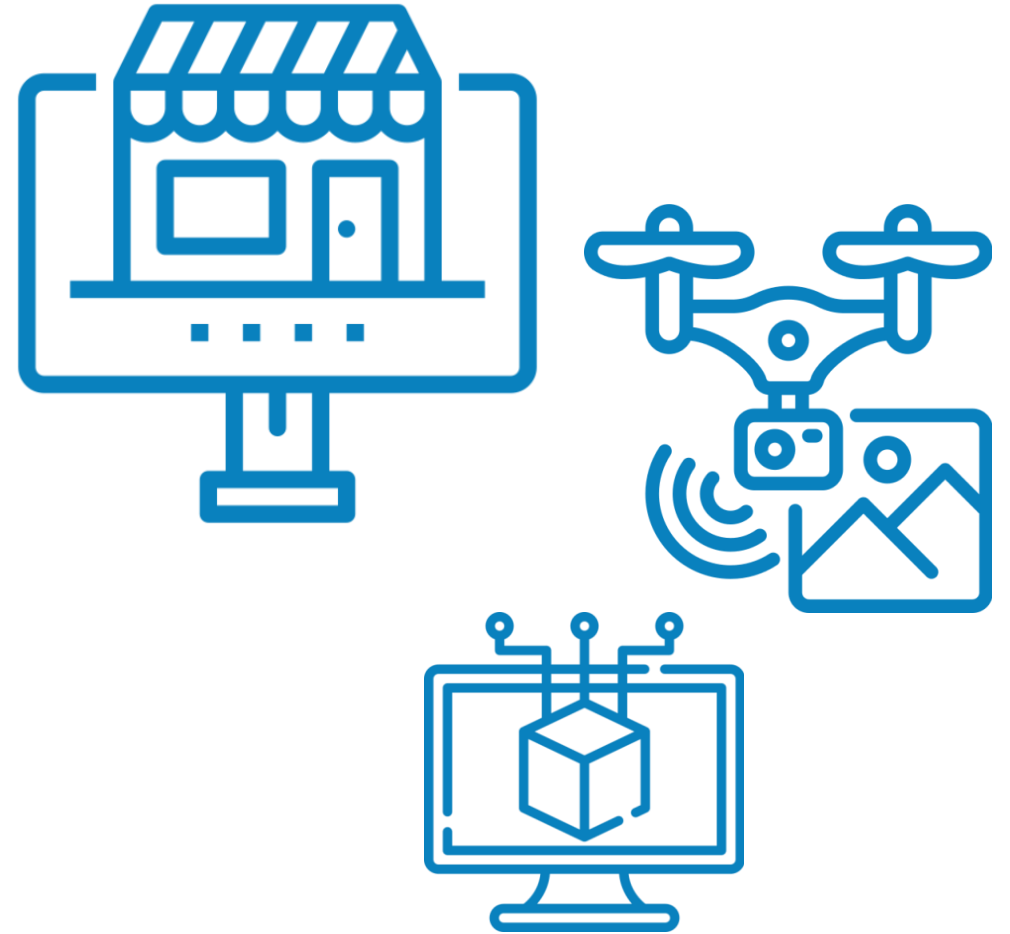**I·FLY**

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Enabling an effective UAV-as-a-Service Market

What is I-FLY?

- Marketplace for specialised IT services for enhancing inspection operations of Critical Infrastructures using drones.

- Allows easy, fast and automatic deployment and execution of services on different environments (drone, Cloud, or Edge).
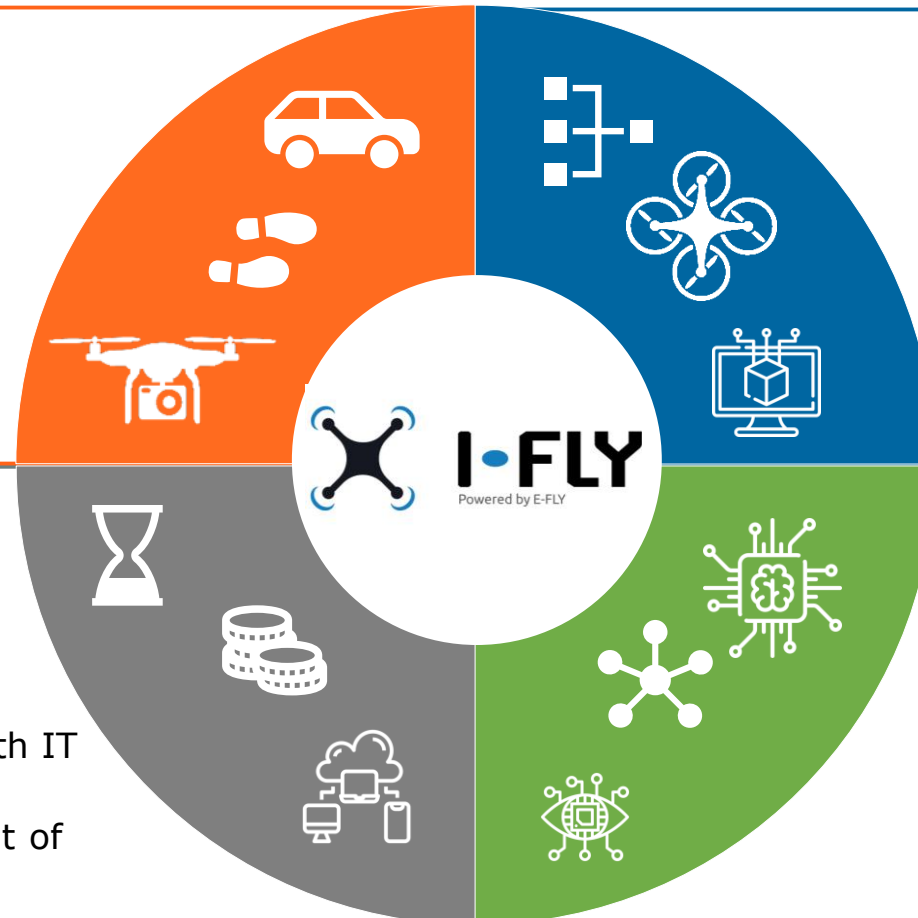
Current challenges

Traditional/Drone Inspection

- Time-consuming and expensive process.
- Using foot, vehicles patrols or drones for recording images.
- Images and videos are currently analysed and proccessed by human operators.

Sector Needs

- UAV-as-a-Service Market.
- Diverse catalogue of IT services for different use cases.
- Ease of deployment in multiple environments and devices.

User Needs

- Accelerate the inspection process.
- Reduce inspection costs.
- Automate detection and reporting of incidents.
- Enhance the detection capabilities with IT services.
- On-demand easy and fast deployment of services.

Technological Development

- Limited drone computing and processing capacity.
- AI & CV algorithms need to be trained to detect specific types of incidents on Critical Infrastructures.
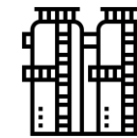
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Potential customers

Drone and inspection services providers

SMEs and companies specialised on inspections using drones for multiple sectors.

Critical Infrastructure Owners/Operators
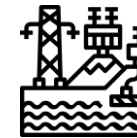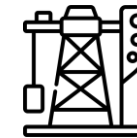
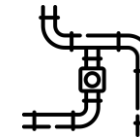| Chemical	Construction	Utilities	Roads and Railways

Power Generation	Mining	Oil & Gas	Public Safety

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Benefits

One-stop-shop for contracting specialised IT services

Diverse catalogue of AI & CV services with the possibility of creating tailored ones for specific detection needs.
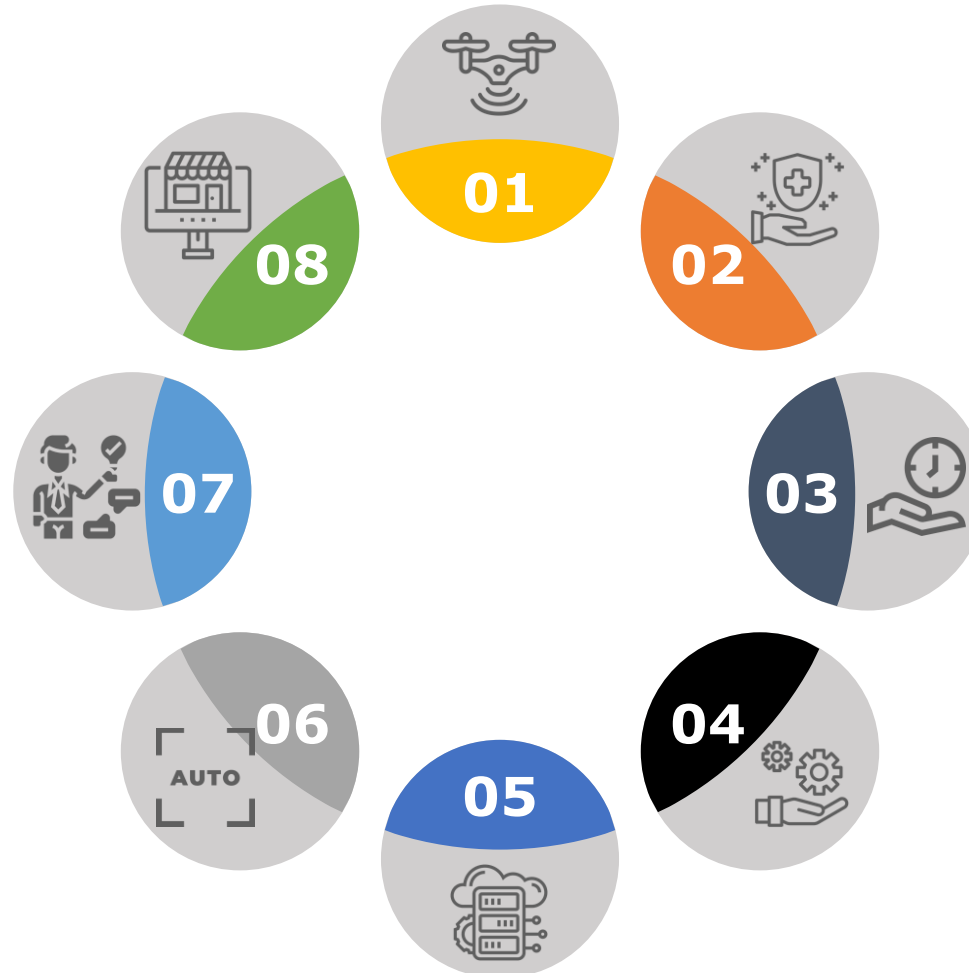
On-demand deployment

Select the services and deploy them on different environments and devices (drone, Cloud and/or Edge).

Real-time data processing

Automatic detection of incidents and early warning of possible anomalies while doing the flight.

Rapid data collection

Less time on site due to rapid collection of multiple datasets in a single flight.

UAV-as-a-Service

Drones can provide businesses with types of data they've never had access to before, enabling decision makers to have a more complete picture of their assets and operations.

Reduced risk

Operators will not be placed in dangerous situations and companies can reduce their corresponding insurance costs

Savings-downtime

Every second of inactivity generates a loss of income, but the use of drones allows inspections without interrupting operations while detecting possible incidents in a preventive way.

Savings-maintenance

Simplification of maintenance tasks, assessment of evolution of incidents.

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Business Case

Pilot with Ferrovial

Who is involved in the pilot?

- Its subsidiary, **Ferrovial Power Infrastructure (FPI)**, develops and operates transmission lines assets.

- **FPI** provides solutions for the design, construction, operation and maintenance of transmission lines in a safe, reliable and efficient way for its customers.

- Ferrovial and the Centre for Innovation in Smart Infrastructures support **FPI** in the development of its innovation strategy through the provision of services and expertise in new technologies.

Inspection of Power Lines

FPI has tested and validated the effectivity of different services provided by **I-FLY Marketplace**:

- 3D digitalization of a transmission line and its surroundings

- Automated categorization of the different elements

- Automated identification of anomalies in the asset and proximity related risks

- Provision of alerts and their geo-localization

This project showcase the feasibility and benefits of integrating drone operations using AI and CV services in the maintenance of transmission lines.

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Marketplace & Services

Marketplace Architecture

Interfaces
- Devices
- Users (Drone Providers & Critical Infrastructure Owners/Operators)

Front-end
- Drone Providers
- AI/CV/Processing services catalogue
- Provisioning
- Quality, logging, monitoring & insurance

Back-end
- Packaged services for download
- Automated deployment
- Data management
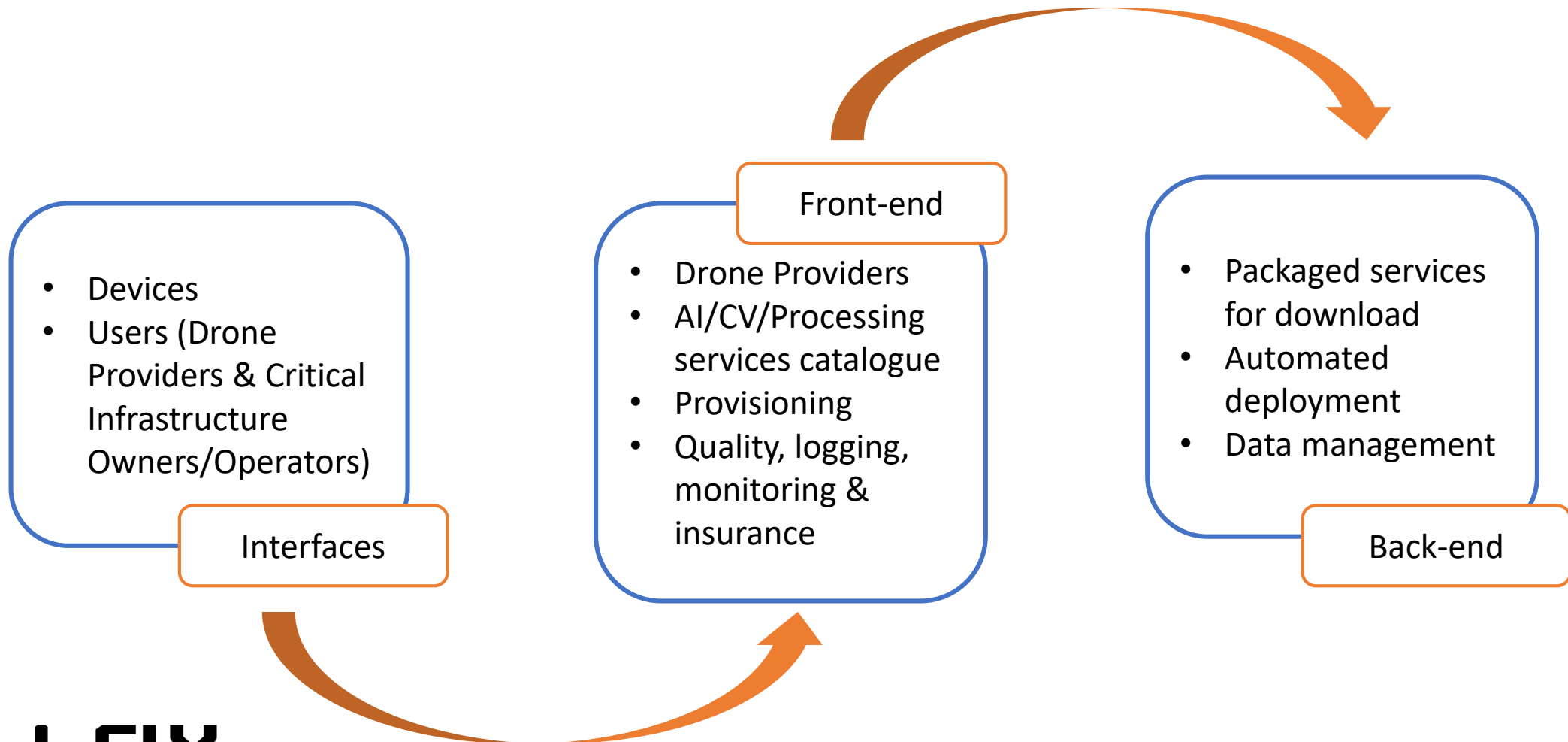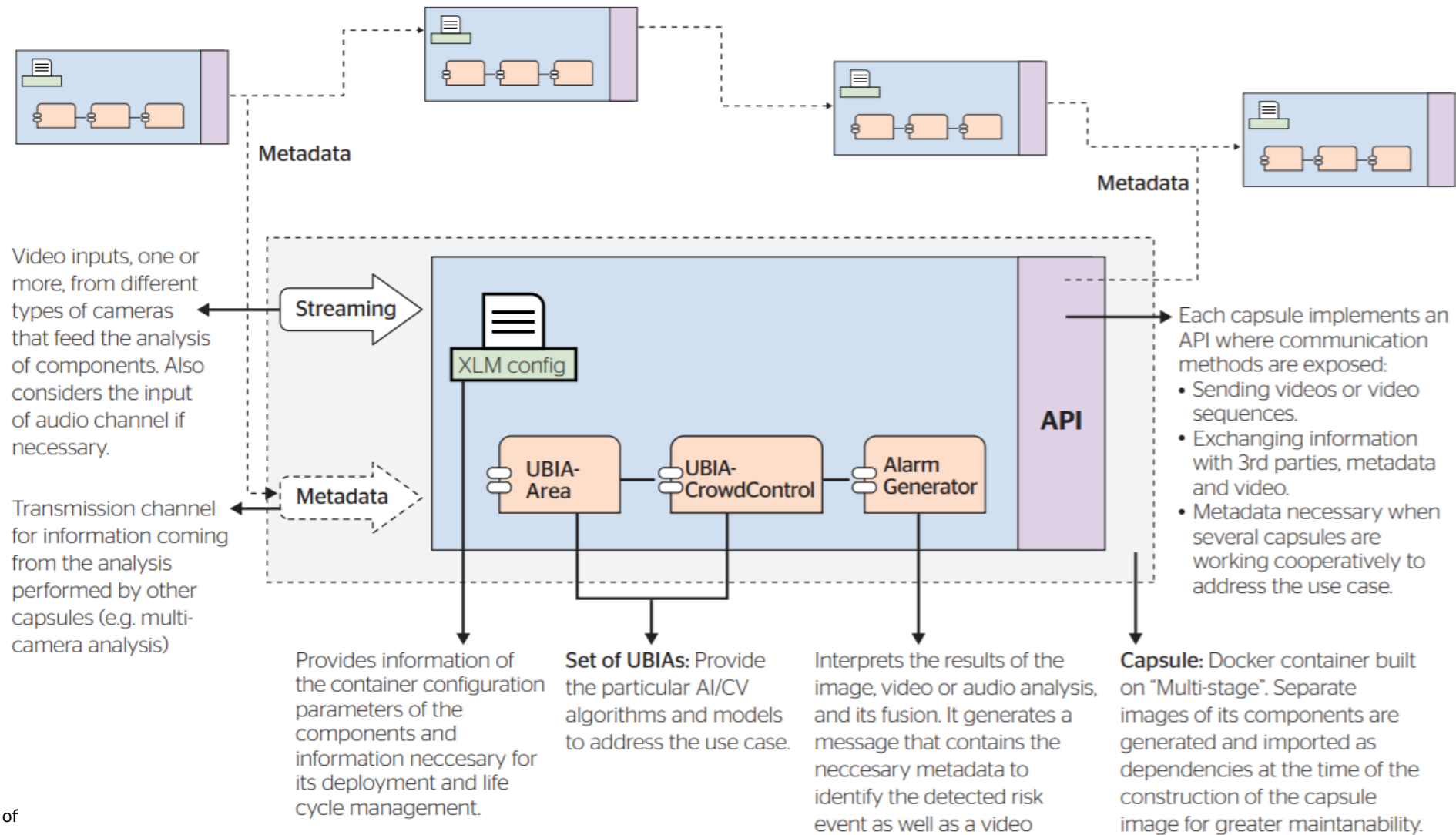
How to use it?

Drone Providers

1 Register and log in

2 Create a Company profile to promote drone services and find new clients

3 Fill in planning questionnaire and browse catalogue of services

4 Check the compatibility for deploying the services selected

5 Contract and deploy the service on the drone, Cloud or Edge devices

6 Make the inspection using I FLY services

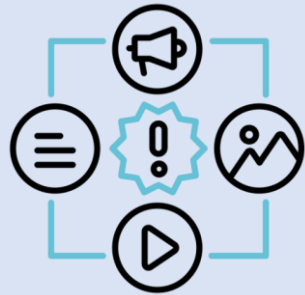**Critical Infrastructure Owner/Operators**

1 Register and log in

2 Fill in planning questionnaire and browse catalogue of services and drone providers

3 Check the compatibility for deploying the services selected

4 Contract and deploy the service on the drone , Cloud or Edge devices

5 Make the inspection using I FLY services

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Services Architecture

Video inputs, one or more, from different types of cameras that feed the analysis of components. Also considers the input of audio channel if necessary.

Streaming

Metadata

Transmission channel for information coming from the analysis performed by other capsules (e.g. multi-camera analysis)

XLM config

UBIA-Area

UBIA-CrowdControl

Alarm Generator

API

Each capsule implements an API where communication methods are exposed:
- Sending videos or video sequences.
- Exchanging information with 3rd parties, metadata and video.
- Metadata necessary when several capsules are working cooperatively to address the use case.

Provides information of the container configuration parameters of the components and information neccesary for its deployment and life cycle management.

Set of UBIAs: Provide the particular AI/CV algorithms and models to address the use case.

Interprets the results of the image, video or audio analysis, and its fusion. It generates a message that contains the neccesary metadata to identify the detected risk event as well as a video

Capsule: Docker container built on "Multi-stage". Separate images of its components are generated and imported as dependencies at the time of the construction of the capsule image for greater maintanability.

*UBIAs: Basic Units of Artificial Intelligence

Services

On-demand video for alerts and incidents

Provides the video of detected incidents and/or alerts based to certain time marks and other tags.

Anomaly detection

Detects different types of anomalies using pattern recognition techniques (e.g. leaks on pipelines). New algorithms and training can be done to detect specific anomalies and/or damages depending on the needs of the client (e.g. rust on pins in power lines).
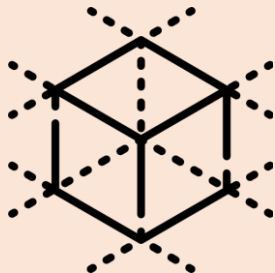
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Services

Categorization

Detects and classifies elements on video footage or images using pattern recognition techniques (e.g. cars, people, trees, etc…)

3D Cloud Image Creation

Creates a 3D manipulable image to compare the status of infrastructures over time (e.g. evolution of building construction, vegetation growth, etc…)
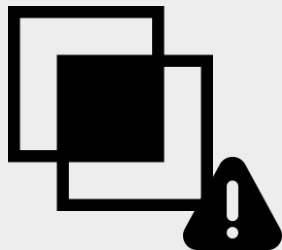
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Services

GIS-based representation of alerts and incidents

Represents all the alerts and incidents on a map on the client's interface with the exact coordinates where the anomaly was detected

Data fusion for alerts with natural language interface

Provides a user interface for the creation of rules combining the capabilities of different algorithms and sensors for establishing the detection requirements

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Services

Storage and tagging of videos/photos

Upload to the cloud or edge any video or photo – including meta information of position and others, and add any number of annotations or tagging to create or enhance and incident
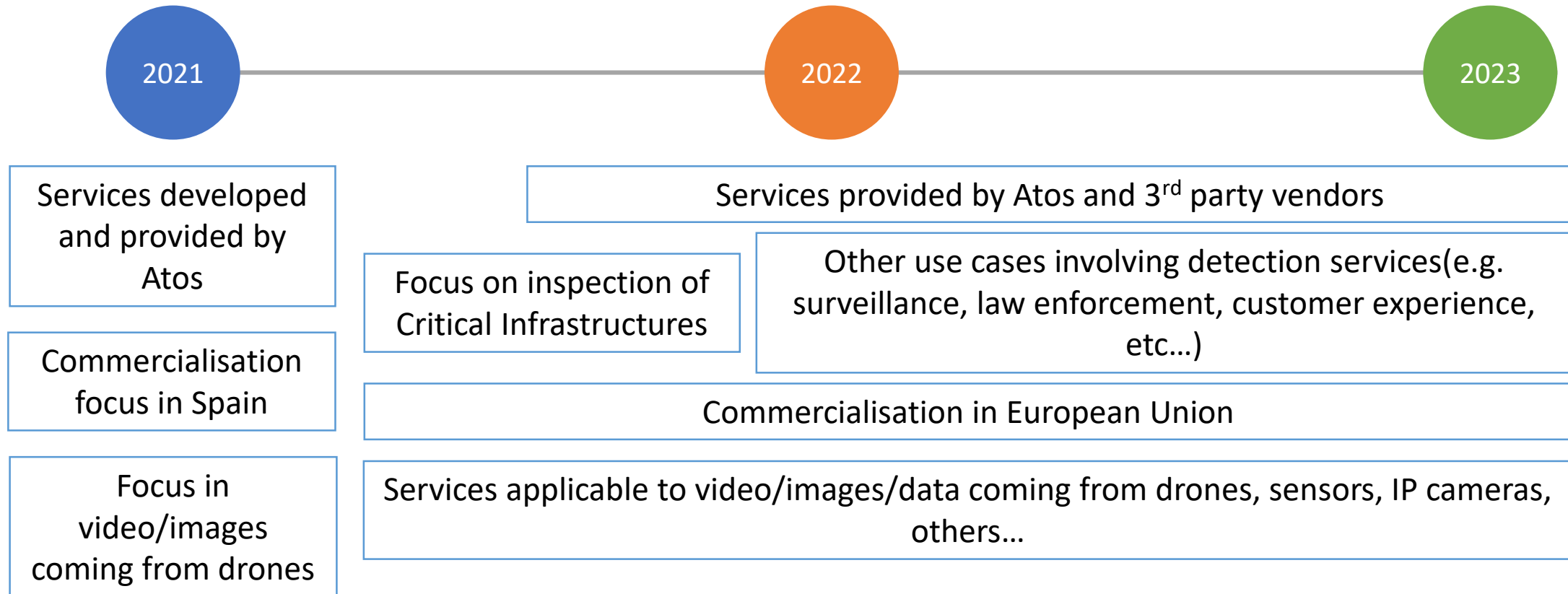
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Roadmap

Roadmap

2021 — **2022** — **2023**

Services developed and provided by Atos

Services provided by Atos and 3rd party vendors

Focus on inspection of Critical Infrastructures

Other use cases involving detection services(e.g. surveillance, law enforcement, customer experience, etc…)

Commercialisation focus in Spain

Commercialisation in European Union

Focus in video/images coming from drones

Services applicable to video/images/data coming from drones, sensors, IP cameras, others…

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