



ITK Engineering joins forces with Lenord+Bauer to optimize train localization

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A railway company that knows its trains' exact location can improve capacity and set the stage for more automated rail operations. Effective and safe localization is the key to all this. Yet current methods for determining the position of trains have their limits. ITK Engineering is developing MAROS, an intelligent localization solution, to push beyond those limits. Now the company has teamed up with sensor specialist Lenord+Bauer to expedite the rollout of MAROS to railroad networks around the world.

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One of the great challenges for tomorrow's rail services is how to run more trains without having to build more tracks. The ability to localize every train safely and effectively is crucial to this end. A railway operator needs to know the location of its trains – and the more precise the positioning, the greater the leeway and speed at which the company can adjust the timetable. ITK Engineering has been working towards a localization solution with this goal in mind since 2020. Magnetic Railway Onboard Sensor, or MAROS for short, helps pinpoint trains' position continuously, reliably, and with track-by-track accuracy. Now the company has teamed up with sensor manufacturer Lenord+Bauer to drive the development and rollout of MAROS.

Press Release

A strategic partnership to fast-track the transition to more sustainable transportation

"We are delighted to have found an excellent partner in Lenord+Bauer – one which will enable us to continue the MAROS success story," says Andreas Hohl, head of Rail business unit at ITK. Originally a family-owned company from Oberhausen in Germany, Lenord+Bauer has been developing and marketing products and systems for automated measurement of speed, position, acceleration, and temperature – especially sensors for rail vehicles – for over fifty years. "For us, the partnership with ITK Engineering represents an exciting and promising journey that will take rail transportation to the next level with the help of smart sensor technology," adds Ulrich Rink, head of the Mobility business unit at Lenord+Bauer. "We want to help boost the capacity of existing rail networks and thereby reduce the carbon footprint of passenger transport."

MAROS measures the track's unique magnetic fingerprint

The sensor is attached to the underside of the locomotive. It uses a magnetic field to measure the ferromagnetic properties of sections of track as the train passes over them. These properties are as individual as a human fingerprint, meaning that each section of track can be clearly localized. "Extensive testing in Germany, Austria, and Switzerland has demonstrated that trains can be localized track-selective and continuously at all times" says Dr. Tobias Hofbauer, program manager at the Rail business unit of ITK.

As the train moves, the individual localization signature is continuously assigned in real time to an exact geographical position. For this purpose, ITK has developed a software solution, including intelligent algorithms. Initially, each railroad route is surveyed with the sensor and the resulting magnetic-field data superimposed on a map of the geographical location of the track. Any subsequent train can therefore be precisely localized or the train can send its measurement data to the infrastructure provider's backend for further analysis. Given its autonomy from additional elements such as balises or GNSS, MAROS is equally suitable for mainline railroads, branch lines, and subways.

Decades of experience in sensor technology

Lenord+Bauer is to develop the sensor unit for MAROS, thereby bringing its expertise to bear on the rail industry. The unit in question is a special sensor array based on individual magnetic field sensors. This is mounted on both sides of the bogie above the top edge of the rail. "We're highly familiar with the conditions in this environment," says Rink. "The sensor will be continually exposed to vibration, dirt, and fluctuating temperatures, which is why it needs to be very robust."

Research with MAROS for Digital Rail Germany initiative

The partnership between ITK Engineering and Lenord+Bauer aims to further refine the sensor, conduct testing, and then bring it to market as quickly as possible. As of 2023, the sensor has featured in the AutomatedTrain research project of "Digitale Schiene Deutschland", which is funded by the Federal Ministry for Economic Affairs and Climate Protection (BMWK) to the tune of 42.6 million euros. Here, ITK Engineering is working with partners from industry and science on technology for fully automated staging and stabling runs.

Press Release

Note: Interested parties can view the MAROS sensor solution at the InnoTrans 2024 trade fair in Berlin from September 24 to 27. ITK Engineering can be found in hall 20 at booth 320, Lenord+Bauer in hall 27 at booth 561.

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About ITK Engineering

ITK Engineering GmbH, founded in 1994 as an “engineering firm for technical cybernetics,” is an internationally operating technology company in the software and systems engineering field. Thanks to its strong methodological expertise, ITK covers the entire spectrum – from embedded systems to cloud computing. With around 1,300 employees, the company is an innovative force in digital engineering. Customers in sectors ranging from automotive, industrial, and railway engineering to medical systems, agricultural/ construction machinery, and motorsports count on ITK to instill intelligence in highly complex systems. Some 1,300 employees currently work for ITK worldwide, at the company headquarters in Ruelzheim in Germany’s Rhine valley, at nine additional branches located across Germany and in Austria, China, Japan, Spain and USA. The company has been a wholly owned subsidiary of Robert Bosch GmbH since 2017.

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