



KALMAR: AUTOMATION TODAY



PTI SPOKE TO:

Timo Alho, Vice President,
Terminal Design Services,
Kalmar Automation Solutions



Jarno Kuipers,
Senior Manager, Terminal Design Services,
Kalmar Automation Solutions



Christopher Saavedra,
Manager, Terminal Design Services,
Kalmar Automation Solutions

In this exclusive discussion with Kalmar, PTI spoke to top executives about automation, how Kalmar approaches the technology and how to overcome the challenges that the port industry faces in today's climates.

HOW HAS THE PORT INDUSTRY PROGRESSED WITH AUTOMATION IN RECENT YEARS?

We have seen that automation has been slowly but steadily gaining more ground in container terminal operations. Automation of the stacking yard has become widely accepted for new container yards globally, and there are also many terminals that have deployed automated solutions for the horizontal transportation of containers. Remote control and semi-automation functions have also become more common for quay cranes.

The drivers of automation investments have become more diverse than earlier. Besides saving on operating costs, operators are looking to improve occupational safety at terminals, resolve issues with labour availability, provide better ergonomics to staff, and gain greater control over their operations.

However, despite so many recent successes, there is still a long way to go for automation to become the standard that all operators can and want to adopt in their operations.

THERE IS CLEARLY A LOT OF INTEREST, BUT WHAT IS HOLDING TERMINALS BACK FROM INVESTING IN AUTOMATION?

From the decision makers' point of view, automation requires significant upfront investments, and immediate financial pressures can make it difficult to realize the value of an automation deployment over the long term. The length of the remaining concession period can hold back terminal operators from investing, as a short concession does not justify the investment because the benefits will not be seen before the concession expires. Therefore, investments also require the support from the port authority, enabling long enough concession periods and maybe even setting automation as a requirement for the concession.

Furthermore, automation investments also do present some risks, as previous projects have demonstrated. Implementing automation in an operational terminal is particularly complicated, so the potential disruption discourages operators unless they are forced to do it. Suppliers have been trying to introduce solutions that can be implemented more easily, but adoption is still slow. In the end, terminals often turn to process automation solutions that can be implemented with fewer risks but can still improve operational efficiency.

Lastly, automated terminals require expertise in operating, troubleshooting and maintaining systems. Particularly given the steep learning curve of new technologies, the process to transform the existing workforce and external parties interacting with the terminal, and also to hire and retain new people with the right skills might create an additional hurdle when making the decision in favour of automation.

In the end, however, once a terminal automates and gains competitive advantage, it usually encourages other terminals in the region to do likewise.

YOU MENTIONED RISKS THAT ARE HOLDING BACK THE AUTOMATION DEPLOYMENT. WHAT IS BEHIND THESE RISKS?

There have been multiple factors. Sometimes the adoption of a completely new technology has been more difficult than originally expected, while sometimes the integration between the various IT systems from different vendors has been challenging.

The companies that adopt automation technologies often fail to oversee an organization's transformation, because they focus too much on the physical construction work. When the system goes live, the operational organization is not ready to



cope with it, as the project delivery team might have been too disconnected from the operations team. Consequently, the project team is the only one that can keep the system running. This escalates when operations are carried out continuously in consecutive shifts with different people.

Additionally, the system might not align completely with the local processes and operating environment. New procedures are forced to roll out in fast-paced environments, causing unplanned system and procedure changes along with all the subsequent implementation struggles that come with them. As terminals are real nexuses of information, it is very likely that these changes also impact external parties like shipping lines and their agents.

The quality of the data can cause issues when the data is processed automatically without human intervention. An inaccurate piece of data that in manual operation was meaningless, suddenly may become the root cause of a serious productivity issue.

Many terminals have adopted a 'mix-and-match' principle in automating their operations by using the suppliers considered as 'the best of breed' for each individual subsystem. Unfortunately, this compromises the usability of the system for the end user. Diagnosing and resolving faults in this kind

of mixed environment is very complex, especially when multiple user interfaces need to be cross-checked, often requiring manual intervention. The exceptions will not be noticed before they escalate on a terminal level, and have a serious impact on productivity.

The long-term reasons for not meeting targets might be being locked in the implementation mode, waiting for suppliers to complete the punch list items. While issues are being resolved, new things are identified, causing a never-ending project. To overcome this, it is essential to agree on how the project will move from implementation to operational mode, and reach an understanding with suppliers to provide support in the continuous development activities.

It is important to understand that automation systems should operate at least for as long as the lifetime of the equipment. When equipment is purchased in several batches, the system is expected to exist longer than the equipment itself, i.e. the equipment can be renewed, while the automation system continues operating. Therefore, it is essential that software can be maintained and upgraded, as the environment around it changes. New operating systems and IT solutions are introduced, parts

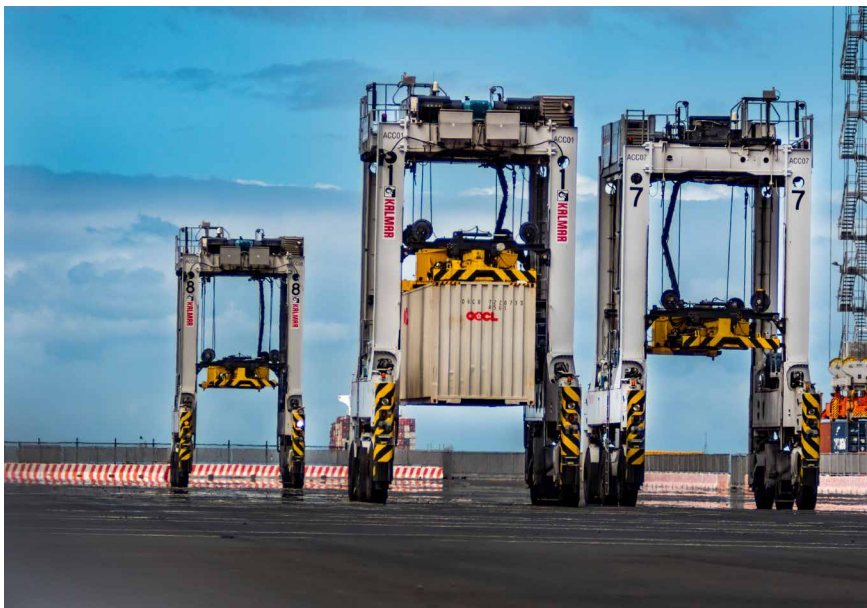
are reaching their end of lifetimes, operating processes and regulations change, and the system needs to be able to cope with many of such changes during its existence. Very often this is not considered in the procurement phase, where the focus is just on the go-live, and later it comes as a surprise.

WHAT ARE THE CONSEQUENCES FOR THE AUTOMATION DEPLOYMENT PROJECT IF THE RISKS MATERIALIZE?

The business consequences are twofold: delayed deployments and missing performance targets. The first will lead to additional cost and delayed value creation, both negatively impacting the financial situation of the terminal. The second will lead to decreased earnings in the long run and endanger the originally calculated business case. Just looking at these potential consequences shows that it is highly important to focus on risk management.

CAN YOU ELABORATE MORE HOW TO MANAGE AND MITIGATE THESE RISKS?

Many of the automation projects globally have been purpose-built and customized, and significant amounts of new functionality have been implemented, to either push the automation boundaries or adopt the systems to suit unique processes. To com-



ply with these requirements, suppliers take the additional risk of developing new functionality during delivery, instead of replicating the existing functionality proven on other sites.

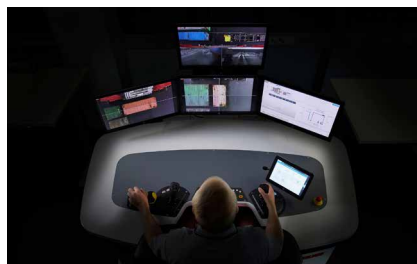
One way to overcome this is by focussing on implementing solutions that already exist. In case further functionality is needed, it is important to identify this early and plan specific risk mitigation strategies. If possible, it may be a good approach to try to plan to go-live with a standard and proven solution and introduce new functionality in controlled steps afterwards. If it is not possible to mostly limit yourself to existing functionality, then it is extremely important to focus on the alignment of the system with the processes it needs to support and the people who will manage it.

The typical planning phase is often at too high a level and does not fully ensure this alignment. This means that the alignment between the system, the processes and the people on the detailed level has to be done during the execution phase, often in parallel with the execution of the civil works and equipment manufacturing. As a consequence, the risk of misalignment is substantial.

In these cases, our advice is to have an intermediate phase in which the alignment between systems, processes and people is done and tested in an emulated environment with the real software. Introducing

such an intermediate step reduces the risk before making certain decisions on the specifications of the equipment and infrastructure. It will add some lead time to the project compared to the ideal parallel project schedule, but we also have to be honest and admit that few of those ideal parallel schedules are ever met. Especially looking at the total time needed to reach the value creation phase, we believe it will reduce the deployment time, especially for projects that have a high degree of complexity or and where technology boundaries are pushed.

The purchasing of automation systems has often been done in much the same way as manual equipment procurement. Contracts typically specify that the automation system should be delivered as defined in the tender specification before it is accepted. In many projects, when aligning these requirements with existing product functionality, there is a lot of room for interpretation. Often at the contract-signing



phase, it is not guaranteed that the supplier and customer's expectations are aligned. Such misalignment leads to an unnecessary disruption during the project execution. Therefore, it is important that in the procurement phase, all future operation processes are known and agreed upon, to ensure that all related suppliers have a mutual understanding of how the system should operate.

Another consequence of the described procurement process is that it focuses only on the delivery of the physical goods on site and their acceptance. It does not consider the lifetime needs of the delivered system, such as software maintenance, upgrades, and updates, which, as mentioned earlier, are an essential part of long-term success. To address this fundamental issue, terminal operators and suppliers need to find new ways of working together.

WHAT STEPS WILL BE NEEDED TO INCREASE AUTOMATION ADOPTION?

Some automation drivers will increase the need and willingness to adopt automation. Remaining an attractive employer for young people is difficult for terminal operators, so automation and related jobs can help attract and retain future workforces.

The work of the TIC 4.0 committee to align the semantics and data interfaces is a good example of the industry working together. The consequence of this will be automation systems and equipment that are easier to interconnect. This will make it easier to customise and optimise systems without creating a gap that will make future upgrading risky or impossible.

Future systems will be easier to deploy. With increasing interest from existing terminals, the suppliers are focusing on developing systems to be implemented on the existing footprint of manual equipment, phase-by-phase, in a live and busy container terminal environment.

Terminal operators will need to start seeing automation in a wider perspective. The focus in automation projects will shift from technology and implementation to management of change in the organization throughout the process. In the future, operators are no longer trying to automate their existing processes, but instead it is accepted that automation will change existing processes, responsibilities and work descriptions. The whole concept of Operations-Engineering-IT will be redefined.

ABOUT THE AUTHORS

Timo Alho has worked at Cargotec for 20 years, first in automation R&D, where his key project was the development of the Kalmar AutoStrad solution. During the past eight years, he has held various positions in terminal automation, from product management to the head of the cranes business line. He has been involved in all Kalmar terminal automation projects.

Jarno Kuipers is a container terminal automation professional with more than 15 years' experience in port automation. His background is in IT consultancy and in terminal operations management of a fully automated terminal, where he was involved heavily in the implementation of new technology. Before joining the Terminal Design Services team, Jarno held several positions involving sales and execution of terminal automation projects.

Christopher Saavedra is a container terminal automation professional with more than seven years' experience in port management and operations. His background is in military naval sciences and in terminal operations management of conventional and automated terminals, where he was heavily involved in the implementation and testing of new technologies. In his previous position at Kalmar, he led process improvement and optimization, connecting processes with staff, IT, customs and customers.

ABOUT THE ORGANIZATION

Kalmar, part of Cargotec, 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.

WHAT BIG INNOVATIONS WILL IMPROVE THE ADOPTION OF AUTOMATION?

The most important thing is to focus on the end user. The key to high productivity will not be better optimization algorithms, but helping end users get the most out of the system. Simpler systems with more efficient processes will let operators focus and keep the terminal performing in various operational situations, and quickly take the right actions. This is only possible if suppliers and end users collaborate well, towards a common goal.

We also expect to see a different type of relation between terminal operators and automation suppliers that will be better suited for automation projects. We are already seeing new and innovative procurement strategies in various terminal automation projects, which all share an emphasis on value creation and risk reduction.

One example is the performance-based contracting model, where the supplier-buyer relationship changes from a transactional one to a business partnership. The business partnership enables the terminal operator to perform better and the operator to focus on the terminal's customers, ensuring maximum value for all. Many other industries have already made this type of shift successfully, so we should try to learn from them.

WHY DOES THE RELATIONSHIP BETWEEN SUPPLIER AND OPERATOR NEED TO CHANGE AS WE MOVE FORWARD WITH AUTOMATION?

As the automation system becomes the core part of the terminal's operations, it is necessary to rethink how it can be continuously improved. Here, operator and supplier share a goal - the operator wants high productivity and consistency, both of which need a skilled and adequately resourced team. The supplier wants a high-performing reference case and satisfied customers. To do so, the current transactional model needs to evolve into a partnership, where both parties can excel in their area and reach the mutual goal.

The current equipment procurement model restricts opportunities to evaluate the potential value of a long-term strategic partnership. If a terminal can provide value six months earlier and the initial productivity ramp-up can be made faster, it can create substantially more value than the savings gained through a traditional procurement process.

ENQUIRIES

www.kalmarglobal.com
kalmar@kalmarglobal.com

