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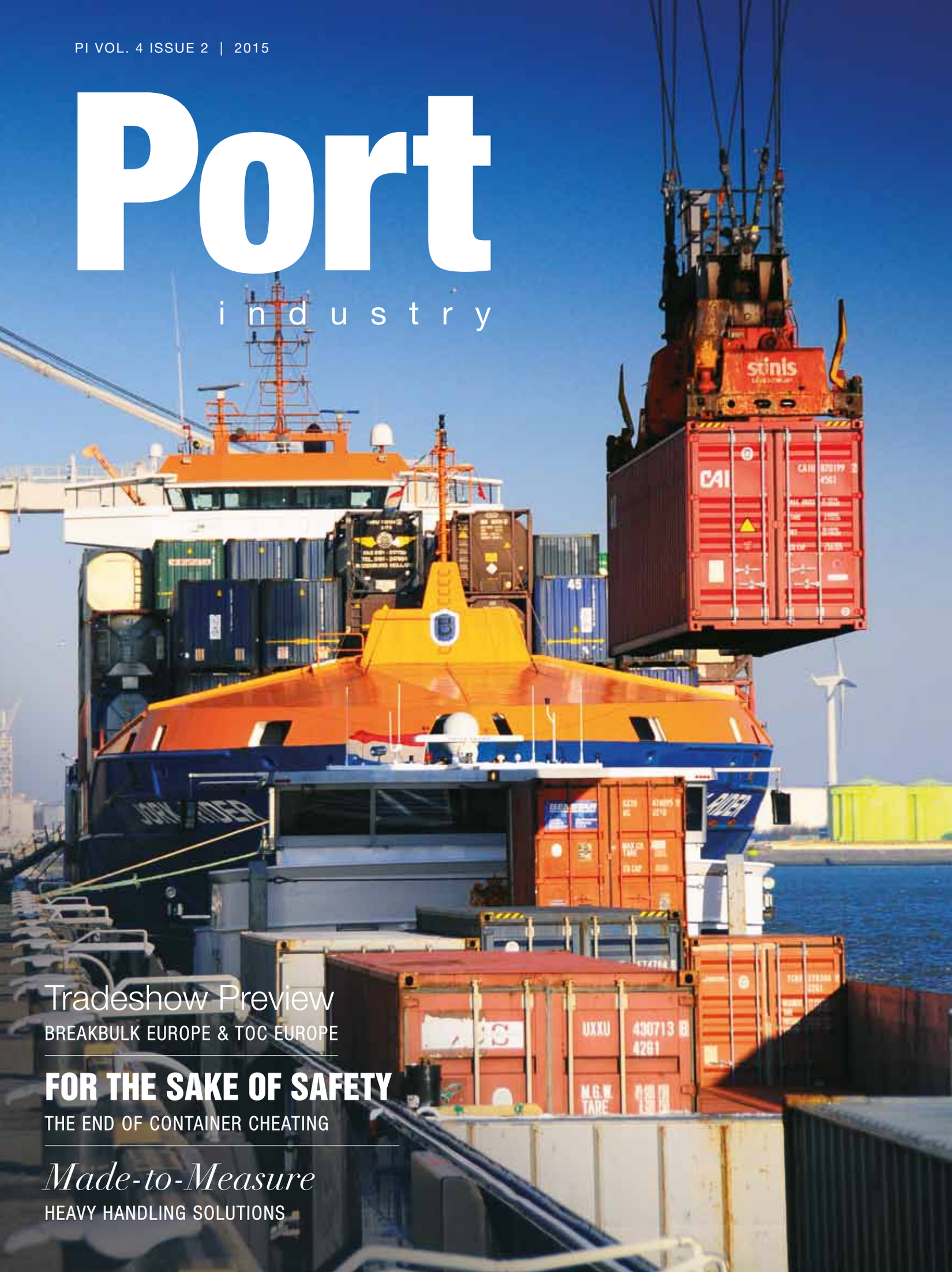


Tradeshow Preview
BREAKBULK EUROPE & TOC EUROPE

FOR THE SAKE OF SAFETY
THE END OF CONTAINER CHEATING

Made-to-Measure
HEAVY HANDLING SOLUTIONS

DELIVERED IN BITE-SIZED CHUNKS

Cost Effective Container Terminal Automation

PORT AND TERMINAL AUTOMATION IS SOMETIMES SEEN AS A HOLY GRAIL THAT CAN ONLY BE ACHIEVED BY THE LARGEST OPERATORS, WITH THE DEEPEST POCKETS. BUT FOR MOST OPERATORS, THE NEED TO AUTOMATE SOME OF THEIR OPERATIONAL PRACTICES IS DRIVEN EVER HARDER BY INCREASING CUSTOMER EXPECTATIONS on cost and productivity. Increasing staff levels to meet these demands is not always the answer. Apart from the extra cost, this will be a long term commitment that won't necessarily deliver the productivity or flexibility required. So where can automation take over and how do you plan for success? For Port Industry, Allan Jones, Head of Business Development at International Terminal Solutions, discusses how operators can automate key parts of the terminal in bite-sized chunks, where the investment is manageable and risks can be mitigated.

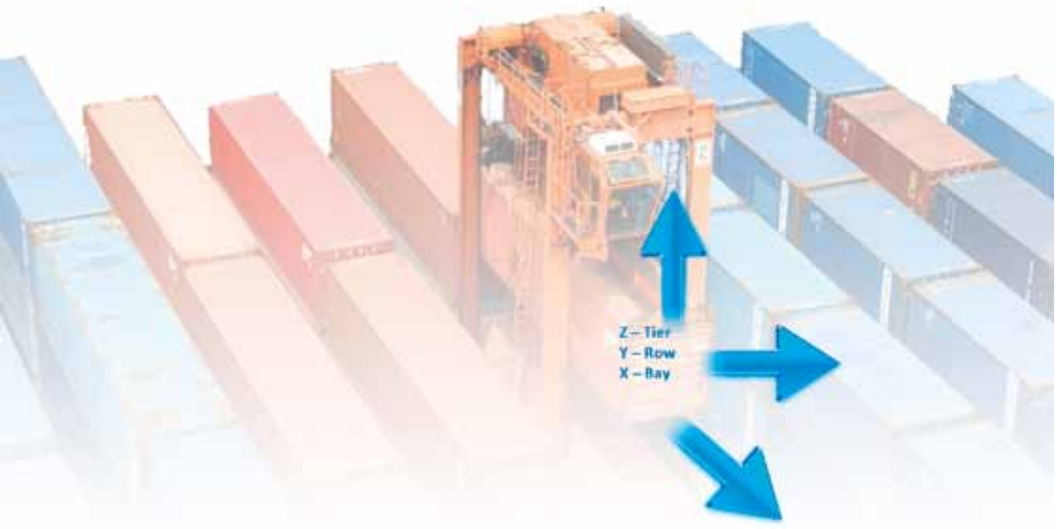
WORDS BY ALLAN JONES, HEAD OF BUSINESS DEVELOPMENT, INTERNATIONAL TERMINAL SOLUTIONS.

The Prime Mover stopped in the correct location.

Easy to Achieve Improvements

The term 'automation' can mean many things, so perhaps some context should be provided. Wherever there is a job handover between cargo handling equipment (e.g. between a truck and crane), there is the opportunity to automate both the process and the associated data capture. A reasonable start point is the exchange between yard and ship-side operations – by positioning the straddle carrier (SC) or trailer in the correct position for the quay crane (QC) spreader. A trailer and carrier positioning system is an easier to implement form of automation, because it is stand-alone.

Using the ITS trailer positioning system (TPS) as an example, it is designed to be installed by the terminal's own engineers and with a very low maintenance overhead and capital outlay, you can quickly achieve a QC productivity uplift.



The PDS determines the exact container locations.

Accurate Locations

Knowing precisely where all the containers are located is key to the optimisation of storage areas. However, performance in this area varies from terminal to terminal and many rely on the cargo handling equipment (CHE) operator advising where they ground the container, which obviously is open to human error. Housekeeping activities such as stack inventory checks will put the records in order, but this is a work-around that ties-up staff and works only for a short period before the daily activities re-introduce further errors.

An automated solution to this will accurately record all container locations by using a Position Determination System (PDS), an example of which is International Terminal Solutions' G-POS system. The PDS will determine in real time the container pick-up or set-down location, and will also keep the Terminal Operation System (TOS) synchronised. It provides the row and bay, and will also resolve the height of the container to a tier by using other measurements.

Enforcing Work Orders

The PDS will maintain an accurate terminal yard map but unless each move planned by the TOS is enforced there is still the possibility for the CHE to pick up or set down in an unplanned location. The TOS will still be advised of the new location, but the plan is now out of step and may not be where the TOS needs it for optimised storage.

The next step in automation refinement is to get the PDS to enforce each move the TOS requires by managing the Twistlocks. The PDS will allow the Twistlocks to lock only if the spreader is on the correct container (for pick-up) and, similarly, it will allow the twistlocks to unlock only if the container has been placed in the correct location.

There will of course be exceptions and the PDS must follow rules established by the Operational Management Team, ultimately allowing a remote override without interrupting the workflow.

Hand-Off Automation

For RTG/RMG operations there is the opportunity to automate the job hand-off between truck or prime-mover and the crane. The TOS will have booked the truck in through the gate and instructed the driver to go to the relevant crane. However, the truck's arrival there is unlikely to align with its position in the TOS work list, because it will be interspersed with other trucks operating in the area. Consequently, it is then up to the crane driver to try and figure out which truck is at the exchange point.

The PDS can automatically identify the truck to the crane, typically using OCR and RFID technologies. However with new long-range passive RFID tags there is the opportunity for a much lower cost solution. The truck is temporarily tagged at the gate (or permanently if it is a frequent caller) and prime movers are permanently tagged. When they arrive at the crane, the PDS will associate the truck with the container to identify the move on the TOS work list, and then ensure the container is picked up from or grounded to the correct location in the stack. >>

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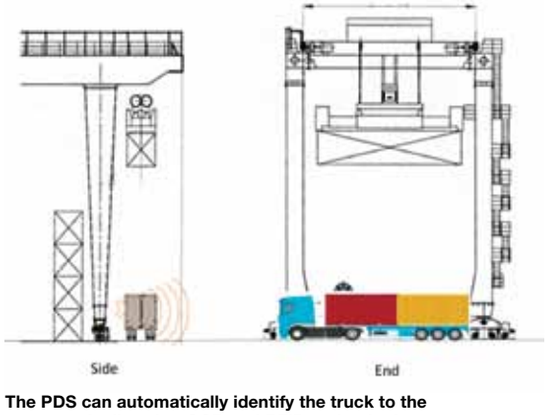

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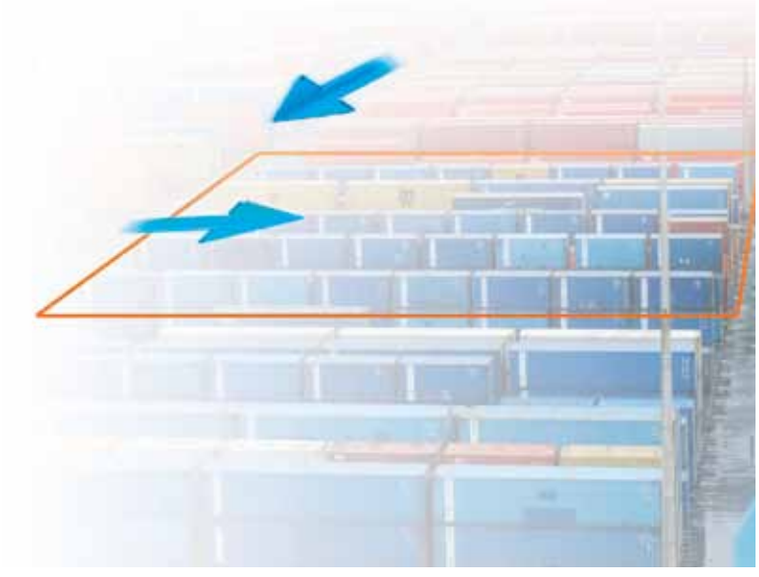
Portals at each ASC Lane to detect Truck ID and direction.



'Geo Fences', which sub-divide the terminal into a number of Job Steps.

Sample initial Job Step Screen for a Straddle Carrier. The screen automatically changes when a Geo-Fence is passed.

Crane Considerations

In ASC and automated RTG operations the operator is remote and typically handles only the final placement of the container – the rest is automatic. To allow the crane to operate in this way the TOS work list will need to align with the sequence at which trucks arrive at the crane. To achieve this an expanded PDS capability called a Real Time Location System (RTLS) will use portals at the end of each road lane to determine the truck arrival sequence. The PDS will then use this to keep the crane's TOS work list synchronised.

Optimising CHE Movement

The modern TOS will provide facilities to optimise the movement of CHE, such as Job Stepping (used by Navis N4 PrimeRoute and other TOS systems). This is a critical optimisation process to manage equipment deployment by varying CHE job assignments on the fly.

Using GPS technology, the RTLS part of the PDS will provide real-time updates to the TOS as each CHE passes through 'Geo Fences', which sub-divide the terminal into a number of Job Steps. Depending on which CHE is closest to the target container, the TOS can re-allocate the target and move or maintain the current one at each Job Step. There are PDS systems that require the CHE operator to press a button to advise the TOS that the job step has been reached. However, this manual intervention will struggle to keep pace with a busy and fluid environment, and for job stepping to work at its best, the PDS should automatically update the TOS and request the next job step.

Keyless System

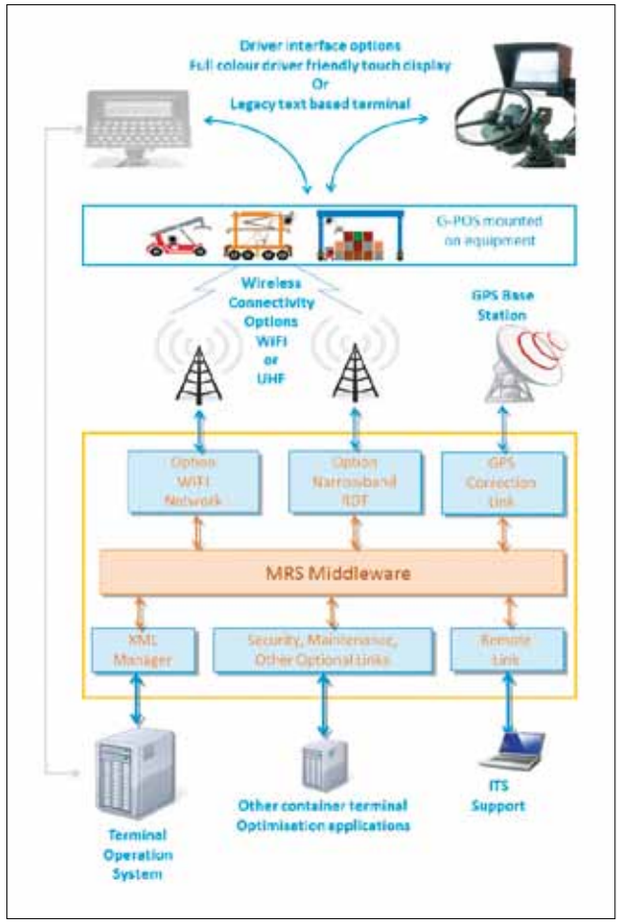
Many of the PDS users have implemented 'keyless' systems for their CHE operators, in which the mobile computer no longer requires a keyboard. The operator registers with the CHE at the start of shift using his site access/ID card. From this the PDS logs him on to the TOS and displays the first move (Drive to CC1). As the CHE passes through Geo Fences (if Job Stepping is used) the TOS is updated by the PDS,

automatically redisplaying any jobs reallocated by the TOS. Move completion is then confirmed by the PDS, which unlocks the twistlock whilst advising the TOS to repeat the cycle and allocate another job. The only time a CHE operator needs to touch his keyboard is for exceptions, and this takes place through a soft keyboard, which will be customised to the exception.

Conclusion

Automation really can be implemented in bite-sized chunks, starting with stand-alone systems such as the TPS and evolving to a keyless operation where the majority of Job handover points are seamlessly integrated to provide a unified operation. The key is to ensure there is an evolutionary path to the next refinement. This means the equipment used should be able to accommodate new technology changes, and each solution should use open architectures. The ability to be open cannot be overstressed, because it is only by integrating the automation with the terminal's processes that you will achieve the goal of productivity improvements.

i. www.terminalsolutions.co.uk



PDS messaging architecture.