WHITE PAPER

Leveraging the value of imaging in enterprise mobility applications

EXECUTIVE SUMMARY

The use of imaging in enterprise mobility applications has been far from pervasive, primarily due to the limitations of the typical cameras that are integrated into business-class mobile devices. But key technology advancements in mobile computing — including high-resolution autofocus color cameras, high speed 3G cellular networks, high resolution displays, highly sensitive GPS and more — are paving the way for a new generation of image-centric enterprise mobility applications. This white paper explores the technology features required to enable enterprise-level image capture in the field, the many applications where image capture can provide real value, and the many benefits that image capture can deliver.

Barriers to the utilization of images in enterprise mobility applications

Bar code scanning has come to play a central role in today's enterprise, eliminating manual processes and bringing a new level of automation, productivity and accuracy to a wide range of applications. But in contrast, mobile image capture — photographs and video — is not nearly as common in today's enterprises. This low adoption rate is primarily due to technology limitations:

- Lower resolution cameras incorporated into mobile devices and smart phones were incapable of capturing the level of detail needed in enterprise applications.
- Existing long-range fixed focus technology posed a challenge for the capture of photographs and documents at close range — documents were often illegible and photographs often lacked clarity and detail.
- The lower bandwidth of older cellular networks resulted in lengthy transmission times for large image files, often adding time and cost to everyday processes.

Additionally, most enterprise class mobile devices previously required companies to choose between a bar code scanner and a digital camera. Given the fact that bar code scanning has become a "must have" application, and image capture has been to date a "nice to have" application, companies typically opted for and deployed devices with the more mission critical bar code scanning functionality. And as a result, the incorporation of digital cameras in enterprise mobile devices has been occasional at best – and the potential value of image capture in enterprise applications has remained primarily unexplored.

The new role of imagery in enterprise data collection

Today, the emergence of new technology capabilities is paving the way for the pervasive use of image capture in the enterprise. A key enabler for a new generation of image-based enterprise applications, image capture can be utilized to achieve further productivity, accountability and visibility improvements for workers out in the field. A picture truly is worth a thousand words — and in addition, in the enterprise environment, a picture can also protect the bottom line. For example, a detailed high-resolution photo can provide:

- Indisputable proof that a large screen TV or other expensive asset arrived at a customer's door in pristine condition
- Proof that a field service technician completed a repair
- Documentation of maintenance that is required for an asset
- Documentation of original condition to protect against or prevent insurance fraud
- An instant electronic record of a document, such as a bill of lading

When GPS technology meets the high resolution color camera, geostamping becomes a reality — the ability to append photographs with a time stamp as well as latitude and longitude data. Geostamping offers a new level of efficiency and accountability for field activities. The ability to augment photographs with GPS information provides organizations with undisputable confirmation that maintenance, service and inspection activities were performed at the right time and place — complete with a verifiable audit trail.

Technology enablers for imagery applications

The key technology advancements required to enable enterprise-grade image capture out in the field include:

Advanced camera technology
Until today, the available cameras in mobile devices were limited in resolution (typically under 2 megapixels) and offered only fixed focal ranges, significantly limiting the amount of detail that could be captured in a photo or document. Fixed focal length cameras are preset for long-range focus and lack the ability to capture detailed images on close-up shots, but today's new 2 megapixel autofocus cameras can capture details on images shot at close as well as far range. As a result, workers can easily capture the fine print on a full-sized document or the detailed damage to a piece of equipment, right from their mobile device.

Evolution of cellular networks
The emergence of 3G networks, including 3.5 GSM HSDPA and 3G CDMA-EVDO Rev A, provides robust bandwidth, significantly improving upstream and downstream transfer speeds. Equipped with a 3G-compatible device, mobile workers are now able to upload rich multimedia and larger data files right from the customer or inspection site to the office without the frustration and productivity loss associated with a slower connection. Additionally, the 3.5 GSM HSDPA network enables simultaneous voice and data services in the field, boosting productivity by enabling workers to download customer data while maintaining a voice call, or to place a call while sending a photo.

Improved displays
Technology advancements are bringing a new generation of better and brighter displays to mobile devices. The higher resolution of full VGA displays provides a better viewing experience for maps, websites and multimedia. And these enhanced displays bring added value to image capture applications, as workers can preview digital photos on their mobile device to verify image quality and content on the spot.

Embedded GPS technology
Integrating GPS technology into a mobile computer enables a multitude of real-time location based applications, from turn-by-turn directions for drivers to real-time fleet location for dispatchers. And the addition of GPS enables a new application known as geostamping — the ability to record when (the time) and where (the physical location — latitude and longitude) a photograph is taken. Advancing technology is bringing more sensitive and low-power GPS chipsets to mobile devices. Improved sensitivity and tracking capabilities ensure an expanded coverage for geostamping and other GPS applications, enabling the rapid and highly accurate capture of signals in some of the most challenging environments — including urban canyons and areas with dense foliage. Finally, enhanced power efficiency enables the use of GPS technology while helping to conserve battery power for a full shift.

Enhanced user ergonomics
Miniaturization of components, improved power management and advanced ergonomics are combining to power a new generation of devices that offer enterprise functionality and durability in a convenient, smaller form factor more typical of consumer-style devices. These sleeker devices replace the more traditional "brick style" business mobile computer, offering cutting-edge devices that are lightweight, compact, easy to carry, easy to hold and easy to use. And unlike consumer grade devices, these enterprise class devices are built to withstand the inevitable drops, spills and bumps, as well as all day use in the most demanding environmental conditions — extreme heat, cold, humidity, rain, snow and dust.

Ample file storage
Enterprise class mobile devices now come equipped with a user-accessible slot for an SD, miniSD, microSD or other external memory card. These memory cards expand storage capacity far beyond the limited onboard memory, allowing workers to easily store large images and files when they are out of WWAN/WLAN range, and also enabling the addition of new functionality for future business applications.

Imagery applications in the enterprise

High resolution image capture and geostamping open up a world of new possibilities where enterprises can improve productivity, accountability and the overall accuracy and quality of data capture for a wide range of workers in the field.

Transportation

Trucking
A mobile device with an integrated high resolution autofocus camera allows truckers to replace paper-based processes with electronic documentation — less time is spent on administration, and more time is available to make more stops. For example, a bill of lading (BOL) can be captured at the press of a button, eliminating the dependence on paper — along with the delays and longer cycle times inherent in manual paper-based procedures. Two megapixel resolution and autofocus technology of today's newer cameras ensure complete legibility of all text, including the very small print. With digital photos of bills of lading, back-office employees can quickly retrieve any BOL image in a few keystrokes, streamlining recordkeeping, reducing response times to customer requests and reducing billing and the cash-to-cash cycle time.

Parcel delivery
High resolution image capture enables new efficiencies in proof of delivery, proof of content

and proof of condition applications. Delivery drivers can take a high quality, location-based snapshot of packages, offering undisputable proof that a high-end asset was delivered without damage, a full shipment of produce was delivered to a convenience store and a box of electrical components arrived at the right office park on time.

When damage does occur in transit, drivers can file a delivery report complete with a close-up image of damage to a box or item — instead of spending valuable time trying to describe the condition on tedious paper forms. As a result, companies have a clearer understanding of damage to facilitate any corrective action — and photographic documentation can help mitigate customer disputes.

Field Service

Insurance agents
These new technology advancements in imaging give insurance agents the ability to take high quality photos of cars and other vehicles in the field. Agents can fully document vehicle damage after an accident, complete with a photograph, as well as record the original condition of a new or newly insured vehicle to help eliminate insurance fraud and false claims for damage that occurred prior to the coverage start date.

Utilities
By extending high resolution imagery to the field, inspectors can document the condition of assets in the field with a quick click of the camera. In seconds, field inspectors can provide a comprehensive record of damage to a pipeline, telephone pole or transmission system – complete with detailed close-ups and precise time and location data. And a second photo post-repair documents the completion of the repair and the return of the asset to working condition. These 'before and after images', complete with a geostamp that includes time and location, helps utilities better manage the field workforce, ensure timely completion of maintenance and provide the audit trail often needed to meet regulatory requirements for service levels and safety.

Government

Inspections
Fire, health and other safety inspectors are now able to capture images of non-compliant areas – such as a faulty sprinkler in an office, fire extinguisher that has expired, unsanitary conditions in the kitchen or food packaging plant and potential hazards at a water treatment facility. Citations can be issued at the press of a button, complete with unquestionable photo evidence as well as a time and location stamp. Productivity increases by eliminating the manual paper-laden procedures, and the detailed, high resolution photo of a non-compliant area helps minimize disputes with constituents by providing unarguable proof of condition. Inspectors can capture a second photo upon return to document the resolution of the issue. Before and after photographs complete with detailed time stamps document the entire incident and help ensure that violations are properly addressed within timing requirements. The end result - cycle times for correction of non-compliant violations can be reduced, improving safety of workers as well as the general public.

eTicketing
Mobile computers, equipped with bar code scanning and an eCitation application have significantly improved productivity, accuracy and efficiency of the citation process, as law enforcement officers can automatically enter information with a quick scan of a driver's license and quick drop-down menus. And a real-time wireless connection immediately transfers the data to the appropriate databases for instant processing.

Now the addition of a high-resolution camera further enhances the citation process, as police officers can easily document parking violations as well as accident reports. A photograph with a geostamp can provide indisputable proof that a car was parked in the red zone at a specific time — as well as provide comprehensive documentation of vehicle damage for Motor Vehicle Accident (MVA) reports.

First response
A mobile computer equipped with bar code scanning and high resolution image capture capabilities enables first responders to rapidly and accurately take inventory of assets, victims, evacuees and responding personnel. Rescue workers can electronically record, photograph and tag all evacuees onsite; and data can be wirelessly uploaded to a centralized system to help speed the identification and processing of disaster victims. Site security can also be improved. Site managers can issue all responding personnel incident-specific ID badges, complete with a picture, site permissions and a bar code to enable easy and highly accurate electronic tracking throughout the duration of the incident.

Asset management
The ability to read bar codes and capture images gives federal, state, city and municipal government workers the tools they need to streamline the inventory process, ensuring timely asset inspection and maintenance for a wide range of assets — including office equipment, road signs, streetlights, vehicle fleets and heavy equipment in public works facilities. A detailed photo can indisputably document the condition of an asset, while GPS-enabled geostamps capture the asset's exact location. Field workers can instantly transmit an electronic inventory form, along with necessary photo files, right from the asset's location to the back-end system — all without any manual intervention or cumbersome data entry.

Enabling future image-based applications

The high resolution camera in today's advanced mobile computers gives government agencies and enterprise organizations a future-proof platform for tomorrow's image-based applications. For instance, an integrated high resolution color camera is ready to support facial recognition and biometric fingerprint-based applications to help combat fraud and security threats. And the ability to view high resolution video from a security or other onsite camera provides increased situational awareness for security personnel and first responders, improving worker safety and providing better data to support better action plans.

Today's new generation of enterprise mobility applications

The powerful combination of a high resolution autofocus color camera, integrated GPS and 3G bandwidth is driving a new generation of enterprise mobility applications that leverage the power of the photograph. Photographic evidence and accompanying geostamps are improving the efficiency and effectiveness of mobile workers involved in field service, delivery, inspections and maintenance, first response and more — as well as the storehouse of enterprise data. With a photograph in hand for proof of condition, proof of delivery, asset management, compliance and more, enterprises are positioned to increase worker productivity and data accuracy while reducing customer disputes as well as cycle times throughout business processes.

For more information

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About Motorola Enterprise Mobility Solutions

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 business in nearly every major industry. Every day, businesses of all sizes all over the world count on Motorola enterprise mobility solutions to maximize employee effectiveness, improve customer service and increase supply chain efficiency.

Our broad technology portfolio and world-class partnerships enable us to offer true end-to-end solutions that 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; business-class smartphones; rugged two-way radios for always on voice communications; private wide area and local area wireless network infrastructure to deliver wireless connectivity to workers inside and outside the four walls — and to network multiple business locations; a partner channel delivering best-in class applications; software products for central 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 mobile automation system solution running at peak performance every day of the year.

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