

## Editorial

### Former GTB President's Draper: Our Future Challenges

Our community continues to innovate and is increasingly aware of the importance of considering regulatory implications at an early stage to anticipate potential barriers. Based on my experience I think that it is important to consider the following topics.

**1.Strengthening our community to make it truly representative of the world-wide stakeholders:** In this respect, GTB and DVN should continue to exploit their synergies which have already revealed mutual benefit.

**2.Intensifying the Harmonisation effort:** This requires strong commitment of all stakeholders.Last year I proposed a new approach to harmonisation by separating the technical work from the politics of the UN 1958 and 1998 Agreements. The main roadblock is the inflexibility of the USA and this will only be addressed by our community speaking with one voice and actively proposing solutions to WP29 in Geneva. This is the work of GTB, an NGO with special consultative status at ECOSOC, but DVN can support with its high-level networking.

**3.Developing a strategy concerning the effects of changing demographics upon requirements for automotive lighting systems:** At the Tokyo 2018 DVN Regulatory Session, Dr. Bodrogi reviewed research concerning the worldwide demographic development and its consequences for the development of global automotive lighting technical requirements. He emphasised that current technical requirements are written for young to middle aged drivers but elderly people over the age of 60 years need double contrast and double illuminance with 50% of the glare load. Governments are attempting to adapt their traffic safety policies to include an ageing population of drivers wishing to retain their mobility. In addition to the question of night-time driving, cognitive changes of the driver due to ageing are being considered.

Maybe it is time for our community to review its product strategy to develop lighting systems that will enable elderly drivers to continue to enjoy their human rights of mobility and safety for longer. In this week's In-Depth, I offer my personal thoughts on this important subject; DVN would appreciate your views, progress cannot be made without you!



Geoffrey R Draper  
DVN Advisor and former GTB President

# In Depth Lighting Technology

## Demographic Changes and the Ageing Night-time Driver

***Geoff Draper, DVN Adviser and former GTB President***



I am 76 years old, and I have realised that I can no longer drive safely at night. About a year ago I started to be aware that I could not adequately see the road ahead and I was having difficulties with glare from oncoming vehicles. I initially thought that the performance of the 10-year-old HID headlights (with automatic static levelling) on my car was the cause and I purchased the latest high performance HID light sources. Now I have the best HID headlights available (and correctly aimed!) but they haven't solved my problem. I consulted my ophthalmologist who confirmed that I have the classic signs of ageing; high sensitivity to bright light (sunshine during daytime and glare from headlamps and signalling lamps at night) and slow adaption to changes in luminance and illuminance at night. This prompted me to recall the keynote presentation by Dr Bodrogi of TU Darmstadt at the DVN Tokyo workshop in 2018. Most of the research reports on this subject are very scientific because of the nature of the effects of glare and visibility but I compliment Dr Bodrogi and Prof. Khanh for their presentation that highlighted the significant facts in a series of easy-to-read diagrams.



06.06.2018 | ... worldwide demographic development... | Bodrogi, Khanh | 2018 DVN TOKYO WORKSHOP 1 QGLR

Of course, like many people, I have been vaguely aware of the issues that affect ageing drivers and their night driving capabilities. I was impressed by Dr Bodrogi's presentation, but until now I was unable to truly appreciate the reality of being an elderly driver, having to encounter the glare and visibility issues on busy roads. Now I fully understand the reality, that many elderly people are losing their mobility independence because they voluntarily decide to stop night-time driving because they realise that the risks are too great. These drivers are most likely to be successfully driving in daylight, even with their increased sensitivity to bright sunny conditions, because they can use good quality prescription sunglasses. At night-time such a solution to counter the effects of glare is not possible.

I must confess that until I became personally affected, I only had a passing interest in the subject of demographic change. Now I expect that with the new lighting technologies, based upon LED light sources and adaptive systems, the automotive lighting community may have the possibility to help ageing drivers to keep driving for longer. For many elderly drivers, their mobility is a key part of

continuing their physical and mental wellbeing. There are many findings from government research that highlight this mobility issue that is a significant factor of demographic change.



New lighting technologies provide opportunities to use lighting to create appealing designs, as marketing features attractive to the customer. This was the subject of the DVN 2021 Study “Lighting under Pressure – Leveraging Tensions Between Design, Marketing, and Engineering”. However, I believe that some of these features can add to the difficulties for elderly drivers by increasing the disability glare and reducing the ability to see the road surface and obstacles in the forward path of the vehicle.

Now, based upon my actual experience, I can understand how “light pollution” can affect the ability of elderly car drivers to retain their mobility and independence. We have reached the stage where almost any lighting function is possible. We all see many instances where lighting is used, not only in automotive applications but also for street advertising, illumination of buildings and for external solutions for domestic security. This adds to the light pollution that can affect a driver’s ability to detect objects and hazards. There is even a glare hazard produced increasingly by lamps mounted on the humble bicycle. LED cycle lamps certainly make the bicycle more visible and improve forward vision for the cyclist but, at the same time they create disability glare if not correctly aligned and most cyclists are not even aware of the discomfort they are causing for other road users.

With my personal experience of deteriorating sight, I can understand that there are two significant issues to be addressed, a) how to reduce the risks of disability glare experienced by ageing drivers, and b) how to provide more road surface illumination to help ageing drivers overcome some of their adaption difficulties. I know that my inability to adapt from the effects of the opposing glare, to being able to see the edge of the road and obstacles on the road, puts me in a dangerous situation. Recently I was confronted with sufficient disability glare from the flashing blue lamps of an approaching ambulance that forced me to stop with a long queue of vehicles behind me, until I could recover my vision to proceed.

As Dr Bodrogi concluded, *“the current regulatory requirements are written for young to middle aged observers, but elderly people need more light and more contrast with less glare. In comparison to young people (around 25 years), older subjects (60-66 years) need double contrast and double illuminance (in lx) and 50 % of glare load in order to have the same visual performance”*. As an example to put this in perspective, the UK Government’s official 2022 statistics, show that **of all UK drivers holding a full license (total for all ages 17-85 years = 40.6 million), 30% (12 million) are aged between 60 and 85 years, with most being fit to drive and wanting to remain mobile!**

My conclusion is that our lighting community should consider how lighting technology could be used more creatively to offer some solutions for this large vulnerable group of ageing drivers.

# Lighting News

## Digital Lights, Projectors on Newest Audi eTron Prototype

### LIGHTING NEWS



The newly-unveiled A6 Avant eTron prototype shows the next step in Audi's electrification push. It's slated for production launch next year, after the A6 eTron sedan going on sale this month. The super-slim front and rear lights carry and harmonise with the overall design lines of the body. Digital matrix LED and OLED technology makes it possible to achieve maximum brightness and a wide range of features with a minimal surface area, while at the same time offering customisable light signatures.

#### Up front

- Three small, high-resolution LED projectors on each side. When the doors are opened, extended dynamic-lighting effects greet the occupants with messages in their own language.
  - Small high-resolution projectors display warning symbols on the ground, for example to draw attention to a bicyclist.
  - Another four high-resolution LED projectors integrated into the vehicle's corners generate turn signal projections on the road surface; these can be modified to address regional regulations as required.
  - The Digital matrix LED headlamps are astoundingly polyvalent; for example, if the car is parked in front of a wall during a break to recharge the battery, the driver and passengers can pass the time playing a video game projected onto the wall. Instead of having to confine their gaze to a small screen in the cabin, they'll see their game projected extra-large by the headlamps.
- More centrally to their primary main objective, the headlamps intelligently adapt to the traffic situation, weather, and surroundings, as well as communicate with other road users.

#### Out back,

- there's a new generation of digital OLED elements that act like a display. They can also be used to create almost unlimited customisable variations of digital light signatures and dynamic lighting displays that can be adapted to the customer's personal taste.
- One new feature in the taillights is the 3D architecture of the digital OLED elements, making it possible to experience the dynamic light show in 3D spatial effect. In their safety-related functions, the taillights are ultra-bright, homogeneous, and high-contrast.

#### Around the vehicle,

projections allow its communication range to be extended beyond the vehicle for the first time. The A6 e-tron concept provides information to other road users with visual signals.

# New BMW 7 Series: Slim Lights, Fat Grille

## LIGHTING NEWS



The new BMW 7-series, including the fully-electric i7 model, will be unveiled next month. Ahead of that, though, BMW have been releasing teaser images. There are super-slim new headlights, with upper light elements having a crystal glass appearance. The illuminated kidney grille is bigger than ever before.

Buyers can also look forward to a newly developed Sky Lounge panoramic glass roof as well as LED "light threads" that can be individually adjusted.

BMW chair Oliver Zipse says the 7er will be offered with four different types of drivetrain: petrol, diesel, plug-in hybrid, and fully-electric. The i7 BEV will offer a claimed range of over 600 km.

# BMW 2 Series: 3-D Taillights, New Headlamp Signature

LIGHTING NEWS



The homogeneous light guide-based tail function of this rear lamp has a wavy, 3-dimensional form that fully supports the car's overall design. The horizontal lines create a play of shadows and light which strongly emphasises the rear part of the vehicle

This lamp was engineered at the Marelli competence centre for rear lamps in Tolmezzo, Italy; it is produced in Toluca, Mexico, close to BMW's production facility.



There's another surprise up front: the headlamps *don't* bear the longstanding usual BMW double module (quad-lamp) signature. Instead, there's a single biLED module with—here again—a thick, 3-dimensional light guide for the position/daytime running light (perhaps it also provides the front turn signal function? We will have to wait and see!)



# Driver Assistance News

## NHTSA Proposes Safety Updates; 60-Day Comment Period Open

### DRIVER ASSISTANCE NEWS



NHTSA has proposed some updates to the agency's NCAP (New Car Assessment Program), including:

- Recommending four new driver-assistance technologies: lane-keeping support, pedestrian automatic emergency braking, blind spot detection and blind spot intervention;
- Strengthening the current testing procedures and performance criteria for the driver-assistance technologies already included in NCAP;
- Establishing a 10-year roadmap for future NCAP updates;
- Requesting comment on ways to develop a meaningful ratings system for driver-assistance technologies, and
- Considering the potential addition of emerging vehicle technologies related to driver distraction, alcohol detection, seat belt interlocks, intelligent speed assist, driver monitoring systems and rear seat child reminder assist.

NHTSA deputy administrator Dr. Steven Cliff says "The proposed improvements will not only make the program more useful and informative but also keep up with the pace of innovation in vehicle safety. For the first time ever, NCAP includes technology recommendations not only for drivers and passengers but for road users outside the vehicle, like pedestrians. The proposal also seeks comment and a novel approach to tie technological change to reducing driver behaviors that contribute to many crashes, injuries and fatalities. We look forward to reviewing the comments we receive and considering them as we complete this important work".

Notably absent from the proposal: all of the [lighting improvements](#) NHTSA proposed as NCAP upgrades in 2015—and never adopted. The current proposal's discussion of lighting is limited to this comment about possible future actions: *NHTSA will consider incorporating several additional advanced crash avoidance technologies including lighting systems for improved nighttime pedestrian visibility into NCAP in the near future, and will be announcing next steps during this timeframe. These include: (1) adaptive driving beam headlights; (2) upgraded lower beam headlighting; (3) semiautomatic headlamp beam-switching; and (4) rear automatic braking for pedestrian protection.*

The full proposal can be [downloaded](#) as a PDF; the public has 60 days to comment on the proposed updates.

# SUV–Pickup–Van Drivers Can't See Pedestrians They Hit: IIHS

DRIVER ASSISTANCE NEWS



A [new study](#) from the Insurance Institute for Highway Safety shows SUVs, pickups, vans, and minivans hit more pedestrians than cars do, suggesting these kinds of vehicles may not afford drivers an adequate view of people crossing the road.

Pedestrian crash deaths have increased nearly every year in the United States since their all-time low in 2009, rising 59 per cent to exceed 6,500 fatalities in 2020. One suspected factor is the growing prevalence of larger vehicles. Prior research has shown that SUVs and pickups are more lethal to pedestrians than cars are. The new IIHS study shows certain types of pedestrian crashes, including those that occur while the vehicle is turning happen more often with SUVs, pickups, vans, and minivans.

The researchers examined how involvement in these crashes varied for three larger vehicle types compared with cars. At intersections, the odds that a crash killing a crossing pedestrian involved a left turn by the vehicle (versus no turn) were about twice as high for SUVs, nearly three times as high for vans and minivans, and nearly four times as high for pickup trucks as they were for cars. The odds that a crash killing a crossing pedestrian involved a right turn by the vehicle were also 89 per cent higher for pickups and 63 per cent higher for SUVs than for cars. Such turning crashes accounted for more than 900 of around 5,800 fatal pedestrian crashes at or near U.S. intersections during 2014-18.

At other locations, SUVs and pickups were 51 per cent and 25 per cent more likely than cars to kill a pedestrian walking or running along the road versus a fatal straight-on crash with a crossing pedestrian. Such incidents accounted for around 2,500 out of some 14,000 U.S. fatal pedestrian crashes that did not involve intersections.

Earlier studies have shown that A-pillars can create blind spots that can make it difficult for drivers to see pedestrians, and that these blind spots grow larger as A-pillars become wider, and IIHS senior transport engineer Wen Hu says "the size, shape or location of the A-pillars could make it harder for drivers of these larger vehicles to see crossing pedestrians when they are turning". While their heavier weight means that larger passenger vehicles need stronger pillars to protect occupants in rollover crashes, a systematic assessment of A-pillar design by vehicle type has not been conducted. Other design elements of larger vehicles could also impede drivers' ability to see pedestrians, such as their high ride heights and long front ends, as chillingly demonstrated in this online video. <https://www.youtube.com/watch?v=NDH3FDfVQI0>

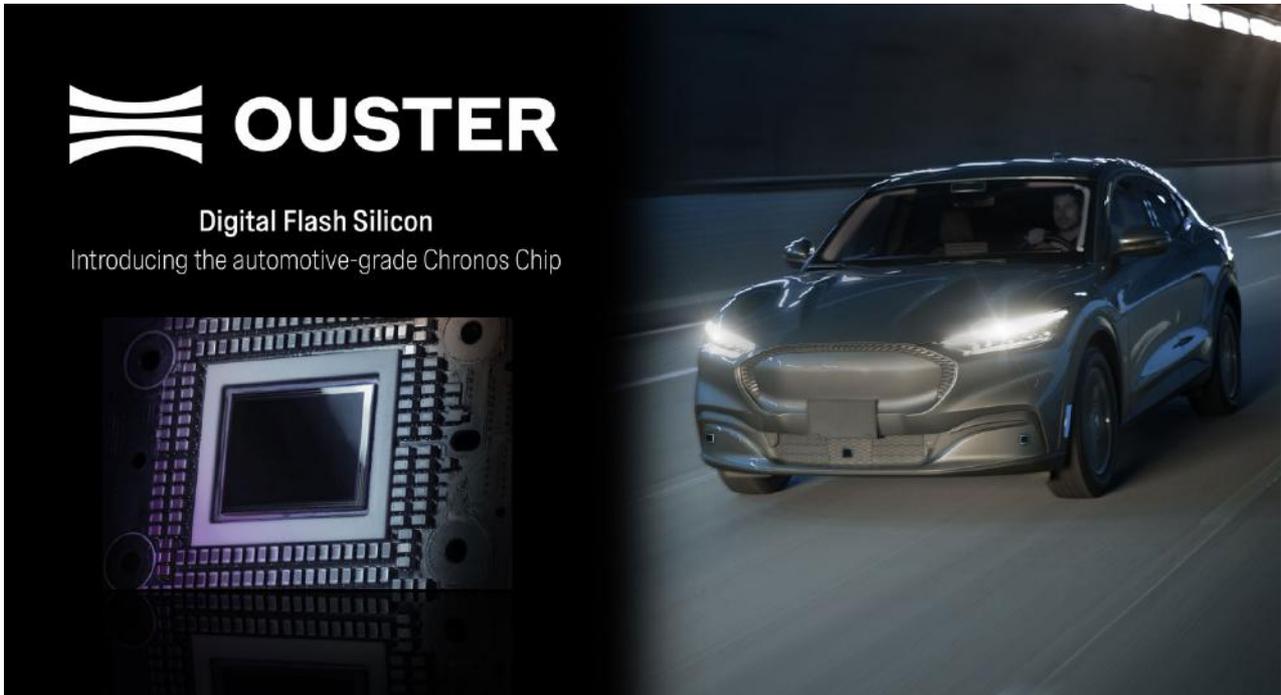
Turning crashes accounted for about 38 per cent of crashes that occurred at or near junctions in North Carolina over the study period. At or near intersections, pickups were 42 per cent more likely and SUVs 23 per cent more likely than cars to hit pedestrians when turning left. Away from intersections, pickups were 80 per cent and SUVs 61 per cent more likely than cars to hit a pedestrian walking or running

along the road, while minivans and vans were 45 per cent more likely than cars to be involved in such crashes—which accounted for about 1,650 of North Carolina’s approximately 7,600 non-intersection collisions.

Turning crashes were the most common type among the police-reported intersection crashes in North Carolina, while crashes in which the vehicle was driven straight made up a majority of the fatal intersection crashes nationwide—probably because drivers have to slow down to make a turn, so the impact is less likely to be deadly.

# Ouster's New Chronos Digital Lidar Chip

DRIVER ASSISTANCE NEWS



Ouster have announced an automotive-grade silicon digital lidar receiver for their digital flash (DF) solid-state sensor suite. The new Chronos chip is the foundation of the company's DF architecture and is designed to enable more performant, efficient, and compact digital lidar sensors to enable L<sup>2</sup> to L<sup>5</sup> automation in high-volume automotive series production vehicles. The Chronos chip harnesses the company's proprietary digital lidar architecture and some of the latest advancements in semiconductor technology.

Chronos expect the Chronos chip to be the most powerful single-photon avalanche diode (SPAD)-based lidar chip produced to date, and say their DF sensors benefit from the same dramatic performance improvements that have made the digital camera ubiquitous across industries; with superior logic and performance capabilities, the Chronos chip delivers improved memory, dynamic range, and detection accuracy.

Ouster Automotive VP Iain Levy says "Unlike lidar technologies which require the complex integration of numerous off-the-shelf components, our proprietary and cutting-edge digital lidar technology produces simple and powerful sensors that automotive OEMs can trust to achieve new levels of safety and autonomy. Ouster Automotive's Chronos chip represents the latest in SPAD technology, making our solid-state digital lidar sensors highly performant, reliable, power efficient, compact, and easily manufacturable".

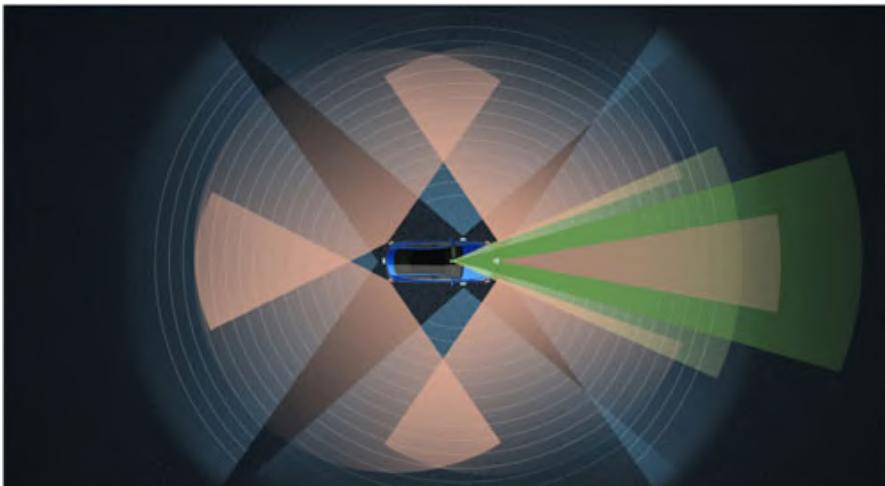
The company intend to tape-out the Chronos chip in late 2022, and to integrate the chips into the first sample units in 2023. They expect the DF series to be available for mass-market passenger vehicles starting production in 2025.

# Toyota's Advanced Drive is Here

## DRIVER ASSISTANCE NEWS



Toyota's Advanced Drive, equipping the second-generation Mirai fuel cell EV, provides the driver with information and driving assistance on supported motorways, and so reduces driver fatigue during prolonged driving. It uses high-definition map data and a variety of vehicle sensors to help determine road conditions; identify objects around the vehicle, and pinpoint the vehicle's location. It uses forward-looking cameras, radar, and lidar sensors



The Advanced Drive system is designed to assist the driver by helping to keep the vehicle in its lane; maintain safe following distance to other vehicles; pass slower vehicles; change lanes, and manage speed around curves.

When using guided navigation, lane changes and highway-to-highway transitions can be performed by the Advanced Drive system to help the driver reach the destination, while considering traffic and other conditions. When Advanced Drive is operating, the instrument cluster and HUD show information about vehicle status; surrounding conditions, and the system's driving plan. While Advanced Drive can operate the accelerator; brakes, and steering during controlled driving, the driver is still able to take control to perform these driving operations at any time.

# Valeo Lauded for Cutting-edge 3D Sensors

## DRIVER ASSISTANCE NEWS



Frost & Sullivan's recent analysis of the global automotive lidar industry recognises Valeo with a 2022 Global Market Leadership Award for strengthening their global market presence with pioneering automotive 3D sensors. Valeo are currently the only automotive supplier commercialising mass-produced automotive-grade lidar sensors, with the perception software included.

Valeo's advanced systems promote intuitive and effective driving, facilitating autonomous vehicle (AV) adoption. Their Scala lidar offers highly differentiated 3D sensing to enable superior autonomy; resolution; distance and speed measurement; pedestrian detection; and autonomous emergency braking, among other features.

Frost & Sullivan research manager Kamalesh Mohanaragam describes Valeo Scala as "the automotive industry's first commercial 3D lidar sensor for AV applications...a 3D mechanical scanning lidar sensor that offers a wide field of view of up to 145 degrees. Its AI-based integrated software detects, recognizes, and classifies static and dynamic objects up to a distance of 200 metres in all weather and lighting conditions".

*Frost & Sullivan Best Practices awards recognise companies in regional and global markets for demonstrating outstanding achievement and superior performance in leadership; technological innovation; customer service, and strategic product development. Each year, Frost & Sullivan present this award to a company who have developed an innovative element in a product by leveraging leading-edge technologies.*

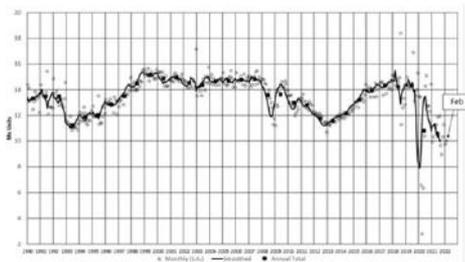
# General News

## Western Europe's Car Market Slumped in February

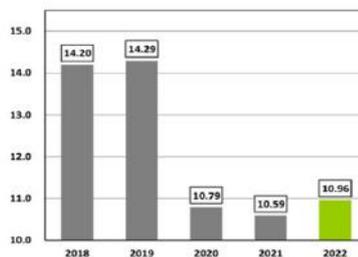
### GENERAL NEWS



The Western European car market continues to struggle with ongoing supply chain shortages, which LMC Automotive's analysis shows continued to constrain regional sales in February. Overall Western European new car sales were down in February by 5.7 per cent at 715,000 units.



EUROPEAN NEW CAR MARKET -1990 TO 2022



FULL-YEAR FORECAST OF EUROPEAN SALES

The regional seasonally adjusted annual selling rate (SAAR) increased only slightly to 10 million units/year in February, from 9.7 million units/year in January. LMC said last month's results reflect the supply constraints faced by the automotive industry.

LMC's 2022 car market forecast for the region has also become more cautious since last month as supply bottlenecks are expected to be aggravated by Russia's invasion of Ukraine and the resulting sanctions. The annualised selling rate is still anticipated to improve over the course of 2022, but at a slower rate than forecast last month. Aside from the supply disruption, downward pressure is building on underlying demand through inflation and confidence.

LMC predict 2022 as a whole will see Western Europe's car sales at under 11 million units, barely up on 2021 and still far less than 2019's 14.3 million.

# Ford to Boost BEV Production in Europe

## GENERAL NEWS



NINE FORD EVS IN EUROPE BY 2024

Following a huge investment in production capacity in Europe, Ford say they will launch seven new BEV models to the market by 2024 to join the existing Mustang Mach-E and the E-Transit. They've created a new global business unit called Ford Model E, focused on the design; production, and distribution of electric and connected vehicles. Ford expect their annual sales of EVs in Europe to exceed 600,000 units in 2026, by which time Ford want to sell more than two million BEVs globally.

Ford have confirmed that the first volume EV to come out of the Ford Cologne Electrification Centre will be a yet-to-be-named five-seat, medium-sized crossover. Last year, SUVs and crossovers accounted for 58 per cent of Ford's passenger vehicles sold on the continent, up nearly 20 per cent from 2020. Investment in the new electric passenger vehicles to be built in Cologne is expected to be \$2bn. On the LCV front, Ford's Transit range will include four new electric models: an all-new Transit Custom one-ton van and Tourneo Custom multi-purpose vehicle in 2023; and the smaller, next-generation Transit Courier van and Tourneo Courier multi-purpose vehicle in 2024.

# Musk opens Tesla's German plant

## GENERAL NEWS



Tesla factory opening ceremony is attended by German Chancellor Olaf Scholz, and Elon Musk which plans to hand over first Model Y cars to customers.

The \$5 billion factory, Tesla's first in Europe, is central to Musk's ambitions to pass European market leader Volkswagen. The plant is set to produce over 500,000 battery-electric vehicles a year, while its battery plant will generate over 50 gigawatt hours a year.

Musk originally wanted to start production on last summer, but the approval process was delayed because Tesla added a battery factory to the application for the car assembly, adding to delays caused by environmental objections. The factory can start as planned this week, the Brandenburg state government said.

Tesla has been constructing the factory under a temporary approval process. The automaker has been allowed to build up to 2,000 cars to test production processes.

# Stellantis: Venture Capital Fund to Invest in Tech

GENERAL NEWS



During the presentation of its "Dare Forward" strategic plan this month, the manufacturer Stellantis reaffirmed its ambition to transform itself into a "mobility technology company".

Last week, Stellantis launched its first corporate venture capital fund dedicated to innovation, called Stellantis Ventures. It will invest €300 million in start-ups developing innovative "customer-oriented" products. The objective is to be able to integrate these technologies into Stellantis in a few months.

For Stellantis, becoming a "tech company" translates into ambitious quantified objectives. The manufacturer wants to achieve 7% of its turnover in 2030 thanks to the software, compared to 0% in 2021. In-house software engineering teams are expected to reach a total headcount of 4,500 by 2024. Software-based product and subscription offerings are expected to generate annual revenues of approximately €4 billion by 2026 and €20 billion in 2030, assuming that Stellantis expects a market of 34 million monetizable connected cars by 2030.

Stellantis is also pursuing a strategy of partnerships with several big names in tech, such as Amazon, Foxconn, and Waymo, with which the manufacturer wishes to "open the way to an eco-responsible 'Delivery as a Service'".

The company's strategic plan also relies heavily on the car-sharing subsidiary Free2move, whose objective is to reach €2.8 billion in turnover in 2030 and 15 million users, as well as on online vehicle sales.

# Magna Win Six GM Awards in Single Year—Again!

## GENERAL NEWS



For the third straight year, Magna have received six Supplier of the Year awards from General Motors, the most ever for a supplier in a single year according to the automaker. Magna won in the categories of Structures; Frames; Driveline; Body Shop; Rubber Sealing, and Fascias, and were recognised as part of GM's 30<sup>th</sup> annual Supplier of the Year awards at a ceremony last week.

GM's VP of global purchasing and supply chain Shilpan Amin says "This year's Supplier of the Year event was special not only because it's the 30<sup>th</sup> anniversary of the program, but because it provided us with the opportunity to recognise our suppliers for persevering through one of the most challenging years the industry has ever faced. These top suppliers showed resilience and reinforced their commitment to pursuing sustainability and innovation. Through our strong relationships and collaboration, GM and our suppliers are poised to build a brighter future for generations to come".

First presented in 2012, the Overdrive Award is a distinction for suppliers who display outstanding achievement across GM's global purchasing and supply chain organisation's key priorities, including sustainability; innovation; relationships; total enterprise cost; launch excellence, and safety.

*Magna are a mobility technology company with a global, entrepreneurial-minded team of 158,000 employees and an organisational structure designed to innovate like a startup. With 60+ years of expertise and a systems approach to design, engineering and manufacturing that touches nearly every aspect of the vehicle, Magna are positioned to support advancing mobility in a transforming industry.*