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CIVILIAN USES OF UNMANNED AERIAL VEHICLES (UAVs): A THREAT TO NATIONAL SECURITY

After their invention at the start of the 20th century and their development within armies during the following decades, Unmanned Aerial Vehicles (UAVs)   gradually imposed themselves as instrumental tools on the battlefields of the 21st century (ZUBELDIA[1] 2012). From 2011 onwards, the civilian use of UAVs has grown in number both in France and around the world. Drones have gained acceptance in the security sector, in agriculture, with media professionals as well as with private individuals (THIBAULT[2], 2016).

Today, the civilian UAVs market is experiencing unprecedented growth: in 2015, it represented 155 million euros in France, and is expected to reach 652 million euros in 2025 (JAMES[3], 2016). Between 2017 and 2021, the number of civilian aircraft operating in France has risen from 400,000 to… 2.5 million. 40,000 of them weigh more than 800 grams and can be easily purchased (SENAT[4], 2021). Following this sudden proliferation, the French authorities took regulatory measures in 2012 (Arrêté du 11 avril 2012 [5], 2012) and in 2016. Since then, the registration of drones weighing more than 800 grams is required by the law (Loi n° 2016-1428 du 24 octobre 2016 [6], 2016).

Despite all the measures that have been put in place, it is undeniable that the proliferation of this type of hardware within the population is not without its own set of risks. Indeed, drone technology is said to "equalise"(GUISNEL[7], 2016) that is to say that is put on an equal playing field, civilians, irregular forces and armies. The security threat towards the public is thus tangible if these drones are used towards a malevolent purpose, in case of a faulty handling from its user or simply by the omission of flying regulations.

For instance, in 2019, the European Union Aviation Safety Agency listed 2000 incidents, mainly at a low altitude, within the European Union's aerial space (SENAT[8], 2021). For the aerial transport gendarmerie task force (GTA), "The unlawful

1   ZUBELDIA, Océane. *Histoire des drones*. Paris : Perrin, 2012, 248 p.
2   THIBAULT, Guillaume, TOULOUMIAN, Archag. Drones : Une révolution en marche, Cabinet Olivier Wyman, *Repères et Stratégies*, octobre 2016, 1 p.
3   JAMES, Olivier. Le marché français des drones civils pourrait dépasser 650 millions d'euros en 2025. *Usine Nouvelle* [en ligne], 1er mars 2016 [consulté le 4 janvier 2022]. URL : https://www.usinenouvelle.com/article/infographie-le-marche-francais-des- drones-civils-pourrait-depasser-650-millions-d-euros-en-2025.N381962
4   SÉNAT. Les drones dans les forces armées. Rapport d'information n° 711 de la commission des affaires étrangères, de la défense et des forces armées, 23 juin 2021, p. 33. URL : http://www.senat.fr/rap/r20-711/r20-7111.pdf
5   Arrêté du 11 avril 2012 relatif à la conception des aéronefs civils qui circulent sans aucune personne à bord, aux conditions de leur emploi et sur les capacités requises des personnes qui les utilisent (abrogé par l'arrêté du 17 décembre 2015 relatif à l'utilisation de l'espace aérien par les aéronefs qui circulent sans personne à bord).
6   Loi n° 2016-1428 du 24 octobre 2016 relative au renforcement de la sécurité de l'usage des drones civils
7   GUISNEL, Jean. Les militaires angoissés par les technologies "nivelantes". *Le Point* [en ligne], 20 septembre 2016 [consulté le 8 décembre 2021]. URL : https://www.lepoint.fr/editos-du-point/jean-guisnel/les-militaires-angoisses-par-les-technologies- nivelantes-20-09-2016-2069733_53.php
8   SÉNAT, *op. cit.* note 4.

usage of drones is undergoing an exponential growth"(Deuxième forum du Conseil pour les drones civils[9], 2019) , reaching, for instance, in 2017 the peak of 445 UAVs[10] conducting unlawful flights over prohibited or sensitive zones.

To fully grasp the threat that civilian UAVs represent for national security, it is necessary to define the various types of UAVs that exist and the threats that they could potentially represent. Then, through various examples of malevolent acts that occurred in France and abroad, this article opts to assess the current state of the threat.

I) The different types of UAVs, a diversified set of risks

The diverse types of drones available on the market vary enormously, as well as the price, the size, the weight, the built-in equipment or even their technical capacities that can change from one manufacturer to another. Yet, military drones aside, two sets of drones distinguish themselves from one another: the first is available in stores or internet and their price can range from a few hundred euros to a couple thousand euros. The second that encompasses "DIY'' drones are self-assembled from loose pieces bought in stores and allows to build a great variety of devices (DUJARDIN[11], 2020).

Drones that can be purchased in stores belong to the easiest aircraft to get one's hands on and make up the bulk of engines involved in criminal acts, whether intentional or not. These UAVs are often equipped of cameras that can be used to take illegal shots with the intention of perpetrating a criminal act; for image collection during terrorist attacks with a propaganda agenda (UNITED NATION[12], 2021) or even for espionage acts, for instance by flying over strategic sites.
With their built-in hardware, these UAVs can create significant damage if they were to fall on an individual or an infrastructure. For instance, a collision with a commercial aeroplane or a helicopter could lead to dramatic consequences. The simple projection of a high-speed drone on an individual can be lethal. Indeed, drones weighing up to 800 grammes such as DJI's FPV can now reach speeds up to 140 km/h (DJI FPV[13]).
The main risk is the repurposing of the drone from its initial purpose. In other words, by adding hardware that isn't provided by the supplier, such as a hook that can be activated remotely and could enable the device to deliver supplies, weapons, smuggled goods or any object light enough to make it on the UAV. Of course, with such modifications, it is easy to transform the drone into a makeshift bomber by using grenades whose pin would be removed thanks to a hook system before being launched from the UAV. This technique has already been used in Syria and Iraq by ISIS fighters that had specialised in modifying the drone's initial purpose (LAGNEAU[14], 2016). It is also possible to use the drone as a "wandering drone" or "kamikaze" drone, thanks to the sole addition of an explosive charge or lethal material. The damage caused by this type of makeshift weapon can be huge and the simplicity of their fabrication represents a significant threat both for the population that could be targeted and for sensitive infrastructure. Fortunately, for the moment this type of device is not present within national territory.

The drones built from loose pieces are sometimes more perfected and their hybrid conception permits a wide scope of uses. They can accomplish the same actions as the drones sold in stores, but their scope of actions, their autonomy and the level of sophistication of their equipment can be much more precise.
Of course, assembling them together requires a larger set of competencies and more extensive technical means. This type of hardware continues nevertheless to develop itself, as has recently demonstrated the incident that occurred in the Marian Sanctuary of Šaštín in Slovakia where, in September 2021, a home-made drone penetrated the security perimeter set up around Pope Francis's mass, compelling security forces to intervene (Renseignor[15], 2021).
The first asset of the drone being its versatility, the risks they represent are varied. The list of possible scenarios range from the interruption of aerial traffic to the attacks of the Seveso (SENAT[16], 2021) sites, or other symbolic sites an even suicide drones, equipped with "dirty bombs" launched into the crowd. Debrief from French and foreign security forces can enable to better evaluate the true level of the threat.

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9   Deuxième forum du Conseil pour les drones civils, *Le rôle de la gendarmerie des transports aériens en matière de drones, Gendarmerie des transports aériens*, Paris, 9 juillet 2019.

10 *Ibidem.*

11 DUJARDIN, Olivier. La menace des drones. *CF2R, Note renseignement, technologie et armement* [en ligne]*,* n° 17, mars 2020. URL : https://cf2r.org/rta/la-menace-des-drones/

12 UNITED NATIONS, *« Countering Terrorism Online With Artificial Intelligence : An overview for law enforcement and counterterrorism agencies in South Asia and South-East Asia »*, Office of Counter-Terrorism, 2021.

13 DJI FPV. Caractéristiques techniques. *dji.com* [en ligne] [consulted on 29 March 2022]. URL : https://www.dji.com/fr/dji-fpv/specs

14 LAGNEAU, Laurent. L'État islamique utilise des drones dotés de grenades à Mossoul. *Opex 360* [en ligne], 16 novembre 2016 [consulté le 30 novembre 2021]. URL : http://www.opex360.com/2016/11/16/letat-islamique-utilise-des-drones-dotes-de- grenades-mossoul/

15 Renseignor, n° 1210, 19 décembre 2021.

16 SENAT, *op. cit*. note 4, p. 1.

II) The current state of the threat, examples of malicious acts

The anticipation and projections regarding drone-generated threats and the novelty they represent must not replace the experienced feedback that can bring various recent incidents sparked by such devices. It is through the latter that we will be able to extricate a clearer image of the current state of the threats and the possible scenarios that could arise in the coming years. Firstly, it is interesting to observe how the drones are employed in the asymmetrical conflict situation. The use of drones on a large-scale truly began with ISIS. Indeed, the proto-state possesses fabrication workshops it which it a pressured explosive (with a built-in timer) or "kamikaze" models (equipped with grenades or explosive charges) (LAGNEAU[17], 2016). It is surely one of these "creations" that led to the 2016 attack that injured 2 French Special Forces soldiers in Erbil (ASSEMBLEE NATIONALE[18], 2021), 77 km from Mosul. Since then, the use of such devices and the competencies associated with them has increased in the Iraqi-Syrian zone, or within the Middle East. Yemen is one example among many, where a war has been ranging on since 2014. There, drones were used to target Saudi installations such as oil plants in 2019 or the Abha airport in February 2022. It is important to state here that the devices used in those attacks were more similar to a long-range UAV (REUTERS[19], 2022) than a device originally meant for leisure.

Secondly, it is crucial to look at how these drones are used with malicious intent outside of the framework of asymmetrical conflicts. This relates to minor breaches on the national territory or acts with larger implications committed abroad. In France between 2014 and 2015, illegal flights over Paris sparked trouble (Pierre[20], 2015), especially since the targeted locations where the Elysée Palace, the American embassy or even the National Assembly. More recently, in July 2018, a drone from the NGO Greenpeace manage to penetrate the enclosed perimeter of the nuclear powerplant in Bugey. In August 2018, the drone protection section (SPAD) of the 2nd regiment of the Republican Guard had to neutralise a drone that was flying dangerously close to the Grégançon fort in the Var, whilst the President of the Republic was present (GABRIEL[21], 2019). To finish, we can also mention the delivery by drone within prison that was illustrated by the crash in summer 2021 over a UAV transporting smuggled goods and razor blades in the square of the Nîmes prison center (MERCIER[22], 2021).

Abroad the use of drones for malicious purposes is also increasing. For instance, in Venezuela in August 2018, Maduro was targeted by DJI M600 drones in an assignation attempt. The culprit behind this attack is still debated. In November 2021, the Iraqi Prime Minister was targeted by a drone strike. Three large distance UAVs filled with explosives aimed for the Prime Minister's residence within the green zone. Despite a heighten security level, only two out of the three drones were intercepted and the third managed to detonate (Renseignor[23], 2021). In April 2021, the Israeli secret service used drones to drop explosives on the Natanz site, committing sabotage on Iranian nuclear installations (Renseignor[24], 2021).

Today, it is undeniable that the treat linked to drone is intensifying. It is certain that such "serious" criminal arts will increase as terrorist groups, mafias and guerrilla armies throughout the world will start to use this type of device, even if such attacks implies the ability to find the necessary hardware and to develop the competencies to make such a device and its explosive charges linked to it works. It is worth mentioning that in autumn 2020, the custom officers from Meurthe-et-Moselle seized in a vehicle, a drone, explosive and a system of remote ignition (OUSLIMANI[25], 2020).

17 LAGNEAU, Laurent. L'État islamique utilise des drones dotés de grenades à Mossoul. *Opex 360*, 16 novembre 2016 [consulté le 30 novembre 2021]. URL : http://www.opex360.com/2016/11/16/letat-islamique-utilise-des-drones-dotes-de-grenades- mossoul/
18 ASSEMBLÉE NATIONALE. *La guerre des drones*. Rapport d'information n° 4320 de la commission de la Défense Nationale et des forces armées, 7 juillet 2021, p. 9. URL : https://www.assemblee-nationale.fr/dyn/15/rapports/cion_def/l15b4320_rapport-information.pdf
19 REUTERS. *« Shrapnel injures 12 at Saudi Abha airport as drone intercepted »*, 10 février 2022 [consulté le 21 mars 2022]. URL : https://www.reuters.com/world/middle-east/saudi-led-coalition-says-destroyed-drone-launched-towards-abha-airport- 4-injured-2022-02-10/
20 Pierre (surnom). Des drones ont survolé Paris cette nuit. *Journal du Geek*, 24 février 2015 [consulté le 30 novembre]. URL : https://www.journaldugeek.com/2015/02/24/des-drones-ont-survole-paris-cette-nuit/
21 GABRIEL, Thierry. Lutte anti-drones, Imsi-Catcher : la Gendarmerie fait son marché dans le high-tech. *L'essor de la gendarmerie nationale*, 1er avril 2019 [consulté le 18 novembre 2021]. URL : https://lessor.org/a-la-une/lutte-anti-drones-imsi-catcher-la-gendarmerie-fait-on-marche-dans-le-high-tech
22 MERCIER, S. Nîmes : quand les détenus de la prison se font livrer lames de scies et chicha par drone. *France 3 Occitanie* [en ligne], 16 août 2021 [consulté le 22 mars 2022]. URL : https://france3-regions.francetvinfo.fr/occitanie/gard/nimes/nimes-quand- les-detenus-de-la-prison-se-font-livrer-lames-de-scies-et-chicha-par-drone-2215534.html
23 Renseignor, n° 1205, 14 novembre 2021
24 Renseignor, n° 1208, 5 décembre 2021.
25 OUSLIMANI, Ryad. Nancy : un homme arrêté avec un drone et des explosifs lors d'un contrôle routier. *RTL* [en ligne], 22 octobre 2020 [consulté le 22 mars 2022]. URL : https://www.rtl.fr/actu/justice-faits-divers/nancy-un-homme-arrete-avec-un-drone- et-des-explosifs-lors-d-un-controle-routier-7800908524

Currently, in light of the recent parliamentary inquiries (ASSEMBLEE NATIONALE[26], 2021) undertaken during the Barkhane operation (ASSEMBLEE NATIONALE[27], 2021), the spread of this know-how is currently being transmitted in the Sahel region after having been initially developed in the Syrian-Iraqi zone. Indeed, in September 2021, the Congolese authorities stated that they had arrested a man from the Middle East whose mission was to train the Islamic Armed group ADF (Allied Democratic Forces) in drone warfare (Renseignor[28], 2021).

All this could, with time, lead to the importation of such know-how and its diffusion within terrorist cells, through the intermediary of fighters from Europe who, once trained in these conflict areas, would come home to commit terrorist acts.

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Faced with ever more versatile and ever more numerous drones, homeland security is today subject to a serious threat, which has been taken into account since 2016 by the Gendarmerie. The development and spread of this technology amongst the population raises fears of an increase in voluntary and involuntary incidents, ranging from airport disruptions to significant material and human damage. Moreover, with regards to terrorism, drones are proving to be a popular tool for combatant groups. The possibility that they could be used for large-scale attacks on national territory is a risk that should not be underestimated. Faced with the spread of such drone expertise and the possibility for these actions to multiply across the world, a scenario seeing the use of "vagabond munitions" no longer seems to be a fantasy in the same way the use of a "pack" of drones to saturate a sensitive area is now a possibility. We should not overlook the risk of drones being used on the national territory to deliver equipment to facilitate the escape of a detainee, to carry out reconnaissance prior to a terrorist action, or to record an attack and then broadcast it for propaganda purposes (UNITED NATIONS[29]). The combination of technologies represents a significant threat. Indeed, it is now conceivable to combine drone technology with facial recognition software, despite the safeguards installed by manufacturers, to turn civilian devices into weapons that can accurately target any individual. Although no cases have yet been reported, "slaughter bot" drones are no longer science fiction (UNITED NATIONS[30], 2021).

The prevalence of aerial drones should not lead us to neglect the risks posed by the civilian use of new land, sea and underwater UAVs, which will constitute a threat in the years to come. Lower prices and growing public interest in these technologies suggest that the threat from civilian drones will extend to land, air, sea and underwater environments in the future, even if, with the exception of flying drones, these technologies are not widely common amongst the population.

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26 ASSEMBLÉE NATIONALE, *op.cit.* note 18, p. 3.
27 ASSEMBLÉE NATIONALE, *Opération Barkhane*, Rapport d'information n° 4089 de la commission de la Défense Nationale et des forces armées, 14 avril 2021. URL : https://www.assemblee-nationale.fr/dyn/15/rapports/cion_def/l15b4089_rapport- information.pdf
28 Renseignor, n° 1198, 26 septembre 2021.
29 UNITED NATIONS, *op.cit.* note 12, p. 2.
30 UNITED NATIONS. *« Algorithms and Terrorism : The malicious use of artificial intelligence for terrorist purposes »*. Office of Counter-Terrorism, 2021.