

Drones in Catalonia

February 2019



Technology Snapshot

ACCIÓ



Generalitat
de Catalunya

Drones in Catalonia: Technology Snapshot

ACCIÓ
Government of Catalonia



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In collaboration with

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Catalonia Trade & Investment. Innovation Unit

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Contents

- 1. Definition of a Drone and Its Importance to Industry**
- 2. Main world magnitudes**
 - World Leading Drone Companies
 - Global Drone Market: Forecasted data and sectors
 - Main regions and hubs in the world
- 3. Drones in Catalonia**
 - Main Conclusions of the Mapping
 - The Drone Ecosystem in Catalonia
 - Ecosystem Companies and Agents
 - Drone Business Cases in Catalonia
- 4. Macrotrends, trends and applications by demand Sector**

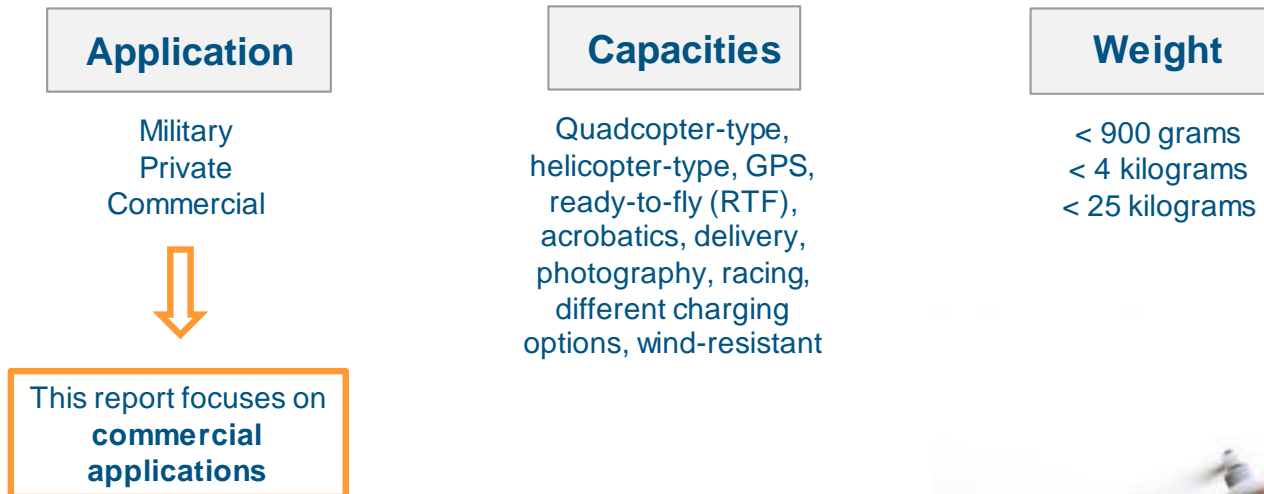
1. Definition of a Drone and Its Importance to Industry



What Is a Drone?

A **drone** is an **unmanned aerial vehicle (UAV)** of any size or shape that is controlled remotely from the ground or operates with a particular level of autonomy.

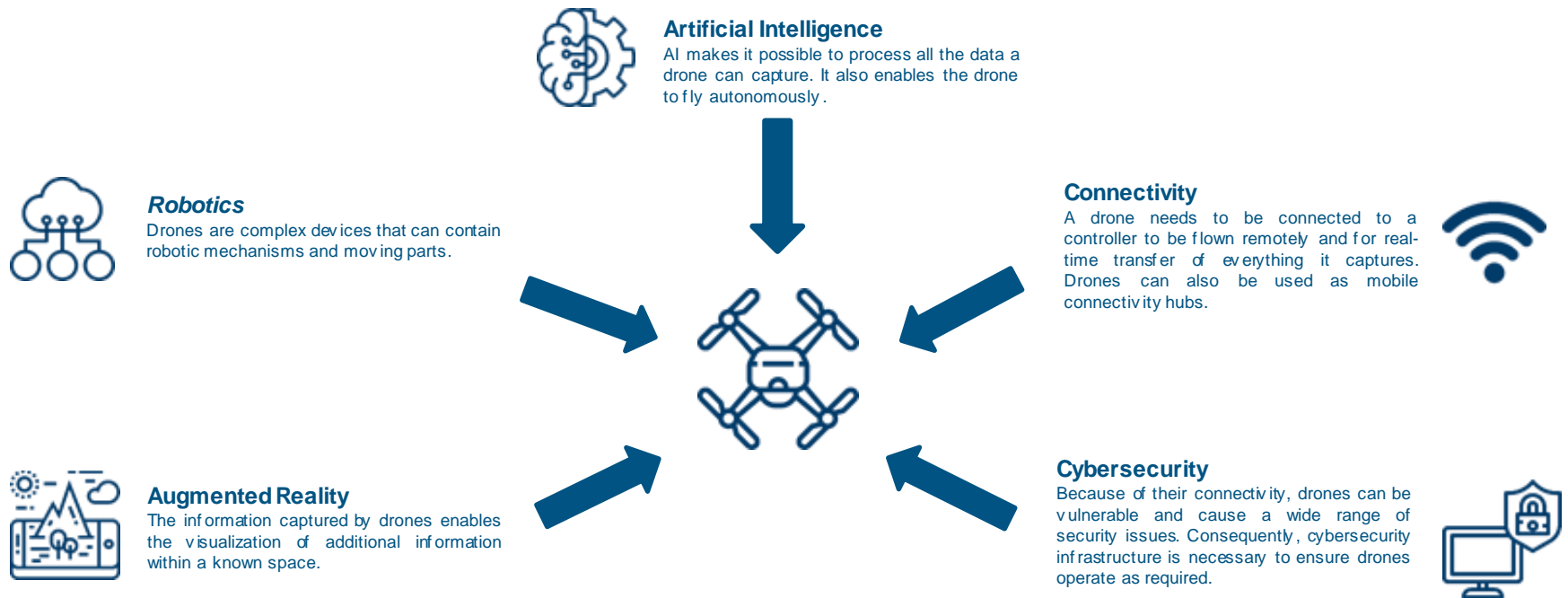
There are **different types of drones** and they can be categorized based on the following:



Source: EIC (DGI-ACCIÓ), based on data from Termcat, 3DInsider, SmartCatalonia and the Ministry of Development.

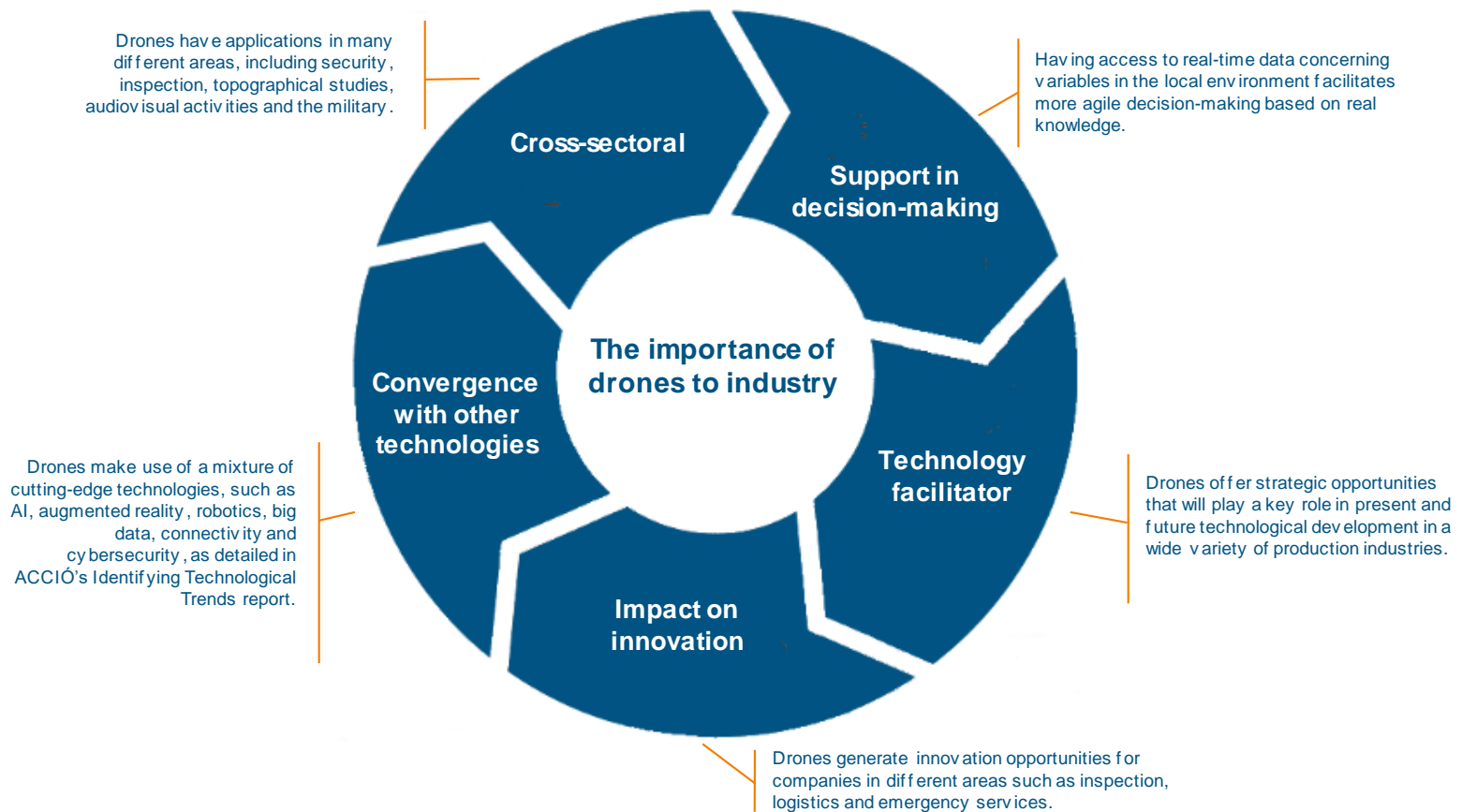
Drones are hybridizations of technologies

Drones chiefly integrate the following technologies:



Source: Own data from EIC (DGI-ACCIÓ), based on information from the press, technology forums and ACCIÓ.

The Importance of Drones to Industry



Source: EIC (DGI-ACCIÓ).

2. Main world magnitudes



World Leading Drone Companies

The 20 leading companies in the global drone industry are:



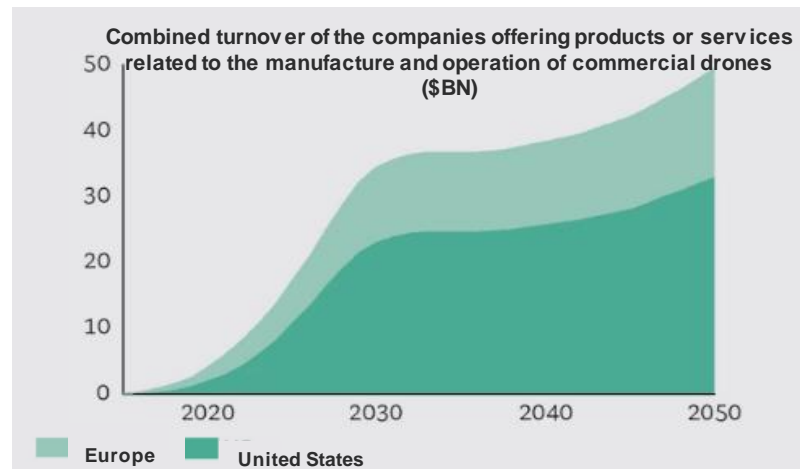
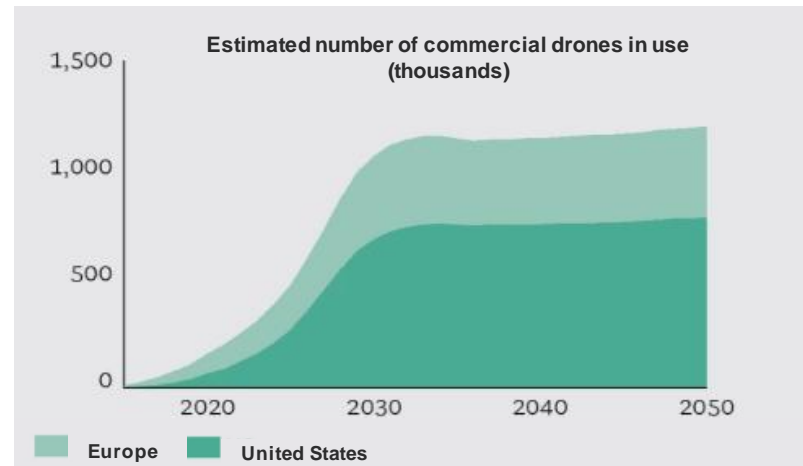
Source: EIC (DGI-ACCIÓ), based on data from Droneii (Q3 2016).
Companies listed in order of importance according to the Droneii ranking.

Global Drone Market: forecasted data and sectors

Of the three major uses of drones, **commercial applications were the last to be developed. However, gradual enforcement of regulations on the use of commercial drones, along with advances in drone technology and ease of use, has led to increased interest in commercial applications.** In the near future, longer operating ranges and an extension of the usable airspace are expected to drive high rates of growth in commercial drone numbers.

Although the number of registered commercial drones is growing extremely quickly, the **turnover of the companies offering products or services related to the manufacture and operation of commercial drones** is expected to take a little longer to hit the same heights. Nonetheless, **worldwide turnover is forecast to grow exponentially: from \$3.7BN in 2017 to more than \$30BN in 2030 and around \$50BN by 2050.**

According to expected data from BCG, although the majority of drone-related turnover will come from the **manufacture and operation** of drones in the short term, in the long term it will be the **related services and software** for controlling and complementing drones that generate the most value.



Source: EIC (ACCIÓ), based on 2017 data from Boston Consulting Group and Business Insider.

Main regions and hubs in the world

The United States is the market leader with regard to the manufacture and use of drones owing to the initiatives of the Federal Aviation Administration (FAA) and the government as a whole, which is increasing the potential uses of drones in the commercial sphere and approving initiatives to support testing, with the ultimate aim of removing the restrictions on commercial drone use in the United States. Innovation in the field of drone-based image capture and filming is also boosting the adoption of drone technology.

The highest anticipated levels of medium-term growth are expected in the region of Asia. The continent's growing interest in the commercial applications of drone technology is expected to speed up governmental reforms in this area and thereby increase the use of drones.

Forecasted drone market volume by region for the period 2017-2021



Source: Goldman Sachs and Global Market Insights.

3. Drones in Catalonia



Main Conclusions of the Mapping

Drones in Catalonia

67 companies

All the companies
are SMEs

The corporate information of more than two thirds of the companies identified is not published in the Companies Register. This makes it impossible to calculate the total turnover and number of people currently employed in this sector in Catalonia



A sector undergoing
internationalization:

1% of companies have
subsidiaries abroad

15% of companies export

Distribution of companies by their
position in the value chain:

1. Drone operators (66%)
2. Drone manufacturers (10%)
3. Data processing (7%)
4. Training and technical services (9%)
5. Drone integrators (7%)

It is a developing sector:
81% of companies are less than
10 years old

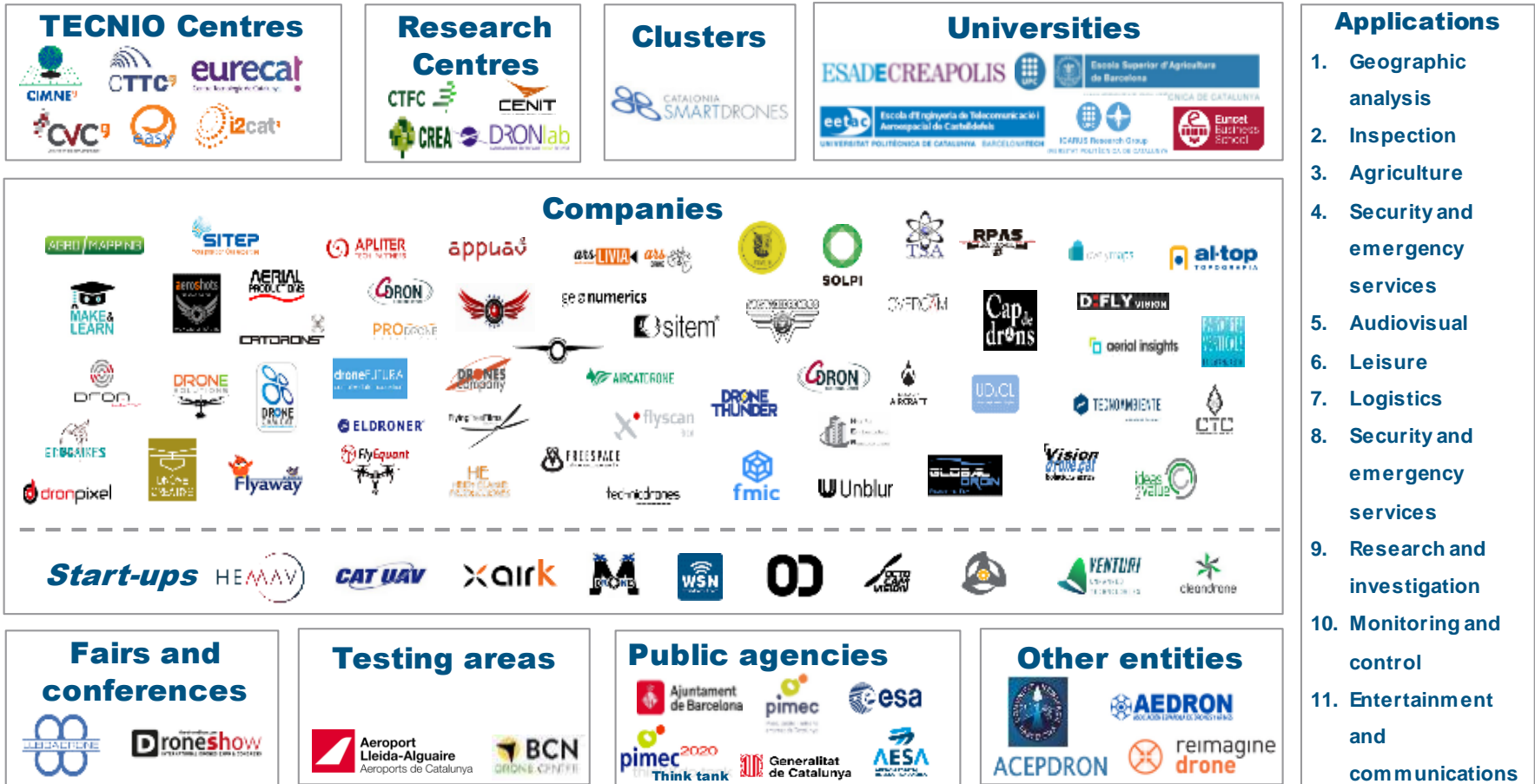
Main areas of application (by
number of companies):

1. Audiovisual (44%)
2. Inspection (18%)
3. Agriculture (9%)
4. Training (9%)
5. Geographic analysis (7%)

Source: EIC (DGI-ACCIÓ), based on data from Orbis, ACCIÓ directories and Barcelona and Catalonia Start-up Hub.

The Drone Ecosystem in Catalonia

Partial illustrational table*



Source: EIC (DGI-ACCIÓ), based on data from Barcelona and Catalonia Start-up Hub, Cluster Development and Catalonia Smart Drones.

Ecosystem Companies and Agents

CLUSTER: CATALONIA SMART DRONES



Catalonia Smart Drones is the Catalan industrial cluster of companies, technology centres, universities and other agents offering smart solutions with drones and driving the smart drone sector in Catalonia.

Catalonia Smart Drones' main objective is to increase the competitiveness of the Catalan drone industry by promoting projects that create jobs and improve the position of the Catalan smart drone sector at world level.

Strategy

Definition of a **strategic plan for industry support**.
Coordination of the different players.
Positioning in terms of regulation and legislation.

Promotion

Information and **company demonstrations**.
 Participation in **trade shows and conferences**.
 Participation in **international institutions and forums**.

Innovation

Promotion of drone **testing sites**.
 Promotion of **research and innovation**.
Search for European funding.

Talent

Support for **pilot training**.
 Training in collaboration with **universities**.
 Support for creating and growing **start-ups**.



Source: EIC (DGI-ACCIÓ), based on data from Catalonia Smart Drones.

Ecosystem Companies and Agents

Barcelona Drone Center

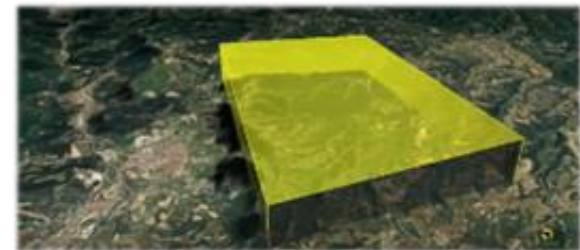
Barcelona Drone Center is **one of only 10 drone testing centres in the world and the oldest civilian drone company in Europe.**

The centre develops, tests and certifies unmanned aerial vehicles, and offers practical and international courses.

The centre's facilities have a segregated airspace, hangar, runway, laboratory, meeting room, ground control stations, office and much more in the centre's bioclimatic building, which is nestled in the natural landscape and powered by solar energy.

Barcelona Drone Center offers the following services:

- Drone development with experts
- Testing and certification of prototypes and projects before marketing
- Commercial events to attract clients
- Drone racing
- Specialized training
- International projects



Regulated airspace near the town of Moia.
 Area: 2,500 hectares.
 Altitude: 1,220 metres (may be increased).

Source: EIC (DGI-ACCIÓ), based on data from BCN Drone Center.

Ecosystem Companies and Agents

ACCELERATOR: REIMAGINE DRONE

Reimagine Drone is the **world's first dedicated drone services accelerator located in Barcelona**. The accelerator supports early-stage startup founders who are leveraging the use of commercial drones to unveil a new generation of services and applications using technologies such as virtual reality, augmented reality, 360 user experiences, data analytics, computer vision, surveying and mapping, deployment systems and more.

The joint program offers entrepreneurs from all over the world access to proprietary online curriculum from Peninsula and technical hands-on training and know-how from Brinc, together with prototyping, manufacturing and supply chain resources and know-how typically available only in Asia.



Source: EIC (DGI-ACCIÓ), based on data from Reimagine Drone.

Drone Business Cases in Catalonia





This Catalan company supports and shares information on **drone technology** to improve processes and provide civil society with innovative solutions by combining **airborne data collection** with the latest information technologies.

 **Ranked 4th in the world** for non-military drone services
Source: Drone Industry Insights.

 Agriculture	 Utilities	 Civil Engineering	 Special Projects	 Training
<p>Agronomic recommendations for optimizing crop production and infrastructure management.</p>	<p>Recommendations for preventive and predictive maintenance for infrastructure management.</p>	<p>Visualization, management and use of geospatial data through drone technology.</p>	<p>Ad hoc digital and integral solutions in drone technology.</p>	<p>Certified and authorized by AESA, ENAC and DGAC as a drone operator.</p>

And, for its solidarity initiatives, **Hemav** has **partners** such as:

 An autonomous drone (which requires little crew support time) equipped with a thermographic camera to detect boats containing refugees in the middle of the sea will be used to send data in real time so the NGO can begin rescue procedures as soon as possible. To prevent conflicts, the drone will also film everything that happens.

 Locus is another Hemav project. It involves taking action against the natural disaster of locust swarms. Drones are used to improve prevention when searching for locusts to keep them from swarming and make it unnecessary for an aeroplane to spray. Drone technology makes it possible to identify green areas with a multispectral sensor, locate locusts with a visual sensor and spray them with a specialized device.

Source: EIC (DGI-ACCIÓ), based on data from Hemav and the press.

Drone Business Cases in Catalonia

EUROPEAN ARSI PROJECT

FCC and the Eurecat technology centre are participating, along with the companies Simtech Design and IBAK, in the European ARSI (aerial robot for sewer inspection) project, which has designed, created and tested a **drone for sewer inspection** that will start operating in Barcelona in 2018. This project forms part of the European ECHORD++ programme.

The consortium successfully tested a multirotor micro air vehicle equipped with navigation sensors that will help reduce the work-related risks associated with this activity and cut down on maintenance expenses. This device can also go where land vehicles cannot, such as areas where accumulated waste and rainwater make it necessary to stop. Based on what the experts within the sector say, a drone can inspect 300 metres in 10 minutes; it is estimated that a team with one drone will be able to inspect 2.4 kilometres per day with a drastic reduction in the number of risks and difficulties.



European Coordination Hub for Open Robotics Development



Source: EIC (DGI-ACCIÓ), based on data from Regio7 and Eurecat.

Drone Business Cases in Catalonia

SITEP

SITEP was founded in Barcelona in 1998 with the aim of providing specialized services in consulting, development and implementation of custom-made computer systems for land management. In the 20 years it has been working with public agencies and private companies, it has adapted to new changes and consolidated its position on the local market as a **specialist in processing, analysing and implementing GIS solutions.**

It offers a wide range of services using cutting-edge technology. Its services include: monitoring natural resources and evolution of the terrain; control and monitoring crops and livestock; inspection of surfaces, cadastral registration and detection of illegal constructions; cartography and topography; emergency management, fire control and locating missing persons; inventory of industrial infrastructure and improvements in energy efficiency; civil engineering, planning and design, road maintenance; defence and security, border control, road traffic management.

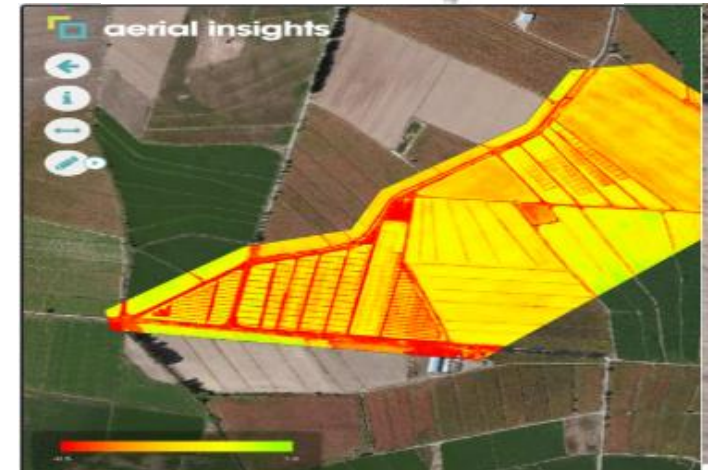


Source: EIC (DGI-ACCIÓ), based on data from SITEP.

Drone Business Cases in Catalonia

AERIAL INSIGHTS

- Aerial Insights works in the areas of aerial topography, orthophotography and cartography by using drones to obtain images that are processed using its proprietary software.
- Aerial Insights software can be used to digitize and convert the images filmed by drone into conventional or 3D maps. With this technology, Aerial Insights provides a service and very useful technical advice for the surveying, agriculture and mining industries because the images obtained by drone and then processed can help optimize production processes. In surveying, it becomes very easy to map the most abrupt elements of the terrain because drones can work in places that are hard for people to reach. In mining, its high-precision maps help managers calculate stacking volumes, monitor equipment and identify areas that do not comply with environmental or safety regulations. In agriculture, it monitors crop status to determine factors such as watering requirements, pest infestations and the crops to be grown.
- Aerial Insights has offices in Barcelona and Zaragoza and was founded in 2016.



Source: EIC (DGI-ACCIÓ), based on data from Aerial Insights.

4. Macrotrends, trends and applications by demand sector



Drones Offer a Solution to Future Macrotrends

Macrotrends are general trends in which people express certain preferences over others. These forces are both visible and invisible and are cross-cutting in nature, rather than linked to a specific sector.

Because of the dramatic increase in urban populations, many cities need intelligent and efficient management to become sustainable “smart cities”. Drones will allow emergency services to deal with urban emergencies quickly, effectively and safely.

An increasingly urban world

The World Economic Forum calculates that by 2020 some 5.1 million jobs will be lost in the world's 15 largest economies as a result of dramatic technological, demographic and socio-economic changes. Drones will bring definitive changes to the way many industries work and will transform many value chains.

The global population is expected to grow by 33% between 2015 and 2050. This growth will be matched by growing demand, which will in turn present a series of unprecedented logistical challenges. In part, these challenges will be the result of e-commerce, which requires rapid and precise last-mile delivery solutions like those offered by drones.

Reinventing the way we shop

New ways of working

Globally, the current level of resource consumption is forecast to double by 2050. The low energy consumption of drones in comparison to other vehicles used for inspection and security purposes, such as aeroplanes and helicopters, may help to slow this frantic rate of resource consumption.

The development of big data and data processing using AI will add another dimension to drone use by making it possible to capture large amounts of geographical information accurately and update it in real time. This will also increase drones' capacity to function autonomously.

Technological revolution

Sustainability

Source: EIC (DGI-ACCIÓ), based on data from PwC, Euromonitor and EY.

Trends in the Drone Industry

Drones and their ecosystem and environment are evolving rapidly, especially in the following areas:

1 New legislation

The entry into force of **new regulations and legislation** that will support industry evolution.

2 Autonomous drones

Autonomous drones piloted by algorithm will become genuine game-changers.

3 Mergers and acquisitions

Increased number of **corporate mergers and acquisitions (M&A)** and consolidation of market leaders.

4 Technology facilitator

Drones will turn big data, machine learning and AI into **technology facilitators**.

5 From hardware to software

Despite the importance of creating new devices, it will be ICT services and drone-related software that truly revolutionize the industry.

6 Questioning its limits

Potential invasions of privacy on the part of drones, along with the decisions they may take while operating autonomously, are the subject of much debate.

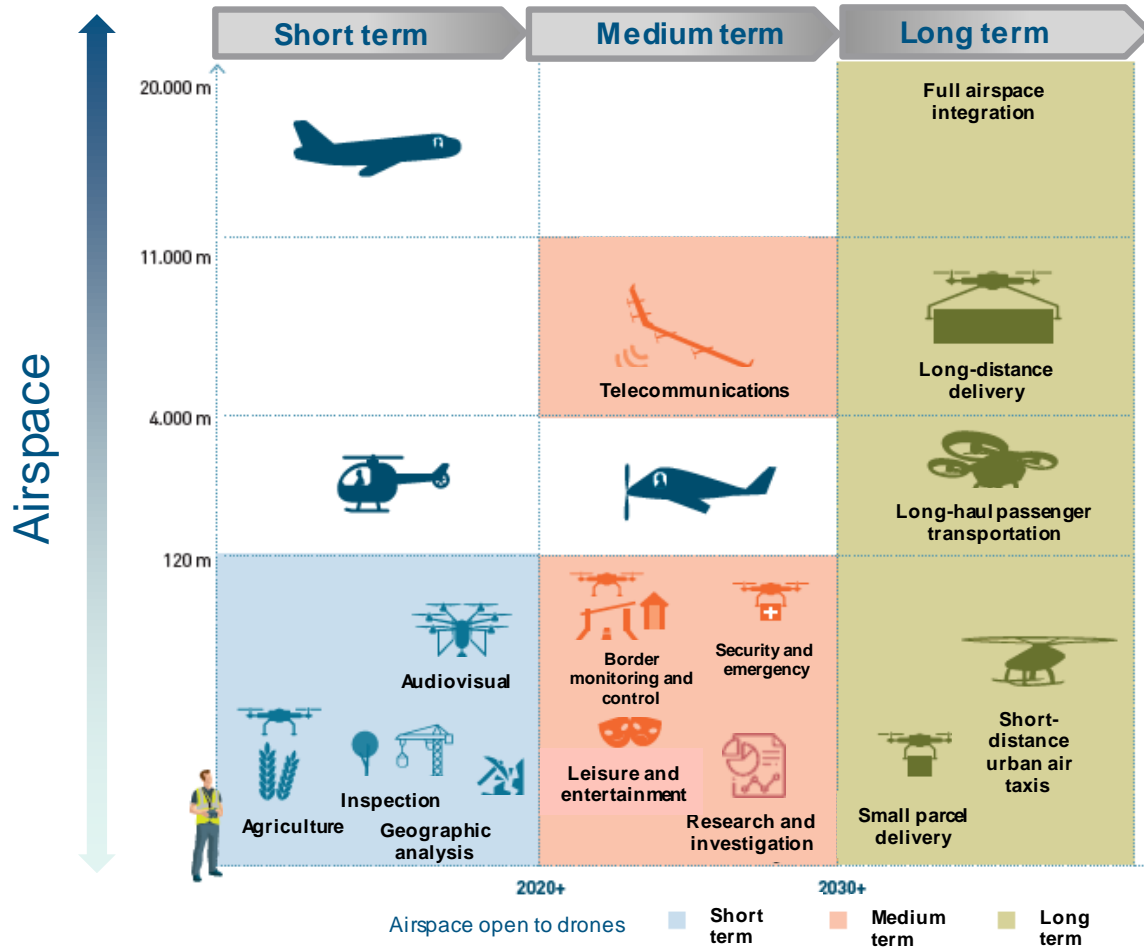
7 Anti-drone measures

The **development and proliferation of drones** means it is also **necessary to protect** against **malicious and threatening uses** (e.g. aerial bombardment, spying, terrorist attacks). This has led to the development of **anti-drone and counter-drone measures** to defend against aggressive use of the devices.

Source: EIC (DGI-ACCIÓ).

Drone Applications

The following developments are forecast with regard to drone applications over time:



Source: EIC (DGI-ACCIÓ), based on data from Cluster Development and PwC's Strategic Plan for Drones in Spain, 2018-2021.

* This report does not include military applications.

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See the full report here:

www.accio.gencat.cat/ca/serveis/banc-coneixement/cercador/BancConeixement/drons-a-catalunya

More information on the industry and related news:

<http://www.accio.gencat.cat/ca/sectors/altres-industries/>



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