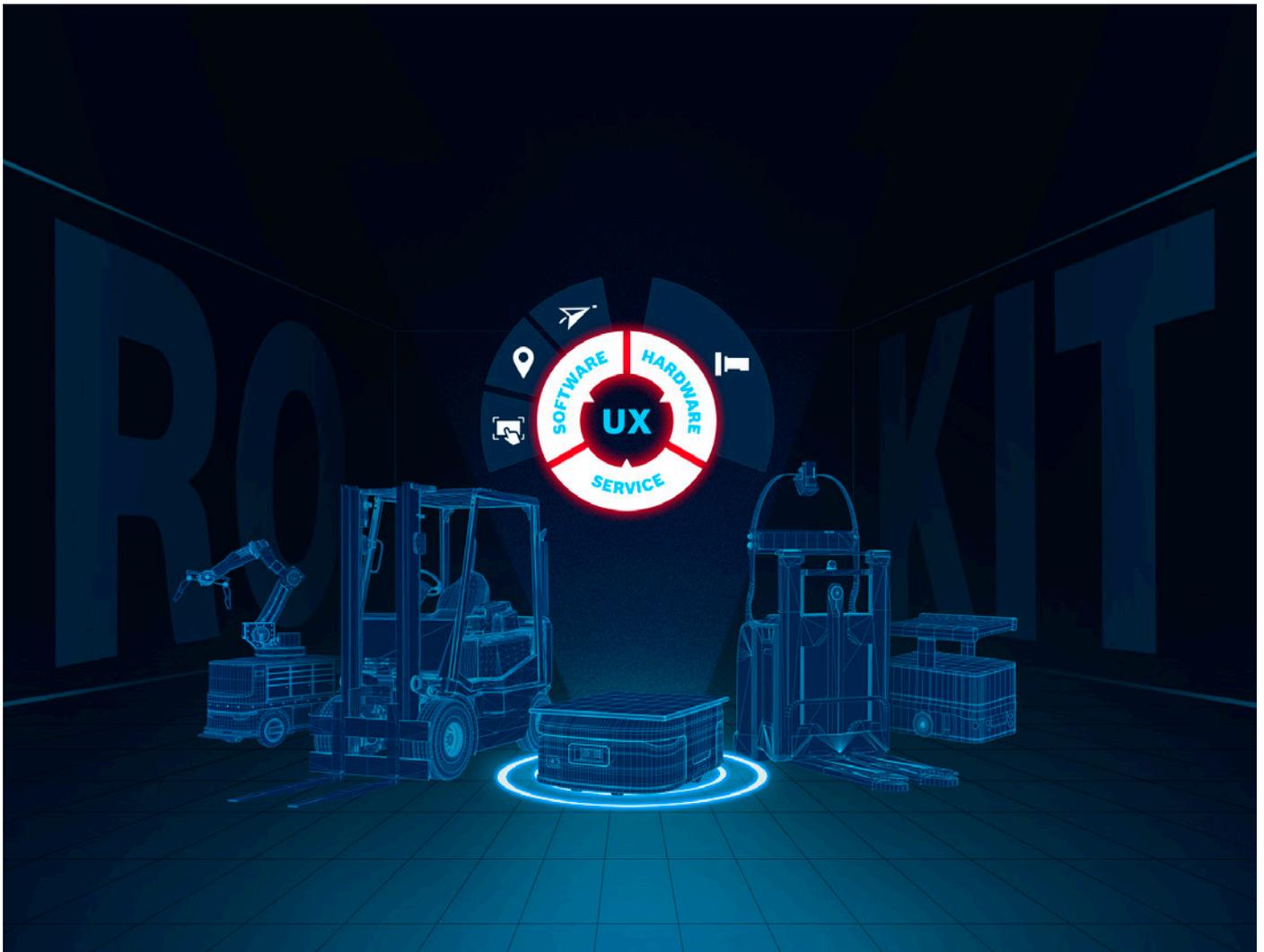


Implementing Mobile Robotics with Bosch Rexroth

Examining innovations for warehouse and intralogistics applications

Matthew Jaster, Director, Editorial Content



Bosch Rexroth continues to expand the ctrlX platform with new capabilities and automation enhancements. The control platform ctrlX COREplus is now available with AI functions on all performance levels. In the area of motion and drives, Bosch Rexroth is presenting compact, energy-efficient, and cabinet-free drives from the ctrlX DRIVE portfolio, which cover virtually all performance ranges. These are complemented by the Motion, CNC, and Robotics software ctrlX MOTION, which is ideal solution for automating production machines and systems. *PTE* recently had a great conversation with Garrett Wagg, product manager, controls at Bosch Rexroth on new developments in mobile robotics.

PTE: What are the greatest challenges and obstacles facing companies in warehouse/intralogistics today regarding mobile robot technologies?

GW: There are quite a few challenges and obstacles warehouse/intralogistics companies may deal with when implementing mobile robotic technologies into their business. The first and most important in my opinion is the challenge of providing safety to the company's employees. When implementing mobile robotics, a company must design safe zones and deploy controlled functional safety features into their mobile robotics that share work zones with humans. Another obstacle includes the growing need for cybersecurity. Mobile robotics connected to a network are vulnerable to cyber-attacks that could disrupt operations, steal data or even harm a human. Other challenges include scalability and flexibility. As a business grows and evolves how easy is it to scale your mobile robotic platform to add additional robots to your fleet and add additional features and technology like Ai or advanced collision avoidance.

PTE: How are Bosch Rexroth's latest products and solutions geared toward improving mobile robots?

GW: One of Bosch Rexroth's latest products recently launched that was designed for improving the mobile robotics market is the "ROKIT." The ROKIT is an "a la carte" mobile robotic solution set allowing a company of any size to design their own mobile robot that tailor fits their business. Whether a business is looking for a simple AGV or an advanced AMR the ROKIT kit gives that flexibility. This solution set is made up of an integrated 6 in 1 motor that combines a wheel, servo drive, motor, gearbox, brake and certified functional safety in one package that is easy to install into an AMR or AGV. This solution set also consist of a navigation software & localization

software that can be run on Bosch Rexroth's ctrlX CORE or packaged in a container to be run on a 3rd party controller or IPC. This solution set also gives the user easy integration with a variety of sensors and lidars giving the user freedom of choice. The ROKIT solution is truly flexible, and a user can choose to implement just the motor and use their own software package or could keep their mobile robot design and implement the navigation and localization software on their own hardware.

PTE: What highlights of the latest version of ctrlX provide customers with the tools they need to build mobile robots?

GW: Aside from the ctrlX ROKIT mentioned, the ctrlX platform offers a variety of tools for the mobile robotics industry. When it comes to implementing safety into a mobile robot, Bosch Rexroth has the ctrlX safety controller that can implement functional safety features into a mobile robot like safe limited speed, safe stop functions and many other safety functions protecting humans and important machinery a mobile robot may work around. Other tools like the Hailo Ai extension on the ctrlx CORE & NIVIDIA extension on the ctrlX IPC can help with vision and inspection tools on a mobile robot.



Garrett Wagg

PTE: Outside of warehouse and intralogistics, does Bosch Rexroth provide mobile robotic solutions for precision-focused areas such as aerospace or medical applications?

GW: Bosch Rexroth does not provide mobile robotic solutions in these industries currently, however one of Bosch's recent acquisitions, Elmo Motion Control, provides servo drive technology for mobile robotics in all these markets and more.

PTE: What role is AI playing in these technologies as we head into 2026?

GW: AI is playing an increasingly central and transformative role in mobile robotics, moving them from programmable machines to truly intelligent, autonomous, and adaptive systems. AI is no longer a peripheral component but the brain and nervous system enabling advanced capabilities. Some of the capabilities include enhanced perception and understanding of its environment like object recognition and classification. Another key capability is intelligent navigation and path planning. Instead of a programmed route an Ai capable mobile robot can generate an optimal path in real time based on obstacles, congestion and efficiency.

PTE: Explain the idea of "mixed fleets" in warehouse operations and the integration of manual vehicles into a fleet management system to make efficiency gains.

GW: A "mixed fleet" in warehouse operations refers to the simultaneous use and coordination of multiple types of automated vehicles (AMRs, AGVs, etc.) alongside traditional manually operated equipment (forklifts, pallet jacks, tuggers) and human workers within the same operational space. A fully automated warehouse is often not



practical or economically viable for many companies. Instead, a hybrid approach leverages the strengths of both human and machine resources. Humans excel at handling highly variable tasks, problem-solving, and dealing with unexpected situations. Automated vehicles excel at repetitive, predictable tasks. A mixed fleet provides the best of both worlds.

PTE: How do your software tools help customers get the most out of their modular automation needs today?

GW: Bosch Rexroth's software tools are the backbone of the ctrlX ecosystem and what makes ctrlX such a powerful platform. With over 100 different software apps, the ctrlX app store gives the user ability to integrate a variety of software tools into whatever automation task they need accomplished. Some of these tools include apps for software development kits allowing a programmer to code in a variety of different coding languages, dashboard tools to create

HMI interfaces, data collection & historian tools, security tools like VPNs and additional firewalls and so many more. With ctrlX OS a user can choose which of these software apps will benefit them and allow them to easily test and add tools to their controls configuration.

PTE: How will the mobile robotics sector look in the next five to ten years? What do you think will stand out in the future? What might surprise manufacturers in this market?

GW: The mobile robotics sector is poised for explosive growth over the next five to ten years. I think with evolving technology and AI it will make mobile robotic solutions much more common and practical. Some evolving features to look forward to that may surprise manufacturers include advanced cognitive autonomy to truly understand its environment, flexibility to change tasks on the fly, more advanced AI

features to interact with human works in a safer and more efficient manner and lastly advancements in battery technology, wireless charging and autonomous energy harvesting.

PTE will continue to cover new component, automation and motion control trends from Bosch Rexroth in upcoming issues of the magazine and on the website.

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