

INCREASING EFFICIENCY, SAFETY & VISIBILITY

FACTS versus MYTHS



Anton Bernaerd
Istanbul, July 6, 2023

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

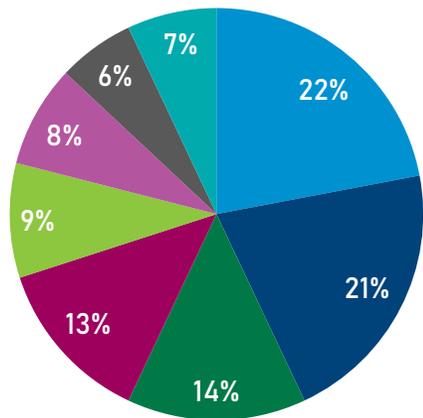
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A unique combination of four business units:

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

Global – Worldwide Presence



EXPORT*	TERMINALS	COUNTRIES
87%	300	53

Global terminal operators



Maritime terminal operators



Multimodal & rail terminal operators



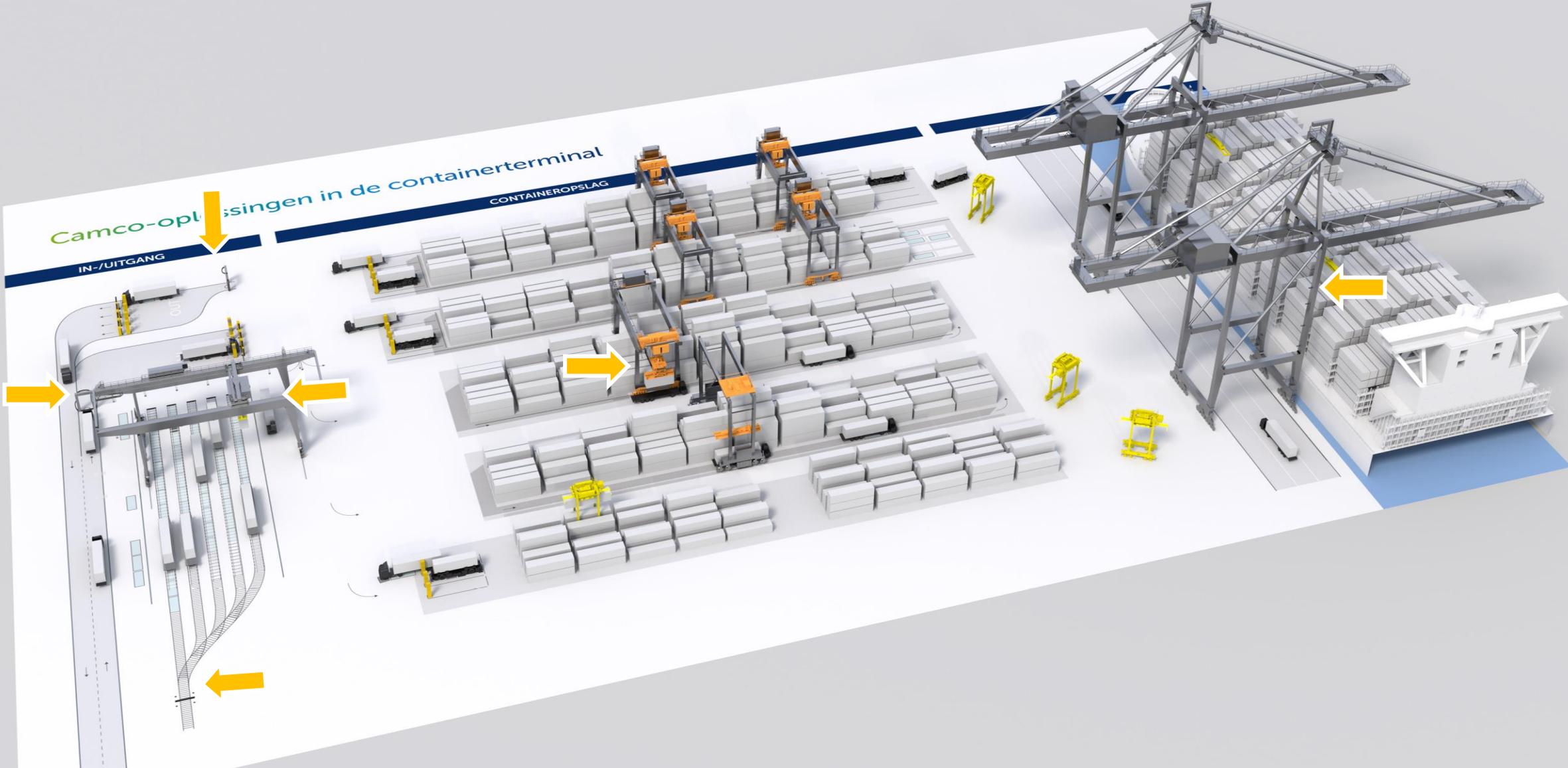
Inland & RO-RO terminal operators



Automating container hand-over processes



Vision & location technology-based solutions





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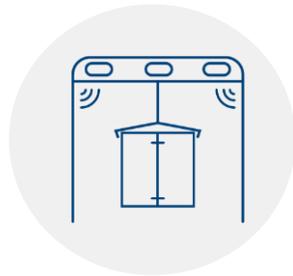


Vision & location technology-based solutions

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



Identification & Registration



Line-scan camera images truck & container



Line-scan camera images truck & container



Container : Area-scan camera images and OCR angle correction



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 specific
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%

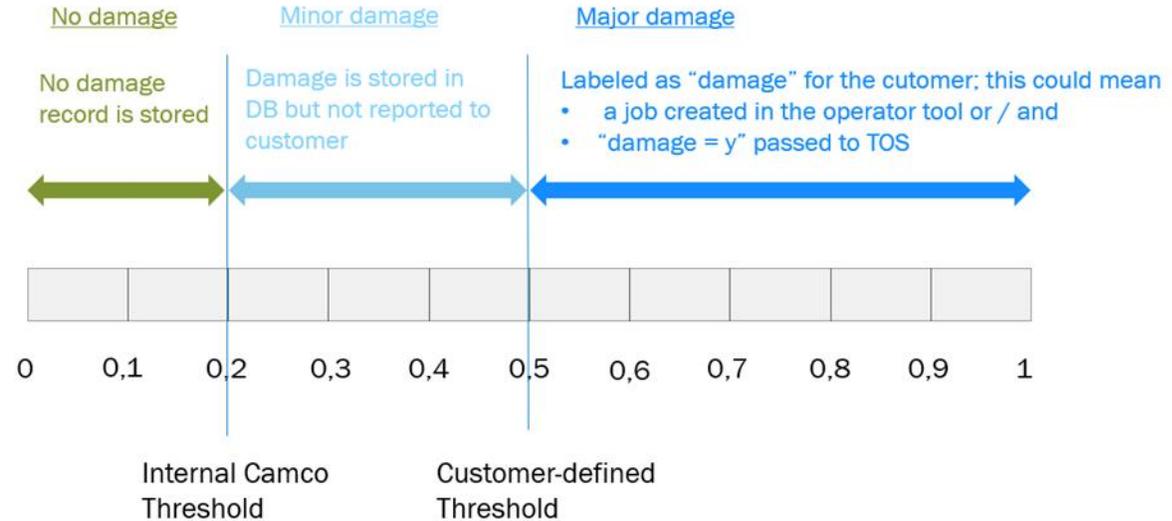
OTHER READINGS	
Chassis TEU length	> 98%

Structural Damage Detection

Intuitive Damage Management

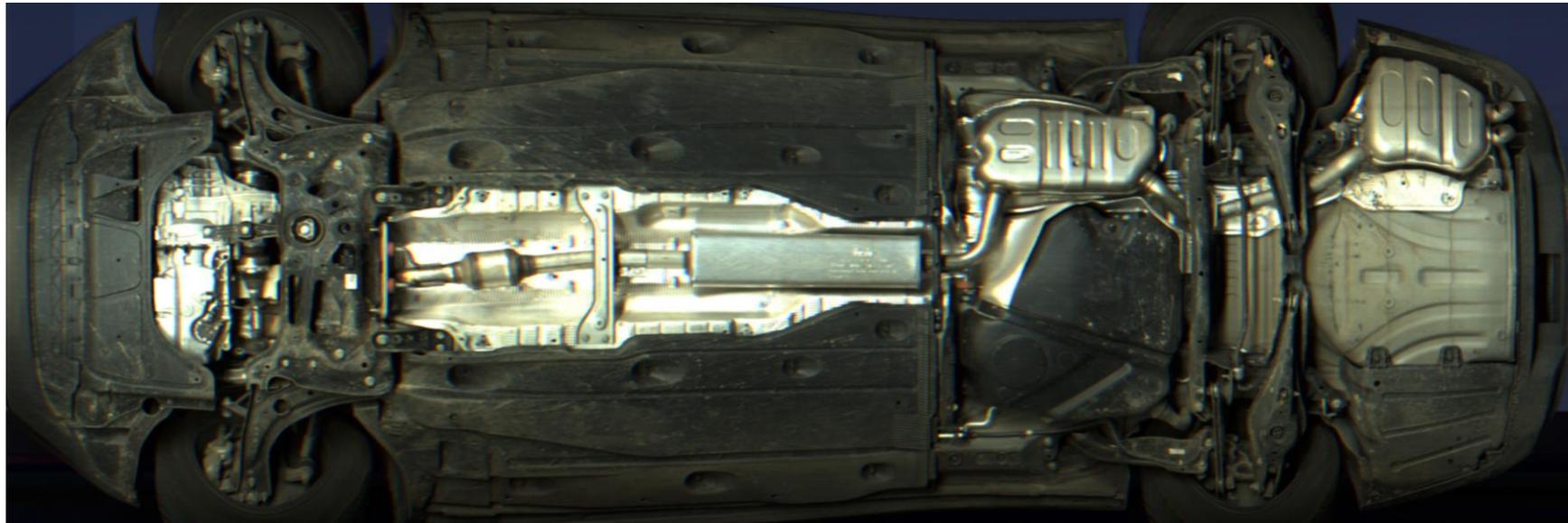
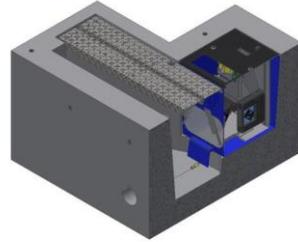
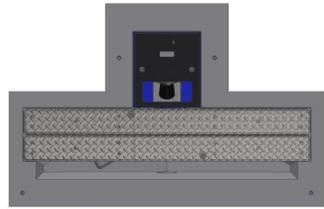
ARGUS Engine reports damage with:

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

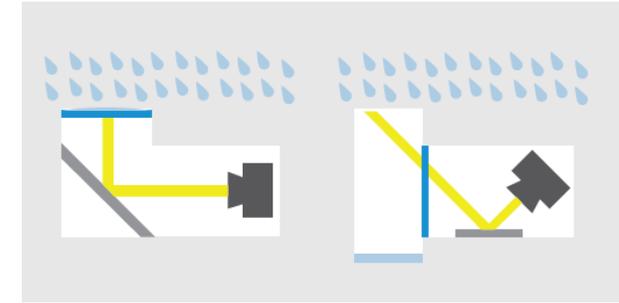


Under-Vehicle Scanner

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



Camco Under Vehicle Inspection





Rail portal in Germany



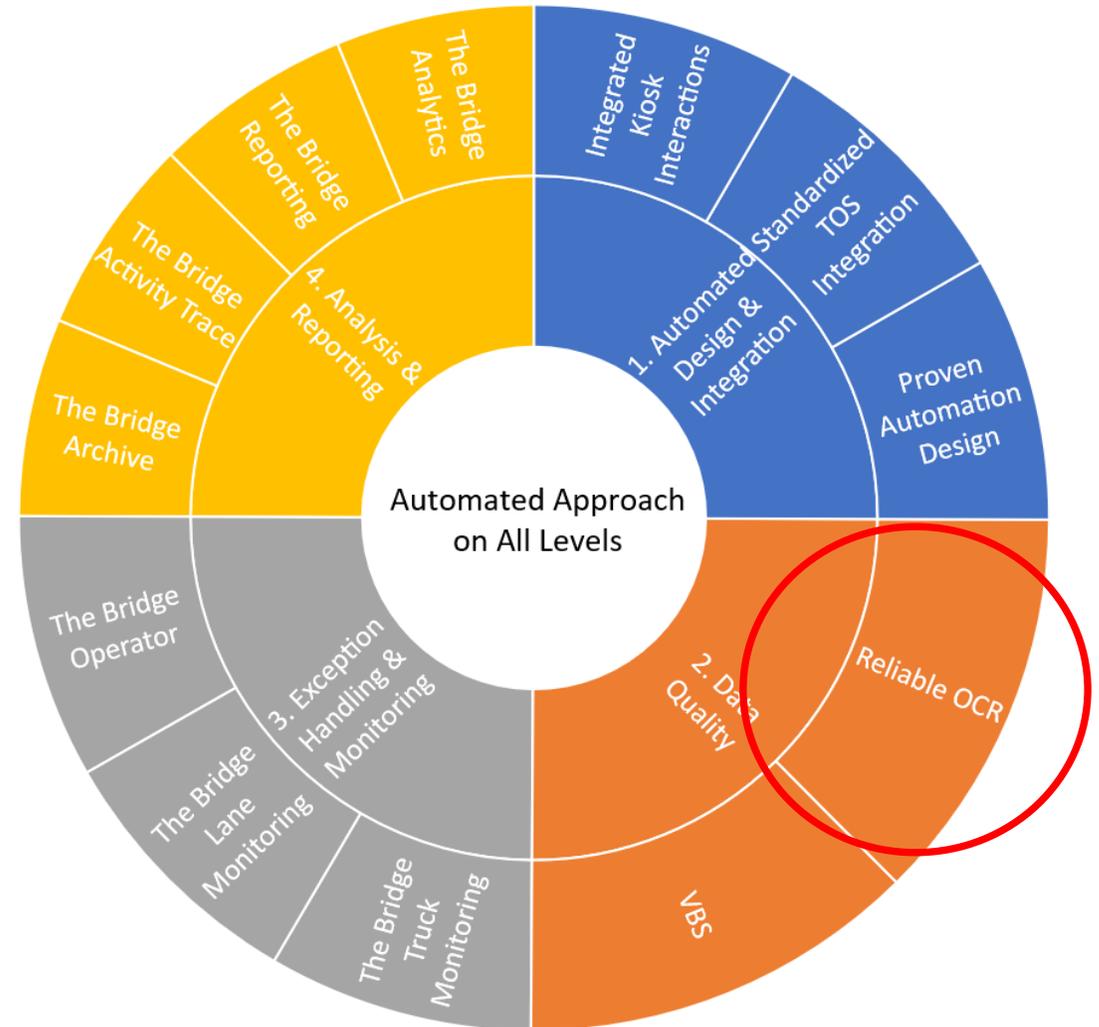
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Common mistake: automation ≠ OCR cameras

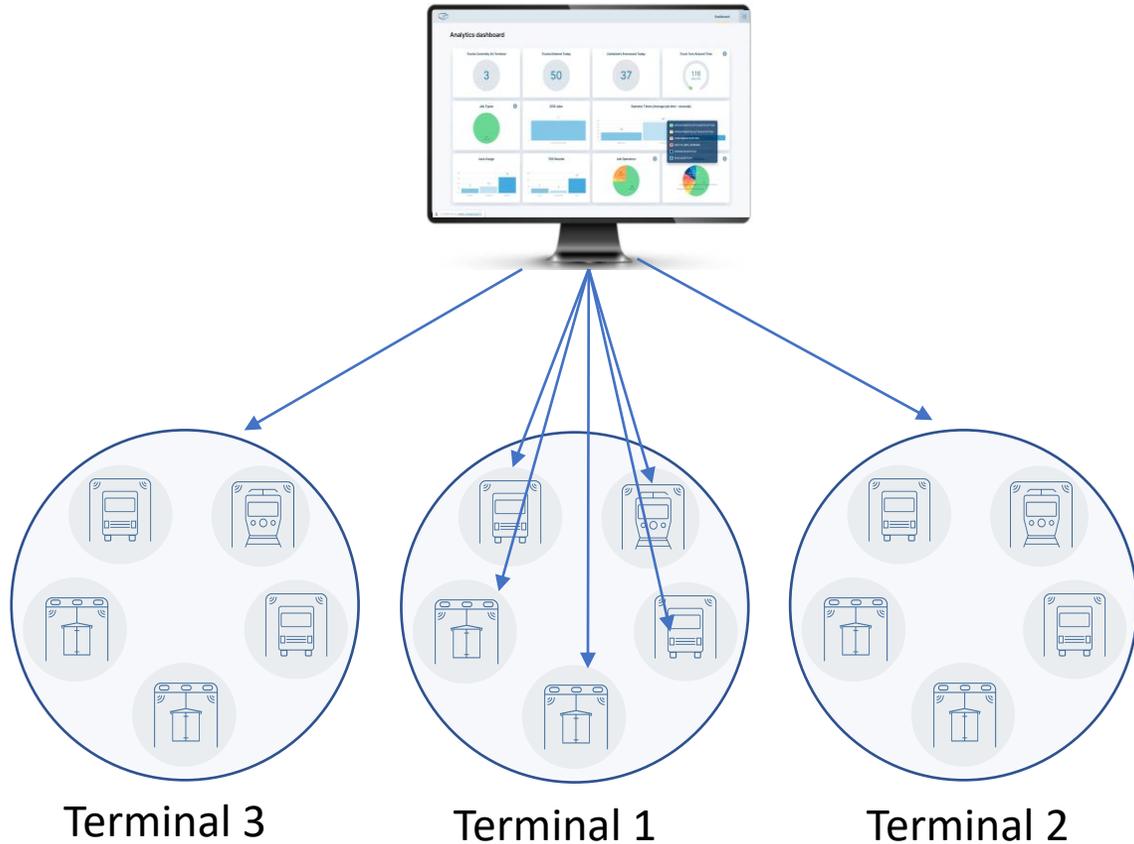
Automated approach on all levels

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



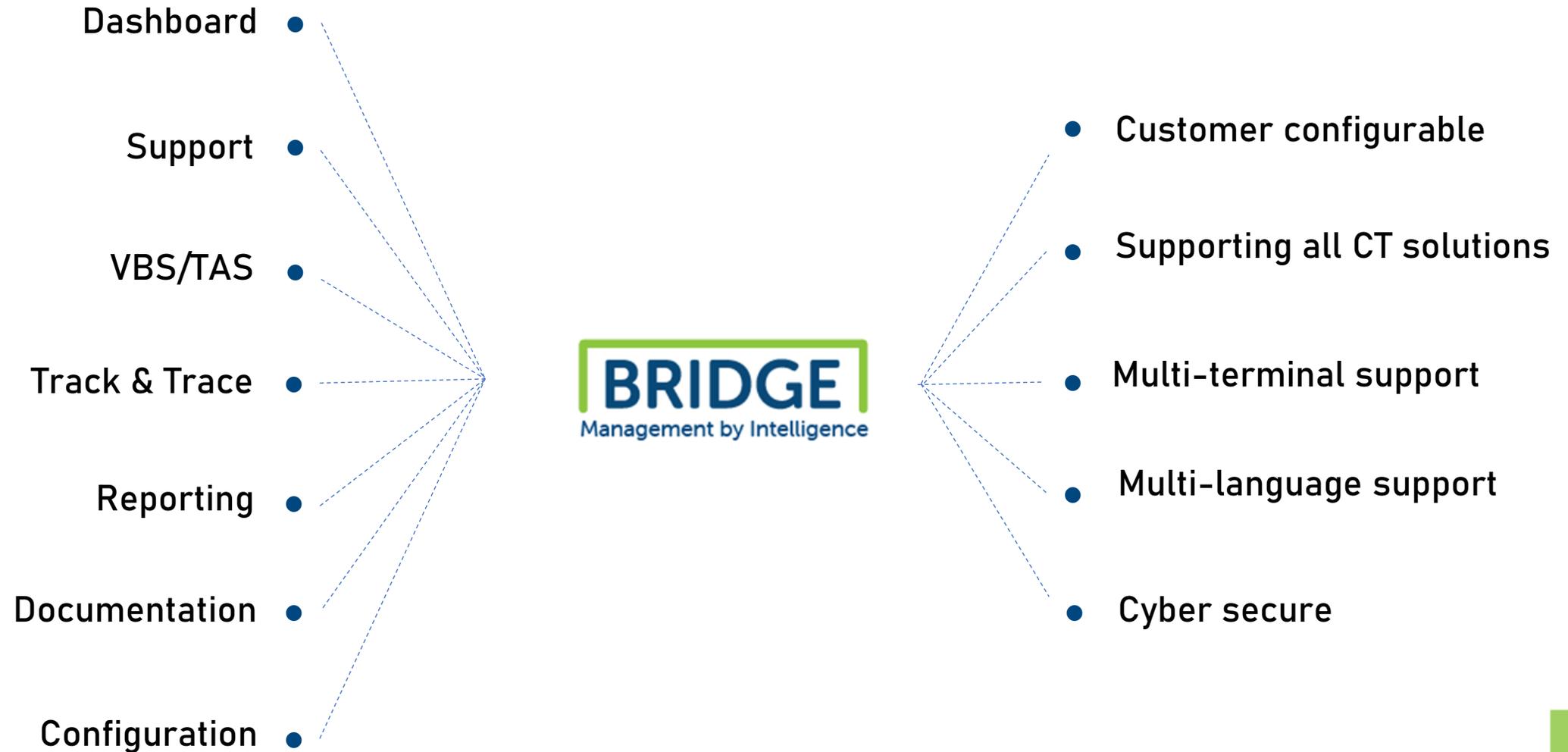
The Bridge : The all-in-one operator web-application





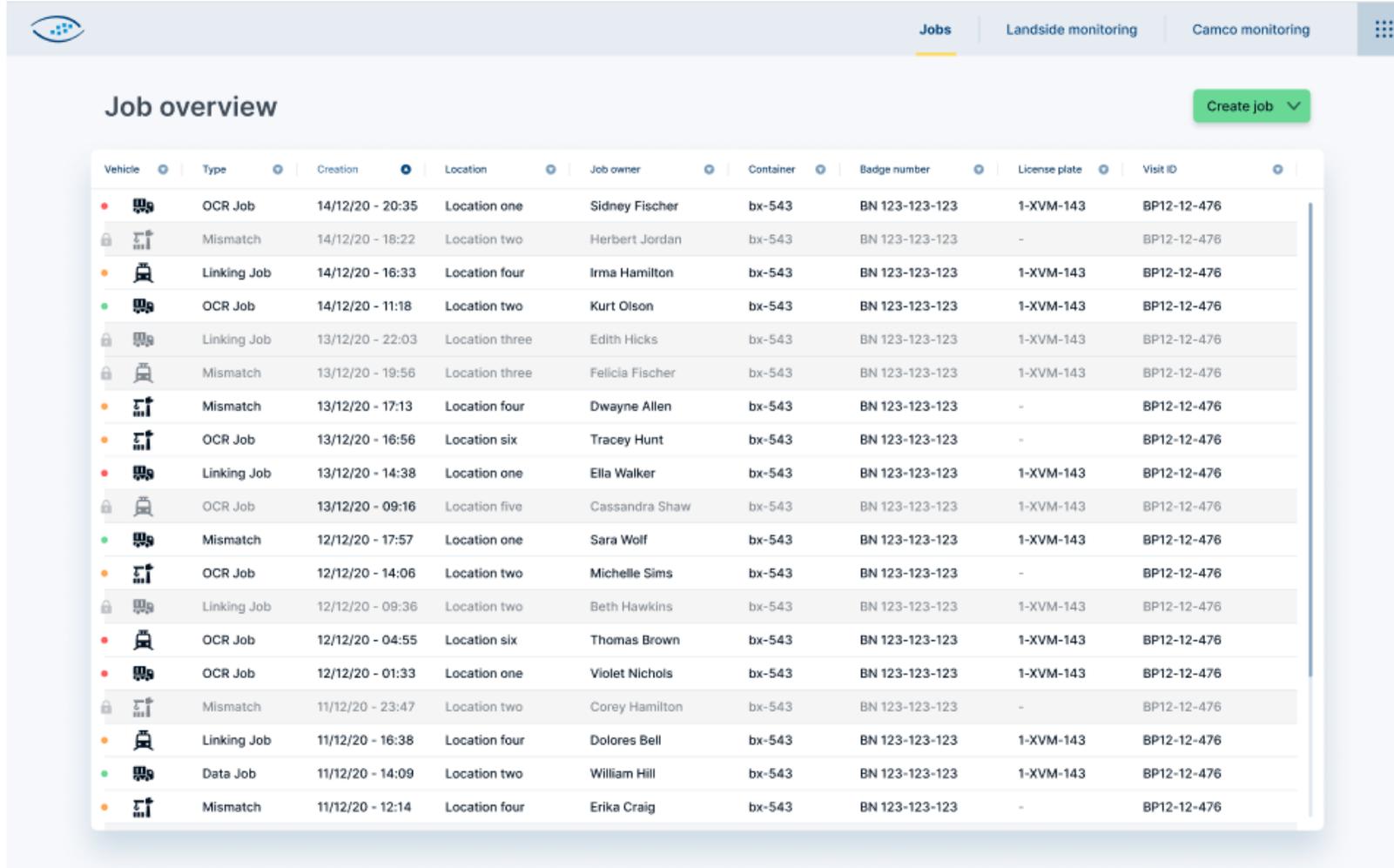
- **Multi terminal**
transparently control Camco's products across several terminals
- **Multi product**
*supports Camco's 4 main products (Gate/Crane/Rail /RTLS)
supports 3rd party products , Q1 2024*
- **Multi application**
supports all applications as exception workstation, configuration, reporting, dashboard

Web-based all-in-one Operation Workstation



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

The Bridge

Truck Gate operator


Jobs Landside monitoring Camco monitoring


CREATION	SUBJECT	LOCATION	CONTAINER	BADGE NUMBER	LICENSE PLATE	VISIT ID		
12/12/20 - 01:33	Truck visit	Location one	bx-543	BN 123-123-123	1-xvm-143	BP12-12-476	Cancel	Stage done 

Gate

Main gate: Ingate 

Truck details

Trucking company: YTIO Tusen terminals

TVA Ref Nr: 0005

Entry lane: 93

Truck license: 9G12345

All transactions

Transaction type: Receive empty

Ctr number: TTNU8341819

CTR Number requested: Missing

Booking number: Missing

Stage ID: Ingate

Next Stage ID: Yard

Status: OK 

 Delete transaction



Ingate transaction entry Remove transaction Submit transaction

<small>CONTAINER NUMBER</small> default label	<small>CONTAINER ACCESSORY NUMBER</small> default label	<small>TRUCK TARE (LB)</small> default label
<small>CONTAINER TYPE</small> default label 	<small>CHASSIS ACCESSORY NUMBER</small> default label	<small>CHASSIS TARE (LB)</small> default label
<small>LINE ID</small> default label 	<small>SEAL #1</small> default label	<small>GROSS WEIGHT (LBI)</small> default label
<small>LINE ID</small> default label 	<small>SEAL #1</small> default label	<small>GROSS WEIGHT (LBI)</small> default label

The Bridge

STS & RMGCAM operator

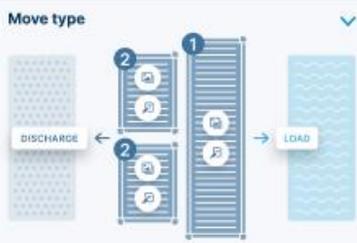
Operator hub - Crane OCR

Jobs Passage monitoring

CREATION	SUBJECT	LOCATION	CONTAINER	SADDE NUMBER	LICENSE PLATE	VISIT ID
12/12/20 - 01:33	Truck visit	Location one	bx-543	BN 123-123-123	1-xvm-143	BP12-12-476

Cancel Confirm job

Move type



OCR Data | Related containers

Container position 1

Container nr:

ISO Code nr:

Seal switch

Door / valve direction:

Bars:

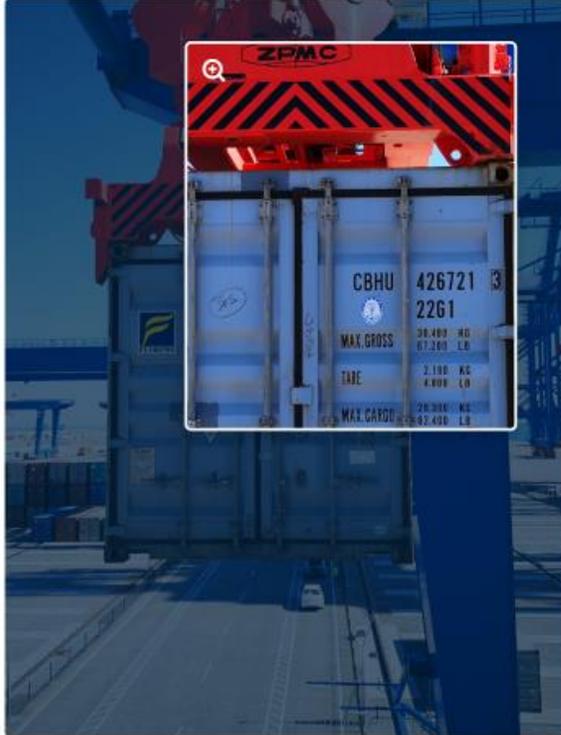
Bundle present

Slave 1:

ISO:

Slave 2:

ISO:



ZPMC

CBHU 426721 3

22G1

MAX GROSS 30 480 KG / 67 260 LB

TARE 2 100 KG / 4 600 LB

MAX CARGO 28 380 KG / 62 660 LB

 Left

 Right

 Left S1

 Right S1

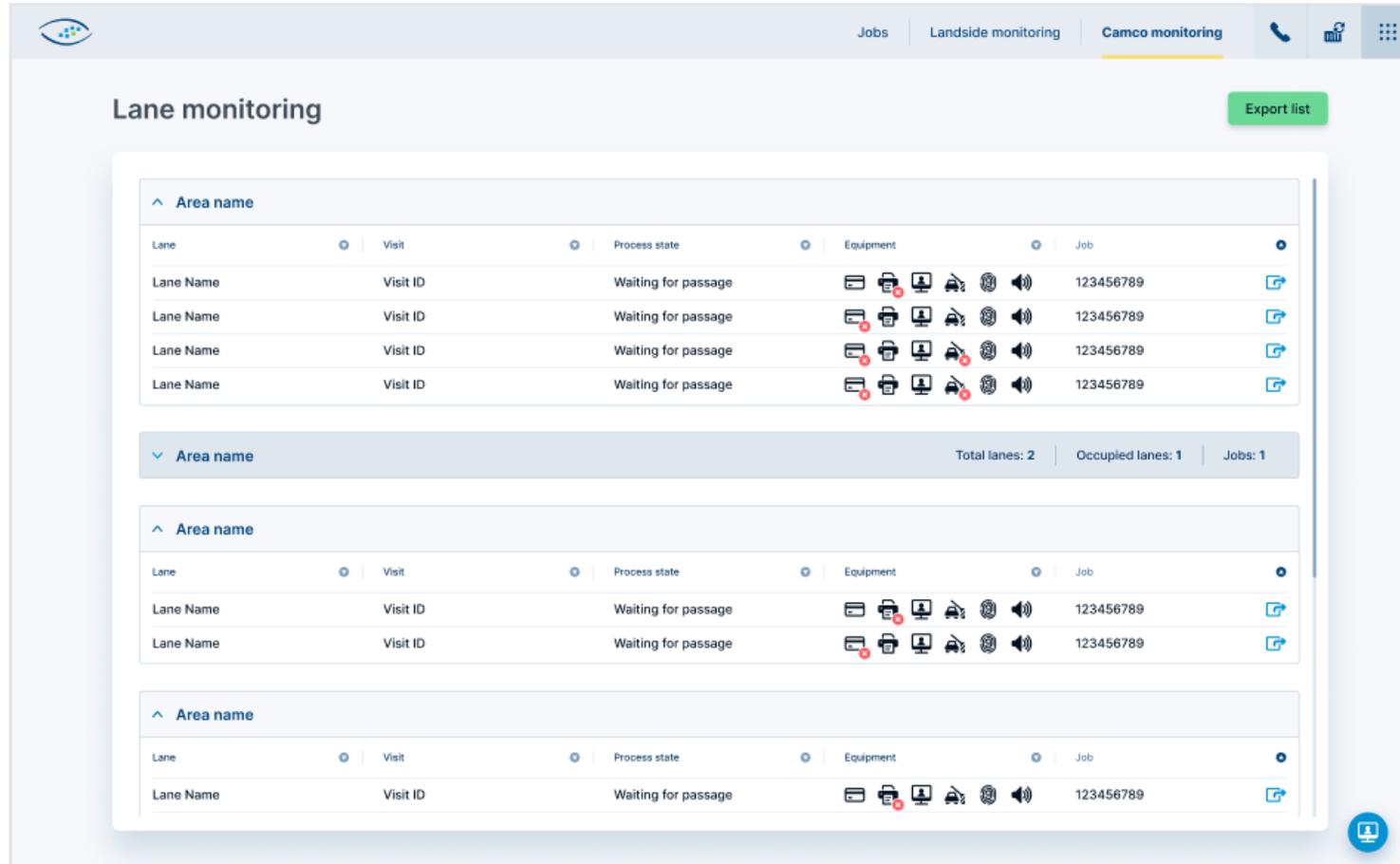
 Left S2

 Right S2

 Spreader path

The Bridge

Gate Lane equipment



The screenshot displays a 'Lane monitoring' dashboard. At the top, there is a navigation bar with tabs for 'Jobs', 'Landside monitoring', and 'Camco monitoring'. Below the navigation bar, the main content area is titled 'Lane monitoring' and features an 'Export list' button. The dashboard is organized into three sections, each with a collapse/expand arrow and the text 'Area name'. Each section contains a table with the following columns: Lane, Visit, Process state, Equipment, and Job. The first section shows four rows of data, the second shows two rows, and the third shows one row. The 'Process state' for all rows is 'Waiting for passage'. The 'Job' column contains the value '123456789'. The 'Equipment' column contains icons for various pieces of equipment. A summary bar between the second and third sections indicates 'Total lanes: 2', 'Occupied lanes: 1', and 'Jobs: 1'. A small blue icon is visible in the bottom right corner of the interface.

Lane	Visit	Process state	Equipment	Job
Lane Name	Visit ID	Waiting for passage	[Icons]	123456789
Lane Name	Visit ID	Waiting for passage	[Icons]	123456789
Lane Name	Visit ID	Waiting for passage	[Icons]	123456789
Lane Name	Visit ID	Waiting for passage	[Icons]	123456789

Lane	Visit	Process state	Equipment	Job
Lane Name	Visit ID	Waiting for passage	[Icons]	123456789
Lane Name	Visit ID	Waiting for passage	[Icons]	123456789

Lane	Visit	Process state	Equipment	Job
Lane Name	Visit ID	Waiting for passage	[Icons]	123456789

The Bridge

Yard cameras

Camera Control 2

Camera control

Search cameras

Cameras | Groups

- Camera name

Camera name Zoom level: 1x / 5x



Camera name Zoom level: 1x / 5x



Camera name Zoom level: 1x / 5x



Camera name Zoom level: 1x / 5x



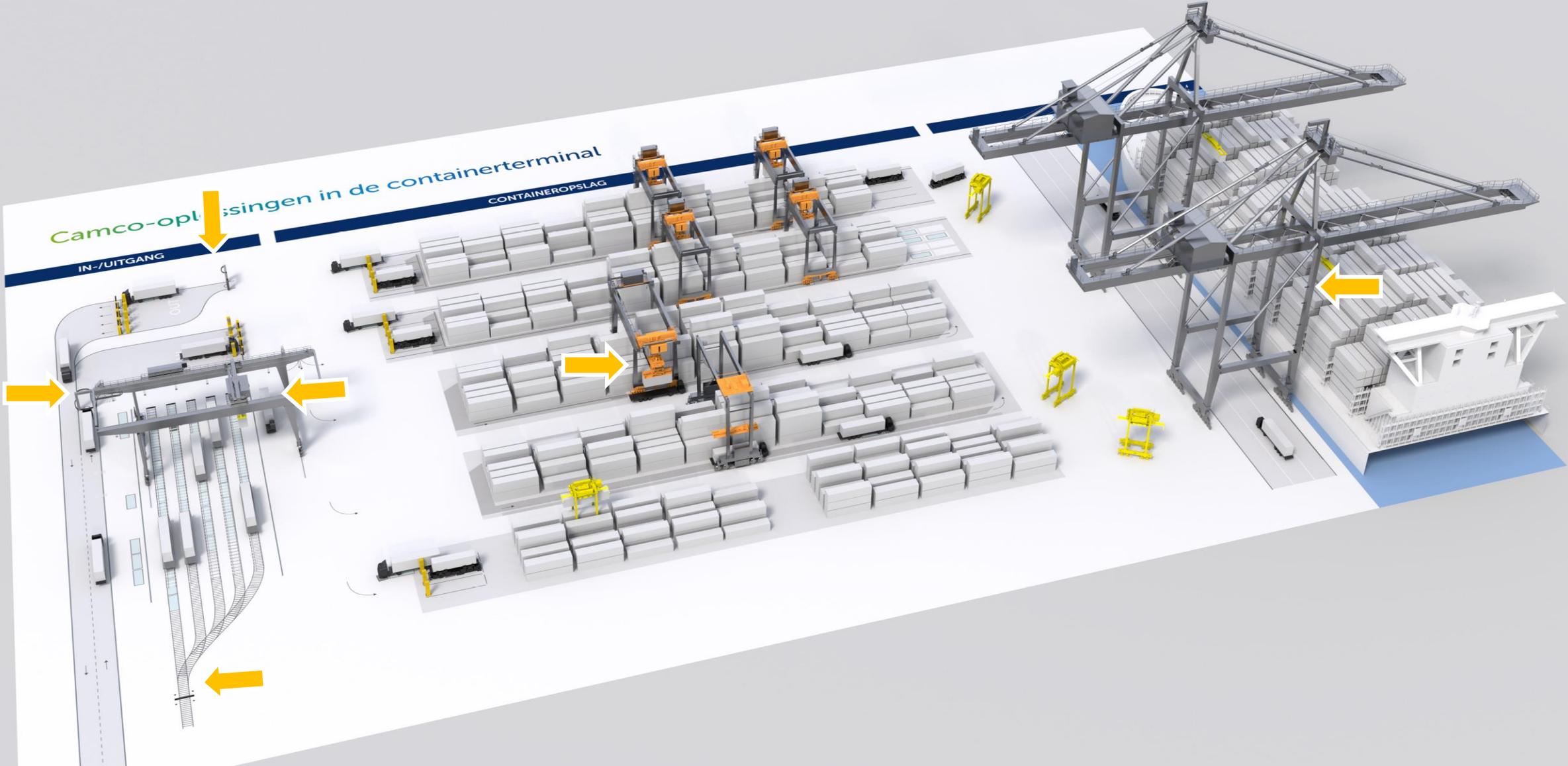
Actions

The Bridge

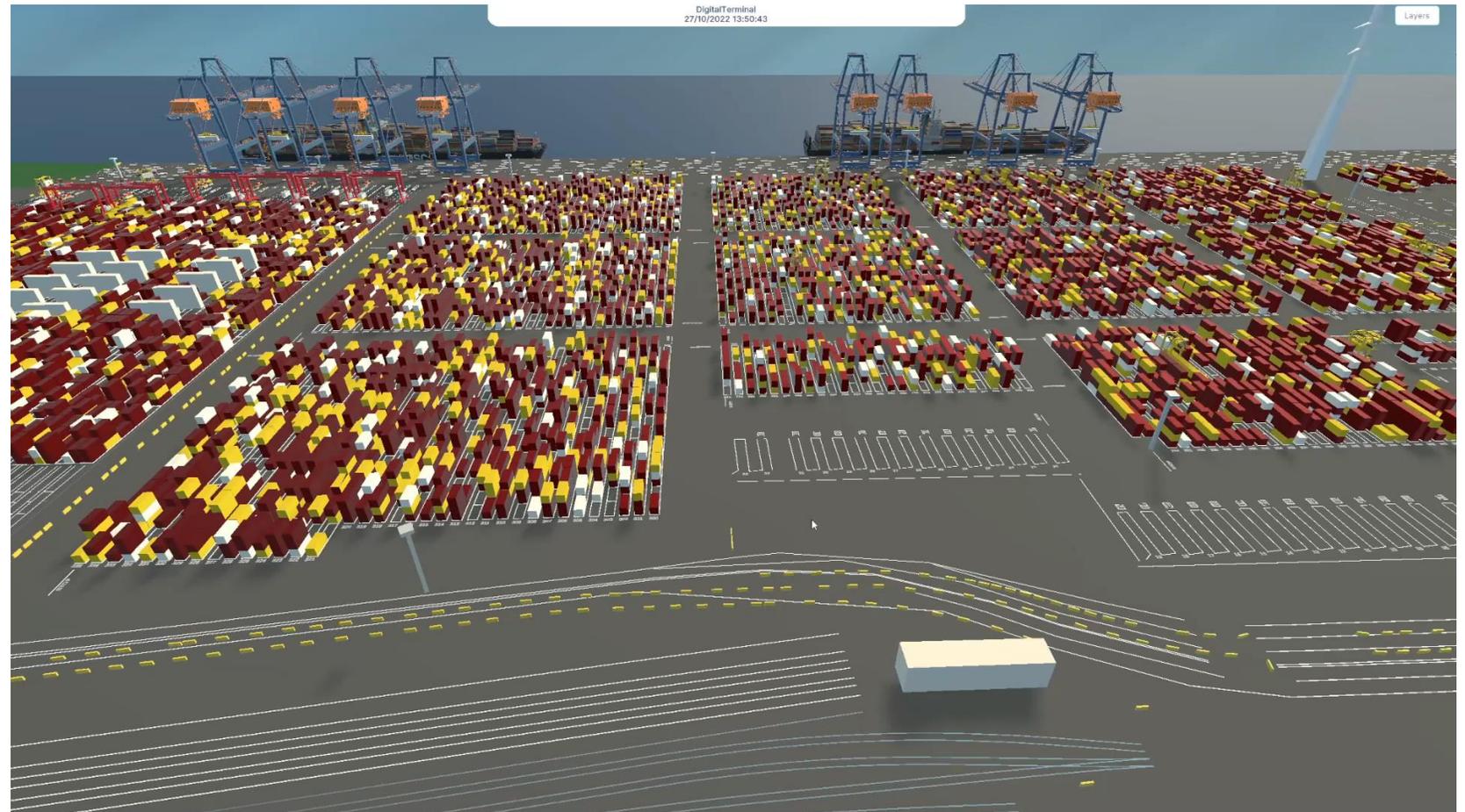
Realtime Analytics Dashboard



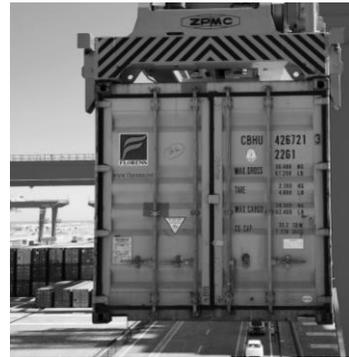
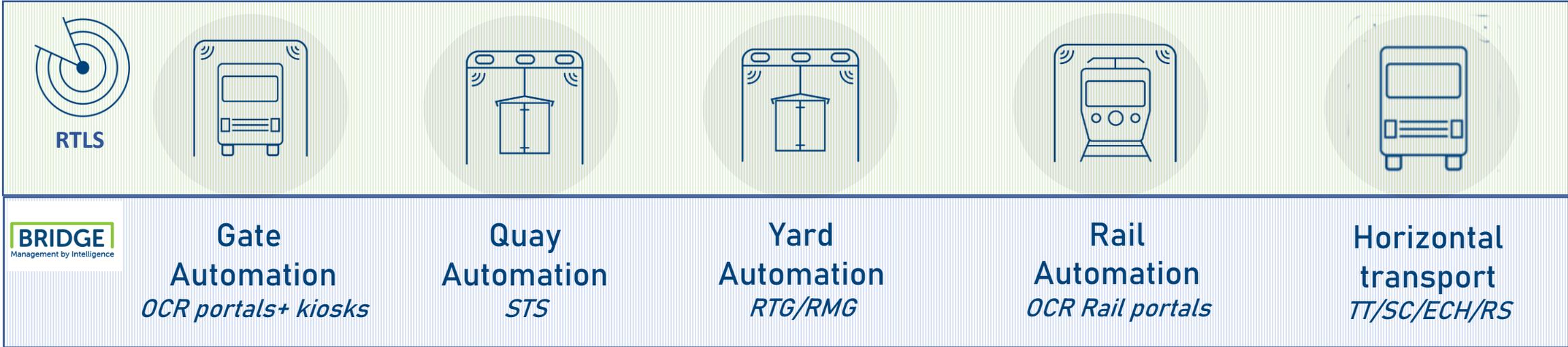
Vision & location technology-based solutions



Real Time Location



Identification + Real-Time Location = WYSIWYO



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

Real-Time Data Ressources



Systems	Source	Data
OCR Systems	<ul style="list-style-type: none"> Truck & Rail OCR portals STS/RTG/RMG OCR cameras 	<ul style="list-style-type: none"> Time stamps, log files Container (ID, ISO, Seal,..), truck id, wagon nمبر Container pictures + damage status
Yard IOT equipment	<ul style="list-style-type: none"> Gate & yard kiosks Barriers, RFID readers Scales 	<ul style="list-style-type: none"> Time stamps, log files, VoIP logging Driver name, truck id, RFID numbers Kiosk processes
Location technology	<ul style="list-style-type: none"> TT's/Straddle/Shuttle STS, RTG, RMG, EH, RCH 	<ul style="list-style-type: none"> Exact location on the terminal Job promotion (via VMT) Truck status, Alignment data
Telematic data	<ul style="list-style-type: none"> TT's/Straddle/Shuttle STS, RTG, RMG, EH, RCH 	<ul style="list-style-type: none"> Tire pressure, engine hours Oil/engine temperature Max speed, battery level, fuel level
TOS	<ul style="list-style-type: none"> TOS VBS 	<ul style="list-style-type: none"> 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)

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

TWIN BRIDGE
Management by Digital Twin



Location technology



RTLS is built on 3 location technologies:



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



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



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



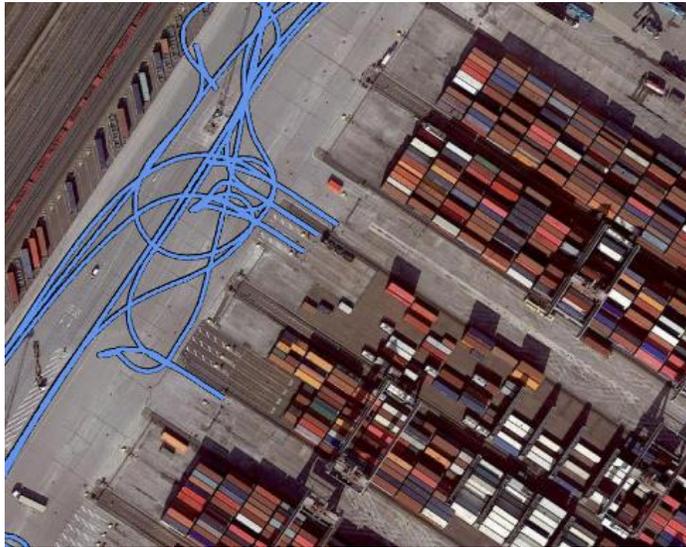
Location Method: GNSS



Problems

- GNSS quality drops under STS cranes

Normal GNSS quality



Disturbed GNSS under STS



Disturbed GNSS under STS





Thank you!



CAMCO
TECHNOLOGIES