



Capgemini  engineering

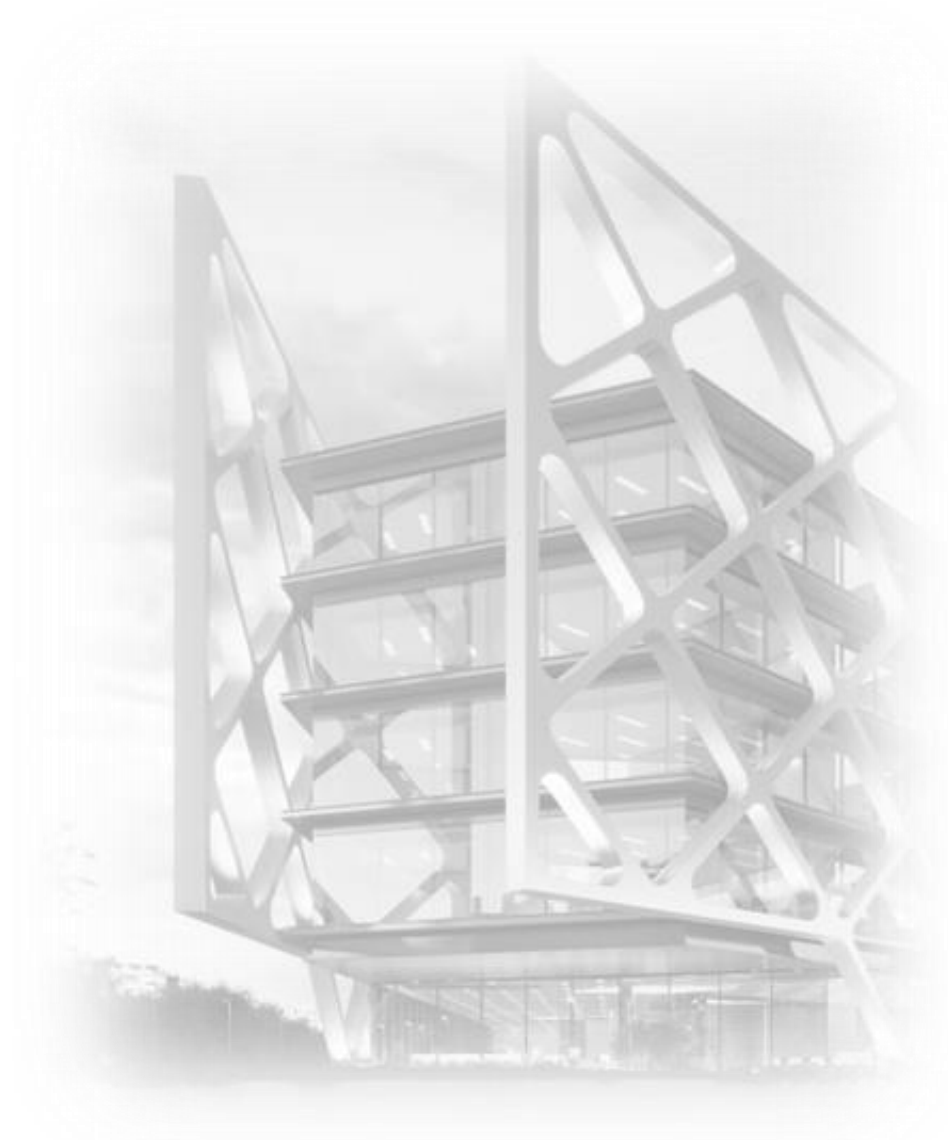
# AI VISUAL INSPECTION AUTOMATION FOR THE GRID

June 2023

engiLens



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Visual inspection of generation and distribution assets is mostly a manual and routine process, that presents a significant opportunity, in particular combined with other data:

- Automation and shorter lead time (10x faster)
- Early detection, anticipate, frequent inexpensive inspections
- Around the clock inspection
- Reduce total cost of maintenance
- Improve reliability of the process (humans typically fail 20% to 30% of the times in these repetitive tasks). Most probability higher
- Improve traceability



# APPLICATIONS FOR VISUAL INSPECTION IN GENERATION AND DISTRIBUTION



Damaged insulator



Hot spot in the facilities



Vegetation too close



Corrosion



Anomalies in breakers



Blade cracks



## Wouldn't be great if we could...



**Support humans and increase reliability of inspections (40% better accuracy):** reduce hazards



**Unlock proactive visual inspection.**  
Anticipate instead of react



**Release a lot of time dedicated to boring anomaly or annotation tasks** (driving up errors, 90% less time)



**Collect more data and use it to enhance generation and grid assets:**  
life extension



## Visual inspections in energy remain unsolved, and AI is rather used, due to:



The dominance of old AI techs and handcrafted do-it-yourself AI



Fragmentation of focused solutions (SET surveillance, Fire prevention, drones...)



Lack of cost-effective AI solutions



No user friendly AI. Unable to make it actionable. The PoC trap



Existing solutions require extremely large datasets



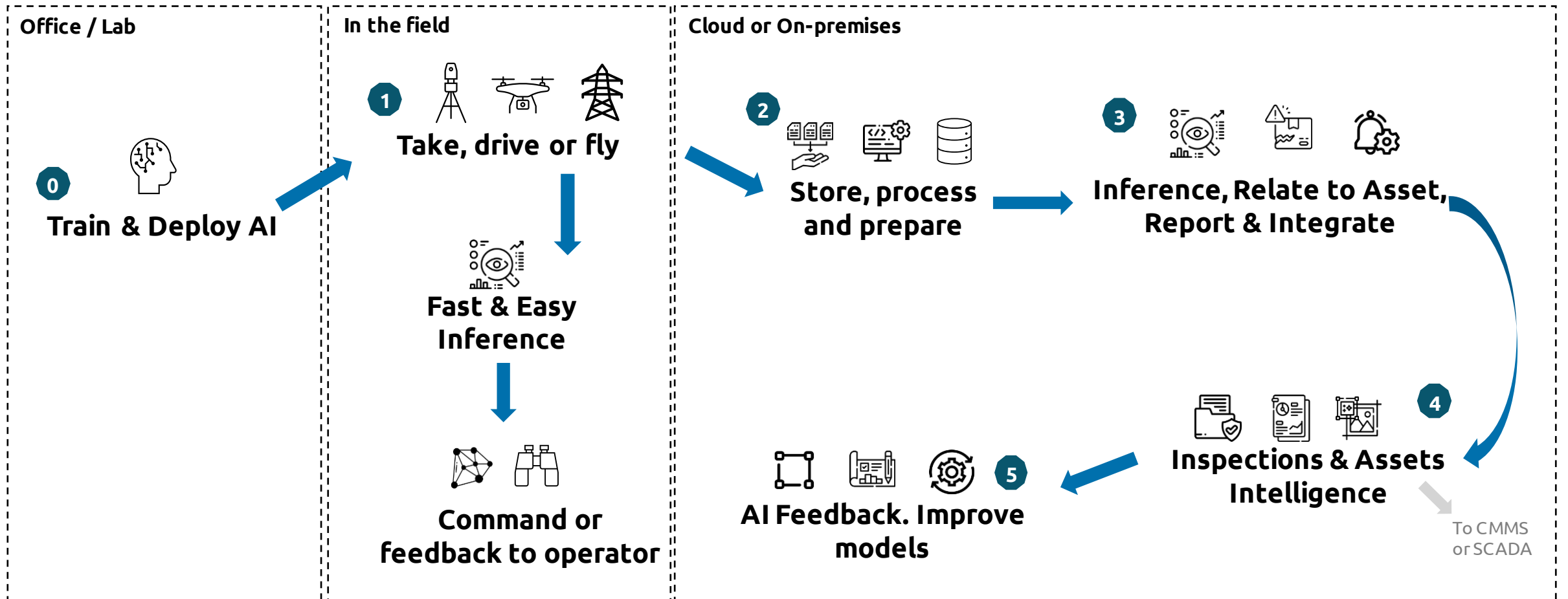
Regulation, inertia of the maintenance teams, distrust

# INDUSTRY FIRST MULTIPURPOSE AI VISUAL INSPECTION AUTOMATION PLATFORM



## Our mission

Our mission is to provide a single AI platform to run Inspection and Asset intelligence, that enables power generators, DSO & TSO to accelerate the adoption of deep learning AI quickly, cost-effectively and successfully: engiLens platform



# THE ADVANTAGE: DEEP LEARNING MLOPS & INSPECTION APP TOGETHER



## A) Train and deploy your models: engiLens relies on our partner platform LandingLens for neural network training and deployment (MLOps)

Powered by LandingLens

Model Name	Training Info	Evaluation Info	Confidence Threshold	Precision	Recall
Modelo Segmentación Rápido	10955 - Test and easy - exported dataset - 10/26/2022, 17:17. Unlabeled set: 246 images (0) 7 months ago	10955 - Test and easy - exported dataset - 10/26/2022, 17:17. dev: 0.987 2 months ago	0.5	1	1
Modelo 1 - Prueba mixto 70 fotos	10900 - New exported dataset - 10/25/2022, 20:53 modo 70 fotos. Train: 246 images (0) 7 months ago	10900 - New exported dataset - 10/25/2022, 20:53 modo 70 fotos. dev: 0.977 2 months ago	N/A	1	1

## B) Run visual inspection and improve



IMAGE	ITEM	SCA	LINE	LOCATION	DEFECT	TYPE OF INSPECTION	THRI
P1110689.JPG					Yes	Insulator	
P1110690.JPG					Failed	Insulator	
P1110691.JPG					Yes	Insulator	
P1110694.JPG					Yes	Insulator	
P1110696.JPG					Yes	Insulator	
P1110697.JPG					No	Insulator	
P1110698.JPG					Yes	Insulator	
P1110702.JPG					Yes	Insulator	
P1110706.JPG					Yes	Insulator	
P1110711.JPG					Yes	Insulator	





Deep Learning based. Deals with subjectivity and complexity in images, no digital image processing



One single universal platform to support all your AI based visual inspection automation needs. Integrates with other adjacent techs (Generative AI, 3D, VR..)



From training to deploy and back. Cycling to refine the AI model using data from the live solution requires one-click



## Advantages



Work with limited datasets (when you only have 50 defects instead of 50 million). Quality of data vs quantity



Best fit for visual quality controls. Focused models with technology superiority



No-code. 10x faster in model building. 90% less time to deploy



Quality managers and SMEs can also label and teach this AI

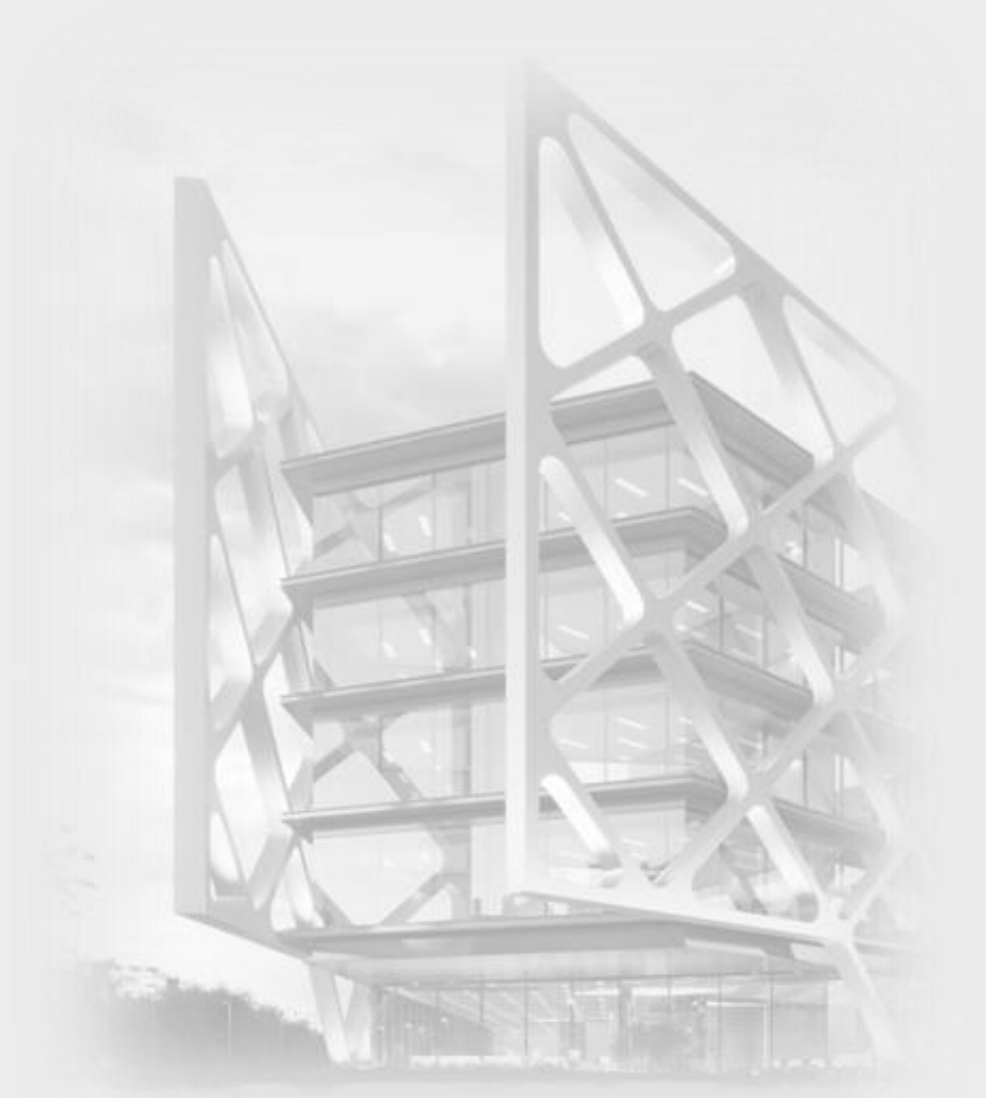


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**Objetivo:** Inspección visual de infraestructuras eléctricas más proactiva, efectiva y frecuente, con autonomía, para una red eléctrica más inteligente, segura y disponible

**Solución:** Plataforma integral IA para planificar, ejecutar, monitorizar y reportar inspecciones visuales de los activos eléctricos. Los equipos de EDP Redes generan un plan de inspección de los activos, que están recogidos en la solución, se asigna el vuelo de inspección (dron o helicóptero), se reciben las imágenes y se analizan por una serie de modelos IA, deep learning, para detectar diferentes tipos de anomalías, generando un aviso en caso de defecto. El análisis IA es inteligente para reconocer varios fotos de un activo, seleccionar la idónea, realizar preprocesamientos necesarios previos y comparaciones con años previos.

La plataforma permite:

- Mejora continua IA: los equipos de inspección de EDP Redes el reentrenar y mejorar los modelos IA fácilmente por sí mismo cuando su comportamiento se degrada, para progresivamente adaptarlos a las condiciones reales y desplegarlos directamente en segundos
- Usabilidad de la IA: los propios técnicos de EDP Redes pueden reentrenar y desplegar los modelos
- Usable en todos los países de EDP, con una rápida adaptación de los modelos
- La solución se embarcará total o parcialmente (más probable) en un dron, sustituyendo al trabajo realizado por helicópteros actualmente, para realizar el análisis en tiempo real.



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