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Tech

Predictive Maintenance of Electricity Grids

28/02/2022 – AI of Things

01

Current situation

Traditional approach for Predictive Maintenance

Predictive Maintenance of Electrical Grids entails several difficulties

Helicopter acquisition cost

4M€

Helicopter's operational cost

1,5k€

per hour

Inspection + Pruning cost

200-600€

per kilometer

Complex operational maintenance

Extension based in many km and not easy access areas

On-field maintenance cost

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AI enables data exploitation generating high value business outputs

01
Insulators corrosion

Detection of corrosion through pre-trained convolutional neural networks.

02
Thermographic revision of the grid

Temperature detection for fault hot spots identification.

03
Plot cartography

Ensure safety corridors to prevent fires and trees from falling on towers.

04
Substations thermography

Detection of anomalous temperature values based on parameterizable thresholds.

05
SF6 Leak detection

Detection of gas leaks with high environmental impact.

06
Detection of bird nests and weeds

Detection of nests and weeds on towers and cables that can cause power outages.

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02

Electrical Grids

Drones end-to-end value proposition

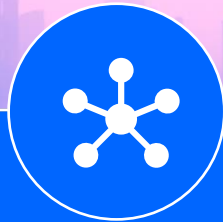# From data capture to business insights

Drones & Sensors

Multiple types of drones equipped with sensors (multirotor, VTOL, etc.) (HD, termal, multispectral, LIDAR...)

Communications

Telemetry, BVLOS flight and enabling real-time scenarios.

Fleet Management

Authorizations management, BVLOS route definition, integration with AGVs, robotic arms...

Pilotage & Maintenance

Routes definition, deployment of Drones-as-a-Service, support and maintenance operations...
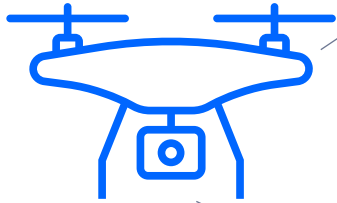
Certification

Certification of information immutability through a Blockchain TrustOS network for audit.

Reports & Business Insights

Dashboards with KPIs defined by clients, vertical platforms and ad-hoc AI models based on clients' data.

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Drones & Sensors

Multiple kind of drones:

- For interior flights
- For heavy loads
- For long distances at high speed

With multiple sensors:

- 4K Cameras
- OGI sensors
- Multispectral Cameras
- LiDAR sensors

Drones & Sensors

Communications
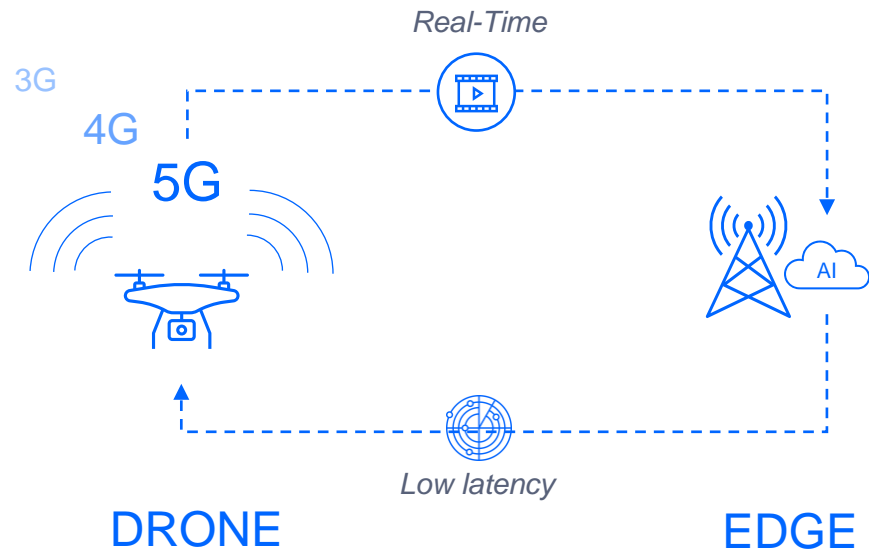
Fleet Management

Pilotage & Maintenance

Certification

Reports & Business Insights

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Communications

Real-Time

3G

4G

5G

Low latency

DRONE

The drone is connected for so it can be controlled remotely and send the sensors data in real time.

EDGE

Edge Computing servers run Artificial Intelligence algorithms to obtain information from the drone's data.

AI

Drones & Sensors

Communications
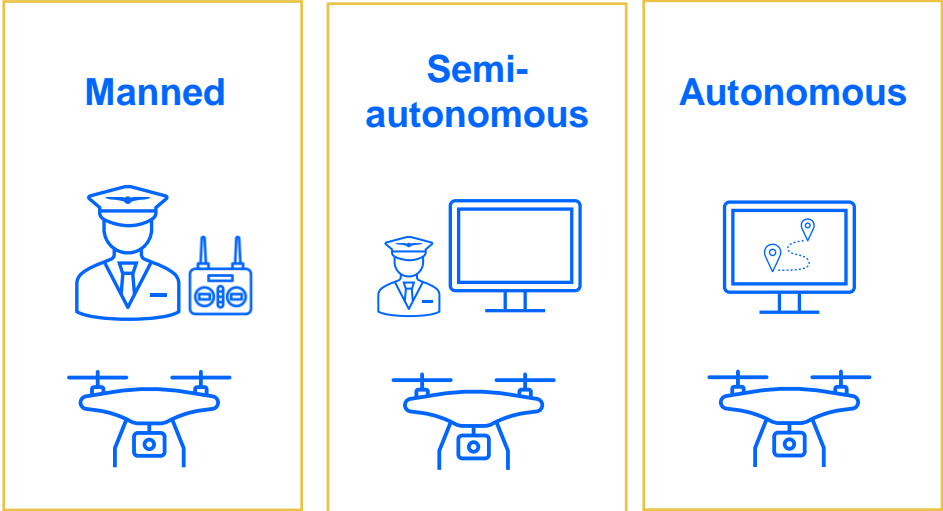
Fleet Management

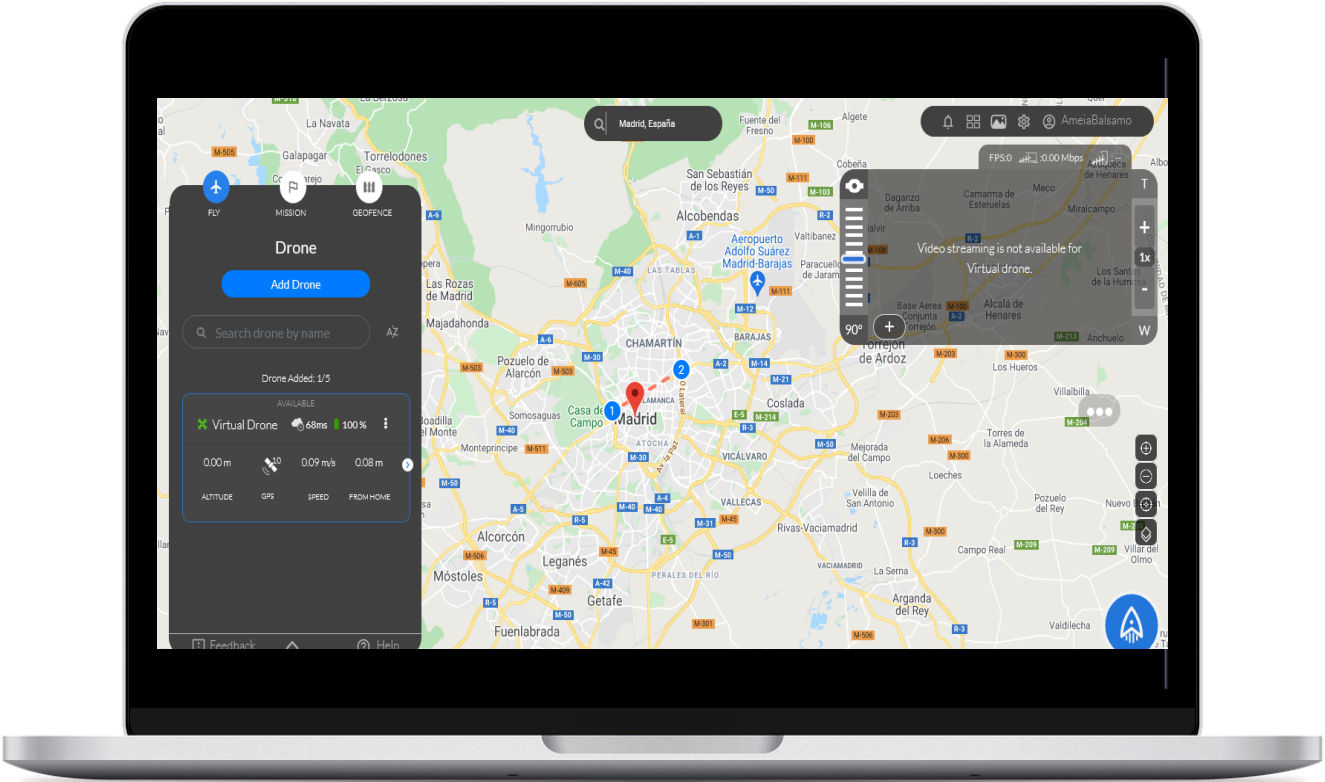Pilotage & Maintenance

Certification

Reports & Business Insights

Fleet Management

Manned
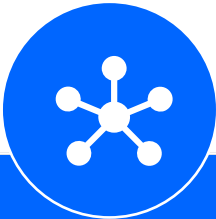
Semi-autonomous

Autonomous

For any type of flight, we take care of the administrative requests through our control center.

Drones & Sensors

Communications

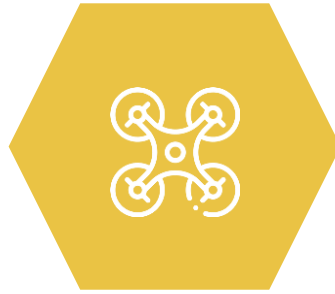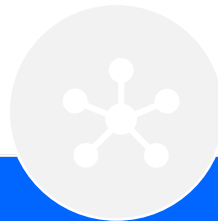Fleet Management

Pilotage & Maintenance

Certification

Reports & Business Insights

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Pilotage & Maintenance

Drone pilotage of any type of flight

Drone Maintenance

Drones & Sensors

Communications

Fleet Management

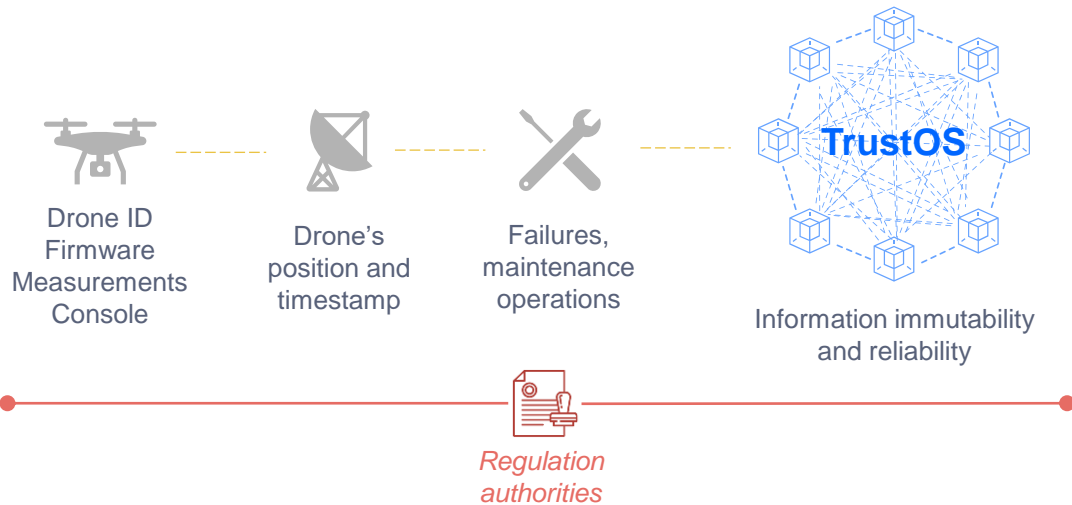Pilotage & Maintenance

Certification

Reports & Business Insights

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Certification

Thanks to the TrustOS Blockchain technology developed and managed by Telefónica, we can guarantee that **drone** flight management **operations** are authentic, complete, safe and **have probative value**.
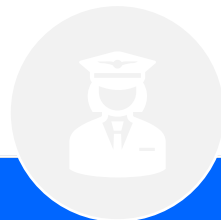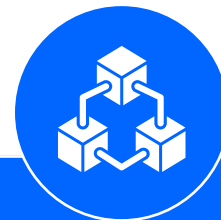
Drone ID Firmware Measurements Console

Drone's position and timestamp

Failures, maintenance operations

TrustOS

Information immutability and reliability

Regulation authorities

Drones & Sensors

Communications

Fleet Management

Pilotage & Maintenance

Certification

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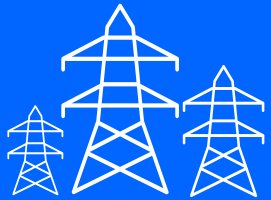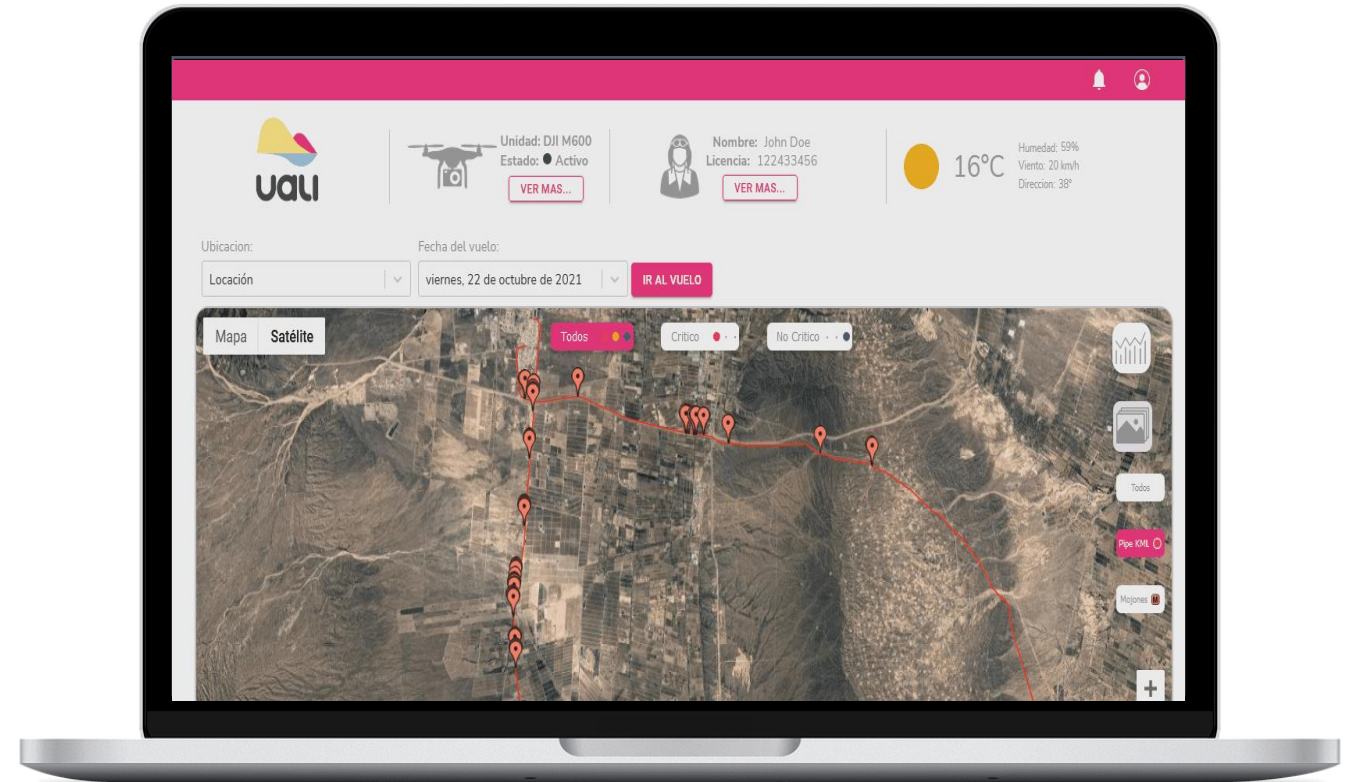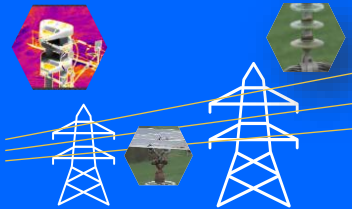
Reports & Business Insights

Pretrained Convolutional neural networks, typically used for **Computer Vision** tasks, enable 2 main outputs:

Inventory of the grid's components

Anomalies detected in the grid

Drones & Sensors

Communications

Fleet Management

Pilotage & Maintenance

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03

Main Benefits

Smart Solutions – Predictive Maintenance

The use of drones optimizes costs and satisfies several objectives

INCRESES SECURITY

Preventing workers from performing their work at height or in the vicinity of tension.

ENHANCES QUALITY

Having high-precision images that allow post-processing from a secure environment.

OPTIMIZES COSTS

Reducing operating costs compared to alternatives such as the use of helicopters or the displacement of personnel.

A modular approach enables various market proposals

Service mode
(per hour, per km, etc.)

Per component
(platform, model, etc.)

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Drones also facilitate a wide range of use cases in other sectors

Mines

Industry

Ports

Oil&Gas

Utilities & Energy

Smart Cities

Agriculture

Logistics

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