

# Saving time and money with mobile printing in field service



A ZEBRA BLACK&WHITE PAPER





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## Executive Summary

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It is not enough for many service operations to make repairs; increasingly, they also need to make a profit. As this revenue pressure is growing, so are performance requirements. Service windows are shrinking and service level agreement (SLA) terms increasingly favor the customer, which makes it imperative to increase the responsiveness and productivity of field service staff. Field service automation is the answer.

Mobile printing is an overlooked and underutilized component that provides rapid return on investment by increasing the responsiveness, customer service and efficiency improvements of field service automation programs. Only 13 percent of organizations are highly satisfied with their current field service operations, according to *The Mobile Field Service Update 2007 and Beyond*, a research report from Aberdeen Group. Coincidentally, only 13 percent of companies surveyed currently use mobile printing as part of their field service operations. The study also found that leaders in field service operations innovation and technology adoption are more profitable, complete more work orders per day and have significantly higher SLA compliance rates than average performers.

Mobile printing is an important enabling technology for improving field service productivity and profitability. Read this white paper to learn how mobile printing can enhance the effectiveness of field service automation efforts. It will:

- Explain how mobile printing can support and improve various field service operations;
- Describe mobile printing applications;
- Document how organizations are saving time and money by producing invoices, work orders, service records and other documentation in the field, with examples from actual users;
- Cover the capabilities of mobile thermal printers and explain why they are the technology of choice for reliable field service operations.

## Introduction

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For many organizations, field service operations are the last frontier where enterprise information systems, labor controls and productivity tools don't reach. Cell phones provide some visibility into field operations and give service staff the ability to inquire about customer records, but cell phones alone provide little overall productivity benefit. For one reason, they do nothing to reduce the non-value-added time technicians spend preparing invoices, filling out work orders and providing other documentation. In the office, practically all record keeping and correspondence is done on a computer, where information can be easily exchanged and updated. In the field, paperwork is commonly completed by hand, which provides no automation benefits or time savings for the technician, and requires additional data entry time later in the office. Companies can scarcely afford this time – 83 percent of service organizations report they must respond to customer requests within 24 hours, yet only 54 percent can consistently meet this service level, according to the Aberdeen study.



NuCO<sub>2</sub>, a carbon dioxide distributor, illustrates the back-office benefits to automating data entry in the field. It used handheld computers and printers to replace paper-based invoicing and other paperwork for service and delivery calls. NuCO<sub>2</sub>'s route workers install and service fountain beverage equipment for restaurants, hospitality venues, sports arenas and other concession locations, and deliver carbon dioxide for the equipment.

“Our route representatives make 20 to 25 stops per day, and the elapsed time between their transactions in the field and data entry into our central information system has been reduced from up to 12 days to just 24 hours. This has increased the speed of problem resolution, while enabling us to improve customer service,” the company’s field liaison reported.

Mobile printers are a powerful complement to other field service automation efforts that reduce non-value-added time spent on service calls. The experience of United Propane Gas (UPG), which delivers propane and heating oil to residential and commercial customers in eight states, provides an example. UPG estimates the time saved by preparing and printing invoices with mobile computers and printers instead of manually saves three to four minutes on each delivery.

“Saving three or four minutes may not sound like much, but when you consider a delivery takes 15 to 20 minutes, that’s a 15 to 25 percent time savings,” said UPG’s assistant general manager.

UPG’s cash flow is directly related to how much fuel it delivers each day. The time saved throughout the day lets its drivers make a few more deliveries than they used to complete in a shift, enabling UPG to supply thousands more gallons of fuel, improving service to customers and its own cash flow. See the complete case study at [www.zebra.com](http://www.zebra.com).

The results UPG and NuCO<sub>2</sub> attained are fairly typical of companies who have replaced paper-based operations with mobile computing and printing. The following sections explain how mobile printing can benefit a variety of field service and back-office support operations.

## Applications

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Mobile printers are routinely used in field service to create work orders and authorizations, invoices, service records, warranty contracts, supply orders, inspection labels and even customer surveys. Producing these records on site increases customer confidence and loyalty, and helps the mobile workforce earn a reputation for professionalism. Companies can use these benefits to differentiate their service from rivals, which provides a sustainable competitive advantage – only 22 percent of best-in-class field service performers identified by Aberdeen still used paper-based field service procedures. Perhaps that’s a reason field operations are 2.5 percent more profitable as best-in-class companies compared to average performers, and 5.8 percent more profitable than automation laggards.

### Work Orders/Receipt

Presenting customers with signed copies of work orders or other receipts can be an effective tool for improving profitability and operational quality. Reviewing work orders during the service call, having customers sign them electronically on a mobile computer, and printing a signed copy of the document can eliminate a lot of misunderstanding that leads to customer dissatisfaction or service revenue write-offs.



To understand the power of receipts and documentation, companies first must understand how mistakes hurt their business. Assume a company employs 20 service technicians who each complete an average of 4.5 work orders each day, which adds up to 23,400 per year. Also assume that customers question or dispute one out of 20 (5 percent) service invoices. That would mean the company must investigate and resolve 1,170 inquiries per year.

Suppose it takes 15 minutes to resolve each inquiry — a conservative estimate, considering the time required to listen to the customer's explanation, access the customer record, follow up with the technician, and potentially schedule a follow up call or credit the customer. The company would then spend 292.5 hours annually on inquiry resolution, or nearly one day a week for a full-time employee. If the service managers who investigate and resolve customer inquiries average \$20 per hour, the company would spend \$5,850 in labor alone for inquiry resolution.

The \$5,850 expense does not include potential revenue lost for crediting the customer's account or for providing an unbilled follow-up call. Disputes are less likely to be resolved in the company's favor if it doesn't have documentation to back up its technicians. When details aren't clear or paperwork isn't legible, companies are more likely to accept the customer's version of events as a goodwill gesture and offer a refund or free future services. It's difficult to measure these indirect costs of poor documentation, but easy to see how they hurt profitability. For companies that earn a 15 percent profit margin on their service operations, removing \$5,850 in labor costs associated with inquiry resolution is the equivalent of gaining \$39,000 in new service revenue.

### **Invoicing and Payment Processing**

Printing invoices and work orders at the time of service gives technicians the opportunity to review them with customers, helping to prevent errors and disputes that are frequently time consuming and costly for office staff and managers to resolve. Real-time invoicing can be supplemented with secure on-site payment processing to improve cash flow.

The alternative to on-site invoicing is for drivers to turn in sheaves of paperwork to billing clerks at the end of each shift. This creates another opportunity for errors to enter the system as clerks re-record the billing information. More significantly, it also adds costly delays to the billing cycle. Consider a technician who finishes his or her Monday shift and turns the daily invoices into the billing department. In the best case, the information will be entered into the billing system and invoices mailed the next day. The customer will receive them in the mail two or three days later; a total of three to four days after the visit. Companies that follow this standard business practice are thus at a three or four day cash-cycle disadvantage compared with their competitors that bill on site. They also build postage expenses into each service call.

The cash-cycle advantage can be accelerated significantly by using mobile printers to accept payment on delivery. Many companies routinely wait 30 days or more to pay invoices. Requiring payment on delivery eliminates the billing lag time and invoice processing delays, improving the cash cycle by at least a month. Mobile printers with integrated credit card readers make it convenient and simple to accept mobile payment and improve cash flow.

An emerging application is the use of wide-area wireless data networks for credit card payment authorization. Field service technicians swipe the credit card through a reader integrated into a Zebra®-brand printer, which transfers the data to a mobile computer or cell phone through either a cable or short-range wireless interface. The cellular network or other wide-area wireless data service is then used to send the credit authorization request. The transaction is processed securely and efficiently in seconds, eliminating the need for batch



processing at the end of the shift. Zebra mobile printers offer WPA and WPA2 security, which meet the Payment Card Industry (PCI) Data Security Standard for payment card processing over wireless LANs.

On-site payment processing is also beneficial to companies because it reduces the resources needed to support the field service operation. Billing departments have fewer invoices to process and customer service has fewer calls to resolve because customers will review and approve invoices with their field service technician. Assuming billing inquiries take an average of 15 minutes to resolve, companies can save \$640 in invoice processing expenses for every 1,000 service calls, which breaks down to \$250 in reduced customer service labor and \$390 in postage at current rates. At a 15 percent margin, the savings is equivalent to \$4,267 in new service revenue.

### **Documentation and Reports**

Service staff can also use mobile printers such as Zebra's RW 420™ to create reports, maintenance records, inspection seals, service reminders, and other documentation. All the required formats are stored in the printer memory, eliminating the need for mobile workers to carry numerous forms. Creating documentation electronically using inputs to a mobile computer is faster and more accurate than writing records on a clipboard, and eliminates the need for transcription and data entry at the office. The forms are also more legible and professional, which contributes to the firm's reputation for quality and helps avoid confusion and conflicts. For ease of use, the RW 420 offers a simple push button release cradle for storage and charging while in the truck.

Studies have found leaders in service management automation are considerably more profitable than average companies, and the average manufacturing company misses 50 to 70 percent of potential service revenue because of poor record keeping and management. Service organizations can use mobile printers to create reorder and service reminder stickers, similar to oil-change reminder stickers that are placed inside the windshield. These items keep the company in front of the customer after the representative leaves and help build repeat business. Similar to service reminders, inspection labels leave behind a permanent record of when service was performed, providing documentation needed to resolve warranty claims. These simple reminders can be powerful profit builders.

There are many other possible uses for mobile printers in field service. In nearly every instance where field service technicians put pen to paper, mobile printers can be used to save time and improve quality.

## **T e c h n o l o g y**

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Thermal printing has displaced impact printing as the dominant technology used in field service because of its outstanding reliability, ease of use and total cost of ownership. Thermal printers are available to suit a variety of mobile operations, whether users prefer vehicle-mounted or portable units, cable or wireless connectivity and other features. Mobile printers are able to print text, logos, graphics, and bar codes on long-lasting forms, receipts and labels of different sizes and thicknesses. Some models have integrated magnetic stripe readers for payment card processing. The key printer performance criteria for field service are durability, battery life and interface flexibility so the printer can be used with mobile computers, cell phones, bar code readers and other devices. These and other mobile printing options and features are described below.

### **Form Factors and Ergonomics**

Printers are available in a variety of designs to meet the needs and preferences of each mobile workforce. Mobile printers must be comfortable and easy to use or they will not deliver any productivity benefits. While overall weight is important, balance, grip, and ease of carrying and operation should not be overlooked. There are



various carrying devices that make carrying a mobile printer easy, such as belt clips, shoulder straps and carrying cases of varying material from waterproof to lightweight nylon. Mobile printers typically interface with mobile computers, either through a cable or wireless connection. Cabled solutions aren't favored for field service because the connections tend to break under normal usage conditions.

## Supplies

On-demand mobile printing often improves the professionalism of invoices, work orders, service records and other paperwork given to customers, while also reducing form costs. It is increasingly acceptable to replace 8.5-by-11-inch three-part forms with smaller documents, which are easier to store and ultimately save the issuer money because less paper is used. Some companies use mobile printers to print variable information like invoice amounts or delivery contents on labels that are applied to forms. This satisfies customer desires to keep using familiar forms, but eliminates handwriting and manual recording.

One Zebra customer performed an analysis to compare the costs of legacy 8.5-by-11-inch invoices used in its field operations with a 4-by-6-inch invoice produced on a Zebra mobile thermal printer. The thermal media cost was measured at 2.7¢ per invoice, compared to 6¢ for full sheets used in inkjet or impact printers – making the thermal media 45 percent less expensive. Switching from full, plain-paper sheets to 4-by-6 thermal receipts would produce savings of \$330 per 1,000 invoices produced. Companies that use multi-part forms could save even more.

Modern mobile printers accept a variety of form, label, tag, ticket, and other media for producing durable work orders, warranties, receipts, invoices, return labels, inspection labels, security marks, and other documentation. Gone are the days of portable printers that print only low-quality receipts that curl at the edges. Top-coated media resists ultraviolet light and remains readable for years, eliminating the problem of receipts that fade after a few days. Many types of linerless media are also available, which eliminates the waste and disposal problems associated with peel-away liners used with adhesive labels.

## Wireless Connectivity

Mobile printers may use two forms of wireless connectivity. Short-range wireless can be used instead of a cable to connect the printer and mobile computer. Printers may also have a direct connection to enterprise wireless networks. Field service technicians can access wireless networks when they are in their own company facilities to receive their daily assignments and instructions, download customer lists and inventory records, and transfer transaction data at the end of the shift.

Using wireless for cable replacement improves ergonomics and productivity. Wireless systems can also be more reliable because there is no chance for printer cables and pin connectors to break. This is a tremendous advantage in field service, where users are often miles away from their headquarters and do not have immediate access to replacement parts. Bluetooth® technology is very popular and effective for cable replacement because it provides excellent range, speed, and connectivity.

See Zebra's white paper *The Benefits of Wireless Printing* for more detailed information about the connectivity, security and applications for wireless printers.



## Bluetooth

A Bluetooth-enabled printer can connect easily and securely with a variety of other standardized Bluetooth devices, including handheld and vehicle-mounted computers, laptops, PDAs, smart phones and peripherals. Bluetooth can be used concurrently in environments where 802.11-standard wireless LANs are operating.

Bluetooth poses a very low security risk because its limited range of typically 30 feet or less and slow transmission speeds mean hackers would likely be noticed as they try to intercept enough transmissions needed to crack the communication. Nonetheless, Zebra has implemented several security measures in its Bluetooth wireless printers. First, Zebra's Bluetooth printers only support the Serial Port Profile (SPP), which somewhat limits the devices they can associate with. The Discovery Mode is turned off in the default configuration, which means the printer itself will never initiate a link with another Bluetooth device. It will only communicate if a handheld computer initiates the exchange, and the printer can be configured to authenticate the computer.

## Wireless LAN

Printers on a wireless LAN network have an IP address and appear like any other device on the network, which lets users take advantage of the many excellent software products available for network management and security. Zebra has many mobile printer models with 802.11b/g networking connectivity and also offers connectivity software, security and printer management solutions. Supported securities include LEAP, WPA, WPA2, 802.1x, 802.11i and VPN. Zebra is committed to this market-leading technology and will support new WLAN enhancements for security, speed, and connectivity as they become available.

## Zebra Wireless Options

Zebra Technologies supports all the wireless LAN and cable replacement technologies described above. Zebra's rugged RW™ series and QL™ series mobile printers support 802.11b/g and Bluetooth connectivity. For maximum flexibility, Zebra offers QuickLink™ removable, upgradeable radio modules for its QL and QL Plus™ series of mobile printers. QuickLink radios come in Bluetooth and 802.11b/g.

## Power Management

How the printer manages its power supply is important to overall battery life and application effectiveness. Battery life varies widely based on how the printer is used. Print volume, document size, the amount of wireless transactions and other factors all affect how long batteries last before needing to be recharged or replaced. It is critically important in field service applications to have enough battery life to power computers and printers for the entire shift or workers may not be able to complete their daily jobs. Adapters are available so battery chargers can plug into vehicle cigarette lighters.

Users should test their applications to ensure that the batteries they use consistently perform as needed and will not contribute hidden expenses to the total cost of ownership. For example, nickel metal-hydride (NiMH) batteries have a higher initial cost than nickel cadmium (NiCAD) products, but have less performance degradation over time, are more efficient at holding their charge, and have a longer life span. Lithium-ion (Li-Ion) cells offer the highest power-to-volume and power-to-weight ratio of the three. For example, in a typical printer application, a lithium-ion battery pack producing 7.2 volts has 30 percent more power than a nickel metal-hydride pack, with half the volume and half the weight.



## Conclusion

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Making field service operations responsive and productive requires organizations to minimize non-value-added tasks. Mobile printing is a powerful enabling technology for processes that help valuable, specialized technicians spend more time on service and less on clerical tasks. The most progressive and profitable field service organizations are aggressively driving unproductive processes out of their operations. Mobile computing and printing provides all the benefits of accurate, on-site documentation, while relieving technicians of the burden of preparing the paperwork and support staff the burden of processing it.

Zebra offers the widest range of mobile printers in the industry. Contact Zebra today to learn more about how our products and expertise can help improve your route accounting operations. Zebra Technologies Corporation (NASDAQ: ZBRA) delivers innovative and reliable on-demand printing solutions for business improvement and security applications in 100 countries around the world. More than 90 percent of Fortune 500 companies use Zebra®-brand printers. A broad range of applications benefit from Zebra-brand thermal bar code, “smart” label and receipt printers, and plastic card printers, resulting in enhanced security, increased productivity, improved quality, lower costs, and better customer service. The company has sold more than five million printers, including RFID printer/encoders and wireless mobile solutions, as well as ZebraDesigner™ software, ZebraLink™ connectivity solutions, genuine Zebra™ supplies and ZebraCare™ services. Information about Zebra specialty printing solutions is at [www.zebra.com](http://www.zebra.com).



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