



Global pioneer in full-category automated loading & unloading

ENGOAL

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ENGOAL | 2026

Company Profile

ENGOAL

About ENGOAL

Engoal harnesses the power of AI and advanced robotics to reshape the future of global industrial productivity. Driven by deep-seated technical innovation, Engoal delivers flexible solutions for diverse materials and challenging conditions, transforming traditional manual processes into unmanned, high-efficiency systems. Our stable, safe, and efficient solutions are widely deployed across industries—including automotive, electronics, new energy, logistics, and food&beverage—empowering enterprises to transcend production limits and embrace the era of intelligent

Mission

Integrate AI & robotics to redefine industrial productivity.

Vision

Lead the industrial robotics revolution,
unlocking infinite value for global production.

Core Values

Deliver excellence for customers; grow together with our team.



100+ Hardware and Software Patents

50% R&D Staff Ratio

15% Year Growth Rate of Annual Sales



Key Milestone

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2016-2017

- ENGOAL (Beijing) Intelligent Technology Co., Ltd. was established
- Secured contracts for 13 consecutive Amazon warehouse automation retrofit projects
- ENGOAL's first series of retrofitted automated loading and unloading products was launched

- Secured tens of millions in Series A funding; established ENGOAL Intelligent Suzhou headquarter
- ENGOAL's first automated loading and unloading system was successfully deployed at SAIC Motor, and subsequently replicated at renowned automake

2020-2021

- Expanded overseas, implemented internationalization strategy, and established overseas subsidiaries
- Launched the first rail-guided automated loading and unloading equipment specifically designed for the FMCG industry; the first-generation model successfully validated the technical feasibility

2022-2023

- Product iterations and upgrades, along with category expansion; standard product lineup now includes 7 series and 12 models tailored for specific application scenarios
- Strategic expansion into the new energy sector, partnering with industry leaders to launch industry leading product

2024-2025

- Automated loading and unloading products are fully deployed across multiple leading lithium battery factories
- Accelerating global expansion, with automated loading and unloading products exported to Southeast Asia, Europe, North America, and South America
- Developing proprietary AI-driven flexible algorithms and control technologies, integrating with autonomous driving interfaces to position for the future

2026

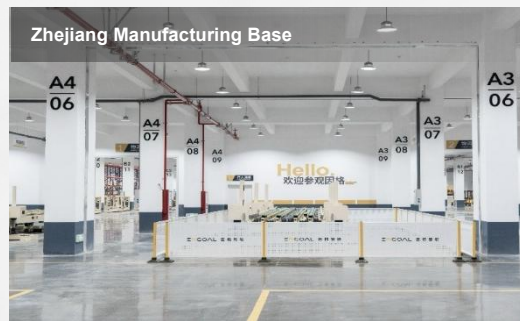
- Completion of ENGOAL's Zhejiang Production Base (Standardized Production, Large-Scale Delivery)
- Iterative development of the "AI+ Hardware + Scenario" technology roadmap, comprehensively upgrading automated loading and unloading products to expand into more overseas markets

Intelligent Manufacturing Base

ENGOAL

R&D Center & Manufacturing Base

Rooted in China, Serving the World



Engoal adheres to technology-driven development. Its R&D team consists of masters and doctors from prestigious universities including Tsinghua University. The company guarantees product quality through standardized production, delivers efficient order fulfillment and reliable after-sales services to global clients, and supports the expansion of worldwide business with robust delivery capabilities.



Production lines

7 Lines



Annual capacity

400+ Sets / type



covered area

20,000 m²

Product Expansion & Iteration

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Engoal's 20,000+ m² Production Base

📍 Xiangcheng District, Suzhou

📍 Jinhua, Zhejiang



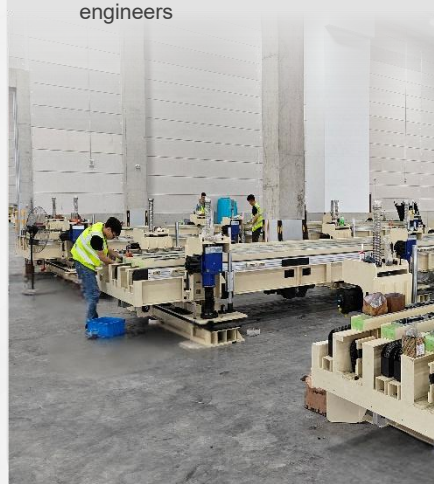
Production Capacity Ramp-Up

- We deliver a new batch of fork-rail automated loading & unloading systems every 20 days



Professional Commissioning & Testing Facility

- Dozens of units run for efficient commissioning and testing
- 10 simulation & test zones
- 15 electrical commissioning engineers



International Quality Validation

- Exported equipment meets special compliance testing requirements for multiple countries
- Delivered to Hungary, Malaysia, the U.S., Brazil and other overseas markets.



CONFORMS TO

Intertek



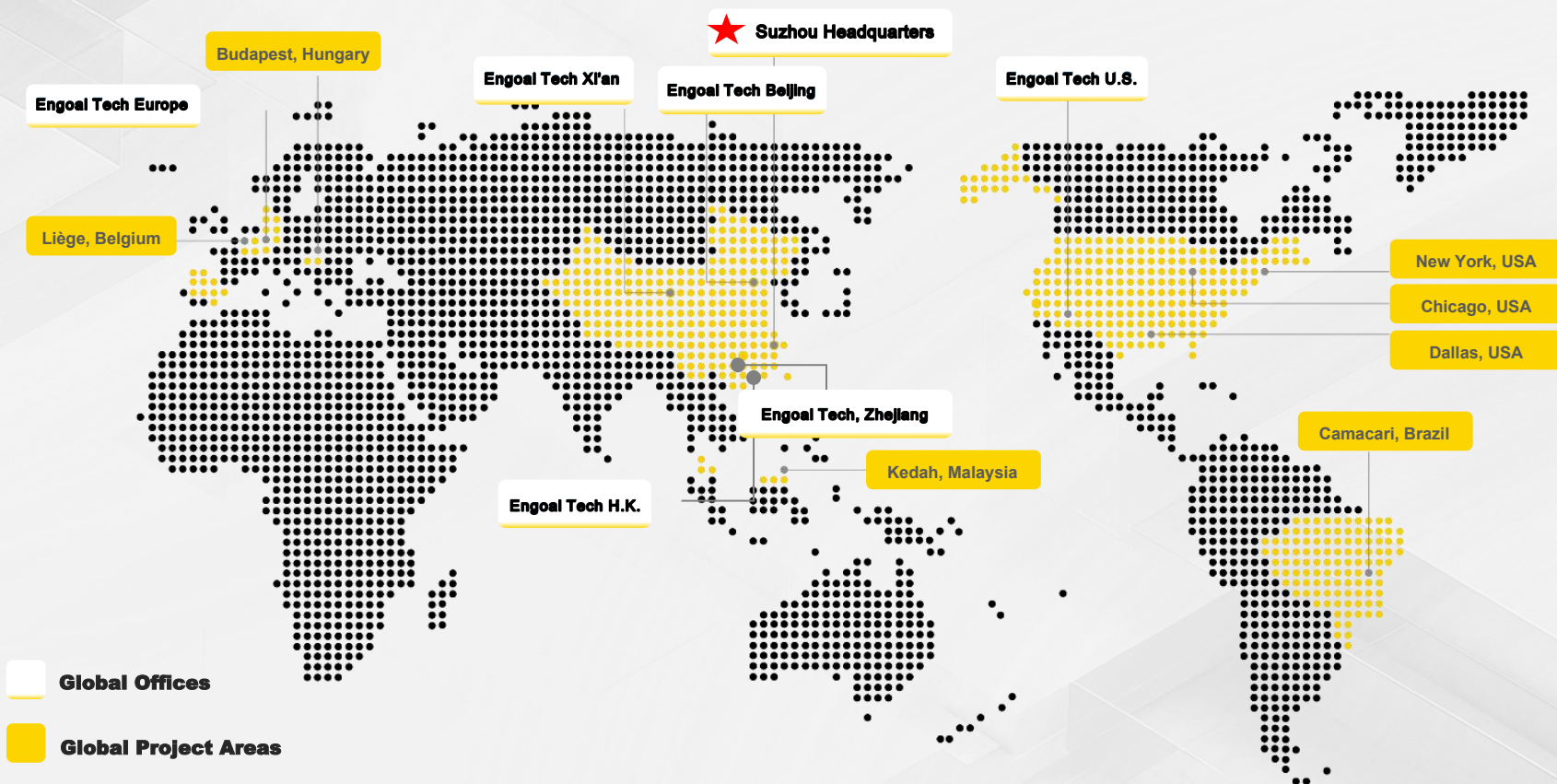
CE Certification
(Mandatory EU
Safety Standard)



Global Footprint

ENGOAL

With offices and branches across key economic regions worldwide, we deliver professional, localized support to our global customers



Qualifications, Honors & Technical Patents

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- Since its establishment, ENGOAL has obtained **over 100** independent R&D patents, including software copyrights, invention patents, and utility model patents.
- The company has acquired certifications for the ISO 9001 Quality Management System, ISO 45001 Occupational Health & Safety Management System, and ISO 14001 Environmental Management System.
- It has gained market recognition with professional service provider qualifications and numerous industry awards.



100+
Patents



3
Software Copyrights



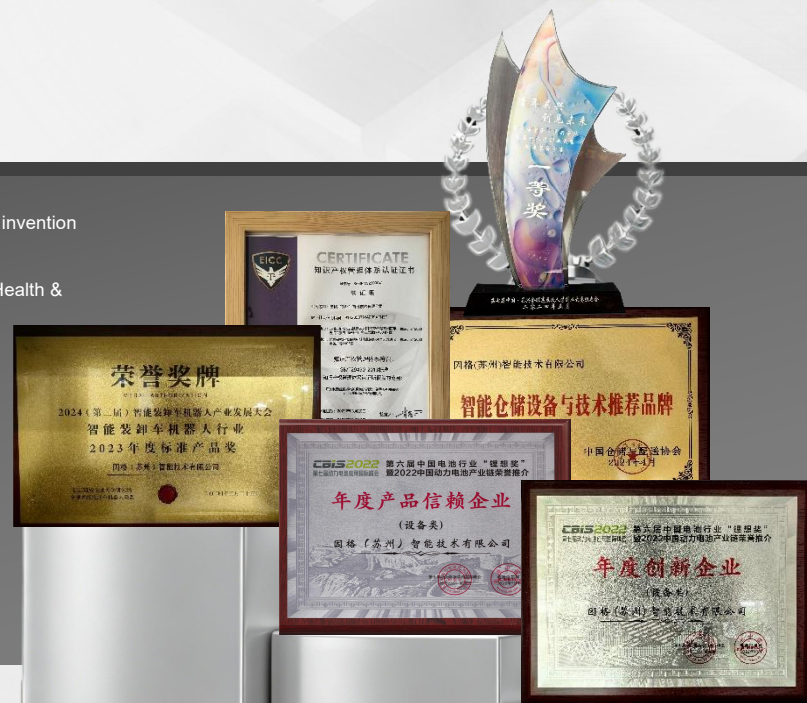
**Industry Standard
Product Award
2025**



**Trusted Enterprise
of the Year
Lithium Battery Industry**



Government-Issued
Enterprise Qualifications



Customer Recognition

100+

Cumulative Delivered Cases

With full-industry coverage advantages, we are the unanimous choice of leading enterprises.



E-commerce
Logistics



Lithium
Battery



Automotive



Beverage



FMCG



Electronics



Chemical
Industry

CATL
宁德时代

EVE

HiTHIUM
海辰储能

远景能源
ENVISSION

BOSCH

BYD

CHERY

Volkswagen

蒙牛

泸州老窖

Unilever
联合利华

亚马逊
amazon.cn

muRata
INNOVATOR IN ELECTRONICS

EMERSON

CRANE

法士特

BASF
The Chemical Company

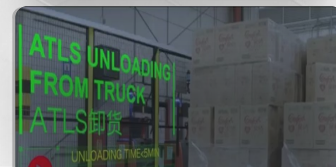
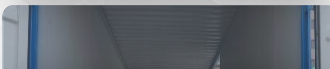
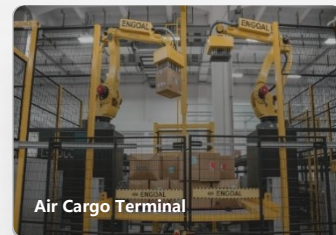
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Industry Pain Points: A Billion-Dollar Labor Gap Waiting to Be Resolved



Automation Gap in Loading & Unloading Market: Unstructured Loading/Unloading Scenarios Are in Urgent Need of Transformation



2 % +



Injury Rate

- The annual workplace injury rate of the loading & unloading industry exceeds 2%, far above the average across all industries, making it a **high-risk occupation**.
- Multiple research institutions cross-verify that labor turnover rate generally stands **above 20%**. **Safety hazards** have become a core pain point for enterprises.

≥ 35 °C + ≥ 30 kg



Red Lines for Loading & Unloading Operations

- German policy mandates **phasing out manual in-trailer loading** within 3 years, especially during extreme hot or cold seasons. Any carton over 30kg must be handled with **mechanical auxiliary equipment**.
- EU regulation **imposes fines** if truck loading/unloading work lasts more than 90 minutes continuously.
- Six Chinese government authorities jointly issued policies to **promote unmanned loading equipment**.

30 % +



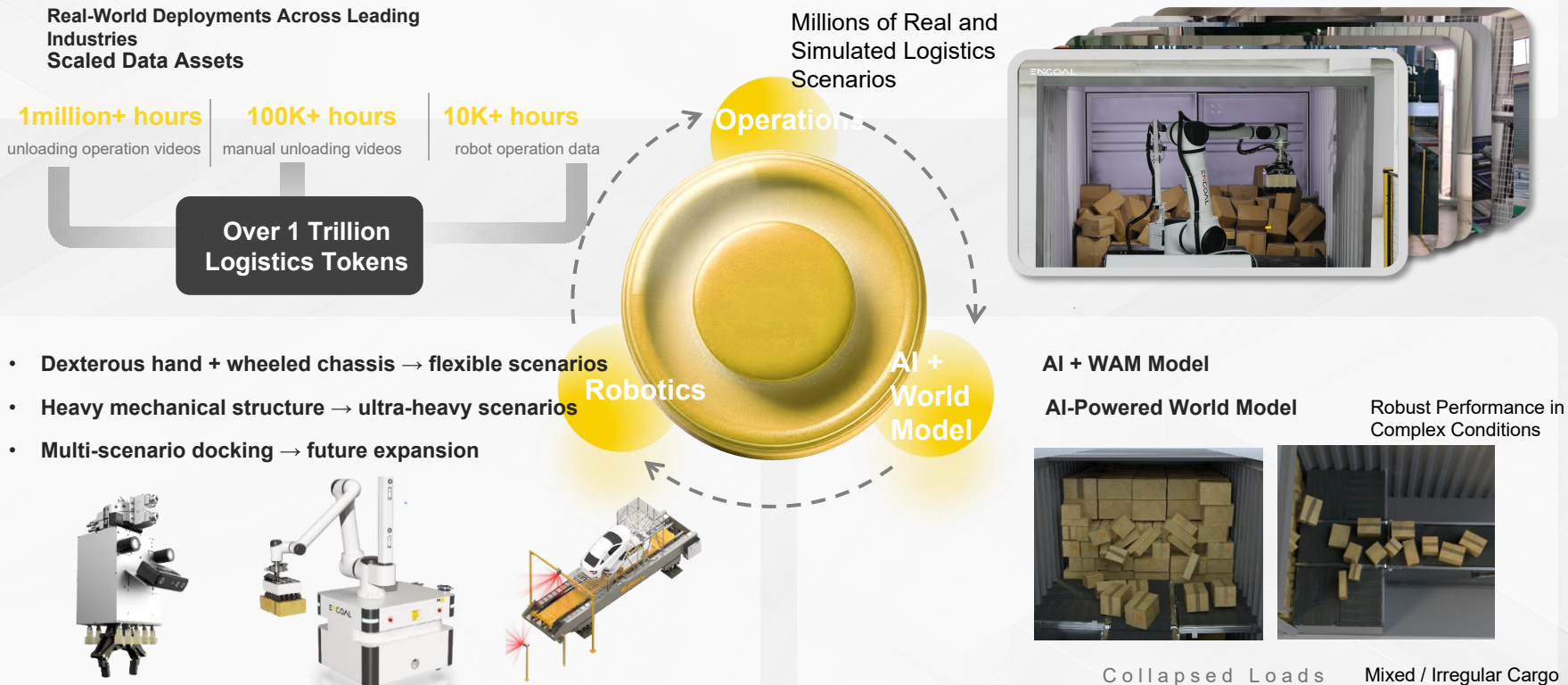
Labor Cost for Loading & Unloading

- China's total logistics expenditure reaches roughly 1.5 trillion RMB. Direct "operational costs" including loading, unloading, handling, packaging and sorting account for **10%–30%** of overall logistics expenses.
- Labor dependency rate for loading & unloading links hits as high as **70%**.

Building Logistics Intelligence Through AI, World Models and Robotics

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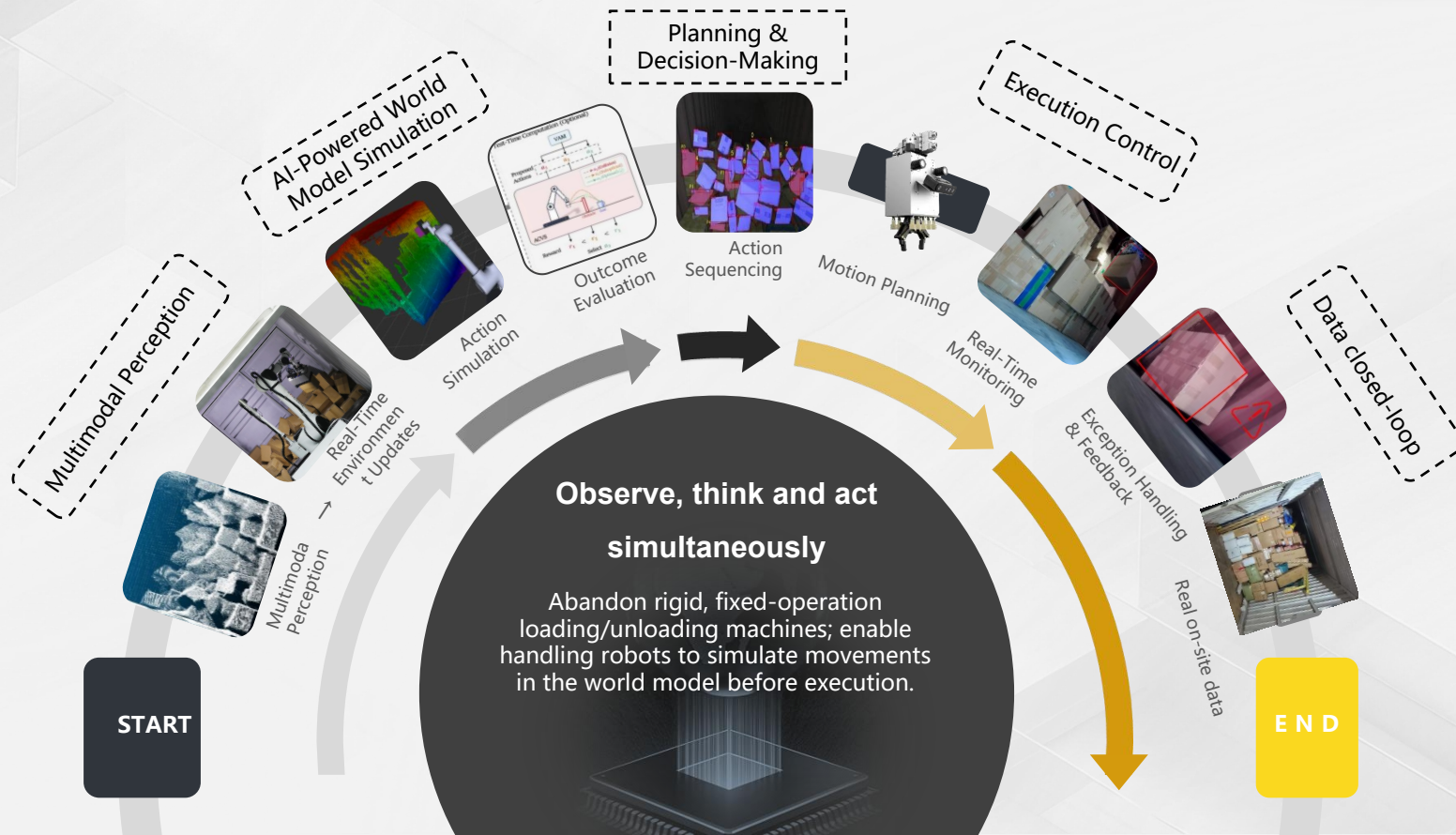
Proprietary data from extreme real-world scenarios trains vertical-domain AI models, feeding back into hardware.



How AI Powers Intelligent Loading & Unloading Operations

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From Rule-Based Automation to AI-Driven Decision Making for diverse cargo types and complex logistics environments



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Product Framework: From single product to full scenarios, from hardware R&D to data assets

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Scenario

Data closed-loop drives underlying technology iteration

Large-scale replication of application scenarios



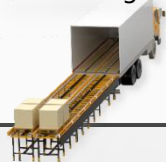
Mass replication

full-category hardware coverage

Rapid adaptation for all product categories
Large-scale replication across all scenarios

Series of Loading & Unloading Robots

Pallet goods



Carton goods



Bagged materials



Massive scenario data feedback
Continuously boost AI
Build data moata

Algorithm-driven hardware optimization
AI empowers intelligent loading & unloading

AI+WAM

Evolve equipment into intelligent loading & unloading agents

Underlying Technology Platform

Multimodal Perception



AI + World Model Simulation



Planning & Decision-Making



Execution Control



Continuous Learning Loop



Truck Digital Dispatching Center Powered by Large AI Models

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**Data Algorithms + Servo Control,
Precise Dispatching for Equipment
Loading & Unloading**



Core Value Products

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Based on various cargo types



Pallet-ATLS

- Efficiency: 5-10 min per truck
- Rated Load: 30 tons
- Labor Replacement: 6-8 workers per unit
- ROI: 1-3 years

 **Efficiency Champion**   



Carton-ATLS

- Efficiency: 800-1200 cartons per hour
- Rated Load: 40 kg per pick
- Labor Replacement: 3-5 workers per unit
- ROI: 2 years

 **Flexibility Champion**   



Bulk/Bag-ATLS

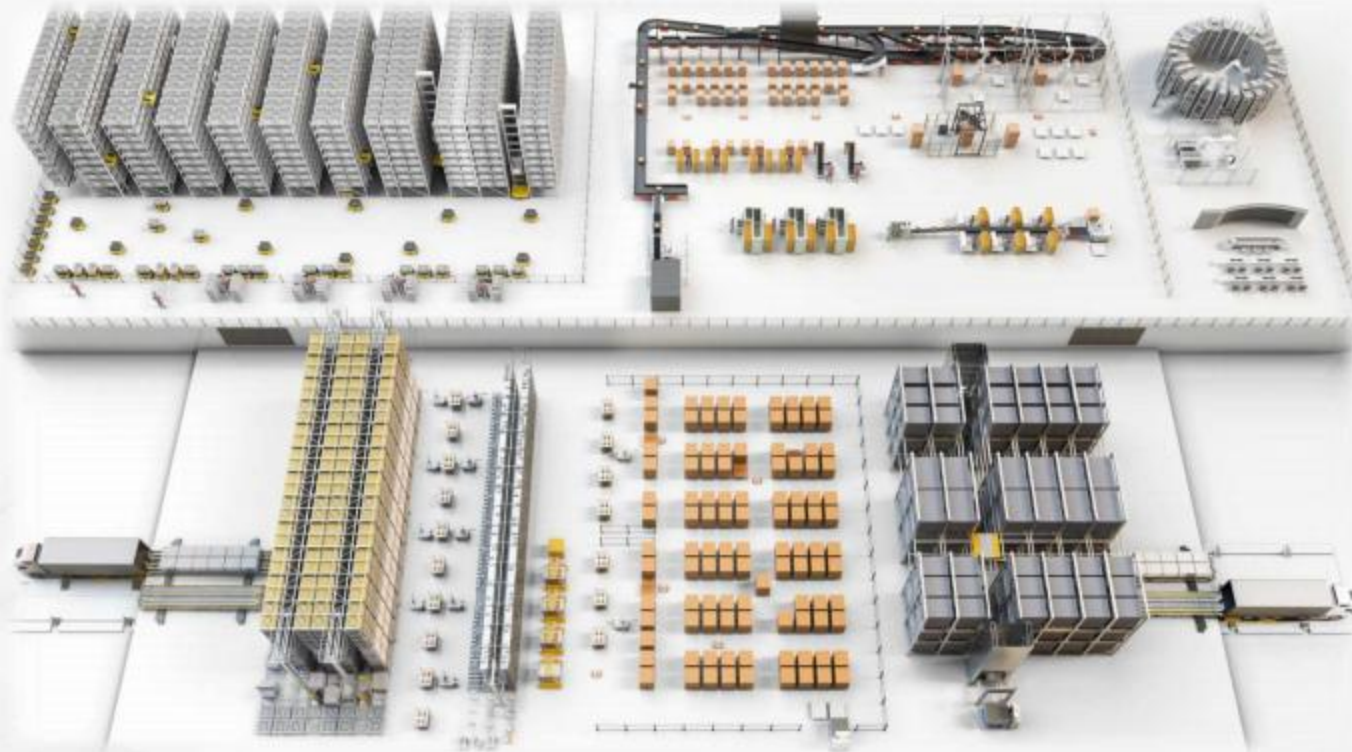
- Efficiency: 40-60 min per truck
- Rated Load: 50 kg per gripper
- Labor Replacement: 3-5 workers per unit
- ROI: 2-3 years

 **Payload Champion**   

Overall Solution Overview



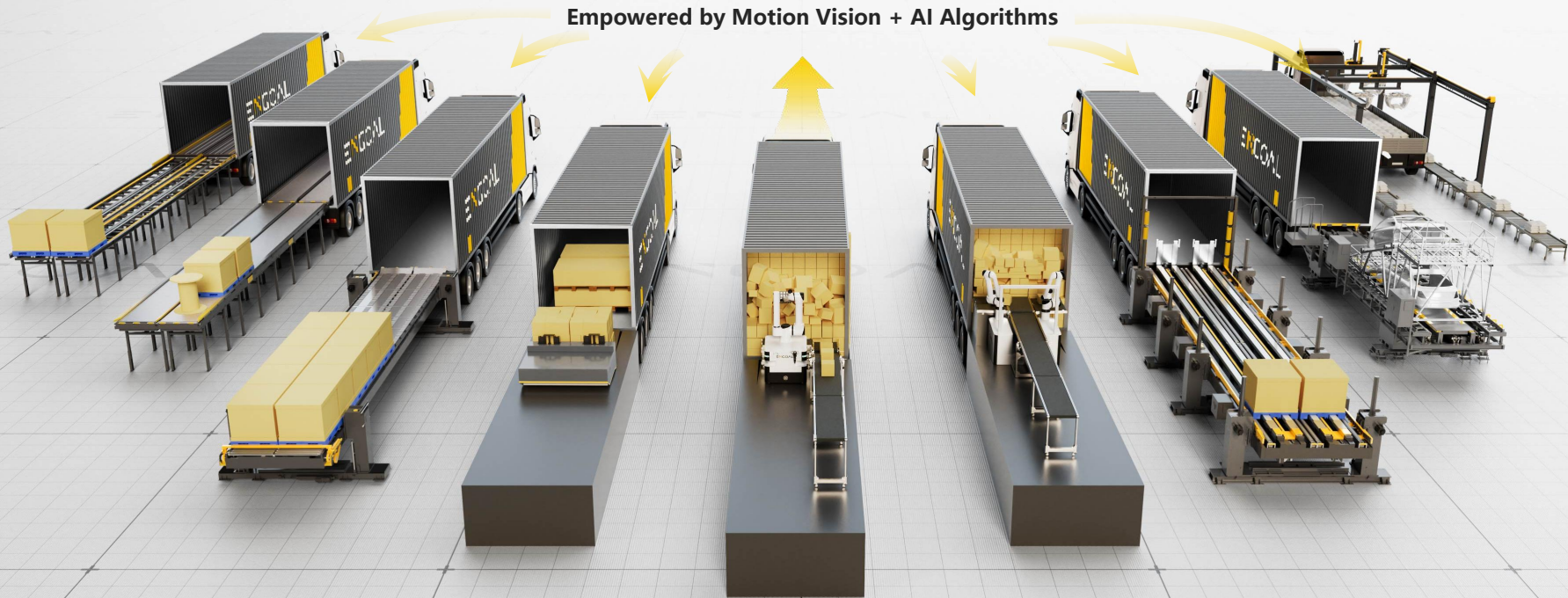
We integrate production planning, material delivery, line-side storage and finished goods turnover to realize accurate line feeding and dynamic inventory allocation.



Global Leader in Full-Category Automatic Loading & Unloading

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Empowered by Motion Vision + AI Algorithms





Adaptive Compatibility

Laser profile scanning offers compatibility across multiple vehicle types.

15 s

Scanning Time

2 s

Data Processing

$\geq 99.6\%$

Vehicle Recognition Accuracy

$\leq 1^\circ$

Scanning Precision

High Efficiency & Reliability

Air-bag Sealing Control Technology with Compact and Stable Structure

90 s

Full inflation & deflation cycle

1.5T/m

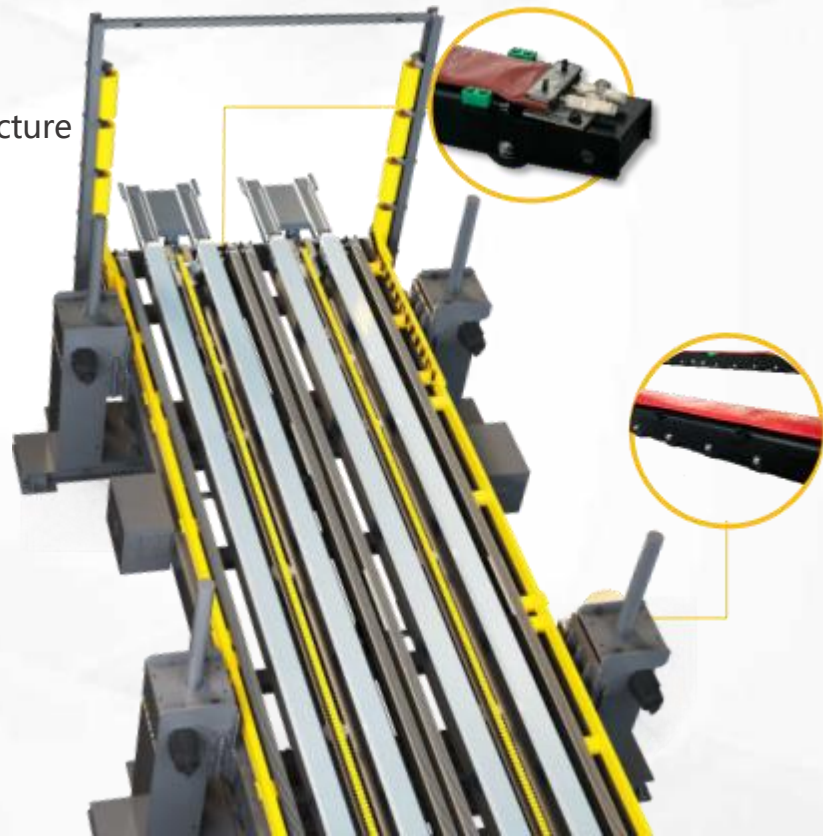
Heavy load capacity

-15-60°C

Resists corrosion
high & low temperatures

5-10 Year

years service life



Platform Adaptive Adjustment Technology Delivers Ultra-precise Posture Adjustment & Faster Response Speed

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Adaptive Adjustment

The platform features adaptive dynamic leveling with millisecond-level stable control, and its action delay is less than 0.001 second.



$\leq 0.1\text{ms}$



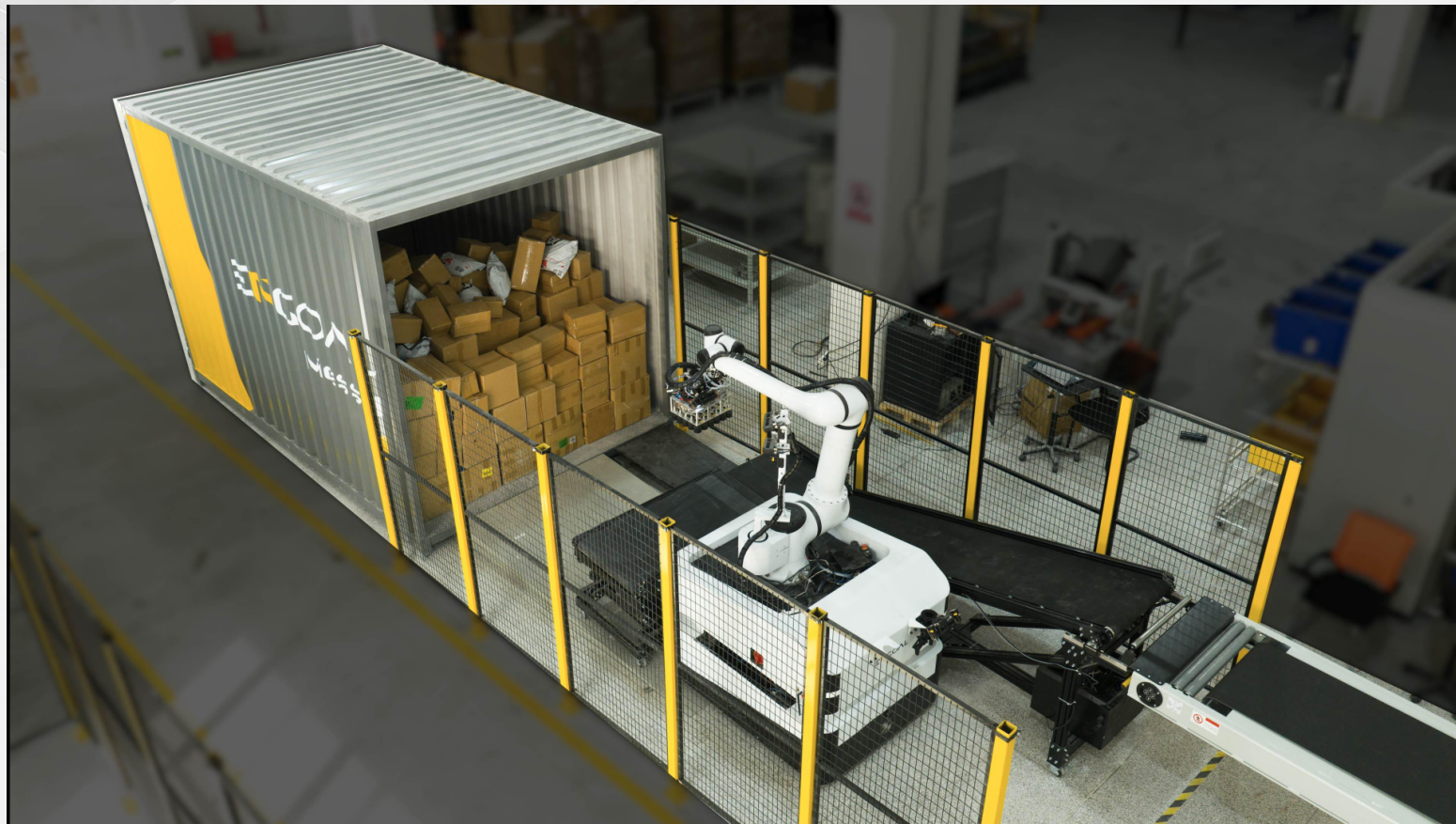
We stand at the forefront of automated loading & unloading technology with the largest number of implemented projects.

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Case Name	Project Location	Industry	Project Type	Project Location
TS11 Automated Loading & Unloading Project	Shanghai Automobile Transmission Co., Ltd.	Automotive	Sliding Chain	Yantai, China
Battery PACK Automatic Loading Project	FAW Logistics (Foshan) Co., Ltd.	Automotive	Sliding Chain	Foshan, China
Truss Automatic Loading Project	Jiaozhou Ririshun Logistics Co., Ltd.	Home Appliance	Truss	Qingdao, China
BASF Automated Loading & Unloading Project	Dematic International Trading (Shanghai) Co., Ltd.	Chemical Industry	Sliding Chain	Zhanjiang, China
FMCG Automated Loading & Unloading Project	Unilever	FMCG	Fork Rail	Hefei, China
Wuxi Murata Electronics Automated Loading & Unloading Project	Jiangsu Feida Baokai Electric Co., Ltd.	3C	Chain Plate	Wuxi, China
Wuxi Bosch RDC Automated Loading & Unloading Project	Levi Automation Systems (Shanghai) Co., Ltd.	Automotive	Chain Plate	Wuxi, China
Yinchuan Mengniu Automated Loading & Unloading Project	Beijing Automation Science and Technology Development Co., Ltd.	Beverage	Sliding Chain	Yinchuan, China
CATL-FD12 Finished Battery Cell Automatic Loading Project	Contemporary Amperex Technology Co., Limited (CATL)	Lithium Battery	Fork Rail	Fuding, China
Luzhou Laojiao Packaging Materials Automated Loading & Unloading Project	Chongqing Gongli Technology Co., Ltd.	Liquor	Chain Plate	Luzhou, China
Bohai America Automatic Unloading System Project	Xiamen Hithium Energy Storage Technology Co., Ltd.	Lithium Battery	Fork Rail	Dallas, USA
BYD Brazil Body Logistics Automatic Unloading Project	Dalian Hausen Ruide Intelligent Equipment Co., Ltd.	Automotive	Traction	Salvador, Brazil
EVE Hungary Automated Loading & Unloading Project	Suzhou Guanhong Intelligent Technology Co., Ltd.	Lithium Battery	Fork Rail	Budapest, Hungary
CATL-LJ Automated Loading & Unloading Project	Dongjie Intelligent Technology Co., Ltd.	Lithium Battery	Fork Rail	Luoyang, China
EVE Malaysia Automated Loading & Unloading Project	Suzhou Guanhong Intelligent Technology Co., Ltd.	Lithium Battery	Fork Rail	Kedah, Malaysia
CNNC Industrial Unmanned Driving + Automated Loading & Unloading Project	Suzhou Zhitu Technology Co., Ltd.	Military Industry	Chain Plate	Zhengzhou, China
EVE Jingmen Automated Loading & Unloading Project	Suzhou Guanhong Intelligent Technology Co., Ltd.	Lithium Battery	Fork Rail	Jingmen, China
Suzhou Ruimai Technology Automatic Loading Project	Suzhou Ruimai Technology Co., Ltd.	Furniture	Fork Rail	Suzhou, China
Envision Energy Yichang Base Automated Loading & Unloading Project	Kejie Intelligent Technology Co., Ltd.	Lithium Battery	Fork Rail	Yichang, China
Envision Energy Cangzhou Base Automated Loading & Unloading Project	Wuxi Lead Intelligent Equipment Co., Ltd.	Lithium Battery	Fork Rail	Cangzhou, China

Case Reference: A Top Global Express Enterprise Has Initiated POC **ENGOAL**

We have conquered the most complex test scenario of the industry leader, delivering preliminary verification of our AI model capabilities.



Case Study: Clients Are Building the Future With Our "New Tools"

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Mengniu Logistics Park's "Minute-Level" Revolution

Daily loading/unloading efficiency increased by **5-6x**



High Automation

Automated loading/unloading
+ AS/RS



Ultra-High Efficiency

40 min → 6 min

20%

Annual Energy
Consumption

¥173K/Year

Loading/Unloading
Opex

Case Study: Clients Are Building the Future With Our "New Tools"

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Luzhou Laojiao's "10-Minute Miracle" Revolutionizing Logistics Speed in the Alcohol Industry

High Flexibility

Dual-mode operation: Fully automatic production line + human-machine collaboration, ensuring uninterrupted supply chain with "smart backup".



Unilever's Automated Truck Loading Breakthrough

Making Bestseller
Fulfillment Even Faster



Case Study: Clients Are Building the Future With Our "New Tools"

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CATL-Automating the **Final Mile** of Inbound/Outbound Logistics for "Extreme Manufacturing"

High Compatibility

Supports multiple truck types

Ultra-High Efficiency

Full truck loading completed in 15 minutes



Case Study: Clients Are Building the Future With Our "New Tools"

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Hithium Energy Storage: Automated Unloading for Safe, Efficient U.S. Operations

Building a secure and efficient supply chain foundation for its U.S. base



Multi-Equipment Integration



Safety Certified

Labor Savings

5 FTEs

Annual Cost Reduction

¥2.5M



Hithium Bohai Automatic Unloading System Project

"AI vision + Adaptive control"

**Accelerate Loading & Unloading,
Unmanned Dock Operations**

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