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Forklift RFID Automatic Reading Kit

Digital China Group.

IoT Department

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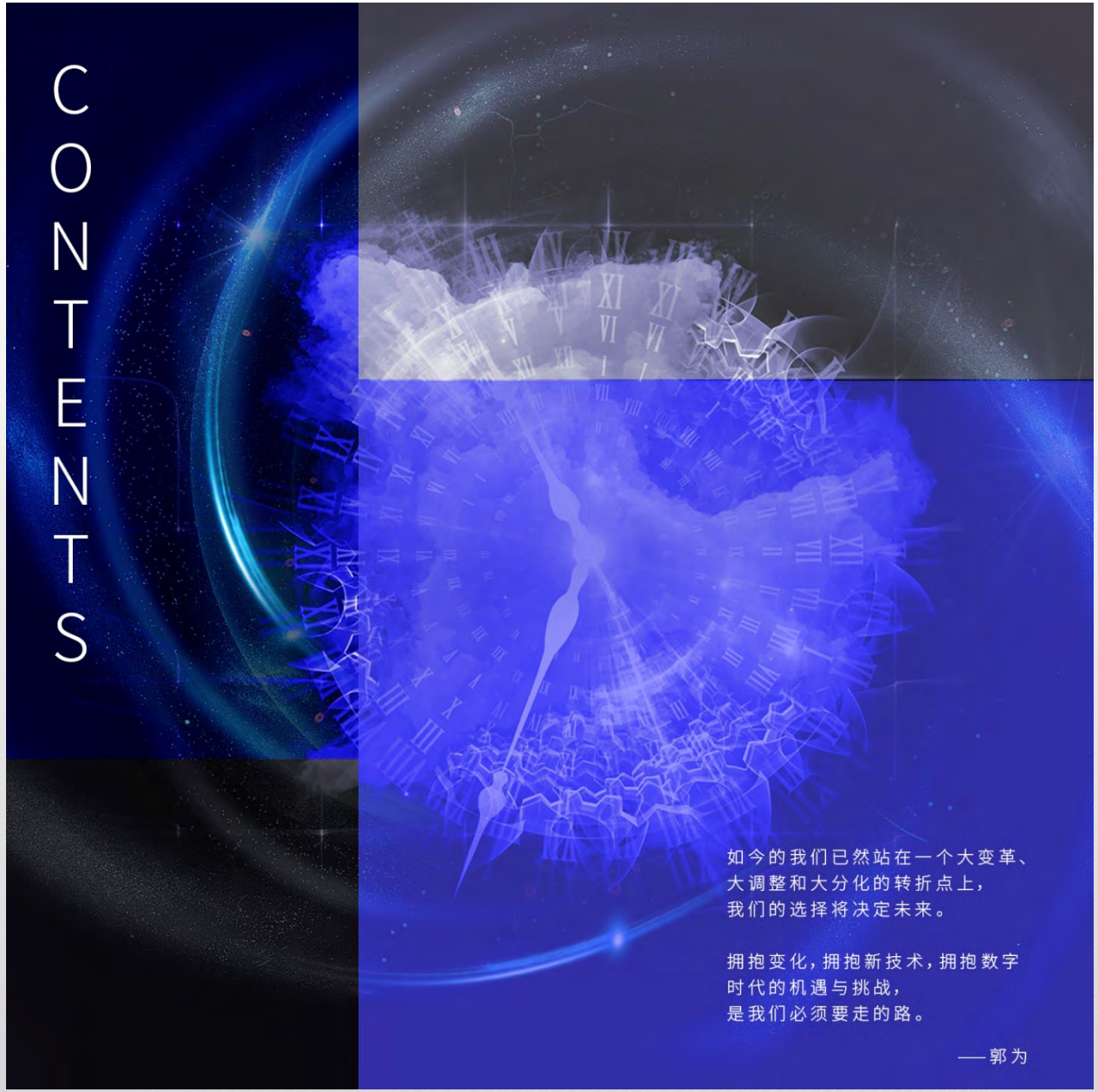

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Marketing Analysis of Intelligent Warehousing

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The formation of automated warehousing systems is not a task that can be completed in a short period. The development of the entire automated warehousing process has gone through various stages. Currently, warehouses at different stages coexist, and there is still significant market space for the upgrading of mechanized warehouses.

Manual Warehousing

- Manual Handling
- Manual Accounting
- Manual Management
- ……

Mechanized Warehousing

- Forklift
- Conveyor Belt
- Stacker Crane
- ……

Automated Warehousing

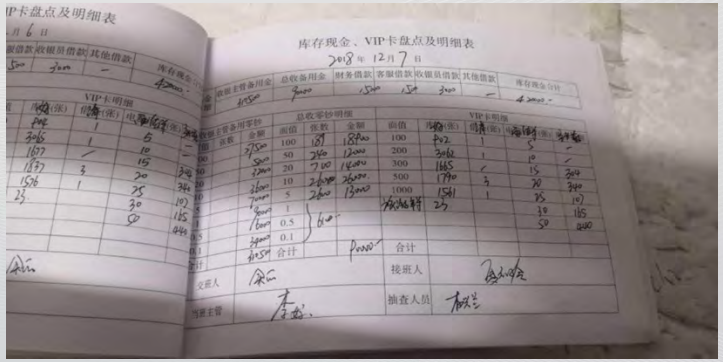
- AGV/AMR
- Automated Shelving
- Automated Sorting Equipment
- ……

Integrated Automated Warehousing

- Hardware and Software Integration
- Data Interoperability
- Organic Collaboration
- ……

Intelligent Warehousing

- Radio-Frequency Identificatio (RFID)
- Machine Vision
- Digital Twin
- ……



Warehouse Types

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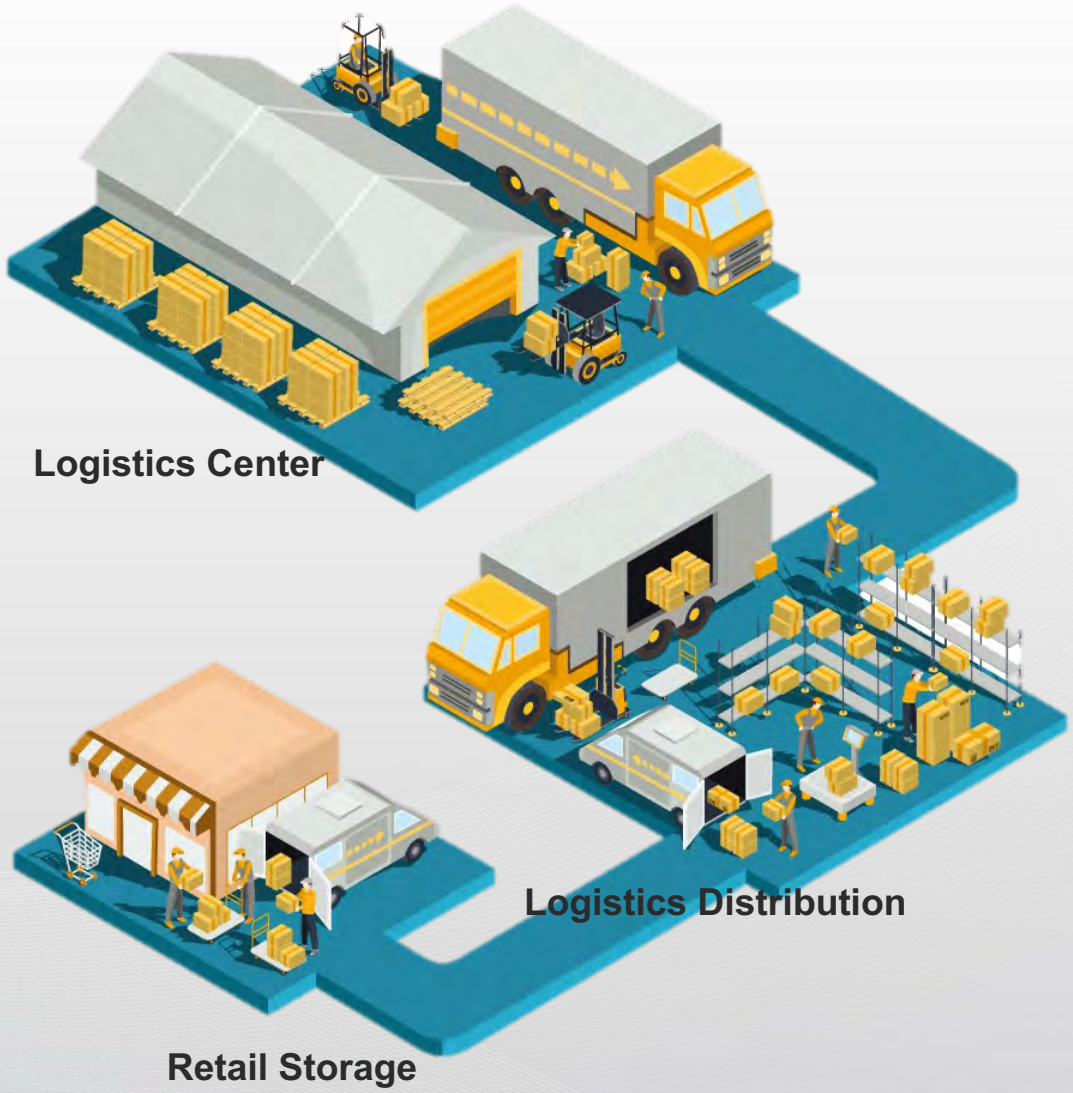

Logistics Center. It is the core part of the entire logistics system, serving as the centralized processing point for the flow of information, goods, and funds throughout the entire process from suppliers to end consumers.

Business Characteristics.

•Needs to complete processes such as receiving management, warehouse management, shelf management, in-stock management, and outbound management.

•Rapid turnover of goods with high requirements for timeliness and accuracy. Traditional management models can lead to long operating times, low efficiency, and information errors.

•Complex processes that require detailed data management. Traditional management models are unable to meet the needs of managers.

Fast Turnover, High Timeliness

Large Goods, Forklift Operations

Whole In, Whole Out

Warehouse Operations-related Issues

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- **Low Efficiency.** During inbound and outbound operations, forklift operators often disembark to scan and verify codes, significantly impacting operational efficiency.
- **Unsafe Practices.** Operators frequently leave the forklift running while disembarked, violating safety regulations and posing potential safety hazards.
- **Low Output.** Excessive dismounting and remounting actions by operators result in inefficient operations, consuming physical energy, and adversely affecting individual output.
- **Labor Intensive.** In some warehouses, an additional staff member is assigned to handle code scanning to ensure the forklift operator can focus on driving, leading to wastage of manpower resources.

Application scenarios

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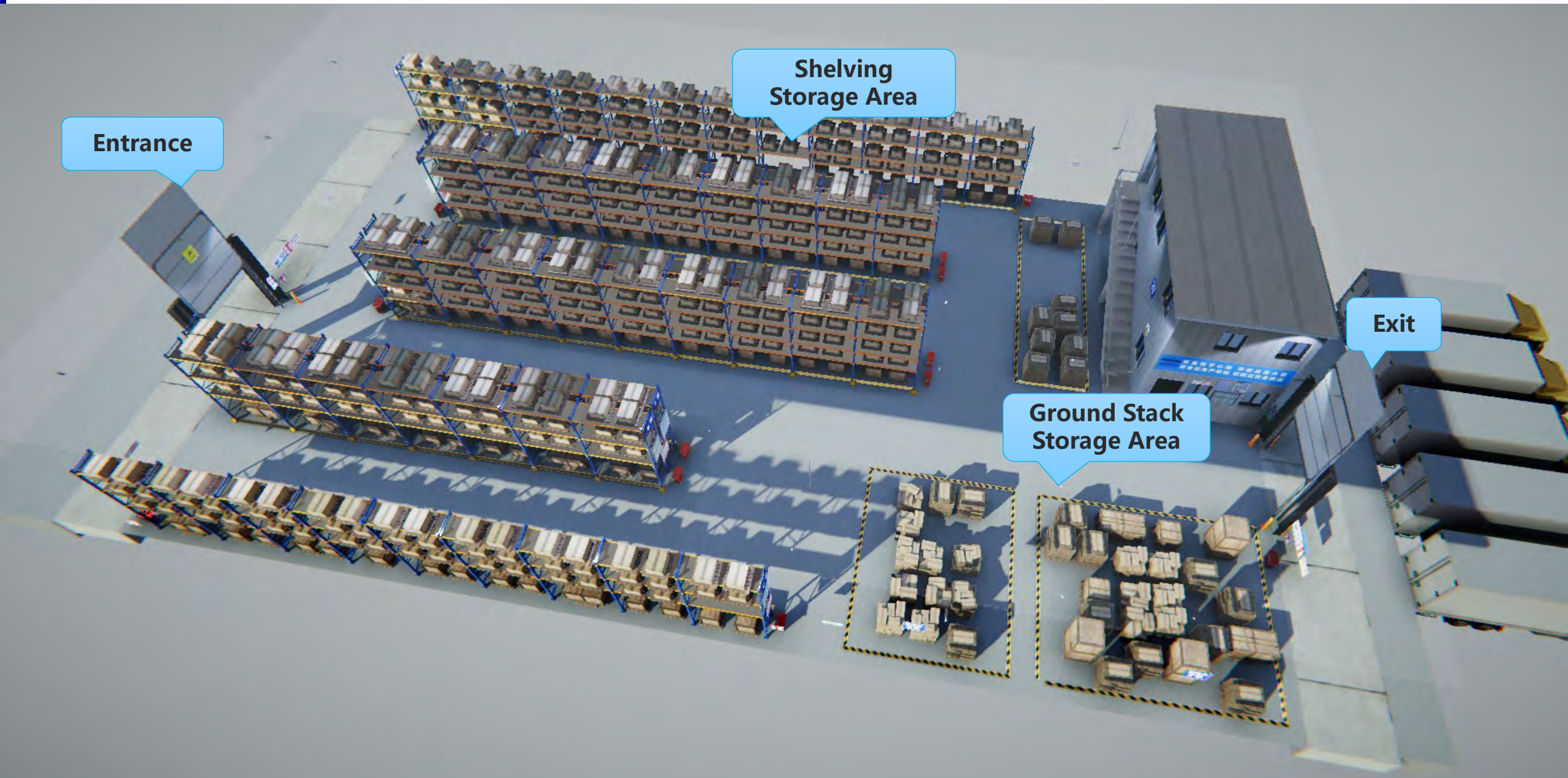

Application Scenarios

Receiving

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Application Scenarios

Receiving

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RFID Flexible Anti-Metal Electronic Tags

Universal RFID electronic tags (non-anti-metal)

Impact-resistant and anti-metal hard RFID tags

High-temperature and acid-alkali resistant electronic tags

Goods Label

Pallet Label

- For easy identification, improved recognition speed and accuracy, without altering work habits, it is recommended to affix RFID labels on both sides of the fork entry of each tray. Two labels are required for each tray

Goods Label

Shelf Label

Ground Stack Label

Application Scenarios

Warehousing/Storage

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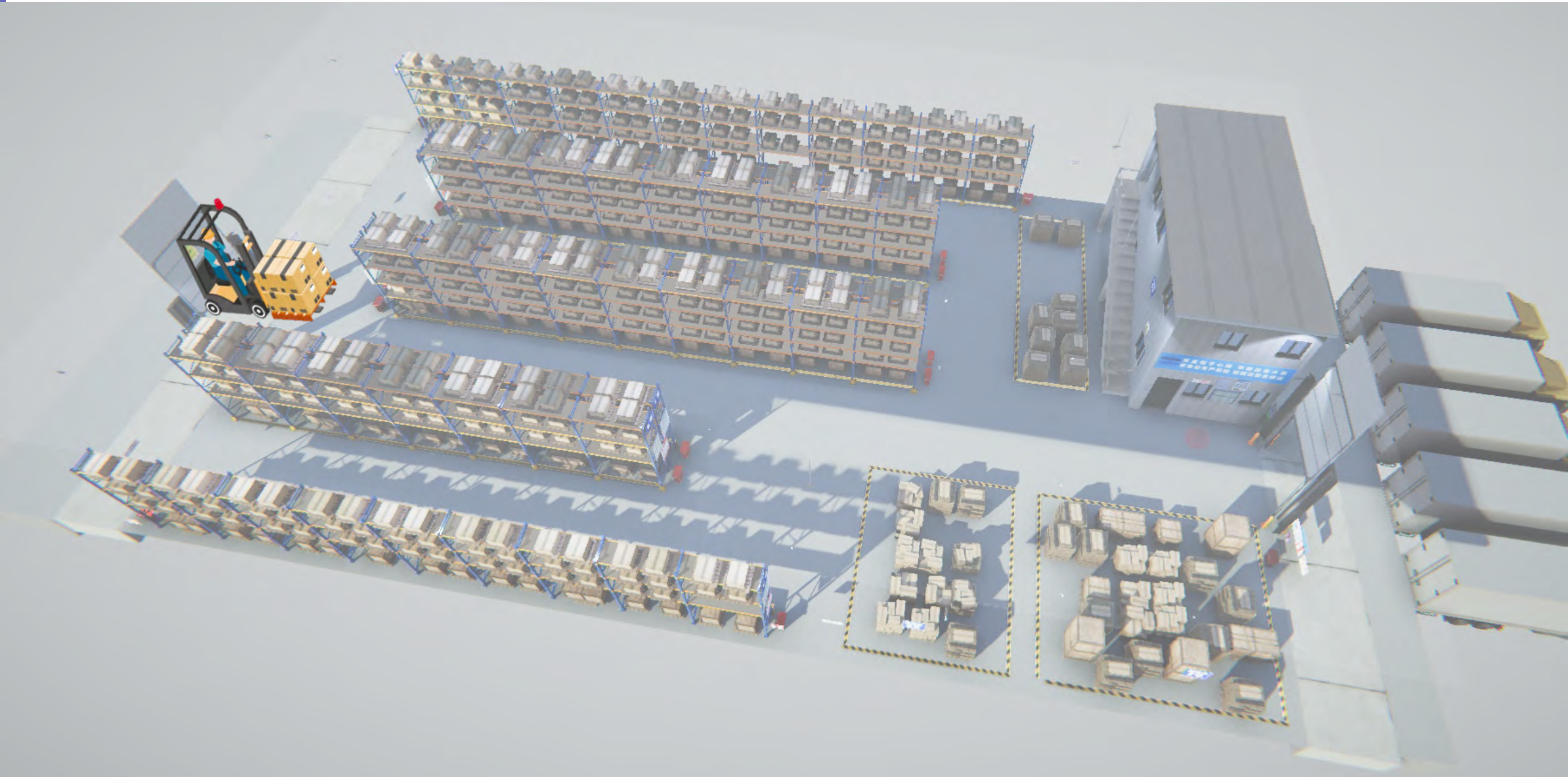

Application Scenarios

Warehousing/Storage

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Task Info

Application Scenarios

Shelving/Putting Away

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Application Scenarios

Shelving/Putting Away

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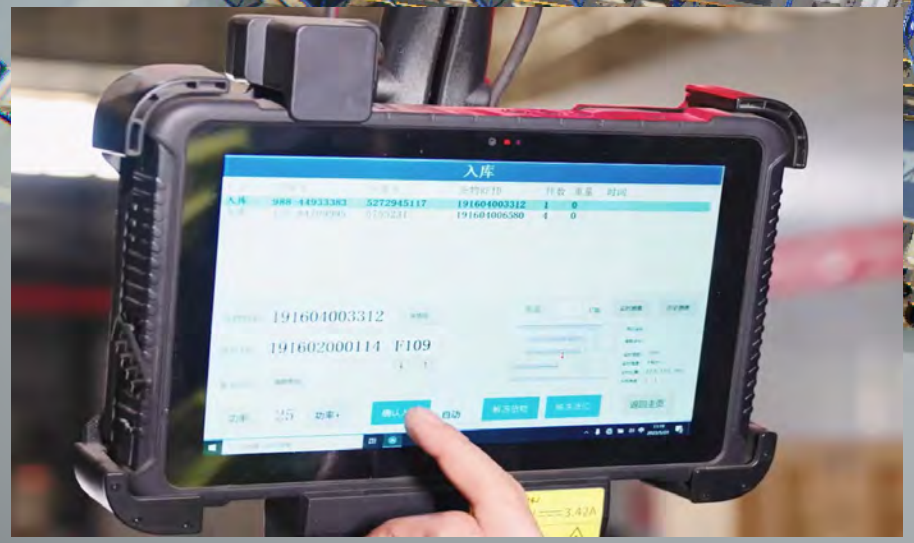

Application Scenarios

Outbound

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Application Scenarios

Outbound

Automatic Timeout Task Reminder

Automatic Selection of Outbound Tasks

Application Scenarios

Outbound

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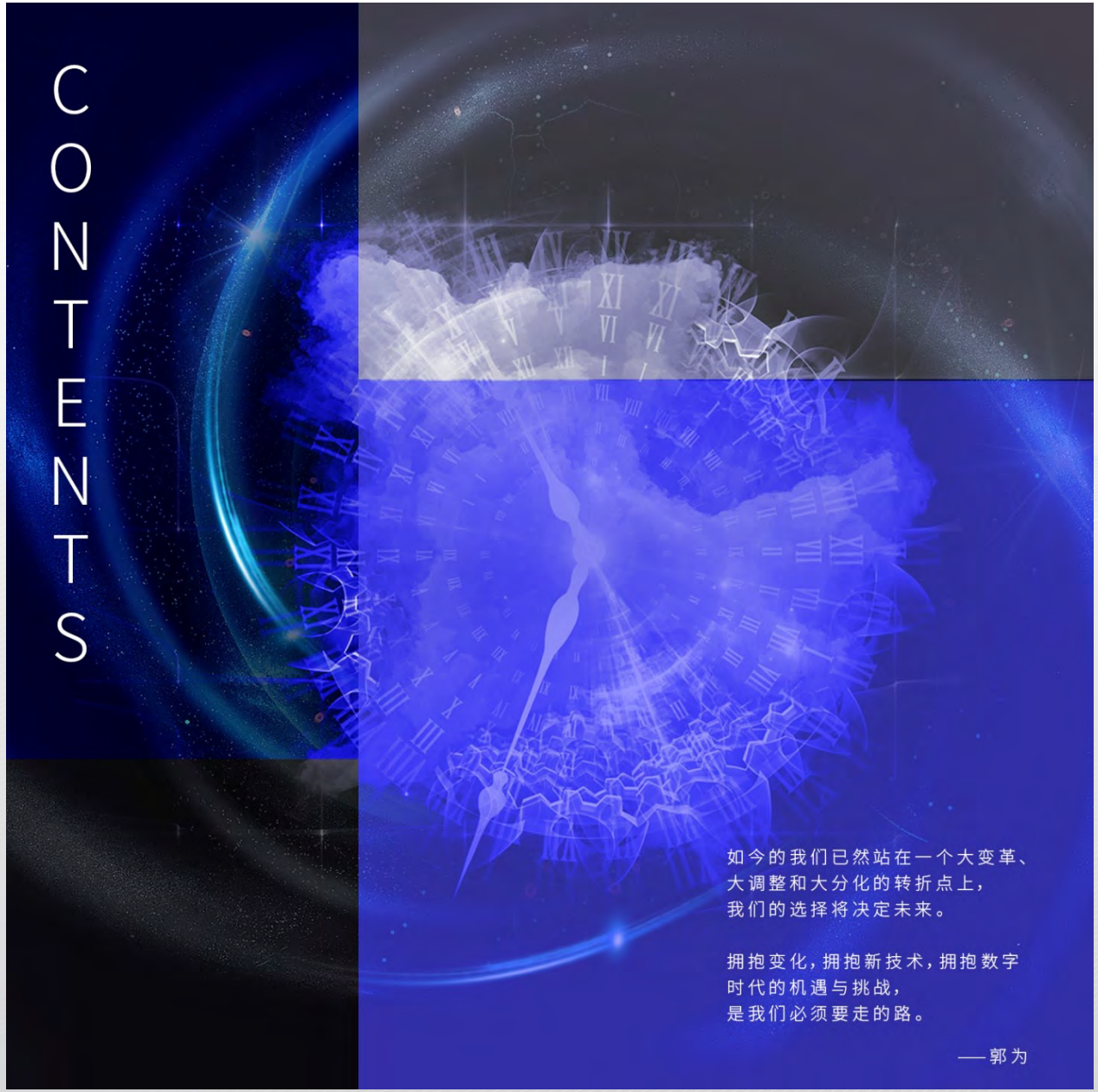

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Application Environment Transformation

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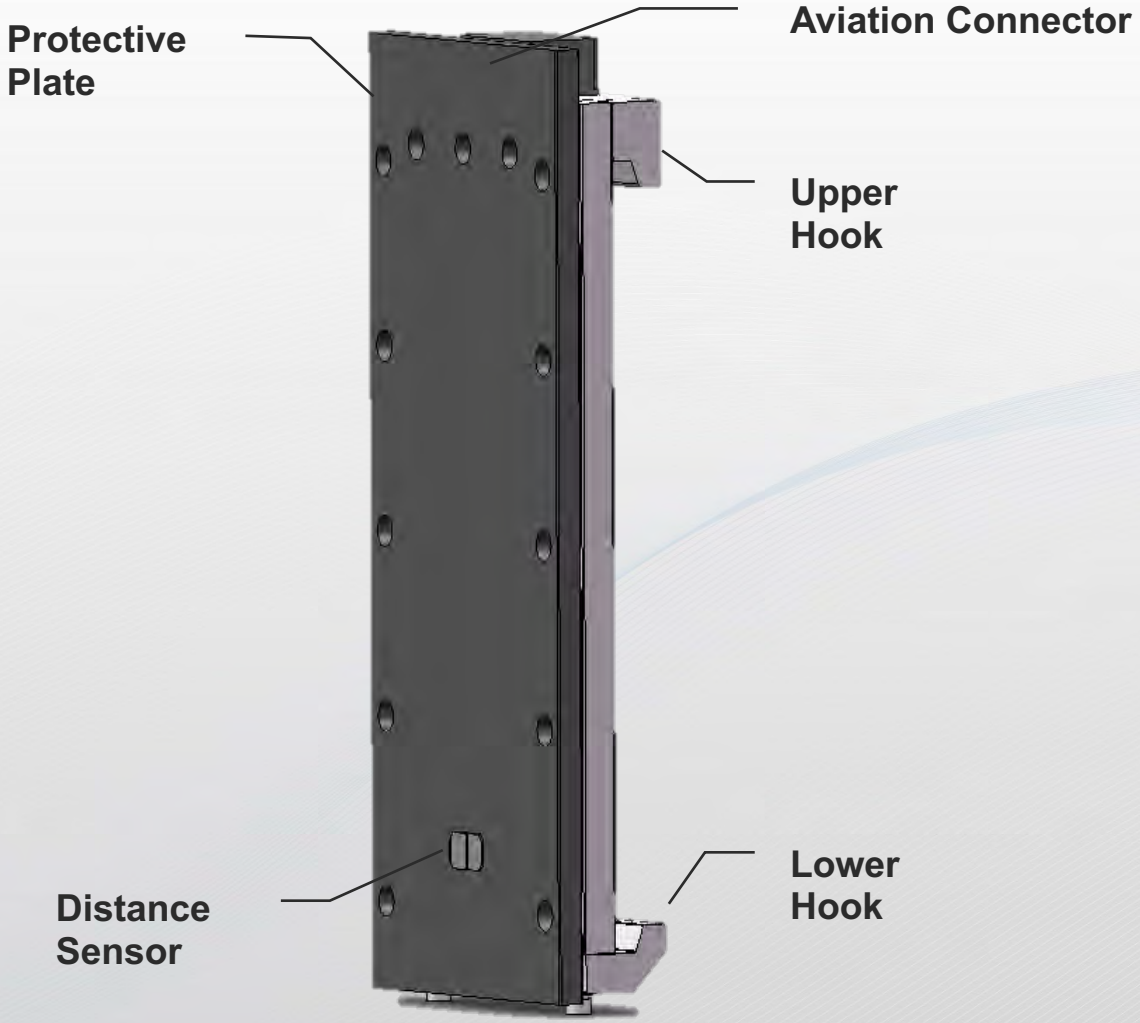
Fundamental Environment Transformation

Forklift Modification

Functionality and Structure

- **Automatic Identification.** Automatically identify RFID tag data for goods/pallets/ground stacks/shelves.
- **Pickup Action Recognition.** Automatically recognize forklift pickup actions, ensuring accurate reading of goods/pallet tags during pickup.
- **Drop-off Action Recognition.** Automatically recognize forklift drop-off actions, ensuring accurate reading of shelf/ground stack tags during drop-off.
- **Fork Height Recognition.** Automatically recognize the height of the forklift's cargo lift, assisting in determining the height of the shelving location during stocking.
- **Forklift Status Data.** Includes battery level, reader connection status, temperature, and other data.



Product Features

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Flexible Power Adjustment

The reader's reading power is flexible, allowing for the optimal antenna power to be provided for different operating environments and tag types.

Precision Reading

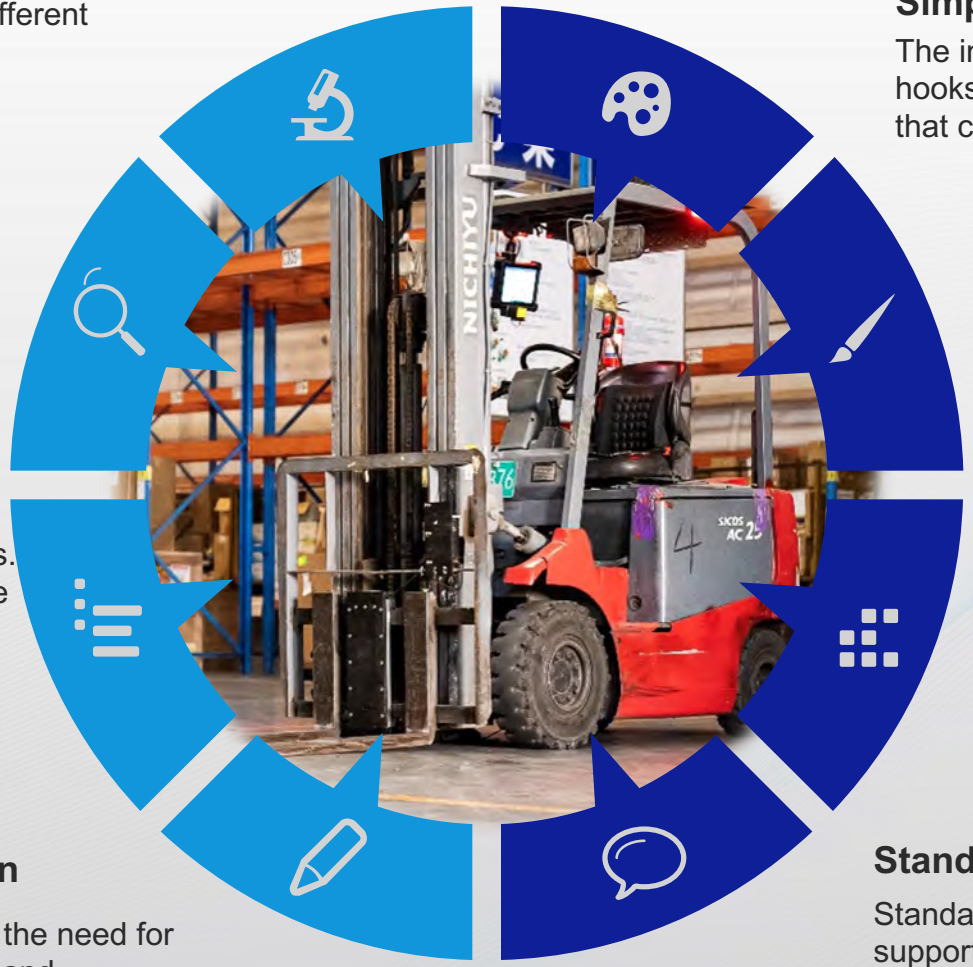
The device with a high-precision distance sensor, supporting reading tags at the optimal distance to avoid misreads and omissions, ensuring 100% accuracy.

Highly Recognition

Automatically discerns pickup and drop-off actions. The device could automatically turn to sleep mode and work mode. That could prevent continuous operation during travel from causing tag misreads and unnecessary power consumption.

Wireless Bluetooth Communication

Wireless Bluetooth communication to avoid the need for wired infrastructure modifications, damage, and maintenance.



Simple and Convenient Installation

The integrated component features upper and lower hooks, ensuring a simple and convenient installation that can be completed within half an hour.

Durable and Collision-Resistant

Aluminum alloy frame and high-strength racing steel plate material provide collision resistance and durability, ensuring that internal components are not damaged in case of impact.

Compatibility with Mainstream Forklifts

The device suit type II and III forklifts.

Standard SDK (Software Development Kit)

Standard SDK with open multi-level functionalities, supporting efficient integration with third-party systems.

Installation Video

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Applications of Electric Hydraulic Vehicles

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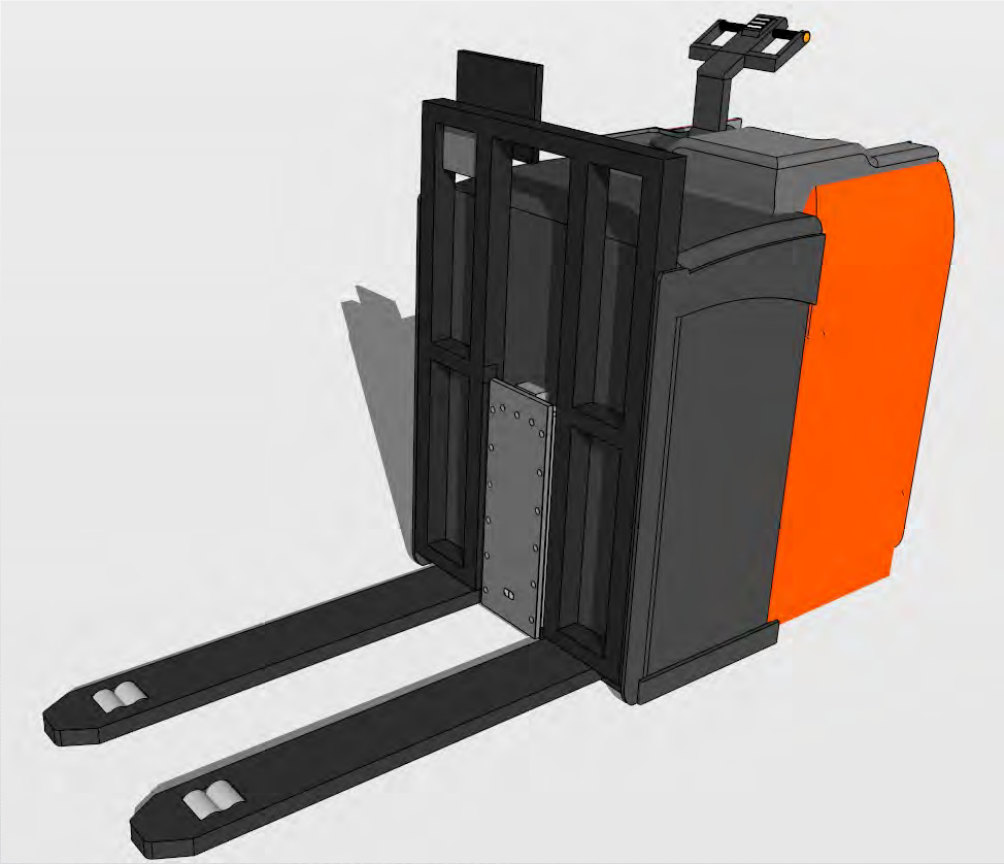

Installation Comparison

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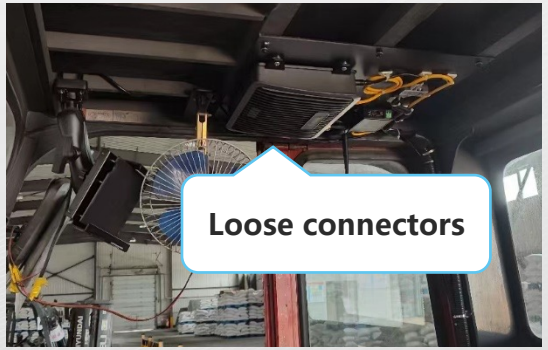
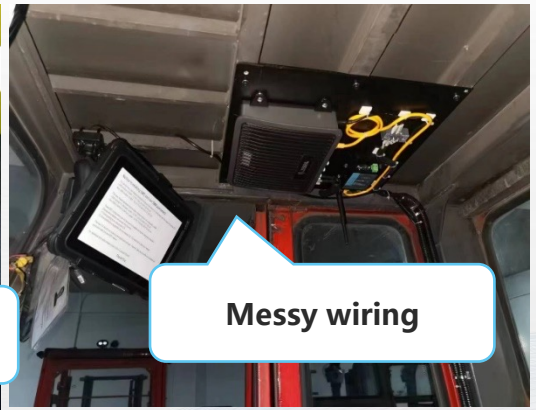
One-piece Installation

Split Installation





Parameters - Standard Version

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Configuration: Main Unit + POC Testing Software (Standalone Version)

Main Unit

Parameters	Model	Type II	Type III
Basic Parameters	Adaptation Fork Type	Type II	Type III
	Forklift Rated Lifting Capacity	1000-2500kg	2501-4999kg
	Device Size	490* 200* 66mm	591*200*76mm
	Weight	6kg	7.5kg
	Package Size	570* 290* 140mm	670*310*160mm
	Package Weight	12kg	14kg
	Power Requirements	10-16VDC、max24W@12V、GX12 Aviation Plug	
	Communication Interface	Bluetooth 2.0	
	Operating Temperature	-20℃~50℃	
	Storage Temperature	-20℃~70℃	
	Operating Humidity	10%~95% RH	
	Protection Level	IP53	
RFID	RFID Protocol Support	EPC C1G2、ISO18000-6B/C	
	RF Power Output	0dBm-33dBm (could be adjusted)	
	RF Antenna Specifications	4dBi circularly polarized antenna -1dBiC circularly polarized antenna	
Height/ Distance	Height Measurement	0-12m	
	Distance Measurement"	0-2m	

Optional: Lithium Battery, Lead-Acid Battery, Select as Needed

Accessories

Lithium Battery	
Battery Specification	12VDC-20AH
Power Supply Voltage	DC9-12.6V、 GX12Aviation Plug
Battery Dimension	158*90*60mm
Battery Weight	1.25kg
Usage Time	Continuous operation for over 8 hours, standby for 72 hours

Lead-Acid Battery	
Battery Specification	12VDC-20AH
Power Supply Voltage	DC9-12.6V、 GX12 Aviation Plug
Battery Dimension	158*90*60mm
Battery Weight	1.25kg
Usage Time	Continuous operation for over 3 hours, standby for 16 hours

Application Effect Analysis

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Number	Content Type	Comparison Group	Operator	Frequency	Action Breakdown							Time in Total （S）	Forklift Operation Time（S）	Overall Efficiency Improvement Rate(%)
					T1. Shelf Location and Task Founding	T2. Picking	T3. Forklift Working	T4. Forklift Moving	T5. Forklift Pickup and Drop-off	T6. LPN Code Scanning	T7.Shelf Code Scanning			
1	Shelving	Forklift Reading Kit Group	Enhanced Forklift	1st	/	28	6.4	25	7	/	/	80.4	76.0	30.7
2			Enhanced Forklift	2nd	/	32	4	29	14	/	/	97		
3			Enhanced Forklift	3rd	/	25	9	21	19	/	/	90		
4			Enhanced Forklift	4th	/	27	9	25	17	/	/	99		
5			Enhanced Forklift	5th	/	32	6	36	8.8	/	/	97.8		
6		Manual Forklift Group	Manual Forklift	1st	17	29	6	35	12	4	1	104	109.7	
7			Follow-up Personnel	1st	17	29	6	35	12	4	1	104		
8			Manual Forklift	2nd	18	34	11	37	14	3	1	118		
9			Follow-up Personnel	2nd	18	34	11	37	14	3	1	118		
10			Manual Forklift	3rd	16	30	8	29	18	5	1	107		
11			Follow-up Personnel	3rd	16	30	8	29	18	5	1	107		
12	Picking off	Forklift Reading Kit Group	Enhanced Forklift	1st	/	29	14	22	10	/	/	75	78.0	31.6
13			Enhanced Forklift	2nd	/	27	12	14	17	/	/	70		
14			Enhanced Forklift	3rd	/	34	11	22	16	/	/	83		
15			Enhanced Forklift	4th	/	30	12	20	17	/	/	79		
16			Enhanced Forklift	5th	/	36	10	17	20	/	/	83		
17		Manual Forklift Group	Manual Forklift	1st	16	37	7	32	15	3	7	117	114.0	
18			Follow-up Personnel	1st	16	37	7	32	15	3	7	117		
19			Manual Forklift	2nd	14	30	11	28	17	5	5	110		
20			Follow-up Personnel	2nd	14	30	11	28	17	5	5	110		
21			Manual Forklift	3rd	17	28	16	30	14	3	7	115		
22			Follow-up Personnel	3rd	17	28	16	30	14	3	7	115		

Competitive Analysis

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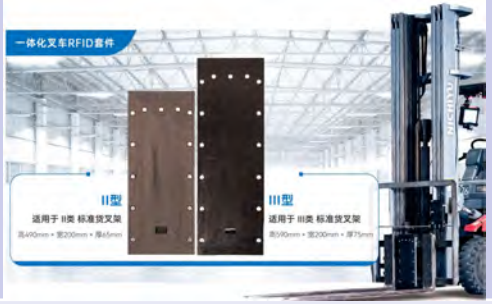
Comparison Items	Forklift RFID Automatic Reading Kit	Current Status
Product Form		
Product Integration	High-Level Integration	Decentralized and complicated installation and debugging.
Power Supply Method	Lithium battery powered. No circuit or oil pipe modifications	Forklift powered, requires additional oil pipes
Installation type	No drilling required, does not alter the forklift's structure	Requires modification to the forklift, drilling for installation
Installation Time	30 mins/set	2 days
Safety	Aligned with the fork, preventing damage to goods	Installed redundant structures may collide with goods causing damage
Collision Resistance	Integrated aviation-grade aluminum frame. 1cm thick high-strength collision-resistant plate.	Common structural components, no protection or simple protection, susceptible to damage
Post-Maintenance	Maintenance-free	Requires regular maintenance, replacement of oil pipes
Automatic Sleep Function	✅	❎
Risk of Misreading	Built-in algorithms, combined with sensor data to ensure accurate reading of goods and narrow aisle shelf locations	May misread non-forklift picked goods near the forklift, potential for misreads in narrow aisles
Applicability	Suit type II and III forklifts.	Customization required based on the vehicle

iWMS Software

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iWMS

Basic Data
- Warehouse Management
- Storage Location/ Zone
- Shelf Management
- Warehouse Type
- Product Management
- Container Management
- Container Identification
- Container Grids
- Supplier Management
- Customer Management
- Line-Side Management
- Product Packaging

System
- Data Dictionary
- Log Management
- System Parameters

Business Rules
- Shelving Strategy
- Wave Strategy
- Picking Strategy
- Completeness Attribute

Permission
- Role Management
- User Management
- Menu Management
- Data Rights Management
- Function Rights Management

User Customization
- Interface Fields
- Numbering Rules
- Order Types
- Order Operation Nodes

Inbound
- Receiving Order
- Blind Receiving
- Container Call
- Quality Inspection
- Shelving

Outbound
- Wave Management
- Removal
- Picking
- Shipping
- Return to Warehouse

Inventory Management
- Inventory Inquiry
- Inventory Locking
- Inventory Movement
- Split and Merge Operations
- Inventory Adjustment
- Empty Container Handling
- Inventory Count Management
- Historical Record

Exception Handling
- Order Operation Exceptions
- Inventory Exceptions
- DOC Synchronization Exceptions
- DOC Feedback Exceptions

Alerts
- Inventory Count Alerts
- Expiration Date Alerts
- Reinspection Alerts
- Inventory Age Alerts
- Upper Inventory Limit Alerts
- Lower Inventory Limit Alerts

AI Platform
- Path Optimization
- Inventory Optimization
- Intelligent Scheduling

Mobile/Car-mounted Terminal
- Inbound Order Synchronization
- Outbound Order Synchronization
- Line-Side Material Call
- Inventory Inquiry
- Line-Side Delivery
- Inventory Adjustment
- Line-Side Return to Warehouse
- Inventory Movement
- Inventory Count
- Empty Container Handling
- Picking
- Receiving
- Shipping
- Shelving
- Return to Warehouse

Workstation
- Inbound Workstation
- Outbound Workstation
- Inventory Count Workstation
- Cargo Sorting Workstation

Reports
- Inbound Report
- Outbound Report
- Inventory Report
- Comprehensive Report

Data Display Screen

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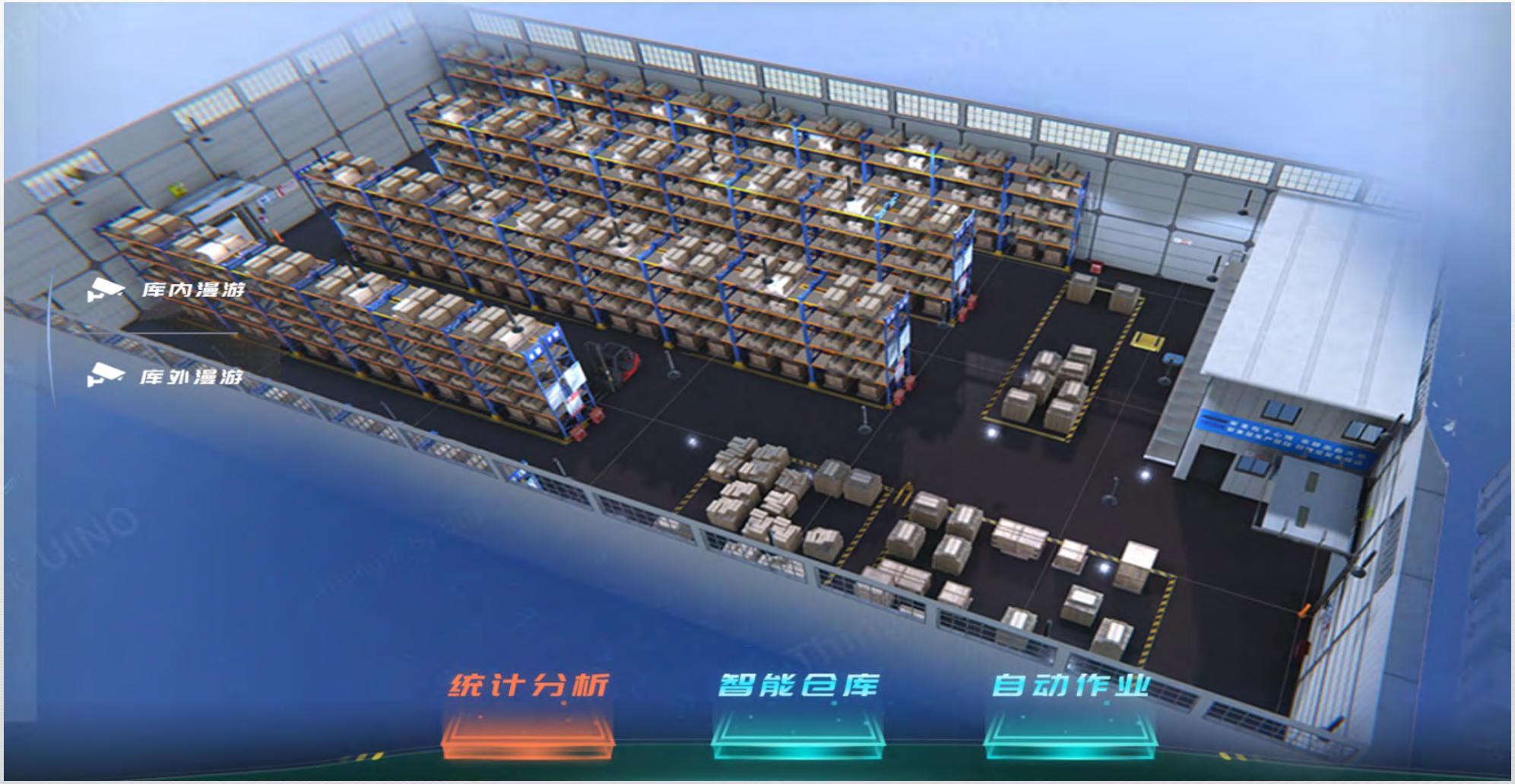
Built on big data analysis technology, the comprehensive data analysis dashboard centralizes the storage, analysis, and processing of key metrics such as inbound and outbound volumes, inventory levels, order fulfillment rates, and personnel performance.
It presents these insights in a visualized format, aiding managers and decision-makers in gaining a better understanding of the operational status of logistics parks and warehouses.

Digital Twin

By creating a virtual scene in three-dimensional digital format, integrating applications such as business automation, operational digitization, data visualization, and digital business model simulation, we achieve visualized management and refined control of warehouse business dynamics, equipment operations, and intelligent alarms. This enhances warehouse management and service capabilities.



Digitized Warehouse and Intelligent Warehouse

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Comparison Items	Forklift Upgrade and Retrofit	Smart Warehouse
Site Requirements	No special requirements	High site requirements, involving renovation
Construction Time	Short-term	Long-term
Cost	Low	High
Return on Investment	Fast	Slow
Technical Requirements	Low	High
Probability of Using Old Equipment	High	Low

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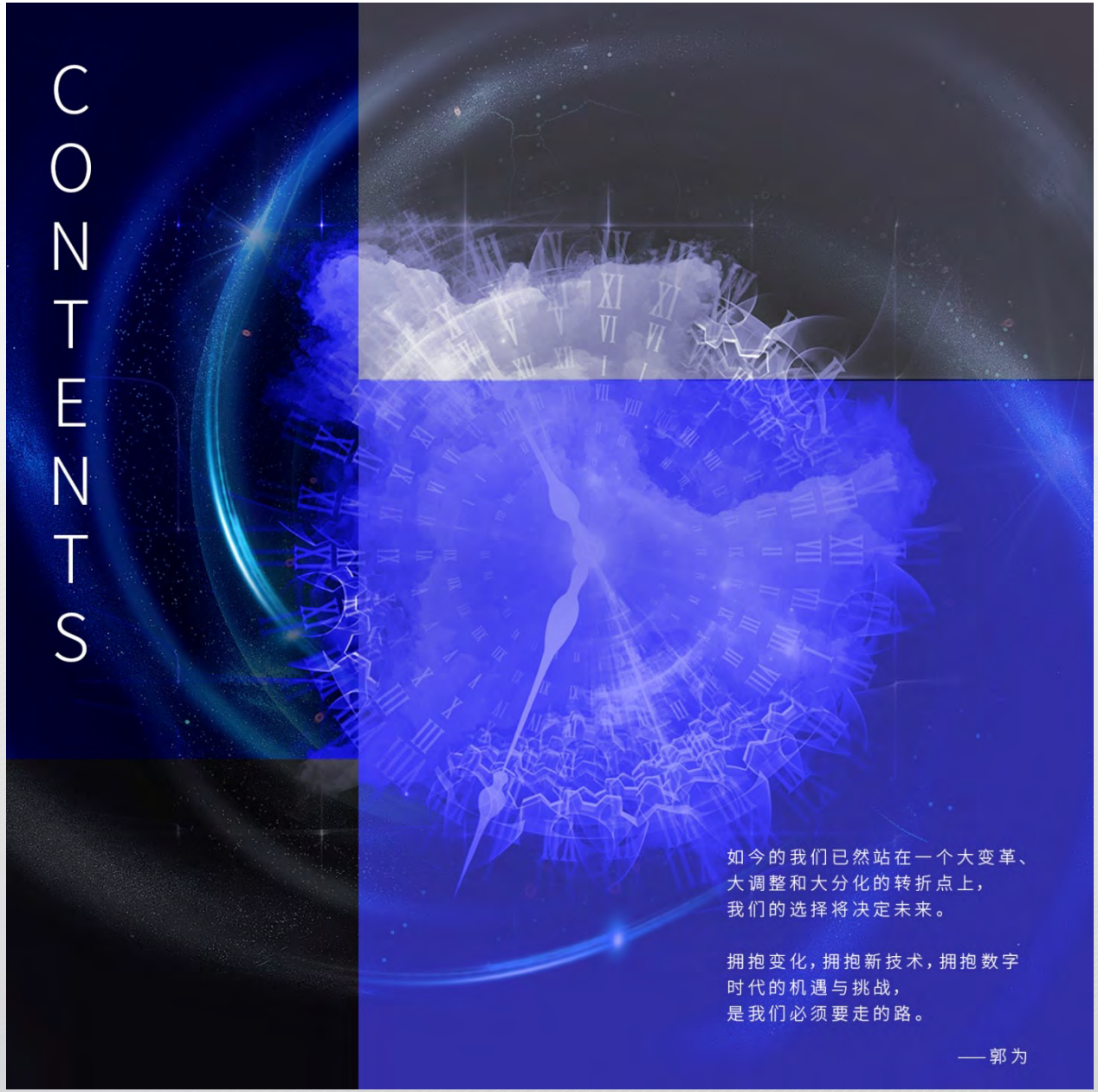

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Case Study

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Background
A supervised warehouse with an area of 1800㎡, specializing in the storage and inspection of customs goods.Manual operations lead to low efficiency and high error rates; high labor costs; lack of efficient tools for customs inspection and security supervision.

Upgrading
- RFID System: RFID channel gates, RFID upgrade for forklifts, handheld devices.
- Security System: Smart glasses, fixed cameras, dome cameras.
- Positioning System: UWB system (including base stations, asset/personnel tags).
- Software System: iWMS system

Results
- 80% Efficiency Improvement in Inbound Processes.
- 60% Efficiency Improvement in Outbound Processes.
- 70% Reduction in Workload for Document Entry.
- 100% Accuracy in Inbound and Outbound Processes.
- Reduction of Staff from 26 to 12.
- Reduction of Forklifts from 5 to 2.

Inbound with smart glasses

Automatic measure

Guide and record the shelf listing

Remote inspection with smart glasses

Customer Feedback

'The intelligent system has changed our work totally. It liberate staff from complexed and repetitive work on inbound, in-stock, and outbound operations. Thereby meeting the shipper's demands for efficiency, safety, accuracy, and timeliness. It has established a leading demonstration effect in the customs supervision warehouse, ensuring effective supervision of import and export goods by customs. Within the company's system, it has created an intelligent application benchmark, providing a reference model for optimizing processes, improving efficiency, and reducing costs for many other warehouse managements.'
— Deputy General Manager, a Logistics Company

Case Study

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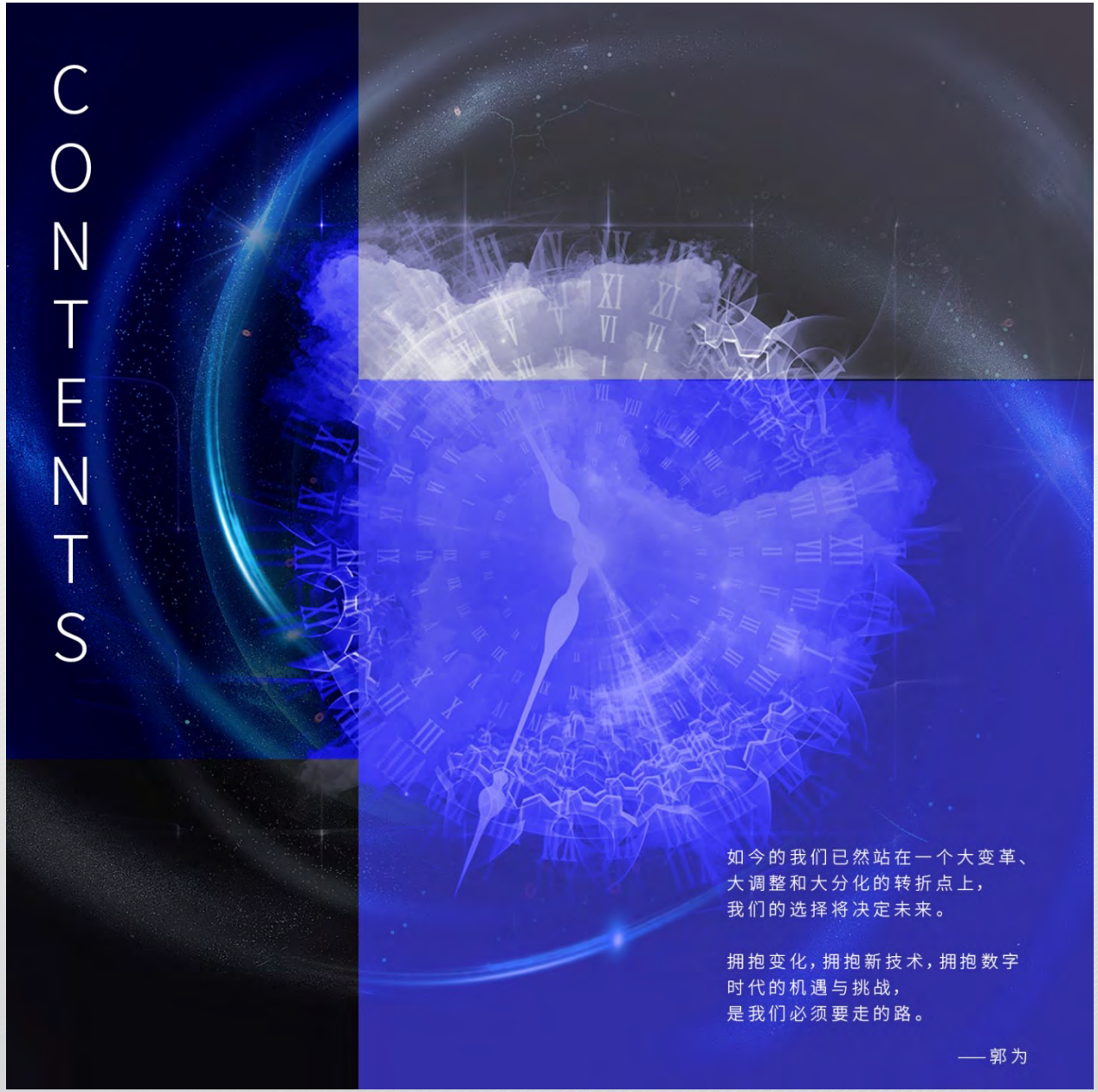

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FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/ TV technician for help.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Caution

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Radiation Exposure Statement

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provide with antenna installation instructions and transmitter operating conditions for satisfying RF exposure

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Supporting Policies

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Training

- Sales training.
- Technical training

SDK Development

- Standard SDK package.
- Development guides

Backup Device

- Based on order quantity

Remote Technical Support

- Remote installation guidance
- Troubleshooting support
- Etc,.

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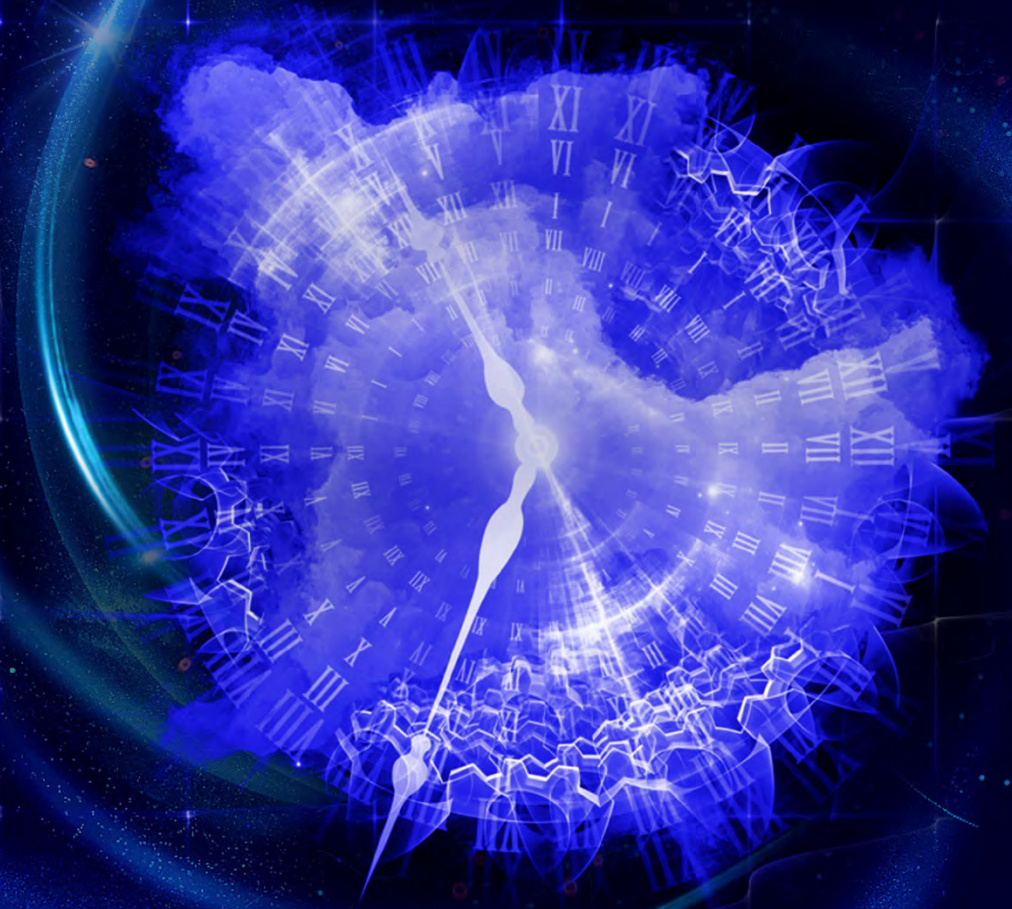
Thank you!



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