PORT AUTOMATION

Case Studies

INNOVATIVE SOLUTIONS FOR PORTS, TERMINALS AND DEPOTS

Port Otago Limited

OPTIMISED OPERATIONAL CONTROL WITH LIVE DATA VISUALISATION

Port Otago Limited (POL) operate a busy container terminal on the south island of New Zealand.

As part of the zero harm culture POL wanted to identify issues and trends in the safe operation of the Container Handling Equipment (CHE) before potential accidents occur. This allows them to take proactive action based on actual measurable metrics with measurable benefits.

The ***PORT****SPECTIVE* Management Suite and ***PORT****AUTOMATION* Mobile Systems provided POL with a rich suite of systems that integrated seamlessly with each other and also offer external connectivity to third party systems.

The POL integration includes sub systems for driver identification, equipment monitoring, GPS tracking and full management operational visualisation.

Key operational benefits

- Visualise the live operation, track and monitor live operations and bottlenecks.
- Monitor equipment operational state. Identify and resolve issues quickly.
- Graphical reports for performance, idle time, etc. Analyse equipment safety.
- Analyse live and historical KPIs and incidents.

***PORT**SPECTIVE* Management Suite features:

- Live map view.
- Status view of equipment.
- Alarms and faults displayed.
- Historical data replays.
- Snail trail replay & analysis.
- Database with second by second data for big data analysis.

***PORT**AUTOMATION* Mobile Systems features:

- Tracks equipment in the live operation.
- Automatically collects equipment and safety data.
- Touch screen for operator pre-start shift checks.
- Live reporting to the PortSpective system.
- Installed with access card reader.

***D-MON** Access Control features:

- Checks operators card and authorisation levels.
- Prevents unauthorised use.
- Automatically identifies and logs who is driving.
- Live reporting to ***PORT**SPECTIVE*.

Key features of the system implemented for POL allows the remote monitoring of fuel levels for a more intelligent fuelling strategy, tip alarm monitoring to identify unsafe areas, and also the operators triggering the highest number of alarms. This provides POL with the ability to set up a proactive safety regime.

Live and historic performance data for move counts and idle time show issues in the live operation and allow for KPI analysis. Live alerts and warnings show where issues are arising and allow the management to take pre-emptive actions.

Port Otago Limited implemented the following systems:

***PORT**AUTOMATION* Mobile Systems

Configurable mobile computers with GPS tracking, telemetry data capture, driver access card authorisation, and driver checklists.

D-MON Access Control

D-MON: Driver's card reader, identification and authorisation.

***PORT**SPECTIVE* Management Suite

PortSpective : Provides a live and historic view of the terminal operation. Equipment location on a map, speed and direction. Live warnings to track and monitor fuel level, equipment faults, running time, driver details, safety issues and many other attributes.

Tuxpan Port Terminal

TRUCK-ID AUTOMATED TRUCK AND LOAD IDENTIFICATION, OPTIMISED OPERATIONAL PERFORMANCE WITH LOW COST OF OWNERSHIP

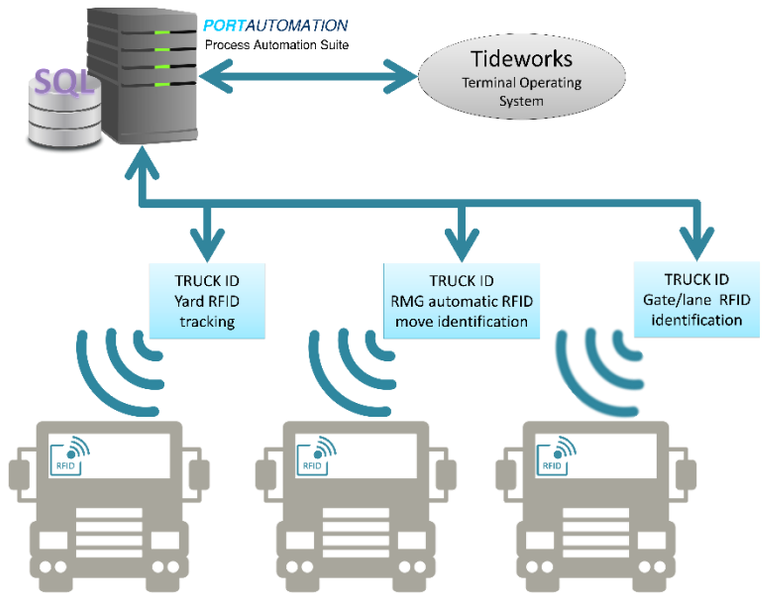
Tuxpan Port Terminal (TPT) is located on the Atlantic coast of Mexico, about 150 miles from Mexico City. TPT operates with 4 Ship-to-Shore Cranes and 8 Automatic Stacking Cranes, as well as top loaders, side loaders and 30 internal (UTR) trucks. Being an import/export terminal, thousands of external street trucks (OTRs) also call at the terminal.

TPT wanted to ensure that the truck arriving at the unmanned yard crane was the correct truck for the planned move issued by the Tideworks terminal operating system. They also wanted to determine the order that the trucks arrived at the cranes and also general visibility of the truck movement around the terminal and in and out of the gates. To achieve these features TPT selected our **TRUCK-ID** system.

TPT selected our Passive RFID **TRUCK-ID** system due to our extensive industry experience with Passive RFID.

Passive RFID has no planned maintenance requirement, and does not suffer with the long range of battery powered RFID making it less complex to discriminate between one tag and the next (or one truck or all the trucks in a queue).

The ultra-low cost of Passive windshield transponders also make a financially viable fit and forget solution. This allows the terminal to tag thousands of street trucks for a fully automated gate and yard solution.



Low cost RFID tag

For TPT the **TRUCK-ID** facilitates automation for an automated gate, automatic yard container move reconciliation, and general progress of traffic in the yard. **TRUCK-ID** provides a low cost of ownership solution for identification of both internal and external container trucks.

TRUCK-ID provides location information, details of trucks queued at the gate, customs kiosk, weigh scale, yard road lane, and general terminal entry/exit point. The system also facilitates the automated job hand-off between a container truck and the Automated Stacking Cranes (ASC) used in TPTs automated yard.

TRUCK-ID at TPT provides the following functions:

- Automatically identifying the trucks and containers in a Weight-In-Motion scale providing an unmanned drive through solution.
- Automatic identification of the truck at customs booths, and terminal in and out gates.
- Automatically monitoring the progress of trucks in the yard to allow dynamic adjustments to the work queues for the ASCs.
- RMGs (ASCs) automatic identification of the load under the spreader (required as there is no crane driver to identify the container/truck).

John Bressi, General Manager at TPT

"TPT considered active RFID, but the cost of the tags was a major concern. Mexico has a large number of truckers, and the business operates on very thin margins. While ports in other locations can charge truckers up to US$90 to fit a tag such a model would be very challenging in Mexico."

"TPT selected UK-based International Terminal Solutions (ITS) to supply low-cost passive RFID. ITS supplied EPC Gen 2 UHF tags, operating in the 902 to 928 MHz band, enough for 15,000 trucks. Internal UTRs have slightly different tags in a rugged housing. As passive tags do not need a power source, there are no batteries to maintain. Another advantage is that they are designed to open international standards, so different brands are interchangeable, and the purchase price is much lower just a few cents each, compared to US$10s per unit for active tags, not including maintenance costs."

"TPT could be tagging as many as 10,000 or more trucks, and it had been concerned about ongoing maintenance of batteries, as well as the initial purchase price. When it comes to trucks that arrive without a tag, passive tags are also a much simpler solution. Low-cost adhesive passive tags can be quickly mounted at the gate, and then stay with the truck permanently. Other terminals that rely on active RFID tags typically have to issue temporary tags, and have a process for collecting these at the out gate. TPT is also managing the distribution process, and tags can either be sent directly to trucking companies or installed at the terminal, where the truck is registered and the driver is also issued with an ID card in a process that typically takes five minutes. The tags are a self-adhesive design that stick permanently to the truck windscreen. Once adhered, they cannot be removed without being destroyed."

Tuxpan Port Terminal implemented the following systems:

RFID enabled
TRUCK-ID

PORTAUTOMATION
Process Automation Suite

Benefits

- Eliminate manual data entry errors
- Industry proven
- Excellent return on investment (ROI)
- No temporary tag required
- Automatically identify the truck at critical hand off points

Features

- Automated gate identification
- Automated yard tracking
- Automated CHE move checking
- Automated CHE VMT job promotion
- Secure data
- Tamperproof tag
- No battery: No tag maintenance

Peel Ports Liverpool

GPS TRACKING, VMT, JOB STEP AUTOMATION, NAVIS N4 INTEGRATION

Situated in the city of Liverpool the port is ranked among Britain's major deep sea container ports, serving more than 100 global destinations. The terminal handles nearly 800,000 TEU per annum with 7 Ship-to-Shore Cranes and a fleet of 40 Straddle Carriers.

The system implementation at the Port of Liverpool is based on modular G-POS GPS technology tracking the equipment in the yard, spotting container lifts, and incorporating geo-fencing. The system is implemented with touch screen panels, secure system log-on via security access card, asset management and includes middleware for connections to external systems.

Gareth Jones - Planning and Operations Manager
"We wanted to select a vendor that not only understood our needs but also had a proven track record in the industry. We chose International Terminal Solutions as they met our requirements and were able to offer a host of operational benefits that hadn't originally featured in our plans." "Liverpool is now recording the fastest turnaround times of any UK port, with 95% of truck drivers processed through the port within an hour, and 65% within 30 minutes a 30% improvement on previous performance."

Straddle Carrier operators are provided with a real time location as to where the Carrier is, the container move instruction and its target destination in either text or graphical map formats - the operator can choose which format they prefer. In poor weather the ability for G-POS to advise the driver of the location is invaluable in circumstances where the ground slot markings are not visible.

Automatic Job Steps
G-POS automatically confirms to the Terminal Planning System when steps are complete, based on geo-location, container lift (or set-down) and requests the next available work step. The Straddle Carrier operator simply follows the work instructions with G-POS monitoring every move to ensure it is executed correctly.

Peel Ports implemented the following ITS advanced systems

PORTAUTOMATION Mobile Systems

G-POS : Mobile systems fully integrated with ECN4, with drivers touch screen, GPS tracking, telemetry data capture, driver access card authorisation, and full connectivity via Middleware.

Operator display

Operators displays are clear and easy to see providing information relating to the current status, current position, and the movements to be performed. G-POS works closely alongside the TOS system with a constant exchange of data to ensure optimal operational movements are made.

Optimal information displayed

Job Step information displayed is clear and automatically changes to the next step.
No input is required from the operator.

G-POS provides the operator with pre-advice of the container length for pick-up, allowing the spreader to be pre-set for the container. This may only save 5 to 10 seconds per lift, but at 500,000 lifts this equates to a saving of between approximately 700 and 1,400 Straddle Carrier operational hours per year. The operator can also select between text and graphical map view screens.

David Huck, Head of Port Operations for Peel Ports Mersey -

"The first phase of implementation saw G-POS applied to the road interchange and has assisted in providing benefits which equate to a 22% increase in available stacking area and productivity enhancements of up to 20%. The benefits of the investments have been realised immediately from Go-live and have helped the terminal to a 30% improvement in vehicle turnaround times."

"The implementation of the new systems took place without even a temporary dip in performance. In fact the Port has already seen improvements in productivity in line with our expectations, Liverpool is now recording the fastest turnaround times of any UK port, with 95% of truck drivers processed through the Port within an hour, and 65% within 30 minutes."

Operational Visibility

Terminal management and key personnel can view equipment status in real-time with live information. They can access details on equipment, operator history and KPI data. Alerts are automatically generated to bring to the managements attention issues, possible outages, and unsafe operation of the equipment.

D-MON
Access Control

D-MON: Drivers card reader, identification and authorisation.

PORTAUTOMATION
Process Automation Suite

Industry proven middleware providing connectivity for mobile systems, TOS, ERP, security systems, and operational visualisation.

BENEFITS

- Full audit trail
- Optimise TOS and operation
- Eradicates lost containers
- Reduces re-handling
- Gives management visibility
- Improved end customer service

FEATURES

GPS / VMT

- Precise 20cm D-GPS
- Integrated with Navis N4
- Full geo-fencing with automated job stepping
- Automated keyless pick and place reporting

Security

- No unauthorised drivers
- Automatic TOS log-on

ISLE of MAN
INTERNATIONAL AIRPORT

Streamlining passenger transit with automated passenger identification

We not only work in sea and dry ports but also provide technology driven optimisations to a range of clients.

The Isle of Man airport operated by the local government is one such case. As passenger numbers increased the airport management realised that streamlining the transfer and flow of passengers was a key element to reduce delays and provide a good passenger experience when using the airport.

As part of a raft of measures a key element to this is the introduction of automatic boarding card readers and passenger gates. The system identifies and automatically authorises passengers to enter the secure departure area. As well as the automation of passenger admittance, the system provides valuable statistics to the management to allow fact based decision making for future initiatives.

- Streamline passenger transit
- Automated passenger identification and access
- Reads smart devices and traditional boarding cards
- Provides evidence based decision making for value based decisions

Infrastructure Minister Ray Harmer MHK said:

"The aim of the work undertaken over the past few months was to reduce the time people had to queue waiting to go through security, and I'm pleased this has been achieved."

"Importantly, the changes will improve the overall passenger experience, and will help residents and visitors enjoy a smooth start to their journey from the island."

PSA

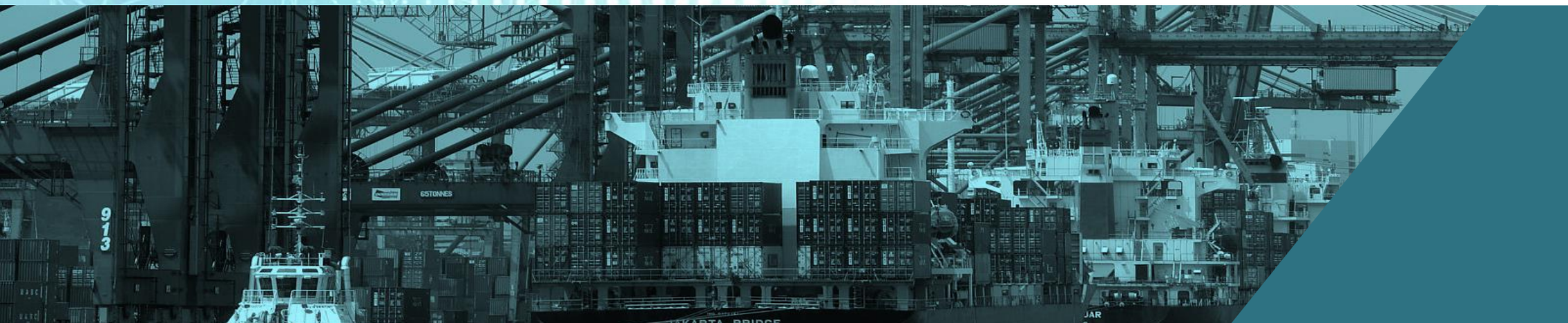
PSA Panama International Terminal

TRUCK-ID

AUTOMATED TRUCK AND LOAD IDENTIFICATION, AUTOMATION ENABLER, OPTIMISED OPERATIONAL PERFORMANCE WITH LOW COST OF OWNERSHIP

Strategically positioned to accommodate the growth in traffic following the canal widening, PSA Panama International Terminal (PPIT) is located at the entrance to the Panama Canal and provides an important port of call for shipping lines with both container and RORO traffic. With a recent expansion to the terminal PPIT has increased its capacity 4-fold up to 2 million TEU from when it first opened in 2010. The expansion included state-of-the-art automation with 12 new automated stacking cranes for making it one of the most productive terminals in Latin America.

With the new levels of automation it was important PPIT made sure they had all the pieces to the jigsaw in place to realise the full potential of the automation investment. One key piece was ensuring the smooth interaction between the manually operated trucks and the fully automatic yard cranes. A critical part of this process was to ensure that the truck arriving at the unmanned yard crane was the correct truck for the planned move issued by the Terminal Operating System (TOS).



TRUCK-ID provides automatic yard container move reconciliation. The system provides a low cost of ownership solution for identification of terminal container trucks. The system facilitates the automated job hand-off between a container truck and the Automated Stacking Cranes (ASC).

Key advantages identified by PPIT is that **TRUCK-ID** uses RFID designed to operate internationally to open standards, with different brands being interchangeable, and the purchase price is much lower - just a few cents each, compared to US$10s per unit for active tags. The passive tags used are military grade in a rugged housing and do not need a power source, and consequently no batteries to maintain or planned maintenance requirements and does not suffer with the long range of battery powered RFID making it less complex to discriminate between one tag and the next (or one truck or all the trucks in a queue).

PSA Panama implemented the following systems:

RFID enabled
TRUCK-ID

Benefits

- Yard automation enabler
- Eliminate manual data entry errors
- Industry proven
- Excellent Return On Investment
- No temporary tag required

Features

- Automated truck identification and reporting
- Secure data
- Tamperproof tag
- No battery - No tag maintenance

PORT AUTOMATION

PORTAUTOMATION.COM

+44 (0)1509 236 555

info@terminalsolutions.co.uk

***Port** Automation* is a trading name of

iTs

International Terminal Solutions Ltd
Loughborough Technology Centre, Epinal Way
Loughborough, Leicestershire, LE11 3GE, United Kingdom

Process automation

- Trailer positioning systems
- Radio data systems
- Mobile computing
- Equipment automation
- Position determination systems (PDS)
- Real-time location systems (RTLS)
- Equipment operator authorisation systems
- Automated job identification and promotion

Software

- Live performance analyticals reporting and KPIs
- Management live operational monitoring
- Real-time equipment bird's eye view
- Middleware
- Mobile applications

RFID

- Gate automation
- RTLS track progress through the operation
- Automatic Job identification for automated terminals
- Automatic Job promotion for manual terminals

GPS

- Geo-fencing
- Job step automation
- Equipment track and monitor
- Automated cargo location reports
- Fully integrated on-board systems

Fleet management and control

- Visual operational mimic
- Track equipment in real time
- Monitor live operations
- Highlight bottlenecks
- Identify unsafe operation
- Monitor: fuel, faults, speed, running time, driver details, yard location, critical/safety issues