

Press release

Infineon is developing laser eyes for cars

LiDAR (Light Detection And Ranging) will supplement the already widely used radar and camera systems in automated vehicles. Infineon is currently developing chips for this technology in Graz.

Graz, April 24, 2018 - Where the mobility concepts of the future are concerned, connected and automated driving takes center stage. As a leading chip provider for driver assistance systems, Infineon provides microelectronics solutions for radar, LiDAR and camera technologies - the key technologies for semi-automated and fully automated vehicles.

Radar and camera systems are already well-established and well-suited for mass production. They provide the basis for semi-automated and fully automated driving. In order to achieve a higher degree of automation of level 3 automated driving and higher (see below for the levels of automated driving), the car's sensor systems must be expanded accordingly. The technology that will take us a significant step further towards achieving fully automated vehicles is LiDAR. LiDAR uses laser beams to detect long-range objects and determine their distance from the vehicle.

Infineon is developing semiconductor-based LiDAR technology

Infineon is developing a semiconductor-based LiDAR technology in Graz for use in driver assistance systems. Stefan Rohringer, head of the Infineon development center in Graz, stated: "Infineon offers key technologies for automated and connected vehicles. We are thereby furthering the development of a new, innovative topic within the field of optical distance measurement, in addition to radar, here in Graz. Infineon aims to make LiDAR an affordable option for every newly manufactured car, worldwide, just as we did with radar." At the same time, research on the associated manufacturing technology, on the basis of MEMS (micro-electro-mechanical systems), is being conducted at the Villach site. This means that Infineon possesses expertise in each of the three complementary sensor technologies: radar, camera and LiDAR. "These technologies enable us to achieve the highest possible redundancy for vehicle sensor systems, creating the basis for a high degree of safety in automated driving", Stefan Rohringer reports.

Advantages of semiconductor-based systems

In the coming years, the first LiDAR systems will be installed in premium class vehicles. At present, the laser beams are still positioned using e.g. mechanically revolving mirrors, which makes the systems relatively cumbersome and expensive. For LiDAR systems to

become established as a standard in all vehicle categories, they must be produced on the basis of miniaturized semiconductors. This will make the systems considerably more compact, robust and inexpensive.

How does LiDAR work?

LiDAR uses infrared laser beams to determine the distance from the vehicle to long-range (up to 200 m) objects. The system measures the distance from moving as well as stationary objects and creates a three-dimensional image of the surrounding area. LiDAR thereby constitutes the perfect complement to the radar chips that are already in use in many driver assistance systems and which use a different frequency of electromagnetic waves. "LiDAR can perform high-resolution, 360-degree measurements for fully automated vehicles", Andreas Foroutan, who is responsible for the LiDAR product group at Infineon, Graz, confirmed. "Using a combination of LiDAR and radar systems allows us to achieve an even better perception of the surrounding area and capture complex conditions with even greater accuracy." LiDAR systems have been in existence for around 60 years. They have been used in the industrial sector, the wind energy sector for example, and in the aerospace sector to scan the surfaces of the moon and Mars. Now the automotive industry is also investing in LiDAR, in addition to cameras and radar, for automated driving.

Active assistance systems for improved ease and safety

Active assistance systems make driving cars safer and easier, for example through pedestrian recognition, distance warning and automatic emergency braking. They are one of the fastest-growing application areas in the automotive industry and are also one of the essential requirements for fully automated driving. Infineon is already a provider of key components for driver assistance systems - for example for the Audi A8, the first serially produced car worldwide to feature level 3 automated driving functions, which enable drivers to remove their hands from the steering wheel at certain times. For example, the A8 allows you to do this while parking or stuck in slow-moving traffic or traffic jams. Infineon's microelectronics solutions enable the vehicle to take over in these driving situations.

Autonomous driving levels

Level 0: There are no automated driving features. The driver is responsible for longitudinal guidance (maintaining speed, accelerating, braking) and lateral guidance (steering). There are no intervention systems, simply warning systems.

Level 1: A system can either take over longitudinal or lateral guidance of the vehicle, while the driver permanently executes the other activity respectively.

Level 2: The driver can hand over longitudinal and lateral guidance to the system in a specific application. The driver must always be in a position to immediately retake control of the vehicle.

Level 3: The system identifies the system limits independently. The driver no longer has to permanently monitor the longitudinal and lateral guidance of the vehicle. However, the

driver has to remain able to resume driving when prompted by the system with a specific buffer time.

Level 4: The driver can hand over the full driving task to the system in specific applications (road type, speed zone, environmental conditions).

Level 5 or driverless driving: The vehicle can perform the driving task fully autonomously – on all road types, in all speed zones and under all environmental conditions.

(Source: VDA)

About Infineon Austria

Infineon Technologies Austria AG is a group subsidiary of Infineon Technologies AG, a world-leading provider of semiconductor solutions that make life easier, safer and greener. Microelectronics from Infineon reduce the energy consumption of consumer electronics, domestic appliances and industrial facilities. They make a major contribution to the convenience, security and sustainability of vehicles, and enable secure transactions in a connected world.

Besides Germany, Infineon Austria is the only subsidiary within the group that pools competencies for research and development, production as well as global business responsibility. The head office is in Villach, with further branches in Graz, Klagenfurt, Linz and Vienna. With 3,785 employees from around 60 countries (including 1,547 in research and development), in the financial year 2017 (ending in September) the company achieved a turnover of € 2.5 billion. An R&D expense rate of €428 million makes Infineon Austria one of the strongest industrial research companies' in Austria.

Further information at www.infineon.com/austria