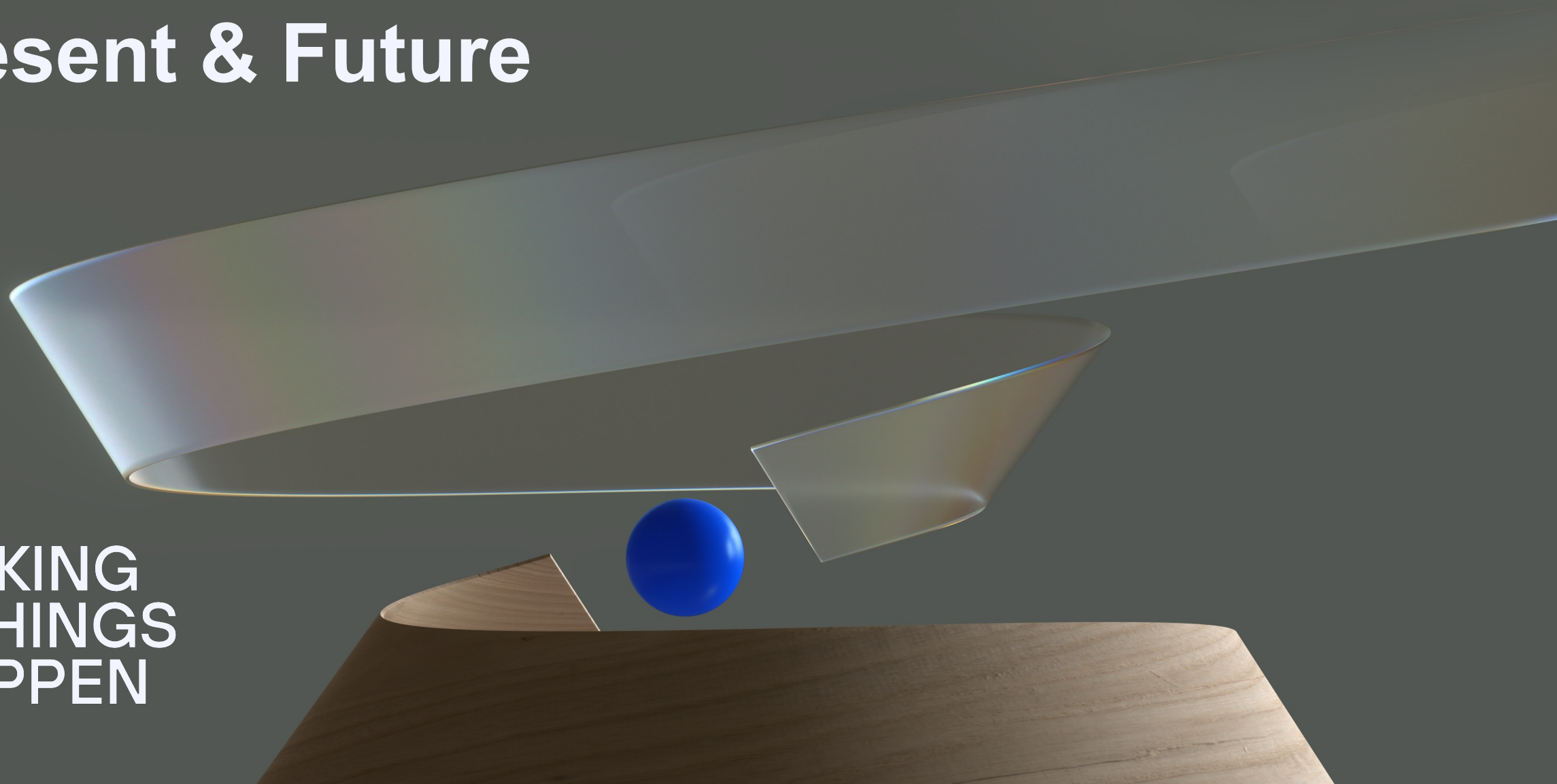


# 5G Drones Present & Future

MWC 2023

MAKING  
THINGS  
HAPPEN

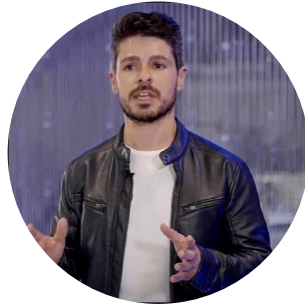


# Speakers



**Leticia López  
Domingo**

Innovation expert,  
**Telefónica  
de España**



**Ángel Alves  
González**

Innovation expert,  
**Telefónica  
de España**



**Lorena  
Senador-Gómez**

Commercial Director and  
Business Development  
**Telefónica Ingeniería  
de Seguridad**



**José Damián  
García**

Director of Integrity  
and Security  
**La Liga**



**Miguel Borja  
Cano**

Head of National Security  
**Telefónica Ingeniería  
de Seguridad**

# 01

## 5G Drones

### Future

Innovation: disruptive projects on 5G drones

# 02

## 5G Drones

### Present

Drone services that are already a commercial reality.

# 5G Drones

Future





# Cooperatives Drones



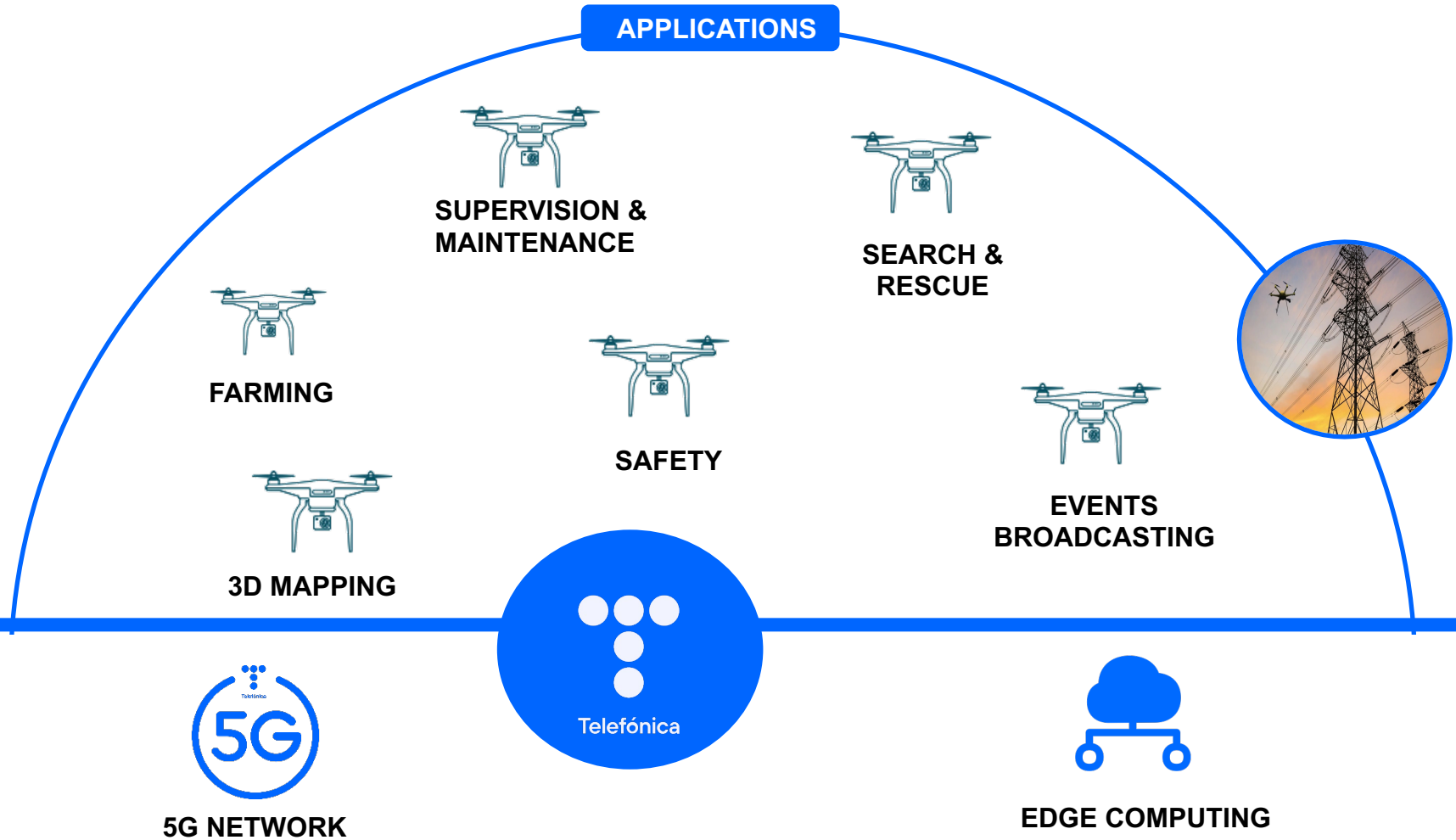
MWC 2023

MAKING  
THINGS  
HAPPEN

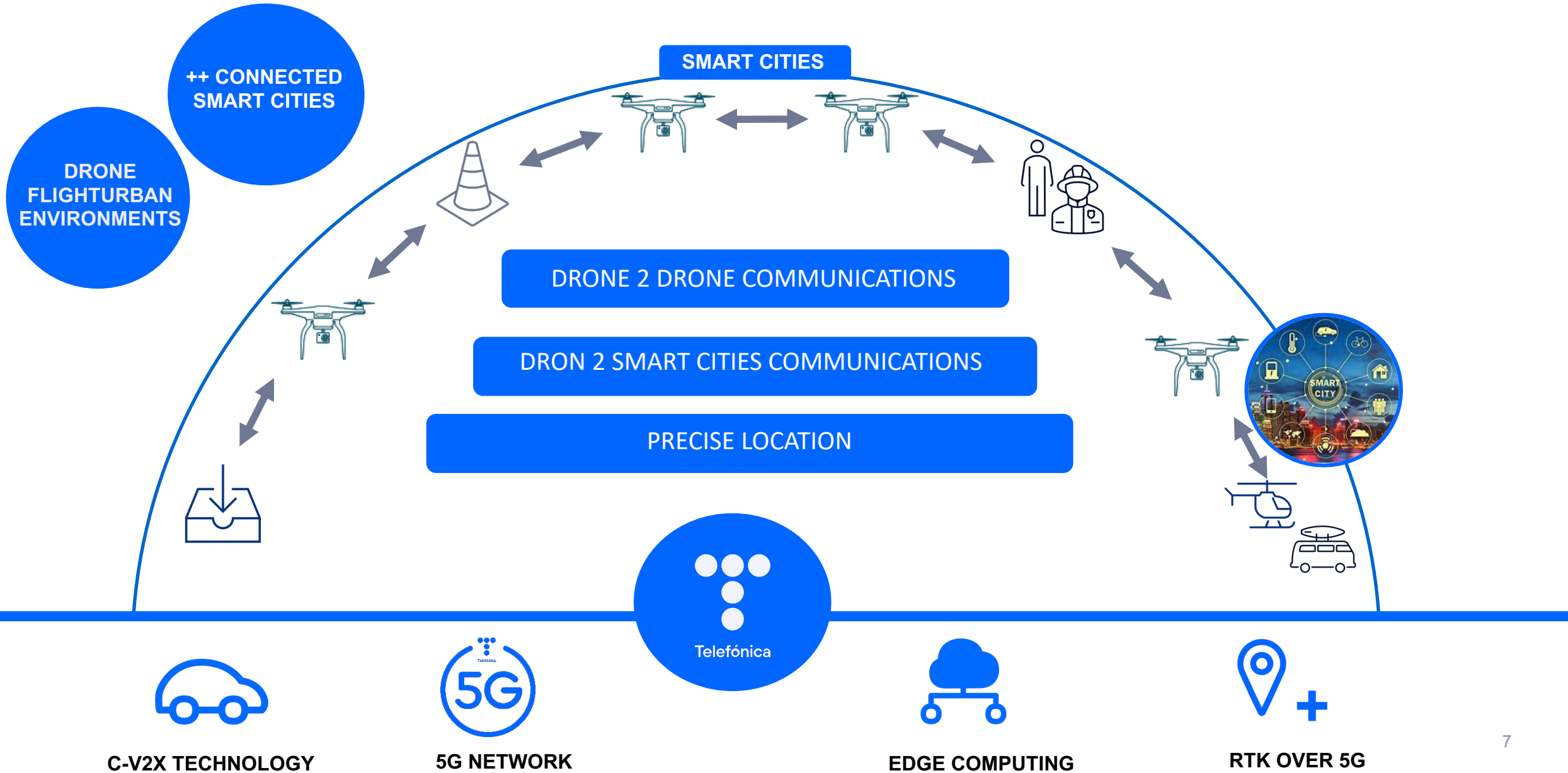


Telefónica

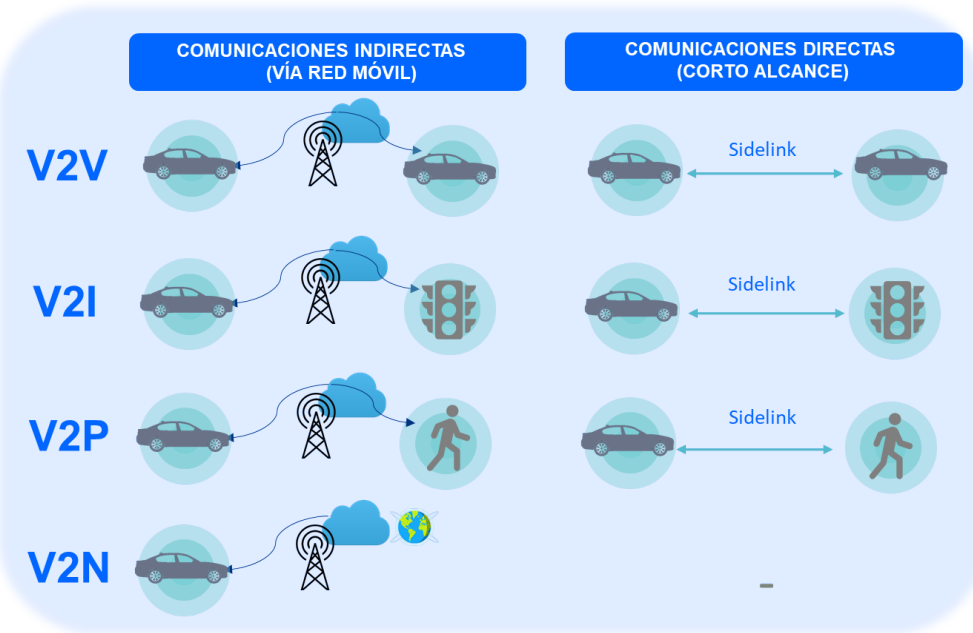
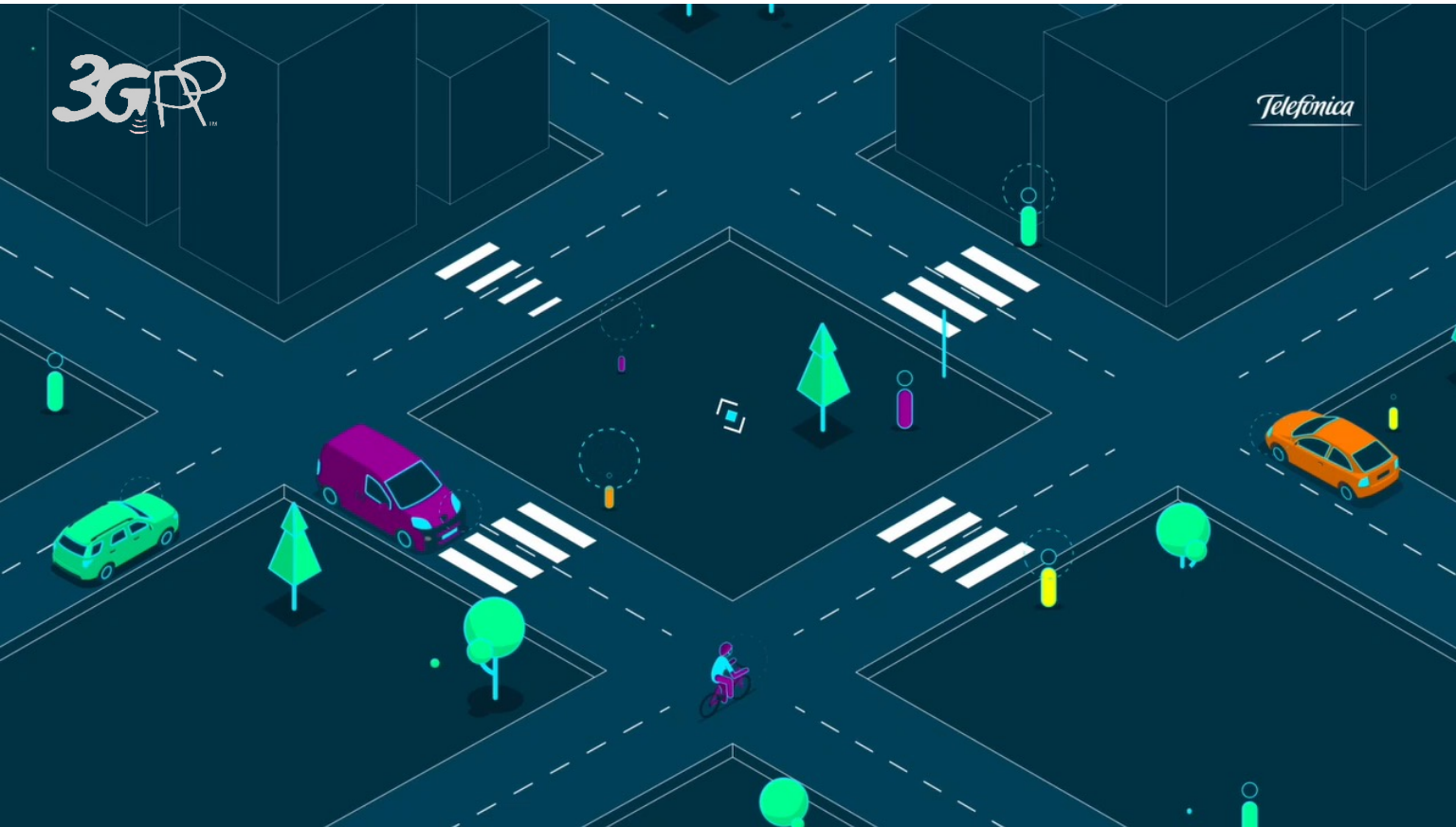
# Contextualizing the demonstrator



# Contextualizing the demonstrator



# C-V2X



**INCREASES ROAD SAFETY**

**INCREASES TRAFFIC EFFICIENCY**


**REDUCES EMISSIONS & POLLUTION**



# 2018

April  
Talavera de La Reina

**AUTONOMOUS DRIVING**




**ASSISTED DRIVING**

July  
Segovia

**ASSISTED DRIVING**

October  
Talavera de La Reina



Logos: EASY MILE, ERICSSON, CarMedia, Telefónica, SEAT, SICE, NOKIA, ERICSSON, FICOSA, Telefónica

# 2019

February  
Barcelona

**CONNECTED CAR**



September  
Málaga

**DEKRA: 5G C-V2X CIRCUIT**



September  
Madrid

**CONNECTED ROADS**



Logos: SEAT, FICOSA, MOBILE WORLD CAPITAL BARCELONA, etra, ERICSSON, DEKRA, Telefónica, NOKIA, ERICSSON, SEAT, DGT, acorum, FICOSA, Telefónica

# 2020

March  
Málaga

**5G Enhanced Tourism**




Logos: TMB, Transportes Metropolitanos de Barcelona, Telefónica, MEDIAPRO

# 2021


April  
Lugo

**Connected Tunnel**



December  
Málaga

**Secure & efficient vehicular communications**



Logos: STELLANTIS, ineco, NOKIA, SICE, CTAG, Telefónica, DEKRA, CTAG, nexuS, HARMAN, Telefónica

# 2022

February  
Barcelona

**5G Connected Cranes**



July  
Madrid

**5G Cooperative Drones**



-

**5G Safer Ports**



Logos: 5G Global Tools, APM TERMINALS, FICOSA, Telefónica, gradiant, ERICSSON, red.es, Telefónica, FICOSA, Telefónica

12  
PoCs

4  
SMART  
CITIES

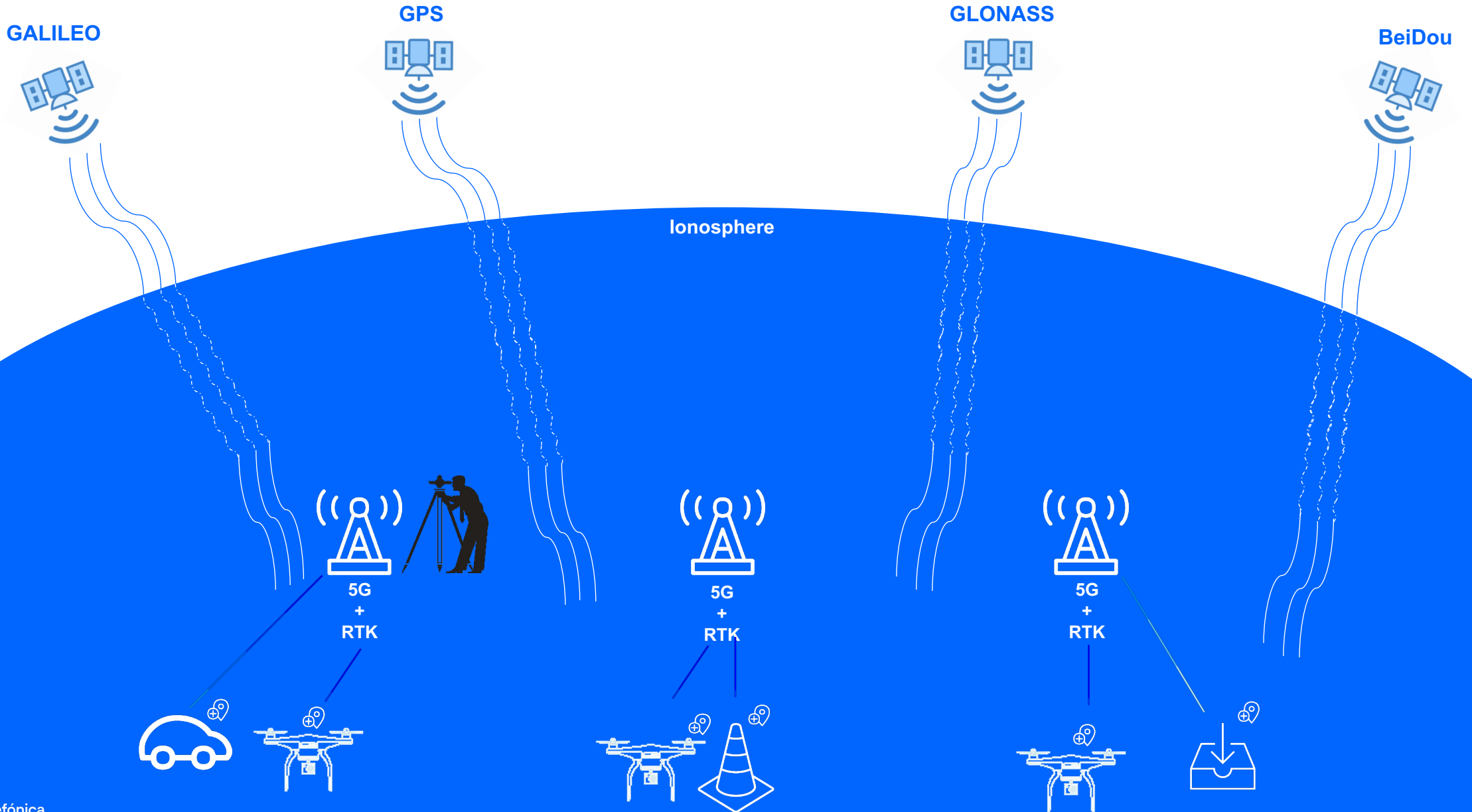
2  
SMART  
ROADS

3  
SMART  
INDUSTRY

2  
TRANSVER  
SALS

1  
INFOTAIN  
MENT

# Precise Location



# 5G Cooperative Drones

Implementation of a secure and reliable system for the delivery of parcels to mobile outdoor delivery points using drones.



BVLOS flight communication network



To have data from the drone in flight



Mobile delivery points



Drone accurate landing

# Connected Drones



5G NETWORK



C-V2X TECHNOLOGY



PRECISE  
LOCATION



INTELLIGENCE



# Connected Smart Cities

CONNECTED  
BEACONS



CONNECTED MOBILE  
DELIVERY POINTS



5G NETWORK

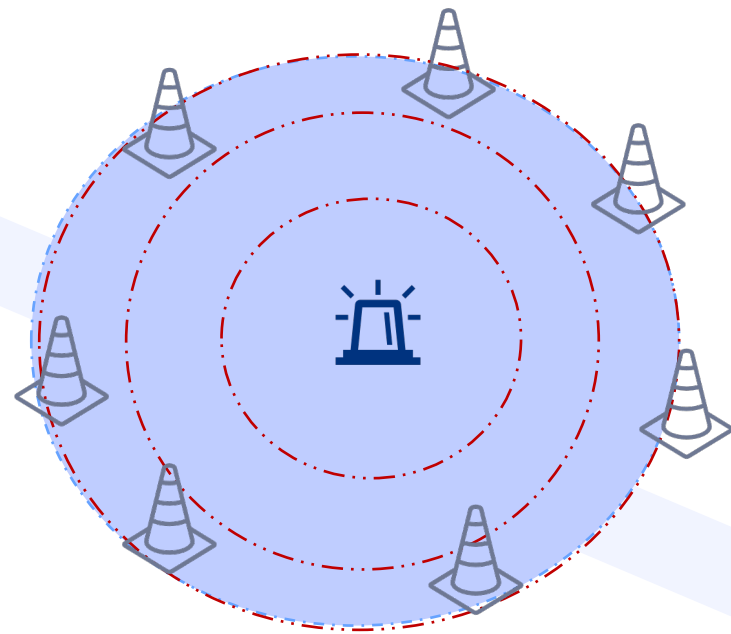
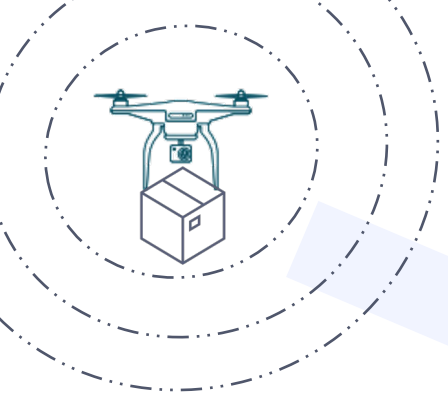


C-V2X TECHNOLOGY



PRECISE  
LOCATION






MWC 2023

**MAKING  
THINGS  
HAPPEN**

# Air traffic control platform

gradient | Telefónica | 

**DRON PRINCIPAL** Via libre

ID 111

RTK LAT. 40,5117° | LON. -3,6596° | ALT. 2M

CARGAR MISIÓN | PAUSE | STOP | ENTREGA PAQUETE

**DRON SECUNDARIO** Via libre

ID 222


RTK LAT. 40,5115° | LON. -3,6602° | ALT. 30M

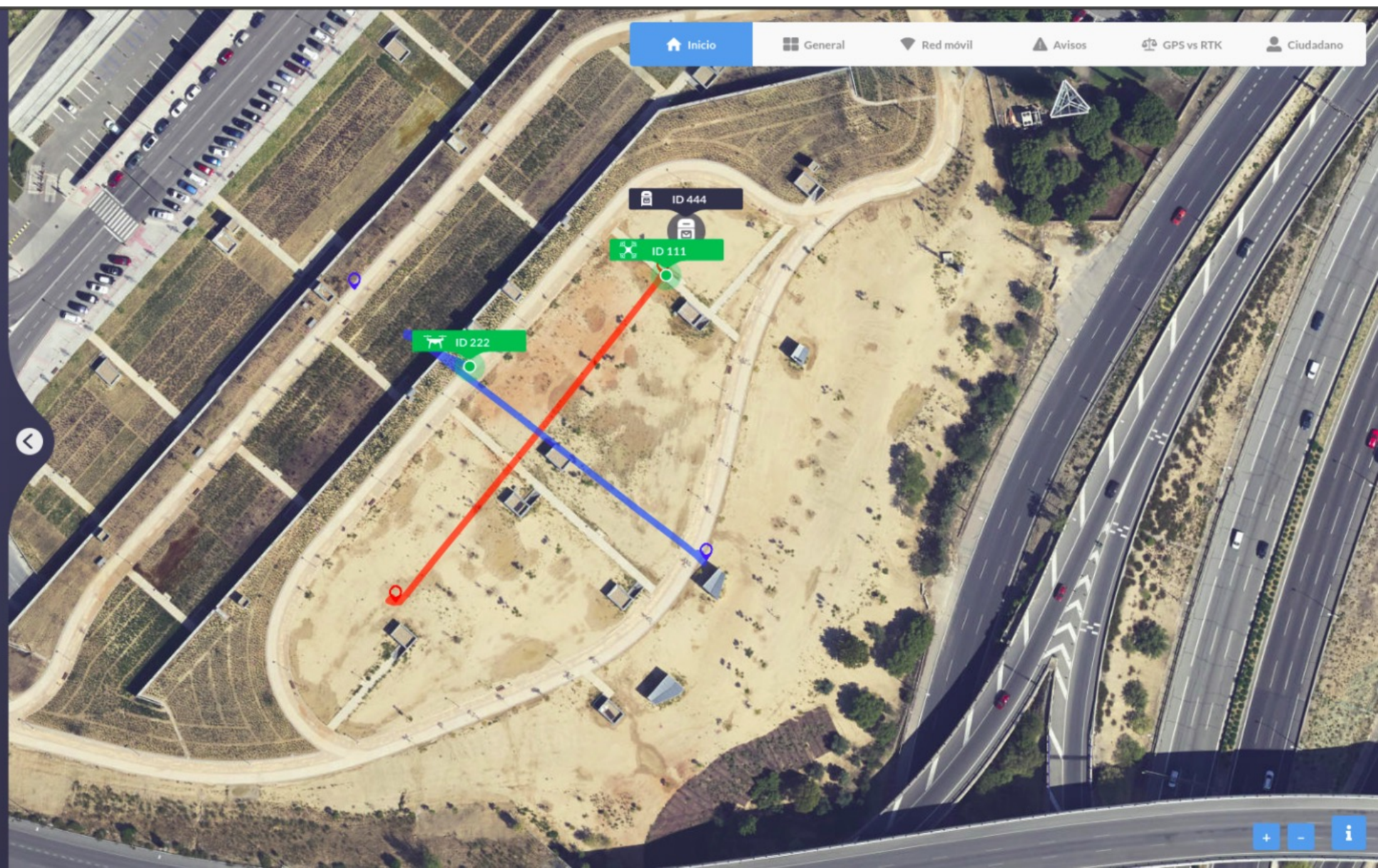
CARGAR MISIÓN | PAUSE | STOP | ENTREGA PAQUETE

**BUZÓN MÓVIL**

ID 444

RTK LAT. 40,5118° | LON. -3,6596° | ALT. 714M

 red.es



# Summarizing...



5G NETWORK



C-V2X TECHNOLOGY



PRECISE LOCATION



INTELLIGENCE

Applicable to other sectors, especially in urban drones

Promotion of C-V2X as a base technology for communication between drones and with their environment

New  use case applied to drones



# SailGP

TV broadcasting via 5G drones

MWC 2023

MAKING  
THINGS  
HAPPEN



# The event

## SailGP, the sea Fórmula 1

- International carbon fiber F50 catamaran competition
- 8 international locations
- 10 boats reaching speeds of 100 km/h
- Cadiz September 24 and 25, 2022
- Approximately 40,000 spectators in the city and around 1,200 private boats around the regatta course

**INNOVATION, TECHNOLOGY & SUSTAINABILITY**



# ¿Why drones?



••• Three different cameras  
at the same time

••• Closer to the action

••• Electrical

••• Less noise

••• No turbulence

# 5G video encoder onboard



Drones – Live video



5G SA coverage with Network Slicing



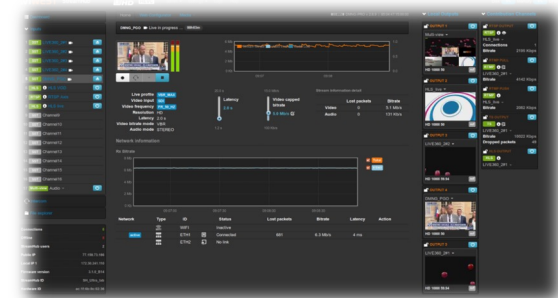
Edge Computing Centre



Remote Producers



**X**  
Data does not travel to the CORE





## 5G SA coverage & Network Slicing



Mass market  
Slice



eMBB  
Slice



DEDICATED  
RESOURCES

PRIORIZED  
COMMS

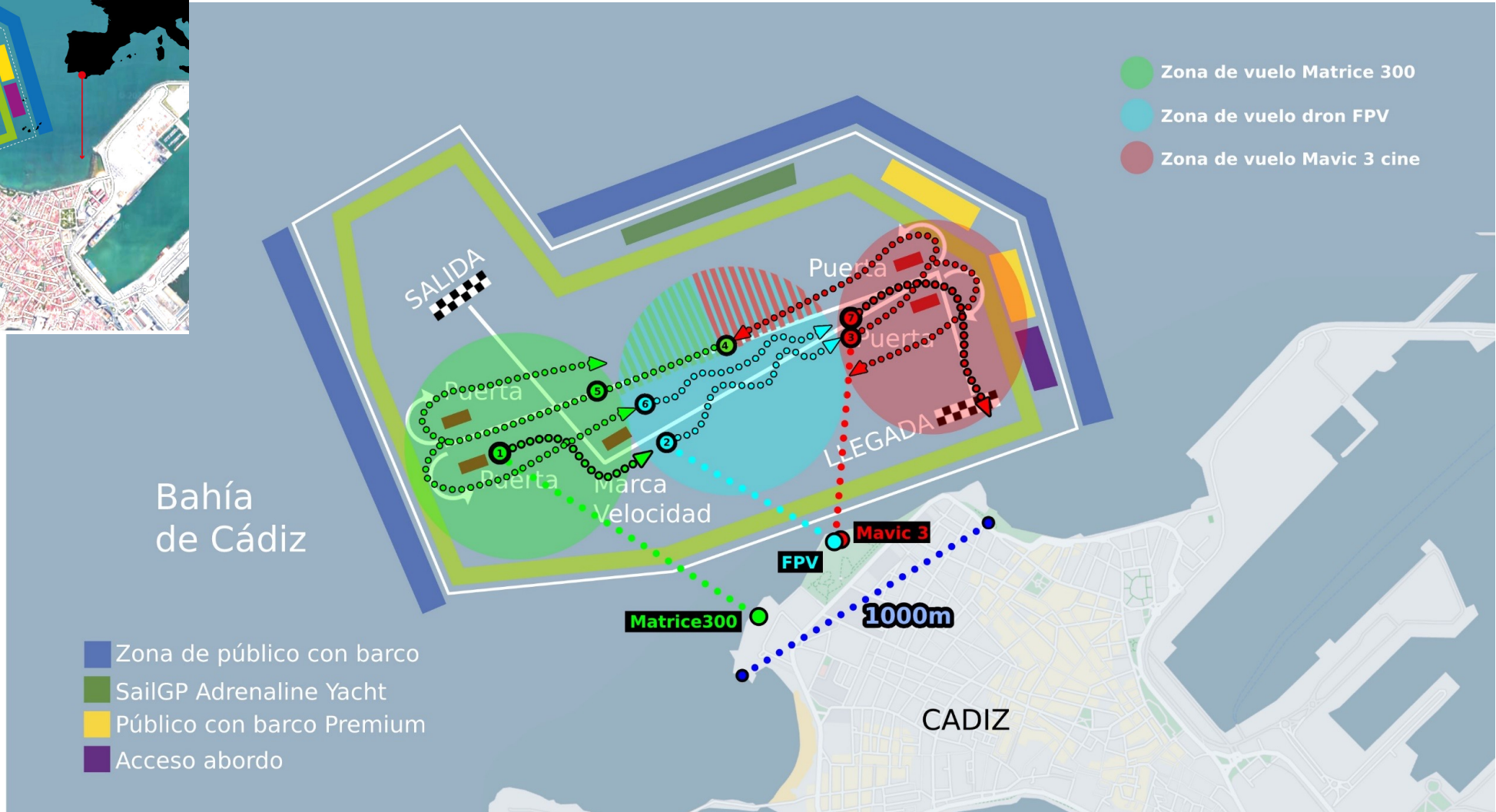
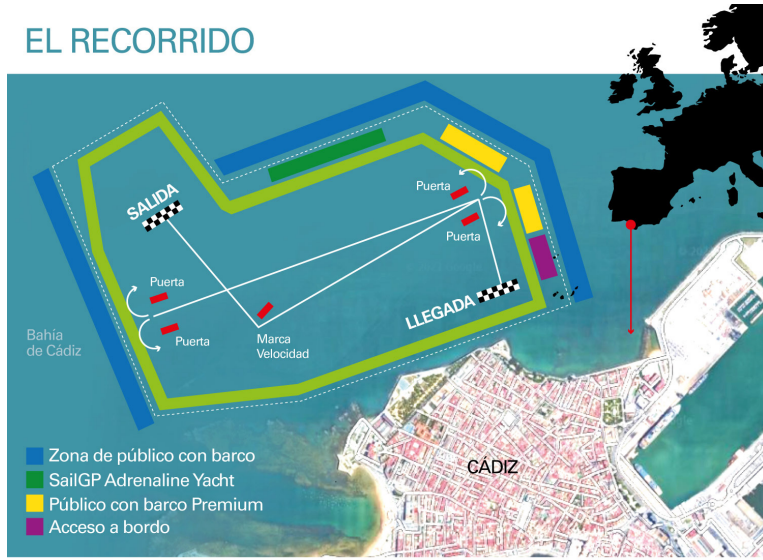
SIM CARDS  
FLEXIBILITY

SEGURIDAD

INVERSION

# The operation y coordination

## EL RECORRIDO



# The operation y coordination

Control area 2.  
Rooftop



Control area 1.  
Parking



# The drones

## DJI Matrice 300

- Autonomy 55 minutes
- Max. Speed 80 km/h
- Camera Zenmuse H20
- 5G video encoder onboard



## DJI Mavic 3 Cinema

- Autonomy 45 minutes
- Max. Speed 75 km/h
- Camera Hasselblad





# Racing drone FPV (First Person View)

- Use to cover specific moments of the race at high speed
- QSL Standar Labs with carbon fiber frame
- Custom-made drone
- Autonomy 10-15 minutes
- Max speed 100 km/h
- Camera PANASONIC LUMIX DC-BGH1
- 5G video encoder onboard

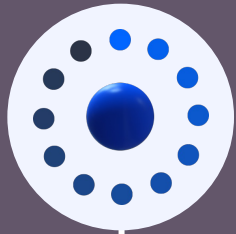


# 5G Drones

Present

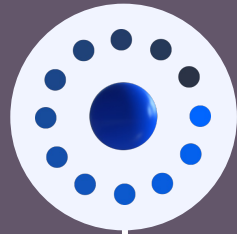


# Chronology



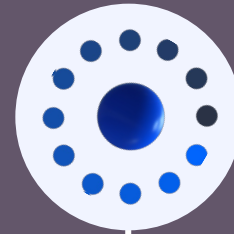
**MAY 2021**

TIS registration as UAS operator



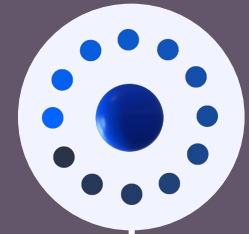
**JULY 2021**

Creation of aeronautical documentation for the operator



**DECEMBER 2021**

POC in Telefónica Headquarters



**MARCH 2022**

Presentation at MWC2022

2021

*"Drones in Security, the future is today"* in the MWC2021

**JUNE 2021**



Operational authorizations to be able to fly drones

**NOVEMBER 2021**



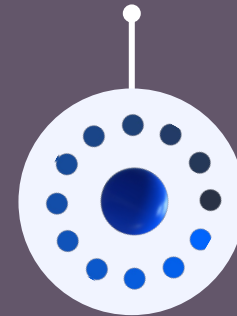
First live demos to customers

**FEBRUARY 2022**



Live demo of Countermeasure Systems for Drones

**MARCH 2023**



2023

# Characteristics



## Advantage



## Threats

### POSITIVE USES OF DRONES

- ✓ Response time reduction
- ✓ Cost savings
- ✓ resource efficiency

### THREATS USES OF DRONES

- ✗ Economics
- ✗ Industrial
- ✗ Society

# Drone Ecosystem

# Ecosystem

## Software

C-UAS Systems

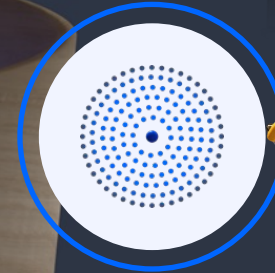
Drone Fleet Management



## Hardware

UGV

UAV



## Operaciones

Mobile Control Centers

Control Centers



# Servicios

✓ Communications



✓ Consultancy



✓ Plataforma



✓ Pilots



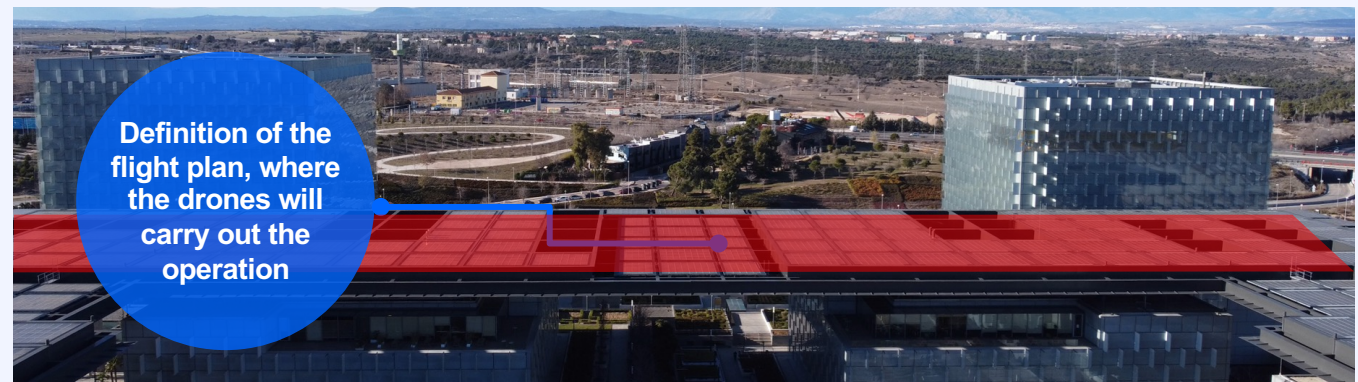
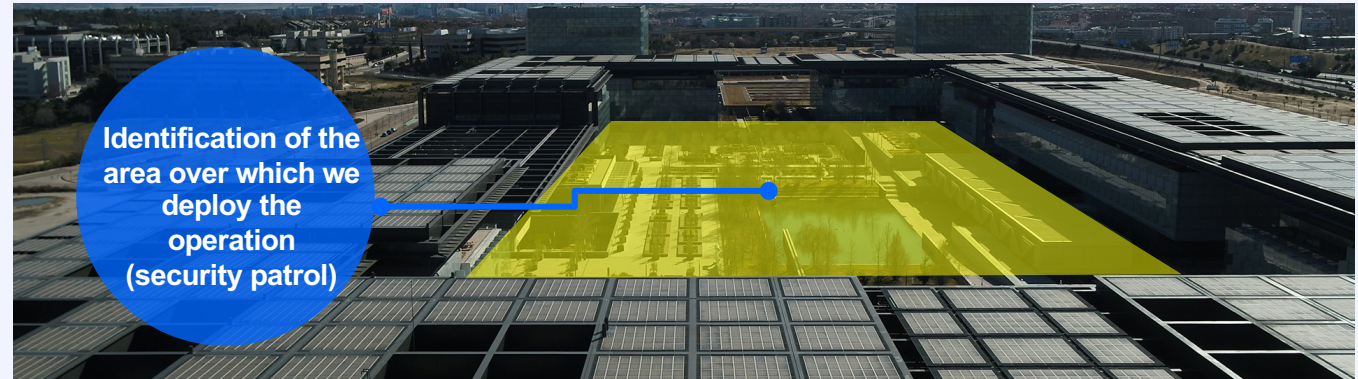
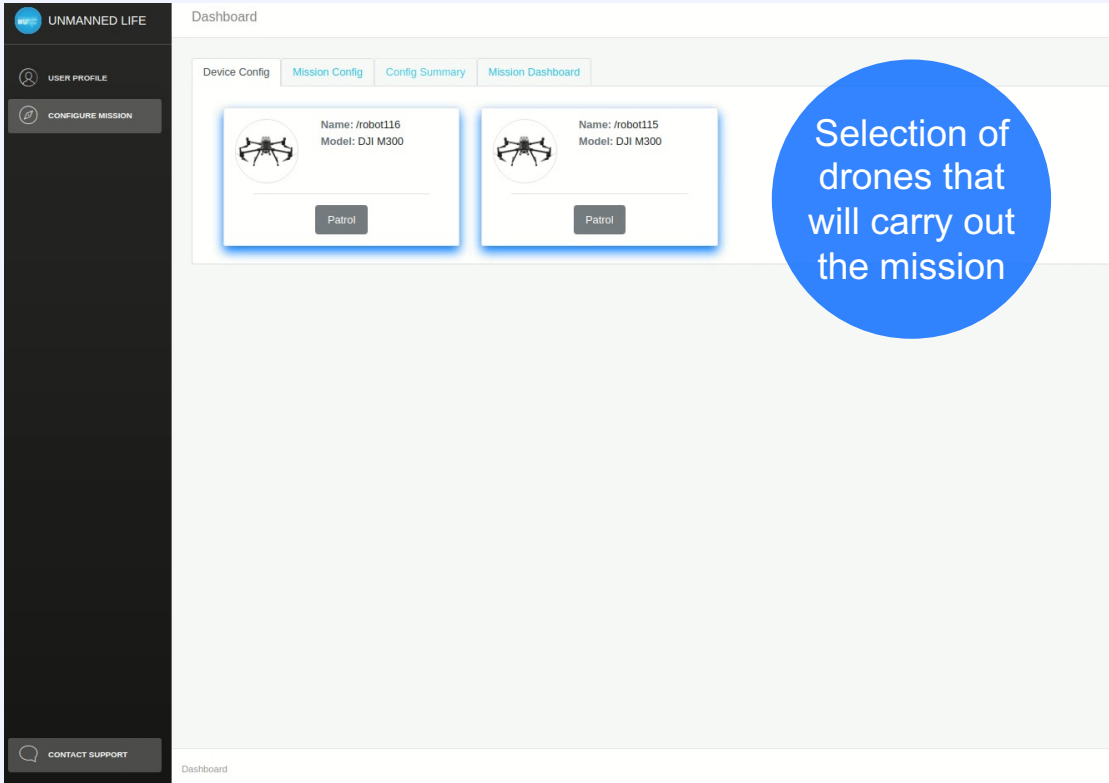
✓ Drones



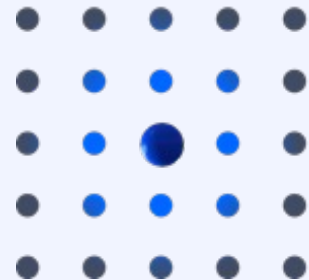
✓ Counter Drones



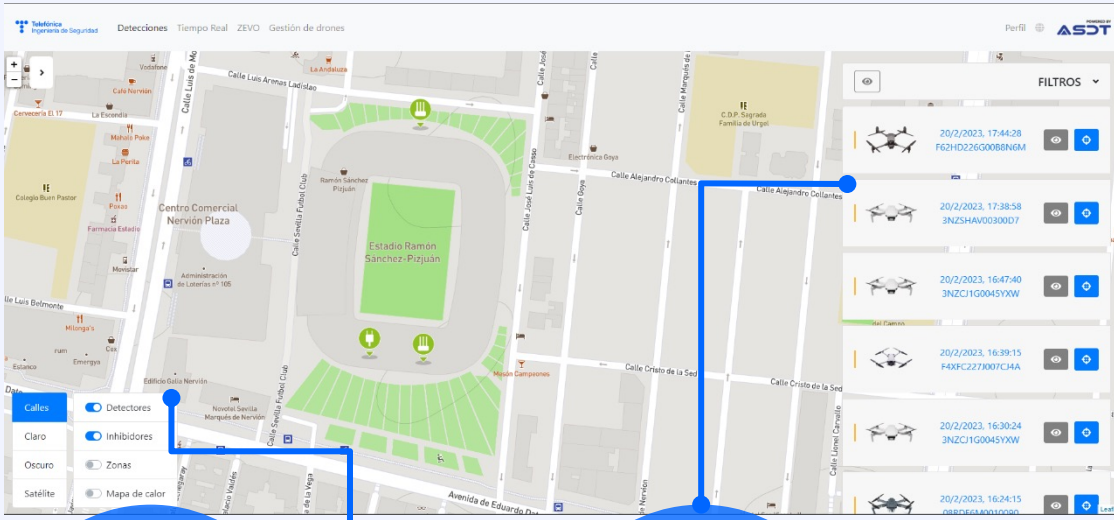
# Telefonica's Headquarter Use Case



## Telefonica's Headquarter Drone Protection



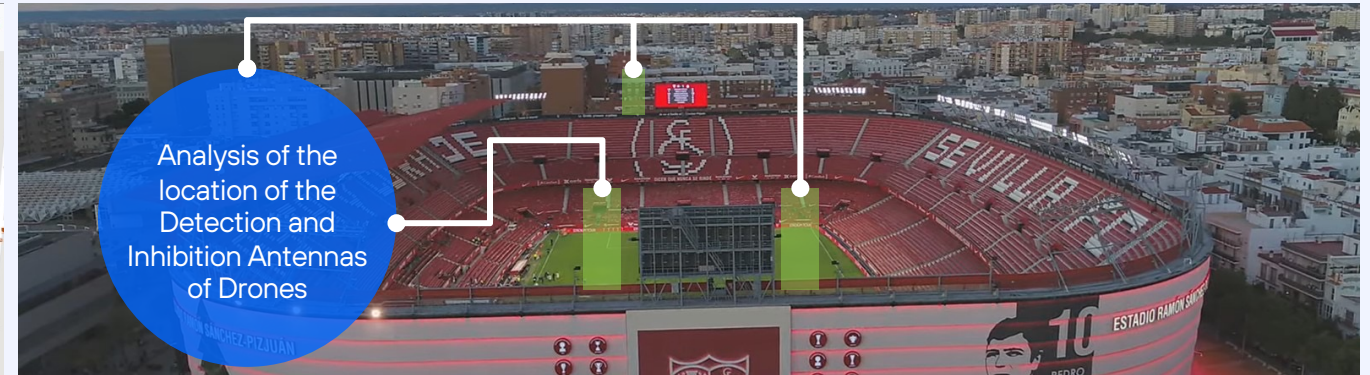
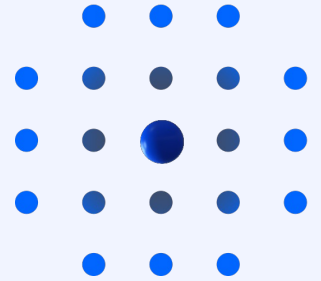
# La Liga Use Case



**Drone Detection and Inhibition Platform**

**Identification of drones operating in the area**

## La Liga Drones Protection Systems



# Round Table Talk



**Lorena  
Senador-Gómez**

Commercial Director and  
Business Development  
**Telefónica Ingeniería  
de Seguridad**



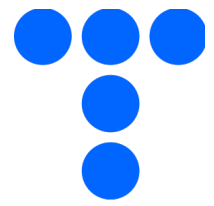
**José Damián  
García**

Director of Integrity  
and Security  
**La Liga**

MWC 2023

**MAKING  
THINGS  
HAPPEN**





Telefónica

# Claim

MWC 2023

MAKING  
THINGS  
HAPPEN

MWC 2023

MAKING  
THINGS  
HAPPEN

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THINGS  
HAPPEN