



ECONOMY

September 2018 • www.lau-idf.fr/en

THE DRONE SECTOR IN THE PARIS REGION: THE EMERGENCE OF A CENTRE OF EXCELLENCE

€10 billion

THE ESTIMATED ECONOMIC IMPACT AND WEIGHT OF THE DRONE SECTOR IN EUROPE BY 2035 (EUROPEAN COMMISSION).

10,000 jobs

FORECAST IN FRANCE AND REVENUES (EXCLUDING MILITARY DRONES) WORTH €250 MILLION.

350

MAJOR STAKEHOLDERS IN THE PARIS REGION IN 2018.

IN RECENT YEARS, DEMAND FOR CIVILIAN DRONES HAS EXPLODED. PUBLIC AND PRIVATE SECTOR STAKEHOLDERS HAVE BEEN MOBILISING IN FRANCE TO TAKE THEIR SHARES OF THIS HIGH POTENTIAL GLOBAL MARKET, WHICH IS AT THE INTERSECTION OF SEVERAL INDUSTRIES: AEROSPACE, ROBOTICS, CONNECTED OBJECTS, ETC. HOWEVER, DRONES REMAIN A RELATIVELY RECENT INNOVATION AND MANY OF THEIR FUTURE USES ARE STILL IN THE EXPERIMENTAL STAGES. THE FRENCH STATE, THE PARIS REGION COUNCIL AND THE "CŒUR D'ESSONNE" AGGLOMERATION COMMUNITY PROVIDE SUPPORT FOR THE PARIS REGION'S DRONE SECTOR THROUGH THE "DRONES PARIS REGION" BUSINESS CLUSTER.

The Paris region stands out as Europe's leading economic region with its large aerospace and defence companies, a profusion of start-ups, the great diversity of its economic fabric and its powerful and world-renowned public and private R&D activities and has the necessary assets to assert the positioning of its drone sector internationally. In most cases, a drone is a flying robot that can travel independently or be remotely piloted for a great variety of purposes including leisure, various professional activities and military missions. The landscape of the "drone sector" is extremely fast-moving, a classic situation in what remains an emerging industry with an undergoing process of market concentration. In the face of foreign competition that is driving prices down, the only way for European and Paris Region stakeholders to ensure a prosperous future is to invest continually in R&D and experimentation in order to provide high-performance customised products and services. The nature of future European regulations is also of strategic importance.

IN FRANCE, A COMPLEX ECOSYSTEM SUPPORTED BY THE PUBLIC AUTHORITIES AND EUROPE

The stakeholders in the drone sector can basically be divided into three categories, some of whom fulfil several functions: the designers/builders and their industrial partners; the operators, direct users or drone service-providers; and finally, all the supporters of technological development, namely: public-sector R&D bodies, higher educational institutions, corporate networks, trade and professional bodies, institutional players, training centres, jurists and specialised insurers.



INSTITUT
D'AMÉNAGEMENT
ET D'URBANISME
 Île de France





Sylvain Ramadier



Drones-Center

Cover

Agriculture is a fast-developing application area for drones, such as the Parrot shown here.

Left: the maiden flight of the Airbus Skyways system for making deliveries in urban areas.

Right: the former Brétigny 217 air base, now owned by Cœur d'Essonne Agglomération Community, is home to the Drones Paris Region business cluster, one of the pivotal areas of development in this region.

Professional civilian drones: a sector undergoing restructuring

According to data provided by the French Civil Aeronautics Directorate (DGAC) in 2018, this sector in France represents 10,000 jobs and 9,700 professional drones. Most of the 5,300 operators are very small enterprises and sole traders, some of whom have very low revenues or no revenues at all. The DGAC estimated in 2017 that the total revenues generated by the drone sector (excluding military drones) in that year amounted to EUR250 million, i.e. barely EUR25,000 per job. However, some large aviation and military equipment corporations such as Airbus, Safran, Thales or Dassault, whose data are not included in the data collected by the DGAC, support the development of civilian drones, if only through their R&D activity. The civil-military dual-use status of the drone market is currently under review by the DGAC and its partners within the Council for Civilian Drones (CDC).

Although the United-States, Israel and China are the three world leaders in drones, the drone sector has developed rapidly in recent years across all industrialised countries. However, there is no guarantee that most stakeholders will break even financially, notably in France. Drone manufacturers are facing stiff competition, particularly from Chinese industrialists. Many companies have expressed their concern about this: will they be able to invest at a steady pace without having any visibility regarding future market opportunities? Owing to these competitive and technological pressures, the drone sector is undergoing industrial concentration. Structuring difficulties and the low financial capacity of small and medium-sized enterprises have led the CDC to form a working group to identify the best ways to support the businesses concerned.

European military drones: a national sovereignty issue

In the military field, the use of American equipment¹ stems from the failure of the development of a French or European military drone industry. Yet, as stipulated in a French senatorial report [Senate, 2017], such a development represents a sovereignty

challenge. The report highlights the fact that France and Europe are lagging behind, and it makes the following recommendations:

- "Work should proceed on a programme of European MALE² drones that is realistic in terms of cost-effectiveness."
- "Franco-British cooperation should continue [...] in order not to delay the production of combat drones, the future sector of excellence."³
- "Collaboration with internal security forces should be facilitated."

THE MARKET FOR PROFESSIONAL DRONES: THE OUTLOOK REMAINS UNCERTAIN

The use of drones appears to be particularly suitable for gaining access more easily or at a lower cost to remote or isolated sites, but also for protecting human life or health and for carrying out a task more rapidly or efficiently by reducing the cost of labour, if need be.

Assessing the suitability of drones for new applications

However, in most areas of application currently being experimented, the economic viability of using drones instead of existing means has not been established yet. This is slowing the consolidation of corporate business plans. In spite of this difficulty, the capacity for innovation of French industry is a key strength. The following areas of application have been identified as having great growth prospects:

- energy/water/railways: inspection and maintenance of networks and equipment (oil rigs, nuclear power stations, dams, wind turbines);
- civil protection: border surveillance, crowd control, monitoring of natural disaster areas;
- agronomy and environment: aerial monitoring of plots of land for a more accurate understanding of crop condition and, if necessary, more specific treatment by specialised drones;
- civil engineering: inspection and maintenance of buildings and infrastructures, particularly if they are inaccessible, and the monitoring of work sites;
- mapping;
- insurance⁴ sector;



SURFACE AREA: **12,012 KM²**

12 MILLION INHABITANTS

18% FRANCE'S POPULATION

6.2 MILLION JOBS

The map illustrates the Paris region with various drone-related locations and flight paths. Key locations include RER C, D19, CDSI, Drones Center, Eurocontrol, Cluster Drones Paris Region, Drones & Goods, Cerbair Aeraccess, Thales, and Air base 217. Drone locations are marked with red and green circles, and arrows indicate directions towards N104/A6, N20/A10, and N20. A scale bar shows 0 to 5 km.

● Designers/builders of drones and their industrial partners

Operators and users

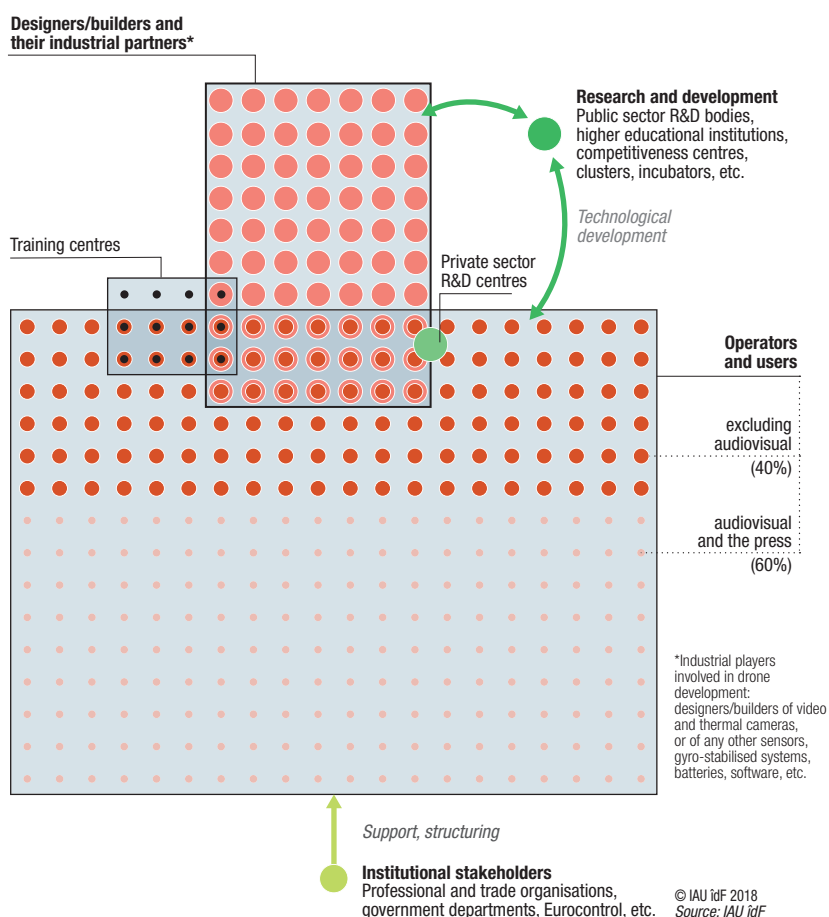
● excluding audiovisual

● including audiovisual

- Technological development:
Public sector R&D bodies, higher educational institutions, competitiveness and support centres
- Professional and trade organisations,
European institutions, government departments
- Training centres

THE DRONE ECOSYSTEM IN THE PARIS REGION

THE 350 MAJOR STAKEHOLDERS



THE DRONES PARIS REGION CLUSTER: THE PROFESSIONAL DRONE SECTOR'S FLAGSHIP CENTRE OF INNOVATION

For several years, the 300-hectare "Cœur d'Essonne" base has been an unprecedented model of site regeneration. Indeed, this former air force base, owned since late 2015 by the "Cœur d'Essonne" Agglomeration Community, has successfully combined economic development, the organisation of large-scale events, organic agriculture and high technology.

The establishment of the Drones Paris Region cluster has been one of the base's major development priorities. In less than two years, this cluster has already attracted 50 members. "We provide the drone sector's customers and stakeholders with a whole range of services specially designed for them," explains Jean-Philippe Bonhomme, the Director of the cluster. These services rely on flight spaces dedicated to professional drones on 300 hectares of land belonging to Cœur d'Essonne and the Val d'Essonne community of communes. This air space is used for incubation/acceleration and the development of partnerships and innovative projects to help structure this new industrial sector. This cluster will be organising the first edition of the Drones Paris Region Expo, the trade show for professional drones, in the Paris Region on 27th, 28th and 29th September 2018. Cœur d'Essonne is developing real estate dedicated to the hosting of companies, which will complement the office space offering already available on site.

Source: Cœur d'Essonne Agglomeration



Background map

- Urbanised space
- Airport area
- Woodland
- Main road network

0 20 km
© IAU idF 2018
Source: Mos 2012, IAU idF

- computerised data management⁵: publishing of software programs that extract the relevant information from the mass of collected data;
- logistics: there is a consensus that drones are efficient for delivering emergency medical supplies, but that they have yet to prove their efficiency for delivering standard products. Using drones to deliver goods is a solution that is being explored by major transport operators and pure players located in the Paris Region. Consideration is being given to testing them during the Olympic Games in Paris in 2024.

The crucial issue of regulation

Although many states have already put regulations in place, none of them has been harmonised at supranational levels. Nevertheless, a European law is currently being prepared, which is expected to be passed in 2018 and implemented by 2021. The European Commission predicts that by 2035 the European drone sector will directly employ over 100,000 people and will contribute more than €10 billion a year to the European economy, mainly in the service sector. For France and the other countries concerned, the current challenge is to submit proposals for future European regulations that do not hinder the achievement of their export objectives, while setting limits on the use of drones.

THE DRONE SECTOR IN THE PARIS REGION

Our count of the main drone-related businesses and institutions in the Paris Region amounts to 350 entities, which have been geo-located, mapped and registered (see the map on pages 3-4).

The industrial sector: an ongoing search for performance enhancement

The industrial sector of the drone business comprises the companies that design and build drones, as well as the “tools” adapted to them, such as cameras, batteries, robotic arms, transfer and data-processing software, etc. Our study identified over 70 entities belonging to the “drone designers and their industrial partners” category, made up of civilian and military stakeholders. Essonne “département” (county) stands out among other Paris Region “départements” (counties) by being home to 30% of these designers, many of which are located on the plateau of Saclay (20 kilometres south of Paris) and form part of the Drone Paris Region business cluster in Brétigny (27 kilometres south of Paris). Most of them (nearly 40%) belong to the “specialised scientific and technical activities” category, according to the NAF coding of the National Institute of Statistics, with a strong emphasis on R&D^a (see NAF codes in the box on page 6). These companies notably include ECA Robotics, Air-Lynx, Aviation Design, Aeromapper, Arvalis, Total R&D, Airinov, Uavia and Azur Drones.

As regards the industrial sector itself, half of the designers make IT, electronic and optical^b products, such as Parrot Drones, Safran Electronics & Defence, Thales and Noxant. The others belong to the aircraft and spacecraft construction industry^c, such as Airbus Defence and Space, Dassault Aviation, Aeraccess and

Drone Volt, or manufacture absolute no consumer (a.n.c.^d) machinery and equipment: Civic Drone, ADR Alcen, which belong to the Patroller business cluster managed by Safran or to Agri-Structures/AS-Drones.

Around 300 major operators

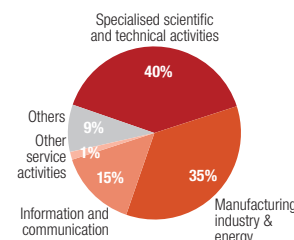
Nearly 60% of drone operators/users are involved in activities relating to film production^e, photography^f, advertising^g or information and communication (television channels, the press^h). These are the majority of drone users today in a now well-established market. The remaining 40% break down as follows:

- nearly half of them are involved in “scientific and technical activities”ⁱ. They represent around 60 companies such as Thales, Veolia, ECA Drone, Diadès, AREP and Airinov, as well as R&D bodies such as the National Institute of Preventive Archaeological Surveying (INRAP), because drones are being used increasingly in archaeology;
- 17% belong to the “information and communication” sector, focused more specifically on IT programming activities, data-processing, software publishing and telecommunications. They include companies such as Altametriz, the drone affiliate of SNCF (French Railways), Cerbair, Parrot Air Support and Silkan;
- finally, the rest are found in various other sectors: energy and manufacturing industry, education, construction (Bouygues, Vinci Construction), administrative services^j, the arts, entertainment, automotive and motorcycle retail/repair, transport, real estate, etc. Although gas and electricity producers are few in number, they are of great importance to the drone sector. Drones are already used intensively by gas and electricity producers and will be used more and more, notably due to major industry leaders such as RTE, Engie and Enedis, and their R&D sections.

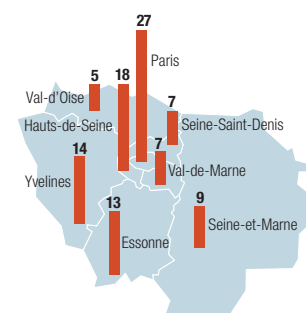
“Other” key stakeholders: public R&D bodies, competitiveness centres, institutional players

Around 40 stakeholders have a crucial role to play for the future of the sector. First of all, they support its technological development. Half of these entities are located in Essonne “département” (county) near Paris, particularly on the Plateau of Saclay. They notably include public bodies such as ONERA, INRA, and the CNRS, as well as higher educational institutions such as Evry University and AgroParisTech school. Furthermore, the drone sector comprises two competitiveness centres – ASTech and Systematic –, as well as technological support centres such as Opticsvalley and Teratec, not forgetting business incubators such as IncubAlliance and Starbust. In October 2016, a business cluster dedicated to the drone sector called Drone Paris Region was established to lead the sector (see the box on page 4). This category also includes bodies that help to structure and support the sector, namely: the Civilian Drone Professional Federation (FPDC) and the French Aerospace Industries Association (GIFAS); government departments and agencies such as the DGAC including, within it, the French Air Traffic Control Agency (DSNA) and Eurocontrol located in Brétigny. Finally, a dozen drone pilot training centres contribute to the vitality of the sector.

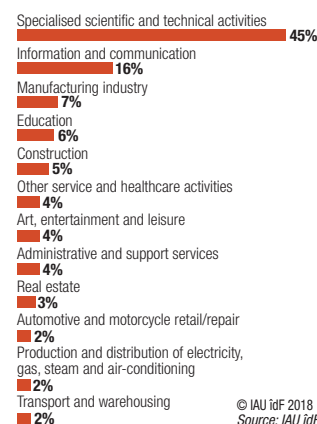
Activities of the 70 main designers and industrial partners, according to their NAF codes



Distribution of drone operators by county (as %, excluding audiovisual and photographic production)



Activities of drone operators, according to their NAF codes (as %, excluding audiovisual and photographic production)



DRONE CLUSTERS IN FRANCE AND EUROPE

The international benchmarking carried out for our study shows that a few specialised business clusters have emerged, to which should be added many aerospace and security-related clusters.

In France

- Established in 2010 in Bordeaux, Aetos is the first drone business cluster created in France. It brings together more than 80 stakeholders, including companies such as Airbus Defence and Space, Thales and Delair-Tech. It should be noted that in the New Aquitaine Region in the southwest of France, drones are also being studied by the Aerospace Valley competitiveness cluster.
- The SAFE Cluster in the Southern region is the competitiveness cluster for security technologies and solutions, whose drones belong to the "autonomous systems" category. In this network of around 450 members, some 50 have links with the drone sector. The major groups concerned include Airbus, Dassault, Safran and Thales.
- Drones Paris Region is a business cluster, which Thales has just joined (see box on page 4).
- Finally, the Patroller business cluster is a network of subcontractors specific to the drones of the Safran Group.

In Europe

- The National Aeronautic Centre (NAC) is situated in Wales. Thales used this facility for the commissioning of its Watchkeeper tactical drone for the British Army.
- In Germany, support for the sector is provided by the UAS INSYS and UAV Dach networks. Support from the federal government is strong too, with a clearly expressed export goal.
- The Barcelona Drone Centre, located one hour from the city centre, is dedicated to the testing of civilian drones.
- In Denmark, UAS Denmark is a drone-specific business cluster, acting as both a national testing centre and a network of 160 companies. Furthermore, the Centre for Defence, Space & Security (CenSec) is a cluster which has conducted with the SAFE Cluster a joint research project on the neutralisation of drones.
- EUKA is the platform for the development of the Flemish drone sector. It claims to have 240 active members in 2018.
- The network of the Drone Industry Association Switzerland was present at the VivaTech trade fair in Paris in 2018.
- The Northern Research Institute in Norway has launched a national research programme on cargo drones.

The development of new applications for drones seems self-evident, even though it is difficult to foresee over the next 10 or 20 years which applications will be profitable in order to target the right markets in which to invest. Nevertheless, against this uncertain background, all the French public authorities aim to support this sector in order to develop the national drone sector, promote a European military drone, influence European regulations and facilitate access to export markets. At the level of the Paris Region, the proposals and actions of the Drones Paris Region cluster are in line with the national guidelines. This cluster aims particularly to position itself in the processing of data collected by drones in support of the digitalisation of the economy. It also invests in the key field of digitalization of flight plans. Finally, it ensures the promotion of French companies on international markets, hence France's interest in getting involved in influencing the substance of Europe's future very strategic regulations. ■

Valérie Constanty, geographer and urban planner
Economics Department (Vincent Gollain, Director)

1. The Reaper drone, which the French government decided to commission in September 2017.
2. MALE: Medium Altitude Long Endurance.
3. "(...) regarding MALE drones, France and Europe are lagging the rest of the world. A strong fresh impetus should now be given to the European drone sector, which is essential to Europe's defence and independence."
4. "One of the key industries on which we are focusing is insurance. Commercial drones are going to revolutionise the way insurance companies collect data on the physical world and the insurance industry is aware of this", explains Jonathan Downey, CEO of Airware, the American company which merged in 2016 with Redbird, a French company in the Paris Region specialised in the processing of data collected by drones.
5. "On the market for corporate drones, 50% of the value added will be generated by IT services, according to the Boston Consulting Group. (...) Drones are going to collect an enormous amount of data, which will have to be transmitted, saved, analysed and processed to enable companies to use them." In "The professional drone market is about to take off", RTBF, 20th March 2017.

HEAD OF PUBLISHING

Fouad Awada

HEAD OF COMMUNICATION

Sophie Roquette

EDITOR-IN-CHIEF

Isabelle Barazza

MODEL

Jean-Eudes Tilloy

GRAPHICS

Pascale Guery, Noémie Le Grand

PRODUCTION

Sylvie Coulomb

TRANSLATION

Cabinet Iain Whyte

MEDIA LIBRARY/PHOTO LIBRARY

Claire Galopin, Julie Sarris

MEDIA RELATIONS

Sandrine Kocki

sandrine.kocki@iau-idf.fr

IAU Ile-de-France

15, rue Falguière
75740 Paris Cedex 15

ISSN ISSN 2555-7165

ISSN online 2497-126X



www.iau-idf.fr/en



RESOURCES

- Amouktech Alexandre, Janda Joel, Vincent Justin, *Drones Go to Work*, Boston Consulting Group, April 2017.
- Constanty Valérie, *La filière des drones en Île-de-France. Situation et localisation des entreprises*, IAU idF, septembre 2018.



- Pôle interministériel de prospective et d'anticipation des mutations économiques (Pipame), *Perspectives de développement de la filière des drones civils à l'export*, juin 2017.
- Sénat, Rapport d'information n° 559 par le groupe de travail « Les drones dans les forces armées », animé par Cédric Perrin, Gilbert Roger, co-présidents, Jean-Marie Bockel, Raymond Vall, sénateurs, 23 mai 2017, et le document de synthèse *Drones d'observation et drones armés : un enjeu de souveraineté*.

NAF CODES OF COMPANIES IN THE DRONE SECTOR

- a) NAF 7112, 7219 and 7490
- b) NAF 2630, 2651, 2790
- c) NAF 3030
- d) NAF 28
- e) NAF 5911 and 5912
- f) NAF 7420
- g) NAF 7311
- h) NAF 6020 and 6391
- i) NAF 7010 to 7490 excluding 7420 and 7311
- j) Including the SDIS, French Fire and Rescue Department Services

