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Shaping Next-Gen Ports through improvements in Container Terminals Productivity

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Kalmar Automation & Projects Division

Content

1. Kalmar in brief
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3. Automation the way forward in Container Terminals

Cargotec wants to become the leader in intelligent cargo handling

Strong global player with geographical diversification

Cargotec Group

Sales: **EUR 3,250 million**
EBIT: **8.0%**
Services and software: **33%**

Kalmar

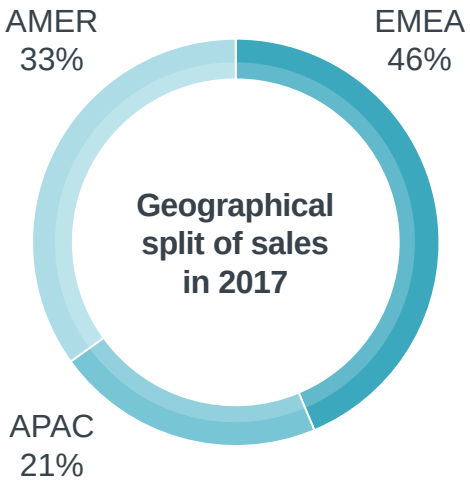
Sales: EUR 1,598 million
EBIT: **8.3%**
Services and software: **37%**

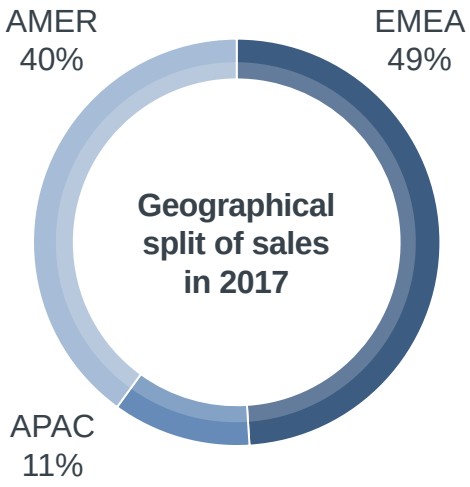
Hiab

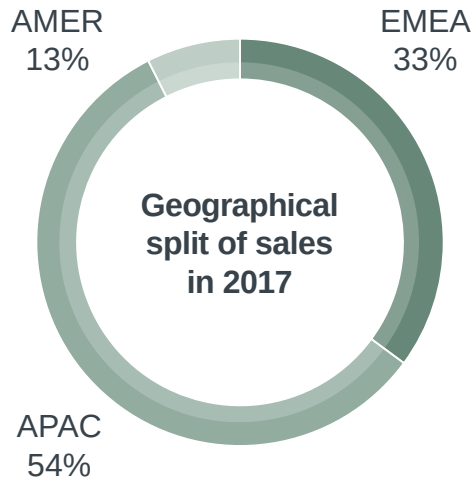
Sales: EUR 1,084 million
EBIT: **14.5%**
Services and software: **24%**

MacGregor

Sales: EUR 571 million
EBIT: **2.0%**
Services and software: **36%**







Figures: 2017
EBIT % excluding restructuring costs

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A global reach with personnel in 30 countries and sales and service in more than 100 countries.

People

5,800

Service staff

1,500

Presence

100+

countries

Assembly

Poland
China
USA
India
Malaysia
Sweden

One in four container movements around the globe is handled by a **Kalmar solution**.

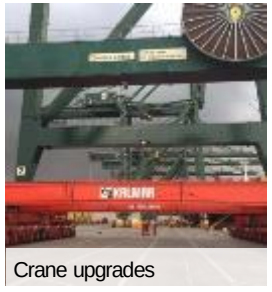
Kalmar business area solutions

Automation

STS cranes

Reachstackers

Empty container handlers


Crane upgrades

Maintenance

Navis TOS

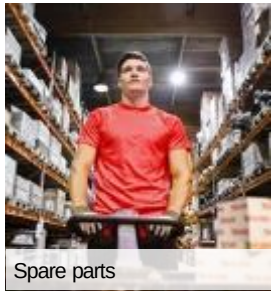
Bromma spreaders

ASCs, RTGs & RMGs

Straddle & Shuttle carriers and AGVs

Terminal tractors

Forklift trucks


Spare parts

Used equipment

XVELA collaboration platform

ALP

Automation & Projects

Mobile Equipment

Services

Navis XVELA

Bromma

Kalmar’s operating environment

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Provides integrated port automation solutions including software, services and a wide range of cargo handling equipment

navis

TOS coordinates and optimizes the planning and management of container and equipment moves in complex business environments.

Navis provides also maritime shipping solutions:

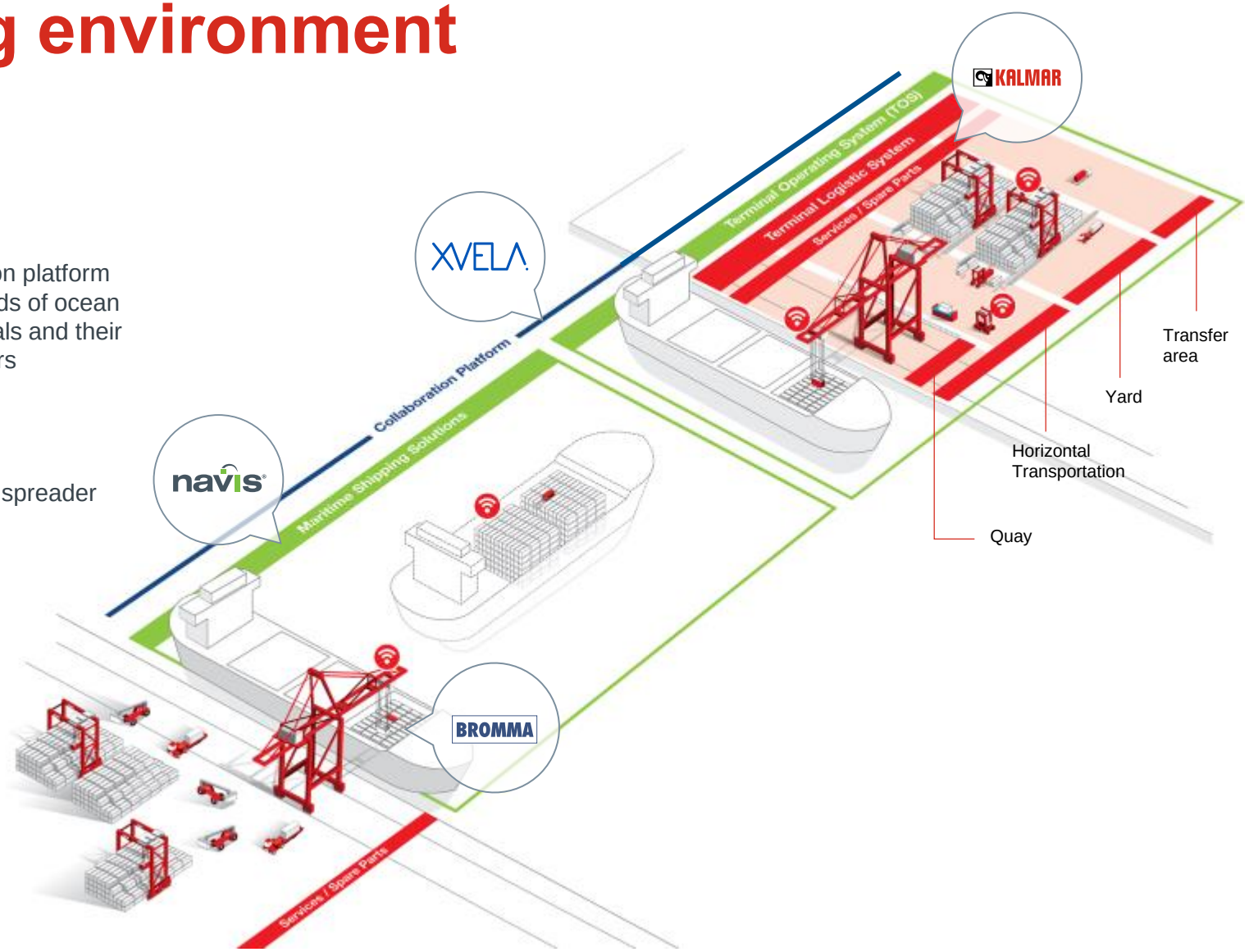
- Stowage planning
- Vessel monitoring
- Loading computer
- Route planning

XVELA

The collaboration platform serving the needs of ocean carriers, terminals and their shipping partners

BROMMA

Industry leading spreader manufacturer



Industry trends

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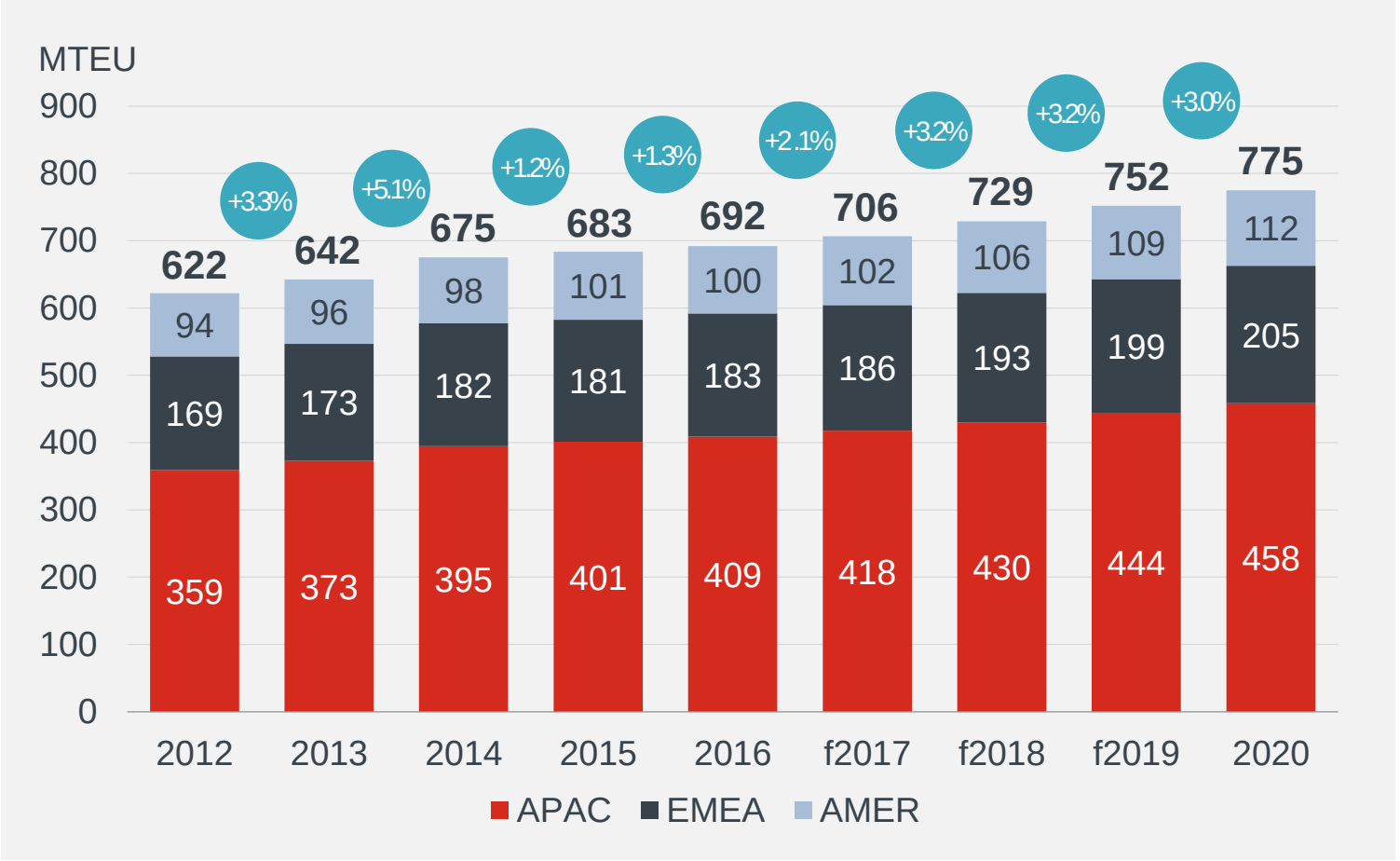
Market environment

Container throughput still forecasted to grow year on year.

Growth trend lower than in the previous decade (2-3% vs. 5-6%)

Growth from 2012 to 2020: **25%**
CAGR: **2,8%**



Source: 2013-2017: Drewry forecaster Q4 2016
F2018-F2020: Drewry forecaster Q3 2016

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Mega trends of the industry

Mega vessels

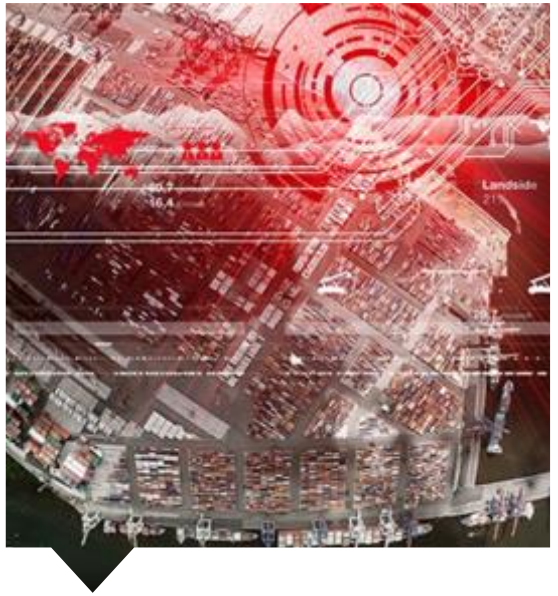
Efficiency demands increase as marine transport continues to grow. Larger ships require capacity improvements from port operators.

Sustainability

Strict emission requirements & growing concern for the environment increase the demand for more intelligent machines with smaller environmental impact.

Industry consolidation

New alliances between shipping lines are impacting container traffic flows and setting new efficiency standards for port operators.



Digitalisation & automation

Digital and automated solutions provide new possibilities for port operators to improve efficiency, safety and sustainability.

Automation in container terminals the way forward

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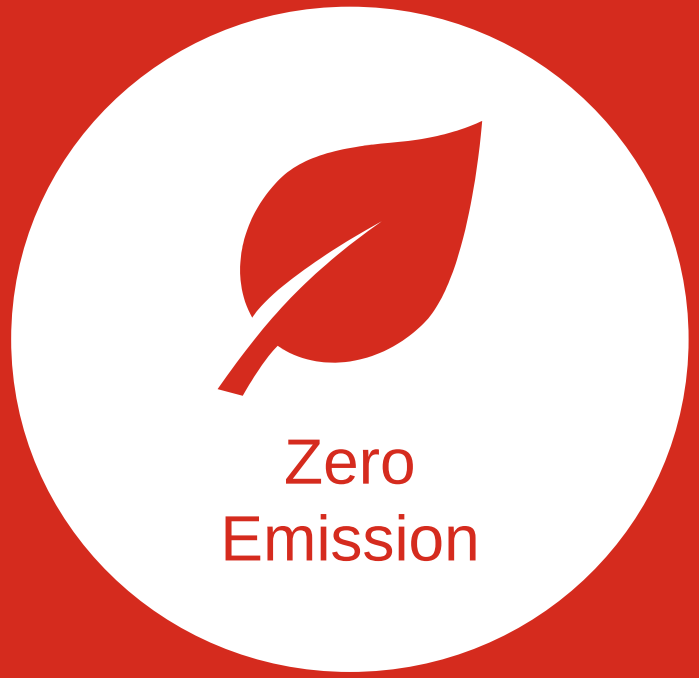
Kalmar Business Area has three focus areas in offering development



All electric portfolio ready for growth

Shuttle & Straddle Carriers

AGV

RTG

ASC/RMG

STS

ECO-EFFICIENCY AT WORK

Kalmar’s full offering to be available
as electrically powered by 2021.
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The future will be automated

Safety

Cost competiveness

Operational flexibility

“In ten years all container terminals will be automated.”

CEO of Container Terminal Operator

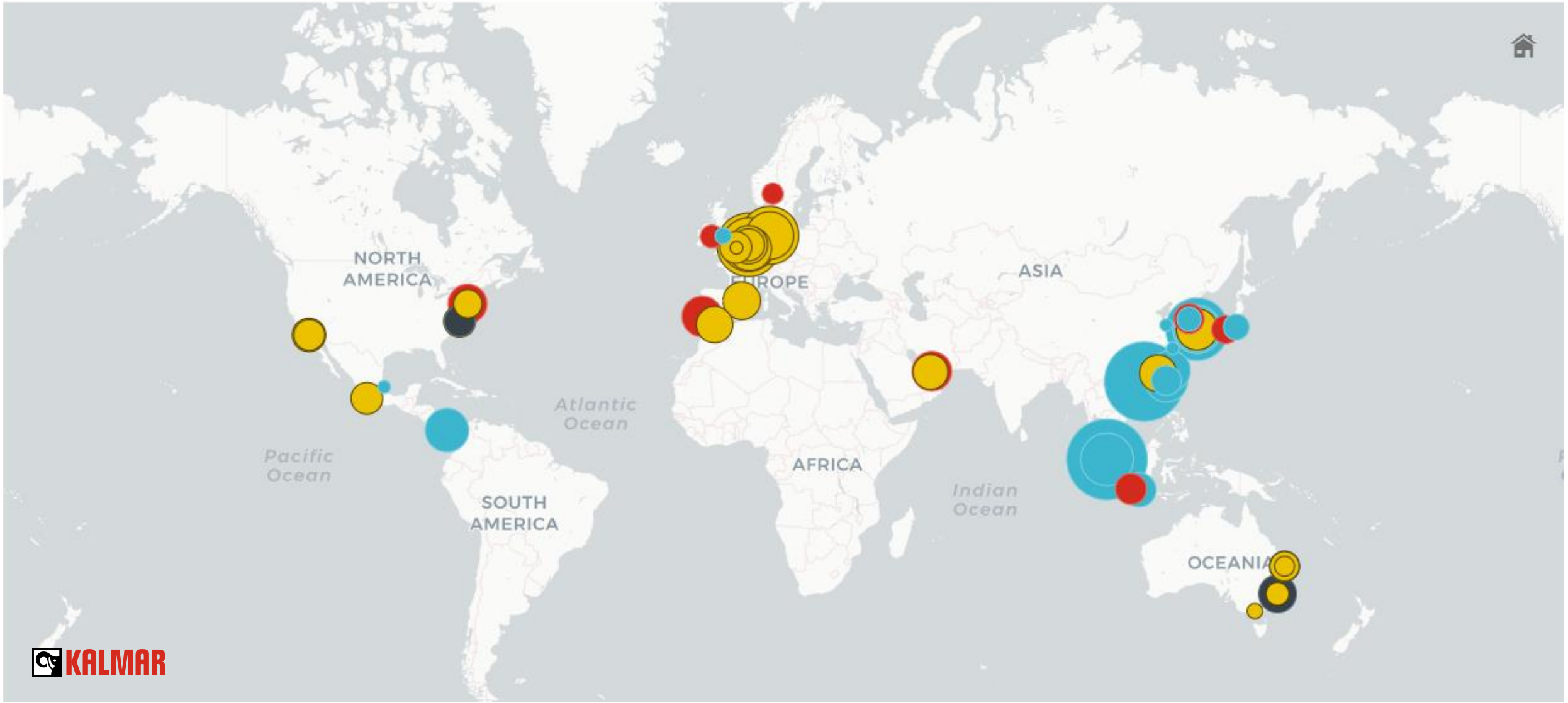
Handling System by Throughput

Number of terminals

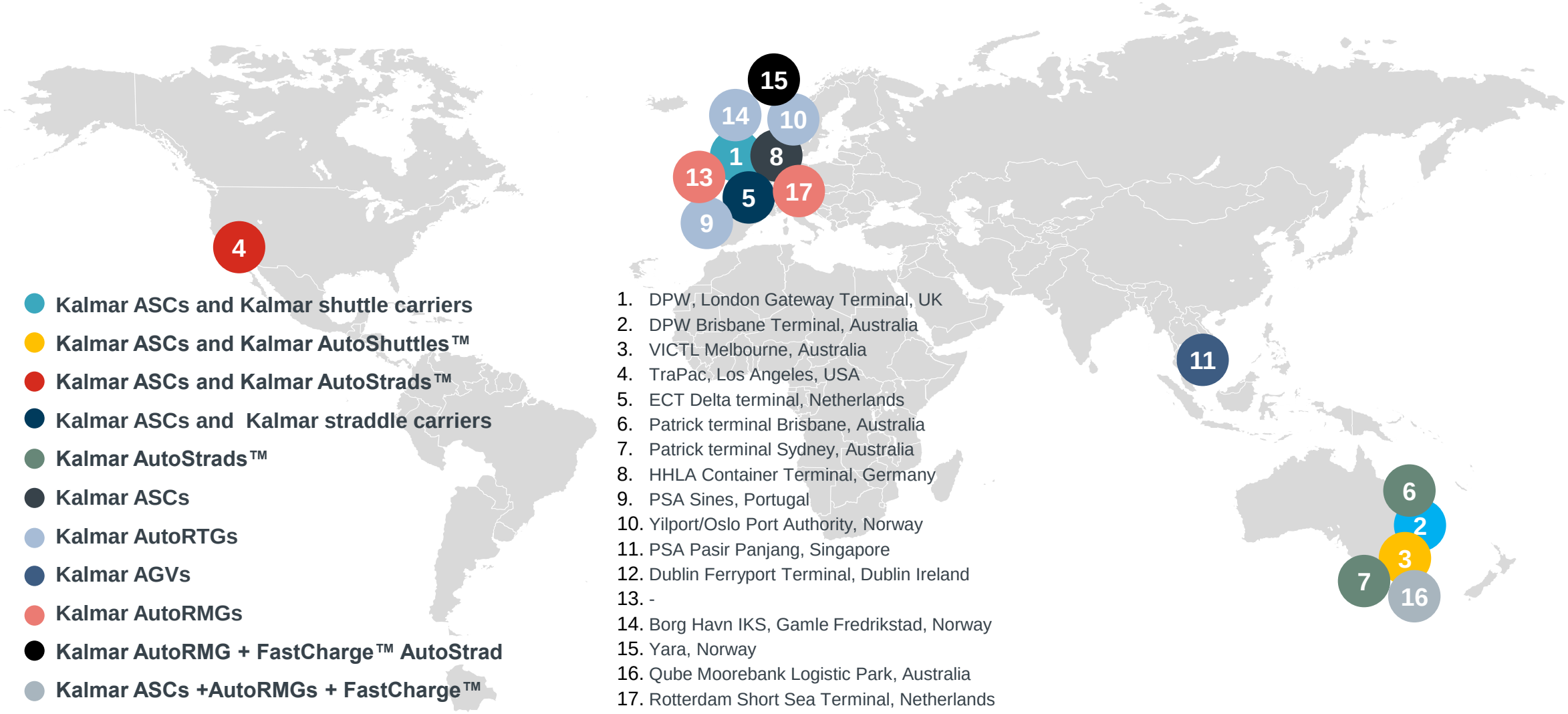
52

Throughput Estimation (2017, T...

77.75M



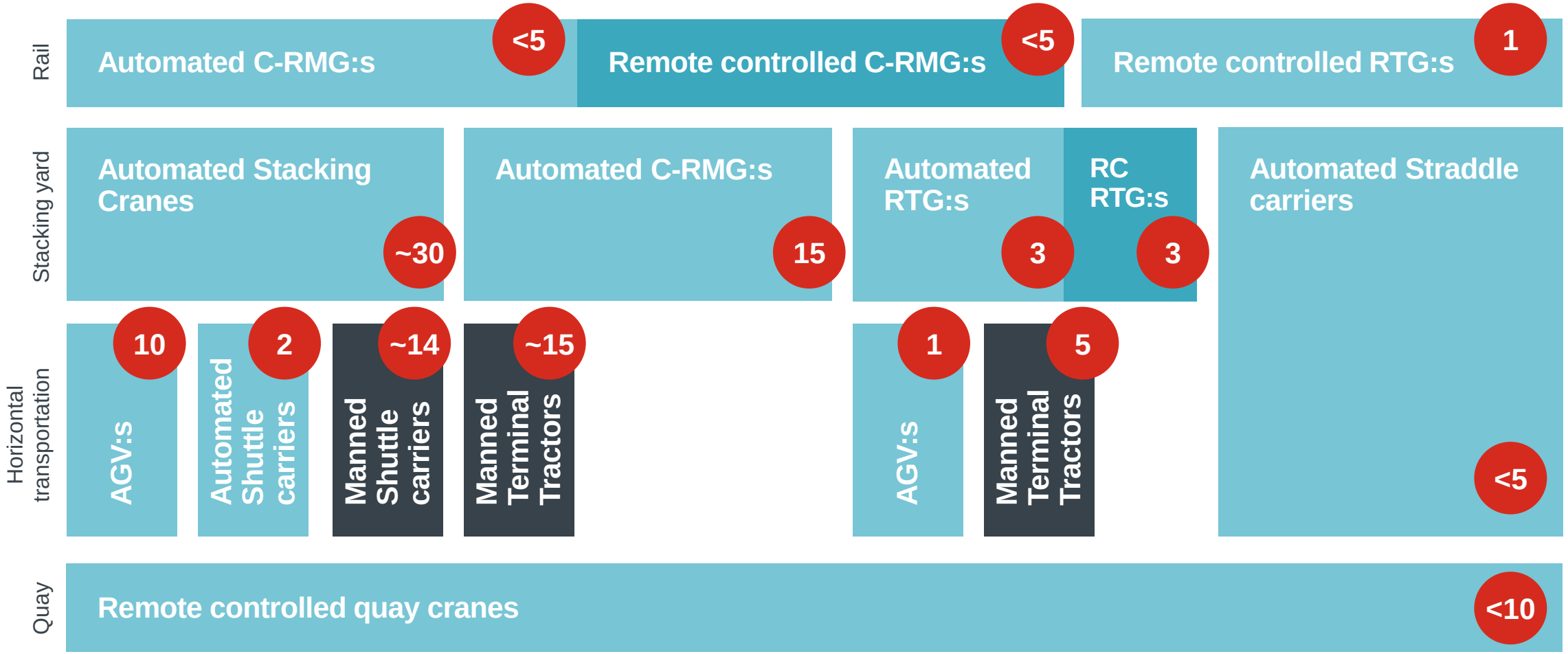
Kalmar automated terminal references



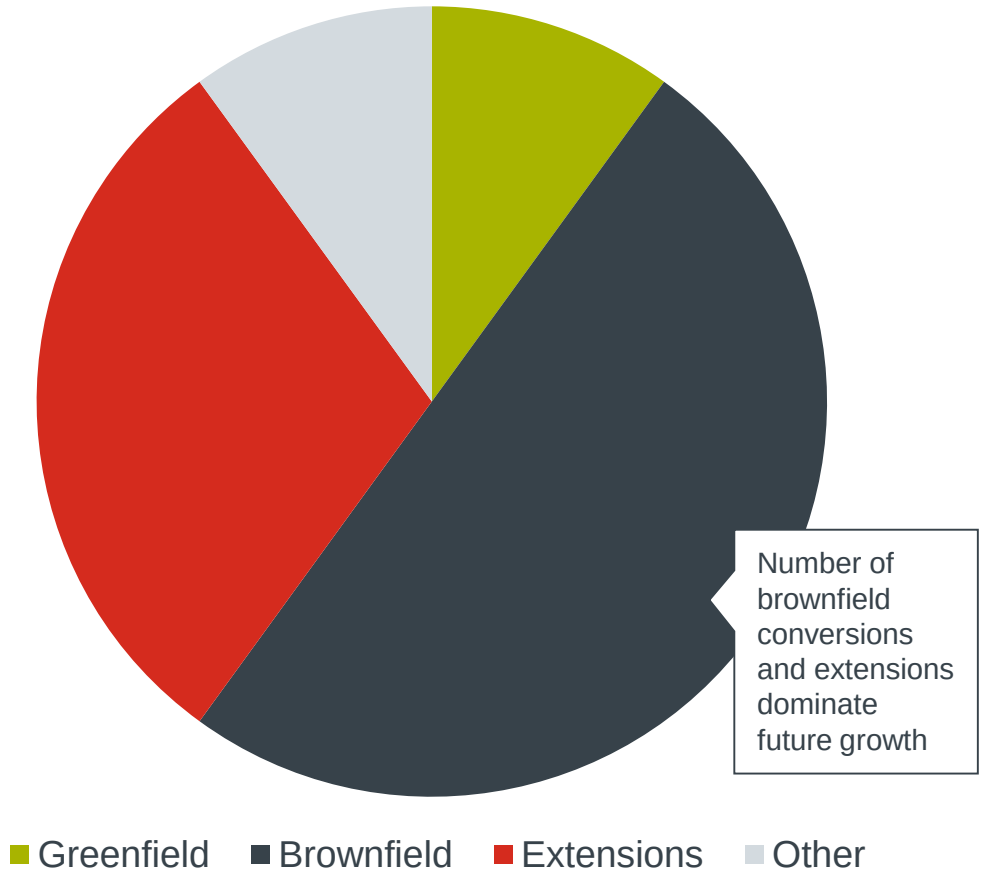
- Kalmar ASCs and Kalmar shuttle carriers
- Kalmar ASCs and Kalmar AutoShuttles™
- Kalmar ASCs and Kalmar AutoStrads™
- Kalmar ASCs and Kalmar straddle carriers
- Kalmar AutoStrads™
- Kalmar ASCs
- Kalmar AutoRTGs
- Kalmar AGVs
- Kalmar AutoRMGs
- Kalmar AutoRMG + FastCharge™ AutoStrad
- Kalmar ASCs +AutoRMGs + FastCharge™

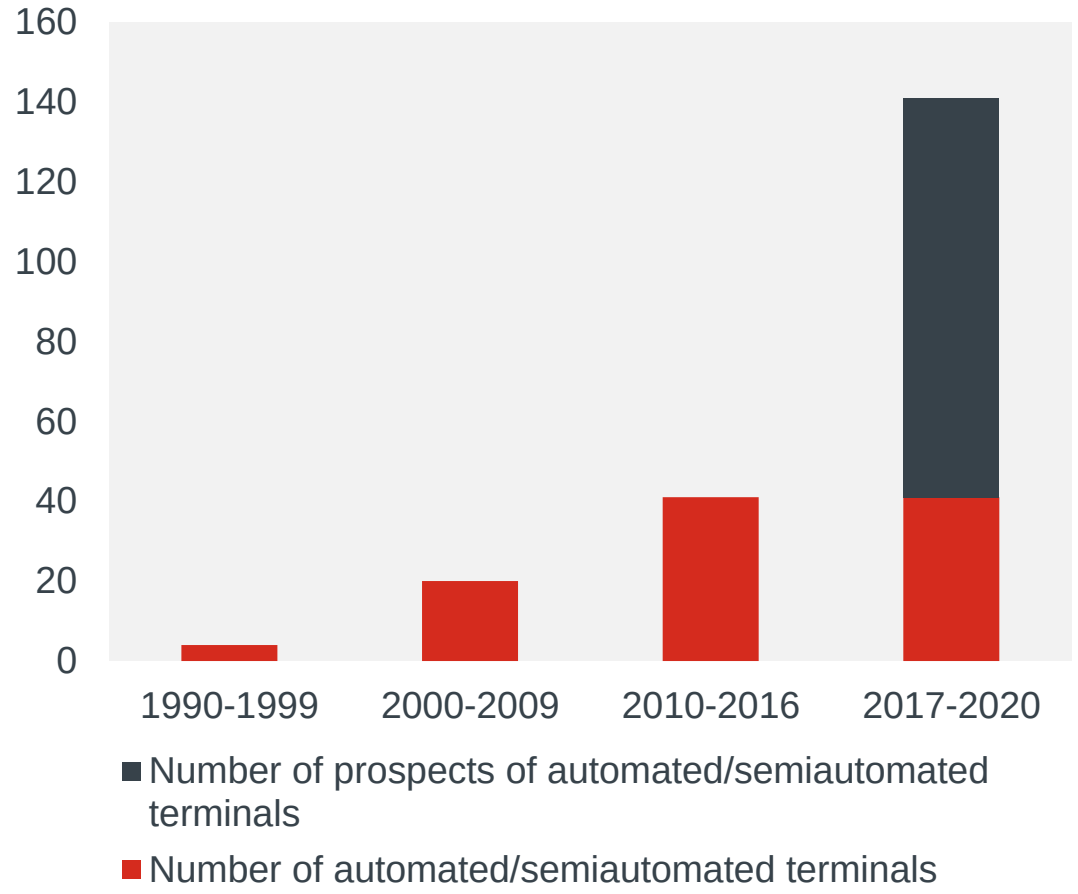
1. DPW, London Gateway Terminal, UK
2. DPW Brisbane Terminal, Australia
3. VICTL Melbourne, Australia
4. TraPac, Los Angeles, USA
5. ECT Delta terminal, Netherlands
6. Patrick terminal Brisbane, Australia
7. Patrick terminal Sydney, Australia
8. HHLA Container Terminal, Germany
9. PSA Sines, Portugal
10. Yilport/Oslo Port Authority, Norway
11. PSA Pasir Panjang, Singapore
12. Dublin Ferryport Terminal, Dublin Ireland
13. -
14. Borg Havn IKS, Gamle Fredrikstad, Norway
15. Yara, Norway
16. Qube Moorebank Logistic Park, Australia
17. Rotterdam Short Sea Terminal, Netherlands

Modes of automated solutions currently adopted in terminals

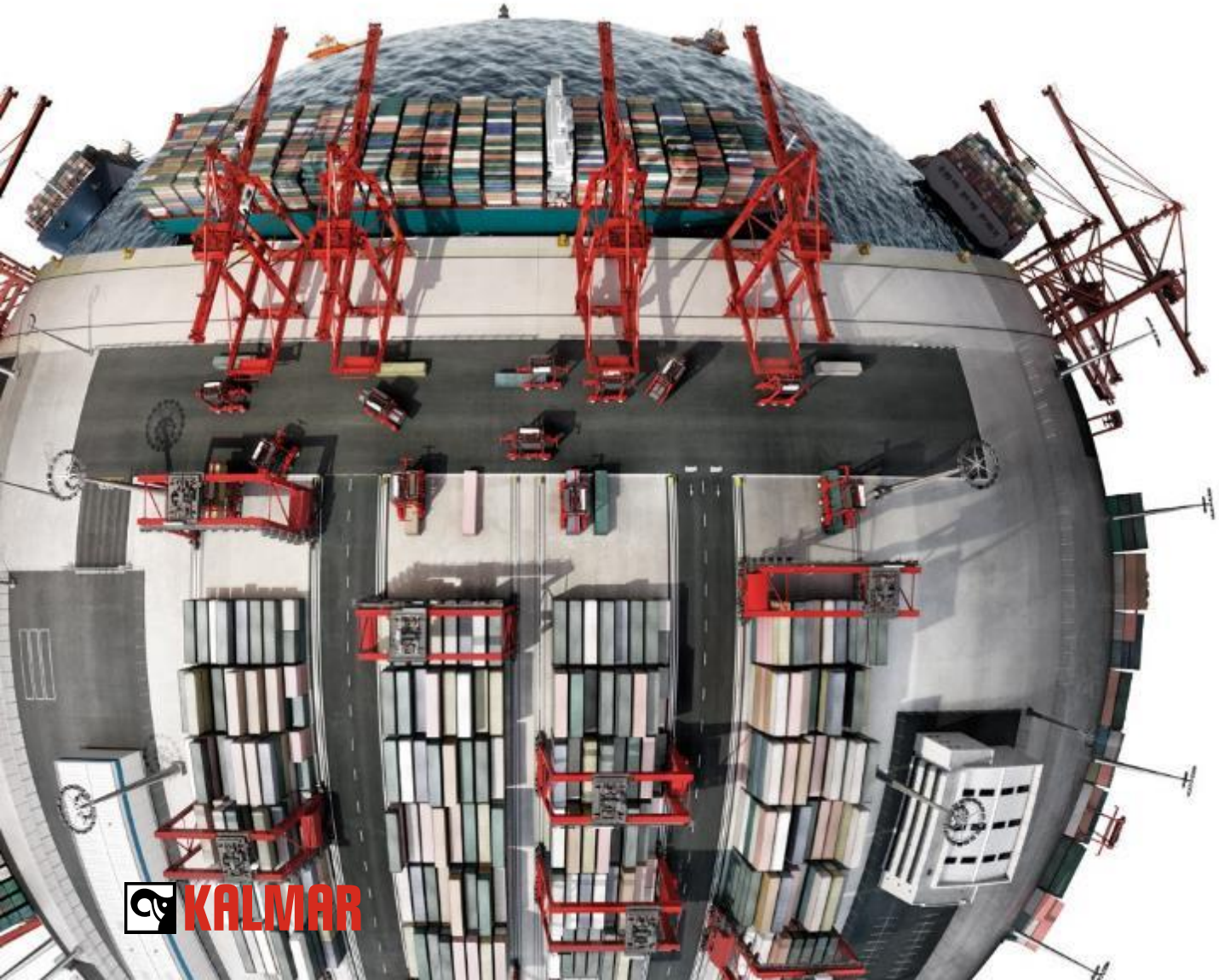


Number of automated / semi automated projects is forecasted to grow in the near future





Provide standardised, pre-integrated automation solutions with performance guarantees



OneTerminal

Your performance guaranteed.

OneTerminal is a standardised terminal automation package developed by Kalmar and Navis, delivered by one team, that gives you a guaranteed performance level after implementation, helping your realise your investment sooner.

navis

In the scenario of performance-based contracting, the customer does not buy a product, but instead pays for its utility

Value Proposition		Description
	Guaranteed Performance	▪ Kalmar to shift from selling cranes and other lifting equipment to providing ***guaranteed performance and availability***
	Complete Solution	▪ ***Complete package solution*** incl. expertise: planning, consulting, design, service, equipment, software and ramp up ▪ Temporary service for running ***operations during the ramp up***
	New Pricing Model	▪ ***Clear fee payment*** structure based on agreed performance and/or technical availability levels ▪ ***Calculated risk*** for offering a monthly fee, which is ***predefined*** for different customer segments ▪ Incorporates ***financing*** options, ***equipment***, ***software*** and ***service*** under the same fee
	Equipment Replacement	▪ Exchange terms for equipment replacements at the end of the ***equipment lifecycle*** ▪ Common understanding of the ***residual value*** of equipment and ***depreciation schedule***
	Equipment & Infrastructure Financing	▪ ***Equipment or project financing options*** from banking, institutional investor or bond markets ▪ ***Concession giver*** or ***financier*** might demand access to the assets in the worst case scenario

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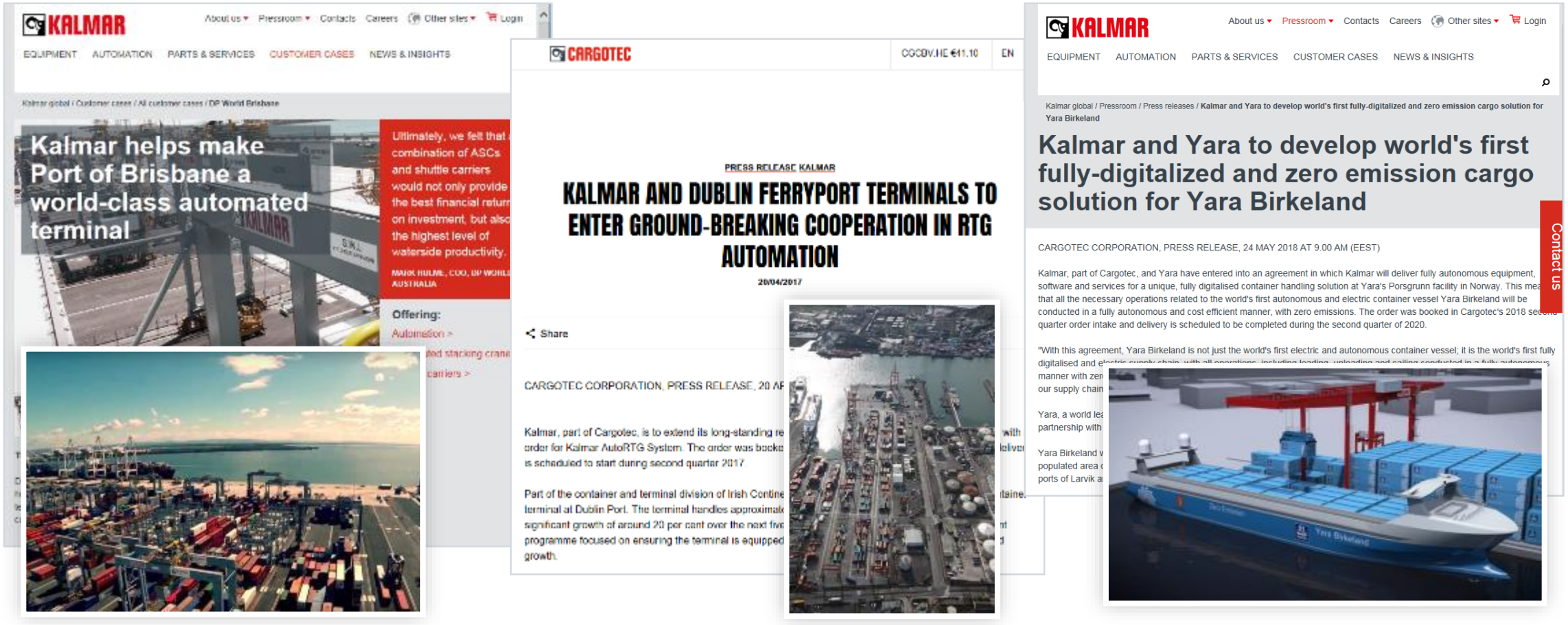
navis

Perceived benefits and risks of automation for container terminals

- Safety improvement
- Consistency of productivity
- Financial benefits, lower operating costs
- Good visibility to the operational parameters
- Helps to address labour availability issues
- No need to optimize the labour headcount during quiet times – full fleet always in use
- Low corrective maintenance cost
- Operator ergonomy improvement

- High initial investment cost
- Implementation challenges to the existing terminals
- Increased preventive maintenance cost
- Requires new kind of skills

Automation is not anymore only for mega terminals



Automation options for brownfield terminals

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Challenge

- How to get all people onboard with the change?
- How to manage the change with unions?
- What to do with the existing equipment having still residual value?
- How to manage the change in IT environment?
- How to phase the construction works?
- What kind of new skills will be required?

How to ensure there will be minimal disruption to the current operation?

Set the goals of automation project

- Cost savings
- Productivity targets
- Capacity increase
- Customer service improvement
- Safety improvement
- Sustainability

Possible ways for implementation

- Retrofitting to the current fleet and increase automation level in multiple steps
  - Block by block
  - Step by step
- Change the operating mode through yard expansion
  - Build automation first on a container yard expansion and make that operational, once that is done, gradually finish the existing yard as well
- Big bang approach
  - Construct the automation system in the middle of operation
  - Through a short downtime max few days convert from manual to fully automated

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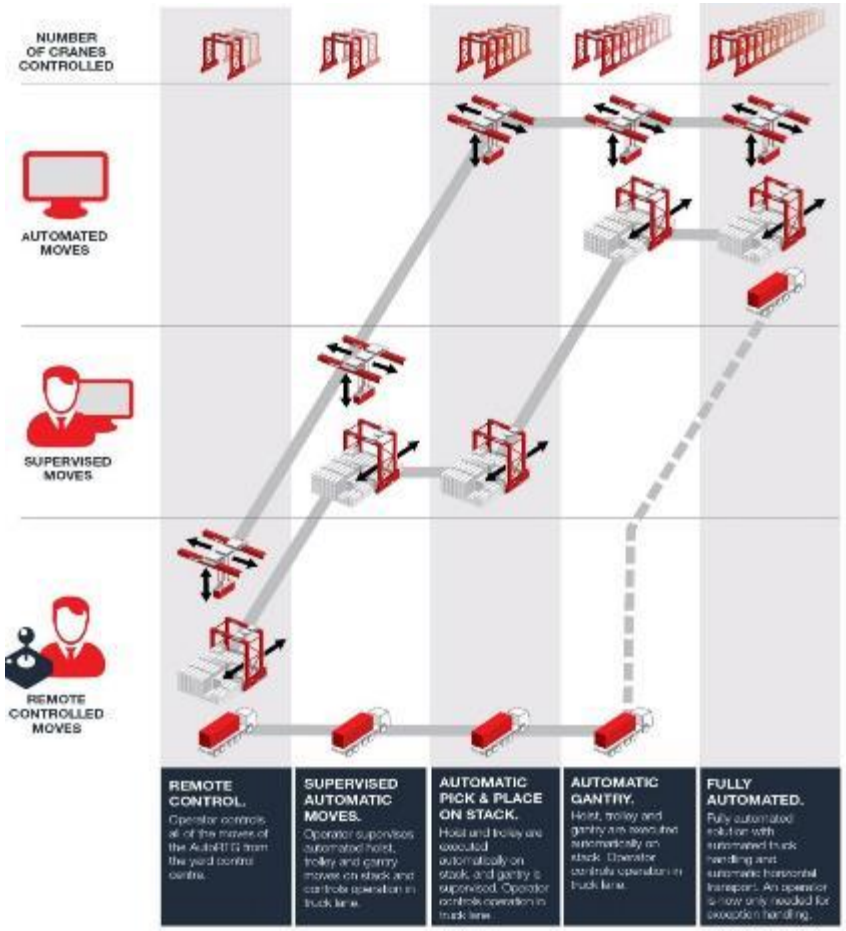
Retrofit and gradual increase



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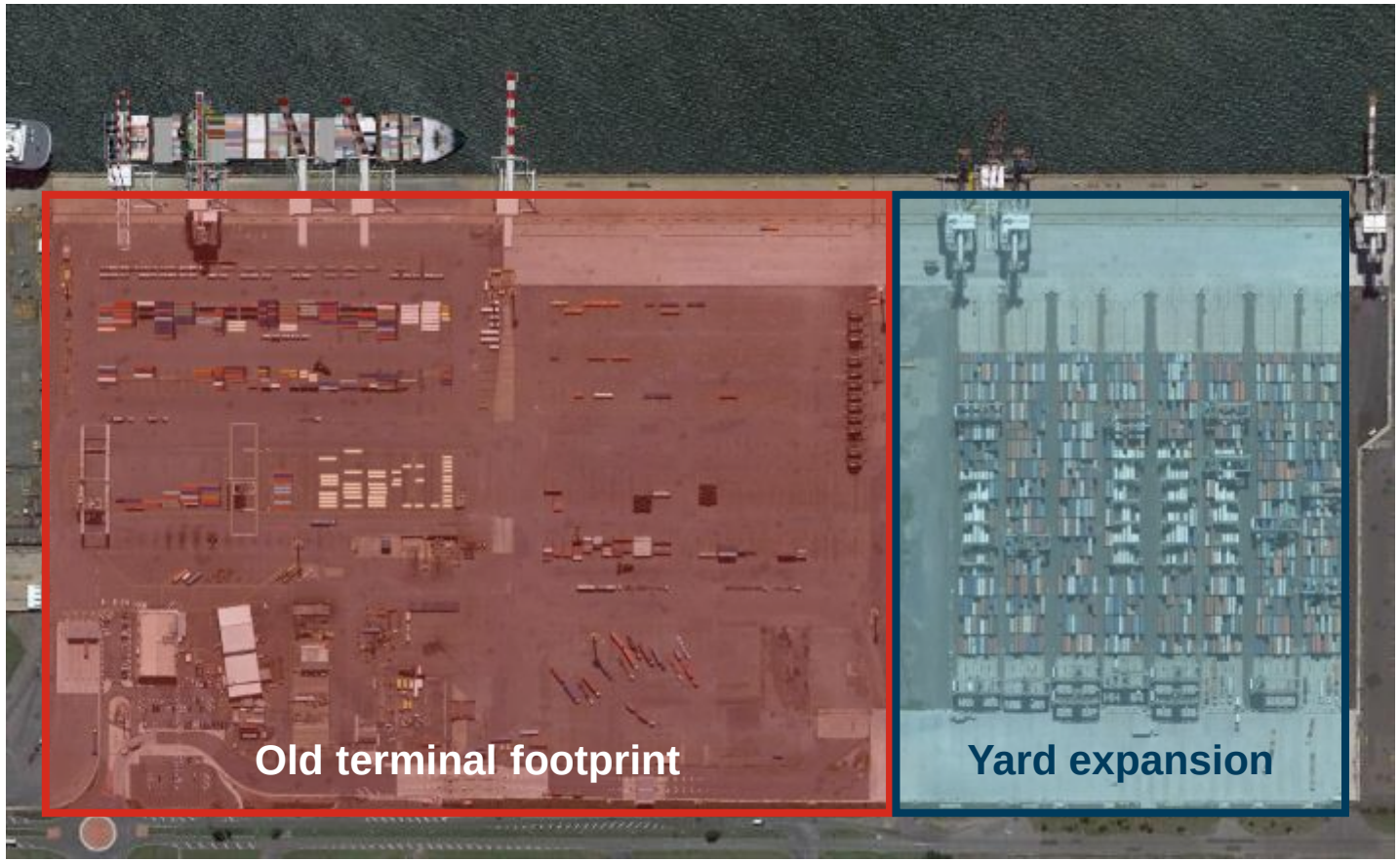
Change operating mode through a yard expansion



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Big bang approach

Example: Patrick Port Botany

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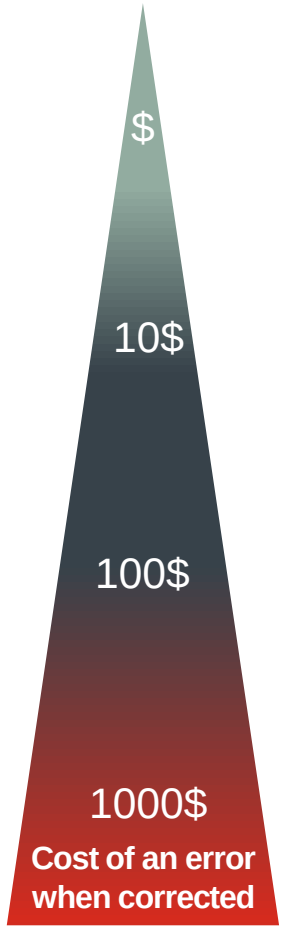
Whatever you do, it requires tedious planning

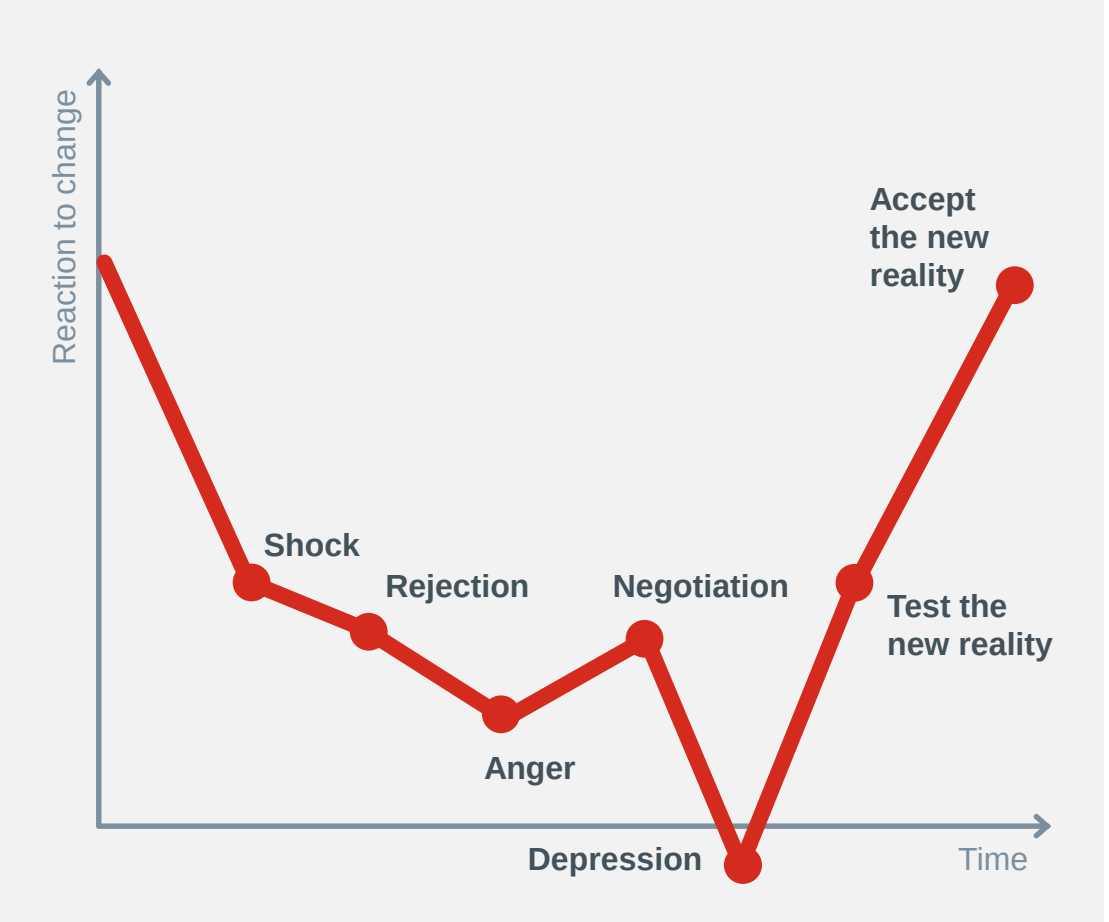
Project progress

Planning	Concept selection	Terminal Detailed Design	Validation, Simulation	Business Processes Modelling	Project approval
Preparations	Civil works contracts	Equipment contracts	SW / IT contracts	Change management plan	Project masterplan
Implementation	Civil works	Equipment deliveries	SW deliveries	Change management process	Joint Testing
Operation	Go Alive	Continuous improvement	Upgrades	Maintenance	



It is not just a technology project!

- Automation requires always a complete change in the roles, working procedures and methods
- Openness in the communication with people is a key
- Proper change management procedures have to be put in place to ensure that the change is adopted by the people
- Proper training needs to be in place from the beginning. Automation system still needs capable users to address exceptions.
- In the end it is the people who make it happen!



Summary

- Automation adoption in container handling industry has been increasing rapidly during last years
- Nowadays there are multiple automation solutions available in the market, for different equipment types and automation levels
- Brownfield terminals can follow several different ways for deploying automation in their operations
  - Gradual deployment through retrofits
  - Through yard expansion
  - Big bang approach
- Automation implementation to existing operation is always a challenging task that requires careful and tedious planning. Cost of an error increases rapidly after planning phase.
- Technology is only one part. Have the focus also in the change management prodecures.

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Together we can shape our industry
Thank you for listening
KALMAR

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Making your every move count.