

Drones and public security

Fernando González Botija

Titular Professor of the Administrative Law Department at UCM and member of the IDEIR (European Law and Regional Integration). (Spain).

Ignacio Zamora Santa Brígida

Research Intern at UCM's Administrative Law Department (Spain).

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Translated by Nerea Rodríguez Trinado, revised by María Dulce Ramírez

ENG Abstract. Drones have become a very beneficial device for society due to a new technological revolution that will bring very positive aspects to society. However, not everything are advantages. Unfortunately, certain groups (terrorists, drug traffickers, etc.) have seen in drones an optimal opportunity to improve their criminal activities. It is necessary that the public authorities reinforce all measures at their disposal to prevent the use of drones from becoming a serious danger to society. It is necessary to adopt a series of subjective measures (police, operators, and pilots) and objective measures. We must provide more resources and training to the State Security Forces and Bodies. More rigorous controls on pilots should be established. This must go hand in hand with greater control of the aircraft that fly. But all these measures will never be enough to prevent the drones from becoming a danger to public safety. This article uses as an essential source the report issued by the Oxford Research Group entitled "Hostile drones: the hostile use of drones by non-state actors against British targets".

Keywords: Drones, police, terrorism, and public security.

Summary: 1. Introduction. 2. Methodology. 3. Subjective aspect. 4. Objective aspect. 5. Conclusion. 6. Bibliography

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1. Introduction¹

Recently, we have been dumbfounded by the President of Venezuela having suffered a terrorist attack carried out with drones. The images were spectacular, and served as evidence of the tragedies that the use of drones may cause. Shortly after, the worrisome news that some drones collapsed Gatwick airport in London in 2018, between 19th and 21st of December, spread, again, on a global scale. Due to this incident, hundreds of flights were cancelled, which affected tens of thousands of people, and produced a level of chaos similar to that of a natural disaster². It seems that the event has encouraged international groups of terrorists to foster a campaign of threats against the West, precisely with the use of drones to attack cities, which is even more serious.

Hence why, as well as any other technological device, drones are not exempted from ending up being used for very different purposes from those they were originally created for. Similarly, drones may constitute a source of accidents and incidents (Guerrero Lebrón, 2018: 279-300).

Nevertheless, this artifact, as a result of human creativity, is promoting beneficial uses for society, ranging from entertainment to manual labor, going through an infinite number of diverse tasks (De Alvear Trenor, 2018: pp. 39 a 61)³, therefore opening the door for an immense world of applications and possibilities (Ayllón Santiago y Fernández González, 2018; Cadenas Zamora, 2018: 66 y ss; Clarke y Moses, 2014; Domínguez Vilches, 2018: 19 y ss; Esclapés Membrives y Esteban Ruiz, 2016: 213-222; Guirado Morales, 2018: 235-278; Mora Ruiz, 2017: 210-237; Morillas Jarillo, Petit Lavall y Guerrero Lebrón, 2014: 91 y ss, y Sempere Samaniego, 2014: 3).

However, the passage of time has proven that, whether being the drone of an enthusiast or a member of a dangerous group of terrorists, including all types of offenders, drones have been acknowledged as a helpful tool that allows illegalities to take place, regardless of the intentions being more or less malicious.

Drones entail a very old and well-known problem that has been affecting the technological world for a while: dual-use technology (Melero Alonso, 2008), which has also been manifested in the world of substances. This dual use can be legal⁴ and used for civilian or military purposes. Amongst civilian ones, police forces can also make use of them for their investigations and repressions. These uses, which involve using force, can pose a risk of certain knowledge and techniques deviating from the usages proposed by the legislator. This obviously leads to a need for establishing restrictions.

Recent studies have shown various organizations which could use these devices for criminal purposes. Without a doubt, the most concerning ones are terrorist groups (Santa Cecilia García, 2016). In this way, studies have pointed out how organized and armed groups such as Hezbollah, Hamas, Colombian guerrillas, or even the quite hazardous Islamic State, have resorted to this kind of apparatus as a privileged means to perpetrate attacks. The ongoing conflicts among these groups, especially the first and second ones with Israel, have proven that drones will be the preferred device for warlords⁵. The worst thing about this collective is that drones are being shown as a way to carry out mass attacks, similar to what happened on 9/11. But terrorists are not the only protagonists of this occurrences. Different groups, such as insurgent organizations⁶, drug dealers (especially the ones operating in

¹ The presented project has been carried out within the framework of the Project *I+D*, Reference DER2017-87981-P, titled "The public cum legal regime of drones", of which professors Juan Ramón Fernández Torres and Fernando González Botija are principal investigators.

² The Prime Minister Teresa May declared the following with regards to all of this: "I feel for all those passengers whose travel plans have been disrupted by this drone activity and the action that has had to be taken in response to it. At this particular time of the year this is particularly difficult for people. We have already passed legislation in relation to the use of drones. As it has been made clear, the activity we have seen is illegal and those who are caught endangering aircraft can face up to five years in prison. And we're consulting on further aspects of this including further police powers. We will continue to work with the Gatwick authorities in order to bring this to a close such that people will be able to get on to the travel that they were expecting over the Christmas". See Weaver, Matthew; Gayle, Damien; Greenfield, Patrick; Perraudin, Frances (20 December 2018). "Army called in to help with Gatwick airport drones' problem". *The Guardian*. Retrieved 21 December 2018. It seems it is not the first time that an incident like that happens in said airport, since there are two other events documented from July 2017, even though they were not made public until October of that year. A similar situation took place, once again, by the end of April 2019, when the airport had to be temporarily closed down due to the sighting of a drone which motivated the rerouting of various flights to Stansted airport.

³ Without forgetting its military origin.

⁴ See, for instance, the document by the European Commission "European funding for dual use (Guide of aid for SMEs and regions)", in <http://ec.europa.eu/DocsRoom/documents/12601/attachments/1/translations?locale=es>. Here, dual use is defined as follows: "The dual use products, services and technology can fulfill the necessities of both the civil community and the defense industry. There is a large and increasing number of generic technologies which are not specifically used for civil or military purposes. Advanced materials, nanoelectronics, information and communication technologies, unmanned systems and the automation and photon mass are just a few examples of areas where investigation, technological development and fabrication can have multiple uses. Dual use technology transfer is the ability to adapt a technology developed for a specific sector (civil or defense sectors) to use it in another (defense or civil sectors). Generally, there are two ways to develop products, services and dual use technologies: through an internal process inside an organization (including spin-in) or by means of an externalizing process (license concessions, joint ventures, spin-off, start-up, collaborations between companies, etc.; in other words, cooperation between companies, with or without the intervention of a mediator)".

⁵ See the document "Hostile drones: the hostile use of drones by non-state actor against British targets", p.11 y ss.

⁶ In this way, in "Hostile drones...", cit, p.12, the following is explained: "Donetsk People's Republic (DPR) militias in eastern Ukraine reportedly possess and deploy sophisticated Russian-made Eleron-3SV drones for ISR campaigns. In contrast, the Ukrainian military has been using a range of modified and tailor-made hobbyist UAVs for ISR support. There are reports that the DPR militias are using signal jamming and GPS spoofing countermeasures against some Ukrainian drones; however, more advanced autopilot software in the tailor-made models is more resilient against these countermeasures. The Ukrainians have requested US military drones, such as Reapers, and jamming equipment and radar to better intercept the Russian-made drones."

Mexico and Colombia), economic espionage⁷ and varying activist groups⁸ are added to the list of subjects who consider this new technology essential to perform their actions.

Certainly, a very important piece of information must be considered, which is that, from the technological point of view, drones seem to promote unlimited functionalities. Their small size (they can even be tiny), their possibility to fly and their recording capacity reinforce this idea.

The problem has awakened a certain level of doctrinal interest⁹, grabbing the attention of security scholars who have to provide answers from the view of administrative law in general and of the one in charge of the penalty in particular (Cano Campos, 2018; Fernández Farreres, 2018; Fortes Martín, 2018: 331-368). It is no wonder since reality will bring us to a generalized use of drones. The truth is that threats can come by land, air, or sea¹⁰; and, of course, civil and merchant problems that improper use of drones may cause have to be borne in mind¹¹. Notwithstanding this, even if those are very important, this paper will mostly cover concerns regarding public law.

2. Methodology

In order to produce this article, normative, doctrinal, and documentary sources which develop the topic of drones, especially regarding public security, have been considered. In this way, apart from the norms that concern this field, the most recent and relevant doctrinal sources have been analyzed, and especially the document "Hostile drones: the hostile use of drones by non-state actor against British targets". It is a project sponsored by the "Oxford Research Group", which studies designs and capacities of over 200 non-manned air, ground, and sea drones, both current and future ones, so as to comprehend the threats that these devices represent for potential targets. Strategies to mitigate said threats are also described in that report.

This article attempts to carry out an analysis of the subjective and objective aspects that this issue may present.

As a general objective, it is intended that, from this double perspective, readers discover that security problems presented by drones can derive from two areas well-delimited by the vision of the subject who operates or controls the device, or by the object itself.

Specific goals include the thorough analysis of the aforementioned aspects. Regarding the subjective view, the role of public administrations, operators, and pilots will be described. When it comes to the more objective side, flying limitations, technical specifications and identification controls will be examined.

Last but not least, this paper will finish with a conclusion that reflects on the route that should be taken in order to overcome those challenges created by security problems tied to drone usage.

3. Subjective aspect

⁷ In "Hostile drones...", cit, p.13, it is implied that "there is a broad range of threat scenarios whereby drones are integrated into corporate espionage operations alongside cyber offensives and spear phishing campaigns".

⁸ In "Hostile drones...", cit, p.13, the following is commented: "Although clearly not presenting a threat of the same type or magnitude as the other threat groups discussed in this briefing, activists have employed drones to support their political campaigns on a number of occasions. In September 2013, the German political party the Pirate Party flew a Parrot quadcopter towards the German chancellor, Angela Merkel, during a campaign rally in Dresden.²³ The stunt was in protest against the German government's surveillance policies. In October 2014, Greater Albania activists flew a drone carrying the Greater Albania flag over an Albania-Serbia football match.²⁴ Greater Albanian's claim territory from Albania's neighbours, including Serbia. In July 2015, Women on Waves delivered pregnancy termination pills by drone from Germany to Poland to highlight restrictive groups have used UAVs to remotely capture farming, animal husbandry and animal testing practices in the United States. In April 2015, a man protesting over the Japanese government's nuclear energy policy landed a drone containing radioactive sand on the roof of the Japanese prime minister's office in Tokyo. Although the use of drones by activists is still uncommon, the most likely way in which such groups will use drones in future is in undertaking publicity-seeking exercises in front of the media or filmed using onboard cameras. Activists could also use drones to assist existing campaign efforts through reconnaissance and surveillance".

⁹ See Marín Delgado (2018).

¹⁰ In "Hostile drones..." cit, p.1, we can find the following: "Ever more advanced drones capable of carrying sophisticated imaging equipment and significant payloads are readily available to the civilian market. Unmanned aerial vehicles (UAVs) currently present the greatest risk because of their capabilities and widespread availability, but developments in unmanned ground (UGVs) and marine vehicles (UMVs) are opening up new avenues for hostile groups to exploit".

¹¹ It is, indeed, more than expected for the presence of drones to generate very relevant conflicts between private proprietaries. Think about the already habitual case of an individual who sees how a drone enters his or her property or focuses its camera on it. But problems do not stop there. The aforementioned case of Gatwick airport offers a source of endless litigations. We could ponder whether an airport should be forced to compensate travelers when flights get cancelled due to the uncontrolled presence of one or more drones in an airport, even if the responsible subject is not identified. It is certainly possible to reflect on this, claiming airport authorities to be in charge of guaranteeing safe flights and that none of these devices enters the airspace of this kind of facilities. But the problem is not as easy to solve, since, as we learned from different areas, it is impossible to foresee and stop a criminal from acting. For them, it is as easy as having the object to commit an infringement and use it against the target or a victim. This could be prevented to some extent, but hundred percent prevention of a drone colliding with its target will never be guaranteed. Regarding the London airport mentioned before, airport authorities were precisely trying to defend themselves by claiming the events to be caused by a force majeure, which basically exempts public authorities and airline companies from having to pay the travelers any compensation. It is no wonder that clients can state otherwise, or, at least, suggest the right to receive some sort of special attention (support for living expenses, housing, etc.) while they wait for their relocation in subsequent flights.

3.1. The role of public administrations

Public administrations have a great deal to say about this field. First of all, they are the ones who control the airspace, authorizing or controlling flying drones. Besides, they are in charge of planning security and urbanism. Therefore, they must remain alert when it comes to drone usage by citizens.

The first thing to consider is the feature of the increment in generalized application of this technology by particulars. Even though few people use drones, the number is expected to exponentially increase in the near future.

Secondly, it is of great importance for public authorities to raise awareness for public agents to keep in mind the risks of using drones in our daily lives. The facts demonstrate that drones can be found in any place or area regarding public spaces. According to the restrictions carried out by the normative, it is evident that state security forces and bodies must take note of the new dangers, which not only affect strategic facilities (military and police installations or public service essential supplies), but also any other kinds of public or private spaces where people gather. Flying drones can certainly become a disturbing element, which is why it is unacceptable for authorities not to be trained and equipped with appropriate gear to confront this new, unavoidable challenge (González Serrano, 2017).

Lastly, it is even less acceptable for those in charge of administrative planning to elude this matter in their estimations. It is especially important to reach out to the civil protection and citizen security sectors, but not exclusively. Territorial and urban planning will also have to adapt to this issue, at least regarding two fundamental aspects. Firstly, the location of these devices, since it will be necessary to anticipate reserved spaces or airfields inside cities. Secondly, if the denominated U-Space gets implemented, drones flying in urban settings will still have to be taken into consideration. In addition to this, the result of several studies presented in a recent report containing information about the monitoring of the implementation of U-Space services is also relevant¹². This study analyzed until September 2018 the progress regarding the execution of principal elements, as well as those underlying U-Space service delivery that allow for procedures involving drones in a very low flight level in the 28 member States of the European Union. Once again, findings of the traffic sector can also be pertinent to this issue, in that it is not the first time they cover the topic of damages caused by drones to particulars as well as that of civil liability (Díaz Alabart, 2018), proving how historical knowledge coming from different legal spheres can cooperate with the technological domain.

3.2. The role of operators and pilots

If we focus on private subjects, the matter gets reduced to determining who should be allowed to fly a drone. Aside from age and apprenticeship limitations, about which there is nothing to discuss, the question that could be given rise to is whether restriction systems can or cannot be established regarding flying permits for those with criminal records (Elorza Guerrero, 2018: 193-212; Mora Ruiz, 2018: 213-234; Quintanilla García y Viñes García, 2018: 183-192). In order not to commit any crime, restrictions will essentially affect individual freedom. But it is also true that, on the other end of the spectrum, we can find individuals who have committed certain infringements that justify their exclusion from the drone market. This is not only true for those who committed crimes against life and physical integrity of other people. It is obvious that a terrorist would never be given the opportunity to drive a drone or to create a company in charge of managing these devices unless social rehabilitation and reintegration were guaranteed. Offences against honor and intimacy of people have a higher risk of reiteration, and people who commit these deserve punishment that impedes the utilization of this type of technology, and even to be excluded from the market in more extreme cases. Let's consider a phenomenon that is sadly becoming more habitual in certain places: a journalist uses a drone to have access to specific information, violating the right to inviolability of the home or to intimacy (Clarke, 2014; Escribano Tortajada, 2017: 238-259; Márquez Lobillo, 2018: 301-330). It is evident that he can get sanctioned for that, but also that, once he serves a sentence or pays the bail, he will be able to use a drone again. This is where the teachings of the traffic sector could be implemented (Cano Campos, 1999). For instance, the system of points which can be lost if certain infractions take place, until the complete loss of the license to operate is unavoidable by accumulation of lost points, could work.

Finally, it is important to remember that the registration of drone operators and pilots is also essential. It is a measure that is already expected and applied, and which effectively allows a strict control of subjects who are active in the drone market. After all, even if this is a necessary measure to guarantee a secure functioning of the market, we cannot believe that, just with this, every potential risk will end, as shown in all economic sectors: there is always a possibility for black market, or even for perfectly identified and registered people to commit an irregularity. It is worth noting that the 9/11 attacks were perpetuated by individuals who had learned to fly in north American schools.

4. Objective aspect

Flying limitations may constitute one of the key elements to avoid detriments caused by the device. It is already possible to provide it with a system that prevents it from invading delicate areas where it is not desirable for it to be. That is why the legislation can establish an exclusion zone surrounding the infrastructure. Think about airports¹³,

¹² See <https://www.eurocontrol.int/publications/u-space-services-implementation-monitoring-report> and <https://www.eurocontrol.int/sites/default/files/publication/files/u-space-services-implementation-monitoring-report-ed-1.2.pdf>

¹³ Regarding the aforementioned incident at Gatwick airport, several statements have been made by public officers about defending a reinforcement of the normative with the aim of securing perimeters around airports. In this way, the State Secretary of Transport, Andy

nuclear power stations, military installations, etc. What is more, even if the drone still enters prohibited areas, the actual system endows authorities with control of different means to deflate the intruder object and stop it from causing damage to the facility¹⁴.

Technical specifications are a very important aspect to consider (Cuerno Rejado y Guerrero Lebrón, 2018: 119-164). We saw before that there is a great variety of drones. This means they present several potential capacities. There are different aspects to consider: load capacity, velocity, the possibility of taking and registering images, and their scope of action. The damage that can be caused by these flying machines has also been foreseen. In the case of the smallest ones, which are usually accessible to the general public, a design which cannot cause important damage has been promoted, and bigger drones have strict regulations so as to avoid these devices falling into the hands of dangerous people.

Let's also not forget that public administrations are making great efforts to invest in investigations and development in order to boost better designs of these machines, which prevent security problems for the general public. This is also tied to the improvements in air traffic control, allowing for a reduction in the risk linked to flying drones.

Finally, we should not forget the relevance of relying on adequate controls of identification and number of these devices (Fanego Otero, 2018: 99 y ss). Once again, the issue of the registrations of these units gains prominence, allowing us to have first-hand knowledge about every aspect which could have a big impact on security matters. If it is not feasible to avoid harm, it is, at least, of great interest to know who the operator or pilot of the drone is. In fact, in multiple occasions, the police cannot identify the owner in the first instance. But, if the drone gets down or located, that will open a route that could lead to discovering who the person behind it is (Cuerno Rejado, 2018: 165-182). Once more, we could link this to the Gatwick airport in London, as a paradigmatic example of what has just been said. Apparently, the police arrested a drone enthusiast and his or her partner at first, who lived near the airport, as presumed authors of the events. However, they ended up being released without charges¹⁵, since there was not enough evidence to prove it. Recently, investigations have pointed towards a different direction. This showcases how complicated police work can be, especially in this particular field which deals with drones. There may be videos or pictures of drones flying over a forbidden space, and a smartphone with a camera can be a powerful ally in this sense. This is the case when it comes to Gatwick, indeed, since the police seemed to receive almost a hundred complaints from incredible witnesses, but it was not effective in the end. Furthermore, it is important to keep in mind that the sighting of intruder drones could be mistaken for seeing devices of the security forces. This all reinforces the complications of the search effort made by the police, as well as of the captures of suspects; which, by the way, can get even more complicated if, as it was the case with the already mentioned Gatwick event, the police points their fingers at people who later on prove to be innocent, and who have had to deal with unfair publicity in the media, where they are shown as guilty. This calls the police labor into question, and could entail patrimonial responsibility for non-material damage.

5. Conclusion

McDonald, declared: "Events at Gatwick Airport highlight the urgent need for clear rules on the use of drones near airports. There has been growing concern over the increasing number of near misses between drones and manned aircraft and the Government has been too slow to act. The Government should fast-track the introduction of a regulatory framework to protect against the misuse of drones and ensure the safety of UK airspace. This should include a drone exclusion zone around airports". Ver «The Government should introduce a drone exclusion zone around airports – Andy McDonald». The Labour Party. Retrieved 21 December 2018. In turn, Karl Turner, previous Attorney General of England, and Wales, commented on the following: "There should be wider exclusion zones around airports. I think the law says one kilometre at the moment, it should probably be five kilometres according to the experts. The government should have brought this legislation forward, it's been an abject failure and I blame Chris Grayling. He should have been in the House of Commons today making a statement and explaining to MPs why the Government has failed to bring this legislation forward". See "Thousands forced to spend night at airport as chaos continues – as it happened". The Guardian. 21 December 2018.

¹⁴ "Hostile drones...", cit, pp.17 y 18, also speaks about the following: "Kinetic defence systems. For those drones that remain a threat after the controller frequency and GPS have been blocked, the last barrier of defence in the hierarchy of countermeasures are systems capable of destroying hostile drones. This includes kinetic weapons, such as missiles, rockets and bullets. Israel's Iron Dome air-defence system has been tested for its counter-UAV capabilities, and according to some sources can destroy armed drones before they are in attack range. Less-advanced kinetic defences use rockets or bullets and require line of sight, meaning a drone can get much closer to the target. All kinetic systems present a risk of collateral damage if deployed in a populated area. Missiles and rockets fired at UAVs could cause catastrophic damage if they miss their target. If the drone is hit, shrapnel and wreckage could still cause casualties on the ground. The blast radius from a missile or rocket fired at a UGV could include civilians near the targeted drone, and bullets fired at UGVs could easily strike passersby. Less risky commercial options include nonlethal projectile weapons that fire blunt force rounds, such as bean bags or rubber bullets, or small portable net guns that can ensnare drones. A consortium of British companies called Liteye has developed the Anti-UAV Defence System (AUDS) system that can detect and track drones using electronic scanning and radar then disrupt its operation with a brief, focused broadcast of directional radio frequency jamming. Laser defence systems. Laser defence systems are being developed that have less chance of causing collateral damage than kinetic systems. For example, a Chinese consortium of companies, led by the China Academy of Engineering Physics, has developed a weapon system that can shoot down light drones at low altitude using a 10-kilowatt high energy laser. It has a 1.2-mile range and is effective against aircraft travelling at up to 112 mph and at a maximum altitude of 500 metres. It can destroy the drone within five seconds of locating its target. Boeing is developing the truck-mounted High Energy Laser Mobile Demonstrator for the US Army and the Compact Laser Weapons System, which can be assembled in 15 minutes and destroy a drone in 15 seconds. Laser defence systems are still in development. However, once deployed and combined with an early-warning system, directed energy weapons could provide a useful counter to a hostile drone, particularly if radio frequency jammers and GPS jammers have also been deployed to remove the pilot's ability to operate the drone. In this situation, the laser defence system would be working against an autonomous vehicle, making it easier to lock on to and destroy. However, such systems might be of limited use in built-up areas, as they can only engage drones during times of line of sight, which may not be enough time to destroy the drone before it reaches its target. The fastest commercially available drones can travel at around 50 mph, meaning a drone could travel 112 metres in the five seconds a laser would take to destroy it. In a domestic, urban setting, this makes such systems most suited to the defence of static targets with clear lines of sight".

¹⁵ It is important to note that, according to the Aviation and Maritime Security Act 1990, penal sanctions could have been imposed.

The importance of all these regulations functioning well resides in the fact that it is fundamental to be conscious of the drone becoming a vehicle that, just as a car, will end up taking up so much of the public space.

If the idea is for these machines to become lords and masters of the urban and interurban public spaces, seeing as some uses will be authorized (especially to carry light goods and passengers in the aforementioned areas)¹⁶, the necessity to rethink the urban and territorial planning will inevitably lead to having to consider the design of every single chess piece in the municipal territory. There will also be experiments about the critical influence of municipal competences, which will have to get reconfigured regarding lots of aspects, especially in view of drones occupying citizen space.

The legislator already knows that drones can be a very aggressive element for the maintenance of a respectful status quo with respect to fundamental rights (Domenech, 2014; Finn, Wright y Donovan y Jacques y De Hert, 2016; Gómez-Juárez Sidera, 2015: 39-49; González Puente, 2015; González Puente y González Botija, 2018: 77-114; Mendoza Enríquez, 2015: 69-76 y Pauner Chulvi, 2016: 83-116.). That is why speculation about what the legal response will be has already started. But, of course, said response should be accompanied by a series of practical measures to avoid damage.

All of this, which we have certainly seen becoming a reality, presents nonetheless important gaps that should not be forgotten. A system for the apparatus not to access specific sensitive areas or protected spaces could also be implemented. Other systems with the capacity to deactivate their flying abilities and take them down could also be beneficial. Notwithstanding, regardless of liking it or not, drones will fly above areas more or less populated, so terrorists will only need to change the target for the attack to be feasible, and at hand reach. Thus, terrorists teach us a lesson in this sense. It is unnecessary to mention the globally known, unfortunate 9/11 attacks, resembling a paradigmatic and very close example that happened not too long ago. Even in our country, the terrorist organization *ETA* already changed their objectives and targets in order to attack people who did not belong to the state security forces and bodies. It is true that they belonged to the political sphere, but it is not less true that this is proof of how terrorist groups are not obsessed with attacking the army or police and their facilities anymore. Their primary aim is not just promoting guerrilla warfare, as we have been seeing with Islamic terrorism. In this case, since the unfortunate 9/11 attacks until, regrettably, nowadays, terrorists have had a very simple goal: reaching out to the general population at any given time and in any place. It does not matter if it happens in public streets, locals open to the public, or private areas. The recent attacks in Barcelona that took place last year can serve as another example, considering what actually happened (assassination of people in the streets) vs. what was intended to happen (attacking an emblematic monument of the Catalan capital).

As we have already seen, there are lots of proposals that could help prevent drone attacks. But we understand that it seems almost impossible to bring the precautionary principle to the very last consequences in this field, as it is in other areas¹⁷. Zero-risk level is unattainable, even though desirable.

It is a very serious problem, since control measures seen before would not serve at all. That is the price that has to be paid in exchange for technological advances. We cannot forbid cars, airplanes, or even knives simply because of the existence of terrorists who decide in a very specific moment to use such objects to perpetuate an attack. It is imperative to establish the highest quantity of control and precautionary measures, and society will not be able to do anything other than accepting that drones flying over the cities helping to transport objects and people regularly entail a risk of chance accidents, but also a danger to the security of people. Reinforcement of police checks, penalties and administrative punishments, and the continuation of investigations to promote an appropriate use of these machines, seem to be the only reasonable solution.

Be that as it may, we cannot finish this project without referencing the effort that is recently being made by the

¹⁶ Azahara (2008) said the following: "The fact that drones are here to stay not only proves the amount of enthusiasts that can be seen during an ordinary Sunday at the park or outdoors flying these small devices. The true dimensions of this phenomenon that was seen as a mere entertaining system not too long ago, are demonstrated by sales figures. The provisions entered in a strategic plan elaborated by the Ministry of Public Works and Transport in March this year predicted a dramatic growth in this sector. There are around 4,200 unmanned flying vehicles currently existing in Spain, and that number is expected to get multiplied almost by 13, reaching around 53,500 in the year 2025. This expansion will also bring the creation of 11,000 employment opportunities and an economic impact of 1,520 million euros. The data collected in Spain follows the tendency of the rest of the world: in Europe, for instance, it is estimated to go from the current number of one million drones to seven million in 2050. But the boom of drones has also been needing regulations to control the airspace, which could get overcrowded with their incorporation. And the same thing happens with their possible functions, since, even though, as it has been until now, many entertainment devices will continue existing, the great boost will come with the use of drones for agricultural, security and rescuing purposes. This significant leap will be necessarily accompanied by technological innovations: "If you think about how regulations work nowadays and the cases of drone usage, they are limited to 500 meters from the owner's standpoint and to a line-of-sight control – explains Santiago Tenorio, director of Vodafone's network group –. The best way to manage a drone farther than line of sight and said radius is by using smartphone technology, since the signal is almost universal." This technology developed by Vodafone is called RPS (Radio Positioning System) and allows for a precise estimation of the positioning of the SIM without the collaboration of the drone, providing an alternative to the traditional GPS coordinates reported by the aircraft, which adds strength and protection against forgery or deactivation of the GPS signal. The RPS lays the foundations for drones equipped with 4G SIM cards to be located and controlled from afar in the future, using mobile phone networks. The key to this technology is the incorporation of artificial intelligent elements to the 4G network: "It is based on providing the network with an intelligent system," explains Tenorio. "The network will gradually learn, and, the more devices linked, and the more time passes, the more it learns and improves its accuracy." This serves as a solution that will allow the boost of secure uses of drones in different areas of economy, such as logistics, fleet and transport management, agriculture, or vigilance of critical infrastructures, fields in which an exponential economic growth is expected to take place in the following years".

¹⁷ See Cierco Seira (2008); Recuerda Girela (2008); Recuerda Girela y Barranco Vela (2005).

project AEROCEPTOR¹⁸. The European Commission explains that intercepting vehicles can be dangerous for the staff who fights delinquency and terrorism. Due to this, a European initiative studies and develops a vanguardist concept of the system of remote-controlled aircraft (drones), which helps to maintain the security of police authorities and third parties during these attempts to intercept them.

The Community executive points out that stopping vehicles employed in criminal offences, either to transport dangerous and illegal substances or to cause terrorist attacks, is often a precarious activity that endangers the lives of the workforce in charge of services that prevent criminality, such as the police and border guards, as well as the users of those vehicles and the rest of bystanders.

For that reason, it has been decided to foster a system of remote-controlled aircraft against criminality by land and sea¹⁹. To mitigate the risks, the project "UAV based innovative means for land and sea non-cooperative vehicles stop" (AEROCEPTOR), funded by European funds, develops a drone to safely control, slow down, and seize, by land and by sea, every vehicle that does not cooperate. Drones, which could be quickly activated by the authorities to intercept these vehicles from a distance, are characterized by their light weight and low fuel consumption, and they are expected to be profitable and respect the environment. The Commission explains that, during the first years of the project, associates evaluated the equipment that was going to be used for the actions of controlling and stopping. The architecture of the drone was defined by an analysis of the VTOL and the fixed wings of the remote-controlled air machines, as well as the communication systems, flying regulations, and the command post's remote station. Plausible scenarios of utilization of this system were also considered. The project team investigated political and legal ramifications regarding the use of drones, and evaluated the possible risks of technology used in the air and on the land. According to the Community institution, the results of the AEROCEPTOR project should contribute to a reduction of the negative consequences of the prosecution of vehicles by land and sea. It is expected for drones to keep criminals at a distance and to guarantee the security of authority agents and citizens in general. It is, most definitely, a good example of how drones, even though they seem to be an ideal tool for felons, they are, simultaneously, an adequate and proportionate measure to fight against them.

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¹⁸ See <http://www.aeroceptor.eu>

¹⁹ See <https://cordis.europa.eu/project/rcn/106475/brief/es>

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