Tim Newbound speaks to a number of companies responsible for supplying terminal operating systems and related technologies. It’s a diverse, evolving market, and business is good...

With larger vessels, evermore complex demands on cargo handling and the rise of automation, advanced information technology continues to become increasingly important at our ports and terminals. The terminal operating system (TOS) is now a vital cog in the work of ports throughout the world, and the demands for innovation and intricate integration with other IT systems are becoming increasingly challenging. This also makes the TOS market big business, with solution providers fighting for significant contracts. To stay competitive in this world of complex operations, those managing ports and terminals increasingly need to focus on offering diverse, in-depth evidence of their capabilities. Exceptional service levels are becoming as important as having the physical means in terms of cargo handling equipment. This means operators must prove their ability to deliver against a matrix of key performance indicators (KPIs) — not just obvious throughput statistics, but detailed analytical data of all facets of terminal management. Russian-based developer Solvo, which provides the SolvoTOS among its solutions, states that the information extrapolated via a TOS can help shape port planning and management on three levels: strategic and tactical levels for long-term planning, and on an operative level to ensure smooth daily operations and react to changing circumstances. SolvoTOS analyses and displays key indicators for all processes running at the terminal during container processing. These include indicators for vessel, truck, and train processing as well as warehouse operations and equipment utilisation. The company keeps its interface simple for operators to quickly view and react to information in real-time. This includes, for example, a ‘traffic light’ system to summarise the state of operation of each container (green normal, red a significant deviation from expected operations). The system will typically offer a series of standard solutions to any problem encountered, and in some instances can also automatically resolve an issue, Oscar Pernia, Director of Product Management Automation at Cargotec company Navis, concurs that quality of service has become a major determining factor in ports and terminals seizing new business opportunities. He lists five key factors for quality of service: vessel call time reduction; cost savings; schedule reliability; operational control, and service excellence. As full automation projects for the next generation of container terminals become increasingly large and complex, tight integration with TOS software is an essential factor for success. With this evolving marketplace, Navis has gathered new customer requirements for extensibility, reliability and performance to face the complexity and size of next generation automation projects. The company’s next automation release will incorporate a new optimisation framework, which provides an open and flexible solution for critical functions in automated equipment scheduling. This, Pernia states, results in reduced labour costs through automation and increased terminal productivity and handling capacity through highly efficient container movements. He adds that, in relation to wider industry discourse about automation solution architecture and how different systems and interfaces integrate, Navis’ approach is consistent with its overall philosophy of open, scalable solutions. This means that customers need not continuously debate which provider will perform each function; Navis’ approach is vendor-agnostic. It uses generic APIs that are independent of any system provider and independent of the specifics of a given solution — providing a sustainable, reliable and efficient option for each case of implementation.

A Taste Of Success

Easy does it

Versatility and ease of use are common selling points of terminal operating solutions. This was integral to a new module for terminal rail operations developed by Italian solutions provider Circle. Delivered as an add-on to a TOS, the MILOS Railway Management module presents a “unique and very user-friendly” graphical interface, which provides an immediate visual overview of a terminal’s rail park as a whole, with simple drag and drop functionality that enables users to quickly access information. This system is accessible on mobile and desktop devices, and Circle boasts that it is interoperable with all major terminal operating systems. Circle has supplied its ‘MILOS’ (Making Intermodal Logistics Optimisation Simple) suite of modules for a range port and inland customers across Italy and the rest of Europe.
This kind of modularity and integration are underpinning concepts in the development of TOS and related systems. This is integral to the work of Spanish company Orbíta Ingeniería, which offers a line of standard products aimed at providing traceability of containers in terminals around the world. Its modular model enables clients to pick the features they desire from its “GateSuite” to put together a comprehensive automation system for gates. The company has now also moved into the quay crane optical character recognition (OCR) market, with the introduction CraneOCR, a system that provides OCR during loading and unloading on ship-to-shore (STS) cranes. The company provides different interfaces for TOS integration in its GateOS software, with Orbíta stressing the importance of preparing a TOS for sending and receiving information from a gate operating system.

“Automated gate systems have to have degrees of liberty to adapt as much as possible to the terminal’s process, not vice versa,” says Francisco J Grau Cavanillas, Key Account Manager – ports and terminals. “Flexibility on the TOS is necessary too, and they need to provide a clear interface for all the data. Orbíta GateOS is designed under these premises.” A notable order for Orbíta recently came from container operator Grup TCB, to supply a GateSuite OCR system as part of a major expansion project at its TCB Barcelona facility. The contract involves the supply of an OCR solution to automate 10 new entry and exit truck lanes at the terminal, which last year handled close to 800,000 TEU. It is due for completion in November. This project exemplifies the aforementioned integration of OCR with a TOS – in this case ARGOS, Grup TCB’s own terminal operating system. In addition to integrating GateOS with this TOS, Orbíta is providing the hardware and systems needed for truck drivers to interact with the TOS, including QR code and RFID readers.

Allan Jones, head of business development at middleware and mobile systems specialist International Terminal Solutions (ITS), states that his company’s G-POS system adds value to a terminal operating system by automating many of the functions managed by the TOS. This includes the automatic detection of container grounding locations and the current location of all the cargo handling equipment. “Many terminal operating systems have optimisation capabilities such as job stepping functionality, and for this to work the TOS needs certainty on where containers are stored, the location of the cargo handling equipment in real time, and all this needs a seamless exchange of information with the TOS,” says Jones. “ITS is one of the early pioneers of container yard geo-fencing and automated job stepping. Our early geo-fencing was aimed at operational safety with the creation of safe operational zones. Now we find we are using this more and more for the automation of job stepping, allowing the equipment operators to automatically receive and update the job steps as the equipment progresses through the yard without requiring any input from the operator.”

**Integrated operations**

As a further example of an integrated project, in April, Central Systems & Automation announced that, in partnership with fellow UK-headquartered firm DBIS, it had secured a new contract with the Port of Tyne to help automate strategic port management operations at its facility in South Shields, Tyne & Wear.

Central Systems & Automation will supply the Port of Tyne with its Autostore system

One of the UK’s major deep-sea ports, in 2012 the Port of Tyne handled a record 6.5 million tonnes of cargo. Central Systems & Automation will supply the port with its Autostore system, which it boasts is the “UK’s leading terminal operating system.” For its part of the deal, DBIS will provide functionality for the bulk operations, vessel management and berth planning by introducing its specialist CommTrac software. Autostore will also be linking to a number of existing IT systems as part of a £1 million project to implement a new container management system. A prominent case study for global terminal technology provider Tideworks Technology has been its supply of a new, integrated TOS to Slovenia’s national port, Luka Koper. This went live late last year. A dynamic, multi-purpose port, Luka Koper had an aging TOS and in 2009 found out that this system would no longer be supported and as such would become obsolete. The port faced an additional challenge in that its new TOS would have to integrate with Tino, an intricate proprietary business system developed by Actual IT and deployed in 2007. The port shortlisted 15 providers that it would evaluate against a series of criteria to become Koper’s new TOS partner. In addition to effective integration with Tino and factors such as ease of use and total cost of ownership, the port wanted a system that would pay full attention to its dynamic needs for upgrades and support. The integration with Tino presented a number of challenges and technical complexities. Tideworks states that both it as a company and the port learnt invaluable lessons from the conversion. The new TOS has been delivered to provide versatility in the future, too — although currently focused on containerised cargo, the solution is capable of managing other cargo types at the multi-purpose Luka Koper. Luka Koper now makes use of Tideworks Technology’s entire suite of TOS solutions, which includes the Mainport Terminal Management System, Spinnaker Planning Management System, Traffic ControlTM, Forecast and the Digital Bridge performance-monitoring tool. The port attests that the new TOS set-up has enabled it to be proactive, rather than reactive, in the management of operations. It has also had a significant impact on enhancing productivity. In April, Luka Koper hit a record of 100 moves per vessel per hour, and the port anticipates further increases in the future.

Other recent implementations announced by Tideworks include the delivery of a TOS to California’s Port of Stockton and Vietnam’s Cai Lan International Container Terminal (CICT). Norbert Klettner, Managing Director at Australian company Realtime Business Solutions’ EMEA office, lists a number of recent orders in his region. These include a contract to implement all modules of its TOPS terminal management system at the new greenfield Lamô Container Terminal in Togo, which is designed to handle more than 2 million TEU per annum. This contract includes the supply of the latest, extended version of the TOPS KPI module which goes beyond KPI figures and allows the terminal management to look into the operational system from any device via the web — for example to view berth planning on a tablet device such as an iPad. RBS has also sealed a deal with Teluk Lamong (Pelindo III) in Indonesia to supply TOPS for a new semi-automated facility that will handle in excess of 2 million TEU a year. Konecranes will supply the automatic stacking cranes (ATCs) for this project. Another major project for RBS has been its involvement...
in the ongoing redevelopment of the Klaipedos Smelte container terminal in Lithuania. Having implemented RBS TOPS at the end of 2010, the system has played a key role in the terminal’s growth strategy, and continues to do so as the Baltic MSC trans-shipment hub moves towards handling more than 800,000 TEU per annum by 2015.

**Self-service**

In systems related to TOS, Netherlands-headquartered company Softpak states that a trend it has observed of late is the widespread use of self-service desks, which can process cargo on the basis of information unique to a trucker. This means that, once a terminal has notification of a container’s impending arrival, it can enter the yard with minimal bureaucracy or personnel involvement. So, for example, in the Netherlands or Belgium, a trucker would only need to provide a cargo card or Alpha pass respectively, in addition to a handscan. The company states that one of its customers in the Netherlands, Kramer Container Depot (or Rotterdam Container Terminal), has extended its self-service desk with a photo camera system. This enables the terminal to recognise the container number via OCR, with the container photographed from different positions to avoid possible claims regarding damage of containers. “Another customer, Progeco Belgium, is operating its depot in Zeebrugge with only a self-service desk,” CEO Joop Keislar tells WPD. “If there is a problem with a trucker, assistance can be given via a video system operated from Antwerp or Rotterdam.”

Among Softpak’s software suites is the Proterm Container Terminal & Depot package. This, the manufacturer details, can be used to manage all the logistic and administrative activity at a container terminal or depot. With its depot and repair functionality, the system is designed to provide streamlined terminal management and maintenance. It works in a sequential manner, logging that a container is set to arrive at a port and then recording a gross damage report. Once the box is moved to the yard, any subsequent actions on the box are logged, triggering automatic invoicing within the billing system. This enables operators to easily track the progress, or check the history, of individual containers via a simple search interface.

**Terminal tickboxes**

Constantine Sokolov, Director of Business Development at Solvo, details 10 checkpoints to consider when choosing a terminal operating system. We can only very briefly summarise these within the context of this article. Nonetheless, doing so at least touches upon the ways to avoid what Sokolov calls the “hidden pitfalls” of TOS purchase. He recommends that purchasing operators consider:

- The number of relevant, successful projects a TOS developer has delivered.
- The size of the company.
- The scalability of the system, and if it can deal with increasing turnover, more personnel and larger general operations.
- Versatility and modularity — the ability to expand software systems by installing add-ons.
- The ability to segment and conduct step-by-step implementation of the system at any stage of terminal development and at any production capacity level.
- The experience of the implementation team.
- Whether the company has an effective personnel training system.
- Round-the-clock multi-language support.
- Adaptability; the ability to integrate the system with various equipment and other systems.
- Round-the-clock multi-language support.
- The system’s adaptability to integrate with other systems.
- A rational cost of ownership/transparent pricing policy.

“Undoubtedly, the total cost of ownership (TCO) is one of the most important factors when evaluating a system and would seem to be the most obvious,” concludes Sokolov. “Nevertheless, certain pitfalls can be found here as well. It is not enough to simply assess a system strictly based on its licensing or implementation price. The cost and level of technical support, follow-up modifications and integration with other systems (gateways) or equipment (e.g. radio terminals) can also significantly impact the final price quote.”

**Thinking big**

While there’s much to consider when deciding on a TOS, then, it is undoubtedly a choice that rightly demands long, hard thought and research from terminal operators. As terminal operating systems become increasingly advanced and central to how our maritime cargo hubs work, this is an investment that they have to get right. And, of course, this burgeoning importance of TOS is great news for the market’s developers and solution providers.  

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