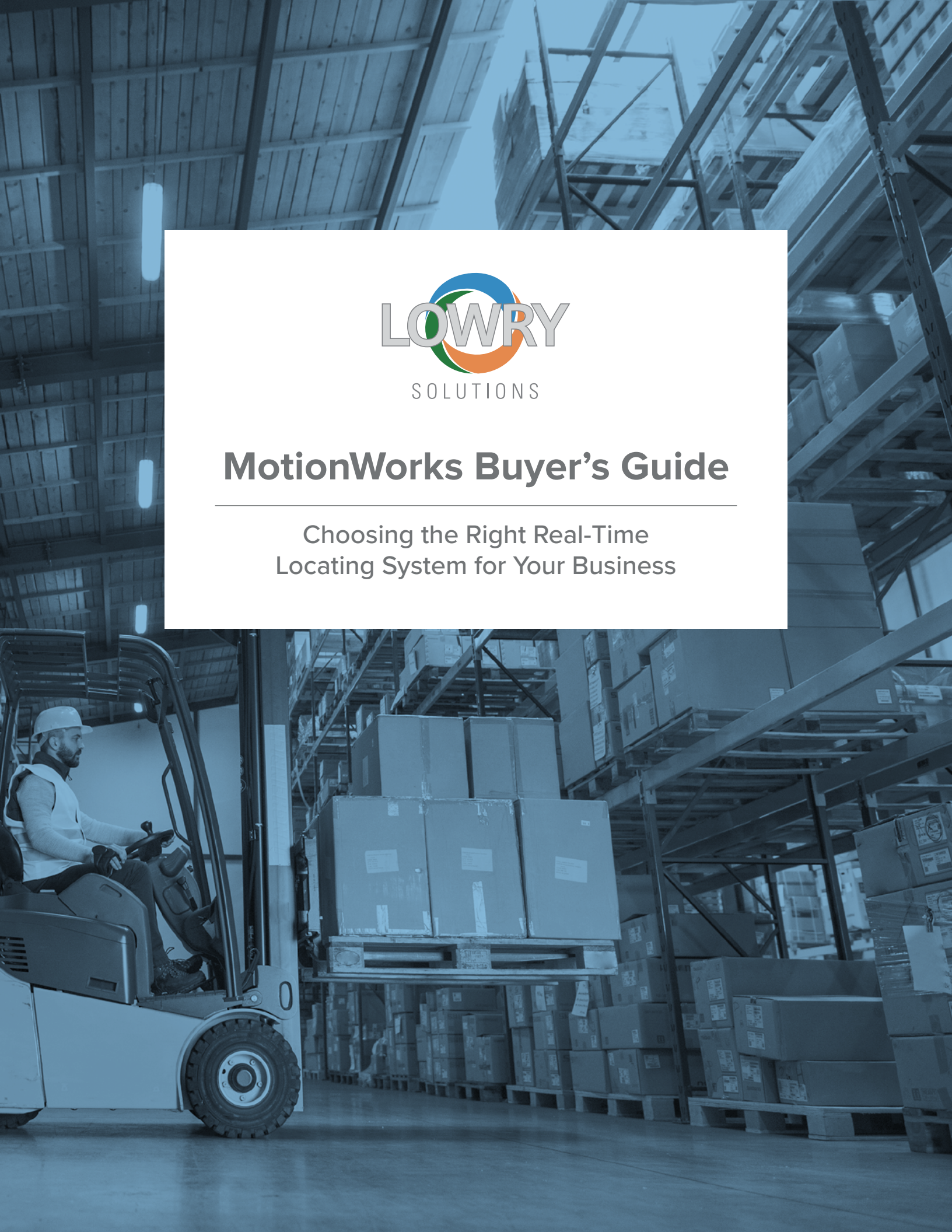


LOWRY SOLUTIONS

MotionWorks Buyer's Guide

Choosing the Right Real-Time Locating System for Your Business

Executive Summary

The business world is in the midst of one of the most challenging periods in recent history. In the wake of the COVID-19 pandemic, companies are facing unprecedented supply chain disruptions, labor shortages, and operational issues that are making it difficult to keep up with production, distribution, and customer demands.

Companies can no longer rely on manual labor, hiring more people, and using existing systems and processes to keep up with demand. They need to figure out how to do more with the people they have, and they need to look for every opportunity to increase output, efficiency, and on-time performance through technology and automation.

One key way that many manufacturers and warehouses are addressing these issues and reinventing their operations is with the use of real-time locating system (RTLS) technologies.

Companies can no longer rely on manual labor, hiring more people, and using existing systems and processes to keep up with demand.

With RTLS technologies such as radio frequency identification (RFID), ultra-wideband active RFID, and Bluetooth low energy smart beacons, companies are automating the tracking and management of their critical assets, goods and people, with accurate visibility into their location, condition and performance.

Using RTLS solutions such as Zebra's MotionWorks, companies are able to replace or streamline many of their manual, labor-intensive manufacturing and warehousing processes with automated workflows that require less time and labor. And they're able to achieve unprecedented visibility into the location, status and motion of goods, assets and people, all with actionable insights from real-time, quantifiable data.

But achieving these results starts with understanding RTLS technologies, how they work, their applications and limitations, and the types of solutions needed to build out and deploy a successful solution.

Before you consider a deeper exploration and an investment in solutions such as MotionWorks, you need to have a realistic picture of what's possible with an RTLS, and you need to understand the different technologies and options, and how these potentially fit with your business needs and environment.

This MotionWorks Buyer's Guide is designed to help you develop that understanding and get you up to speed as quickly as possible, so you can evaluate RTLS possibilities for your operations and identify the types of solutions you might need to realize them.

MotionWorks RTLS Overview

Zebra MotionWorks is a data collection and software platform that uses a variety of sensing and locating technologies to track important resources in your enterprise. It gives your business the ability to automate data collection, and it delivers actionable insights from qualified and real-time data on the location and state of tagged resources.

… you can get real visibility into your goods and assets, streamline workflows, ensure replenishment, and expedite shipping and fulfillment.

By automating tracking with MotionWorks and pinpointing asset locations, status and motion, you can get real visibility into your goods and assets, streamline workflows, ensure replenishment, and expedite shipping and fulfillment.

You can also increase control over your operations, minimize downtime, and maximize performance, even in terms of worker productivity and safety. Since MotionWorks can be used to sense the location of your workforce, you can better ensure safety, improve connectivity and collaboration, and enhance your compliance processes as well.

Zebra's location data collection and support platform, MotionWorks Enterprise, can collect and derive all the data you need, including locations, paths, and even temperature. The application layer then integrates or interfaces with your enterprise or third-party applications through open standard protocols and APIs. It also connects to Zebra's Savanna data intelligence platform, where data can be aggregated, stored and analyzed through cloud-based analytics and web data services.

It's all delivered through a user interface and console experience that simplifies data collection and calculation by providing reports, events, alerts and recommended actions at the enterprise level, along with the ability to manage your system. It's also scalable to up to hundreds or thousands of sites, with thousands of users and hundreds of thousands of tracked resources.

Asset Tracking

MotionWorks Asset

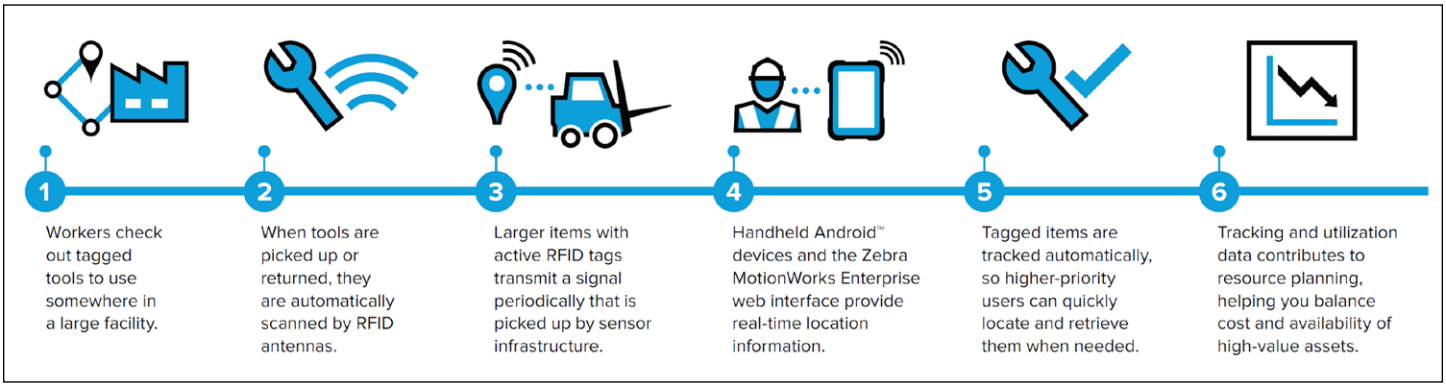
Overview

In high-tech manufacturing environments, you need to know where your specialized and high-value tools and equipment are, so they can be shared, quickly located, and moved into the right place for production.

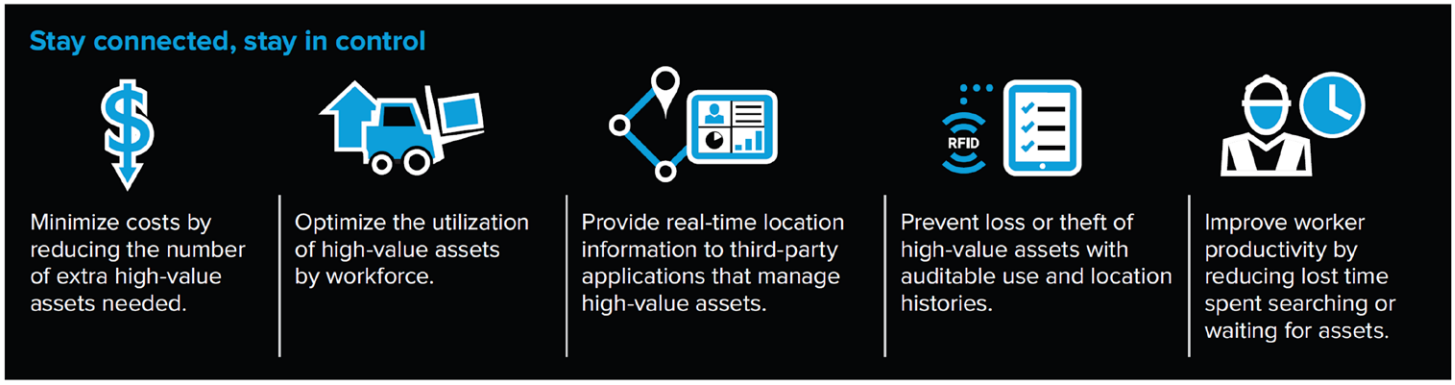
If these high-value assets go missing or can't be located, it can cost hundreds of thousands of dollars in lost productivity, and any unnecessary duplication of expensive tools can be disastrous for company budgets.

Zebra's MotionWorks Asset makes it easy to avoid downtime and save on tool and equipment costs by being able locate, share and optimize resources whenever needed. MotionWorks can employ passive and active RFID tags, ultra-wideband RTLS, and phased-array readers to tag and track any high-value asset, so you always have detailed information on their movement, location and utilization.

How It Works



Results You Can Expect



Warehouse and Inventory Management

MotionWorks Warehouse

Overview

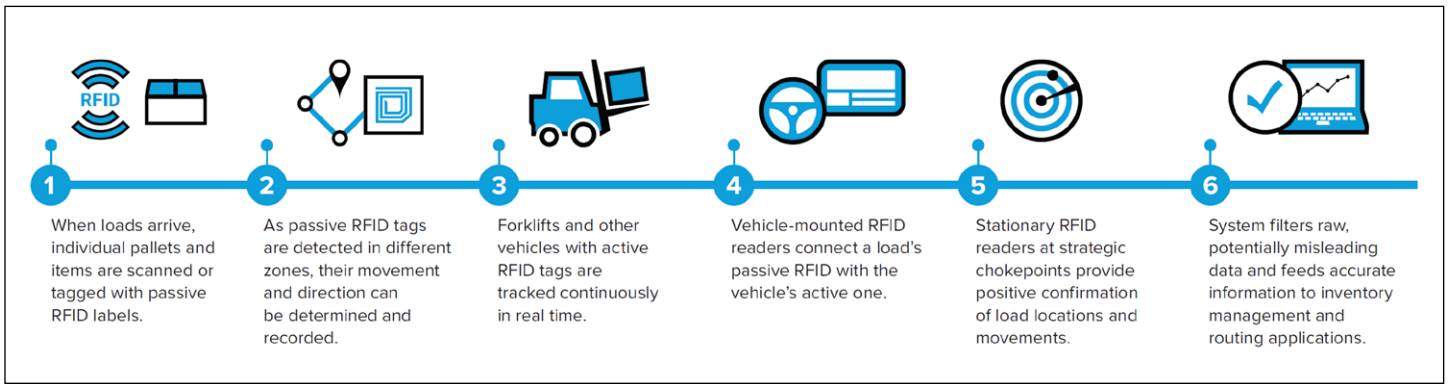
Customer demands for faster and more accurate deliveries are pushing many warehouses and distribution centers to their limit. There's a constant tide of packages and pallets streaming on and off trucks, across docks and staging areas, and into and out of storage aisles.

An RTLS such as MotionWorks automates inventory tracking so you know where every tracked item is, where it's been, and where's it's going.

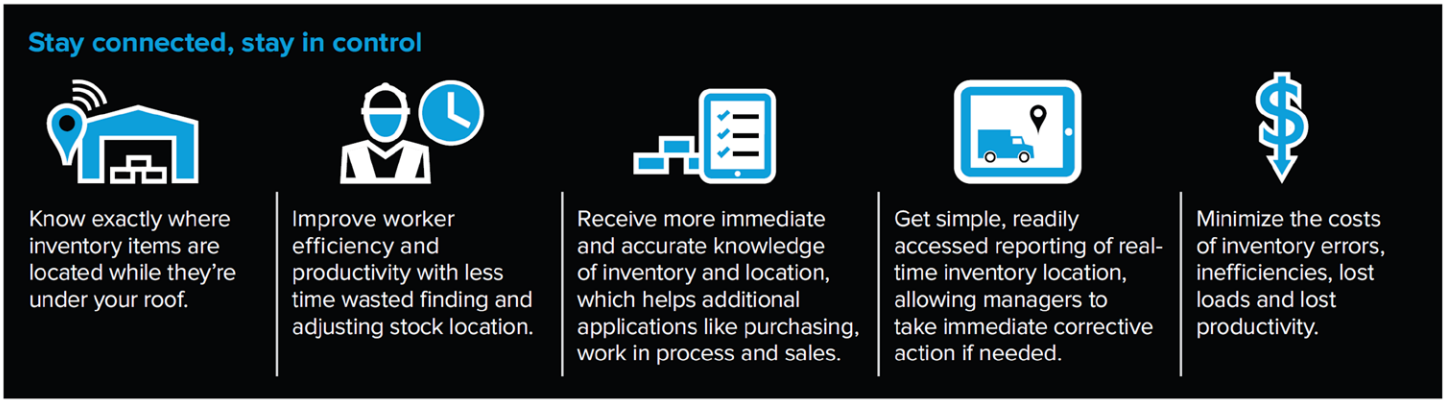
Zebra's MotionWorks Warehouse software employs a combination of passive RFID readers and tags for goods, along with active RFID readers and tags for material handling equipment, to track inventory as it moves through your operation.

This way, you never lose items or lose sight of a shipment. And you can more easily manage the movement of every item, pallet and shipment, from dock doors and loading zones through staging areas and storage shelves.

How It Works



Results You Can Expect



Parts and Material Replenishment

MotionWorks Material

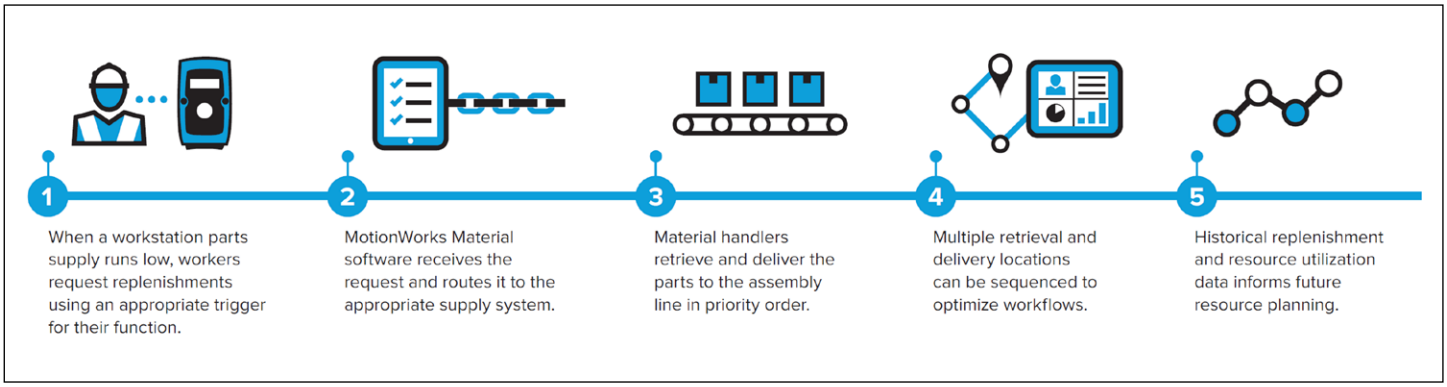
Overview

A constant and uninterrupted flow of parts and material is needed to keep production lines and assembly processes running successfully. But it's also a key strategy in controlling costs by creating efficiencies that minimize and eliminate downtime.

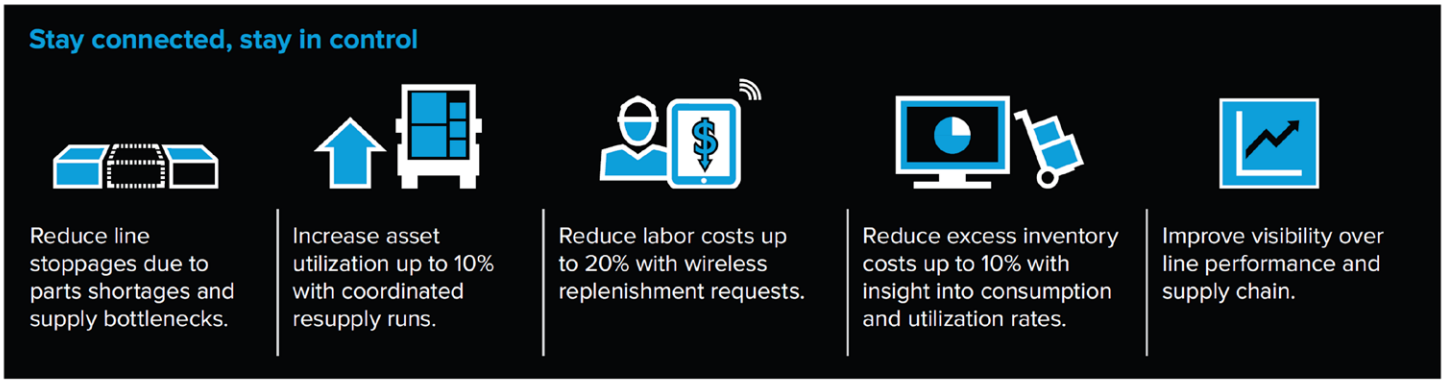
Zebra's MotionWorks Material is a smart, automated system that allows you to manage and control the flow of material throughout your operation, so line-side workers and processes always receive the components they need to keep lines moving without interruption.

When they supply runs low, workers can request or pull additional parts using one of several trigger options such as a Where Call button, barcode scan, or a virtual button a Zebra tablet. Material handlers then receive prioritized requests automatically, and MotionWorks coordinates workflows so they can deliver supplies to the line as directed, quickly and efficiently.

How It Works



Results You Can Expect



Work-in-Process Tracking for MRO

MotionWorks Asset

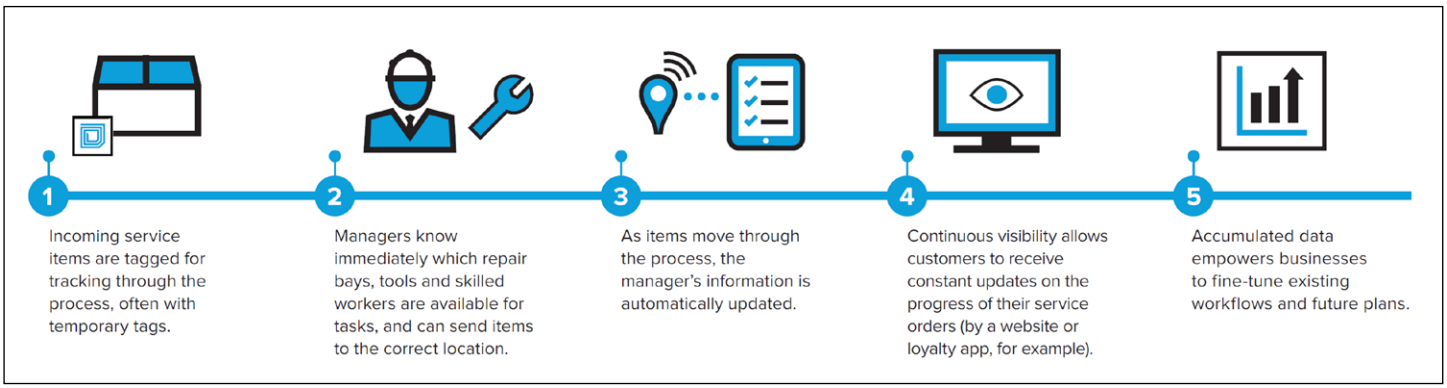
Overview

When it comes to maintenance, repair and service operations, the availability of people, parts and space is crucial. Everything needs to be available, organized and tightly scheduled so service providers can be responsive and provide fast and smooth service to customers and managers.

Zebra's MotionWorks Asset helps ensure that everything flows smoothly and that parts, tools, key personnel and service bays are scheduled and ready when they're needed. Zebra's software uses active or passive RFID, depending on the use case, to monitor the progress of items through service process steps, ensuring that work proceeds on schedule and without unnecessary disruptions.

MotionWorks delivers real-time visibility into the status and location of every resource, tool and worker, with instant updates to managers so tasks can be directed to the correct location or worker. And real-time updates are sent to customers for improved satisfaction and confidence.

How It Works



Results You Can Expect

Yard Management

MotionWorks Yard

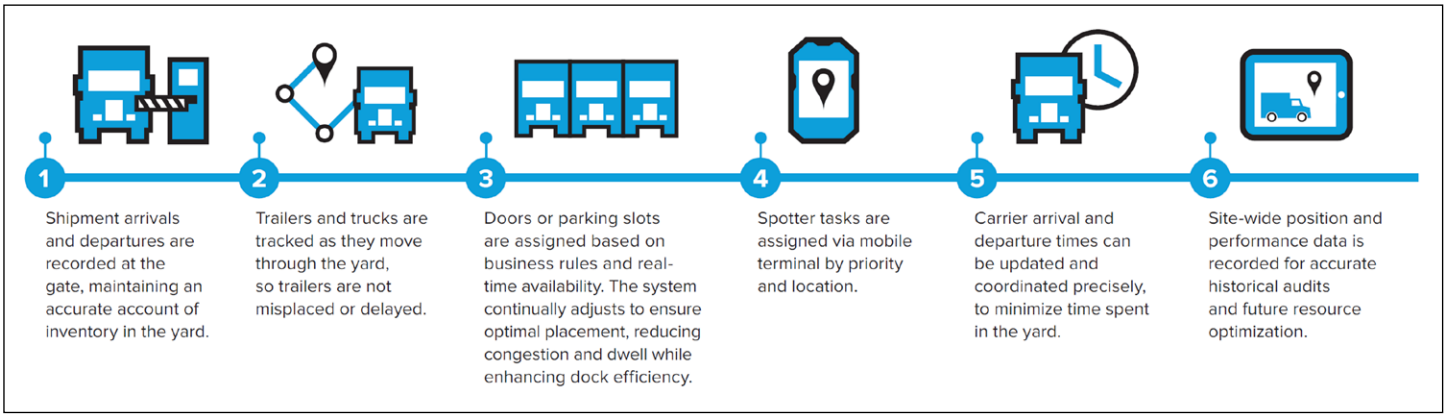
Overview

All too often, confusion and a lack of visibility in the yard creates congestion, slows down transportation and logistics operations, and leads to docking errors, increased detention costs, and unwanted downtime.

RTLS solutions such as Zebra's MotionWorks Yard automate your key yard processes and lets you know where everything is in real time, so you can reduce congestion, automate docking, avoid errors, and increase your yard throughput and space utilization.

MotionWorks can employ WhereNet active RFID tags or passive RFID tags to track the movement of trucks, trailers and spotters into and around the yard. This gives you visibility into the flow of goods and lets you know exactly when shipments are expected, when they arrive, where they are, and when they leave your yard.

How It Works



Results You Can Expect

RTLS Misconceptions, Limitations and Cost Factors

Not all locating systems are truly "real time," and their ranges and accuracy may be limited depending on the type of tags and technologies you use. True real-time locating and tracking with precise accuracy requires active RFID tags, ultra-wideband tags or Bluetooth low energy beacons to automatically read tags and capture data as assets or people move past those readers or beacons.

The actual physics of locating technologies as well as any environmental factors are also major considerations when evaluating and choosing solutions.

With active RFID or Bluetooth low energy beacons, tags are self-powered and periodically wake themselves up and communicate with nearby readers or other infrastructure to automatically update the status and location of each tagged item. This makes active RFID tags or Bluetooth low energy beacons and infrastructure significantly more expensive than passive RFID.

Passive RFID tags don't need to have their own batteries and have more limited range, so they're considerably cheaper, which makes passive RFID systems much less expensive. But passive RFID also relies on handheld RFID reads to send signals and wireless energy to provide power for RFID tags, wake them up and transmit data. So passive RFID is not truly real-time in the way that active RFID or Bluetooth locating is.

But passive RFID performs well and is cost-effective in many use cases, and the higher cost of active RFID or Bluetooth beacons can be justified in many uses where you need to track higher-value assets. You can also combine passive RFID with active RFID or Bluetooth beacons to create hybrid solutions that deliver good business results at a good balance of cost.

Physics and Environmental Factors

The actual physics of locating technologies as well as any environmental factors are also major considerations when evaluating and choosing solutions.

Since RTLS solutions such as MotionWorks rely on wireless radio or Bluetooth signals to transmit data, they may not work in every environment. For example, the presence of a significant amount of liquids or metals can potentially disrupt wireless signals, causing tag reading failure or unreliability.

Similarly, since up to 60% of the human body is comprised of water, there are limitations in using RFID to track people or assets with tags that will be used in someone's pocket. The tag's proximity to all that liquid in the human body will disrupt any wireless tracking and locating signal.

However, in recent years, new specialized RFID tags have been developed to help overcome some of these limitations. As you look at potential solutions and applications, make sure to evaluate your environment and its compatibility with RTLS systems and related technologies, and make sure to conduct proper testing before fully investing in any solution.

Zebra MotionWorks Real-Time Locating Technologies

Dart Ultra-Wideband (UWB)

- Zebra's Dart ultra-wideband technology is designed for precise, real-time active RFID locating, with a range of up to 220 meters and locating accuracy to within +/1 18 centimeters.
- Dart uses 6.5GHz ultra-wideband (UWB) for fast and super-accurate location sensing.
- Battery life is up to 7 years at 1 location event per second.
- Tags are available in multiple form factors to support multiple use cases.
- Receiver's sense one-way "blinks" or transmissions from the tags, time stamp them, and forward them to the Dart Hub
- The Dart Hub provides power, synchronization, a long-range wired network connection for the receivers, and it forwards location data to the Zebra location appliance.

WhereNet

- Zebra's WhereNet is a long-range locating solution that can locate and track tagged assets with a range of up to 1 kilometer and with location accuracy to within +/- 1.6 meters.
- WhereNet uses a 2.4 GHz Direct Sequence Spread Spectrum for broad global compatibility, long range and reliable results.
- Battery life is up to 10 years.
- Tags are available in multiple form factors to support different use cases.
- Receiver's sense one-way "blinks" or transmissions from active tags, time stamp them, and forward them to LS Enterprise to be turned into location data.

Mpact Bluetooth Smart Beacons

- Zebra's Mpact Beacons use Bluetooth low energy technology to create an easy and affordable system for location tracking, with accuracy to within +/- 2 to +/- 10 meters depending on your installation density and configuration.
- Beacons transmit every 100 milliseconds, and mobile devices such as Zebra mobile computers, smartphones, or dedicated Bluetooth low energy gateway receive those transmissions, time stamp them, and forward them over Wi-Fi or cellular to LS Enterprise to be turned into location data.
- Beacons and tags are available in multiple form factors to support different use cases.
- Battery life is up to 4 years with update rates of every 0.1 to 5 seconds.

The 4 Key Technology Selection Factors

1	2	3	4
SPEED	ACCURACY	CONVENIENCE	RANGE

Shipping | Receiving – Transition

- Passive UHF RFID - Dock Door | Conveyor | Chokepoint: SLS SmartPORTAL (available with Zebra or Impinj fixed readers) - On-reader or ClearStream software
- Passive UHF RFID with Transition Logic – High Value IT Asset Closets |Tool Cribs: Impinj xSpan or xArray – ItemSense software, Zebra ATR, Zebra or Impinj Fixed Reader with Photo Eyes - 7iD software
- Near Proximity HF RFID – Badge Scan: Siemens Simatic - Siemens software

Real-Time Location System

- Passive UHF RTLS Technology (3-6-foot accuracy) – Pallet Level Location Tracking: Zebra ATR, RF Controls, Impinj can be considered if the use case has an X, Y only requirement
- Active RTLS Technology: (1-foot accuracy) – High Value or Mission Critical Asset Tracking: Zebra MotionWorks - Dart UWB, mPact BLE, WhereNet, ZaiNar (future)

Mobile RFID

- Passive UHF RFID Handheld Mobile Computer – Point Solution (i.e. CATS) | Cycle Counting | Giger Counter Type Location(ing): Zebra MC, CSL Bluetooth Sled
- Employee Proximity Tracking: Pointr BLE, Zebra MotionWorks BLE

Global Tracking | Sensing

- Global Positioning System(GPS): LoRaWAN, Samsara, Savi, AirFinder
- Sensor: Shock, Temperature, Optical, GeoFence, SpotSee

RFID Tagging, Printing, and Encoding

- Zebra, Avery Dennison, SIVA, Confidex, MetalCraft, Vizinex

Solutions from RTLS Experts You Can Trust

Since 1974, **Lowry Solutions** has provided enterprise automatic identification and data capture (AIDC) technologies for leading companies nationwide, building a reputation as a premier provider with over 10,000 customers.

Partnering with real-time locating technology leaders such as Zebra, we offer the most complete portfolio of tracking and locating systems to tackle today's toughest business challenges, giving our customers a competitive edge through barcoding, RFID, RTLS, and asset management solutions.

Our experts tap into decades of experience and in-depth knowledge, putting into place a systematic approach to translate your business needs into relevant solutions for a real return on investment.

We take the time to understand your business needs, help you evaluate and choose the right technologies, and not only create the solution but follow through to project completion and provide world-class, 24/7 service and support.

Zebra is a global leader in data capture, mobile computing and real-time locating technologies with an unsurpassed reputation for innovation and quality. Zebra solutions work behind the scenes in many industries around the world, ensuring that every asset and worker on the edge is visible, connecting them to the data they need, guiding them with accurate insights to the best next action, optimizing workflows, operations, and decisions in real time for efficient, impactful results.

Founded in 1969, Zebra now has offices in over 54 countries, has over 8,800 employees, and has over 5,300 patents, all dedicated to delivering industry-tailored solutions to intelligently connect people, assets and data. Across the globe, where businesses and people find their edge, Zebra is there.

Connect with Us to Learn More and Explore RTLS Solutions in Detail.

To explore real-time locating technologies for your business, connect with our team at Lowry Solutions to learn more about our solutions and get expert guidance for your needs and use case.

1- 888-881-2477 | www./lowrysolutions.com