Efficient hospital logistics with AGVs

The automated guided vehicles (AGVs) Medi Move from EK Robotics, a Neura brand, help to optimize hospital logistics enabling hygienic transport, and efficient material flow. CANopen ensures reliable communication inside the vehicles.

In modern hospitals, thousands of meals, medications, sterile goods, and laundry items must be transported reliably and hygienically every day. For a long time, these tasks were labor-intensive; today, automated guided vehicles (AGV) are increasingly taking over the internal flow of materials in hospitals. They operate around the clock, relieve the burden on nursing and service staff, and ensure stable processes even during peak logistics times.

System introduction and control

Introduction of an AGV into existing hospital systems begins with an analysis of transport flows to define optimal routes and time slots. Hospital operations remain largely unaffected during the installation. Test runs are initially carried out outside of peak hours before the system transitions to 24/7 regular operation. The transport manager software assumes central control, distributing transport orders, optimizing routes, planning loading strategies, and monitoring vehicle utilization. In combination with sensor and safety technology, this ensures safe operation even in mixed traffic environments. Training ensures that nursing, service, and technical staff operate and accept the systems efficiently.

CANopen interconnection

For transport robots such as the Medi Move to work precisely, drives, sensors, and safety components must communicate reliably. EK Robotics consistently relies on CANopen for this purpose. A total of nine CAN nodes are installed in the Medi Move, including the battery, drive and lift controllers, safety system, vehicle control, encoder, I/O modules, and hand-held control unit. Depending on the vehicle type, there can be between seven and 17 nodes. An example of the requirements: In the electric spindle lift, two lifting systems work synchronously. Over a thousand encoder values are recorded and compared per motor revolution. This achieves a lifting accuracy of up to 0,1 mm – an advantage in comparison to hydraulic solutions. For subsystems with high data rates, EK Robotics also uses Ethernet, for example in 3D cameras for obstacle detection.

Vehicle details

The Medi Move was developed specifically for hospital use. It transports loads of up to 500 kilograms, reaches a speed of 1,7 m/s, and lifts loads up to 170 mm. With its symmetrical 6-wheel configuration, it is easy to clean and maintain: stainless steel chassis, smooth surfaces, rounded edges, and drainage concepts for liquids meet high hygiene standards. Special cable guides ensure long-term operational safety despite frequent lifting intervals.

Figure 1: Transport robots handle the daily flow of materials at Pistoia Hospital – from meals and medication to laundry and waste (Source: Neura Mobile Robots)

Practical examples of AGVs in hospitals

- Denmark (Herlev Hospital): 11 custom-made Medi Move transport robots connect hospital wards with the central goods receiving area.
- Germany (university hospital): 51 vehicles move materials between buildings via a tunnel network. This was based on precise 3D surveying of the infrastructure.
- Italy (Tuscany): 44 vehicles ensure the supply of 1900 beds.

Figure 2: For almost 30 years, 38 transport robots have been ensuring the automatic transport of goods at the Motol Hospital in Prague (Source: Neura Mobile Robots)

Example for AGV use in healthcare

A German medical technology company has modernized its intralogistics with an individually tailored overall AGV concept from EK Robotics. The goal is a safe, efficiently timed material flow along the entire process chain – from sterilization to storage.

The company has been relying on AGVs for years and decided to strategically expand and replace outdated systems in 2023. Three existing systems from a competitor were replaced by transport robots of the Heavy Move series from EK Robotics. These now handle storage and retrieval in a total of six sterilization chambers, where sensitive medical devices are treated with gaseous sterilants. Thanks to four fork arms, the vehicles can transport two pallets at the same time – a decisive advantage for maintaining the tight cycle times in the sterilization process.

Figure: Twelve transport robots from the Vario Move CB series are responsible for transporting medical products between the sterilization processes and the warehouse in the basement (Source: Neura Mobile Robots)

In addition, a new system has been put into operation that smartly links the interfaces between sterilization, post-conditioning, and automated storage. Twelve Vario Move CB vehicles with fork adjustment and counterweights ensure the automated transportation of the reprocessed medical products on two levels and in 24/7 operation. The route, which is around 500 m long, runs through particularly narrow structural conditions and requires the utmost precision in navigation. The time-critical transfer takes place at a total of 20 post-conditioning chambers, each with three buffer lanes. A maximum of 60 minutes is available for each batch. A material flow simulation, carried out in advance, ensured the cycle accuracy of the processes. Three additional vehicles organize the transfer to the storage area. The semi-automated system significantly increases operational efficiency, reduces staff workload, and creates the conditions for further growth, with maximum process reliability and economic scalability.

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Figure 3: The Medi Move transport robot has a stainless-steel chassis, transports up to 500 kg, and lifts loads up to 170 mm (Source: Neura Mobile Robots)

These examples illustrate that AGVs can be operated reliably for decades. Maintenance and modernization keep systems technologically up to date and efficient.

Conclusion

Driverless transport systems are an established standard in hospital logistics. CANopen is a key component of this technology: the protocol ensures robust, synchronous, and scalable communication between the numerous in-vehicle devices. In conjunction with the operating system software, this creates a comprehensive solution that prioritizes transport, distributes energy efficiently, and reliably detects errors, providing a technological foundation for safe and efficient hospital processes.

About EK Robotics – a Neura brand

EK Robotics is one of the world's leading specialists in driverless transport systems (AGVs) and automated material flow solutions. For over 60 years, the company has been developing and implementing intelligent, networked, and efficient transport robotics for the production and warehouse logistics of international customers. At five locations – Hamburg and Reutlingen (Germany), Milan (Italy), Prague (Czechia), and Buckingham (Great Britain) – more than 300 employees design customized AGV complete solutions from a single source: from vehicle design and software and control system integration to commissioning and lifecycle service.

After the acquisition of the former EK Robotics by Neura Robotics in 2025, the company will continue under the name Neura Mobile Robots. The EK Robotics brand will remain and continue to stand for proven quality and expertise in transport robotics. ◀

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