

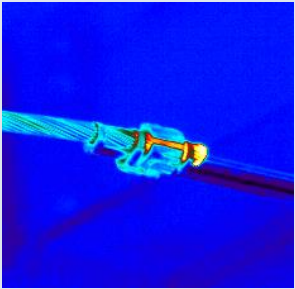
SIEAERO powered by MindSphere - Next Generation of Overhead Line Inspection

Siemens AG

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

SIEMENS
Ingenuity for life

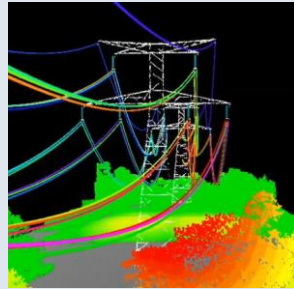
Hot Spots



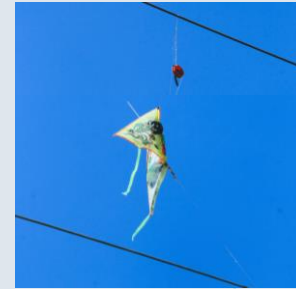
Bird Nests



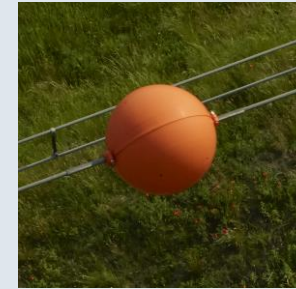
Right-of-Way



Kites/Balloons



Aerial Marker Balls



Insulators



The SIEAERO service helps customers to overcome the shortcomings of a conventional inspection approach

Today

Current inspections via helicopters are

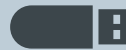
Inaccurate



Slow



Mainly manual work



Dangerous



SIEAERO

Next generation service with the following features

More precise

Faster

Automatic detection and evaluation

Integrated

Safer

More cost efficient

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



Multi-Sensor System

Integrated system with highest resolution (incl. patents)



RGB



UV



3D

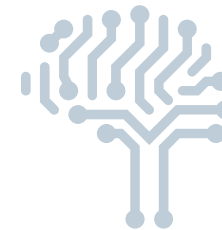


IR

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



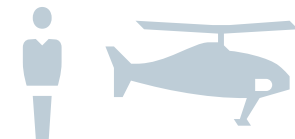
Integrated

Helicopter (Short Term)



Long Range UAV (Mid Term)

Most advanced UAV, Partnerships



Safer

Components are automatically identified using artificial intelligence and machine learning

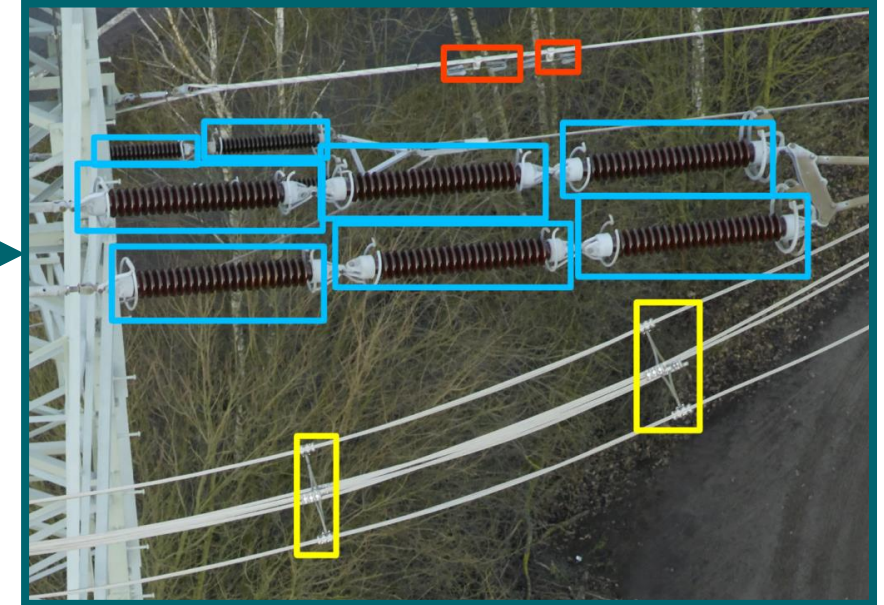
Color image



Identified components



Automated
detection, loca-
lization and
identification of
components



□ Vibration dampers □ Insulators □ Spacers

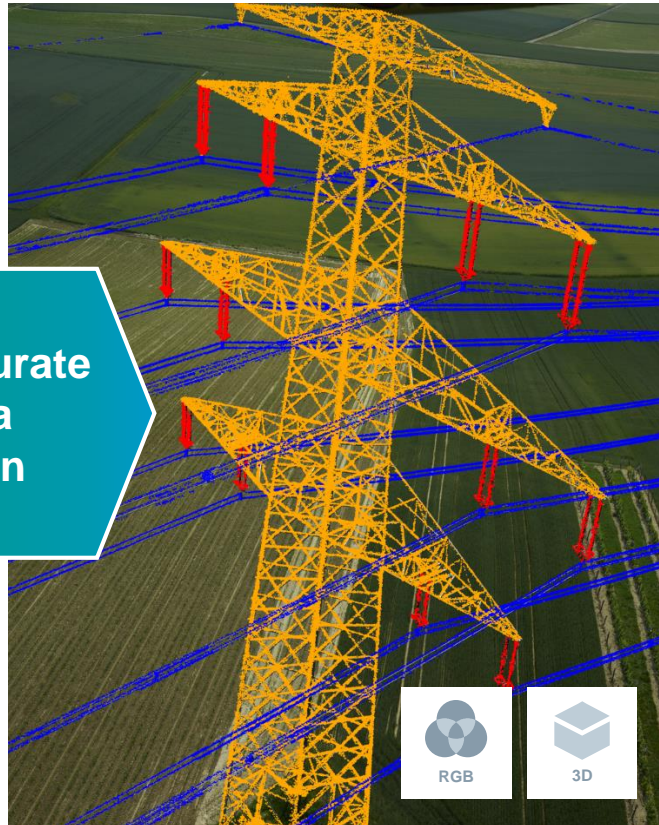
SIEAERO high definition sensor system was specifically developed for overhead line inspection

Color image (RGB)



Highly accurate
sensor data
combination

Color image and 3D model



- Comprehensive high definition sensor system currently not available on the market
- Selection and arrangement of high definition sensors focus on overhead line requirements



RGB



UV



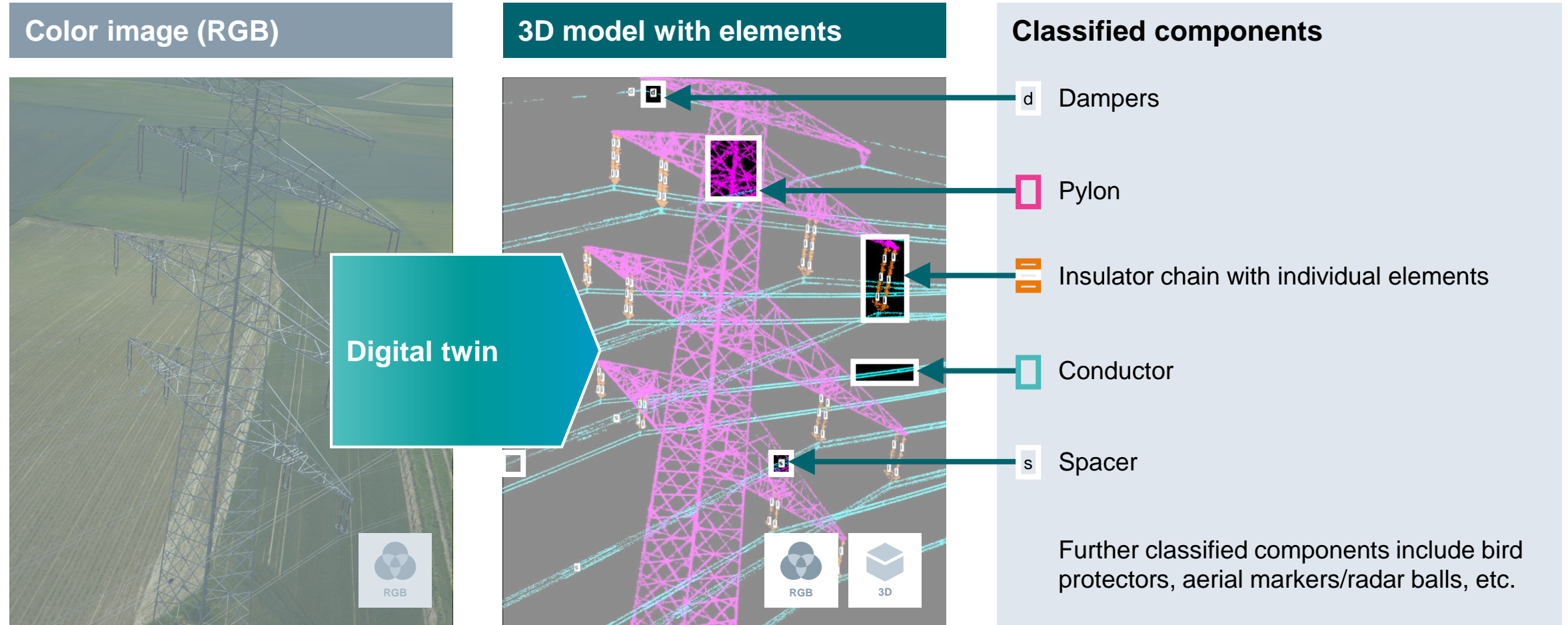
3D



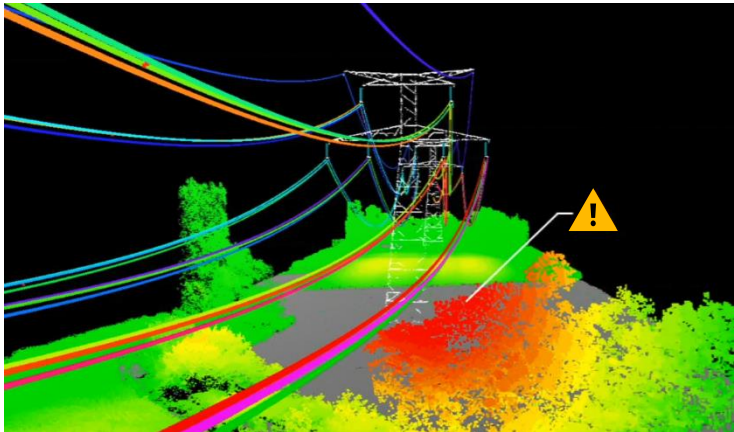
IR

- Precise calibration of all sensors
- Combination of all sensor data possible (2D and 3D)
- Exact determination of the geographic locations

A 3D Digital Twin with classified components is automatically generated



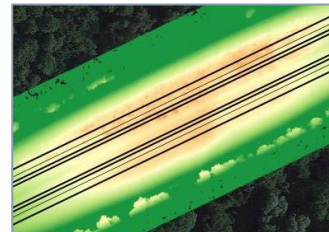
Vegetation management



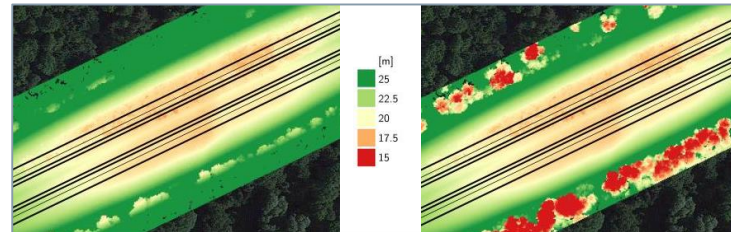
- Distance of vegetation to conductor wires is calculated
- Red areas indicate that vegetation is too close to the conductor wire
- All critical areas will be identified and documented
- The exact geographic location of all identified critical areas is provided. The respective plants can be easily identified

Tree fall simulation

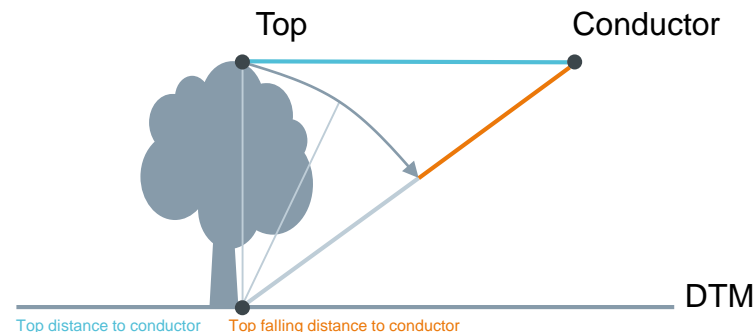
Vegetation distance **without** simulation of falling trees.



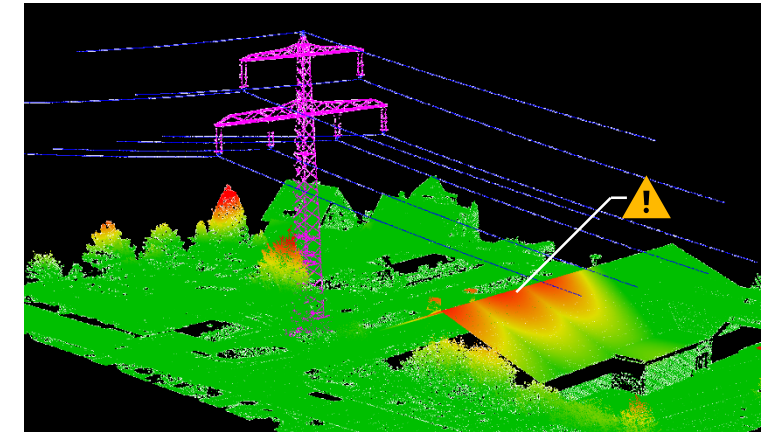
Vegetation distance **with** simulation of falling trees.



Distance between conductor and vegetation typically smaller when tree is falling.



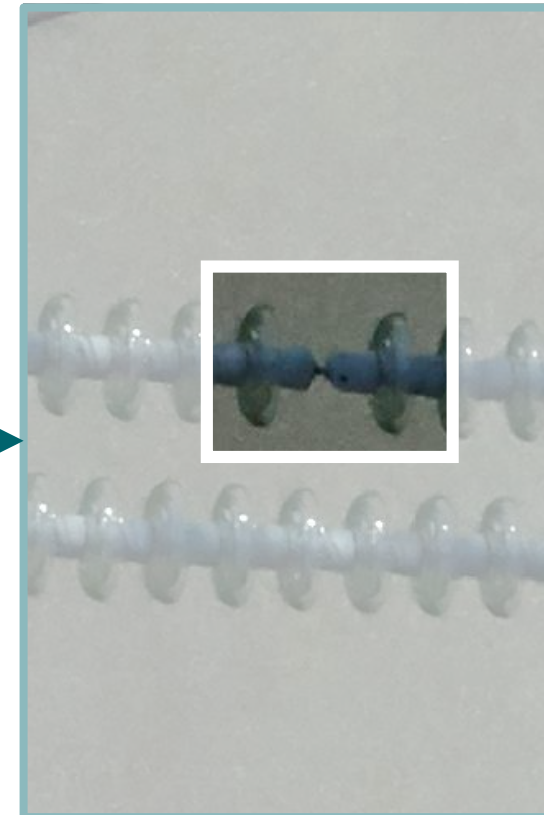
Illegitimate constructions



- Distance between conductor wires and constructions (e.g. buildings) or other objects along the over head line right-of-way is calculated
- Red areas indicate objects which are too close. All critical areas will be identified and documented
- The exact geographic location of all identified critical areas is provided

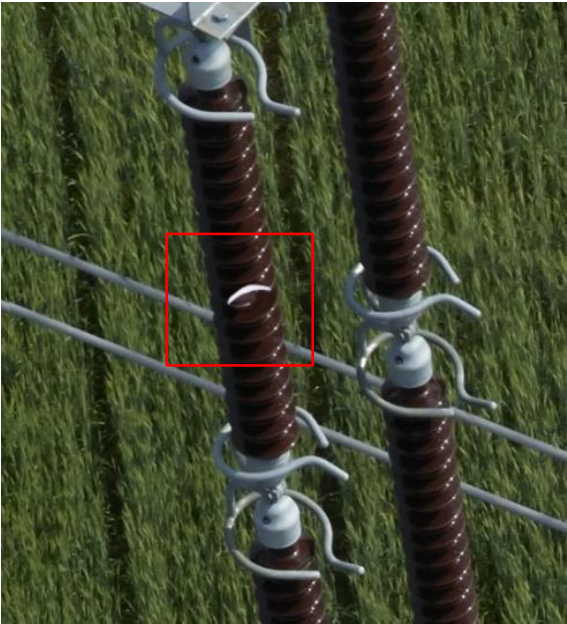
Examples for components and defects: Insulators

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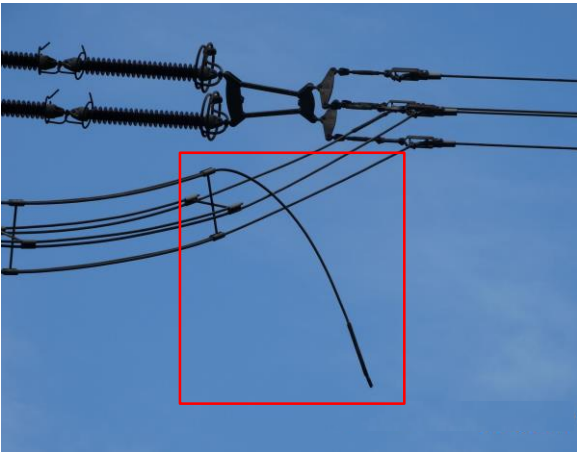
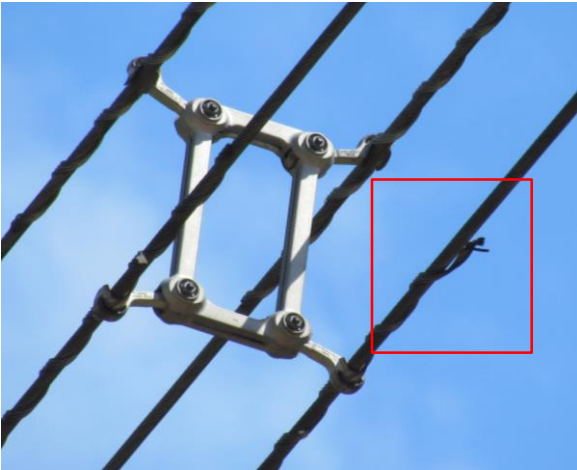


Examples for components and defects: Insulators, conductors, spacers, bird nests

Insulators



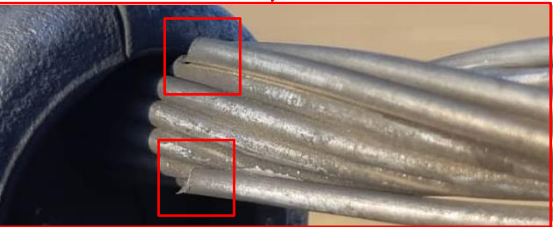
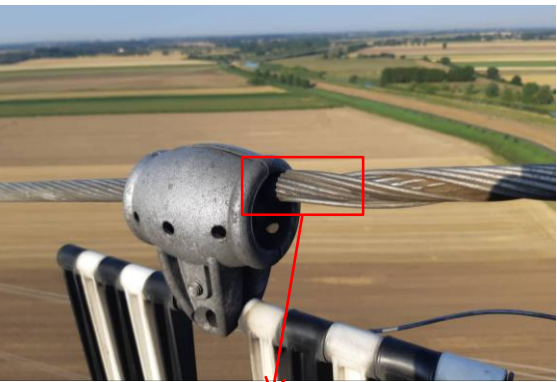
Conductor, spacers



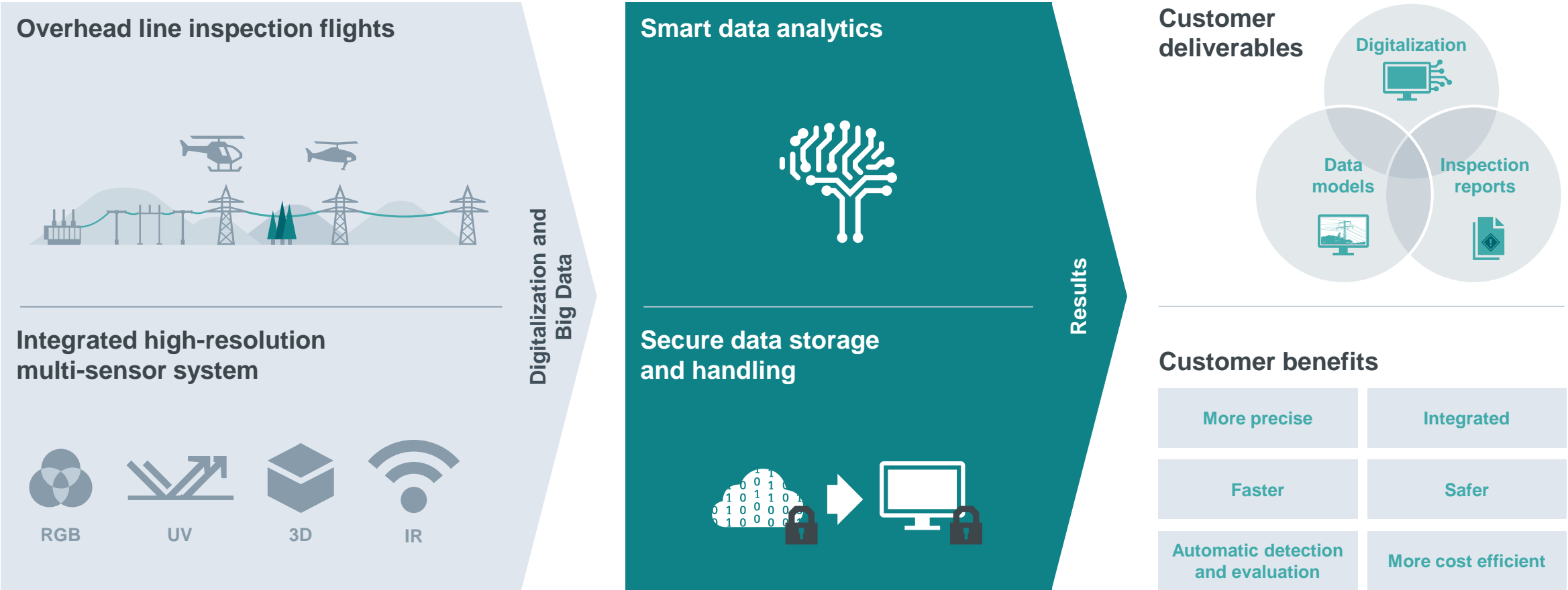
Bird nests



Further components



SIEAERO service in a nutshell



Feel free to contact us!



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[siemens.com/sieaero](https://www.siemens.com/sieaero)

SIEAERO is already up in the air!

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