DrivingVisionNews.com
Automotive lighting and driver assistance technologies

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Editorial

Working At Home To Enrich Knowledge On Lighting

On behalf of everyone at *Driving Vision News*, we are grateful for your continued support. We remain your trusted source for lighting and ADAS news, especially now in this difficult time, when information is the most valuable resource.

That's why in this week's News you will find, as promised, *The Wonderful story of Lighting*, with over 130 slides. This week, you will only present the introduction of the story, then the different chapters, will come week after week. It's a production by DVN's Jean-Paul Ravier, former Valeo Research Director. These slides are presented for you who are stuck at home right now, to offer pleasant and fruitful ways of thinking about your field of speciality.
In it, you will discover the long history of lighting technologies, lighting today focussed on the link between styling and safety, ADB which is the main breakthrough of our time, and lighting in the future, focussed on lighting communications for safety and decoration and convenient lighting for styling and marketing needs. These slides are like a book, very pleasant to read because in one hour you will see one century of lighting.

Just before decamping to my home office, I had the opportunity to make a night drive with Koito's newest BladeScan ADB technology—read about it in this week's episode of the News. I was initially skeptical on the scanning technology and the compactness of the module. After the night drive, I have an easier time believing in the potential of this technology Congratulations to Koito for this great job, let's see how it will further develop!

Last information: the DVN Tokyo workshop is postponed to 24-25 August, 2020, same hotel, same program. I hope the coronavirus crisis will be totally overcome

at this time.

Good luck to you all, and above all, let's be confident and keep our hands washed.
We will defeat the coronavirus!

Sincerely yours

DVN President

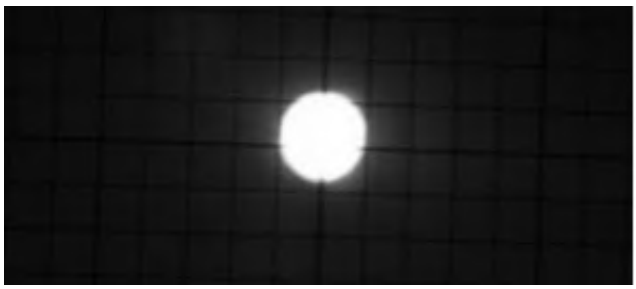
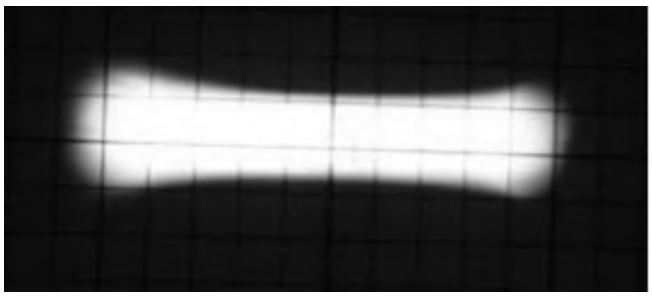
In Depth Lighting Technology

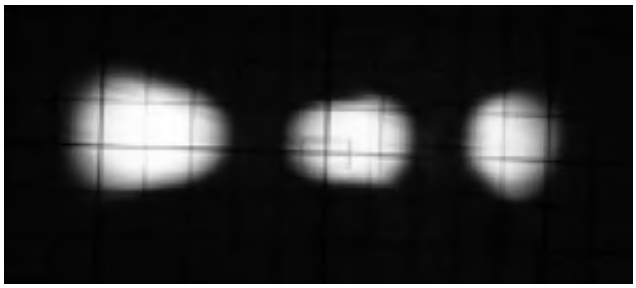
Koito's BladeScan is Very Good, Still Faces Challenges

As a variety of makers develop a variety of high-resolution headlighting technologies including µLEDs, DMD, and LCS for advanced ADB, Koito are proposing an original solution based on a mechanical scanning system they call BladeScan.
The main principle is to use a rotating mirror to spread the light horizontally, resulting in efficiency over 35%, compared to under 15% with MEMS, for example, because of its extensive light waste.

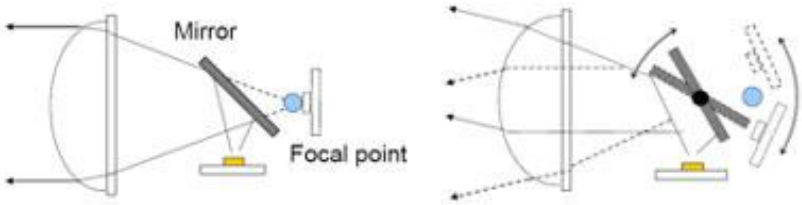
Koito say their technology can be produced at low cost because the number of LEDs is low and it doesn't require expensive special devices. There's also the future potential to supplant the LEDs by laser diodes to improve intensity and luminance.

Principle of BladeScan

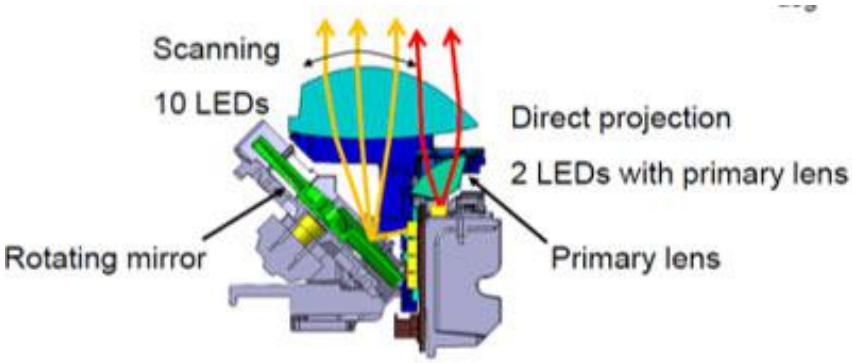
- 
  Bright spot
- 
  Spread by scanning

- 

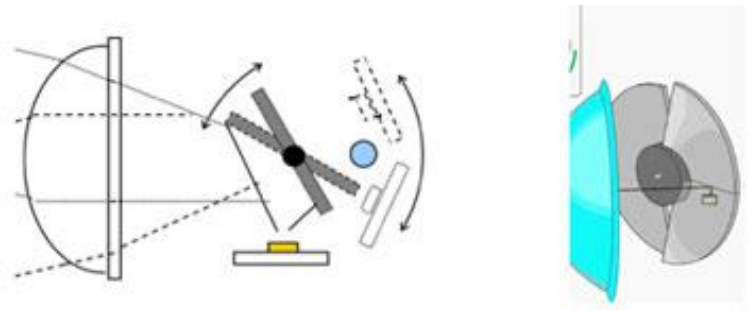
  Multiple shadows

- 

  Concept of beam scanning: Moving mirror

- 

The rotative speed of the reflector is 6000 rpm, corresponding to a frequency of 200 Hz, so the synchronisation of the LEDs with the timing signal extracted from a DC brushless motor needs only a very short time to turn on or off: just 5 µsec (that is five one-millionths of a second!). Optical results are good with a sharp resolution of 0.1° , a flux of 700 lm, I_{max} of 55 kcd and beam spread of ±15°. Specific attention was given to the reliability of this mechanical system. The module has 12 LEDs and produces a high-definition ADB.

- 

BladeScan in production

SOP was the middle of last year, and BladeScan was installed first on the Japan-market Lexus RX in August 2019, and very rapidly thereafter in the RX for the European-, UK-, and Australian markets. In comparison with the previous model, the three modules are small to save room for the fitting of the bladeScan module.

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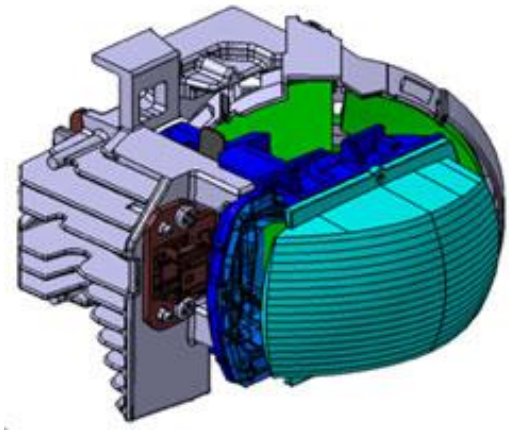
  Lexus RX 450h
- 
  Very compact BladeScan ADB module

Night drive

The night drive was done in an Infiniti equipped with a Bi-LED standard projection module (same as Renault Zoé) and the BladeScan module.

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  Outboard Bi-LED module, Inboard BladeScan module

The night drive, done in dense traffic because between 7 and 8 pm, allowed for evaluation of the performance of the BladeScan ADB and also the other functions.

Low beam

Very high performance: good homogeneity, wide spread, and an intense hot spot.
Unfortunately, the low aim angle severely limited seeing distance. The same car will be presented for the night drives at VISION, with a more appropriate aim angle.

High beam

It was difficult to evaluate the high beam because almost never in one hour we could use it; the traffic was too dense. Nevertheless, we did our best; our impression is that when the speed is higher than 80 km/h, the two modules (standard Bi-LED module and ADB) work together and the performance is great, but at lower speeds the high beam is weak.

ADB with BladeScan

ADB works at road speeds over 30 km/h and with the low beam of the standard module.

On a positive side, I was impressed by:
• the high resolution of the ADB: the width of the shadow was very close to width of the de-glared car, much better than a 12-segment matrix beam thanks to BladeScan's resolution of about 0.1° versus 1°, and
• the freedom from "dancing light" effects: just smooth, unobtrusive movement of the light.

On the negative side of the ledger, I was disappointed by:
• slow movement of the shadow to track accurately the de-glared car on a curving road, so we don’t have the benefit of the ADB during this time, around one second.
• weakness of the intensity and light flux of the ADB when we passed a car. We clearly saw the low beam cutoff with hard darkness above it. It is probably because of a requirement from Lexus RX in order to make a balance between styling (module lens size) and performance. The car will be presented in the VISION night drives and Koito will update the headlamp in order to improve it by then.

• no light above the car, and no road marking possibility, compared to what we have seen with the 10- to 50-kilopixel µLED systems.

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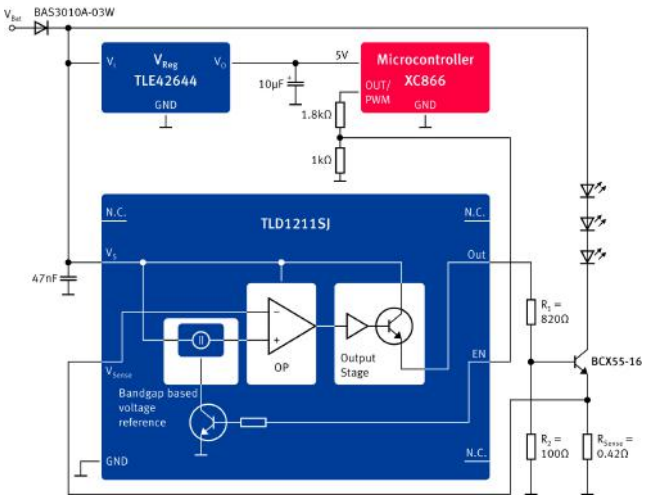
In conclusion

Before the night drive, I was skeptical of the scanning technology and the compactness of the module. After the night drive, I have an easier time believing in the potential of this technology, but it still poses some major developmental challenges. The quantity of light and the speed of the movement have to be improved. There is also the open question of its price; Koito say it will be somewhere in between matrix and µLED technologies.
Congratulations are in order for this nifty technology, let's see how it will further develop!

Lighting News

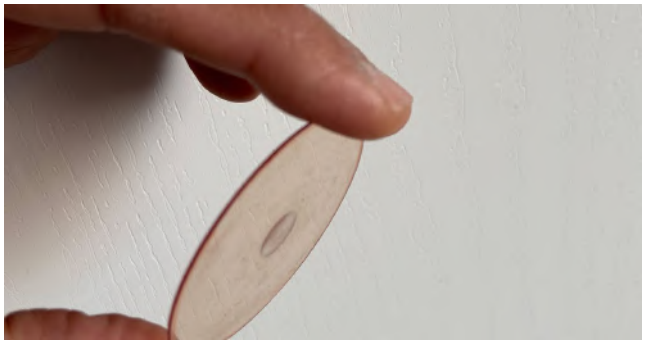
Infineon's Litix Linear LED Drivers



Infineon's Litix linear drivers are designed to supply constant current up to 500 mA, which enables constant LED brightness and ensures extended LED lifetime, independently from supply voltage or LED forward voltage class. Infineon are calling it the best solution for interior LED lighting, LED tail lights, and indicating LEDs where diagnostic capabilities are required.

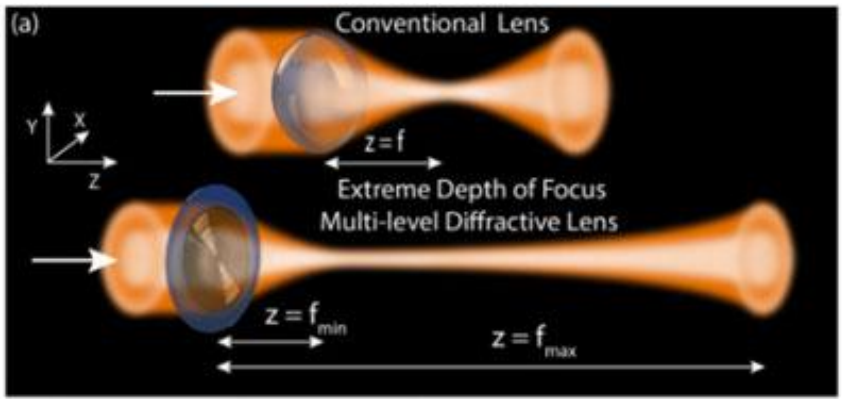
A **video posted online** shows two innovative car lighting solutions: an HD pixel front light built around the example of an Osram Eviyos with Litix Power Flex driver TLD5501-2QV; and a full LED rear light demonstrator driven by a Litix Power Flex TLD5541-2QV.

Super-Slim Lens for Focus-Free Imaging



A team of researchers from the University of Utah has designed an ultra-thin flat lens with a remarkable depth of focus spanning several metres.

In a paper titled "Extreme-depth-of-focus imaging with a flat lens" published and **available online** in the Optical Society of America's journal Optica, the researchers describe a very thin lens that does not require refocusing to sharply capture images of objects separated by large distances, removing the need for refocusing mechanisms and drastically simplifying imaging systems.



The MDL (multilevel diffractive lens) described in their paper enhances the depth of focus by over 4 orders of magnitude compared to traditional fixed lenses. In experiments, the researchers were able to maintain focus for objects separated by as large a distance as 6 metres. When illuminated by collimated light at 0.85m, a ø1.8-mm MDL shaped with a distribution of concentric rings of varying thickness up to 2.6 μm, produced a beam which remained in focus from 5 mm to 1.2 m.

AUO Panel Products Update

Taiwan-based LED panel makers AU Optronics held an annual press event displaying their new-for-2020 products and applications, including mini- and micro-LED displays.

AUO noted that orders for medical and educational applications such as electronic whiteboards and digital X-ray panels have increased with rising needs in home education and medical treatment due to coronavirus outbreak.

The company say their production operations are not affected by the epidemic; 95% of their production capacity in China has resumed for now, so they will not change their outlook for 1Q20. But, they say, impacts of the global pandemic might expand in the second quarter.

AUO consider the pandemic a turning point for the panel industry as the severe price competition might slow down, since the Chinese government might stop its vast subsidies to China's panel makers.

The coronavirus may also bring up new demands in TVs and entertaining products as people are, perforce, spending more time at home.

AUO also are pushing their developments in microLED automotive displays, and have been in talks with automakers; the displays could enter validation processes this year and be adopted by 2022.

Hella : Adjustment of Outlook Necessary

In the first nine months of the current fiscal year 2019-20 (June 2019–February 2020), Hella's sales and earnings have developed in line with expectations despite the outbreak of the coronavirus. On a provisional basis, currency and portfolio-adjusted sales decreased by 3.7% to € 4.8bn with an adjusted EBIT margin at 7.2% vs 8.2%.

The COVID-19 pandemic and the global reactions to it—particularly increasing production shutdowns by customers, disruptions of global logistics chains, and anticipated intensified decline in demand—have significant effects on the global automotive industry, including the demand for automotive lighting and electronics solutions from Hella. Consequently, already at the end of 3Q19, Hella were confronted with a significant decrease in customer demand. As a reaction, in addition to the existing cost control program, the company have adopted comprehensive measures to reduce staff and material costs. Furthermore, short-time work on domestic sites is under preparation. Management considers further measures which can include short-time work at other locations and the temporary shutdown of the company's own production facilities.

Given the reduction in customer demand and the interruption of logistics chains, Hella are now anticipating currency and portfolio adjusted sales to be below the originally forecasted range of €6.5bn to €7bn. Detailed nine-month results for the current fiscal year will be published as planned on 2 April.

Osram Withdraws FY2020 Guidance

Osram have withdrawn the guidance for their fiscal 2020; on account of the coronavirus pandemic they consider it unlikely they'll achieve their corporate targets.

Osram noted that the unprecedented operational and financial challenges posed by the spread of COVID-19 and the uncertain developments in the coming weeks are leading to economic impact on the company, which cannot be dependably determined or quantified at this time. The pandemic has led to increasing production shutdowns by Osram customers and disruption of global supply chains; Osram’s Opto Semiconductors and Automotive units, whose

activities in automotive business accounted for more than 50% of the Osram Group's 2019 sales, are thus highly affected.

Driver Assistance News

American Teen Wins $25K Prize for See-Thru Pillar

(Editor's Note: the news of this award came some time ago, and we deliberately held onto it until Ms. Gassler herself was able to contribute to our coverage. We feel the wait was worthwhile, and are most encouraged to see young people independently devising creative, elegant solutions to challenging difficulties related to driver vision.)

American teenager Alaina Gassler saw her mother's problem with blind spots created by the windshield pillars in the car, and set about solving it. Her prototype system comprising a webcam, a projector, a 3D-printed optic adapter, and retro-reflective fabric won Alaina the top USD $25,000 Samueli Foundation Prize in the prestigious Broadcom MASTERS competition in Washington, DC.

Gassler bested 29 other finalists winnowed from 2,348 applicants from all over the United States. The MASTERS (Math, Applied Science, Technology, and Engineering for Rising Stars) competition is held every year by the nonprofit Broadcom Foundation and the Society for Science & the Public. The Society's President and CEO Maya Ajmera praised Alaina's work on the project itself as well as in leadership, communication skills, and teamwork with other students: "Everybody hates blind spots. A lot of accidents happen because of blind spots. [Alaina] took something very personal to her—'How do I make this easier for my mom'—and from there it became an incredible science project".

Ms. Gassler **says** she drew further inspiration from learning that there are over 840,000 blind spot-related crashes every year in the U.S., and describes her countermeasure: there's "*a web camera, a projector, and a retro-reflective piece of fabric. I designed and 3D-printed an elongated piece that allows the projector to focus on the A-Pillar. The retro-reflective fabric is what really makes the project useful. It's attached to the A-Pillar where the image is being projected. Since the projector is close to the driver's head, the driver can see a clear and bright image. Everyone else [in the car] can only see black fabric, because their eyes are not close to the source of light, so light isn't reflected to them. The projected image is set up for only the driver to see, so [without the retro-reflective fabric] everyone else in the car would see moving, blurry, bright lights. I added the fabric so the passengers can ride comfortably.*"

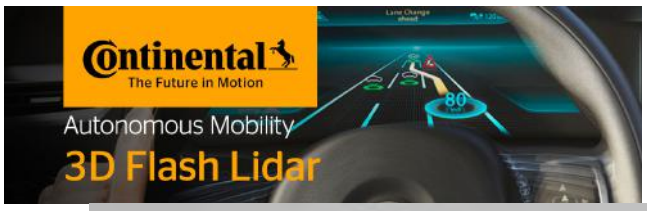
A **video posted online** shows her prototype, installed in her parents' SUV, working beautifully. She would like to show her system to car companies.

Velodyne Boost Lidar Supply to Navya

Velodyne Lidar announced a multi-year sales agreement with French autonomous-driving supplier Navya, who first put autonomous mobility solutions into service five years ago. They use Velodyne's lidar sensors in production for their autonomous shuttle fleet that provides mobility services to cities and private sites.

With the sales agreement, Navya plan to pursue the worldwide deployment of their shuttles with Velodyne's sensors for precise real-time localisation and object detection. The Navya autonomous shuttle fleet offers effective first- and last-mile transport solutions with optimised navigation and safety features.

Continental's Flash Lidar



Continental are expecting their new high-resolution close-range 3D flash lidar (HFL) sensor to find applications in commercial vehicles and off-highway machines this year.

Continental's ADAS Business Development and Sales Head Thomas Laux (photo) says the new hardware "is automotive grade and solid state, meaning no moving parts. It’s a bunch of semiconductors, which is ideal for commercial vehicle and even more so for the off-highway environment—they don’t have a lot of hours [of operation] but their environments can be pretty rigorous." He pointed specifically to the IP6K9K packaging and 3D Global Shutter feature that eliminates motion distortion and enables persistence mode and geo-registration of point cloud, as features responsive to extreme needs.

Laux, who is located in Carpinteria, California as part of Continental Advanced Lidar Solutions, was working for a Tier-2 supplier acquired by Continental a few years ago. "We started off with 22 engineers and now we have 300, working across domains on everything from the software to the test and validation, which is one of the most crucial pieces," Laux said. About 25% of the activity in developing its automotive-grade lidar sensor is devoted to test and validation, he added.

"For this sensor we designed short range first. We thought this was a bigger issue, which turned out we’re right," Laux said. The HFL110 lidar sensor has a 50-metre range, and it's being supplied on a sample basis to commercial vehicle and off-highway manufacturers for evaluation. Application areas include

agriculture, construction, mining, UAV delivery, and precision infrastructure inspection. Series production is expected by the end of this year, and there are already launch customers for automotive and off-highway applications.

General News

How Geely Are Battling Coronavirus

The European auto industry is in a dark place right now after the coronavirus forced the temporary closure of many factories. In China, however, life is returning to some sort of normality—at least for now before a potential next wave of new outbreaks—and the steps taken by Geely to get back on its feet give us a look at how that might be achieved for European automakers.

The New Year holiday's end was postponed from 26 January to 10 February. Those who could work at home, did so. From 10 February, some of the 6,000 employees who work at Geely's headquarters in Hangzhou, south east of Shanghai, were allowed back. A week later that number was increased again, and from 25 February the headquarters was fully staffed once more. All Geely vehicle factories are now running again.

So how did Geely achieve this? As **a fascinating blog post** describes it, by very careful monitoring of employee health and by obsessive sanitising. To get on site, employees have to pass through a tent in which a special camera has been set up to scan temperature. A nearby screen shows a body heat-map. Too hot equals potential fever, and anyone with a fever must be sent to isolation and medical teams alerted.

The precautions continue: once in the headquarters all employees are given new face masks every eight hours and are encouraged to keep their mouth and nose covered at all times. Large meetings are forbidden, and at lunch employees must stand a metre apart while queuing to use the microwave ovens.

€30bn in BMW R&D to '25: Zipse

The BMW Group are investing heavily in R&D in an effort to shape the mobility of the future.

Oliver Zipse (photo), Chairman of BMW's Board of Management, says "New technologies are key to the future of mobility. Up to 2025, we intend to invest more than €30 billion in R&D to underscore our position as an innovation leader. This also expresses our confidence for the future business development. The ability to integrate diverse technologies to form a complete system is vitally important. Those companies capable of developing and combining hardware and software in equal measure will shape the future of the automobile. In this respect, we are quite clearly in the fast lane."

The BMW Group is one of the largest IT employers in Germany with 5,300 employees trained in the field of data analytics. In view of the growing importance of software expertise, the group founded the Critical Techworks IT joint venture in 2018 in order to secure the relevant expertise and skills.

European Sales Fell in February

New-car sales in Europe fell 7.2% to 1.067 million vehicles in February, as weakening global economy, higher vehicle taxes and the coronavirus outbreak weighed on consumers' appetite for new cars.

The decline comes after a 7.4% drop in January. The monthly drops mean car sales in Europe are off to their worst start to a year since 2013 and are poised to deteriorate further after automakers across the region shuttered plants to counter the coronavirus pandemic.

Sales fell for the second consecutive month in major European markets, with Germany dropping 11%, Italy down 8.8%, the UK and France down 3%, and Spain down 6%. Governments have shut borders, closed restaurants, and urged people to shelter to slow the spread of the disease.In February :
- Volkswagen Group's sales fell 4.4%, with the VW brand down 9.7%, and Audi down 4.6%. Bright spots for the gorup were Porsche, whose volume gained 70% after the brand recovered from supply bottlenecks last year and Seat, up 8.4%.
- Renault Group posted a drop of 14%.
- PSA Group registrations fell 8.5%.
- Fiat Chrysler sales fell 7%.
- Ford's registrations dropped 20%.
- Toyota's registrations grew 11% and Nissan’s registrations were down 5%

- Kia and Hyundai registrations were flat.
- The BMW brand rose 4.%, while demand for rival Mercedes-Benz fell 4%.