Supplemental Project Notice

# EVALUATING THE EFFICACY OF DRONE-BASED INSULATOR INSPECTION TOOLS

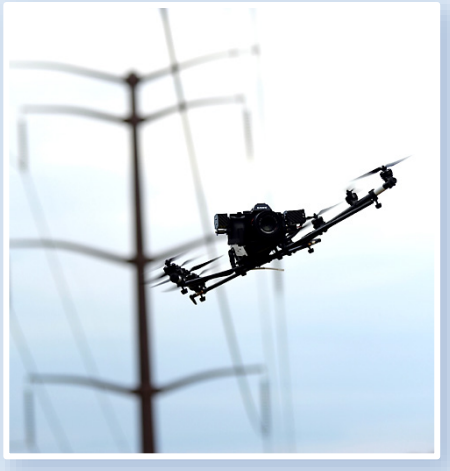


*Image of drone in flight*

## PROJECT HIGHLIGHTS

- Drone inspection of transmission insulators
- Evaluation of technolgy in a controlled lab environment
- Comparison of traditional inspection techniques to drone based inspection

## Background, Objectives, and New Learnings

Drones—also known as unmanned aerial vehicles (UAV) or unmanned aircraft systems (UAS)—have become a more frequently used tool by utilities to reduce cost, increase speed, increase safety, and provide improved results for inspection of overhead transmission assets. Asset inspection via drone, including transmission line insulators, using visual cameras have found success for several years prompting the inspection industry to develop more drone compatible devices. Inspection technology such as infrared (IR), ultra-violet (UV), acoustic, and electric field (E-field) can detect various anomalies that can alert inspection to insulator degradation and pending failure.

The objective of this work is to prepare examples of typical in-service anomalies in a controlled lab setting and have drone operators perform blind inspections to document how effective each inspection tool is at finding the anomaly.

Traditional inspection techniques that can be performed from the ground can be used as a baseline reference to compare efficacy and efficiency.

## Benefits

When reliable inspection data is used and risks of equipment failure are accurately identified and repaired, the public can realize improved reliability of service and improved safety from reduced failure risks. The potential to reduce inspection costs and avoid emergency repairs can help keep electricity affordable.

Utilities can realize the benefit of reduce inspection cost and time while improving worker safety by reducing keeping workers safely on the ground.

## Project Approach and Summary

This project intends to identify potential candidates for evaluation and test them with various lab setups that represent in-service anomalies. The goal is to have drone operators/inspectors look for the anomalies without prior knowledge so that an accurate assessment of the technology can be completed. Inspections from the ground can be used as a baseline reference to compare efficacy, efficiency, and effectiveness.

## Deliverables

- Project Report
  - Documentation of the available drone-based insulator inspection technology
  - Documentation of tests performed
  - Documentation of results of testing
  - Analysis of findings with comparison of traditional inspection and the drone based inspection
- Project Presentation
  - Summarizing project report

## Price of Project

The estimated cost per utility is $50,000, with at least five (5) utilities required to complete the full scope of work.

## Project Status and Schedule

The project is expected to last 18-months.

## Who Should Join

Utilities using drones or are interested in using drones to inspect transmission line insulators can find the information gathered from this project helpful when selecting technology to find in-service anomalies.

## Contact Information

For more information, contact the EPRI Customer Assistance Center at 800.313.3774 (askepri@epri.com).

### Technical Contact

Timothy Shaw at 704.595.2734 (tshaw@epri.com)

### P35 Program Manager

Rachel Moore at 704.595.2095 (ramoore@epri.com)

### Member and Technical Services

Brian Long at 704.408.8139 (blong@epri.com)

Dan Tavani at 704.773.2025 (dtavani@epri.com)

David Welch at 702.208.8276 (dwelch@epri.com)

Jeff Hlavac at 402.314.1049 (jhlavac@epri.com)

**Product ID:** 3002031092 **Project ID:** 01-120161 **April 2025**

**EPRI**

3420 Hillview Avenue, Palo Alto, California 94304-1338 USA • 800.313.3774 • 650.855.2121 • askepri@epri.com • www.epri.com

© 2025 Electric Power Research Institute (EPRI), Inc. All rights reserved. Electric Power Research Institute, EPRI, and TOGETHER...SHAPING THE FUTURE OF ENERGY are registered marks of the Electric Power Research Institute, Inc. in the U.S. and worldwide.