Revista catalana de dret públic #55

www.rcdp.cat

DRONES: AN OPPORTUNITY FOR CATALONIA? LEGAL REFLECTIONS AND STRATEGIC PROPOSALS*

Marc Valls Estefanell**

Summary

The growth of the drones sector is proving unstoppable and the economic possibilities of using drones are infinite. Although drones are piloted by remote control, they are deemed to be aircraft, and therefore the laws that apply to them are the aircraft laws that each country has enacted in accordance with the Chicago Convention of 1944, the magna carta of aviation law. In Spain, the Constitution reserves sovereignty of airspace for the Central Administration, and therefore the autonomous communities do not have any regulatory capacity in this regard. Apart from analysing the legal situation on the use of drones in Spain and in Europe, this article reflects on the various scenarios for the construction of a Catalan legal system to regulate drones within the framework of an independent Catalonia, either as a EU Member State or not. We conclude with some future-oriented strategic ideas aimed at strengthening the Catalan drones sector and helping the country become one of a world leader in this sector.

Key words: RPAS; public-service drones; Catalan drones sector; Mediterranean of the two poles; Barcelona city-laboratory.

DRONS: UNA OPORTUNITAT PER A CATALUNYA? REFLEXIONS JURÍDIQUES I PROPOSTES ESTRATÈGIQUES

Resum

El creixement del sector dels drons és imparable i les possibilitats econòmiques del seu ús són il·limitades. Els drons, tot i ser pilotats per control remot, són aeronaus i per això la legislació que se'ls aplica és l'aeronàutica que cada país ha desenvolupat d'acord amb la norma magna del dret aeronàutic que és el Conveni de Chicago de 1944. A Espanya, la Constitució reserva la sobirania de l'espai aeri a l'Administració Central i, per tant, les comunitats autònomes no tenen capacitat normativa al respecte. L'article, a part d'analitzar la situació legal de l'ús dels drons a Espanya i a Europa, reflexiona sobre els diferents escenaris de la construcció d'un règim jurídic català regulador dels drons en el marc d'una Catalunya independent estat membre, o no, de la UE. Per finalitzar, es proposen algunes idees estratègiques de futur per potenciar el sector català dels drons per tal que el país esdevingui un dels líders del sector a nivell mundial.

Paraules clau: RPAS; drons servidors públics; sector català dels drons; Mediterrània dels dos pols; Barcelona ciutatlaboratori.

---

* This article is a translation of the original version in Catalan.

** Marc Valls Estefanell, legal expert in drones and autonomous machines. Partner, legal director and Director of Education and Public Policy of Unblur. Campus Diagonal Nord, Building C6, c. Jordi Girona, 1-3, 08034 Barcelona, marcvallsestefanell@gmail.com, @Vestefanell.

Article received 30.01.2017. Blind review: 27.02.2017, 02.03.2017 and 19.03.2017. Final version accepted: 29.05.2017.

Recommended citation: Valls Estefanell, Marc. "Drones: an opportunity for Catalonia? Legal reflections and strategic proposals". *Revista Catalana de Dret Públic*, Issue 55 (December 2017), p. 113-131, DOI: 10.2436/rcdp.i55.2017.2927.

Summary

1 Introduction

Once again, we find ourselves in a situation where technology is putting us to the test. This time, drones have brought it about. The growth of the sector has been unstoppable and economic opportunities are infinite. Whatever the case, the proliferation of these devices is obliging states to regulate their use. So then, what role can Catalonia play in the face of this scenario?

This is the question that this study will attempt to answer with the aim of setting what are basically three objectives. The first of these is to analyse the current legal regime for drones at both an international and a European level, and to conduct a more in-depth study, especially in the case of Spain, so that we can see whether Catalonia really can exercise regulatory powers in this sector or not. The second of these objectives is to consider a number of scenarios in which an independent Catalonia might find itself as it constructs a Catalan legal system. The third and final objective is to propose some strategic ideas for the future that can strengthen the drones sector in Catalonia so that the country can become a world leader in the sector. These ideas might be polemical and daring but they can act as a basis for a debate process about whether or not we want drones to be an opportunity for our country to grow and develop, and to see what strategic decisions we should take to bring this about.

2 Concept and scope of action of drones

A drone is an aircraft, either military or civil, that is piloted by remote control. We need to associate the concept of drone with that of an aircraft insofar as the former is always linked to the latter. In short and as we will see later, the assimilation of the drone-aircraft pairing is essential in order to understand how this technology fits into law.

The word 'drone' comes from the sustained buzzing sound that the male bumblebee or drone makes as it flies. However, in technical terms, drones are known by different names: *Unmanned Aerial Vehicle* (UAV), *Unmanned Aerial System* (UAS) or *Remotely Piloted Aircraft System* (RPAS).

Drones, as aircraft, can take on all types of shapes, but there are essentially three main types: multirotors, aeroplanes and helicopters. Within these three variants, the models are infinite. Apart from shape, drones also come in different sizes.

According to the Spanish Air Safety Agency (AESA), "an aircraft piloted by remote control is technically considered to be a drone when it has a commercial or professional use. When the use of these aircraft is exclusively for sporting or leisure purposes, they are considered to be model aeroplanes and they are governed by the regulations for these".[1]

Any private person who has acquired a device of these characteristics and who simply flies it as a hobby must be aware that this device is not legally considered to be a drone, even though it may be one in their minds, but rather it is a model aeroplane, and as such, it is not subject to the regulations that we will analyse later. However, if the device is used for professional and commercial purposes, it is automatically deemed to be a drone. In short, how the aircraft is used will determine whether it is a drone or a model aeroplane.

The AESA indicates that "the activity of aeromodelling is regulated by the *Royal Spanish Aeronautical Federation,* and moreover, each autonomous community and each municipality can have its own regulations on this sporting or leisure practice, although these regulations must always respect the general legislation on aviation".[2]

Drones look like futurist machines, but the first drones were actually created a long time ago. Just like the Internet and many other inventions, drones have a military origin. Essentially, they arose out of the need that some armies had to carry out missions that would end up with crew members being captured or suffering an enemy attack.

1 AESA Circular "El uso de los drones en España. ¿Qué es un dron?".

2 AESA Circular "El uso de los drones en España. El uso de drones/aeromodelos por particulares para fines deportivos o de recreo".

To find the origins, if not the idea, of unmanned aircraft, we need to go back to the mid-19th century and the Austrian army, which used unmanned hot-air aerostatic balloons to bomb Venice.[3]

The basket of these balloons would open when it was activated by a timer and then unleash its cargo of explosives on a target on the ground.

Years later, drones were employed during the First and Second World Wars, the Gulf War, in Kosovo, Serbia, Iraq and Afghanistan[4] and they are currently being used in Syria, once again in Iraq, as well as Libya and Yemen. Today, more than 60 countries use military drones. The main advantages of using these aircraft are to: ensure the life of the pilot is not put at risk, to minimise one's own causalities, to maximise those of the enemy, to increase flight range and to reduce costs. Drones are primarily used in the military industry for two things. Firstly, to gather intelligence. A clear example here is the famous *Global Hawk*, a gigantic US device fitted with extremely powerful cameras, radars that is capable of gathering all kinds of detailed information about any target. The second function is to attack. What is the most-feared done of all? This is the *Predator B* combat drone also known as the *MQ9 Reaper*, which is fitted with *hellfire* missiles. Notwithstanding these examples, there is an increasing tendency for military technology to develop small. autonomous drones that capable of going unnoticed, or even entering the interiors of buildings.

At an ethical and moral level, certain military uses of drones have come in for a lot of criticism, but there have also been some legal doubts about whether or not attacks using armed drones can be considered war crimes. In quantitative terms, the Obama Administration undoubtedly marked a before and after with regard to the use of this technology. Most of these drones are piloted from distances of thousands of kilometres as if they were part of a videogame. The aim is to dehumanise war and sell the notion that the greater the amount of technology involved, the cleaner the war. However, and at a personal level, I believe that the debate should not focus so much on technology *per se*, but rather on the uses that are made of this technology in certain military actions.

Within the civil field, drones can carry out a plethora of functions, and many more uses will arise in the future, although these uses have already reached unimaginable levels today.

Today, agriculture is one of the industries where this technology is most used. Planning a selective harvest, managing water and spraying insecticides represent some cases of drones being used in this industry.

Drones have established a strong foothold in sectors such as the audiovisual industry as their use makes it possible to quickly and safely reach places of difficult access, at a low cost. Airplanes and, in particular, helicopters, which had been the main actors used to capture aerial images up to now, have found themselves pushed to the sidelines within this sector.

We also find areas where drones are still at a testing phase, but where they will undoubtedly end up having a very important use in our everyday lives. The emergency services are an excellent case in point. We are now starting to see several fire brigades, research and rescue teams and some police forces testing this technology in some of the operations that they undertake. However, research missions are the area where we see the greatest use of this technology, and here they will be essential for carrying out rescues in places where there are as yet no drones capable of performing operations of such characteristics.

Inspections of drains and sewers, electric towers and buildings under construction, hobby-leisure uses, providing the entire planet with Wi-Fi (a Facebook-led project), detecting land mines, cleaning solar panels in desert areas, scattering the ashes of deceased persons in places that are difficult to access, fighting mosquitos and plagues are among the uses that we could mention from the many applications.

Just as with the use of drones in the military field, drones for civil use are not controversy-free either as they can easily undermine or breach fundamental rights such as the right to privacy, because most of them are

3 Baquero, Antonio; Planas, Carles. "Drones: l'última revolució militar". *El Periódico de Catalunya*, Saturday 7 March 2015, page 3.

4 Montoya, Roberto. *La muerte por control remoto*, Ediciones Akal, SA, pages 22 and 23.

fitted with video cameras. Accordingly, in the EU, for example, drones are subject to the data protection laws of the Member State in which the flight takes place.

3 The legal regime of drones

3.1 Aviation law

Since they are considered to be aircraft, the legislation regulating drones is aviation or aeronautical law, and this legislation contains regulations of both a public international and an internal nature. Let us start our analysis of the legal system governing these aircraft from a global and international perspective in order to see the scope of this technology and get a better understanding of what is happening at a European, Spanish and Catalan level.

The Chicago Convention is the magna carta of aviation law.[5] This Convention was passed in 1944 as the Second World War drew to a close, and it was intended to harmonise and standardise international civil aviation, and establish standards for all the states that ratified it, thereby helping to avoid or prevent conflicts of any nature related to international flights (i.e. flights that fly through the airspace of more than one country).

The body charged with overseeing the application and fulfilment of the Chicago Convention is the International Civil Aviation Organization, (ICAO). Does this Convention regulate drones at a world level? The answer is that it does not, but it does establish the bases that should be followed by any regulations of an aeronautic nature, and drones, we should remember, are aircraft.

3.2 Spanish legislation

Before analysing Spanish aviation legislation and its corresponding specific drone laws, it is important to clarify that this process starts with a regulatory analysis of the Spanish state rather than that of the EU, since the European regulations are still at the draft stage and are a response to the many regulations on drones that have been passed by Member States. This is the reason why the European regulations cannot be understood without first analysing several regulations of different Member States. We will now examine the case that we are concerned with here, the Spanish one.

In Spain, the State Agency for Aviation Safety (AESA), which depends on the Ministry of Public Works and Transport *(Fomento)*, is the body responsible for ensuring civil aviation safety on Spanish territory, in other words, the exercise of powers in matters related to the control of general air traffic in peacetime and the upholding of civil aviation regulations for all aviation activity in Spain.

Going back to the drone-aircraft pairing, we should emphasise the three main pillars of Spanish aviation legislation that apply to drones:

- *Law 48/1960 on Air Navigation.*[6]
- *Law 21/2003 on Air Safety.*[7]
- *Royal Decree 552/2014 (Air Regulation).*[8]

With regard to specific Spanish legislation for drones, there are three regulations that need to be taken into consideration, and we will now discuss these below in chronological order:

5 Convention on International Civil Aviation.

6 *Ley 48/1960, de 21 de julio, sobre Navegación Aérea.*

7 *Ley 21/2003, de 7 de julio, de Seguridad Aérea.*

8 *Real Decreto 552/2014, de 27 de junio, por el que se desarrolla el Reglamento del aire y disposicions operativas comunes para los servicios y procedimientos de navegación aérea.*

3.2.1 AESA Circular of 6 April 2014 on the use of drones in Spain

In the face of the ever-increasing use of drones, and in order to impose some order until such time as Spanish regulations on drones had been drafted, on 6 April 2014, the AESA issued the very restrictive

AESA Circular on the use of drones in Spain,[9] forbidding the use of these aircraft for commercial or professional purposes:

> "In Spain, the use of drones is not permitted for civil applications (for military use there are regulations that allow them to be operated exclusively within a segregated airspace). In other words, **it is not permitted, and it never has been permitted, to use aircraft piloted by remote control for commercial or professional purposes** to carry out activities considered to be aerial works, such as photogrammetry, intelligent agriculture (detecting specific plants on a farm or estate that may require intervention, such as watering, crop-spraying, optimising crop-growing), graphic reports of all kinds, inspections of high-tension lines, railways, border controls, detection of forest fires, checking places affected by natural disasters in order to adequately focus help, etc."[my emphasis].

The legal argument behind this circular was based on articles 150 and 151 of the *Air Navigation Act 48/1960,* which specifies that carrying out a specialised task, such as aerial filming, surveillance, detection and/or extinguishing of fires, cartography, inspections, etc., requires the authorisation of the AESA and, given the fact that there were no specific regulations at that time to regulate the use of drones, this organisation understood that it could not issue these authorisations because it lacks a legal basis to do so.

3.2.2 Current regulation (January 2017): Art. 50 of Law 18/2014 of 15 October approving urgent measures for growth, competitiveness and efficiency

Because of the manner in which it was planned, and given the fact that the previous situation had become unsustainable to the point that it was becoming a clear limiting factor for the practical development of this new technology, the regulation was inadequate and weak from a legal perspective, and on 5 July 2014 the Council of Ministers passed a provisional regulation on the use of drones. This regulation is based on Article 50. *Operation of civil aircraft piloted by remote control* of *section 6. Civil aircraft piloted by remote control* (*Chapter I. Civil aviation,* Title II. *Infrastructures and transport*) of *Royal Decree - Law 8/2014 of 4 July approving urgent measures for growth, competitiveness and efficiency*.

> "There is also an extraordinary and urgent need to establish this legal framework to **strengthen the competitiveness of the Spanish industry and put it on a par with that of other neighbouring States that have already dealt with the regulation of the sector or which are in the process of doing so**.
>
> It is therefore extremely urgent **to establish a legal framework that allows the operation of these aircraft under conditions of safety, and to make sure they are controlled by the State Agency for Air Safety in order to avoid security risks that might cause aviation accidents or incidents**". [the emphasis is mine].

This regulation was subsequently enacted into law and this process culminated on 17 October 2014 with the publication of *Law 18/2014 of 15 October approving urgent measures for growth, competitiveness and efficiency* in the Official Gazette of the Spanish Government (BOE).[10]

Before analysing the current regulations, it is interesting to take a look at what triggered the State to urgently regulate the use of drones via a Royal Decree law. The reasons are set out in Section V of the preamble to the aforementioned law:

> "In recent years, scientific and technical advances have contributed to the progress of aviation, allowing the **appearance of new users of the airspace that receive various names such as drones**, RPAs (*Remotely Piloted Aircraft*) or UAVs (*Unmanned Aerial Vehicle*).
>
> These technological advances have also seen a considerable reduction in the cost of acquiring this type of aircraft, **allowing a proliferation of their use in an almost indiscriminate manner with the consequent risks for air safety that this involves**.

9 AESA Circular "El uso de los drones en España".

10 *Ley 18/2014, de 15 de octubre, de aprobación de medidas urgentes para el crecimiento, la competitividad y la eficiència.*

> To **guarantee a progressive transition to a high level of civil aviation safety**, it is necessary to establish the specific legal system that applies to these aircraft and to the air activities they carry out.

These regulatory measures must reflect the current state of the technique whilst simultaneously including the needs of the industry of the sector and strengthening its uses.

> [...]
>
> The reasons for the extraordinary and urgent need to establish the legal framework applicable to the operations of civil aircraft piloted by remote control stem from the need to **create a legal framework under conditions of safety that allows the development of a cutting-edge sector with a great capacity for growth**, especially bearing in mind that in the current economic context, it is necessary to establish measures that make it possible to diversify economic activity and strengthen industrial activity for the benefit of the economy and employment." [my emphasis].

With regard to the content of the regulations - and analysed from a general perspective - these are structured on the basis of three main pillars: types of drones, envisaged activities and pilots.

First of all, the regulations differentiate between drone types depending on their weight at the time of take-off, and they are classified into three groups:

- Those less than 2 kg
- Those up to 25 kg
- Those weighing more than 25 kg. Valid up to 150 kg, given the fact that drones above this weight come under the competences of the *European Aviation Safety Agency* (EASA).

Secondly, the envisaged activities that the regulations establish for drones are:

- Research and development activities.
- Aerial, plant-protection and other treatments that involve spraying substances on the ground or into the atmosphere, including the spraying or pouring of products to extinguish fires.
- Observation and aerial surveillance including filming and forest fire-surveillance.
- Aerial advertising, radio and TV broadcasts, emergency, and search and rescue operations,.
- Other special work.

Thirdly and lastly, the regulations set out the requirements that pilots must meet:

- They must be of legal age.
- They must hold a pilot's licence or else have a basic or advanced certificate for the piloting of civil aircraft piloted by remote control that fly within or beyond the visual range of the pilot, respectively.
- They must have a medical certificate that meets the technical requirements and administrative procedures required for civil aviation flight personnel.
- They must have a document showing that they have adequate knowledge of the aircraft, its systems and how to pilot it, which must be issued by the operator or manufacturer of the aircraft or an organisation authorised to do so.

And this is not all. In order to pilot drones for professional and commercial purposes, it is not sufficient to have a pilot's licence for these aircraft, but rather it is also necessary to register with the AESA as a drones operator or else to work for an already-registered operator, and in all cases, pilots must also be covered by a civil liability insurance policy.

There are several limitations on flying: drones cannot operate in urban areas, nor can they fly over agglomerations of people or fly at night; neither can they operate in controlled airspace (this means they cannot share airspace with aeroplanes and helicopters) nor fly close to airports, aerodromes, etc.

3.2.3 Draft Royal Decree regulating the civil use of aircraft piloted by remote control (October 2016 version)

The *draft Royal Decree regulating the civil use of aircraft piloted by remote control*[11] establishes the definitive legal framework applicable to the civil use of aircraft piloted by remote control (RPA) that are not subject to the regulations of the European Union.[12] This decree is still awaiting approval. If its publication is delayed for much longer, it might occur that the European Union's ever more powerful activity to produce Europe-wide regulations on drones could end up leaving this Draft Royal Decree without effect. However, it is interesting to highlight the fact that this regulation does take a more flexible and permissive approach compared to current regulations in that in some cases, and strictly complying to certain requirements, it opens up the possibility of flying over urban areas and agglomerations of people, flying beyond the visual range of the pilot and flying at night, actions which are currently not allowed:

a) The visual line of sight of the pilot is increased in some cases. Therefore, according to section 2 of Article *21. Conditions on the use of airspace for specialised air operations by remotely piloted aircraft that do not have an airworthiness certificate*,:

> "Moreover **specialised air operations could be carried out** in zones outside agglomerations of buildings in cities, towns or inhabited places or open-air meetings of personas, in uncontrolled airspace and outside a flight information zone (FIZ), **beyond the visual line of sight of the pilot (BVLOS)** and within direct reach of the radio frequency from the remote piloting station that allows a command link and effective control**:**
>
> By remotely piloted aircraft **(RPA) whose maximum take-off mass is less than 2kg**, pursuant to the provisions of Article 23 (iii).4, paragraphs one and two of Royal Decree 552/2014 of 27 June.
>
> By remotely piloted aircraft **(RPA) that have systems** approved by the State Air Safety Agency and **which allow the pilot to detect and avoid other users of the airspace**. Otherwise, these flights beyond the visual line of sight of the pilot (BVLOS) can only take place in airspace that has been segregated for this purpose.
>
> For the approval of the systems referred to in the previous paragraph, the State Air Safety Agency will apply the technical standards established for this purpose by the Agency itself or by the International Aviation Civil Organization (IACO), or failing that, by the aviation authorities that it considers, or national or international standardisation bodies of recognised prestige". [the emphasis is mine].

b) Possibility of flying over cities, towns, inhabited places or open-air meetings of people provided that certain requirements are complied with, such as making sure that the drones in question do not exceed a maximum take-off mass of 10 kg. Pursuant to *Article 21. Conditions for using airspace to carry out specialised air operations by aircraft piloted by remote control which do not have an airworthiness certificate*, section 3:

> "**Specialised air operations can only take place over agglomerations of buildings in cities, towns or inhabited places or open-air meetings of people**, in uncontrolled airspace and outside of a flight information zone (FIZ), using remotely piloted aircraft **(RPA) whose maximum take-off mass does not exceed 10 kg, within the visual line of sight of the pilot (VLOS), at a maximum horizontal distance of 100m from the pilot, and at a maximum height above the ground of no more than 400 feet (120m) above the highest obstacle situated within a radius of 600m from the aircraft**.
>
> These operations, must be carried out over designated zones on the surface where the authority that is competent for this purpose has limited the passage of persons or vehicles or, otherwise by maintaining a **minimum horizontal safety distance of 150m with regard to buildings or any other type of structures and 50m with regard to any person, other than the staff of the operator or personnel involved in the development of the operation**". [the emphasis is mine].

11 *Real Decreto por el que se regula la utilización civil de las aeronaves pilotadas por control remoto.*

12 Idem, page 2.

c) Possibility of flying at night. According to *Article 25. Meteorological visual flight conditions:*

> "**The operation of night flights shall require the express authorisation of the State Air Safety Agency, following an application made by the operator accompanied by the safety study** envisaged in the aforementioned Article 23 (iii) 2, letter a) of Royal Decree 552/2014 of 27 June. According to the provisions of SERA.5005, letter c) 5) of the Annex of the SERA Regulations, in this authorisation the State Air Safety Agency may establish the minimum height that corresponds to the operation
>
> The maximum period to decide on an application for an authorisation to operate night flights will be six months counting from the application, after which the application will be understood to have been rejected in accordance with the provisions of the nineteenth additional provision of Law 21/2003 of 7 July". [the emphasis is mine].

3.3 Future European regulations

As far as the European panorama is concerned, in broad terms, we need to highlight the role of the European Aviation Safety Agency (EASA), which is the body entrusted with the task of drafting the common rules for European civil aviation and overseeing compliance with these through inspections in the corresponding Member States. In mid-2015, EASA published the *Advance Notice of Proposed Amendment 2015-10, Introduction of a regulatory framework* (A-NPA 2015-10) [13], a document commissioned by the European Commission that contains a series of proposals about how future European regulations on drones should be.

At the present time, the main European problems regarding the regulation of drones are:

- The lack of legal harmonisation on the use of drones, which means that a drone pilot or operator, for example one certified in Spain, cannot operate in the other Member States of the Union, since their titles would not be recognised there and they would not be registered as an operator.
- The failure of Member States to establish inter-state operations in their corresponding regulations for drones, and the consequent unfeasibility of certain operations where the airspace of more than one state is involved.

Support for drone technology from the European Commission, the European Parliament and the Council of the European Union was materialised at the start of March 2015 with the *Riga Declaration, On Remotely Piloted Aircraft (drones)* 'Framing the future of aviation', [14] the principles of which are gathered in a document, that we have already mentioned, the EASA document. These principles, which were established as the basic pillars of a regulatory European framework are as follows:

- Drones need to be treated as a new types of aircraft with proportionate rules based on the risk of each operation that they carry out.
- European regulations that ensure the safe provision of drone services should be developed.
- Drone technology and standards must be developed to fully integrate them into European airspace.
- Public acceptance is key to the growth of the sector.
- Drone operators are responsible for their use.

Returning to the previously mentioned *A-NPA 2015-10*, the three basic ideas of the regulatory framework proposed in this document are as follows:

- All drones would be regulated by the European Union.

13 Advance Notice of Proposed Amendment 2015-10. *Introduction of a regulatory framework for the operation of drones*.

14 Riga Declaration on Remotely Piloted Aircraft (drones). *'Framing the future of aviation'*.

- Drone types are no longer classified according to their weight as they are currently classified by Member States and by the Spanish state, but rather they are classified on the basis of the risk posed by the operations that each of them carries out.

- Three categories (*open*, *specific* and *certified*), ranging from lesser to greater operational risk, are established together with their corresponding requirements.

On 22 August 2016, EASA published the document *'Prototype' Commission Regulation on Unmanned Aircraft Operations,*[15] which "represents the current views of the Agency, although as this document states, it does not constitute any formal commitment on behalf of itself or the European Commission". The future regulations of the EU will be accompanied by the amendment of "Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 on common rules in the field of civil aviation, establishing a European Aviation Safety Agency, and this repeals Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/CE",[16] which will give EASA powers to regulate all unmanned systems of any size (at present it only regulates drones weighing more than 150 kg with drones below this weight coming under the competence of the Member States).

3.4 And Catalonia?

Given the regulatory panorama at an international, Spanish and European level, does Catalonia currently have any powers with regard to the airspace above its territory, and consequently can it control the use of drones in this space? The answer here is no. The reasons are as follows:

- Chicago Convention. Article 1 of the magna carta in aviation matters states this very clearly. Regarding sovereignty, the Convention establishes that the contracting states recognise that every State has full and exclusive sovereignty over the airspace above its territory. And as far as territory is concerned, it states that the territory of a State shall be deemed to be the land areas and territorial waters adjacent thereto under the sovereignty, suzerainty, protection or mandate of this State. What conclusion can we reach then? Spain has full and exclusive sovereignty over the airspace situated above its territory, and therefore, Catalonia, which is deemed to be Spanish territory, falls under the sovereignty, protection and mandate of the Spanish state.

- Spanish constitution. According to Article 149.20 of the Spanish Constitution (Title *VIII. Territorial Organisation of the State, Chapter Three – On the Autonomous Communities*), which refers to the matters that are the exclusive competence of the State, only the Spanish state has powers over the control of airspace, general-purpose airports, air traffic and transport.

- *Law 48/1960 on Air Navigation*. To round things off, Article 1 (*Chapter one. General provisions. On sovereignty over airspace, Aviation Laws and the general rules for their application.*) of this law establishes that "the airspace situated over the Spanish territory and its territorial sea is subject to the sovereignty of the Spanish state".

Spanish airspace is therefore protected by both the Chicago Convention and by the Spanish Constitution, and consequently by *Law 48/1960 on* Air *Navigation*. The result is a Catalonia that that cannot regulate drone flights as it is not an independent state, a key factor for enjoying full and exclusive sovereignty over the airspace situated above its territory.

However, and despite not being the subject of this study, it is interesting to point out that Article 139 of the Statute of Autonomy of Catalonia recognises the exclusive competence of the Catalan government (Generalitat) in matters of industry, which could be the basis of its actions in the drones industry, without prejudice to those aspects related to air navigation or defence, which are competences of the State.

15 Prototype' Commission Regulation on Unmanned Aircraft Operations.

16 *Reglamento (CE) nº 216/2008 del Parlamento Europeo y del Consejo, de 20 de febrero de 2008, sobre normas comunes en el ámbito de la aviación civil y por el que se crea una Agencia Europea de Seguridad Aérea, y se deroga la Directiva 91/670/CEE del Consejo, el Reglamento (CE) nº 1592/2002 y la Directiva 2004/36/CE.*

Despite this situation, the Government of Catalonia (Generalitat), and more specifically Catalonia Smart Drones, the embryo of what wants to become the cluster for the Catalan industry in smart solutions with drones, formed by companies, technological centres, universities and other agents that are driving this sector, wants to monitor the regulations at both a state and an international level in order to see how it affects the sector, and to participate, insofar as it is possible, in international institutions in order to be in a position to influence the most relevant decisions at a sector level.[17] The position of the Catalan Government is very clear regarding the current regulatory panorama, and it is because of the very limited framework of action that Catalonia finds itself limited solely to monitoring regulations, and participating, whenever possible, in international institutions.

4 Scenarios in the construction of a Catalan legal regime

4.1 Creation of aviation bodies and the incorporation of Catalonia into the International Civil Aviation Organization

According to the *White Paper on the National Transition of Catalonia* [18]drawn up by the Advisory Council for the National Transition (CATN), referring to the administrative structures that the EU requires of all States, "within the field of air transport, Catalonia must create its own air navigation entity, which should be integrated into the European air navigation network (it could be created from the already-existing control centre in Barcelona), and a Catalan Aviation Safety Agency that would assume the competencies for aviation safety in Catalan territory (it could incorporate AESA's flight safety office in Sabadell to do this). It would also be necessary to create a national supervisory authority to certify providers of air navigation services".[19] In summary, therefore, the CATN recommends the creation of three bodies for aviation matters:

- An entity responsible for air navigation (the equivalent in Spain is ENAIRE).
- A Catalan Aviation Safety Agency (the equivalent in Spain is AESA).
- A National Supervisory Authority (depending on the matter concerned, the corresponding entity in Spain would be the National Supervisory Authority (AESA), or the competent organ of the Ministry of Defence).

Following the CATN guidelines and regarding integration into the international community, Catalonia would have to join the International Civil Aviation Organization (ICAO), the specialist United Nations body. Therefore, Catalonia would have to join the UN and thus form part of the main organs of that institution, and it would "also access many of its specialised bodies through a unilateral act",[20] as is the case of the ICAO. However, it is important to remember that it is possible to be a member of the UN without being a member of the specialised organs and vice versa.[21] Accordingly, it would not be necessary to join the United Nations for this purpose. Despite being a completely atypical scenario, the CATN "insists that it is not convenient to envisage entry into the UN in a quick or precipitated manner, despite its symbolic nature".[22]

It is interesting to point out that the CATN, in referring to border control,[23] recognises that control of the airspace is the most complicated part of this task and that support should initially be sought to help implement this, until such time as equipment has been specifically provided.

17 More information at Catalonia Smart Drones.

18 Summary of the *White Paper on the National Transition of Catalonia*.

19 Summary of the *White Paper on the National Transition of Catalonia*, 2.2.2 Other administrative structures that the EU requires, a) Rail transport, gas and electricity energy services and telecommunications. Transport policy, p. 75.

20 Summary of the *White Paper on the National Transition of Catalonia*, 3.6.3 Joining international inter-governmental organisations, b) United Nations and its System, p. 127.

21 "Los organismos especializados de la Naciones Unidas. Naturaleza jurídica" in Juspedia.

22 Summary of the *White Paper on the National Transition of Catalonia*, 3.6.3 Joining international inter-governmental organisations, b) United Nations and its System, *cit.* 22, p. 129.

23 Summary of the *White Paper on the National Transition of Catalonia*, 2.5.2 Options and actions within the field of internal

4.2 The development of a specific legal system for drones in Catalonia depending on whether or not the country belongs to the EU

In the case of an independent Catalonia, there are several possible scenarios for the development of a specific legal system for drones and these would depend on whether the country is a EU Member State or not.

The first scenario to bear in mind is one of Catalonia becoming an EU Member State, and in this case, it would be difficult for the country to have its own drone laws as European legislation would most likely be already in force in this regard and its application would be compulsory for all Member States.

The second envisaged scenario is that of Catalonia not becoming a Member State of the EU and in this case it would have more freedom to develop its own specific drones legislation. A practical option would be to make a law in the image and likeness of the European one and thus operate in the same way as the surrounding countries. Another option to be taken into consideration is that of producing a more flexible law than the European one that allows greater freedom of action, thereby favouring a faster development of sector. In any case, it would be important to ensure that the legal regulation of the sector is in line with the strategy that the country has decided to adopt.

5 Strategic ideas and future-oriented proposals to strengthen the growth of the Catalan drones sector and help Catalonia become a world leader in this field

5.1 Strategic planning

If Catalonia wishes to adopt a strategy that can help it become a pioneering State and a country of reference within the drones sector, Catalans will have to decide which field they wish to commit to; the military field or the civil one. Very few states play in the first division of this sector and those that do are indeed true giants: United States of America, China, Israel, Turkey, France. All these countries are leaders in the manufacture and sale of civil drones (China, France and USA) and/or military drones (USA, Israel, China, Iran, Pakistan and Turkey), and Catalonia would find it difficult to overshadow them. Accordingly, the key to the hypothetical success of Catalonia within the drones sector lies with specialising in some specific matter within one of these two areas.

Bearing in mind that Catalonia is a peaceful country with a high sense of solidarity, it would appear more coherent to incline towards the civil field. Accordingly, peaceful and caring are adjectives that would correspond to a possible Catalonia that specialises in the development and manufacture of public-service drones. Indeed, Catalonia can become a leading State at a world level in the development and commercialisation of drones of this type, which are designed to serve society, oversee its integrity and security, and piloted by police, fire brigades and medical emergency services on search and rescue missions, monitoring and controlling fires, road safety, terrorism and special operations, etc.

Denmark has been a pioneer in the adoption of a national drones strategy and it could be a model for Catalonia to follow. The Danish government, through the Ministry of Higher Education and Science, together with the Ministry of Transport and Construction, has adopted the Danish Drone Strategy through which it aspires to become a pioneering State in Europe, with the development, research, and safe and stable use of drones on Danish territory as its main objectives. Developers, operators, universities and municipalities constitute the 130 members that form part of this national strategy, which is moving Denmark towards becoming, at least, a leader in the European drones sector.

At a business level, the corporation *Singular Aircraft*, is the company that is best adapted to the planned strategy. This Catalan company has created the *Flyox I* drone, a hydroplane designed to carry out rescue and fire-fighting missions, which can fly either on its own or piloted by remote control.

From a legal point of view, and bearing in mind that this point proposes the development and production of public-service drones as a Catalan national strategy in order to become a leading country in the sector,

security, p. 90.

it is essential that the Catalan regulations establish certain exceptions that favour the emergency services, which will be responsible for operating this type of aircraft for public purposes. Along these lines, Andorra, and more specifically "Article 14. State RPAS" in its "Unmanned, Remotely-piloted Aircraft Regulations" offer a good example. This article affirms that "State RPAS", in other words, public-service drones, after obtaining an administrative authorisation from the ministry with competences in civil aviation matters, can enjoy certain exceptions such as flying over congested areas, flying beyond the pilot's line of sight, flying at night and sharing the airspace with other State aircraft.

We will now go on to propose three strategic ideas for the future aimed at strengthening the drones sector in Catalonia so that the country can become one of the leaders of the sector at a world level. These ideas may be polemical and daring but they must serve as a basis for starting a process of reflection and debate about whether or not we want drones to be an opportunity for growth and development for our country and, if necessary, to decide what strategic decisions and public policies we should take to achieve this:

5.2 The Mediterranean of the two poles: Catalonia – Israel

If Catalonia, as a small country, is to become a world leader in the drones sector as described in the previous point, it needs strategic allies who can allow it to compete with the large countries that currently lead the sector. In this contest, we believe that an alliance between Catalonia and Israel is one possibility that could be taken into consideration. This proposal is based on the points set out below:

5.2.1 Israel, a leader in technology, cybersecurity and drones

Occupying a smaller territory than Catalonia and with only half a million more inhabitants, Israel had put an end to the technological monopoly of the famous *Silicon Valley*. The competition between the US and Israel is such that Tel Aviv, the headquarters of this new world technological power, is now referred as *Silicon Wadi*.

But what is its secret? How is it that Israel, a country that has been at "war and subject to systematic terrorism for decades" whilst still "maintaining the structures of a democracy",[24] has positioned itself at the head of the technological avant-garde at a world level? This success is built on four pillars:[25]

- An academic system based on an educational model of technological knowledge and innovation, aimed at making the country the world's Number 1 in terms of the most engineers per capita (working).
- A very strong connection between universities and companies, a fact that helps researchers to commercially develop their ideas through technological transfer centres.
- A military culture that has been built up thanks to the permanent state of war in which the Israel has been immersed for years. In this context, after the Israeli army's engineers have completed their military service, they are allowed to put the military technology that they have created to civil use so that it can be commercialised.
- R&D and public-private investment: Israel is the world's leading country in terms of R&D investment as a percentage of GDP, and allocates 4.2% of its GDP to research and development.

Israeli leadership in technological issues is so powerful that in matters such as cybersecurity, Israel has become a true point of reference. Construction work is currently under way on the so-called CyberSpark in Beer Sheva, a group of twelve buildings that will form a technological park and which they hope will become a world incubator in cybersecurity that any company in the world with problems in this area can recur to.[26] What makes this project attractive is the fact that both the academic part and the business and military part,

24 Rahola, Pilar. *Prou!*, RBA Libros, SA, page 119.

25 Otto, Carlos. "Los secretos de Silicon Wadi", *La Vanguardia*, Sunday 19 June 2016.

26 Emergui, Sal. "El 'ciber oasis' de Israel que blindará el mundo", *El Mundo*, Monday 18 April 2016.

all of which are focussed on cybersecurity, will be concentrated in this technological park in order to provide services of the highest quality.

Israel is also one of the world's leading producers of military drones. According to the study *Trends in International Arms Transfers, 2014*[2729] from the Stockholm International Peace Research Institute (SIPRI),

Israel has also been the world's largest supplier/exporter of drones since 1985.[2830]

5.2.2 Political affinity

We should remember that we are considering the hypothetic scenario of a State in its own right, and for the time being, it would seem that apart from the Baltic and Nordic countries, Israel would be one of the first countries to recognise an independent Catalonia.[29] What is the reason for this? This is because of the almost four decades that Spain has been reluctant to in recognise Israel as a State, because of the improvable diplomatic relations that the former has had with the latter, thanks to the good relationship that Israel has with Catalan research groups[30] and finally, as a result of the desire for freedom and the claim to the right to self-determination shared by the two groups (the Jewish and the Catalan people).

5.2.3 Growing business and university relations between both countries

Today, more than 800 Catalan companies export to Israel, and turnover of these exports has increased considerably in recent years, with an 8.4 % increase in 2015 compared to the previous year.[31] The automobile sector, chemical products and prepared foodstuffs account for the bulk of these exports.

However, cooperation between the two countries might be much more important than exports as the Israeli market is small. In an interview for this article, Mar Pérez, executive director of the *Catalonia Trade & Investment* - Action office in Tel Aviv said "Israel is not a market to sell in, but rather one to cooperate with".

The current level of university collaboration is small but everything would seem to indicate that there is a desire to increase it in the forthcoming years.[32]

5.3 Barcelona city-laboratory

At present, many companies are faced with the problem of not being able to test and put their products into practice in urban environments before they launch them on the market (or if they are being able to do so, it is in a very limited way). The reasons for this include the fact that it is not legal to do so in most places.

Faced with this scenario, Barcelona could make the most of this problem by becoming a "laboratory" for all those companies that are interested in testing their products in an urban environment before commercialising them. The orography of the city of Barcelona is excellent in this regard:

- The urban area is very diversified. Barcelona is characterised by having streets of all kinds and sizes. These range from narrow pedestrian-only streets (the Raval neighbourhood, the Gothic Quarter, the Born area, Sarrià, Gràcia, the super-block of Poble Nou) to very busy streets (e.g. Gran Via, Av. Diagonal, Av. Meridiana, Ronda Litoral, Ronda de Dalt), taking in those that are a mixture of the other two (the majority of the city's streets).

27 D. Wzeman, Pieter; Siemon T., Wezeman. "Trends in International Arms Transfers 2014", *SIPRI Fact Sheet*, March 2015, page 3.

28 Arnett, George. "The numbers behind the worldwide trade in drones", *The Guardian*, World news, Monday 16 March 2015.

29 Casulleras Nualart, Josep. Interview with Josep Maria Terricabras, philosopher and MEP for ERC who explains how the decisive phase of the Catalan process is seen from Brussels, *Vilaweb*, Monday, 19 September 2016.

30 To provide an example, "El Govern posa en marxa el programa TWINS per promoure la col·laboració entre grups de recerca de Catalunya i Israel".

31 "Israel, anàlisi d'oportunitats", ACCIÓ – Government of Catalonia (Generalitat), June 2016.

32 "El Govern posa en marxa el programa TWINS per promoure la col·laboració entre grups de recerca de Catalunya i Israel", *cit.* 31.

- Mountains. The city has a large mountainous area. Towards the sea, Collserola behind, and Montjuïc to the right.
- The sea. Barcelona has several Mediterranean beaches.

So then, there are three classes of remotely controlled or fully autonomous vehicles that could be used in Barcelona: earth, air and aquatic vehicles. Indeed, all of these should be used on behalf of citizens and to promote a sustainable city model. Indeed, "South Korea and Japan have now introduced legislation to create 'free-trade zones' where robots can be tested in real world settings without breaking the law, and without the need for special permits from the local authorities".[33]

Once again, Barcelona is becoming a centre of attraction for multinational companies as they seek to establish their headquarters in the Catalan capital. Amazon and Tesla are perfect examples. On the one hand, Amazon has made a strong commitment to the city, and in 2017 it will open southern Europe's largest logistics centre in El Prat de Llobregat.[34] The most interesting case, however is the Amazon Prime Air[35] project, which is still in its infancy, whose main objective is to deliver parcels to the homes of private individuals in record time using drones. On the other hand, Tesla, a company that designs, manufactures and sells electric cars, has chosen Barcelona as the site for its Spanish headquarters.[36] It is also interesting to highlight Uber, "an international company that provides its customers with a private transport network through its mobile application software, which puts passengers in contact with drivers". This Silicon Valley company is currently working on the development of autonomous or driverless cars and says it "believes that it will be the future of urban transport and that it will be possible to cut costs by eliminating the need for a driver".[37]

Indeed, along these lines, the Catalan Government (Generalitat), together with the industry and agents from the sector, has designed the Catalonia Living Lab project, which will allow manufacturers from around the world to carry out tests on roads, cities and circuits. "The aim is for manufacturers of vehicles and components from this industry to be able to test their products in real driving environments, with full guarantees of safety. The goal of this project is to contribute to the development and transformation of the Catalan car industry and to attract new foreign investment projects that can take advantage of an suitable regulatory environment to move their projects forward. These tests could be conducted on three circuits and seven routes totalling about 200 kilometres, and seven open zones covering a surface area of more than 12 square kilometres"[38].

In short, electric cars, autonomous vehicles, drones and many more technologies that will arrive in the future could be tested in a city as internationally attractive as Barcelona.

5.4 Alguaire Airport: the largest military-drone base in southern Europe

This future proposal is valid for both those in favour and those against an independent Catalonia having an army, irrespective of whether or not it ends up forming a part of the EU and/or NATO. If Catalonia does not have its own army, Catalans will have to "buy" their security from the country's allies. The compensation for this security could be monetary or it could take the form of another type of compensation, and the airport of Alguaire could play a role if the latter option is chosen.

Catalonia is situated in a key geostrategic zone. In practical terms, Europe lies to the north of the country, the USA lies in a straight line to the west, and the Mediterranean is immediately to the east with the Middle East a bit further on, while the Maghreb lies to the south, and beyond that we have the Sahel. Catalans need

33 Sánchez del Campo Redonet, Alejandro. *Reflexiones de un replicante legal. Los retos jurídicos de la robótica y las tecnologías disruptivas,* Editorial Aranzadi, SA, page 30

34 Rahola, Pilar. *Prou*!, RBA Libros, SA, p. 119.

35 Alegret, Xavier. "Por qué Amazon se instala ahora en Barcelona", *Economía Digital*, December 2015

36 "Tesla se decanta por Barcelona para instalar su sede en España", *El Economista. Ecomotor*, Monday 31 October 2016.

37 Hook, Leslie. "Uber lanza sus taxis autónomos en EEUU", *Economía Digital*, Wednesday 21 September 2016.

38 Smart Catalonia "Catalunya serà un camp de proves únic a Europa per a vehicles autònoms i connectats".

to make the most of this geostrategic advantage that the country enjoys, and one way of achieving this to convert the airport of Alguaire into the largest military-drone base in the south of Europe.

We still do not know what allied countries this airport could work in favour of, but there are at least two possible scenarios. The first of these involves a Catalonia, with or without its own army, that is a Member State of the EU. In this case, the proposal is very powerful in European terms and even more so if a European army is created in the medium term. The EU army could conduct humanitarian missions or even intelligence gathering missions or attacks from this airport as its location is extremely close, from a drone-distance perspective, to failed states such as Libya that have been the focus of terrorism and human-trafficking mafias.

The second scenario is that of a Catalonia that is neither a Member State of the EU nor one with an army, but which establishes alliances with certain states to guarantee its security in exchange for exploiting military drone technology at the airport of Alguaire. Iceland has adopted a similar strategy to this. Despite participating in international missions in Iraq, Afghanistan and Kosovo and being a founder member of NATO in 1949, Iceland does not have an army of its own. In 1951, Iceland signed "an agreement according to which the USA undertakes to defend the country and establish an important air base there. The agreement ended in 2006 and since then NATO countries have provided it with combat personnel and airplanes to guarantee protection of its airspace".[39] In June 2016 Iceland and the United States signed a new defence agreement.

Apart from incorporating Lleida into the map of European airports, these two options would be a way to revive Alguaire airport and take advantage of its facilities. In any case, this proposal might be the perfect basis for a possible National Security Strategy for Catalonia.

6 Conclusions

Catalonia has powers to regulate the drones industry but it cannot regulate drone flights because it is not an independent State, and this is a key factor with regard to having full and exclusive sovereignty over the airspace situated above its territory. At the present time, Spanish airspace is protected, legally speaking, by both the Chicago Convention and the Spanish Constitution, and consequently by *Law 48/1960 on Air Navigation*.

In summary, Catalonia will either have to end up becoming an independent State or it will not be able to regulate the use of drones. In the case of an independent Catalonia, there are several possible scenarios when it comes to developing the legal system on drones, and these depend on whether or not the country belongs to the EU.

The first scenario to be envisaged is one where Catalonia becomes an EU Member State. In this case, it would be difficult for Catalonia to adopt its own drones legislation as European legislation on such matters would probably be in force and it would be compulsorily applicable in all Member States.

The second envisaged scenario is one in which Catalonia does not join the EU, and in this case, it would have greater freedom to develop its own specific legislation on drones. A practical option would be to produce a law just like the European one, and in this way operate in the same way as neighbouring countries. Another option would be to produce a more flexible law than the European one, which allows greater freedom of action, and therefore a more rapid development of the sector. In any event, it would be appropriate to have the legal regulations of the sector aligned with the strategy that the country wishes to adopt so that it can take advantage of the development opportunities that drones can offer.

If Catalonia wants to commit itself to the drones sector, it must decide on which area it wishes to choose, either the civil one or the military one. There are only a few states in the first division of this sector and all of them are true giants, so it would be difficult for Catalans to overshadow them. Therefore, the key to Catalonia's hypothetical success in the drones sector lies with specialising in some specific matters within one of these two areas. Bearing in mind that Catalonia is a country with peaceful roots and a highly caring spirit, it would seem more coherent to opt for the civil field. Peaceful and caring are therefore the adjectives

39 "Països sense exèrcit", Defensa.Cat, Monday 29 August 2016.

that would define a possible Catalonia that specialises in the development and manufacture of public-service drones. In world terms, Catalonia could become a leading State in the development and commercialisation of drones of this type, designed to serve society and oversee its security and integrity and piloted by police forces, fire brigades and medical emergency services in search and rescue missions, the monitoring and control of fires, road safety, terrorism and special operations, etc.

Establishing a strong technological alliance with Israel, making Barcelona a city-laboratory for drones and other disruptive technologies, and turning Alguaire airport into the largest military-drone base in southern Europe are three future-oriented strategic ideas that could strengthen the drones sector in Catalonia and help it become a world leader in the sector. These ideas might be polemical and daring but they must be used as a base to start a process of reflection and debate about whether or not we want drones to represent an opportunity for our country to grow and develop, and if applicable, to decide what strategic decisions we should take to make this become a reality.

Bibliography

Ballesteros Martín, Miguel Ángel. "En busca de una Estrategia de Seguridad Nacional". Madrid: Ministry of Defence, 2016.

Baquero, Antonio; Planas, Carles. "Drones: l'última revolució militar". *El Periódico de Catalunya*. Barcelona: Grupo Zeta, 7 March 2015, page 3.

Clotet, Jaume *et al.* "Política de defensa i Estat propi". Barcelona: Editorial Base, 2017.

D. Wezeman, Pieter; Siemon T., Wezeman. "Trends in International Arms Transfers, 2014*"*. *SIPRI Fact Sheet* [online]. Stockholm: Stockholm International Peace Research Institute*,* March 2015. page 3. <https://www.sipri.org/publications/2015/sipri-fact-sheets/trends-international-arms-transfers-2014> [Consulted: 15 October 2016].

Government of Catalonia (Generalitat), Department of the Presidency. "Llibre blanc de la Transició Nacional de Catalunya. Síntesi" [online]. Barcelona: Government of Catalonia (Generalitat), September 2014. <http://www.gencat.cat/eapc/revistes/RCDP/Documents_interes/RCDP_54/05_19Llibre_blanc_Sintesi.pdf> [Consulted: 15 October 2016].

Montoya, Roberto. "Drones. La muerte por control remoto". Madrid: Ediciones Akal, 2014, p. 22 i 23.

Pauner Chulv, Cristina. "El uso emergente de drones civiles en España. Estatuto jurídico e impacto en el derecho a la protección de datos". *Revista de Derecho Político*, No. 95 (2016) [online]. <http://revistas.uned.es/index.php/derechopolitico/article/view/16233/13991> [Consulted: 15 October 2016].

Sánchez Del Campo Redonet, Alejandro. "Reflexiones de un replicante legal. Los retos jurídicos de la robótica y las tecnologías disruptivas". Editorial Aranzadi, p. 30.

Sánchez Gómez, Rafael Emilio. "Sistemas aéreos no tripulados y espacio aéreo en Europa: una combinación estratégica" [online]. Madrid: Spanish Institute of Strategic Studies, 2011. <http://www.ieee.es/Galerias/fichero/docs_marco/2011/DIEEEM14-2011_UAVyEA_Europa.CombinacionEstrategia_RESanchezGomez.pdf> [Consulted: 15 October 2016].

Rahola, Pilar. "Prou!". Barcelona: La Magrana-RBA Libros, p. 119.

Webography

ACCIÓ. "Israel, anàlisi d'oportunitats" *[online]*. Barcelona: Government of Catalonia (Generalitat), June 2016. <http://accio.gencat.cat/cat/binaris/Israel_tcm176-230077.pdf> [Consulted: 15 October 2016].

"Advance Notice of Proposed Amendment 2015-10, Introduction of a regulatory framework" [online]. <https:// www.easa.europa.eu/system/files/dfu/A-NPA%202015-10.pdf> [Consulted: 15 October 2016].

State Agency for Aviation Safety (AESA). <http://www.seguridadaerea.gob.es> [Consulted: 15 October 2016].

Alegret, Xavier. "Por qué Amazon se instala ahora en Barcelona". *Economía Digital* [online]. Barcelona, 14 December 2015. <http://www.economiadigital.es/es/notices/2015/12/por-que-amazon-se-instala-ahora-en-barcelona-80400.php> [Consulted: 15 October 2016].

Arnett, George. "The numbers behind the worldwide trade in drones". *The Guardian* [online], London, 16 March 2015. <https://www.theguardian.com/news/datablog/2015/mar/16/numbers-behind-worldwide-trade-in-drones-uk-israel> [Consulted: 15 October 2016].

Casulleras Nualart, Josep. Interview with Josep Maria Terricabras, philosopher and MEP representing ERC, who explains how the decisive phase of the Catalan process for independence is viewed from Brussels. *Vilaweb* [online], Barcelona, 19 September 2016. <http://www.vilaweb.cat/noticies/terricabras-israel-podria-ser-dels-primers-a-reconeixer-una-catalunya-independent> [Consulted: 15 October 2016].

Catalonia Smart Drones: <http://cataloniadrones.cat> [Consulted: 15 October 2016].

AESA Circular. "El uso de drones en España" [online]. <http://www.ecestaticos.com/file/ fb4b6837af-de026acdf41a1be1fd7f16/1397052934.pdf> [Consulted: 15 October 2016].

"Convention on International Civil Aviation" [online]. <https://www.icao.int/publications/pages/doc7300.aspx> [Consulted: 15 October 2016].

CyberSpark. <http://cyberspark.org.il> [Consulted: 15 October 2016].

European Aviation Safety Agency (EASA). <https://www.easa.europa.eu> [Consulted: 15 October 2016].

Emergui, Sal. "Israel's 'cyber oasis' that will protect the world". *El Mundo* [online], Monday 18 April 2016. <http://www.elmundo.es/papel/futuro/2016/04/18/57110911ca4741e6728b458f.html> [Consulted: 15 October 2016].

Government of Catalonia (Generalitat), Press room. "*El Govern posa en marxa el programa TWINS per promoure la col·laboració entre grups de recerca de Catalunya i Israel"* [online]. Barcelona: Government of Catalonia (Generalitat), 12 June 2014. <http://premsa.gencat.cat/pres_fsvp/AppJava/notapremsavw/272114/ca/govern-posa-marxa-programa-twins-promoure-collaboracio-grups-recerca-catalunya-israel.do> [Consulted: 15 October 2016].

Government of Catalonia (Generalitat), Smart Catalonia. "Catalunya serà un camp de proves únic a Europa per a vehicles autònoms i connectats" [online]. Barcelona: Government of Catalonia (Generalitat), 15 May 2017 <http://smartcatalonia. gencat.cat/ca/detalls/noticia/catalunya_camp_proves_vehicle_autonom_connectat> [Consulted: 15 May 2017].

Government of Denmark. "Danish Drone Strategy" [online]. Copenhagen: Govern de Dinamarca, octubre 2016. <http://ufm.dk/en/publications/2016/files/danish-drone-strategy-2016.pdf> [Consulted: 15 October 2016].

Hook, Leslie. "Uber lanza sus taxis autónomos en EEUU". *Economía Digital* [online], Wednesday 21 September 2016. <http://www.expansion.com/economia-digital/companias/2016/09/21/57e145f922601d41198b4606.html> [Consulted: 15 October 2016].

International Civil Aviation Organization (ICAO). <http://www.icao.int> [Consulted: 15 October 2016].

"Ley 18/2014, de 15 de octubre, de aprobación de medidas urgentes para el crecimiento, la competitividad y la eficiència" [online]. <https://www.boe.es/boe/dias/2014/10/17/pdfs/BOE-A-2014-10517.pdf> [Consulted: 15 October 2016].

"Ley 21/2003, de 7 de julio, de Seguridad Aérea" [online]. <https://www.boe.es/buscar/act.php?id=BOE-A-2003-13616> [Consulted: 15 October 2016].

"Tesla se decanta por Barcelona para instalar su sede en España". *El Economista, Ecomotor* [online], 31 October 2016. <http://www.eleconomista.es/ecomotor/motor/noticias/7927839/10/16/Tesla-se-decanta-por-Barcelona-para-instalar-su-sede-.html> [Consulted: 10 November 2016].

"Ley 48/1960, de 21 de julio, sobre Navegación Aérea" [online]. <https://www.boe.es/boe/dias/1960/07/23/pdfs/A10291-10299.pdf> [Consulted: 15 October 2016].

North Atlantic Treaty Organization (NATO). <http://www.nato.int> [Consulted: 15 October 2016].

Otto, Carlos. "Los secretos de Silicon Wadi". *La Vanguardia [online],* Sunday 19 June 2016. <http:// www.lavanguardia.com/tecnologia/20160618/402597185310/israel-emprendedores-startups-silicon-wadi.html> [Consulted: 15 October 2016].

"'Prototype' Commission Regulation on Unmanned Aircraft Operations" [online]. <https://www.easa.europa.eu/system/files/dfu/UAS%20Prototype%20Regulation%20final.pdf> [Consulted: 15 October 2016].

"Reglamento (CE) nº 216/2008 del Parlamento Europeo y del Consejo, de 20 de febrero de 2008, sobre normas comunes en el ámbito de la aviación civil y por el que se crea una Agencia Europea de Seguridad Aérea, y se deroga la Directiva 91/670/CEE del Consejo, el Reglamento (CE) nº 1592/2002 y la Directiva 2004/36/CE" [online]. <https://www.boe.es/doue/2008/079/L00001-00049.pdf> [Consulted: 15 October 2016].

"Real Decreto 552/2014, de 27 de junio, por el que se desarrolla el Reglamento del aire y disposiciones operativas comunes para los servicios y procedimientos de navegación aérea y se modifica el Real Decreto 57/2002, de 18 de enero, por el que se aprueba el Reglamento de Circulación Aérea" [online]. <https://www.boe.es/boe/dias/2014/07/01/pdfs/BOE-A-2014-6856.pdf> [Consulted: 15 October 2016].

"Proyecto de Real Decreto por el que se regula la utilización civil de las aeronaves pilotadas por control remoto" (version October 2016) [online]. <http://fomento.es/NR/rdonlyres/63ECAE3A-B29E-45A7-A885-D314153883EE/139826/RDRPAS27102016.pdf> [Consulted: 15 October 2016].

"Riga Declaration on Remotely Piloted Aircraft (drones) 'Framing the future of aviation'" [online]. <http://ec.europa.eu/transport/sites/transport/files/modes/air/news/doc/2015-03-06-drones/2015-03-06-riga-declaration-drones.pdf> [Consulted: 15 October 2016].

Vilanova, Pere. "Els 'drones' i la teoria de la 'guerra neta". *El Periódico de Catalunya* [online]. Barcelona, 7 March 2015. <http://www.elperiodico.cat/ca/noticias/opinio/els-drones-teoria-guerra-neta-3996178> [Consulted: 15 October 2016].