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SIEAERO – The next generation of overhead line inspection

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Today, TSOs and utilities inspect their power lines with helicopters at least once a year

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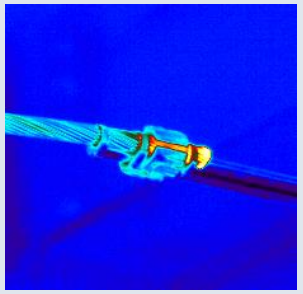
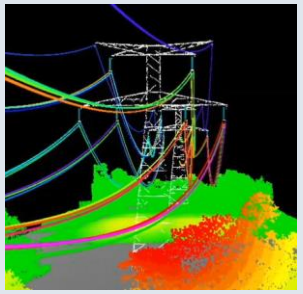
Hot Spots



Bird Nests

Right-of-Way



Kites/Balloons

Aerial Marker Balls

Insulators

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SIEAERO leverages UAVs and artificial intelligence to revolutionize overhead line inspection services

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Today
Current inspections via helicopters are

- **Inaccurate**
- **Slow**
- **Mainly manual work**
- **Dangerous**

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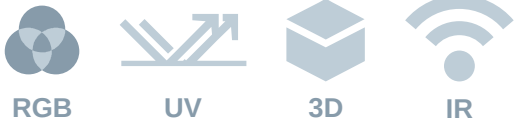
Next generation service with the following features

- **More precise**
- **Faster**
- **Automatic detection and evaluation**
- **Integrated**
- **Safer**
- **More cost efficient**

Multi-Sensor System
Integrated system with highest resolution (incl. patents)



More precise / more comprehensive

Artificial Intelligence
Advanced algorithms due to domain know-how

Faster, automated, more cost effective

Cloud Computing and Customer System Integration
Highest data security

Integrated

Helicopter
(Short Term)

Long Range UAV
(Mid Term)
Most advanced UAV, partner-ships

Safer

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Multi-Sensor System

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Sensor data

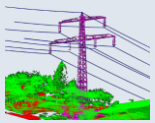
All sensors are integrated in one multi-sensor system to record all data in one go

RGB

Up to five 100 megapixel ultra-high definition color cameras

3D

LIDAR 3D laser scanner
Appr. 120 points/ m²

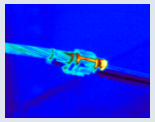


UV

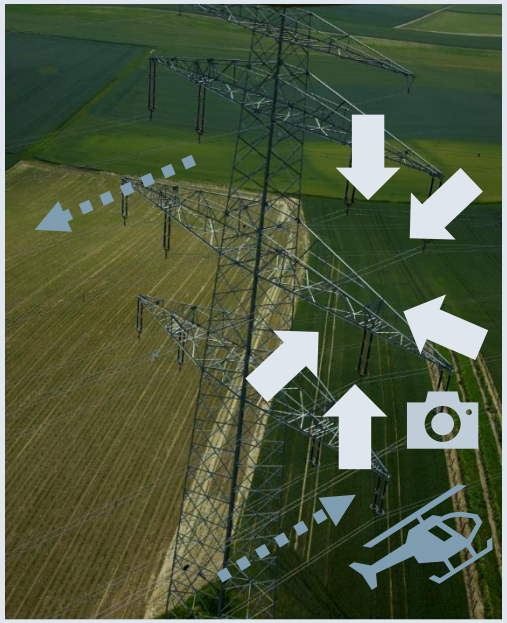
Corona sensors

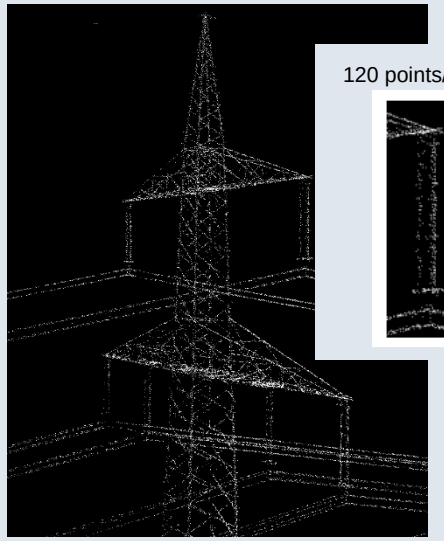
IR

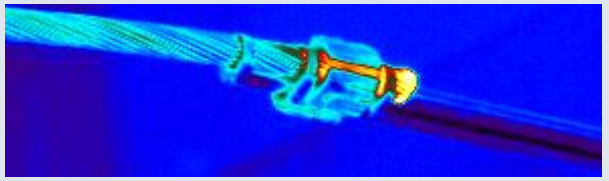
Infrared sensors



- Up to 100 GB of data per km of overhead line (160 GB per mile)
- Highly accurate geo-referenced 3D localization of all sensor data







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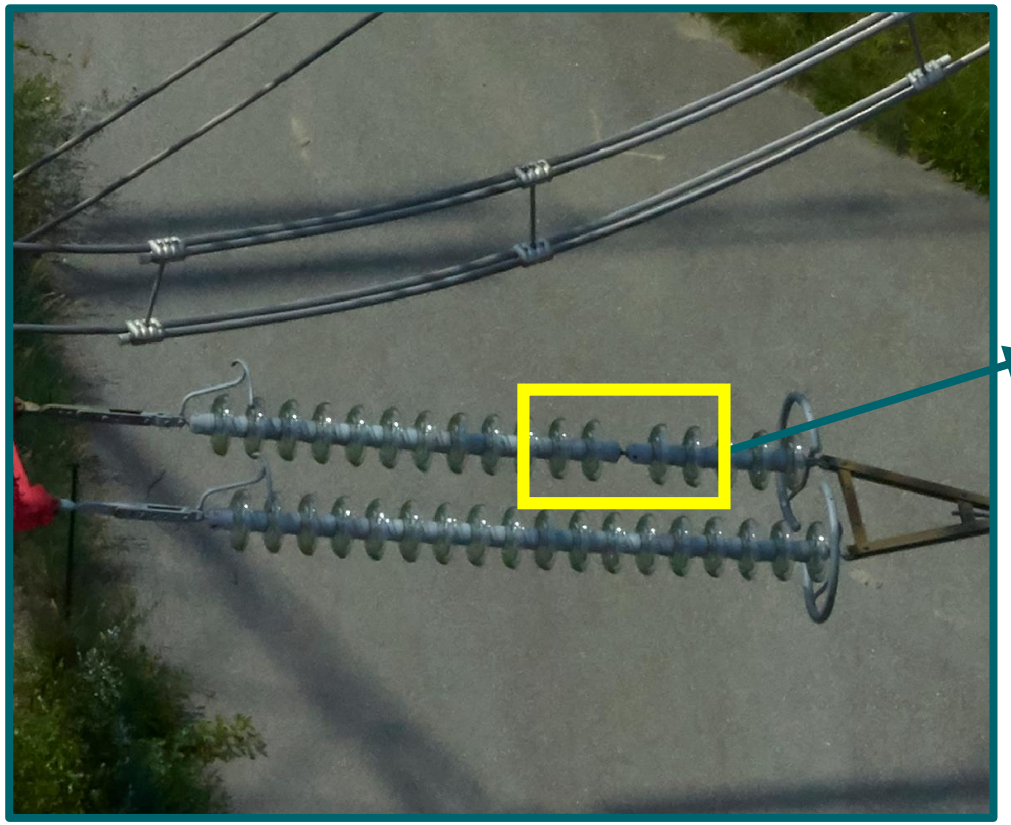
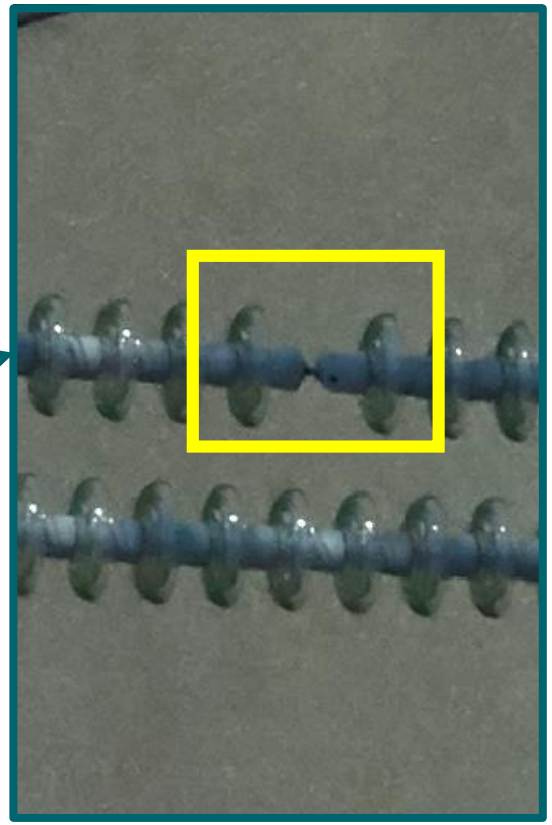
Example: Insulator Defects

Can you spot the damaged insulator?

Manual inspection during a helicopter fly by is a difficult and laborous task → especially for small-sized damages, automation is a huge benefit





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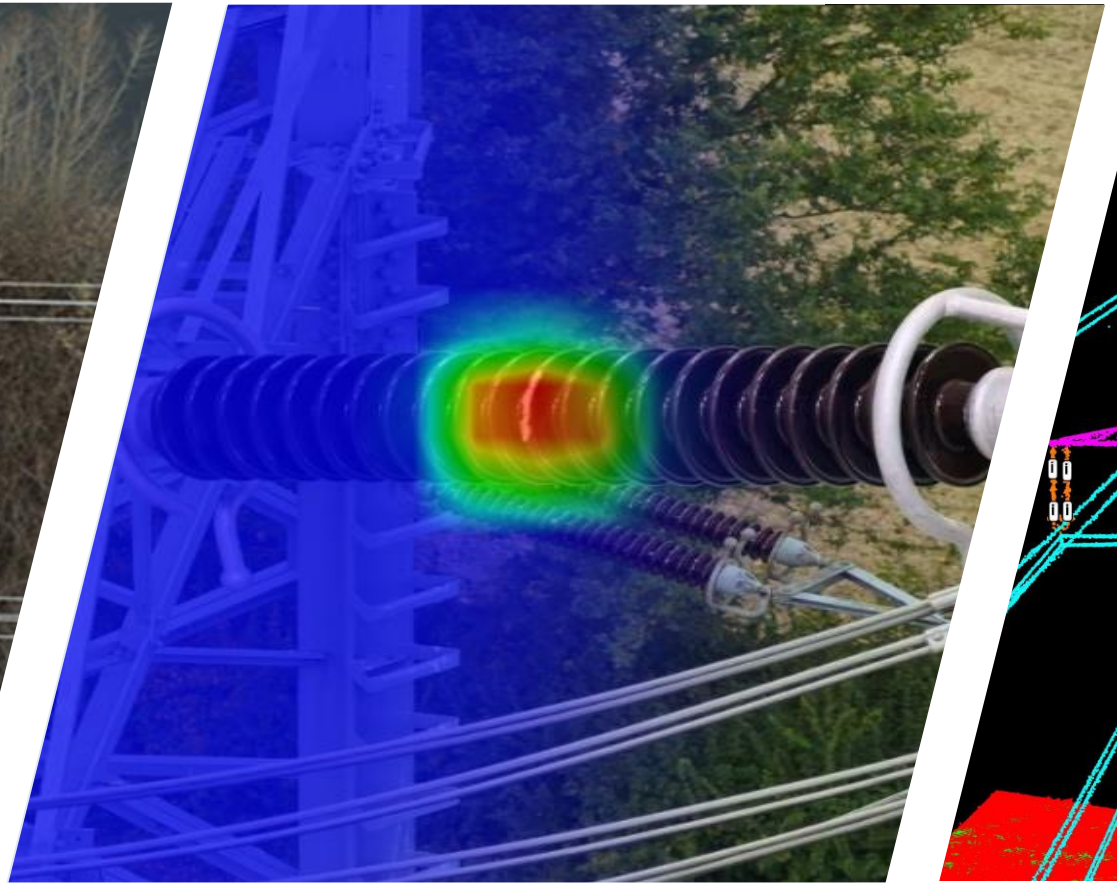
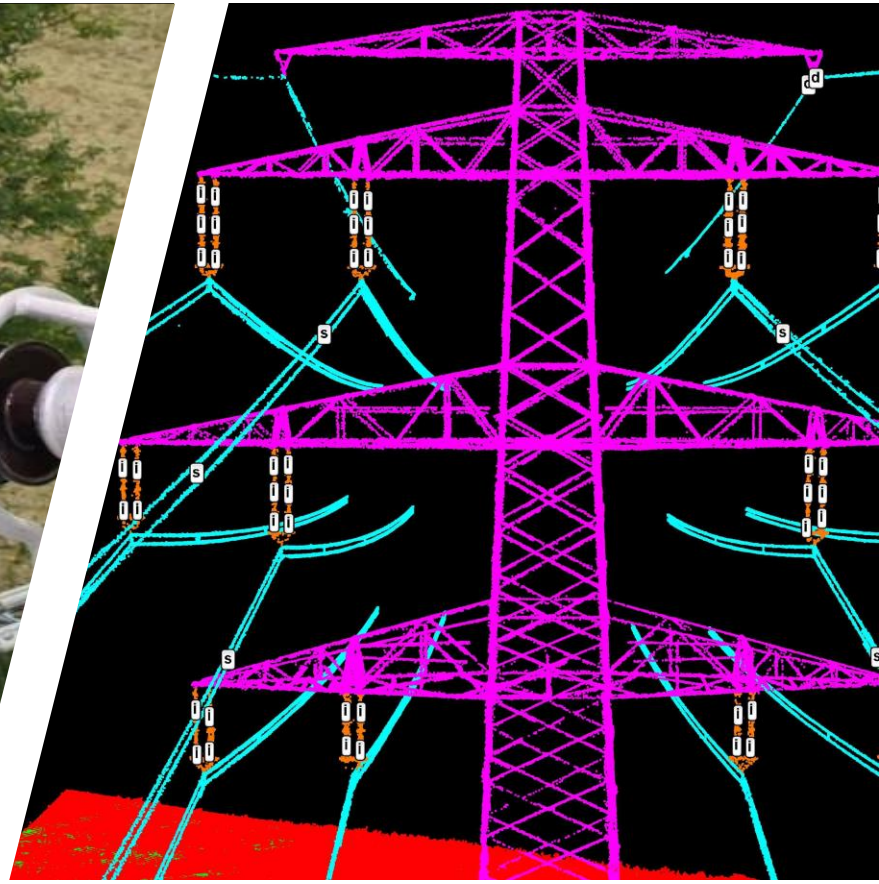
Analytic Algorithms – The Perceptual Core
Deep Dive!





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A 3D DIGITAL TWIN is automatically generated with classified, georeferenced components

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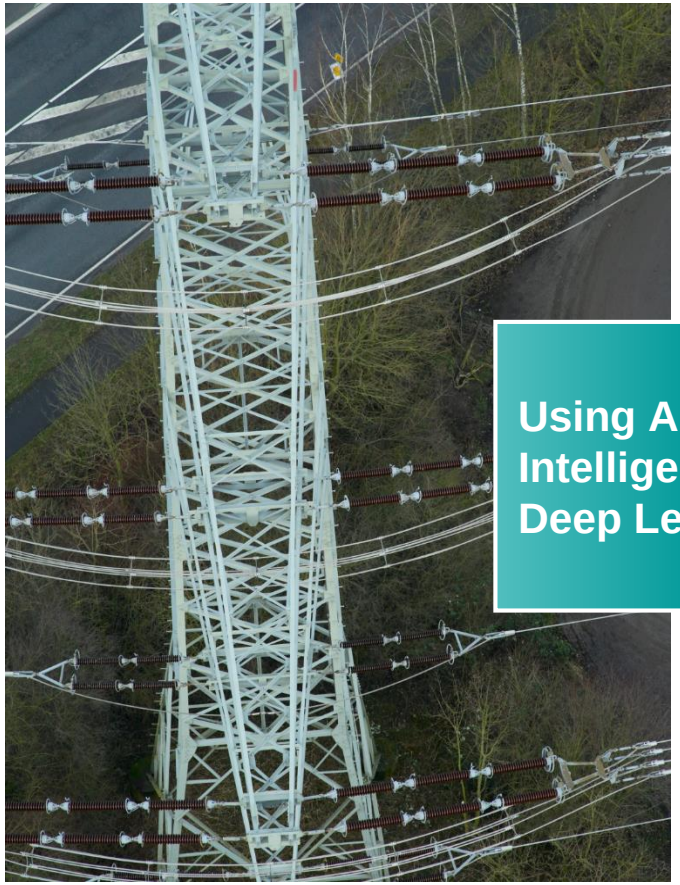
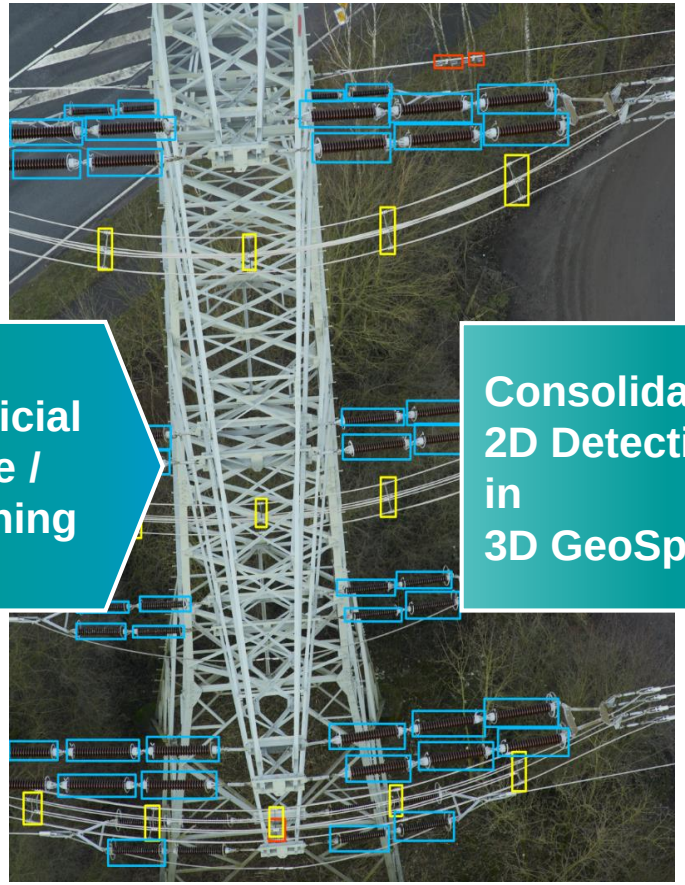
Color image

Identified components

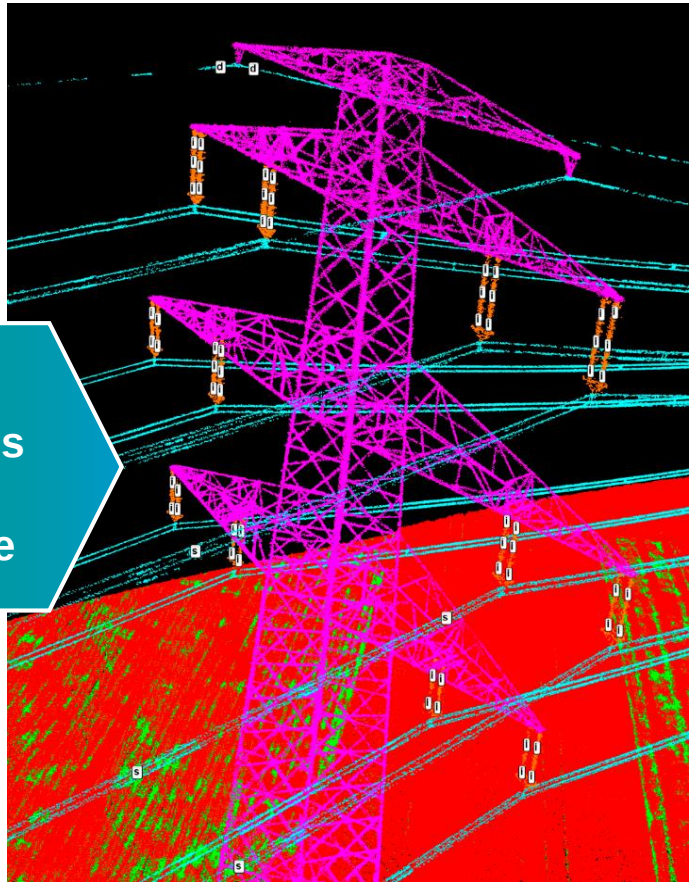
3D DIGITAL Twin / Inventory



Using Artificial Intelligence / Deep Learning



Consolidate 2D Detections in 3D GeoSpace



Vibration dampers Insulators Spacers

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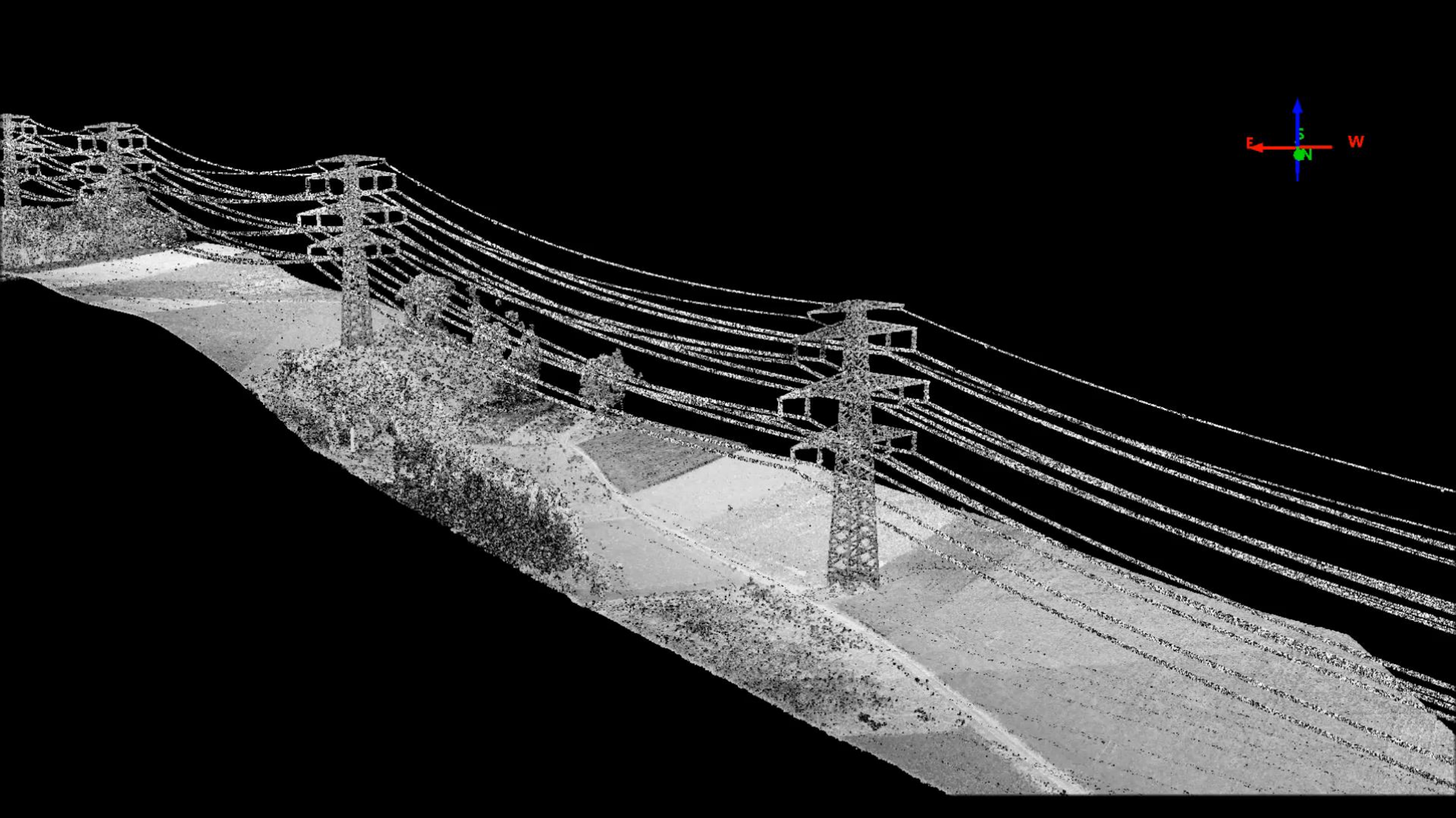
E
W
S
N

A 3D DIGITAL TWIN is automatically generated with classified, georeferenced components

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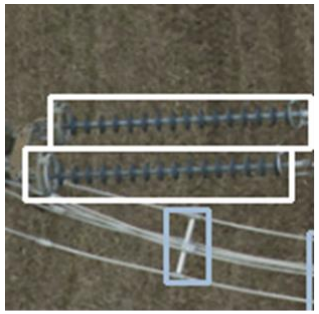
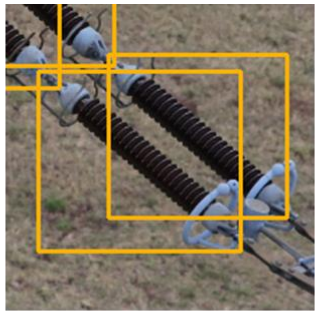
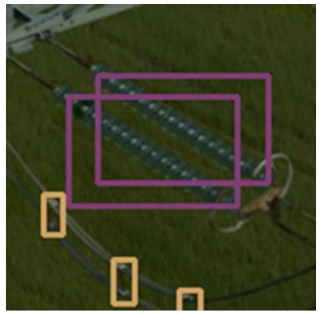
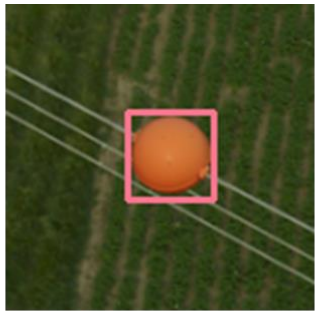
Examples of identified and classified components


Composite Insulator

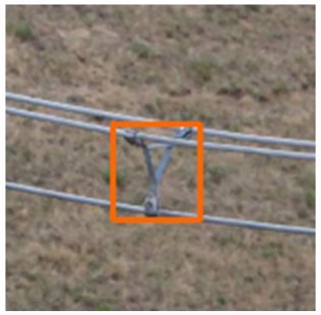

Ceramic Insulator


Glass Insulator

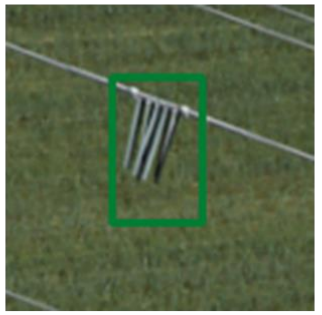

Aerial Marker Ball

Vibration Damper

2-bundle spacer


3-bundle spacer

4-bundle spacer


Bird protector

Bird nest

Using artificial intelligence and deep learning methods (2D / 3D)

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Component Inspection / Defect Classification using Image Processing and Deep Learning

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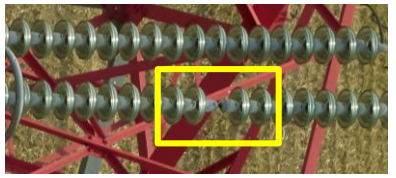
Addressed Applications

Ceramic Insulator Inspection

- Detection of chippings

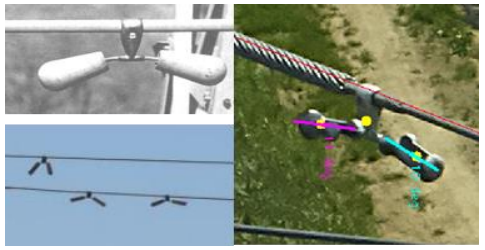
Glass Insulator Inspection



- Detection of missing shells

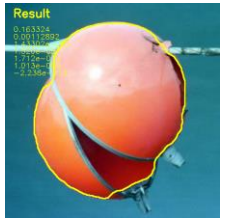
Vibration Damper Inspection

Vibration Damper – Mass Drooping



- Detection of missing damper mass
- Detection of drooping damper mass

Damages on Aerial Marker Balls



- Detection of missing shells
- Can only either shatter completely or remain intact

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SIEAERO service in a nutshell

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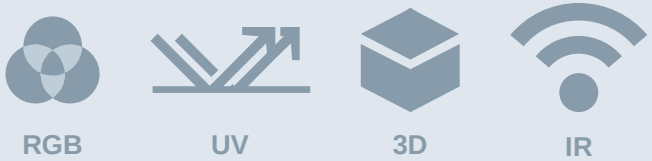
Overhead line inspection flights

Integrated high-resolution multi-sensor system



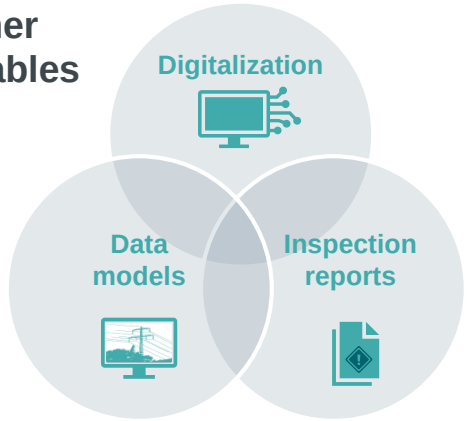
Digitalization and Big Data

Smart data analytics

Secure data storage and handling

Results

Customer deliverables



Customer benefits

More precise	Integrated
Faster	Safer
Automatic detection and evaluation	More cost efficient

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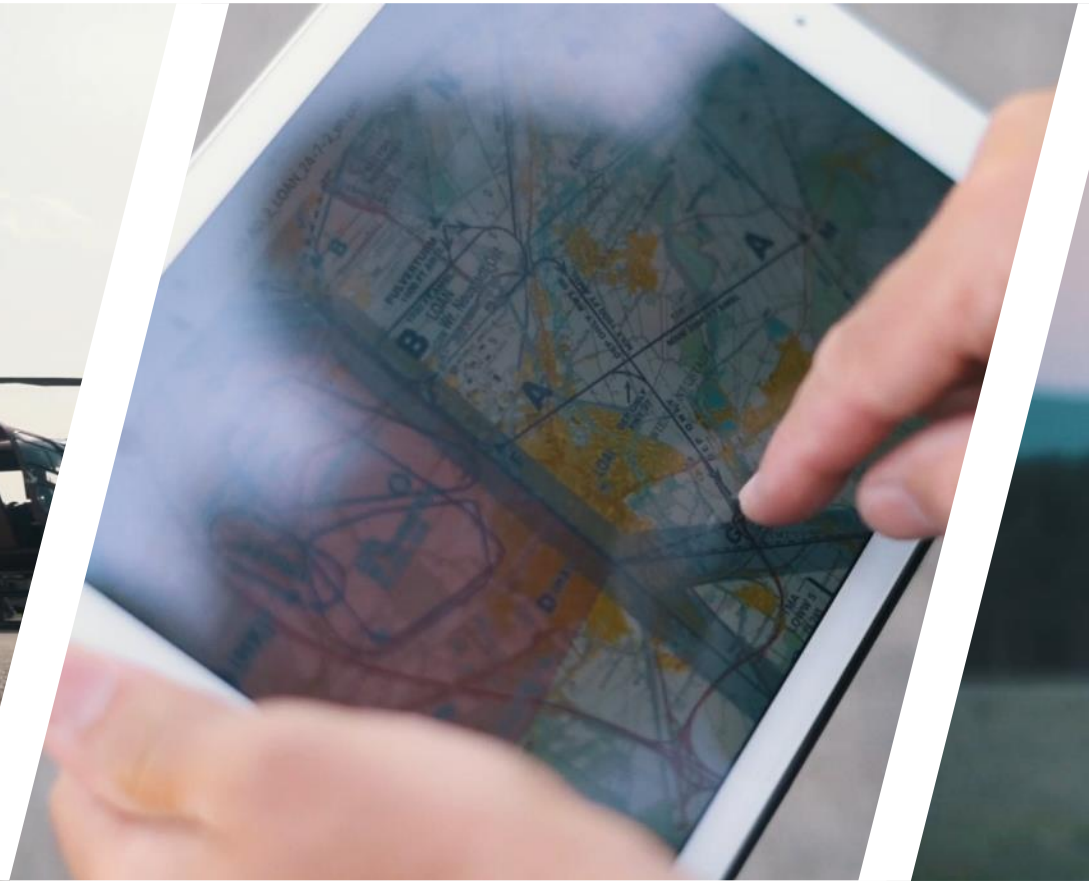
SIEAERO is already up in the air!



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Feel free to contact us!

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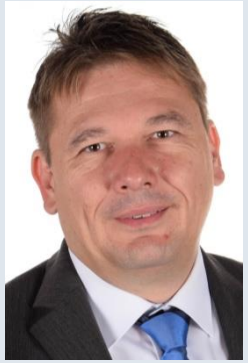

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