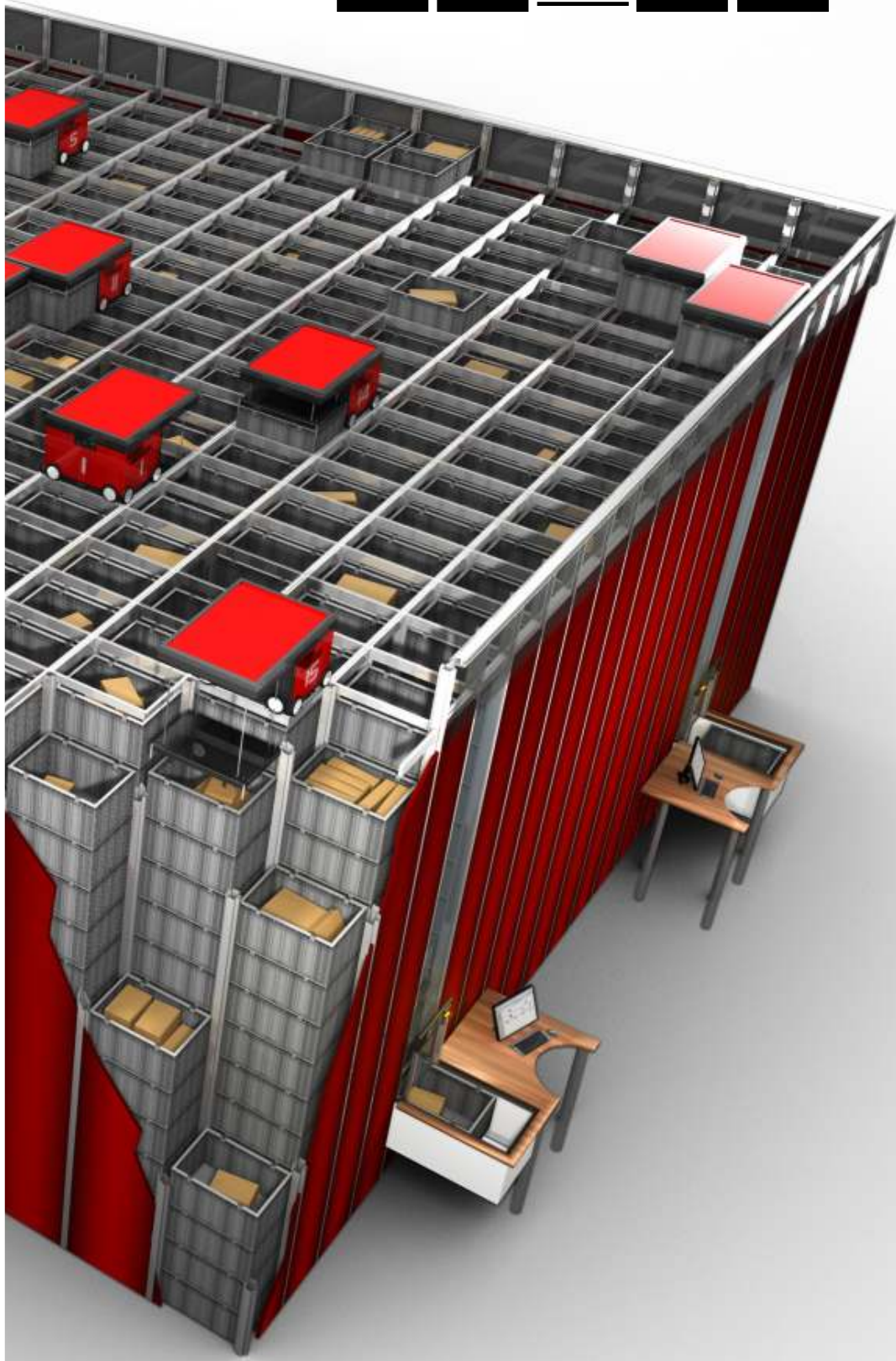


The AutoStore System

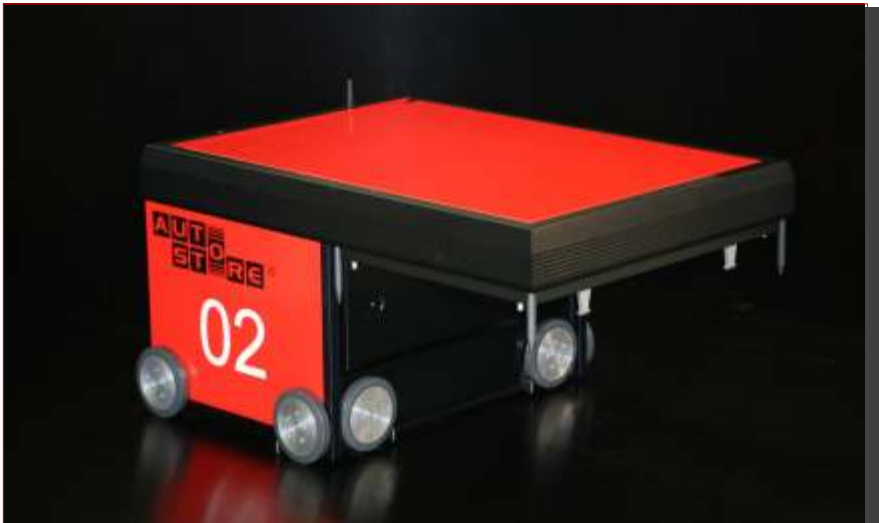
**AUT
STORE**



AutoStore in business



Workstations in the picking area.



Robot fetching a BIN.



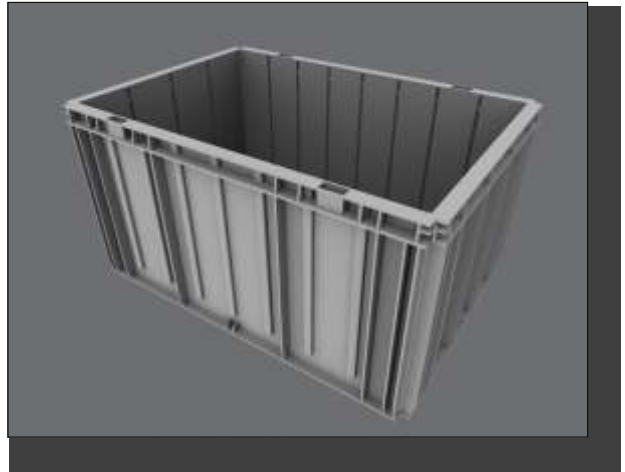
AutoStore grid with robots.

Benefits

- Increases the speed and improves the quality of the internal logistics
- Makes better use of the available area and volume than any other system
- Provides practical and effective automation
- Is easy to install in existing buildings
- A flexible system that can be changed and developed
- Very reliable, as the system units work independently of each other



Workstation with port controller.



Standard version of the bin.



Grid track.

Grid

The grid is an aluminum structure organized in rectangular cells. Each cell has room for several bins that are stored on top of each other. Different configurations of height and shape are possible, making the AutoStore grid able to surround pillars and other obstacles. There are tracks for the robots on top of the grid.



Bin

This is the basic module in which the goods are stored. The bin is currently available in two different heights and can be produced in different materials in order to achieve particular properties, for example anti-static bins for the electronics industry. Standard inner measurements: 600mm x 400mm, with heights of 210 mm or 310mm (i.e., standard packages fit into a bin).

Port

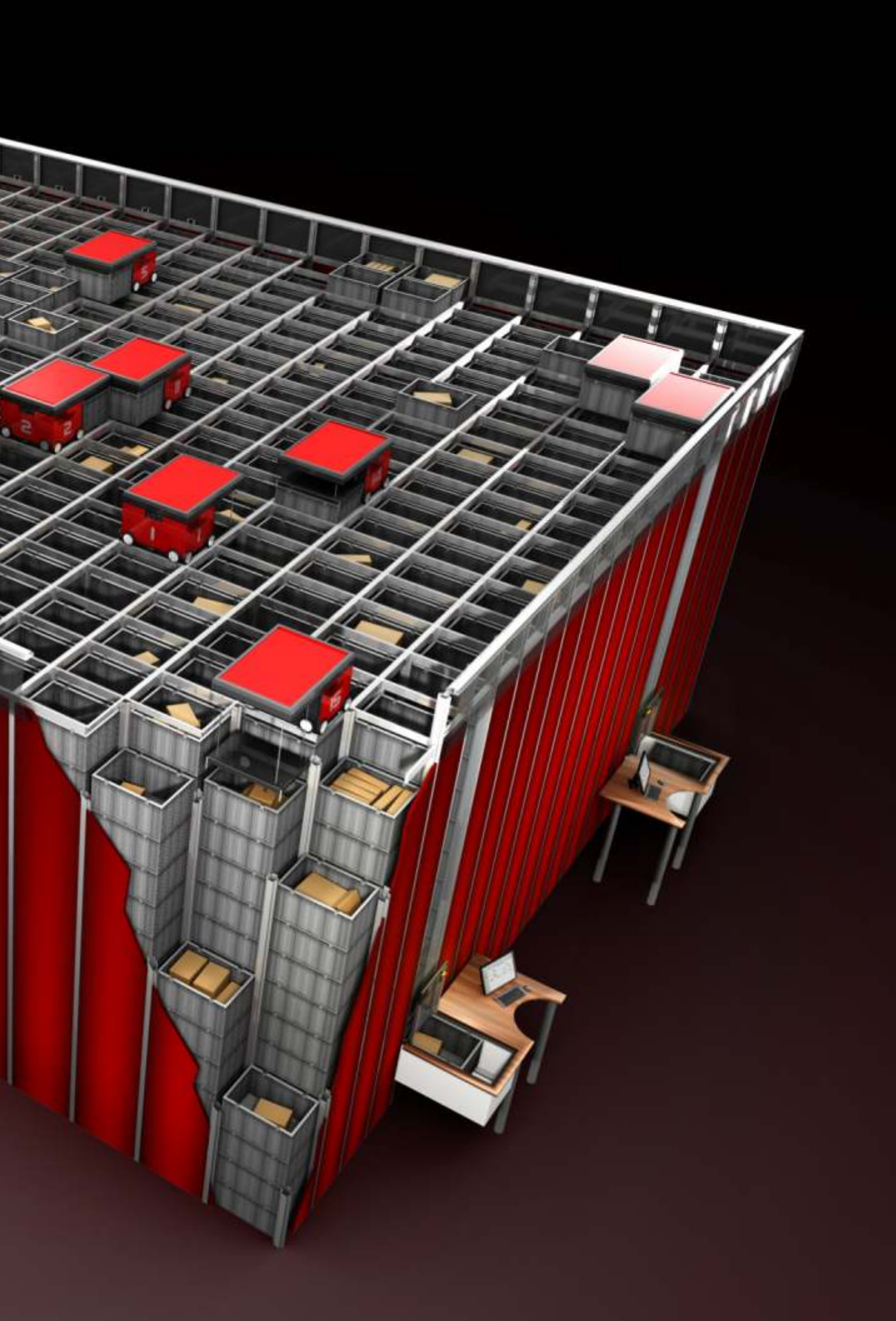
This module delivers the bins to the operator. Ports can be installed on all sides of the grid, or even under it if the grid is on the floor above. When a robot delivers a bin to a port, the port exchanges this bin with the previously used bin and the robot returns it back to storage. Thus, new bins are delivered back-to-back and the operator rarely has to wait for bins. There is an operator panel on every port that shows status information and provides simple support functions.

Robot

This is the module that most people associate with AutoStore. These are the workers that move the bins around. A robot has two sets of wheels that enable it to move along two axes. This makes it possible for all robots to reach any position on the grid. The robot is equipped with a lift for picking up, carrying, and placing bins that are stored in the grid. The robot communicates with the control system via a wireless link and is automatically recharged when needed (charging is normally done at night).









Flexibility

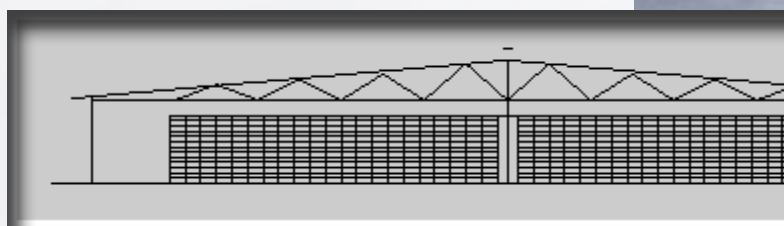
The AutoStore system is designed to fit into any existing warehouse.

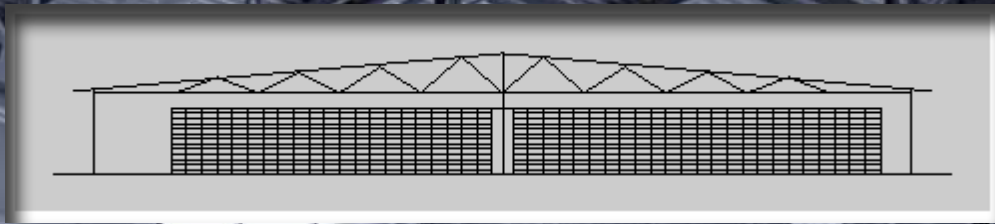
There are several ways to configure the grid for AutoStore. Some examples are shown on the following pages. These examples do not include every possible configuration of the grid; different configurations may be combined to create a new solution, or a custom configuration may be designed based on specific requirements. Thus, the grid can be tailored to suit every customer's needs.

Available options:

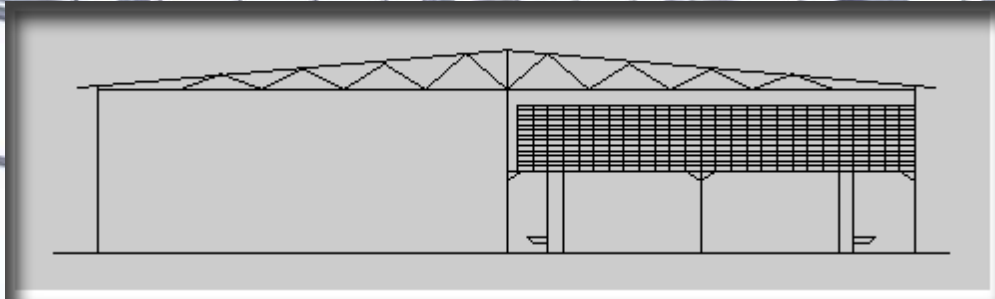
1. Surrounding columns
2. Mezzanine placement
3. Several levels or floors
4. Different heights
5. Several cubes with extension tracks

Note: Possible configurations are not limited to these examples.

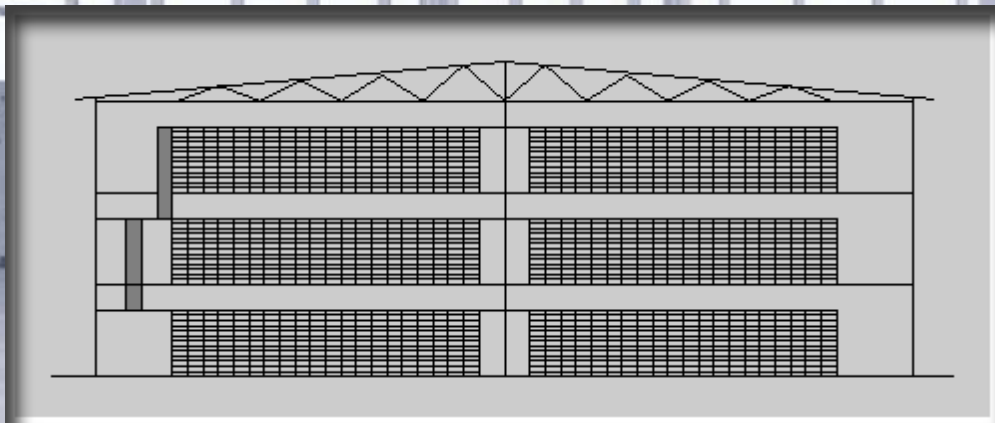




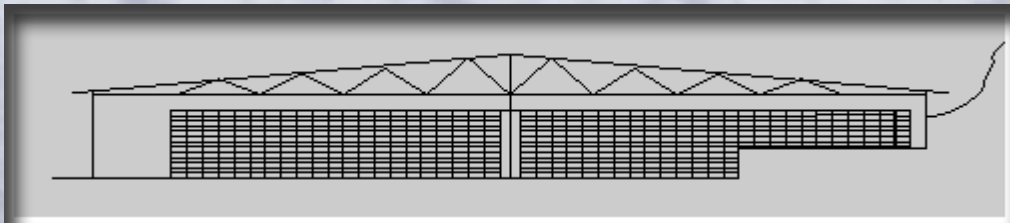
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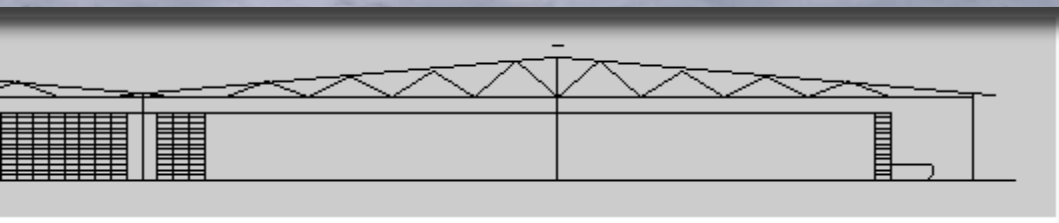
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Reliability

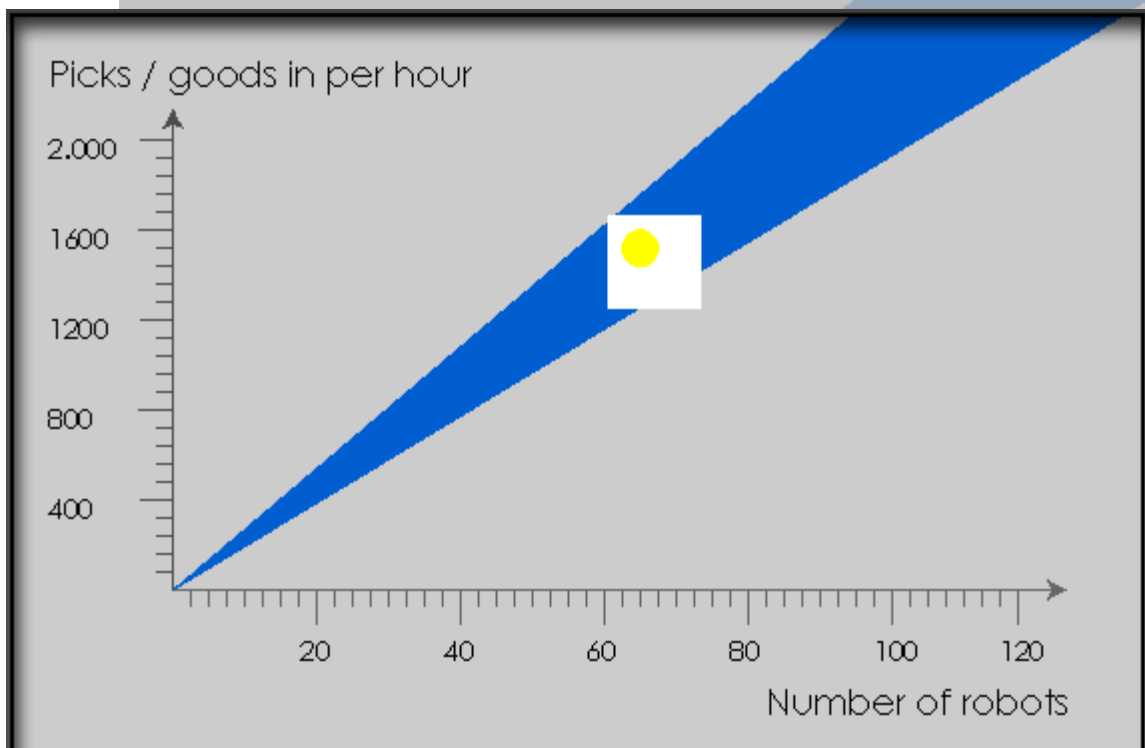
AutoStore consists of several redundant modules. Even if any one of these modules should fail, the system will still operate at near full capacity. For example, if a robot is in the middle of a job and fails, then the robot can be parked and another robot will come and finish the job. By designing AutoStore with overcapacity this warehouse solution can be configured to meet any reliability requirements.

System Speed and Capacity

The total performance of the system is controlled by several different parameters.

Each installation will have its unique configuration that is adjusted to the customer's needs. The type of logistics (for example short/long handling times due to serial number registration) and the picking speed requirement will determine the number of ports and robots.

In most scenarios the number of robots will have a linear effect on system performance. Almost any speed can be met by adding enough robots and or ports. The system can be configured to handle several thousand picks an hour if needed.





Configurable

One of the major benefits of the AutoStore system is that the flow of goods can be easily modified. The actual position of a bin inside the grid does not depend on any physical factors. The factors that influence the bin movements can be configured as software options.

AutoStore will (if not forced to behave differently) have high-runners on the top and low-runners farther down in the grid. The bins are kept this way because recently used bins are put on top in the grid when returned to storage.

This is a benefit but not mandatory for the system. It is possible to override this option if some products should always be on the top level. In other cases the warehouse owner may not want to store some types of goods on the top level for security reasons.



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