Capturx Case Study
American Transmission Company

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Summary

Customer: American Transmission Co. manages a 4-state network of high-voltage transmission lines.

Challenge: Needs faster inspection data processing to improve operational visibility, efficiency, and minimize compliance risk.

Solution: Excel-based forms solution for digital pens automatically digitizes handwritten data on paper forms and records digital timestamp.

Results: The team was able decrease data re-entry, spend less time, and money on redundant inspections. Reliable documentation supports NERC compliance.

Automated Data Entry and Better Operational Visibility for Aerial Power Line Inspection

American Transmission Co. provides the pathway for power into communities in portions of Wisconsin, Michigan, Minnesota, and Illinois over a network of approximately 9,400 miles of high-voltage electric transmission lines.

Overhead transmission lines are inspected several times each year via helicopter to assess equipment condition, identify defects or concerns, and potential vegetation abatement needs. These scheduled aerial patrols result in more than 27,000 miles flown and patrolled each year. Veteran line patrollers and vegetation management experts fly along side helicopter pilots for up to six weeks of seasonal patrols, three times a year. While airborne, patrollers take detailed field notes, assessing the physical condition of transmission lines, hardware, structures, and rights-of-way.

ATC utilizes local distribution company line mechanics and contracted third-party service provider expertise to conduct its aerial patrols. These seasoned veterans are familiar with the electric transmission system they are assigned to patrol and possess the skills necessary to recognize issues while flying overhead at cruising speeds ranging from 35 to 60 miles per hour. As many as a dozen different patrollers may be utilized during a given patrol season.

Challenge: Improving documentation, post-processing cycle variability

Each patroller is responsible for closing out ATC-issued inspections for each overhead transmission line, including any field notes captured during the patrols. Historically, patrollers managed their workflow process during the patrol cycle. The task of compiling and processing any notes taken during the helicopter patrols could be daily, weekly or at the conclusion of all scheduled patrols, depending on individual preference. Using pen and paper to capture patrol comments makes great sense, but the variability in this post-processing cycle presented an excellent opportunity for ATC to implement improvements designed to reduce cycle times, costs, and minimize data loss or transposition errors.

Documenting inspections, compliance

An increasingly demanding regulatory environment has prompted ATC to take additional action when documenting work performed on its bulk electric transmission system. In addition to internal assurances that equipment and rights-of-way are being adequately patrolled and inspected, penalties for NERC non-compliance with respect to the Transmission Vegetation Management Program (FAC-003-1) can be financially crushing, with penalties issued to utilities as high as $1,000,000 per day in violation.

This scrutiny on documentation goes beyond the patrol; ATC wanted to not only streamline the workflow process of retrieving and compiling patrol data, but also to improve the accuracy or "confidence" in the geographic location of patrol comments collected. A field crew dispatched to an erroneous structure number noted with a defect could result in a compliance violation, even though all documentation supported that course of action.

"We estimate a significant reduction in back office processing time and see the immediate benefit of having detailed patrol data to support our compliance requirements."

DUANE SCHOON
Manager Asset Maintenance
American Transmission Company

"Data from Capturx Forms for Excel is immediately available to our GIS, and the inspection data is formatted for automated entry into our maintenance management system."

ERIC FOWLER
Senior GIS Developer
American Transmission Company

"Justification for digital pen technology was very straightforward. Pen and paper have a consistent, proven value in the field. This is the introduction of a considerably more efficient way to process inspection data collected by our patrollers."

SHERRI GROSS
Manager Asset Records and Data Management
American Transmission Company

Operational visibility and efficiency
Variable time lag between data collection and processing prevented any predictable real-time visibility into patrolling progress. ATC could not readily measure the progress of scheduled patrols or address variances in expected progress due to inclement weather, illness or unanticipated emergent tasks. Furthermore, ATC was seeking to visually track where and when lines were patrolled in an attempt to validate the completeness of the patrolling effort. Helicopter rental, pilot and fuel costs for more than 27,000 miles of patrols are significant—eliminating redundant patrols could provide additional cost savings.

Solution: Capturx Forms for Excel

ATC implemented several key changes to the aerial patrol data capture process, keeping in mind the primary objective: let the patrollers focus on the patrol. ATC replaced outdated reference map books with passive GPS, dynamic real-time mapping and an Excel-based forms solution for digital pens. The patrollers received a digital pen and a stack, of preprinted Excel-based forms, printed on ordinary copy paper.

The passive GPS device is turned on by the pilot and kept on for the entire flight, capturing time and location data every second the helicopter is moving. The mapping system displays the GPS signal via Bluetooth, constantly updating the map display with the current location, giving patrollers a real-time reference system identifying transmission line names, structure numbers, and base map information.

The patroller is free to document any issues, defects or concerns seen in or near the right-of-way. With the digital pen and Excel-based forms, all written comments have a digital timestamp recorded when the pen meets paper. After a patrol is completed, data is downloaded from the pen and emailed to ATC, along with a GPS log. These two data sources are combined, pinpointing an exact time, latitude and longitude for each piece of information recorded on the form.

Results

Decreased data re-entry, more accurate data
The patrollers are able to email each day's work to ATC as soon as the patrol is completed. This information is imported directly into Excel and ready for internal processing with patrol GPS data. The patrollers are no longer required to re-enter information written down during the patrols, saving ATC time and money.

The data is automatically converted from handwriting to digital text, where it can be quickly and consistently reviewed for errors. This task automation greatly reduces the risk of transposition or omission errors.

Less time, money spent on redundant inspections
Aerial patrols are now tracked efficiently via GPS flight log, which is downloaded nightly. Pre-flight patrol review can better plan daily route schedules based on cumulative flight logs from prior patrols.

Reliable documentation supports NERC compliance
All patrol data is recorded as it is written, minimizing exposure to gaps in inspection data or coverage. At the end of the day, the pen is still writing in ink on standard paper, essentially the same process and practice previously in place. Should the paper get lost or destroyed, all information is recorded by the pen. If the pen is lost or damaged before data is downloaded, the patroller still has the original paper forms.