DVN

Sensing & Applications

Monthly newsletter #4.1

APRIL 2, 2025
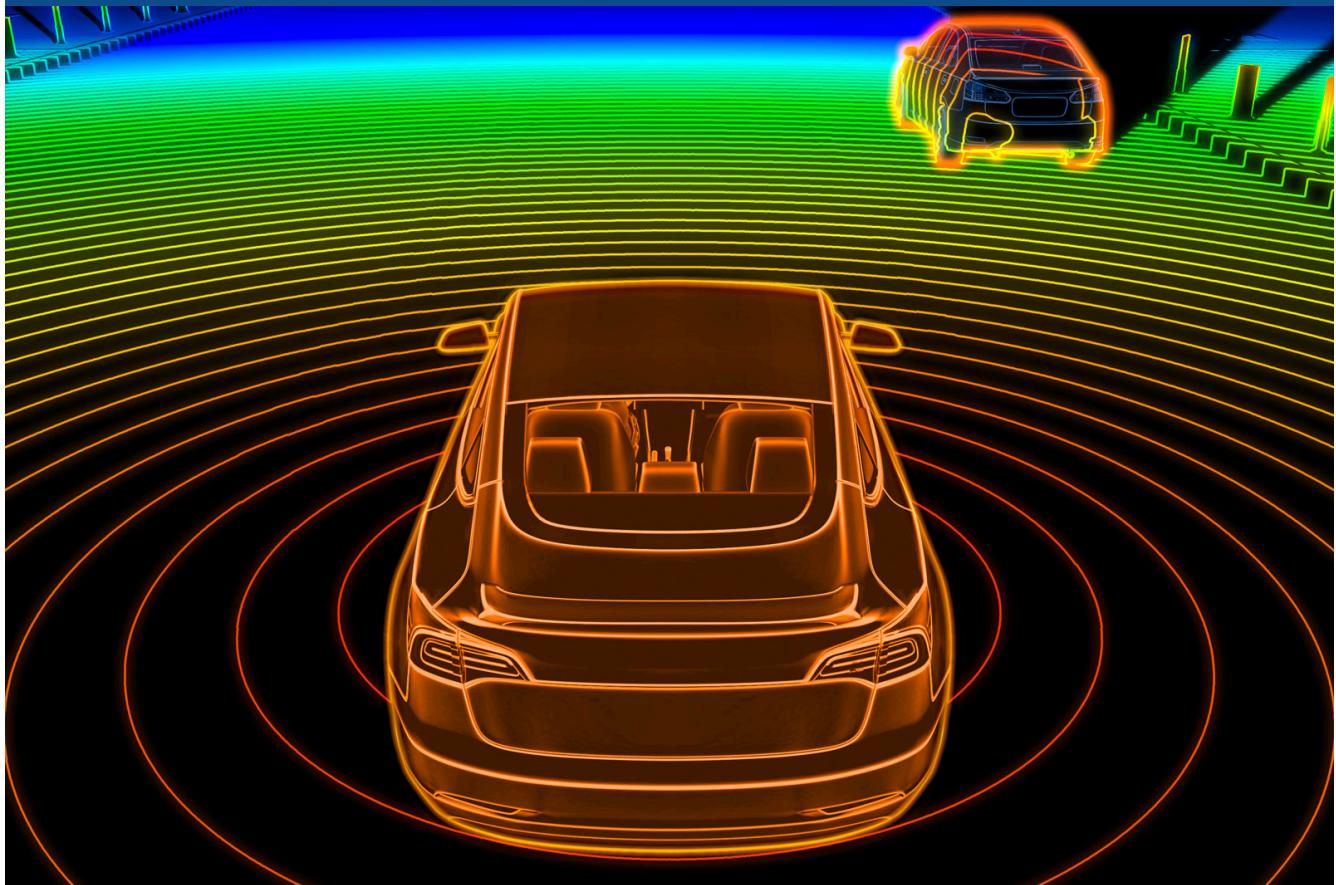
DVN Sensing Newsletter – April 2025: DVN Sensing & Applications Will Soon Be Members-Only

DVN Lidar became DVN Sensing & Applications in January 2025. For the introductory four months, the new DVNSA Newsletter was open to the DVN community or based on a simple registration on web-site. This will change from May 2025; only members will receive the in-depth newsletters. A three-month free trial will be offered to newcomers. So: if you haven't already done so, now's the time to **sign up** for your full membership or to contact us.

In this edition of your DVNSA Newsletter, we bring you coverage of L^{2+} applications, becoming popular with European automakers as we can see with the cooperation of VW with Valeo and Mobileye. As expected, European brands have to catch up with the NOA applications which are now popular for EVs in China, with installation rates exceeding 40 per cent.

We also bring you news of lidar business growth at Hesai, who sold over half a million units in 2024, and an interview with Obsidian about their innovative low-cost technology for IR cameras.

Forthcoming DVN Events
• AEB Workshop · FMVSS 127 (Detroit, 9-10 April)
• EAC Lidar Tech Expo (Hangzhou, 4-6 June), co-hosted by DVN
• 8th ADAS Sensing Conference · L^{2+}/NOA applications (Wiesbaden, 19-20 September)

We're ever so glad you're here with us in the DVNSA community.
Enjoy this newsletter!
All best,

Alain Servel

DVN-ADAS Sensing adviser

Special Report: Mercedes-Benz Drive Pilot Levels Up to SAE L3

DVN CEO Paul-Henri Matha conducted a test of the Mercedes-Benz S-Class equipped with L^3 Drive Pilot on the motorway between Sindelfingen and Mercedes' Immendingen test site. Recently, the German Federal Motor Transport Authority approved an increase in its top speed to 95 km/h.

History of Drive Pilot

In December 2021, Mercedes-Benz became the world's first car company to meet the requirements of UN R157 for an L^3 system enabling conditionally automated driving. Mercedes-Benz initially offered Drive Pilot in Germany, where 13,191 kilometers of motorway had been approved for conditionally automated driving.

Drive Pilot has been available on E- and S-Class cars in Germany since May 2022. Meanwhile, Mercedes-Benz has also received world-first approval in the U.S. states of California and Nevada, and Drive Pilot has been offered as an option on E-and S-Class cars in the US since model year 2024. The L^3 functionality is operable in Germany, France, Nevada, and California. Local laws have not yet been adjusted to allow it in other European countries or US states. And only testing is possible in China for the moment.

Functional Description of Drive Pilot

Drive Pilot permits the vehicle to take over the dynamic driving task under certain conditions in heavy traffic or congestion situations on suitable sections of freeway. At first, it was operable up to 60 km/h. This gives customers back precious time when they're in the car, so they can relax or be productive instead of battling traffic. For instance, they can communicate with work colleagues via in-car office tools, write messages and emails via the head unit, browse the internet, or just sit back, relax, and watch a movie.

L^3 conditional automated driving features present the unique challenge of managing the interaction between the automated driving feature and the driver/fallback-ready user, which is foundational to the design of Mercedes-Benz's system. Three principles that are key to managing this interaction are:

- After engaging Drive Pilot, the fallback-ready user can resume manual driving at any time by steering, braking, accelerating, or manually switching the feature off.
- While the Drive Pilot feature is engaged, it continuously monitors the fallback-ready user's ability to resume driving when requested (they aren't allowed to sleep, leave the driver's seat, etc.).
- After issuing a request for the fallback-ready user to resume driving, Drive Pilot continues safely operating the vehicle until the person resumes driving, or, if they fail to do so, it brings the vehicle automatically to a controlled stop while turning on the hazard warning lamps. The system will not rely on the fallback-ready user to manage an urgent and hazardous situation. Instead, it will continue to operate the vehicle until the fallback-ready user is able to resume driving or the vehicle is brought to a controlled stop.

Availability and Fade In

The Mercedes-Benz Drive Pilot operates only within its operational design domain (ODD), which includes medium to dense traffic on fully access-controlled highways in fair weather. It won't engage outside these conditions, even if the driver tries to activate it.

When entering a highway, Drive Pilot signals its availability. The driver can enable it, and the system will adjust the vehicle's parameters to enter conditional automated driving mode. This adjustment period is called 'fade In'.

L^3 Conditional Automated Driving

In conditional automated driving, the person who was driving becomes a fallback-ready user and may use the multimedia system for communication, productivity, or entertainment. Drive Pilot monitors the user's readiness to resume driving and prohibits behaviours like sleeping that can delay takeover. If detected, warnings are issued, and if ignored, the system will stop the vehicle and put on the hazard lights. If the driver remains unresponsive, Drive Pilot will secure the vehicle, call for emergency aid, and unlock the doors.

Unavailability and Failure Mitigation

When Drive Pilot senses that it will be unable to continue operating the vehicle (whether due to exiting its ODD or a malfunction), it will prompt the fallback-ready user to resume driving and provide time for him or her to do so in an orderly manner. In the event the fallback-ready user is unable or unwilling to resume driving, Drive Pilot will bring the vehicle to a controlled stop and activates the hazard lamps. During this failure mitigation sequence, and even in the event of a malfunction, Drive Pilot will continue to safely operate the vehicle, including making emergency manoeuvres as needed, until the vehicle is brought to a controlled stop.

ODD (operational design domain) of Drive Pilot

The operational design domain (ODD) consists of the geographical area and conditions under which an automated driving system like Drive Pilot is intended to be operational. These conditions include weather, traffic, lighting, and road types.

Currently, Drive Pilot's ODD is confined to fully access-controlled highways, commonly known as freeways or motorways, up to a specified maximum speed. A fully access-controlled highway is defined as a divided highway with at least two lanes of traffic in each direction and no intersections – only on-ramps and off-ramps.
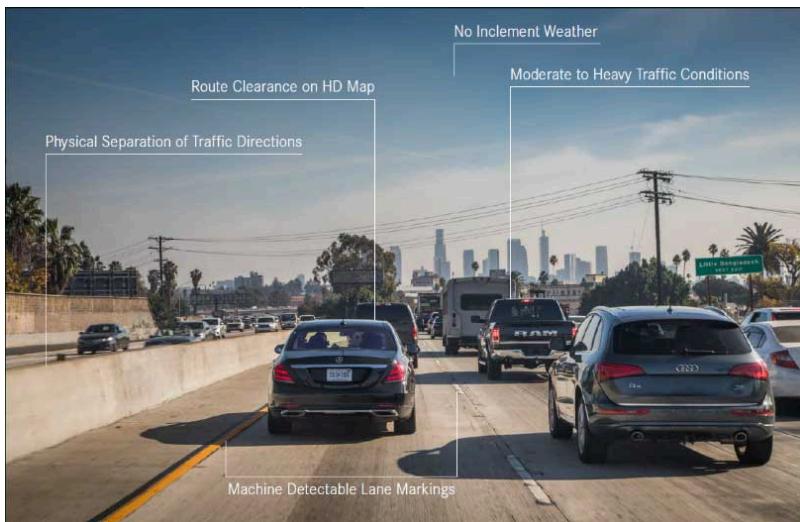
Drive Pilot's ODD is also limited based on the presence or absence of certain road features and conditions, such as:

- Machine-detectable Lane markings
- Absence of tunnels, toll booths, and traffic control devices (stop signs, traffic lights, etc.)
- Compliance with legal requirements

These ODD boundaries are defined within a high-definition map, forming a geofence for Drive Pilot's area of operation. The feature will not function, nor allow driver engagement, outside these boundaries.

Mercedes-Benz implements a robust solution with two independent positioning methods to secure the geofence. There's a high-precision satellite positioning system which uses live correction data to mitigate satellite and transmission errors affecting conventional navigation systems' accuracy and integrity. And various objects like signs, poles, and guardrails are stored in the high-definition map. Their expected locations are continuously compared to their real counterparts detected by the vehicle's sensors, ensuring reliable positioning.

Transient conditions can further restrict the ODD. Examples include inclement weather—heavy rain, snowstorms, heavy fog—and adverse traffic conditions, such as temporary construction sites. Dedicated sensors detect these conditions by monitoring the performance of the vehicle's sensors to ascertain if environmental factors affect Drive Pilot's perception of its surroundings.

If ambient conditions prevent Drive Pilot from accurately perceiving its environment or operating safely due to conditions like icy roads, activation of the Drive Pilot feature is denied. If already activated, the system requests the fallback-ready user to resume driving as presented below.

Mercedes-Benz aims to expand Drive Pilot's ODD continually as technological advancements allow. Alterations to the ODD may be necessary in response to evolving laws or regulatory requirements. The goal is for Drive Pilot to operate in numerous geographical areas, under varied environmental conditions, and at any time.

Drive Pilot's sensing system
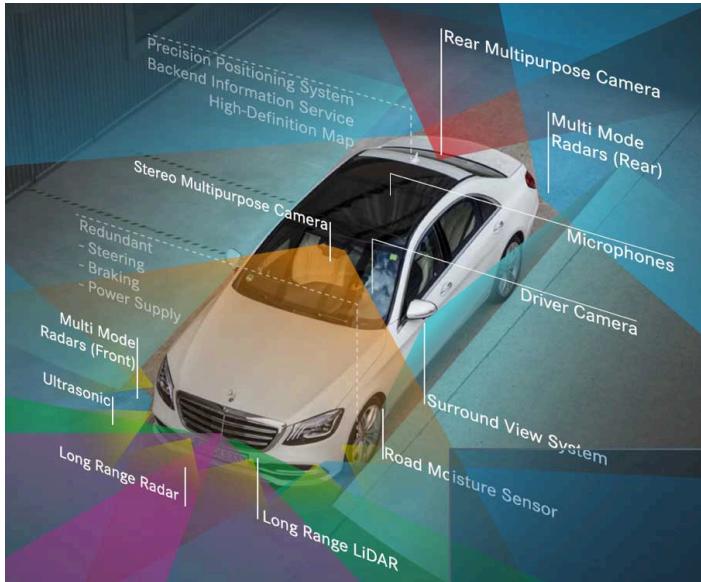
Mercedes-Benz Drive Pilot uses radar, lidar, cameras, road moisture sensors, ultrasonic sensors, and microphones to monitor traffic and road conditions around the vehicle. These overlapping sensors ensure reliable perception.

If a sensor fails, Drive Pilot's redundant system allows it to function and hand over control to the driver. If the driver doesn't take over, Drive Pilot will safely stop the vehicle and put on the hazard lights.

Combined input from all sensors creates an accurate representation of the vehicle's surroundings, leveraging each sensor's strengths for robust environmental perception.

## Stereo Multipurpose Front Camera

This system is implemented in the top windscreen area for these tasks:

- Depth perception of road in the immediate vicinity of the vehicle (occupation grid) in complement of lidar.
- Roadside equipment recognition and localization (traffic signs) in complement with GNSS and lidar to enhance and verify HD map (SLAM)
- Identification of mobile objects (vehicles, vulnerable) in redundancy with other sensors like front radars and lidar.

360° 77-79 GHz Radar belt

A frontal long-range radar is placed behind a cover in the upper grille area. Here are sample specifications of the ARS 54x from Continental:

Distance range:	0.2 – 300m (up to 1500m extended range)
Distance Resolution:	0.22m
Distance accuracy:	±0.15m
FoV in Azimuth:	±60°
FoV in Elevation:	±4° at 300m, ±14° < 100m
Accuracy Elevation:	±0.1°
Speed range:	-400 km/h to +200 km/h
Speed resolution:	0.35 km/h
Speed accuracy:	±0.1 km/h

LR Radar key points:

- Object List for subfunctions like: ACC full speed, AEB,
- Safety rated ASIL B for autonomous driving applications.
- Continuous alignment and misalignment detection capabilities allow to compensate it during operation.
- Real Elevation measurement capabilities proving 3D spatial info on targets.

Four corner radars (Continental SRR 52x) are implemented behind frontal and rear bumpers, to provide object lists for subfunctions like blind spot warning, lane change assist (Type IIIc), front and rear cross traffic alert with braking, rear pre-crash sensing, occupant safe exit, and lateral collision avoidance. They have blockage detection, automatic alignment, and an Ethernet interface. Their safety integrity level is ASIL-B per ISO 26262, and they operate on frequencies approved for use in the European Union, Russia, Canada, the USA, Japan, South Korea, Australia, and China.

Drive Pilot comprises additional sensors Mercedes-Benz considers indispensable for safe L^3 driving, including lidar and a camera in the rear window and microphones, especially for detecting flashing lights and sirens from emergency vehicles. There is also a wetness sensor in the wheel well for adhesion detection, for ODD monitoring.


Front lidar

This is the Valeo Scala 2. It is integrated behind a transparent cover in the grille, below the front long-range radar. This lidar has the following specifications:
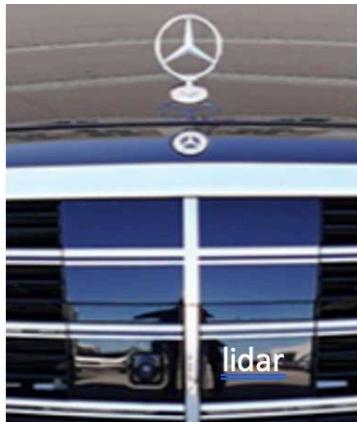
Distance range:	150m (@ 10% reflection)
Distance accuracy:	±0.1m
FoV in Azimuth:	133°
FoV in Elevation:	10°
Resolution Azimuth:	0.125° (on +/- 15° FOV)
Resolution Azimuth:	0.250° (on 133° FOV)
Resolution Elevation:	0.6°

Rear multipurpose camera

This camera is dedicated to the detection of emergency vehicles (flashing lights) and other vehicles in the rear space of the vehicle. Rear radars ensure redundancy with this camera especially assuming an efficient perception of relative speed of these approaching vehicles.

Precise localization

The top priority for Mercedes-Benz with this system is safety, which includes high demands on operational reliability. The exact location of the car is determined using a highly accurate positioning system. This is much more powerful than conventional GPS. In addition, data obtained from satellite navigation are matched with sensor data and data from an HD map. The type of data collected by lidar, camera, radar and ultrasonic sensors can include information on road geometry, route characteristics, landmarks or traffic signs.

HD map (on- and offboard)

As well as the sensor data, the Drive Pilot control unit receives information on road geometry, route profile, traffic signs and unusual traffic events (e.g. accidents or roadworks) from a digital HD map, which provides a three-dimensional street and environment image. The map data are stored in backend data centres and updated constantly and transmitted to Mercedes cars through their V2X system. Each vehicle also stores an image of this map information on board, constantly comparing it with the backend data and updating the local data set if necessary. The HD map thus offers stable positioning through a representation of the surroundings independent of factors such as shadows or a dirty sensor. This high-precision map differs from maps for navigation devices through its greater accuracy down to centimetres rather than metres and its detailed intersection and track model among other things.

The V2X function ensures the connection with the Mercedes Data Centre through secured communication networks (4G or 5G). A dedicated cellular antennas system is integrated in the rear part of the roof among GNSS receivers.

AD L^3/L^2 central control unit

The central unit is equipped with Nvidia Drive AGX Orin, which incorporates multiple processing engines delivering high-performance, energy-efficient computation and artificial intelligence capabilities. It is integrated with surround sensors to guarantee highly efficient and redundant fusion. This unit also ensures fallback-ready user's monitoring through a cockpit camera, ODD supervision through the HD-map and sensor's status data and consequently minimum risk manoeuvres when the driver is unable to take over the system. All critical algorithms are calculated redundantly.

Cars with Drive Pilot also have redundant steering and braking systems, and a redundant onboard electrical system. This ensures that the car will remain maneuverable even if one of these systems fails, and enables safe handover to the driver.

DVN Sensing Interview: Obsidian Sensor

Prior to our upcoming Workshop in Detroit on 9-10 April, which will include participation from Obsidian Sensors Company, we had the opportunity to meet with CEO Dr. John Hong. Obsidian's offices are in San Diego, California. Obsidian Sensors use uncooled microbolometers on glass.

Hong earned his PhD in electrical engineering from Caltech, and his B.S. in electrical engineering from MIT. He has over 35 years' experience in R&D and product development involving optics, MEMS, and semiconductors.

Prior to co-founding Obsidian Sensors, he was the General Manager of Qualcomm's MEMS technologies, and a VP of engineering with Corporate R&D. He was Chief Technologist for astrophysics with JPL/NASA. He is a fellow of Optica (formerly OSA).

DVN: Could you tell us more about the history of Obsidian Sensors?

Dr John Hong: We formed the company in 2017 as a spinoff from Qualcomm, our first investor. Some of the know-how comes from the work we did at Qualcomm in the development of low-power reflective displays. That was quite unique because the manufacturing required the fabrication of MEMS devices on a glass sheet at a flat panel display fab. When the development was terminated, the executive team allowed us to explore microbolometers as another application. A successful proof of concept led to a seed investment followed by the typical steps in a startup.

DVN: Who are the main investors in Obsidian Sensors?

J.H.: Our current investors are Qualcomm, Innolux (our manufacturing partner), Hyundai Motor Company, Hyundai Mobis, STK Walden (a VC), Himax Technologies, and some individuals.

Obsidian VGA Thermal Camera

Obsidian Thermal Camera · Visible Camera · Night · Day– Sun Glare · car 0.96
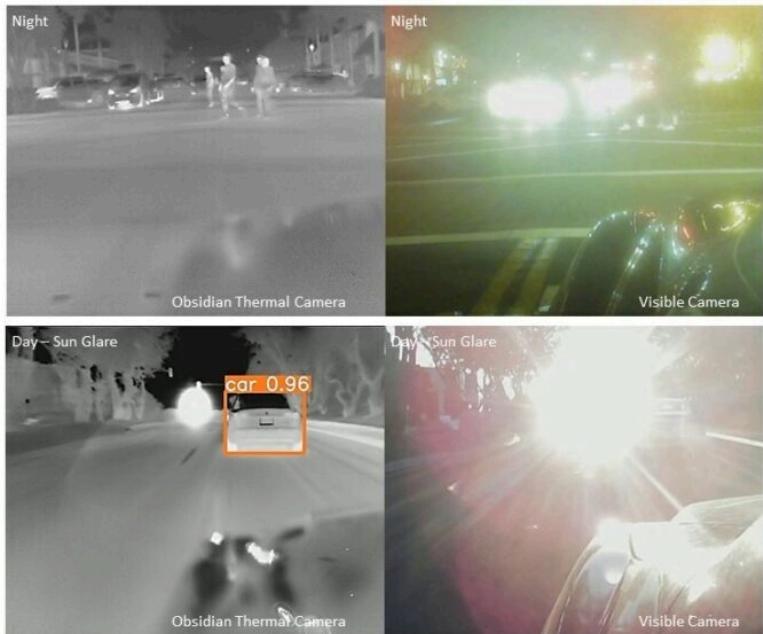
DVN: What types of thermal sensors do you develop?

J.H.: We make uncooled microbolometers, which are infrared sensors that operate in the longwave infrared band (LWIR, 8-14μm). Unlike shorter-wavelength infrared bands like SWIR and NIR, LWIR imaging does not need illumination and directly uses the radiation emitted by all warm objects. Like any imaging modality, resolution (number of pixels) is a very important parameter for users. We are currently shipping VGA (640 × 480) resolution cameras, and have a roadmap to offer higher resolution products including SVGA (800 × 600) later this year and SXGA (1,280 × 1,024) next year. Our unique approach in device design allows us to scale up the resolution much faster and much more economically than our competition.

DVN: What are the major markets or industries targeted by Obsidian Sensors?

J.H.: We serve both commercial and defense markets as the microbolometer is truly dual-use technology. Thermal imaging with microbolometers is a standout whenever day/night imaging is required without reliance on illumination systems and when viewing conditions are challenging like seeing through smoke or blinding glare. Automotive usage can become the highest volume sector driven by ADAS, autonomous driving, and in-cabin applications. Security/surveillance and industrial usage represent very large opportunities with a lot of potential customers eager to use thermal imaging for the value it brings. More recently, there has been an explosion in demand from drones and robotic platforms, both commercial and military.

DVN: How can your technology contribute to the safety of standard and autonomous vehicles in comparison with standard cameras, radars, and lidars?

J.H.: Visible cameras, radar systems and lidar collectively have a blind spot. And that is what thermal imaging fills in, so it is complementary to existing sensor suites. Being able to image objects at a long distance in total darkness, in varying, challenging conditions such as fog, smoke, headlight glare, or sun glare helps to address important corner cases which are at the center of FMVSS 127 and related standards.

DVN: What opportunities and growth factors do you see for the thermal cameras or the automotive market?

J.H.: Right now, the thermal imaging industry seems focused on finding some sort of middle ground between cost and resolution. The pioneers of the automotive thermal imaging actually advanced the resolution to VGA but there is talk of QVGA (¼ the pixels) trying to meet perceived cost targets. The FPA resolution affects imaging in two related factors: the field of view and range (how far can you see that there is a person on the road?). For the same field of view, VGA doubles the range of a QVGA camera. Range is important because it relates to stopping distances that increase with increasing speed. But so is field of view. Because of this we should not regress back to lower resolution but move it forward with a sensible roadmap that keeps pace with improvements in both visible and radar sensing.

DVN: How do you see the market price evolving for thermal sensors?

J.H.: The cost of cameras is dominated by the focal plane array cost, hence the desire to cap the resolution for overall cost control. By adopting our unique manufacturing approach with patented device designs, it is possible to get the resolution you need at the price you want. That is our message to our OEM customers who in turn need to deliver driving machines to drivers who demand safety, performance and affordability in what they buy or lease. The parameters involved in driving are complex. Field of view, range, detectability, false positives are all directly related to safety outcomes.

DVN: When will you have validated products ready to go to production (B & C samples)?

J.H.: We are shipping product to support real needs in robotics and consumer markets today. We can support automotive projects with SOP consistent with FMVSS 127 timelines.

DVN: What are the advantages of your technology regarding competitors?

J.H.: Although we offer both focal plane array and camera products, it is important to note that at the core, we are a sensor manufacturer. We can promote market leading FPA products as well as to customize them quit easily to exploit application particulars. Here is an important point. We make microbolometers in a way wholly different and fundamentally advantaged in both cost and scale when compared with everyone else in the industry. We make glass based microbolometers with a proprietary fabrication process implemented in a standard flat panel glass fab. There are other aspects to this I will describe in the DVN session. Per unit area, costs to build electronics and MEMS on glass is over an order of magnitude lower than a comparable manufacturing strategy based on silicon wafers. Moreover, in terms of capacity, glass production is capable of several orders of magnitude higher volume manufacturing output. This is the core value we bring. High resolution, high performance thermal imaging at a fraction of the cost and with much higher volume capacity.

DVN: Do you have projects or pre-developments with tier-1s or automakers?

J.H.: Compal, Quanta, Mobis. We also have had a project with HATCI, the North American Hyundai division.

DVN: How do you ensure the quality and reliability of your sensors?

J.H.: We can pass the same qualification standards as other microbolometer sensors. Also, we do not have wire bonds in our focal plane module due to our unique architecture. There are several other distinct advantages baked into our unique approach that cover both front end (glass) production and back end (packaging).

DVN: Do you sell the entire camera module or just the sensor?

J.H.: We sell both at this point. When the volumes become larger, it is more efficient for us to handle the sensor module and work with integrators and camera makers.

DVN: Does Obsidian provide a software stack with the sensor?

J.H.: We have an ISP with minimal latency and tone mapping that can be tailored for human vision, machine vision or radiometry.

DVN: Where are the sensors manufactured?

J.H.: We describe our manufacturing process in two stages, the front end and the back end. The front end is the manufacture of the glass-based device and that is done today in Taiwan by our manufacturing partner, Innolux—Taiwan's largest LCD manufacturer, and an important partner for us. Last year, we announced a new front end manufacturing partnership to focus on a 12µm SXGA product launch in 2026, with JDI in Japan. The back end of the manufacturing process involves vacuum encapsulation, ROIC attachment and other packaging steps, all done in our facility in San Diego.

DVN: Thank you, John, for this interesting information on your company and products!

Sensing Business Newsbites

VW Group, Valeo, Mobileye cooperate on MQB platform

Volkswagen Group is working with Valeo and Mobileye to upgrade their advanced driver assistance systems up to L^{2+} (enhanced partially automated driving) in their upcoming vehicle portfolio based on the MQB platform. Launching in the next few years, this cooperation will improve safety and driving comfort in high-volume vehicles, addressing both customer expectations and regulatory requirements.

Hesai Advances in Mainstream Automotive Market

Hesai reported a full-year revenue of C¥2.08bn in 2024, with fourth-quarter revenue reaching C¥720m. They delivered 501,889 lidar units in 2024, a 126-per-cent year-on-year increase. In December 2024, they became the world's first lidar supplier to achieve a monthly delivery volume exceeding 100,000 units. As of February 2025, Hesai has secured mass production supply agreements with 22 automakers for 120 models.

Hesai to open overseas plant with '26 SOP

Hesai intends to inaugurate their first overseas factory next year, citing customer concerns over geopolitical tensions. "On the heels of the global supply program, we hope to accelerate our overseas production (...) an inescapable step toward our global ambitions," Hesai CFO Andrew Fan told the Financial Times. He said Hesai will break ground on their first overseas project by the end of this year, with the goal of starting production in 2026. Hesai announced on 12 March that they have entered a multi-year exclusive supply partnership with a top European automaker, whom they did not name.

Luminar: Strong Q4-24

Luminar anticipates tripling their lidar shipments in 2025, starting from around 9,000 units in 2024. The first OEM design win, the Volvo EX90, has entered production with an estimated few thousand units expected in 2024, and the ES90 sedan has been announced as a design win. TPK Asia started production on certain subsystems for the Iris lidar, while prototypes of the next-generation Halo lidar were delivered to certain customers. Q4 revenue increased by 45 per cent versus Q3 to $22.5m, but remained relatively flat year-over-year. Gross loss is anticipated to be between $5m and $10m per quarter in 2025 due to insufficient volumes to achieve positive gross margins.

Ouster: Record Revenue for Q4 and FY24

Ouster reported record Q4-24 revenues totaling $30m, reflecting a 23-per-cent year-over-year increase, and shipped nearly 5,000 lidar units at a 44-per-cent gross margin. Their net loss amounted to $24m. Annual revenue reached $111m with shipments of 17,300 sensors, for a net loss of $97m—almost down to ¼ the 2023 figure. Their primary markets served were robotics and robotaxi pilots. Ouster is currently not engaged in mainstream automotive markets, and their future involvement in high-volume robotaxi and truck company contracts remains uncertain. However, growth in industrial and robotics markets is anticipated to continue.

Rayz Gets Almost C¥100m in New Funding Round

Rayz, a lidar company in China, announced the completion of a new funding round, raising nearly C¥100m. The funds will be primarily allocated to developing automotive-grade lidar, mass production expansion, and commercial deployment across various sectors. Rayz has leveraged their proprietary MSSP architecture to achieve advancements in sensing efficiency, power consumption, size, and cost on 905-nm technology. Their H260 long-range lidar, which can detect 10-per-cent-reflective objects at 260 meters, features an ultra-low power consumption of 10W and a competitive price.

Seyond Lidar for Stars' Self-Driving IGVs

Driverless-driving specialists Stars Technology and lidar maker Seyond have announced a strategic partnership to develop self-driving intelligent guided vehicles (IGVs) for smart logistics. The collaboration will focus on integrating high-performance lidar technology into industrial logistics applications, driving the global adoption of functional autonomous vehicles. Stars aims to enhance warehouse and transportation efficiency through self-driving technology. Under this partnership, Seyond will equip Stars' new IGV models with the Robin W wide-angle lidar as a core perception unit.

Seyond, TrafficSensors to Take ITS Management Platform to Australia, New Zealand

Seyond has entered partnership with TrafficSensors.com to introduce the Seyond ITS Management Platform (SIMPL) to Australia and New Zealand. TrafficSensors.com, with 40 years' experience in traffic systems, provides expertise and local presence. They distribute advanced sensors to highway departments and local authorities, with thousands of deployments. This partnership combines their experience with Seyond's innovative SIMPL solution.

Forvia Hella: Solid Results in FY24
Forvia Hella presented their final results for 1 January to 31 December 2024, confirming the preliminary financial data announced this past February. Currency-adjusted sales improved by 1.3 per cent to €8.1bn, and sales of €8.0bn are at the previous year's level. Global vehicle production declined by 1.1 per cent in the same period, with the European automotive market making a disproportionately large contribution to this with a decline of 4.3 per cent.

Indie, GlobalFoundries in Automotive Radar Deployment Pact
Indie Semiconductor has partnered with GlobalFoundries to develop high-performance radar systems-on-chip (SoC) on GF's 22FDX® platform for 77- and 120-GHz radar applications. These SoCs support ADAS and industrial use cases. Indie's 77-GHz SoCs enable long- and short-range radar applications for situational awareness and obstacle detection, including forward collision warning, automatic emergency braking, blind spot detection, cross-traffic alerts, and automated parking.


Sensrad, Zenseact in 4D Radar Pact for AD
Sensrad and Zenseact, two Gothenburg-based companies, are collaborating to explore 4D high-resolution imaging radar for automated driving. Sensrad's expertise comes from over five years' radar development and software delivery. Zenseact is an AI and software company focused on car safety, founded by Volvo Cars. They develop autonomous driving and driver-assist systems, aiming to eliminate car accidents. Zenseact operates in Gothenburg and Lund, Sweden; Munich, Germany; and Shanghai, China.
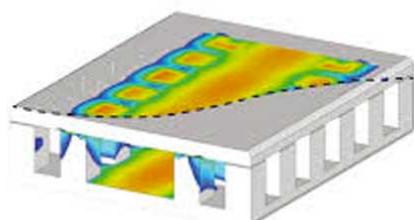
Gapwaves Gets Radar Antenna Orders from Hella
Gapwaves has received new orders from Hella to develop waveguide antennas for Hella's ADAS radar sensors. Deliveries are expected through the first half of 2025. This continues the development project started last December. Gapwaves CEO Jonas Ehinger says the new orders "highlight our positive momentum and the value our technology brings to customers".

Nodar's New HDK 2.0 for 3D Sensing
Nodar's Hammerhead Development Kit (HDK) 2.0 brings cutting-edge stereo vision to engineers, offering what the supplier calls a high-performance alternative to lidar for autonomous vehicles and 3D monitoring. Nodar's specialty is stereo vision technology, and the kit delivers long-range object detection, high-resolution depth perception, and environmental resilience at a lower cost. It simplifies integration with ready-to-use hardware and software, targeting applications from automotive to agriculture.

Lidar tech news

Aeva Wins Development Bid for Global Passenger Car Platform

Aeva has won a development program for a major automaker's next-generation global passenger vehicle platform. The automaker, as yet unnamed, has also sent Aeva a letter of intent for a large-scale, multi-year production program award opportunity this year, including multiple vehicle models across maker's global platform. The development program focuses on Aeva's recently announced Atlas Ultra 4D lidar sensor, with SOP targeted for 2027.

Aeva has been gaining traction as a direct tier-1 supplier to top automakers and autonomous vehicle developers, including Aeva's ongoing production program with Daimler Truck.

Aeva cofounder and CEO Soroush Salehian says "This win is a key milestone in our ongoing collaboration with a top-10 passenger OEM, and is a major validation of the capabilities of our new Atlas Ultra 4D lidar sensor (...) this further reinforces Aeva's position as the leading supplier of next-generation sensing solutions for automated driving. It also represents another major automotive manufacturer moving to FMCW technology to expand its operational design domain and enable highway-speed L^3 automation. We believe these trends are just beginning and will ultimately benefit the automotive industry and Aeva as the emerging leader in the market".

🔖 DVN comments

The particularly high sensitivity of FMCW lidars, and good performance in harsh conditions like fog and rain, mean AEVA could leverage these advantages with collision avoidance rule evolutions (US FMVSS 127, for example) and futures L2+ and L3 system deployments. This technology remains expensive but accessible for premium carmakers.

Mercedes Partners with Hesai

Mercedes-Benz has reportedly chosen Hesai to equip their vehicles with advanced lidar sensors. This is the first instance of a non-Chinese automaker integrating Chinese-made lidar technology into models intended for international markets.
Hesai faced challenges with U.S. regulators and security agencies. Listed on NASDAQ since 2023, Hesai was designated as a Chinese military company by the U.S. Department of Defense in 2024. After a temporary removal following a lawsuit, the designation was reinstated. The Mercedes-Benz partnership announcement led to a 30-per-cent rise in Hesai's stock value.

Hesai CEO and cofounder Yifan Li says Hesai achieved a monthly production rate of 100,000 units in December 2024. The company intends to start new production lines in the first quarter of 2025, with production commencing in the third quarter, targeting an annual capacity of two million units by end of year—a significant increase from their production figures of 220,000 units in 2023 and 500,000 units in 2024.

Hesai offers a variety of lidar scanners with various resolutions, ranges, and FOVs. One notable product could be integrated in future Mercedes cars; that is the AT512 long-range lidar. It offers 300 meters' range at 10-per-cent reflectivity, and a point rate is 12.3 megapoints per second, resulting in a high-resolution point cloud with an angular resolution of 0.05° horizontally and vertically. Combining the angular resolution and the field of view – 120° × 25.6° – results in a pixel resolution of 2,400 × 512.

Hesai faces challenges from proposed U.S. tariffs on China and a focus on American manufacturing, impacting competition. Mercedes' partnership with Hesai enhances the supplier's credibility, an important factor for other automotive lidar makers.

Luminar Iris Lidar for Volvo ES90

Luminar's lidars will be integrated into Volvo's new ES90 model, slated for production this year. This follows the successful launch of the Volvo EX90 SUV.

Luminar founder and CEO Austin Russell says the inclusion of Iris lidar in the ES90 "will scale our safety-critical technology at a time when consumers, auto makers, and regulators demand advanced sensing capabilities".

Volvo Cars Head of Software Engineering Alwin Bakkenes says, "The Iris lidar on ES90 will complement other sensors and enable exceptional perception to keep everyone safe. This selection builds on our partnership with Luminar and our shared commitment to automotive safety".

Volvo Cars is introducing advanced driver assistance features in the ES90 using a state-of-the-art sensor set, including lidar. By integrating Luminar's lidar into the roofline, along with radars, cameras, and ultrasonic sensors, Volvo aims to enhance safety for everyone in and around the car. The ES90, built on the latest SPA2 platform like the EX90, will expose more buyers to this advanced technology.

Despite the successful launch of the Volvo EX90 SUV and now positive expectations on ES90, Luminar's gross loss is expected to be $5m to $10m per quarter in 2025 due to low volumes preventing positive gross margins. It is necessary for Luminar to find new customers or other markets.

Camera tech news

Quanta, Obsidian to Co-Develop Thermal Imaging Solutions

Quanta Computer, specialists in advanced computing technology, is partnering with Obsidian Sensors to produce high-resolution thermal imaging cameras for automobiles.

Obsidian makes high-resolution thermal sensors at low cost and high volume on LAMP (Large Area MEMS Platform), manufactured at established flat-panel foundries. With large glass substrates capable of producing sensors with VGA-or-higher resolution at volumes exceeding 100 million units per year, Obsidian aims to drive the adoption of this technology into the automotive industry, as well as other areas such as security, surveillance, and drones.

"We are developing imaging system solutions with both visible and infrared camera technologies," said Alan Chai, Senior Vice President of Quanta Computer. "The collaboration with Obsidian enables the fusion of RGB and LWIR sensor signals using AI vision processors to trigger systems such as AEB (Automatic Emergency Braking) and in-cabin vital sign detection. This combination will also advance machine vision products including automotive and professional surveillance."

Obsidian CEO John Hong says he intends the partnership to introduce his company's thermal imaging solutions into the automotive market: "Our manufacturing method is scalable to meet the cost and volume requirements of the automotive industry. Thermal imaging is important for improving automotive safety, especially for pedestrians at night. Our sensors make this feasible at scale".

US regulations mandating that pedestrian AEB systems be installed on all new vehicles starting in 2029 as a standard feature. Although that regulation is being contested by auto industry groups, who may find a receptive audience for their objections in the Trump administration, traffic safety authorities around the world have been looking for solutions to address the rise in pedestrian injuries and deaths in recent years, especially in low light conditions. ADAS and AEB systems benefit from thermal sensors' ability to see in complete darkness and through challenging weather conditions.

VGA-class thermal imaging cameras with GMSL connections, jointly designed by Quanta and Obsidian Sensors, have been demonstrated at Autosens USA 2024 in Detroit.

🔖 DVN comments

Range relates to stopping distances, which increase with speed. Field of view is also important. Therefore, Obsidian will take advantage to advance the resolution of cameras by the development of new formats like SXGA (1,280 × 1,024 pixels) in this bolometric (8-14 μm) technology.

Adasky, Imagry to Put Thermal Imaging Into AI Platform

Imagry, specialists in HD-mapless autonomous driving technology, have been collaborating with Adasky, specialists in thermal cameras. The partnership integrates Adasky's advanced thermal imaging technology into Imagry's vision-only AI-driven autonomous vehicle platform, setting a new benchmark for safe, reliable driving in adverse visibility conditions after dark.

Thermal imaging cameras from Adasky can detect a pedestrian crossing a road with his bicycle at night, revealing hazards invisible to visual spectrum cameras and ensuring safer autonomous navigation in low-visibility conditions

Adasky's thermal cameras enhance vehicle perception in scenarios where standard cameras and other sensors fall short, such as dense fog and low-light environments like rural roads at night.

Combining Imagry's visual spectrum AI driving system with Adasky's infrared spectrum thermal imaging cameras ensures safer L^{3-4} autonomous driving. Adasky thermal cameras can detect objects and classify living beings at distances that significantly surpass the nighttime detection range of typical daytime cameras reinforced with low-beam headlights. The integration of thermal imaging enables Imagry's AI Driver to 'see' in complete darkness and extreme weather, ensuring safer navigation in real-world scenarios.

This collaboration further improves Imagry's vision-based HD-mapless driving platform, which relies on real-time visual spectrum camera-based perception and imitation learning to adapt to dynamic environments. With the addition of thermal cameras, Imagry's platform features enhanced capabilities in night and extreme weather driving. The result: safer autonomous driving solutions for passenger vehicles and public transportation, irrespective of lighting conditions.

Dr. Ilan Shaviv, Imagry's Chief Technology Officer, says the collaboration will bring advanced thermal imaging into their autonomous driving system: "This integration allows our AI Driver to confidently navigate situations with compromised visibility, such as low-light or rural night driving. With this collaboration, we're making driving safer and more reliable for everyone sharing the road".

The side-by-side images shown here compare what a standard visual camera captures at night with the headlights on (left) with what Adasky's thermal camera reveals (right). These images demonstrate how thermal imaging enables vehicles to detect and classify objects, living beings, and road hazards with unmatched clarity in dense fog and complete darkness.

🔖 DVN comments

LWIR thermal cameras improve vehicle perception in dense fog and low-light settings, like rural roads at night. Increasing pixel count is essential to match visible cameras' performance in detecting small objects at long distances. Even if Imagry's AI is effective, high resolution and sensitivity are essential.

Radar technologies News

Magna Blends Thermal, Radar Tech for Better Detection

Over 90 per cent of new passenger vehicles in North America have ADAS features like forward collision warning, lane departure warning, and automatic emergency braking. Diversified tier-1 megasupplier Magna is combining the heat-signature detection of thermal technology with imaging radar's ability to determine an object's location, speed, and direction, to provide quicker, more reliable environmental analysis under adverse conditions.

The result is a more accurate and robust ADAS, which can boost driver confidence and reduce anxiety in tough driving conditions. Magna says the fusion of thermal and radar technologies offers a significant leap in sophistication and capability, far beyond incremental improvements to current systems.

Conventionally-configured sensor suites can struggle in adverse weather and low-visibility conditions. Magna is addressing those challenges by incorporating thermal imaging and doppler-type radar to improve detection and classification of threats. Magna excels in this area, offering advanced systems that extend perception up to four times beyond headlight range to detect objects up to 200 meters away.

Improving reaction times and safety in adverse conditions is the goal, and thermal and radar technologies cost less than lidar.

🔖 DVN comments

Combining thermal 2D imaging with radar 4D imaging can detect stationary objects at long distances where radar resolution falls short. In foggy conditions, the thermal camera can locate crashed vehicles by their heat signatures, unlike lidars or visible-spectrum cameras.

Indie Semiconductor, GlobalFoundries in Car Radar Pact

Indie Semiconductor will partner with GlobalFoundries to develop high-performance radar systems-on-chip (SoC). These, manufactured on GF's 22FDX® platform, will target 77- and 120-GHz ADAS radars and adjacent industrial applications. Automotive radar adoption is being accelerated by global vehicle safety regulation, new car assessment programs, and consumer demand for convenience features. As a result, new vehicles are being built with more and more radars.

Indie's 77-GHz SoCs are used in systems for short- and long-range situational awareness and obstacle detection to enable features including forward collision warning, automatic emergency braking, blind spot detection, cross-traffic alerts, and automated parking. Their 77-GHz radar is at an advanced design-in stage with a tier-1 customer supplying multiple automakers.

The 120-GHz SoCs will target in-cabin applications requiring higher resolution and precision over shorter ranges, such as occupant monitoring and detection of vital signs such as heartbeat and respiration. Indie's 120-GHz SoC supports antenna-in-package designs, enabling smaller systems to be developed without compromising performance, cost or in-cabin aesthetics. First customer samples are already available.

For both product lines, the key challenges were to deliver high performance without compromising hardware, software and system integration, at the lowest total cost. Indie says they have done so. Their design innovation and functional integration of analog, digital, RF, power management, and memory functions are enabled by GF's automotive-qualified 22-nm fully-depleted silicon-on-insulator process. For ADAS and processing applications that rely on responsive, always-on wireless connectivity, GF's 22FDX platform offers FinFET-class performance and energy efficiency in a planar technology with state-of-the-art PPA (power, performance, area) and RF performance.

Indie COO Michael Wittman says his company has been working closely with GlobalFoundries for several years; they aim "to keep our customers at the forefront of technology in the increasingly competitive automotive sector, and the combination of Indie's design innovation and the foundry's manufacturing leadership will enable safety-critical radar-based ADAS technologies to be deployed cost-effectively across automotive and industrial mobility applications".

Ed Kaste, GlobalFoundries' SVP of Ultralow Power CMOS Products, says "Our strategic collaboration with Indie is bringing exciting and innovative product solutions to the automotive and industrial mobility markets," said Ed Kaste, senior vice president of GF's ultra-low power CMOS product line. As GF continues to invest in capacity and technology differentiation in our 22FDX platform and build on this partnership for Indie's next-generation solutions, customers will mutually benefit from GF's purpose-built, automotive-grade technologies and Indie's best in class radar design innovation, ultimately delivering the highest-integrated silicon solutions that drive down the total system cost and power consumption for faster and ubiquitous market deployment".

Advantages of 120- and 240-GHz radars

- All-weather performance (rain, fog, dust...)
- Low power, low cost, low computing requirements; complements camera and lidar
- Large field of view
- Antenna in package: small Footprint (no RF on PCB) for simplified design
- License-free ISM bands
- Increased accuracy; better micro-doppler due to smaller wavelengths in 120- and 240-GHz bands
- Better range resolution due to larger bandwidth
- Range resolution up 3.3mm (theoretical value corresponding to 45-GHz bandwidth in 240-GHz ISM band)

🔖 DVN comments

Higher frequencies in the ISM band facilitate the implementation of antenna-on-chip techniques. These techniques simplify PCB design, minimize sensor form factor, and reduce costs. These benefits are vital for applications where external antennas conflict with automotive design standards. For instance, antenna-on-chip can substitute current ultrasonic sensors for ultrashort-range detections during parking maneuvers.

Sensing Architecture · Integration · Regulation News

VW Group, Valeo, Mobileye cooperate on MQB platform
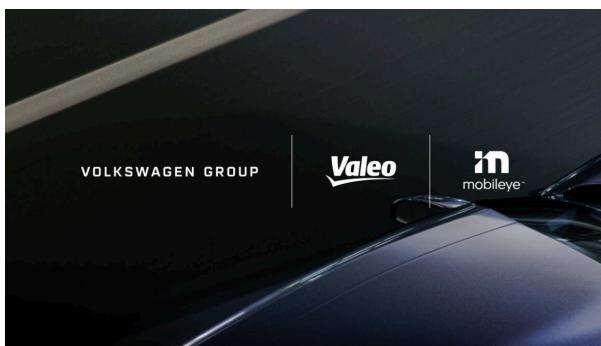
Volkswagen Group is working with Valeo and Mobileye to upgrade their advanced driver assistance systems up to L^{2+} (enhanced partially automated driving) in their upcoming vehicle portfolio based on the MQB platform.

This cooperation will improve safety and driving comfort in high-volume vehicles, addressing both customer expectations and regulatory requirements.

The new system features a 360-degree ring of multiple cameras and radars, along with software-defined capabilities, enabling hands-free driving on approved roads, smart parking, and improved occupant and pedestrian safety.

Valeo provides high-performance ECUs, sensors, and parking solutions, while Mobileye supplies their Surround ADAS™ platform, including the EyeQ 6 High processor and mapping technologies. For the first time, these elements are integrated into a single system, replacing multiple ECUs with a centralized unit. This improves efficiency, system performance, and allows for over-the-air updates.

Valeo Brain Division CEO Marc Vrecko says his company is "excited to embark on a new journey and to offer to Volkswagen, together with Mobileye, this complete solution of affordable, state-of-the-art, advanced driving features".

And Amnon Shashua, President and CEO of Mobileye, says, "By improving efficiency and costs while upgrading capabilities for safety and comfort in driver assist, this system points the way to a new class of driving technology".

Magna, Nvidia Partner for Automotive Tech

Magna International is partnering with Nvidia to integrate the Nvidia Drive AGX platform into Magna's advanced technology offerings. The next-generation Nvidia Drive AGX Thor SoC, which runs the safety-certified DriveOS operating system and is built on the Blackwell GPU architecture, consolidates increased functionality to improve efficiency, speed, and scalability. This will help Magna enable cutting-edge functionality and varying levels of autonomous driving and interior cabin applications.

Magna will develop and test the latest advancements in L^{2+} through L^4 active safety solutions on Drive Thor, which helps position Magna as a leader in automotive electronics and AD solutions. By using this SoC's accelerated computing performance and scalability, these solutions aim to enhance vehicle safety, and comfort.

Steven Jenkins, VPof Technology Strategy at Magna Electronics, says, "Our collaboration allows us to develop market applications for AI-powered solutions that could redefine the driving experience and address the evolving demands of the automotive industry".

Magna's expertise in developing, integrating and launching advanced features such as adaptive cruise control, driver and occupant monitoring, highway and urban navigate-on-autopilot, and interior cabin companion functionalities positions the company well for this pilot program. This initiative focuses on solving the complexity of computing availability with performance for integrating ADAS, AD and interior cabin features, providing scalable, flexible and customizable system solutions that meet specific market needs and regulatory requirements.

"As the automotive industry transitions to safer, more intelligent vehicles with autonomous driving capabilities, our collaboration with Magna is the latest in our endeavours to bring our safety-certified in-vehicle accelerated compute and AI to the transportation industry," said Ali Kani, Vice President of Automotive at Nvidia. "By combining core technologies and Magna's integration expertise, we aim to shape the future of mobility."

Nvidia Drive AGX Thor delivers up to 1,000 trillion operations per second of computing power, featuring 8-bit floating point support optimized for transformer models, large language models and generative AI workloads.

Magna plans to unveil a working demonstration platform expected in Q4 2025. As part of this, Magna will tap Nvidia Drive-OS for development, integration, validation and production workflows.

April '25 DVN Sensing & Application Event Docket
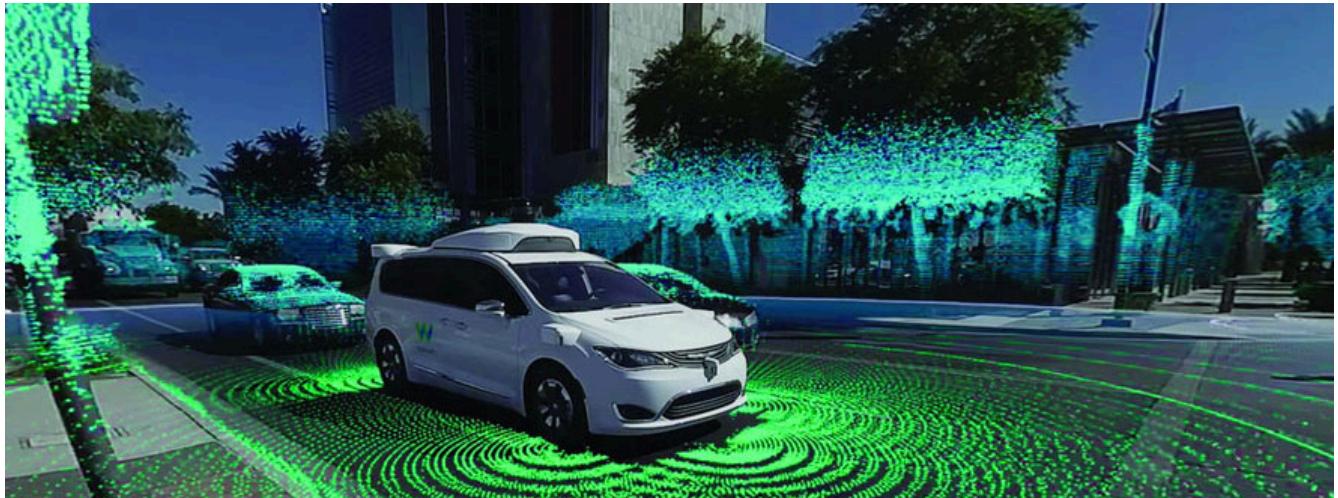
APRIL 9th - Part-I: ICE BREAKER

06:00 PM   **Welcome Cocktail & democars' test**

07:30 PM   **Standing Dinner on exhibition platform**

APRIL 10th - Part-II: CONFERENCE - MORNING

08:15 AM   **Opening** - Paul Henri Matha, DVN CEO

08:30 AM   **Keynotes - NHTSA Requirements & Challenges**
- **General Motors** – Jodi Allen
Automatic Emergency Braking - A Lighting Perspective
- **MAGNA** - Jan Erik Källhammer, Director of Visual Enhancement and Cognitive Systems
Challenges in PAEB Systems: Dark Conditions, True Positive Criteria, and Risk of False Positives

09:00 AM   **Q&A: NHTSA Requirements & Expected Challenges**

Session 1- Performance Lighting & Vision Systems

09:10 AM
- **APTIV** – Philippe Troia, Senior Director FuSa
Impact on Functional Safety of the FMVSS127 requirements
- **VALEO** – Dirk Schulte, R&D Director, Advanced Engineering & Product Platforms
Scalable ADAS Platform for FMVSS127, US NCAP and beyond
- **OMNIVISION** - Jeffrey Morin, Automotive Imaging Solutions Specialist
Pixel Scaling Automotive Image Sensors

10:10 AM   **PANEL-1: Opportunities for Vision Systems**

10:25 AM   **Coffee Break**

Session 2 - Performance of Radars & Fusion

11:00 AM
- **FORVIA HELLA** - Nicholas Williams, Lead Program Manager, Advanced Driving
PAEB Obstructed – S8.3.3: Practical Radar Applications
- **PERCIV.ai** - Andras Palffy, Co-Founder
Next-gen, AI-driven radar perception for AEB and beyond
- **ZENDAR** - Antonio Puglielli, VP of Engineering
A Scalable Solution for 2029 AEB Compliance
- **SABIC** - Carlos Pereira, Chief Scientist
Optimizing radar transparency of plastics for exterior trim

12:00 PM **PANEL-2: Benefits of FUSION Systems**

12:15 PM **Lunch break & democars' test**

APRIL 10th - Part-II: CONFERENCE - AFTERNOON

Session 3 - Performance of IR Cameras

01:50 PM
- **ADASKY** - Bill Grabowski, Head of North America
Beyond Regulations: Expanding the ODD (Operating Design Domain) L2+/L3 ADAS with Thermal
- **Teledyne FLIR** - John Eggert, Director, Automotive Business Development
Saving Lives with Pedestrian AEB – Thermal Test Protocol Development and Results
- **OBSIDIAN** - John Hong, CEO
Thermal Imaging at the Right Cost and Scale with Microbolometers on Glass
- **Compal USA** - Richard Seoane, General Manager of Infrared Technology Systems
Improving Pedestrian Safety with Infrared Technology

Session 4 - Performance of Lidars

- **ROBOSENSE** - Scott Skelton, Director, Engineering and Technical Sales
LiDAR's role in automakers meeting the latest NHTSA AEB rules
- **CEPTON/KOITO** - Henri Haefner, Senior Dir. Product Management
Lidar sensor contribution to AEB according to FMVSS127
- **Light IC** – Jie Sun, Co-founder
Silicon Integrated FMCW LiDAR for Automotive

03:35 PM **PANEL-3: Benefits of the new technologies**

03:50 PM **Coffee Break & democars' test**

Session 5 - Performance validation, Simulation/Calibration

04:40 PM
- **ANSYS** - Lionel Bennes, Lead Product Manager
Simulation-Driven Development for FMVSS 127 Compliance Using Perception-in-the-loop Testing
- **BURKE PORTER** – Brunno Moretti, President ADAS Solutions
ADAS Sensors Post-Repair: A Hidden Threat To Road Safety

05:10 **PANEL-4: Sensing Architecture & validation**

05:25 **CLOSING REMARKS** - Eric Amiot, Head of DVN Sensing & Applications & Martin Booth, DVN Senior Advisor