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Getting *smarter*

Emmanuel Mair finds that the latest terminal software systems are making container terminal operations more intelligent and as a result are leading to increases in productivity and safety for operators

The pressures on ports and terminals to deliver outstanding efficiency and reliability are at an all-time high. Ironically, however, trends such as shipping alliances, vessel sharing agreements and larger vessels mean that the container handling process has never been more complicated.

While automated equipment offers one part of the solution to minimising human error, as well as making ports safer, many terminals are also looking towards terminal software for answers.

Smarter systems and big data are finding their way into the container handling industry, where the influence of the terminal operating system (TOS) is increasing. There are also a number of other terminal software options worth considering, so ***CM*** took a look at what's available on the market.

In New Zealand, Jade Software Corporation has enjoyed a successful past 12 months, with 18 new terminals across the Middle East, Europe and Africa going live with its Master Terminal TOS in the third quarter of 2014 alone.

Some of Master Terminal's appeal lies in its status as a multi-cargo solution, enabling a single software system to cater for containers and general cargo; it has contributed, for example, to sales at Grupo CICE's mixed cargo ports in Mexico and Central America.

Captain Kaustubh Dalvi, director of business development at Jade and a Master Terminal evangelist, spoke to ***CM*** about the demands the industry places on providers of automation solutions.

As many terminals across the world have found, servicing bigger ships often requires larger volumes to be handled within the same time window. "This exposes a port to a variety of cascading challenges and risks, starting right from the fairway buoy through to the hinterland exchange," said Dalvi.

Throughout the port world, authorities are looking to improve operational efficiencies and productivity, and Dalvi believes that Master Terminal can help them make "smarter" supply chain decisions.

"For instance, the gate interchange is one area where ports often experience congestion or bottlenecks, largely due to sporadic arrivals of trucks wanting to collect and/or deliver cargo," he said. "Master Terminal's gate solution includes an integrated web portal which acts as a secured single-stop shop."

This portal allows users with the appropriate access controls "to book time slots, monitor the status of cargo holds (stops) such as customs stops, pre-announce and manage cargo weight certification and requests for services, generate reports in real-time and handle exceptions," according to Dalvi.

The solution caters to a wide range of stakeholders, including ports, shipping lines, logistics companies and customs agents.

'Go live' milestone

Meanwhile, Navis, part of Cargotec, announced the 100th 'go live' of its N4 TOS last October, with the milestone celebrated at the Modern Terminals facility in Kwai Tsing, Hong Kong.

Over the past year, the firm has sold two concurrent versions of N4 to terminals – 2.6 and 3.0. Regarding N4 2.6, which was released a year ago, Scott Holland, Navis's vice president of product management, told ***CM***: "We have many new customers who have signed up to implement N4 2.6 and many existing customers who are upgrading to it so they can stay up to date with the latest release."

He added: "Three terminals are currently working on their implementation of N4 2.6, three sites are live and 26 more sites have

Björn Henriksson, global technology manager at ABB Ports

Captain Kaustubh Dalvi, director of business development at Jade

Harvey Bauer, director of marketing and contracts at Tideworks Technology


London Gateway is using many of the latest pieces of terminal software

either upgraded or are in the process of upgrading from previous versions of N4."

With considerable pressure for efficiency and reliability at large terminals and the need to cut costs and complexity at smaller locations, Holland noted that it was key for N4 to feature "an increasingly stable and robust platform".

Also of vital importance was making the solution both "horizontally scalable for the mega-terminal while being designed for remote hosting for lower-volume terminals over time". According to Holland, a focus on configurable workflows, a state-of-the-art optimisation suite and standard interfaces for equipment automation are helping Navis to meet these needs.

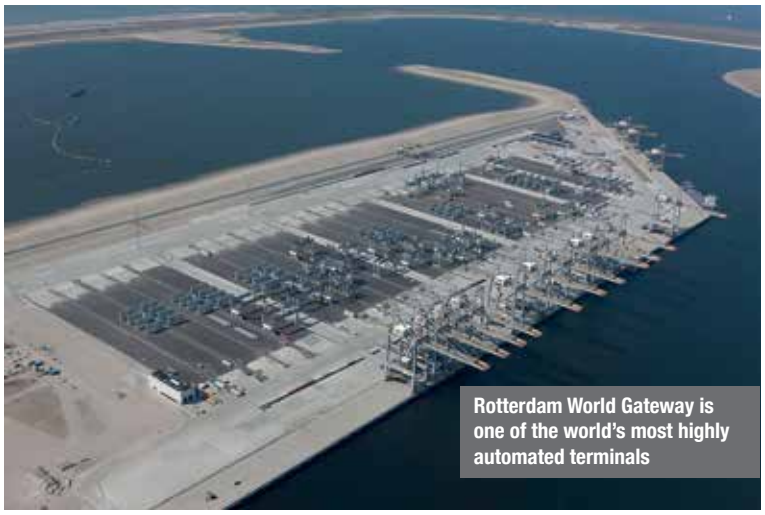
Perhaps the biggest development in the company's product offering has been the launch of N4 3.0, representing what Holland called a "step function change in our architecture for optimisation and automation".

The new release is being used in Rotterdam's newest terminals, APMT Maasvlakte II and Rotterdam World Gateway (RWG). Offering support for automated stacking cranes (ASCs) and automated guided vehicles (AGVs), N4 3.0 has been built especially for fully automated terminals in Europe and Long Beach, so it will not be released on a general availability (GA) basis.

However, N4 3.1 is scheduled to be released later this year, offering functionality for semi-automated and manual terminal operations. "We see the release of N4 3.1 as the next step for all N4 customers looking to upgrade and new sites implementing N4 following the GA certification of the release," said Holland.

Plans are also in place for the launch in 2016 of N4 3.2, with additional functionality to accommodate more equipment types and other improvements for fully automated, semi-automated and manual terminals.


Scott Holland, Navis's vice president of product management


Rotterdam World Gateway is one of the world's most highly automated terminals

Another 100 up

Seattle-based Tideworks Technology has also reached a landmark, announcing the 100th go live of its TOS at CSX Intermodal's Valleyfield terminal in Quebec, Canada. So far, 100 rail and marine terminals across 22 countries and four continents have chosen a Tideworks TOS, although that is not the only solution the company offers.

In addition to Mainsail Vanguard, its core TOS, Tideworks offers the Spinnaker Planning Management System as a graphical planning tool; Traffic Control, an equipment and despatch solution; the Forecast web portal for the port community; a gate automation platform called GateVision; and on the rail terminal side of the business, Intermodal Pro.

Harvey Bauer, director of marketing and contracts at Tideworks, told ***CM*** that the company is now nearing completion of extensive integration and development work at its first ASC marine terminal.

"We have integrated with the crane drive system supplier, as well as developing some very advanced features," he said. "These include automated housekeeping moves; automatic set-asides, a feature which selects the 'to' location based on a process that minimises the probability of the box needing to be set aside again; and dynamic yard allocations, which allows yard allocation ranges to expand and contract."

In the past year, Tideworks has completed a software-as-a-service (SaaS) implementation at a container facility in Freeport, Texas, and is nearing completion at two terminals operated by Sea Star Line in Jacksonville, Florida and San Juan, Puerto Rico, along with another facility at Port Lafito in Haiti.

In March, the firm announced that Baltic Container Terminal (BCT) in Gdynia, Poland had successfully implemented its latest electronic data interchange (EDI) solution offering, EDI Porter as a Platform (EPaaP).

Bauer explained: "This solution provides our customers with the benefits of our hosted EDI offering, but allows them to manage it themselves in-house. They control the toolkit for establishing and managing trading partnerships, communications, EDI message sets and mapping."

With EPaaP, Tideworks configures and installs the server at the customer's site, including the entire suite of EPaaP applications, sets up the system, provides training and gets the customer started. Upgrades to the software suite are provided at no additional charge to the terminal.

BCT, which possesses a "very strong group of IT professionals on site," according to Bauer, wanted a level of independence, and this is something he believes that other terminals may want to pursue in the future.

System supplier

Swiss conglomerate ABB positions itself as a "system supplier" in the field of container terminal automation. The company delivers automation and crane motion control systems with remote control for all types of container-handling cranes. The offering also includes crane, rail and gate optical character recognition (OCR) solutions for container identification and verification, allowing fully automated container hand-off at all transfer points in a terminal.

ABB is currently supplying electrical and

The Messina Terminal in Genoa uses Jade systems

automation systems for large terminal projects in the US (Long Beach), the UAE (Dubai), the UK (London), Panama and Turkey and to multiple terminals in Holland (Rotterdam), Korea (Busan and Incheon) and Mexico (Tuxpan and Lázaro Cárdenas).

Projects delivered in 2014/15 include systems for over 200 ASCs and rail terminal cranes, as well as automated STS cranes. The automation of STS cranes is increasing and remote control is now a trend, according to Björn Henriksson, global technology manager at ABB Ports. Since 2012 ABB has delivered or has under delivery more than 50 STS cranes with remote operation. The systems are all based on the latest revision of the ABB crane automation system.

This offers automated hand-offs to all types of horizontal transport and interfaces to logistics systems. The systems are built on the "distributed control" principle, optimising productivity and enabling interfacing at crane, block (stacking cranes) and fleet levels, according to Henriksson.

The distributed format allows for instantaneous decision-making. For instance, the coordinated execution of multiple orders sent to stacking cranes enables higher productivity and saves energy by reducing travelling and waiting times. The operation and maintenance of the entire terminal is supported by control room solutions from ABB, added Henriksson.

Integration of OCR solutions for the identification and verification of containers, vehicles and rail cars is an enabler for automated hand-offs between automated cranes and horizontal transport. All automated cranes are connected to a control network, using information about containers to speed up the handling process and improve the quality of BAPLIE messaging.

> *"It is no longer enough just to read the container's number"*
>
> **Anton Bernard, Camco**

APS Technology Group (APS), a member of the ABB Group, has delivered OCR-based systems to manual terminals, where they have improved productivity by reducing container handling times, achieving greater inventory transaction accuracy, reducing truck turn times and improving safety.

The company highlighted Grup Maritim TCB terminal in Buenaventura, Colombia (TCBuen), which saw its average STS crane productivity increase by three moves per hour after an APS OCR system had been installed.

OCR opportunities

The presence of automation, not just on the landside but also at the waterside and everywhere in between, has been one of the big changes in terminal operations over the past few years, according to Anton Bernaerd, business development manager at Camco Technologies. Since at a number of greenfield terminals there are no people working in the yard, this creates a number of opportunities for OCR technology, in his opinion.

Camco released its BoxCatcher system last year, looking to capitalise on market demand for a "dynamic" crane OCR solution. The system has been implemented at some of Europe's most modern terminals – London Gateway and APMT Maasvlakte II and RWG in Rotterdam.

Explaining the need for dynamic crane OCR, Bernaerd said: "It is no longer enough just to read a container's number. It is very important as well to be able to automatically detect the door direction and the presence of seals and to read the classification numbers of dangerous goods."

The BoxCatcher solution, which is adaptable according to the customer's needs, features a number of static and moveable cameras that take pictures of these details. In a digital process, once the pictures are taken, the OCR system looks for characters and reads them automatically before relaying this information to the TOS.

The cameras are mounted on aluminium rails, which can in turn be mounted on the front or back legs or even the portal beams of a crane. This enables flexibility in the movement of the spreader.

"Everybody wants the highest productivity from a crane, the most moves per hour. To do this, you need to have a spreader following the most economical and efficient path," said Bernaerd. "We do not require that the spreader takes a fixed route to pass a camera – the camera will position itself at the spot where the crane or spreader will pass. That makes a big difference."