

DIGITAL PEN SOLUTIONS

**A Fresh Perspective on Automation of
paper based processes using Digital
Pen & Paper technology (DP&P),
Mobile Phones and GIS**

16 April 2007

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Outline



- ✓ Background
- ✓ What you will learn
- ✓ About Technology
 - ✓ How it works?
 - ✓ The pen
 - ✓ The form
 - ✓ The Mobile & Router
 - ✓ The server
 - ✓ Text/handwriting Recognition
 - ✓ The editor and form viewer
 - ✓ The process
- ✓ Technology & Benefits
- ✓ Case Studies
- ✓ Questions
- ✓ Demonstration and live testing



Background



- ✓ This piece explores the potential of the new Digital Pen & Paper (DP&P) and how it can bring IT transformation to previous paper based processes and increase efficiency and turn around time.
- ✓ Introduce the technology to new users
- ✓ Those in the know - Show new advances and innovative uses
- ✓ Most importantly! – Will show that the use has to no boundaries and possibilities are endless.



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What you will learn?



- ✓ The benefits for an organization by using DP&P technology
- ✓ Technical insight on DP&P technology
- ✓ Communication methods
- ✓ New advances:
 - ✓ GPS location
 - ✓ Geo-referenced sketches
 - ✓ Photo transfer
 - ✓ SMS
 - ✓ Barcodes
- ✓ Visualizing and analyzing the collected data
 - ✓ BI tools
 - ✓ Workflow tools
 - ✓ Spatial analysis and representation



How it works?



- ✓ Digital Pen technology is a groundbreaking tool for collecting information and relaying it electronically to back-office systems within seconds using mobile phone or internet technology.
- ✓ Easy to use, the Digital Pen functions like a normal pen however it has the functionality to transmit data from remote locations via Bluetooth, GPRS, the internet as well as translate and assimilate it into existing systems seamlessly.



The Pen



- ✓ The digital pen uses ink and handles just like a normal ballpoint pen, but it also contains a digital camera, an advanced image processing system and a communication unit, for example for wireless Bluetooth connection to a mobile phone.



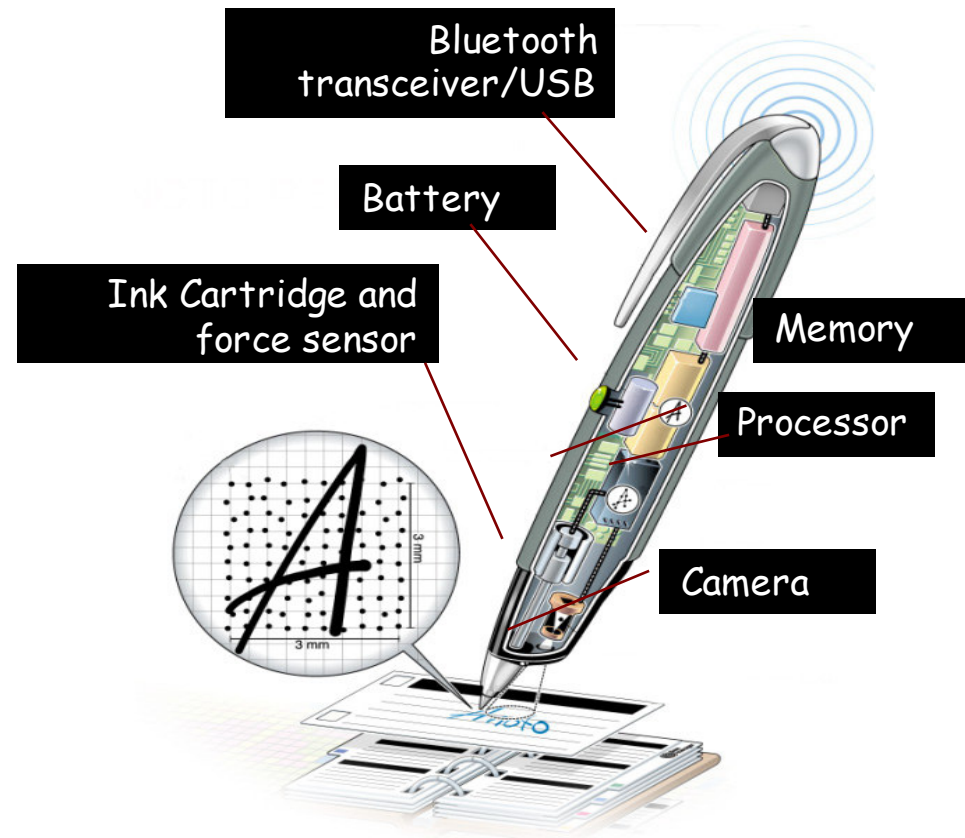
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The Pen



- ✓ A normal ink cartridge
- ✓ An infrared camera
- ✓ Processor
- ✓ Operating System
- ✓ 1.3 megs of Memory – (stores approx 40 A4 pages or approximately 80 A5 pages)
- ✓ 128bt Encrypted
- ✓ Battery
- ✓ Bluetooth transceiver



The Pen



- ✓ When using a digital pen, a tiny camera in the pen registers the pen's movement across the grid surface on the paper and stores it as series of map coordinates. These coordinates correspond to the exact location of the page you're writing on.
- ✓ How does it register the coordinates?



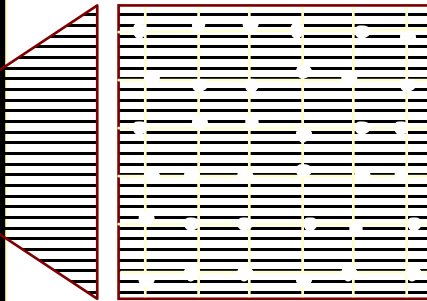
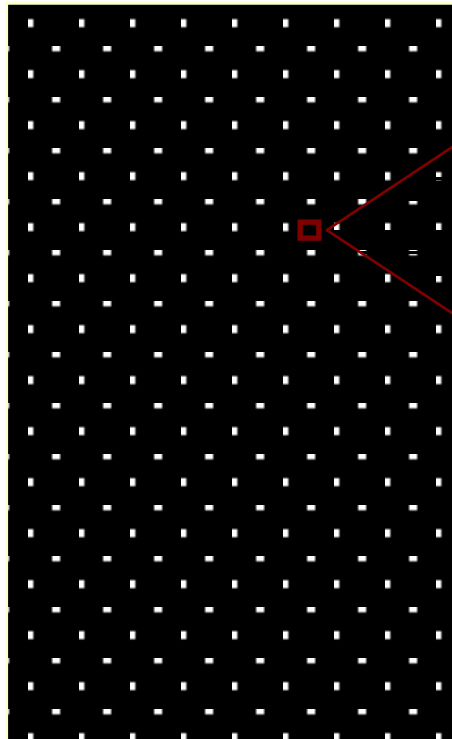
The Pen



- ✓ The paper consists of an ordinary paper of any size provided with a dot pattern, invisible to the eye that is either pre-printed or printed on a laser printer.
- ✓ The displacement of the dots, 0.1 millimeters in size, from the relative position enables them to be programmed to tell the pen the exact location on the page

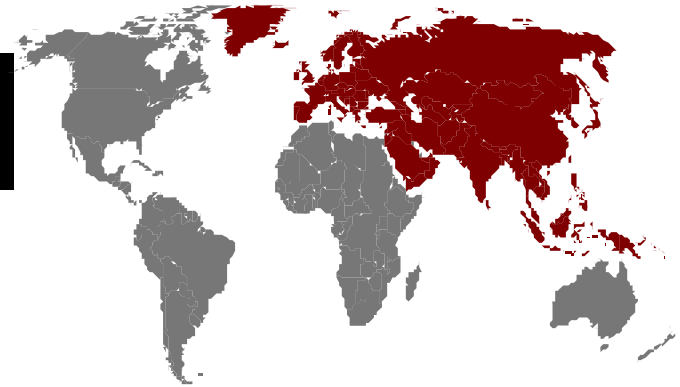


The Paper



1.8 mm

1.8 mm



- ✓ Small dots printed on an invisible grid
- ✓ Visually a slight grey tone on the paper
- ✓ Pen highlights the pixels when writing
- ✓ The pixels have an addressing system from Anoto



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The Form



**GENERAL VALUATION DATA COLLECTION FORM
SINGLE RESIDENTIAL PROPERTY**

[Scan barcode](#)

Collection Type Data Collection Sales review Valuation review Investigation

1 Sales Information

1.1 Sale Price: 1.2 Sale date: 1.3 Sale Validity: Improved Vacant Unusable

2 Property use

2.1 Residential Commercial Industrial Flats Vacant Other:

2.2 Zoning: 2.3 Use code:

3 Land

3.1 View: Sea Partial sea Panoramic Surrounds Industrial Commercial Internal settlements

3.2 Security: High Medium Low None

3.3 External noise: Freeway Major road Side street Cul de sac Entertainment

3.4 Topography: Level Average slope Steep

4 Residence

4.1 Quality: Excellent Good Average Fair Poor

4.2 Condition: Excellent Good Average Fair Poor

4.3 Exterior walls: Brick/glass Face brick Concrete block Stone Timber Iron clad

4.4 No. of bedrooms: More than 5

4.5 No. of Living rooms: More than 5

4.6 No. of Bathrooms: More than 4

4.7 No. of Storeys: More than 3

4.8 No. of Houses: More than 3

4.9 Total living area: 1. m² 2. m² 3. m²

4.10 Year built:

4.11 Unfinished building: Yes

5 Yard items

5.1 Garage: m² 5.2 Carport: m² 5.3 Granny flat: m²

5.4 Servants quarters: m² 5.5 No. of sheds: 5.6 Pool: Yes

6 Access

6.1 Access codes: Full External only No access Entrance Owner

6.2 Contact person: 6.3 Contact no.:

6.4 Value: 6.5 Est. MV: 6.6 Date:

7 Remarks

Yes

8 Postal address

Town:

Code:

9 Photos

Yes

Sending a Form



- ✓ To send the form 'Mark' the SEND box with your digital pen, the pen is instructed to send the stored sequence of map coordinates, which are translated into an image that will result in an exact copy of your handwriting displayed on any computer or mobile phone.
- ✓ Since you are writing with a normal ink pen – YOU STILL HAVE THE HARD COPY



- ✓ Docking Station (network/local) – internet
- ✓ Bluetooth Access point – network/internet
- ✓ Mobile phone – bluetooth/GPRS/internet



The Mobile and Router



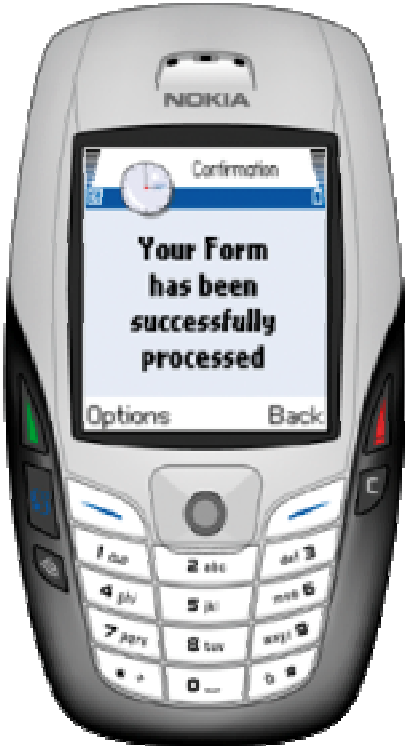
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Mobile Checks



**Job completion
confirmation**



All in 10 seconds.

“The wholesale re-engineering of pen & paper”



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- ✓ Software Development KIT
- ✓ Vision Objects
- ✓ Hand Writing Recognition Software (HWR)
- ✓ Pen Lookup service
- ✓ Database
- ✓ Rules and response tools
- ✓ SMS Push technology
- ✓ Viewer & Editors
- ✓ BI and Reporting tools





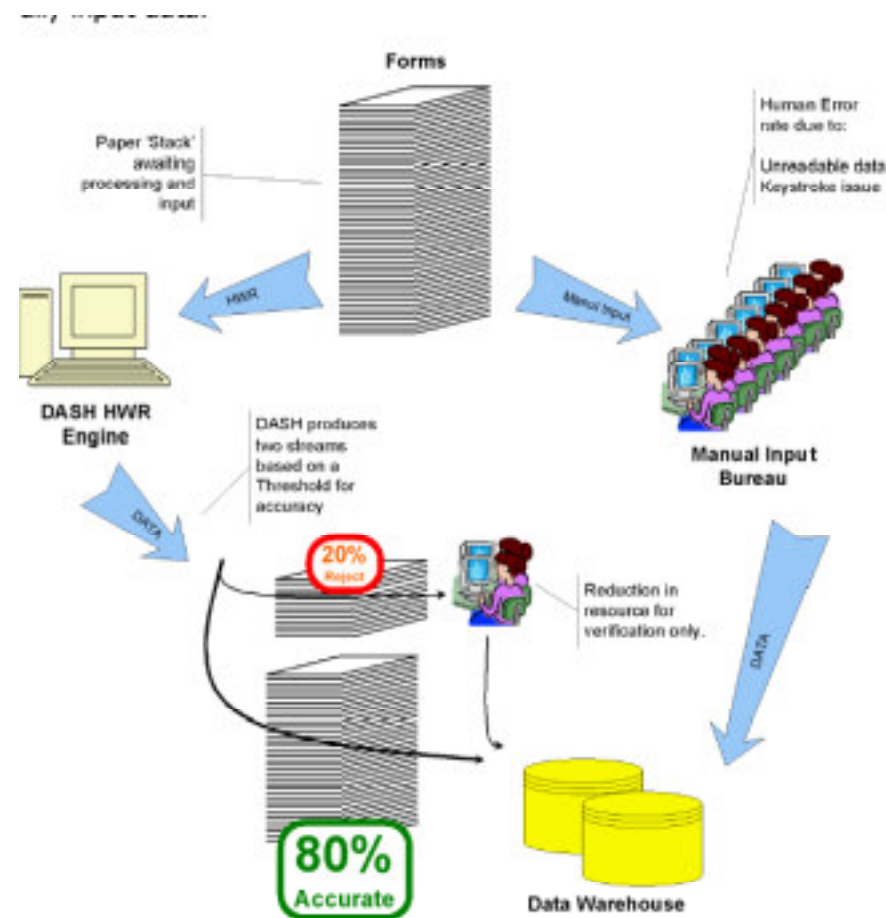
- ☐ Convert hand written forms to text
- ☐ Hand Writing Recognition Software (HWR)
- ☐ Tick Boxes & Images (signatures & drawings)
- ☐ By registering the pen's movement across the paper, and also the pressure, the writing is interpreted and digitalized. Hence the technology is not based on characters having to be written in a special way, in contrast to various other applications such as hand-held computers. Even drawn sketches can be interpreted and transferred.



Hand Writing Character Recognition (HRC)



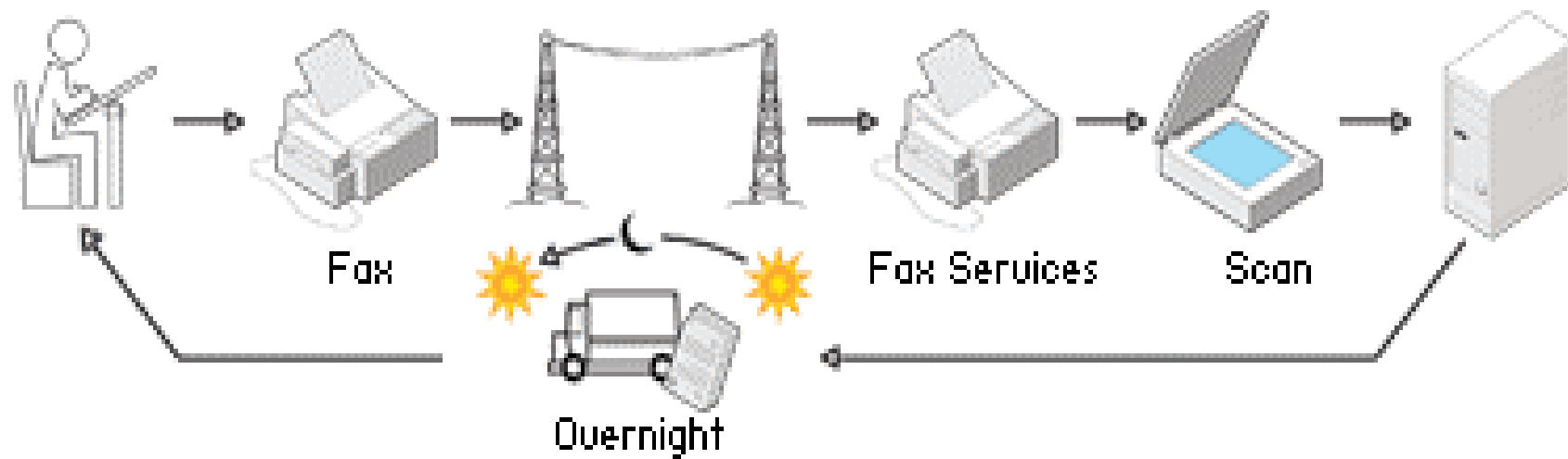
- ✓ Accuracy improved by using lexicons
 - ✓ User names
 - ✓ Place names
 - ✓ Street names
- ✓ Automatic Data verification
 - ✓ ID Numbers
 - ✓ Fieldworker Names
- ✓ Coded Forms reduce error



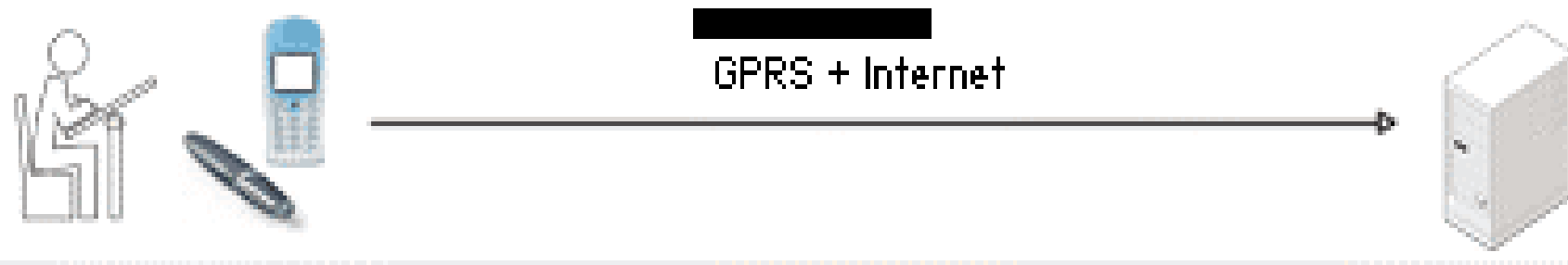
Recap Process



Before



Now

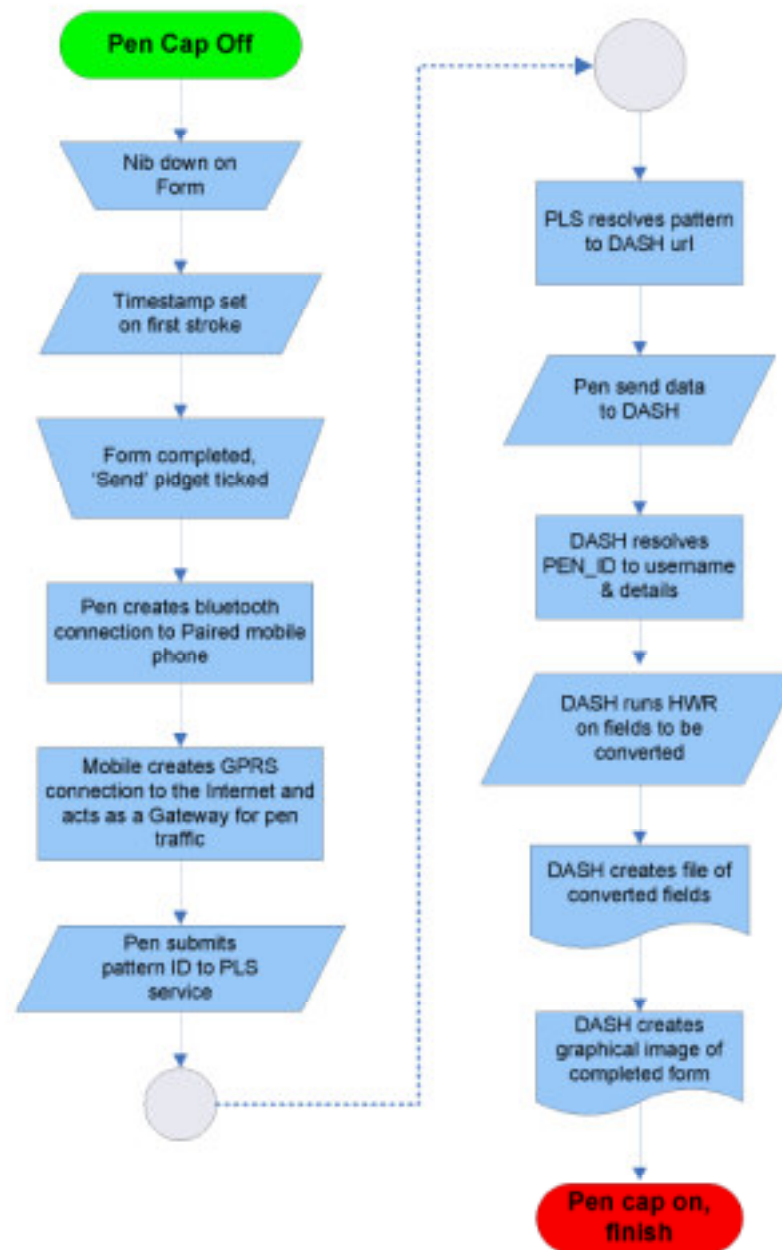


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Transaction Detail

- ✓ Pen reads form and stores image on memory
- ✓ Pen connects to Mobile using bluetooth
- ✓ Pen and Mobile are pre-paired (passcode)
- ✓ User tickets submit and info is sent to mobile
- ✓ Mobile has a router that sends info via GPRS to internet (Data World Server)
- ✓ Info arrives on server and undergoes text recognition and is inserted into a database
- ✓ Data World server send mobile a message confirming the receipt of data.
- ✓ Data editors use online application to edit and verify data.



on your back office system in seconds



Convertible to the following formats;

XML
CSV
Text Files
SOAP
SVG

(Pen strokes are converted into ASCII characters)

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Forms Management (FM)



- ☐ Web Based
- ☐ Form Flow Management
- ☐ Status (Validation & Authorisation)
- ☐ Review (Editing)
- ☐ Replay (Compliance & Training)
- ☐ Squawk (Communication Portal)
- ☐ Reporting
- ☐ Control (Hierarchical set-up)
- ☐ Customisable



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Category: New Forms

April 2007						
S	M	T	W	T	F	S
25	26	27	28	29	30	31
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	1	2	3	4	5

Date:

Form No.:

Apply Filters

Reset

FORMS

Date: 16 Apr 2007

Page(s) : 1

Name	ID/Passport #	View	Data	Rev	Del	Exp
NIRODE BRAMDAS	67125175086					
LAVEN						
STEVEN TAIT	7101285103080					

Page(s) : 1

Start

Scan

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Business Contact Manager

Update

Reset

PERSONAL DETAILS

First Name: STEVEN

Surname: TAIT

Identity Passport No: 7101285103080

Country: SA

Designation: HEAD SURVEY TECHNOLOGY

Company: ESKOM

Business Sector: UTILITY

Date of Birth: 19710128

Gender: Male Female

Preferred Language: English Other

Attach Photo:

CONTACT DETAILS

Telephone (H): 27 27 31 31

Mobile: 7495338

Physical Address: 27 27 82 82

Postal Address: 7495338

Code: 0

E-Mail: 37248872428

Code: 0

E-Mail Type: Work Home

Preferred Measure of Communication: E-Mail Post

(W): 0+ 0

Fax: 0+ 0

Postal Address: _____

Code: 0

Code: 0

Pen Style Settings >> Red Blue Yellow Green 2.1mm 0.5mm

DRAWING AREA



Technology Value Added



- ✓ Scanning barcodes
- ✓ GPS
- ✓ Sketch to GIS
- ✓ Mobile verification
- ✓ Taking photographs
- ✓ Automated Sms responses/verification
- ✓ Automated call backs
- ✓ Advanced Lexicons
- ✓ Hand Writing Recognition Software (HWR)
- ✓ Data streaming – email, sms, xml, spreadsheet
- ✓ Existing System integration
- ✓ Data Mining and Business Intelligence



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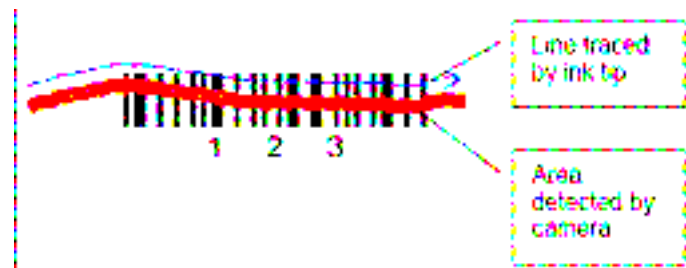
- ✓ The digital pen communicates using end-to-end cryptography. A message written with the pen is encrypted within the pen before transmission. The message remains secret from the very moment it leaves the pen. It uses 128-bit symmetric key encryption



Barcode Scanning

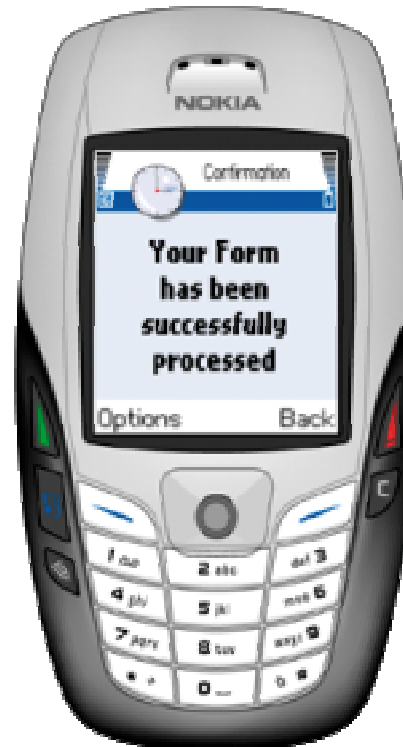


- ✓ The pen must be held in a specific angle when scanning a barcode
- ✓ The barcode must be scanned with normal hand movement avoiding extremely high or low speeds





**Job completion
confirmation**



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- ✓ GPS capture – Bluetooth GPS device
- ✓ Geo-referenced sketches
- ✓ Photo transfer
- ✓ Digitizing



Case Studies



- ✓ Property Info Systems & Valuation
- ✓ Stats SA – Listing and surveys
- ✓ UN – FAO – Animal disease control
- ✓ Short Term insurance
- ✓ Medical Aid
- ✓ Hospitals & clinics
- ✓ Order Processing
- ✓ Banking



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6.2 Contact person 6.3 Contact no.

6.4 Value 6.5 Est MV 6.6 Date

Property information

Property no.	GIS key	Route no.	
Account no.	Related property ref	Extent	at 1
Property description			
Address			
Owner			

7 Remarks

8 Postal address

Town

Code

9 Photos

Yes

- ✓ Valuation Form completion - phones
- ✓ 550 Pens across 5 municipalities
- ✓ Verify pre-completed info supplied by municipality
- ✓ Photo of Property
- ✓ GPS coordinate – bluetooth GPS
- ✓ Geo-referenced Sketch
- ✓ SMS verification of all success or incomplete while still in the field



- ✓ Form completion - Phone
- ✓ 300 Pens – 3 Provinces to be chosen
- ✓ Verify pre-completed info supplied from previous surveys or census
- ✓ Photo of person interviewed
- ✓ GPS coordinate of dwelling or household – PDA built in GPS
- ✓ Geo-referenced Sketch of dwelling
- ✓ SMS verification of all success or incomplete while still in the field





- ✓ Form completion - Phone
- ✓ 80 Pens – 7 SADC countries chosen & as chosen technology by UN.
- ✓ Photo of diseased animal or environment
- ✓ GPS coordinate of crush pen or farm – bluetooth GPS
- ✓ Scan barcode on animal – animal info
- ✓ SMS verification of all success or incomplete while still in the field and lab results



Short Term Insurance (e.g. Liberty life)



- ✓ Form completion - Phone
- ✓ 15 Pens – 15 brokers nationally 6 forms (approx 7 pages).
- ✓ Photo of applicant
- ✓ Original Signed copy
- ✓ SMS of approval and/or reasons for rejection



- ✓ Form completion - Phone
- ✓ 30 Pens – 30 brokers nationally 2 forms (approx 10 pages).
- ✓ Photo of applicant
- ✓ Original Signed copy
- ✓ SMS of approval and/or reasons for rejection



- ✓ Form completion – Phone and access point
- ✓ 50 Pens – 3 hospitals 3 forms (approx 2-4 pages).
- ✓ Ward Round, patient chart & item usage
- ✓ Patient script
- ✓ Dispensing
- ✓ Workflow and nurse workload allocation
- ✓ Billing
- ✓ Original doctors writing
- ✓ SMS work allocation, medicine delivery, etc



Order Processing (e.g. Henkel adhesives & Unilever)



- ✓ Form completion – Phone
- ✓ 10 Pens each
- ✓ Take glue product & quantity order
- ✓ Immediate SMS verification of stock on hand and delivery date
- ✓ Sales reporting and manufacture planning
- ✓ Stock control
- ✓ Scanning of stock and order generation
- ✓ Stock on hand and delivery dates
- ✓ Automated Billing
- ✓ Clients signature



Benefits



- ✓ Digital secure image sent to head office within seconds.
- ✓ Reduce processing time
- ✓ Minimal training required
- ✓ Image decoded and converted to DATA and inserted into database – “no need to capture” – Hard “Legal” copy will still follow.
- ✓ Eliminates capture, QA and related errors
- ✓ Field checks, credit verification can be done while consultant still with client. Either on mobile or system
- ✓ Digital captured data can be instantaneously sent to multiple sources in multiple formats, including email as well as integrated into existing systems.
- ✓ Cheap and cost effective as most already have mobile phones, therefore only pens to be purchased.
- ✓ Once off setup and then transaction or monthly costs can be chosen.



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Benefits



- ✓ Business Intelligence – Instantaneous – value added – make better business decisions
- ✓ Competitive advantage
- ✓ Cost cutting in costs related to courier, scan, fax and copying involved in paper based processes
- ✓ Leave a copy behind. Source Paper trail is always available for validating the electronic information
- ✓ Mobile verification
- ✓ SMS notifications
- ✓ GPS Barcode and Photo capture
- ✓ Seamless integration with backend systems
- ✓ Reduce data flow cycles
- ✓ Very little training required to end users
- ✓ Secure data transfer
- Reduction in errors due to capture of data at source
- Accountability due to extensive Audit Trails



Questions?

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