

# AUTOMATION OF HOSPITAL INTRALOGISTICS



**GIBOCARE**<sup>®</sup>  
by GIBOTECH A/S - moving technology

# NOTES



# WHAT WE DO?

GIBOCARE is a part of GIBOTECH. While GIBOTECH works within robot automation in the industrial sector, GIBOCARE is orientated towards labour intensive logistic processes for the healthcare sector.

We aim to find the best subcontractors available on the market, and making their products work seamlessly together with all the other components in the solutions we design. GIBOCARE projects span from a wide array of technological applications, but they all share the same fundamental characteristics of taking the best available technology and making it even better.



Our core competence is our well-honed ability to expand existing technology to cover new applications and to merge previously unmerged technologies. Our greatest asset is our technical curiosity, and we are always looking for new ways to incorporate the latest developments in the world of automation into our customers' projects.



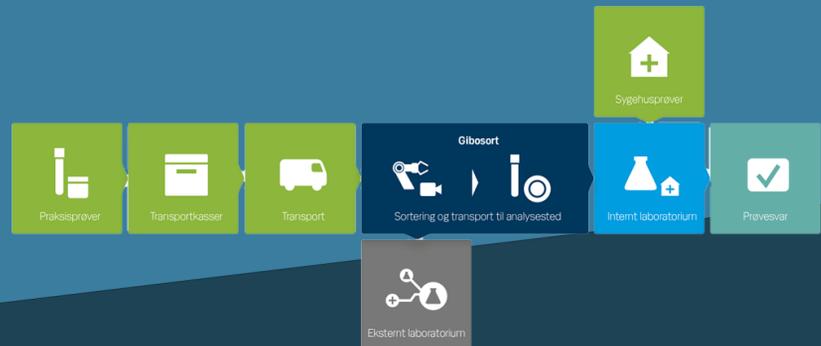
# GIBOSORT



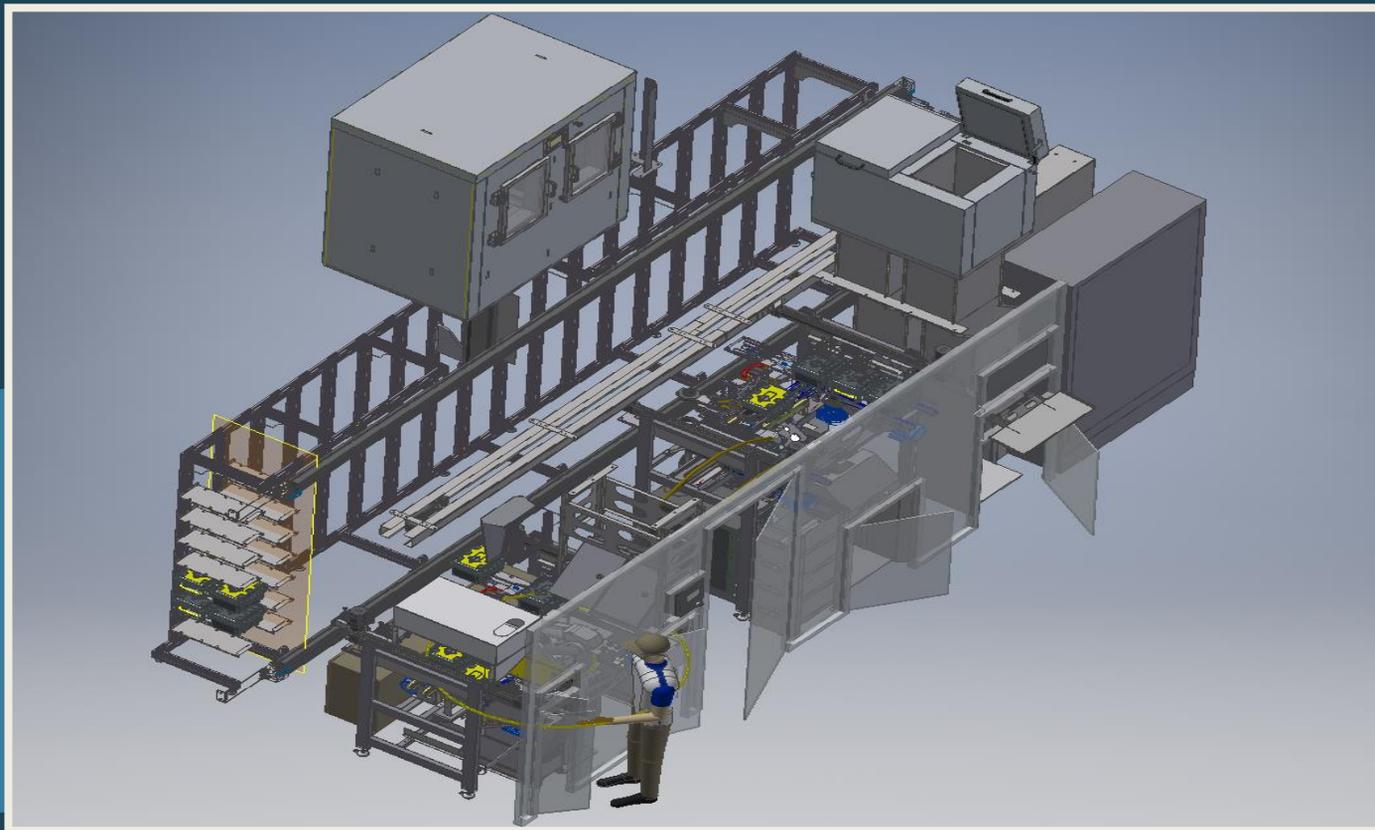
GIBOSORT is an automated solution for handling blood- or other biological samples. It automatically unpacks and empties all commonly used bio sample transport containers and forwards their content via pneumatic delivery, conveyor, postage crates or other means.

As with other GIBOCARE automation solutions it eliminates the potential for human error in critical systems where mistakes may have enormous consequences.

The core element in the GIBOSORT blood sample sorting installation is the FANUC robot which task it is to empty the blood sample transport cases. Around the robot we have designed a system to open the boxes, analyze their contents and pass on the empty boxes once the sorting is complete.



# GIBOSORT



# STERILE STORAGE SYSTEM

The integration of a number of robots and other automation devices our system, which stores the sterilized surgical equipment as it exits the autoclaves, has allowed the hospital to significantly reduce unintended incidents on staff and make their sterile storage facility much more efficient.

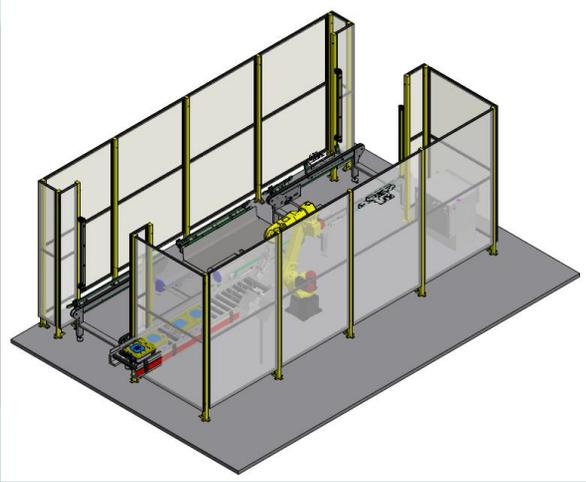


The flexibility of the storage systems is second-to-none, since surgeons can always order urgent deliveries to take advantage of unforeseen surplus capacity in the surgical wards, or in the event that an operation requires additional surgical equipment than the standard equipment which were ordered during the planning phase of the operations.

GIBOCARE sterile storage systems are fully integrated with the software planning system, thus trolleys with surgical instruments can be planned and prepared during the night, so they are ready in the morning without manual interventions. The system is based on a modular principle, so it can be customized according to the required capacity.



# AUTOMATIC LOADING ON WASHING STAND – CONTAINER WASHING



Containers for surgical equipment are being delivered by an in-feed conveyor. A robot places the containers on a washing stand so the interior of the container is facing towards the cleaning flusher. The lid is placed on the stand and the container bottom is lifted from the conveyor by the container lifting device. The robot can then pick up the container bottom part from underneath and place it correctly on the stand. This is an automated process - as long as containers are transferred into the cell, the robot will fill the stand. The washing stand is transferred into the cell by conveyor and makes a stop on the turntable conveyor. The turntable then rotates so the robot can fill all four sides of the washing stand. After the filling process has been completed, the washing stand is transported by conveyor out of the filling station. To be able to handle different objects, the robot is equipped with a changeable tool head which allows the robot to automatically change tools for different types of lifting tasks.

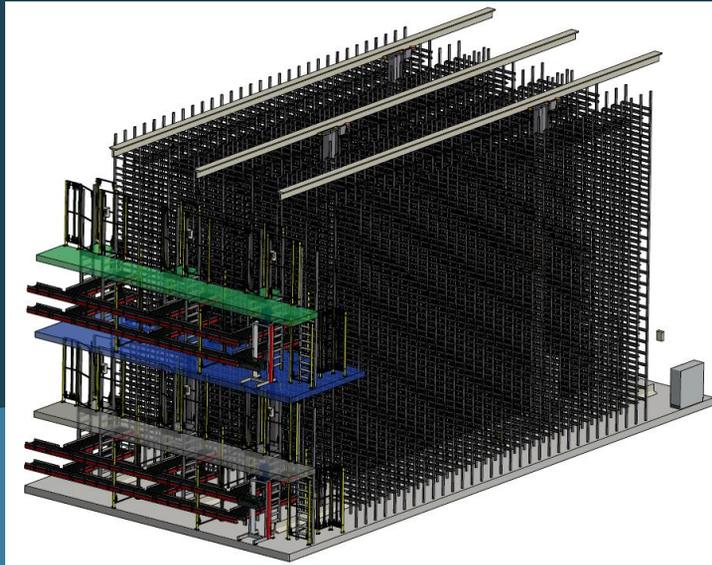
## Handling options:

- Empty surgical equipment containers and unlock lids
- Washing stand for both empty and loaded surgical equipment containers and lids
- Container sizes 1/1, 3/4, 1/2

Capacity	Calculated	Load
Minutes pr. cabinet/ washing stand	6,1	83%
Numbers of containers pr. hour	72,9	81%



# AUTOMATIC STORAGE SYSTEM



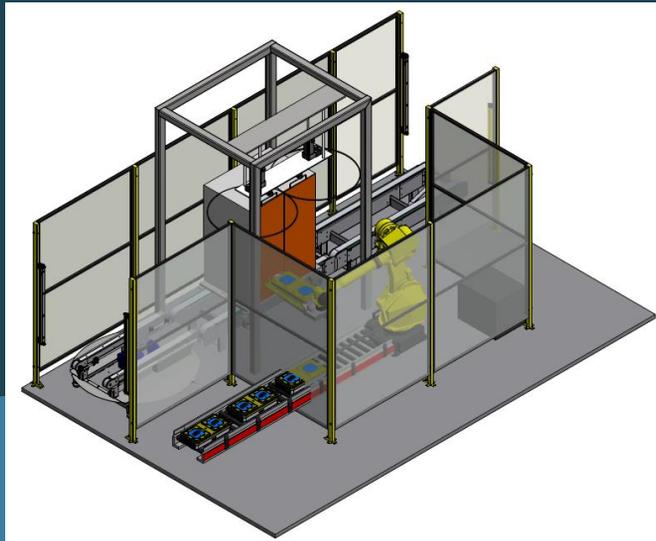
## Handling options:

- Max load capacity 50 kg excl. load handling device
- Flexibility to be used in single and multiple depth applications
- Container sizes 1/1 3/4 1/2
- Crane (double deep reach) 145 items/hour
- Crane (single deep reach) 250 items/hour
- Storage system capacity: 11880 racks

Containers for surgical equipment are transported by a conveyor system that is equipped with a box lift unit, which makes it possible to transfer items between one or more conveyor levels. The crane system is mounted with a load handling device. Each handling device is able to handle 1 item per cycle. Items are picked up at the conveyor system by the load handling device. The item is transported to the desired individual position in the racking system. If there is an order for retrieving an item, the crane will pick the item before it returns to the buffer conveyor. In some cases the item for retrieval is placed rear on a double deep shelf. In this case, the crane will first reshuffle the front item on the double deep shelf. The item is transported to the conveyor for outgoing transport and placed by the load handling device.



# AUTOMATIC LOADING OF CONTAINERS INTO TRANSPORT CABINETS



## Handling options:

- Containers for surgical equipment
- Transport cabinet
- Container sizes 1/1, 3/4, 1/2

## Process

Unload/load  
cabinet

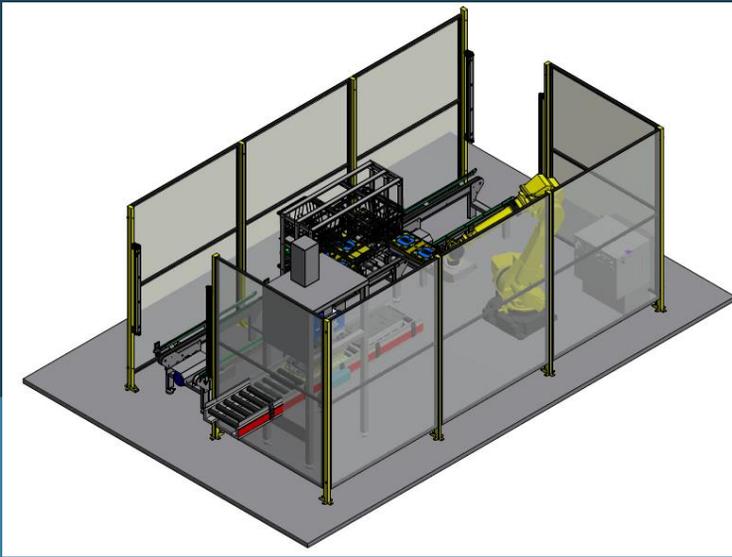
## QTY:

19 pr hour

Containers for surgical equipment are transported by an in-feed roller conveyor. The container is picked up by a robot, which then places them in a closed transport cabinet. The cabinet is transported into the cell by conveyor. On the conveyor line a turntable is incorporated to make sure that the doors of the cabinet are positioned correctly, so the cabinet door opener is able to open the doors. The robot then fills the cabinet with containers. When the cabinet is full, it is transported by roller conveyor to the next task.

Cabinets with containers for surgical equipment are transported by roller conveyor into a cell. On the conveyor line a turntable is incorporated to make sure that the doors of the cabinet are positioned correctly, so the cabinet door opener is able to open the doors. The robot then picks up the containers and places them on a roller conveyor for transportation to the next task.

# AUTOMATIC LOADING OF AUTOCLAVE RACK



## Handling options:

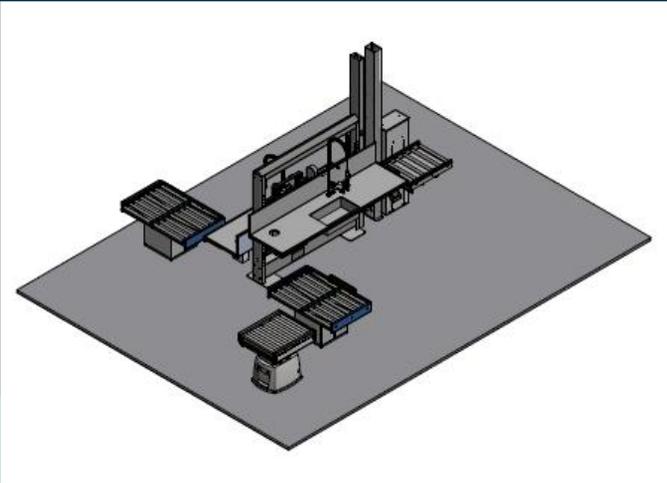
- Container rack
- Empty surgical equipment containers and unlocked lid
- Container sizes 1/1, 3/4, 1/2

Capacity	Calculated	Load
Number of containers pr. hour	84	80%

Containers for surgical equipment are transported by an in-feed roller conveyor. It makes a temporary stop at the container opening device, where the lid of the container is unlocked. The unlocked container is then moved forward on the roller conveyor until end stop. The robot picks up the container and places it in container racks. The container rack is transported by a conveyor line.

The container rack is moved by a conveyor line into the cell. The robot picks up the containers from the rack and places them on an out-feed roller conveyor. Afterwards the lid is placed on the container, which is transported to the container locking device. After the container is locked, it is transported by the out-feed conveyor.

# WASHING TABLES INCLUDED AGV TRANSPORT



Containers for surgical equipment are transported by AGV to the roller conveyor into the manual washing area. The basket with surgical equipment is then removed from the container by hand and manually washed and afterwards the container is transported further on by an out-feed conveyor on to an AGV. The surgical tools are all put on washing racks manually after cleaning. The washing rack is transported by conveyor and AGV. The washing tables are height adjustable from 630 mm to 1280 mm, the in-feed and out-feed conveyor table is height adjustable from 650 mm to 900 mm and the conveyor for washing stands /racks is height adjustable from 250 to 900.

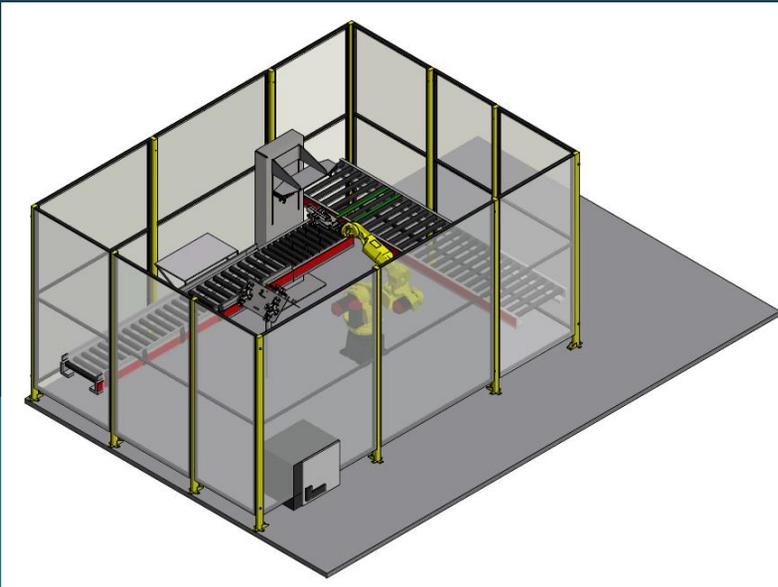
## Handling options:

- Fully loaded surgical equipment containers with unlocked lid
- Empty surgical equipment containers with unlocked lid
- Fully loaded washing stand/rack with pretreated surgical instruments
- Fully loaded washing stand/rack with surgical instruments basket
- Empty washing stand/rack
- Maximum load capacity of 100 kg on table.
- Container sizes 1/1 3/4 1/2

Item	QTV:	Process
Washing stand /rack	58	In/ out pr hour
conveyor in feed	94	In/ out pr hour
conveyor out feed	94	In/ out pr hour



# AUTOMATIC UNLOADING OF METAL BASKETS FROM CONTAINERS



## Handling options:

- Fully loaded surgical equipment containers with unlocked lid
- Empty surgical equipment containers with unlocked lid
- Container basket sizes 1/1 3/4 1/2
- Container sizes 1/1 3/4 ½

Capacity	Calculated	Load
Numbers of containers pr. hour	69	77%

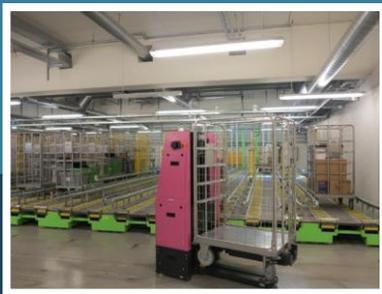
Containers for surgical equipment are transported by an in-feed roller conveyor. It makes a temporary stop at the basket extraction station. The robot lifts off the lid and places it temporarily on the lid table. The basket pickup device picks up the basket from the container. The container is forwarded and the lid is placed on the container again. Finally, the container and the basket are forwarded to the next process. A tool table with multiple tools is placed in the cell for multiple pick up purposes.

# LOGISTIC FOR HOSPITAL GOODS

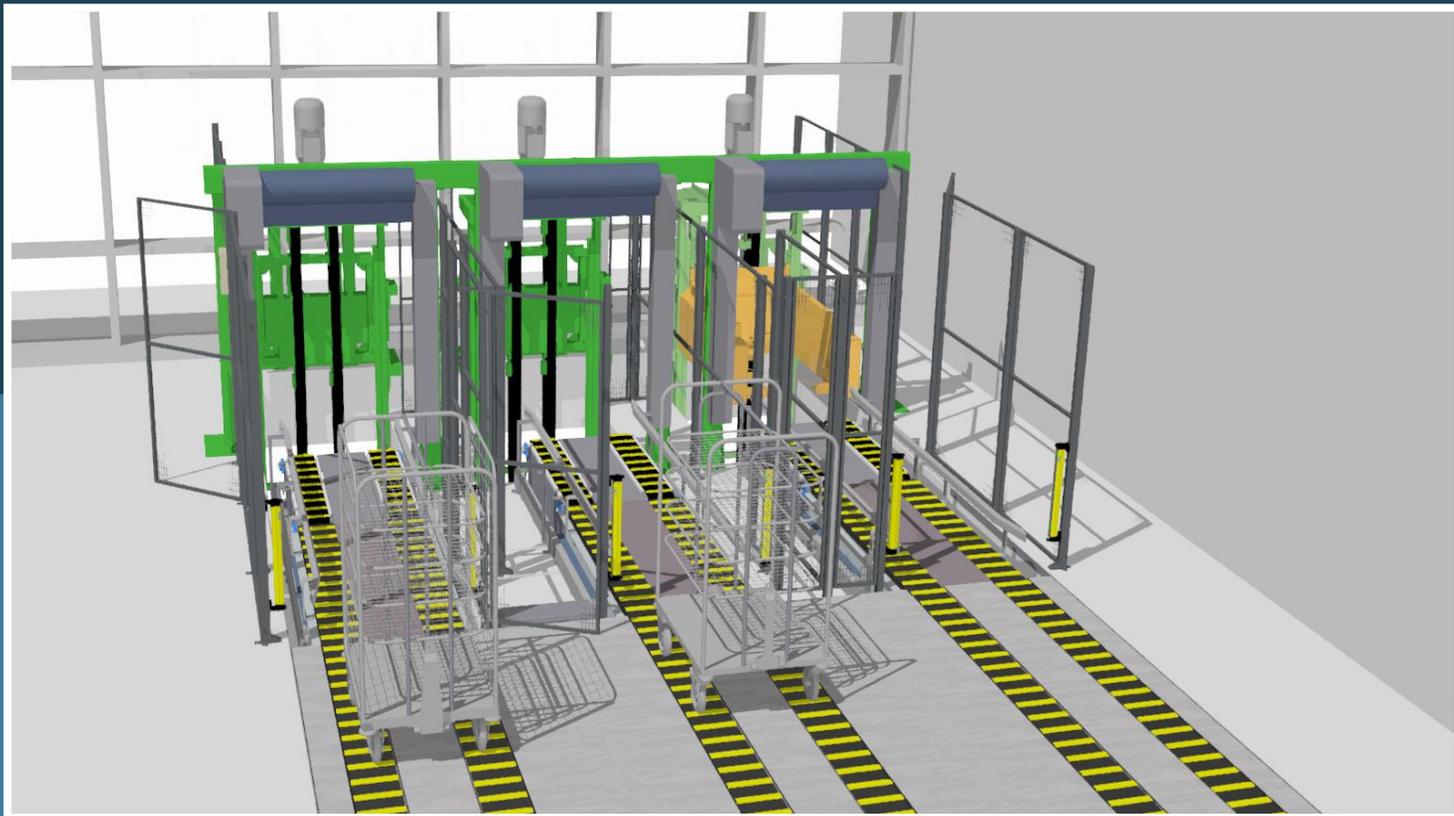


A pivotal element in the modernisation of Herlev Hospital, the new automated facility will be handling all incoming goods apart from comestibles, and has an initial, expandable capacity of 1500 vehicles/24h. The goods arrive round-the-clock, meaning the facility will be operating 24h, 7 days/week.

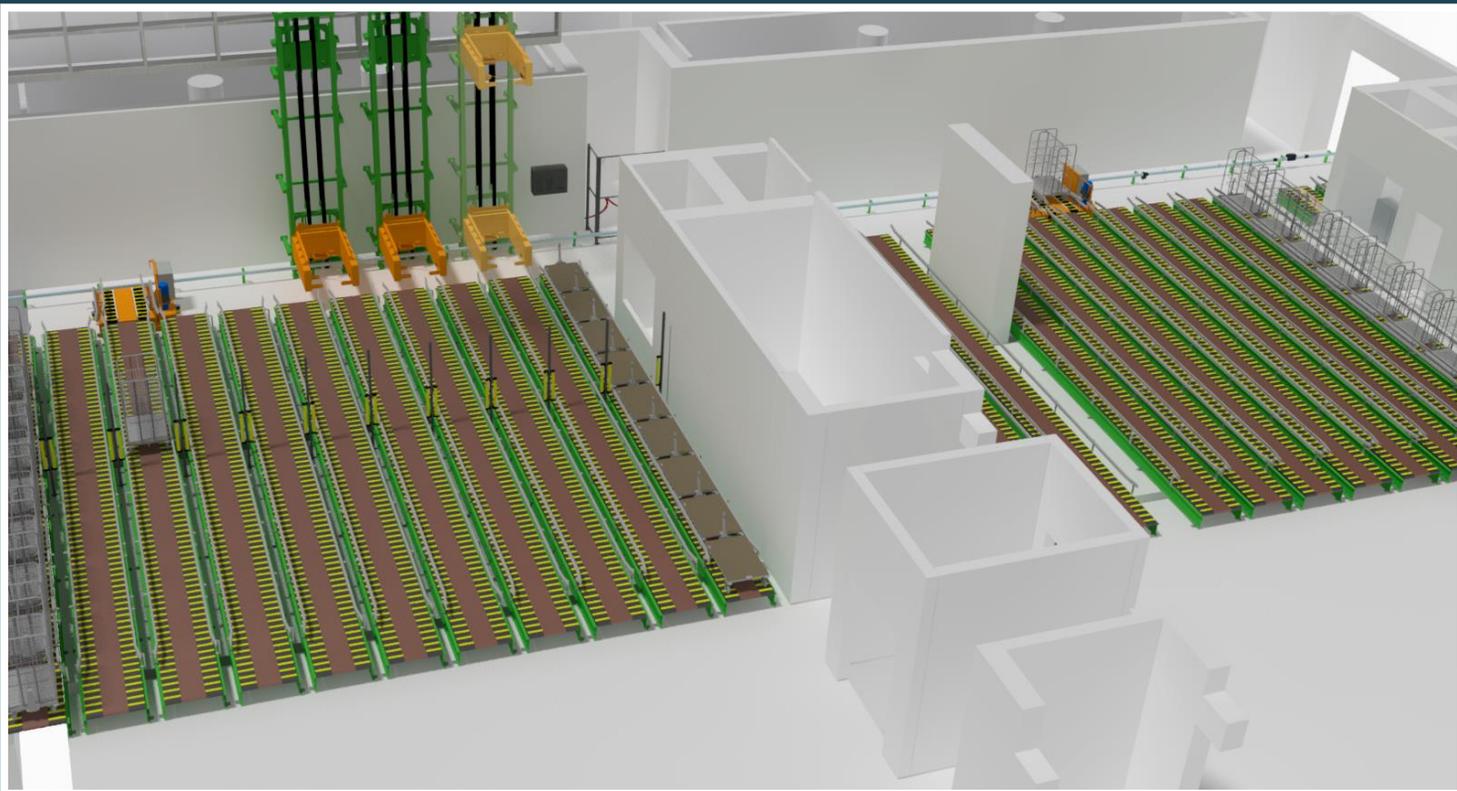
Herlev Hospital was the first hospital in Denmark to introduce Automated Guided Vehicles (AGVs), and an automated system for receiving and storing consumer goods. The goods are transported without the involvement of employees from goods receipt to central distribution centers and finally to individual departments. The automatic plant and the AGVs also handle linen and medicine.



# LOGISTIC FOR HOSPITAL GOODS



# LOGISTIC FOR HOSPITAL GOODS



# SORTING AND HANDLING OF MEDICINE FOR PHARMACIES

The GIBOCARE medicine robot automates the sorting of medicine containers, regardless of format. It uses the barcodes from the packaging to place the containers in the correct conveyor receptacles.



The solution's task is to separate and sort the medicaments as well as reading the barcodes, and then deliver the products to Apostore's internal storage system together with barcodes, thereby obtaining full-automatic storage. When delivering to the storage system it ensures that the products are positioned correctly on the way to the storage robot. The medicine robot handles both square and round seals, glass, cardboard and plastic packaging.

# AGV SOLUTIONS

DS Automotion is one of the leading manufacturers of heavy lifting AGVs (Automated Guided Vehicles). The self driving autonomous robots from DS Automotion are able to deliver both light and heavy goods and they are useful in multiple sectors.



The Austrian-based company has developed innovative solutions to logistical applications for almost 30 years. Apart from general AGV logistic applications in various branches of industry, DS Automotion has specialised, in particular, in the Automotive, Print & Paper, Hospital & Healthcare, and Intralogistics sectors.



AGVs from DS Automotion provide GIBOTECH the opportunity to automate transportation and logistics in various industries and sectors. The speed and flexibility of the self driving robots from DS Automotion fit perfectly with the demands GIBOTECH has for suppliers and solutions.



## REFERENCES



*“The amount of automation that GIBOSORT provides is definitely very interesting – more so when it comes to the future of hospitals. We are very interested in innovative and future-proof solutions, which can free up resources from administrative labour, which instead can be used on patient related tasks. The safety for our patients is increasing as we are automating the previously manual workflow and it creates more time for our bio analysts for value-adding tasks instead of sorting blood samples manually.”* **Vice President of Nordsjællands Hospital, Henrik Schødt.**

*“It is an amazing opportunity for us to test the robotic solutions in our current hospital. It gives us a technological advantage for 2020 when we are moving into our new super-hospital. The experience that we gain will be tremendous for us when we develop our high-tech laboratory in the new hospital, while also ensuring the absolute best in terms of patient safety today.”* **Evy Ottesen Biomedical laboratory scientist at Nordsjællands Hospital.**

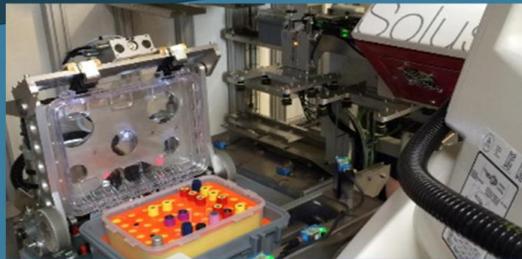


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VISIT OUR WEBSITE [WWW.GIBOCARE.COM](http://WWW.GIBOCARE.COM)



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