

ZEBRA

**VISIONARY
VISIBILITY IS
AT THE HEART
OF THE SMART
FACTORIES OF
TOMORROW**

ZEBRA'S MANUFACTURING SOLUTIONS

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Zebra's Manufacturing Visibility Solutions: The Heart of the Smart Factory

High customer expectations and increasing regulatory requirements are making it critical for manufacturers to achieve greater operational visibility, from the supply chain to manufacturing plant.

With real-time intelligence and actionable insights, factories become smarter, service is optimized and production is more agile. For technology solutions that increase quality and enhance safety, without compromising speed or profitability, turn to Zebra.



INTRODUCTION:

READY FOR WHAT'S NEXT?



New Demands

Manufacturing today is becoming increasingly complex. Costs are under more pressure than ever before, compliance and legislation are stricter, and raw materials are more expensive. Then there's the trend for personalization – consumers today have become entranced by the chance to own something that's uniquely theirs.

While technology has enabled manufacturers to meet these personalized needs across industries, product variants have grown exponentially – as consumers continue to expect their products built and delivered more quickly to flawless quality. Manufacturers must keep pace.

The Next Tech Revolution

Our customers are searching for new ways to refine operations and act with greater agility. New technology is making that possible. Mechanization, mass production and robotics each transformed the industry. Now, the era of ultra-connectivity is with us and it's kick-starting its own revolution. Internet of Things (IoT), mobile tech, wearable devices, real-time location tracking, and guided voice directions are today's allies and change-makers in the quest for ever greater-agility, speed and accuracy.

The Power of Visibility

At Zebra we're playing a lead role in the IoT and connectivity trends that are helping manufacturers gain a real-time view across operations from the supply chain to finished goods, and all stops in between. Our smart barcodes and sensors, connected to objects – from vehicles in the supply chain, toteboxes, to raw materials, components, equipment, machines, robots, people, and many more – give your items a digital voice.

That voice, read by our Radio-Frequency Identification (RFID) readers, mobile computers and barcode scanners, enables your manufacturing assets to connect. The stream of data allows you to see continuously into every corner of your business, giving you what we call Enterprise Asset Intelligence.

In today's lean and fluid manufacturing environments, this all-seeing perspective is essential to help your people make quicker, better and more informed decisions and cope with the ever-growing complexity. Together, we can create frictionless workflows, save time and money, cut waste, meet consumer and legislative demands, and maximize output and quality.

In the following section we look at how new technology can help transform every stage of the manufacturing process.



INTRODUCTION:

READY FOR WHAT'S NEXT?



About Zebra

At Zebra, we empower the front line of business in retail/ecommerce, manufacturing, transportation and logistics, healthcare and other industries to achieve a performance edge. We deliver industry-tailored, end-to-end solutions that intelligently connect people, assets, and data to help our customers make business-critical decisions.

Our portfolio of intelligent solutions and rugged devices is designed to deliver a performance edge wherever the front line may be - especially the factory floor. We are number one in the Android™ enterprise device space and have the tools and support to help you make the risk-free transition to the operating system.

We work with most Fortune 500 companies and have longstanding relationships with the world's leading manufacturers. With more than 4,400 US and international patents pending, 7,400 employees in 120 offices across 45 countries, and strong alliances with over 10,000 channel partners, our presence reaches far and wide across the world.

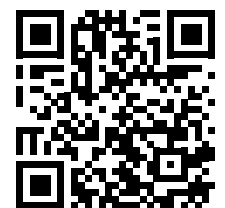
Key Priorities for Manufacturers in 2020 and Beyond

The next decade of manufacturing is shaped by increasing expectations of faster and higher quality production. As we enter 2020, manufacturers look toward innovations to respond to this new demand. According to our Asia Pacific (APAC) Manufacturing Vision Study, nearly half (46%) of APAC manufacturers expect to field a fully connected smart factory by 2022. Around 77% of APAC businesses also expect to fully adopt Industrial Internet-of-Things (IIoT) solutions for strategic data collection across the production line - outpacing the rest of the globe.

While 44% of respondents predict growth of 5% or more year-on-year, 46% of manufacturers believe that increased visibility over their operations will be key to supporting that growth. For 55%, supplier quality is a key focus area, with 72% planning to expand the use of mobile technology to help address these and other areas.

Additionally, 48% plan to deploy RFID solutions and 50% real-time location solutions to achieve the smart factory vision.

You can download the vision study [here](#) to learn more.



GOODS IN, GOODS OUT & WAREHOUSE

TRANSFORM YOUR FACTORY AT EVERY STAGE



THE CHALLENGES

- Booking in is time-intensive, creating scope for line downtime and congestion in the yard
- There can be discrepancies between parts ordered and parts delivered
- Deliveries don't always arrive on time and suppliers can fail to meet their Service Level Agreements (SLAs), affecting Just In Time (JIT) and storage needs
- The complexities of locating finished goods, loading and tracking through to the end point of delivery can lead to inefficiencies



GET VISIBILITY WITH ZEBRA

Optimize accuracy and efficiency by removing paper from workflows, accurately capture data in real-time, accelerate tasks from registering goods-in to put-away, and identify where workflows can be streamlined.

PHASE 1

- Install barcode ID technology and give scanners and mobile computers to material handling staff
- Use Simulscan, a multi-barcode capture application that captures multiple codes in one scan

PHASE 2

- Implement RFID gates at goods In, goods out and warehouse storage locations
- Use active RFID to manage yard, mechanical handling equipment and staff



Visibility



Efficiency



Security and loss prevention



Save space



Save time booking in – scan, check and go



Identify underperforming suppliers and uncover workflow bottlenecks



Optimize delivery planning and yard management



Eliminate human error, e.g., illegible handwritten delivery notes

LINE SIDE PARTS

TRANSFORM YOUR FACTORY AT EVERY STAGE



THE CHALLENGES

- Manufacturing line material shortages can lead to inefficiencies
- Material scheduling is difficult if all materials on hand and in supply chain are not known
- Production Engineering are reluctant to adopt Just In Time (JIT) Kanban principles – they're worried reducing the number of stored parts will increase shortage risks
- Large storage areas in manufacturing facilities can be costly and ineffective
- Manual/paper-based re-ordering is slow and open to errors
- When Quality teams are bounding issues, all suspect material needs to be identified across the factory and supply chain
- Lengthy engineering change break-in point because of manual paper based stock checks



GET VISIBILITY WITH ZEBRA

With the accurate capture of data allied to its real-time flow and availability, manufactures are able to better prepare for deliveries, optimize inventory, save valuable space, speed up replenishment, and have better control of materials on hand to lower production costs.

PHASE 1

- Install Barcode ID, scanning and on-demand printing
- Component kit management via on-demand scanning and printing
- Give part kits a unique ID

PHASE 2

- Use RFID at manufacturing storage
- Implement JIT eKanban solution



Visibility



Save time booking in – scan, check and go



Efficiency



Replenish fast, smart and smoothly



Optimize planning and processes



Reduce costs



Save space

MANUFACTURE

TRANSFORM YOUR FACTORY AT EVERY STAGE



THE CHALLENGES

- Work In Progress (WIP) visibility – on cost and on plan – can be challenging
- Material and resource consumption can lack accuracy
- It can be difficult to follow and track Standard Operating Procedures (SOPs)
- Failure to identify newly manufactured parts can impair audit trails
- Machine-to-operator logins are often cumbersome or non-existent leading to missed opportunities for ownership
- Training and right-skilling teams to SOPs can be a challenge
- Workflow inefficiencies can lead to a failure to auto-replenish line side parts



GET VISIBILITY WITH ZEBRA

Smoothly integrate the creation of audit trails into processes; digitize SOPs on mobile devices (e.g., tuition videos or schematic drawings) to 'right-skill' teams quickly; secure process improvements; create digital IDs for parts; and further promote quality by using voice-guidance and linking operators to work cells to track, analyze and improve their performance.

PHASE 1

- Install barcode ID, scanning and printing for newly manufactured parts
- Use personnel ID badging (barcode/RFID enabled) to create ownership of work output
- Digitize SOPs onto mobile computers
- Scan material as it's consumed, and activity as it's completed

PHASE 2

- Implement RFID at manufacturing process gates
- Use mobile computers for voice and visual training, process and activity optimisation
- Use line side RFID to automate and communicate replenishment



Visibility



Create an audit trail



Efficiency



Upskill staff and enable ownership



Optimize planning and processes



Replenish fast, smart and smoothly

ASSEMBLY

TRANSFORM YOUR FACTORY AT EVERY STAGE



THE CHALLENGES

- Ensuring that an audit trail is created for every component within an assembly can be overlooked and result in wrong part fitted or material shortages
- SOPs are often paper-based and time-consuming to follow
- Work cell performance is hard to measure in real time
- Machine-to-operator logins are often cumbersome or non-existent leading to missed opportunities for ownership
- Process improvement and quality alerts are manually flagged
- Tooling check and calibration takes time and is reactive rather than proactive



GET VISIBILITY WITH ZEBRA

Build the creation of digital identification into workflows to embed audit trails into processes, digitize and make it easy for teams to follow SOPs, and link operators to work cells to track, analyze and help improve their performance.

PHASE 1

- Digitize the SOPs: equip work cells with barcode scanners – scanning parts as they're consumed offers unprecedented confirmation of building the right product the right way
- Use personnel ID badging (barcode/RFID enabled) to create ownership
- Send quality alerts in real-time
- Digitize SOPs onto mobile device for ease of look-up

PHASE 2

- Use RFID at assembly process gates
- Deploy RFID to communicate replenishment and track tooling



Visibility



Upskill staff and enable ownership



Efficiency



Accelerate New Product Introductions (NPIs)



Create audit trails

MAINTENANCE

TRANSFORM YOUR FACTORY AT EVERY STAGE



THE CHALLENGES

- It's not easy to connect and monitor digitally enabled machinery
- Assets including tools, machines and staff aren't always easily located
- Spare parts inventory can be open to error and lack ownership
- Planned maintenance and unplanned downtime isn't easy to accurately track
- The process for booking out tools for jobs is often cumbersome
- Machine settings, repair manuals and schematics tend to be paper-based



GET VISIBILITY WITH ZEBRA

Provide maintenance teams with mobile computers to connect with IoT-enabled machinery, receive warnings or alerts on near out of tolerance events and manage machine settings remotely. Ensure maintenance teams can easily locate equipment by scanning Near Field Communication (NFC), barcode or RFID tags; automate machine readings using handheld devices; digitize manuals and 'how to' guides to help teams resolve issues first time; and remove paper from processes – from receiving jobs and reporting or scheduling, and maintenance to booking tools out, managing parts and more.

PHASE 1

- Install barcode ID, scanning and printing
- Use personnel ID badging (barcode/RFID enabled)
- Digitize key information, making it instantly accessible on mobile computers

PHASE 2

- Implement RFID locating for key assets



Visibility



Create an audit trail



Efficiency



Upskill staff and enable ownership



Optimize planning and process



Access reliable information digitally – instantly, on-the-go

INDUSTRIAL CONTROL

TRANSFORM YOUR FACTORY AT EVERY STAGE



THE CHALLENGES

- Assets including tools, machines and staff aren't easily located
- Providing engineers with mobile computers is costly and difficult to efficiently manage
- Machine settings and data are often stored locally or on paper
- Industrial systems engineers often physically attend and manage machines to monitor performance and report non-conformance
- Manufacturing Execution Systems (MES) and Shop Floor Control Systems often operate in silos
- Adding barcode printing and scanning into the industrial automation network is complex as conversion equipment and middleware are usually needed



GET VISIBILITY WITH ZEBRA

Help engineers easily locate machines, access manuals and maintenance guidance, contact colleagues, and review analytical data. Ensure too that a stream of analytical data (e.g., based on data from machine sensors to predict output and variance) is available to quality, production, maintenance and operations teams, and enable engineers and production managers to control and manage shop floor operations, from the shop floor.

PHASE 1

- Deploy a blend of barcode and RFID technology
- Introduce mobile computing with Zebra LifeGuard mobile security software
- Use personnel ID badging (barcode/RFID enabled)
- Digitize key information
- Use Zebra's Asset Visibility Services to manage devices

PHASE 2

- Deploy Network Connect: seamlessly connect your printers and scanners directly to your industrial automation and Ethernet network with no additional conversion equipment.



Visibility



Access reliable information digitally – instantly, on-the-go



Efficiency



Manage non-conformance quickly and easily – anywhere



Optimize planning and process



Create an audit trail

QUALITY PRE-DELIVERY INSPECTION (PDI)

TRANSFORM YOUR FACTORY AT EVERY STAGE



THE CHALLENGES

- It can be tricky to isolate non-conformance materials across the factory and supply chain
- Paper-based or digital Quality Management Systems (QMS), including SOPs, may not be followed, so impeding the ability to make real-time adjustments
- Where machine-to-operator logins aren't used, opportunities for ownership and audit trails are missed
- Where digital links to machine setting and output control are unavailable, changes have to be made manually
- Fixed quality or inspection stations can slow production



GET VISIBILITY WITH ZEBRA

Connect personnel to their work stations to monitor output and help them improve performance, build seamless workflows that ensure the simple, accurate and automated capture of quality data with bulletproof audit trails, red-flag quality issues, and support the remote and efficient control and calibration of machines.

PHASE 1

- Digitize the SOPs: equip work cells with barcode scanners – scanning parts as they're consumed offers unprecedented confirmation of building the right product the right way
- Equip your quality teams with mobile computing capabilities to make them agile and connected to colleagues and machines to access quality alerts, inspection results and more
- Use personnel ID badging (barcode/RFID enabled) to generate ownership of activity at points of activity
- Digitize key information, making it instantly accessible on mobile computers for Inspection teams

PHASE 2

- Implement RFID at manufacturing process gates to key work cells and assets



Reduce cost of quality



Optimize planning and process



Create an audit trail



Upskill staff and enable ownership



Access information digitally – instantly, on-the-go



Manage non-conformance quickly and easily – anywhere

PACKAGING

TRANSFORM YOUR FACTORY AT EVERY STAGE



THE CHALLENGES

- Without a high degree of automation, finished goods can be labelled and identified incorrectly
- Packaging labelling may not be managed to customer requirements, breaching SLAs
- Where shipping manifests aren't auto-produced, or digitally optimized, there is potential to not comply with legislation or customer requirements



GET VISIBILITY WITH ZEBRA

Create electronic, connected and automated environments to ensure delivery manifests and packaging are labeled to requirements; scan items to create pre-delivery notices – in the process triggering real-time asset tracking for customers; – and ensure the swift and accurate release of invoices.

PHASE 1

- Install barcode ID and scanning
- Use Zebra print media
- Use Simulscan, a multi-barcode capture application that captures multiple codes in one scan

PHASE 2

- Implement RFID at item level or package level



Visibility



Efficiency



Enhance labelling accuracy and enable logging



Flex labeling to legislation and customer requirements



Improve invoicing accuracy and speed



Send pre-delivery notifications

RECOMMENDED PRODUCTS



We're committed to the highest standards of product design. Our devices set the benchmarks for usability, ergonomics and performance, with each one created by a research-driven design team that spends a huge amount of time investigating how your industry operates and what your teams need.

INDUSTRIAL PRODUCTION SOLUTIONS

Capture data, use apps, collaborate, print labels, tags and more.

Mobile Computing	Data Capture	Printers
 <p>Handheld Vehicle Mount</p>	 <p>Handheld Hands-Free</p>	 <p>Mobile Desktop</p>
 <p>Tablets</p>	 <p>RFID</p>	 <p>Industrial RFID</p>
 <p>Wearables</p>	 <p>RFID</p>	 <p>Card Print Engines</p>

The first ultra-rugged scanner

Demanding environments need special technology such as the DS3600 scanner. Designed for life on the plant floor, it's the first ultra-rugged scanner. Pretty much indestructible, it offers a fast scan engine, a powerful battery (70,000 scans on one charge) and a wide range of models including the ER version that scans from close up to over 68ft away to handle a range of applications in one device.

Network Connect:

Industrial ethernet connectivity

Seamlessly connect your Zebra printers and scanners to your Industrial Ethernet network with no additional conversion equipment. Eliminate points of failure, increase reliability, security, device response time and save hours in set-up, management and troubleshooting.

RECOMMENDED

PRODUCTS



We're committed to the highest standards of product design. Our devices set the benchmarks for usability, ergonomics and performance, with each one created by a research-driven design team that spends a huge amount of time investigating how your industry operates and what your teams need.

INDUSTRIAL PRODUCTION SOLUTIONS

Capture data, use apps, collaborate, print labels, tags and more.

Software	Location Solutions	Services
<div data-bbox="162 685 261 857"></div> <div data-bbox="151 869 279 898">Print DNA</div> <div data-bbox="316 685 483 857"></div> <div data-bbox="347 869 448 898">Link-OS</div> <div data-bbox="162 965 261 1137"></div> <div data-bbox="162 1158 268 1218">Mobility DNA</div> <div data-bbox="352 965 448 1137"></div> <div data-bbox="319 1158 478 1218">DataCapture DNA</div>	<div data-bbox="576 674 1010 707">Real-Time Locating Systems (RTLS)</div> <div data-bbox="619 745 951 947"></div> <div data-bbox="684 1014 906 1178"></div>	<div data-bbox="1126 719 1469 947"></div> <div data-bbox="1150 983 1426 1012">Professional Services</div> <div data-bbox="1110 1048 1469 1077">Support & Visibility Services</div> <div data-bbox="1169 1113 1406 1142">Knowledge Centre</div>
<div data-bbox="145 1301 466 1330">Data Intelligence Platform</div>	<div data-bbox="699 1256 922 1576"></div>	<div data-bbox="1129 1301 1442 1330">Zebra Certified Supplies</div>
<div data-bbox="97 1610 520 1744">ZEBRA SAVANNA™</div>	<div data-bbox="684 1648 906 2007"></div>	<div data-bbox="1086 1491 1522 1648">ZEBRA Certified Supplies</div> <div data-bbox="1078 1688 1501 1928"></div>

ZEBRA DNA:

THE GENETIC CODE THAT DIFFERENTIATES
ZEBRA PRODUCTS



GETTING THE MOST FROM YOUR ZEBRA DEVICES

We have decades of experience in the manufacturing space. Experience that has helped us create a smart ecosystem of intelligent software, utilities and applications focused on:

- Better performance and productivity
- Ease of integration
- Simpler deployment and management

With Zebra DNA, everyone wins: Zebra DNA tools make life easier for workers, managers, IT staff and developers.

We have three DNA strands:

- Mobility DNA
- Data Capture DNA
- Print DNA



Mobility DNA

Your choice of your mobile device is important. But it's how they're deployed, managed and maintained that determines their success. That's why we've developed Mobility DNA, the genetic code that differentiates our products and makes Android a professional-grade OS. What's more, it makes it easy to squeeze every ounce of value from your devices while reducing the cost of owning, managing and running them.

Data Capture DNA

Data Capture DNA is the genetic code that not only makes our data capture devices the best in the industry, but also the easiest to use, maintain and own. From integration to deployment and then management, complexity has been stripped away. And whether it's scanning 1D, 2D or micro barcodes through to Direct Part Marking, we have the high performance scanner you need, backed with a range of applications, to help your teams intuitively capture data by speed and accuracy.

Print DNA for Zebra's Link-OS® printers

Intelligent apps, utilities and developer tools unite in our Print DNA portfolio to optimise printer performance while making it easy to integrate devices into your infrastructure and oversee and manage them.

ZEBRA VISIBILITYIQ:

INSTANT BUSINESS INTELLIGENCE ON
YOUR ZEBRA DEVICES



VisibilityIQ™ Foresight

VisibilityIQ Foresight goes above and beyond what a conventional Mobile Device Management (MDM) solution alone can offer. It intelligently pulls data from more sources than any other service, aggregates your big data onto a single, color-coded, cloud-based pane of glass and then instantly translates it into action-ready insights. But it doesn't stop there. VisibilityIQ Foresight has the power to capture and harness your historical data for predictive intelligence. That's how you can catch problems before they impact your business and accurately forecast future needs for smoother operations.

VisibilityIQ™ DNA

VisibilityIQ DNA allows you to fully utilize your key Zebra DNA tools—an exclusive and powerful set of software, applications and utilities that transforms your Zebra mobile computers, scanners and printers into true enterprise solutions. Speedily gather critical DNA data to bolster efficiency and uptime. Configure fleets in no time. Ensure devices have the best possible WiFi connection with WorryFree WiFi. Avoid battery disruptions with PowerPrecision battery analytics - and so much more.

VisibilityIQ™ OneCare®

VisibilityIQ OneCare is a benefit of Zebra OneCare's expert support services, designed to eliminate unplanned device downtime and unbudgeted repair expenses. In addition to repair, technical support and software support, you can view the status of your device repairs, technical issues and LifeGuard™ security anytime, anywhere using cloud-based VisibilityIQ OneCare.

WORKING TOGETHER

Want to know about how we can help you see in real time across your plant and beyond?

Please visit:

<https://www.zebra.com/ap/en/solutions/industry/manufacturing.html>

You can access our research here:

https://connect.zebra.com/ap_manufacturingvisionstudy

For more information or a conversation, drop an email to:

contact.apac@zebra.com





FOR MORE ON ZEBRA'S MANUFACTURING SOLUTIONS, PLEASE VISIT [HERE](#)

NA and Corporate Headquarters
+1 800 423 0442
inquiry4@zebra.com

Asia-Pacific Headquarters
+65 6858 0722
contact.apac@zebra.com

EMEA Headquarters
zebra.com/locations
contact.emea@zebra.com

Latin America Headquarters
+1 847 955 2283
la.contactme@zebra.com

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