NON STOP - NEW SMART DIGITAL OPERATIONS NEEDED FOR A SUSTAINABLE TRANSITION OF PORTS

Ines Distel

SICK AG

30.10.2019

SICK - AT A GLANCE – SENSORS AND FIGURES

SICK – worldwide one of

the leading manufacturers of sensors

and sensor solutions for industrial

applications

LOGISTICS AUTOMATION BUSINESS FIELD OVERVIEW


Airport


Cranes


Retail and warehousing


Building management


Industrial vehicles


Storage and conveyor


Building safety and security


Mobile automation

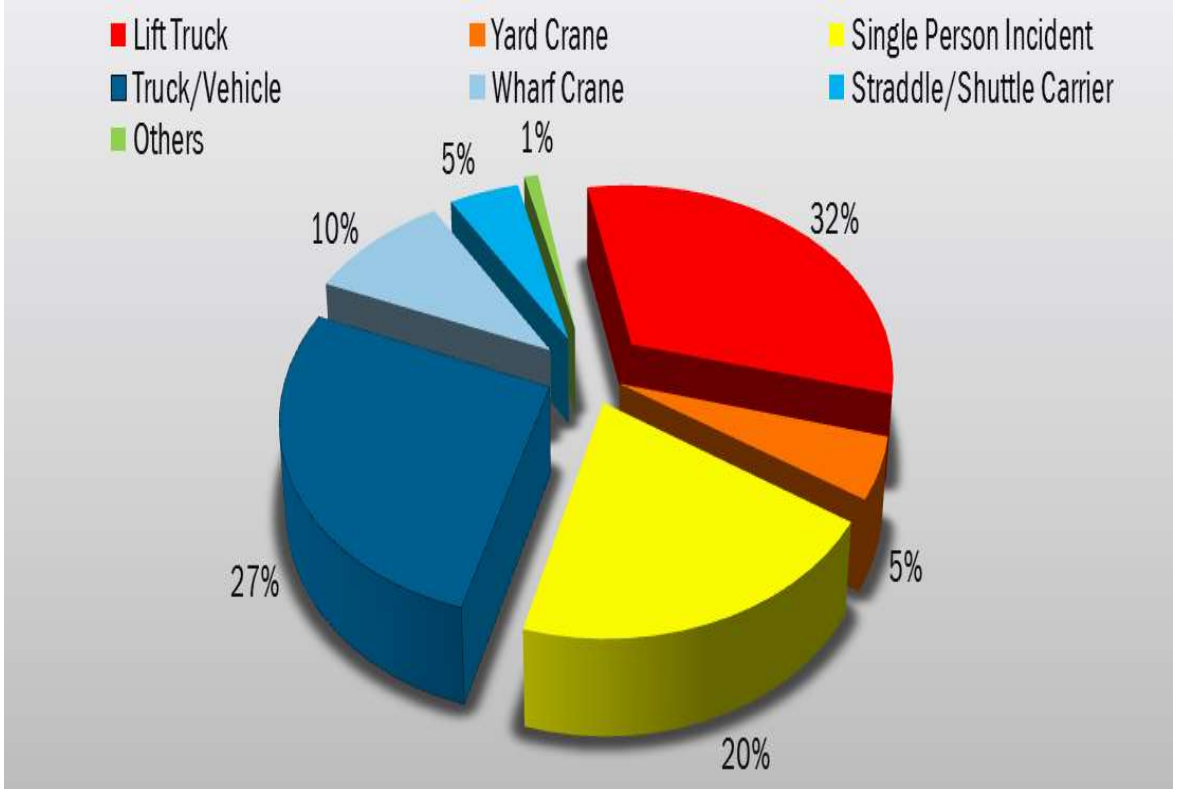

Traffic


Courier, express, parcel, and postal


Ports

RISK ANALYSIS
TT CLUB GLOBAL ANALYSIS CLAIM DATA 2010 – 2014

BODILY INJURY CLAIM COSTS

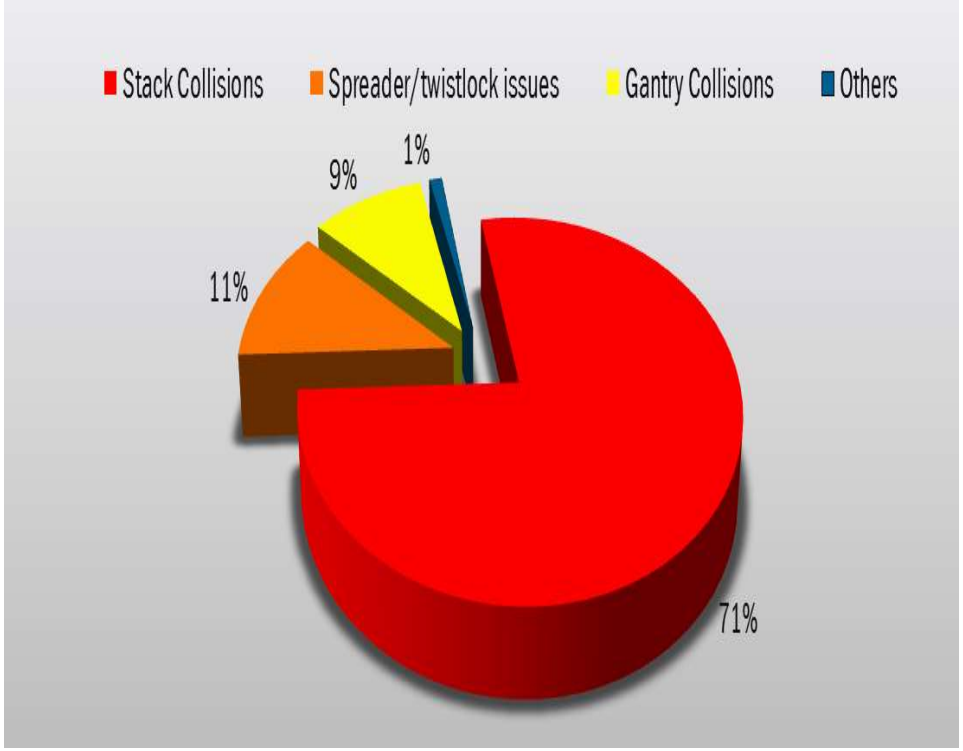


TT CLUB

Source: TT Club global analysis claims data (2010 – 2014).

RISK ANALYSIS
TT CLUB GLOBAL ANALYSIS CLAIM DATA 2010 – 2014

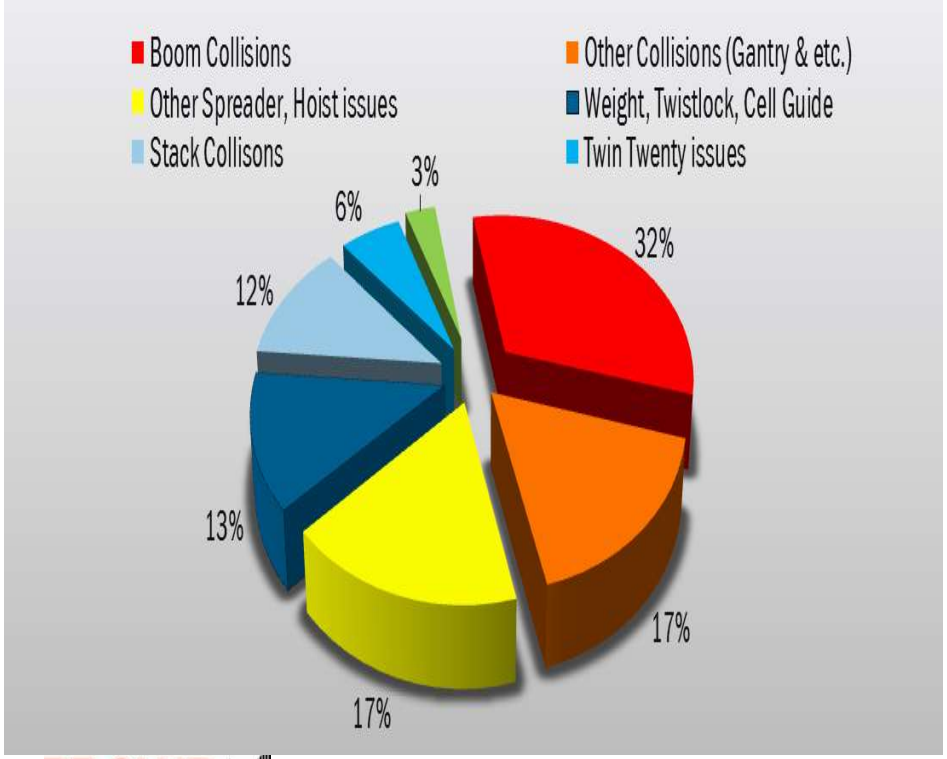
YARD CRANE CLAIM COSTS



TT CLUB

Source: TT Club global analysis claims data (2010 – 2014).

QUAY CRANE CLAIM COSTS



TT CLUB

Source: TT Club global analysis claims data (2010 – 2014).

SAFETY AND RISK REDUCTION
@ CONTAINER TERMINAL ENVIRONMENT

SICK
Sensor Intelligence.

Where are the risk spots?

Safety and risk reduction solutions with (automated) equipment

OUR TODAYS EXPERTISE IN PORTS AND CRANES APPLICATIONS WITH LIDAR SENSORS

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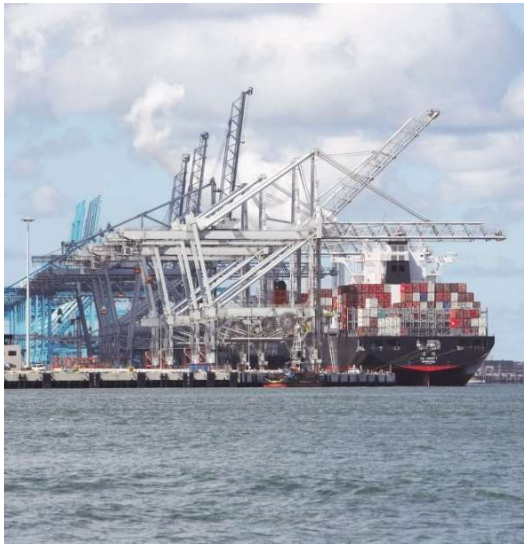
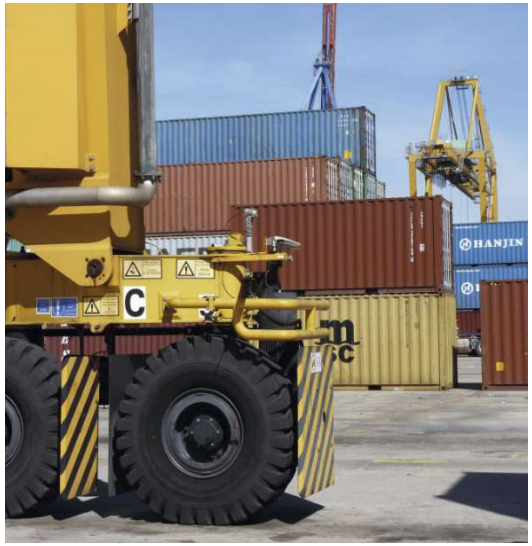
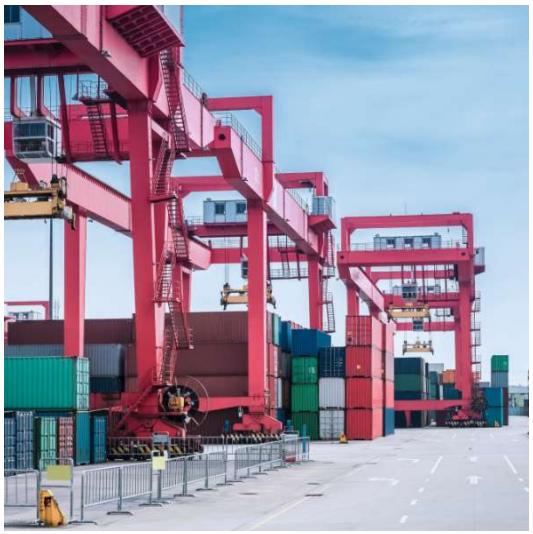
Quay cranes to prevent collisions with ship superstructures and neighboring cranes, and ensure smooth operation. Encoders ensure the precise positioning of the trolley.





Gantry cranes issue warnings about obstacles and assist navigation.

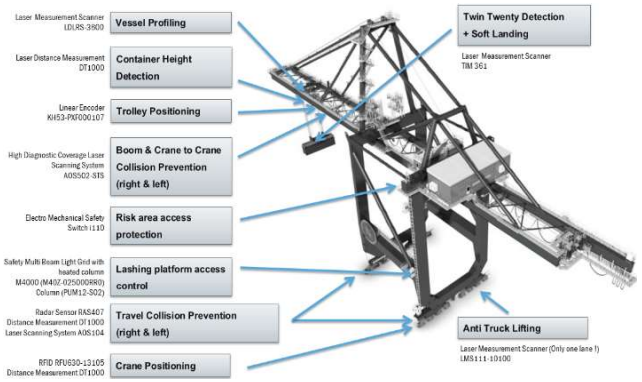
LiDAR sensors and high-resolution encoders enable precise positioning and therefore effective container handling

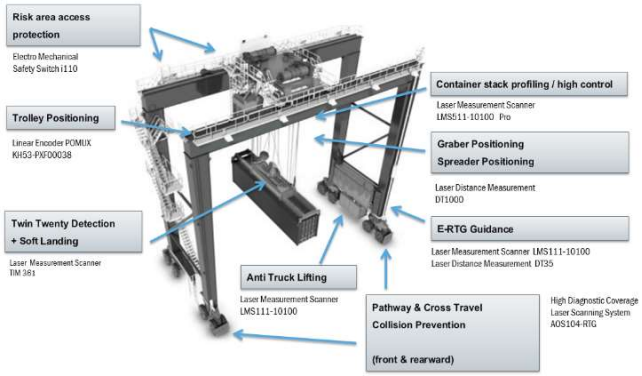


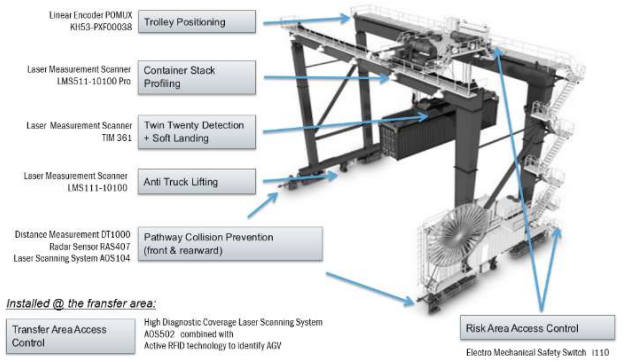
Profile scanning of the approaching transport vehicle enables optimum positioning. Monitoring of the vertical position of the transport vehicle and direct reporting back of any unwanted lifting of the transport vehicle.

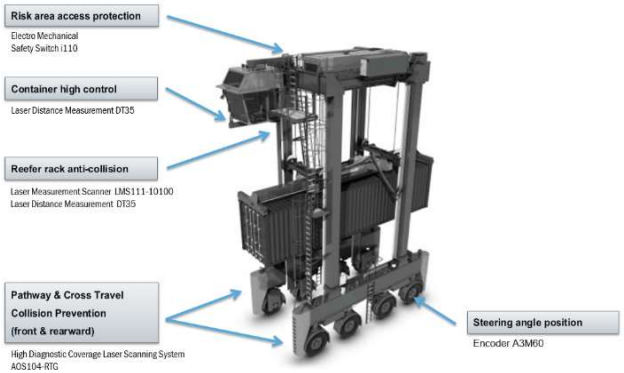
SICK PORTS & CRANES SENSOR SOLUTIONS

RELIABLE & SUSTAINABLE







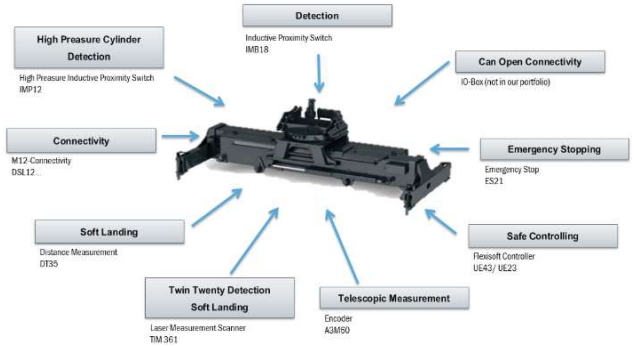


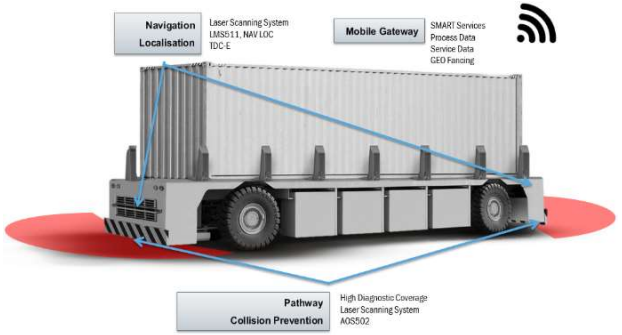
Collision avoidance
Object, people detection

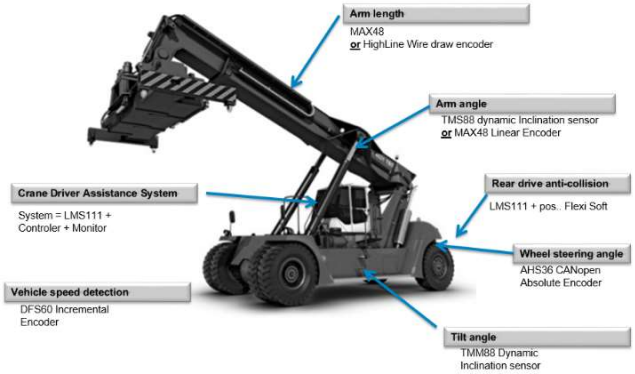
Flexible automation
Presence detection & measurement

Driver assistance
Monitoring movements

Smart Data & Services
Diagnosis, Analytics, Fusion…







OUTLOOK TO THE FUTURE – SMARTKAI PROJECT

IHATEC PROJECT

This is a support program financed by the German Federal Ministry of Traffic and Digital Infrastructure (BMVI). We applied and presented our idea to the decision body by mid 2019, but decision is currently pending and expected by end of 2019.

PARTNERS

Nports – Niedersachsen Ports, Oldenburg

OFFIS - Institute for Information Technology, Oldenburg

HuMaTects - designing and programming Human-Machine Interaction

SICK AG – sensor development and supply

TARGET

Digitalization of port quay (quay and Watergate areas)

Generation and visualization of a port situation overview incl. position of ships and weather conditions (e.g. current detection).

OUTLOOK TO THE FUTURE – SMARTKAI PROJECT

SICK
Sensor Intelligence.

BENEFITS:

Increase safety of human beings and environment by using UI technologies for optimum support of pilots and harbor captains, ensuring safer maneuvers in ports and Watergates, especially in narrow passages.

Less damages to the harbor infrastructure and ships, leading to less downtime and reduction of risk potential in the harbor.

Data based documentation of incidents for damage claims.

More efficient docking operations (faster and safer).

Increased attractivity of regional ports by digitalization.

Clear the way for potential autonomous driving and docking of ships.

SMARTKAI PROJECT
THIS IS HOW IT MIGHT LOOK LIKE

Schematic overview of important “hotspots” to avoid accidents and damages of the harbor infrastructure.

Focus will be on the Watergate (left), harbor entry (middle) as well as Terminals and Ferry docks (right).

We selected Cuxhaven port as a test harbor. In the narrow harbor entry the following parameters will be monitored:
Distance, wave lengths and water level.

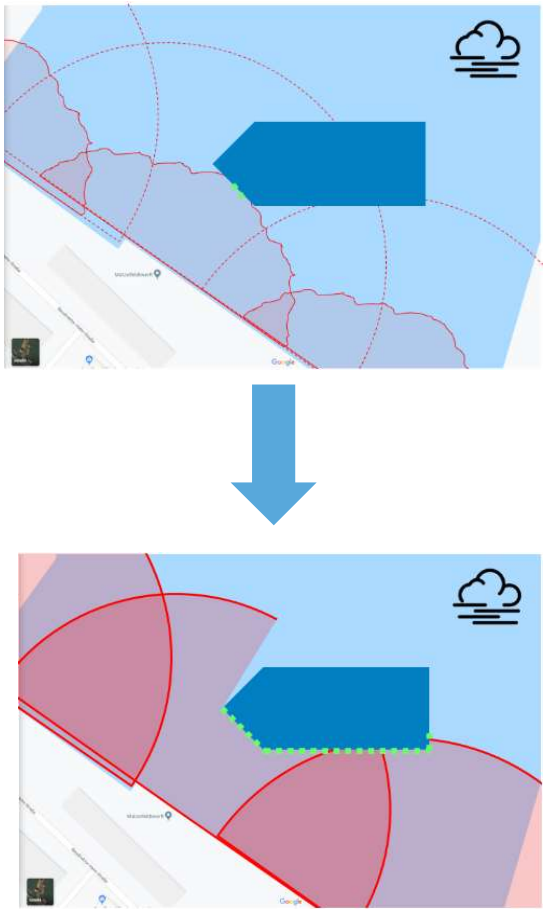
We will also monitor docking of the ship to the mole as well as the Watergate entry and exit.

Possible view on laptops, tablets or AR glasses for pilots or on fix PC stations in harbor control rooms.

SENSOR BASED SOLUTION

How it will work

SICK will develop a LiDAR device combining a large detection area with high resolution. Filter functions will be implemented to avoid misleading information. Data signals are evaluated and support for algorithms provided There will be sensor fusion that combines distance and velocity measurement with environmental factors such as tide, current, wind velocity and visibility.



HuManTects will process the signals from the sensor and define the necessary algorithms to visualize the information on appropriate UI, i.e. smartphones, tablets, PCs and possibly also Augmented Reality Glasses.
They closely work together with pilots and harbor captains to define a user-friendly graphical user interface and ensure all necessary information will be available.

Nports will install and test the prototype system in Cuxhaven harbor and support during the complete testing phase (schedule for one year).

OFFIS will provide the necessary infrastructure at site and project coordination.

THANK YOU FOR YOUR ATTENTION

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Sensor Intelligence.

Ines Distel
SICK AG
30.10.2019

SICK PORTS & CRANES SENSOR SOLUTIONS

SHIP TO SHORE (STS) CRANE

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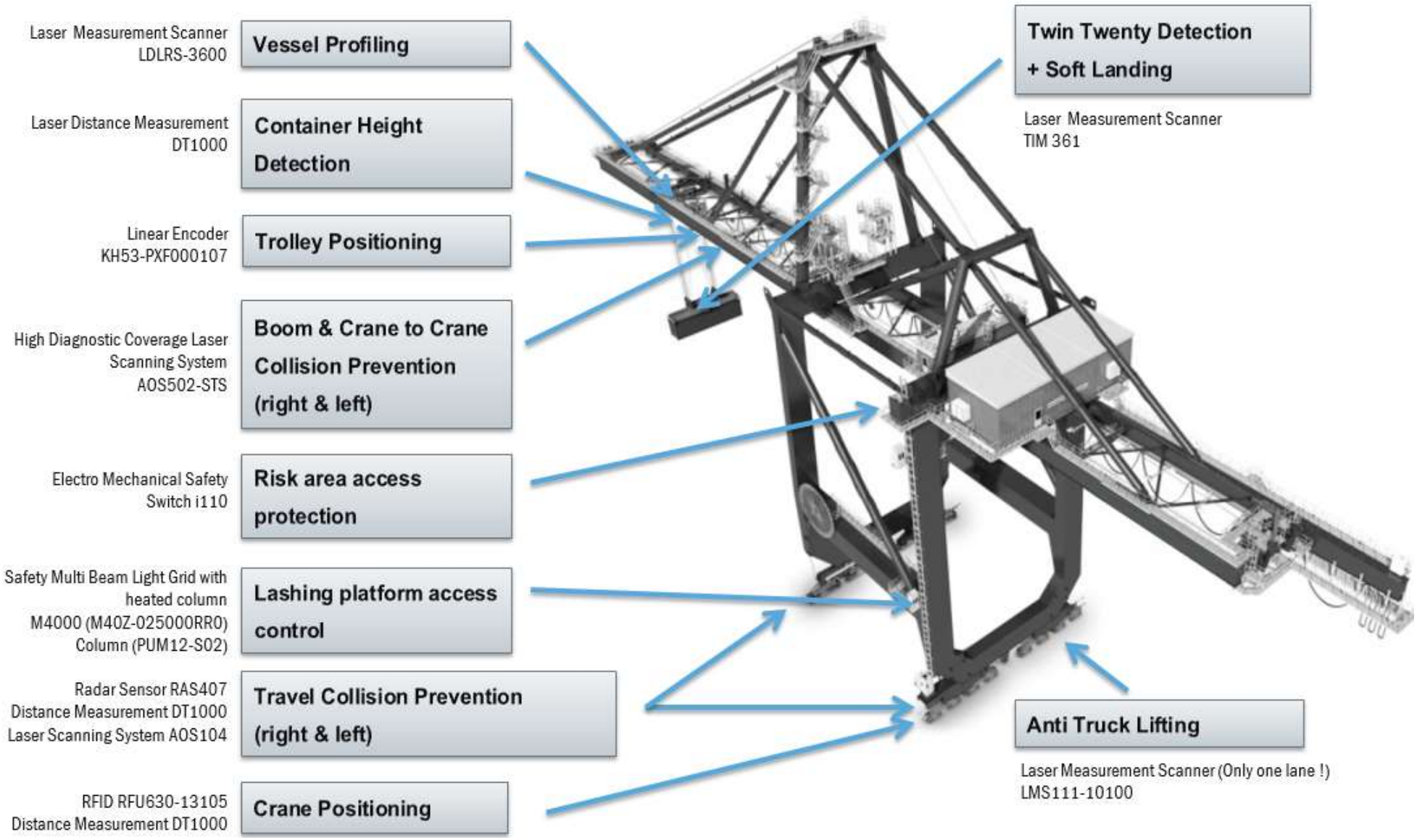

SICK PORTS & CRANES SENSOR SOLUTIONS

E-RTG, RMG, ASC

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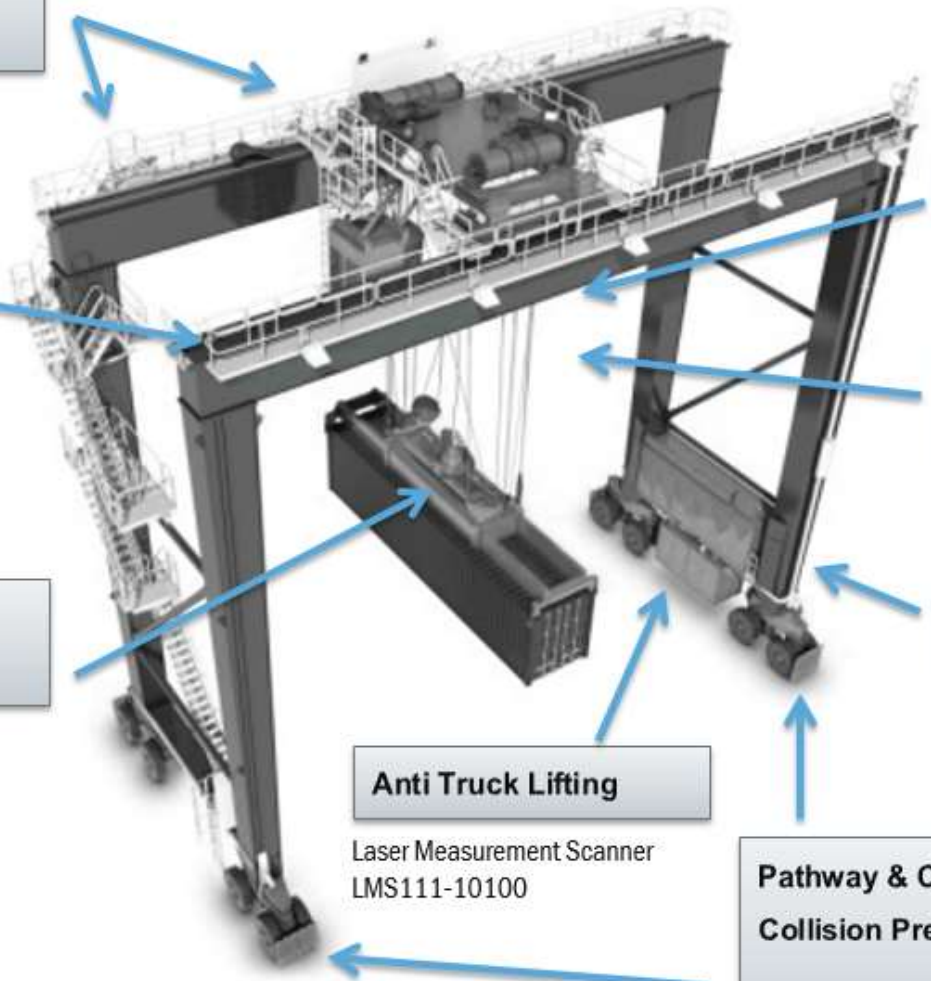

Risk area access protection

Electro Mechanical
Safety Switch i110

Trolley Positioning

Linear Encoder POMUX
KH53-PXF00038

Twin Twenty Detection + Soft Landing

Laser Measurement Scanner
TIM 361

Anti Truck Lifting

Laser Measurement Scanner
LMS111-10100

Container stack profiling / high control

Laser Measurement Scanner
LMS511-10100 Pro

Graber Positioning
Spreader Positioning

Laser Distance Measurement
DT1000

E-RTG Guidance

Laser Measurement Scanner LMS111-10100
Laser Distance Measurement DT35

Pathway & Cross Travel Collision Prevention

(front & rearward)

High Diagnostic Coverage
Laser Scanning System
AOS104-RTG

SICK PORTS & CRANES SENSOR SOLUTIONS

REACH STACKER (RS, EH & CLT)

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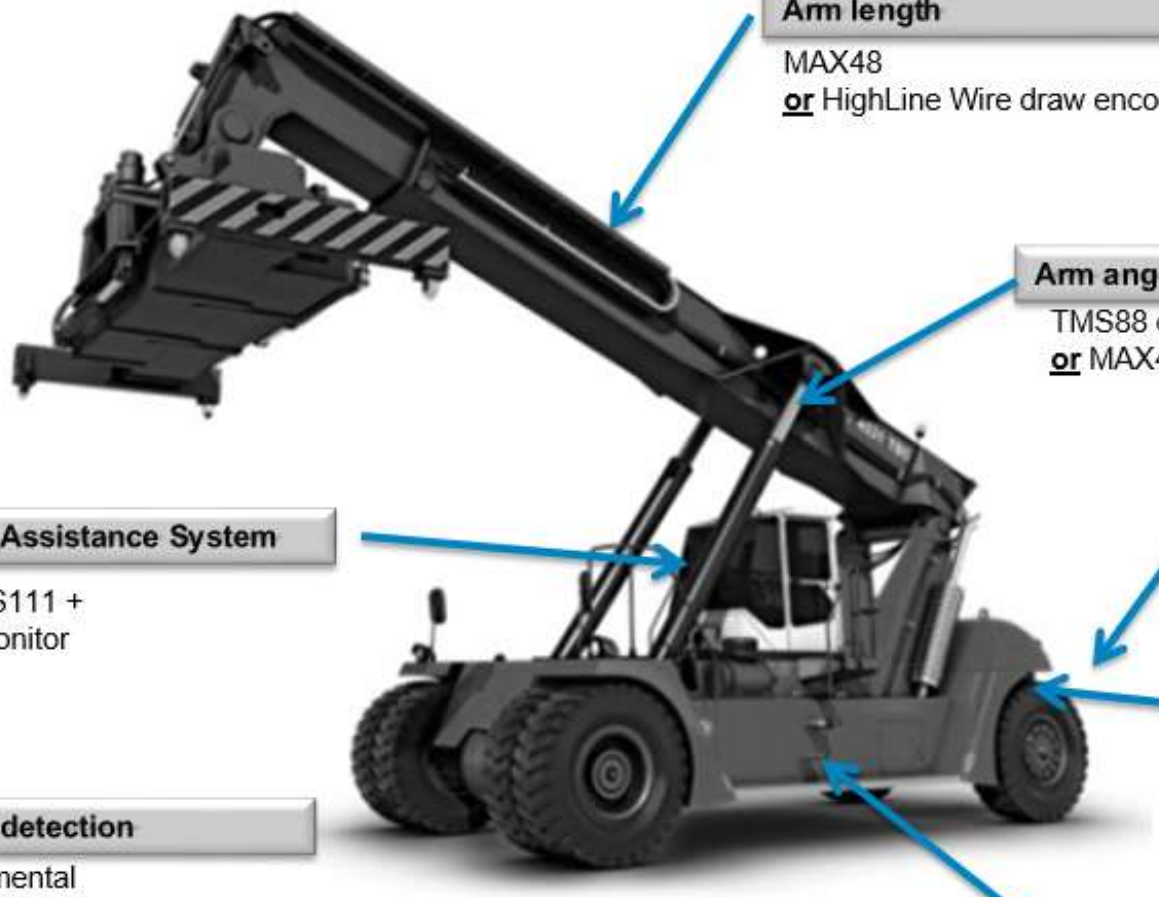
Sensor Intelligence.



Arm length

MAX48
or HighLine Wire draw encoder

Arm angle

TMS88 dynamic Inclination sensor
or MAX48 Linear Encoder

Crane Driver Assistance System

System = LMS111 +
Controler + Monitor

Rear drive anti-collision

LMS111 + pos.. Flexi Soft

Wheel steering angle

AHS36 CANopen
Absolute Encoder

Vehicle speed detection

DFS60 Incremental
Encoder

Tilt angle

TMM88 Dynamic
Inclination sensor