CASE STUDY

USING DRONES TO ENHANCE TRANSMISSION LINE RELIABILITY AND PRIORITIZE MAINTENANCE ACTIVITIES

EXECUTIVE SUMMARY

To ensure the reliability of a transmission line feeding a large manufacturing facility in New York State, ULC Robotics conducted an Unmanned Aerial Vehicle (UAV) inspection of a 14.6 mile segment of 115kV double-circuit powerline to identify reliability issues and prioritize maintenance activities.

CHALLENGES

Conventional methods of inspecting the transmission line and its towers include the use of helicopters, which:

- Are expensive and not always readily available, as there is often a wait-list of several months for their use
- Disturb the public and livestock in the heavily farm-populated area
- Place utility workers and air crew at heights close to high voltage powerlines
- Can be delayed by weather restrictions, such as fog, and low cloud ceilings

The alternative for utility reliability and asset managers is to use ground patrol, which also comes with its own set of challenges, including:

- Visual limitations, as workers are unable to see a majority of defects from the ground
- Extended project timelines; this particular job would require utility personnel to walk the segment over the course of approximately 7 days

“Drones are a great complement to the work we already do to keep our system fully functional. The benefits they deliver are incredibly valuable and I’m interested to see where they take us.” Mark K., Principal Engineer

INDUSTRY: Electric T&D

BUSINESS AREAS ADDRESSED:
- Reliability
- Maintenance

SOLUTION IMPROVED:
- Safety
- Data quality
- System performance and reliability

RESULTS:
- Rapid mobilization
- 100% data capture
- Delivery of high-resolution imagery of all key inspection points
- 30% of the UAS findings would not have been detected by helicopter survey
RESULTS:

Using a 42-megapixel DSLR mounted on a custom-developed, US-built multirotor aircraft, ULC’s pilots captured 1400 high-resolution images the 30 transmission towers included in the mission and segments of the lines near the towers.

The resolution of images enabled all details, down to minute parts such as cotter pins and bolts that would have been challenging to capture from a helicopter, were clearly visible and easily identifiable. The data collected showed several defects, including:

- Broken and flashed insulators
- Excessive corrosion on several arm braces and vangs
- Defect in a shield wire
- Bent corona rings, an additional finding not previously included in the inspection criteria

Post-flight, ULC Robotics delivered a custom report tailored to the specifications of the client. Information included in the analysis helped the utility’s asset management team prioritize urgent fixes and form long-term maintenance plans, optimizing their maintenance budget and helping to minimize downtime. **Approximately 30% of the UAS findings would not have been detected by helicopter survey.**

**AIRCRAFT:**
ULC Custom-Developed Multirotor

**PAYLOAD:**
42MP DSLR

**FLIGHTS:**
Circuit Length: 14.6 miles
Towers Inspected: 30

**AIRSPACE:**
Class G