INCREASING EFFICIENCY, SAFETY & VISIBILITY
FACTS versus MYTHS

Black and Caspian Sea
PORTS & SHIPPING

CAMCO
TECHNOLOGIES

Anton Bernaerd
Istanbul, July 6, 2023

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Camco Technologies

Private owned
Global presence
24 years in terminal automation
Passion for technology
Industry innovator

Camco US
One World Trade Center
Long Beach

Camco Middle East FZE
JAFZA ONE Tower – Building A

CAMCO TECHNOLOGIES AUSTRALIA PTY LTD

Camco China
Shanghai

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Camco Technologies

A unique combination of four business units:

- Product Development
- Production Factory
- Project Factory
- Services Factory

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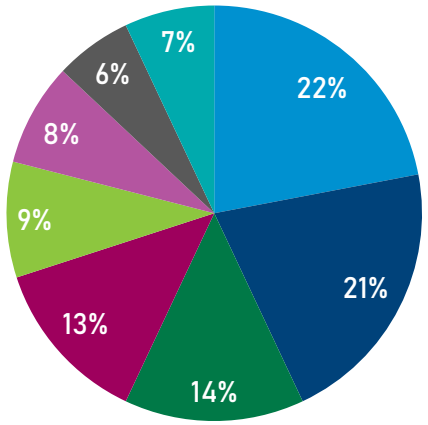
Global – Worldwide Presence



EXPORT*	TERMINALS	COUNTRIES
87%	300	53

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Global terminal operators

Maritime terminal operators

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Multimodal & rail terminal operators

Inland & RO-RO terminal operators

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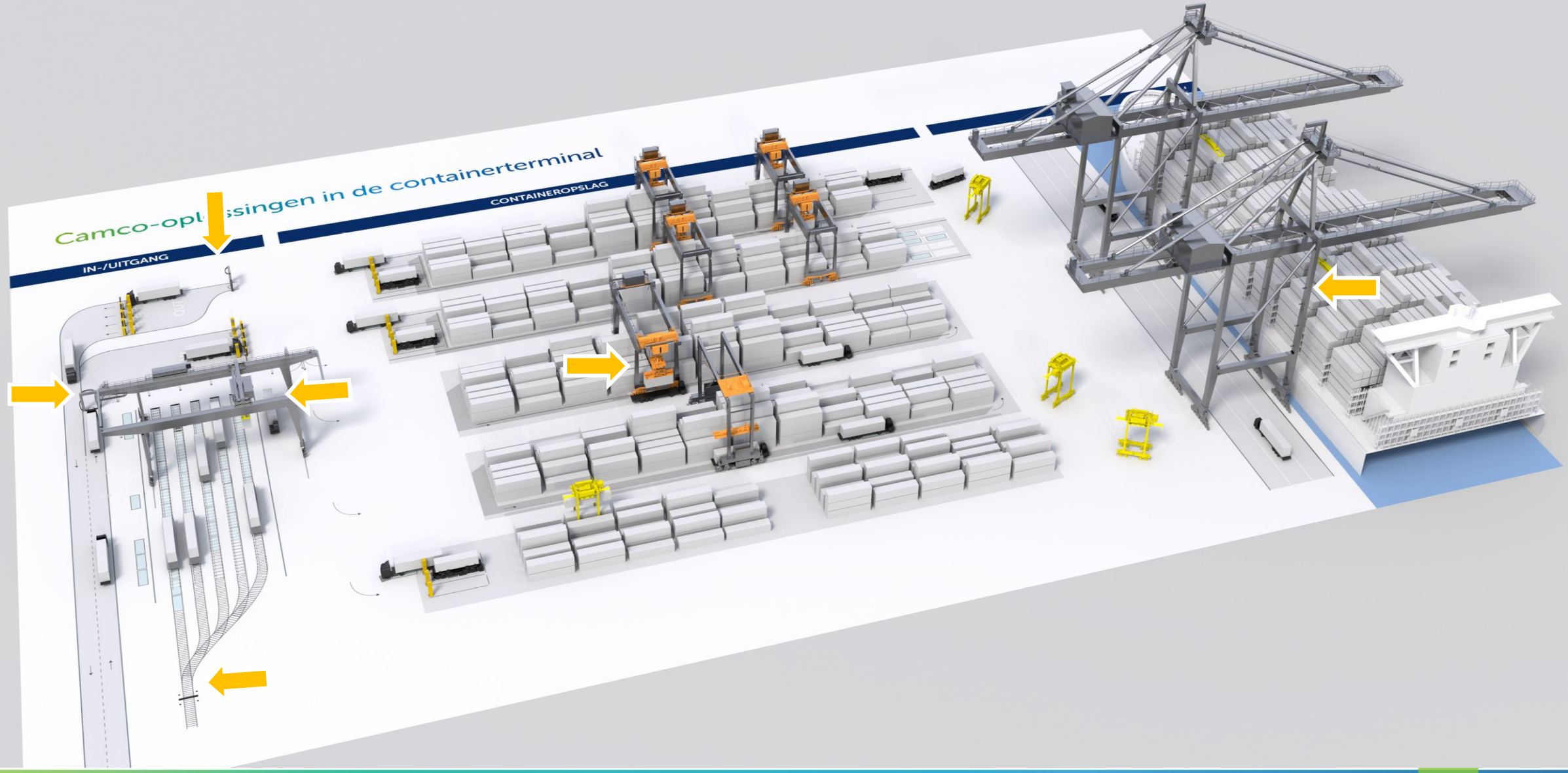
Automating container hand-over processes

CAMCO TECHNOLOGIES

Vision & location technology-based solutions



MAERSK
MAERSK
MAERSK

Vision & location technology-based solutions

Visual based

Gate Automation
OCR portals+ kiosks

Quay Automation
STS

Yard Automation
RTG/RMG

Rail Automation
OCR Rail portals

Location based

Horizontal transport
TT/SC/ECH/RS

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Identification & Registration

Line-scan camera images truck & container

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Line-scan camera images truck & container

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Container : Area-scan camera images and OCR angle correction

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Artificial Intelligence-based OCR engines

OCR	
Container number	> 98%
ISO code	> 98%
IMO placards : presence	> 96%
IMO placards : class	> 93%
License plate number	> 98%
UN number : presence	> 96%
UN number	> 90%
ILU number*	> 98%
Trailer license plate *	region specifi
Non-ISO container number*	> 98%
Container weight* °	> 90%
Chassis number*	TBA
Fleet number*	TBA

° Not if container tank volume is > 10%

* Extended feature

OFR	
Container position on chassis	> 99%
Door direction	> 99%
Seal presence	> 95%
Cargo classification*	TBA
Genset presence*	> 95%
Tank container bars presence*	TBA
Tank valve detection*	TBA
Waste label detection*	> 95%
Wheel group count*	> 95%

OTHER READINGS	
Chassis TEU length	> 98%

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Structural Damage Detection

Intuitive Damage Management

ARGUS Engine reports damage with:

- Indication of damage type
  - Frame damage
  - Holes
  - Corner posts
  - Dents
  - Bulges
  - Doors (open, deformed hinges)
- Severity with customizable threshold

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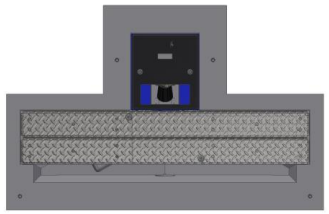
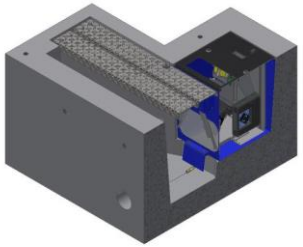
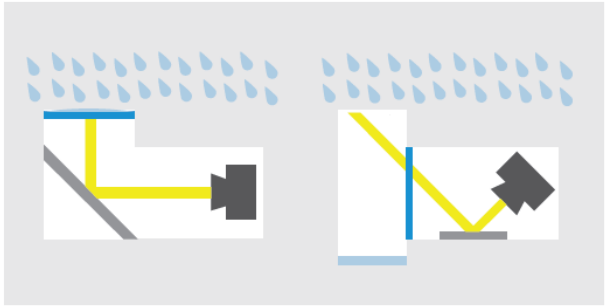
Under-Vehicle Scanner

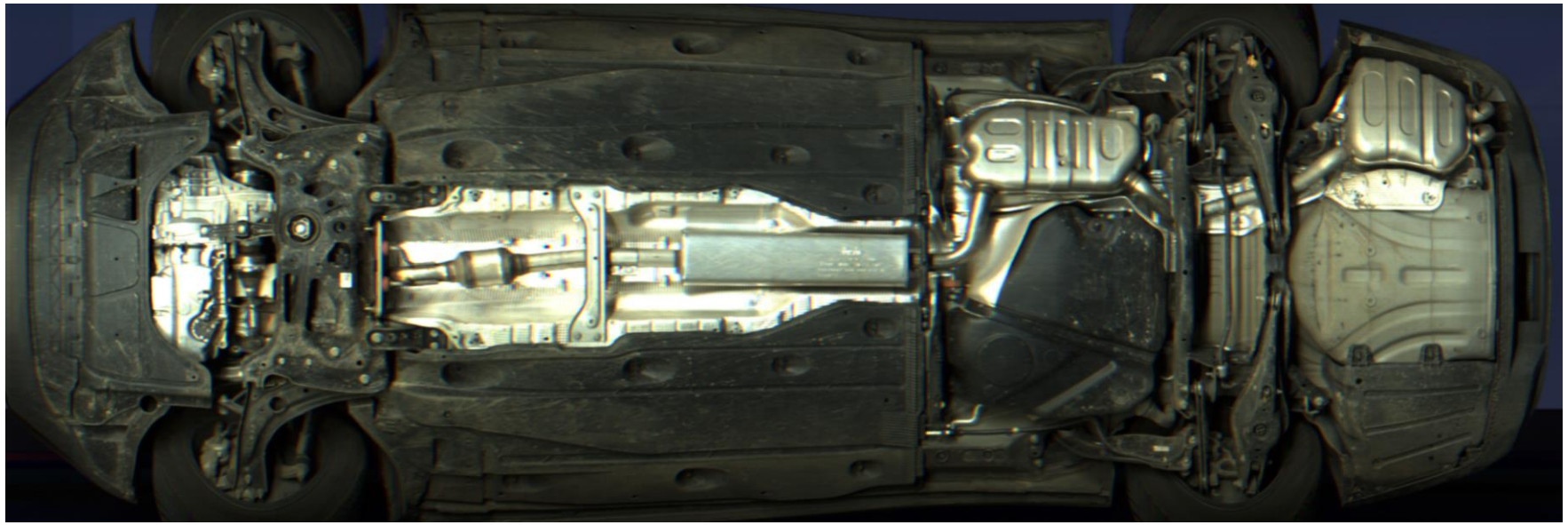
Under Vehicle Scanner: fully integrated system and a unique low maintenance design.





Camco Under Vehicle Inspection





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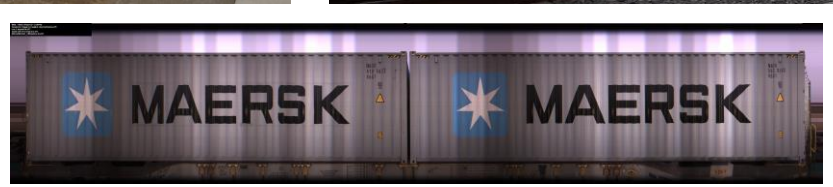
Rail portal in Germany



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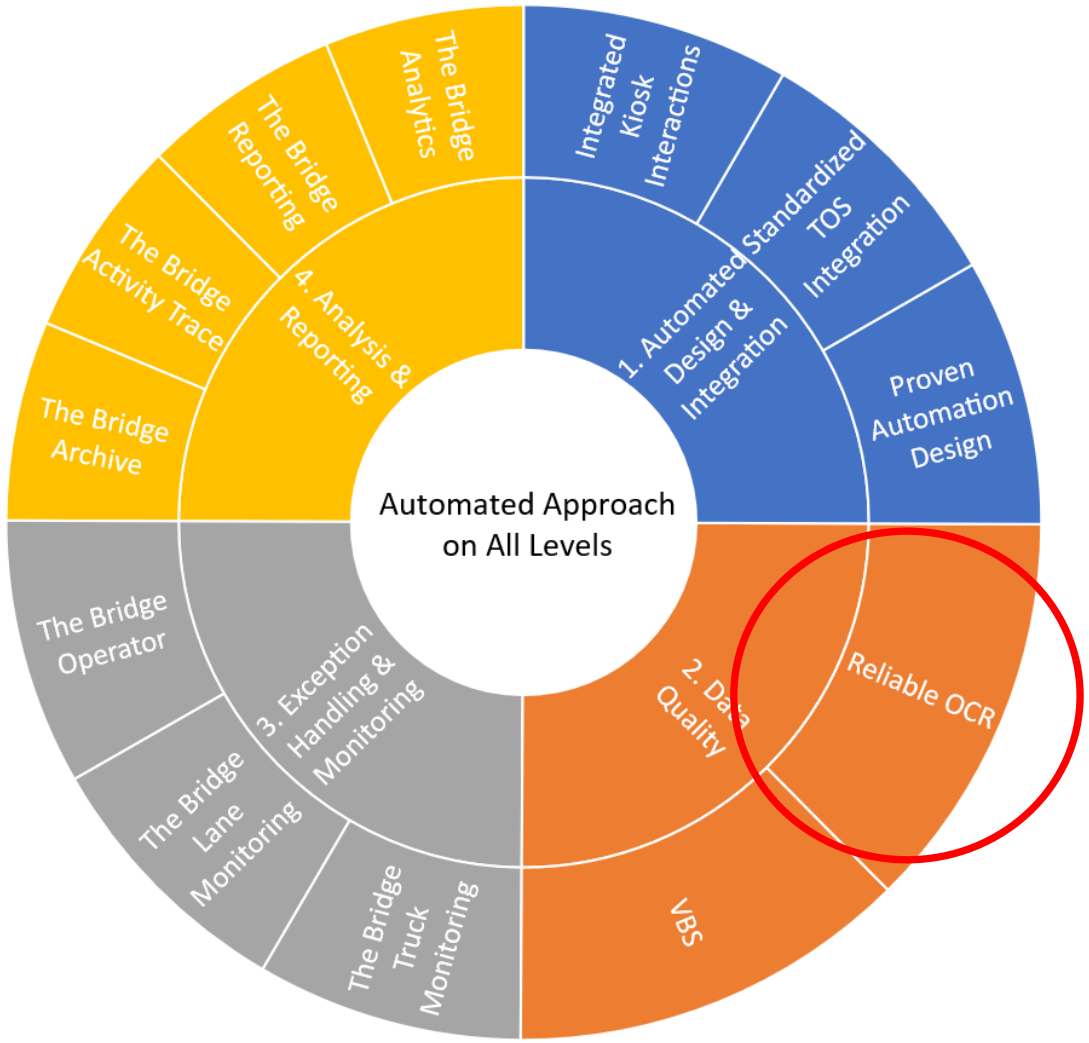
CMA CGM
CAMCO
TECHNOLOGIES
DP WORLD

Common mistake: automation ≠ OCR cameras

Automated approach on all levels

1. Automated design & Integration
2. Data Quality
3. Exception handling & monitoring
4. Analysis & reporting



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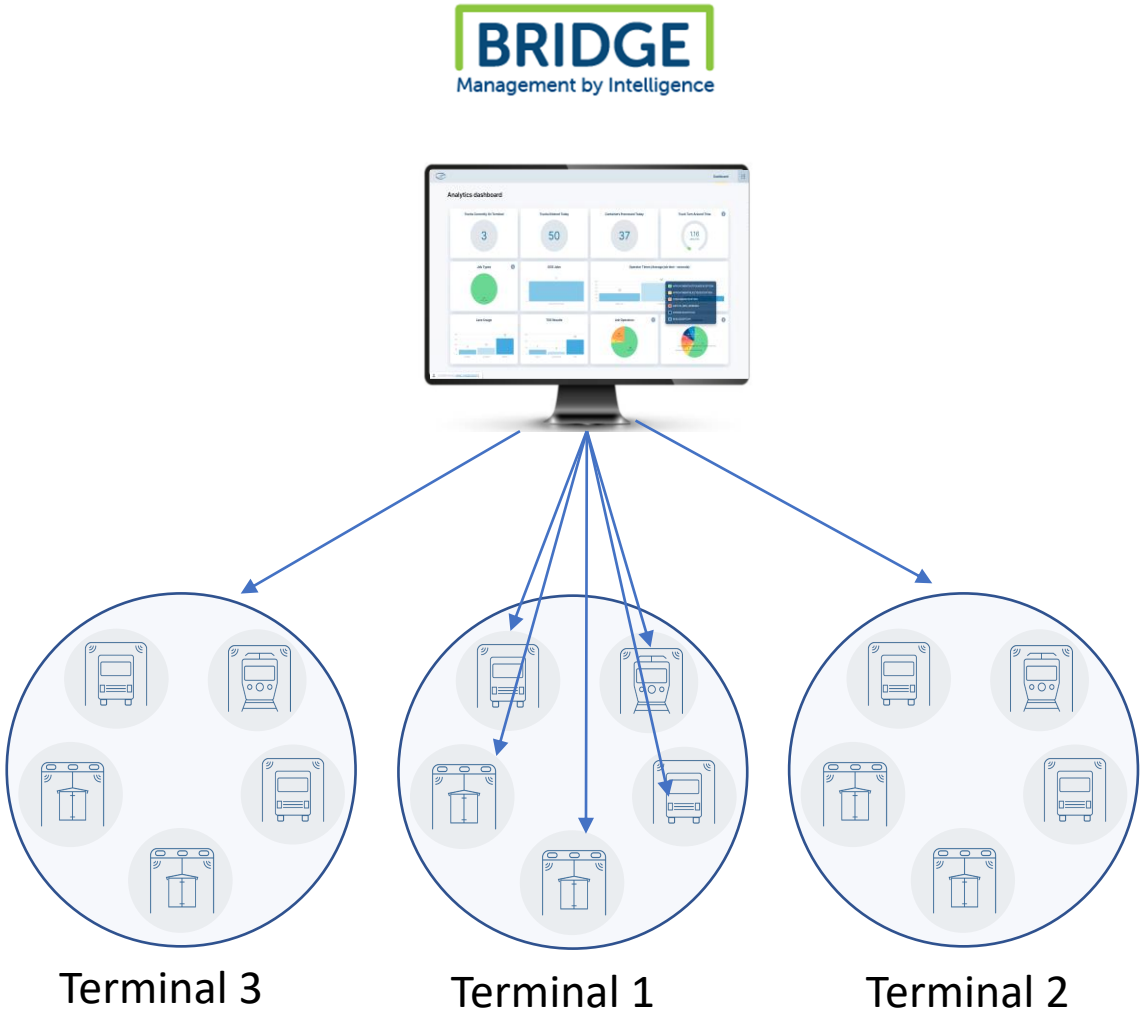
The Bridge : The all-in-one operator web-application



- **Multi terminal**

transparently control Camco's products across several terminals

- **Multi product**

supports Camco's 4 main products (Gate/Crane/Rail /RTLS)
supports 3third party products , Q1 2024

- **Multi application**

supports all applications as exception workstation, configuration, reporting, dashboard

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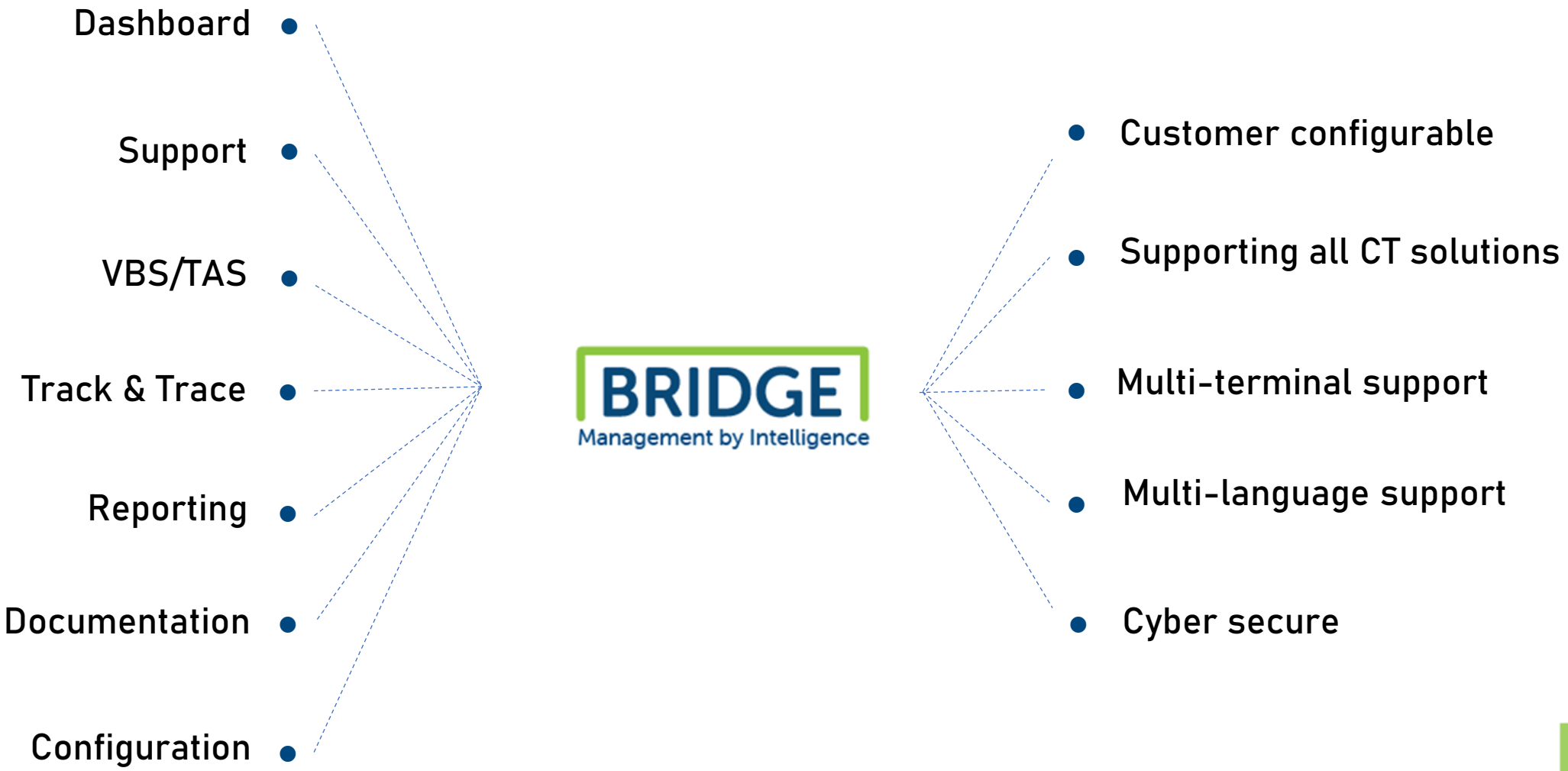
27

Web-based all-in-one Operation Workstation



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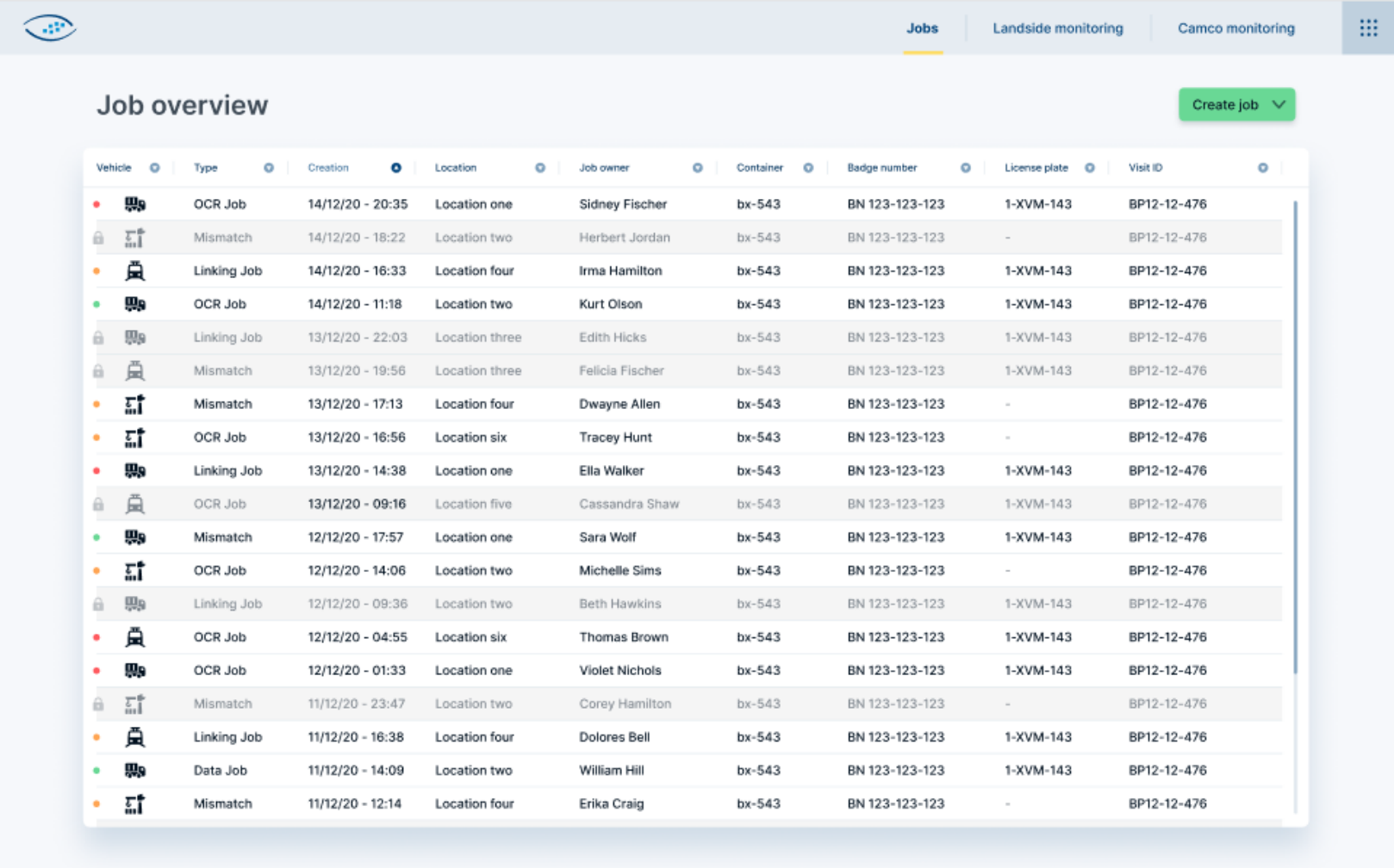
The Bridge

Exception Selection Job on one page (truck, rail, crane, PDS)



Vehicle	Type	Creation	Location	Job owner	Container	Badge number	License plate	Visit ID
	OCR Job	14/12/20 - 20:35	Location one	Sidney Fischer	bx-543	BN 123-123-123	1-XVM-143	BP12-12-476
	Mismatch	14/12/20 - 18:22	Location two	Herbert Jordan	bx-543	BN 123-123-123	-	BP12-12-476
	Linking Job	14/12/20 - 16:33	Location four	Irma Hamilton	bx-543	BN 123-123-123	1-XVM-143	BP12-12-476
	OCR Job	14/12/20 - 11:18	Location two	Kurt Olson	bx-543	BN 123-123-123	1-XVM-143	BP12-12-476
	Linking Job	13/12/20 - 22:03	Location three	Edith Hicks	bx-543	BN 123-123-123	1-XVM-143	BP12-12-476
	Mismatch	13/12/20 - 19:56	Location three	Felicia Fischer	bx-543	BN 123-123-123	1-XVM-143	BP12-12-476
	Mismatch	13/12/20 - 17:13	Location four	Dwayne Allen	bx-543	BN 123-123-123	-	BP12-12-476
	OCR Job	13/12/20 - 16:56	Location six	Tracey Hunt	bx-543	BN 123-123-123	-	BP12-12-476
	Linking Job	13/12/20 - 14:38	Location one	Ella Walker	bx-543	BN 123-123-123	1-XVM-143	BP12-12-476
	OCR Job	13/12/20 - 09:16	Location five	Cassandra Shaw	bx-543	BN 123-123-123	1-XVM-143	BP12-12-476
	Mismatch	12/12/20 - 17:57	Location one	Sara Wolf	bx-543	BN 123-123-123	1-XVM-143	BP12-12-476
	OCR Job	12/12/20 - 14:06	Location two	Michelle Sims	bx-543	BN 123-123-123	-	BP12-12-476
	Linking Job	12/12/20 - 09:36	Location two	Beth Hawkins	bx-543	BN 123-123-123	1-XVM-143	BP12-12-476
	OCR Job	12/12/20 - 04:55	Location six	Thomas Brown	bx-543	BN 123-123-123	1-XVM-143	BP12-12-476
	OCR Job	12/12/20 - 01:33	Location one	Violet Nichols	bx-543	BN 123-123-123	1-XVM-143	BP12-12-476
	Mismatch	11/12/20 - 23:47	Location two	Corey Hamilton	bx-543	BN 123-123-123	-	BP12-12-476
	Linking Job	11/12/20 - 16:38	Location four	Dolores Bell	bx-543	BN 123-123-123	1-XVM-143	BP12-12-476
	Data Job	11/12/20 - 14:09	Location two	William Hill	bx-543	BN 123-123-123	1-XVM-143	BP12-12-476
	Mismatch	11/12/20 - 12:14	Location four	Erika Craig	bx-543	BN 123-123-123	-	BP12-12-476

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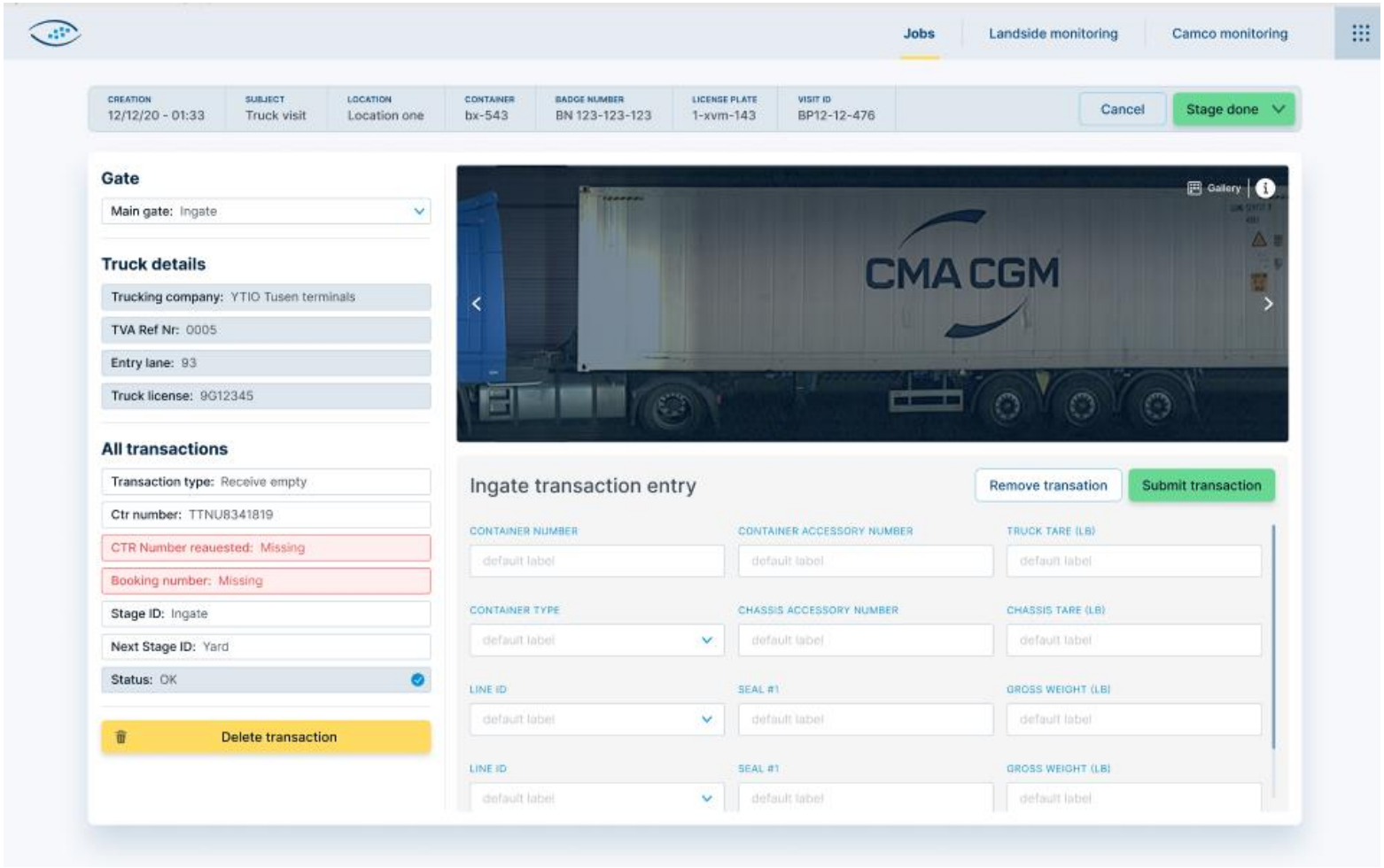
The Bridge

Truck Gate operator



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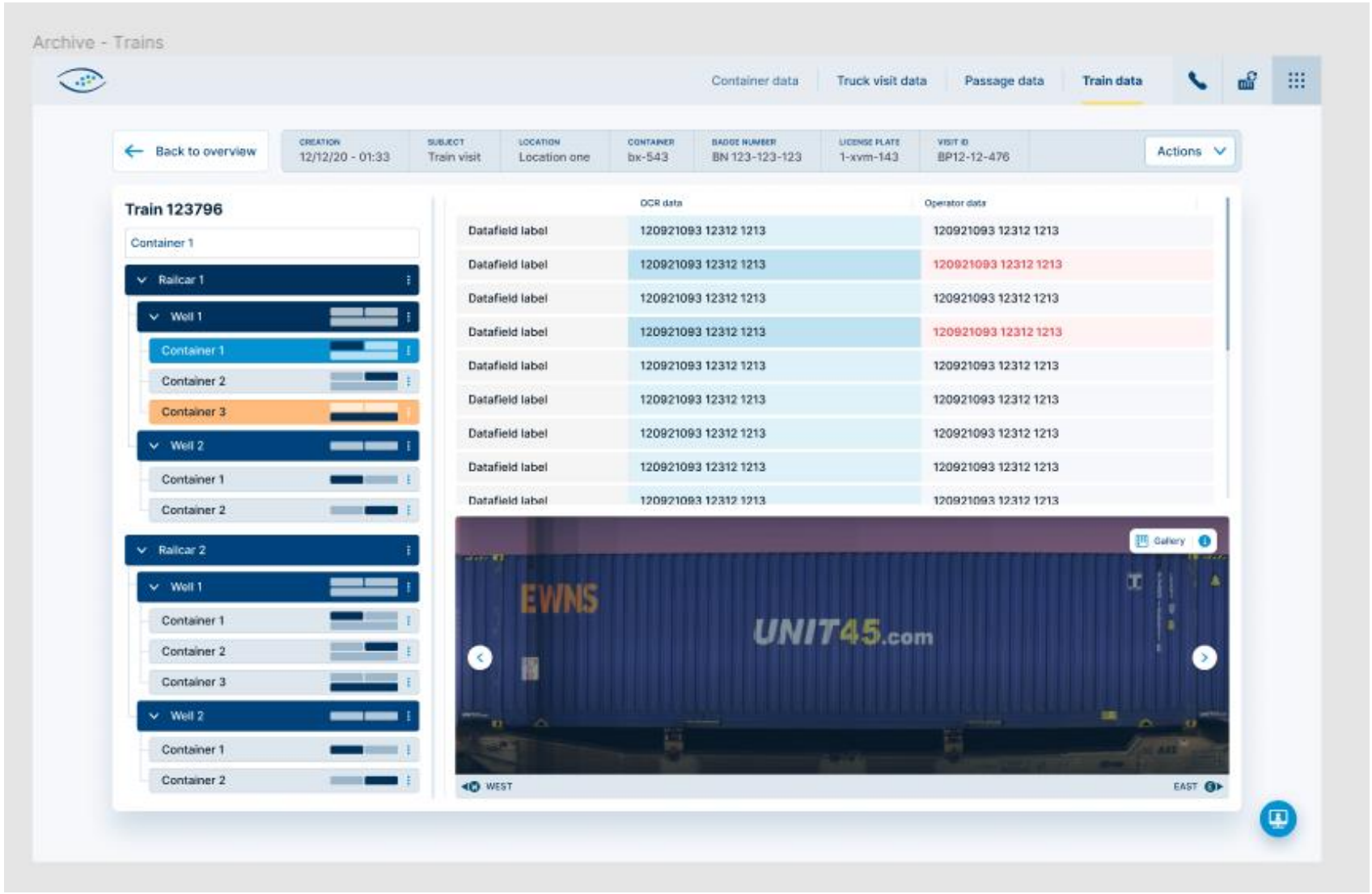
The Bridge

Rail portal operator



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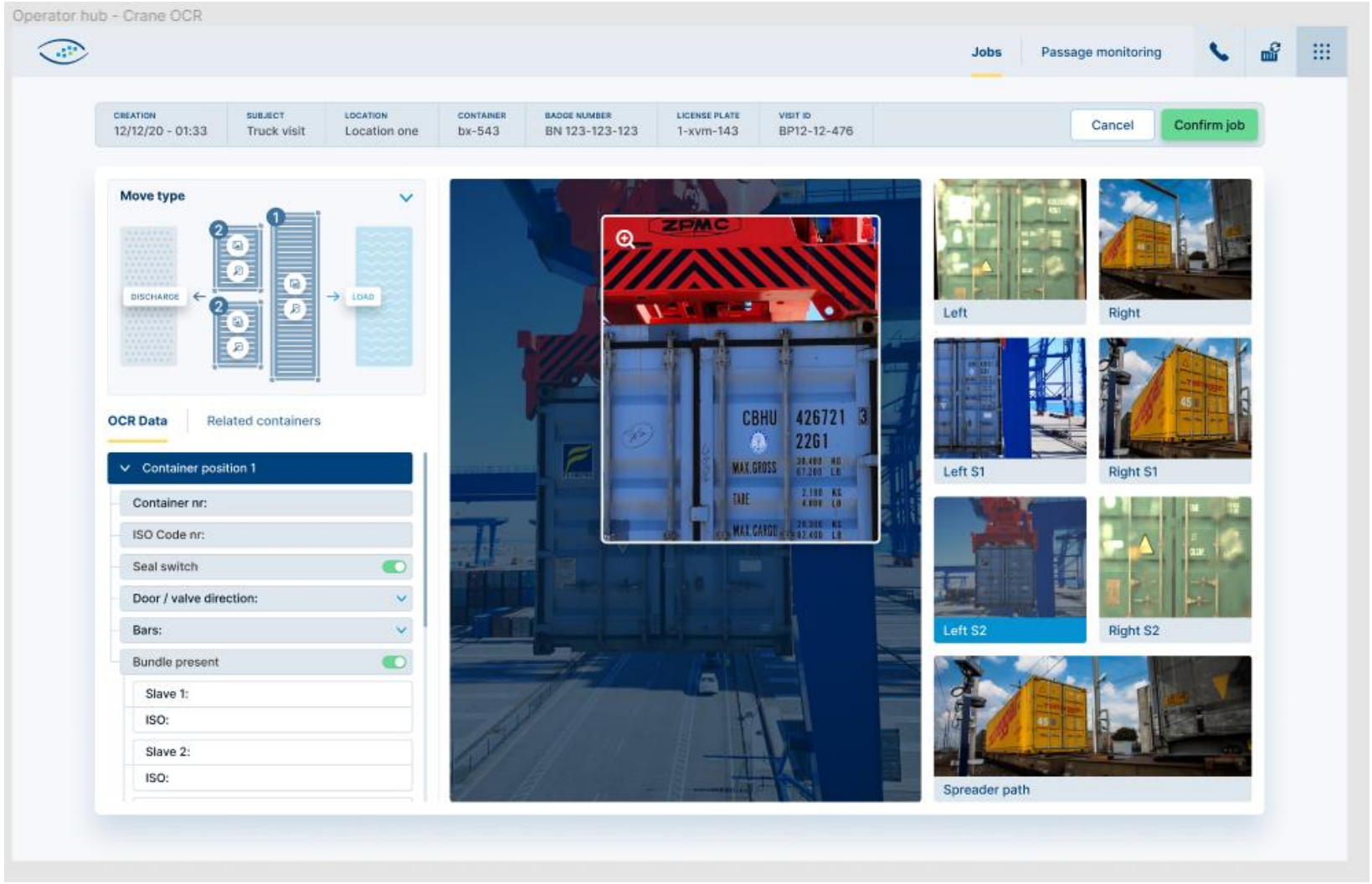
The Bridge

STS & RMGCAM operator



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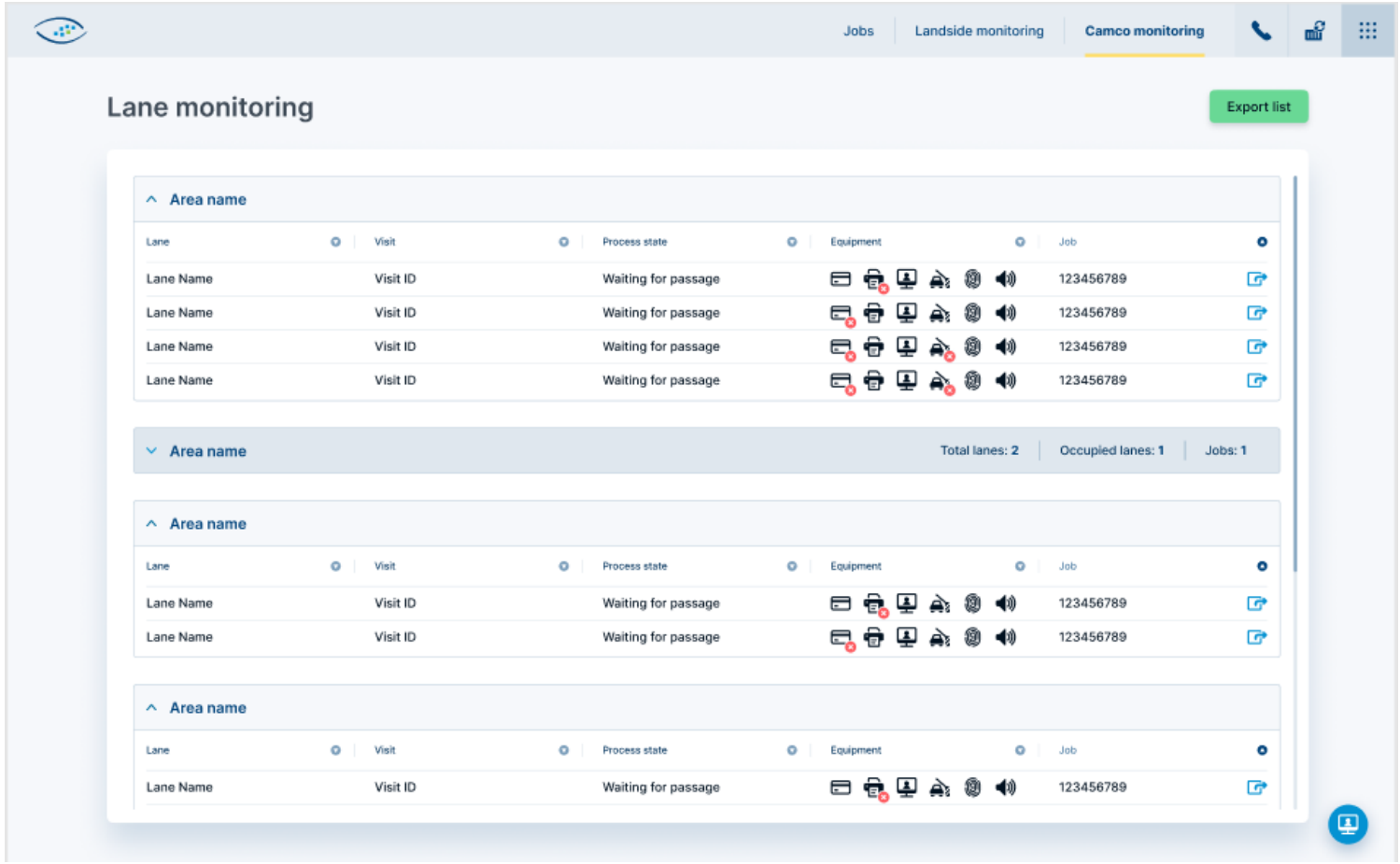
The Bridge

Gate Lane equipment



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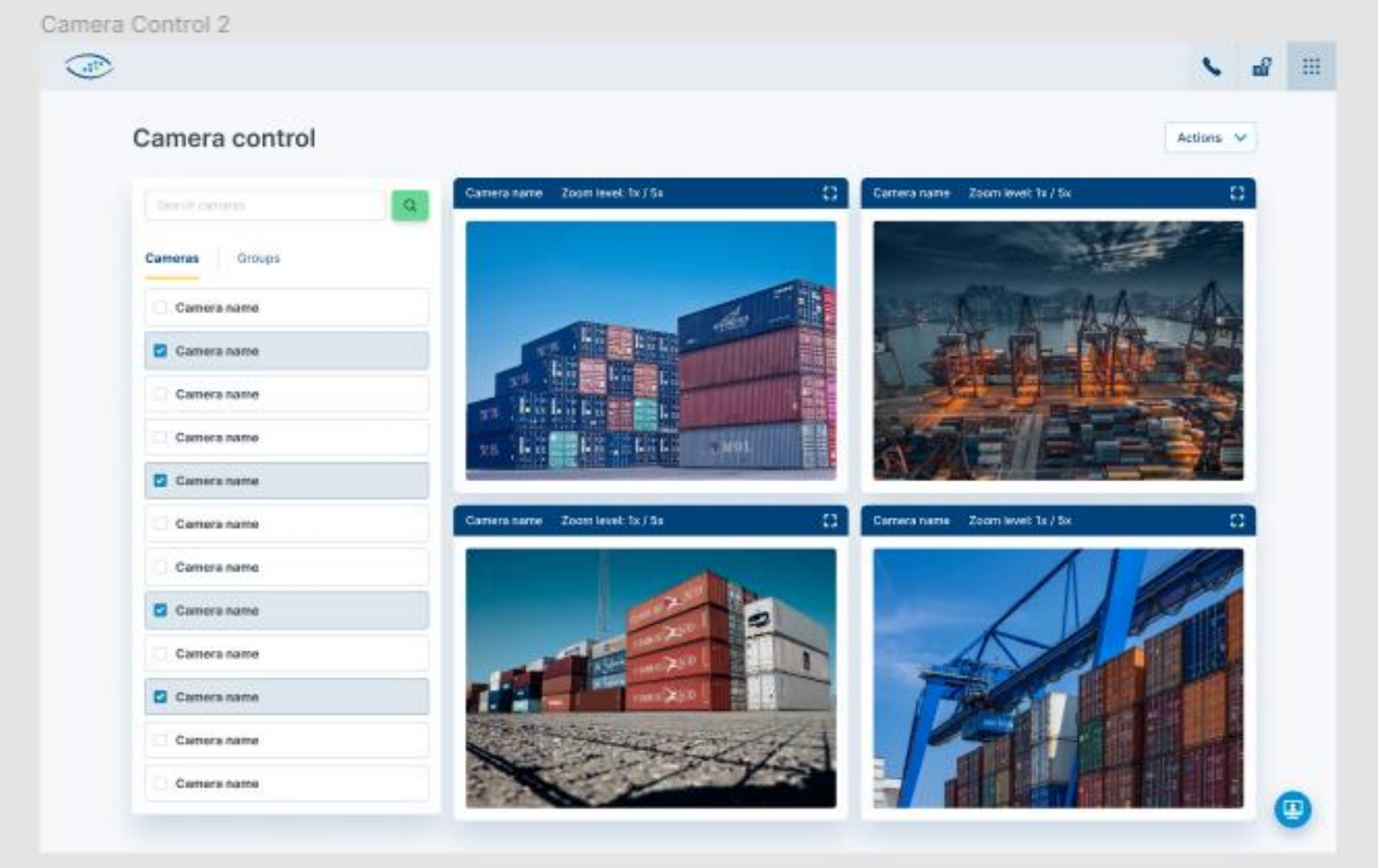
The Bridge

Yard cameras



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The Bridge

Realtime Analytics Dashboard

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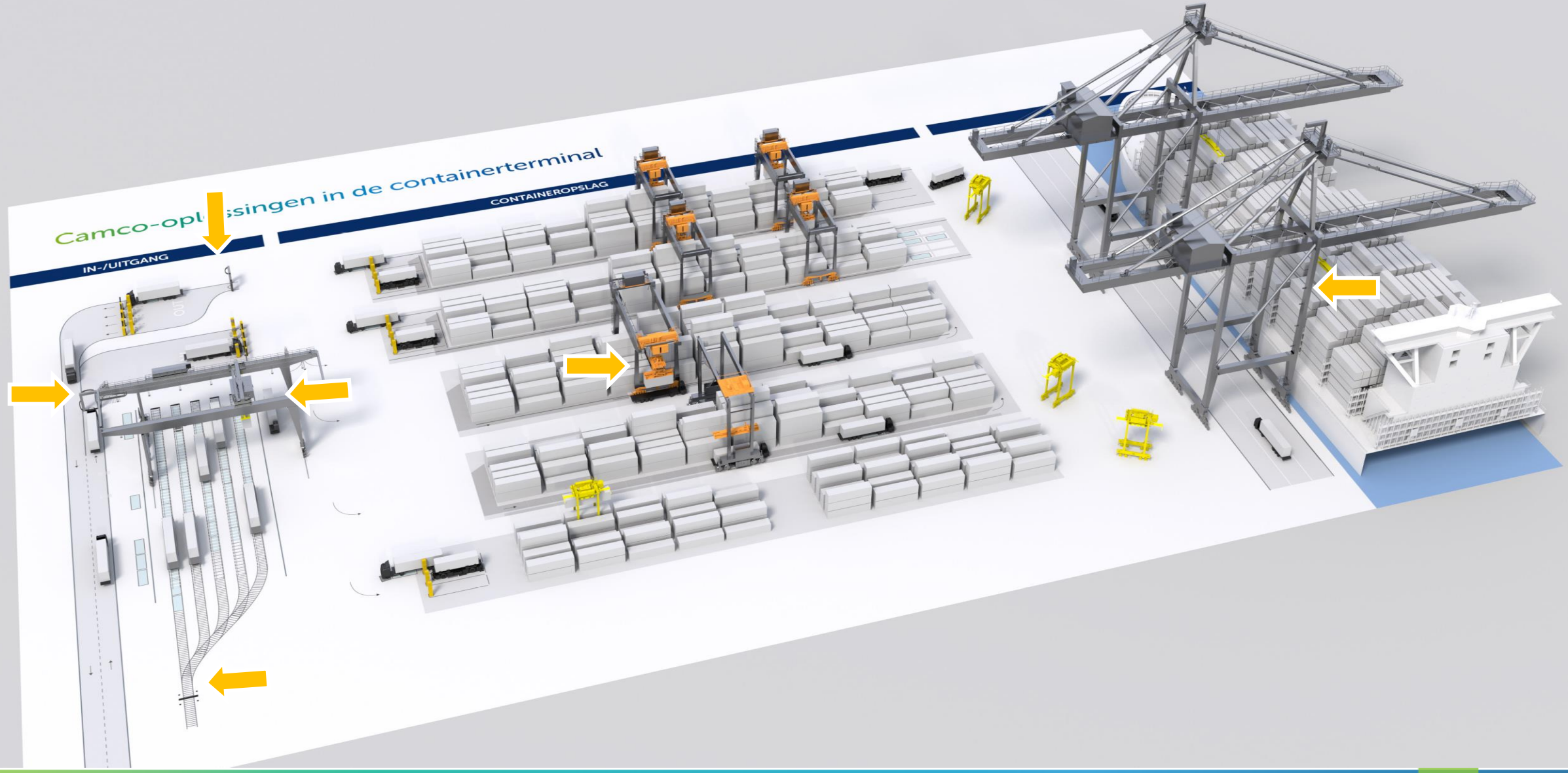
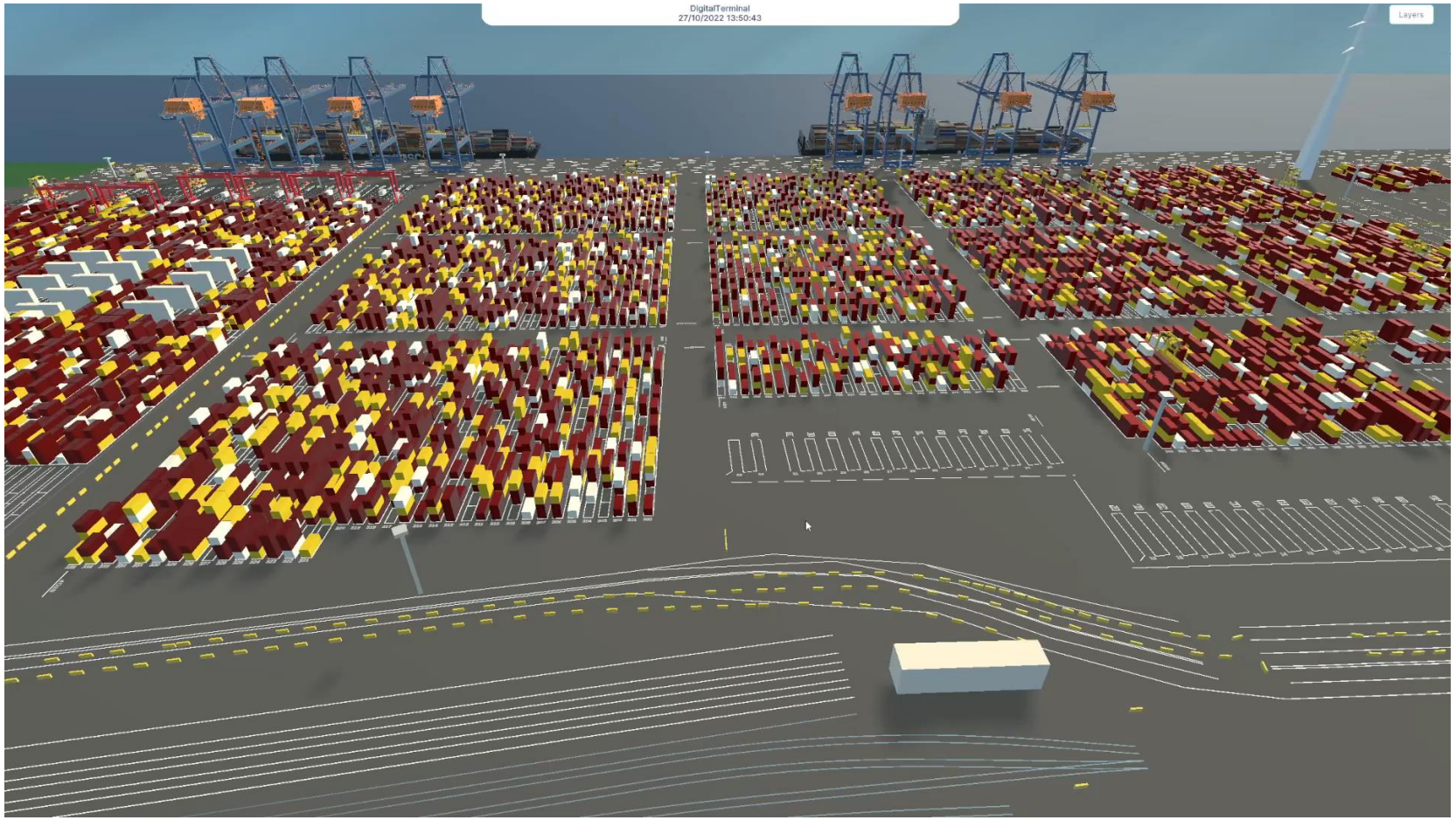
Vision & location technology-based solutions



Real Time Location



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Identification + Real-Time Location = WYSIWYO

RTLS

BRIDGE
Management by Intelligence

Gate Automation	Quay Automation	Yard Automation	Rail Automation	Horizontal transport
OCR portals+ kiosks	*STS*	*RTG/RMG*	*OCR Rail portals*	*TT/SC/ECH/RS*

OCR technology = Identify object Location technology = Track of the object

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Real-Time Data Ressources

Systems	Source	Data
OCR Systems	• Truck & Rail OCR portals • STS/RTG/RMG OCR cameras	• Time stamps, log files • Container (ID, ISO, Seal,..), truck id, wagon nmbr • Container pictures + damage status
Yard IOT equipment	• Gate & yard Kiosks • Barriers, RFID readers • Scales	• Time stamps, log files, VoIP logging • Driver name, truck id, RFID numberss • Kiosk processes
Location technology	• TT's/Straddle/Shuttle • STS, RTG, RMG, EH, RCH	• Exact location on the terminal • Job promotion (via VMT) • Twistlock status Alignment data
Telematic data	• TT's/Straddle/Shuttle • STS, RTG, RMG, EH, RCH	• Tire pressure, engine hours • Oil/engine temperature • Max speed, battery level, fuel level
TOS	• TOS • VBS	• Stacks (yard), Bapli (vessel), • Rail manifest (wagon/container), Truck chassis • Booking number

VISUAL & KIOSK BASED

LOCATION & VMT BASED

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Real Time Location System

2 Main Functionalities

- **Track & Trace** with high accuracy all Container Handling Equipment, everywhere on the terminal

- **Automate handover** processes at STS, RTG, RMG and ASC based on
  - Location information
  - Driver Guidance (Job stepping on VMT)

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Real Time Location System

4 Secondary Functionalities

- TT or SC alignment under the STS crane
- Centralized equipment telematics (fuel, tire pressure,..)
- Safety and fraud control functions (collision avoidance, geofencing,..)
- Record and replay functionality

TWINBRIDGE
Management by Digital Twin

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Location technology

RTLS is built on 3 location technologies:

- Global Navigation Satellite System
- Based on recent GNSS chips
- Multi constellation
- Multi receiver, allows orientation

UWB

- Based on RF-pulse technology
- Measures distance between antennas
- Very high accuracy (2cm)
- Very fast (collision avoidance)

RAIN RFID

- RFID is a location *awareness* technology
- Presence in a radius of 8m

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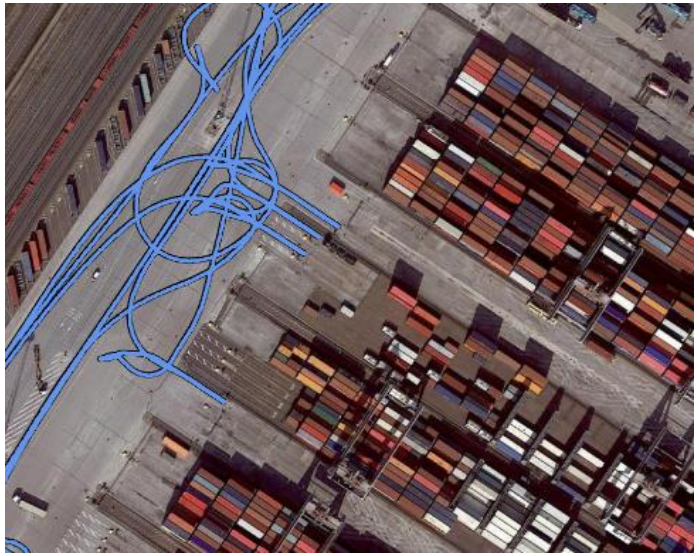
Location Method: GNSS

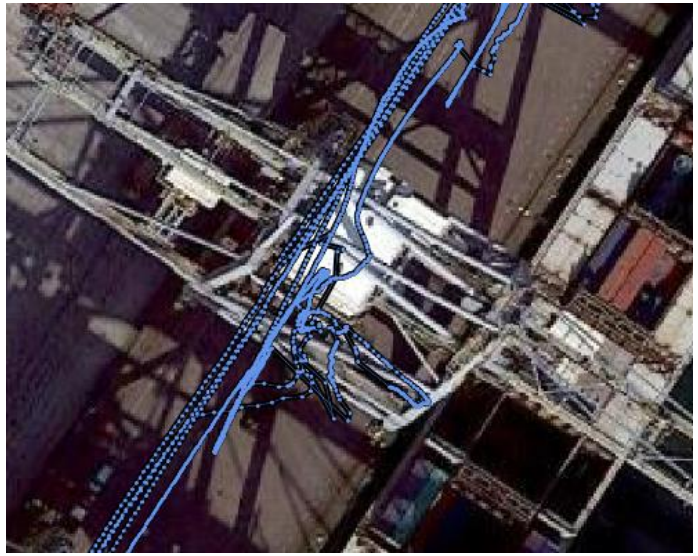
Problems

- GNSS quality drops under STS cranes

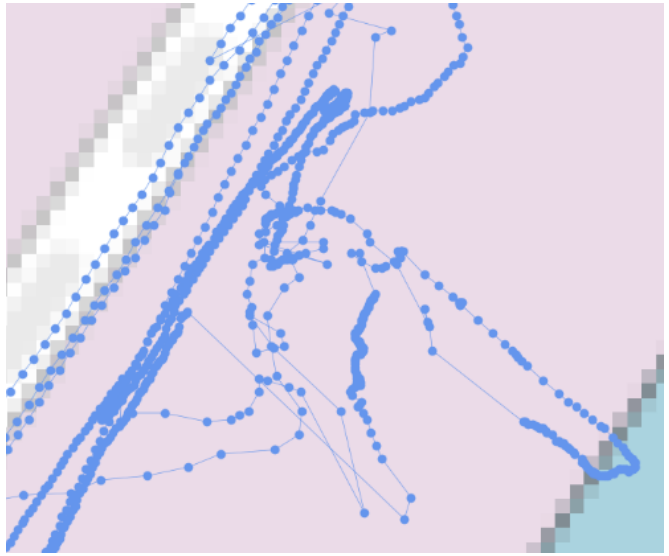
Normal GNSS quality



Disturbed GNSS under STS



Disturbed GNSS under STS



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DigitalTerminal
27/10/2022 13:50:43
Layers

Thank you!