DVN
Lidar

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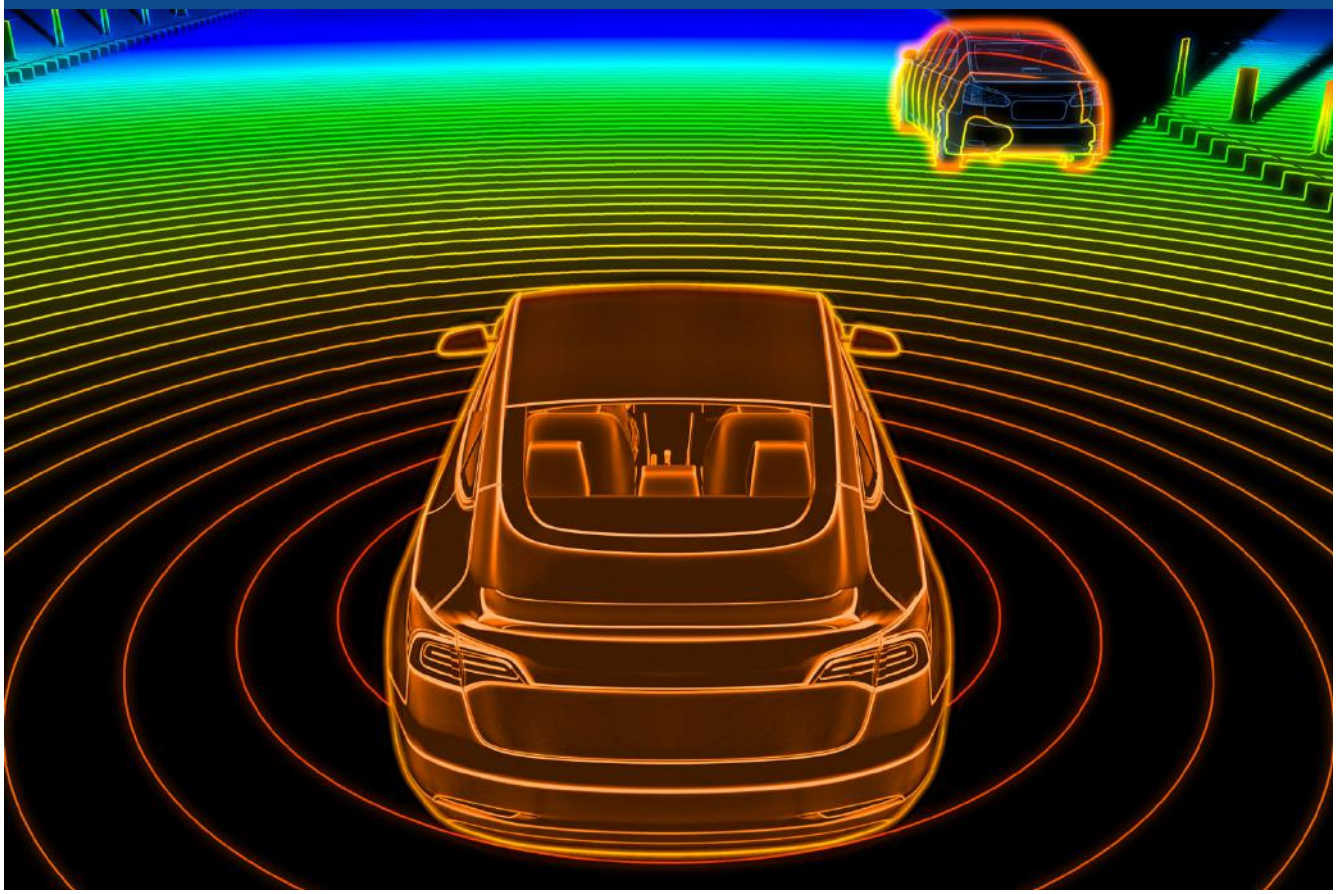


EDITORIAL

Why Lidar is So Important in China

Here you see the Aito M7, a car from Huawei and Seres, equipped with a lidar on the roof. All Aito models have Huawei lidar.

Is Lidar growth in China linked to some key new feature like ACC for front radars in the past? No, not really. So then why is lidar so important and successful in the Chinese market? Well, because a lidar conspicuously on the roof means everyone can see you're driving a smart car, which means it has navigation-on-autopilot and other new features. Still, Huawei is strongly promoting the safety benefit of lidar, which allows the fast creation of a good, performant system. Compare that with Tesla, whose owner Elon Musk calls lidar "doomed" and "a technology for losers", and equips his cars with a vision-only system which requires millions and millions of recordings to achieve decent safety performance (sort of, maybe one day...so far no luck).

In this edition, we bring you our reportage on the EAC Lidar Tech Expo, co-organized by DVN, and the DVN visit to Robosense in Shenzen.

And you'll find the preliminary docket for our next event in Detroit, on 12 September.

Next DVN - Events 2024

- Deep Dive 3 workshop in Detroit (12 September)
- Lidar Conference in Wiesbaden (18-19 November)

We're ever so glad you're here with us in the DVN-Lidar community. Enjoy this 28th newsletter!

All best,

Alain Servel

DVN LIDAR ADVISOR

LIDAR BUSINESS

Lidar Business Newsbites

Yole Trims Car Lidar Expectations as Prices Drop

Yole's new estimate for the automotive lidar market in 2029 is USD $3.6bn, with an average growth rate of 40 per cent per year, starting from 2023's $538m market size. The statistics show a decline compared to the previous year's forecast, which predicted 55-per-cent growth and a $4.5bn value by 2028. The reduced expectations are on account of anticipated price drops as production increases, particularly in China.

Chinese NEV Sales for June 2024

	May, 2024	YTD, 2024
Outputs	**940**	**3,926**
BEV	557	2,410
PHEV	383	1,514
FCV	0.4	2
Sales	**955**	**3,895**
BEV	583	2,407
PHEV	371	1,486
FCV	0.4	2

In May, 2.372 million vehicles were produced in China, representing a modest 1.7-per-cent rise from the previous year (but still +6.5 per cent for production in the first 5 months).

Regarding NEVs, 940,000 were produced in May and 2.9 million in the first five months, during which NEVs made up 33.9 per cent of China's auto sales.

Huawei Becoming Key Lidar Supplier

Aito, the premium NEV brand jointly developed by Huawei and Seres, announced that their M9 SUV—priced over C¥500k—attracted fixed orders for over 100,000 units within six months of its market launch.

The car is equipped 100 per cent with a lidar from Huawei, which means Huawei can be now considered as one of the key-supplier selling Lidar in China.

Leapmotor Partners With Ambarella for Smart Driving R&D

Leapmotor has recently partnered with semiconductor company Ambarella to develop new intelligent driving solutions on the CV3 platform. Ambarella's renown CV3-AD series AI SoCs are highlighted for their performance, power efficiency, and their ability to handle advanced neural networks. Leapmotor's CEO Zhu Jiangming views this collaboration as a pivotal move towards advanced smart driving. Additionally, Leapmotor is also expanding its reach through a joint venture with Stellantis to enter nine European markets beginning of September.

Nio Revamping Smart-Driving R&D Division, Focusing on Large Models

Nio's smart driving research and development sector has experienced a notable organizational change. Previously divided into perception, planning and control, and integration units, the department now consists of a combined "large model team" from the former two and a newly named "delivery team" from the integration group. It's said that Ren Shaoqing, Nio's VP of Intelligent Driving R&D, will keep leading the newly-organized autonomous driving division. He has directed his team to move away from the long-standing industry approach of "perception-decision-planning and control" towards leveraging end-to-end large models for enhanced advanced driving intelligence.

Tier IV, Suzuki Partner for AD Applications

Tier IV and Suzuki have joined forces in a capital and business alliance to enhance regional mobility through advanced autonomous driving technology. This partnership merges Tier IV's open-source software with Suzuki's manufacturing prowess to develop innovative mobility solutions. The focus will be on areas with diminishing traditional public transportation.

China OKs 9 OEMs for L^3 Smart Connected Car Pilot Program

Various Chinese ministries selected nine groups for an L^3 intelligent connected vehicle pilot, following last November's Notice on Conducting the Pilot Program for Intelligent Connected Vehicle Access and Road Traffic. The notice specifies requirements for selecting L^3 and L^4 self-driving vehicles ready for mass production, which will undergo road tests and demonstrations in the program.

China has allocated 100 million communication network numbers for V2X

China's Ministry of Industry and Information Technology (MIIT) recently allocated 100 million 11-digit mobile communication network numbers exclusively for V2X (vehicle-to-everything) services. Intelligent connected vehicles use IoT (internet of things) cards with dedicated V2X numbers to connect to 4G/5G networks. This connectivity supports various functions such as data communication between vehicles and manufacturers, onboard internet access and entertainment for passengers, as well as communication for emergency assistance.

Hyperview, Smarter Eye in AD Pact

Smarter Eye, a perception solution firm, and Hyperview, an autonomous driving tech provider, have entered a strategic partnership to build advanced intelligent driving solutions. Hyperview will use their software and hardware expertise, including autonomous driving platform and system integration skills, to enhance intelligent driving technologies. Smarter Eye will contribute their cutting-edge binocular stereo vision algorithms to create performant solutions for various vehicle types and expand the use of intelligent driving technologies with more partners.

SPECIAL REPORT

DVN-L Report: EAC Lidar Tech Expo '24

The AEC Lidar Tech Expo is the biggest lidar expo in the World. This year it was co-organized by DVN and Enmore. DVN is now present with events in the EU, the US, and China.

DVN brought about 20 companies, including seven speakers—Valeo, AGC-Wideye, Sony, FKA, Siemens Simulation, Voyant, and Baidu Apollo), three exhibitors (C3nano, RCoola, and Konrad), and multiple visitors from Mobileye, Luminar, Onsemi, AMS Osram, Dexerials, Koito, Forvia Hella, Suna Opted, Schott, LG Innotek, and Robo-technik.

This was a unique opportunity for DVN to better understand why Lidar is so popular in China. We met with lidar suppliers and automakers at the DVN booth, and after the expo we visited the facilities of Robosense and Seyond and meet with Professor Ling Ming, who leads the International Conference for Automotive Lidar, to discuss standards and regulations.

Picture: DVN Booth

Here are key takeaways:

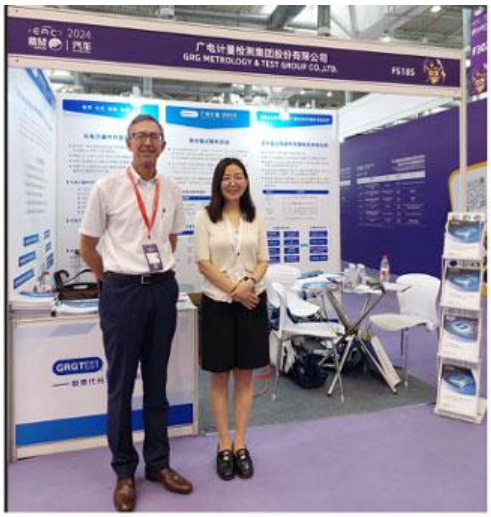
- Yole revised the size of the lidar business in 2030 to take into account the steep cost reduction curve of lidar in China.
- Buyers of Luxury cars: some buyers are young and like high-tech cars. Most Porsche buyers, for example, are 30 to 35 years old.
- OEMs tried last year to replace Lidar by more vision or imaging radars, but this year no OEM is questioning the value of Lidar (assuming the cost can go down).
- Hesai has been promoting the safety benefit of lidar, which can increase the maximum speed for AEB by 50 per cent, and the development of L^3 applications in China (9-model pilot project already under way).
- Seyond: L^{2+++} applications expanding to urban and highway environments, just a step away from L^3. Seyond has found the mean time between human-driver interventions is improving fast, and already exceeds 100 km on highways.
- Vanjee is launching a premium lidar with 300m range and up to 0.15° × 0,08° resolution in the ROI (80° × 12.5°) – see our lidar technology articles.
- Lidar is getting cheaper and cheaper for L^{2+}/NOA applications (0.1 - 0.2° resolution), expected at $200 in 2025 and with a target of $150 or less in 2026-27.
- To go further in the cost reduction, there are investigations to integrate vision and lidar together (Tanway, DJI...), with installation behind the windshield.
- Huawei will become one of the key suppliers for lidar.
- FMCW: Scantinel announced representative prototypes next year and possible SOP by 2027. Lidwave, a startup from Israel, has shown a simplification of the design, as has US startup Voyant using a design based on mature components from the telecoms industry and also targeting a 2027 SOP.
- Vueron mentioned they are ranking first in the list of Waymo perception software suppliers.
- FKA promoted their research project related to the extension of the first DIN-SAE spec of lidar for bad weather conditions.
- Professor Ling Ming is concerned by the steep price reduction curve of lidar, which might be difficult to manage by startups (e.g., Robosense, Hesai) in case they do not achieve profitability within the next two-three years.
- Robotaxis: Baidu Apollo is operating a fleet of 500 robotaxis without any safety driver, like most of their competitors (Weride, Pony, Didi, Auto X...) but using remote-control monitoring. There are concerns about the business model, given today's low taxi fares. On the other hand, a improvement of traffic conditions might become a priority (smart roads) and support the deployment of robotaxis in some areas.
- Robotrucks are also making progress. The convoying solution might be relatively easy to implement and generate profit.
- Imaging radars are geeting cheaper—they're well below $100—but the resolution is still much higher than lidar (0.6° in best case).

SPECIAL REPORT

In Pictures: Lidar Tech Expo

MOBILEYE AT THE DVN BOOTH

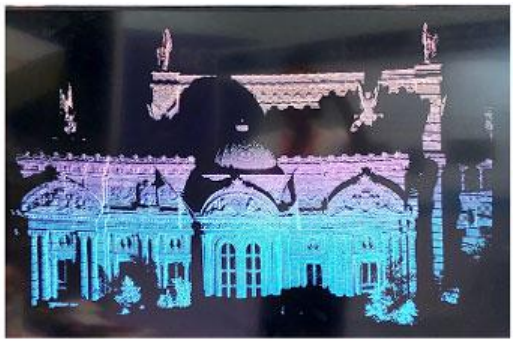
DVN AT THE ROBOSENSE BOOTH



DVN DISCUSSING TESTING WITH GRG

DVN DISCUSSING IMAGING RADARS WITH AUTOROAD

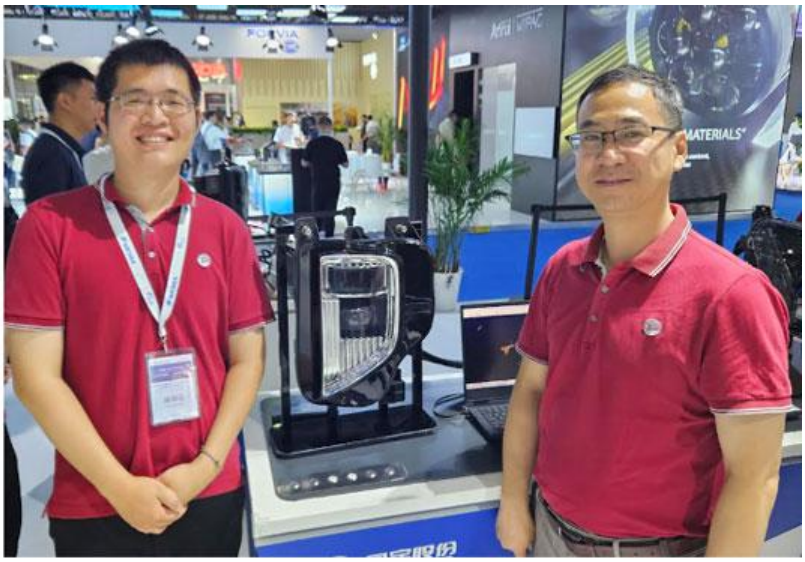
FKA PROMOTING LIDAR STANDARDS ONLINE



LIDAR PICTURE AT THE BOOTH FROM VOYANT

SUNA OPTOELECTRONICS

SCANTINEL



LIDAR INTEGRATED IN OPTICS BY XING YU LIGHTING (ALE EXPO)

INTERVIEW

DVN-L Visits Robosense in Shenzen

Robosense & DVN team in front of the democar

DVN had the pleasure to visit RoboSense's facility in Shenzen, including labs and manufacturing lines. We met with Senior Product Director Sean Wang; Strategic Planning Manager Anna Zhang; Marketing Deputy Director Jasmine Gao, and Overseas Marketing Specialist Gloria He.

The DVN team included DVN-Lidar General Editor and lidar sensor expert Eric Amiot, and ADAS & AD Systems Expert Luc Bourgeois. The main purpose of the visit was to better understand the reasons why vehicular lidar is expanding much faster in China than in Europe. The agenda included discussion about market trends and technology; demo-car presentation, and a factory visit. Here are some of the questions and answers:

DVN-L: What passenger cars are equipped with lidar today?

Robosense: Today you can find lidar applications on cars with a price above $30,000. Based on the current cost reduction curve, we can expect to see lidar on cars cheaper than $30,000 in the next three years.

DVN-L: What is your expectation for the robotaxi market?

Robosense: 99 per cent of the robotaxis operating in China are still in the testing phase. Some have safety drivers, some have a remote monitoring system in case something happens. The deployment is limited to some big cities, and we do not expect any ramp-up before 2026-27.

DVN-L: Why is lidar so popular in China?

Robosense: There are several reasons adding up to make the lidar more and more popular in China.

- Lidar improves safety. Huawei is one of the OEMs using lidar to improve the AEB function and claims a significant improvement of the max AEB speed with lidar.
- Driver peace of mind: The driver is responsible for L^2 - L^{2+} functions like NOA, the end user also knows the current systems are not 100 per cent reliable (Tesla 'Autopilot' issues are infamous). He needs a robust system and lidar makes the system safer, especially in urban areas.
- Object detection: Lidar is the high-resolution sensor which can measure exactly the dimensions and position of the target, including the moving direction / angle of the target, which is a great help in urban areas and to detect small objects lying on the road.
- SLAM: no HD map is required for the NOA function; this is the new trend. The map is created and memorized for the frequent travel route using lidar (e.g., home-office).
- Price Curve: lidar is getting cheaper and cheaper.

DVN comment

The driver expects the functional safety level at a similar level for L^{2+} and L^3, the main difference between L^{2+} and L^3 should be the redundancy. This was already the conclusion of the DVN report ***Tesla 'Autopilot', its Implication for the Growth of the Automotive Lidar Market***, published at the end of 2022.

DVN-L: Are there already hands-off applications on the Chinese market for L^{2+}?

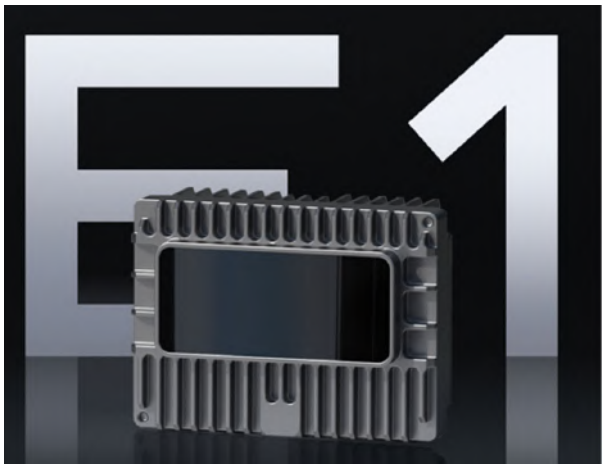
Robosense: In China, hands-off systems are not allowed by the regulation and the driver clearly knows he is fully responsible. This means there is no pure hands-off application, and the driver is warned after a certain time if he doesn't put hands on the steering wheel.

DVN-L: When do you see L^3 applications coming in China?

Robosense: We have developed a new M3 sensor to support future L^3 applications, with a 300-m range and a resolution of 0.05°, anticipating an active deployment from 2027, which means the lidar sensor should be SOP ready in S2-2026.

DVN-L: Do you see BSD applications for lidar coming?

Robosense: We have recently developed a new E1 sensor for BSD applications. This would also support L^3 applications to get a better safety performance in cities for close cutting, and support remote parking / valet parking applications.



DVN-L: What is your competitive position on the market?

Robosense: Robosense is mostly focused on automotive applications, and has already equipped 25 car models with its lidar (>50 per cent of all car models on the market equipped with lidar - announcement at the Beijing Auto Motor Show 2024).

DVN-L: What is the cost reduction curve for lidar applications in China?

Robosense: We have developed a new MX sensor which will be much cheaper - starting early 2025, and the market expects a continuous price reduction over the next three years.

DVN comment

See DVN special report of the EAC lidar Tech 2024 expo in Suzhou; it is expected some suppliers will reach a $200 price range in 2025 thanks to the high volume effect, and C¥1,000 (USD $138 as of 1 July 2024) was mentioned as a target for the industry in the next three years.

DVN-L: What is your current business model? How big is the Robosense team?

Robosense: Robosense, which was created in 2014, has 1,300 employees currently focused on automotive applications. It sells lidar sensors sending point cloud data.

DVN-L: How many lines do you have in Shenzen?

Robosense: We have four lines in the Shenzen plant for the M1 sensor. The manufacturing process is split in four lines: Scanning Module (MEMs) / Modules Prototypes production / Sensor Assembly / Sensor Calibration & Testing.

DVN comment

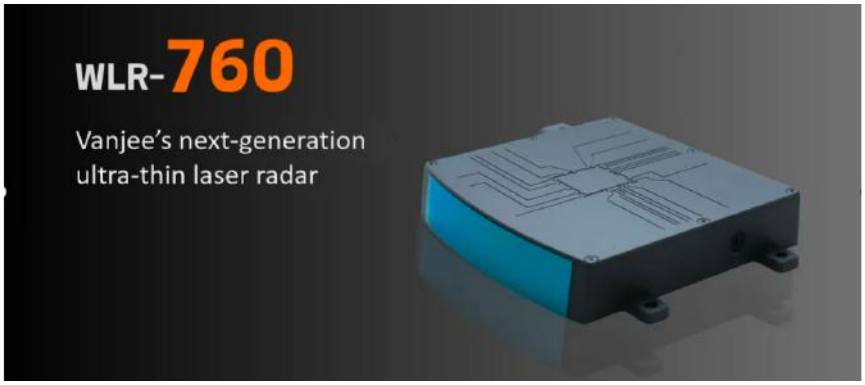
We noticed state-of-the-art scanning technology (2D MEMs); high-tech assembly processes to manage the complex architecture of the lidar; high automation levels and systematic quality verification (e.g., CCD cameras) at each station, and state-of-the-art quality organisation and quality tools (QRQC, San Gen Shugi...).

Inside the manufacturing plant

DVN-L: Many thanks to the Robosense team for hosting us at your facility in Shenzen!

LIDAR AND IMAGING RADAR TECHNOLOGY NEWS

VanJee's New vehicle-mounted Lidar is Thinnest in World



VanJee has officially released new automotive lidar, the WLR-760. It achieves all-around strength in an ultra-thin body, with ultra-clear vision; ultra-low power consumption, and ultra-low cost thanks to new transceiver technology.

It's just 24 mm high, for a slimmer profile than other lidars for versatile integration. It has low power consumption of only 12 W due to advanced transceiver technology, which keeps it cool even after 8 hours of use in nearly 30°C heat, as demonstrated at the Beijing Automotive Exhibition. Its compact size and minimal power needs allow for flexible and aesthetic placement on vehicles, like the roof, windshield, or bumper, contributing to lower wind resistance and more smart sensor integration options.

Lidar point cloud quality is assessed using three key metrics: angular resolution, field of view (FOV), and detection range. The WLR-760 has a 192-line high-definition point cloud harness, achieving up to 300 meters in detection distance with a FOV of 120°H × 25°V. It excels in ranging performance by detecting objects 200 meters away at just 10 per cent reflectivity, aiding in complex driving environments.

The WLR-760's ROI is engineered for 80°H and 12.5°V to optimize point cloud efficiency. This scanning capability strengthens the resolution to 0.15° × 0.08° for better object recognition at greater distances. It incorporates a cutting-edge VCSEL+SPAD design, paired with VanJee's proprietary FOC vector control algorithm and a multi-channel VCSEL driver. This integration markedly increases the performance of the product while streamlining its structure.

By simplifying and integrating the structure of the product, there will be a considerable increase in the production efficiency of the lidar. The WLR-760 reduces component types by over 60 per cent, lowers the quantity of components needed by more than 80 per cent, and shortens the manufacturing process by 30 per cent compared to conventional methods.

DVN comment

The integration of VECSEL smart control algorithms could significantly improve the performance of the lidar while simplifying its internal structure. That can allow important gains in production processes, facilitating low dispersions among units, high volumes and consequently a lower unit cost.

LIDAR AND IMAGING RADAR TECHNOLOGY NEWS

Aeva FMCW Lidar for Major German Automated Train Project

Aeva has been chosen to participate in an automated and driverless train initiative in Germany. Leveraging their frequency-modulated continuous wave (FMCW) technology, which is unique from traditional lidar by being chip-scale silicon photonics-based, Aeva joins forces with a consortium of ten companies including the likes of Siemens Mobility and Bosch Engineering.
This collaboration, known as “AutomatedTrain” and spearheaded by a Deutsche Bahn subsidiary, receives backing from the German Federal Ministry of Economic Affairs and Climate Action under its Digitale Schiene Deutschland program. The aim is to equip two regional trains with the types of intelligent sensors used in autonomous vehicles, to achieve full automation including dispatch and parking functions without drivers by 2026.

The FMCW method, which employs a frequency-chirped laser source, can enhance both the position and velocity of objects, making it ideal for autonomous transportation, albeit more complex and nascent compared to conventional time-of-flight lidar tech. Market analysts at Yole Intelligence predict its influence within automotive applications will become significant around 2028, with earlier implementations likely in industrial domains.

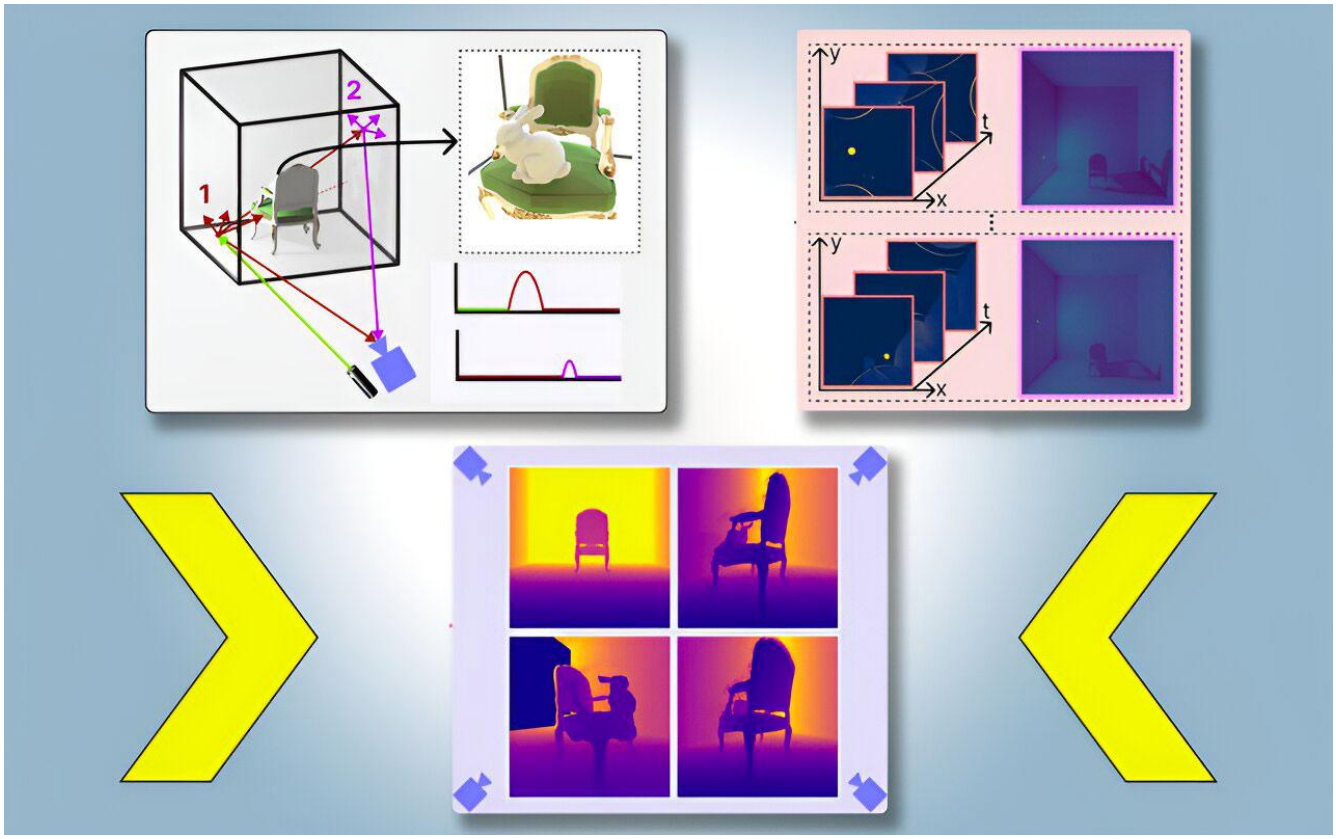
Christian Hauswald of Digitale Schiene Deutschland highlights that the decision to engage Aeva was driven by the superior resolution and compact design of its lidar sensor, alongside its advanced readiness level. Jakub Zimny of Aeva reciprocates the enthusiasm, noting the critical role of their partnership in revolutionizing rail industry standards across Europe with sensing solutions. A key benefit of the FMCW sensor offered by Aeva is its swift identification of stationary versus moving objects near railway tracks, enhancing safety through early detection of possible obstructions.

DVN comment

Aeva previously mentioned last year that Railergy, a German rail automation company, chose their FMCW tech for train coupling tasks. More recently, Aeva announced that its FMCW sensors are set for extensive use by Daimler Truck, planning to integrate the technology in 2026, with a significant increase in production expected in 2027.

LIDAR AND IMAGING RADAR TECHNOLOGY NEWS

MIT Uses Shadows to Model 3D Scenes, Occluded Objects



A collaborative effort between MIT and Meta researchers has led to a new computer-vision technique that potentially allows self-driving cars to have a more comprehensive view of their surroundings, even seeing through obstacles like nearby vehicles.

The technique involves producing complete, three-dimensional models of a scene including sections not directly visible by employing just a single camera viewpoint. This method leverages shadow analysis to infer what occupies the hidden parts of the scene. They're calling it PlatoNeRF, inspired by the allegory from Plato's "Republic" wherein individuals interpret reality through shadows projected on a wall.

Harnessing both lidar and machine learning, PlatoNeRF can construct more precise 3D geometries compared to some current AI methods, and it outperforms them in areas with either intense ambient light or dark backdrops where shadows are less distinct. This technology could enhance autonomous vehicle safety, and also stands to benefit AR/VR technologies by simplifying room modelling for users and assisting warehouse robots in locating objects within cluttered spaces more efficiently.

One of the core insights of this research, according to Tzofi Klinghoffer—an MIT Media Lab graduate student and lead author of the CVPR paper presenting PlatoNeRF—lies in integrating multibounce lidar and machine learning. This combination unlocks new potentials and synergizes the strengths of each discipline.

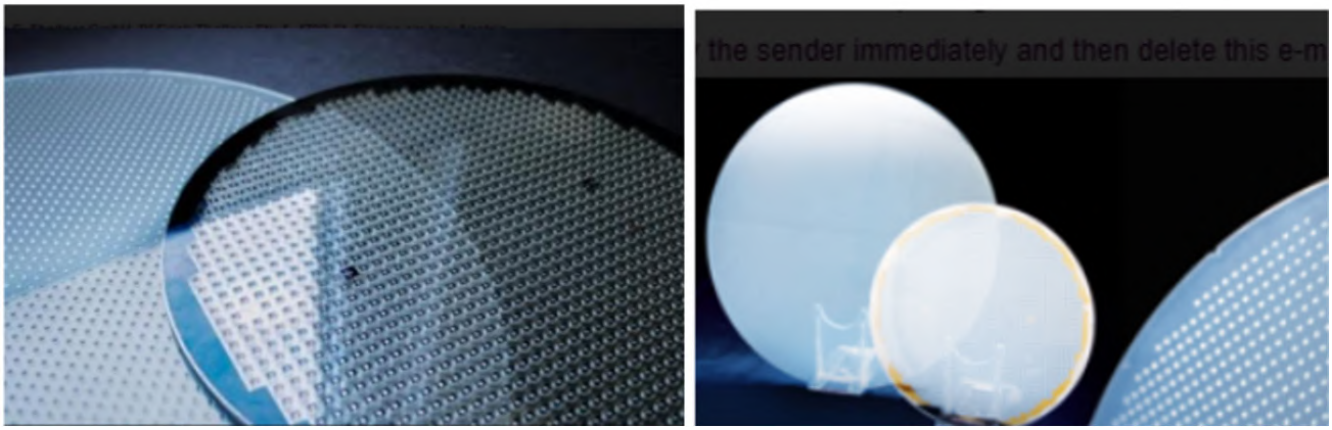
Presented at the recent Conference on Computer Vision and Pattern Recognition in Seattle, Washington, this research confronts the challenge of full 3D reconstruction from a stationary camera position. While conventional machine-learning techniques may inaccurately create non-existent aspects within concealed segments, and other methods struggling to define shapes based on shadow-casting in colour imagery might falter under certain lighting, PlatoNeRF advances by using single-photon lidar technology.

PlatoNeRF's approach captures light bouncing multiple times within a scene, thus gathering in-depth data, including details cast by secondary shadows. The system sequentially illuminates numerous points within the scene to compile comprehensive images that reconstruct the entire space in three dimensions. Klinghoffer explains that every illumination point produces new shadows which, when combined with various light sources, helps to exclude occluded regions from the overall view, providing a clearer picture of what is actually present. Looking ahead, the MIT team seeks to explore further the benefits of tracking multiple light bounces and is poised to introduce deep learning enhancements along with incorporating color image analysis to enrich texture details in reconstructions.

DVN comment

PlatoNeRF, by integrating lidar with advanced machine learning algorithms, can generate more accurate 3D geometries than several existing AI techniques. Integrating multibounce propagation in lidar processing can enhance the characterization of objects, particularly if these objects are partially shadowed by first plane located objects. This innovation has clearly the potential to improve safety for self-driving cars and advance AR/VR technologies.

Delo White Paper on UV-Cure Molded Microöptics



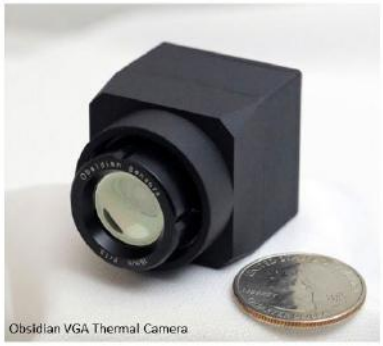
There's a new white paper from Delo, presenting an industrial solution for the manufacture of microöptics at the wafer scale by lens molding using UV-curable polymers. It is a technology of choice for the mass production of high-performance, purpose-built optical components and modules for a variety of emerging markets and applications.

The EVG 7300 is a state-of-the-art piece of equipment for wafer-scale lens molding, which offers high alignment accuracy, flexibility, automation, and scalability. It uses transparent working stamps to replicate defined lens shapes in UV-curable polymers, deposited directly onto substrates. The paper describes the casting process and its main features. Delo Katiobond OM6611 is an epoxy-based optical polymer material, which has outstanding optical and mechanical properties, as well as excellent reliability and low shrinkage. It is optimized to work with the EVGNIL UV/AF7 working stamp, which ensures process stability and high product quality.

The paper can be downloaded from DVN website or from Delo's website.

LIDAR AND IMAGING RADAR TECHNOLOGY NEWS

Obsidian Gets Himax Cash to Advance Thermal Image Sensor Tech



Obsidian Sensors, specializing in thermal imaging tech, has secured an investment from Taiwan's Himax Technologies, a display driver and semiconductor provider. Together, they plan to create an enhanced thermal vision system that integrates Himax's AI technology with Obsidian's sensors to improve detection in demanding environments, aiming to enhance industrial, automotive, and security applications.

Obsidian crafts their sensors on a broad microelectromechanical systems platform, enabling cost-effective, high-volume production in mainstream flat panel foundries. Their existing investors include the likes of Qualcomm, Hyundai, and Innolux. The partnership is expected to advance Obsidian's engineering efforts through Himax's expertise in circuit design and image processing.

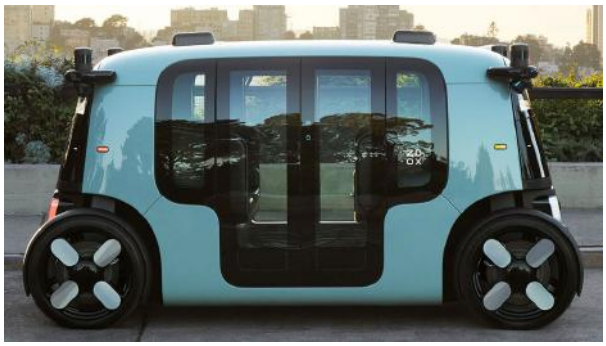
Himax's investment coincides with Obsidian's recent partnership announcement with Quanta Computer, a Taiwanese electronic hardware company. Together, they're focusing on thermal imaging for cars, following new U.S> safety regulations from NHTSA. Quanta SVP Alan Chai highlights their work on merging visible and infrared camera tech to enhance safety systems like automatic braking. CEO of Obsidian, John Hong, remarks on the importance of affordable thermal imaging technology in advancing car safety without financial barriers.

DVN comment

Established in 2001 with headquarters in Tainan, Taiwan, Himax provides CMOS image sensors and wafer-level optics for augmented reality devices, along with 3D sensing and ultra-low power AI image sensing technologies. Associated with Obsidian Sensors these two companies can really create and product, at terms, lower cost oriented thermal vision systems, integrating Himax's artificial intelligence for AD vehicle.

AUTOMATED DRIVING

AD Newsbites



The California Senate Transportation Committee has passed two bills to regulate AVs. They focus on protecting union jobs and enhancing public safety.
AB 2286 mandates a trained human operator to be present in self-driving trucks weighing over 10,000 pounds. This measure is designed to preserve trucking jobs and ensure road safety.
AB 3061 requires AV companies to report any vehicle collisions, traffic violations, disengagements, assaults, or harassment incidents to the California Department of Motor Vehicles. This step is critical for public transparency and accountability.

Waymo has announced the full rollout of their autonomous ride-hailing service in San Francisco, making it available to all residents and visitors. This expansion emphasizes safety, sustainability, and convenience, offering a new mode of transport that supports local businesses and reduces carbon emissions.

Mobileye announced the in-traffic testing of their fully autonomous no-driver system, Mobileye Drive, in Germany. This involves Deutsche Bahn (DB) introducing the platform in six on-demand shuttles in Darmstadt and Offenbach. The KIRA project aims to expand this service, potentially including rural areas within the Rhein-Main-Verkehrsverbund (RMV) service area. The platform successfully met Germany's strict "national type approval for motor vehicles with a fully automated driving function," known as AFGBV.

BMW received approval for integrating both an L^2 driving assistance system (BMW Highway Assistant) and an L^3 system (BMW Personal Pilot L^3) within the same vehicle. Highway Assistant (L^2) enhances comfort on long journeys with automated lane changes and hands-free driving. Personal Pilot L^3 allows drivers to engage in other activities during traffic jams with highly automated driving.

At the recent World Intelligence Expo, Zhang Xinghai, Chairman and Founder of Seres, gave a keynote address. In his speech, he revealed that Aito vehicles have collectively achieved an intelligent driving distance of 265 million kilometers, adding roughly 2.35 million kilometers each day.

Xpeng Navigation Guided Pilot system has been expanded to 14 additional cities. This includes six new cities in Shaanxi province and eight in Shanxi province. With this expansion, XNGP is now available in a total of 336 cities in China. The safety validation distance for XNGP in Shaanxi, Shanxi, Jiangsu, and Zhejiang provinces has surpassed 31,100 km. Xpeng plans to achieve a full coverage of major city road networks across the country by the end of 2024.

May Mobility has revealed the initiation of the Detroit Automated Driving Systems (ADS) pilot, realized in collaboration with the Office of Mobility Innovation (OMI) of Detroit and the Michigan Mobility Collaborative (MMC). The service named "Accessibili-D" is designed to enhance life quality for residents of Detroit who experience disabilities or are aged 62 and over. Starting June 20, 2024, through 2026, it will be accessible to a select group of Detroit locals.

Baidu Maps has debuted their V20 lane-level navigation feature worldwide, which is now accessible in every Tesla model with AMD automotive chips (Models S, 3, X, and Y) throughout China. The V20 introduces an innovative 3D technology leveraging detailed lane-level maps nationwide, offering Tesla users a seamless navigation experience. This enhancement elevates the built-in navigation to equal or surpass the performance of smartphone-based GPS systems.

Zoox is expanding testing to Austin and Miami—the fourth and fifth locations for Zoox's public testing after San Francisco, Las Vegas, and Seattle. The initiative underscores Zoox's commitment to refining its autonomous technology in diverse and challenging environments.

Nissan has started demonstrations of a prototype vehicle equipped with their own AD technologies. The prototype vehicle is a Nissan Leaf with 14 cameras, 10 radars, and 6 lidar sensors. The target is to introduce autonomous-drive mobility services in Japan by fiscal year 2027. In the busy streets of Yokohama, near Nissan's global headquarters, the Leaf prototype smoothly demonstrates its ability to predict pedestrian behavior, conduct lane changes when merging, and judge when to safely enter intersections.

Pony announced the launch of their paid autonomous shuttle (robotaxi) service at Beijing Daxing International Airport, becoming one of the first companies in Beijing to obtain a commercial pilot license for expressways with a safety operator in the driver's seat. In February, Pony opened their autonomous airport transfer service to the public. Users can book the service via the Pony.ai mobile app one day in advance, enabling travel between over 1,000 drop-off/pick-up points in the Yizhuang area and Daxing Airport.

Zeekr received the first batch of Ningbo Intelligent Connected Vehicle Road Test Permits from Ningbo authorities. Autonomous driving tests will be performed with a speed up to 80 km/h. During these tests, a safety officer will sit in the car. Zeekr will provide vehicles for Waymo One's unmanned fleet, based on the SEA-M architecture and equipped with WaymoDrive's L^4 autonomous driving capabilities for future commercial operations in the USA. In June, Zeekr's self-developed SEA-M intelligent driving system obtained an L^3 expressways AD test permit for Shanghai.

Avatr, the high-end brand jointly backed by Changan, Huawei, and CATL, announced that it would be one of the first car brands to integrate Huawei's Qiankun ADS 3.0 smart driving system, starting with valet parking function. The Huawei Qiankun ADS 3.0, launched on April 24, includes upgrades in HD map-free smart driving, omnidirectional collision avoidance, and all-scenario intelligent parking.

Zeekr obtained a test license for L^3 AD functions on their Haohan intelligent driving system on Shanghai's highways and expressways. The system can recognize traffic light information and perform proactive lane changes, navigation-based lane changes, automatic ramp passing, correct fork selection, intelligent detours around construction, lever-based lane changes, and environment simulation display for seven core functions. Since the launch of Zeekr highway NZP, the autonomous driving service covers 65 cities nationwide.

BAIC Group has been selected as one of the first automakers to join the pilot project of L^3 intelligent connected vehicles nationwide. The company focuses on demonstrating autonomous taxis, Autonomous Valet Parking (AVP), 5G-V2X vehicle-road communication, and platooning. Last year, BAIC's subsidiaries, Arcfox and Foton Motor, were among the first to receive Beijing's conditional AD (L^3) expressway testing licenses.

Changan will be one of the first car makers for the pilot project of L^3 intelligent connected vehicles nationwide. The SL03i model submitted by Changan Automobile is equipped with an L^3 traffic jam pilot system.

Xiaomi EV will introduce urban NOA (navigate on autopilot) in ten cities, and support the integration of more Mi Home devices. The feature will be available to SU7 users who meet the "smart driving safety distance" criteria accumulated 1,000 kilometers of safe smart driving distance by 31 May 2024. Eligible users in the core areas of Beijing, Shanghai, Guangzhou, Shenzhen, Hangzhou, Wuhan, Chengdu, Xi'an, Nanjing, and Suzhou cities will be able to use the urban NOA on major roads.

KargoBot, the autonomous truck creator for DiDi, began showing their L^4 self-driving convoy on a principal route carrying goods between an Ordos coal mine and a power plant in Kangbashi District, Inner Mongolia. This 50-km route is responsible for transporting over a million tonnes of freight yearly.

Waabi has raised USD $200m in a Series B round, led by Uber and Khosla Ventures, with participation from Nvidia, Volvo, Porsche, Scania, Ingka Investments, and others. The funding will support Waabi's deployment of autonomous trucks in 2025. Recent milestones include opening a new Texas AV trucking terminal, partnering with Uber Freight for autonomous shipments.

DVN-LIDAR DEEP DIVE

Preliminary Docket: DVN-Lidar Deep Dive 3 @ Detroit

Program under review (max 8 speakers); online participation possible

11 September (Welcome Dinner)

19:20 Cocktail
20:15 Dinner

12 September (Lidar Deep Dive 3 event)

8:30 Opening and introduction of participants

Session 1: Lidar Applications & Technology, FMCW Lidars
9:00 **GM-tbc**: Lidar for L^{2+} and L^{3} applications (title & speaker tbc)
9:20 **Luminar:** New generations of lidars (title & speaker tbc)
9.40 **Robosense**: Low-cost lidars for L^{2+} Applications (title & speaker tbc)
10:00 Conclusion: Four Questions to the Community

10:05 Coffee Break
10:30 Two breakout groups, each discussing four questions from the speakers
12:05 Lunch Break

Session 2: Lidar Integration & Cleaning, Sensors Performance & Fusion for AVs
13:30 **Monentive-tbc:** Weathering resistant coating for lidars
13:50 **Virginia Tech**: Interference Study with NHTSA (Title - tbc)
14:10 **Valeo Brain** : Sensors for AVs: Lidar, 4D Radars, IR cameras (Title - tbc)
14:30 Two breakout groups, each discussing four questions from the speakers.

15:30 Coffee Break
16:00 Breakout group reporting and discussion
16:30 What did we learn together?
17:00 Closure

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