



# ROBOTIC DATA FRAMEWORK

VISUAL AI AND SYNTHETIC DATA





# BACKGROUND

Robotic Data Framework has emerged as a leading option to help inspect assets using AI. Augmented with drones and other devices, this helps increase the frequency of inspection for areas difficult-to-reach, minimize safety risks, and improve accuracy of analysis.

This continuously maturing space will help develop proactive maintenance strategies that will increase maintenance efficiency and reduce the down time.



Depth	Time	LOWALC	TIMEALC	IPWS	WHEEL	WHEEL	WHEEL
300	1000:00:00	001F	0000	1	✓	✓	✓
300	1000:00:00	001F	0000	0	✓	✓	✓
300	1200:00:00	001F	0000	1	✓	✓	✓
300	1000:00:00	001F	0000	1	✓	✓	✓
300	1000:00:00	001F	0000	1	✓	✓	✗



# CHALLENGES



Low frequency of inspection due to manual, time consuming effort



Insufficient visuals for Computer Vision (CV) model training



Missed defects, inaccurate detection, especially with visuals on screens



Rare events and events with no history – unable to train AI models without visuals



Managing collection of videos & images



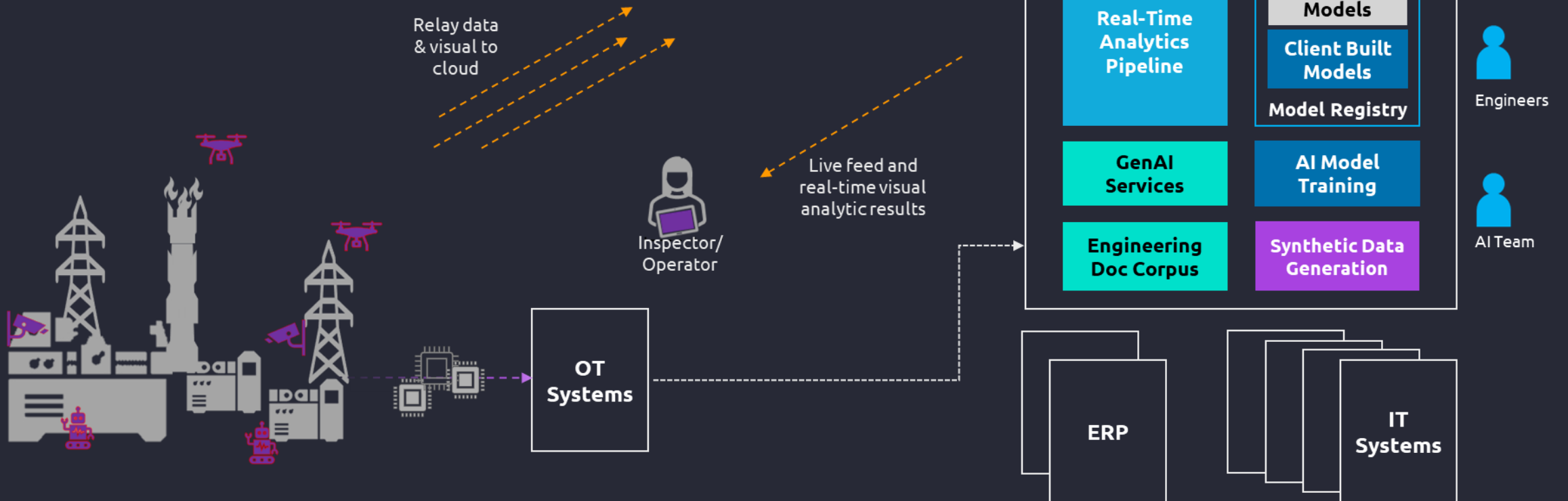
Images captured are not always in the correct angle and view that allows defect detection



# ROBOTIC DATA FRAMEWORK

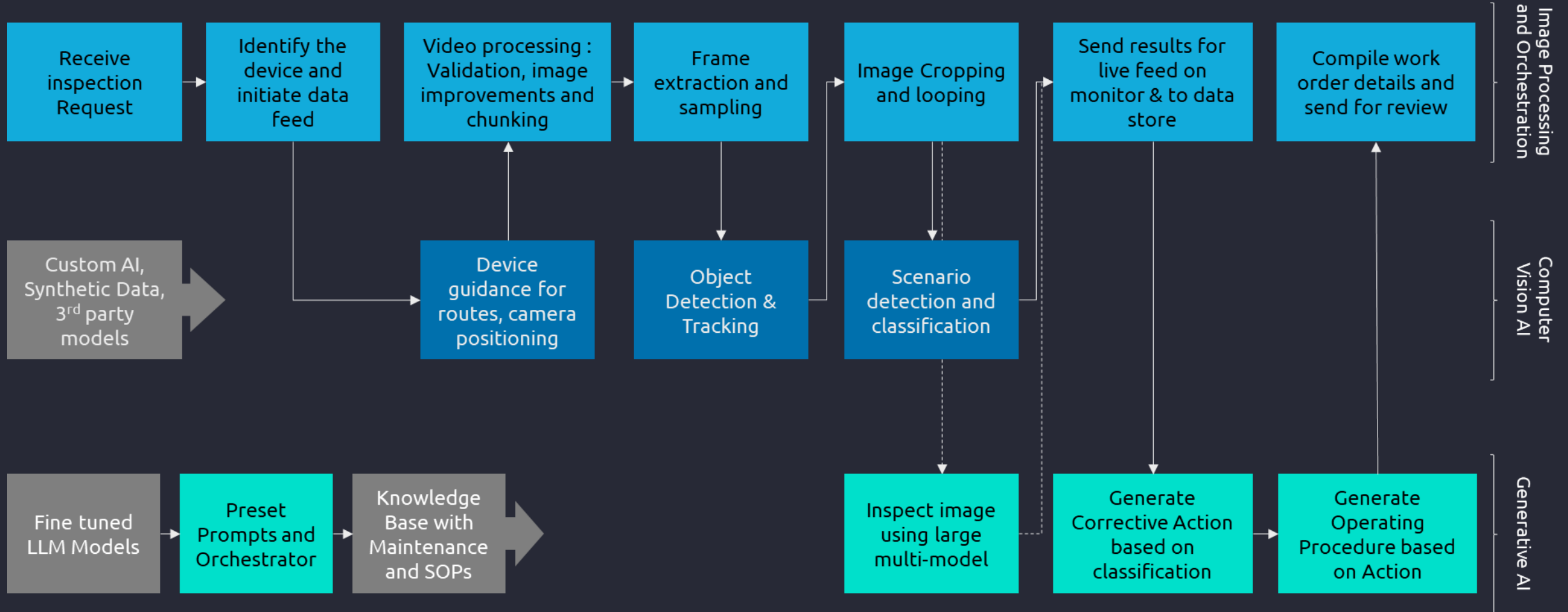
REUSABLE, SCALABLE CV FRAMEWORK FOR SCENARIO DETECTION. EG: INSPECTION, HSE, QA, etc.

- Visual image processing pipeline to plug-and-play CV model
- Synthetic data organization and generation stack
- Partner Ecosystem with Microsoft and device services





# IIF : LEVEL 1 PROCESS FLOW





# CASE STUDIES



## Pipeline

Corrosion, Encroachment, Excavation, Deformation, Leaks, vegetation...etc.



## ROV (Underwater)

Deformation, corrosion, intrusion, vegetation on Pipe, cables, joints ...etc.



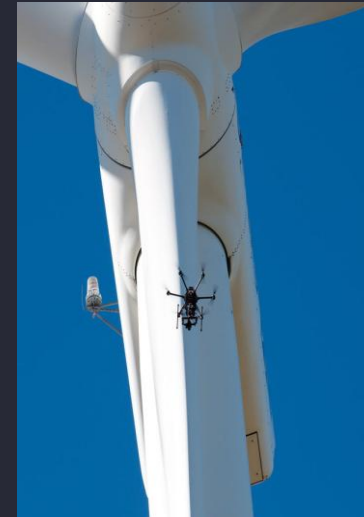
## Flare Stack

Deformation, defect, alignment, position



## Pipe and Corrosion

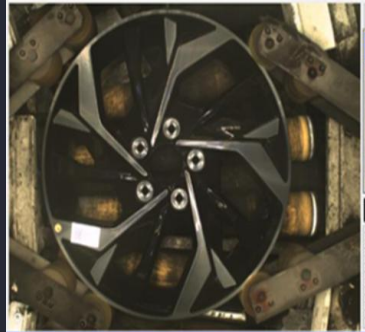
Corrosion, paint, deformation



## Wind Turbine

Blade, casing, generator/motor Intrusion

SeqNo	Vino	WHLALC	TIREALC	TPMS	WHEEL1	WHEEL2	WHEEL3
360	FHW 067183	SD17	N7CD	L	OK	OK	OK
361	FHW 067832	SD16	N6S5	H	OK	OK	OK
362	CFA 836948	DS15	WH15		OK	OK	OK
363	FHW 066669	SD17	N7CD	L	OK	OK	OK
364	FHW 067173	SD17	N7CD	L	OK	OK	OK



## Automobile QA

Detect manufacturing defects – eg wheel, frame, casing, joints, alignment ...etc.