

## Press release

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# INNOVATIVE VEHICLE TECHNOLOGY INCREASES ROAD SAFETY

In the zoneZ project, ZKW, AIT and FH Wiener Neustadt are developing a high-performance control unit with robust environment detection for vehicles. It increases road safety and protects vulnerable traffic participants.

They maintain the distance and the lane, they monitor the blind spot and help with parking, they warn if there is a risk of collision with people or other vehicles. Assistance systems support driving and increase road safety. However, their function is limited in adverse weather conditions and poor visibility, because the necessary sensors, especially cameras, often reach their limits in detecting the surroundings.

This is why experts from the ZKW Group (ZKW), the AIT Austrian Institute of Technology and the mechatronics course at the University of Applied Sciences Wiener Neustadt are working on the "zoneZ" research project to develop a robust vehicle environment detection system and an innovative control unit concept that will enable increasingly intelligent safety functions for the cars of the future.

### Increase road safety and relieve the burden on drivers

The common goal of the project partners is to address various vehicle sensors for environment detection such as radar, camera and lidar directly via a powerful control unit. But actuators such as headlights and displays are also controlled by this control unit. At the same time, the control unit evaluates the data from the environment sensors very quickly in a computationally intensive process in order to create a virtual model of the vehicle environment in real time. This versatile functionality of the control unit forms the basis for various applications, such as driver assistance functions, spotlight for the targeted illumination of endangered objects, parking assistants or assistants for the protection of vulnerable road users. This innovative approach takes road safety and protection to a new level.

### Robust sensor technology for reliable environment detection

The team around Christian Zinner from the AIT Center for Vision, Automation & Control is dedicated to the question of how intelligent vehicles can reliably perceive their surroundings even in difficult environmental conditions and poor visibility. The project uses modern 3D sensors, for whose signals the AIT is researching suitable evaluation algorithms. Among other things, fusion concepts for robust multimodal sensor configurations are also being investigated. The so-called imaging 3D radars and lidar sensors used here are currently being tested and will then be available

for installation in series-production vehicles. "Even today, there is no 'ideal' 3D sensor that works equally well in all visibility and weather conditions and provides a detailed image of the environment. In addition to the 'fair weather properties' of a sensor, greater interest must therefore be placed on its behaviour in adverse conditions. This is where we bring our many years of expertise in the development of assistive and autonomous systems for a wide range of applications, as robust sensory detection of the 3D environment is always a key component here", says Christian Zinner.

### Zonal Architectures & Control Units

In order to be able to process this sensor data in the vehicle, the team at ZKW is significantly involved with the question of future EE architectures in the automotive industry and the associated ECU types. A clear trend is moving in the direction of the so-called zone architecture and the zonal ECUs required for this. Various functions that were previously performed by individual ECUs will be bundled in defined zones. Here it is particularly important to cover the different developments and requirements of the market as best as possible in the course of the research work and to prepare for potential series developments. The first demonstrator for this was already set up at the end of last year and is now gradually being put into operation and integrated into the zone architecture. To demonstrate the possibilities and functionalities, a first demo application for pedestrian detection and thus pedestrian protection is being implemented on the system.

### Pedestrian detection by means of AI

The environmental data collected by the various sensors is processed with the help of artificial intelligence (AI) methods in order to reliably detect particularly vulnerable road users, such as children, pedestrians or cyclists. Training the AI algorithms requires the analysis of thousands of different traffic situations. Therefore, a wide variety of scenarios are first simulated with the help of computer simulations and the sensor data required for the AI system is derived from this. The final fine-tuning of the evaluation procedures is carried out with the help of real measurement data recorded during journeys with the test vehicle. After completion of the training phase, different AI algorithms are available for the demo application for pedestrian protection. Since pedestrian detection in the control unit must take place autonomously and in real time, the focus of the development is on the use of methods that are particularly efficient in terms of computing power and energy consumption.

The zoneZ project is funded by the Federal Ministry for Climate Protection within the framework of the RTI programme Mobility of the Future and is managed by the Austrian Research Promotion Agency.

### More about the AIT Center for Vision, Automation & Control

The AIT Austrian Institute of Technology is Austria's largest non-university research institution. At the European level, it plays a key role as the research and technology institution that deals with the central infrastructure issues of the future.

The Center for Vision, Automation & Control (VAC) is one of a total of seven research units at AIT. It is dedicated to industrial automation and digitalisation and uses the opportunities they offer to initiate and drive innovations for industry. The centre conducts research in the areas of image processing, automation and control, as well as the use of artificial intelligence methods. The centre covers the entire automation chain, from the acquisition of information by intelligent sensor systems to AI-based decision-making by autonomous systems. The research work at the centre results in innovations to increase the flexibility, adaptivity and resilience of companies while simultaneously improving energy and resource efficiency and minimising production costs.  
[ait.ac.at/vac](http://ait.ac.at/vac)

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#Sensors #E-vehicles #Environmental sensing #Driver assistance #Traffic safety

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