

MAXIMIZE ASSET VALUE WITH INNOVATIVE MOBILITY SOLUTIONS

EXECUTIVE SUMMARY

Today's organizations are facing challenging times — a worldwide economic downturn, new global supply chains, a rapid increase in industry and government regulations and pressures from customers to continually improve 'green' initiatives. It is a daily struggle to maintain profit margins, revenues and quality of service. While addressing these issues takes a multi-pronged approach, it also requires innovative thinking. One initiative that is often overlooked is asset management. Many times, assets are viewed simply as a cost of doing business — requiring inventory counts, inspection and maintenance. Yet regardless of your industry or the type of assets in your organization — from production line machinery, material handling equipment and utility infrastructure to network servers, and the tools and parts required to maintain your assets — your assets are directly connected to your bottom line. This white paper examines the relationship between your assets, the quality of the asset management initiative and your profitability — and how innovation with a mobile asset management solution can help you not only maximize the value of your assets, but also the health of your organization and the value of your business.

BACKGROUND: PROTECTING PROFITABILITY — ASSET MAINTENANCE VS. ASSET MANAGEMENT

Everyday operations are heavily dependent upon business assets — from utility poles, vehicle fleets and the machinery on a manufacturing production line to laptop and mobile computers, network servers and high-dollar sensitive medical equipment in a hospital and even the physical buildings of your operation. Regardless of your industry or the type of assets in your organization, your assets are directly linked to your profitability — poor utilization and unplanned downtime can impact sales as well as customer service, satisfaction and retention, and ultimately your bottom line.

Consider the affect on the health of your business if:

- A facilities issue results in the need to shut down a building — and the impact of paying tens or hundreds of employees to remain at home for the day.
 - A key piece of manufacturing equipment breaks, bringing the entire production line to a halt — an event that can cost millions of dollar an hour.
 - An asset cannot be instantly located when needed — from an IV pump in a hospital to a drill bit on an oil rig
 - A delivery truck breaks down on the road, rippling into the high cost of an unproductive employee, missed delivery deadlines, irate customers and potentially spoiled product.
- A server or backup drive that houses sensitive customer financial information or other intellectual property is misplaced — customers may lose confidence in the company and seek out your competition or even take legal action, and there may be steep regulatory fines for lack of compliance.

As a result of the direct tie to profitability, innovative organizations are no longer focused solely on asset maintenance. Today's executives are held accountable for 'total asset management', a more holistic approach concerned with managing the financial impact of the asset throughout business operations, including:

- **Capital and operational asset-related costs:** Asset-related costs reach many areas of the business. There are capital costs related to asset lifecycle and replacement as well as purchasing parts and spares inventories; the time and cost to manage the inventory; the warehouse real estate required to house the inventory; and the cost of the staff required to maintain and manage assets and the parts/spares pools.
- **Compliance:** Almost every business is subjected to some form of government or corporate regulation, requiring the cost-effective collection and maintenance of data required to prove compliance. For example, proper accounting of all assets is required to meet Sarbanes Oxley requirements as well as ensure proper

asset depreciation on company tax returns. Safety and security compliance requires companies to prove that eyewash stations, fire extinguishers and building access checkpoints and more are available, with maintenance performed as required. Environmental regulations require companies to protect the environment by ensuring emissions do not exceed established limits. And the company may likely have its own energy efficiency or green initiatives, creating a focus on reducing

energy consumption and the company's overall general environmental footprint.

- **Asset Performance:** To get the most return on any asset, companies must achieve maximum asset utilization — measured by asset uptime, availability and efficiency. And the ability to achieve maximum utilization is dependent upon the efficiency and effectiveness of the maintenance function.

BARRIERS TO EFFECTIVE ASSET MANAGEMENT: MANUAL TIME-CONSUMING AND ERROR-PRONE PROCESSES

To effectively manage assets, workers are involved in performing day-to-day inspections, maintenance or emergency repair routines; inventorying assets, parts, tools and other required materials; and collecting and compiling data to prove compliance with environmental, security, safety and other government, industry and corporate regulations. To act as efficiently and effectively as possible, these workers need real-time access to the tools on the desktop — the computer and the deskphone. But these workers are highly mobile and spend the bulk of their day away from their desk. To bridge the gap between the mobile worker and the desktop, many companies utilize manual paper-based processes resulting in:

- **Poor productivity:** Workers are forced to spend as much as half of their time on pure administration — handwriting information, managing paper forms and locating needed materials — time that could be much better spent 'on task'.

- **Data inaccuracies:** The information is 'touched' twice — first handwritten and then transcribed and keyed into the computer, increasing the opportunity for data errors.
- **Slow movement of information:** Information is 'invisible' from the time it is collected until the time it is entered into the computer system — which could be days, weeks or even a month.
- **Lack of documentation for actual asset maintenance as well as technician/engineer knowledge base:** When manual procedures are utilized, processes and machine knowledge are often undocumented and possessed only by your more experienced workers, leaving the company vulnerable. As employees either reach retirement or move on from the company, that knowledge is lost, reducing the capabilities of your staff — and the quality of your asset management initiatives.



Mobility effectively streamlines the entire inspections, maintenance and repair effort by enabling:

- Real-time electronic work orders
- On-demand maintenance and repair routines
- On-demand product manuals
- On-demand training
- Real-time proof of condition
- Real-time asset condition monitoring

...and more. Data collection is automated, errors are reduced, a richer data set can be collected and technicians have instant access to the information needed for better decision-making.

THE SOLUTION: MOBILE ASSET MANAGEMENT

Today's mobile solutions offer a real-time connection to your voice and data networks and provide your workers with the tools they need to strip redundancies, errors and wasted time out of business processes, basically 'leaning' the entire asset management effort. Workers enjoy the functionality of a mobile computer, a mobile phone, a digital camera, a bar code scanner, RFID reader, and for workers outside your four walls, a GPS unit — all in a single easy-to-carry and easy-to-use device. The result is an unprecedented level of process efficiency for all asset management-related activities — from routine maintenance and inspections to emergency repairs and inventory counts.

In addition to streamlining actual technician-based processes, organizations can also leverage RFID and real-time locationing systems (RTLS) to improve efficiency in related departments or business functions, such as the tool crib or warehouse.

Applications include:

Mobile Asset Inspections, Maintenance and Repair

Mobility effectively streamlines the entire inspections, maintenance and repair effort by automating the collection of data, enabling the collection of a richer data set and enabling instant access to the information required for better decision-making through:

- **Real-time electronic work orders.** Paper is replaced by an electronic form that is wirelessly distributed to your workforce at the start and throughout the day

as needed. Workers no longer need to travel to a centralized dispatch area to collect worker orders or manage paperwork. The form can be auto-populated with known information — for example, a quick scan of a bar code or RFID tag on an asset can instantly fill all appropriate fields with known information, such as asset serial number, asset name and asset location — allowing workers to verify that the right action is being performed on the right asset at the right time. A quick scan of the employee badge can capture accurate information on the employee who is performing the task. And drop down menus help further automate and error-proof data capture as well as ensure data consistency.

Instead of requiring the information to be entered into a computer at the end of the day, the press of a button transmits the completed work order directly to the appropriate back end system, in seconds.

- **On-demand maintenance and repair routines.** With the press of a few keys, repair technicians can access standard maintenance and repair routines, complete with detailed instructions and a check box that provides accountability for the execution of each step. As a result, consistency and quality of service are improved, while training requirements are reduced.
- **On-demand product manuals.** Instead of locating and lugging the typically large equipment user manuals to a job site, manuals can be accessed online or stored on the mobile computer as a PDF. The electronic documents provide an added bonus — they are searchable, allowing workers to simply enter key words to locate

Streamlining Asset Management with Mobile Computing

Great River Energy is a wholesale electric services provider, distributing electricity to 600,000 homes, businesses and farms in Minnesota and Wisconsin. Continuity of service and repair costs are dependent upon how well the company maintains its \$1.7 billion in assets and 4,500 miles of transmission line. In the existing paper-based system, information moved too slowly — often a month old before it was visible. Now, thanks to mobility, information is instantly visible upon completion of an inspection — and repairs are typically scheduled within 24 hours. Data entry of paper forms is eliminated, allowing workers spend more of the day on task. The automation of data capture via drop-down menus, checkboxes, bar code scanning and more greatly improves data accuracy. And since repairs are performed on time, asset uptime is improved — and service disruptions are minimized.

the right page. And for crews who spend their days out in the field managing assets, valuable space is freed up in the work truck to carry additional materials, parts and tools.

- **On demand training.** Support for multimedia enables workers to view how-to and training videos and presentations right on the handheld mobile computer. Workers can complete training at their convenience — time spent organizing and conducting formal training classes is dramatically reduced and workers can improve skills without losing valuable time in the field. And a complete audit trail allows supervisors and Human Resources to monitor training status — and ensure that required training is completed on time.
- **Improved collaboration.** Sometimes a technician may need guidance on how to proceed with a repair. An integrated high-resolution autofocus digital color camera with flash allows workers to snap photographs — even close-ups — in any lighting condition. And the wireless connection enables the instant transmission of the picture to another member of the team who can help, providing on-the-job training and enabling even new technicians to provide the right level of service for the asset.

In addition, the availability of electronic work order schedules can allow the parts and tools crib departments to automatically create a list of parts and tools that each technician will need the following day, greatly reducing coordination time on both ends. The tool crib and parts department can operate with a reduced staff — and maintenance technicians have more time to perform more work orders throughout the day.

Finally, with voice-over-WLAN (VoWLAN) inside the four walls and wireless WAN (WWAN) cellular capability out in the field, inspectors and technicians can remain in contact with co-workers, engineers, customers, supervisors and others as needed.

- **Proof of asset condition.** The ability to snap a photograph and attach it permanently to the electronic work order for a specific asset provides a new level of business intelligence. The new visual information enables supervisors to validate that the asset condition was assessed correctly and determine that the best course of action was identified.

- **Proof of asset location/work order completion.** An integrated high-resolution camera and GPS can work together to enable workers to snap a geo-stamped photo of an asset — a picture that also contains a date and time stamp as well as latitude and longitude. This capability can be utilized in two ways. Workers who are taking inventory can attach the photo to the asset record to provide detailed asset location. In addition, workers who are performing routine maintenance or repairs can take a picture to provide proof positive that the service was completed — as well as capture an electronic signature to validate a completed work order.
- **Real-time asset condition monitoring.** When the control systems for large equipment — for example, the machines on a manufacturing production line or the heating and air conditioning systems in your facilities — are integrated into your asset maintenance function, alarms can also trigger the delivery of an instant emergency work order to the nearest technician to contain the situation. As a result, emissions and leaks that threaten employee safety and government compliance can be addressed immediately.

In addition, for vehicle fleets, telematics allows real-time monitoring of engine metrics, including engine fault codes, temperature, oil pressure and more. As a result, organizations can quickly spot and address:

- mechanical issues, helping to contain maintenance costs as well as protect against incremental vehicle damage or even catastrophic failure
- destructive driving behavior, such as speeding and heavy braking

GPS-related capabilities

Integrated GPS provides additional benefits for organizations with technicians who spend the day out in the field — such as utilities, state and local governments and the military.

- **Real-time navigation.** Turn-by-turn directions keep inspectors and maintenance technicians on schedule throughout the day — despite traffic jams, roadwork or road closings.
- **Real-time resource location.** Drivers can instantly locate needed resources — from a gas station to a store to purchase a needed tool or part.
- **Improved route efficiency/real-time tracking.** GPS



In the data center, a mobile computer streamlines maintenance activities and enables the cost-effective capture of the information required for compliance with PCI, HIPAA and other government regulations. Technicians can: scan the bar code or RFID tag on a server to ensure the right device is removed for regular maintenance; access a full maintenance history; automatically record the date and time of removal and the time the server was returned to the rack; and capture detailed information on the maintenance performed — all in real time.

can provide organizations with a wealth of information that helps protect worker productivity and drive fleet costs down. The ability to see real-time and historical location information enables the creation of routes that will minimize mileage, fuel costs and vehicle wear and tear. In addition, breadcrumbing allows dispatch and supervisors to compare pre-set routes against actual routes to better manage drivers. And geo-fencing can send an immediate alarm to supervisors and dispatch when a worker takes a wrong turn or otherwise leaves a pre-set route or remains in a spot too long, improving route efficiency and driver safety.

Mobile Workforce Management

With a real-time asset management function, supervisors have the visibility required to improve workforce utilization and ensure inspections, maintenance and repair are performed on time, every time with:

- **Real-time dynamic work order scheduling.**
Since completed inspection, routine maintenance, and repair work orders are filed in real time in the appropriate business system, proper scheduling is nearly instantaneous. If an emergency repair is required as a result of an inspection, alarms can be sent to the appropriate supervisors. Due to the ability to aggregate real-time information in different systems — including the location of each worker, the worker’s specific expertise and the tools and parts in the worker’s possession — the closest appropriate employee can be instantly identified and dispatched within seconds to perform the needed services, all without any human intervention. Work orders are always scheduled efficiently and accurately, based on asset condition, ensuring that assets receive the timely and complete services required to perform at peak levels.
- **Real-time management of the mobile workforce.**
Regardless of whether your inspectors, technicians

or engineers work inside or outside your four walls, they are highly mobile, always on the move. With a paper-based system, supervisors can only monitor past performance. But with mobility, supervisors now have the visibility required to assess and address individual and workgroup performance levels in real time. Supervisors can provide on-the-job training, mentoring and more to improve the productivity of individual workers. And the ability to monitor the workload in real time allows supervisors to determine if and when additional workers are required to ensure timely completion of all open work orders.

In addition, push-to-talk (PTT) over either the wireless LAN (WLAN) inside the facility or the cellular network (WWAN) out in the field provides supervisors with a real-time voice connection to the workforce. Now, with just the literal press of a button, supervisors can:

- Reach an individual to check the status of an emergency repair
- Reach a work group to locate the right product expert to help address an urgent issue
- Provide a critical announcement to an entire department — for example, providing updated storm information to a utility crew out in the field

Mobile Asset Tracking

Instant visibility into a wide variety of asset inventories is required in order to achieve maximum efficiency in the asset maintenance function — from parts and tools to IT assets. RFID and Real Time Locationing Systems (RTLS) can completely or significantly automate the asset inventory process, dramatically improving accuracy and reducing the associated time and cost:

In the parts warehouse, tool crib and IT data centers, a mobile RFID reader on a cart can allow a worker to simply walk up and down the aisles to take a highly

Streamlining Asset Management with RFID

“Large enterprise data centers can easily contain thousands of servers and tens of thousands of data tapes in geographically dispersed locations. The advancement of mature RFID platforms paves the way for highly scalable RFID applications that can virtually automate IT asset management tracking, dramatically reducing IT time and costs as well as providing the real-time IT asset visibility required to ensure security and compliance.”

Sudhir Hasbe, Sr. Product Manager, BizTalk RFID for Microsoft Corporation

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accurate inventory in a fraction of the time it would take to complete a physical inventory count. A handheld RFID reader can allow IT personnel to scan a large rack to locate a specific backup tape — or a technician in a cable company can scan all the parts and tools in the back of the truck to ensure that all required materials are on board before leaving the dock for the day. And fixed RFID readers or Wi-Fi-based RTLS systems can continually monitor asset location, providing hospitals with the ability to instantly locate critical medical equipment such as portable x-ray or

EKG machines and pumps, manufacturers with the location of welding machines and more.

In addition, when RFID or RTLS-enabled employee badges are used in conjunction with fixed RFID readers or Wi-Fi-based RTLS systems, the result is an accurate accounting of asset movement, complete with the identity, time and date of the person who moved it — ideal in data centers that are subject to strict government regulations that protect sensitive customer financial or health information.

THE BENEFITS OF MOBILE ASSET MANAGEMENT

When you empower your asset management function with mobility, you give your inspectors, technicians, dispatchers and supervisors the tools and information they need to act as effectively as possible, ultimately impacting your bottom line through:

Reduced costs

- Timely inspections, maintenance and repair keep assets operating at peak performance:
 - maximizing asset lifecycles, which minimize asset replacement costs
 - reducing the high cost of unplanned downtime
 - reducing energy consumption — for example, well maintained engines in the fleets of your vehicles reduce fuel consumption
- Streamlined processes improve the productivity of your workforce, allowing you to handle more work orders with fewer people.

- The ability to present procedural checklists complete with detailed instructions reduces training time and cost.
- Today's technology-savvy workers are seeking technology-savvy employers — companies who know how to leverage technology to empower workers to do the best job possible. A state-of-the-art mobility solution in your asset management function will help attract and retain a more qualified workforce, reducing the high cost of workforce turnover.
- Real-time accurate inventory visibility:
 - enables a reduction in stocking inventory for high-value equipment, the parts and tools required to service that equipment as well as the required warehouse space, in turn reducing the associated capital and operational costs
 - enables recovery of revenue from unregistered assets, for example, an electric meter



Mobility improves overall asset visibility and utilization. With a rugged RFID tag on forklifts and other material handling equipment, warehouse workers can rapidly locate a needed asset, protecting productivity. In addition, with RFID tags on your trucks and an RFID reader at your facility gate, you can automatically record the exit and entry of every vehicle in your fleet.

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- The ability to create an aggregated view of information in different systems allows workers to merge inspection, maintenance and repair records with asset performance data, serial number and warranty information. As a result, organizations can ensure that, when warranted, service is performed under warranty, maximizing the value of any extended warranty programs as well as containing repair costs.
- The need for workers to carry two devices is eliminated — a mobile computer and a cell phone — providing single device simplicity. Productivity is improved — workers only have one device to learn and manage. And capital and operational costs are reduced, since the enterprise is no longer required to purchase and manage multiple devices — along with their unique accessories and batteries — per person.
- Green initiatives have become part of the core business strategy for many companies. According to AMR Research, manufacturers will spend \$3.64 billion to position brands as green⁴ — and mobility can help companies comply with corporate green initiatives. For example, proper maintenance of heating and cooling systems can substantially reduce the carbon footprint and reduce leaks.
- The ability to automatically document the inspection process for eyewash stations, fire extinguishers, emergency doors and more, complete with a photograph, enables cost effective compliance with safety regulations.

Improved performance

- Improved asset management leads to peak performance, which in turn:
 - increases availability by improving uptime and reducing unplanned downtime
 - ensures that machinery on a production line maintains tolerances and that product is manufactured to specifications, protecting yield by preventing the manufacture of non-standard product

Cost-effective compliance

- The ability to heavily or completely automate the asset inventory process improves accuracy and reduces the cost of compliance with Sarbanes Oxley regulations
- The ability to properly maintain machinery and monitor emissions in real time enables cost-effective compliance with environmental regulations — also protecting the organization from incurring heavy fines for non-compliance.

BENEFITS: BEYOND THE MOBILE ASSET MANAGEMENT FUNCTION

The benefits of implementing mobility for mobile asset management reach beyond the asset management function to touch many other areas of the business, such as:

- **Customer service.** The improvement in uptime has a major impact on customer service, customer satisfaction and customer retention. In a manufacturing operation, proper maintenance of the machinery on the production line ensures that orders are manufactured to specification and shipped on time. In an electric or cable utility, proper maintenance of the infrastructure ensures seamless delivery of service to homes and businesses. And in a retail operation, keeping network servers up and available ensures that customers have uninterrupted access to order status.
- **Sales.** The ability to prevent unplanned downtime can prevent lost sales and protect revenue. For example, a more dependable production line in a manufacturing facility ensures ample yield to keep the shelves stocked — so salespeople have available product to sell. And for retailers with an online store, increased uptime in the datacenter ensures website availability, helping protect against lost sales.
- **Quality and data accuracy.** The ability to heavily or completely automate data capture allows organizations to achieve the coveted Six Sigma level of accuracy, where less than four out of every million customers will experience any type of defect in your operations. And the value of Six Sigma is well documented. American Standard saved \$35 million in one year; Ford increased profitability by \$300 million in 2001; and Allied Signal/Honeywell saved \$600 million in seven years.¹

Streamlining Asset Management with Bar Code Scanning

On election day, volunteers at the polls represent the largest one-day workforce in the United States—two million people must be trained and complete their work, all in less than 24 hours. In North Carolina, nearly six million voters and up to 100 different types of ballots are potentially in use in any single election, placing volunteers under a great deal of pressure to ensure that the right voter receives the right ballot. To address this challenge, the North Carolina State Board of provides volunteers with a lightweight ergonomic handheld device to scan the bar code associated with a voter's name. With just a quick press of a button the right ballot is identified, preventing ballot distribution errors, an event that can require a repeat of the election—and cost millions of dollars.

SUMMARY

The efficiency and effectiveness of asset management drives profitability — and the worth of your business. According to ARC Advisory Group, “The potential for savings from proper management of capital assets is immense. And these savings go straight to the organization’s bottom line.” The report continues, “Even a small percent improvement in uptime and performance can be worth billions annually.”² And Bharat Nair, senior VP and research director for global manufacturing markets at Aberdeen Group goes a step farther, stating that “Optimizing asset performance to maximize economic value for your asset base offers the best path to increasing shareholder value.”³

Mobility is a best-in-class solution will help align maintenance, operations, marketing and sales initiatives, delivering benefits that reach well past the asset management function to positively impact other core areas of the business. The power of mobility will streamline processes, provide real-time information to improve decision-making, automate data capture and improve the accuracy of your data. The result is a reduction in capital, operational and compliance costs, while improving uptime and availability, allowing organizations of all sizes across industries to truly maximize the asset investment — and the profitability of your organization.

FOR MORE INFORMATION

For more information on how you can maximize asset value with innovative mobility solutions from Motorola, visit www.motorolasolutions.com/manufacturing or call 866-416-8593.

WHY MOTOROLA

Every day, organizations of all sizes all over the world count on Motorola mobility solutions to maximize personnel effectiveness, improve services, and increase revenue potential. When you choose Motorola for your mobility solution, you get the peace of mind that comes with choosing an industry leader as your technology partner. Motorola offers the proven expertise and technology you need to achieve maximum value and a fast return on investment—as well as first hand experience in virtually every size organization in nearly every major industry. And our end-to-end solutions offer the simplicity of a single accountable source—regardless of the number of vendors involved.

Our comprehensive product offering includes: rugged and enterprise class mobile computers with extensive advanced data capture and wireless communications options; rugged two-way radios for always on voice communications; private wide area and local area wireless and outside the four walls—and to network multiple locations; comprehensive RFID infrastructure, including fixed, mobile and handheld RFID readers; a partner channel delivering best-in class applications; software solutions that enable centralized and remote management of every aspect of your mobility solution; and a complete range of pre-and post-deployment services to help get and keep your mobility solution up and running at peak performance every day of the year.

FOOTNOTES

1. Motorola website; The Impact of Six Sigma;
<http://www.motorola.com/content/0,,3081,00.html>
2. Collaborative EAM Achieves the Full Vision of Enterprise Asset Management,
ARC Advisory Group; ARC White Paper November 2004

"Over 65 percent of manufacturing investments are in production facilities that directly affect revenue generation. Even a small percent improvement in uptime and performance can be worth billions annually." ALSO "The potential for savings from proper management of capital assets is immense. And these savings go straight to the organization's bottom line."
3. Asset performance management is the backbone to culture of reliability;
Frank O. Smith, senior contributing editor; Manufacturing Business Technology; December 1, 2007
4. Services: A Key Underpinning to the Carbon Economy;
AMR Research; Simon Jacobson, Stephen Stokes and Karen Carter; March 10, 2009