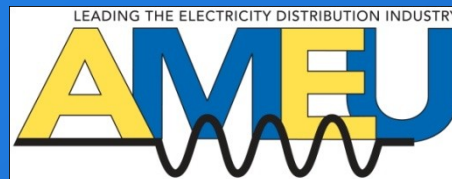


Mobile Solutions for Capturing Electrical Assets of Municipalities

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Overview

- Challenges facing municipalities
- What is actually required & what is the problem?
- Solution overview & walk through
- What are the outputs?
- What has been achieved?
- Job creation
- Summary

Challenges facing Municipalities

- Compiling **Asset Registers** for the purpose of **Asset Management** (NRS 093-1:2009, GRAP 17)
- Lack of up to date as-built technical drawings of all networks
- Ability to accurately simulate network performance
- Ensure public safety (OHS Act)

Municipalities have IT systems such as GIS, ERP, CRM, power simulation, financial systems, etc, *but*

- **they all lack extensive, detailed and accurate network data from HV through to LV**

What “data” is actually required?

- A full **audit of Asset & Customer data** (as per GRAP, NRS, etc):-
 - Precise geographical location (GPS coordinate)
 - Technical data (eg date of commission, type, classification, ratings, etc)
 - Present condition of equipment (level of impairment)
 - Network interconnectivity data (how each node connects to others)
- Data of peripheral assets that could affect network:-
 - servitudes, fencing, vegetation, terrain (roads, rivers,...)
 - structures (buildings, etc)

What is the problem?

- Data collection is an expensive exercise and is generally avoided.
- Data collected on an urgency basis is expensive
- High-end skilled resources are required to manage the volume and quality of data (paid on an attribute by attribute basis)
- Several pockets of data capturing done in isolation with duplication (unconsolidated work)
- End result: **only partial data is being captured at exorbitant costs**

Solution Overview

Hardware:



- Rugged mobile device with built-in GPS
- Supplied by authorised dealer for Sub-Saharan Africa
- Con: built-in camera is limited

D-CENT

Mobile Software Applications:



- Uses simple screen layout (technician level)
- Systematically prompt the user for comprehensive information (customisable)
- Documents the network interconnectivity
- Use external zoom camera for high quality images

Tfr# asgnd

MV# asgnd

Type **GPS**

Brand **42\42**

S/N

[kVA] MV Phase

PV[kV] SV[V] unsure

Tap LV Feeders

Service Kicker

Calculating Positions; 70%; 7.2m; 8; 0.1m

3:19

mer: 2

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Overview of the Workflow



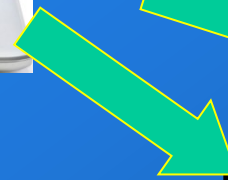
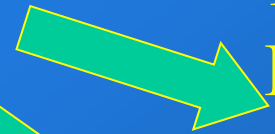
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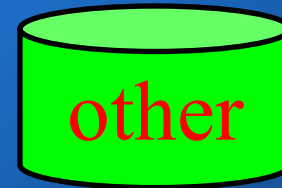
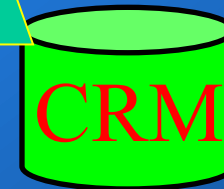
Images



Formatted
Data



Municipal
IT systems



- Compile Asset Registers with images
- Conduct Power Simulation studies
- Proceed with Asset Management strategy

- Asset Management enables municipalities to:-
 - Address maintenance issues with prioritisation
 - Identify root cause of recurring problems
 - Use all the data above to develop accurate business plans

Other outputs (Desktop)

- Generate as-built drawings to be used for:-
 - Archival (record storage)
 - Extension of existing networks, in-fills, etc
- Detailed report on the data collected for analysis
- Provide an environment for interactive analysis of network in detail (see example)



Check Sheet Data for Transformer: LMSR004

Latitude Longitude Date Time To

Transformer MV

- | | | | |
|-----|---|--------------|---------|
| 1. | Is the Installation height correct? | Correct | |
| 2. | What is the Transformer installation? | Out of line | |
| 3. | The Transformer condition - rust / oil leaks? | Good | |
| 4. | Is the transformer mounting brackets / platform in order - bolt through pole? | | Good |
| 5. | Tap changer position set? | 3 | |
| 6. | Is MV Jumper clearances in order / covered with pipe? | | Good |
| 7. | Is MV bushing connections in order? | Good | |
| 8. | What type of MV bushing? | porcelain | |
| 9. | Is LV bushing connections in order? | Good | |
| 10. | What type of connection to LV bushing? | ABC | |
| 11. | Is LV fuse unit in order? | Good | |
| 12. | Is distributor neutrals directly to bushing in a pipe? | Correct | |
| 13. | Is MV Surge arrestors in order? | Good | |
| 14. | Is MV Surge arrestor connected to the tank? | Correct | |
| 15. | Is LV surge arrestor connections correct && in order? | | Correct |
| 16. | Is MV Links in order? | Good | |
| 17. | MV Links Type? | Solid | |
| 18. | What is Conductor size from LV bushings to fuse unit? | | >35mm |
| 19. | What is the LV fuse unit rating? | 80A | |
| 20. | Is MV Earthing in order? | Good | |
| 21. | Is LV earthing in order? | Good | |
| 22. | What is MV / LV earthing method? | Separated 5m | |
| 23. | Is Earth connections in general in order? | Good | |
| 24. | Trfr Label installed? | Good | |
| 25. | Max fuse label installed? | Good | |
| 26. | LV feeder label installed? | Good | |
| 27. | Danger sign installed? | Good | |
| 28. | Anti climbing device installed - type? | Good | |
| 29. | Fault Comments | none | |

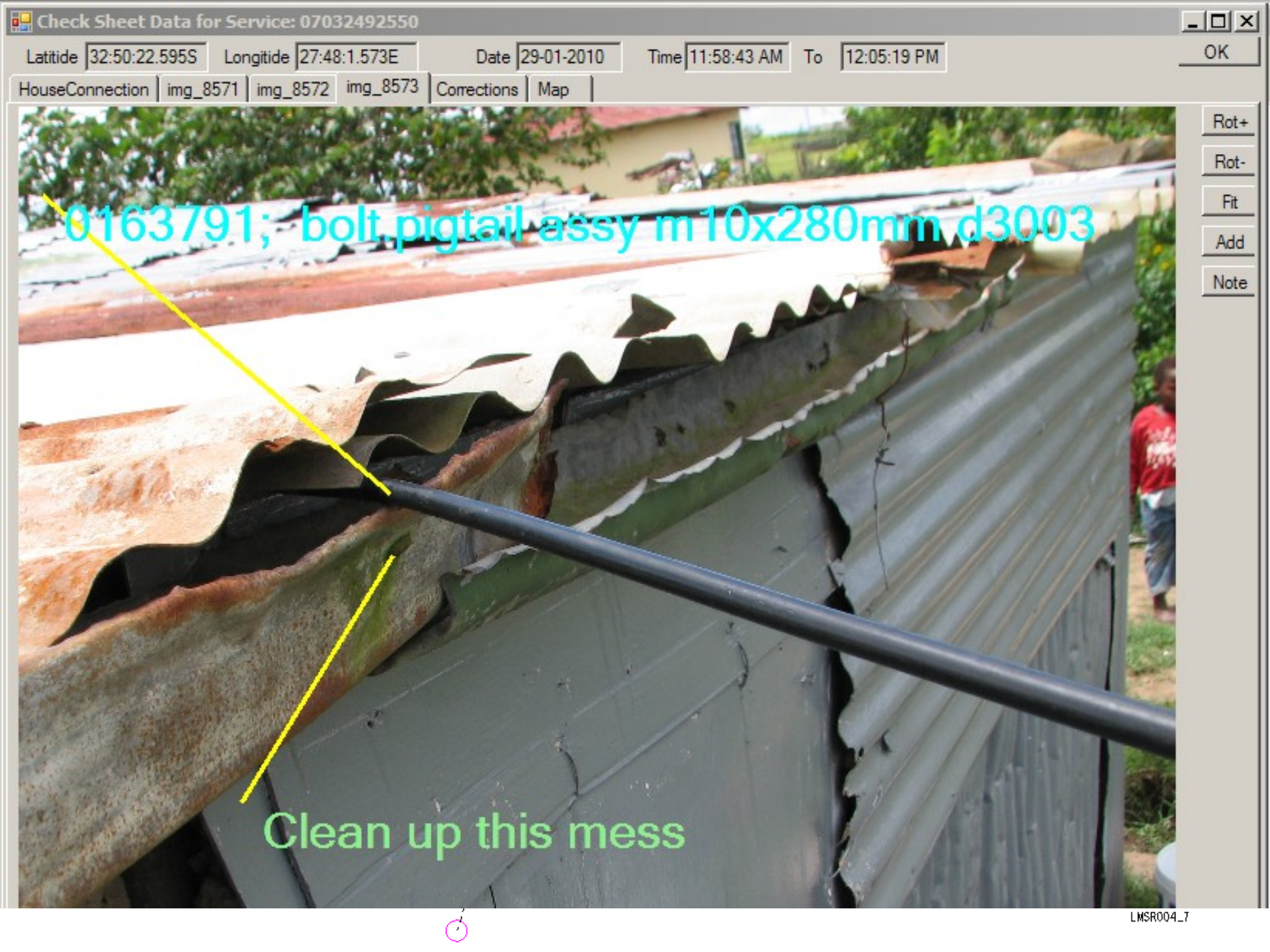
Latitude Longitude Date Time To

HouseConnection

1. Airdac Overhead or Underground? Overhead
2. Airdac clearance in order - road
3. Is an additional kicker pole needed Yes - 5m
4. Airdac tension in order (spring tension test)? Retension
5. Is Airdac damaged / joints - Replace (JR)? Good
6. Is Airdac touching tinned roof - possible damage? Touching-Rectify
7. Is Airdac through wall or roof sealed? Not sealed
8. Is Airdac Drip loop in order? Redo drip loop
9. Is Strain clamp at house in order? Replace
10. Is Pigtail Screw or Bolt type? Pigtail bolt
11. Type of Roof entry? Tin
12. Is Airdac secured inside house? Good
13. Passive Base or Readyboard Installation? Passive Base
14. Is Passive Base/Readyboard Installation in order? Good
15. Is Ready board Connections in order? Good
16. Is Meter in order - testing procedure - Earth leakage? Good; 0168580; kiosk-meter 16kva spu 1ph o/d d3185
17. What is the Meter size? 20A
18. Is COC with customer? No
19. Is the Meter sealed? Not sealed
20. Is Labelling done- house number
21. Are there suspect ready board connections / tampering? Good
22. Is wiring practice unsafe? Unsafe
23. Is Service Connection valid or to be Removed? Valid
24. Fault Comments no pigtail at house

Add Material

Create Work-order



0163791; bolt pigtail assy m10x280mm d3003

Clean up this mess

-
-
-
-

What has been achieved?

- Developed a mobile solution in collaboration with Eskom and consultants to streamline asset data capturing to:-
 - Eliminate onerous paperwork on site and back at the office
 - Not concern the user about GPS readings
 - Reduce the skill level of users to clerks-of-works/technicians
 - Capture ALL the required data in one go (consolidation)
 - Document the network interconnectivity
 - Increases speed and accuracy to obtain data, supported by images
 - Standardise the way in which data is captured by configuring the questionnaires for each piece of equipment
 - Rapidly produce as-built drawings (time saved)
 - Reduce capturing costs by over 70% (outsourced)
- Eskom used this tool on a research project to gather data on the condition of existing networks

How can we create jobs?

- Ideal skill level: clerks-of-works (for accountability)
- Skilled technicians can also undertake the work (it will require both internal skills and outsourcing)
- Redeployment creates vacancies that will be addressed by promoting / training internal staff
- This in turn will create opportunities at the bottom for the employment of graduates / youth

Working with electricity is dangerous!!!

- Therefore entrants must be formally trained with apprenticeship for establish lifelong careers.

Summary

- Created mobile software specifically for capturing electrical assets, interconnectivity & peripheral data
- The solution is designed to be compact and easy to use in the field (limited computer literacy and technician level)
- Customised to comply with data standard (content)
- Compile **Asset Registers** as part of the Asset Management strategy – needs to be done on an on-going basis
- Reduce operating costs by over 70% for data capturing while improving data quality & accuracy
- Technology is an enabler in tackling “costly” inevitable work → create new job opportunities

Thank you

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