

THE APPLICATION OF HANDHELD PHOTOGRAMMETRY TO ENABLE QUICK RETURN ON INVESTMENT ON POLE AUDIT PROJECTS.

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ABSTRACT

This paper considers how development of handheld photogrammetry offers the Power Industry a unique approach to ground-based OHL inspection, vegetation management and pole audit, and provides industry specific examples of return on investment (ROI) from the United States.

INTRODUCTION

Handheld PC, mobile GIS software, GPS receiver, digital camera, laser range-finder; A standard checklist for today's utility field surveyor undertaking Overhead Line (OHL) clearance surveys, pre-construction planning, and post-construction audits on distribution network operator (DNO) assets.

Many DNO's and service providers now see the value of investing in technology to improve, operational efficiency and data quality. The number of systems and solutions available testify to this, yet most still require considerable resource to verify, validate and integrate with back office databases and processes.

Having the ability to integrate all positional and attribute information within a single photogrammetric or calibrated image has major benefits for distribution network operators and provides a verifiable, accurate and safe approach.

Development of the TrueSize solution using ikeGPS offers the Power Industry a unique approach to ground-based OHL inspection, vegetation management and pole audit, and provides industry specific examples of return on investment (ROI) from one of the largest power industry service providers in the United States, Henkels & McCoy.

The Measurement Challenge

Power industry regulatory drivers for improved safety, network resilience and proactive maintenance on above-ground distribution assets require investment in smarter and more efficient field technologies.

Existing methods for capturing OHL clearances, pole audit

data and asset condition on the ground involve a combination of visual inspection, manual measurement, large field survey crews, and requires multiple pieces of equipment and back office process. This can lead to inconsistency, potential sources of error, increased safety consideration and additional project costs.

ikeGPS Approach

The development of TrueSize imagery and data capture builds on the measurement capability of ikeGPS; an integrated 300m laser rangefinder, sub-metre GPS, 3D compass, digital camera and customisable Windows Mobile software within a single, rugged handheld platform.



Figure1. ikeGPS and TrueSize Data Capture

Using a single or series of Truesize calibrated images, 3D measurements, heights and critical asset information can be recorded and verified directly on annotated images. These images are geo-tagged with accurate GPS locations to enable seamless integration with GIS, web and back office systems using industry standard output formats such as JPEG, CSV, XML and KML.

ROI CASE STUDY

Background

Henkels & McCoy (H&M) are one of the largest and most highly regarded privately held engineering, project management, construction, and training firms in the US. H&M provides critical infrastructure services for the electric power, renewable energy, communications, natural gas, pipeline and water industries and consistently ranks at the top of Specialty Contractors according to the Engineering News-Record list.

Project Challenge

H&M conducted a joint attachment audit and a detailed equipment condition review for the City of Riverside California. For the first phase, of the joint attachment audit, 3,000 poles needed to be completed in 26 weeks. H&M realized that to get this initial phase completed on time they needed to collect data faster, and their existing combination of equipment - an inventory map, GPS, laser rangefinder, measuring tape and digital camera, would not get the job done.

Measurement Solution from ikeGPS

H&M purchased a solution combining an ike300 data capture unit, drag and drop software to easily build custom forms and workflows, and desktop software to measure and annotate joint height attachments by simply clicking on a photograph of a pole.

ikeSolutions Poles provides efficient data capture and accurate measurements, along with a digital, photo-verifiable record for each pole and the related joint attachments. Pictures and associated data are captured together and are therefore viewed and managed from one source.



Figure 2. Annotating TrueSize Images



Figure 3. An engineer capturing images using ikeGPS

Data is entered using custom forms that are easily created and deployed to the ike300 units. Additionally, since all the data is digitally recorded this avoids transcription errors.

RESULTS

Previously H&M were able to collect data for about 20 poles per day. Using ikeSolutions Poles this increased to 45 poles per day. This in turn reduced their time to complete the 3,000 pole project from over 30 weeks to less than 14 weeks.

Faster project completion means additional project work can be scheduled, thus increasing revenue. H&M sees real value of ikeGPS solutions and plans on increasing its use of this solution.

"We now carry less equipment around in the field."

"The photos are used to conduct fast and accurate measurements, but also provide photo-verifiable evidence." **Brad Mayo – Project Manager, H&M**

The increase in efficiency using retrospective measurement from TrueSize images also enables consistency, higher accuracy, and verifiable evidence for the client. Safe working practices are significantly improved as all measurements are captured from stand-off locations by a

single field operative.

CONCLUSIONS

Power industry regulatory pressures for improved safety, network resilience and proactive maintenance on above-ground distribution assets require investment in smarter and more efficient field technologies. Innovative methods such as handheld photogrammetry using Truesize and ikeGPS can deliver significant ROI within a single project, and provides benefits to Distribution Network Operators and Service providers, using a consistent, verifiable and safe solution.

REFERENCES

None Applicable