Inspection Interface

Optimizing the Inspector's work

The inspection procedure used by most power line inspection crews involves noting on paper the time, brief description and location (power line, tower, and/or GPS) of anomalies detected visually or with video and thermographic cameras.

At headquarters, inspectors must compose an inspection report that combines the notes taken during the inspection with video and thermographic images. In addition, the inspectors are generally required to insert the data in asset management databases.

Inconveniences

Making hand written notes during the inspection is cumbersome, imprecise and slow whether the inspection is performed on foot, in an off-road vehicle or in an aircraft. At headquarters, manual data collating and data entry into asset management systems is inefficient, especially when the hand-written notes are illegible, inconsistent or incomplete.

Procedure Optimization

Albatroz Engineering has developed an intuitive Inspection Interface that facilitates note taking during inspection and automatically generates inspection reports. The inspection interface runs independently on a portable computer (TabletPC or PDA). The interface can accommodate other inspection sensors and equipment such as GPS receivers, microphones, and cameras.

Inspection Interface

After interface startup the user is presented with a various mission data fields such as time, line code, voltage and line geometry.

During the inspection the inspector registers anomaly types by activating different buttons corresponding to issues such as hot points, broken isolators, tower corrosion, etc. When a button is activated, the interface records the GPS coordinates and video images relative to that point in time in the even these sensors are connected to the computer (see Figure 2). Furthermore, if the inspector has access to a microphone, a vocal description of the anomaly can be recorded.

At the end of the inspection a complete list of anomalies is produced and an anomaly report generated in PDF, HTML or SQL including anomaly location, description and images.

Advantages

By activating specific buttons corresponding to the different types of anomalies, inspection crews are free to focus on the power line anomaly rather than a notepad.

Furthermore, inspection data can be transferred automatically resulting in more efficient inspection data review permitting an increase in the quantity and quality of inspections performed.

The inspection interface can be customized according the specific needs of each client and is encouraged.

Figure 1 - Mission

Figure 2 - Thermography

Figure 3 - Report

Inspection data integration with Geographical Information Systems

Geographical Information Systems (GIS) have for long been established as the essential tool for the planning of an energy transmission and distribution grid. Their value for asset management, maintenance and line operation is multiplied with the integration of the information collected during grid inspection activities.

An integrated digital, georeferenced solution for line inspection, such as PLMI, enables this information to be readily integrated into GIS. Records of anomalies unambiguously associated to assets, photographs of these referenced by time and space, and even, when laser sensors are used, complete tridimensional models of lines and surrounding environment are all examples of information which can be fully integrated into GIS.

This integration allows life cycle assessment not only to account for factors such as make, model and installation but also factors which are geographic in nature, such as weather data, coastal proximity and atmospheric deposition data, as well as factors related to neighbouring facilities. Inspections may be focused on areas with higher risk exposure, such as areas with fast growing vegetation in rainy years.

The GIS integration of tridimensional models of the lines obtained from laser inspection data brings about the possibility of following the environmental evolution year after year, as the trees grow, new buildings are built and the line operation conditions change. This integration goes beyond simply maintaining video records of the inspections, because the models remain available for tridimensional queries and queries can be made that relate models obtained at different times.

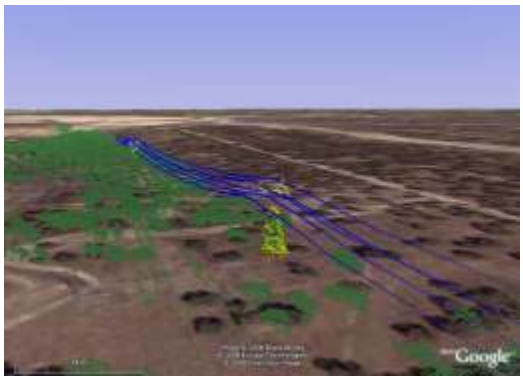
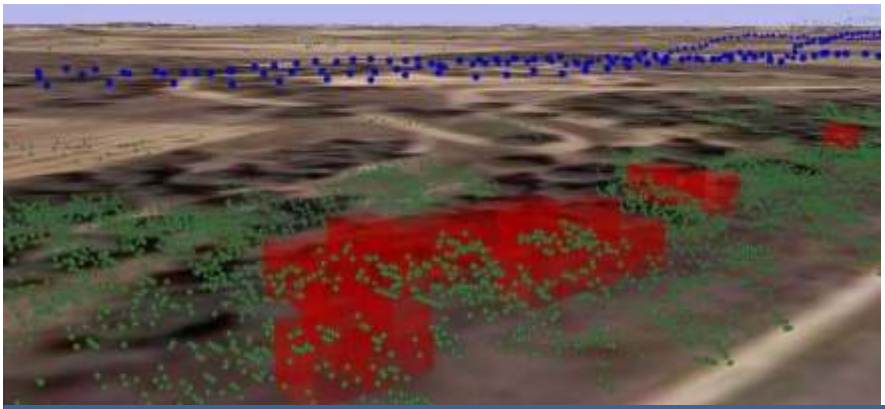


Figure 1 - Assets representation

Figure 2 ilustrates how a tridimensional model of the vegetation surrounding a line (the vegetation in green and the line in blue) can be used to obtain an estimate of the volume of vegetation to be removed with a simple GIS query. The space around the line is divided into elementary cubes and each is checked to verify whether it contains vegetation (in red, the cubes which do contain vegetation); the estimate derives from the simple counting of the cubes in red and their volume, becoming more precise with smaller cubes. An estimate such as this contributes for a better resource allocation.

Figure 2 - Vegetation volume estimation



Albatroz Engineering supports its clients in integrating into their GIS the data obtained in line inspection with the PLMI system in order to enable them to extract from this data all the information they require.