



Mediterranean Ports and Shipping, Portoroz, Slovenia, 26 of May 2022

Automation and Digitalization of Crane Operation

SIMOCRANE Solutions Strategy and offering



Zero Harm

Increase of **Safety** and productivity by higher safety level

Certified and state of the art **Cyber Security** solutions for all levels of the automation



Cost Savings

Integration & Standardization & Usability allow reduction of hardware costs and shorter commissioning time

Energy saving & CO2 footprint reduction by ECO solutions



Faster Execution & Optimized Logistics

Logistic Simulation allows an early optimization of performance and material flow control

Crane Simulation shortens the design and development time



Higher Availability

Digital Services empower reduction of down times

Predictive maintenance reduces the probability of down times



Performance

Cutting-Edge technologies empower new business models and automation applications

The usage of advanced **Artificial Intelligence** technology leads to high performance pattern recognition systems

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SIMOCRANE

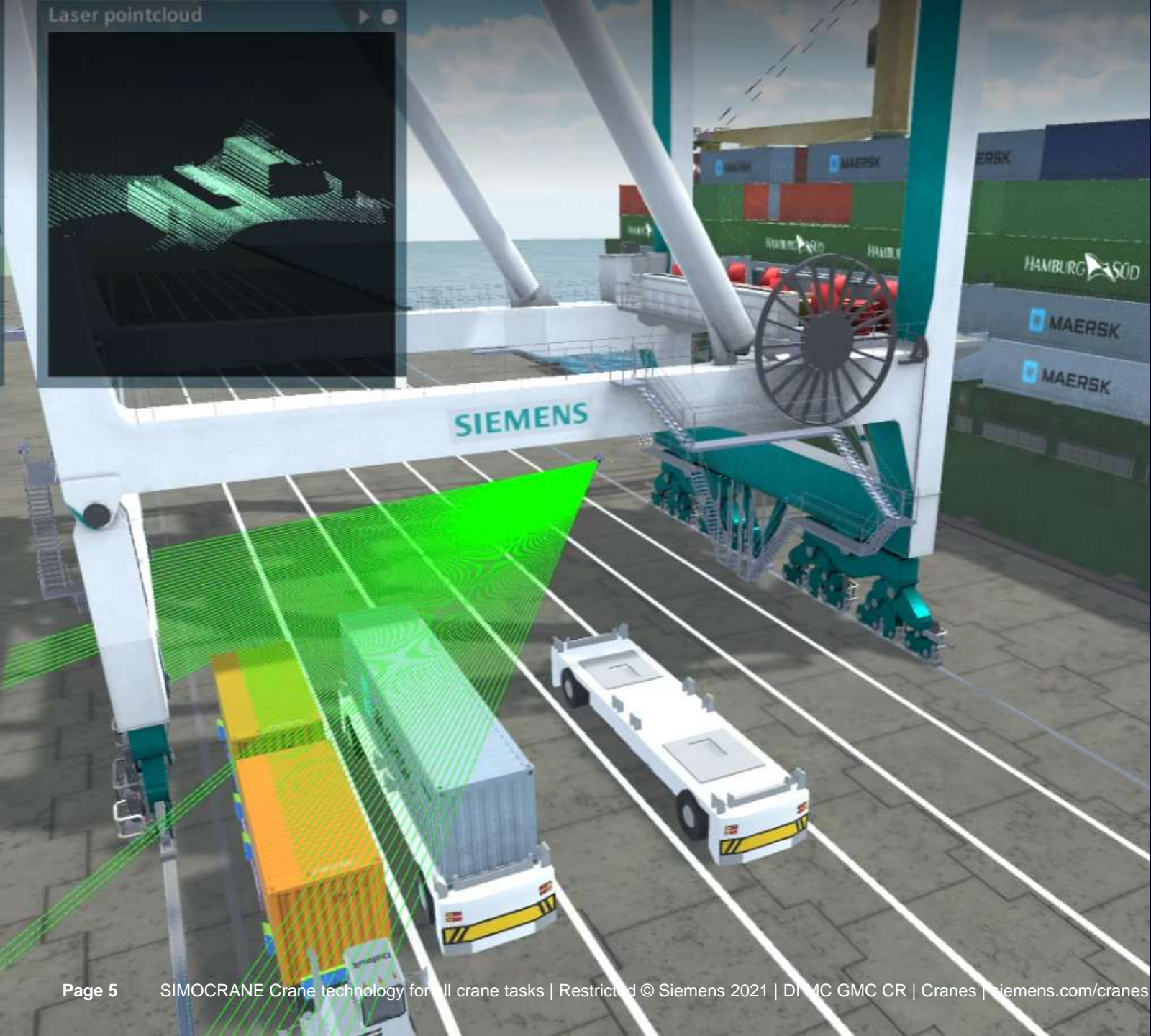
Strategy and offering

Safety

- Increase the safety level of crane applications
- Increase productivity by higher safety level
- Sensor systems help with target control, positioning and collision prevention

Zero Harm





Truck Positioning System

Flexible

Trailer handling

Streamlined

Commissioning parameterization

New

Model creator

Redesigned

Lean PLC Interface

Customer benefit

due to enhanced functionalities

SIMOCRANE Cyber Security IEC 62443-2

Zero Harm

- Secure Solutions
- Patch Management
- Incident Handling



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Integration & Standardization

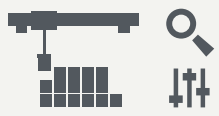
Fully Modular Automation Solution for Terminals



Logistics Control



**Equipment Logistics System
Warehouse Management System**









Full Automation

SIMOCRANE subsystem functions

Sway control		Stack positioning	
Skew control		Stack profiling	
Truck positioning		Container No. Recognition	
Remote control		Auto landing	
Ship profiling		Optimum path	
Crane Management		Collision prevention	



Basic Technology

-  **Hoist**
-  **Grab**
-  **Trolley**
-  **Gantry**
-  **Slew**
-  **Boom**

Integration & Standardization

Shared Sensor Concept

Load Collision Prevention System



- Collision prevention between spreader and containers on the vessel
- Adjacent object detection: overlapping containers, catwalks, ship cranes, etc
- Soft landing
- Load position measurement

Final Landing System



- Accurate stacking
- Improve performance and productivity
- Accurate landings
- Cost-saving with FLS in remote operations.

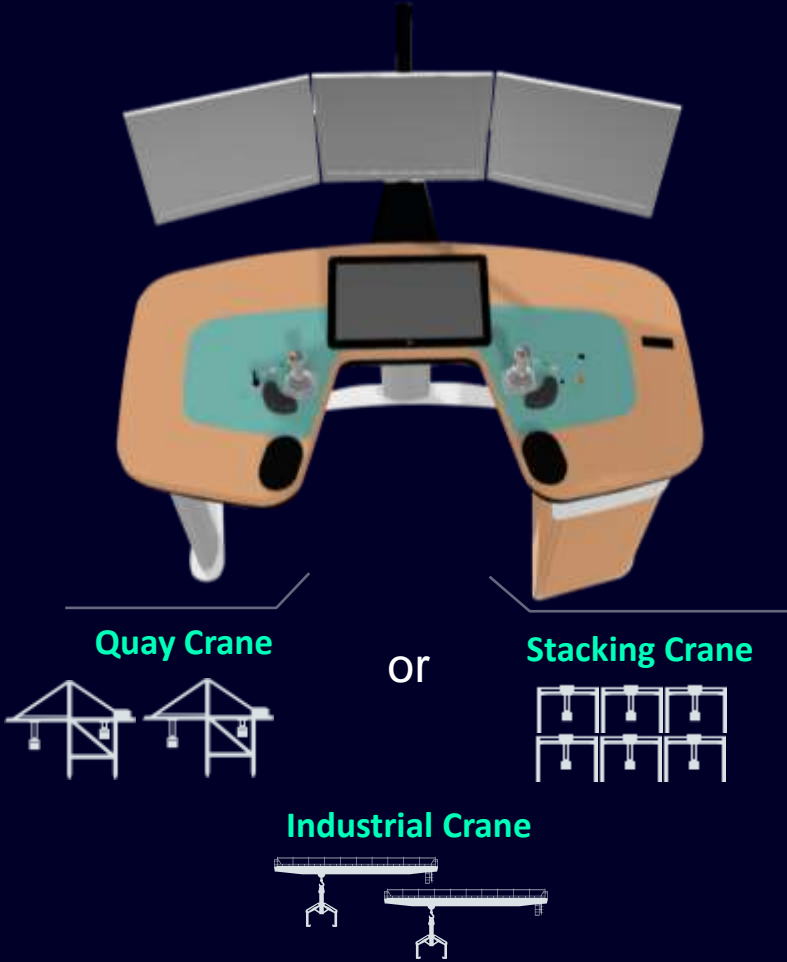
Truck Positioning System



- Using the traffic light, truck drivers are precisely navigated to the target position
- An intelligent, laser technology-based measuring system detects the position of containers and means of transport for highly precise positioning applications.

Same hardware used by various subsystems

Labor cost reduction and improved quality of life for crane operators with RCOS



“Any to any” operator connects to any crane from any desk.



“Pooling” connects crane to a free desk when assistance is needed

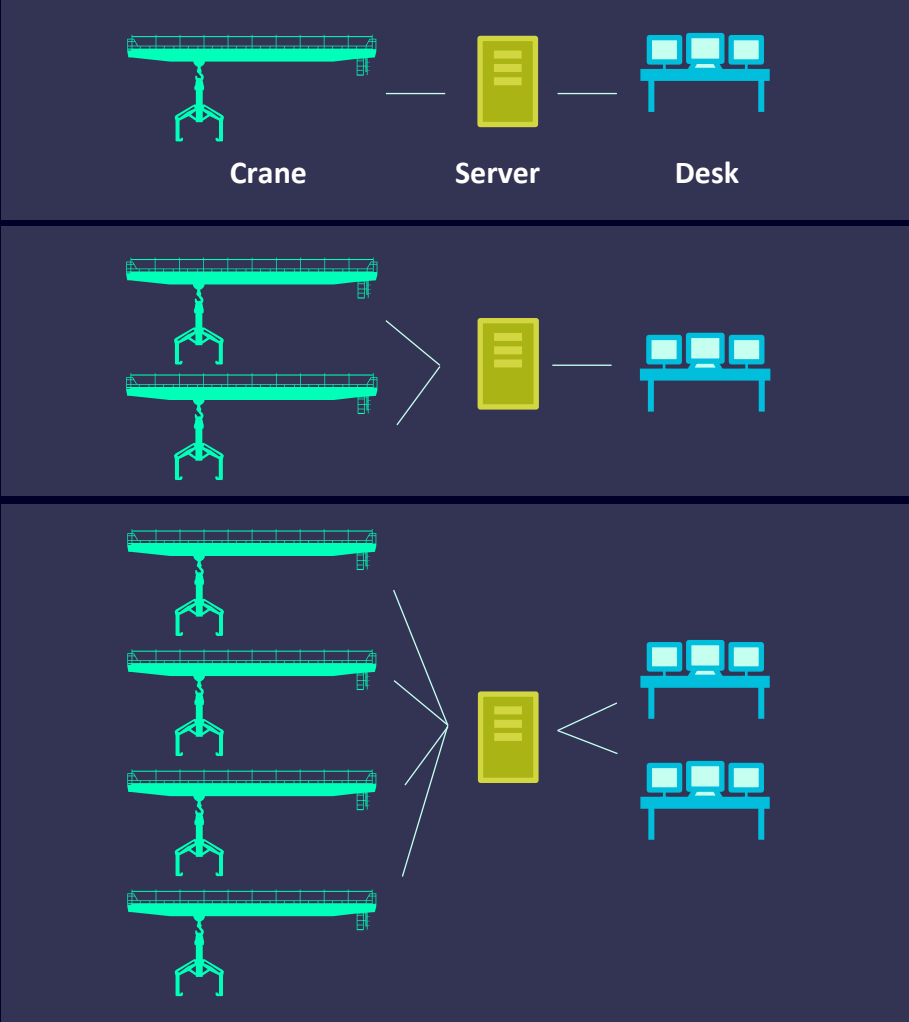


“Decentral Concept”
Decentral PLC software

- Redundant Server Pair
- No single point of failure



“Integration & Interfacing” can be applied to non-Siemens PLC’s, offers interfacing with TOS



Energy Storage System Management (ESSM)

Reduced emission, high efficiency – DC infeed for mobile harbor cranes and ERTG

Features

- ALM infeed functionality (regulated DC link, regeneration mode)
- Peak shaving
- Manual charging/discharging
- Local GUI (HMI) with user management
- Sinamics DCP - compact buck & boost converter with 15kHz pulse frequency direct battery connection
- Up to 480kW nominal infeed power

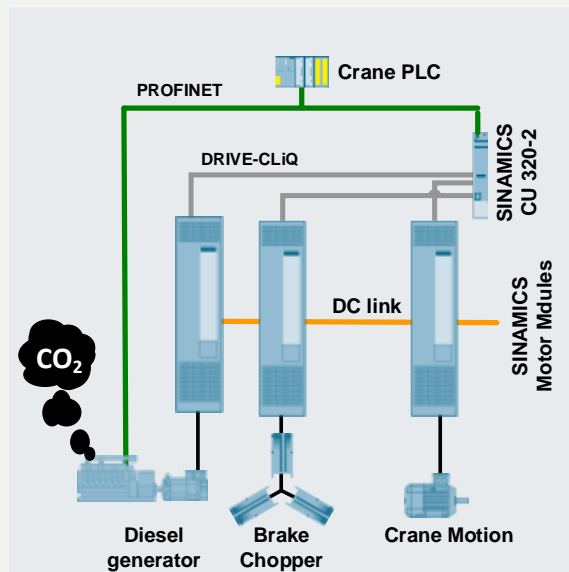
Benefits

- Reduced energy consumption & CO₂-Emission
- One supplier for the drive system
- Standardized, modular & scalable solution
- Highest possible battery utilization
- High flexible power management

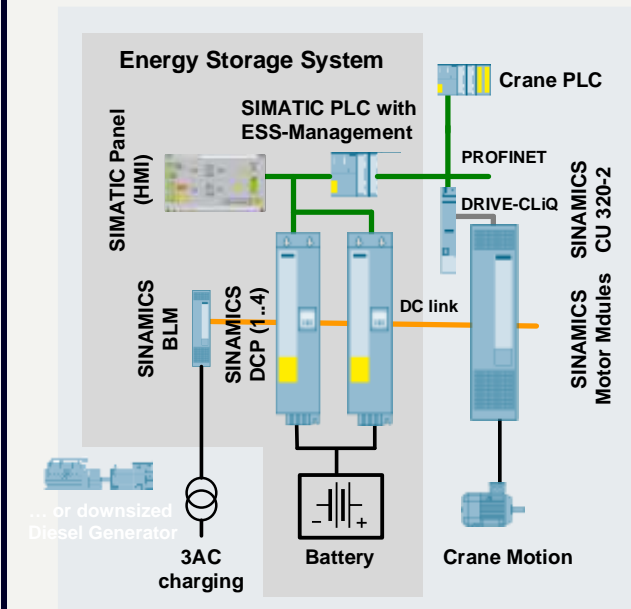
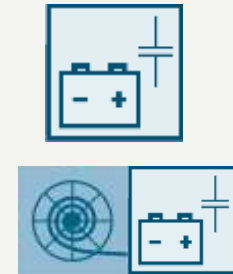
Status

- Successful pilot commission 09/2021

Conventional solution



ESSM based solution



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Sales Simulator

Unleashing the power of a fully virtual environment

The Sales Simulator:

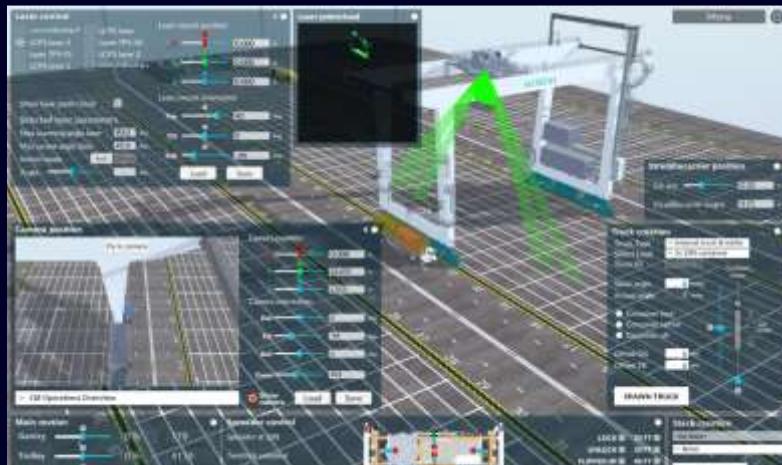
- directly executable on office notebooks
- includes holistic model of cameras, lasers, trucks, stacks, spreader controls
- allows to generate and discuss different scenarios ,Live' with end-customers
- can also be used in web meetings (runs stable)



Align and evaluate the project's outcome before commissioning.



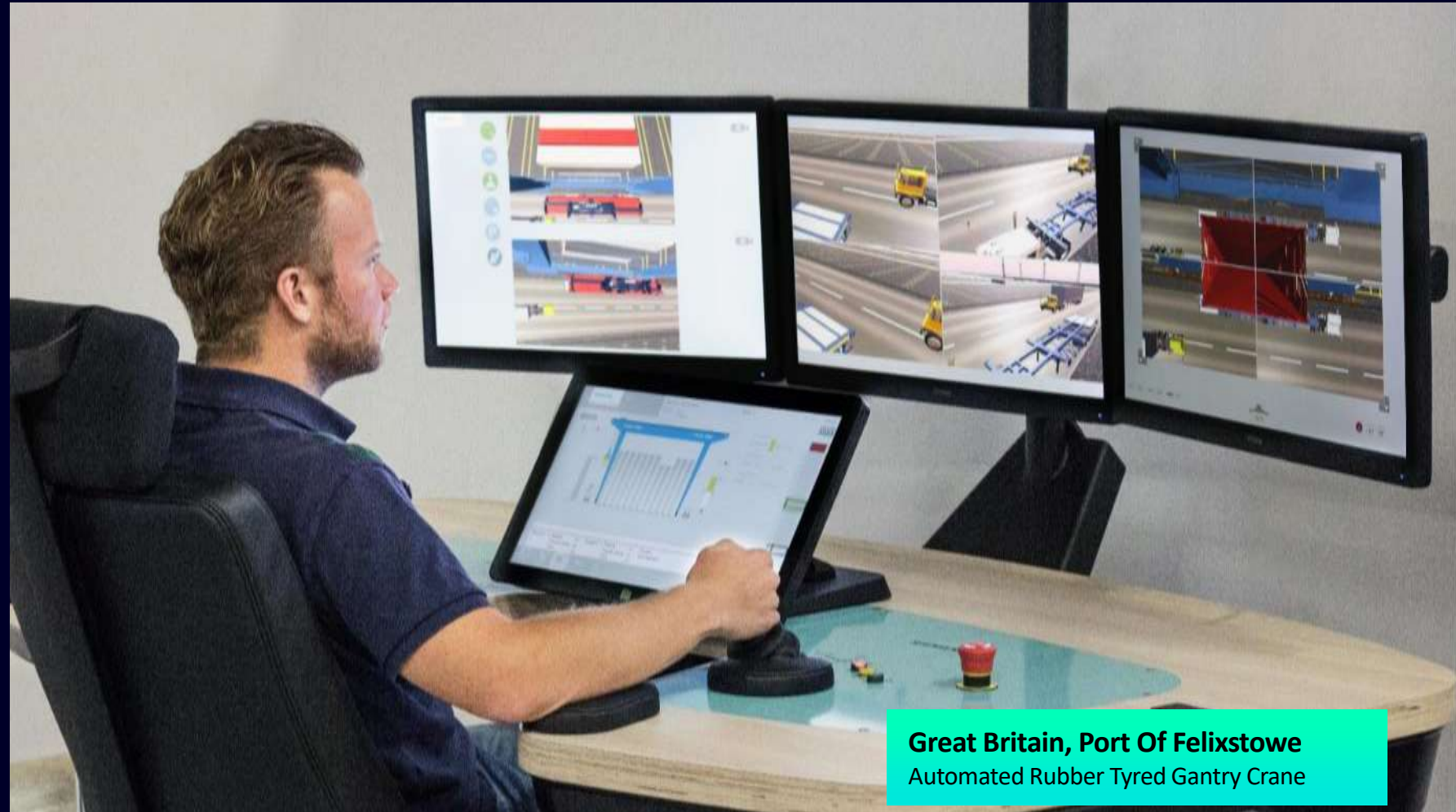
Benefit from first-time-right solutions.



Crane commissioning Operator Training Simulator

Training on digital twin

- STS, RTG and RMG training in a simulated environment ahead of plant start-up.
- SIMOCRANE RCOS, SIMOCRANE SIM



Great Britain, Port Of Felixstowe
Automated Rubber Tyred Gantry Crane

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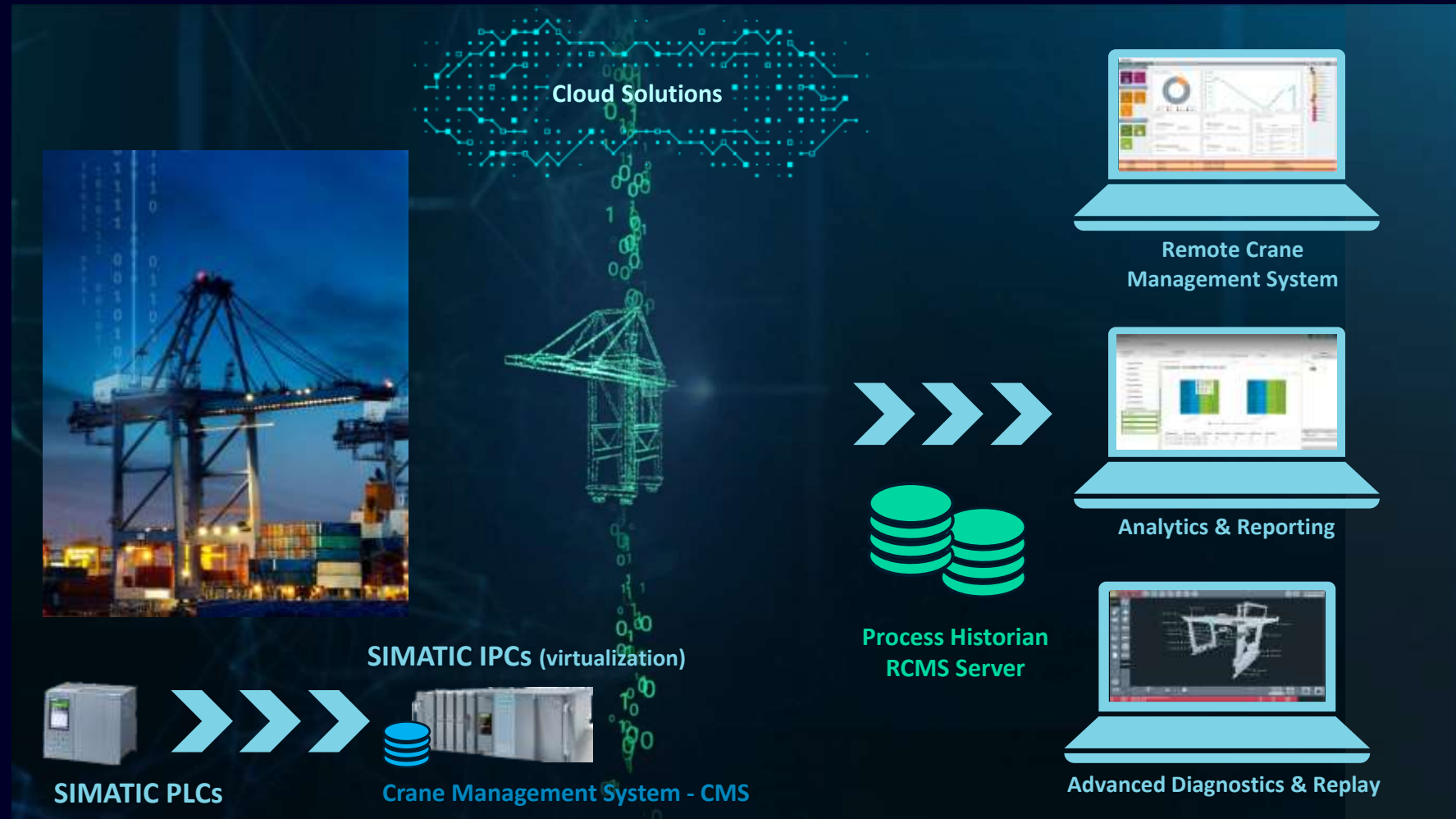
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Crane Management System Remote Monitoring & Diagnosis

Logging & analyzing subsystem operations

- Centralized logging framework developed for Crane Subsystems
- CMS: Crane diagnostics, preventive maintenance and crane performance
- RCMS: Share information, analytics & reports, manage crane KPI's



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SIMOCRANE Camera Based Solutions

Vision-Based Systems Toolbox

<p>Multi-Object Detection</p> 	<p>Object Character Recognition</p> 
<p>Object Tracking</p> 	<p>Segmentation</p> 
<p>Video Recording System</p>	<p>Logging</p>
<p>GUI</p>	<p>Monitoring</p>



Example: Container Handling

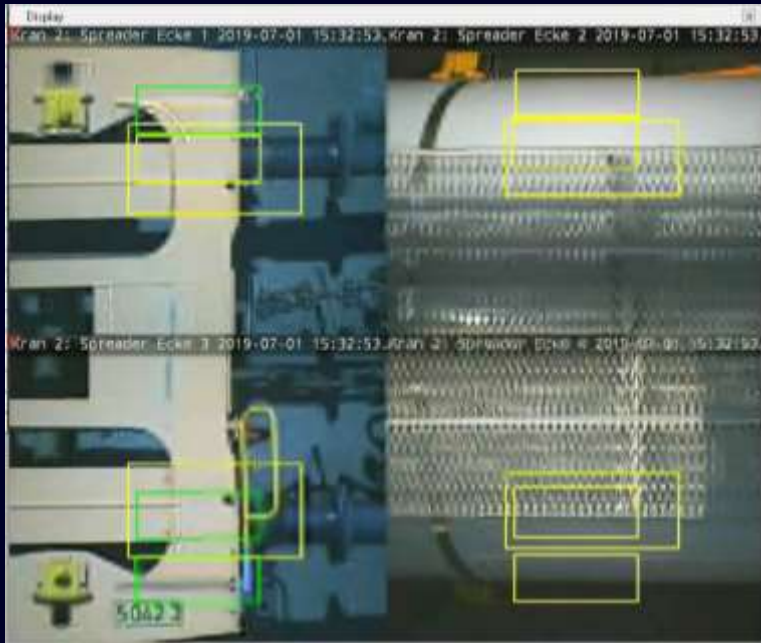
Final Landing System Camera (FLS-C)

Container Handling with Sensor System

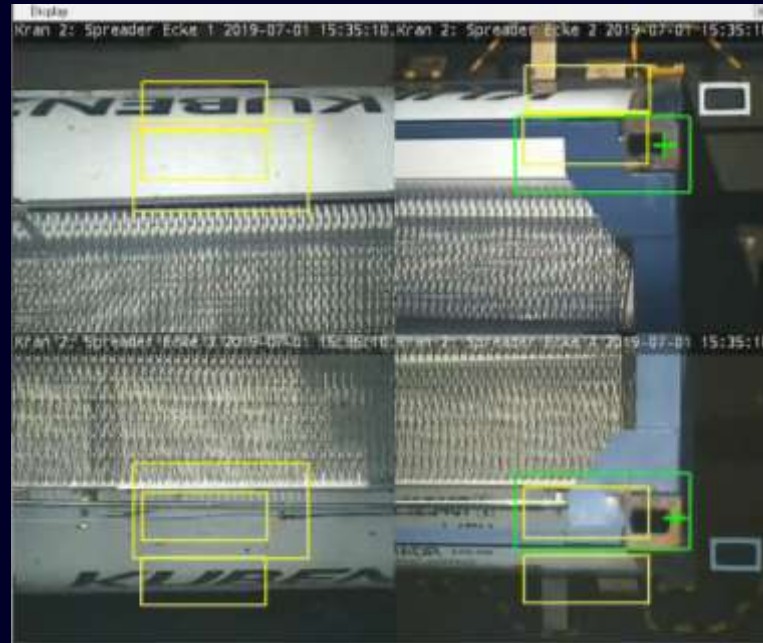


BASF

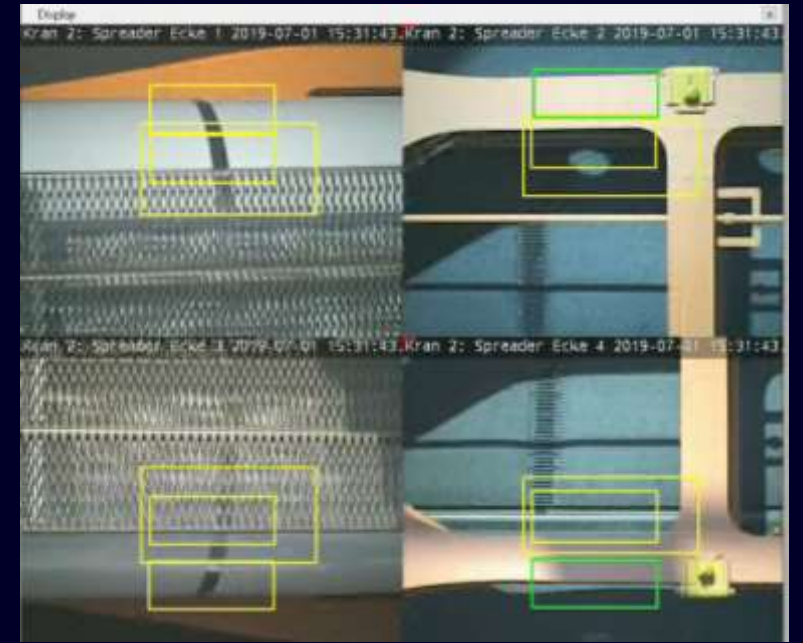
Buffer Detection



Corner Cast Detection

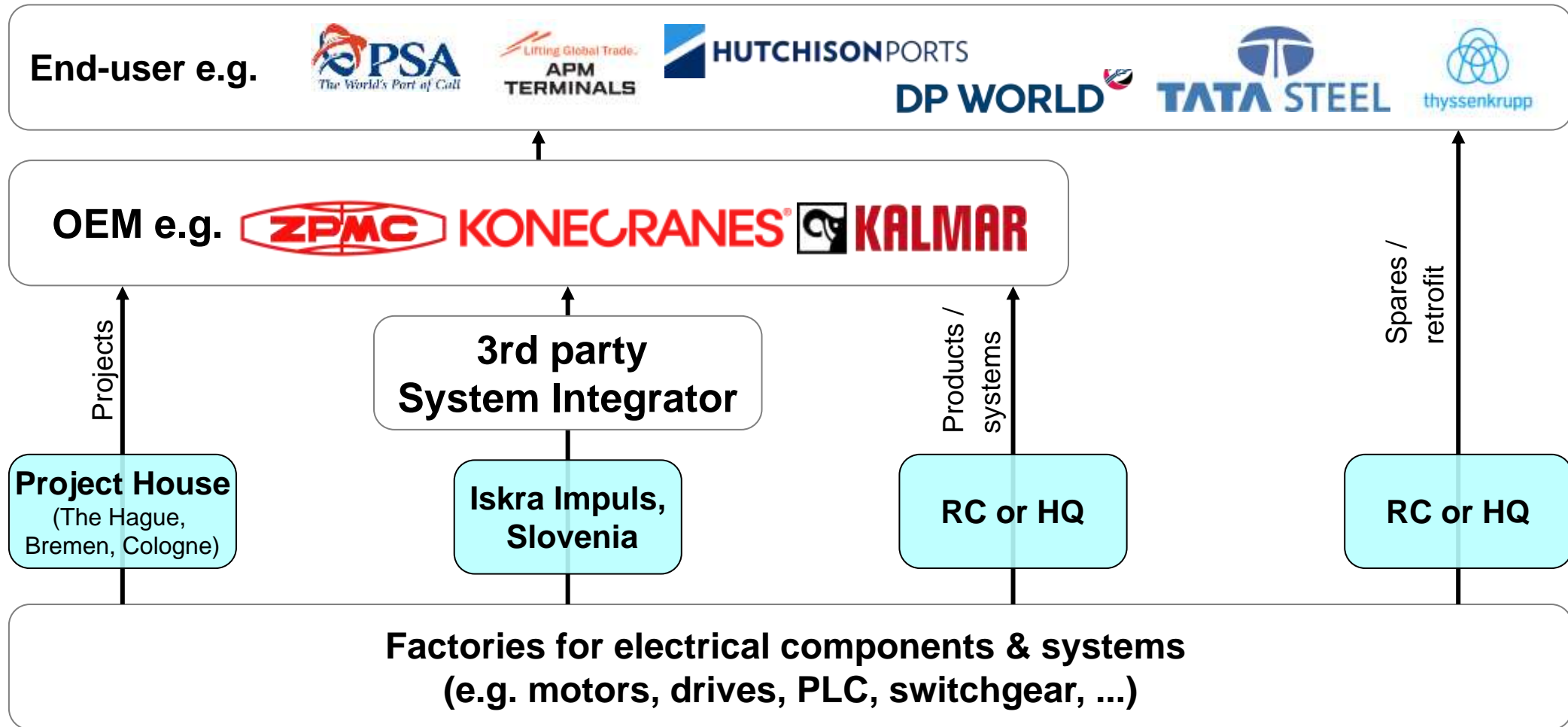


Pin Detection



**Artificial Intelligence empowers smart and robust solutions
with shorter time-to-market and reduced costs**

We serve all channels to the market with our diversified sales approach



RC: Regional company Siemens

| Contact

Alexey Zinovyev
Regional Manager
Siemens Cranes

E-mail alexej.sinowjew@siemens.com

