

Sky-Futures Africa has partnered with Hepta Insights

AFRICA REGIONAL PARTNER

Increasing utility grid resilience

Providing a prioritized list of grid anomalies

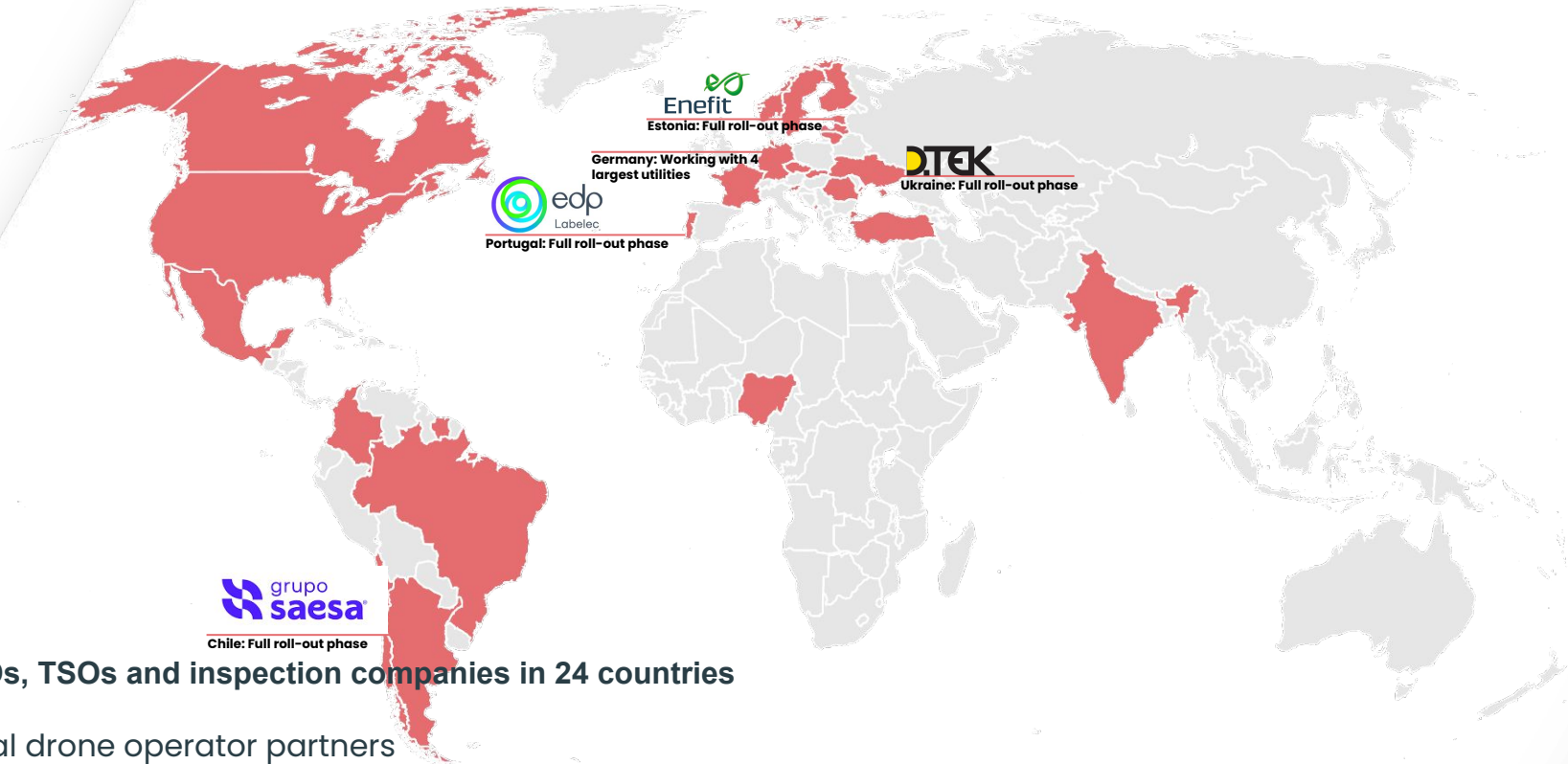
- Analysing 3000 km+ monthly
- AI-enhanced analysis process
- Insights on grid anomalies

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Customers

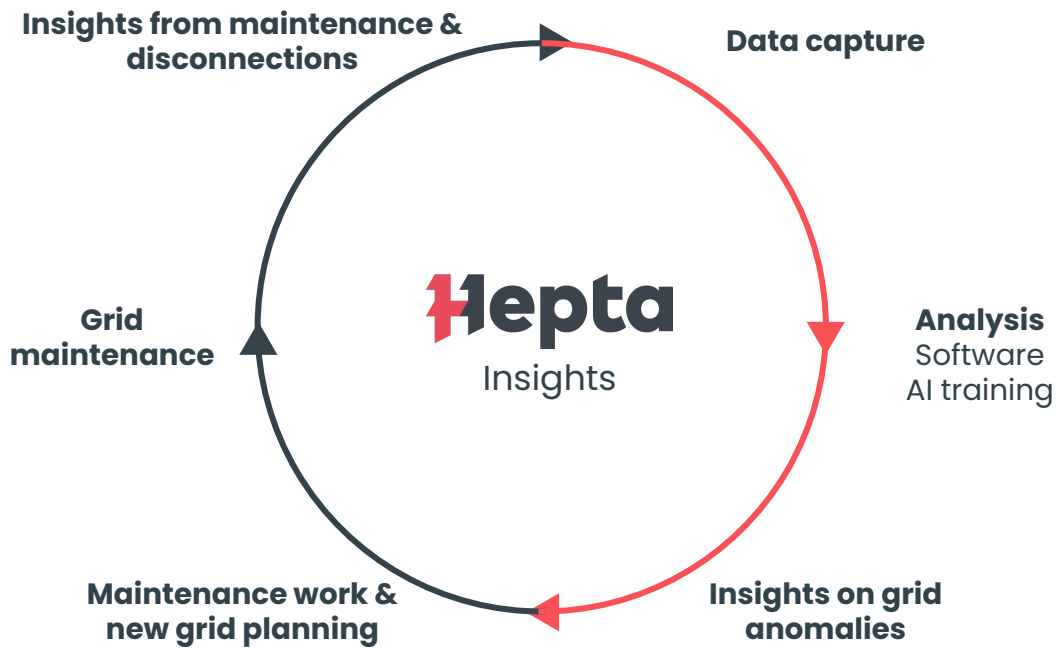


DSOs, TSOs and inspection companies in 24 countries

Local drone operator partners

Trusted to analyse **3000+ km monthly**

Our approach

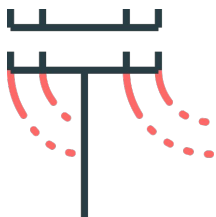


— Hepta Insights
— Utility

Goal of the inspection

Finding most amount of defects in the grid to reduce the grid outage

Quality of the analysis is the no. 1 result. Cost of not missing a defect that would cause an outage has the lowest total cost of grid maintenance.



10x

More defects found
vs on-foot inspection
Celsia DSO in Colombia

4.8x

More defects found
vs helicopter inspection
ZSDis HV in Slovakia

€32M

Projected OPEX savings
and 3.3x reduced average
outage duration (SAIDI)
vs on-foot inspection
DTEK DSO

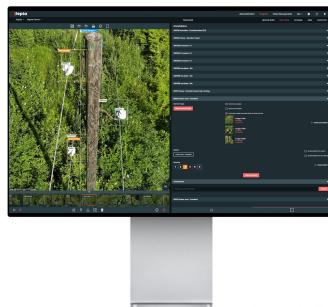
The inspection & analysis process

1. Data capture



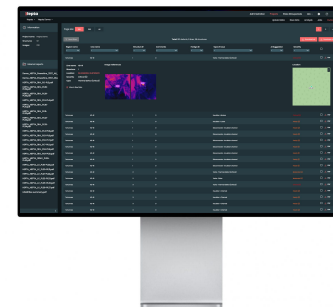
- Drones, helicopters, satellites, on-ground data
- Mostly handled by the customer or Hepta's certified local partner

2. Analysis & AI training



- Fully taken care of by Hepta
- Productivity enhanced up to 90% by AI
- Mechanical defects, 3D models, collision distances, heat maps

3. Insights

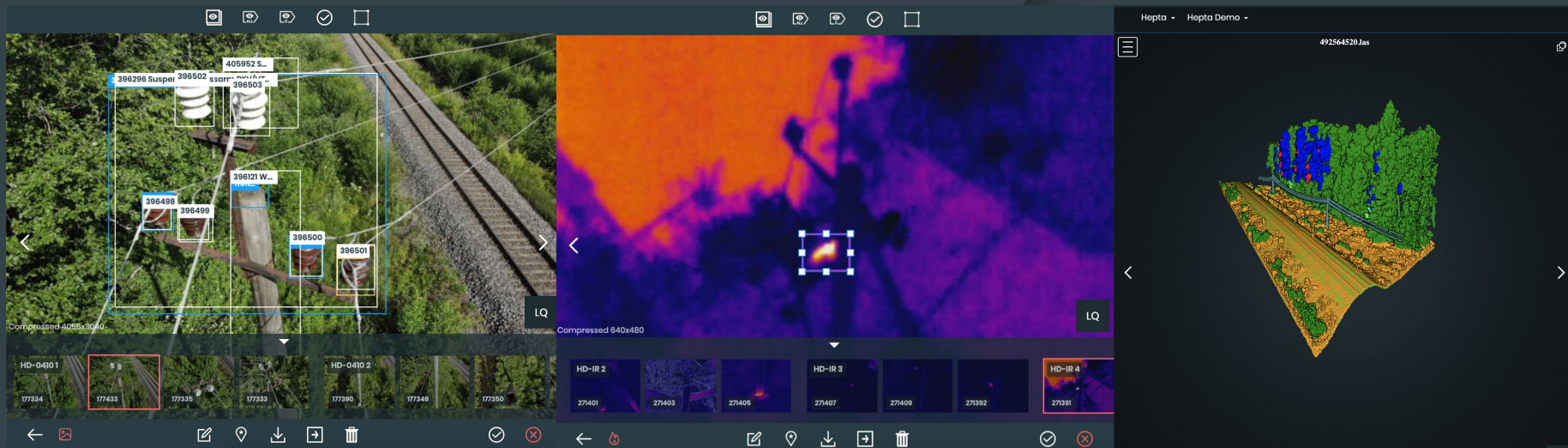


- Cloud based software
- Export XLS reports
- Integrate with GIS systems
- Printable PDF reports

Insights

- Insights is an automation platform that uses AI
- AI is used consistently throughout all of the projects
- Library of more than **200 AI models** from 24 countries
- AI deployment from Day 1
 - Our automation workflow allows for AI deployment from scratch, providing immediate benefit to the analysis workflow, without giving away quality
- Ability to integrate already developed (existing) AI models

AI-enhanced analysis software – DSOs



RGB

- Chipped or loose insulators
- Crooked and contaminated towers
- More than 100 defect types and custom defects

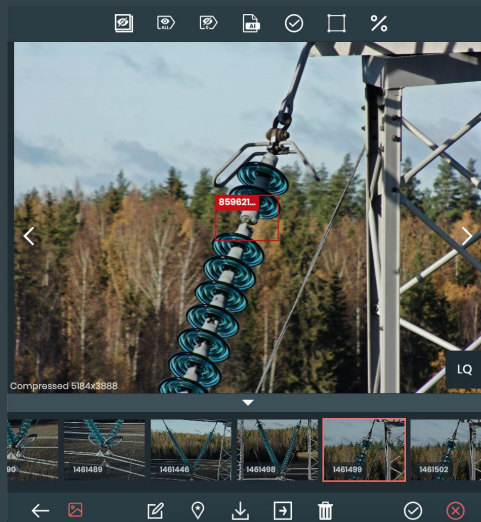
Infrared

- Overheated elements
- Damaged insulators and potential short-circuits

Lidar

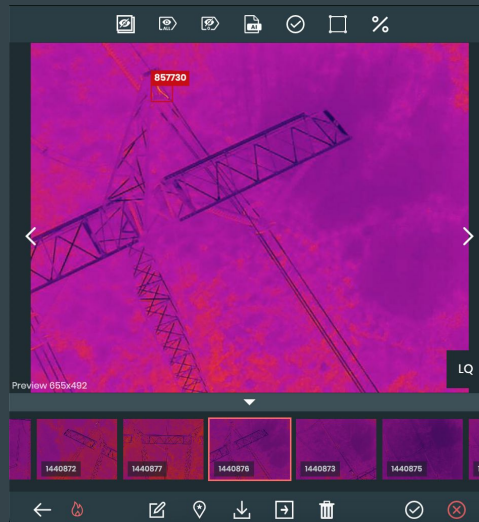
- Wire profiles
- Distance calculations
- Vegetation analysis
- Dangerous trees

AI-enhanced analysis software – TSOs



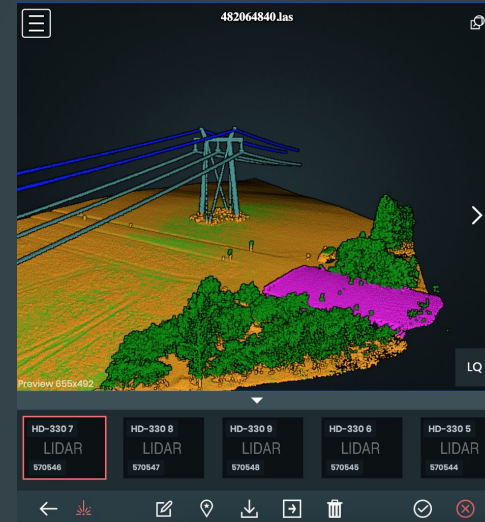
RGB

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Infrared

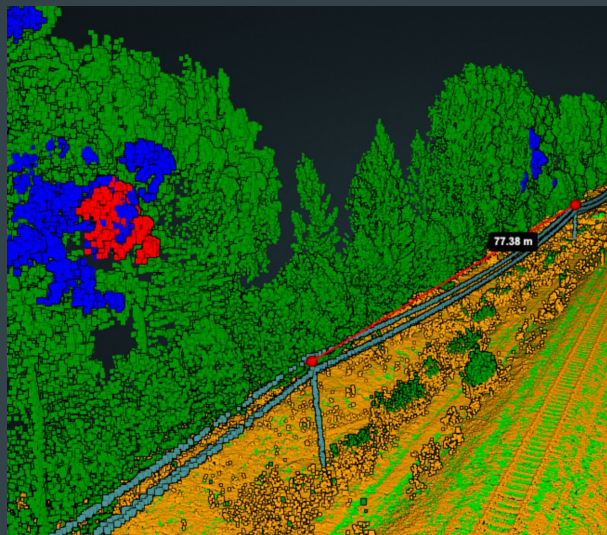
- Overheated elements
- Damaged insulators and potential short-circuits



Lidar

- Wire profiles
- Distance calculations
- Vegetation analysis
- Dangerous trees

Vegetation analysis



Lidar

10 cm precision

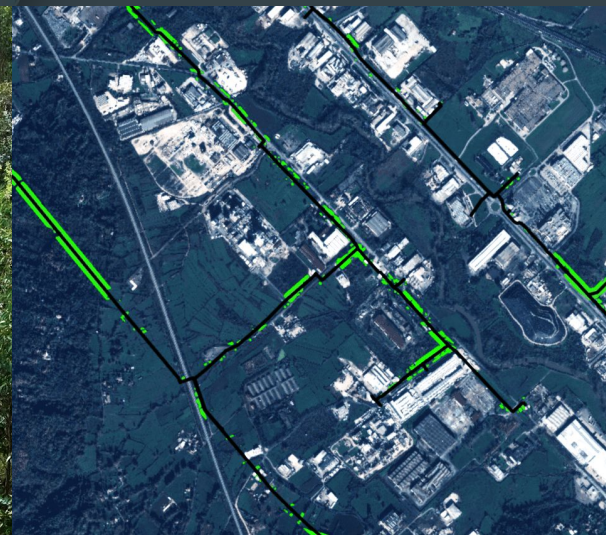
- Centimeter level distance calculations
- Get precise tower coordinates
- Wire profiles and measurements



RGB

50-100 cm precision

- Cost-efficient AI analysis
- Visual reference to the issue
- Multiple severities based on the defect risk



Satellite

60-100 cm precision

- Cost-efficient AI analysis
- Quick post-storm inspection
- Measure tree growth rate
- Inspect areas not accessible by drones

Insights on grid anomalies

Page size:

100

500

All

1

2

»

Reset filters
Total: 150 defects, 4 lines, 26 structures
☒ Show automatically detected defects
Download .xls
Download .csv

Line name	Structure #	Comments	Foreign ID	Type of Issue	Confidence	Severity	
HD-IR	1	0		Varia » Thermal defect (critical)		Critical (5)	☐ PDF

Line name: HD-IR
Structure: 1
Location: 58.20663183, 26.87915872
Severity: Critical (5)
Type: Thermal defect (critical)
☒ View in Raw Data

Image references

Location

Data delivery:

- Insights in the cloud
- XLS reports
- Enterprise integrations

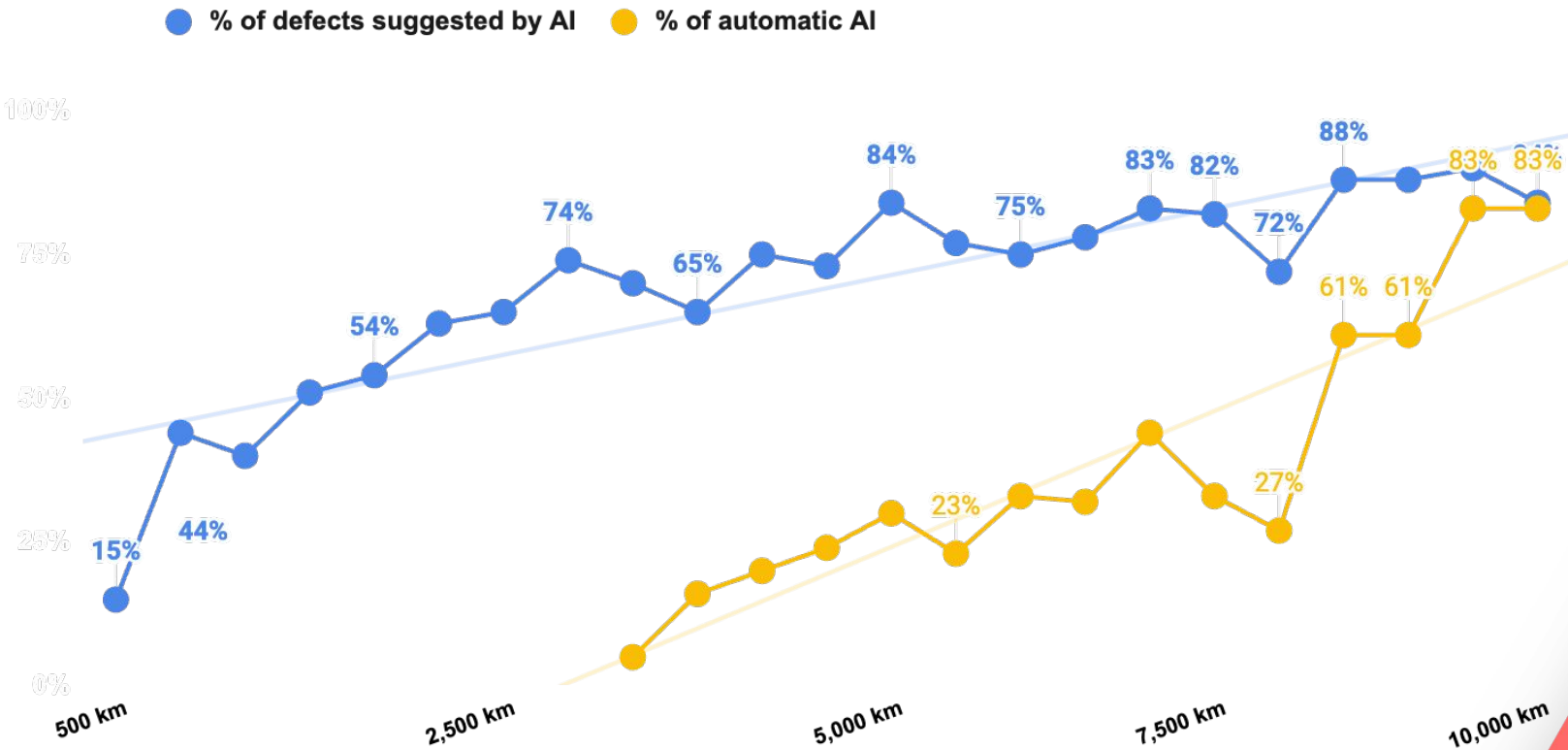
Defect #61,813

Region: Hepta_demo
Line: HD-IR
Structure: 1
Defect type: Varia » Thermal defect (critical)
Severity: 5/5
Internal type:
Coordinates: 58.206632,26.879159
uBird link:
<https://ubird.eu/project/19/raw/powerline/360/items/172787/artifacts/271395/annotations/226149/ir/single>
Image references:

<https://api.ubird.eu/ubird/public/image/edaa41b-7b96-4927-8702-241b9d373302/defect/68164d72-9a7e-41e2-9572-fe918459487d>

Printable PDF reports

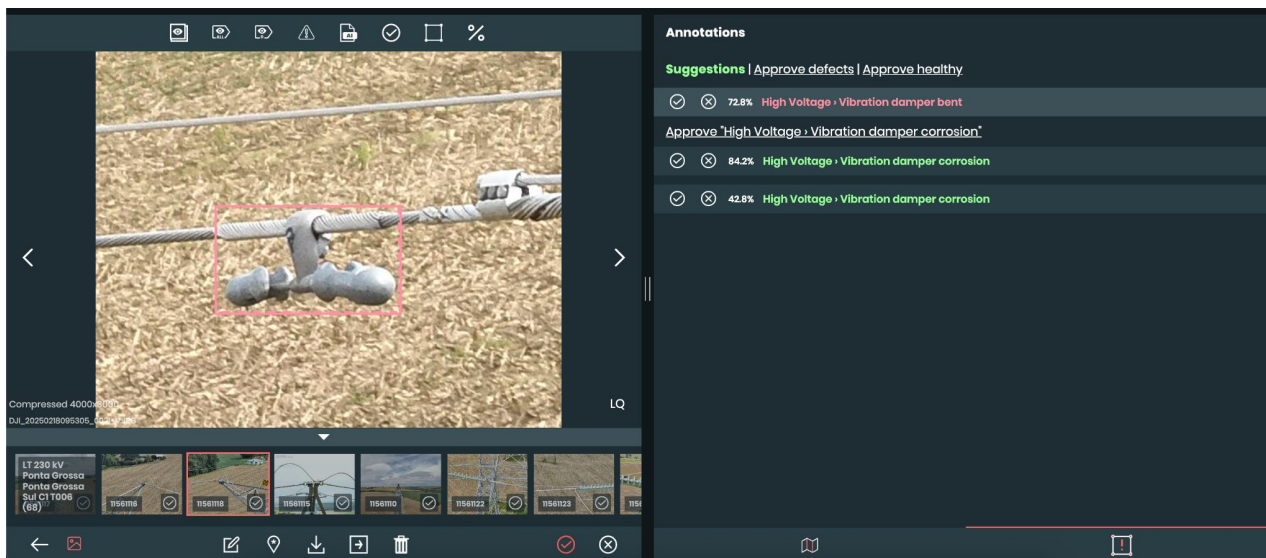
AI development customer case study



Lowest risk approach

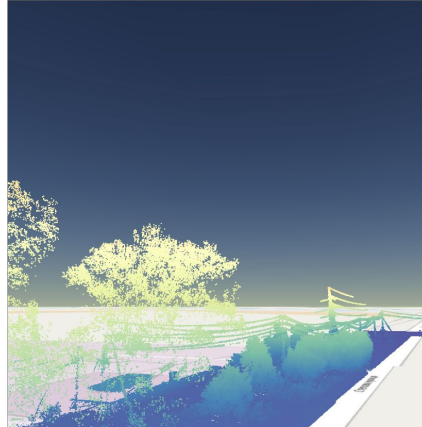
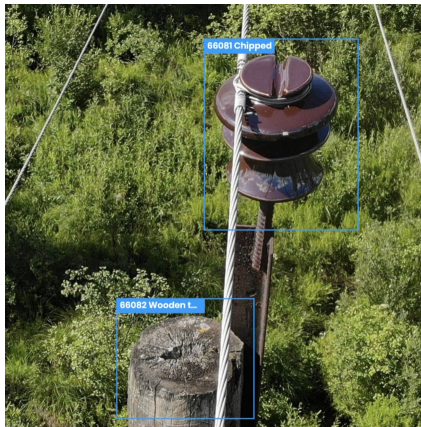
Analysis approach that **finds most defects in the grid:**

- **Cost of not missing a defect that would cause an outage has the lowest total cost of grid maintenance**
- Manual analysis by power line engineers (fully verified results)
- Efficiency enhanced by AI



How can we help you?

- **Insights software.** Used for storing, analysing and reporting. Works with photos and LIDAR point clouds.
- **Insights AI.** Used in combination with Insights software to increase efficiency and accuracy of analysis.
- **Hepta analysis service.** Full analysis service, where the customer uploads the data, Hepta analyses it and the customer gets the results fast.
- **Crew training.** Hepta has extensive experience operating in the field and providing end-to-end power line inspection service. Hepta can train your team to collect the data with drones.
- **Satellite inspection.** Vegetation analysis as an alternative to Lidar.





(**DSO** Estonia) 700 km inspected

elering

(**TSO** Estonia) 2 800 km inspected



(**DSO** Estonia) 17 000 km inspected



(**DSO** Finland) 400 km inspected

*"Hepta is analysing power lines with **faster, smarter and more accurate** solutions. It was painful to do it with traditional methods."*

*"The results of the operations enable us to **optimize the technical specifications** of the energy sector tenders."*

*"Inspection with drones is the **fastest and less costly** solution for after storm analysis on PAS and power lines."*

*"Hepta provides a **high necessity solution** for grid operators in towards making electricity **safe, constant and cheaper**."*

DSO case studies

- **Saesa Group** (Chile) >10,000 km analysed and trained AI engine
- **EDP Labelec** (Portugal) 5,000 km/yr inspection
- **DTEK** (Ukraine) 3.3x SAIDI reduction (disconnection duration)
- **KEDS** (Kosovo) full-scale 23,000 km analysis software
- **Celsia** (Colombia) 10x more defects found vs on-foot inspection
- **Enefit Connect** (Estonia) 60,000 km/yr inspection full-scale
- **Sadales tīkls** (Latvia) 1350 km inspection & AI grid analysis

Sadales tīkls (Latvian DSO) case study

2 main challenges:

- **Inspections done on-foot:**

- Time consuming inspection process requiring ca 120 in-field inspection employees
- Employee motivation & attracting new personnel – it is difficult to motivate and attract new employees with electrical education to do on-ground inspections in the field in the current job market

- **Data-based decision making:**

- Currently the decisions for maintenance are made by the in-field inspection personnel → this can lead to human errors and decisions can vary from one linesman to the other
- Current solution is very manual and can't be automated

Data capture is outsourced for drone based inspections:

- **RGB – AI-enhanced analysis with detailed images of all visible mechanical defects:**
 - All visible mechanical damages – damaged insulators, cracked hooks (>200 unique defects types)
 - QA for newly built lines
 - Training AI-engine for:
 - Element classification (updating GIS)
 - Defect detection (preventive maintenance)
- **LIDAR – data-based decisions for:**
 - All geospatial measurements from automatized calculations from Lidar dataset
 - Precise tower coordinates (updating GIS)
 - Pole leaning
 - Vegetation – precise height and distance to power lines
 - Temperature, wind and icing simulations on wire sag

Data capture is outsourced but analysis is done in-house by ST using Hepta Insights software and AI

TSO case studies

Fingrid

Finland

83 km of high voltage lines inspected in 21 days

4 AI models created and successfully tested

82% F-Score was achieved for some AI defects

25 unique defect types identified

ZSDis

Slovakia, part of E.ON Group

[Case study on website](#)

35.1 km of high voltage lines inspected in 6 days

4.8x more defects found compared to previous helicopter inspection

4.5x more unique defects compared to previous helicopter inspection

2 new AI models created and successfully tested

Netz

Germany, part of E.DIS Group

[Case study on website](#)

40 km of lines inspected for the PoC

<10 min / high voltage tower inspection time required with drones

2.5x faster defects analysis enabled by AI

ČEPS

Czechia

14.8 km of high voltage 400kV/220kV lines inspected (RGB + IR + Lidar)

>40,000 images analyzed

850 defects in a very detailed defect list

Saesa Group

Chile

2324 km/year high voltage grid analysis (since Aug 2024)

Single circuit: **1407 km**

Double circuit: **917 km**



**Discuss your grid
inspection programme.**

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