher reflection. The core of the new sensor is a proprietary silicon MEMS mirror embedded in a coaxial structure based on commercial standard components.

With the launch of the Cube, Blickfeld now offer a full lidar suite for autonomous vehicles. Co-founder and CEO Dr. Mathias Müller calls the Cube central to his company's "extraordinary lidar which, thanks to its outstanding properties, is particularly suitable for driving at highway speed because it provides reliable environmental images even under these conditions". With the "Cube Range", Blickfeld presents a MEMS-based lidar sensor that can detect objects even at greater distances. The device is mainly intended for applications in vehicles.

The Blickfeld Cube is so compact it fits easily into a vehicle headlamp; Koito and Blickfeld have announced they will do exactly that.

## Hella's LED Headlamp Modules Smaller, Lighter, More Affordable



Busworld 2019, the international trade fair for city buses and coaches, will be taking place from 17 to 23 October with a focus on innovations that contribute to greater safety and comfort in traffic and to individualised vehicle design.

Hella will be there with the latest additions to their widely popular ø90mm headlamp module range. They're called the new R 80 modules, and they've got an innovative new reflector optic said to provide especially homogeneous illumination. They're also lighter and less bulky than previous, projector-based LED 90mm modules. The new low beam comes in UN-spec versions for left- or right-hand traffic and in a US-spec version. The new high beam is a worldwide item. All versions can be had with Deutsch or FEP connectors.

Other Hella goodies to be displayed at Busworld include Multi Lens Array (MLA) projection module, which allows for personalised welcome messages to be put forth inside or outside the vehicle. There's also Hella's Visiotech projection technology, which enables communication by means of light and can visually warn other vehicles and pedestrians. Hella will also be presenting further intelligent lighting systems based on established matrix LED technologies, which have been in series production in the automotive industry for several years and provide more precise, individual and situational illumination of road surfaces.

## Slow Start to Hella's Fiscal Year

Hella have concluded the first three months of their new fiscal year (1 June to 31 August 2019) with the anticipated decline in sales and earnings. Currency and portfolio-adjusted sales fell by 5.5 percent to €1.6bn due to the further decline of the automotive market. Reported consolidated sales also dropped by 12.1 percent as the result of portfolio changes.

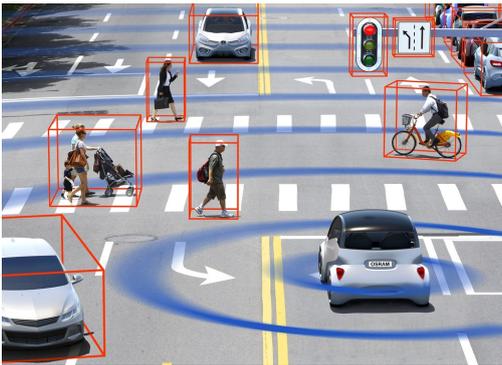


At the same time, the adjusted EBIT (earnings before interest and taxes) decreased to €113m. CEO Dr. Rolf Breidenbach called it "the difficult start to the new fiscal year that we anticipated", saying "The automotive industry continued to weaken in the first quarter, with light vehicle production again declining significantly. Despite the negative industry trend, our automotive business developed better than the market as a whole. This affirms our strategy of consistently aligning our activities with major trends such as electrification and autonomous driving."

After the first quarter, Hella confirm their outlook for the current fiscal year 2019–20. Breidenbach says the industry as a whole still faces steep challenges and uncertainties: "We still do not expect the market to recover. Quite the opposite: the global automotive industry will continue to weaken in the foreseeable future; nevertheless, we are still on track to achieve our targets for the year at the present time". For the current fiscal year 2019–20, Hella expect currency and portfolio-adjusted sales of €6.5bn to €7bn, with an EBIT margin of 6.5 to 7.5 percent, as adjusted for restructuring measures and portfolio effects.

## DRIVER ASSISTANCE NEWS

### Osram's New Lidar Lasers for AV Eyes



Osram have introduced new high-power IR SMT components for lidar applications: the world's first AEC Q102-qualified single- and four-channel pulse lasers. The two new products offer 125 Watt per channel and an efficiency of up to 33%.

The requirements for safety systems in (semi-) autonomous vehicles are complex. They must be reliable, work in all lighting and weather conditions, identify potential hazards and obstacles in time to take appropriate driving decisions. There is now widespread agreement a combination of lidar, cameras, and radar will be needed to meet these needs.

A central aspect in terms of safety is the range of the used IR light source. A powerful laser is required to be able to look as far ahead as possible. Both products have an output power of 125W at 40A per channel. The four-channel version features a chip with four emission areas delivering 480 watts of optical power.

### Qualcomm, Trimble in Precision Positioning Effort

GPS developer Trimble are working with Qualcomm Technologies to produce highly accurate location systems for connected and autonomous vehicles.



The two California-based companies will work together to integrate Trimble's RTX technology into Qualcomm's Snapdragon 4G and 5G platforms to deliver a highly accurate positioning solution essential for maintaining absolute in-lane positioning. The new system will help automakers and tier-1 suppliers accelerate the adoption of road-level navigation and emergency services applications, as well as satisfy the requirements for developing ADAS and AV.

The Snapdragon platforms feature integrated multi-frequency and multi-constellation high-precision GNSS (Global Navigation Satellite System) technology. They also support all major global and regional GNSS satellite constellations including GPS (USA),

GLONASS (Russia), Galileo (Europe), BeiDou (China), and QZSS (Japan), operating concurrently on the L1, L2, and L5 frequency bands, including a Precise Positioning Framework which ensures consistency in access and use of precise positioning information and uses GNSS corrections technology.

Trimble's RTX technology provides real-time, multi-constellation GNSS corrections and positioning capable of achieving 2-cm horizontal accuracy worldwide, compared to uncorrected GNSS positioning that can be accurate only to several metres. The combined solution will provide reliable, consistent, high-accuracy positioning, to serve even the most precise requirements of the automotive and transportation industries. The partners say an RTX-enabled Snapdragon evaluation kit (EVK) is expected to be available in 2020 for use by automakers and their suppliers.

## Pedestrian-Safety Systems Fail When Most Needed: AAA

New research just [published](#) by AAA finds that automatic emergency braking systems with pedestrian detection perform inconsistently, and can be completely ineffective after dark when most pedestrian hits occur. The systems AAA tested were also challenged by real-world situations like a vehicle turning right into the path of a pedestrian. AAA's testing found that in this simulated scenario, the systems did not react at all—the car hit the adult pedestrian target every time.



On average, nearly 6,000 pedestrians are hit and killed in American traffic every year, accounting for 16% of all traffic deaths—a percentage that has steadily grown since 2010.

"Pedestrian fatalities are on the rise, proving how important the safety impact of these systems could be when further developed, but our research found that current systems are far from perfect and still require an engaged driver behind the wheel", says AAA Director of Automotive Engineering and Industry Relations Greg Brannon.

AAA's latest study found that vehicle speed affected system performance as well, with results varying between testing performed at 30 and 50 km/h.

AAA evaluated the performance of four midsize sedans equipped with automatic emergency braking with pedestrian detection. Testing was conducted on a closed course using simulated pedestrian targets for the following scenarios:

- An adult crossing in front of a vehicle traveling at 30 and at 50 km/h during the day and 40 km/h at night;
- A child darting out from between two parked cars in front of a vehicle traveling at 30 and at 50 km/h;
- A vehicle turning right onto an adjacent road with an adult crossing at the same time, and
- Two adults standing along the side of the road with their backs to traffic, with a vehicle approaching at 30 and at 50 km/h.

Overall, the systems performed best in the instance of the adult crossing in front of a vehicle traveling at 30 km/h during the day. In that case the systems avoided a collision 40% of the time. But at 50 km/h most systems failed to avoid a collision with the simulated pedestrian target, and at night none of the systems detected or reacted to the adult pedestrian.

The other scenarios largely foiled the systems, too. When encountering a child darting from between two cars, with the vehicle traveling at 30 km/h, a collision occurred 89% of the time. Immediately following a right turn, all of the test vehicles collided with the adult pedestrian. When approaching two adults standing alongside the road, with the vehicle traveling at 30 km/h, a collision occurred 80% of the time. In general, the systems were ineffective in all scenarios when the vehicle was traveling at 50 km/h.

AAA's Brannon comments: "The rise in pedestrian deaths is a major concern and automakers are on the right path with the intent of these systems. Our goal with this testing is to identify where the gaps exist to help educate consumers and share these findings with manufacturers to work to improve their functionality".

## GENERAL NEWS

### Assigned SEATs: VW Group's New Brand Strategy

The Volkswagen Group plan to increase differentiation among the VW, Škoda and SEAT brands, pushing SEAT upmarket while focusing Škoda more on challenging lower-priced rivals such as Hyundai, Kia, and Dacia.



"We want to manage our brand identities more clearly in future", VW Group's product strategy chief Michael Jost told *Automobilwoche*. "Seat could represent even more emotional cars, as exemplified by the Cupra models. Škoda could serve Eastern European markets more intensively, as well as customers seeking functionality".

The result could mean a rise in pricing for SEAT models compared with the VW brand. It would also mean that SEAT could become a rival to FCA's Alfa Romeo brand, a desire of former VW Chairman Ferdinand Piech.

Škoda will likely scale down premium extras in future models and focus more on previously neglected markets, especially in eastern Europe where Hyundai, Kia, and Dacia have pushed down VW Group's market share.

## □ VW's New Turkish Plant for Passats and Superbs

The VW Group will build the next-generation Volkswagen Passat (shown) and Škoda Superb cars at a new plant in Turkey.

The factory will be located in Manisa, 40 km northeast of Izmir on Turkey's West coast. With an annual production capacity of 300,000 vehicles, job one is scheduled for 2022.



VW picked Turkey for the factory because of what they call "positive macroeconomic conditions" including an 80-million-strong population that rivals Germany's in size and its location amid growth markets, according to the company document.

The plant will cater for the domestic market and serve as an export hub for the Middle East and Eastern Europe including Russia. The VW brand will operate the factory, and about two-thirds of the 300,000 production volume will be for the Passat.

The factory will allow VW to move Passat production from Emden, Germany, and turn Emden into a factory building only electric cars. It will also give Škoda much-needed extra capacity at the plant in Kvasiny, where they build the Superb.