MARINE TERMINAL AUTOMATION
Increased Productivity and Efficiency with Real-Time Visibility

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Overview

As marine terminal operation volumes continue to grow throughout the world, terminals are seeking ways of improving the productivity and efficiency with which they meet their customer requirements. Today’s terminals are expected to handle increased container volumes, larger vessels and greater capacity. Terminal operators need to streamline their business processes in order to stay competitive and profitable.

Zebra Technologies marine terminal automation and real-time locating system (RTLS) technologies play a key role in streamlining these processes. Zebra’s RTLS technologies are always-on technologies that integrate wireless communication with vehicle monitoring systems and location devices for real-time information and data management. The technology uses sophisticated hardware infrastructure to capture real-time data to locate, track and manage critical assets (containers and CHEs) used in marine terminal operations. These solutions help automate terminal asset management including inventory, managing critical assets and people, job promotion and container handoff, and the real-time identification of over-the-road trucks.

MARINE AUTOMATION AND REAL-TIME LOCATING SYSTEM (RTLS) APPLICATIONS

The Zebra solution contains hardware components installed on the terminal asset that need to be tracked allowing the assets to be tracked in real-time. The hardware interfaces with on-board PLC (where available) to collect and transmit real-time status information for smarter business decisions.

Zebra’s hardware seamlessly integrates with application software such as leading Marine Terminal Operation Solutions (TOS) and Terminal Automation Systems (TAS). The application software receives real-time information data from the asset tags and converts it into meaningful information for the TOS or TAS. The application software also monitors and reports on the overall health of the installed system. Sophisticated algorithms, tailored to the needs of marine terminal operations, interpret the events from the devices and provide the precise information needed by the terminal system.

Automated Job Stepping

This solution automates the events that operators are required to key-in, removing the dependency on manual data entry and eliminating erroneous entries. This allows accurate job-step event messages to be sent to terminal operating systems. Zebra’s RTLS infrastructure enables process automation, real-time visibility and process monitoring capabilities.

The automated data, allows terminal managers to uncover and address operational inefficiencies. Configure rules that assign yard slots to trailers during check-in and after they are processed at a door. Available slots are determined by the location system when using RTLS infrastructure deployed across the yard.
Equipment Fleet Management

This solution offers a comprehensive and real-time equipment tracking and monitoring solution that enables terminal operators to see and monitor container handling equipment. This real-time information offers operators critical data needed to efficiently manage their operations; it also offers rules setup that helps automate fleet processes such as switcher movement and availability. This critical information is determined by the RTLS technology.

Automated Inventory Management

This solution provides marine terminal operators with real-time and precise location information of terminal assets. The real-time locating technology allows an automated system to determine container positions, replacing manual processes. This system saves time, reduces the demand on CHE operators and increases productivity with more moves per hour. The technology also helps reduce operation costs by ensuring terminal operators have clear visibility to all containers thus preventing loss and theft, leading to higher customer satisfaction.

Automated Job Promotion and Container Handoff

This solution provides accurate location data for an optimized and real-time job-list for CHE operators; this automated system ensures they see assigned tasks more efficiently limiting previous manual display methods. The solution allows operators to get instant and precise information about truck positions, CHE positions and other mission critical task data.

Container Handoff automates the transfer of a container between the truck and CHE. The CHE operator does not need to manually select a job. RTLS technology allows automatic assignment of tasks such as next container move details to be sent to truck drivers based on real-time activities taking place in the terminal. This information history also provides a valuable resource for process and asset audits. Available slots are determined by the location system when using RTLS infrastructure deployed across the yard.

Over-the-Road Truck Management

Over-the-road (OTR) truck management presents a challenge for terminal operations as they are often outside the range of terminal automated systems. The Marine Telematics Over-The-Road Truck Solution fills this important gap by automating all facets of gate and yard operations. The RTLS technology allows for the automation of truck identification at terminal gates and real-time locating of truck location throughout their visit to the terminal. The technology also allows for the automated identification of trucks during CHE to truck transfers.
ZEBRA TECHNOLOGIES REAL-TIME LOCATING SYSTEM (RTLS) INFRASTRUCTURE

The Zebra RTLS infrastructure includes sensors, asset tags and exciters. The Zebra WhereLAN III is the industry leading sensor with SNAP SHOT technology for complete asset visibility. Its low power requirement and 802.3af Power-over-Ethernet compliance makes it flexible and cost effective for marine terminals. The sensors are certified intrinsically safe and have all-weather enclosures for use in indoor or outdoor operations.

The WhereTags are the #1 active RFID tag used in the ports and terminals today. The tags are compliant with the ISO/IEC 24730-2 and IEEE 802.11 (Wi-Fi) global standard for easy deployment, integration and a complete asset visibility and tracking solution. It delivers an enhanced user experience and the lowest total cost of ownership in the industry. The tags support single or multimode operations with a 7 years battery life. Its configurable power output also ensures multiple deployment and application use flexibility.

The Zebra WherePort HD is a ruggedized and performance driven ISO/IEC 24730-2 standard heavy duty exciter with a configurable spherical signal field and range for mobile environments. It supports up to 8 configurable range settings for easy configuration and deployment and is also designed for high levels of shock and vibration seen in the port and terminal environments. It is indoor and outdoor compliant.

Accessories – Zebra supports multiple tag installation options for ports and terminals that enable easy deployments. This includes the self install and centralized install options. Zebra's System Builder software tool also enables easy planning and designing of the RTLS network ensuring a simple and accurate network installation from day one.

Self Install Option – Drayman Mirror Mount Kit: This kit is designed to be installed by the trucker and mimics the installation of an external antenna on the driver’s side mirror. This application is both simple and familiar to the trucker. More than 35,000 of these install kits have been used to date.

Centralized Install Option – Roof Top Kit: This kit uses 3M poly lock double sided adhesive tape. This same adhesive is used to bond fenders on to vehicles and is proven to be robust and durable.

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<thead>
<tr>
<th>Product</th>
<th>Feature</th>
<th>Value</th>
<th>Benefits</th>
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<tbody>
<tr>
<td>WhereLAN III</td>
<td>Accuracy</td>
<td>One Meter Accuracy</td>
<td>Enables more locate-driven solutions</td>
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<td></td>
<td>Lower TCO</td>
<td>• Wireless time synchronization suitable for heavy industrial environment&lt;br&gt;• 802.3af PoE, Wi-Fi backhaul and Solar power support</td>
<td>• Elimination of wired cabling cost &amp; installation time&lt;br&gt;• Reduced BOM due to increased accuracy and performance&lt;br&gt;• Simpler install due to PoE support &amp; ability to maximize existing Wi-Fi assets</td>
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<td>Maintenance</td>
<td>Self-configuring, Self-Adjusting Wireless Time Synchronization</td>
<td>Simple to operate network with self healing functionalities</td>
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<td>WhereTag IV</td>
<td>Multimode</td>
<td>Supports both ISO24730-2 RTLS and IEEE 802.11 Wi-Fi</td>
<td>Allows customers to maximize Wi-Fi assets while also meeting location requirements</td>
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<td>Configurable blink rate &amp; power output</td>
<td>Programmable features - Blink rate ranging from 4 seconds to multiple hours</td>
<td>Allows customer to support multiple scenarios, applications and requirements easily</td>
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<td>Intrinsically Safe Compliant</td>
<td>IS certified to be safe for Class 1, Division 1, Groups A-D, T6 environments</td>
<td>Allows for use in hazardous and explosive environments</td>
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<tr>
<td>System Builder</td>
<td>Ease of Use</td>
<td>Intuitive user interface and multiple technology support</td>
<td>Simple user interface, modularized interface for WhereNet and Dart technology</td>
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<td>Planning</td>
<td>Built in planning and design tools simplify defining location sensors placement and coverage</td>
<td>Reduced total cost of ownership with reduced planning and infrastructure</td>
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Today, ports and terminal facilities across the world have identified the need for real-time visibility and have deployed Zebra’s RTLS technology. Zebra is a Navis STAR Technology Alliance partner with commercial experience integrating RTLS infrastructure and tags with Navis’s Marine Terminal Operating Solution (TOS). Navis TOS helps terminal operators increase capacity and optimize operations to lower costs. The real-time architecture ensures that Navis systems are always up to date, enabling operators to react immediately to changes in operating conditions.

Our vast experience includes a multitude of deployments, ranging from single facilities to multiple port terminals across the globe. In addition to taking advantage of the latest features of the Zebra RTLS infrastructure and tags, terminal operators experience increased productivity and efficiencies.

Zebra Technologies Corporation (NASDAQ: ZBRA) gives customers visibility of critical assets, people and transactions through a broad range of printing and location technologies. Our bar code, card, kiosk and RFID printers as well as real-time location solutions have made us a recognized global leader in providing enabling solutions that identify, track, and manage critical assets, people and transactions for improved business efficiencies. For more information about Zebra’s solutions, visit www.zebra.com