

# LIEBHERR

## Automation and Smart Port Technologies



**LIEBHERR**

# Content

## **-Operation**

Assistance Systems as an Enabler for Automation

## **-Maintenance and Fleet Management Systems**

Automated Maintenance

Intelligent Fleet Management & Automated Positioning

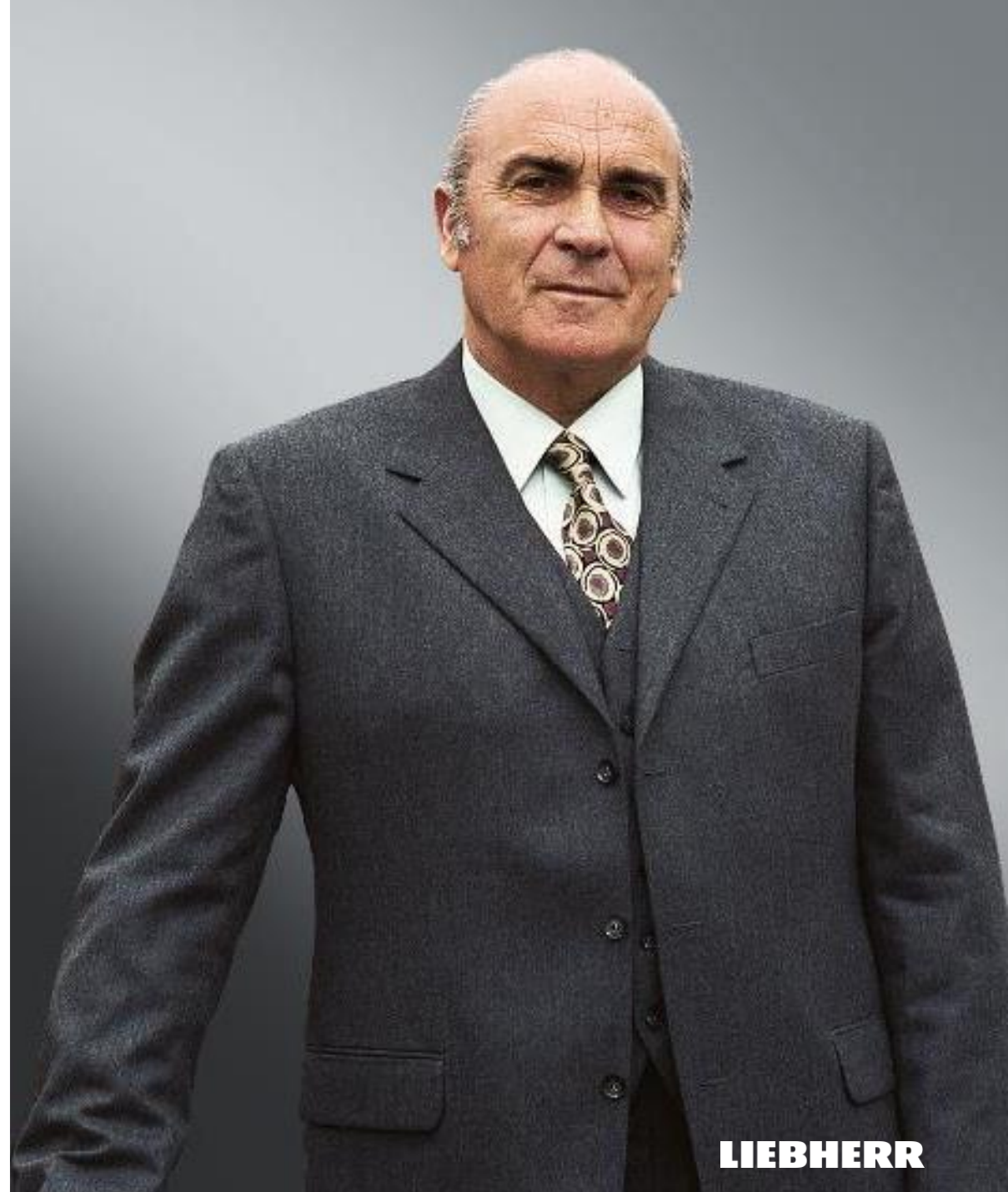
## **- Automation**

Liebherr Container Cranes

The Liebherr Group

## Liebherr – a family business

- Company founded in 1949 by Dr.-Ing. E.h. Hans Liebherr
- The Liebherr Group today:  
over 140 companies worldwide,  
51.321 employees and  
€ 12.598 million turnover (2022)
- Decentralised structure with straightforward,  
autonomous corporate units – divisional structure
- Holding company:  
Liebherr-International AG, Bulle/Switzerland



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The Liebherr Group

# Multifaceted product range



Earthmoving



Mining



Mobile Cranes



Tower Cranes



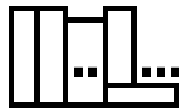
Concrete Technology



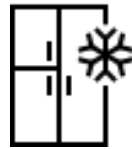
Maritime Cranes



Aerospace and  
Transportation  
Systems



Machine Tools and  
Automation  
Systems



Domestic  
Appliances



Components



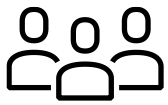
Hotels

# Production network

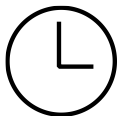
## Facts and figures



**1.33 B €**  
Turnover (2020)



**5,010**  
Employees (Jan 2022)



**2,110.000**  
Production hours (2022)



**43**  
Companies worldwide







Liebherr-MCCtec

# Liebherr Rostock

[Germany]

Foundation	2002
Total area	451.000 m <sup>2</sup>
Employees	1.828 <small>(Dez. 2022)</small>

## Fertigung

- Mobile harbour cranes
- Ship cranes
- Offshore cranes

Turnover 2022	500 M €
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# Operation



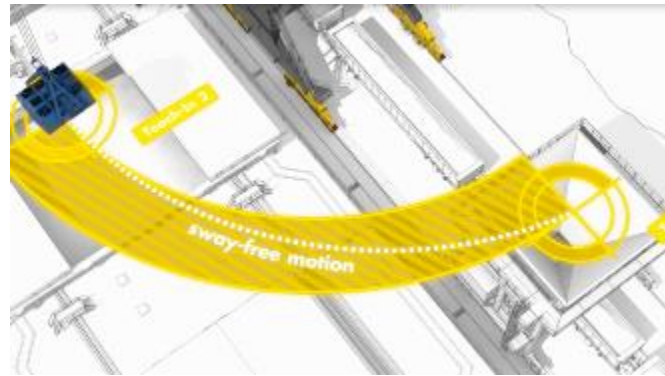
# Assistance Systems as an Enabler for Automation

Smart Grip



→ Intelligent Bulk Handling

Teach-In



→ Semi-Automatic Point  
to Point Control

Sycratronic



→ Automatic Tandem Lifting



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# SmartGrip®

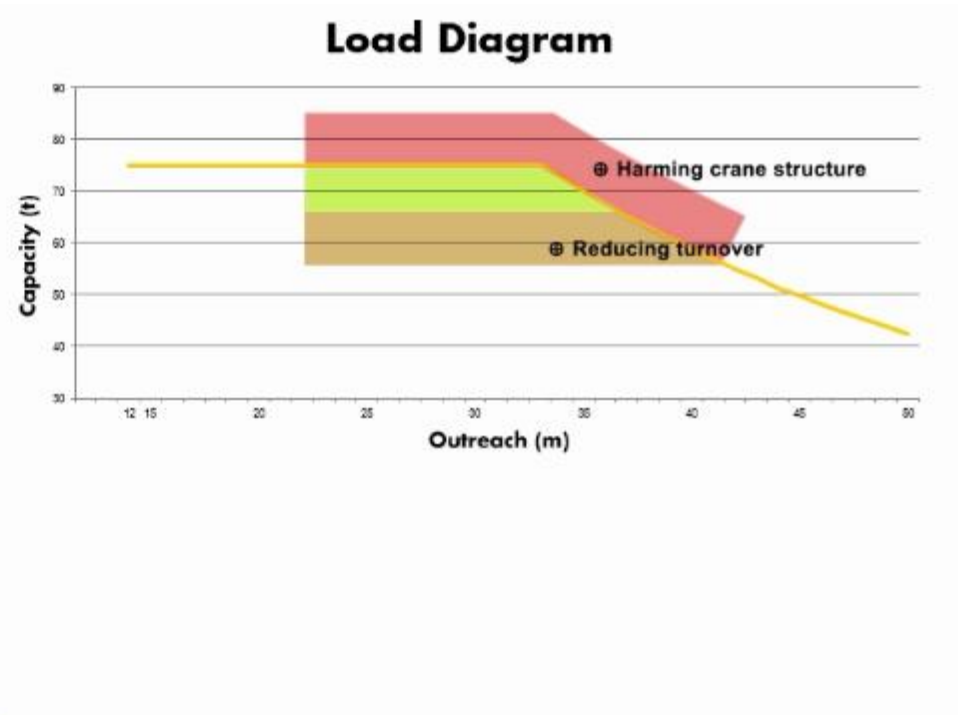
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Intelligent Grabbing  
Technology

# LIEBHERR



# Challenge

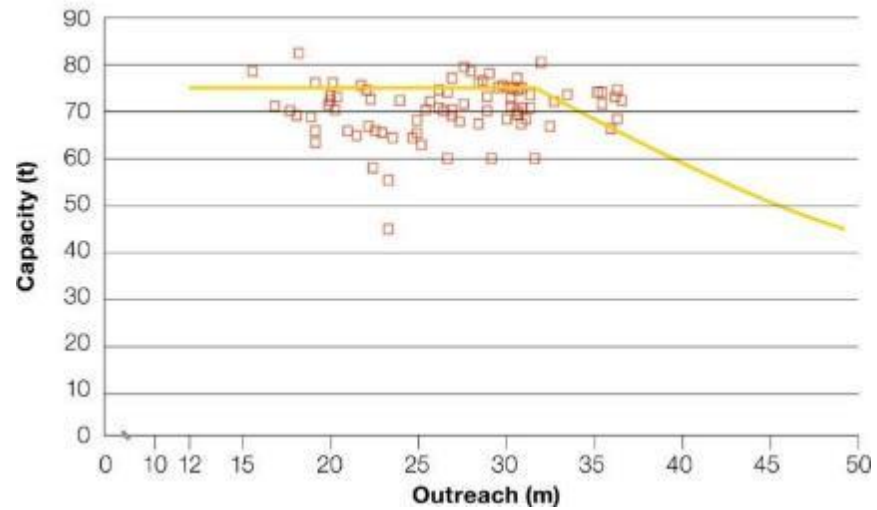


- **Grab is too small**
- High costs for multiple grabs
- Wasting fuel & time
- Average loss in turnover of 30%

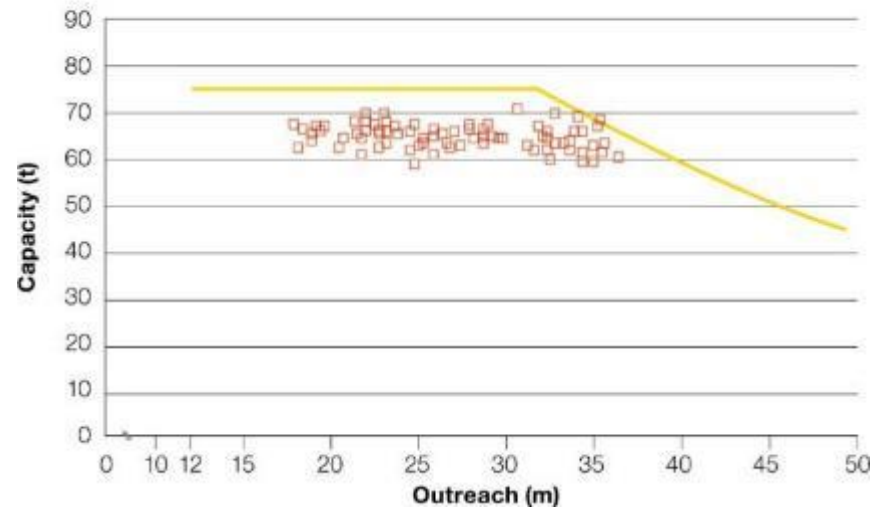
- **Grab is too big**
- Overloads: Harming crane structure
- Wasting fuel & time
- Stress for the crane driver Less Safety

# Technical Solution

Load Diagram without SmartGrip



Load Diagram with SmartGrip



Test and analysis in the field have shown an average grab filling rate of 70%. SmartGrip® utilizes the remaining 30%.

SmartGrip®

## Advantages

**01**

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Optimized filling rate & reduced cycle time

**02**

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Massive reduction of overloads

**03**

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One grab for different particle sizes

**04**

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Easy and stressless crane operation

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**Intelligent Grabbing**

**As an enabler for an  
automated, safe bulk  
operation**

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# Teach-In®

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Point to point control for  
bulk handling operation

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# Advantages

**01**

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Enhancement of turnover

**02**

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Exact load motion without any sway

**03**

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Simplified operation and reduced workload

**04**

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Enhanced safety and longer lifetime for lifting attachments

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## Safety

Highest protection  
for sensitive goods



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# Sycratronic®

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Automatically  
synchronized tandem lifts

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## Advantages

**01**

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Only one crane operator needed for control of two cranes

**02**

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More turnover and faster crane operation

**03**

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Increased safety

**04**

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No downratings necessary (= both cranes can be utilized at full lifting capacity)

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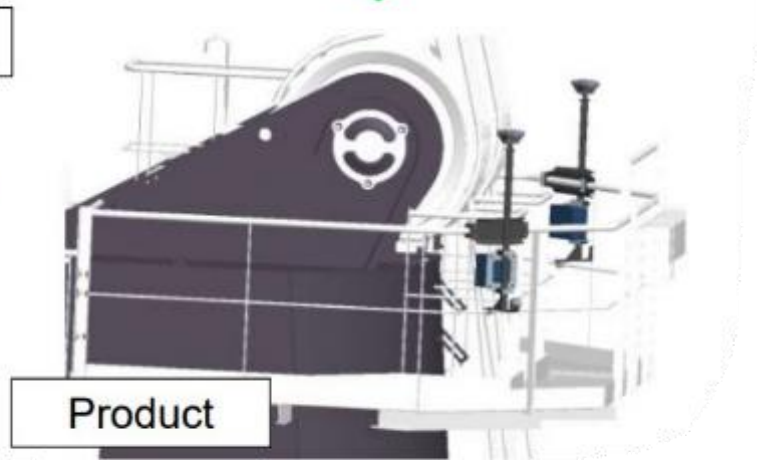
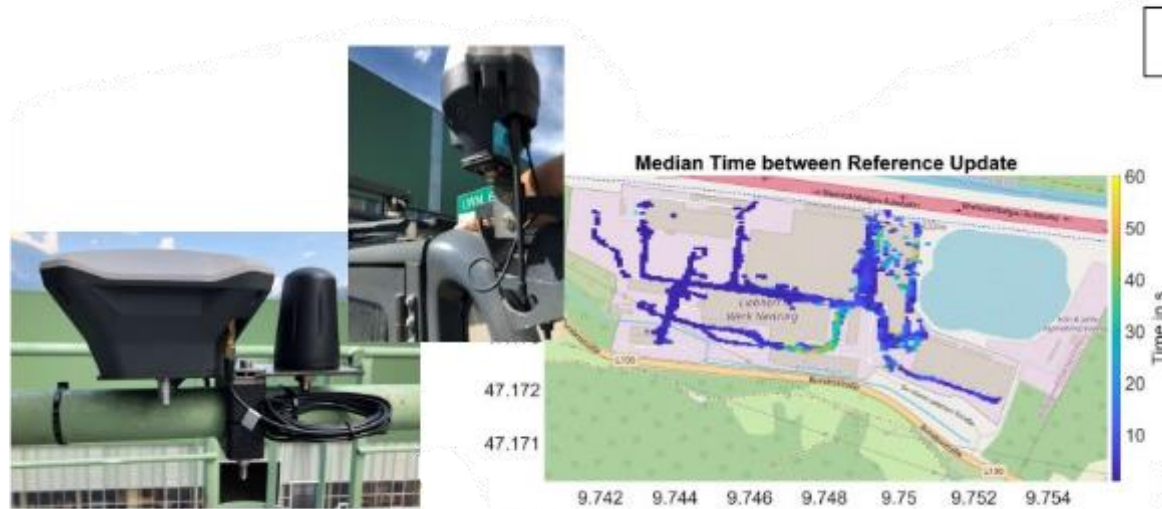
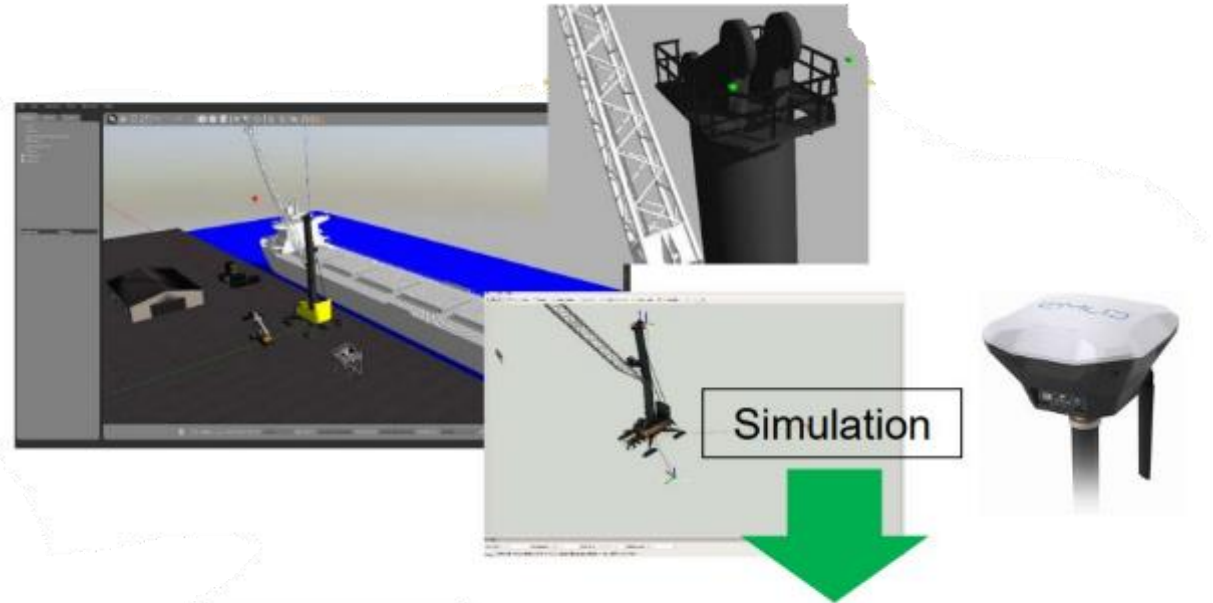
### **Tandem lifts**

Sycratronic operates two Liebherr cranes in tandem mode at 100% crane utilization

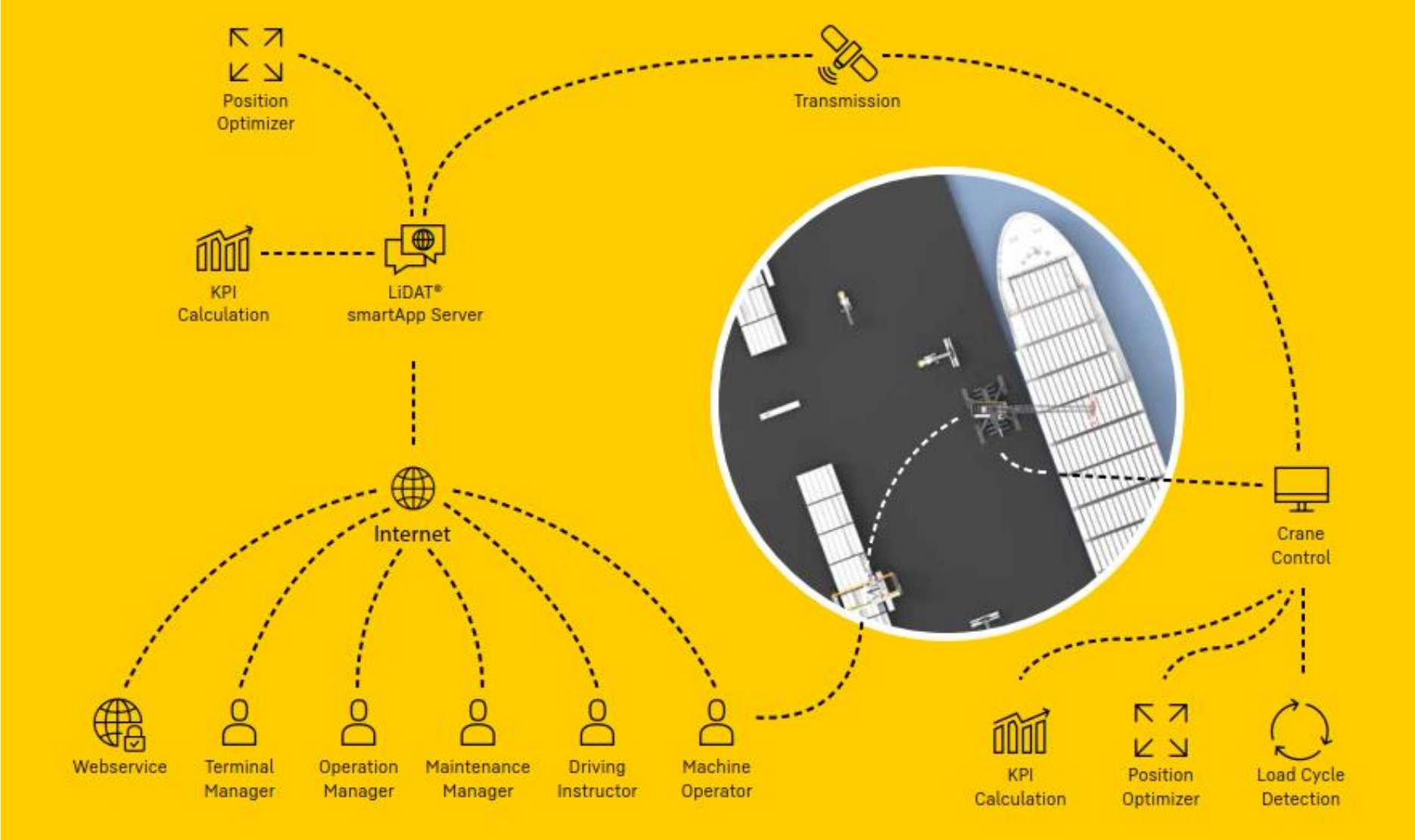


# Global positioning / referencing

- Implementation of positioning data via geotagging or simulation
- Automatic tagging of destination position (hatch / hopper)
- Automatic tagging of crane positions for planning tandem lifts



# Maintenance & Fleet Management





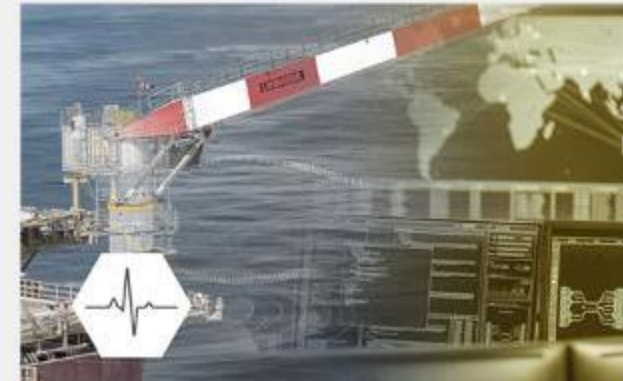
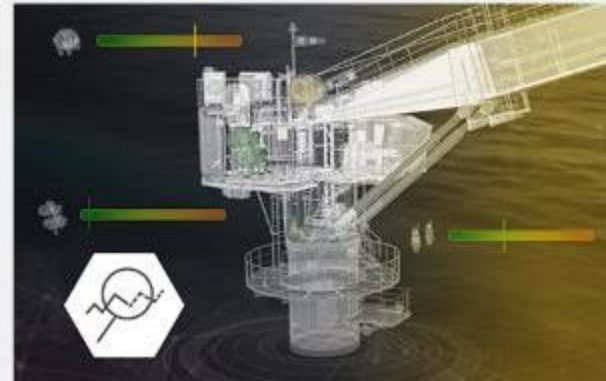
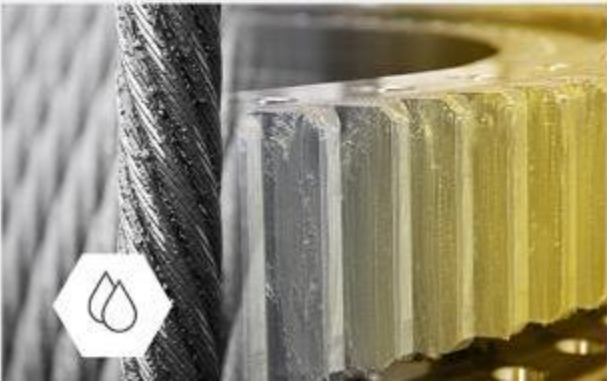
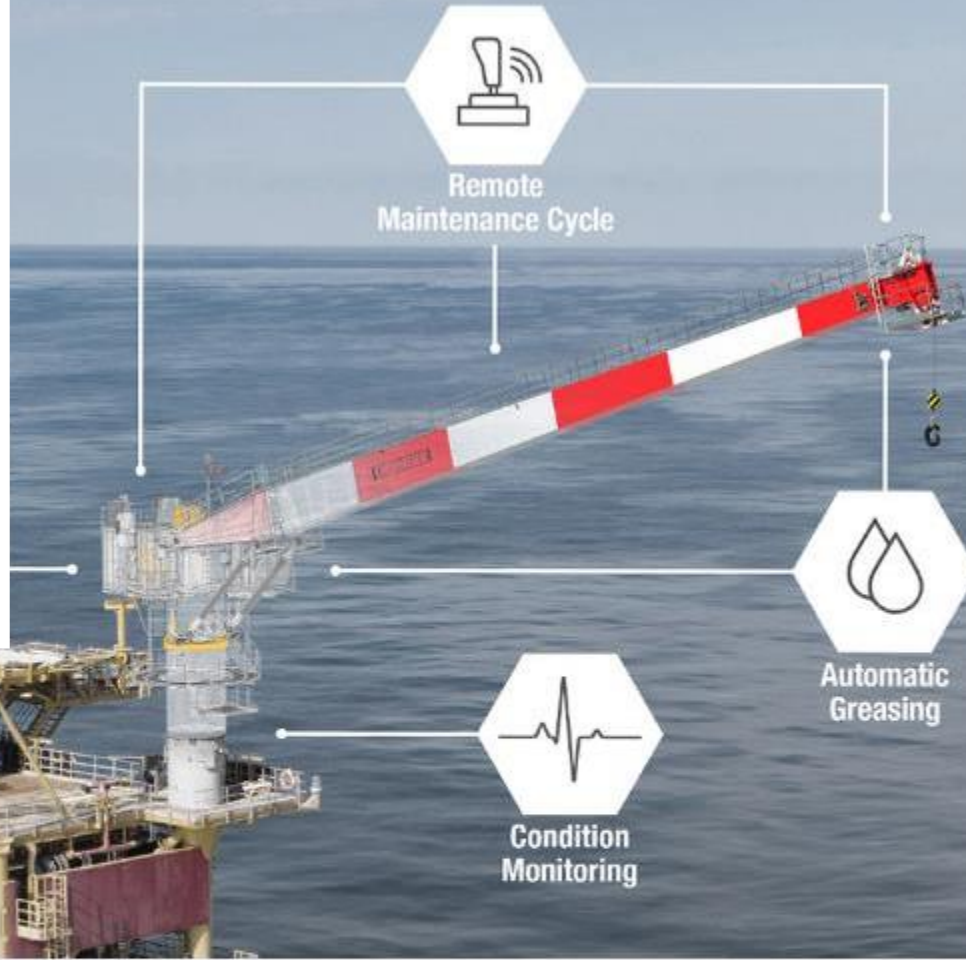
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# LiMain

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Liebherr Intelligent  
Maintenance

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02 - About LiMain - the Modules

## LiMain Components



### Automatic greasing

Critical components are continuously checked and automatically lubricated.



### Predictive maintenance

Foundation for an optimised product and component life cycle.



### Condition monitoring

Records detailed data about relevant components and crane systems.



### Remote maintenance cycle

Best possible maintenance process, completely remote.



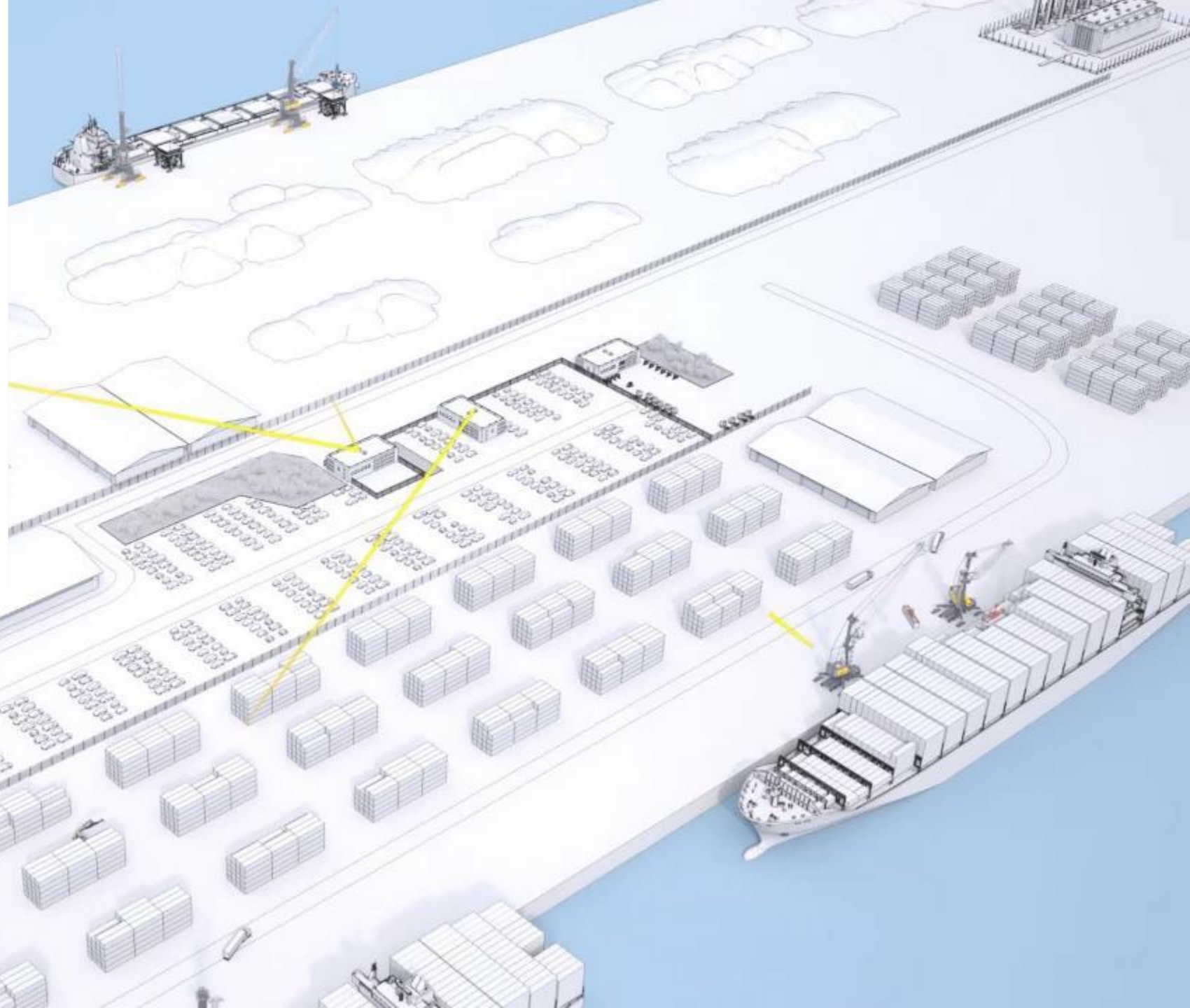
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# LiDAT® smartApp

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Intelligent fleet  
management system

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# LiDAT® smartApp



## Analysis

Detailed analysis of cargo handling process in real-time



## Optimisation

Identification of starting points for optimisation activities



## Direct access

Information obtained directly from crane control system, rather than from external sensors



## Web app

Intuitive web application, available for different devices



## Tracking

Comprehensive, informative data collection on process and machine statuses



## Comparison

Direct comparison of multiple cranes during definable time periods



LiDAT® smartApp

## What it is





# Automation







## Liebherr Automation Systems

- Automation/semi automation for all container cranes
- Remote Operator Station (ROS) for operation/exception
- Fully flexible, tailored to your operation

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# STS Automation

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Semi-automated ship to shore  
container cranes in operation  
at Patrick Terminals - Brisbane  
AutoStrad (Australia)

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Maritime cranes



## Selected references STS automation

### Patrick Terminals Brisbane Autostrad, Australia

- Automated STS – Interface with straddle carriers
- Automated landside
- Automated seaside with manual control below a safe height over the vessel and for exception handling
- Remote control using Liebherr Remote Operator Station (ROS)

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Selected references

## **RTG automation**

### **Port of Duqm, Oman**

- 12 cabinless RTGs
- 4 STS
- 8 Remote Operator Stations (ROS)
  - 1 ROS for 3 RTGs
  - 1 ROS for 1 STS
- RTGs communicate using a mesh WiFi system







Selected references

## **RMG automation**

### **CSX, Carolina Connector Terminal, USA**

- 3 Cabinless RMGs
- Fully automated
- 3 ROS desks
- Emission free container handling

Selected references

## projects of interest

### **Eurogate & HHLA, Germany**

- Automated dual trolley STS cranes
- HHLA cranes are also all electric, no hydraulics

### **Spark Dry Port, Saudi Arabia**

- Automated RTG
- 4 RTG, 2 with cabins/2 without
- 4 remote operator stations





# Questions about our products?



Paul Bruhn  
Sales Manager Middle East  
Tel.: +49 381 6006 5135  
Paul.Bruhn@liebherr.com



Ian McLean  
Sales Manager Middle East  
Tel.: +971 48891 748  
Ian.McLean@liebherr.com