

# MARS

Mobile Autonomous Robot for Safe sorting



Left: Collaborative sorting robot | Above: Collaborative vehicles and humans work hand in hand in the sorting centers, Photos: Fives

## Motivation

Automated guided vehicles or autonomous mobile robots are widely used for sortation applications in postal and e-commerce applications. In this context, they increase both flexibility and scalability of logistics sorting centers. Currently, two contrasting solutions are present in the market. First, collaborative sorting robots that operate at low speed in the same areas as humans. This allows employees to load and unload objects from the robots. These systems are characterized by very high flexibility. However, for safety reasons, they operate at reduced speed and thus lower performance. Second, non-collaborative systems that operate completely separate from humans, allowing higher speeds and performance. For this, however, they require a cage that severely restricts potential usage scenarios.

## Objective

The MARS project will develop an intelligent system that allows switching between these two principles. Based on an existing

vehicle, it offers the optimal compromise between the two modes of operation; it is safe for humans and at the same time offers maximum possible efficiency through increased driving speed in closed-off areas.

## Approach

The system is equipped with a unique and secure localization of the position in each vehicle. Based on the determined position, the vehicles independently adjust their behavior. In collaborative areas, they intelligently avoid people, vehicles and other obstacles. If the vehicles detect that they are in a cordoned-off area, they increase their operating speed, maximizing the performance of the system. This solution allows any combination of collaborative workspaces with areas of maximum performance. Accordingly, the MARS system can be used both to expand existing systems and to design new flexible sorting systems. For this purpose, BIBA creates a localization concept and compares technical solutions. The concept to be used is verified by evaluation in technology tests.

## DURATION:

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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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