

White paper

Eight Steps to Going Mobile

When Automating Your Field Force, Consider the Total Cost of Ownership

More and more companies are automating their mobile workforce. They want workers in the field to have access to corporate databases and applications such as customer relationship management (CRM) software, as well as the ability to update customer records wherever the work occurs.

Gartner research indicates that “through 2005, more than 65 percent of the Fortune 2000 companies will adopt mobile applications.”¹

These companies realize that linking the mobile workforce with the enterprise and its data resources is key to enhancing productivity, accuracy, profitability and, ultimately, customer satisfaction.

This is true for any mobile business application, whether the workers provide field repair services, deliver products such as chips, soda or beer, dispense pest control chemicals or pickup and deliver packages. But for some, choosing the right devices can be a real challenge.

The most knowledgeable companies are carefully selecting their mobile computers for durability, compatibility and minimum impact on the information technology (IT) department. In fact, Gartner has recommended that “enterprises should consider industrial forms of handhelds whenever application conditions involve the potential mistreatment of units. Failure to follow this best practice will lead to failure rates in excess of 20 percent per year.”²

These and other buying considerations such as required functionality, wired or wireless connectivity and system integration and management all need to be taken into account as part of the total cost of ownership (TCO). Selecting mobile hardware relatively early in the automation process so that company data needs, field user and environmental requirements, and IT support issues are all adequately considered can help minimize TCO. It can also help you realize return on investment (ROI) sooner rather than later.

Many organizations base their mobile workforce automation decision solely on the expected ROI from taking their existing processes paperless but there are other benefits that can be achieved by enabling new processes. On-site invoicing and collections can reduce customer payment cycles by 30 to 45 days. Bar code scanning of inventory or parts eliminates the errors of manual data entry and can improve visibility to millions of dollars of unrecognized or unaccounted assets.

Determining the True Cost of Ownership

Ruggedized industrial mobile computers sell for as little as \$1,000. They can be configured to do specific types of data collection and communicate in either a wireless or batch (connecting to the server once a day via dock or modem) mode without changing out components. They can be ordered with built-in bar code scanners, wireless radios, interfaces to lightweight, wearable printers, magnetic stripe/smart card readers, or GPS that all work together. Their batteries can last for 8 to 20 hours, and can be hot swapped. If you drop this type of device, you can simply pick it up and get back to work.

Industrial devices that are Ethernet ready can eliminate the need to send data through a PC before it gets to the server. In fact, the PC can be taken out of the equation completely. That can result in major cost savings, depending on the number of mobile devices in the organization.

Industrial-strength devices are capable of running Windows CE or PocketPC for a high level of compatibility with many enterprise programs that are operating today, and they can perform multiple tasks at the same time. Industrial units often have a solid-state storage media that protects the data should the units lose power for any reason.

Industrial units can easily be expected to remain on the job for 2.5 to 3 years, with many customers actually getting double or triple that, so the amortized hardware cost could easily be around \$500 to \$700 per year, per unit.

Basic consumer mobile devices usually sell for \$300 to \$700 right out of the box without peripherals. They operate on either Windows CE or Palm operating systems. These units are not rugged. If you drop one four feet to the concrete the odds are fairly high that you will lose both your data and your device.

Some consumer devices have expansion slots and some do not. Normally, the expansion slot can be used for one card or function at a time. For example, if you are using a wireless radio, you must remove it to use the GPS device. Each add-on is sold separately.

A fully loaded, wireless enabled Compaq iPAQ™, for instance, might run close to \$2,000. In the field, the units might last for a year if they are pampered and carefully looked after.

While industrial mobile computers may initially appear more expensive, they're longer in-field life and lower IT and administrative costs can actually make them more cost effective. In addition, when you are building your business based on automated field workers, the downtime from damaged devices or loss of data can quickly have a bigger impact than the cost to replace the device.

The Rugged Case that Prevailed

When Mockler Beverage Company decided to automate its sales and delivery process, it didn't realize how important a rugged mobile computing device would be. As the exclusive Anheuser-Busch distributor in Baton Rouge, La., and eight surrounding parishes, heavy cases and kegs made ruggedness a factor when choosing a mobile computer.

“The drivers' working conditions are pretty tough and it benefits both the customer and us to know that they can concentrate on the task at hand instead of worrying about the abuse their mobile computer is taking,” said Mary Lewis, information systems manager at Mockler. “It all boils down to better customer service.”

Part of providing exceptional service is getting the order right, even when unexpected setbacks occur. That's what happened to Mockler when one of their trucks backed over an Intermec mobile computer. “The salesman called me ahead of time to warn me,” said Lewis. “When I got the unit it was a mess – I never thought I'd be able to salvage the data.”

When Lewis saw the crushed unit she began thinking of ways to re-create the orders. First, she thought they could re-build the orders off of the receipts, which the driver printed on an Intermec portable printer. "We'd have to re-key the data and hope the discrepancies were minimal," Lewis said.

Fortunately, none of that was necessary. "We began looking closer at the handheld and realized we could remove the data card," Lewis said. "We took needle-nosed pliers, pulled it out and examined it. It seemed in good condition."

In fact, it was. Lewis inserted the data card into a different handheld and began pulling up the day's records. "I was amazed and relieved," Lewis said. "It only took me five minutes to recover the data."

Automating Mission Critical Business Processes

Many first-time mobile applications tend to focus on getting rid of paper by automating a business process. In short order however, the automated process often becomes mission critical to the company's ongoing success and device or system performance can have a significant impact when there is no paper back-up. Initial mobile implementations usually are targeted for high priority business processes that are either important to decision-making or to the distribution of labor or other assets. Even if your company's approach is to simply "try out mobile computing" you must plan for reliability and quality or face problems that could force you back to the old paper systems.

Choosing Wisely - Eight Steps For Going Mobile

Presented here are eight steps to help you gather facts you need to review your options for going mobile.

1. Start with clear goals.

Identify current processes and what you want to improve. You may want to start by choosing a business process that would greatly benefit by moving from manual to automated data collection and data entry. Begin by asking yourself:

- Which data collection processes, if done at least daily without reentering or re-keying data, would improve productivity, maximize resources or lead to much quicker decision-making?

2. Determine your data requirements.

Based on your business needs, answer the following questions:

- How often will data need to be transferred between the field and the corporate office?
- Is once a day (typically at the end of the day) enough?
- Will your mobile equipment need to operate in a disconnected environment? If so, the device must be capable of supporting an intelligent application, local processing and data storage (processor, RAM and storage media.)
- Is real-time access to information required? If so, you must investigate the availability and accessibility of wireless data networks and the costs associated with transmitting data between the field and the office or vice versa. Some industrial mobile units are not only rugged, but also offer a variety of options, including integrated wireless cards, Ethernet cards, or can be linked to a wireless data network via a cellular phone. Be careful to validate that the hard benefits outweigh the technology, inconvenience and costs.

Consider the cost of wireless and whether your enterprise can truly use the data in real time. Not only consider application designs that allow time-critical information such as messages, new jobs, and status to be sent in real time, but also allow queuing of other transaction data, such as parts used, inspection reports, or invoices to be sent at the end of the day using a less costly method such as dial-up, Ethernet or 802.11 at the service center. These decisions will impact your device selection, software requirements, and communication management functionality. Some companies such as Mockler Beverage have found that when data is "batched" or stored for transmission at the end of day, it becomes more important to store it on a solid state card rather than RAM to prevent data loss in the event something happens to the device itself.

- Do you need GPS (global positioning system) to track your workers and their locations?

Be realistic about your requirements. If your travel times are less than 45 minutes between locations, it may be more cost effective and useful to your enterprise to automatically send updates as the technician changes status (departs for a job, arrives, starts and finishes his work) without adding additional GPS hardware. With location-based services becoming available from wireless carriers and the time and date stamps provided by most professional-level software and hardware products, you can create a sufficient audit trail with less investment.

Wireless Order Processing Keeps Things Moving

Euclid Beverage, LTD is the exclusive distributor of Miller products in Chicago's western suburbs. Like other distributors, Euclid had a difficult time keeping up with the demand for information to run its business efficiently. Expanding product lines means tracking a larger variety of products, along with pricing, promotional offers and discounts. For Euclid, this means tracking well over 350 stock keeping units, or SKUs.

Euclid automated its beverage distribution business with Intermec pen-based mobile computers and Sales Delivery and Merchandising (SDM) application software, which allows sales reps to collect data at each customer location using an on-screen step-by-step process.

The distributor decided to change its selling system from driver sales to pre-sales, meaning the sales force would sell one day ahead of the driver. The drivers would no longer have to guess which products to load on their trucks and the company could increase its product distribution and reduce customer out of stocks. The next issue Euclid faced was how the salesmen would get their orders from the field back to the distribution center.

In a joint effort, Euclid, Intermec, and Nextel worked together to provide a wireless data transport solution for the field information to the warehouse. With this application, Euclid can update sales and inventory information at a customer location using Nextel's wireless data service.

Changes in prices, important messages, customer payment terms and sale items can also be downloaded to the mobile computer wirelessly. Additionally, a Euclid salesperson can inform the customer of any promotional items and volume discounts of available products.

Before wireless, drivers either spent lots of time talking to the office and verbally reported their orders, or had to use valuable time at the end of the day to drive back to the office. With the new system, orders can be submitted from the field up until the 4:00 p.m. cutoff time. This typically allows for three or four additional customer orders per sales rep each day.

Now drivers and salesmen each concentrate on what they do best and the levels of customer service and satisfaction have increased dramatically.

3. Determine what data needs to be sent to and collected by the mobile worker. Based on your data needs, answer the following questions:

- What data can be captured with a built-in bar code scanner?
- How much data can be put into the mobile unit in the form of business rules and be handled through pick lists or pre-determined answers?

Data that is captured in a consistent, accurate, and pre-determined way by all users can be easily mined and analyzed later. A key consideration in your mobile automation project should be to minimize entry at the job site. For example, if you can predict the delivery information or likely parts to be used, have that information pre-populated on the application so the worker can easily make changes. Having the majority of the information initially means less data to enter onsite. Also, make sure the workflow matches the way the worker does his job – not the way the paper form was organized.

It is imperative to ask mobile workers for their input and actively engage them in the process. They will not feel they are a part of the process if you simply hand them a mobile device and send them out the door. However, be realistic about your expectations and give the workers adequate guidance. Creating a knowledge base is a good idea, but expecting field techs to write well-organized troubleshooting or resolution notes is misguided and may not be a cost effective use of their time. Likewise, if you simply tell them to select a device to replace their paper, the worker may not realize that much of the information can be presented on a smaller form factor while virtually eliminating typing. If they envision typing everything they used to write, they may feel a laptop is required. It is important to look at hardware and software as one system.

Eliminating Pesky Paper Pays...

Taking an entire division from a paper-based system to an automated one can be intimidating to the users. That is what pest elimination company, Ecolab®, Inc. faced when it decided to take its mobile field service application paperless to improve customer service.

As the largest U.S. provider of premium, commercial pest-elimination services, Ecolab used a paper-based system to track completed service calls, invoices and reports. Each field service specialist had to manually fill out invoices and reports and mail them back into the National Support Center. In addition, office personnel had to sort, key in and disseminate the information to the appropriate departments, back to the service specialist and customers. As a result, data from over 75,000 invoices monthly and reports was being entered at multiple points.

Ecolab chose an Intermec mobile computer for capturing and processing customer information overnight via a modem or a docking station. Field associates use a custom-written Intermec software application running Microsoft Windows CE to manage their routes.

Today, technician productivity has increased 10% and Ecolab is servicing more customers with fewer errors than ever before. Now, field associates can place orders, send in reports and deliver services in a timely manner, which has greatly improved customer satisfaction. It also expedites and makes regulatory reporting easier because the data is gathered daily and in an electronic form.

Ecolab has found that the deployment sharpened their competitive edge and cut their operating costs by \$2 million per year. By streamlining the process, the company has visibility to service calls much more quickly than before. Customers want to know immediately if they're having a problem at one of their locations and Ecolab has the tools to report problems almost instantly.

4. Determine the work environment and the physical form factor requirements. Environmental factors make it necessary to consider the working conditions of the mobile worker.

- Will they leave the unit in a vehicle overnight?
 - Does it need to operate in extreme environmental conditions?
 - Hot or cold?
 - Rain or high humidity?
 - Around dust or other airborne matter?
- Will the unit need to operate in low light conditions? In sunlight?
- Does the user need a keypad or a touch screen?
 - Could voice recordings be used instead of typing? When making this evaluation, be sure to provide examples of the software to be used. Well-designed applications will minimize the amount of typing a user performs and help end-users make more informed hardware selections.
- How big should the screen be? If the mobile worker has to do a lot of walking, the weight and portability of the device needs to be considered.
- Is there a backup battery to protect data stored in the random access memory (RAM)?
- Does the device have a long boot time (laptops) or instant on capability? If the unit suspends, does it also suspend the wireless radio? This prevents dispatcher communication with the field.
- Can the battery be charged separate from the unit? This ensures maximum productivity of the device so you don't have to leave it plugged into a wall during the day if your batteries run low.
- Are the batteries hot swappable so the unit will not have to be powered down when changing them?

A mobile device is only as good as its battery. Workers who will be out for an 8-hour shift will either have to have a battery that lasts that long or a spare if it is integrated. The length of time it takes for the battery to be charged can have a significant impact on productivity. Sometimes different tasks need different functions. If your application calls for radios, scanners, faster processors and color screens, power consumption will increase and the need for both larger and replaceable batteries will be more important in device selection.

Because battery charging is important, the mobile device should be compatible with docking and mounting options within the vehicle. Vendor supplied docking solutions generally offer the highest reliability as they are designed as a true system with the device, tested for high insertion rates, and able to withstand the vibrations and bumps typical of the road.

- Will you need one configuration for the device, or will workers have to change cards and add on components throughout a shift to print or transmit and receive data?

Changing peripherals adds risk. Most consumer devices are not designed for regular and repeated insertions. The battery on the device is also not designed to power external devices, so battery life will suffer, often dramatically. Many peripherals have their own battery to compensate, but this adds bulk and becomes a liability should the unit be dropped. Industrial devices offer integrated peripherals designed to withstand drops and optimize battery life.

Your application may also assume access to all the peripherals at once. For example, your dispatcher expects to be able to send new jobs to technicians at any time, but if the technician had to swap the radio for the scanner, the technician won't receive it. Likewise, you may design the application to use a solid state storage card to record transactions for safe keeping, but the card may also have to be removed when using the radio or the scanner.

- How many different devices will you deploy?

Wherever possible, try to settle on one type of mobile device to streamline user training and minimize IT support needs. Deploying a variety of mobile devices raises the issues of compatibility between devices and applications, puts additional software on the server, raises the need for different modes of synchronization, and demands a lot of IT time and attention.

5. Determine the technology requirements.

When selecting a device it is important to consider if it meets the requirements of the application in terms of the operating system, peripherals and concurrent use of those peripherals, the processor and data storage. It should also integrate well with the enterprise.

- Does it require Microsoft ActiveSync™ via a PC versus a direct Ethernet link?
- Does it need middleware?
- Is it local IP address capable?

Even if wireless transmissions are not in your company's plans at the moment, one should consider if the device supports wireless wide area network applications and whether or not it offers backward compatibility and multitasking.

How current and proven is the technology you are looking at is another important consideration.

- Can the supplier guarantee support for three years or more?
- Can you lock down the application or browser so a field worker cannot cause intentional or unintentional problems, such as adding their own software, playing games or deleting information?

Linux and Java for mobile handhelds may look appealing, but the manufacturer must provide drivers for those operating systems for a large variety of peripherals, and these may not be available for the peripherals you want to use. The flexibility may also sound advantageous but differences in operating systems cost IT support time and may prevent compatibility between manufacturers due to lack of standards.

Mobile devices that run Windows CE or PocketPC usually employ the fastest processor chips available for handhelds, while Palm operating system units are currently using older technology and slower chips. While they are making the move to rewrite the OS for the Intel processors, the debate is still out on how much functionality they will include in the first version. The Pocket PC environment provides strict standards that all manufacturers must support in order to carry the Microsoft® PocketPC logo. This rigid control ensures your IT department will have only one environment to support.

Be careful of bleeding-edge technology. You may be successful, but your project may see delays as you wait for peripheral support or for the debugging of a new environment that is not well proven. Considering these factors ahead of time can save you valuable time down the road. The ROI from most projects can be achieved with the most basic available technology tools.

A Mix of Features in a Single Package Fuel Growth

For U.S. Fleet Services, Inc., the nation's largest on-site, commercial fleet re-fueling company, automating meant providing accurate and timely information to its customers 24/7 and improving productivity.

U.S. Fleet started in 1997 and soon the company began purchasing other fuel oil businesses around the country. Today, U.S. Fleet does over \$150 million annually with 50 branches in 23 states. With the purchase of each company came a new system for collecting data and only one of those was automated using a DOS-based system. It soon became apparent that a common infrastructure was needed in order to keep track of its growing customer base.

For about two years U.S. Fleet looked at several different wireless mobile solutions, until they found the right mix of features in a hardware and software combination. The right combination turned out to be Microsoft's Pocket PC operating system and Intermecc's 710 mobile computers and 782 portable printers.

Prior to deployment, US Fleets observed drivers to identify time saving opportunities and recognized that drivers were having to go between the fleet vehicles and the fueling truck multiple times in order to record the fuel meter reading and calculate dispensed fuel for each individual vehicle. This wasted time and was prone to errors if a driver forgot to check his meter.

To improve efficiency, US Fleets installed an 802.11 radio in the truck connected through a hub to a fuel meter. Not only is the meter reading transmitted to the handheld computer in real time, but the scan of the vehicle ID validates the fuel type required and prevents the valve from opening if the driver attempts to use the wrong fuel.

Since drivers no longer have to write down transactions, productivity has increased enabling them, in most cases, to add another stop to their route each day. In addition, the extra time has also been used to shift drivers toward providing better customer service.

6. What kind of supplier support can you get?

When selecting a supplier look for one who has solid experience in the mobile market, as well as with various field applications and wireless technologies. Vendors who offer a broad variety of available products and who can offer IT support and end-user training both on- and off-site can shorten your rollout, help you avoid common pitfalls, and achieve your ROI and breakeven points quicker.

- Can your supplier offer service support after the sale? Do they have a variety of options for spares management and turn-around time?
- Can they preload your software at the factory or prior to shipping?
- Can the supplier offer purchase or lease options, including a technology lease, which is often considered for investment protection?
- Does the supplier have a commitment to the product line? Have they demonstrated a sensitivity to backwards compatibility with their existing install base?

All of these are important considerations when choosing a vendor.

7. Determine the financial considerations.

Conducting an ROI calculation to determine what you are getting in return for your investment is important to benchmark the success of any project. When integrating a mobile system consider:

- What is most cost effective for your business?

For instance, should you spend \$500-900 for a consumer unit plus the cost to add-on the radio, rugged case, storage card, etc. to provide paperless work orders? This solution can have a higher overall TCO, versus a \$1,500 industrial system that can produce an automated, paperless work orders in addition to supporting scanning and printing, with an expected life of several years. These added features allow you to increase your realized benefits and provide a breakeven payback in much less time than the consumer device option. Financing can offer a way to benefit from the total solution now while reducing your initial out-of-pocket expense. Because many projects breakeven in less than one year, your cash flow or cost reduction should exceed your payment even faster.

8. What future business processes will you be implementing, and will the system support the upgrades?

Be practical about timing expectations. Your organization will not want to undergo major hardware changes more than once every 2.5 to 3 years from an operational and end-user training perspective. Ensure your solution is not shortsighted and that you will not outgrow it during that time frame. IT departments like to add the latest technology they can afford, but you need to maintain a profitable business. Most companies did not adopt each new Windows operating system when it was introduced because of cost and implementation factors, skipping versions until there was a compelling need to upgrade. Think of your mobile devices in the same way and plan well enough into the future.

Also, consider including Bluetooth™ as part of your device configuration. Bluetooth will provide an easy and cost effective way to extend the functionality of the device in the future – from headsets to talking to your cell phone, GPS receivers, printers and more.

SUMMARY

Choose the system that is right for your requirements. You have to find that fine balance between need and cost. Don't buy a system that provides a lot more capability than you need, particularly at the expense of ergonomics and usability. Nor should you install a system that cannot deliver the data when and where you need it or provide enough automation to truly enable your service organization to remain competitive, reduce operating costs, or provide leading edge service for the next 2 to 3 years. This is truly a case where finding the right supplier with a wide variety of experience and products over many years is essential to your success in taking your workforce mobile.

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¹ Gartner Inc. - Enterprise Wireless: Measure the Cost and Benefits for a Total Return on Investment, March 11-13, 2002, Phil Redman

² Gartner Inc. - Frontline Computing - Mobile Devices on the Rise, March 11-13, 2002, Ken Dulaney

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She has spent the last four years focused on wireless CRM and S-Business, with emphasis in field service, service parts logistics, asset and inventory tracking and facilities maintenance. She has worked with organizations in the manufacturing; third party service; gas and electric utilities; cable and telecommunication industries. She is a member of the Association of Field Service Managers (AFSM) International and Geospatial Information Technology Association (GITA). Ms. Urich can be reached at kristi.urich@intermec.com.

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