

Press Release

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AUTOMATED FORKLIFT TRUCK: PRESENTATION AT THE AIT LARGE-SCALE ROBOTICS LAB

The AIT Austrian Institute of Technology researches and develops automated, safe and user-centred transport and logistics systems.

The European research project 'AWARD' (All Weather Autonomous Real logistics operations and Demonstrations) is investigating how automated transport vehicles can sustainably improve the transport of goods in all weathers in Europe. At an international level, the project partners are investigating a wide range of use cases and scenarios. In Austria, the AIT is focussing specifically on the automation of loading and unloading processes using forklift trucks in outdoor operations. This should significantly increase efficiency in the logistics sector in the future.

AIT plays a key role in the optimisation of logistics processes. 'AWARD is a model project that underlines our focus on the topic of Industry 5.0: it is about intelligent automation for more sustainability and efficiency - including the human factor,' emphasises Andreas Kugi, Managing Director of Scientific Excellence at AIT.

The AIT Centre for Technology Experience (AIT coordinator for AWARD) and the AIT Centre for Vision Automation and Control are involved in the development of the automated forklift truck, which incorporates human-machine interaction. The driverless forklift truck was presented on 7 May as part of the AWARD project in the Large-Scale Robotics Lab, AIT's own outdoor test site for work machines in Seibersdorf. In a specific use case, the automated loading and unloading of a truck with pallets to and from a loading zone was demonstrated.

Intelligent automation for robust outdoor operation

Automating the complex process of loading and unloading operations, especially in different weather conditions, without predetermined routes and in environments with a wide variety of obstacles, is a challenging task. The precise loading of pallets requires centimetre-accurate positioning of the forklift truck, which is ensured by the use of the latest sensor technologies and intelligent software solutions.

Significant challenges for automated vehicles and machines continue to be unstructured environments and changeable weather conditions. 'The first and most important requirement was therefore to develop a system that adapts flexibly to the current situation and operates with the required level of safety and functionality in all weather conditions,' emphasises Patrik Zips, expert in the field of automation at AIT.

By using the latest algorithms, AIT researchers have now succeeded in significantly improving the adaptability and precision of the forklift truck. These advances make it possible to react more

effectively to unforeseen events, such as sudden obstacles. Artificial intelligence plays a crucial role in the operation of autonomous forklift trucks in the logistics sector. 'AI-based methods are indispensable for sequence control, error detection and, in particular, for the recognition and centimetre-precise positioning of load carriers,' says Markus Murschitz, who works on the environmental perception of autonomous work machines and commercial vehicles at AIT. In logistics, load carriers such as pallets, mesh boxes, containers and customised transport racks are used to bundle several goods into a single load unit. While forklift truck drivers can intuitively recognise different loads based on their experience and react accordingly, this poses a much greater challenge for an autonomous machine. Recognising different, often concealed load carriers is only possible with neural networks.

Human-machine interaction

In addition to the technical challenges, AIT's research also focussed on the interaction between humans and machines. 'The aim is to support people in synergy with future autonomous systems and to develop a human-centred interface for interaction with the automated forklift,' says Setareh Zafari, human-robot collaboration expert at AIT, describing the challenge.

In order to find out more about the acceptance of the autonomous forklift truck, a survey is currently being conducted as part of AWARD. The aim of the study is to gain a better understanding of how people think about the use of automated vehicles in the logistics sector and what the design and functionalities of automated logistics vehicles should look like. Industry experts, logistics professionals and researchers as well as the general public and representatives from the public sector and machine manufacturers are invited to take part. The study will run until May: <https://award-h2020.eu/index.php/award-survey-4/>

Outlook for the future

The primary aim of the AWARD project is to promote the commercial use of automated vehicles in the logistics sector and to formulate recommendations for certifications and authorisation processes as a basis for political decisions. In addition, it should be possible in future to monitor a fleet of forklift trucks or other machines remotely and assign tasks. As part of the project, data was therefore specifically collected and made available to the industry partners for the development of a sophisticated fleet management system.

AWARD project: Large consortium with diverse expertise

The AWARD project 'All Weather Autonomous Real logistics operations and Demonstrations' (AWARD), which is funded by the European Commission through the HORIZON 2020 framework programme with almost 20 million euros, aims to develop and operate safe automated transport systems in a variety of real-life use cases in different scenarios.

Manufacturers of heavy goods vehicles, technology providers, end users and logistics operators from factories, warehouses, ports and airports as well as research institutions, laboratories and regulatory authorities from eleven European countries (Austria, Norway, France, England, Belgium, Denmark, Finland, Germany, the Netherlands, Spain, Switzerland) and Israel are working together on the project. In Austria, the AIT Austrian Institute of Technology, the DigiTrans test region, the Automotive Cluster, AustriaTech, the Linz Centre of Mechatronics, the University of Applied

Sciences Upper Austria, BRP Rotax, DB Schenker and Business Upper Austria are also involved in the AWARD project. The project has been running since January 2021 until mid-2024 and is coordinated by EasyMile. The French company specialises in the development of software for driverless mobility and the production of autonomous vehicles.



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Further information:

[Project Webseite AWARD](#)

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