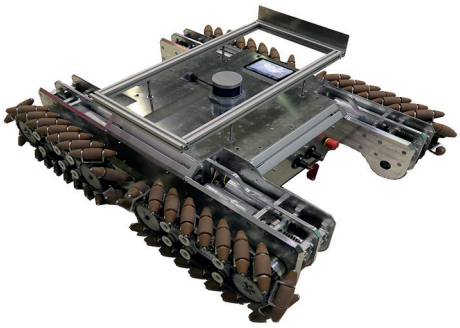
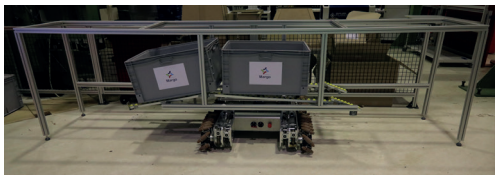
MARGO

Optimizing Material Flow with AGV's in Ring Gear Production





Left: Prototypical automated guided vehicle with mecanum chain drive | Above: AGV with KLT transfer station in pilot test, Photos: BIBA

Motivation

Due to a lack of skilled workers and external cost pressure, small and medium-sized production companies are also forced to optimize and automate processes. A great potential lies in logistic processes, which often take place manually and thus require productive working time of skilled personnel. For small and medium-sized companies, however, the initial investment for automated processes represents a major hurdle.

Approach

For the identification of optimizations, the production environment of a ring gear manufacturer was mapped in a 3D simulation environment that is part of OPIL (Open Platform for Innovation in Logistics). This made it possible to quickly and cost-effectively evaluate and compare different deployment scenarios of automated guided vehicles (AGVs). A prototypical AGV of the BIBA was extended by a lidar-based environment detection and the vehicle control was converted to ROS (Robot Operating System). Subsequently, the AGV could be integrated into the cloud-based IoT platform. This allowed existing processes to be connected with new material handling processes. After integration, the AGV was controlled directly via OPIL based on the simulation results. The pilot test in the BIBA´s hall serves to demonstrate the feasibility and potentials of the optimization in order to drive a fast automation of the material flow in the SME. For the selected application scenario, a KLT transfer station was developed, with which a change of KLTs under the metal scrap conveyor of CNC milling machines is made possible by the movement of the AGV only.

Results

In the MARGO project, the internal material flow at the ring gear manufacturer KLS Ljubno was optimized. For this purpose, the structure of the production hall was first digitally transferred to OPIL and the optimization potential was determined by simulation. Based on the simulation results and the general conditions provided by the prototypical FTF of BIBA, the integration and control in OPIL could be successfully tested in an application scenario.

Publication:

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BIBA is an engineering research institute located at the University of Bremen. It is committed to basic research as well as to application-oriented development projects and engages itself in practice-oriented implementations, whereby it relies on cross-national, -institutional and interdisciplinary cooperation and transfer. BIBA always considers the entire value-added chain: from the idea, concept and production, through to the use and the end recycling of a product.

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