

Kalmar Global

kalmarglobal.com

Instant insight

A groundbreaking solution will offer a real-time view of terminal productivity and performance

Today

**COST
MOVES**



KALMAR

Customer magazine 1/2016



06



12

16

“ Kalmar Insight helps terminals make sense of big data in order to harness its power. We will be able to provide terminal operators with true real-time data on current and past productivity.



27

Kalmar in social media

Have you visited our social media channels yet? Follow us in Twitter to get real-time access to our news and other topical matters. In Facebook, you can get a feel of our events from the pictures and videos we share. In LinkedIn we promote job openings and our most important news. Follow @kalmarglobal also in YouTube and Instagram.

www.kalmarglobal.com

Keep in touch with us



YouTube

LinkedIn

- 04** Cathrine Ramsdal sorts out drill pipes with a Kalmar forklift truck
- 05** IMO tightens container weight legislation
- 06** A successful automation project requires change management expertise
- 09** Advanced monitoring is a necessity in automated terminals
- 12** Smart solutions help the Port of Hamburg transform its operations
- 16** Kalmar unveils a groundbreaking performance management solution
- 18** The Port of Manzanillo is on its way to become the country's leading port
- 21** Kalmar FastCharge makes battery swapping a thing of the past
- 24** Kalmar T2's flexible design allows tailoring to customer specifications
- 27** CargoHack resulted in innovative solutions to improve the terminal industry
- 28** Lithium-ion battery saves time, money and trouble
- 30** News from around the world
- 32** Kalmar's leadership in automation has long roots
- 34** A vintage workhorse keeps tank containers clean in South Korea

Kalmar Global is Kalmar's customer magazine. **Publisher:** Kalmar, part of Cargotec, Porkkalankatu 5, FI-00180 Helsinki, Finland. **Editor-in-chief:** Maija Eklöf (kalmar.communications@kalmarglobal.com) **Managing Editor:** Kristiina Sikiö **Editorial Board:** Sonia Heinrich, Niclas Samuelsson, David Malmström, Annelies Nentjes, Cecilia Lo Greco Laustsen, Tiina Tausta, Shushu Zhang **Layout and production:** Zeeland Family **Cover:** Kalmar **Printed by** Hämeen Kirjapaino Oy. The opinions expressed by the authors or individuals interviewed do not necessarily represent the views of Kalmar.



Kalmar offers the widest range of cargo handling solutions and services to ports, terminals, distribution centres and to heavy industry. Kalmar is the industry forerunner in terminal automation and in energy efficient container handling, with one in four container movements around the globe being handled by a Kalmar solution. Through its extensive product portfolio, global service network and ability to enable a seamless integration of different terminal processes, Kalmar improves the efficiency of every move. www.kalmarglobal.com

Editorial

Everything connected to everything

Innovative organisations in both business and public sectors are using connectivity and big data to transform their operations and improve productivity. Sensing, machine-to-machine networks and automation are reshaping the container handling industry and port equipment. We call this the Internet of Things – IoT – but ‘Internet of Everything’ might be a more accurate term, because this connectivity is ultimately not about machines. It is about people; about creating new ways of delivering services to customers.

In Germany, the Port of Hamburg is using digitalisation, smart logistics and a holistic citywide innovation approach to double its capacity in the coming years without increasing the size of the port. An essential factor is the real-time sharing of data and information gathered from multiple sources, and making this data instantly available at all levels of the logistics chain.

This initiative is part of a larger sea change. For the first time, we are able not only to use the vast amounts of information generated and collected by our systems – big data – to gain insight into business and equipment performance, but to do it in real time. At this summer's TOC Europe, we are excited to unveil Kalmar Insight, a truly groundbreaking solution that offers manual container terminals a true moment-by-moment view of their productivity and performance.



Utilising big data isn't just about making the most of new technologies - it's about changing our culture and working practices. Open innovation provides new ideas to the industry and changes the way we co-create new services and solutions with our partners. We

are lucky to have close relationships with our customers, and with connectivity, this relationship will become even closer. I am looking forward to the bright future, working together with you and developing solutions that will benefit the entire value chain.

Olli Isotalo
President, Kalmar

The right stuff

When Cathrine Ramsdal picks up drill pipes for sorting, her Kalmar DCG 140 is an extension of herself. Together they perform as one, fluidly and efficiently.

Mongstad, an hour's drive from Bergen in Norway, is a major hub for the country's oil and gas industry and home to Norway's largest port. WellConnection's Cathrine Ramsdal plays her part to keep things rolling as she sits at the wheel of a Kalmar DCG 140 forklift truck.

Ramsdal has been at WellConnection, an inspection, maintenance and repair services company, for four years, and is now driving her second Kalmar forklift.

"I've worked with the new generation forklift for the past year, and I think it's a much improved version of the older one. It's fantastic to be able to make the cabin your own."

"When you drive a forklift for 5–6 hours a day five days a week, it's important that the seat, the steering wheel, and the controls are where you want them to be to avoid back or other muscle problems."

The adjustments may not be completely automatic, and Ramsdal has to make them every time she gets behind the wheel, but with her experience, the process is instantaneous and getting ready for the day takes no time at all.

Watching Ramsdal work makes you forget she's using heavy machinery, as she lifts drill pipes in a way that could almost be called delicate.

"Mostly we store pipes, but a lot of my work is sorting out our customers' pipes. Sometimes they borrow pipes from each other, so we have to sort them and we have to do it quickly. That's why the clamp attachment is so important, and the clamp on the new DCG 140 is much better."

"When I lift pipes off a vehicle, I have to be sure they won't fall off and damage the vehicle or injure anyone."

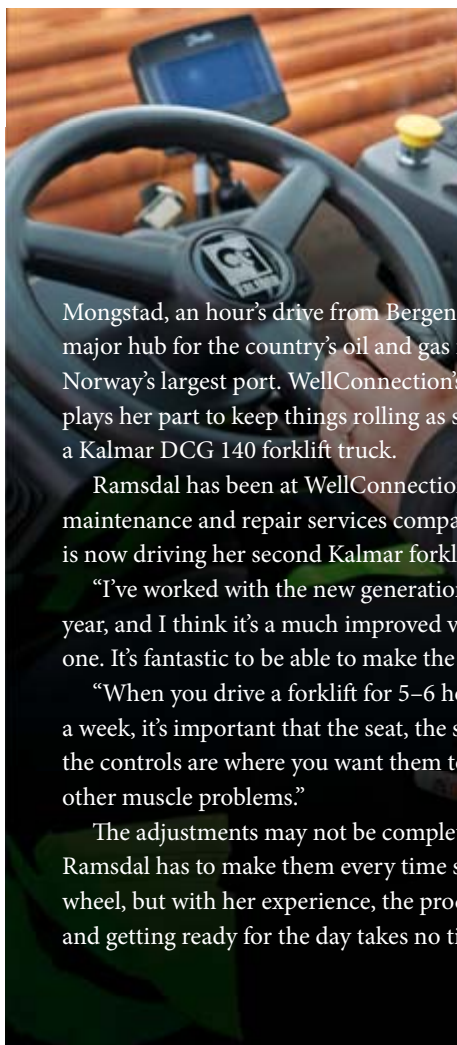
That is another reason Ramsdal likes the improved control safety system that prevents unsafe moves.

"Sometimes you need to reconsider things," she says.

Mostly, she's happy sitting in her forklift. While she wouldn't say no to pre-programmed cabin settings, she is content doing it herself at the start of her shift.

"The forklift is my most important tool. I have to be able to trust that it does exactly what I need it to, but I also know its limits."

Ramsdal's verdict on the new forklift? "In Kalmar I trust!" ■





IMO weighs in with container verification

The requirement making container weight verification a condition for vessel loading will become legally binding on 1 July 2016, just over two years after the IMO Maritime Safety Committee approved changes to the Safety of Life at Sea (SOLAS) convention. Kalmar Global spoke to **Lars Meurling**, Bromma's Vice President Marketing, about some of the key aspects of the legislation.

text PAUL GOLDEN

What is the purpose of the legislation?

Its main purpose is to address vessel stability and safety. If containers are not correctly declared when they are loaded onto a vessel, there is a potential risk of instability. The SOLAS acronym – Safety of Life at Sea – outlines the main reason why container weight verification is considered important, although there are also environmental and material concerns.

Does the lack of a single global standard for weighing equipment present a challenge for equipment manufacturers?

Yes it does. The IMO specifies 'national legislation regarding certification and accuracy to apply'. Theoretically this could mean 170 different standards and accuracies. The closest thing to a global standard is the International Organization

of Legal Metrology (OIML). The 60 member states of OIML and about equally as many Corresponding members have stated they will abide by its standards, but this is still not a global reach. I expect there will be countries where these standards will not be accepted or followed.

How does the new legislation affect Kalmar's customers?

It is the responsibility of the shipper to provide the verified gross mass. But terminal operators can gain a competitive edge by offering weighing services. Bromma has designed a solution that helps shippers weigh their containers without affecting cycle times and logistic flows. That includes load sensors mounted on spreader twistlocks, which means we can measure the weight when the crane lifts the container.

The basic principles of the IMO legislation

- + Before a packed container can be loaded onto a ship, its weight must be determined.
- + There are two permissible methods for weighing: weighing the container after it has been

- packed; or weighing all the cargo and contents of the container and adding those weights to the container's tare weight as indicated on the door end of the container.
- + A carrier may rely on a shipper's signed weight verification as accurate.
- + The lack of a signed shipper weight verification can be

- remedied by weighing the packed container at the port.
- + If a packed container is weighed at the load port, that weight is used for vessel stow planning.
- + Vessel stow plans should use verified weights for all packed containers loaded on board.

Cheers for change

Terminal automation leads to a revolution
in the way we think and work.
A comprehensive change management
plan is essential to ensure an outcome
with a robust bottom line and strong
workforce culture.

text HELI SATULI
photos KALMAR

From Jurassic Park to Star Wars. That's how **Mark Hulme**, Chief of Safety, Innovation and Integration, describes the change that took place at DP World Australia's Brisbane facility. The Port of Brisbane is the fastest growing port in Australia. To make sure the terminal is fit for the future, DP World Australia's facility underwent a total transformation that turned it into the most advanced semi-automated terminal in Australia. New facilities comprise 14 Kalmar automated stacking cranes, shuttle carriers and automated truck handling – all integrated to operate optimally with the Kalmar terminal logistic system and the Navis terminal operating system. This huge project was completed on schedule, on budget and with zero forced redundancies.



Listen, talk, repeat

Without a comprehensive change management plan, the Brisbane project would have been mission impossible. “We began the planning process in 2008 and the new terminal went live in May 2014. Six years is a long time for the workforce to operate under constant change,” explains Hulme, a former Brisbane General Manager with extensive experience in terminal automation projects.

According to Hulme, terminal automation is, in fact, more a cultural and change journey than a technical issue. The most important element of successful change management is continuous and open communication with all stakeholders. Automated operations require radically different skillsets than traditional terminals. Fewer employees are required for basic container operations and traditional maintenance tasks. Almost everyone’s role and work changed at the Brisbane facility. Hulme adds that automation also meant cutting the workforce nearly by half.

“This naturally caused a lot of uncertainty,” says Hulme. “Who stays and who goes? At the same time, we needed to take care of customers and run the day-to-day business efficiently.”

The time to repair the roof is when the sun is shining. So in 2010, before the automation project started, Hulme launched an employee engagement program to keep the workforce up to date as information became available. The aim was to ensure effective sponsorship for the project at all levels: members of the board and senior management, as well as each and every employee at the terminal, down to the newest trainee.

“We repeatedly explained the process, what was happening at that moment and the next steps to be taken. We explained why it was essential to make this big change.” The reasons were clear. “We wanted to deliver exceptional customer service, and grow and offer jobs in the future in a very competitive business environment,” says Hulme.

In addition to regular town hall meetings or briefings, management provided a great deal of written communication. Employees also had a chance to meet managers individually to discuss difficult issues that they might be uncomfortable discussing in large groups. Hulme underscores that terminal automation is a labyrinthine project. It’s important to keep the end goal crystal clear in everyone’s mind. He recommends building a vision of where the company wants to be when the project is finished and then making sure everyone understands and shares this vision. Otherwise, there is a risk the project will run overtime, over budget and fail to meet critical objectives.

Change skills not people

DP World Australia took a tight partnership approach with all of the 30 contractors involved in the project delivery. Hulme and his team spoke regularly face-to-face with their contractors and held video meetings. “Kalmar was our key partner. We agreed to talk openly and work out solutions to everything together. The commitment to a partnership from Kalmar’s side was outstanding,” says Hulme.

One of the most important stakeholders in the process was the Maritime Union of Australia (MUA), which represents the majority of employees. The MUA was kept informed as much as possible from the very beginning. Employee representatives and management, for example, worked together in many areas, including how workforce reductions would be handled. Thanks to that close cooperation, there were no forced redundancies. There was some natural attrition through retiring employees and others who left to pursue new careers. During the entire project, DP World Australia lost zero hours to



industrial action, which is a credit to the maturity of both parties throughout the process. Industrial action is a common challenge in civil construction projects. Last year (2015) alone saw over 83,400 lost working days due to industrial disputes in Australia.

“Training was essential,” says Hulme. “Sophisticated equipment requires a higher level of skills to operate the machinery. In addition, a major retooling of skills and how to apply them in our maintenance operations was required. With manual equipment, human operators can compensate for the quirks, hiccups and deficiencies that occur from time to time. But automated equipment needs always to be in perfect working order.”

Hulme notes that he was lucky to have a strong team with the right skills, experience, attitude, and above all, commitment. Team members were not only specialists in their own area, but they were also capable of taking a cross-functional approach.

“We could not have achieved this transition without the commitment from employees at all levels of our organisation. Happily, we hired very few additional staff and instead focused on changing the skillset of our existent employees,” says Hulme.

DP World Australia purchased a training simulator. Workplace trainers were involved in the process, commissioning and building the training package. Employees then trained their colleagues to use the new shuttle carriers. The result was a seamless transition.

“Damage is a big issue for equipment at ports. Thanks to the extensive training and familiarisation undertaken, we have had no serious damage to shuttle carriers since we went live. Our Brisbane terminal now has the best operators in the country,” beams Hulme.

Full speed ahead

According to Hulme, the biggest challenge was running existing operations alongside the terminal automation project. Thanks to the strong employee engagement, team members were able to come up with quick, innovative solutions to everything from meeting customer expectations and modifying existing work practices, to setting departure times. “They took ownership of the issues at hand and ownership of the entire project.”

Automation has significantly improved productivity and safety at DP World Australia’s Brisbane facility. The majority of trucks are now processed through the terminal in under 30 minutes. The 50 tonne ASCs are operated remotely, taking workers from the yard and quayside to the safety of the control room. But even more significant, the working culture is more vibrant than ever before.

The latest survey shows that the level of employee engagement is an impressive 80 percent. Hulme underscores that the project has made the company stronger in every way. DP World Australia has already ordered two new ASCs for Brisbane, due for delivery in mid-2016, and has publicly stated their intention to go ahead with a similar automation project at its Sydney facility in the near future. ■



Commitment from employees at all levels was essential for successful transition to automation, says DP World's Mark Hulme.

7 commandments for successful change management

- 1.** Ensure buy-in at all levels: members of the Board, senior managers, site manager and employees. Launch an employee engagement program before the project begins.
- 2.** Engage with employees: constant and open communication is essential. Keep the workforce up to date at all times. Explain why the change is needed.
- 3.** Focus on the goal: build a common vision of where the company wants to be when the project is finished. Make sure the vision and the steps taken to realise it are shared.
- 4.** Bring employees and their unions on board: involve employee representatives right from the start. Plan what you can do together, for example, training and how to implement possible workforce reductions.
- 5.** Build a strong team: ensure the workforce has the right skills, experience and commitment. Train employees to train other employees.
- 6.** Take a partnership approach with contractors: talk openly and regularly, agree to disagree and work out solutions together.
- 7.** Make change stick: monitor employees' reactions and measure workforce culture via surveys, focus groups and other means.



In automated terminals, advanced monitoring tools are essential to know what is going on with the fleet.

Supporting the future

text THOMAS FREUNDLICH
photos KALMAR

Kalmar services help sustain optimum performance for automated terminals.

When automating a manual container terminal, the first considerations are installation of the automated equipment and building the infrastructure needed to run it. However, it is equally important to provide the necessary services to ensure optimal performance. Decisions on services are taken at the migration planning phase, continue through the deployment and start up phases, and extend into maintenance planning and optimisation over the lifetime of the terminal.

Manual container handling equipment can function even if the machines are not in perfect working order because human operators can work around problems or faults that arise with the equipment, and they can handle unexpected problems or situations with the operational processes. In contrast, automated equipment must operate steadily at optimal levels to ensure fluid performance.

In a manual terminal, replacing and repairing individual components or machines typically has a small impact on the overall performance of the terminal. The situation is very different with an automated terminal.

“In the worst-case scenario, the breakdown of a single piece of equipment can lead to a shutdown of the entire terminal for 15 to 30 minutes to remove the machine from the yard,” says **Arto Keskinen**, Director, Service Contracts, Kalmar.

Converting to automation requires a major rethink of practices and attitudes for the terminal’s maintenance team, as well as retuning its relationship with operations and IT. “In a manual terminal, these are traditionally separate organisations. With automation, they need to be more tightly integrated. This is a very new concept for many terminals,” states Keskinen.

In addition, the workload of the maintenance team changes in automated terminals as the scope for human error is reduced or even eliminated. Manned equipment events, such as collisions, accidents and unscheduled repairs, are dramatically reduced.

The result is another plus for automation in overall, long term cost savings.

“Monitoring is no longer ‘nice to have’ but an absolute necessity.”

Data-driven decisions

Standard maintenance intervals – typically every 1,000 operating hours – are the same for both automated

and manned equipment. However, short-term maintenance checks become more important at automated terminals because of the absence of human input on the status and condition of the machines.



“Without advanced monitoring tools, there is no way to know what is going on with the fleet,” says **Ilkka Annala**, Vice President, Project Delivery, Kalmar Automation and Projects. “Monitoring is no longer ‘nice to have’ but an absolute necessity.”

Kalmar’s automated equipment is monitored 24/7 by equipment control systems. Performance data is captured in one system, such as Kalmar FleetView, and the data makes it possible to track trends and schedule predictive maintenance. Decisions are based on data gathered from the machines.

“In automated terminals, the system collects and measures key equipment performance and availability metrics that

have been typically collated manually for decades,” says Annala. “These statistics are highly important for terminals looking to understand and optimise the performance and usage of their fleets.”

Fine-tuning performance

The experience gathered through Navis’ optimisation services in support of the Navis N4 TOS provides additional insight into how terminal operators need to review performance, analyse data, and fine-tune the use of the systems that support the automated equipment in order to optimise cycle times and maintain operational performance.

“When implementing a TOS for automatic terminals, there are some special factors that need to be considered,” says **Peter Miedema**, Vice President Professional Services EMEA, Navis. “For example, we have found the importance of a comprehensive professional testing strategy to improve the performance of the terminal by continuously improving systems, equipment and people.”

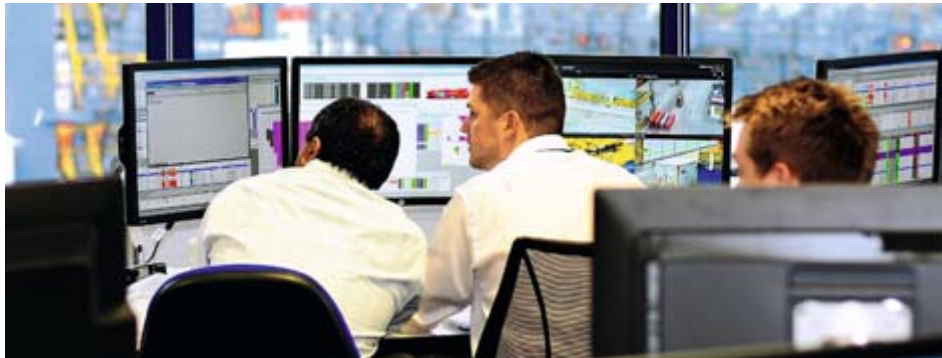
Another nugget gleaned from Kalmar’s and Navis’s extensive experience in terminal automation is ‘exception handling’. Miedema says they can’t fall back on the ‘happy day scenario’ of container flows. “We need to ensure that we can stay operational when things don’t go to plan, and are prepared for unexpected operational problems. There are no manual workarounds. In automated terminals, this must be the focal point of services, testing and training.”

Moving to the next level

“With Kalmar and Navis, we are in the privileged position of having worked on some two-thirds of all terminal automation projects in the world, so we can bring a lot of experience to the table,” says **Mike Medcalfe**, Vice President Integration Services, Kalmar.

In the planning phase, Kalmar helps the customer develop their business case, equipment choices and terminal plans. “We can bring together a complete integrated automation offering through our OneTerminal concept,” Medcalfe says. “This means that in the start-up phase, we can work with our customers to find ways of shortening the time to evaluate the solution. Our products are pre-integrated, which reduces the integration test time for the project and helps to get the terminal up and running as quickly and as efficiently as possible.”

Once the automated terminal is operational, Kalmar helps maintain the equipment to its optimum capacity and optimise the system. “Terminal automation will continue to evolve rapidly. Whether it’s utilising the latest technology or fine-tuning the performance of an existing deployment, we need to be there to help our customers get to the next level of productivity,” says Medcalfe. ■



Up and running

Kalmar services ensure a swift and smooth automation start-up.

The most critical phase in an automation deployment is the ramp-up to production. Kalmar supports terminals in the full range of start-up activities required.

“There is often a sense of urgency to get the system running, even if all the in-house competence is not yet in place,” says Kalmar’s Arto Keskinen. “This is where we see the biggest risks for unplanned downtime. So we can step in to support the customer with getting the right processes and resources ready.”

In the start-up phase, expertise within the organisation typically needs to be brought

up to speed with training and external support.

“Automated terminals call for a new calibre of technical competence,” Keskinen notes. “All levels in the organisation, including the traditional technical roles, will require some understanding of the entire automation system.”

In the start-up phase, Kalmar experts serve as “co-pilots”, supporting terminals through an education and knowledge transfer period while the operators develop their skills and accrue experience. Maintenance operations also need to be up and running from the outset. “The start-up is the ideal time to establish the routines that ensure optimum performance in the long run,” Keskinen says.

Features

Pages 12–27

12

Hamburg's
smartPORT
strategy
improves port
efficiency



16

Kalmar Insight gives
access to real-time
productivity figures

24

Kalmar T2 is ready
to take Europe by
storm

21



Smart port works with the city

The Port of Hamburg uses digitalisation and a holistic innovation approach to transform its operations

text THOMAS FREUNDLICH photos SHUTTERSTOCK



Connectivity and smart solutions are changing the world, including cargo handling and terminal operations. SmartPORT Hamburg is a long-term strategy that improves port efficiency with intelligent port logistics. Focusing on infrastructure, traffic and cargo flows, the project is part of the wider Hamburg SmartCity initiative that aims to digitally enhance the city habitat to the benefit of its citizens.

With two million inhabitants, Hamburg is the second-largest city in Germany, and the heart of the country's most dynamic

“A special focus lies in infrastructure, traffic and trade flows.”

business region. It is also the German logistics, trade and aviation hub. The city port is Europe's second-largest, and it is the number one railway port on the continent.

The movement to digitise was pioneered by the Port of Hamburg, which is growing rapidly. Unlike many other major European ports, this port is embedded in the city it serves. In 2015, the Port of Hamburg handled 8.8 million containers, and that figure is expected to rise to 18 million by 2030. Hamburg smartPORT facilitates an ambitious goal to double the capacity of the port while retaining the existing size of the area. It also means making the port less dependent on conventionally generated electricity by switching to renewable sources.

Smart traffic flows

“The port of Hamburg is the backbone of Hamburg's economy,” says **Jens Meier**, CEO of the Hamburg Port Authority, which initiated the smartPORT strategy. “However, we are faced with a challenge. We cannot and do not want to expand our

roads, rails and waterways indefinitely. ‘Smart’ means the exchange of information to increase the quality and the efficiency of the port as an important link in the supply chain.”

A special focus of smartPORT logistics lies in infrastructure, traffic and trade flows. An intermodal Port Traffic Centre will interlink the various modes of transport and make traffic on water, rail and road more efficient. The centre will process all traffic information collected in the Port of Hamburg and circulate it to users. Transport users and decision-makers will then be able to follow the relevant traffic information in real time, enabling them to choose the fastest and most favourable mode of transport to get their goods to their final destination.

With smartPORT logistics, the Hamburg Port Authority can interlink and manage the services and functions offered by different providers. For example, truck drivers and schedulers will receive personalised traffic and infrastructure information about the traffic situation in





the port and on the autobahns, closure times of movable bridges and other infrastructure information, the status at the container terminals and depots, and parking facilities. This information will enable them to respond to changes quickly, and to avoid disruptions in logistics processes.

The project includes extensive digitalisation of the infrastructure in and around the port, including advanced sensing on rail and switches to monitor their maintenance needs; mobile all-purpose GPS sensors to track vehicle and crane locations and even flows of the Elbe River; and smart sensing and lighting on roads. The ultimate aim is to interconnect all parties to the port logistics chain.

Connecting with the city

“The most notable aspect of the smartPORT strategy is the way it really goes beyond the port itself,” says **Mirko Bass**, Head of Country Digitisation, EMEA & Russia, Cisco Systems. Cisco heads the company ecosystem working on smartPORT in cooperation with the City of Hamburg and the Hamburg Port Authority.

“Anything that happens in the port affects the entire city. With this project, we are looking at ways to use technology to

double port capacity without doubling land usage, and at how to be more efficient with intermodal, road and rail transport. But it’s also about a more holistic view, making all data available in real time, and providing it to the entire ecosystem to facilitate speedy decision-making,” notes Bass.

“Anything that happens in the port affects the entire city.”

“Through a large number of projects with many different partners, we are laying the foundations for the intelligent, smart city of the future – a city that uses technology to protect resources and to move closer to its citizens,” commented **Olaf Scholz**, Mayor of Hamburg, at the signing of the memorandum of understanding to establish the smartPORT project in April 2014.

Since its inception two years ago, the project has been running well. “The next phase is to take the data already generated from the various installed solutions and connect it to the rest of the city,” says Bass. “For example, construction workers will be able to input information on a construction site at the push of a button that will automatically reroute directions in applications providing traffic information in Hamburg.”

The heart of digitalisation

Digitalisation is taking the world by storm, as transformations already seen in consumer markets permeate into industrial and



logistics processes. The Internet of Things – or perhaps more accurately, the Internet of Everything – is here, today.

“We live in extremely interesting times,” says **Lasse Eriksson**, Vice President, Digitalisation at Cargotec. “Digitalisation is a genuinely transformative force. At its core, it’s often about removing a pre-existing limitation in a process. But these changes can have tremendous add-on effects throughout the entire logistics or supply chain. This is what the Port of Hamburg is doing, and it is right at the center of digitalisation.”

Eriksson emphasises the need to view the port or terminal not as a separate entity, but as part of a larger whole. “You need to look at everything that it is connected to. This is something that we do see our customers already embracing, and there are some very

interesting digitalisation projects underway around the world.”

An industry undergoing rapid digitalisation also calls for a new kind of collaboration between companies and customers. “The traditional equipment provider’s role might no longer

“In the future, ports may see themselves more and more as a worldwide logistics chain.


be enough,” says Eriksson. “One needs to move the entire conversation to another level, to what is happening around the port, how the links of the logistics chain fit together, and how companies can bring added value through more advanced solutions, including process automation. This can be complex – and challenging – but there are massive benefits to be gained.”

Leading the way together

The results in Hamburg have generated worldwide interest. “Other ports and cities are definitely looking at Hamburg. They have done a great job of advocating and managing a genuine infrastructure for innovation, giving people the time and resources to innovate,” says Cisco’s Mirko Bass.

As technology becomes increasingly standardised and commoditised, Bass foresees ports increasingly cooperating with each other. “There is a clear business need for working together and sharing information. In the future, ports may see themselves more and more as a worldwide logistics chain instead of just as competitors.”

“Connectivity alone doesn’t make a difference,” says Lasse Eriksson. “You need to be able to create meaningful digital offerings on top of it. But this is the interesting part, and the one that all the discussion is centered on.” ■



New Kalmar Insight enables real-time access to terminal productivity data.

Instant insights for instant impact on terminal productivity

text THOMAS FREUNDLICH
illustration KALMAR

Kalmar has unveiled a groundbreaking performance management and improvement solution that offers terminals, for the first time, a true real-time view of their productivity and performance.

Kalmar Insight is a cloud-based software service that combines data from equipment fleet, Terminal Operating System (TOS) and the terminal's Maintenance Management System (MMS). The solution aggregates the data from these sources and displays the most relevant information on a single user interface with simple dashboards.

"Kalmar Insight helps terminals make sense of big data in order to harness its power," says **Kimmo Kallioniemi**, Vice President, Service Business Development, Kalmar. "For the first time ever, we can provide terminal operators with true real-time access to data on their current and past productivity."

By aggregating real-time business data into easy-to-read management dashboards, the solution allows terminal management to identify and plan operational actions that will have an instant impact on the business. The dashboards have been tailored for different user groups: senior management, operations

management, maintenance management and health and safety officers.

For operations management, the solution enables access to real-time productivity figures that can be evaluated against historical data from the terminal. Maintenance management can use the solution to view the status of the entire equipment fleet and coordinate with operations to respond proactively to expected peak performance needs.

Senior management also has access to customised dashboards on the productivity of each shift. "For the first time, we can provide real-time figures on the actual moves per hour and cost per move at the terminal," Kallioniemi notes.

Data from equipment, the TOS and MMS is processed through standard APIs, and Kalmar Insight will be fully compatible with equipment from all manufacturers.

"One of the major benefits of Kalmar Insight is that manually operated terminals now have access to many of the analytics features that have previously only been available to automated terminals," says Kallioniemi.

Kalmar Insight was introduced to the market in June 2016 at TOC Europe. ■

Kalmar Insight

Instant insights:

- Ability to aggregate data from equipment, TOS and MMS
- Making sense of aggregated data
- Dashboards for senior management, operations and maintenance
- Holistic view of ongoing operations

Instant actions:

- Real-time shared information for impactful decisions
- Enables optimal planning and execution of operations

Instant impact:

- Optimal utilisation of assets
- Increased moves per hour
- Reduced cost per move
- Safer working environment

“Manually operated terminals now have access to many features that have previously only been available to automated terminals.”

Mexico's premier port
expands with the help
of Kalmar solutions.

for

Aiming and wide

text MARKKU SAKSA,
THOMAS FREUNDLICH
photos NICK SOUZA





 Kalmar technicians keep the equipment working at its optimum.

The Port of Manzanillo in Colima, Mexico is undertaking an ambitious expansion project to position itself as the leading port in Latin America. Employing the latest equipment as well as strong customer and industry practices, Manzanillo is now Mexico's premier port and the fifth-largest in Latin America.

Phase 1 of a three-phase, 12-year project to create a new terminal in Manzanillo has exceeded expectations. The work is being carried out by the port's operator and developer, Contecon Manzanillo SA (CMSA), the Mexican subsidiary of International Container Terminal Services Inc. (ICTSI), one of the world's leading container terminal operators.

Surpassing targets

A bird's-eye view of the new port expansion, located on one of the country's most beautiful Pacific seafronts, reflects a shiny mosaic of productivity and efficiency with containers stacked high and moving seamlessly under a bright Mexican sun.

"Container traffic has increased, even outperforming productivity targets for the new terminal, and port capacity has doubled. Today, we can confirm that we are meeting our commitment to make Manzanillo the country's leading port," says **Fortino Landeros**, CEO of CMSA.

Mr. Landeros says investments have focused on infrastructure and the newest high-technology equipment for port management, as well as on personnel training.

"Phase 2 starts in 2017 and Phase 3 in 2020, and when completed, we will consolidate the port as the leading gateway for Mexico's foreign trade with high volume and high productivity. We are very happy and pleased with how rapidly we are expanding."

Deep partnership

ICTSI has successfully used Kalmar equipment in the past and turned again to Kalmar for the new project. For the port expansion, CMSA selected a combination of Kalmar RTGs and terminal tractors to accomplish the capacity increase needed to satisfy their customer base.

"We ordered from Kalmar because we believe that their equipment is first class. They presented the best design and quality and offer the best maintenance service for us," says Landeros.

"Our partnership with Kalmar has been very important from the beginning because of the brand's reputation and guaranteed quality. Kalmar's after-market services ensured that the equipment worked perfectly once it arrived at the terminal, and everything was on time to keep our customers satisfied."

Thinking globally

The port expansion project was inaugurated in August 2013 and operations started a year later with the arrival of the first vessel from Danish megaliner Maersk. Subsequently, CMSA has added three more lines to its portfolio, with the Swiss MSC, French CMA-CGM and Chilean CSAV operating a joint service from Asia. Total annual throughput was 537,000 TEU in 2015.

Phase 1 of the project covered 42 hectares with 720 metres of quay length. Eventually, the \$500M expansion project will extend to 72 hectares on the beautiful Mexican seafront.

Manzanillo is the only port in Mexico capable of double-stacking containers onto railcars, providing efficient movement of cargo throughout Mexico and as far away as Texas. It is poised to be a major port serving the Pacific Rim and beyond. CEO Fortino Landeros expects that in the next eight to ten years, the port will see an annual capacity of 2 million TEU. 

» Modern facilities

The project in Manzanillo is part of ICTSI's strategy to expand its international and domestic operations. Established in 1987 and headquartered in the Philippines, ICTSI is a leading port operator and innovator in the field. The company has pursued a strong international and domestic expansion program since 1994 with worldwide operations.

Manzanillo boasts modern facilities, including four Kalmar super Post-Panamax quay cranes that can serve a vessel of up to 22 containers wide. Landeros says that world-class infrastructure, equipment and technology, along with the best industry practices, transparency, agile processes and excellent client service make CMSA the best port services option on Mexico's Pacific Coast, and will help to realize Manzanillo's goal to be the country's leading container terminal.

Turnkey process automation

As part of the expansion project, CMSA has deployed an extensive range of Kalmar process automation solutions. In addition to boosting terminal performance, process automation also increases occupational safety as well as cargo security at the port.

At Manzanillo, Kalmar SmartRail provides automatic gantry steering for Kalmar RTG cranes, which increases crane handling and stack preparation speed, decreases crane-to-container collisions and increases operator comfort. Kalmar SmartFleet improves operational

transparency and reduces downtime through remote equipment monitoring and reporting. SmartTrucks uses temporary RFID tags to identify and track up to 150 road trucks moving through the yard.

SmartLift automates the job promotion and container handoff between the lifting equipment and the terminal tractor/street truck, while SmartStack automatically captures container movements and accurately reports their locations to SPARCS N4 in real-time. SmartPath optimises the routing of the terminal's 30 tractors, and the SmartMap visualisation tool provides real-time and retrospective monitoring of all equipment movements in the terminal yard.

The process automation was delivered as a turnkey installation by Kalmar, which decreased project risks for CMSA. Kalmar automation solutions are pre-integrated and pre-tested, and nowadays the hardware is installed on the equipment already at the factory. This ensures delivery of proven solutions and minimizes the need for on-site testing prior to production use.

Engine of development

The port expansion project also has an important social and economic dimension. According to Landeros, CMSA has a strong commitment to hiring qualified people for each position. "This allows for constant training, which provides excellent growth opportunities

for our employees. CMSA workers are responding positively and every day we are working together to reach our goals."

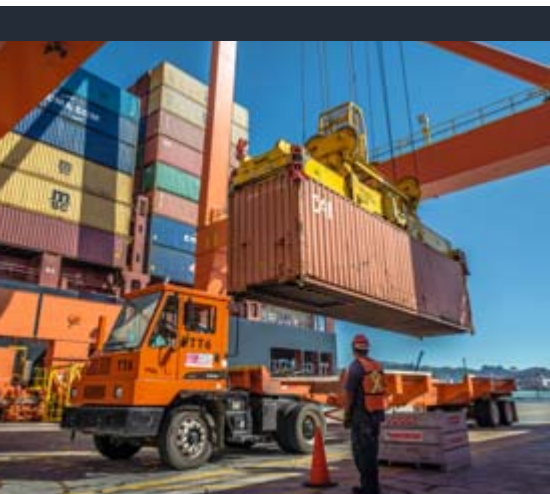
Landeros also points with pride to the some 600 direct positions of employment and 1,100 port-related jobs created by the port expansion, and the positive social and economic impact it is having in the region. Colima officials see the port as the cornerstone of the state's economic development, and the expanding capacity as a draw for other industrial activities.

Meeting the challenges

A major project like the Manzanillo port upgrade has its challenges. "One goal that is also one of our biggest challenges is to reduce dwell time at the terminal. The dwell time for containers at the port is currently around six days, but we want to lower that. Another goal is the turnaround. In the first stage, trucks stay in the terminal for 30 minutes, but we are working to reduce that as well," says Landeros.

Meeting the challenges, building the new port, and having completed the first phase of the project, Landeros is satisfied with Kalmar's role as the main partner in reaching their goals. "They provide the right equipment, the right service and are on time to keep our customers satisfied," he says.

The strong partnership between CMSA and Kalmar will continue as Phases 2 and 3 of the Manzanillo expansion upgrade project are implemented, keeping CMSA on course to realise its ambitious aims for the Port of Manzanillo. ■



Kalmar fleet

- CMSA's Kalmar fleet includes four Kalmar Super Post-Panamax ship-to-shore (STS) cranes, 16 Kalmar E-One² RTG cranes, 5 Kalmar reachstackers with 45 ton lifting capacity and 30 Kalmar Ottawa 4x2 terminal tractors.
- The STS cranes have an outreach of 63 metres and maximum lift capacity of 65 tonnes with twin-lift spreaders.
- The RTGs are 6+1 wide and 1-over-6 high with a lift capacity of 41 tonnes.
- All STS and RTG spreaders are by Bromma.
- The Kalmar Ottawa 4x2 terminal tractor has been designed as the most durable yard tractor on the market.
- Process automation includes SmartRail, SmartFleet, SmartTruck, SmartLift, SmartStack, SmartPath and SmartMap solutions.
- CMSA uses the Navis N4 terminal operating system, which fully supports also automated operations and processes.

text MARJAANA LEHTINEN
photo LAURA VESA

No more battery swapping



With Kalmar's innovative and industry-first fast charging solution for hybrid and fully electric powered shuttle and straddle carriers – **Kalmar FastCharge™** – terminals will be able to meet tightening environmental requirements without compromising productivity.

A frequent question in every terminal operator's mind is how to boost efficiency and at the same time reduce emissions. The two targets often contradict each other. Kalmar experts have been working hard on this challenge. In 2013, they came up with a hybrid straddle and shuttle carrier that combines a small diesel engine with a lithium-ion on-board battery system and consumes up to 40 percent less fuel than a traditional shuttle carrier equipped with an efficient diesel engine.

Now these bold Kalmar innovators have taken one step further by removing the diesel engine altogether, scaling up the lithium-ion battery and using it as the only power source. "This is a logical step forward for many reasons. Global oil resources do not last forever. The operators want to reduce fuel consumption to save money as well as reduce CO₂ and NO_x emissions," says **Henrik Häggblom**, R&D Manager, Horizontal Transportation, Automation & Projects, Kalmar. "Kalmar is the industry frontrunner and has now developed a locally emission-free machine without compromising on efficiency."



The new solution is economical, too, as it does not require any additional machines to the fleet and features low operating and maintenance costs, all resulting in lower total costs of ownership.

Flexible charging on the working route

All electric powered equipment must be charged. Instead of traditional overnight charging or complicated battery swapping, the Kalmar FastCharge utilises automatic fast charging, so-called opportunity charging. It takes place during the natural duty cycle and the idle time when the machine has stopped to wait for a container.

This novel approach minimises the charging time and makes the charging process smooth as the typical charging time in operation is only 30 to 180 seconds. With the maximum charging power of 600 kW, full charge can be achieved in just a few minutes. However, the best charge level of a lithium-ion battery is about 40 to 95 percent. A frequent short charging time is good for these batteries as deep discharges shorten battery lifetime.

“The Kalmar FastCharge solution is based on the same opportunity charging

technology that is used in some electrical buses. We have closely followed their development and adopted proven and safe practices from them into the terminal environment,” Häggblom explains.

Battery charging is achieved with an inverted pantograph direct current charging system, fully automated in operation. The charging station is located flexibly on the machines’ working route in the terminal. As a rule of thumb, one station serves three vehicles, depending on their energy consumption.

Many ‘Gyro Gearlooses’ involved

The solution has been developed by a number of people in Kalmar’s R&D and engineering departments and prototyping workshop in Technology and Competence Centre in Tampere, Finland, for some years now. “Great new ideas are seldom produced by only one ‘Gyro Gearloose’ but instead

by a team that carries out experiments together and shares ideas. That’s exactly what our main philosophy at Kalmar’s Technology and Competence Centre is all about,” Häggblom says.

Adopting new ideas from a totally different field calls for boldness and open-mindedness. “You have to believe in what you are doing. I think that the strength of our team lies in the fact that there is so much diverse know-how involved, and people trust that everybody does his or her share in the project. It is actually the only way to push

“The strength of our team lies in the fact that there is so much diverse know-how involved.”

forward major innovations,” Häggblom points out.

Kalmar’s prototyping workshop, automation test field and laboratory have all played an important role in creating something totally trailblazing in the industry. Since nothing like this has ever been done before, there are naturally no blueprints to follow.



“Kalmar FastCharge utilises so-called opportunity charging.”

Modular and scalable layout for all needs

Hägglom emphasizes that the first published layout of the Kalmar FastCharge solution shows just the basic idea. Thanks to its high flexibility, the solution can be tailored to meet each terminal's specific needs and to fit its container yard, and thus the layout can look totally different.

"The solution is simple, modular and suitable for any terminal that operates with straddle and shuttle carriers. One of the strengths of Kalmar FastCharge is its scalability. It is equally applicable for small or large terminals, existing or greenfield, as well as manual or automated operation. We are able to create many kinds of different set-ups and multiply their number according to each terminal's needs," he adds.

The basic Kalmar straddle or shuttle carrier has been changed as little as possible. The diesel engine has been removed, battery capacity has been increased and a contact dome for the pantograph has been added. As the contact dome – the current collector – is located on top of the machine frame, it is very safe for the machine operator.

In addition to the machine, Kalmar's full-scope delivery includes the pantograph, a charging pole, a charging power station packed in a 12-foot container and WLAN communication between the machine and the charging station. The idea has been to keep the infrastructure cost low.

The Kalmar FastCharge solution is not only applicable for new machines but can be retrofitted to most of Kalmar's existing ones.

Available for sale later in 2016

Kalmar plans to bring its first straddle and shuttle carriers featuring the FastCharge solution to market during the latter part of 2016. Currently, further trial tests are being carried out at the Technology and Competence Centre to be followed by tests at customer terminals.

"The interest shown by our customers in this fast charging solution has surprised us. We came out with the news about its launch in December 2015 because we wanted to inform our customers about the feasibility of this new horizontal transportation solution in case they start to plan new investments," Hägglom concludes. ■



The FastCharge solution has been developed by Kalmar's R&D and engineering departments and prototyping workshop in Tampere. Pictured here are Jeroka Alanko, Henrik Hägglom and Hannu Santahuhta.

The supporter and enabler in R&D

One of the team members who have been closely involved in developing the Kalmar FastCharge™ solution is **Henrik Hägglom**, M.Sc. (Tech.). At the beginning of 2016, he was appointed R&D Manager, Horizontal Transportation, Automation & Projects. Hägglom has worked with Kalmar for over nine years, mostly developing new products and solutions.

What fascinates you about R&D?

My education, personality and past work history with machinery all make me lean towards it. I enjoy creating something new and meaningful. It is especially rewarding to see how an idea little by little starts to develop and turns into something concrete. In leading the R&D team, I see my role as a supporter and enabler for the team members.

How do you support and inspire your team?

It is possible to inspire people in many ways. In our case, inspiration comes from everyday work and clear goals. In R&D you must endure uncertainty and learn from possible failure. For me the most important factor is safety; there is absolutely no playing around with it. Otherwise the team has free hands to carry out experiments.

What energizes you personally?

It's important to find a balance between work, family life and leisure time. One of my favourite sports is volleyball, a team sport in which all players cooperate to win the game – just like in R&D.

text PAUL GOLDEN
photos KALMAR

Flexibility arrives at busy distribution terminals

The Kalmar T2 terminal tractor can be tailored to customer requirements and monitored remotely. It's the start of something new.

Over the last six decades Kalmar has produced more than 65,000 terminal tractors, and over 2,500 units of the Kalmar Ottawa T2 have been sold in North America since its launch in February 2015. With the T2, Kalmar takes another major leap forward in terminal efficiency. Built on knowledge gained over many years, experience with thousands of units, and insight garnered from talking and listening to existing customers, the T2 adds to Kalmar's history of design flexibility and lets the company enjoy the economies of scale while catering to local European needs.

“The T2 can serve both port and distribution fleets.

The key is flexibility. The T2 can serve both port and distribution fleets. This crossover capacity gives Kalmar room to expand its market focus. **Mikko Lehtinen**, Director, Business Development, Kalmar Mobile Equipment, says, “Kalmar has until now mainly focused on the port market in Europe. The current plan is to expand aggressively into the distribution segment. This requires a

lighter and more flexible design and a greater emphasis on the serviceability of the machine.”

Tailored for port and distribution fleets

Distribution and port fleets have different needs and challenges. The Kalmar T2's wide range of configurations

makes it suitable for use in busy distribution terminals and in heavier port operations. “The key requirements of both market areas are provided by the T2 with its focus on driving down costs and optimising operational performance and flexibility,” says Lehtinen.

As distribution fleets are smaller than standard port fleets, there is less availability of replacement machines and breakdowns can have a greater impact than with port fleets. Port fleets, on the other hand, require more robust solutions with heavier drivelines. The T2 can accommodate these differences. It reduces the handling time of every trailer through high up-time, good ergonomics and visibility, and Kalmar's excellent service network.

Kalmar's standard specifications give the T2 the flexibility needed for large fleet orders while at the same time tailoring for individual cases. This is vital to meet the needs of both port and distribution customers, which traditionally have been provided by different products. Where the industry typically offers a specific product for different uses, Kalmar has a flexible solution to match customer needs more precisely. This means more trailer types can operate efficiently with one truss design.



Matching solutions to customers

One example of flexibility is the T2's ability to accommodate different trailer types without extending the length of the trailer beyond what is absolutely necessary. When every centimeter counts, reducing the trailer's turnspace adds to efficiency.

Two features of the T2 are particularly relevant for industrial customers. **Niclas Samuelsson**, Project Manager, Terminal Tractor Sales Business Support & Product Marketing, Kalmar Mobile Equipment, says, "The completely new cabin with its easy two-point access and excellent visibility addresses many different customer scenarios, and the machine is easily adaptable from distribution to LoLo. With three

different wheel bases on the same model, you simply configure the truck for any need, add in the multiple axle and ratio options and the Kalmar T2 will support all distribution and LoLo operations."

The chassis is based on the Kalmar Ottawa T2 terminal tractor. The entire machine is manufactured with a higher proportion of advanced composite materials to reduce weight and prevent corrosion without compromising safety and durability.

Serviceability maximises operating time

Service downtime is reduced by using service panels that provide easy access to key components and consumable parts. The front cab access panel can be easily opened by removing a few bolts, allowing drivers to complete daily checks for oil and transmission fluid quickly and efficiently from ground level. Revised suspension points put less wear and tear on components, and the chassis is fully bolted and optionally galvanised.

The Kalmar T2 is certified to meet all rollover and falling object protection standards (ROPS/FOPS), with less noise and high-density cabin insulation.

The flat rear access platform is designed to speed up the hooking-up process, which reduces driver fatigue and improves productivity.



Safety and ease of operation have been improved in other ways as well. Kalmar has developed specific features over its long experience with terminal tractors that reduce the frequency of common mishaps. Drivers have traditionally had the option of a power operated or gravity controlled boom, but Kalmar has chosen to always offer power operation, which has proven to reduce axle breaks in trailers.

More movements per shift

Kalmar's top priority is to offer its customers faster and more effective operations. The T2 is designed precisely to achieve that goal. "Improving cycle times for trailer movements is vital to calculating ownership costs. The new T2 gives optimum visibility and ease of use, which reduces cycle times and machine damage. It allows more moves per shift and greater throughput, which ultimately lowers the cost of every trailer movement," says Lehtinen.

All units are designed to lower ownership costs through faster cycle times and more

efficient drivetrains. Customers can choose a Cummins QSB6.7 engine or, for the first time, a 4-cylinder Volvo (Stage IV Volvo Penta TAD571DE). Other options include double gas tanks that allow non-stop operations through an entire shift.

Designed for the driver

Drivers in the distribution market generally have an important input in purchasing decisions, so cabin ergonomics and driving comfort are critical. The cabin on the T2 has been redesigned to feature rocker switches, improved steering wheel belly clearance, suspended break and throttle pedals, more room behind the seat, and space on the dashboard for yard management devices.

The tailoring ability of the T2 to match specific customers further adds to its value. "This is important since not all ports or distribution centres are the same." The new cabin design has eliminated A-pillars in favour of a smooth front glass with panoramic visibility

that customers want. The addition of a back door allows easier access to the trailer operations. "We firmly believe this should be standard," says Lehtinen. ■

- 1 The cabin now has a back door that allows easy access to trailer operations.
- 2 T2 utilises electric cab tilt, which helps speed up maintenance and servicing.
- 3 The new clear-view cabin delivers an uninterrupted view of the working environment, improving safety and reducing damage through panoramic visibility and increased awareness.
- 4 With a flat rear access platform, T2 speeds up the hooking-up process.



1



2



3



4

The new Kalmar T2 terminal tractor

- + A two-year\4,000-hour standard warranty – up from one year\2,000 hours
- + 10 percent lower fuel consumption, which equates to average annual fuel savings of €4,000 per truck
- + Three wheelbases in one model compared with two wheelbases in two different models
- + Replaces the TT612D distribution tractor introduced in 2008 and the TT616i port terminal tractor introduced in 2009



1 The winning team, Jonne Davidson and Jukka Tolonen from Pointscene, created a unique concept for visualisation with several possible use cases. 2 The Mentors' Choice award went to team Solita for showing a great attitude and asking a lot of questions. From left: Mikko Pajulahti, Topi Manu, Tomi Lahtinen and Jonne Heikkinen. 3 Preparing for the final pitches.



CargoHack kicks off a new era of co-creation

Kalmar's first hackathon generated a bounty of innovative solutions to improve terminal operations through digital operations.

text KALMAR photos KALMAR

Kalmar CargoHack, held in April at Kalmar's Technology and Competence Centre in Tampere, Finland, brought together some one hundred participants from around the world, including 57 hackers, to solve the challenges terminals face today.

The event was an unequivocal success. "We received more than 100 applications, more than expected, and had to widen the scope. We selected 16 teams and assigned them challenges covering areas such as visualisation of terminal operations, use of mobile technologies, safety, and improving the efficiency of the wider value chain around cargo handling," says **Tommi Pettersson**, Vice President, Automation at Kalmar.

The participants had access to the industry's latest technology and equipment, which included the world's largest automation test field with unmanned machines and drones, Kalmar's Virtual

Lab, Application Program Interfaces (APIs), sensors and big data from the terminal environment. Experts from Kalmar and Tieto Corporation, the leading Nordic software and services company, served as the teams' mentors during the entire event.

More photos available in Facebook



Safety and performance topped the list

The most popular themes in the final pitches were safety and improving performance by utilising existing technology. Several proposals looked at new ways to use drones, sensors, robots, smart glasses or other innovative tools and devices to improve efficiency and safety or create new intelligent services for terminal operators.

"Some teams came up with new concepts and creative ways to improve the sharing of data and knowledge along the entire value chain of terminal operations. We even heard ideas on how to intelligently combine manual and automated operations."

And the winner is...

The criteria for selecting the winner were based on customer value and business model. The winning concept came from Team Pointscene from Finland for their unique idea of using visualisation in a terminal environment that can be implemented in multiple ways.

"Overall, the hackathon proved to be a great tool and method for giving birth to and demonstrating new ideas and creating a forum for thinking outside the box. We will move forward with some of the ideas and integrate them into our product and technology roadmaps," Pettersson concludes.

Next generation

BATTERY TECHNOLOGY

Small but powerful lithium-ion batteries save time, money and trouble.

Lithium-ion (Li-ion) batteries, a battery technology used in mobile phones and electric cars, now powers Kalmar forklifts, too. “The Li-ion battery technology is groundbreaking in many ways,” says **Johan Hellström**, Product Manager, Kalmar Forklift Trucks.

Traditional lead-acid batteries require expensive acid-protected charging areas. Many companies don’t have room in their plants to build such facilities. Lithium-ion batteries, on the other hand, can be charged anywhere, anytime. This brings unique flexibility to the operations. There is no need to move the machines to a separate charging area or to schedule a compulsory overnight charging time. Users can say goodbye to costly waiting times.

“Charging is extremely fast. Equipment can be charged, for example, during a lunch or coffee break to keep operations up and running 24/7,” explains Hellström.

Low maintenance, high safety

The energy density of lithium-ion batteries is three times higher than that of lead-acid batteries. In addition, they have an up to five times longer lifespan and are nearly maintenance free.

Unlike lead-acid batteries, Li-ion batteries contain no liquid so water fillings are not required. The equipment uses the same batteries constantly, eliminating the need for investing in battery swapping stations or extra batteries.

Lithium-ion technology is also an ideal choice for cold weather conditions since the batteries have a much better low-temperature performance. Moreover, the voltage of Li-ion batteries doesn’t drop dramatically even at a low level of charge. This means machines also perform well at a low battery level.

Last but not least, lithium-ion batteries are safer than alternative battery options. There are no gas emissions during charging. The charging time depends on the limitations of the power grid. For some customers, the new technology might require grid upgrading to ensure energy voltage is high enough for efficient charging. Otherwise, no other investments are needed to start using the new Li-ion batteries.

With the Li-ion battery technology, all different kinds of companies can now cut emissions, save energy, increase efficiency and lower the total cost of ownership. The solution is currently available for Kalmar’s electric powered shuttle and straddle carriers. ■



With the new lithium-ion batteries, charging is as **fast and easy** as one, two, three.



1

- No need to build a separate, acid-protected charging room.
- There are no gas emissions during charge.
- Charging can be done throughout the facility.
- More efficient use of the space inside the facility.

2

- No need to move the equipment. Charging can be done anywhere, anytime.
- No need to invest in additional batteries or battery swapping stations.
- No extra equipment needed to replace batteries.
- No charger intelligence needed.
- Full current during the entire charging process, no different charging stages.

3

- No need to schedule long charging periods.
- Fast charge during any break.
- No idle waiting times, machines can be kept in operation 24/7

Demo Tour on the road again

Kalmar's Electric Evolution Demo Tour continues this year in Europe. The tour has to date reached well over 100 customers in seven European countries.

During the upcoming tour, customers can test drive the new lithium-ion powered electric forklift, ECG80-6. The machine has so far handled everything from bananas to paper rolls. The response has been enthusiastic. Customers enjoy the complete silence of the electric machine and test drives have shown that the performance of electric machines is equal to diesels. In some countries the sales figures of electrical equipment have risen three-fold over the previous year.

You can follow the machine's tour on social media.



HHLA and Eurogate opt for diesel-electric straddles

Kalmar will deliver diesel-electric straddle carriers to two long-standing customers operating at the Port of Hamburg. Hamburger Hafen und Logistik AG (HHLA) and EUROGATE have both ordered nine diesel-electric straddle carriers from Kalmar.

Established in 1968, HHLA Container Terminal Burchardkai (CTB) is the largest and oldest facility for container handling in the Port of Hamburg. The terminal's annual capacity is over 3 million TEU. EUROGATE Container Terminal Hamburg is a modern facility that operates state-of-the-art container gantries and straddle carriers.

"These new fuel-efficient straddle carriers support our goals to cut both operating costs and exhaust emissions at the terminal. They also set a new benchmark in terms of noise emissions, which will help us further reduce our impact on the surrounding environment," says **Jens Hansen**, Managing Director of Container Terminal Burchardkai.

"Protecting the environment is a high priority at EUROGATE, and investing in Kalmar diesel-electric straddle carriers contributes to our goal of continuously reducing the company's ecological footprint by cutting fuel usage and exhaust emissions," says **Peter Zielinski**, Managing Director, EUROGATE Container Terminal Hamburg.

APM's new deepwater terminal goes all hybrid

APM Terminals is building a new deepwater container terminal in Vado, Italy. The Vado terminal will be the world's first container terminal to employ an entirely hybrid shuttle carrier fleet.

APM Terminals has ordered 19 Kalmar HSH240 hybrid shuttle carriers to help optimise the productivity of the terminal by decoupling waterside and landside operations. The hybrid machines have been designed with an advanced regenerative energy system that converts energy from operational braking and lowering of the spreader into electric power, which is then captured and stored through new and innovative battery technology. An automated computer-assisted power system determines the most efficient balance between the diesel engine and battery power.

The Port of Vado is located in northwestern Italy, near Genoa. The facility is scheduled to become operational in January 2018 with the ability to handle 18,000 TEU vessels.

"The enhanced hybrid power enabled by Kalmar's shuttle carriers will result in an estimated 30% reduction in fuel consumption, as well as a reduction of an estimated 50 tons of CO₂ annually per unit, compared with conventional diesel/electric-powered shuttle carriers," says **Carlo Merli**, Managing Director of APM Terminals Vado.

New Asian distribution centre for Kalmar spare parts

Kalmar has established a new Asian distribution centre for spare parts. The new central warehouse complements Kalmar's current setup of offering a wide range of genuine, premium-quality Kalmar spare parts for customers around the globe with fast delivery times. The new distribution centre, located in Singapore, is operated by DHL as the third party logistics partner. The Asian centre significantly improves the availability and delivery time of spare parts in the Asia-Pacific region, but also customers in other regions can benefit from the improved global support in spare part logistics.



DP World upgrades cranes at Antwerp Gateway

DP World, a long-standing Kalmar customer, continues to expand its terminal at Antwerp Gateway in Belgium. The terminal is upgrading three ZPMC ship-to-shore (STS) cranes in anticipation of significant growth in container movements and in response to the ever-increasing size of vessels.

The three cranes, operational since 2006, will be heightened by seven meters. Kalmar will be responsible for the planning, engineering and execution of the heightening as well as commissioning of the project.

“Kalmar’s technical and project management expertise in this kind of highly specialised project is second to none. We were extremely happy with the results of the previous crane-heightening project that we concluded with Kalmar in 2016 and are confident that this next phase will also be completed smoothly and on schedule. Upgrading our STS cranes in this way is vital to ensure we remain competitive and can continue to meet the demands of our shipping line customers,” says **Jef Lambregts**, Technical Manager at DP World Antwerp Gateway.

Kalmar strengthens its software competence

Kalmar’s parent company Cargotec has acquired INTERSCHALT maritime systems AG, the leading maritime software specialist.

“This acquisition is part of our strategy of growing our software business in new areas and creating more value for existing and new customers,” says **Olli Isotalo**, President, Kalmar.

The acquisition will support the future growth of XVELA as the leading collaboration platform serving the needs of ocean carriers, terminals and their shipping partners.

Piraeus Container Terminal meets environmental demands with all-electric RTGs

Kalmar has received a large repeat order for fifteen all-electric rubber-tyred gantry cranes from Piraeus Container Terminal (PCT) S.A. in Greece, a wholly-owned subsidiary of COSCO Pacific Limited. PCT already operates Kalmar all-electric RTGs, straddle carriers, reachstackers, forklift trucks, empty container handlers and terminal tractors.

“The zero-emission cranes, which are 9+1 wide and 1-over-6 high, will help us to achieve our goal of increasing capacity while meeting all the latest environmental demands,” says **Li Jianchun**, Deputy General Manager of PCT.

The RTGs use new technologies that enhance productivity, reliability and flexibility. They will be manufactured in China at Rainbow-Cargotec Industries.

The new K-Motion drive train solution improves fuel efficiency

Kalmar has launched K-Motion, its new drive train solution, into the Asia-Pacific region. Embedded into the programming of the Kalmar Gloria reachstacker, K-Motion increases the efficiency and productivity of reachstackers by improving uptime, ergonomics and safety and reducing fuel consumption, emissions and running costs. The solution was first launched successfully in Europe last year.



The APAC region’s first Gloria reachstackers equipped with K-Motion will be delivered to Quality Marshalling’s Tauranga Container Terminal and Timaru Container Terminal operations in New Zealand.

text MARJAANA LEHTINEN
photo LAURA VESA

Automation: How it all started



What started off as a bold and pioneering venture into the unknown has become a worldwide leader in automation offering for terminal operators.

Back in the late 1980s, Koninklijke Nederlandsche Hoogovens, a Dutch steel producer now part of Tata Steel Group, had a problem with transporting heavy cold-rolled steel flat product rolls to storage. Forklifts were too harsh, which resulted in a loss in the roundness of the rolls that is needed for further processing into beer cans. The company started to look for a gentler ride.

“Hoogovens contacted our Dutch agent who then turned to us. Valmet’s material handling division, which later became part of Kalmar, made industrial straddle carriers. The idea of automating a machine and using a Dutch company called ICH – later also part of Kalmar – for the job came from the agent,” recalls **Edo Woessink**, former Sales Manager at Kalmar.

High risks pay off

At that time, Valmet’s material handling division had no experience in automation. There had been talk about it, but nobody seriously believed in free-ranging vehicles, even though AVGs already existed.

Matti Sommarberg (left), Ilkka Annala and Edo Woessink were all involved in the very first automated straddle carrier project in the late 1980s. “It taught us how automation optimises equipment use, improves availability and extends equipment lifetime,” they say.

Everybody thought that if automation was feasible, it would be rail-based.

For the company, the risks of doing something that had never been done before were high. How could we trust an unknown automation supplier whose most important reference was automating the warehouse of the brewing company Heineken? Valmet, however, decided to go for it. “I take my hat off to our directors for allowing the project to start,” Woessink says.

“The Hoogovens project showed us that automation is not rocket science. It made us believe that automation is something that actually can be done.”

In 1991, Valmet delivered four industrial straddle carriers with automation readiness to Hoogovens. Their automation was based on transponder technology. The equipment met fully the customer’s need for gentle and automated transportation and is still operating today.

Automation is not rocket science

Featuring the world’s largest automated vehicles at the time, the Hoogovens delivery was pioneering and forced everybody to step outside their comfort zone.

Ilkka Annala, Vice President, Project Delivery at Kalmar’s Automation and Projects division, reminisces about the case: “The Hoogovens project showed us that automation is not rocket science. It made us believe that automation is something that actually can be done. As an innovative company even back then, we wanted to see whether automation would become a new trend also at terminals. No other supplier was even talking about such ideas.”

Automation did emerge – eventually – but it was years before the right technology was developed for it, and more importantly, before customers were ready for it.

Expanding the scope

Today, Kalmar has many industry firsts in automation. In 1991, it was the first to introduce automated stacking cranes at the ECT terminal in Rotterdam. In 1995–1996, participation in an EU Brite Euram project resulted in automated straddle carriers that led to fruitful cooperation with Patrick in Australia, who started fully unmanned operations at the Port of Brisbane in 2005. In 2014, Kalmar supplied the first automated RTGs to the Port of Oslo. These represent just a few examples of the company’s automation solutions.

“We have been applying technology in a way that nobody else has done. It takes innovation, boldness and daring, without which quantum leaps forward are not possible,” points out **Matti Sommarberg**, Vice President, Senior Technology Advisor at Kalmar. “However, you have to keep in mind that in the background there is Kalmar’s strong engineering know-how. Only by combining it with courage has it been possible to go beyond the conventional.” ■

A reliable workhorse

text KALMAR photos KALMAR

A vintage Kalmar workhorse, a 24-year-old Kalmar empty container handler is still at the top of its game, serving beautifully to keep tank containers clean at Hyop Woon Stolt's depots in South Korea.

Hyop Woon Stolt Transportation Services Co., Ltd is the leading container cleaning and repairing service provider in South Korea.

Established in 1992, the company is a joint venture between Stolt Tank Containers Ltd. and Hyop Woon Shipping Ltd. It handles tank containers at the depots in Onsan using two highly durable and efficient Kalmar machines.

In 2010, Hyop Woon Stolt purchased a vintage Kalmar DC13.6 EC4 empty container handler from the secondhand market. Still giving top performance after more than two decades, it is in

excellent condition, serving as a blue chip piece of equipment turning in a star performance. It is an indispensable piece of equipment in the operations of the depots, averaging 150 hours of work per month and will soon hit a highwater mark of 36,000 operational hours.

S. K. Kim, Managing Director, Hyop Woon Stolt says, "The machine is strong and durable. After 24 years, it still performs very well with no serious flaws. A maintenance staff member is assigned to monitor its daily performance and replace parts in accordance with the instructions given by Kalmar's Korea dealer."



Hyop Woon Stolt ordered another Kalmar DRF 100 empty container handler in 2013 to cope with the growing demand for tank container cleaning at the depots. "Once again, Kalmar has satisfied our requirements precisely. With Kalmar's equipment, we have received more and more tank container cleaning orders and are able to expand our capacity. I am delighted that Kalmar equipment is growing together with us," Kim says.

For a manufacturing plant, reliable equipment with outstanding performance is critical. "We have cooperated to great success with Kalmar for many years. Their high performing equipment and excellent after-sales support are helping us to maximise efficiency and productivity at our depots. Kalmar is certainly the natural choice for us when we look for new machines."

Hyop Woon Stolt took delivery of a new Gloria reachstacker from Kalmar in early 2016. ■

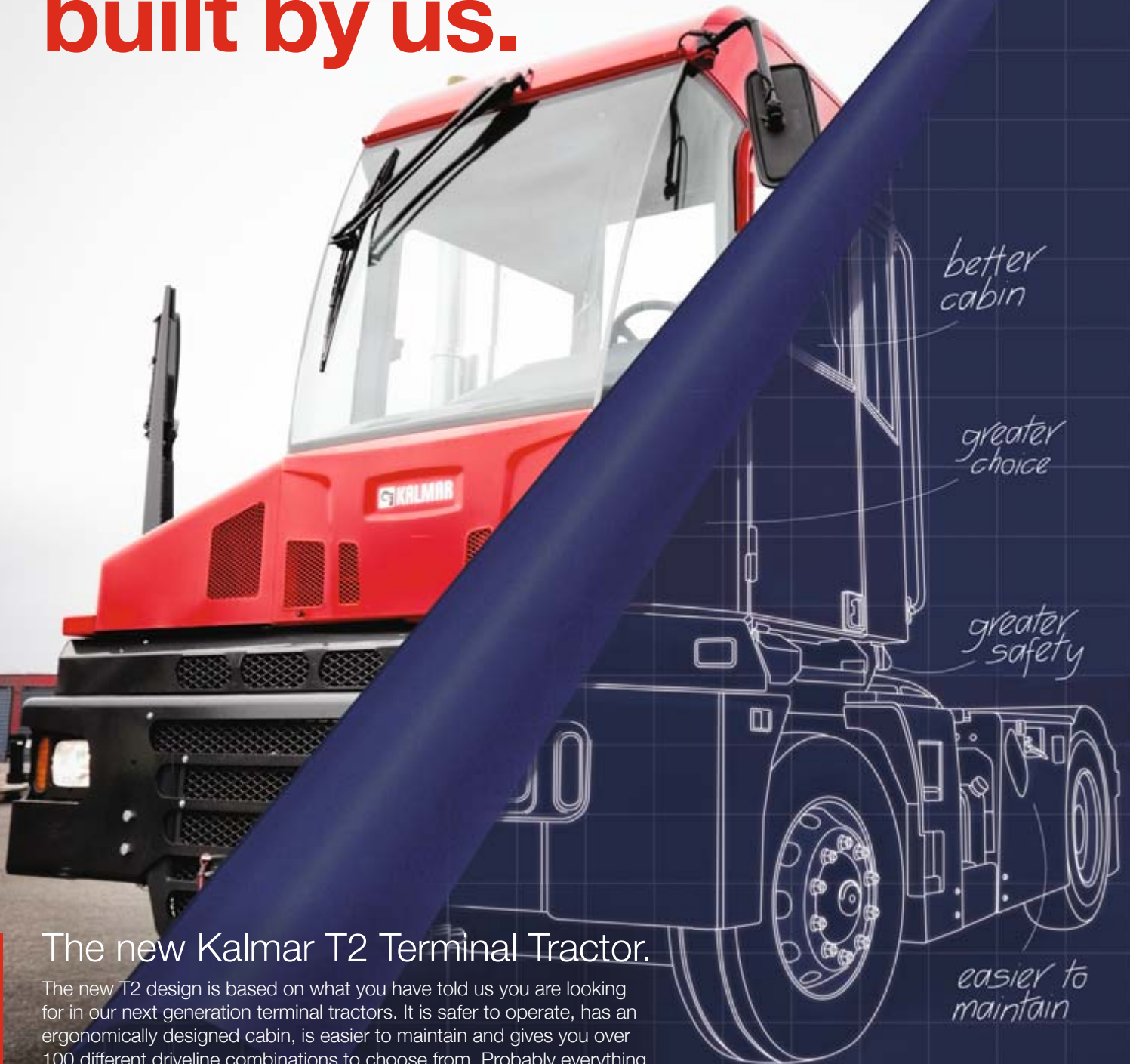
“ With Kalmar’s equipment, we have received more and more tank container cleaning orders and are able to expand our capacity.



The relationship between Hyop Woon Stolt and Kalmar goes back many years.



Designed with you, built by us.



The new Kalmar T2 Terminal Tractor.

The new T2 design is based on what you have told us you are looking for in our next generation terminal tractors. It is safer to operate, has an ergonomically designed cabin, is easier to maintain and gives you over 100 different driveline combinations to choose from. Probably everything you need in your next terminal tractor. Kalmar T2, making your every move count. Find out more at kalmarglobal.com

