

A U T O M A T E · D I G I T I Z E · A N A L Y Z E · I N F O R M

POWER-I® INTELLIGENT ASSET INSPECTION

INSPECTION SOLUTIONS FOR DISTRIBUTION LINE INFRASTRUCTURE

Maintaining distribution line infrastructure across hundreds and thousands of circuit miles is one of the most resource-intensive challenges facing electric utilities. Manual inspection programs are slow, inconsistent, and leave enormous volumes of imagery unanalyzed. MEPPI's Power-I® extends automated AI inspection to the distribution system—where the vast majority of customer outages originate¹—transforming raw drone and camera imagery into structured, actionable asset intelligence. The result is proactive maintenance, defensible compliance documentation, and measurable reductions in outage frequency and duration.



~90%

of U.S. outages originate
on the distribution system¹



\$40B+

spent annually on
distribution O&M



~70%

reduction in inspection
review time with AI

MEPPI's Power-I distribution inspection solution is offered via two tiers—accommodating your program objectives:

BASIC

Inspection Coverage Area + Circuit Boundaries Asset Tagging + GIS Verification

Streamline your inspection data management with pole asset tagging, GIS verification, and as-observed GPS coordinate matching—the foundation for a defensible, accurate asset record.

PRO

Full Thermal + Visual AI Analytics

Adds the complete Thermal Inspection Suite plus visual AI detection and condition assessment—binary flags, defect severity scoring, and percentage-based assessments for full lifecycle management.

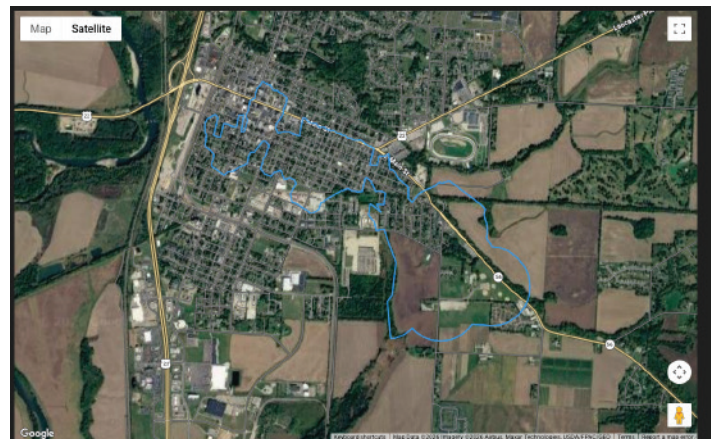
INSPECTION COVERAGE AREA + CIRCUIT BOUNDARY LINKING, ASSET IDENTIFICATION, AND TAGGING

Associate Inspection Coverage Areas to Geofenced Circuit Boundaries

Import circuit boundaries from ArcGIS® GeoJSON files into dedicated Power-I coverage areas, enabling automatic import from Skydio® Cloud and accurate image-to-circuit matching within Power-I.

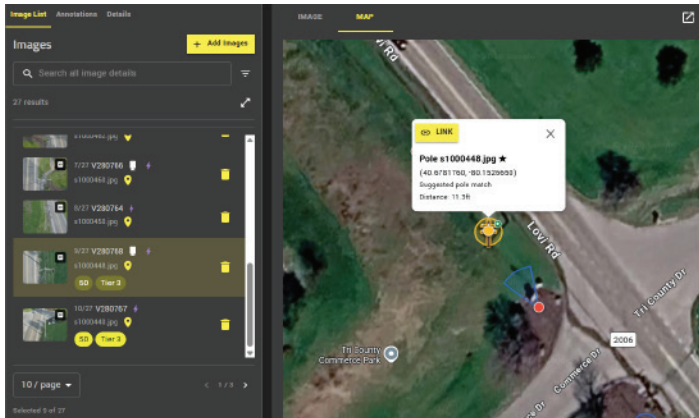
Verify and Correct GIS Data

Leverage Power-I's distribution inspection workflow to visualize, verify, and correct distribution GIS data. The inspection workflow allows utilities to see both the existing GIS location of record and an "as-observed" GPS coordinate for where the inspection image was taken. Using camera direction metadata and street-view capabilities, users can accurately match inspection images to the correct distribution poles in the field. GIS deviation reports can be generated.

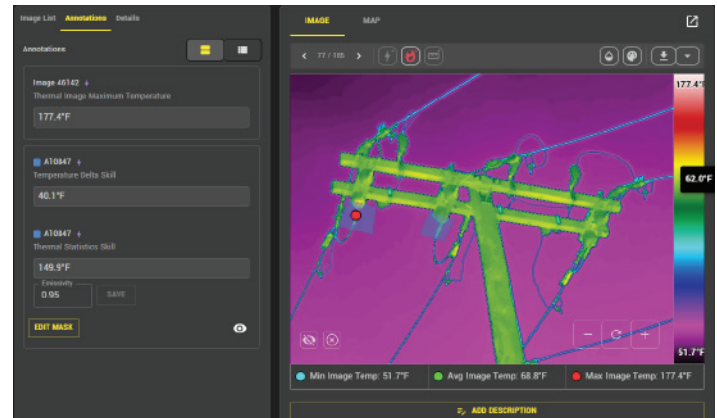


Power-I GIS data satellite image

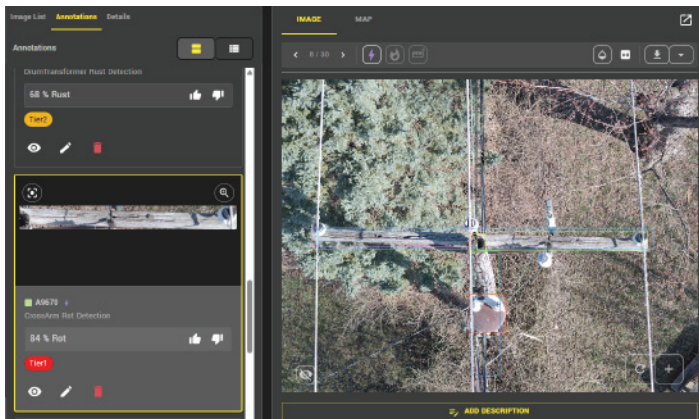
T&D GEOLOCATION: AI-POWERED THERMAL AND VISUAL INSPECTION



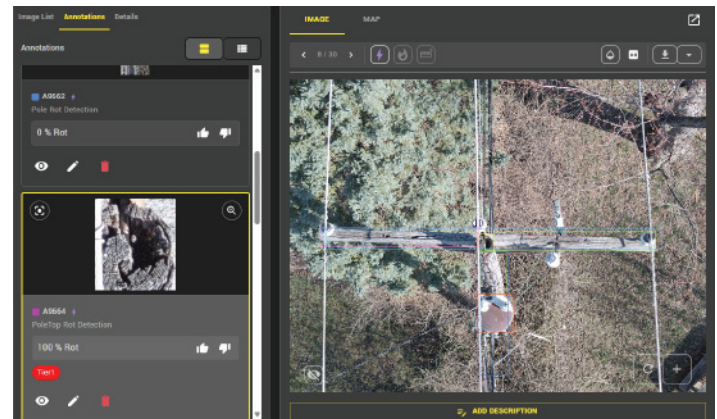
Link pole to GPS coordinate / GIS



Thermal image / temperature delta skill



Cross arm rot prediction



Pole top rot AI prediction

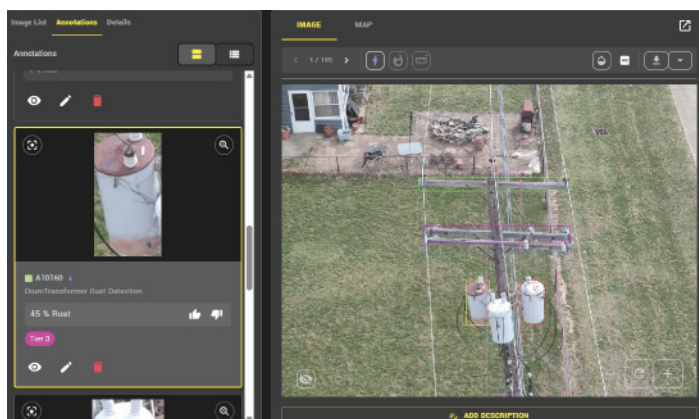
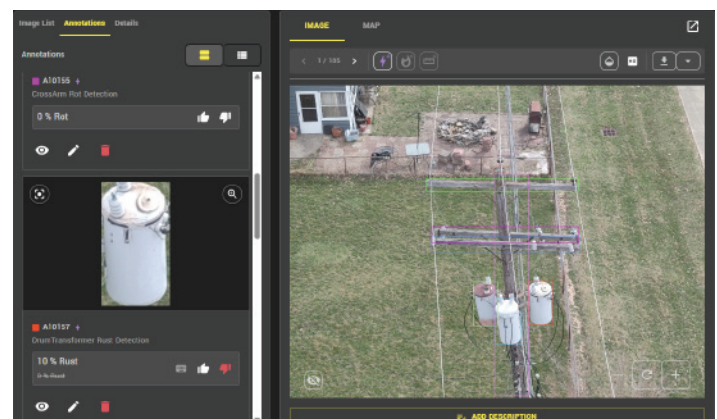


Image tag for transformer with rust



Human in the loop "AI Training"

THERMAL INSPECTION SUITE

Intelligent Thermal Analysis

Power I applies proven thermal analytics to distribution line assets—including conductors, connections, cutouts, and transformers—to automatically identify temperature anomalies that indicate developing faults before they result in outages. Utilities can upload radiometric thermal images from any source, define temperature thresholds and alert tiers, and process inspection datasets through Power I's thermal workflow. Images are automatically organized based on user defined parameters, allowing thermographers to focus on the most critical findings. For flagged assets, users can draw comparison masks to evaluate maximum temperatures between like components within the same image, with ambient based deviation thresholds configurable as needed. By eliminating manual image review, Power I streamlines thermal inspections, prioritizes high risk conditions, generates inspection reports, and directs attention to issues that require action.

Why Thermal Detection is Critical for Distribution Systems

Industry studies show that loose or corroded electrical connections account for the majority of thermally detectable faults on distribution systems. Left unaddressed, thermal anomalies can progress into faults or sustained outages over time, as connection resistance increases and components degrade². Automated thermal detection on every inspection cycle enables earlier, lower-cost intervention.

With Power-I, utilities can:

- Pinpoint hot-spot anomalies on connectors, splices, and terminations
- Determine temperature deltas between like components
- Identify temperature threshold deviations
- Correlate thermal findings with severity scoring
- Detect drum transformer overheating and oil-related thermal signatures

VISUAL INSPECTION SUITE

Computer Vision and AI

Power-I's Visual Inspection Suite applies purpose-built AI analytics to distribution line imagery—detecting asset conditions and quantifying defect severity across the full spectrum of pole-top assets, conductors, and protective equipment.

Distribution Line Vegetation and Structural Risk

Automated detection of limb-on-line contacts, pole lean, and rot conditions helps utilities identify vegetation and structural risks that are among the leading contributors to sustained outages and ignition risk on the distribution system^{3,4}.

DATA MANAGEMENT AND ALERTS

Real-Time Alerts

Upon processing datasets, Power-I will flag anomalies per user-defined parameters (i.e., 80% Rot – T1 Alert). Email notifications containing the inspection defect reports can be sent to supervisors, allowing the utility to initiate an on-demand inspection or work order to further investigate or repair.

System Integration

Via third-party integration, export Power-I data to data historians (PI), CMMS/Asset Management Systems (work order automation), GIS platforms, and Asset Performance Systems to inform asset health scoring programs.

INNOVATIVE TECHNOLOGY

High Accuracy

Developed with input from utility customers, Power-I integrates cutting-edge computer vision and machine learning models trained on real-world distribution line imagery—delivering high precision and recall across diverse geographic and weather conditions.



DRONE + DOCK

Remotely supervised data collection missions at scale.



MANUAL IMPORT

Upload imagery from any existing collection platform.

ENHANCED RELIABILITY

Proactive Response

Identify vegetation encroachments, structural defects, and connection failures before they manifest as outages—reducing SAIDI and SAIFI metrics tracked by regulators and customers¹.

Remote Assessment

Equip field crews with AI-prioritized work orders before they leave the yard. Situational awareness gathered remotely reduces truck rolls and improves first-time fix rates.

Extended Equipment Life

Condition assessment scores for pole rot, cross-arm deterioration, and insulator health support risk-ranked capital replacement planning—extending asset service life and deferring capital spend.

SIGNIFICANT COST SAVINGS

Reduced O&M Costs

Automate the review and documentation layer of your inspection program. Cut the hours spent manually tagging, classifying, and reporting defects from drone imagery.

Reduced Repair Costs

Catching a failing insulator or a corroded transformer before it fails costs a fraction of an emergency repair plus the associated outage penalty and restoration crew time.

Efficient Personnel Use

Optimize staff deployment through automation of data collection, documentation, defect review, and CMMS/GIS work order creation via technology integrations.

IMPROVED SECURITY AND SAFETY

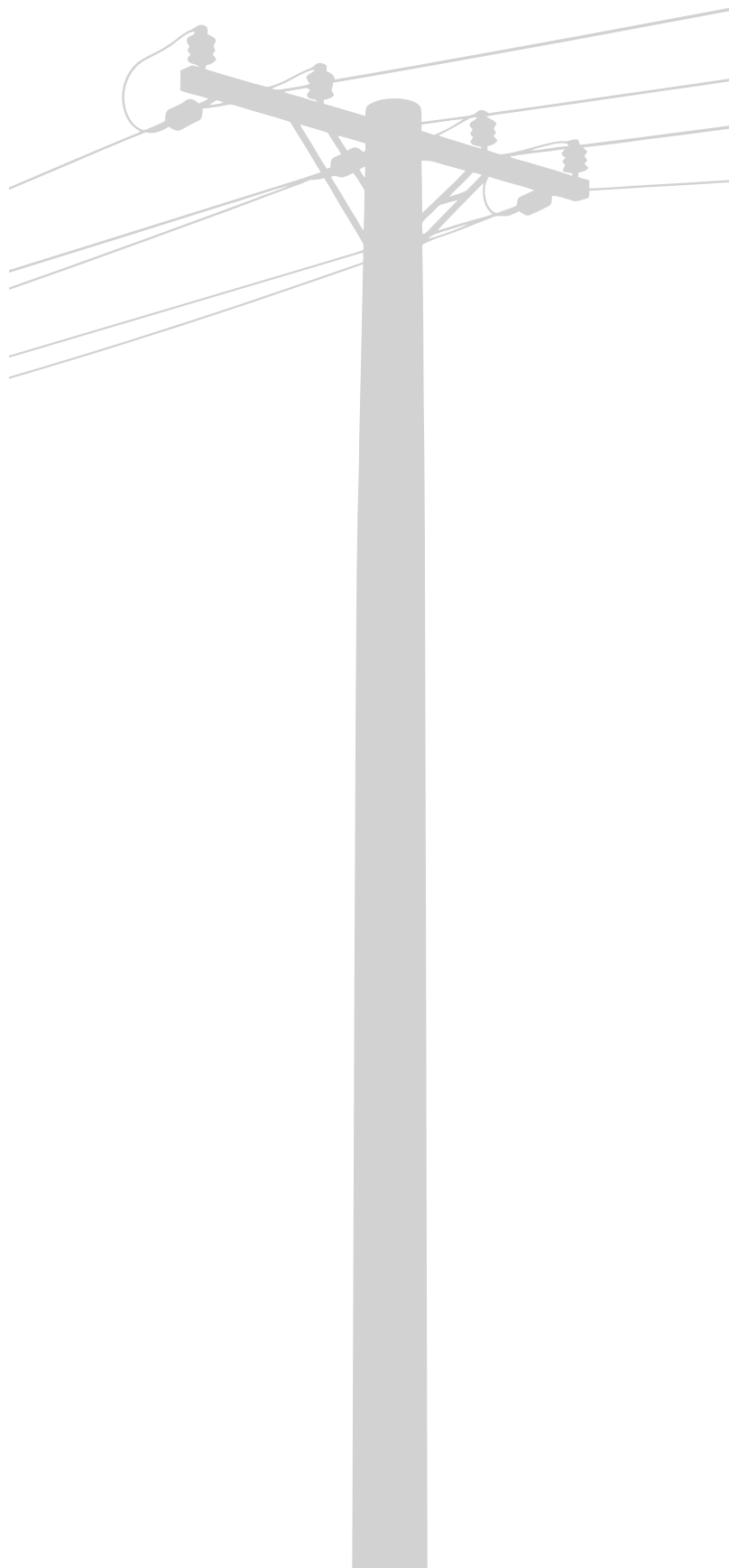
Reduced Risk

Dramatically reduce the need to place line workers in proximity to energized distribution infrastructure during routine inspection.

AI-powered remote assessment keeps crews out of harm's way.

Informed Decision-Making

Access comprehensive asset condition data—searchable, filterable, and exportable—to support maintenance planning, PBR program submissions, and regulatory compliance documentation.



FEATURES

DISTRIBUTION LINE FEATURE CATALOG	BASIC	PRO
CIRCUIT BOUNDARIES, ASSET IDENTIFICATION & TAGGING		
Inspection Coverage Area + Circuit Boundary Geofence Link	✓	✓
Asset Tagging / Pole Matching Workflow—As-Observed GPS vs. GIS Location of Record	✓	✓
GIS Deviation Report	✓	✓
THERMAL INSPECTION SUITE (THERMAL ANALYTICS)		
Temperature Threshold Alerting	—	✓
Like-Component Temperature Delta	—	✓
VISUAL INSPECTION SUITE—AI SKILLS (VISUAL AI)		
Vegetation (Limb-On-Line / Veg-On-Pole) Detection—Yes/No	—	✓
RECLOSURES		
Reclosure Status Detection—Open/Closed	—	✓
DRUM TRANSFORMERS		
Drum Transformer Rust Detection—Yes/No	—	✓
Drum Transformer Rust Score—Percentage (%)	—	✓
Drum Transformer Detection—Yes/No	—	✓
WOOD POLE ASSETS		
Pole “Double Wood” Detection—Yes/No	—	✓
Pole Equipment Detection—Yes/No	—	✓
Pole Rot Detection—Yes/No	—	✓
Pole Rot Score—Percentage (%)	—	✓
Pole Leaning Detection—Yes/No	—	✓
Pole Lean Severity Score—Degree Lean	—	✓
Pole Charring Detection—OK/Defect	—	✓
Pole Top Rot Detection—Yes/No	—	✓
Pole Top Rot Score—Percentage (%)	—	✓
Cross Arm Rot Detection—Yes/No	—	✓
Cross Arm Rot Score—Percentage (%)	—	✓
INSULATORS		
Insulator Type Detection—Polymer/Porcelain/Glass	—	✓
Insulator Health Detection—OK/Defect (Broken, Flashing, Contaminated)	—	✓
CUT-OUTS		
Cut-Out Health Detection—OK/Defect (Broken, Flashing, Contaminated)	—	✓

Additional Features Include:

Scalable: Adaptable to both targeted feeder deployments and system-wide programs.

Expert Engineering: Backed by Mitsubishi Electric’s 30+ years in power systems design and support.

References

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<https://docs.nrel.gov/docs/fy24osti/87297.pdf>



- ² Kimande et al. Application of Infrared Thermography in Fault Detection and Preventive Maintenance in Distribution Transformers.
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<https://www.ijcaonline.org/archives/volume174/number12/kimande-2021-ijca-920995.pdf>



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- ⁴ Electric Power Research Institute (EPRI).
Vegetation-Caused Faults and Burndown Scenarios.
<https://distribution.epri.com/epri/public/oh-hazards/vegetation-faults/>



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