

## Press Release

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### **KION Group starts research project ARIBIC: creating high-resolution digital twins of warehouses**

- **Project partners KION Group, LeddarTech, Karlsruhe Institute of Technology (KIT) and the STARS Lab at the University of Toronto develop intelligent indoor cartography**
- **ARIBIC is funded by the National Research Council of Canada Industrial Research Assistance Program (NRC IRAP) and the German Federal Ministry for Economic Affairs and Energy (BMWi)**
- **Project scheduled for completion in the fourth quarter of 2023**

Frankfurt/Main, 4 August 2021 – The KION Group and its cooperating partners LeddarTech, Karlsruhe Institute of Technology (KIT) and the STARS Lab at the University of Toronto have started research project “ARIBIC”. The acronym stands for “Artificial Intelligence-Based Indoor Cartography”: continuous data evaluation shall make it possible to create a real-time digital twin of a warehouse or a production environment. This is a further step in order to enhance already existing digital twin solutions as well as simulation and emulation platforms of KION Group. German and Canadian government agencies are convinced of the project's potential and provided research budgets. The research project is one of several cooperations KION Group has already started with different partners.

Automated guided vehicles are already being used on a large scale in warehouses and production facilities today. With modern sensor technology such as laser scanners and cameras, they find their way safely through racks, production lines, and warehouses. In the process, they continuously generate a considerable amount of data about the environment in which they move. However, this data is usually not yet systematically processed and lies fallow. What if the full potential of these bits and bytes could be exploited?

#### **Creating a digital twin of a warehouse**

Systematic data processing is precisely where the ARIBIC digitization project implemented by the STILL, a KION Group subsidiary supplying industrial trucks and related services, comes in. “The data collected by the sensors on the vehicles are used

to create high-quality, high-resolution 3D maps of warehouses or production facilities. The objective is to create a digital twin of the environment, thus enabling relevant information to be displayed and shared in real time,” says Dr. Henry Puhl, Chief Technology Officer of the KION Group. “Today, many industrial companies apply so-called post-digitization of their production environments and warehouses. However, this only captures a snapshot. The research results of the ARIBIC project go further by enabling continuous data evaluation,” adds Dr. Joachim Tödter, Senior Director Technology & Innovation at the KION Group.

The data generated by the sensor system is sent to the vehicle, processed there, and sent to the ARIBIC cloud platform. The sensor data is then processed further in the cloud. The advantages of this solution are obvious: firstly, the user receives live information about object locations via tracking & tracing. This information makes it possible, for example, to simulate the routes of vehicles and thus optimize processes in the warehouse and production. At the same time, intelligent digital services offer the advantage that anomalies such as a blocked route are detected and reported. The consistent evaluation of the data shall ultimately lead to a warehouse’s entire structure being optimized and adapted.

“KION is already in a position to implement such techniques: ARIBIC provides an important progress in adding computational perception capabilities. Those leverage edge intelligence and open the door to many applications ranging from more efficient design of flexible automation and mobile robotic operations for the warehouse of tomorrow to inspection and detection of warehouse material placement and distribution that is critical to workflow optimization for many logistics operations,” says Hamid Montazeri, Senior Vice President, Software & Digital Solutions Development at Dematic, a KION Group subsidiary offering supply chain solutions and related services.

### **Project partner LeddarTech with strong expertise in sensing**

The idea for the research project originated in the summer of 2019 in the Technology & Innovation department of KION Group. In preparing the funding application, cross-border partners from industry and research were recruited: LeddarTech, a leading company in environmental sensing solutions for autonomous vehicles and advanced driver assistance systems headquartered in the Canadian province of Québec is significantly involved in the project. The contribution of LeddarTech to the project will be centered around the sensor system, which leverages their technological expertise in sensing, perception, and sensor fusion for mobility applications.

“When KION approached us and explained their vision for ARIBIC, it was clear from the beginning that we had to be part of this project,” said LeddarTech’s Chief Technology Officer, Pierre Olivier. “Not only does it allow us to collaborate with an industry leader as well as with two renowned labs, it also represents a perfect opportunity to leverage

LeddarTech's strong expertise in sensing, in integrating sensing platforms on vehicles, and in maximizing the potential from the available sensor data," added Mr. Olivier.

### **Strong cooperation between industry and science**

Research partners are the Karlsruhe Institute of Technology (KIT) and the STARS Lab at the University of Toronto, both leading institutes in artificial intelligence and robotics. As part of the ARIBIC project, the STARS Lab will develop methods to extract detailed semantic information (object labels) from large 3D maps of warehouse environments. "ARIBIC is a perfect project for us to collaborate on current research topics with international partners and to establish new industry relationships", says Prof. Jonathan Kelly, head of the STARS Lab.

The Department of Robotics and Interactive Systems of the Institute of Materials Handling and Logistics Systems (IFL) at the KIT researches future-oriented robotics solutions with practical benefits for its users. The field of research includes topics such as mapping and localization of mobile robots, computer vision, automated grasping and placing of various articles, and the development of intuitive human-machine interaction. Within the ARIBIC Project the IFL focusses on the detection of intralogistics elements in 3D sensor data, as well as the merging of maps in multi-robot scenarios. "We are very much looking forward to the opportunity for international cooperation", states Prof. Kai Furmans, head of IFL.

At the beginning of 2021, the project was approved by the National Research Council of Canada Industrial Research Assistance Program (NRC IRAP) and the German Federal Ministry for Economic Affairs and Energy (BMWi), and funding was secured. The project is scheduled for completion in the fourth quarter of 2023.

### **About KION**

The KION Group is among the world's leading suppliers of industrial trucks and supply chain solutions. Its portfolio encompasses industrial trucks, such as forklift trucks and warehouse trucks, as well as integrated automation technology and software solutions for the optimization of supply chains, including all related services. Across more than 100 countries worldwide, The KION Group's solutions improve the flow of material and information within factories, warehouses, and distribution centers.

The Group, which is included in the MDAX, is the largest manufacturer of industrial trucks in Europe in terms of units sold in 2020. In China, it is still the leading foreign manufacturer (as measured by revenue in 2020) and number three overall. The KION Group is also one of the leading providers of warehouse automation worldwide (as measured by revenue in 2019). At the end of 2020, more than 1.6 million of the KION Group's industrial trucks and over 6,000 of its installed systems were in use by customers

of various sizes and in numerous industries on six continents. The Group currently has in excess of 36,000 employees and generated revenue of €8.3 billion in 2020.

*Current KION Group images can be found in our image database at <https://mediacenter.kiongroup.com/categories> and on the websites of our various brands.*

## **About LeddarTech**

LeddarTech is a global leader in environmental sensing platforms for autonomous vehicles and advanced driver assistance systems. Founded in 2007, LeddarTech has evolved to become a comprehensive end-to-end environmental sensing company by enabling customers to solve critical sensing and perception challenges across the entire value chain of the automotive and mobility market segments. LeddarTech enables Tier 1-2 automotive system integrators to develop full-stack sensing solutions for autonomy level 1 to 5. These solutions are actively deployed in autonomous shuttles, trucks, buses, delivery vehicles, smart cities/factories, and robotaxi applications.

Additional information about LeddarTech is accessible at [www.leddartech.com](http://www.leddartech.com) and on LinkedIn, Twitter, Facebook, and YouTube.

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## **Disclaimer**

This release contains forward-looking statements that are subject to various risks and uncertainties. Future results could differ materially from those described in these forward-looking statements due to certain factors, e.g. changes in business, economic and competitive conditions (including with respect to further developments in relation to the COVID-19 pandemic), regulatory reforms, results of technical studies, foreign exchange rate fluctuations, uncertainties in litigation or investigative proceedings, and the availability of financing. We do not undertake any responsibility to update the forward-looking statements in this release.

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