# The Path to Port Automation

## A practical guide from vision to execution

Kuala Lumpur
PORTS AND LOGISTICS 2026

CAMCO TECHNOLOGIES

July 2026

**Jan Bosses**
**Camco Group CEO**

# Outlines

- About Camco
- The next wave
- How to integrate AI
- Use cases
- Demo

# About Camco

CAMCO Headquarters in Belgium

## 27 Years
## The longest history

CAMCO established in **1999**, with 350 employees becomes the biggest company in terminal automation. CAMCO is the most stable technology company guarantee to provide long term services for her supplied systems.

## M&S teams, 3 regions
## The Efficient Service

With five M&S teams located in Belgium, Abu Dhabi, Shanghai, Los Angels and Australia, CAMCO provides the 7/24 full time efficient maintenance service globally.

## 320+
## Biggest Project Reference

More than **300** container terminals worldwide installed Camco automation systems, it makes Camco the global leader in our industry with the richest experience and knowledge for all types of projects. And same time all the new technology developed by CAMCO are proved.

## Innovation Focus

With a 50 engineers R&D team, CAMCO never stopped innovation, it guarantees the customers of CAMCO have always the most advanced technology in the industry.

## Design and produce own hardware
## In-house engineered Solutions

Camco designs, develops and implements its own technologies. Unlike sales organizations or system integrators, we keep total control over our hardware and software, and support a long-term product strategy.

CAMCO Shanghai Office

CAMCO USA Office

CAMCO UAE Office

CAMCO Australia Office

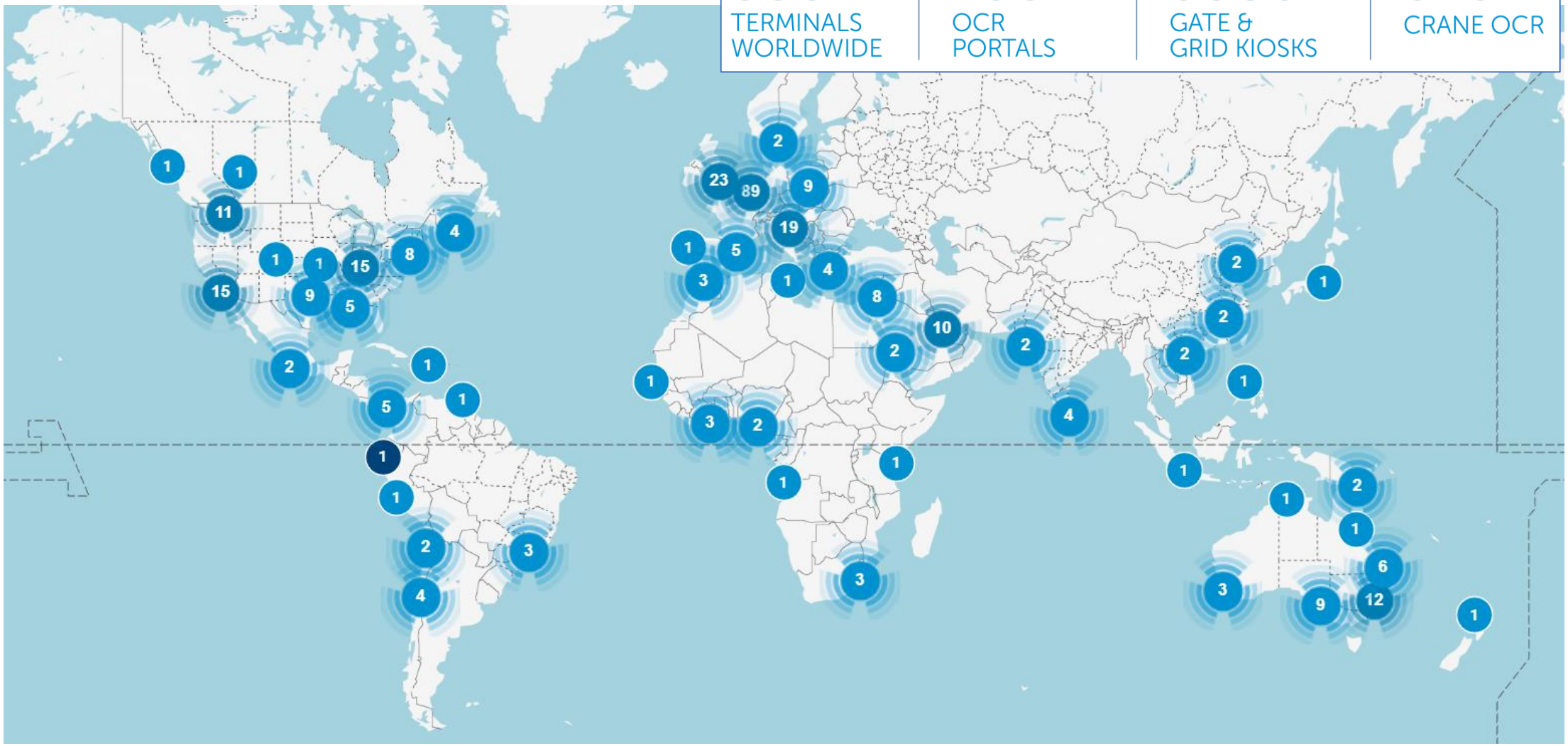
CAMCO India Office

CAMCO Japan Office

# Camco at a Glance

CAMCO TECHNOLOGIES

| 300+ | 700+ | 3000+ | 320+ |
|---|---|---|---|
| TERMINALS WORLDWIDE | OCR PORTALS | GATE & GRID KIOSKS | CRANE OCR |



# CAMCO Customers

CAMCO TECHNOLOGIES

DP WORLD · APM TERMINALS (Lifting Global Trade.) · HUTCHISONPORTS · International Container Terminal Services, Inc. · CMA CGM · PSA The World's Port of Call · COSCO SHIPPING · TiL Terminal Investment Limited

EVERGREEN LINE · WAN HAI LINES LTD. WE CARRY, WE CARE · SIPG 上港集團 · 招商港口 CHINA MERCHANTS PORT · adani Ports and Logistics · BOLLORÉ PORTS · 中国国家铁路集团有限公司 CHINA RAILWAY

## Maritime terminal operators

HHLA · EUROGATE · noatum · MPET MSC PSA EUROPEAN TERMINAL · RWG · CMP COPENHAGEN MALMÖ PORT · PORTO DE LEIXÕES · msc · TERMINAL PORTE NORTE · MCT Moerdijk Container Terminals B.V.

SEAYARD Opérateur sud-européen · PD PORTS · Société Manutention Portuaire Aquitaine · PCT · EUROPORTS · Générale de Manutention Portuaire · TERMINAL DES FLANDRES · ALTAS · THESSALONIKI PORT AUTHORITY S.A.

TraPac · Long Beach Container Terminal · SSA Marine A Carrix Enterprise · GLOBAL CONTAINER TERMINALS · MGT SOCIÉTÉ TERMINAUX MONTRÉAL GATEWAY TERMINALS PARTNERSHIP · Virginia International Terminals, LLC · THE PORT OF VIRGINIA · HATECO HHIT

SOCIEDAD PUERTO INDUSTRIAL AGUADULCE BUENAVENTURA AN ICTSI & PSA COMPANY · TPS Puerto Valparaíso · Contecar · Brasil TERMINAL PORTUÁRIO · PORT OF PORTLAND · Port of Halifax

pacificnational · PATRICK · PORTS OF AUCKLAND TĀMAKI HERENGA WAKA · TRANSNET · MPS TEMA · HAIFA PORT · TRANSFENNICA

King Abdullah Port · الشركة السعودية العالمية للموانئ SAUDI GLOBAL PORTS CO. · مشروع الميناء الجديد NEW PORT PROJECT · NPCT 1 NEW PRIOK CONTAINER TERMINAL ONE · QINGDAO QIANWAN CONTAINER TERMINAL CO.,LTD · TSPGC · MGT SOCIÉTÉ TERMINAUX MONTRÉAL GATEWAY TERMINALS PARTNERSHIP

# Camco Asia Today

**Camco Asia Management Team:**

- CEO
- Asia administration director
- Asia sales director
- Asia HR Manager
- Asia Finance Manager
- APF Head
- ASH Head

**Camco China Scope**

- **Product, Sales , Marketing, project, service**

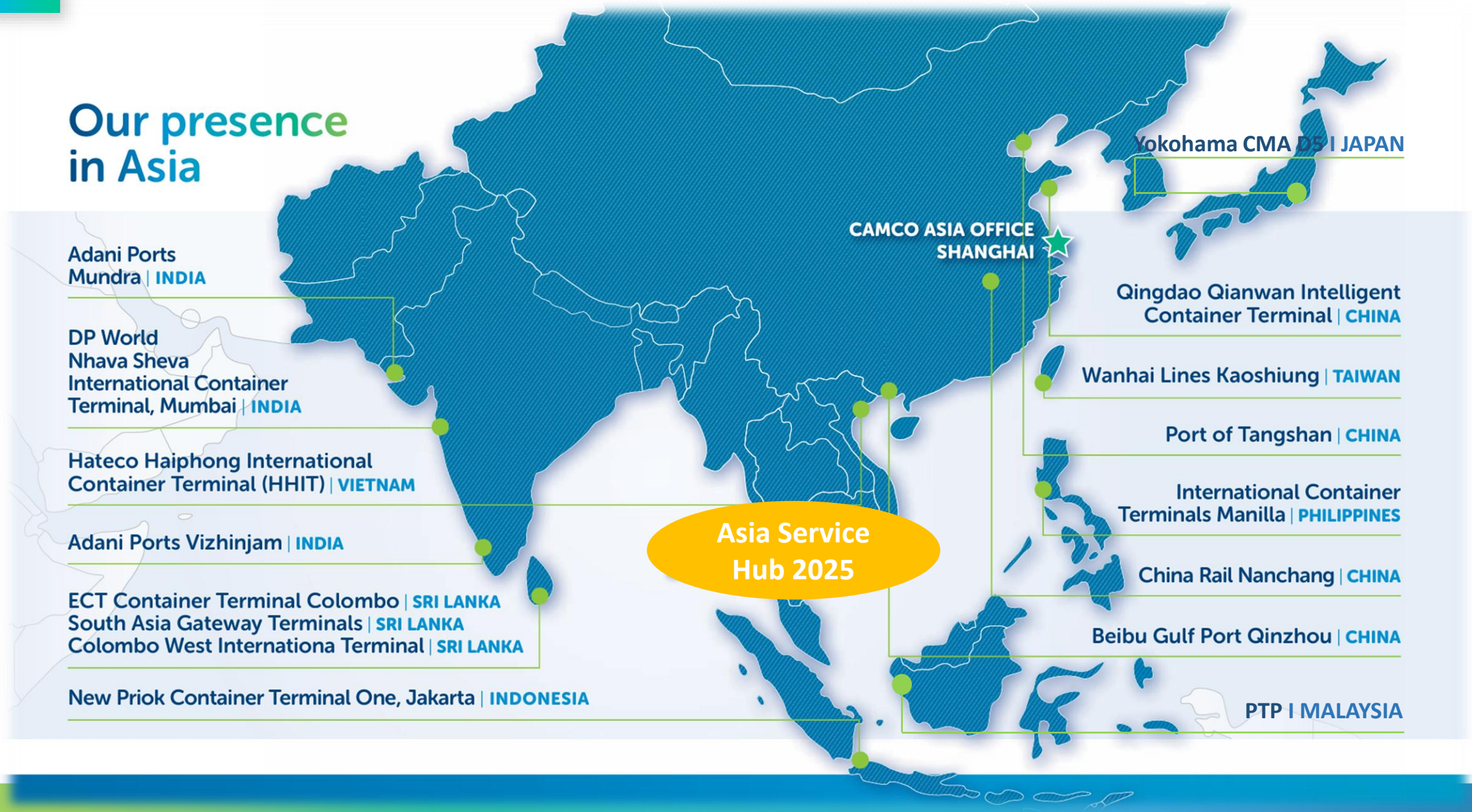
**Camco India Scope**

- **Sales, Marketing, project, service**


# Camco Asia Map

# Camco in Asia

## Our presence in Asia



# Camco Product Portfolio

## RAIL AUTOMATION

START PROCESSING TRAINS WITHOUT DELAY AND IMPROVE TRAIN TURNAROUND TIME

- OCR RAIL PORTAL
- RMG OCR CAMERAS
- RTLS
- SPREADER CAMERA

## YARD AUTOMATION

FROM A STEP BY STEP INTEGRATION TO FULL INTEGRATION OF TERMINAL PROCESSES

- RFID RTG/RMG TRUCK HANDOVER
- VMT MANUAL / AUTO JOB STEPPING
- RTG/RMG OCR CAMERAS
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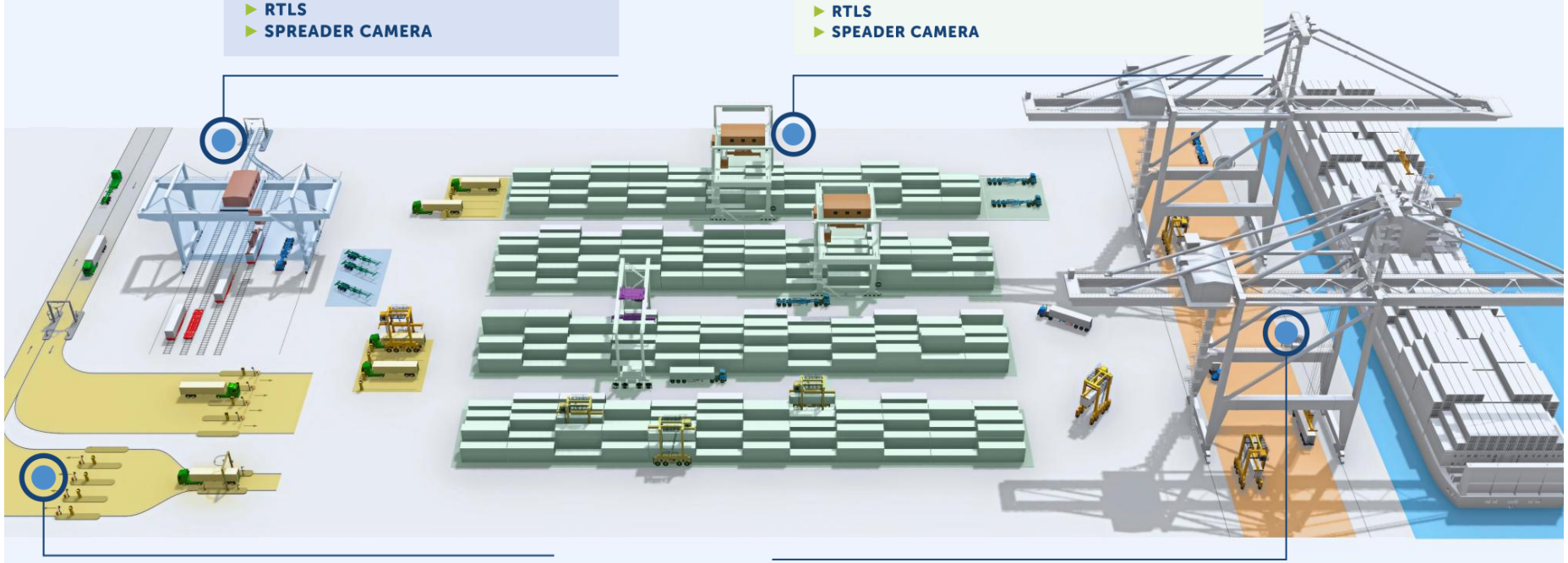
- SPEADER CAMERA



## GATE AUTOMATION

THE INDUSTRY REFERENCE IN VISION-BASED GATE AUTOMATION SOLUTIONS

- OCR PORTALS
- KIOSKS
- VBS + ITT VEHCILE BOOKING SYSTEM
- RFID
- WEIGHT IN MOTION (WIM)

## QUAY AUTOMATION

IMPROVING WATERSIDE OPERATIONS FOR A LEANER, GREENER INDUSTRY READY FOR INCREASING TRAFFIC

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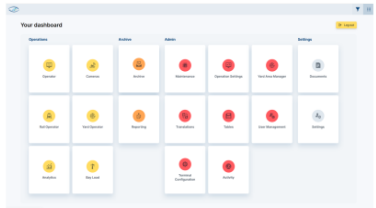
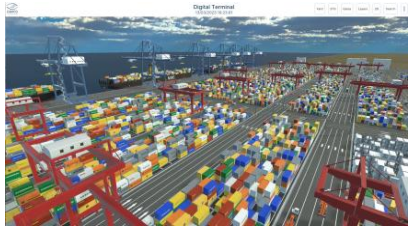
THE BRIDGE
Management by Intelligence



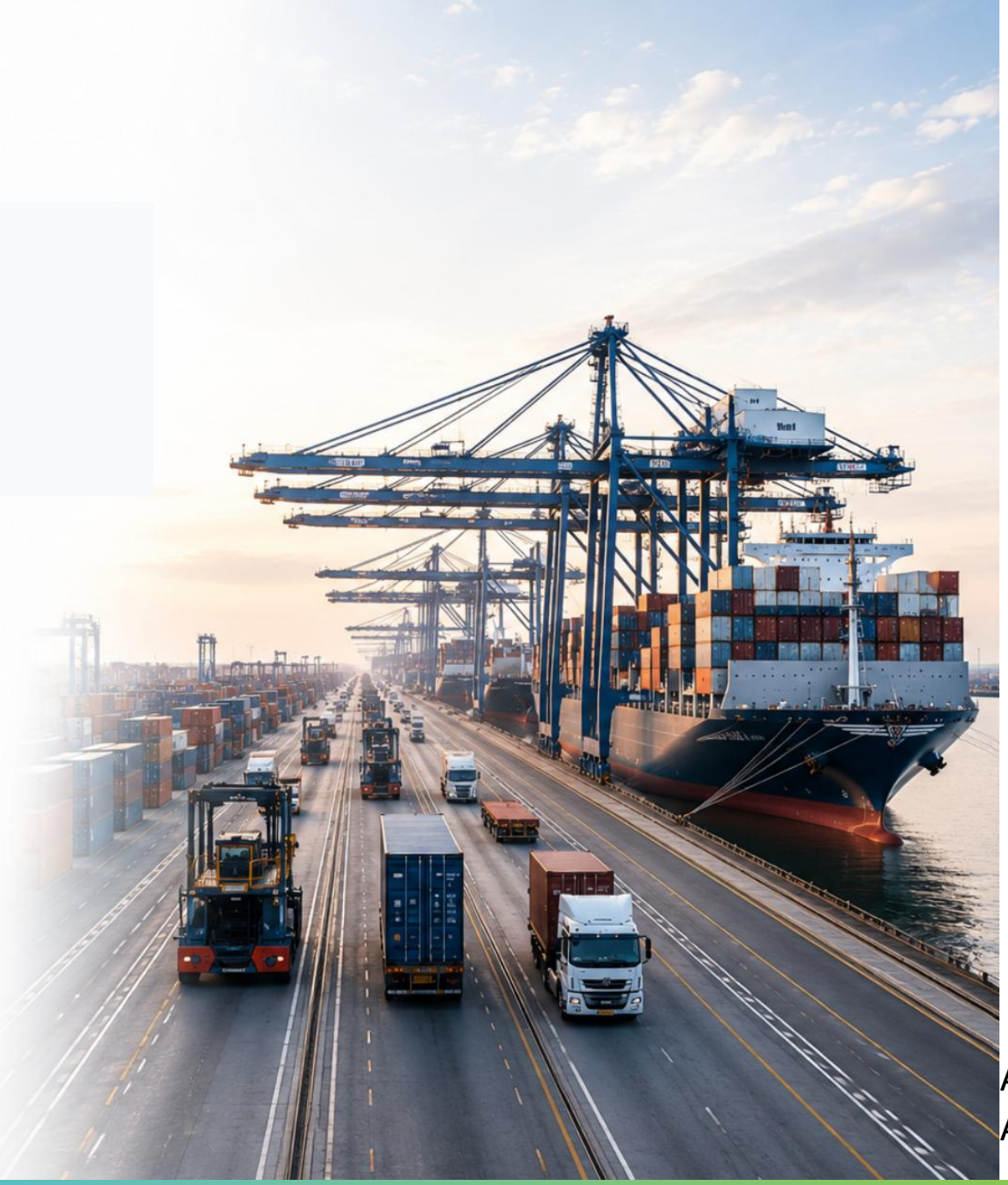
## RT DIGITAL TWIN



# FROM DATA TO DECISIONS

## END-TO-END OPERATIONAL CONTEXT

Connecting every operational event
from road to vessel
into one operational understanding.



CAMCO TECHNOLOGIES

OPERATIONAL INTELLIGENCE SERIES



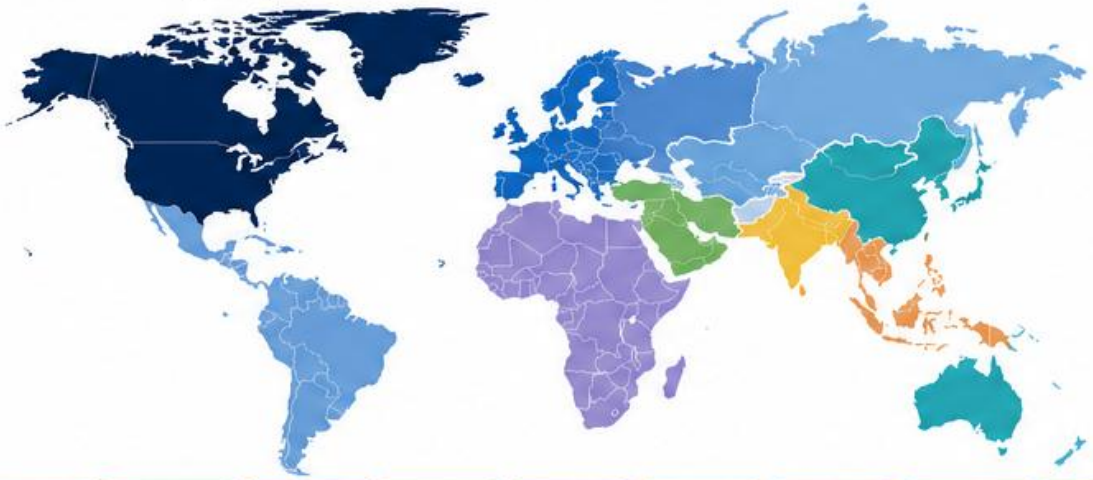
AI awareness
AI wave

# AI Adoption & readiness across the world

**AI is the next productivity wave.**
Leadership today defines advantage tomorrow.

## AI READINESS BY REGION (2026)

Illustrative Index (0–100)



| NORTH AMERICA | EAST ASIA | WESTERN EUROPE | OCEANIA | MIDDLE EAST | EASTERN EUROPE | LATIN AMERICA | SOUTH ASIA | AFRICA |
|---|---|---|---|---|---|---|---|---|
| 92 | 88 | 82 | 74 | 66 | 58 | 48 | 46 | 29 |

LOWER READINESS ← → HIGHER READINESS

## TOP 20 COUNTRIES BY AI READINESS (2026)

Illustrative Index (0–100)

| RANK | COUNTRY | SCORE |
|---|---|---|
| 1 | United States | 96 |
| 2 | China | 94 |
| 3 | Singapore | 93 |
| 4 | South Korea | 91 |
| 5 | United Kingdom | 90 |
| 6 | Canada | 89 |
| 7 | Japan | 88 |
| 8 | Germany | 87 |
| 9 | France | 85 |
| 10 | Netherlands | 84 |
| 11 | Sweden | 83 |
| 12 | Switzerland | 82 |
| 13 | Australia | 81 |
| 14 | United Arab Emirates | 80 |
| 15 | Israel | 80 |
| 16 | India | 76 |
| 17 | Finland | 75 |
| 18 | Belgium | 73 |
| 19 | Spain | 72 |
| 20 | Italy | 70 |

McKinsey Global Institute analysis 2026

# Why AI May Become
# The Largest Productivity Wave

**1 STEAM**

1760s – 1880s

More physical power.

**2 ELECTRICITY**

1880s – 1920s

Machines everywhere.

**3 ASSEMBLY LINE**

1920s – 1950s

Faster production.

**4 COMPUTERS**

1950s – 1990s

101010
010101

Faster calculations.

**5 INTERNET**

1990s – 2010s

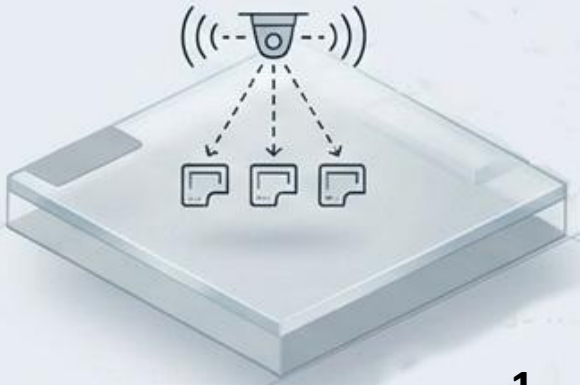
Faster communication.

**AI**

2020s and beyond

Faster thinking.

# The four generations of Terminal Automation



**1. Data Acquisition**

OCR Portals, RFID, GNSS, Biometrics

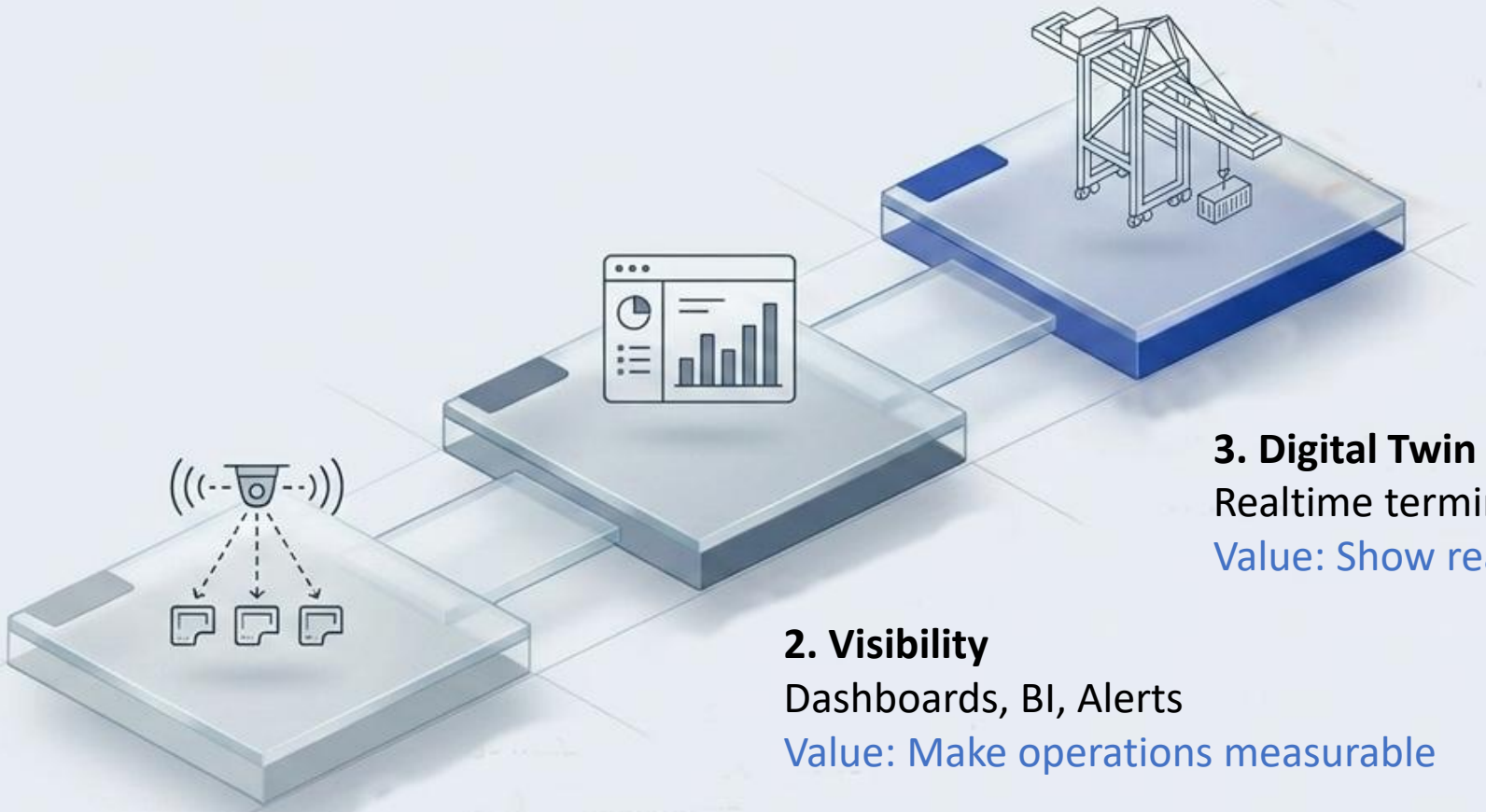
Value: Reduce manual verification

# The four generations of Terminal Automation

**2. Visibility**
Dashboards, BI, Alerts
Value: Make operations measurable

**1. Data Acquisition**
OCR Portals, RFID, GNSS, Biometrics
Value: Reduce manual verification

# The four generations of Terminal Automation



**3. Digital Twin**
Realtime terminal model
Value: Show real time physical state

**2. Visibility**
Dashboards, BI, Alerts
Value: Make operations measurable

**1. Data Acquisition**
OCR Portals, RFID, GNSS, Biometrics
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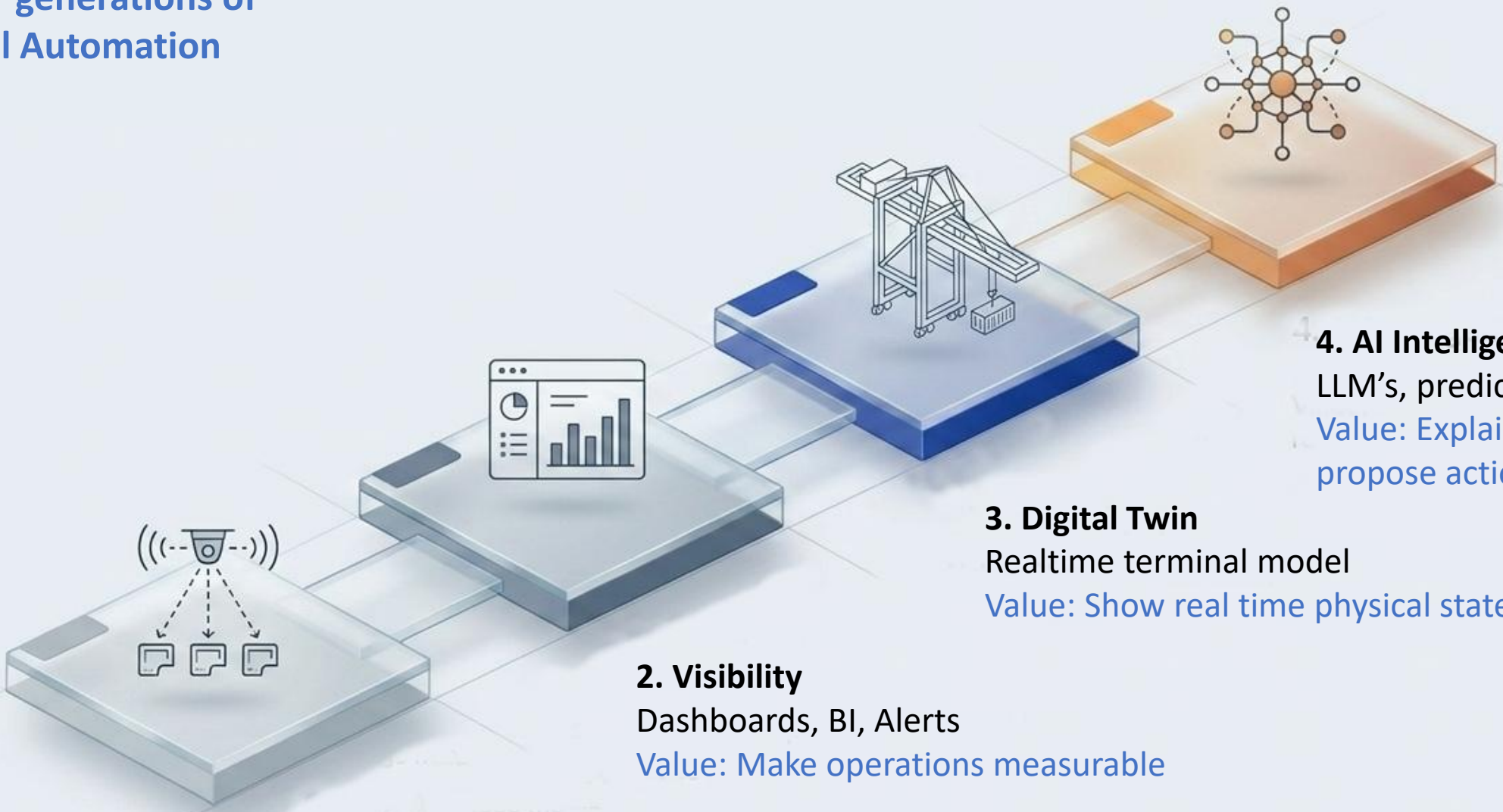


**4. AI Intelligence**
LLM's, predictive agents
Value: Explain, predict and propose actions

**3. Digital Twin**
Realtime terminal model
Value: Show real time physical state

**2. Visibility**
Dashboards, BI, Alerts
Value: Make operations measurable

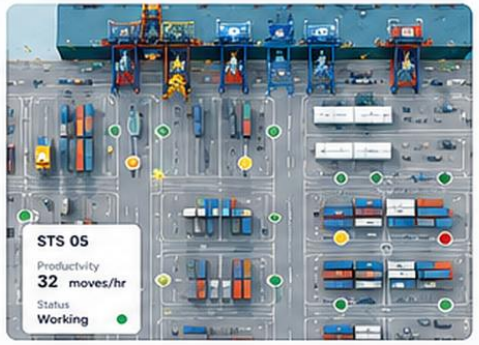
**1. Data Acquisition**
OCR Portals, RFID, GNSS, Biometrics
Value: Reduce manual verification

# From Dashboard to BI to AI

## DASHBOARD
Monitor operations in real time

### REAL-TIME OPERATION OVERVIEW

- Vessels alongside: 2
- Crane productivity: 32 moves / hour
- Trucks in gate: 58
- Yard occupancy: 72%
- Train arrivals: 3




### LIVE ALERTS
⚠ Gate lane 2 congestion
Yard block **E17** nearly full (92%)

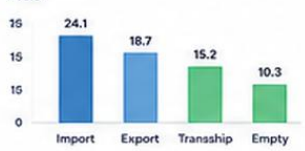
| | |
|---|---|
| PRIMARY PURPOSE | Monitor live operations |
| TIME FOCUS | Real-time / Now |
| KEY QUESTION | What is happening right now? |
| WHO USES IT | Operators, Shift Managers |
| DATA USED | Live data from IoT, TOS, equipment |
| EXAMPLE (TERMINAL) |  Live yard map, crane status, truck in gate |
| OUTPUT | Live, alerts, status indicators |

## BI (BUSINESS INTELLIGENCE)
Analyze & understand performance

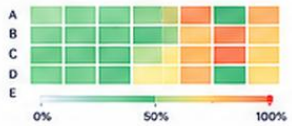
### PERFORMANCE ANALYSIS

**Crane Productivity Trend**
Moves / hour


**Turnaround Time by Cargo Type**
Hours

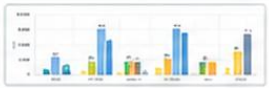



**Yard Utilization by Area**




**Gate Performance**
Avg. Waiting Time (min)


### KEY INSIGHTS
- Crane productivity dropped **8%** vs last week due to higher rehandle.
- Import containers dwell time **increased 15%.**
- Gate 2 waiting time high in afternoon peak.

| | |
|---|---|
| | Understand performance & drivers |
| | Historical (days / weeks / months) |
| | Why did it happen? |
| | Planners, Analysts, Terminal Managers |
| | Historical data from TOS, ERP, IoT, KPI's |
| |  Why crane productivity dropped? Dwell time analysis, gate KPI's |
| | Reports, dashboards, trend analysis, root cause insights |

## AI (ARTIFICIAL INTELLIGENCE)
Predict, recommend & automate decisions

### PREDICTIONS & RECOMMENDATIONS

**YARD CONGESTION PREDICTION**
Block **E17** will reach **100%** occupancy **in 3 hours.**
Confidence: 92%

**GATE TRAFFIC FORECAST**
220 trucks expected between 14:00 – 18:00.
Recommend opening additional lane.
Confidence: 89%

**CRANE MAINTENANCE ALERT**
STS **06** gearbox anomaly detected.
Probability of failure: **74%** in next 7 days.
Recommend maintenance.

**RECOMMENDED ACTION PLAN**
- ✓ Reassign export containers from E17 to E21.
- ✓ Pre-advice 30% of trucking appointments to off-peak.
- ✓ Schedule maintenance for STS 06 on next window.

Apply Actions

**ASK AI ASSISTANT**
"Why is vessel turnaround time increasing this week?

| | |
|---|---|
| | Predict outcomes & recommend actions |
| | Future (hours / days / weeks ahead) |
| | What will happen & what should we do?' |
| | Decision Makers, Planners, Operations Teams |
| | All data + external factors + ML models |
| |  Predict congestion, recommend moves, optimize resources |
| | Predictions, recommendations, automated actions |

# Example Truck waiting time

## BI Dashboard

Dashboard shows

```
Average waiting time

52 minutes
```

Operator knows waiting time increased.

Nothing else.

## AI

Operator asks

> Why are trucks waiting longer today?

AI answers

> Average waiting time increased from 38 minutes to 52 minutes.
>
> Primary causes:
>
> • Export volume increased by 18%.
>
> • RTG-03 was unavailable for 43 minutes.
>
> • Gate Lane 5 processed 35% fewer trucks due to OCR performance degradation.
>
> • 27% of arriving trucks came earlier than their appointment window.

That is reasoning.

# Implementing AI in a nutshell

It's about the context.

The better the context,

the better the decisions.

# Camco eco system

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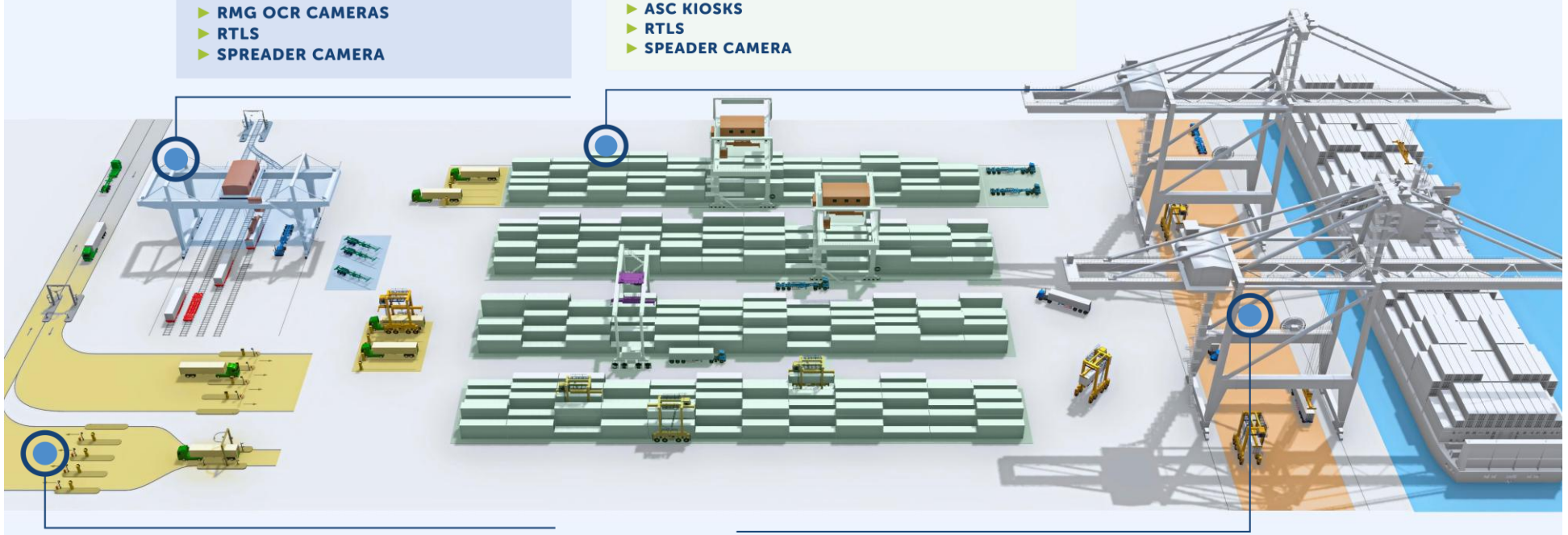

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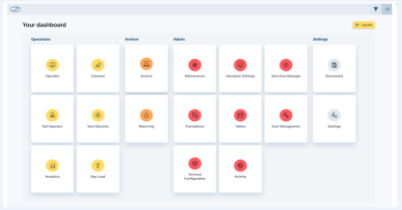
## SOFTWARE

THEBRIDGE
Management by Intelligence



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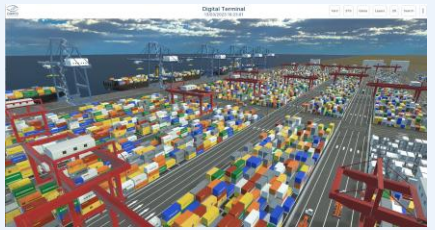
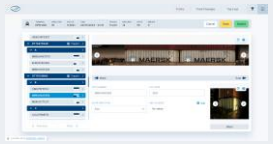


THEBRIDGE
Management by Intelligence

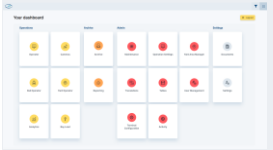
THETWINBRIDGE

Software

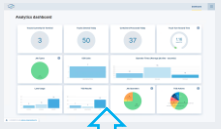
Operational



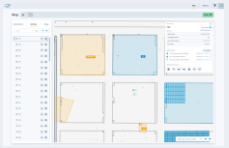
Management



Analytics (BI)



2D Viewer



3D viewer

API

**API**

Data

GOS

ROS

COS

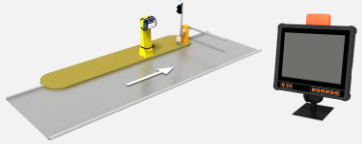
CHEOPS

VBS

Technology

Camera technologies: Truck, rail, crane systems

Location technologies: GNSS, UWB, RFID



Yard & IOT equipment

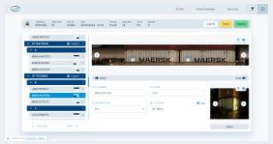
Handhelds & Smartphones

THEBRIDGE
Management by Intelligence

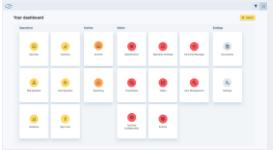
THETWINBRIDGE

Software

Operational



Management



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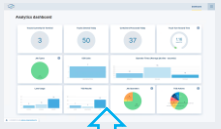

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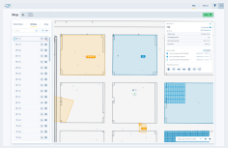


3D viewer

API

**API**

1. DATABASE
Raw & fragmented data

GOS

ROS

COS

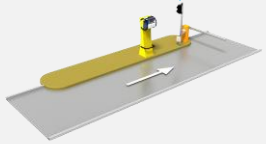
CHEOPS

VBS

Technology

Camera technologies: Truck, rail, crane systems

Location technologies: GNSS, UWB, RFID



Yard & IOT equipment

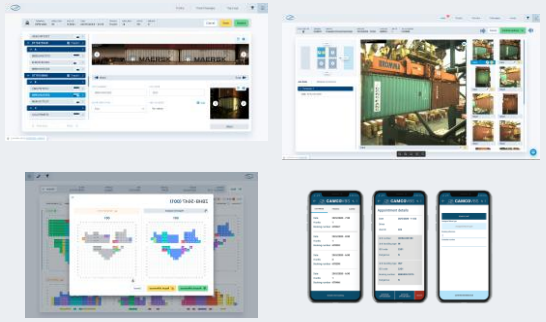
Handhelds &
Smartphones

THE BRIDGE
Management by Intelligence

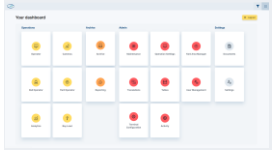
THETWINBRIDGE

## Software

### Operational

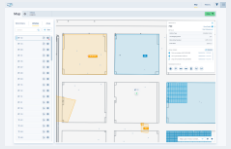


### Management



### Analytics (BI)

### 2D Viewer



### 3D viewer

## 2. SEMANTIC LAYER
Context · Meaning · Relationships

### STANDARDIZE
Maps data from multiple sources to a consistent business vocabulary (names, units, formats).

### ADD BUSINESS CONTEXT
Adds meaning, rules, hierarchies, KPIs, calculations and definitions.

### ROLE-BASED CONTEXT
Ensures each user/role sees only the data and functions they are authorized to access.

### DEFINE RELATIONSHIPS
Captures how entities are related (customers, assets, events, orders...).

### OPERATIONAL POLICIES
Defines business rules, constraints and allowed AI actions.

### EXPOSE AI-READY INTERFACE
Provides a clean, structured semantic API for AI consumption (NLQ, RAG, tools, agents).

## 1. DATABASE
Raw & fragmented data


GOS


ROS


COS

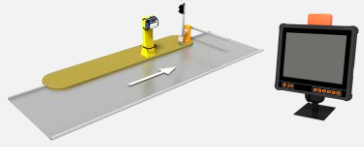

CHEOPS


VBS

## Technology


Camera technologies: Truck, rail, crane systems


Location technologies: GNSS, UWB, RFID


Yard & IOT equipment

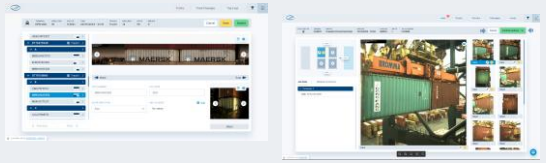

Handhelds & Smartphones

THEBRIDGE
Management by Intelligence

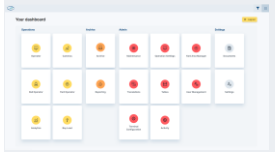
THETWINBRIDGE

## 3. AI ENGINE
Understand • Reason • Act

### Operational

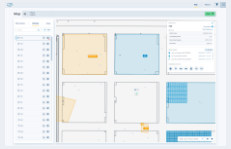


### Management



### Analytics (BI)

### 2D Viewer



### AI Apps

- LLM / Generative AI
- AI Agents
- Analytics & Insights
- Automation & Actions

### 3D viewer

## 2. SEMANTIC LAYER
Context • Meaning • Relationships

**STANDARDIZE**
Maps data from multiple sources to a consistent business vocabulary (names, units, formats).

**ADD BUSINESS CONTEXT**
Adds meaning, rules, hierarchies, KPIs, calculations and definitions.

**ROLE-BASED CONTEXT**
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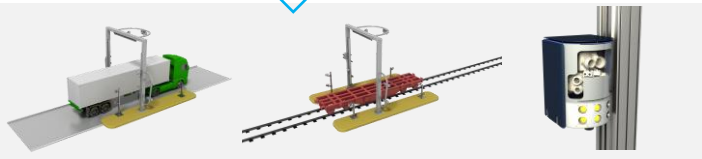

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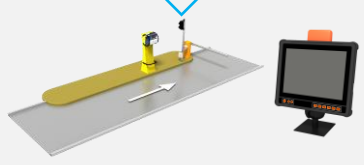
Location technologies: GNSS, UWB, RFID

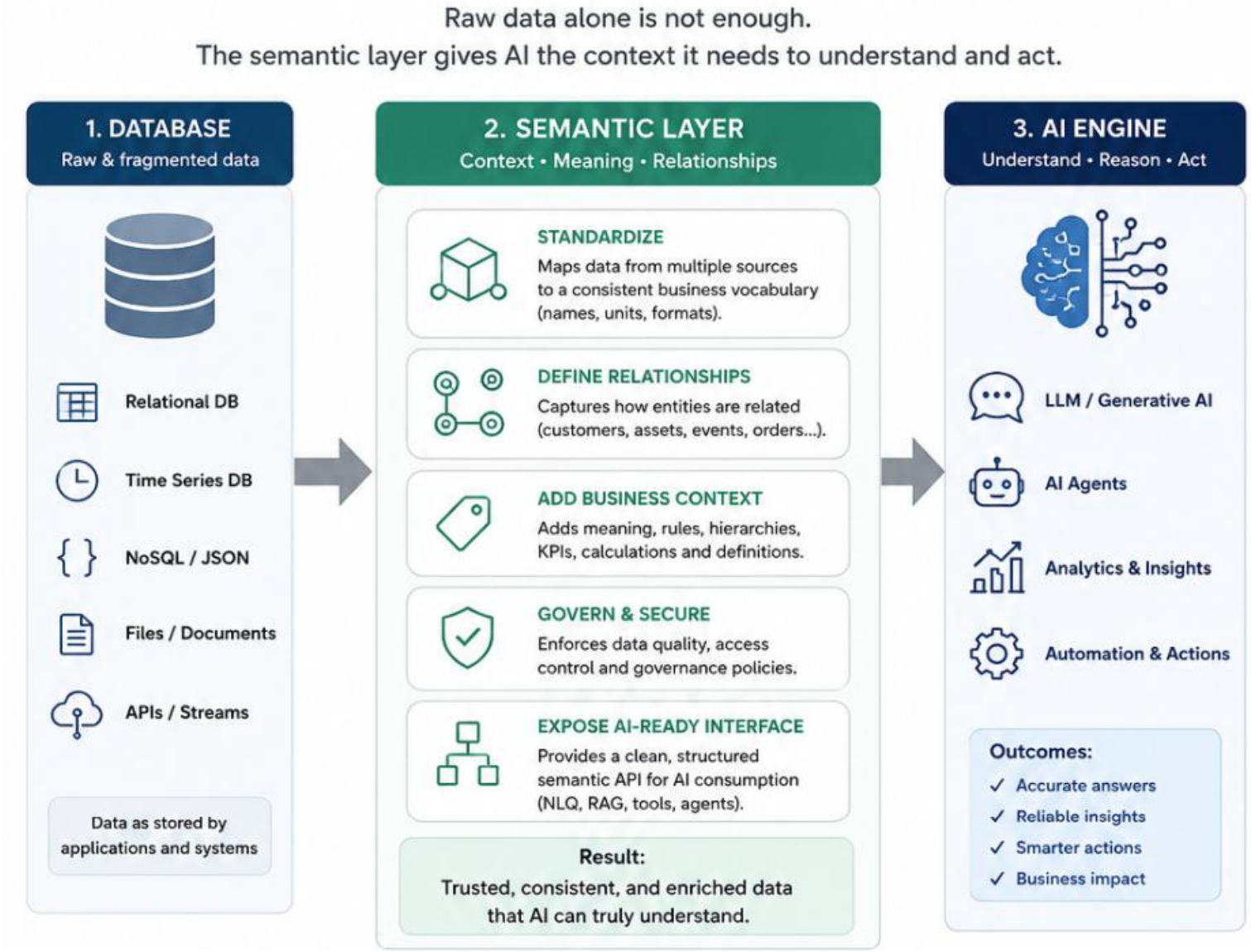


Yard & IOT equipment

Handhelds & Smartphones

# The **Semantic layer**

## The intelligent bridge between terminal data and AI

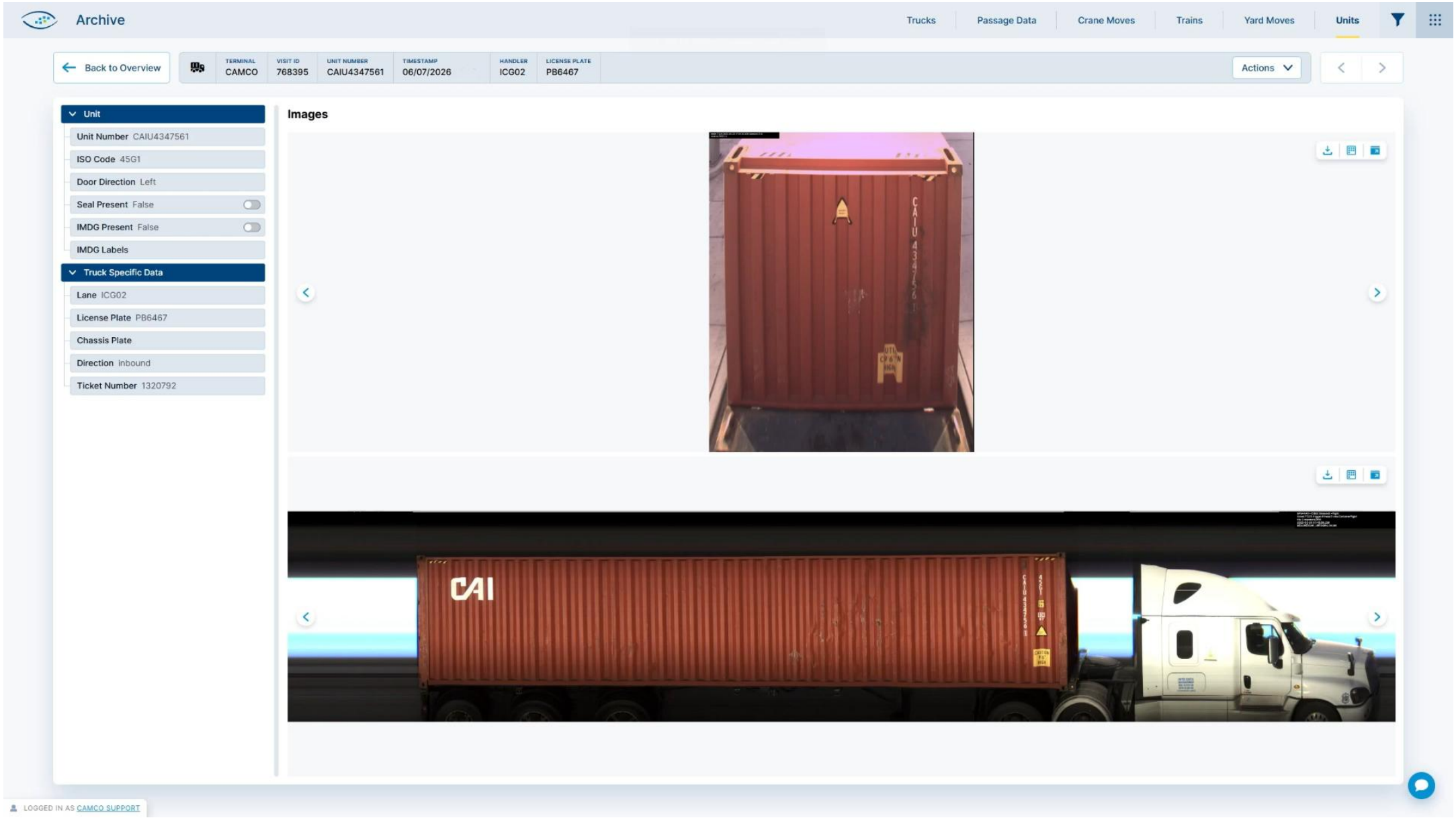



**The database stores facts.**

**The semantic layer understands operations.**

**AI reasons using operational context, not raw data.**

The semantic layer becomes the operational brain between terminal systems (TOS, OCR, RTLS, cameras, RFID, IoT) and LLMs, enabling AI to think in terms of terminal operations rather than database tables.



New chat

| | | | |
|---|---|---|---|
| 07/07 03:16 | Quay | Arrived at quay | STS-03 |
| 07/07 03:21 | Quay | Loaded on vessel | MSC Aurora |

Can you provide a more detailed breakdown?

Here is a detailed event-by-event breakdown:

**Monday 6 July 2026, 09:22:10**

- Container CAIU4347561 enters the terminal on an external truck with license plate PB6467. The truck is processed at Inbound Gate Kiosk 1.

**Monday 6 July 2026, 09:24:45**

- The truck enters the yard and drives to yard block D01 to drop off the container.

**Monday 6 July 2026, 09:29:16**

- The truck arrives at block D01. The container will be unloaded by crane RMG-D01.

**Monday 6 July 2026, 09:32:58**

- The crane RMG-D01 places the container at stack location 1D08K.2 corresponding to block 1D, row K, bay 08, tier 2. The container stayed there for the next 17 hours and 19 minutes.

**Tuesday 7 July 2026, 03:12:56**

- The container is loaded onto ITV EP03 by crane RMG-D01.

**Tuesday 7 July 2026, 03:16:24**

- The ITV arrives at quay crane STS-03, lane 1.

**Tuesday 7 July 2026, 03:21:40**

- The crane loads the container onto the vessel MSC Aurora at location B03504.2, corresponding to below deck, bay 035, row 04, tier 2.

**Tuesday 7 July 2026, 06:12:15**

- The container leaves the terminal on the vessel.

New chat

Provide an overview for container MRSU4386599 that was here last month

Container MRSU4386599 entered the terminal on vessel **Ever Glory** and left the terminal on vessel **MSC Adele**.

| Timestamp | Zone | Stage | Location |
|---|---|---|---|
| 06/09 06:11 | Quay | Arrived at terminal | Ever Glory |
| 06/09 11:12 | Quay | Vessel discharge | STS-07 |
| 06/09 11:15 | Quay | Loaded on ITV | EP10 |
| 06/09 11:19 | Yard | Arrived at stack | RMG-B03 |
| 06/09 11:21 | Yard | Placed in stack | 2B10C.1 |
| 06/11 08:22 | Yard | Loaded on ITV | EP11 |
| 06/11 08:39 | Quay | Arrived at quay | STS-06 |
| 06/11 08:45 | Quay | Loaded on vessel | MSC Adele |

Why did it take so long to move from stack to quay?

The average time to move a container from stack block 2B to the quay crane is **4 minutes**. In this case, the move took **17 minutes**.

There appears to have been a high density of ITVs at the quay at that time, likely causing **congestion**.

Can I view that trajectory on a map?

Yes, the **Archive module** can display the trajectory of ITVs for a specific job. The trajectory of **ITV EP11** for the associated container job can be viewed here.

Everyone has access to powerful LLMs.
Everyone has databases.
The competitive advantage lies in everything in between.

End-to-End Operational Context: the connected understanding of every operational object, event, relationship and dependency from the public road to the vessel. Artificial Intelligence becomes valuable only when it reasons over this context.

We automate, you operate.

Thank you!

# Example 1 – Container Search

## Business Intelligence

Operator wants to know where a container is.

He opens:

- Container screen
- Search filter
- Types container number
- Receives

```
Container:
MSCU1234567

Current location:
Stack B4-17

Status:
Export
```

Done.

## AI Assistant

Operator asks

> Where is MSCU1234567?

AI replies

> Container MSCU1234567 is currently located in Stack B4-17.
>
> It arrived yesterday at 14:37.
>
> It is scheduled for loading onto vessel MSC Aurora tomorrow at 08:00.
>
> It has already passed customs inspection.
>
> There are currently two containers stacked above it. If loading starts now, one reshuffle will be required.

Notice the difference.

The AI adds context.

# Example 2 – Truck Waiting Time

## BI Dashboard

Dashboard shows

```
Average waiting time

52 minutes
```

Operator knows waiting time increased.

Nothing else.

## AI

Operator asks

> Why are trucks waiting longer today?

AI answers

> Average waiting time increased from 38 minutes to 52 minutes.
>
> Primary causes:
>
> • Export volume increased by 18%.
>
> • RTG-03 was unavailable for 43 minutes.
>
> • Gate Lane 5 processed 35% fewer trucks due to OCR performance degradation.
>
> • 27% of arriving trucks came earlier than their appointment window.

That is reasoning.

# Example 3 – Damage Detection

BI

Dashboard

```
Damaged containers today

17
```

End of report.

AI

Result

> 11 of the 17 damaged containers belong to Evergreen.
>
> Nine arrived on the same vessel.
>
> Eight were unloaded by STS Crane 4.
>
> Similar patterns occurred three weeks ago.

Nobody explicitly asked for that correlation.

The AI discovered it.

AI analyses

- shipping line
- vessel
- origin port
- crane
- weather
- truck operator

# Example 4 – OCR Performance

BI

Dashboard

```
OCR Accuracy

96.8%
```

Good.

But why?

Nobody knows.

AI

> OCR accuracy dropped from 98.7% to 96.8%.
>
> 71% of OCR failures occurred during rainfall.
>
> 63% occurred in Lane 6.
>
> 54% involved trucks from Logistics Company ABC because their chassis partially cover the container number.

This is impossible using traditional dashboards unless someone explicitly created that report.

# Example 6 – Support

BI

Support engineer searches Jira.

Searches emails.

Reads manuals.

Reads release notes.

Takes 45 minutes.

AI

Engineer types

> RFID performance suddenly dropped yesterday.

AI immediately replies

> Similar incidents occurred:
>
> Rotterdam (2023)
>
> Colombo (2024)
>
> Vizhinjam (2025)
>
> All three were caused by water ingress inside the antenna connectors after heavy rainfall.
>
> Recommended diagnostic procedure:
>
> Step 1...
>
> Step 2...
>
> Step 3...

The future of terminal AI is not about having the best LLM. It is about giving the LLM the richest operational context.

THE BRIDGE provides that context by connecting every operational event from road to vessel into a single, end-to-end operational knowledge graph.

## My proposed definition

> **Operational Context is the complete set of relationships that explains why an operational event occurs, what influences it, and what impact it has on the rest of the operation.**

Notice that this is **not data**.

# Data versus Context

Let's take a simple example.

### Data

```
Container:
MSCU1234567

Location:
Yard Block C4

Time:
10:42
```

This is data.

It answers:

> **Where is the container?**

### Operational Context

Now let's add context.

Container MSCU1234567

- belongs to Evergreen
- contains dangerous goods
- arrived by vessel EVER ACE
- leaves tomorrow morning
- waiting for customs inspection
- currently blocked by two import containers
- assigned to RTG-04
- truck appointment at 13:00
- customer has priority status
- one previous OCR exception
- one damage detected yesterday

Now the AI understands

- why it is there
- why it cannot move
- what happens if it is delayed
- who is affected
- which equipment will handle it
- which customer is waiting

That is operational context.

**The Shift from Information to Understanding**

Traditional software tells us **what** happened.
Operational Intelligence explains **why** it happened.
Traditional software reports delays.
Operational Intelligence identifies their root causes.
Traditional software counts exceptions.
Operational Intelligence discovers relationships between exceptions.
Traditional software visualizes the terminal.
Operational Intelligence understands the terminal.
This is not an incremental improvement.
It is a fundamental shift in the role of enterprise software.

**Chapter 1**

**The End of the Dashboard Era**

For more than three decades, the primary objective of terminal automation has been straightforward: digitize operations, eliminate manual processes and increase productivity.

The industry has achieved remarkable progress.

Optical Character Recognition replaced manual container identification.

RFID automated truck recognition.

Automated gates accelerated terminal access.

Real-Time Location Systems continuously track equipment and assets.

Terminal Operating Systems coordinate increasingly complex workflows.

Digital Twins provide real-time visibility into terminal operations.

Every technological innovation has generated more operational data than the generation before it.

Today's container terminal is one of the richest operational data environments in global logistics.

And yet, every morning, operations teams still gather around the same question.

Not:

*"What happened?"*

But:

**"Why did it happen?"**

Truck waiting times increased.

Container damages suddenly rose.

OCR performance deteriorated.

Equipment productivity declined.

The information exists.

The understanding often does not.

This is not a failure of automation.

It is a limitation of the current generation of software.

Most operational platforms were designed to collect data, process transactions and visualize information.

They were never designed to reason.

The next generation of terminal software will therefore be fundamentally different.

Its purpose will no longer be reporting.

Its purpose will be understanding.

**How do we transform operational data into operational decisions?**

Most software platforms still provide dashboards, reports and alarms. They tell operators what happened, but rarely explain why it happened, what will happen next, or what should be done to improve the situation.

Recent advances in Artificial Intelligence have created enormous excitement across every industry. Large Language Models (LLMs) have demonstrated an impressive ability to answer questions, summarize information and generate content. Consequently, many software vendors now position AI as the next revolution in terminal automation.

We believe this perspective is incomplete.

The real breakthrough is not the Large Language Model itself.

The real breakthrough is the availability of operational context.

An AI system is only as intelligent as the information it can access and the relationships it can understand.

A language model connected to a single database will produce answers limited to that database.

A language model connected to an OCR system can reason about OCR.

A language model connected to a TOS can reason about terminal transactions.

Neither can understand the terminal as a whole.

True Operational Intelligence only becomes possible when AI has access to the complete operational lifecycle—from the moment a truck begins its journey towards the terminal until the container is safely loaded onto the vessel.

This publication introduces a new architectural vision for terminal automation. Rather than viewing AI as an isolated technology, we describe a layered architecture in which operational data, operational context, digital twins, knowledge graphs and AI reasoning combine to create an entirely new generation of terminal software.

**Why AI may become the largest productivity wave**

Previous waves:

**Steam**

More physical power.

**Electricity**

Machines everywhere.

**Assembly line**

Faster production.

**Computers**

Faster calculations.

**Internet**

Faster communication.

**AI**

Faster thinking.

That last transition is unique because almost every office worker performs cognitive tasks.