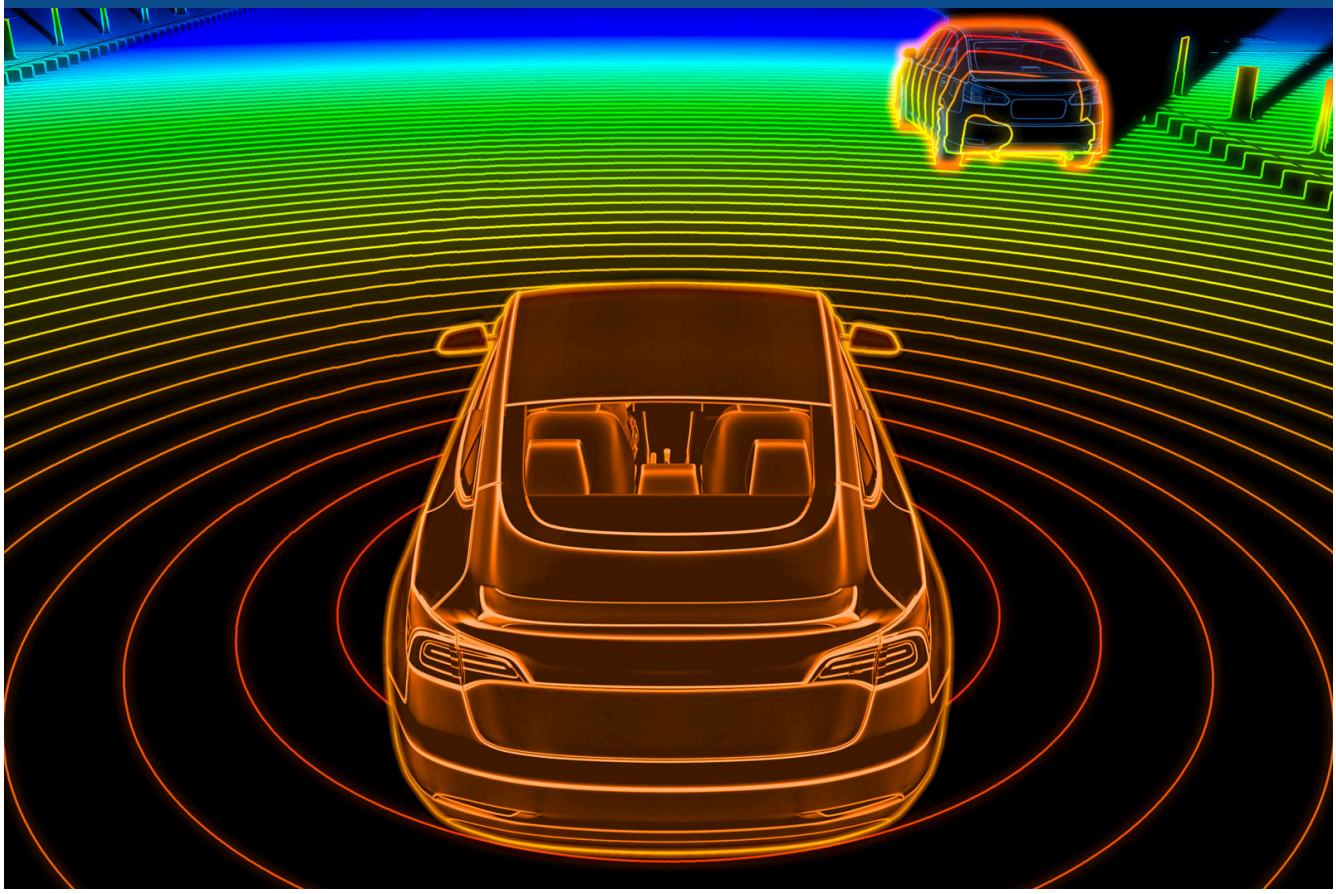
DVN

Sensing & Applications

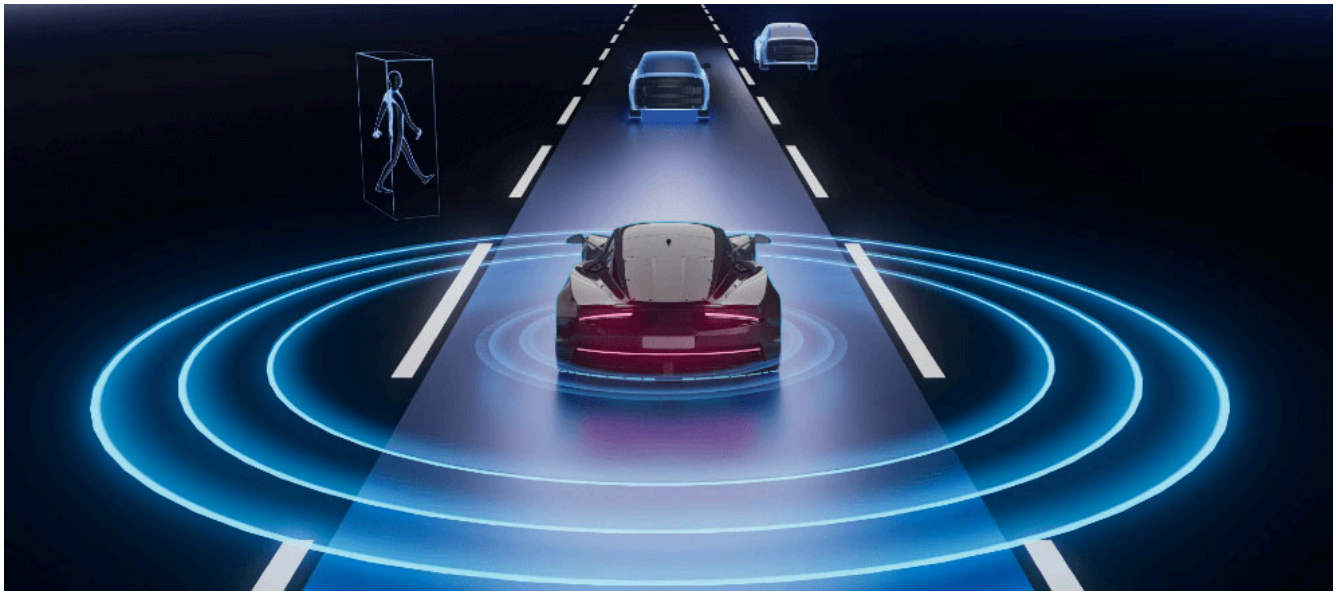
Monthly newsletter #6.1

JUNE 4, 2025



EDITORIAL

UNECE approves L2+ Systems and EU will start its deployment



UNECE which includes 56 countries, incl. European countries, Japan, Korea, USA and cooperates with China (for specific domains like Autonomous Driving), has adopted and enforced its Driving Control Assistance System (DCAS) regulation in September 2024 which allows the deployment of L2+ systems in Europe, which should happen after the approval of each state. This will change the market for Autonomous Driving features and gives a strong push for the L2+ systems (eyes-on systems like Tesla Autopilot, for which the driver is still responsible). See details in our Architecture / Integration section.

In this edition, you will also find the interview of NORAD which is a specialist of AI Perception Software for cameras, a special report related to Lidar applications for infrastructure (ITS), and technology news about Light-IC, Opsys, Eyeo, Onsemi Hyperlux, NXP, Calthera ...

And do not miss the next DVN - Events 2025

- CN- EAC Lidar Tech Expo (Hangzhou 04-06 June), co-hosted by DVN
- EU- 8th Sensing & Applications Conference (Wiesbaden 19-20 November)

We're ever so glad you're here with us in the DVN-Lidar community. Enjoy this 39th newsletter!

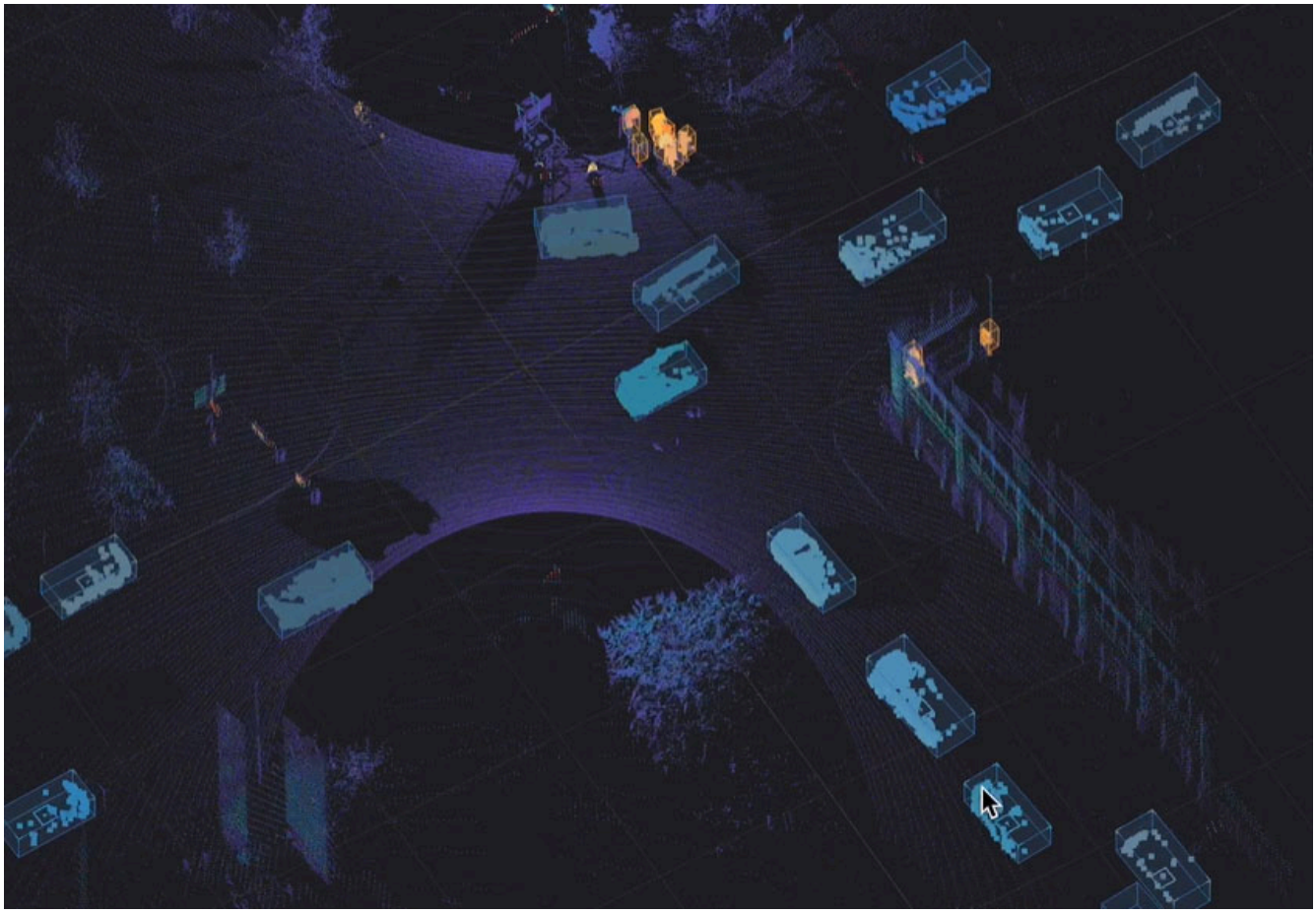
All best,

Alain Servel

DVN-ADAS Sensing adviser

SPECIAL REPORT

Special Report: Ouster and Seyond showcase their systems at ITS World Congress 2025



Lidar's role in smart transportation infrastructure for a safer, connected future with ADAS and V2X

OUSTER™

The rise of ADAS to improve road user safety

Vehicles are rapidly evolving with Advanced Driver Assistance Systems (ADAS) aimed at reducing fatalities and injuries. These technologies include collision warnings, automatic emergency braking, and lane-keeping assist systems, paving the way for autonomous driving. The EU targets a 50% reduction in road fatalities by 2030 and near-zero by 2050 through widespread adoption of ADAS. The Partnership for Analytics and Research in Traffic Safety reports substantial ADAS penetration in new vehicles, with 10 out of 14 key features exceeding 50% market penetration and 5 over 90%.

To maximize the safety benefits of ADAS-equipped vehicles, modernizing road safety infrastructure is essential. While ADAS technologies can reduce certain types of crashes, their effectiveness can be improved with smarter infrastructure that provides richer, real-time data about road users and environmental conditions. This requires an upgrade beyond basic traffic signals and static signage towards intelligent infrastructure capable of communicating directly with vehicles, pedestrians, and cyclists. The progress in infrastructure communication is linked to V2X technology. The V2X market was valued at USD 3.59 billion in 2024 and is expected to reach USD 42.69 billion by 2031, indicating that V2X may play a significant role in future infrastructure plans.

Introducing V2X: A new era of connected mobility and smart infrastructure

V2X communication technology is rapidly expanding and transforming road safety efforts, fueled by connected car advancements, a stronger focus on traffic safety, and supportive government and regulatory initiatives. At its core, V2X enables connected vehicles to communicate wirelessly with:

- Other vehicles (V2V)
- Infrastructure (V2I - also known as smart infrastructure)
- Pedestrians (V2P)
- The broader network (V2N)

Real-time data exchange through V2X communication enhances road safety by improving situational awareness and preventing injuries. Originally focused on V2V collision avoidance, V2X now includes infrastructure intelligence, with Roadside Units (RSUs) broadcasting signal phase and timing, and connected vehicles using this data for better decision-making.

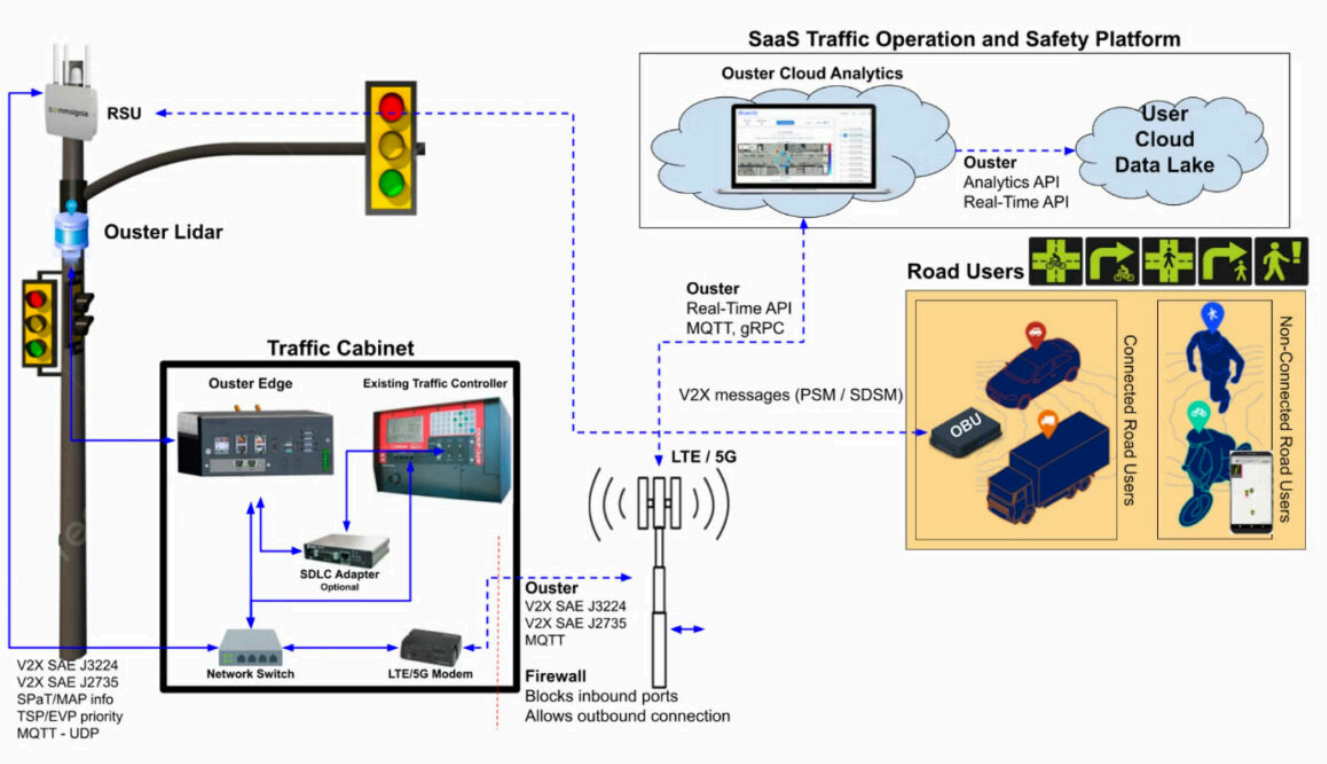
The FCC's unanimous ruling on cellular-vehicle-to-everything (C-V2X) on November 21, 2024, aims to improve vehicle and infrastructure communication, reducing crashes, improving traffic flow, supporting autonomous vehicles, and modernizing road infrastructure. These regulations are expected to boost innovation and economic growth, promoting connected transportation technologies like 3D digital lidar-powered solutions.

Ouster BlueCity: Intelligent infrastructure for a connected future

Ouster leads in modernizing road infrastructure, V2X, and intelligent transportation. Ouster BlueCity combines 3D digital lidar with AI perception software and data analytics to create a real-time 3D traffic twin of intersections or roads, detecting and tracking multimodal users in all conditions for improved safety.

The system automates cloud-based data collection to monitor road events for vehicles, pedestrians, and cyclists, offering detailed analytics for quick safety interventions and long-term planning. This cost-efficient solution integrates seamlessly with V2X communications, aiding traffic operators and city planners in managing intersections and public corridors effectively while preparing for ADAS-equipped vehicles.

How Ouster BlueCity powers V2X for enhanced safety



Ouster BlueCity's real-time 3D digital traffic twin surpasses traditional sensors by offering precise detection, classification, and tracking of all road users. This spatial awareness helps identify safety threats to vulnerable users, providing reliable safety messages for V2X applications.

Here's how Ouster BlueCity works for a V2X integration:

- Detection and tracking for accurate safety messages: Following a fast and simple install of Ouster BlueCity at an intersection or road, transportation agencies and municipalities can accurately detect and track the precise geolocation, speed, and trajectory of different types of vehicles, pedestrians, and cyclists.
- Standardized safety message generation: Using accurate data from Ouster BlueCity, the system converts object metadata into standardized SAE J2735 Basic Safety Messages (BSM) for vehicles and Personal Safety Messages (PSM) over 5G for pedestrians and cyclists. Furthermore, Ouster BlueCity supports the more advanced SAE J3224 (SDSM), enabling the combination of information for all road users into a single, more comprehensive message that provides richer contextual awareness to connected vehicles.
- Broadcasting safety information to connected road users: A RSU receives the safety messages from Ouster BlueCity and broadcasts them to connected vehicles and VRUs equipped with OBUs This allows drivers and other road users to receive real-time alerts about potential hazards, such as a pedestrian entering a crosswalk outside of the designated time or a cyclist approaching rapidly, even if they are not directly visible to the driver, significantly enhancing VRU safety.
- Seamless integration with RSUs: Ouster BlueCity features technology-agnostic V2X integration capabilities designed for efficient plug-and-play compatibility with various RSU vendors. By strictly adhering to SAE standards, there is no need for custom API development, thereby simplifying deployment and ensuring interoperability.

Key Benefits of Ouster BlueCity for V2X road safety:

High-resolution 3D data is essential for precise near detection and tracking. Unlike cameras that provide 2D views, Ouster BlueCity generates accurate 3D bounding boxes, delineating object boundaries with high precision. This capability is vital for safety-critical applications, offering detailed information on the type of road user and accurate geolocation with minimal latency.

Accurate detection of safety events relies on precise identification of object boundaries, known as bounding boxes. Many camera-based systems produce 2D bounding boxes that may not accurately reflect the actual edges of objects, leading to potential false positives where background elements are incorrectly identified as part of the object.

Conversely, as depicted in the right image, a 3D lidar system produces bounding boxes that precisely conform to the true contours of objects. This accuracy significantly reduces false positives, thereby improving the reliability of the detection algorithm.

In conclusion, 3D spatial awareness is crucial for precise detection and substantial reduction in false positives, ensuring reliable V2X detection and communication.

Seyond's SIMPL formula for success in the US

Seyond reports it has achieved "a major operational milestone" by deploying its end-to-end Lidar-based ITS platform to enable traffic signal actuation in Georgia, US.

By combining the Falcon Lidar sensor with its NEMA TS2-rated SIMPL (Seyond ITS Management Platform) at Peachtree Corners' Technology Parkway, Seyond says it delivered reliable vehicle presence detection to the traffic controller, demonstrating full stop bar actuation with independently validated results.

SIMPL combines Lidar detection hardware, perception software and traffic system integration. This offers highway agencies a resilient, infrastructure-ready deployment model that Seyond says simplifies operations, improves reliability and enhances scalability.

Notably, SIMPL is traffic-controller-agnostic. In this deployment, SIMPL's perception software transmitted vehicle presence data to the traffic signal controller using the Serial Data Link Communications (SDLC) protocol, ensuring precise, standards-compliant communication without reliance on proprietary interfaces.

This flexibility enables seamless integration into a wide variety of intersection environments and controller ecosystems, the company says.

The SIMPL platform delivers 3D multimodal detection with unmatched accuracy and resilience. Agencies can start with basic detection and scale into advanced operations, analytics and safety capabilities through SIMPL's modular software licensing model.

The project supports the City of Peachtree Corners' broader Smart City strategy, in partnership with Curiosity Lab, to address operational inefficiencies along Technology Parkway.

The goal is to explore innovative applications of Lidar for multimodal detection, including vehicles, pedestrians and vulnerable road users.

"Our work with Seyond and their SIMPL system demonstrates how Lidar-based detection can optimise traffic operations, not just collect data," said Brian Johnson, city manager of Peachtree Corners.

Seyond - based in Sunnyvale, California - is collaborating with the Georgia's Department of Transportation to expand the application across multiple intersections along State Route 141, Peachtree Parkway. The broader pilot will enable real-time roadside data collection, creating a scalable model for future-ready traffic management. This initiative will be highlighted at the 2025 ITS World Congress in Atlanta, Georgia, in August.

Meanwhile, Seyond has announced a strategic partnership with Twincrest Technologies to accelerate deployment of SIMPL across the states of Texas, Louisiana and Mississippi. Twincrest will serve as a channel partner and certified integrator for SIMPL, offering consulting, deployment and support services tailored to local and regional agency needs throughout the Gulf South region.

INTERVIEW

Interview: NODAR by Brad Rosen COO & Co-Founder at NODAR

Brad Rosen COO of NODAR is a seasoned business executive and entrepreneur. With seven tech startups under his belt, Brad has a proven track record of taking ideas from inception to product market fit, to exit. Prior to NODAR, Brad started, ran, and sold Drync, a venture-backed B2B platform for retailers of beverage alcohol. Before Drync, Brad served as VP Product at Where, a mobile-first LBS company that was sold to eBay. Earlier in his career, Brad held roles at Cognio, a full-stack spectrum analysis system that was sold to Cisco, Ucentric Systems (sold to Motorola), and PureSpeech (sold to Philips). Brad has an Electrical Engineering degree from the University of Colorado and an MBA from MIT's Sloan School of Management.

We had met and interviewed Brad last month to get more information about NODAR and its products:

DVN: NODAR is using 3D Vision Technology with advanced perception software to improve safety. Is there a specific stereo camera you are using for automotive applications today?

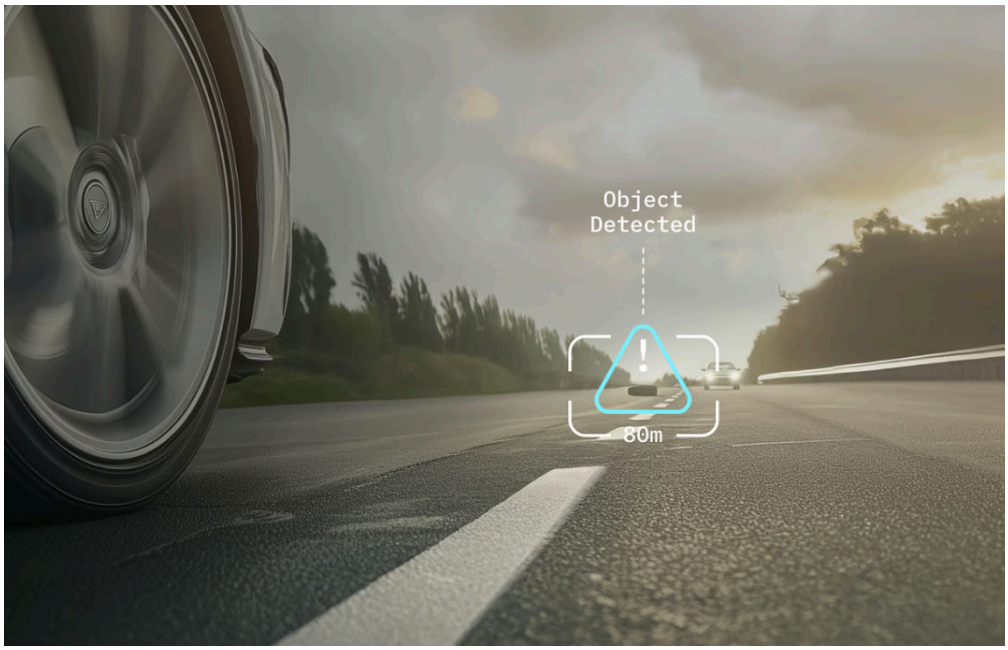
Brad: We design our perception stack to be camera-agnostic, allowing customers to Bring Your Own Cameras (BYOC). While we provide a fully integrated solution including automotive-grade cameras through our Hammerhead Development Kit (HDK 2.0), some customers integrate their own cameras with our software, providing flexibility across automotive, robotics, and infrastructure applications.

DVN: Which silicon partner did you develop your perception software with?

Brad: Our software is optimized to run on NVIDIA Orin AGX platforms, though we remain flexible to work with other customer-selected compute platforms as needed. This flexibility future-proofs deployments and supports a broad range of applications from automotive to industrial automation.

DVN: How accurate is the depth information at 1M, 10M and 100M?

Brad: At 1 meter our depth accuracy is within a few millimeters. At 10m we maintain centimeter level precision, and even at 150m our accuracy is typically within 0.2% of range — or just 30 centimeters. This level of precision is made possible by our online calibration algorithms and support for wide-baseline (distance between cameras) camera mounting. The farther apart the cameras are located, the better the accuracy and range. In practical terms, our software can reliably detect a 10 cm object at 150 meters or even an overturned motorcycle at 350 meters.



DVN: How far out can you identify an object like a palette lying on the freeway?

Brad: A standard NODAR system (5mp cameras, 1m baseline) can detect a 14cm wooden pallet at 200m. For larger or higher-contrast obstacles, such as vehicles, detection ranges can extend even further, while at closer ranges the system can detect much smaller objects. This long-range precision makes our solution ideal for safety-critical applications of autonomy requiring high-confidence object detection and longer ranges.

DVN: What sort of compute resources are required to run the perception stack?

Brad: The compute resources required depend on the requirements of the application. For instance, a high-speed autonomous vehicle traveling at 80mph will require more compute resources than a tractor traveling at 13mph. Resolution and frame rate are optimized given the ODD (operational design domain) and compute constraints of the target system. A full instance of the Hammerhead perception stack running at full resolution and frame rate outputs 50 million depth measurements per second utilizes a small portion of an NVIDIA Orin AGX. For applications needing lower resolution and/or framerate, NODAR supports lightweight configurations and can tailor solutions depending on performance requirements.

DVN: Has your software already been trialed by a major auto OEM or what are your plans to enter the automotive industry?

Brad: We are currently deploying the solution to production in several non-automotive environments. In the automotive sector, we are working with a select number of OEMs to support their L3 and automated parking initiatives. Unfortunately, in all cases we are bound by NDA's that prohibit mentioning customer names.

DVN: How does the latency to detect an object (e.g., stationary car in your lane) at 100M compare to imaging radar and lidar?

Brad: NODAR will take about 50-75ms to detect an object the size of a car at 100m, while lidar will take 100-200ms, and imaging radar 150-300ms. NODAR is processing 50 million depth measurements per second, while high resolution lidar is between 1-5 million measurements per second. A lidar must pass its laser across the scene many times before having enough points on the target to have confidence there is an object there, while nodar will detect the object in every frame. Most imaging radars will have difficulty with a stationary object as it will be filtered out as “clutter”. Like lidar, the radar will require multiple returns (tracking cycles) from an object as well as time for classification.

DVN: Versus a single forward-facing camera system, how does the cost/benefit of NODAR’s stereo solution compare?

Brad: Compared to a monocular camera system that uses AI to estimate where objects are based on training data, NODAR's stereo approach provides a physical measurement of true depth to any object, resulting in higher reliability and safety. While the monocular system has lower hardware cost with only 1 camera, it suffers in two important ways: 1) the mono camera can only estimate depth for objects and situations similar to those it has been trained on, often failing in edge-case scenarios, and 2) the neural networks are computationally intense and require decimation of the camera images, for example from 5 megapixels (2592 × 1944 pixels) down to 640x480 (VGA). In reducing image size, important data are lost and the images become “grainy”, making object identification more difficult.

In terms of system cost, the monocular camera system will typically require dedicated compute (GPU) to run its neural networks, while NODAR can share the car’s centralized GPU with other functions.

DVN: How does your auto-calibration work?

Brad: NODAR’s patented self-calibration system continuously calibrates stereo cameras in every frame, using image-based algorithms that detect and correct for sub-pixel misalignments caused by vibrations, thermal expansion, mechanical drift, or shocks. This real-time, software-only approach eliminates the need for external calibration targets or manual intervention, ensuring precise depth perception at long range, in low light, rain, or other challenging conditions. The result is highly robust, maintenance-free performance that remains stable across real-world automotive and industrial environments.

DVN: How does NODAR manage to overcome the mechanical limitations of stereo camera mounts in case of vibrations and heat deformations?

Brad: The range and precision of a stereo vision system are proportional to the distance between the cameras. By eliminating the mounts and placing the cameras wide apart, the range and precision are improved. NODAR overcomes the mechanical limitations of stereo camera mounts by allowing the cameras to be mounted independently and correcting for vibrations and shocks (like heat deformations) in software, on every frame. The NODAR online calibration system is so fast that it is able to compensate for vibrations from a cobblestone road or the engine of a class 8 truck in realtime, ensuring accurate depth measurements.

DVN: How does performance in bad weather compare to traditional camera-based systems?

Brad: In challenging conditions like rain, snow, and fog, NODAR's stereo depth maps outperform traditional monocular vision systems. Poor visibility means a reduction in valid visual data on which to perform measurements. Because monocular systems require that each camera image be reduced significantly in size to allow the neural networks to run fast enough, valuable visual data is lost, making already degraded images worse. In other words, using images already visually degraded by poor weather and then further degraded by the system to reduce resolution, makes object classification by traditional monocular systems in inclement weather challenging. In contrast, NODAR uses each high resolution image, with up to 8 megapixels per image to estimate depth and detect objects. While degradation caused by environmental conditions exists, sufficient data remains in each image for NODAR's algorithms to accurately perform its functions.

DVN: How does performance in bad weather compare to Lidar-based systems?

Brad: The performance of lidar systems degrades substantially in the presence of airborne particulates, such as rain drops, snow, fog, and dust. One reason for this dropoff in performance is that the photons must successfully pass through the cloud of particulates going to and from each object in the scene without being reflected, refracted, or absorbed by the particulates in the air.

NODAR is a passive sensor, meaning that it only receives photos from the scene the camera imagers are "looking" at. With the ability to receive 10x more photons than a lidar, and not being subject to the interference of outbound photons as lidar is, a nodar system performs 2-3x better than a lidar in the face of low visibility.

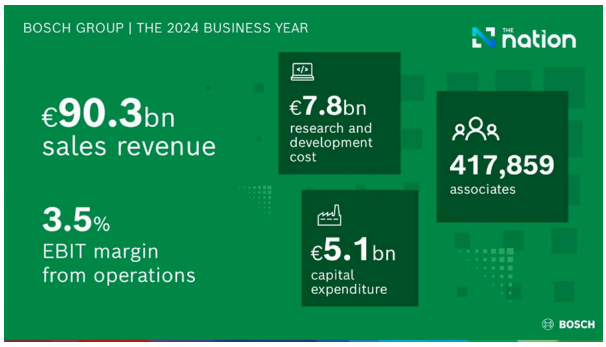
SENSING BUSINESS

Sensing Business News

ZF Aftermarket is revolutionizing the independent workshop industry with the ZF Smart Camera.
On May 22, ZF announced that his advanced technology, previously exclusive to original equipment manufacturers (OEMs), is now available for aftermarket use. It helps workshops service more vehicles with advanced driver assistance systems (ADAS) to meet rising demands. As the leading supplier of front cameras, ZF delivers over ten million units annually to 14 major automakers. With the increase in ADAS-equipped vehicles, demand for repair and maintenance will grow. The ZF Smart Camera empowers independent workshops to handle camera sensor replacements and repairs, supporting over 50 vehicle models from manufacturers like Stellantis Group and Nissan.

Continental Reaches 200 million Radar Milestone for Greater Safety and the Mobility of Tomorrow

On May 8, Continental announced the production of 200 million radar sensors. This figure represents the company's significant market share of over 20 percent in safety technology components for the automotive sector. It also indicates a trend in the development of advanced driver assistance systems (ADAS) toward automated and future autonomous driving. From 1999, when Continental's first generation of long-range radar was used in the Mercedes S-Class, to 2021, the company supplied 100 million radar systems. Four years later, the company reached the milestone of producing 200 million radar sensors.



Bosch relies on its strengths as a technology leader

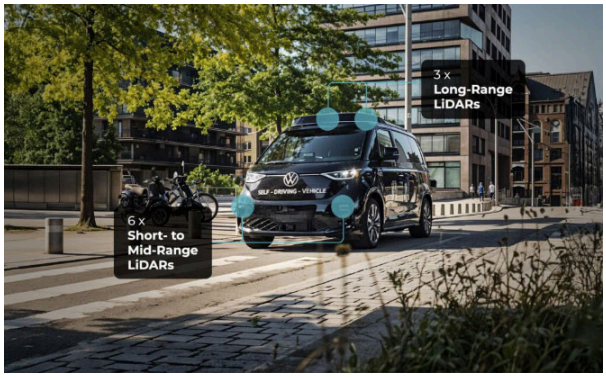
On May 8, the Bosch Group remains committed to its Strategy 2030 to enhance its competitive position, despite market challenges. In 2024, Bosch generated 90.3 billion euros in sales revenue, a 1.4 percent decrease from the previous year (or 0.5 percent after adjusting for exchange-rate effects). EBIT from operations was 3.1 billion euros (2023: 4.8 billion euros) with an EBIT margin of 3.5 percent. Stefan Hartung, chairman of Robert Bosch GmbH, stated: “In 2024, we made significant improvements in costs, structures, and portfolio. We aim to grow and maintain our financial independence, guided by our Strategy 2030, to become a top three provider in our core markets within five years.”

China Introduces Next-Generation Extended Range Electric Vehicles (EREVs) With an Impressive 870-Mile Range and Hesai LiDAR That Could Transform Autonomous Driving

On May 17, in an audacious bid to reclaim its competitive edge in the crowded electric vehicle market, Beijing-headquartered Li Auto has unveiled its 2025 lineup of revamped L-series EREVs, boasting cutting-edge LiDAR technology and enhanced performance features. In a rapidly evolving automotive industry, innovation is crucial to staying ahead of the competition. This mantra is exemplified by Beijing-headquartered Li Auto as they unveil their 2025 lineup of Extended Range Electric Vehicles (EREVs). The revamped L-series models—L6, L7, L8, and L9—showcase a host of upgrades, including a cutting-edge LiDAR sensor, improved suspension systems, and enhanced battery performance.

Aeva Partners with Global Tech Leader

On May 15, Aeva Technologies, Inc., known for advanced sensing systems, has partnered with a Global Fortune 500 technology affiliate. This collaboration integrates Aeva's 4D LiDAR into new markets and selects the affiliate as a Tier-2 manufacturer for a passenger OEM program. The partnership includes up to $50 million investment, giving the partner a 6% equity stake in Aeva. Using Aeva's FMCW technology, 4D LiDAR sensors detect instant velocity and 3D positioning, improving autonomous systems in vehicles, robotics, and consumer devices. This collaboration will boost next-gen sensing solutions with the partner's manufacturing expertise.

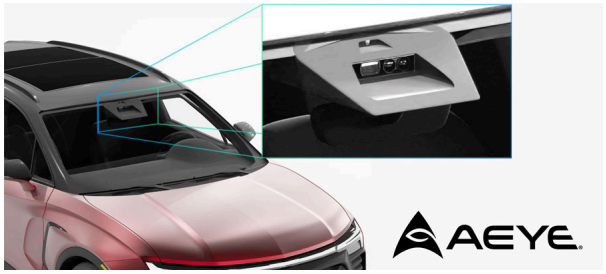


Innoviz Boosts VW's Autonomous Shuttle Tech

On May 13, Innoviz Technologies, has announced the expansion of its partnership with Volkswagen Autonomous Mobility. This collaboration aims to integrate InnovizTwo LiDAR units into Volkswagen's ID. Buzz AD, a Level 4 autonomous shuttle scheduled for release in 2025. The initiative seeks to streamline the deployment process and support MOIA's planned expansion into various European and U.S. cities beginning in 2026. This advancement builds upon previous successes where Innoviz's LiDAR technology was incorporated into Volkswagen's vehicles.

Hesai Powers Global Robotaxi Expansion

On May 9, Hesai, is growing globally through partnerships with robotaxi developers on Uber's platform. As the robotaxi industry moves to commercial deployment, Hesai's technology ensures safe and scalable autonomous driving. WeRide, partnering with Hesai, started operations in Abu Dhabi in late 2024 and expanded to Dubai, aiming to reach 15 cities across the Middle East and Europe over five years. Each WeRide robotaxi uses four of Hesai's lidar sensors. Pony.ai has made a strategic deal with Uber, launching its seventh-generation robotaxi fleet with Hesai's AT series lidars in the Middle East later this year, with further expansion planned.



AEye Starts Apollo Lidar Mass Production

On May 7, AEye has reached a significant milestone in collaboration with its partner, LITEON. The two companies have successfully initiated the production of the first Apollo lidar sensors at a new manufacturing facility located in Taipei, Taiwan. This advancement paves the way for large-scale manufacturing of the Apollo sensor, designed to enhance vehicle safety and performance through its superior detection capabilities. This production launch represents a notable achievement for AEye, demonstrating its capability to supply advanced lidar systems to automobile manufacturers.

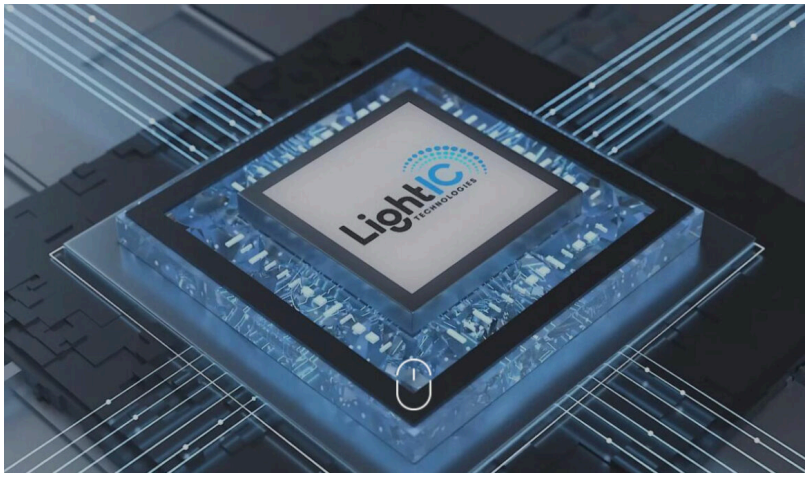
Ouster to Supply Lidar Sensors for Komatsu's Suite of Autonomous Offerings

Ouster will supply lidar sensors for Komatsu's autonomous mining equipment under a multimillion-dollar agreement. These advanced 3D digital sensors offer zone monitoring and firmware updates, enhancing performance and product development. "Ouster's products developed through this partnership can withstand the shock, vibration and temperature constraints while delivering the enhanced range and spatial awareness necessary to operate in harsh mining environments," said Matt Reiland, Technical Director, Automation Innovation at Komatsu.

LIDAR TECHNOLOGY

Lidar technologies News

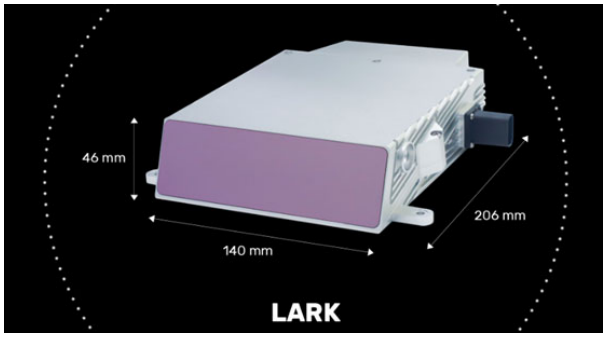
Enablence Technologies and LightIC to Deliver Next-Generation FMCW LiDAR Sensing Chips for Automotive, Robotics and Industrial



Enablence Technologies, a provider of planar lightwave circuit (PLC) optical chips and subsystems for applications in datacom, telecom, automotive, and artificial intelligence (AI), announced today a partnership to supply its PLC optics chips in LightIC's Frequency-Modulated Continuous-Wave (FMCW) Light Detection and Ranging (LiDAR) sensor products. Based in Silicon Valley, Calif., LightIC supplies FMCW LiDARs based on silicon photonics integration technology. Adoption of LightIC's FMCW LiDAR products is increasing as their long-range, direct velocity detection, precision, and interference immunity support advancements in automotive, robotics, and industrial automation.

Instead of emitting short pulses, FMCW LiDAR continuously emits a laser beam whose frequency is modulated. When the laser beam reflects off an object, the reflected light's frequency is shifted due to the object's motion (Doppler effect) and distance. The FMCW LiDAR system then compares the frequency of the reflected light with the frequency of the emitted light to determine the object's distance and velocity.

LARK, the LightIC's FMCW LiDAR, enables the highest-precision distance and velocity measurements on the market.



	LARK
Wavelength	905 nm
Distance range	230 m @ 10% albedo
Distance precision	0.03 m
H FOV	120°
H separation	0.1°
V FOV	25°
V separation	0.08°
Velocity range	-80 to 80 m/s
Velocity precision	0.05 m/s
Update rate	10 fps
Size (mm)	120 × 80 × 30
Connectivity	Eth 1GB/s

Unlike time-of-flight (ToF) LiDAR which needs to estimate velocity from changes in position, FMCW can directly measure the speed of an object using the Doppler effect. FMCW LiDAR is also less susceptible to light interference (such as sunlight) compared to ToF LiDAR because of its coherent detection. FMCW LiDAR signals also extend to longer ranges compared to ToF LiDAR.

The global FMCW LiDAR market is a rapidly growing market projected to surpass $15Billion by 2033 representing a CAGR of more than 20 percent during this period.

"Our collaboration with Enablence Technologies, a developer of optics chips, represents our combined strengths of innovation and commitment to providing value to our customers," said Dr. Sun, CEO of LightIC. "In automotive, industrial, and robotics fields, accuracy, precision, safety, and reliability are essential for ensuring customer success, and our FMCW LiDAR products meet these requirements for our expanding customer base in North America, Asia, and Europe."

LightIC's innovative FMCW LiDAR sensors are designed to meet the growing demand for a wide range of advanced industrial applications where high precision is critical to ensuring advanced automation. For example, automotives, robotics and industrial automation all require the most precise navigation and obstacle detection capabilities. In Robotics, enhanced operational reliability in dynamic environments is critical. Most importantly, in automotive, providing real-time, accurate velocity-awareness can be a matter of lifesaving.

"We are delighted to partner with LightIC, an innovator in the fast-growing FMCW LiDAR space," noted Todd Haugen, CEO of Enablence Technologies. "Combining Enablence's proven PLC optics technology with LightIC's silicon photonics integration technology allows for a superior FMCW LiDAR platform with best-in-class range, resolution and accuracy and the ability to achieve the highest performance in the most challenging environments," added Haugen.

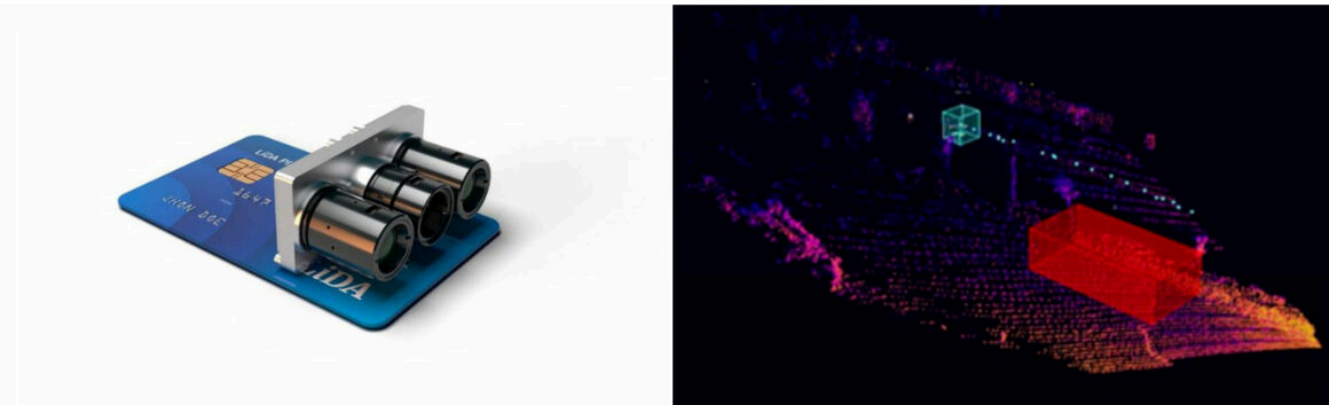
About Enablence Technologies

Enablence specializes in designing, marketing, and selling optical chips and subsystems, primarily in the form of planar lightwave circuits (PLC), on silicon-based chips for data communication, telecommunications, automotive, and artificial intelligence (AI) applications. Enablence products serve a global customer base, with a current focus on data centres and other rapidly growing markets. The company also collaborates with customers exploring emerging market uses for its technology, including medical devices, automotive LiDAR, and virtual and augmented reality headsets. In select strategic circumstances, Enablence utilizes its proprietary, non-captive fabrication plant in Fremont, California, to manufacture chips designed by third-party customers.

DVN comments

Founded in 2019, LightIC is headquartered in Santa Clara, California. The company's LiDAR chips and systems are developed and manufactured using its advanced, proprietary silicon photonics technology. LightIC continues to expand its presence in the USA, Europe, and Asia by securing top-tier strategic partnerships with both domestic and international automobile and industrial manufacturers.

Opsys unveils a new LiDAR sensor with integrated perception software



Last month, Opsys Technologies, the developer of the world's most advanced pure solid-state LiDAR, was proud to announce the launch of its latest innovation: a state-of-the-art LiDAR sensor that seamlessly combines their proprietary LiDAR technology with integrated perception software. This all-in-one solution is poised to revolutionize the space by providing unparalleled accuracy, efficiency, and ease of integration.

Traditionally, LiDAR systems and perception software have operated as separate entities, requiring complex integration processes that can be both time-consuming and costly. LiDAR and perception software are not always thought of as being on the same domain. Opsys' new offering eliminates this hurdle by delivering a unified system that not only captures 4D data but also interprets and analyzes the information in real-time all runing on the LiDAR unit. Opsys' system reports the events and other information that the user may want, which they can set themselves.

Key Benefits:

- Enhanced Performance: the integration of perception software directly within the LiDAR unit ensures faster processing and extremely accurate object detection, classification, and

tracking
- Cost Efficiency: by consolidating hardware and software into a single unit, companies can reduce expenses associated with procurement, integration, infrastructure and maintenance
- Simplified Integration: the all-in-one design streamlines the deployment process, allowing for quicker implementation across various platforms and applications.
- This solution is designed to be adaptable across various industries (e.g. security, robotics, smart cities, healthcare, and ITS), offering a versatile tool for numerous applications.

"We are committed to pushing the boundaries of what's possible in LiDAR technology," said Rafi Harel, CEO, Opsys. "By integrating perception software directly into our LiDAR units, we are providing our clients with a powerful, efficient, and cost-effective solution that meets the evolving needs of various industries."

For infrastructure supervision use cases the all-in-one Lidar is available in the ALTOS platform (Advanced LiDAR Technology Opsys Sensors) range (70/150/300m). The ALTOS platform makes the use of LiDAR possible in harsh environmental conditions. It operates with a wide temperature range: -30°C to +65°C, IP67 and allows 24/7 operation, as it has no moving parts, so there is no wear and tear over time. Along with a host of other benefits, it also supports PoE and is NDAA compliant. The ALTOS comes at an affordable cost for mass production and the LiDAR with integrated perception software is now available for order.

For automotive, trucking and Robotaxis, Opsys still proposes two types of Lidars:

- OPSENS 110, which is the first automotive-grade solution for mass production. It is built on a multiple base sensor architecture which allows for a customized field of view (FOV) for specific requirements. OPSENS 110 provides FOV coverage of 110° horizontal and 13° vertical. It includes two high resolution sensors in the center (22.5° horizontal at 0.1° x 0.1°) and two additional medium resolution sensors on each side (45° horizontal at 0.2° x 0.2°).
- OPSENS 140 which also offers a flexible angular resolution built on a multiple base sensor architecture. It provides FOV coverage of 140° horizontal and 22.5° vertical. OPSENS 140 includes two high resolution sensors in the center (22.5° horizontal at 0.1° x 0.1°) and two low resolution sensors (80° horizontal at 0.4°x 0.4° with overlap to get 140° in total).

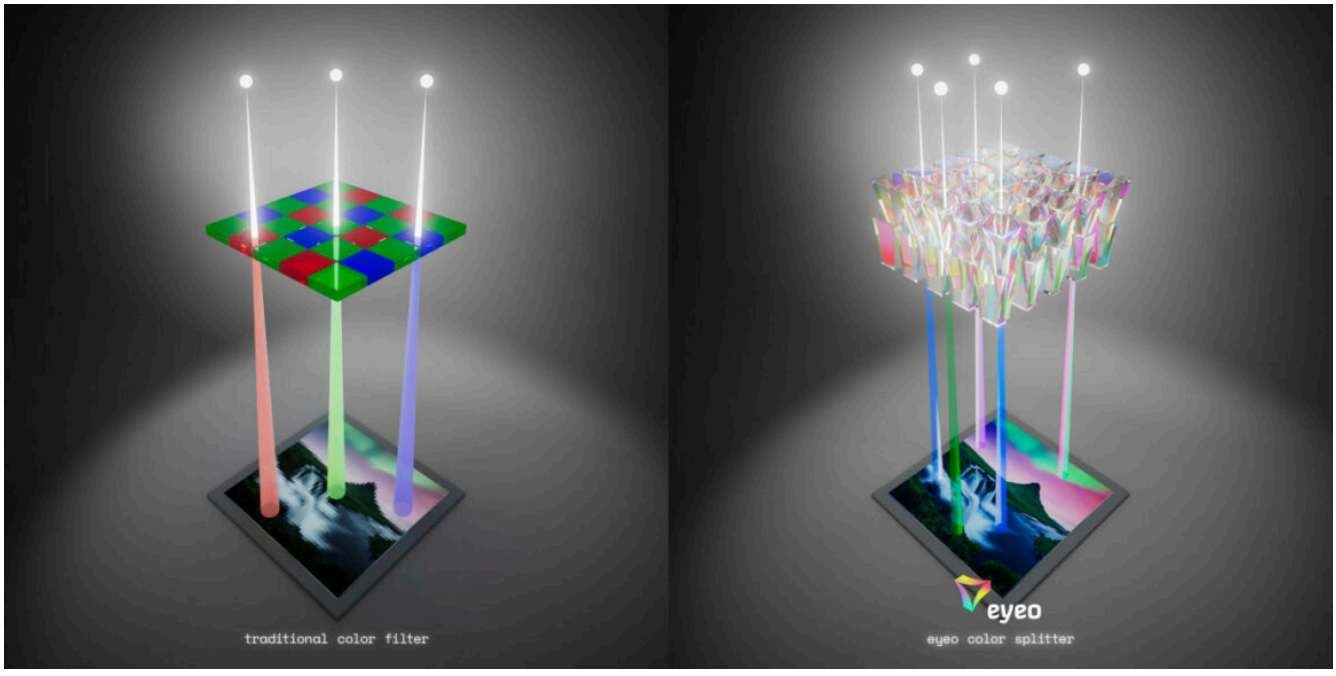
DVN comments

Since 2023, Opsys have been working with the Wideye product line of Japanese glass specialist AGC on integrating the Lidar sensors in a module behind the windshield and aimed to achieve series production readiness by 2024. They see the position in the area of the interior mirror as ideal for capturing the vehicle's forward field and expect synergy effects from integrating multiple sensor technologies into a compact cluster.

CAMERA TECHNOLOGY

Camera technologies News

Eyeo, a new imec spin-off, raises €15 million seed round to give cameras perfect eyesight



On May 7, 2025, eyeo, a new imec spin-off, announced it has raised €15 million in seed funding, co-led by imec.xpand and Invest-NL, and joined by QBIC fund, High-Tech Gründerfonds (HTGF), and Brabant Development Agency (BOM).

Eyeo aims to enhance the imaging market for consumer, industrial, XR, and security applications by increasing the light sensitivity of image sensors. This development is intended to improve picture quality, color accuracy, resolution, and cost efficiency in smartphones and other devices. The €15 million raised will support evaluation kit development, preparation for scale manufacturing of an initial sensor product, and expansion of commercial partnerships to bring this imaging technology to market.

Decades-old color filter technology throws away 70% of light, crippling sensor performance

For decades, image sensors have utilized red, green, and blue color filters on pixels to produce color images or videos. However, color filters obstruct a significant amount of incoming light, which limits the sensitivity of the camera. Additionally, they restrict the scaling of pixel size below approximately 0.5 microns. These issues have hindered advancements in camera technology, affecting both image quality and sensor efficiency. In smartphone cameras, manufacturers have addressed this limitation by increasing the sensor size to capture more light, which enhances low-light performance but also results in larger cameras. Compact, high-sensitivity image sensors are important for slimmer smartphones and new applications such as robotics and AR/VR devices, where size, power efficiency, and image quality are important.

Color-splitting via vertical waveguides

Eyeo has developed an innovative image sensor that removes the need for traditional color filters, enhancing sensitivity without increasing the sensor size. Using vertical waveguide-based technology to divide light into colors, these sensors capture all incoming light, tripling sensitivity. This is particularly useful in low-light conditions. Unlike traditional filters, Eyeo's technology allows pixels to receive full-color data, doubling resolution and producing sharper images for precise applications like computational photography, machine vision, and spatial computing.

Jeroen Hoet, CEO of eyeo: "Eyeo is fundamentally redefining image sensing by eliminating decades-old limitations. Capturing all incoming light and drastically improving resolution is just the start—this technology paves the way for entirely new applications in imaging, from ultra-compact sensors to enhanced low-light performance, ultra-high resolution, and maximum image quality. We're not just improving existing systems; we're creating a new standard for the future of imaging."

Market Readiness and Roadmap

Eyeo has already formed strategic partnerships with leading image sensor manufacturers and foundries to support the successful commercialization of its technology. The €15 million seed funding will be allocated to further enhance the current camera sensor designs, optimize the waveguide technology for scalable production, and accelerate the development of prototypes for evaluation purposes. By collaborating closely with industry leaders, Eyeo aims to introduce its advanced camera sensors to a broad spectrum of applications, including smartphones, VR glasses, and other compact devices utilizing color cameras. The first evaluation kits are projected to be available for selected customers within the next two years.

About eyeo

Eyeo, based in Eindhoven (NL) and Leuven (BE), is revolutionizing imaging with nanophotonic color-splitting technology. This innovation allows image sensors to capture 100% of incoming light, surpassing the 30% limit of traditional color filters. By guiding photons directly to pixels, Eyeo ensures full light sensitivity and true color fidelity, even in tough conditions. Compatible with any CMOS sensor, this technology also breaks resolution barriers, enabling sub-0.5-micron pixels for high-quality imaging in XR, industrial, security, and mobile applications.

About imec

Imec is a leading research center in nanoelectronics and digital technologies. With a team of over 6,000 employees, it specializes in semiconductor scaling, silicon photonics, AI, beyond 5G communications, and sensing technologies. Imec collaborates with industry leaders, tech companies, academia, and knowledge centers globally. Headquartered in Leuven, Belgium, it has sites in Belgium, the Netherlands, the UK, the USA, and representation across three continents. In 2024, imec's revenue totaled 1.034 billion euros.

DVN comments

imec says that the technology is poised to elevate high-end camera performance, delivering higher signal-to-noise ratio, enhanced colour quality with unprecedented spatial resolution. Designing next-generation CMOS imagers requires striking a balance between collecting all incoming photons, achieving a resolution down to photon size or diffraction limit, and accurately recording the light colour.

onsemi Hyperlux Sensors Selected for Subaru's Next-Generation AI-Integrated EyeSight System

onsemi announced recently it will be the primary supplier of image sensors for Subaru's next-generation EyeSight stereo-camera front sensing system in future vehicle models. onsemi's advanced Hyperlux AR0823AT image sensor will serve as the "eyes" of the system, tailored to capture the critical visual data required to feed into Subaru's stereo-camera enabled artificial intelligence algorithm that will allow the car to make more accurate driving decisions and improve overall vehicle safety.

“Capturing precise and reliable visual data is paramount to the success of AI-enabled driver assistance systems and significantly improves overall vehicle safety,” said Hassane El-Khoury, president and CEO, onsemi. “The combination of high-performance imaging and compliance with key safety standards in onsemi’s Hyperlux image sensors will ensure Subaru’s next-generation system can interpret the driving environment and make accurate driving decisions.”

The Hyperlux AR0823AT features a whole pixel design, capturing clear images regardless of lighting conditions, and includes special controls to ensure the two sensors of the EyeSight stereo-camera capture images synchronously. This is essential for stereo vision systems that mimic human vision and enables the system to discern depth as well as the relative size and distance of objects in the vehicle’s path. Additionally, the sensor’s High Dynamic Range (HDR) allows for both brightly lit and shadowed areas of a scene to be captured in detail to ensure that the AI-enabled system can make accurate decisions.

“Subaru is committed to achieving the goal of ‘zero fatal road accidents in 2030*.’ We regard onsemi, a market leader in automotive image sensing technology, as a partner who shares our vision and dedication in pursuing safety, and we look forward to accelerating our collaborative efforts while leveraging our respective strengths,” said Eiji Shibata, executive officer and chief digital car officer (CDCO), Subaru Corporation. “To realize our vision, we will continue to enhance the performance of our next-generation AI-integrated EyeSight through the use of advanced image sensors such as the AR0823AT.”

The Hyperlux AR0823AT is also equipped with functional safety features that meet Automotive Safety Integrity Level (ASIL) C standards, to uphold the safety and reliability of the driver assistance system. These features actively monitor the sensor’s functionality, and, if an issue is detected that could compromise the system’s accuracy, they can enable actions such as resetting the camera or alerting the driver.

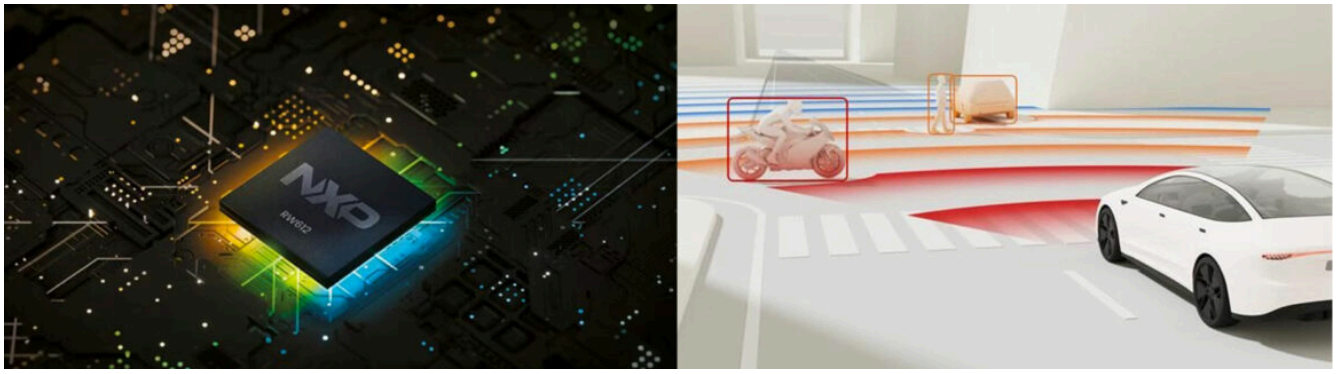
DVN comments

onsemi's Hyperlux AR0823AT image sensors chosen for Subaru's new AI-integrated EyeSight system highlight the importance of advanced imaging technology in automotive safety. Investments in tailored imaging solutions like the Hyperlux AR0823AT offer a competitive advantage as vehicles increasingly rely on AI-driven features.

RADAR TECHNOLOGY

Radar technologies News

NXP unveils third-generation imaging radar processors



NXP Semiconductors has introduced its third-generation S32R47 imaging radar processor using 16nm FinFET technology, offering up to twice the processing performance in the radar MPU and a 38% smaller IC footprint than the previous generation. It includes AI/ML support for features such as enhanced direction of arrival (DoA) processing and object classification.

Combined with NXP's mmWave radar transceivers, power management, and in-vehicle networking solutions, the S32R47 family meets functional safety ASIL ISO 26262 ASIL B(D) requirements.

Imaging radar uses richer point cloud data for more detailed modelling of the environment, which is important for AI-based perception systems that support assisted and autonomous driving.

The S32R47 incorporates a high-performance multicore radar processing system, allowing denser point cloud output and improved algorithms for next-generation ADAS systems. This helps to better distinguish objects, enhance detection reliability, and accurately classify objects such as vulnerable road users or lost cargo.

According to Yole Intelligence's Status of the Radar Industry 2024 report, by 2029, approximately 40% of vehicles on the road will be passenger cars with Level 2+ (L2+)/Level 3 (L3) driving automation, with an increasing number of vehicles reaching Level 4 (L4).

“The S32R47 can efficiently process three times or more antenna channels in real-time compared to current production solutions,” said Meindert van den Beld, senior vice president and general manager for radar and ADAS at NXP. “It enables improved imaging radar resolution, sensitivity, and dynamic range, which are essential for demanding autonomous driving use cases, while still meeting the stringent power and system cost targets set by OEMs for volume production.”

DVN comments

NXP provides a portfolio of integrated, secure product families of MMICs, processors and SoCs that address safety requirements and support autonomous driving levels 2+ and beyond. System designers require a scalable, streamlined and integrated processing platform that balances compute agility and power efficiency for radar sensor solutions.

At Auto Shanghai 2025 Multiple Popular Car Models with Calterah Radar Chips Inside for Safer and More Reliable ADAS

Some popular car models with ADAS, such as the BYD models with "God’s Eye C", AITO models, NIO ET9, Deepal S09, Zeekr 001, etc., have Calterah mmWave SoCs inside their radar systems. Such chips and solutions from Calterah are helping automotive OEMs achieve safer and more reliable ADAS functions.

Advanced Driver Assistance Systems (ADAS) use sensors like radar, cameras, LiDAR, and algorithms to monitor the environment and improve driving safety and comfort. As cars become smarter, mmWave radar is becoming crucial in ADAS. Major Chinese car manufacturers have introduced their ADAS solutions: BYD's God's Eye and Changan's Dubhe Plan 2.0 use 5 radars, while Geely's G-Pilot and Chery's Falcon systems use 3 to 5 radars, increasing demand for mmWave radar chips. By the end of Q3 2024, Calterah's radar shipments surpassed 10 million units.

Calterah has innovated by integrating GaAs/SiGe MMICs and MCUs into a single SoC with Baseband Accelerator (BBA) for radar signal processing, reducing system complexity and costs. They have also produced the first 77 GHz and 60 GHz mmWave radar SoCs with Antenna in Package (AiP), decreasing size, power consumption, and costs. These advances expand applications for short-range radar in vehicles, including door radar, Automatic Parking Assist (APA) radar, and in-cabin radar.

Building on the results of disruptive innovations, Calterah has achieved technological upgrades and improved product performances via continuous innovations:

- Proprietary Radar Signal Processor (RSP) offers an upgraded architecture compared against the BBA, significantly enhancing the flexibility and processing performance of SoC systems;
- Innovative Flex-Cascading® technology, applied in the CAL77C844-AR device from Calterah's Andes family of radar SoCs, achieves imaging radar via cascading two chips and simplifies the BOM, providing strong hardware support for advanced intelligent driving-assistance systems;
- Calterah's leading-edge and most innovative Radiator on Package (RoP®) technology provides mmWave signal interfaces, namely the radiators, and enhances the ESD robustness, offering better solutions for connecting waveguide antennas. Calterah's Alps-Pro SoC and Andes SoCs with RoP®, working waveguide antenna systems, can greatly improve radar detection performances and angular resolution.

With the global average number of mmWave radar per vehicle reaching 3, mmWave radar will continue to support automotive active safety by providing reliable environmental sensing for safe driving. Calterah's mmWave radar SoC solutions offer performance and cost benefits, enabling large-scale applications of ADAS and delivering driving-assistance experiences to more users.

About Calterah:

Established in 2014, Calterah Semiconductor Technology Co., Ltd. (hereinafter referred to as "Calterah") is a global leader in designing and developing CMOS single-chip millimeter-wave (mmWave) radar sensors.

Calterah in 2017 mass-produced the world's first CMOS 77/79 GHz mmWave radar transceiver for automotive use, pioneering in breaking into the automotive OEM market.

In 2019, Calterah took the lead again to launch SoC products with radar signal processing baseband, fully innovating the development and implementation of mmWave radar sensors that are easier to use and more compact with strong performance. Furthermore, Calterah also mass-produced the world's first 77 GHz and 60 GHz mmWave radar Antenna-in-Package (AiP) SoCs, accelerating the wide applications of mmWave radar in the automotive, industrial, and consumer electronics markets.

DVN comments

Since 2024, Calterah has also established its first overseas office in Munich, Germany, to provide localized support for European Tier-1 automotive customers and further expand into the European market.

SENSING INTEGRATION & STRATEGY

Sensing Architectures / Integration News

Lidar Lasers can fry Smartphone Camera Sensor

Recently, a Volvo showroom's visitor shared the video on the r/Volvo subreddit showing permanent damage to his iPhone 16 Pro Max after filming the lidar sensor on a Volvo EX90.

As this visitor filmed the car, colourful specks started appearing on the screen. These artifacts indicate physical damage to the phone's telephoto lens sensor.

The Volvo EX90 is equipped with a roof-mounted lidar sensor that emits high-powered infrared laser beams to map the vehicle's surroundings. These beams are invisible to the human eye but can be highly disruptive — or even destructive — to image sensors in cameras.

Volvo has acknowledged the risk. A warning on its website advises: "Do not point a camera directly at the lidar. The lidar, being a laser-based system, uses infrared light waves that may cause damage to certain camera devices. This can include smartphones or phones equipped with a camera."

Volvo added that, “Using filters or protective covers on the camera lens can help reduce the impact of lidar exposure. Some cameras are designed with built-in protections against high-intensity light sources.”

It must be noted that the risk isn’t exclusive to Volvo’s system. “It should be said that the risk here is inherent to lidar technology and has nothing to do with Volvo’s specific implementation on the EX90,” reports the car-focused news website.

The lidar system is used for autonomous features, and there is ongoing debate in the automotive industry over which system is best for self-driving purposes: lidar or cameras. Tesla relies solely on cameras, and Elon Musk has criticized lidar as “a crutch.”

While lidar systems used in vehicles are eye-safe due to the use of longer wavelength infrared light — typically around 1550nm — camera sensors remain vulnerable. That wavelength allows for higher power output, which extends the range but increases the potential to damage sensitive imaging hardware.

Online commenters point out that damage appears to occur primarily when the phone switches to a telephoto lens, which uses a different sensor more susceptible to laser interference. In this typical case, the phone’s wide-angle camera showed no signs of harm.

DVN comments

Recent studies on 1550nm laser effects on ADAS cameras have provided valuable insights into damage mechanisms. This data can guide camera and windscreen design, enhancing autonomous driving technology by adding a low-transmittance infrared filter in the 1550 nm band before CIS to block infrared light.

Hesai Leads Development of China’s First National Automotive Lidar Standard

GB/T 45500-2025, titled "Performance Requirements and Test Methods for Automotive Lidar," is a newly established national standard in China that has officially come into effect. Hesai Group, a global leader in lidar technology for automotive mobility and robotic applications, served as the lead drafting organization. This initiative involved collaboration with over 50 leading lidar manufacturers and automotive OEMs over a span of three years.

The new standard establishes unified testing methodologies and performance benchmarks for automotive lidar systems, including ranging accuracy, angular resolution, anti-interference measures, and environmental durability. These guidelines are designed to support the safe and scalable deployment of advanced driver-assistance systems (ADAS) and autonomous vehicles.

Advancing Global Standardization

Hesai leads in international lidar standardization. In September 2024, ANSI adopted ANSI/UL 4740, a lidar safety and performance standard initiated by Hesai, developed with Intel, Bosch, and Continental. These standard address functional safety, cybersecurity, and electromechanical integrity.

Hesai is also active in ISO standards, heading the working group for ISO/PWI 13228 on automotive lidar test methods with participation from 13 countries' experts.

Notably, Hesai is the only lidar company to present peer-reviewed papers at the 2025 International Laser Safety Conference (ILSC), underscoring its leadership in laser safety research.

Commitment to Industry-Wide Impact

The issuance of GB/T 45500-2025 marks the beginning of a new phase characterized by standardized and high-quality advancements within the automotive lidar sector. Hesai remains committed to working in conjunction with international standard-setting organizations to advocate for safer, more reliable, and broadly applicable lidar technologies.

UNECE approves deployment of L2+ Systems, Implementation in European States can start

The **United Nations Economic Commission for Europe** (**ECE** or **UNECE**) is an intergovernmental organization or a specialized body of the United Nations. The UNECE is one of five regional commissions under the jurisdiction of the United Nations Economic and Social Council. It was established in 1947 in order to promote economic cooperation and integration among its member states. The commission is composed of 56 member states, most of which are based in Europe, as well as a few outside Europe.
Its transcontinental Eurasian or non-EU member states include Armenia , Azerbaijan , Canada , Cyprus, Georgia , Israel , Kazakhstan , Kyrgyzstan , the Russian Federation , Tajikistan , Turkey , Turkmenistan , the United States of America and Uzbekistan.]

UNECE recently made a major decision regarding the "System-Initiated Manoeuvres" of autonomous vehicles. These manoeuvres, long considered too risky to be authorised in Europe, will finally be able to be implemented on the continent's motorways from the start of the school year. This follows the UNECE regulation implemented in September 2024 (see extract at the bottom). This breakthrough marks a significant turning point in the evolution of autonomous driving, paving the way for significant technological and legislative changes for the L2+ systems in Europe.

States have the final say

Although the UNECE has endorsed autonomous driving in Europe, this progress will not come without conditions. Each Member State of the European Union retains the right to oppose this decision. They can object and delay the implementation of the autonomous technology for as long as they deem it necessary. This possibility of opposition ensures that each country can consider its own security and infrastructure concerns. The development of autonomous driving represents a major opportunity for car manufacturers, especially for Tesla, which is at the forefront of this technology. However, some point out that the use of cameras, as Tesla does, could pose security problems compared to Lidar sensors, which are said to be more reliable.

From September 26, all Tesla users in Europe who have subscribed to the FSD option will be able to experience autonomous driving on the highway. However, they will still need to supervise the actions of the on-board computer and remain vigilant, as they remain responsible in the event of a failure. This raises important questions about accountability and trust in autonomous systems, a debate that will likely continue to evolve over time.

As Europe prepares to welcome increasingly autonomous cars on its roads, many questions remain. How will governments manage this technological transition? Are drivers ready to embrace these innovations? These questions underscore the importance of ongoing dialogue between regulators, manufacturers and the public to ensure that autonomous driving is not only possible, but also accepted and safe for all.

Announcement of DCAS regulation adopted by UNECE

8 January 2025

A new United Nations Regulation on Driver Control Assistance Systems (DCAS) adopted by the United Nations Economic Commission for Europe (UNECE) World Forum for the Harmonization of Vehicle Regulations (WP.29) in March 2024, entered into force at the end of September 2024. The regulation ensures improved safety and performance for driver assistance systems.

The Regulation describes DCAS as systems that assist the driver in controlling the longitudinal and lateral motion of the vehicle on a sustained basis while not taking over the entire driving task. DCAS are categorised as Automated Driving Systems corresponding to SAE Level 2. This means that while using such systems, the driver retains responsibility for the control of the vehicle and must, therefore, permanently monitor the surroundings as well as the vehicle/system's performance to be able to intervene if needed.

The Regulation specifies DCAS' safety and performance requirements. Effective warning strategies are mandated if a lack of driver engagement is detected to ensure that drivers remain available and engaged.

The regulation also requires vehicle manufacturers to proactively communicate to users via all available means, including online, in advertising, and at dealerships when purchasing a vehicle, about the limitations of DCAS and drivers' responsibility when using the systems, in order to address drivers' potential overreliance on some assistance systems

The adoption of the Regulation enhances safety, unlocks innovation to develop next-generation assistance technologies, and helps to harmonise standards that support European manufacturers in reaching global markets efficiently.

EVENT

Next DVN Sensing & Application events

We are starting the promotion of the 8th DVN Automotive Lidar & ADAS event, which will take place in Wiesbaden on 19 - 20 November, 2025. The theme is Emerging Markets: L^{2+}, L^{3}, and Robotaxis. Here's the preliminary docket:

SESSIONS - DAY1 (Applications + Vision,Radar, AI Perception SW)	
Key-notes	
1	Applications (part1): L2+,L3 and Robotaxis => incl. OEMs
2	Applications (part2): L2+ & beyond - Market, Regulation, Safety
Deep Dive	*L2+ Test Report: NOA Systems in CN*
3	Vision systems for L2+,L3 applications
4	Radar & Fusion for L2+,L3 applications
5	AI & Perception Software
6	Validation & Simulation

SESSIONS - DAY2 (New technologies + Sensor Integ. & Manufacturing)	
Key-notes	
7	Sensors & Car Integration => incl. OEMs
8	Sensors Manufacturing & Testing
Deep Dive	*New Technologies: Localization & Mapping*
9	New technologies (part1): IR & Gated Cameras
10	New Technologies (part2): Lidar incl. FMCW
11	New Technologies (part3): Components

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