Rapid Data Capture and Asset Inspections

Saving Money

Authors

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Paper Abstract

How a New Zealand power company saved time and money by using a new data capture system for their in-the-field asset inspections will be presented. Electra saved 50 percent on their in-the-field costs and completely eliminated their back-end data entry, realizing a whole host of other benefits in the process. The system is based around mobile data capture in the field with integrated GIS data collection tools which have been designed especially for field users who are not computer proficient, such as Electra's linesmen.

Introduction

Electra is the 8th largest electricity company in New Zealand. The company owns and operates the electricity lines and distribution assets for 40,000 users in the Kapiti - Horowhenua region, on the west coast of the lower North Island. To ensure that quality and reliable service is delivered to its customers, Electra is dedicated to maintain, monitor and manage its infrastructure in a professional manner. This involves a lot of fieldwork and is not without challenges. Electra's commitments to make use of innovative technologies to fulfil its mandate lead to a close relationship with a dynamic Wellington company, **Surveylab**, the home of **ike**™. This paper investigates how Electra made it to the forefront of the electricity industry in New Zealand by saving 50 percent of in-the-field data capture costs and completely eliminating back-end data entry with the use of simple data capture devices, such as **Surveylab**'s **ike**™.

Data Capture Challenges

Natural disasters such as floods and slips regularly affect the Kapiti region. The consequences of these acts of God can be significant on the Electra's infrastructures. Power cuts, damages to power lines and network, road closures or direct impact of slips and flooding are major challenges faced by Electra. In these circumstances, access to sites for data collection can be difficult or dangerous and this can lead to inaccurate recording of the assets damaged.

However, natural disasters are not necessary to show that data capture for asset management is a challenge in itself. Data is often captured with multiple devices (including pen and paper) then needs to be matched and transcribed into a computer database or GIS system. The time required for matching and processing data can be significant and potentially induce costly errors in data transfer.

Historically, Electra experienced significant discrepancy between contractor assessment of power pole condition and Electra's own assessment of the same asset. This problem was initially addressed by ensuring that all Electra's contractors took photos of the power poles being assessed, accompanied by a GPS fix. This allowed Electra to properly assess what maintenance was required on the asset and checking quality of its contractor's work.

Despite taking this initiative, Electra remained faced with significant data capture and maintenance challenges:

- There was a significant time lag between asset data capture and population of the GIS database. Sometimes up to 4 months.
- There were transcription errors due to illegible handwriting. In these cases, re-work and subsequent data entry were required.
- There was a 20% mismatch between photos taken by contractors, pole numbers and related paper records.
- All re-inspections due to these errors were expenses above the $180,000 annual allocated for inspections.

Surveylab introduced Electra to **ike**™ in 2001. This simple, innovative and cost-effective solution to GIS data capture in the field was to stop Electra's headaches.

ike™, *Electra's data capture solution for asset management*

Figure 1: Surveylab's ike™

ike™ is a totally integrated data capture device incorporating a Pocket PC computer, GPS, Laser Distance meter, compass and digital camera.

Electra uses IKE to record location and condition of all network assets, ensure that high quality asset data capture is reported by contractors, record the before and after condition of repairs to check contractors work and monitor tree growth over time to plan cost effective pruning programs.

ike™ digital camera ensures that each object or asset measured in the field is the correct one and each photo or position captured using **ike** is date and time stamped. Photographs, attribute and location data captured in the field integrate seamlessly with ArcPad, a mobile GIS application or can also be exported to any GIS. For Electra, this provides a proof of pole inspection by the contractor. This is useful in case of legal challenge and discourages the inspectors to fill out the inspection sheets in the pub!!

ike™ also enables capturing a remote target using a laser-range finder. **ike**™ 's GPS and real-time DGPS processing allow for a sub-meter accuracy of the target location. This allows Electra to capture asset location and condition from a remote location, which is very useful when the access to the asset is obstructed, dangerous or nonexistent (e.g. power pole located across a flooded river).

Surveylab developed a data capture interface for Electra, designed especially for 33kv line inspection. The application developed for **ike**™ mirrored existing Electra paper based methods but integrated photo capture, GPS fix and attribute data entry for each pole or transformer inspected. The forms records pole, high voltage equipment and control gear condition for maintenance or replacement. This allows Electra's contractors to capture correct and timely location-based information on pole conditions. This eliminates the need for costly reworks, reinspections or data entry and allows Electra's contractor to easily find and identify power poles and equipment needing maintenance during subsequent inspections.

Back in the office, asset photos, locations and condition attributes captured by **ike**™ can directly be transferred to a spatial database and from the database back onto **ike**™ for subsequent inspections. The data stored on **ike**™ therefore integrates with other Electra datasets and corporate systems. Electra's **ike**™ 's data and photos are accessed directly from an ArcGIS database via hyperlinks and standard GIS functionalities.

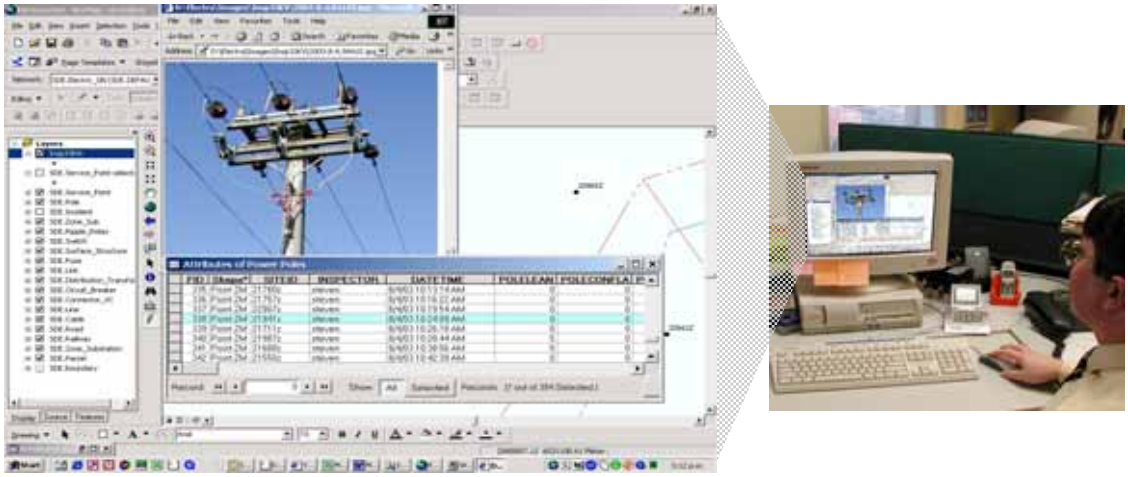

Figure 2: ike™ data and photos are accessed directly from Electra's ArcGIS database via hyperlinks and standard GIS functionalities (Photo: Electra).

Future use of ike™ by Electra includes further pole and ground mounted equipment inspections (transformers and pillars), underground cable route inspections, identification of areas of slumping, erosion or other obstacles, and street lighting inspections.

Electra benefits…

Electra benefits from using **ike**™ in the field in many ways:

1. **ike**™ is a *robust* and *rugged* data capture device that can sustain heavy use in the field
2. **ike**™ is *simple* to use: *" I'm no rocket scientist when it comes to computers, but this is easy!" - Steve Roygard Linesman for Linework*
3. **ike**™ eliminates data capture and maintenance discrepancies and reduces field inspection time by more than 50%
4. **ike**™ decreases overall inspection costs by 25%: *"The two **ike** units we bought have been paid off in less than a year, way in advance of our business case." Mike Hearn from Electra*
5. **ike**™ saved 50% of Electra's historical in-the-field costs and completely eliminated back-end data entry

Conclusion

New Zealand power company Electra saved time and money by using a new data capture system, **ike**™, for their in-the-field asset inspections. **ike**™ is build by **Surveylab**, an innovative Wellington (New Zealand) technology company. **ike**™ is a field mobile data capture device that integrates with GIS data and corporate systems. The on-going relationship between Electra and **Surveylab** translated in the development of easy-to-use custom applications for use by Electra. Electra saved 50 percent on their in-the-field costs and completely eliminated their back-end data entry using **ike**™.

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