

# Aerial Inspection

with Drone Technology and Visual Asset Management

**CURTISS -  
WRIGHT**

Nuclear Power Products and Services



## PLANT TYPE

Nuclear Power Plant

## LOCATION

Northeast United States

## CHALLENGE

Exterior wall inspection for six critical structures

## SOLUTION

Aerial drone inspection and visual data management

## Background

A nuclear power plant facility in the northeastern United States needed to conduct exterior wall inspections per ACI 349.3R-02 Evaluation/Acceptance Criteria for Concrete Components on six structures in its protected area. Site engineers – also scheduled to perform internal structure inspections to the same specifications during the same timeframe – lacked the bandwidth to conduct all the inspections by the scheduled completion date. The utility decided to pursue an innovative solution – conduct aerial inspections with drone technology.

The nuclear facility selected Curtiss-Wright, along with its partner, Cyberhawk Inc, to perform the drone inspections and visual data management. Curtiss-Wright has over 40 years of specialized experience in the equipment design, inspections, and field services for the nuclear power industry; its partner, Cyberhawk, is an international engineering inspection and survey specialist and a leading provider of end-to-end visual data management. Cyberhawk conducted similar structure inspections at American Electric Power (AEP)'s D.C. Cook plant which resulted in cost savings of over 66% and additional indirect cost savings through reduced site disruption.<sup>1</sup>



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## AERIAL INSPECTION

Over approximately ten days, aerial inspections were performed on the exterior walls for six critical structures of the nuclear power facility, including the reactor, auxiliary and turbine buildings.

The inspection captured detailed photography of the concrete walls, metal siding, and associated structural steel structures and supports – covering approximately 275,000 square feet of wall space. The images were then analyzed to detect and measure various defects such as crack width and length, spalling, pop-outs, erosion, corrosion, and other defects in accordance with ACI 349.3R-02. The equipment utilized for the inspection, a USA-made Unmanned Aerial System with a Sony A7R4 camera, enabled precise image capture and high accuracy measurements.

Photogrammetry techniques captured 100% coverage of each wall and identified visible defects including:

- The presence or absence of the component or subcomponents
- Gross damage or deformation
- Visible cracks
- Extent of coating/painting breakdown
- Variations from the structural drawings
- Anomalies

Cyberhawk's inspection personnel and engineers organized and reviewed the captured data, then processed the data through photogrammetric software to produce 2D and 3D stitched deliverables.

## RESULTS AND COST SAVINGS

The final deliverable for the aerial inspection project was a comprehensive report compiled in iHawk, Cyberhawk's cloud-based visual asset management software. The report included high definition photographs and a description of defects including an indication of their nature, location, and size. Site engineers are able to navigate each wall in iHawk to understand the full context of each defect. In addition to the PDF report, iHawk features an ortho-mosaic photo representation of each building wall. This enables a full overview of the surface inspected and "top to bottom" rapid access to detailed individual images.

By using aerial inspection technology, the utility avoided expenses related to renting/utilizing rope access, man baskets, and scaffolding to perform the inspections with the necessary acuity and accuracy, as well as inspection and engineering resources needed to capture, review, catalog, and analyze results. These cost savings allowed the utility to achieve estimated savings of over \$375,000 compared to traditional, manual inspection techniques.



<sup>1</sup> <https://www.neimagazine.com/features/featureeye-in-the-sky-6136284/>

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