

# **PROMISING AND IN-DEMAND ROBOTIZED TECHNOLOGIES FOR WAREHOUSE LOGISTICS AUTOMATION**

(GUIDE TO CHOOSE THE MOST OPTIMAL  
TECHNOLOGY FOR YOUR WAREHOUSE,  
THAT MINIMIZES OPERATING COSTS)





Metra Digital Logistics transportation and logistics robots work in a wide variety of fields: food processing, industrial production, oil and gas, pharmaceuticals, construction materials, consumer goods, and other industries



The company has developed and is actively implementing **Digital Warehouse**. This high-tech complex consists of modern warehouse equipment, robotic devices, unmanned transport and WMS (Warehouse Management System).

## MAIN TASKS:



INTEGRATION  
AND  
DEVELOPMENT



SOFTWARE



DEVELOPMENT  
AND DESIGN



MANUFACTURING



## MAIN TASKS:

- 01 INTEGRATION AND DEVELOPMENT**  
Integration and development of modern complex solutions, such as Digital Warehouse
- 02 SOFTWARE**  
Development of new software and WMSs
- 03 DEVELOPMENT**  
Development of new technologies for warehouse terminals and in-plant logistics
- 04 MANUFACTURING**  
Manufacturing of new robotic logistics transport with industry specifics in mind

**WAREHOUSE  
OF A HEALTHY PERSON**



**WAREHOUSE  
OF A SMOKER**



# DIGITAL LOGISTICS FACILITIES



RFID TECHNOLOGIES

MACHINE VISION

AUGMENTED REALITY

CARRIER ROBOT

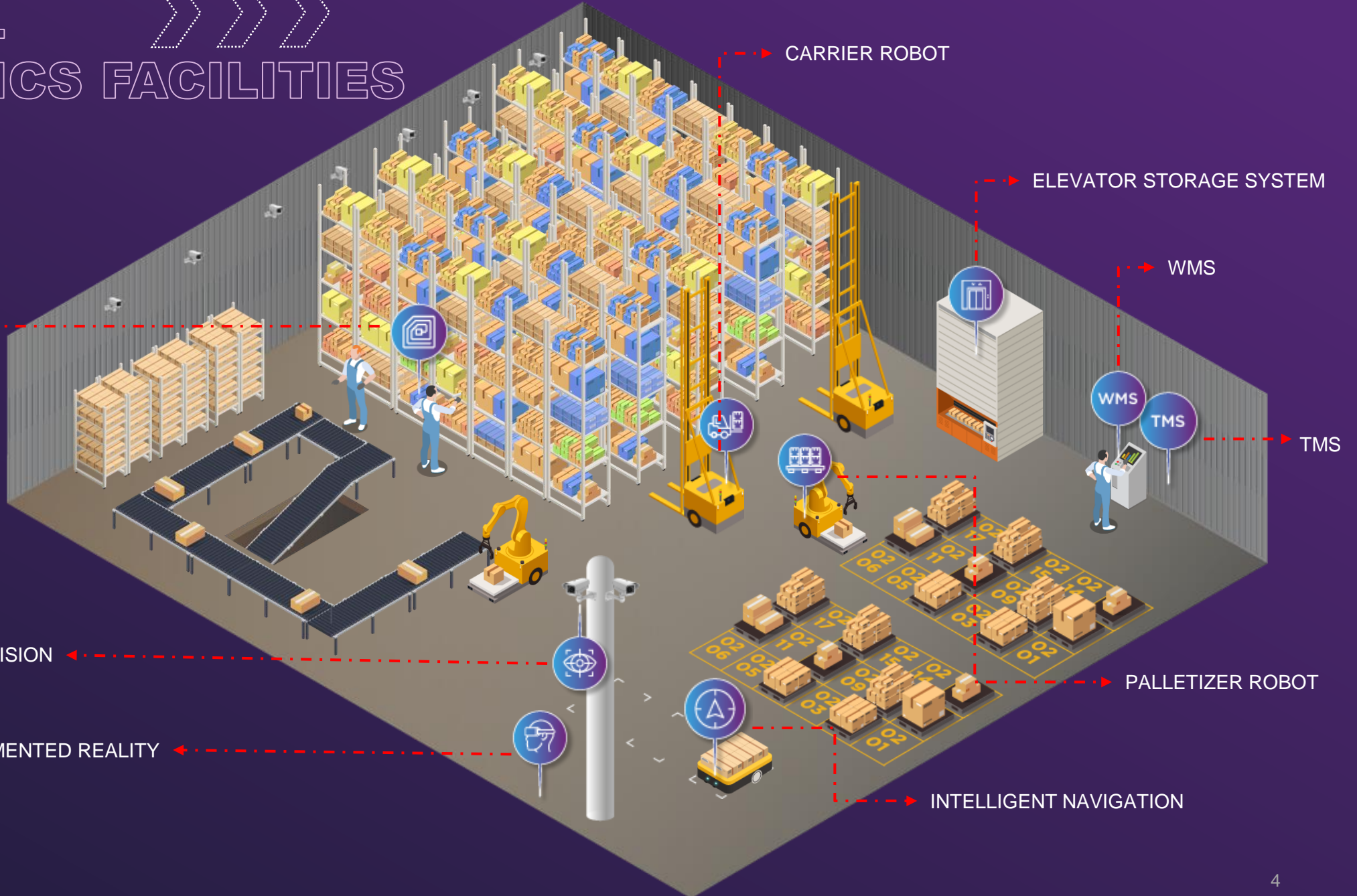
ELEVATOR STORAGE SYSTEM

WMS

TMS

PALLETIZER ROBOT

INTELLIGENT NAVIGATION







**EFFECTS**  
**OF WAREHOUSE**  
**LOGISTICS**  
**AUTOMATION**  
**IMPLEMENTATION**



Minimizing the cost of cargo storage



Savings in labor costs



Increasing storage capacity



Designing the most "deserted warehouse"



Solving the problems of shortage of blue collars staff



# EFFECTS OF WAREHOUSE LOGISTICS AUTOMATION IMPLEMENTATION



**40%**

Increase speed of  
access to goods



**90%**

Reduction of  
overdue goods  
losses due to  
FIFO selection  
(goods rotation  
rule)



**100%**

Eliminate manual  
scheduling of  
transactions and  
product search losses



**30%**

Operational costs  
saving



**40%**

Optimization of  
usable storage  
facility

AGV: An Automated Guided Vehicle is an industrial vehicle that can be pre-programmed to transport goods within and between production and warehouses. Also, an AGV system is a set of such devices those interact with each other to perform a wide range of tasks, mainly the movement of goods within a company.

#### AMONG THEM:

1. Creating lines to replace conveyor systems;
2. Moving parts and finished goods from and to the warehouse;
3. Removing waste from work areas;
4. Delivery of tools and consumables to workplaces;
5. Intra-warehouse moves and other similar tasks

There are three main types of AGVs and AMRs - transport trucks, forklifts and towing units.

## 1 TRANSPORT TRUCKS Automated Mobile Robots (AMRs)



## 2 FORKLIFTS



## 3 TOWING UNITS



A

G

V

Automated guided vehicle systems AGVs have already become an integral part of a portfolio of warehouse and inter-shop logistics automation solutions

## Benefits of AGV:

- 1 Reduction of financial costs and losses
- 2 Saving production space
- 3 Adjustment to the requirements of the dynamic logistics market
- 4 Careful and safe transportation of various cargoes, resulting in reduced rejects
- 5 Optimization and increase of cargo flow
- 6 Increased operational safety and improved working conditions
- 7 Possibility of use in hazardous industries





Automated Storage and Retrieval Systems ASRS are THE solution for managing and optimizing your product storage and consistency. These automatic stacker cranes increase productivity by eliminating manual errors and constantly updating inventory. AS/RSs allow you to create large capacity warehouses in an optimized volume.

### TOP LEVEL STORAGE:

1. Possibility of using different types of racking systems to store different types of cargo units, i.e. pallets, crates, containers, cardboard boxes, reels, etc.
2. Possibility to store one, two or more storage units in a channel
3. Automated warehouses can be built as part of an existing warehouse or as a self-supporting structure



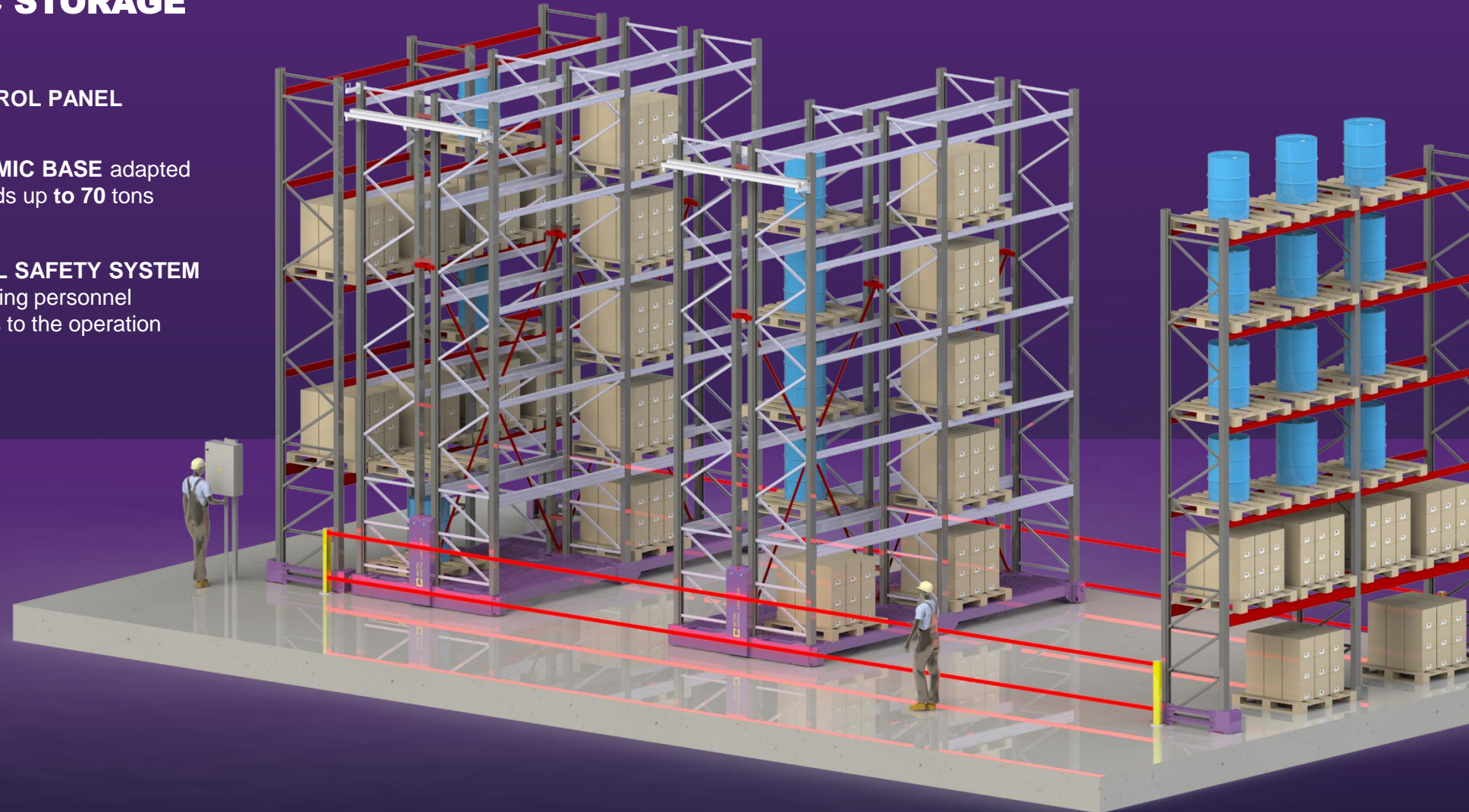
**KEY ADVANTAGES OF AUTOMATED STORAGE AND RETRIEVAL SYSTEMS:**

1. Optimizing the use of storage heights up to 45 m
2. High storage density resulting in even more effective use of storage capacity, up to 80% of storage volume
3. High load handling speed up to 2 m/sec
4. Elimination of errors arising from manual warehouse management
5. No need for lighting and heating of the warehouse resulting in reduced costs for facility maintenance
6. Possibility of permanent 24-hour operation
7. Savings as a result of reduced employment



## ELEMENTS of DYNAMIC STORAGE SYSTEM

- AUTOMATION CABINET
- PRIMARY SECURITY BARRIER
- RAIL GUIDEWAY
- CONTROL PANEL
- DYNAMIC BASE adapted for loads up to 70 tons
- LOCAL SAFETY SYSTEM restricting personnel access to the operation area





**KEY ADVANTAGES OF DYNAMIC STORAGE SYSTEMS:**

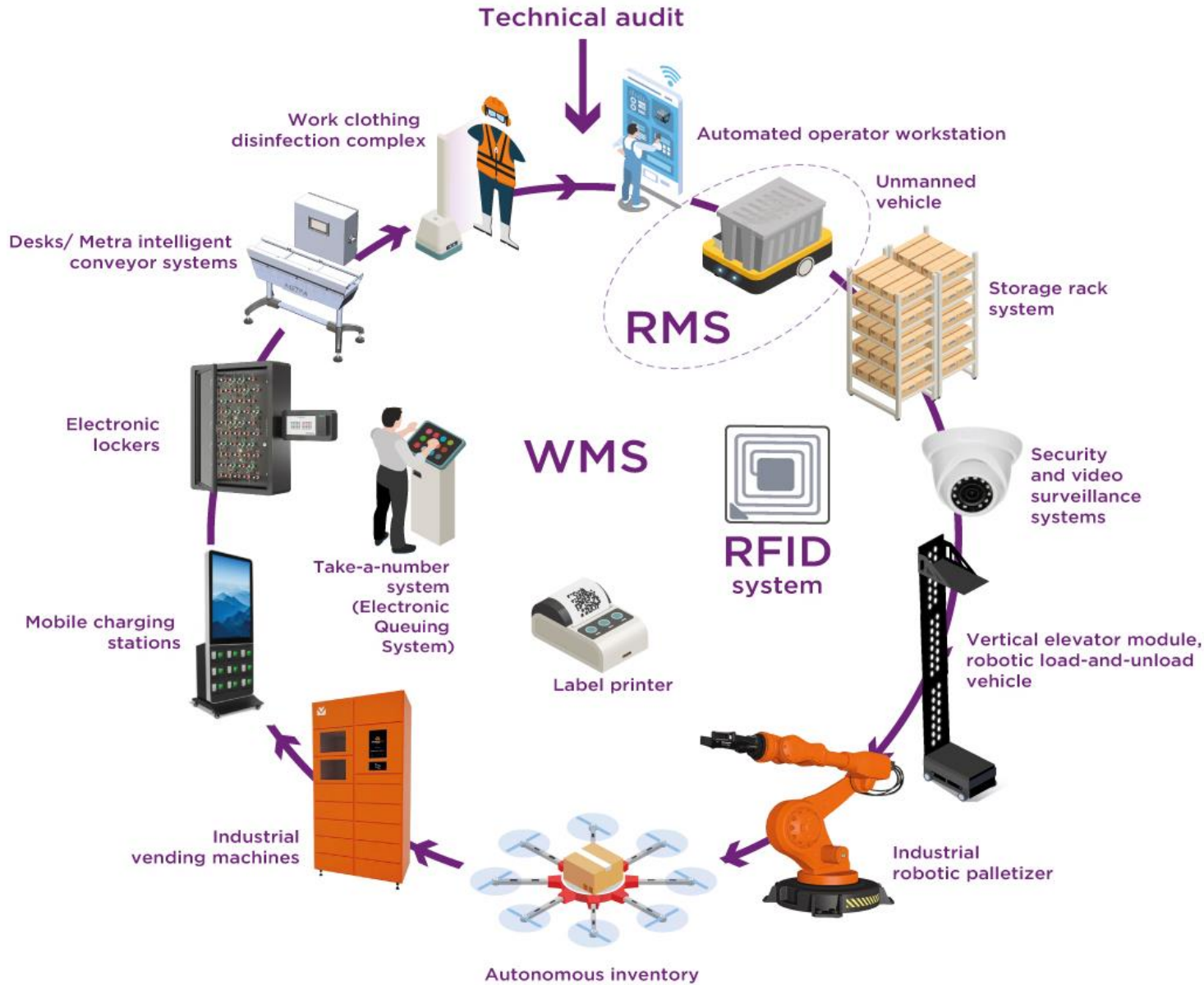
- Increasing the volume of stored cargo **up to 95%**
- Easy and quick access to inventory (reduced handling time)
- Optimization of storage space by **up to 50%** (reducing the cost of renting or operating additional space)

**DIGITAL LOGISTICS SOLUTIONS GUARANTEE LOWER COSTS AND SHIPMENT PROCESSING TIME**

**Metra Digital Logistics is a manufacturer of dynamic platforms that enable the realization of targeted storage**



# CONTAINER STORAGE SYSTEMS









### 1. MOBILE TRANSPORT ROBOT

Quickly assembled construction with heights from 1 to 8 meters. The geometry is configured to the shape of the store to maximize the use of space. Additional shafts can be added after the system has been put into operation.

### 2. TRAYS

Standard trays with dimensions of 600 x 400 mm and heights of 150 / 220 / 320 / 420 mm are used, withstanding a load of up to 50 kg

### 3. FAST LOADING

Mobile transport robots hold one tray at a time and can be used for rapid automated loading into a storage system

### 4. SHAFTS

The main component of the system that moves the product. Handles up to 100 trays per hour. Operates for 8 hours without recharging. It has a self-diagnostic system

### 5. RMS

Receives orders from the customer's WMS system. Controls the movement of the robots, coordinates the dispensing zones and stores information about the product position in the system. All system parameters can be monitored via a graphical interface

### 6. Automated WKS

Automated workstation for a picker, where trays with product are delivered by robots. Processes up to 400 trays per hour. It has input and output buffers for constant readiness to work with the next box

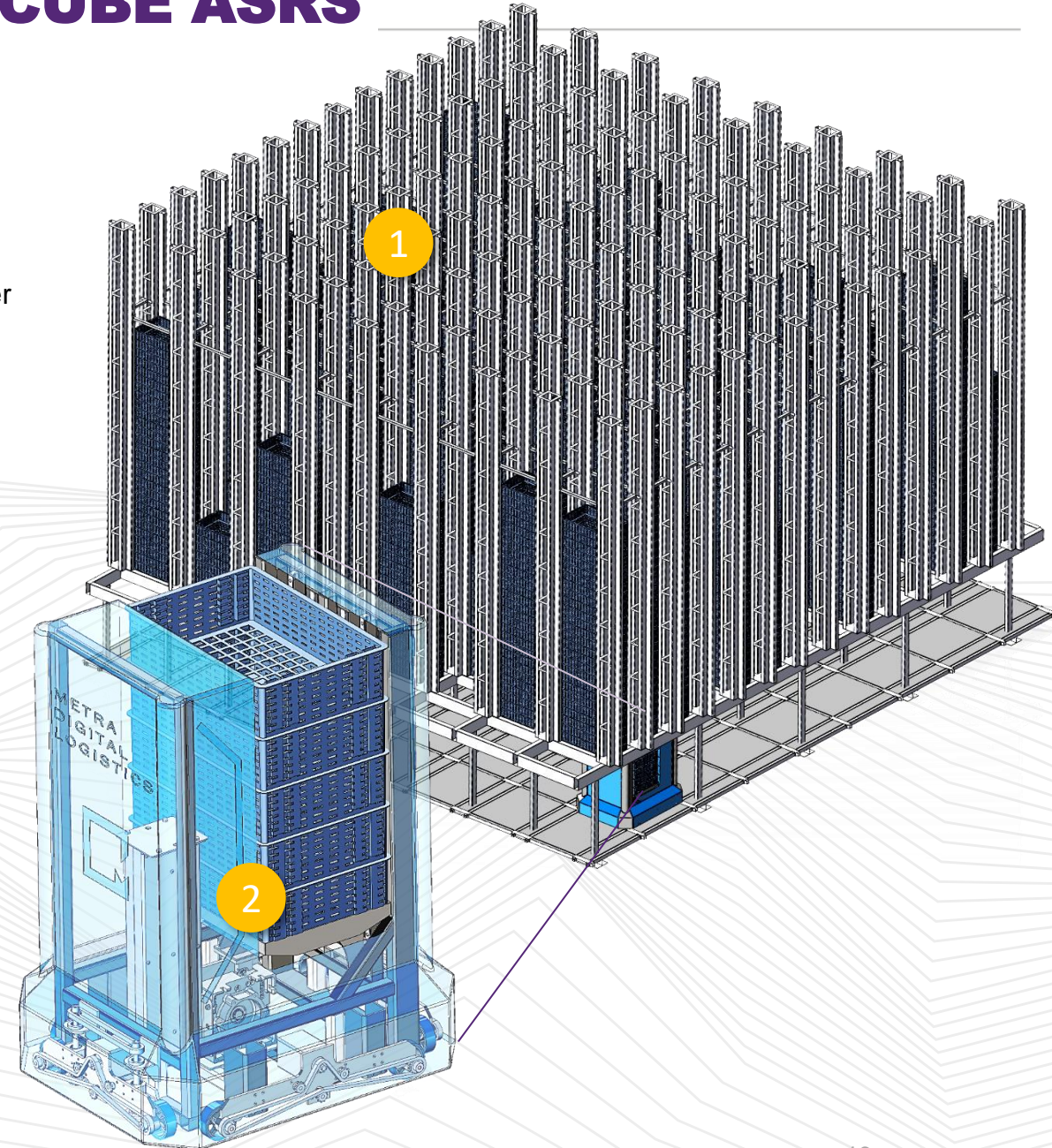


## RACK SYSTEM 1

1. The product is stored in trays located in separate shafts up to 8 meters high
2. The shafts are grouped together in the desired configuration and form a cubic storage system
3. Mobile transport robots move through the shafts and can handle trays from the lower level
4. Robots deliver the trays to picking areas where pickers can unload the required amount of product from them
5. Flexible approach to ceiling utilities
6. Use of the system for both chilled and frozen products
7. Sanitary floor up to 2000 mm high, allows manual loading / unloading of the rack system
8. The modules of the rack system as well as the target points are interconnected by transportation arteries with no storage shafts above them

## ROBOT 2

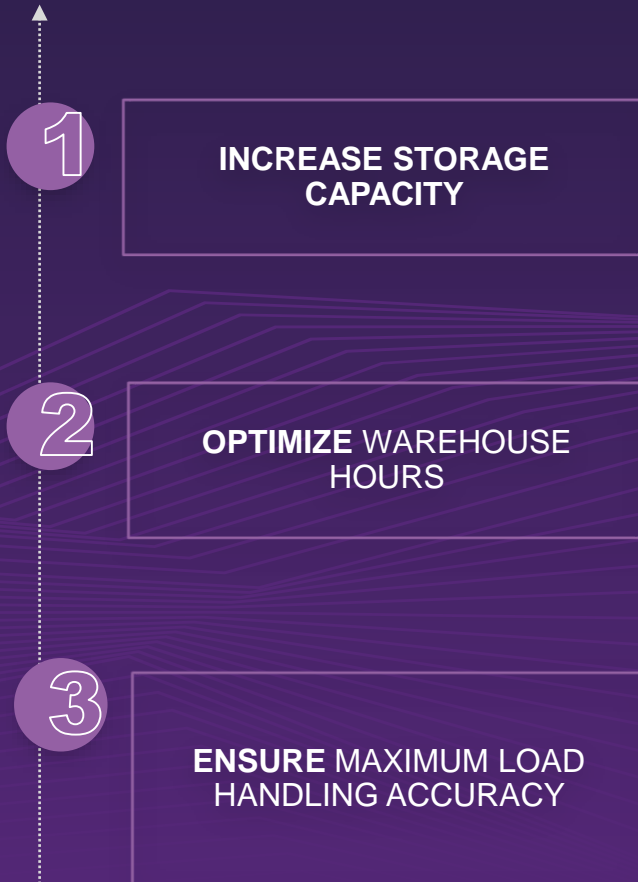
1. The robot moves in two degrees of freedom thanks to its 8-wheel base
2. Lifting mechanism is a rigid chain designed for a pulling force of 1000 kg
3. The battery life without recharging is in the range of 6 to 8 hours.
4. Simultaneous handling of one to five trays at a time
5. It has both stand-alone and manual controls
6. Charging stations are based at targeted product loading/unloading points
7. Floor-mounted contact trolley rails systems are used for warehouses with sub-zero temperatures to ensure continuous autonomous operation



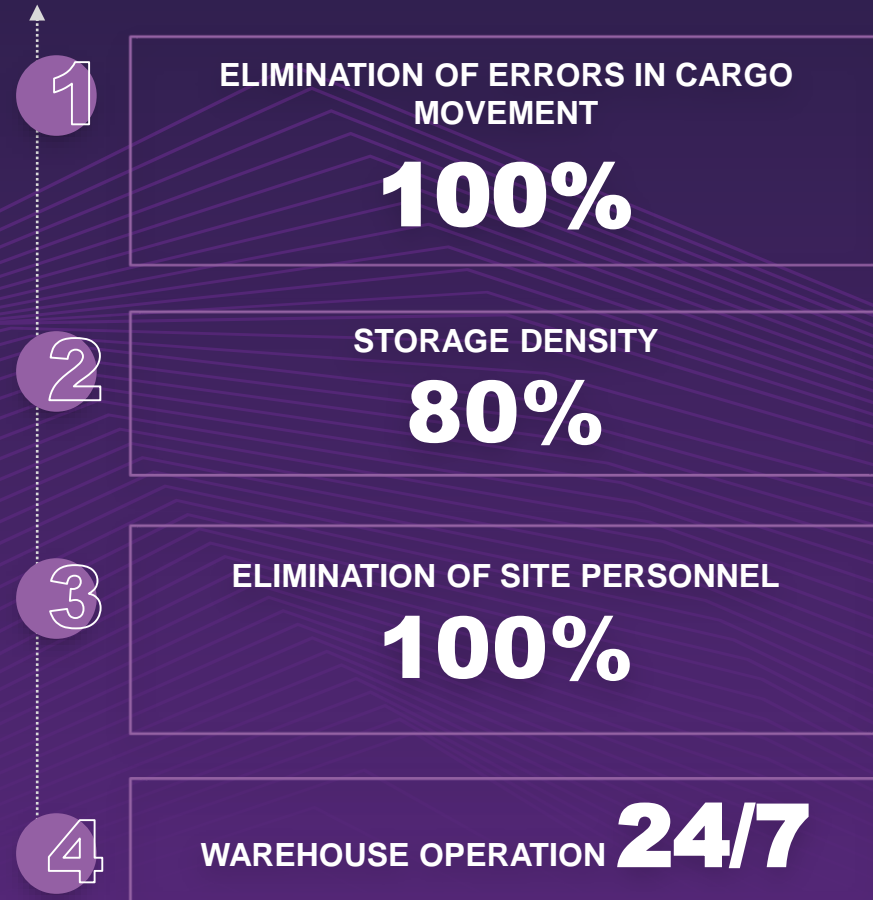




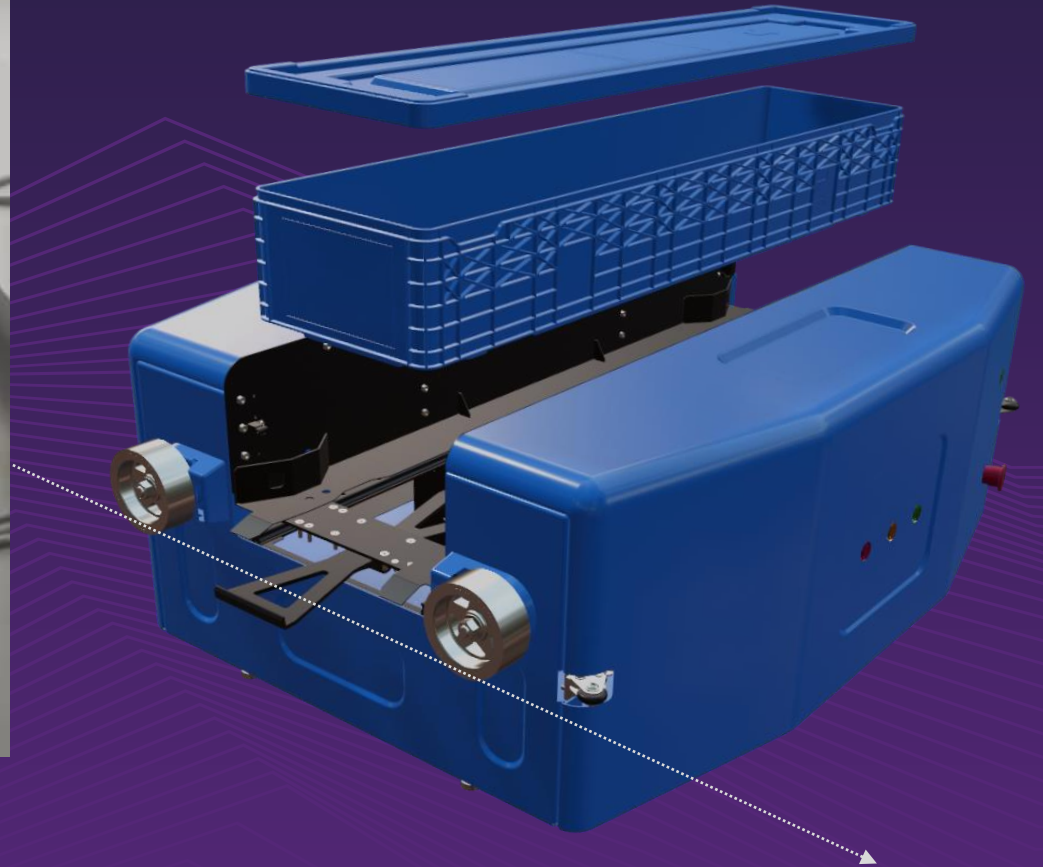
# TARGETS



# EFFECTS

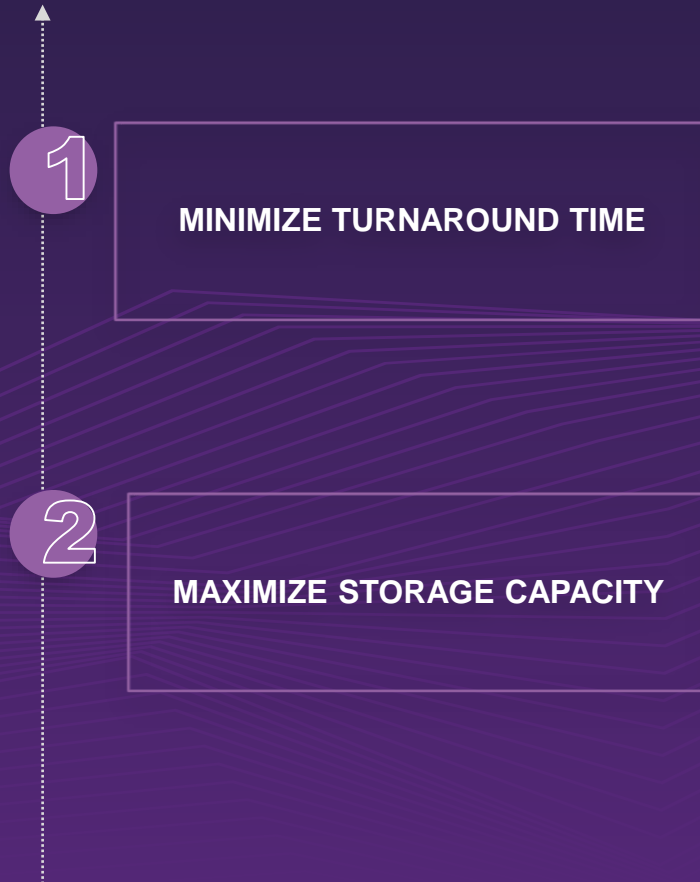




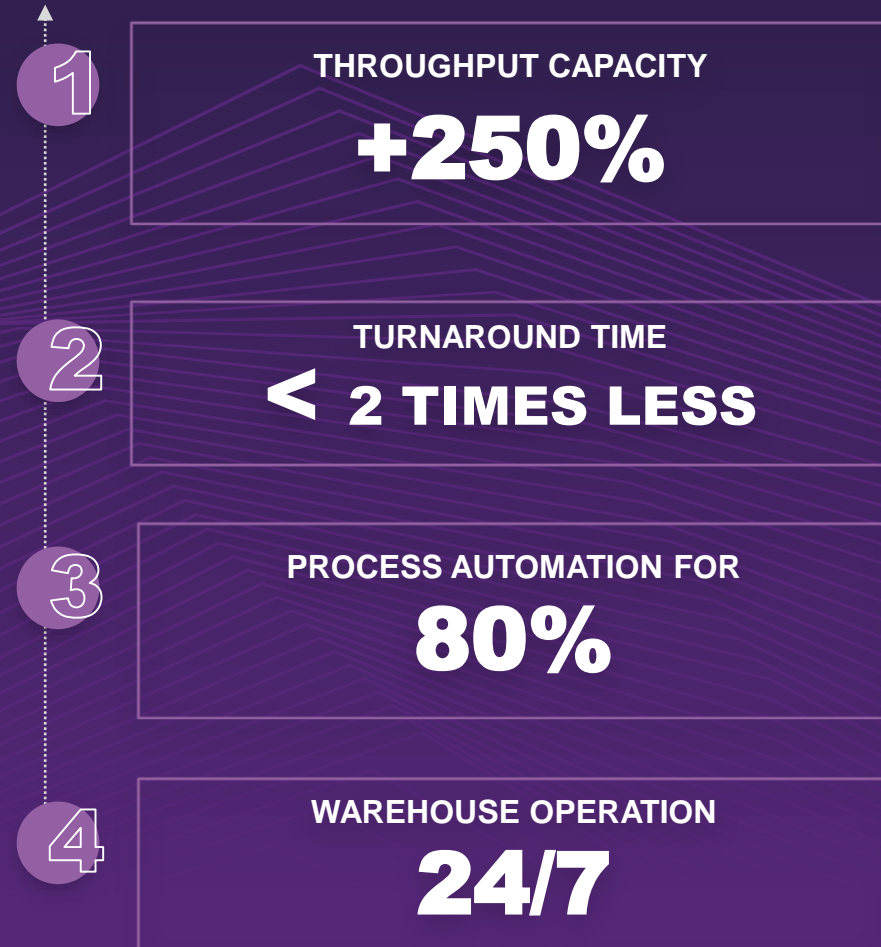




# TARGETS



# EFFECTS







# TASKS

1

**CUT** COSTS DOWN ON **40%**

2

**ENSURE**  
LABOR SAFETY

3

**AUTOMATIZE**  
the movement of loads weighing up to 3 tons







# TASKS

1

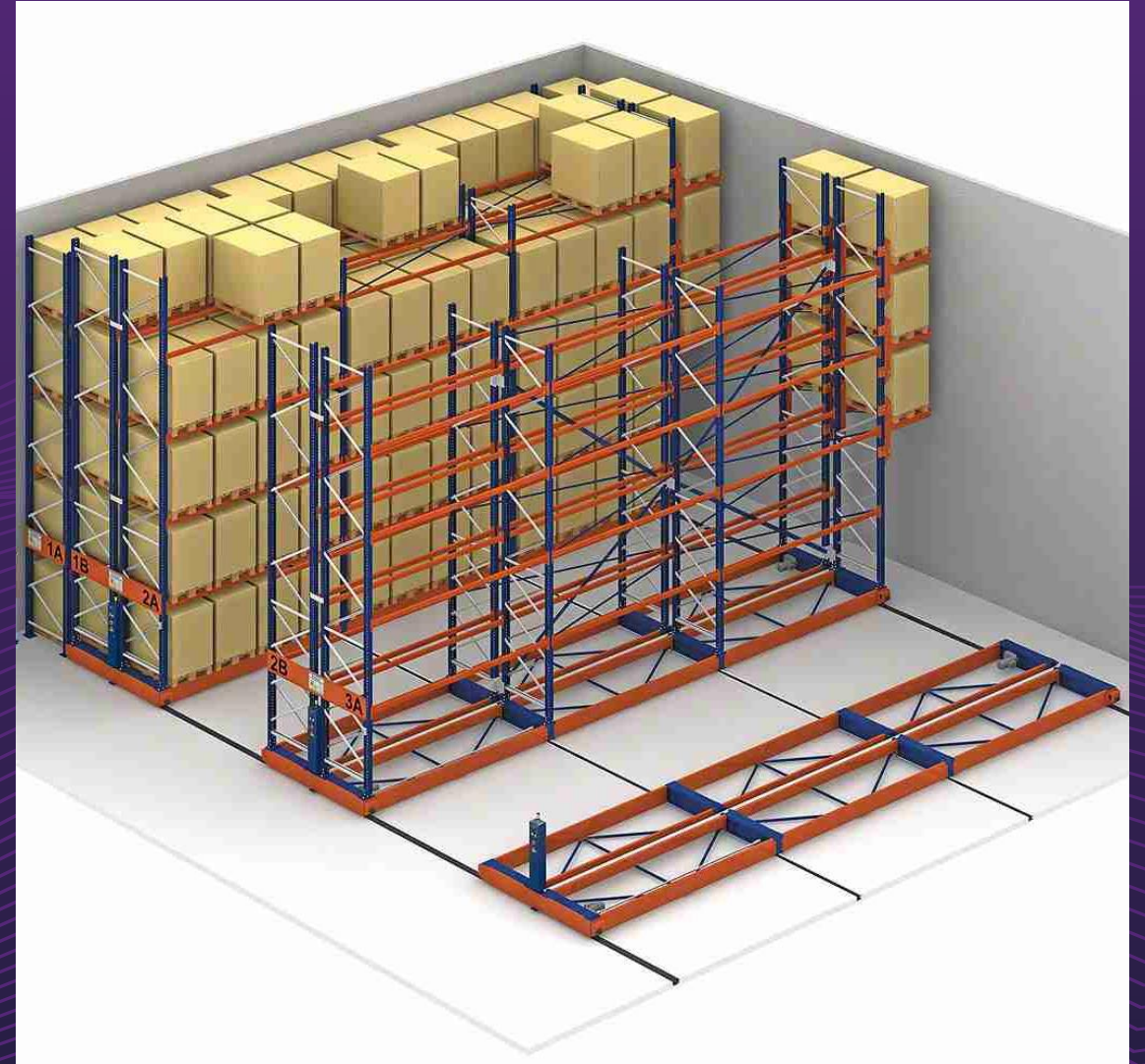
**INCREASE**  
STORAGE CAPACITY UP TO 40%

2

**ENSURE**  
OPERATION IN LOW TEMPERATURE  
MODE

3

**ENSURE**  
WIDE RANGE STORAGE





# RESULT

1

Storage capacity  
> up to 80%

2

Automation of cargo  
movement on racks 100%

3

Operation at temperature  
-37°C

4

Warehouse operation 24/7

 METRA  
DIGITAL LOGISTICS

**We hold meetings with managers and specialists of your company to discuss the possibilities of interaction in any convenient way for you:**

- 01** On your premises with our experts on-site
- 02** At production sites in Obninsk
- 03** Industrial Cluster of the Republic of Tatarstan
- 04** In videoconferencing mode (videoconferencing)



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