

PORT AUTOMATION



**LEADING TO IMPROVED SAFETY,
PRODUCTIVITY AND ECO-EFFICIENCY**

SUSTAINABLE ELECTRIFICATION BY AUTOMATION OF PROCESSES

YOUR BENEFITS

- **economic**
high savings in operation and maintenance costs
- **efficient**
quick and reliable electrification systems
- **ecological**
significant reduction of CO₂ emissions and noise pollution

→ **preservation of resources and contribution to sustainability**

STEP BY STEP TO AUTOMATION

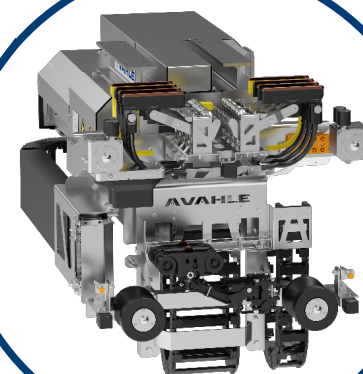
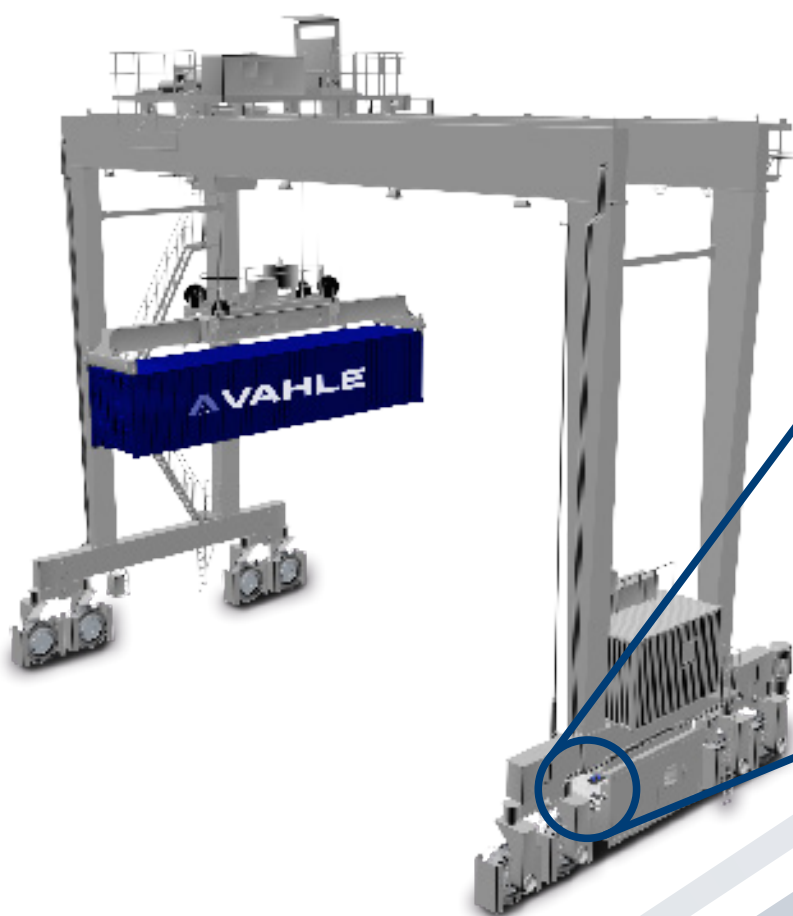
Are you looking for automation processes in your port? VAHLE provides you with

- smart
- customised
- cost-effective

solutions of Electrification, Data Communication and Positioning Systems for RTGs, ASCs and STS cranes leading to a significant reduction of container handling and turnover time – **this is how to optimize your efficiency.**



STEPS TO AUTOMATION



3.0 Data Communication

reliable, interference-free and safe data communication for data and video signals up to 200 MBit/s

2.0 Positioning

precise position feedback by durable stainless steel code rail combined with a contactless reading head

1.0 Electrification

robust and powerful solution by single insulated conductor rails 1000 V, 1250 A with aluminium/stainless steel or copper surface, multiple combinations possible

1.0

eRTG 1.0 TO 4.0

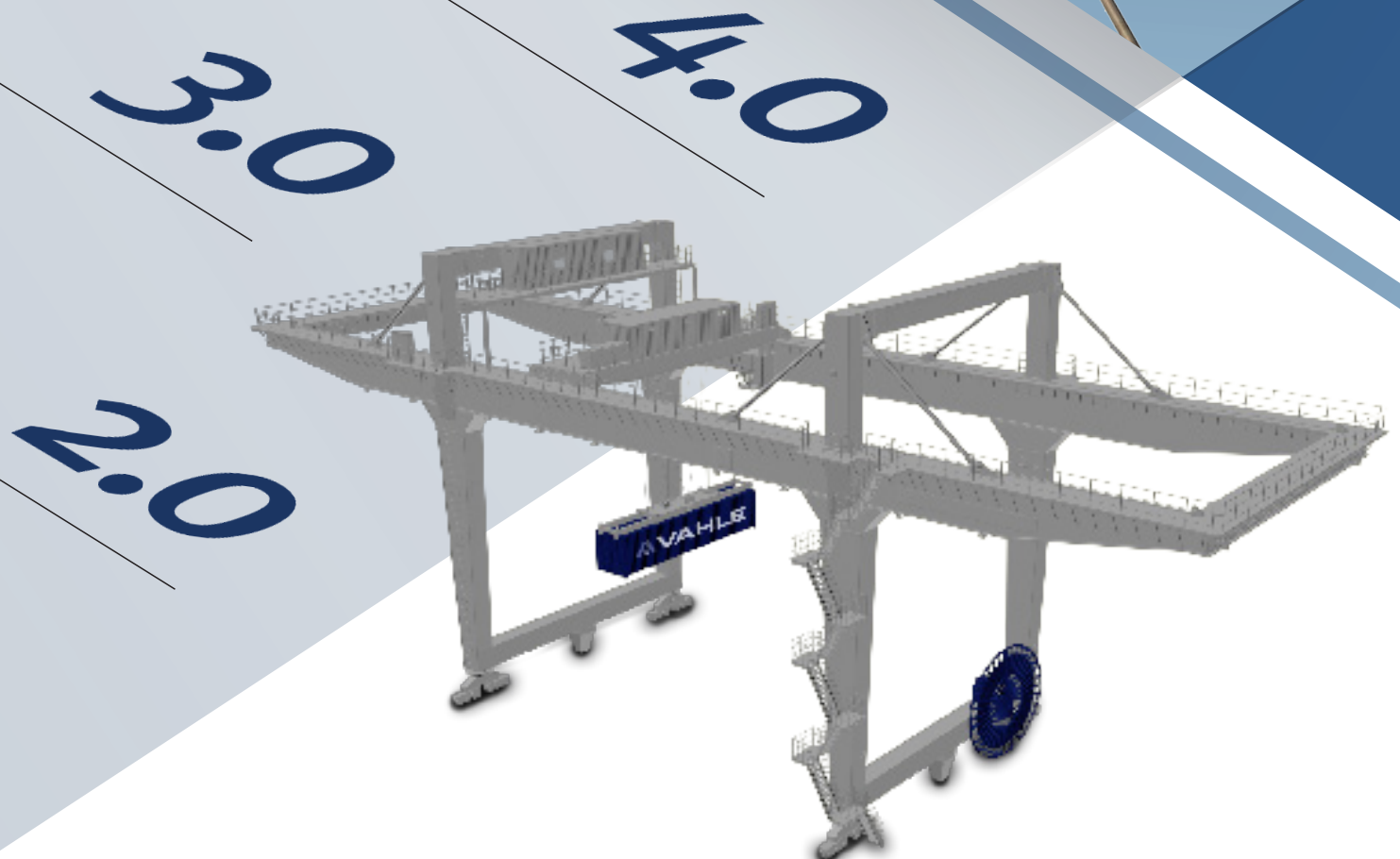
Today, process data communication is an integral part of the industry 4.0 approach.

The availability of high data rates for machine-to-machine communication and human-machine-interfaces is one crucial aspect. However, data communication is only one step to take. The main goal, using the valuable source of an efficient operator, is still valid. Therefore more steps have to be taken. With an electrified system, e.g. an eRTG, the carbon footprint as well as operational costs can be reduced significantly. To get all locations with one tick in the box will help to optimise the efficiency. The creation of infrastructure for secured data communication is the third element of VAHLE's innovative trio for the demand of future.

Electrification + Positioning + Data Communication
leading to AUTOMATION

4.0 Automation

by the combination of the elements electrification, positioning and data processes and thus remote operations can be realised



ABSOLUTE POSITIONING SYSTEM

Making processes smarter by knowing at all times the exact position on a millimetre basis. The system can be used on STS trolley travel, eRTG crane, RMG and ASC gantry travel. The positioning system is independent of a global positioning system which enables the first steps into Remote Operation/ Automation.

Absolute Positioning System supporting
AUTOMATION

TECHNICAL BENEFITS

- Millimetre precise position feedback with high resolution $\pm 0,4$ mm
- Interface: Profibus or Profinet
- Reliable reading up to a velocity of 750 m/min
- Determination of position values in real time and independent of temperature fluctuations
- Calibration- and adjustment-free system
- Not sensitive to power cuts

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

CONDUCTOR RAIL
POWER SUPPLY



SMGX DATA COMMUNICATION SYSTEM

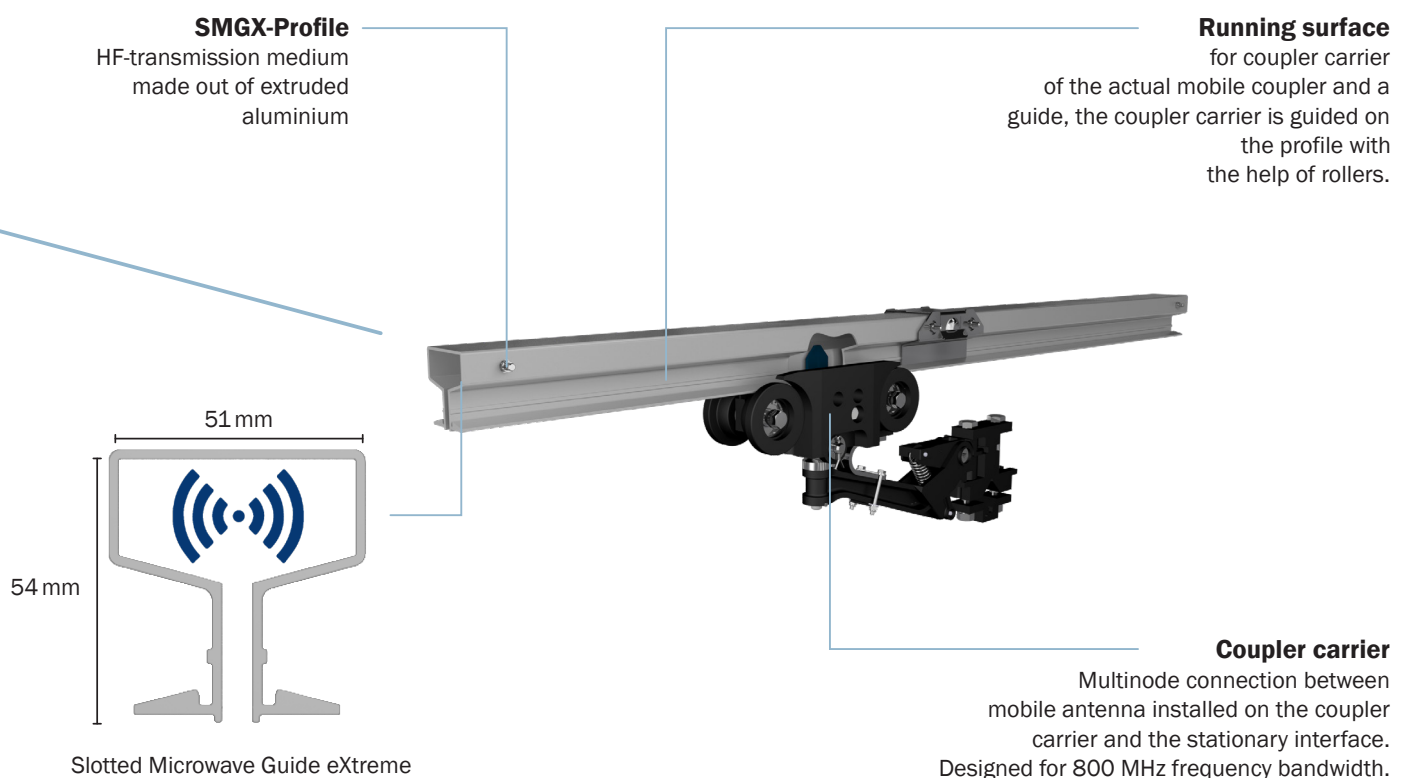
To handle the global demand of products and goods the shipping lines are still increasing their capacity of cargo container vessels. Cargo container ships average capacity has doubled over recent decades, faster than any other ship type. The on-going development is a challenge for all Terminal Operators. The loading and unloading of vessels must be highly efficient and reliable, to serve both the Port's customers and to maximise container moves/hour. Improving efficiency by optimising the process and utilising the most valuable resource, the crane operator,

where every finger movement gains profit: Remote Operation, Semi- or Full Automation is possible.

SMGX Data Communication leading to AUTOMATION.

TECHNICAL BENEFITS

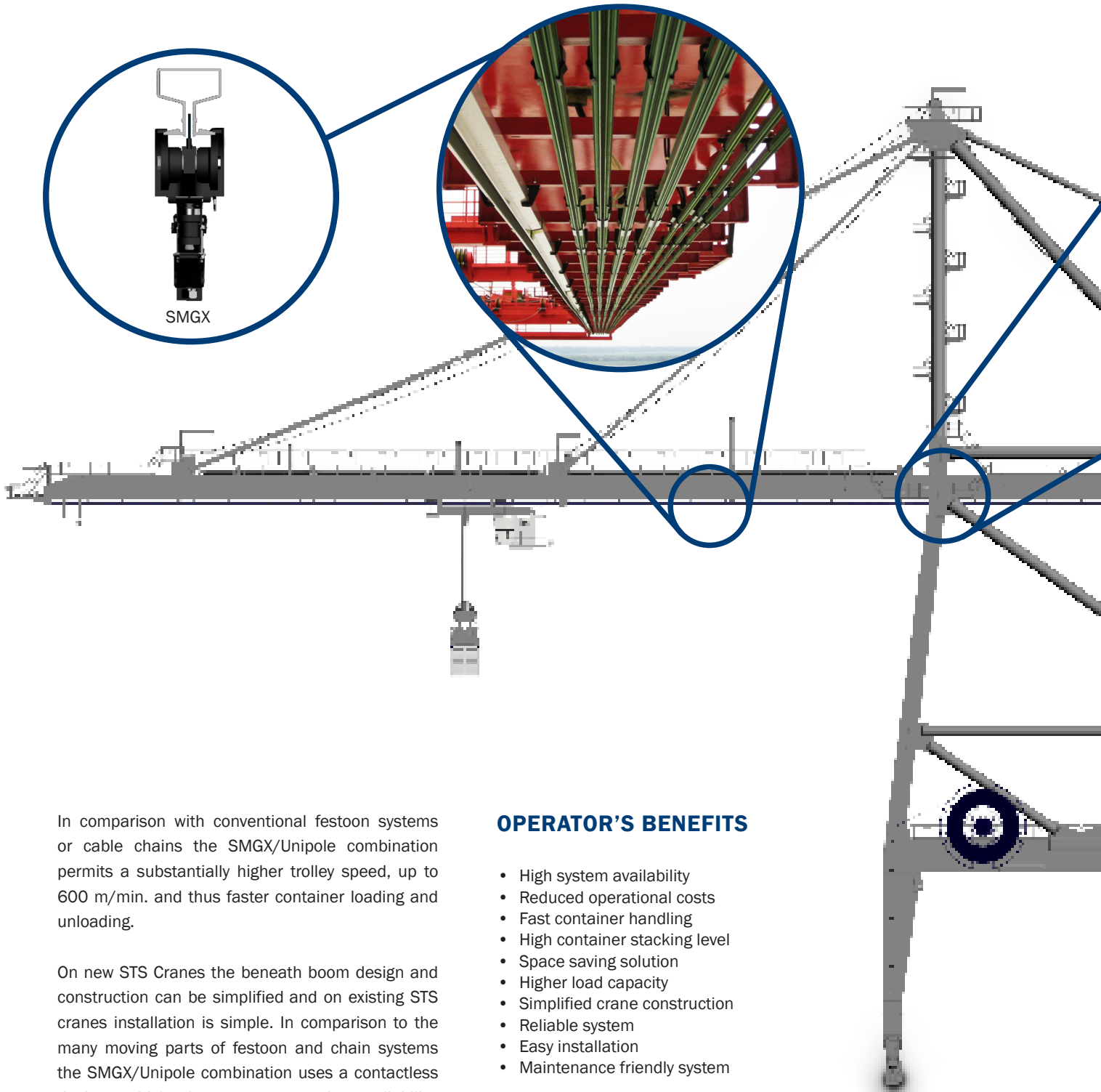
- Bandwidth of 300 Mbit/s (gross rate)
- Low latency fast path communication system (< 5ms)
- Stationary mounted compact waveguide and movable antenna
- Leading high frequency shielded radio transmission system
- Transmission of Video and Audio over Ethernet
- Transmission of Profinet and Profinet Safe signals with priority
- Interface: Ethernet 200 Mbit/s
- Interference-free Profinet Safe data transmission for automation



U-SMGX

DATA COMMUNICATION & ELECTRIFICATION SYSTEM FOR STS CRANES

Rugged, reliable and above all proven technology to optimise your Port Operation. U-SMGX is a combination of VAHLE conductor rails with SMGX Data Communication Technology. This combination provides high operational availability with a minimum of maintenance. Predestined for PORT AUTOMATION.

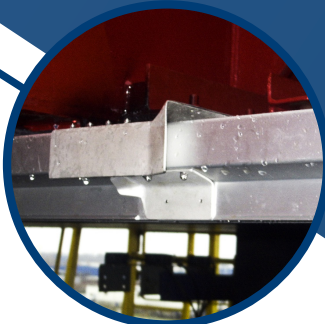


In comparison with conventional festoon systems or cable chains the SMGX/Unipole combination permits a substantially higher trolley speed, up to 600 m/min. and thus faster container loading and unloading.

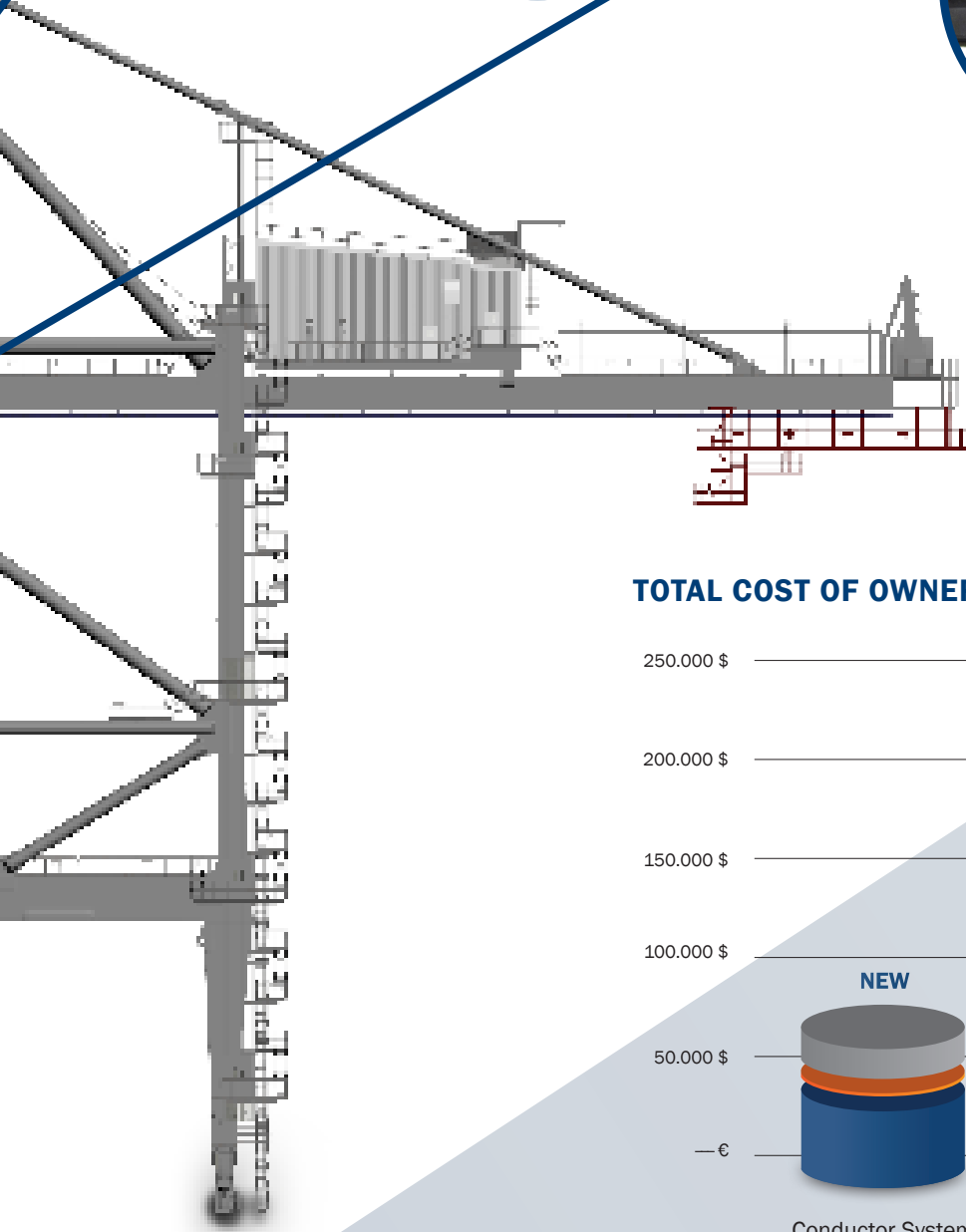
On new STS Cranes the beneath boom design and construction can be simplified and on existing STS cranes installation is simple. In comparison to the many moving parts of festoon and chain systems the SMGX/Unipole combination uses a contactless design which increases operating reliability, significantly reduces maintenance time and hence lowers the cost of ownership.

OPERATOR'S BENEFITS

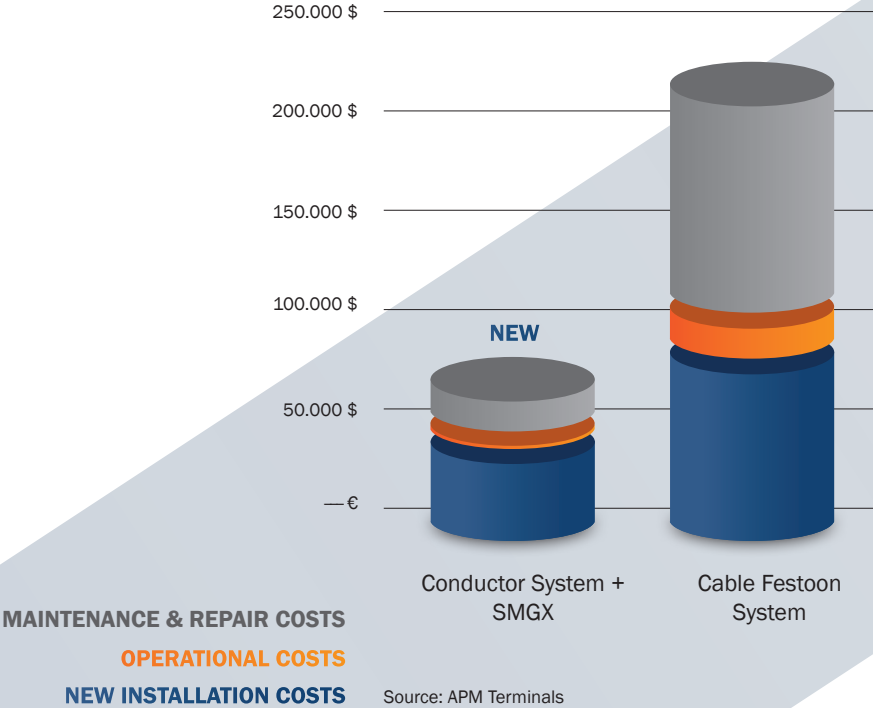
- High system availability
- Reduced operational costs
- Fast container handling
- High container stacking level
- Space saving solution
- Higher load capacity
- Simplified crane construction
- Reliable system
- Easy installation
- Maintenance friendly system



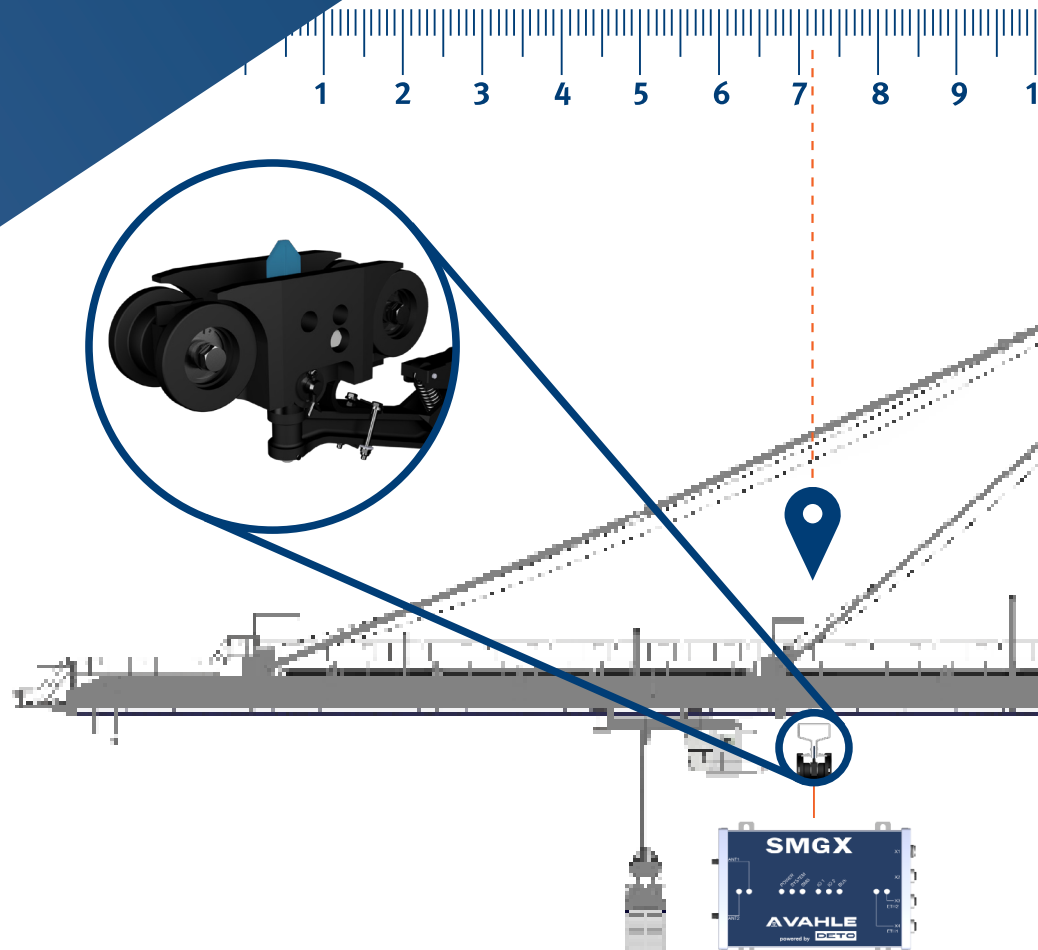
Transfer funnel
at boom hinge



TOTAL COST OF OWNERSHIP ANALYSIS

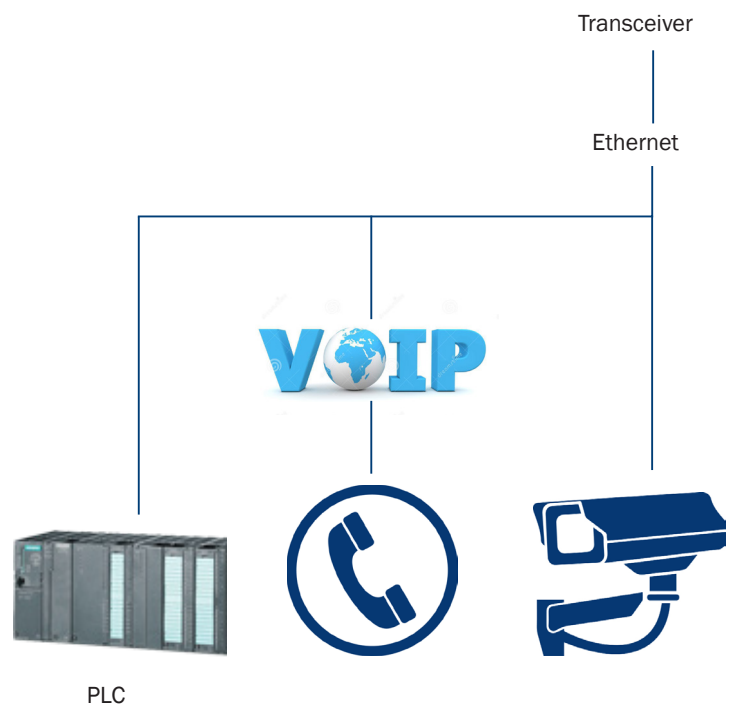


ABSOLUTE POSITIONING SYSTEM



TECHNICAL BENEFITS

- High trolley speed
- No cable loops, no storage area
- Multipole combinations possible
- Precise positioning
- No signal delay
- Lower weight
- Suitable for harsh environmental conditions
- Not susceptible to wind
- Extremely low maintenance effort
- No additional beam for festoon system



U-SMGX

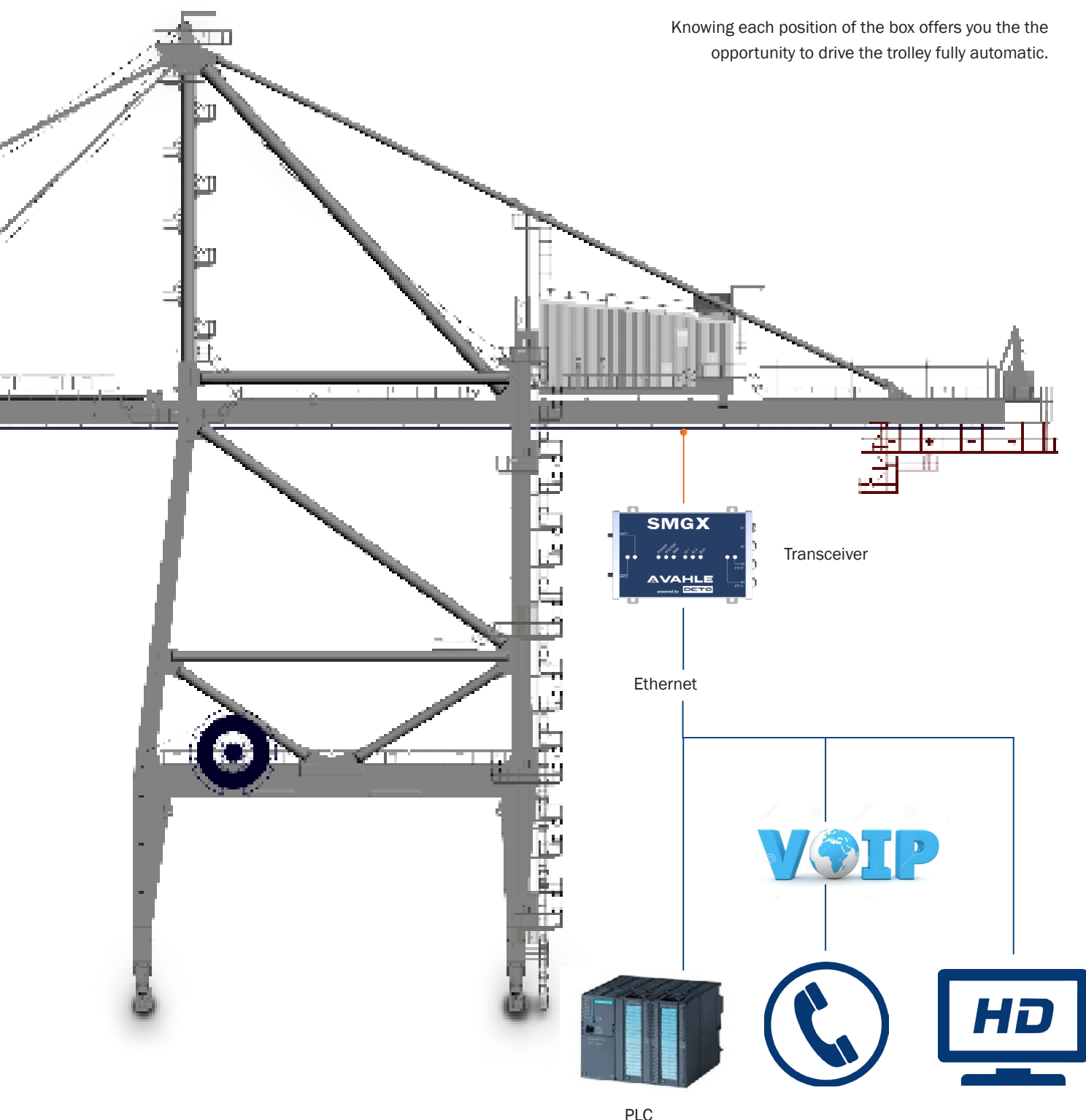
DATA COMMUNICATION & ELECTRIFICATION SYSTEM FOR STS CRANES

The combination of Power, Data Communication and Positioning on the STS boom provides major benefits for the AUTOMATION. The positioning system provides permanently redundant position information without the necessity of calibration. Together with

the U-SMGX components the effects of downtime by weather conditions can be significantly minimized. Due to the contactless design of the Communication and Positioning Systems, wear parts and maintenance works can be reduced to a minimum.



Knowing each position of the box offers you the the opportunity to drive the trolley fully automatic.





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