

Postal Operations:

Achieve productivity gains with bar code scanning & mobile computing

Honeywell Scanning & Mobility

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Postal Operations Overview

Mail, packet and parcel delivery by large public and private operators has been a trusted service to both consumer and business customers for many decades.

Over the years, public postal operators have employed technology to support the universal service obligation (USO) regulated by the Universal Postal Union (UPU), a United Nations body, obliging each state-owned operator to ensure that every citizen enjoys the same level of postal service, regardless of geography.

Private postal operators have also employed similar technologies to be able to compete with state-owned service providers, without the restriction of the USO. This freedom enables private operators to be more selective regarding the geographies where they operate and compete.

According to 2010 data from the UPU, public postal services—some of the most trusted brands in the world—handle roughly 370 billion domestic mail pieces each year. Additionally, research from Copenhagen Economics suggests that about 88% of postal income in Europe is from business mail. As such, public postal providers are able to exploit low cost delivery networks and score very highly on arguably the two most important business criteria – reliability and accountability.

The Changing Face of Post

In recent years, declining mail volumes—due to the increasing use of e-substitutes, and market liberalisation—have had a dramatic effect, forcing postal operators to review all elements of their business.

In many cases, this decline has led to mergers amongst postal operators hoping to realise greater economies of scale. Additionally, many postal operators have acquired logistics and parcel businesses to exploit explosive B2B and B2C parcel growth, as online commerce continues to replace traditional retailing. Driving down costs to maintain efficiencies in this scenario of declining revenues and increasing competition, and providing new value added services to loyal customers, is the paradigm that is forcing greater technology investment.

Postal operators rely on large workforces in the community, in the post office and in the back office. Unions and worker councils are core to the operation of posts and represent their members to postal operators' executive management.

In 2010, the world's public posts employed about 5.5 million full and part-time workers, with 1.5 million postal employees in Europe alone, according to UPU figures. With so many mobile workers operating in diverse communities, in varied weather conditions and at all times of the day, one of the key worker council discussion points is worker safety and security.

Duty of care to a remote workforce is not only an ethical responsibility of management and workers unions alike, but also a legal obligation in many countries. Wherever possible, technology providers must offer a platform that allows remote workers to feel they have adequate communication and back up, if an unfortunate event occurs. This type of platform also mitigates the risks of legal proceedings for employers, if such an event occurs.

Identifying suspect packages in the mail and parcel end-to-end process has unfortunately also become a priority, not just for the workers handling the items, but also for the unaware recipient. Technology plays a key part in package identification, whether suspect or otherwise, and for subsequent process traceability to determine from where the item may have been sent. This may require deep detective work due to the sheer volume of items processed daily throughout the world, but without the raw data captured at source, this would be a near impossible task.

What Does the Future Hold?

An example of postal operators adapting to meet the new digital paradigm can be seen as they leverage increased online activity and link it to physical mail. Postal operators are essentially trusted public communications enterprises, so migration to digital services and exploiting new innovations, such as social media, must become integral to the business, not just a separate revenue stream. One such service is known as hybrid mail, where the recipient will receive physical mail that has been created electronically. Many postal operators now offer a variety of hybrid mail services to its customers.

Consumers have increasingly experienced delivery excellence from many operators, and now expect optional delivery methods, rather than being obliged to accept one level of service. This presents opportunities for postal operators to leverage their trusted brands and invest in new premium, revenue generating services.

Consistent service levels, to ensure repeat business and customer loyalty, can only be delivered if the right technology is the foundation. An example is the prevalence of parcel lockers or drop boxes, which are becoming increasingly popular for unattended deliveries, as opposed to carded deliveries that require a collection trip to a post office depot for example.

Equally, this can be extended to consider augmented reality and context awareness, so that postal operators can conceive of delivering items to a person's current location, rather than their home. A good example may be the delivery of medicines to a customer.

Sustainability and social responsibility are also key investment drivers. With millions of postal workers delivering items in a variety of vehicles, whether they be large trunking vehicles between sortation hubs or small vans on local delivery routes, the consumption of fuel is a huge cost burden. This factor, coupled with the need to promote carbon friendly policies for an increasingly environmentally aware customer base, is forcing postal executives to invest heavily in carbon reduction policies. Increasingly, electric-, gas- and hybrid-powered vehicles, in some cases using bio fuels, are being deployed by forward thinking operators. This is to be commended; however, it will be some years before carbon-based fuels are reduced to minimal levels or even eliminated. Technology providers must work closely with postal operators to ensure that solutions delivering the value added service required by customers are not outweighed by increased delivery costs and pollution.

Essential Technologies Supporting the End-to-End Postal Process

A critical success factor in reliable postal delivery is the ability to accurately track and trace items from first to last mile. This data must be made available to all stakeholders, who must have confidence that it is reliable and consistent, throughout the process. On this basis, best practice and efficiency gains can be highlighted and new value added services conceived and implemented.

Bar code scanning and mobile technology play a key role in driving data acquisition, worker communication and operational reporting. The following section will explore each key postal process area and the application of scanning and mobility technology, which is essential for delivery excellence:

1. First mile collection

Post box, parcel locker, post office and doorstep collections all require fast and reliable bar code scanning. Mobile devices used by postal workers must be capable of scanning 1D and 2D bar codes at any angle, including damaged bar codes. This capability speeds up data capture, avoids delays in the collection process and ensures that postal workers do not suffer strain and fatigue in trying multiple angles to scan a bar code.

This must also be the case for scanning engines used by parcel locker manufacturers. For the optimal customer experience, the individual collecting a parcel from a locker, just like a customer at a self-service retail checkout lane, expects the bar code to be decoded instantly, whether on a piece of paper or the screen of a mobile device. With so many exterior parcel lockers deployed, no customer wishes to be standing in inclement weather any longer than necessary. This is true of postal workers also, who spend much of their time outside in varying and inhospitable conditions.

2D bar codes are fast becoming the standard in mail and parcel operations, as they can store more data and be decoded very quickly in one scan button depression. However, for hand written address labels on collections, another technology is required.

Optical character recognition, or OCR, has been used in the automation of mail sorting for some years; however, it is only in recent years that domain experts have engineered this technology to be available on mobile devices. Leaders in mobile technology must partner with OCR specialists to ensure a complete customer solution, so that ad-hoc collection labels, both hand written and printed, can be captured in nearly the same amount of time as a bar code scan. Additionally, OCR technology can be used to verify that the address and post code on a package are valid. This will ensure that any erroneous data is captured at the earliest point in the delivery cycle and dealt with before a cascading error leads to delivery failure and additional cost.

This is also true of volumetrics or package dimensioning. Many shippers price by weight, as it is one of the only measureable criteria by which to charge. However, shipment is largely defined by volume. In many cases, volume will be estimated by a customer and on collection is found to be inaccurate. Some operators may charge for the inaccuracy, others may absorb the cost. In either case, fast and accurate dimensioning will reduce the instances of inaccurate volume recording and provide more efficient shipment data, and therefore charging. Fast and accurate

volume scanning at post offices and parcel shops will also increase shipment price accuracy. Image capture and sensor technologies have the ability to record dimensions and overlay them on colour images, and export the data to the appropriate systems. Best-in-class mobile computing providers will have this technology deployment in their solution roadmaps.

Vehicle loading of mail bags, packets, parcels, totes and roll cages must be as efficient as possible. Imaging technology allows the reading of bar codes on any of these items or containers in any orientation or direction, with one button depression. This has a significant operational impact when loading vehicles with consignments, as first time accurate scanning can save critical minutes. A high level of accuracy ensures drivers are on the road earlier and therefore delivering more items per day.

2. On the Road

Mobile devices are critical to delivery operators. These tools record collections and deliveries, communicate with the back office and customers, and can even be used to monitor driver performance. These demanding and critical use cases require exceptional battery life and performance. Operators should have the choice of deciding whether to invest in vehicle cradles, for stable mounting and viewing, and not be forced into that decision, because device batteries will not operate for an entire shift. Of course, procedures must be in place to ensure devices are fully charged before the operational day begins.

Reliable communications are essential for mobile operator excellence. For example, immediate task allocation and timely service level agreement (SLA) failure alerts allow mobile workers to proactively notify customers when unforeseen events occur. When operators are delivering optimum service levels, technology providers must ensure that seamless roaming is available through use of software-definable radios and dual SIM cards for carrier choice. This is particularly evident where vehicles are crossing borders, and coverage or air time costs can be inhibitors to service delivery.

Additionally, convergence with fleet telematics systems must be considered to ensure economies of scale when investing in separate vehicle and mobile computing systems, such as wireless communications and GPS. Integral to a successful mail delivery operation, vehicle and driver performance metrics can be used to initiate improvement and cost reduction programs. Therefore, mobile computers must have the underlying technology required to integrate with in-vehicle systems.

3. Sortation

Postal facilities encounter a number of difficulties in efficiently identifying and sorting items using the postal bar code found on each item. Because of the small size of a typical postal bar code and the low-resolution printers used to create them, postal codes can be one of the most difficult types of codes to find and decode in real world environments. Postal codes are also often damaged or covered by plastic due to the rough handling they have to endure. Both can cause major problems for the high-speed decoding systems used to scan them.

Higher read rates are extremely important to postal applications and slight increases can greatly reduce a facility's costs associated with finding, reading and sorting letters, packets, flats and parcels. If the codes cannot be read first time, then optical character recognition (OCR) and eventually manual sorting must be performed to get the item to its proper location. Higher read rates greatly reduce the quantity of items that have to be sorted using these costly methods.

The technology employed by automated sortation machinery providers must therefore aggressively decode virtually all 1D, 2D and postal bar codes on the first read. Additionally, the scanning engines employed to ensure postal operator service levels can be met must be able to decode poorly printed, damaged or obscured by plastic 1D and 2D bar codes travelling on conveyor belts at speeds in excess of 600 ft/min (3.05 m/s).

Tracking of mail bags, totes and roll cages also requires fast and reliable tag and label scanning to

ensure nested items are recorded accurately, and avoid cascading errors as mail, flats, packets and parcels move through the end-to-end chain.

4. Post Office Counters

Bar code technology has been used extensively in the retail environment for many years. Retailers could in fact be identified as the pioneers of item-level tracking, and subsequently using this item, and now customer data from loyalty schemes, to provide a better customer experience.

Post offices are now providing value added services such as insurance and financial products, foreign currency, mobile phone services (in some countries), and even travel planning assistance. Customers now expect a multi-channel retail experience in what is increasingly becoming a click and collect culture. A successful deployment of these new revenue-generating services must be balanced with reduced transaction times, adequate counter staff workload, and line-busting technologies in major post office outlets.

In many large outlets, self-service kiosks are being successfully deployed, and just as with parcel lockers and automated sortation, the embedded bar code scanning engines must be fast and reliable to provide the best customer experience.

An underlying technology to deliver these services is the 2D bar code. Post office counters are no different than major retail stores, where the migration from 1D to 2D codes is well underway. 2D codes allow more information to be stored than in traditional linear bar codes, resulting in shorter customer transactions and the opportunity to provide new services.

Postal operators must be prepared to accept 2D stamps, Quick Response (QR) codes and 2D tracking identifiers from third party shippers—which are all being widely adopted on a global basis. In fact, large operators are offering special discounts for any letters or flats that include 2D bar codes that can be read by consumer smart phones.

The use of smart phones by consumers to purchase items and receive 2D codes for both order confirmation, just like airport boarding passes, and marketing promotions, is quickly rising. Postal operators must have the capability at the counter to be able to scan these codes using fixed or hand-held bar code scanners that can reliably decode from a customer's smart phone. Equally, mobile devices must have the same capability, so that staff can deal with customers' enquiries where a counter line has developed. Anecdotally, customers are happier in a line if they know that a line-busting staff member is trying to assist them.

QR bar codes are already used in print advertising, allowing a consumer to scan items with their smart phone in order to access extra information. This might link them through to online content, special offers or competitions. Operators are now offering lower postage rates, as long as mailers display 2D bar codes either outside or within all mail pieces, using the bar codes to "market, promote or educate" mail recipients, rather than for internal tracking purposes.

With the wider adoption of 2D infrastructures, postal operators can consider customer loyalty programs, allowing post office retail customers to earn points for each item shipped that can be redeemed for merchandise or vouchers.

Area-imaging scanners are also widely used to scan 2D codes when parcels are collected at the post office, primarily to verify that it is being delivered to the correct individual.

Additionally, some operators use 2D codes for electronic forms filling, for example taxation and insurance forms. Many payment and financial documents contain 2D bar codes, some against every field entered on-line by a customer, which are scanned to automatically populate fields in financial transaction forms, leading to faster customer processing and increased satisfaction at the counter.

Some operators are also planning to add 2D bar codes to digital mail services, such as E-shops, hybrid mail, text messaging, e-coupons, and internet messaging.

The same imaging technology used for 2D code scanning can also be used to capture proof of delivery signatures from documentation submitted at the end of the day, and to scan postal/bank payment orders and ID cards. In this case, postal operators should ensure their technology provider can capture bar code data and images in one scan. This is particularly useful where sign-on screen is not legal tender and a paper document must be signed and electronically captured for proof of collection/delivery and payment. It is essential for smooth and efficient customer processing that the technology allows one scan to capture customer signature with automatic de-skewing, colour correcting, cropping and rotating of the image. Intelligent imaging logic can straighten the image and enhance the quality, regardless of the users' orientation of the scanning device.

5. Last mile

Last mile delivery is one of the key end-to-end components by which recipients and regulators judge the service quality of postal operators. Having conformed to the universal service obligation for many years, operators recognize that they can leverage their strong local brands to deliver additional value add services at the doorstep. These additional services help to counter declining mail revenues.

The predominant opportunity that mail operators and private companies have exploited is the significant rise in B2B, B2C and in some cases, C2C packet and parcel delivery, due to the explosion in e-commerce. In parallel with this growth, time-starved customers are increasingly prepared to pay for guaranteed time-definite services.

Mobile computing and bar code reading technologies are the platform for accurate first-time deliveries for operators. They also enable the valuable data captured to support the future optimisation of walk sequences, vehicle routing and marketing services through demographics and survey data.

GPS satellite navigation naturally enables parcel delivery drivers to utilise turn-by-turn navigation to reduce miles driven and fuel consumed, meeting cost and sustainability objectives. Additionally, GPS

location management can assist zonal pricing and delivery initiatives.

GPS and geographic information can also be employed to record specific locations where items can be delivered when the recipient is not present, or specific drop boxes. Coupled with colour imaging, the same technology employed at post office counters for document capture can be used to verify proof of condition/location imagery, without the network bandwidth overhead that photographs consume.

Additionally, geo-codes can easily be embedded in the image for location accuracy, minimizing delivery issues in geographies where addresses and post codes are not standard or even used at all. In the near future, with this technology deployed and proven, and coupled with situational awareness, it is anticipated that operators will be able to provide deliveries to the recipient's location rather than their home address. As stated earlier, this may be a special or premium service, for the delivery of medicines for example.

With so many postal workers on the road, voice communication is required, predominantly for exceptions, such as incidents, traffic alerts, ad hoc deliveries or collections, or even to assist a colleague – please refer to the 'Mobile worker duty of care' section.

Operators wish to keep cellular voice calls to a minimum, not only to avoid daily operational disruption but also to reduce cellular tariffs which can be very expensive, even with large corporate rates. Air time contracts for data are more economical and for this reason, as well as reducing wasted directory searches and dialling time, postal operators must consider push to talk solutions.

With one-to-one, or one-to-many options, fleet controllers and supervisors can immediately communicate with individuals or pre-assigned groups of workers at the press of a button from their desktop. Equally, mobile workers can speak to local colleagues or supervisors at the touch of one button on their mobile device. Whether over WWAN or Wi-Fi, this option provides more economical 'walkie-talkie'

functionality within the same mobile device used for task assignment, direction finding, location finding and electronic proof of delivery, without the cost of cellular voice tariffs.

Electronic proof of delivery by signature or document capture is essential for updating online track and trace systems, so that shippers and recipients can view their consignment status. Sign-on glass technologies must be rugged—how many times have you seen a mobile worker's device with pen marks and scratches on the screen—and visible regardless of weather conditions, from bright sunlight to dark and inclement conditions. If sign-on screen is not legal tender, then signed document capture must be swift and executed in one key depression, without the operator needing to move the device around in multiple angles to obtain the image. This means that postal operators must deploy imaging technology with automatic de-skewing, colour correcting, cropping and rotating of the image.

In many geographies, mobile postal workers will also be responsible for collecting customer payment at the doorstep. Snap-on card readers are a useful solution for accepting credit and debit cards, where chip and pin is not legally required. In those countries where chip and pin is utilised, a two-piece solution is generally favoured, for four clear reasons:

- First, a two-piece solution allows the operative to see the transaction on his mobile device screen whilst the customer uses the chip and pin pad, secreting their pin number. This avoids fraud and error, for example an operator may otherwise believe the customer has completed the transaction when they have not.
- Second, battery life on the mobile device is not diminished, particularly when mobile payment transactions may only be a small percentage of daily activity. In this case, there is no need to have the additional device present with the customer, it can stay in a vehicle or bag for example.
- Third, the cost of accreditation and certification of one-piece chip and pin devices is extremely expensive to technology providers, including both the initial investment and on-going certification. In

this case, it is more practical to use best-of-breed pin pad devices that are regularly updated with the latest technology and accredited for wider global retail operations, to ensure future proofing.

- Last, postal operators do not want to be locked in to one device provider with an integrated payment reader, as this means both estates need to be refreshed simultaneously in future. Also, with the advent of new electronic payment solutions such as near field communication (NFC), operators may continue to use their mobile device investment, whilst divesting the lower cost pin pad devices.

Mobile devices can also be used for customer surveys at the doorstep by creating and configuring survey-based screens within software providers' applications. Multiple question types, for example multi choice, free text entry or imagery, can be integrated into a specific customer relationship management (CRM) system or marketing activity. When triggered, the surveys will present a form to the postal worker or end customer to be completed. The data collected can be provided to postal operators' customers as a service offering or used for internal purposes to drive enhanced customer satisfaction or new service delivery. In some countries, this valuable data collected can be sold on to government agencies for demographic analysis, assuming compliance with privacy laws.

6. Mobile Worker Performance and Duty of Care

Large mobile workforces are a key feature of the postal landscape. Duty of care to those workers is not only an ethical corporate responsibility, coupled with worker council/union obligations, but also a risk mitigation policy in geographies where corporate manslaughter and homicide acts are in force. In these cases, 'man down' scenarios due to management negligence can result in severe penalties, including imprisonment for directors responsible and publicity orders, which impact morale and brand strength.

Instant communication options must be available on mobile computing platforms at relatively low cost. This allows postal operators to talk with one or many of their employees instantly, regardless of geographic location. Push to talk is instant, no delays in dialling

a number or leaving messages and waiting for a call back. It looks like and feels like instant messaging. If a user has a green icon next to their name, this means that they are available to talk. Push to locate displays employees locations from a control room desktop and allows communication at the press of a button. Push to alert is a panic button, which if pressed, alerts the control room of a man down situation. In this scenario, a siren will sound at the supervisor's desktop and a one-way voice channel is opened to start recording the call for situation diagnosis. All voice and data communication will be automatically recorded, which could be used as evidence at a later time.

Having located the postal worker through push to locate, the control room can then decide on the necessary response. In some cases, the supervisor may not be able to speak directly to the worker, so the ability must be provided to contact individuals from either an internal or external emergency response centre. At all times, both voice and mapping information can be recorded and stored locally on servers.

Worker communications can also add to a positive user experience and mitigate risk in the event of unfortunate situations. Instant communications can be used for broadcasting news and traffic updates, perhaps union or worker council information at the start or end of the day.

Ergonomically designed, durable scanners and mobile computers are also a need for postal workers. Wrist posture and scan angles, with scan buttons strategically positioned for comfort, are essential for large workforces to feel at ease with the tools of their job. Technology providers must seek to reduce operator fatigue, provide easy scanning without wrist twisting and also a good angle of viewing on a bright display, which must be easily readable in either bright sunlight or in darkness.

Latest mobile technologies also include sensors that record the daily operation of the device for 'in-field' intelligence. Examples are log on/off times, quantity of bar code scans, wireless connectivity, or even harsh vehicle acceleration or braking via accelerometer

feeds. In each case, postal operators can use this data for best practice education to ensure a motivated workforce. If a wider user community issue is detected, online training materials can be broadcast to all remote workers, directly to their mobile device. It is a widely held theory that a workforce with high morale is more efficient and productive.

7. Remote Management of All Mobile and Scanning Devices from a Central Location

Postal operators have mobile devices and bar code scanners that are widely dispersed, whether on the road, in sorting centres, depots or in retail outlets. In this case, a remote device management solution can help to significantly reduce the total cost of ownership of the mobile and scanning estate.

When such large equipment estates are deployed, it is difficult to keep software up-to-date, ensure proper configurations, and monitor vital performance indicators. A remote device management solution can solve this problem by performing key functions, such as asset tracking, software distribution, configuration management, remote diagnostics, and performance measurement, all from a single, remote location. As noted in the 'Worker performance' section, more sophisticated remote device management solutions can even provide additional data on device usage, including bar codes scanned, drops and key presses, allowing postal operators to easily identify areas of improvement.

Summary

A key element in delivering postal end-to-end excellence and value added service differentiation is the integration of new processes, hardware, software, IT services, project management, education, and user acceptance, together with reliable on-going service and maintenance.

Honeywell Scanning & Mobility is an industry-leading provider of data capture solutions. Together with its partners, Honeywell Scanning & Mobility provides fit for purpose postal solutions to a prestigious global customer base.

Honeywell is a Fortune 100 company that invents and manufactures technologies to address tough challenges linked to global macro trends such as productivity, safety, security, and energy. With approximately 122,000 employees worldwide, including more than 19,000 engineers and scientists, we have an unrelenting focus on quality, delivery, value, and technology in everything we make and do.

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