

KINEXON



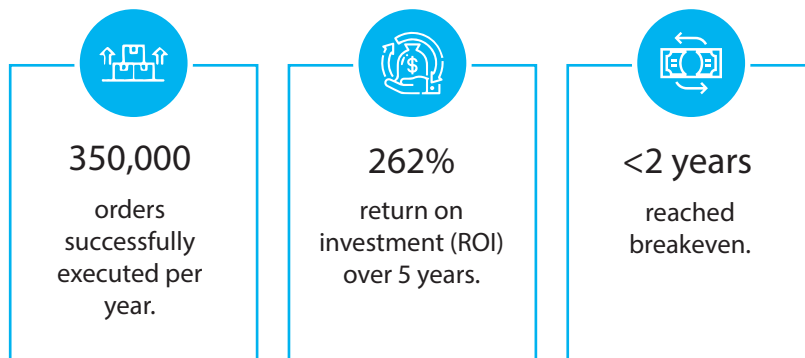
Continental 



Case Study

**Driving Operational Efficiency with
KINEXON AMR & AGV Fleet Management**
Continental's Success with over 250% ROI
in Autonomous Mobile Robot Operations

The Results at a Glance



With KINEXON Fleet Manager, Continental harnessed the power of centralized control for their fleet of AMRs in specified use cases. This centralization unlocked an array of capabilities, enabling them to effectively oversee diverse robot types, allocate tasks with precision based on AMR positions, and seamlessly integrate a forklift avoidance system. As a direct outcome, Continental has achieved a new standard of operational excellence, facilitating punctual, error-free task completion. This transformative shift has elevated their productivity and streamlined their entire operational framework.



Core Solution Benefits

- Increased efficiency
Replacement of eight manually operated forklifts
- Improved flexibility
Low integration effort due to VDA 5050 compliance
- Enhanced process quality
Minimizing failure rate in transports



Prof. Dr.-Ing.
Tobias Bornemann
Senior Product Manager
AMR, Continental



The combination of KINEXON Fleet Manager and Continental Autonomous Mobile Robots showed that this option has helped us across use cases to automate and standardize the core processes that are needed to ensure long-term success in the highly competitive automotive business."

The Situation

In Continental factories in Rheinböllen (Germany), Zvolen (Slovakia), and Changshu (China), the production processes for friction brake and electronic parking brake systems encountered challenges tied to manual transport using forklifts for heavy materials, despite efforts towards automation. Complex material movement, safety considerations concerning loads exceeding a ton, and intricate layouts posed continuous issues. Within Continental's vast global manufacturing footprint, spanning Rheinböllen, Zvolen, and Changshu, the production of critical automotive components - friction brake and electronic parking brake systems - presented challenges. Despite their ongoing efforts towards automation, manual material transport via forklifts remained the practice, amplifying complexities. Stricter safety regulations, especially regarding loads exceeding a ton, further compounded the challenges. Each facility exhibited unique complexities. Notably, Rheinböllen's factory contended with navigation issues, stemming from an abundance of windows, intensifying the intricacies of their production processes. Meanwhile, in Zvolen, the mission

was to automate analogous tasks, including the transportation of brake caliper raw materials and machined parts to the galvanic area. Ensuring the safety of autonomous material transport, particularly for standardized EU pallet loads, emerged as an imperative. Furthermore, the sites shared a common challenge: maneuvering through narrow corridors, profoundly affecting operational efficiency and safety. In Changshu, the brake caliper production process encompassed multiple stages, involving the movement of raw materials from the warehouse to machining and, subsequently, the transfer to the galvanic area. This intricate cycle also entailed the return of empty carriers to the warehouse. This presented a two-fold challenge: first, the imperative to automate these factories with cutting-edge mobile robots; second, the need for a robust fleet management solution that would seamlessly connect diverse mobile robots and ensure future scalability and expansion.

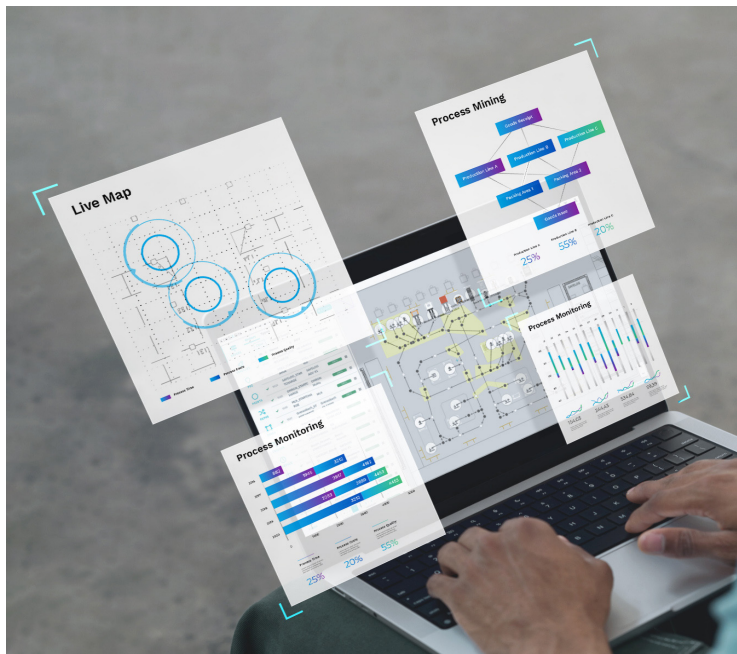
The Challenges

 Manual transport inefficiencies	Heavy materials requiring manual transport using forklifts despite automation efforts.
 Complex material movement	Complex movement of materials across plant sections.
 Standardization	Uncertainty of future rollout and expansion with a mix fleet
 Intricate layouts	Challenges posed by intricate layouts of the production area.
 Navigation issues	Navigation complexities in confined spaces and narrow corridors.
 Forklift reliance	Overreliance on forklifts for critical tasks.
 Safety Assurance	Ensuring safety during autonomous transport of heavy loads.
 Operational Bottlenecks	Addressing bottlenecks in task allocation and traffic flow.

The Requirements

To solve these challenges, Continental's requirements towards a fleet manager for AMRs were demanding: To address the Continental AMR rollout, KINEXON delivered its fleet management solution:

- Efficient traffic management for overseeing AMR traffic and dynamic route optimization.
- Adaptive job allocation for allocating tasks based on factors like robot location, battery levels and distance from zones.
- Scalable for various scenarios including system loads and integration with third-party AMRs using industry standards.
- Real-time error handling for dynamic error and warning management, which is essential for safe and efficient operations and ensures swift corrective action.



The Solution

To address the Continental AMR rollout, KINEXON delivered its fleet management solution:

KINEXON OS: The operating system and its various microservices serve as the backbone of KINEXON Fleet Manager. The platform empowers the fleet management solution to scale, serve multiple use cases and ultimately decrease customer time-to-market.

KINEXON Fleet Manager: Designed to streamline and enhance fleet management operations, its standout feature lies in its VDA 5050 compatibility, empowering customers to seamlessly operate their preferred robots from various manufacturers. This vendor-agnostic approach enables the integration of multiple vehicles and interfaces on a single shop floor, creating a unified and efficient automation environment.

Prof. Dr.-Ing. Tobias
Bornemann
Senior Product Manager AMR,
Continental



Using KINEXON as one of our partners for our AMR robots has further optimized our operation processes in many use cases. The ability to efficiently manage and automate the traffic flow for our robot fleet has optimized task allocation and eliminated bottlenecks. Furthermore, the integration of the solution with our shopfloor technology has enabled forklift collision detection, taking our safety measures to the next level. We further improved the operation with greater precision and confidence, knowing that our operations are automated and also safeguarded. Working with KINEXON continuously helps us to increase our level of operational excellence.”

Solution Features

- Dynamic order generation
- SAP Extended Warehouse Management (EWM) integration
- Geofencing via coordinates
- Push buttons on tablets

Solution Benefits

- Boosts customer productivity
- Automates site processes
- Optimizes material flows
- Improves safety measures
- Maximizes robot utilization

Third-party integrations: KINEXON Fleet Manager establishes connections with multiple on-floor systems. The strategic integration bolsters safety protocols, provides valuable guidance, and contributes to the overall productivity of the factory or shopfloor environment.



The Benefits

Boosting Productivity and Extending Automation

When utilized alongside the Continental AMR IL 1200 and other robots, KINEXON Fleet Manager excels in selecting the optimal robot type for each unique use case within the customer's ecosystem. Leveraging factors like the robot's current charge status, real-time traffic data, and proximity to charging stations, the solution dynamically optimizes the availability of the robot fleet in real time. This synergy enhances productivity while extending the scope of automation across various operational scenarios.

Streamlining Material Flow and Enhancing Safety

KINEXON Fleet Manager offers extensive flexibility, empowering shopfloor supervisors to exert full control by digitally partitioning areas into discrete zones. This innovative zoning concept paves the way for real-time traffic management, operating in alignment with customized rules for each zone. These zones can be further categorized into various access levels, including restricted and fire alarm zones, fostering an environment of enhanced worker safety. This seamless combination of zones augments safety measures and cultivates a secure operational ecosystem.

Prof. Dr.-Ing. Tobias
Bornemann
Senior Product Manager AMR,
Continental



Implementing KINEXON Fleet Manager for our Autonomous Mobile Robots has transformed our operations beyond our expectations. With the power to orchestrate and automate our robot fleet, we've achieved an additional push for our operational efficiency and accuracy. Our tasks are seamlessly completed, and errors have become a thing of the past. The fleet management solution from KINEXON has saved us time and resources and positively impacted our overall production quality."



Andreas Kerkenhoff
Head of Industrial Engineering
AMR, Continental

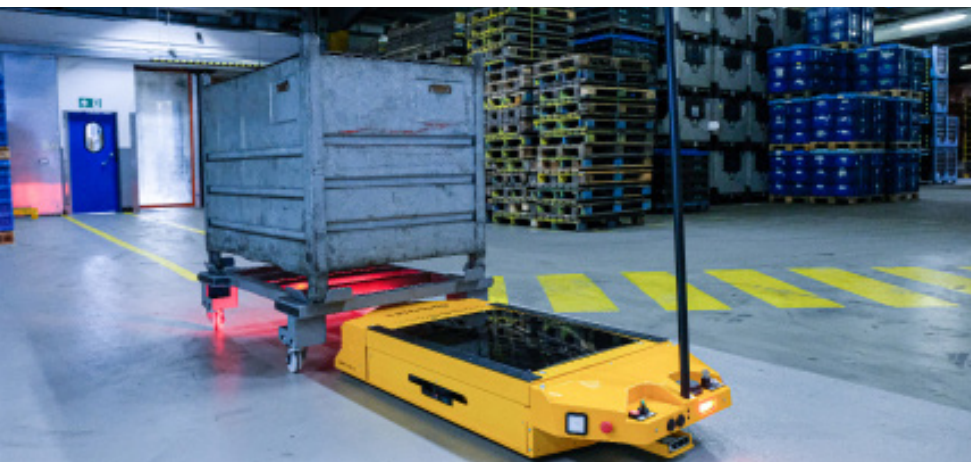


By implementing the Continental Mobile Robots along with the KINEXON Fleet Manager, we were able to reliably automate important core processes to ensure long-time success in the highly competitive automotive business."

Future-Proof and Scalability Assured Through VDA 5050

The KINEXON Fleet Manager offers the foresight to seamlessly plan. It facilitates the incorporation of additional first- and third-party robots, as well as the integration of pre-existing robots, all through the standardized VDA 5050 framework.

This commitment to standardization empowers Continental to remain unconcerned about future challenges stemming from new models or diverse third-party robots. In essence, the choice of robots is according to customer requirements, unhampered by onnectivity limitations. This enables future-proof expansion and the ability to easily scale in line with evolving operational needs. With more than 100,000 orders per year, the AMR fleet has been highly reliable, with the installed system among the things enabled by the inherent zoning capabilities provided by KINEXON.



In Summary

This partnership between Continental and KINEXON has achieved an elevated level of automation in the aforementioned Continental plants with a significant ROI. With an average breakeven period of under 22 months and an impressive 5-year ROI of 262%, the partnership underscores efficiency and profitability.

Spanning three key Continental sites, this transformative partnership has delivered impact. The operational uptime across these sites is a testament to the efficiency gained through seamless automation, ensuring continuous production 24/7. Handling approximately 6,000 weekly orders across these sites demonstrates the enhanced capacity and fluidity brought about by this collaboration. The success rate of the AMRs met all customer requirements, reflecting the reliability and optimization achieved through the powerful combination of Continental's robotics expertise and the capabilities of KINEXON's fleet management solution.

Additionally, the projected breakeven period of just under 2 years showcases the swift and substantial return on investment. This forward momentum points to the strategic and pragmatic integration of technology that Continental and KINEXON have undertaken. The projected 5-year ROI of 262% is a testament to the enduring value generated by this collaboration.



Jörg Rosenland
Head of Supply Chain
Management, Continental



With more than 100,000 orders per year, the AMR fleet has been highly reliable with the installed system among the things enabled by the inherent zoning capabilities provided by KINEXON."

Ken Wang
Continental Business Systems
Manager, Continental



"We are thrilled with how reliable the Continental Mobile Robots running with the KINEXON Fleet Manager are. Every day, the fleet overs the distance of a half marathon, which is why our employees now have the opportunity to dedicate themselves to more complex tasks and take on more responsibility."

Results in Numbers

- 350,000 orders in three-shift operation with 9 Continental Mobile Robots per year
- 24/7 operation, 14 production lines
- Circa 250 km distance per week
- 8 Forklifts replaced



About Continental

Continental develops pioneering technologies and services for sustainable and connected mobility of people and their goods. Founded in 1871, the technology company offers safe, efficient, intelligent and affordable solutions for vehicles, machines, traffic and transportation. In 2022, Continental generated sales of €39.4 billion and currently employs around 200,000 people in 57 countries and markets.

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About KINEXON

KINEXON is a global technology leader that develops groundbreaking solutions for connected and automated operations in automotive, manufacturing, and aerospace industries. The company is a pioneer of nextgeneration cloud software, connected devices and indoor location services. KINEXON's end-to-end solutions capture, analyze, and automate processes for industry leaders such as BMW and MTU Aero Engines.

KINEXON's technology also powers performance tracking and advanced analytics for club and professional sports organizations and leagues, including the Fédération Internationale de Football Association (FIFA), and the National Basketball Association (NBA) and more than 400 professional teams worldwide.

Headquartered in Munich, Germany, KINEXON has grown to more than 300 employees across offices in Munich and Chicago. For more information, visit www.kinexon.com.

Interested in discussing your use case? Schedule a meeting with our experts now!

[Schedule your meeting](#)

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