CENTRE DELÀS D'ESTUDIS PER LA PAU

CAMPAIGN TO STOP KILLER ROBOTS

CENTRE DELÀS REPORT 39

NOVEL WEAPONS AGAINST ETHICS AND PEOPLE

Armed Drones and Autonomous Drones

Authors: Joaquín Rodríguez, Xavi Mojal, Tica Font, Pere Brunet

Centre Delàs d'Estudis per la Pau
Carrer Erasme de Janer 8, entresol, despatx 9
08001 Barcelona
T. 93 441 19 47
www.centredelas.org
info@centredelas.org

Authors: Joaquín Rodríguez, Xavi Mojal, Tica Font, Pere Brunet

Barcelona, November 2019

Graphic and layout: Esteva&Estêvão
Photos: cover, Bobbi Zapka, U.S. Air Force; p. 5, Jessica Crownover/U.S. Navy; p. 9, Neil Ballecer/ California Air National Guard; p. 11, Karsten Franke/Wikimedia Commons; p. 16, Capricorn4049/ Wikimedia Commons; p. 25, Daniel McLain /U.S. Navy; p. 26a, Brian Ferguson/U.S. Air Force; p. 26b, AeroVironment; p. 26c, www.defenceimagery.mod.uk/OGL; p. 41, U.S. Army; p. 46, Kevin Steinberg/U.S. Navy; p. 56, Julian Herzog/Wikimedia Commons; p. 61 www.defenceimagery.mod.uk

D.L.: B-19744-2010
ISSN: 2013-8032

INDEX

EXECUTIVE SUMMARY

Military and "security" actions with military robotic and armed systems have radically changed the war scenarios, which have evolved from concentrating on military and strategic targets to performing attacks that can seriously affect uninvolved civilian population. Attacks with armed drones often do not appear in newspapers, but they show a steady growth rate in recent years. They are **attacks that end up killing civilians, as well as perpetrating summary and extrajudicial executions** of supposedly terrorist people. Lately, in addition, the military drones are evolving to incorporate autonomous systems of decision. **This escalation towards autonomous armed systems is ethically and legally unacceptable, because delegating in a machine the decision to kill is something that goes against the human dignity and the rights of people.**

The New Weaponry Business

Robotic military systems, and in particular the drones, have managed to drastically reduce military operations while significantly increasing the **business volume of the military industrial sector.** The sector of companies that manufacture and export military drones and the high-tech instrument used in modern wars is expanding rapidly.

Border surveillance systems are other types of systems that have been designed specifically to monitor (and, if necessary, attack) civilians. Monitoring and control systems armed with drones are being used, among other countries, in Israel, South Korea, the United States and Europe (the Frontex Agency).

The Geography of the Military Drones

Military drones are manufactured mainly in the United States, Israel, Russia, China and Europe. The United States is clearly the world leader in the creation and manufacture of robotic military systems, military drones and armed drones. The Report tables show the current state of these military systems. The United States, Israel, Russia and China are actively working in the development of weapon systems that allow a significant degree of autonomy, especially in the case of loitering drones and drone swarms. **The big exporting companies are located in the United States, Israel, Russia and China**. This report opens the way to know who are the big players (countries and companies) in this field and who can be the leaders in drone autonomy.

The first wave of drones came from the United States, followed by Israel, Russia and China. After that, research and production started on some other countries, including **Turkey and Iran**, who decided to successfully promote domestic research and production, forced by the international context - complicated relations of Turkey with NATO, or the embargo in Iran -. These two countries are using drones internally or in various conflicts in the Middle East.

The **manufacturing countries** include Germany, Austria, Belarus, Brazil, Colombia, South Korea, Spain, the United States, France, Hungary, India, Iran, Israel, Italy, Latvia, Mexico, Nigeria, Pakistan, Poland, United Kingdom, Russia, Serbia, Sweden, Norway, Turkey, China, and Ukraine. The **user countries** include these countries and in addition Canada, Azerbaijan, Chile, Brazil, Greece, Thailand, Philippines, Vietnam, Zambia, Ukraine, Kazakhstan, Qatar, Lebanon, Australia, Afghanistan, Indonesia, Egypt, Latvia, Holland, Czech Republic, Japan, Belgium, Uzbekistan, Jordan, Arab Emirates, Algeria, Saudi Arabia and Iraq among others.

Wars Without Risk

Double use is a feature inherent in military technologies, and of course, the drones, which refers to the convertibility of civilian applications, products or components to the military. Dual use complicates the regulation or prohibition of drones, which, combined with its advantages for states and non-state groups, have facilitated **proliferation**. Many states have official positions that are still not defined, but in practice they have decided to opt for the use of military robotic systems and military drones for reasons of competitiveness: "if the others do it, we must do it, not to be left behind".

The perception of **the possibility of starting wars without risk** can make military solutions prevail over those based on diplomacy, **lowering thresholds to initiate military actions**. Artificial intelligence will make it easier to think on more abstract distance wars, which can lead to more military actions and an **uncontrolled escalation of conflicts.**

Fallacies and false messages

Over the last decade **a false narrative has been built on the goodness of artificial intelligence** that has a tendency to ignore all those aspects that experts and academics are expressing. In fact, robotic **military systems with constructive autonomy have unexplained behaviours**, with a **guaranteed probability of error that is significant** and not small. This makes them essentially unsuitable in situations where **errors will be human lives** and where accountability will be difficult.

The Danger of Emerging Autonomy

Loitering drones and drone swarms can easily incorporate autonomous decision-making systems. They are economical, being within reach of a large number of countries, and can therefore change the geopolitical map of armed conflicts. **The incorporation of constructive autonomy in robotic military systems and loitering drones**, and the development of new **drone swarms** is something that will most likely change war scenarios.

Autonomous weapons place us in a dehumanization scenario. **To delegate the decision to kill on a machine goes against human dignity and the rights of the people**. The ethical problem appears when military systems are not operated by people and perform their tasks with **autonomy of use, without human intervention in the decision and attack processes**.

Proportionality, Distinction, Responsibility, and Precaution

Autonomous weapons systems should respect **the legal principle of proportionality**, which analyses whether the damages caused are proportional to the military gains obtained or if the damages (to civilians) are excessive. On the other hand, it is necessary to respect **the legal principle of distinction** that forces to distinguish between combatants and non-combatants. The question is whether these weapons systems can understand the context; distinguishing between a civilian with fear and a threatening enemy, and if they can understand the intentions behind a human face expression. Finally, these weapon systems must

respect **the principle of responsibility**: if there is an error or a war crime, which is responsible? The soldier, the one who gives the order, the politician, the manufacturer, the programmer... In the context of this dilution of responsibilities, it is necessary to expect that all those involved will try to evade responsibility, so that impunity will prevail.

Bearing in mind the debate on nuclear weapons and the lack of consensus to reach agreements to outlaw them, the question of considering autonomous weapon systems as illegal should be considered. As is foreseeable, this is a question about which there is no consensus, but in which common sense invites us to act by applying **the precautionary principle**, acting before they are developed. Applying the precautionary prevention principle involves stopping any development before autonomous weapons are created. We already have the nuclear threat. **The threat of autonomous armed drones is unacceptable.**

Weapon Systems Without Significant Human Control Must be banned

It is necessary, therefore, to have a legally binding instrument that prohibits the lack of significant human control over the selection and attack of the objectives, and which therefore prohibits robotic military systems with autonomy of use.

These warnings have been growing, leading to the creation of an **international coalition called Campaign to Stop Killer Robots** that involves civil society organizations, and the world of disarmament and human rights. Calls made from Private companies, technological workers and founders of companies in the sector are also opposing to what could be the beginning of a new arms race that could lead not only to military escalation but that could also endanger the survival of our species.

Thanks to this effort, conversations are currently taking place in the CCW (Convention for Certain Conventional Weapons of the United Nations), with the aim of **creating a binding legal framework that prohibits weapons without meaningful human control**. Although this international effort has not yet been able to bear fruit due to the pressure exerted by the military superpowers that act as a suppressor of world politics with the support of countries aligned with their interests, there is a need for an increased pressure from citizenship if one wants to avoid a scenario that can destabilize the fragile international balances and the precarious current peace.

1. INTRODUCTION

Wars are great businesses that escape democratic control. They enrich some powerful persons at the same time that destroy lives of many other people who have the same right to life as the first. In addition to the current military drones, able to stay in the sky for extended periods, we are seeing the development of autonomous drones and armed robots that also have to be able to select, identify and destroy objectives without human intervention (Burt, 2018). In many ways, and although the current armed drones can not be considered as totally autonomous weapons, the growing use of remote control remote systems can be considered as a path that can lead to the development of truly autonomous weapon systems (Burt, 2018).

More than 70 countries use military drones (Calvo, 2015). Most of them use them for surveillance tasks, and in this case they are not armed, having also a limited scope. But, despite the lack of information on the number of drones that different countries possess, we can state that just NATO has thousands of drones, with more than 60 different models, and 2,200 terrestrial control stations.[1]

Lethal autonomous systems could be the third revolution in war technologies (after gunpowder and atomic bomb), in the words of the Berkeley Professor Stuart Rusell.[2] They may come as a natural evolution of the present remote control weapons (current armed drones and laser bombs) that trivialize the act of distance killing, as Medea Benjamin (Benjamin, 2013) says, making it similar to the apparently innocuous activity of computer games.

In this context, Ethics require to place people and their rights at the centre of politics. We believe that a public debate on Ethics and the future use of Artificial Intelligence and autonomous technologies must be held, particularly in view of their military applications and their foreseeable effects.

This report begins by presenting the main concepts related to the new robotic military systems as well as the different types of military drones and the inherent **risk of the transition from automation to autonomy and towards the deployment of autonomous and lethal armed**

1. War, Peace, and Disarmament Dictionary. Printed version: (Calvo, 2015). Online version (Spanish and Catalan): http://diccionarioguerrapazdesarme.centredelas.org/ca/
2. Stuart Rusell, "La tercera revolución en el arte de la guerra" (In Spanish; last access, 3-9-2019): https://elpais.com/elpais/2015/05/28/ciencia/1432827187_930472.html

systems (LAWS). Next, the **current status of drone military technology** is presented, with particular emphasis on the **most significant countries in this field**: United States, Israel, Russia, China and the United Kingdom. The main types of drones that can include autonomous capacities are analysed together with the countries that investigate and develop them, the countries buying them, and the military drones most used in the world. Afterwards, the proliferation, the role of emerging countries and the problems related to dual use are discussed, and international efforts are presented (campaigns like "Stop Killer Robots[3]" and meetings of the UN CCW Committee). The objective of these international efforts is **to ban LAWS**. Finally, the Ethical problems that arise in relation to these new weapons (armed drones and their possible autonomy) are discussed on a **geopolitical framework in which business has abandoned people and their rights**.

The report covers the period between December 2017 and May 2019, analysing the months after the SIPRI report published in November 2017 (Boulanin, 2017), and also continuing the previous work in this field from the Delàs Centre for Peace Studies, which already published a Report (Calvo, 2014) in which the controversy generated by the use of military drones was analysed. In this work, the implications of carrying out selective killings were discussed, as well as the volume of business benefits that can represent for the military industry. The essential change, however, between the moment in which that work was written (Calvo, 2014) and the situation five years later is the staging of armed systems based on Artificial Intelligence techniques, being increasingly autonomous with new decision-making capacities. The Report wants to show the serious current dangers, arguing the need for the **prohibition of lethal autonomous weapons, LAWS**. When this Report was already in the process of being printing, the work "The Drone Databook" (Gettinger, 2019) was published, presenting a current and complete vision of the implementation of military drones worldwide. Anyway, the Report that we present here is complementary to that of Gettinger in all those aspects that refer to the autonomous capacities of these drones, to the shortcomings that these future potentials may have, to the dangers that this represents, and to the urgent need to establish binding agreements to prevent the manufacture and use of Lethal Autonomous Weapons (LAWS) worldwide.

3. Stop Killer Robots: https://www.stopkillerrobots.org/

2. THE NEW METHODS OF WAR

Traditionally, regarding innovations in R&D of new weapons and/or methods of war, they are first developed, then their adaptation or conformity with current international law is analysed, then conceptualized and, if it were necessary to generate new specific legal norms, they are regulated. The transcendence of the effects from the use of these weapons has initiated debates that have reversed the traditional thinking dynamics, favouring a preventive approach to the issue.

Three concepts have been discussed in recent decades: "asymmetric wars", "hybrid wars" and "fourth-generation wars".

The adjective "asymmetrical" wants to emphasize the differences between the two warring sides, on the one hand the differences between actors, one of the sides is usually a powerful army of an industrialized and developed country, therefore a state that has the monopoly of the legal use of violence, and on the other, groups, in many cases diffused, with few endowments of weapons and often called guerrillas, terrorists, militia members, insurgents or resistance fighters. The other asymmetry can be found in the means to make war, David against Goliath or stones against tanks, as has been the conflict that confronted the Israeli army with young Palestinians. Or, for example, in the wars in Iraq or Afghanistan, where the United States has a military power that its opponents do not have and therefore cannot confront them in the same terrain; or the use of conventional airplanes or trucks that are crashed into areas with a high human density as if they were weapons. In short, an asymmetry that would represent a war of what we would call David against Goliath.[4]

This profound inequality forces the weak side to develop or refine clandestine and different methods of combat. In asymmetric warfare there is no direct confrontation between sides, adversaries use an asymmetric strategy to weaken the ability to use violence from the side with military superiority. Asymmetric strategy involves thinking and organising differently from the opponent in order to maximise one's own strengths, explore one's weaknesses and gain freedom of action, while aiming to deny the opponent's

4. Baqués, J. (2015) *Las Guerras Híbridas: Un balance provisional.* As Working Paper 01/2015 from the Instituto Español de Estudios Estratégicos. Available at: http://www.ieee.es/Galerias/fichero/docs_trabajo/2015/DIEEET01-2015_GuerrasHibridas_JosepBaques.pdf

advantages and explore its vulnerabilities (from the strongest party, be they legal, political or geographical) rather than seeking direct confrontation.

In general we can say that there are three asymmetries. Asymmetries of methods, which consist in the use of operational concepts or tactical doctrines different from those of the adversary, or when one of them does not respect the laws or rules of war; the asymmetry of means or capabilities, due to the difference in technology, quantity and quality or type; and the asymmetry of wills, which occurs when one of the antagonistic blocs sees that its vital interests are compromised and as a consequence is willing to assume more risks and actions against the other.

The concept of "hybrid warfare" has been applied in the contexts of war in Iraq, Afghanistan or southern Lebanon, thus in contexts of war involving Western states and non-state or non-public armed actors, located on the periphery of the global political system and often linked to a failed state. But it must be borne in mind that this form of war could also be applied to states that feel threatened by some military power.

Regardless of how we characterize the current wars, whether asymmetric, hybrid or fourth generation, the current conflicts allow us to make some observations on the most characteristic elements of the war making way.

One of the differential features lies in the fact that current wars take place in urban areas, where combatants can be confused among the civilian population and can provoke a collision in the western way of making war, generating limitations or obstacles in the combat design, in the use of armament and with the legality of war. It must also be borne in mind that both the weak side and the peripheral countries have a greater capacity to assimilate combat casualties than Western countries do; for this reason the weak side tries to take the combat of military forces into spaces that are favourable to it, leading to a war of attrition in which the victor is not the one with more capacity but more resilience. The weak side usually has a great ability to move in the information age, in the use of the Internet or social networks disseminating content and images favorable to their cause, in the communication of ideas, myths or stereotypes and in the confrontation of these with those of their enemies, seeking to have a greater presence in global communication channels. The digitalization of society has turned the Internet into a new battlefield where the rules have yet to be defined and formulated.

In modern conflicts, the emphasis on models of struggle is shifting or extending traditional combat actions to strategies that combine conventional or traditional warfare actions with political, economic, information/advertising or electoral interference measures. These combined actions may include cyber-attacks, manipulations in social networks, elements of economic pressure in order to destabilize the public opinion from the adversary, encourage subversive movements that combine conventional weapons, irregular tactics, terrorist acts and criminal behaviour, such as becoming associated with organised crime (from which to finance themselves, among other reasons) or cybercrime, thus expanding the space of the battlefield to achieve political objectives.

2.1 CYBERSPACE, CYBERWAR AND CYBERWEAPONS

In the 1970s there was talk of "hackers", of their ability to enter computers and systems at the Pentagon, the CIA or the Wall Street Stock Exchange. The activities they carried out were not for profit; they only sought recognition of their skills and often ended up being hired by the company under attack. But at the beginning of the 21st century the spirit of cyber-attacks would radically change, the reason or the main component is to be found in the widespread use of the Internet in the daily lives of users, at institutional levels of all administrations in their management, as well as businesses. When the use of the Internet has become an essential part of daily life, criminal acts and attacks and aggressions between States have begun to appear.

In recent years in various scenarios states have used cyberspace to attack an enemy or adversary. In September 2007 two Israeli planes bombed a Syrian industrial area near the Turkish border, neither country publicized the military action. We will not go into hypothetical details about how this intervention could have been carried out, but it is obvious that the Israeli military took over Syria's anti-aircraft defense systems which allowed them to be "ignored" or not detected, achieving that anti-aircraft weapons were silent and still while Israeli planes conducted the bombing without worrying about being shot down.

Estonia, a former USSR republic, in 2007 passed a law that ordered the removal of Russian occupation symbols, as a result of this situation, Estonian web servers received millions of requests that were unable to respond and collapsed, citizens could not use online banking, government services or enter digital newspapers; there was an attack that collapsed the system by forcing the disconnection of "cyber borders" and left the country paralyzed for days, the tracking of computer addresses from where the attacks were made ended up in Russia, but Russia denied it.

In Georgia in 2008 South Ossetian forces attacked Georgian territory, the Georgian army responded by force, but Russia launched a cyber attack against media and government websites; Georgia's connecting lines went through Russia and Turkey, routers collapsed and diverted traffic abroad; the government decided to locate its websites out of its territory in Google servers in California; the banking sector was affected because faced with the possibility of a massive theft of information online operations were blocked, Russia again denied being responsible.

North Korea in 2009 carried out an attack against South Korea, which aimed to obtain information on the capabilities of South Korea's communication infrastructure, since if necessary these communication systems could be used by the United States. Simultaneously they wanted to know the situation of weapons of mass destruction in South Korean territory.

In Georgia in 2008 South Ossetian forces attacked Georgian territory, the Georgian army responded by force, but Russia launched a cyber attack against media and government websites; Georgia's connecting lines went through Russia and Turkey, routers collapsed and diverted traffic abroad; the government decided to locate its websites out of its territory in Google servers in California; the banking sector was affected because faced with the possibility of a massive theft of information online operations were blocked, Russia again denied being responsible.

North Korea in 2009 carried out an attack against South Korea, which aimed to obtain information on the capabilities of South Korea's communication infrastructure, since if necessary these communication systems could be used by the United States. Simultaneously they wanted to know the situation of weapons of mass destruction in South Korean territory.

A further step and thanks to microprocessors, has been to attack with software that controls and supervises industrial processes remotely. The best known case, the Stuxnet virus, which is installed in the operating system and remains waiting until the moment of its activation, this virus was used to attack Iran, specifically to attack the ability to create nuclear weapons in 2012. In order to stop the Iranian nuclear program, an embargo was applied to the import of Iranian-produced oil, sanctions were applied to the Iranian Central Bank and even the Ormuz Strait was blocked. Since Iran continued with the nuclear weapons program despite all the sanctions and blockades, the Stuxnet virus was incorporated, which takes advantage of the Windows operating system's vulnerability, in order to attack the centrifuges and force the nuclear power plant to stop. The suspicions about the perpetrator of this attack have fallen on the United States and Israel, neither has acknowledged the facts.

In 2014, Edward Snowden leaked to the press documents revealing a complex network of intelligence agencies in numerous western countries through which a globalized surveillance system was established, gathering data, records, documents and communications of all kinds, using secret programs of massive surveillance and breaking the security of the operating systems IOS, Android or violating the encryption systems of the BlackBerry. It turned out that the United States was watching and spying on its own allies, even listening to Chancellor Merkel's calls.[5]

These events bring us into the debate of a new concept that is the cyber weapon and how to adjust it to International Law. Experience shows that actions are carried out in cyberspace that may be qualified as use of force within a context of armed conflict, and that many States are developing cybernetic capabilities within their defence and security strategies, both offensive and defensive. We do not have a legally defined concept of cyberweapons, but we can say that a cyber weapon cannot be assimilated to an object, it must be approached in functional terms to an action that is carried out with a purpose. A cyberattack can have a criminal, terrorist, war, espionage or social activist purpose. In front of any attack in cyberspace the act itself should be taken into consideration, who the perpetrator is, who the addressee is and for what purpose it has been carried out and what effects it has had.[6]

Generally speaking, the population is worried about the possibility of creating machines that deliberately deceive, manipulate or coerce people. In short, a technological scenario is opening up where war and combat by unarmed means in the conventional sense of using weapons is continued, where combat is continued through cyberspace, a space without physical borders and in which legal regulation has not yet begun.

The emergence of artificial intelligence can transform the way in which people intervene in conflicts and war, the way in which society perceives these interventions and may lead to a loss of human centrality. The importance of Artificial Intelligence research can

5. Aznar J. (2015) *Evolución de los modelos de confrontación en el ciberespacio*, In Opinion document 03/2015 from the Instituto Español de Estudios Estratégicos. Available at: http://www.ieee.es/Galerias/fichero/docs_opinion/2015/DIEEEO03-2015_Confrontacion_Ciberespacio_JL.Aznar.pdf
6. Robles M. (2016) *El concepto de arma cibernética en el marco internacional: una aproximación funcional.* In Opinion Document 101/2016 from the Instituto Español de Estudios Estratégicos. Available at: http://www.ieee.es/Galerias/fichero/docs_opinion/2016/DIEEEO101-2016_Arma_Cibernetica_MargaritaRobles.pdf

be measured in the exorbitant amount of money that some countries are allocating to its development, as can also be seen in the growing protagonism it holds within the rivalry maintained by the main economic powers. The attractiveness of this technology is determined by the possibility of turning scientific innovation into wealth and political power.[7]

2.2 ROBOTS AS WEAPONS

Let us bear in mind that any development of robots in the military field is not governed by the same principles as in industrial robotics.

The new generation of weapons that this report collects is the first generation of new weapons. An unthinkable revolution is about to take place on the battlefield of war; science fiction is about to become reality. In the coming years the way wars are fought will begin to change. This transformation is now beginning to be seen in the use of drones that carry out targeted killings, or extrajudicial killings of suspected terrorists in Afghanistan, Pakistan, Yemen or Somalia. The robots will mark the wars of the future, with them we will change the doctrines, the strategies, the plans and operations of combat, it is very possible that in the future development of all these concepts the machines will play a determining role.

These drones have already been used to find Osama bin Laden's house, before the Marines killed him in their famous mission, or for murdering other alleged terrorists. In short, we have entered the generation of war through machines as a way to combat an irregular enemy that is attacked by remote explosions. Robots offer a greater projection of force, with less risk to the lives of soldiers and allow more actions to be carried out with fewer military personnel, which raises the ethical question or the issue of whether avoiding the risk to the life of one's own combatant is above the risk to which non-combatants are exposed.

Technology and in particular robots will change the strategies, tactics and theories of making war and not only in terms of capabilities. When these drones are operated from an office thousands of miles away, the experience of waging war and the profile of the warrior changes drastically; with these weapons the soldier makes war for 12 hours and returns home to have dinner and review homework with his or her children. According to (Singer, 2009),[8] this type of weapon interposes a great physical distance between the human being, the weapon itself and the effects of its use. If we think of a drone flying over Afghanistan we can see modifications in the "combatants" who make war, on the one hand, we have some combatants in the classic sense, but on the other we have a "technician" of dispatch. In this context we can affirm that we are modifying the rules of war or that the "fair play" of any confrontation of a war is not respected.

This physical distance can lead to a psychological and moral distance or a decrease in the sense and awareness of the responsibility of the intervention. With robotic weapons wars will be easier to start, moral, ethical and psychological barriers will be weaker, politicians may be less reluctant to get involved in the development of wars as they would not be so pressured by citizens' rejection of the loss of human life and politicians may reduce efforts in seeking non-violent solutions to a conflict. In short, the use of robots in combat opens up the debate on the trivialisation of the fact of war on a political and social scale, and poses a double standard in relation to the sacrifices that can be accepted by a society that demands military interventions without human sacrifices and without political risks.

Robotic weapons represent a clean technology that offers us the perspective of "clean war". In the Korean and Vietnam wars, the United States lost many soldiers (in Vietnam 60,000), while in the recent wars in Iraq and Afghanistan 1,000 military casualties, a figure that seems, according to opinion polls of citizens, socially unacceptable. The use of robots in combat can make war more acceptable to society and can also avoid the "combat fatigue" caused by a long-lasting war.[9]

In conventional wars and armed conflicts, the principles of necessity and proportionality and the minimization of casualties in order to achieve military objectives and respect for non-combatants are part of the legal norm. However, the use of drones in warfare eliminates the risk of being a casualty among one's own pilots and raises doubts about the risk of increasing the number of collateral victims among non-combatants, who according to international law would be innocent victims.

We are not yet in the world of Terminator, where weapons make their own decisions, but some models such as Dron Reaper are already beginning to grow closer. The importance of these robots and their role

7. Torres M. (2018) *Operaciones de influencia e inteligencia artificial: una visión prospectiva.* In Opinion Document 74/2018 from the Instituto Español de Estudios Estratégicos. Available at: http://www.ieee.es/Galerias/fichero/docs_opinion/2018/DIEEEO74-2018_InteligenciaArtificial_ManuelRTorres.pdf
8. Singer P. (2009) Wired for War. The Robotics Revolution and Conflicts in the 21st Century. New York. Penguin Press
9. Vilanova P. (2014) *Drones y política exterior: un instrumento de* múltiples lecturas; en ICIP Reserach nº4: El arma de moda: impacto del uso de los drones en las relaciones internacionales y el derecho internacional contemporáneo. Barcelona pp 73.

in combat is highlighted by the fact that the U.S. aerospace industry has stopped investing in research and development of conventional fighter planes and focuses exclusively on unmanned vehicles.

These new weapons are a technology designed to reduce the death of soldiers in combat, which does not mean that fewer civilians die in wars and that no more people die from robot attacks than from conventional weapons. The use of robots in war will eliminate the political obstacle of making war, will cause politicians to avoid assuming before society what represents the return of the corpses of soldiers killed in a military intervention. More and more politicians ask the military to design interventions under the doctrine of "zero dead", that is why they promote the development of these new weapons, it is easier for them to send the robots to make war, rather than sending our children and having to make letters of condolence to the families of dead soldiers. Politicians will avoid responsibility in the eyes of the public, because with the use of robots we dehumanize war and eliminate the human factor. But the use of robots in "armed conflict" opens a great debate on the ethical, legal and political implications.

The essential point of this debate focuses on the impact that these autonomous weapons would have on the life or protection of the life of the civilian population in time of war.

At this stage we know that robotics is advancing at a rapid pace, although we cannot predict what the near future will look like. We still do not know how close we are to having autonomous robotic weapons, their development moves between secrecy, confidentiality and discretion, although we already know prototype weapons whose many functions are already autonomous.

The robot prototypes we have seen so far have an important degree of autonomy, many of their tasks function independently of human action, although under human supervision and with the possibility of human intervention. The robots we have seen cannot decide to open fire without the intervention of a soldier, until now in the developed weapons or prototypes under work, the function of shooting falls on a soldier, falls on a human.

3. ROBOTIC MILITARY SYSTEMS

Robots are programmable or self-controlling machines that can perform complex tasks automatically, usually using sensors to analyse their environment. Robots also include a control system and one or more actuators, which act on the environment to do what they have been programmed for. The function of the control system is to command the actuators based on the real-time information it receives from the sensors and certain pre-set information stored in its digital memory. Programmable robots perform repetitive tasks (such as industrial robots that perform certain functions to assemble vehicles in production chains) although they may have sensors to avoid, for instance, unforeseen danger situations. Self-controllable robots, on the other hand, have a much lower level of previous programming, allowing them to adapt and to be able to act in variable and even unpredictable environments. As examples, we can quote robots that walk on rough terrains or those helping to dress disabled people or persons in the process of post-traumatic recovery.

Note that robots are not necessarily material. Increasingly, we find computer robots that are nothing more than pieces of software (applications or software programs) that react to the stimuli of the environment (internet) and act on it. Their sensors capture information from the network, while their actuators create new messages that disseminate on the Internet. They are called "chat bots" or "social bots", among others. As an example of the latter we can mention the robots that send advertising "tweets" (such as those looking for followers in electronic cigarettes[10]), posing as real people.

The concept of robotic (or robotized) military systems arises when robots are used in the military.

3.1 NOVEL WEAPONS. CLASSIFICATION. DRONES

There are **robotic military systems** that we could classify as classic systems, and which we will not consider in this work. Robots to deactivate explosives and a good part of mine detection systems would fall into this category. Anyway, robotic military systems have enabled the development of what we might call

10. Jon-Patrick Allem, Emilio Ferrara, Sree Priyanka Uppu, Tess Boley Cruz and Jennifer B Unger (USC): JMIR 2017: https://publichealth.jmir.org/2017/4/e98/

"new weapons." We find them, among other military applications, in air defence systems, active protection systems, guided ammunition, sentinel robotic weapons and drones. The definitions presented below are from in (Boulanin, 2017), and can be found in more detail in (Boulanin, 2017: 36-47). They claim to be a categorization (based on their military use) of the main systems that may evolve into autonomous systems during the next few years.

Air defense systems are weapon systems designed specifically to nullify or reduce the effectiveness of war actions from the air. They include missile defence systems and anti-aircraft systems, among others. They all use radar to detect threats (missiles, rockets or enemy aircraft) and a computer-controlled attack system that can automatically prioritize, select and attack these threats. Automatic computer control is considered to be essential, since the required response speed is higher than what human operators could give. These systems are currently deployed in many countries, Boulanin (2017: 40).

Active protection systems are armed systems designed to protect armoured vehicles against missiles or anti-tank rockets. They work with the same basic principle as air defence systems, combining sensors (radar, infrared or ultraviolet) to detect incoming projectiles, with a fire control system that tracks, evaluates and classifies threats, then firing several types of ammunition to destroy the attacking systems.

Guided ammunition, also called smart bombs or precision guided bombs, are explosive shells that can correct initial targets or subsequent errors once they have been fired or thrown. Guided ammunition includes a wide range of systems: missiles, torpedoes, laser-guided bombs and others. Laser-guided bombs are aimed to destroy targets that the operator points in real time with a laser. These weapons use their automatic systems to navigate, track, and attack the previously assigned target. The general characteristic of all of them is that human operators have previously selected and assigned the targets.

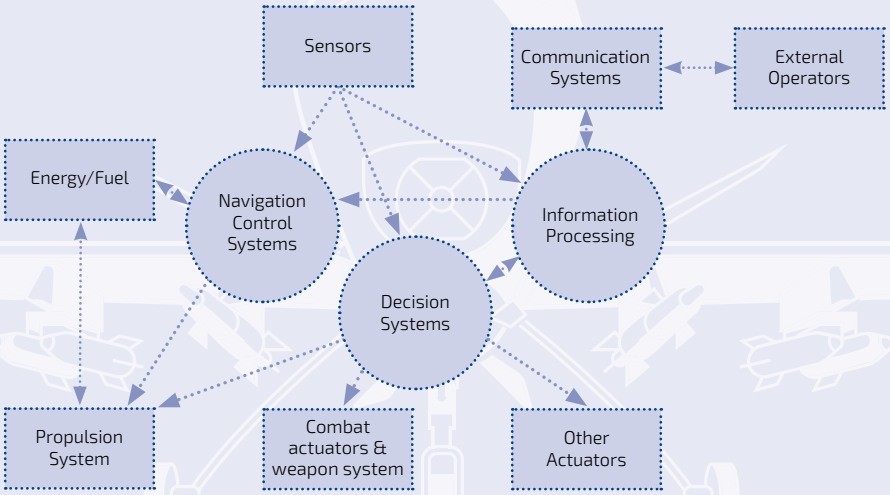
Sentinel robotic weapons are surveillance and attack systems that can detect, track and attack targets (people) automatically at borders. They can be used as stationary weapons or mounted on various types of vehicles. They are generally used as anti-personnel weapons for border security purposes, to shoot at people who intend to cross "nobody's" areas. The SIPRI Report (Boulanin, 2017) identified three different models: the Samsung SGR-A1 (South Korea), the Sentry Tech (Raphael, Israel) and the Super Aegis II of DODAAM (South Korea). Israel and South Korea export these systems to other countries. The SGR-A1 can make the decision to shoot (supervised or unsupervised) based on a heuristic system for processing images captured by its infrared sensors.

Military drones are highly versatile flying robotic systems, which can carry out a large number of functions and which, due to their characteristics, are especially suitable for incorporating autonomous functions. We therefore analyse them below in a specific Section.

Drones

A drone is a flying robot. As a robot, it is a programmable or self-controllable device being able to perform complex tasks, including sensors and actuators. As a flying system, it also needs a propulsion system, an energy store and several control systems, as well as remote communication elements with the base and the people operating it. The English acronym for drones is UAVs (Unmanned Aerial Vehicles). The drones also analyse, process and encrypt / decrypt the information of their sensors as well as the information they receive from the base. Control systems ensure that complex tasks (navigation, stabilization, take-off, landing) are done automatically and without the human control. Control systems of the most advanced drones include collision avoidance algorithms, automatic location systems, automatic base return algorithms, intelligent energy management systems, fault detection sensors, and even recovery systems that can help in cases of minor breakdowns (the so-called drone health control systems). Armed drones also include fire control systems. Figure 1 shows the typical structure of a military drone. Communication systems receive and send information to operators, who are usually on the ground, at the Operations Base.

Figure 1. Structure of a drone, with its main components and processes



The drone revolution has been possible as a result of the simultaneous disruption of five technologies: propulsion (increased aerodynamic efficiency and engine performance, both electric and fossil fuel based), control (which have allowed the total automation of stable navigation), energy systems (production of more powerful and less heavy electric batteries), information processing (new algorithms that we also find in other internet applications) and communications systems (more bandwidth and more coverage).

As indicated in Peter Burt (Burt, 2018), it is likely that the first truly autonomous weapons systems are drones. Advances in artificial intelligence (AI), machine learning (ML), and deep learning neural networks (DL) are already being applied to drones, and over the next few years we will surely see the development not only of drones capable of flying automatically (staying in the air for prolonged periods), but also of drones that could select, identify and destroy targets without any human intervention.

Among the different types of military drones (see Annex 1), we briefly describe five categories that are strong candidates to become autonomous in the near future: reconnaissance and surveillance systems, armed drones, loitering drones, mini-drones, and drone swarms.

Recognition and surveillance systems include unarmed drones that collect information (usually images and video) while flying on previously established routes. In this case, sensors are cameras that work in visible light or in other areas of the electromagnetic spectrum, or other information detectors (radio, mobile communications, etc.). The information can be encrypted and sent in real time in the base of operations or stored locally, so that it can be downloaded with more security on return. These drones have no combat actuators.

Armed drones are attack systems, usually remotely controlled (see Annex 1). In this case, the communication system sends real-time information about the geographical location and what the sensors capture, while receiving orders for the possible modification of the flight and for the attack. These drones wear combat actuators.

Loitering drones, also called "loitering munitions", are military systems that can combine the manoeuvrability of drones with the ability to attack guided munitions. They can perform just recognition, or recognition and attack tasks. In both cases, their interest comes from the fact that they are not aimed at a predetermined objective, but at a target area or region. Loitering drones hover along the assigned region, flying over and capturing information on everything they find. In the case of recognition, they simply communicate it (in real time or not) to the base. But, when performing attack missions, their decision systems can activate (following or not the operator's orders according to their degree of autonomy) their weapons systems. In this case, they are single use because they explode during the attack in the same way as guided ammunition. Loitering drones can carry out offensive and defensive missions that would be considered dangerous or risky for other types of manned or unmanned systems, such as the attack to enemy air defences or support tasks for artillery. This type of robotic military system is increasingly widespread and used by armies and security forces around the world (see Annex 1).

Mini-drones are small-sized drones, between a few centimetres and one meter. They can be reconnaissance or loitering drones, and they may wear small weapons. They are currently under investigation by many countries (see Annex 1), being potential candidates to include autonomous functionalities, either as loitering systems or as swarm components.

Drone swarms are sets of tens, hundreds or thousands of mini-drones that act in coordination thanks to a specific communication system that enables interaction between them. They can also be armed, reconnaissance or swarms around. They are subject to research by several countries (see Annex 1), and are also potential candidates to include autonomous capacities. The swarms of drones are inspired by the behavior of swarms of birds and are extraordinarily resistant to accidents and adversities, because in the case of problems, any subset of drones in the swarm can continue to develop the assigned tasks.

It should be noted that the scheme shown in Figure 1, when removing the navigation control system and the propulsion system, applies to other types of robotic military systems such as sentinel weapons.

The key aspect, in any case, is the structure of the decision system (Figure 1), which ends up determining the degree of autonomy of a particular robotic military system or drone. This is the object of the following Section.

3.2 AUTOMATION, AUTONOMY AND LEARNING. LETHAL AUTONOMOUS WEAPON SYSTEMS

Many robotic military systems are automated in some sense. Automation algorithms can be found in their geolocation and driving systems, in the control of their sensors, actuators and weapons, in their health management, but also in orientation, decision processes, and during attacks.

Peter Burt (Burt, 2018) cites the Spectrum[11] model, classifying military systems into 4 categories according to their degree of control and automation: inert systems that do not have any type of control (classical ammunition), systems remotely controlled by people who operate them (for example, laser-guided bombs), automated systems (which can act even without human control but following a set of rules already programmed), and autonomous systems, which can "define their own actions" despite having to follow some restrictions. They all depend on the structure of the decision system in Figure 1:

- **Inert systems** do not include any decision system.
- **In systems operated by remote control**, the "decision system" is reduced to a simple transmission channel that sends all commands received by the communication system to the processing systems and the combat actuators.
- **In automated systems** (such as sentinel armed systems), decision systems are algorithms that follow already programmed rules. These automated systems can also be classified, as we will see below, into two types: reliable automated systems and automated heuristic systems.
- **Autonomous systems**, finally, are not pre-programmed. Their decision system works through real-time analysis of the available data, either coming from the sensors and the communication system or from a drone "reality model". This model of reality, massively heuristic, has been previously created from a huge volume of data (the so-called "Big Data") by using Machine Learning techniques (ML) with deep learning (DL) neural networks, as we will see below.

In short, and from the point of view of design and construction, the difference between automation and autonomy lies in the structure of the decision system. If this consists of algorithms that follow already programmed rules (whether reliable or heuristic), the military system is said to be **automatic or automated** (some authors use the "semi-autonomy" term, but we prefer to avoid this term so as not to generate confusion). If this decision system is not based on rules but on a model of reality obtained with neural networks of deep learning (DL) from massive amounts of data, we will say that **the system is autonomous**. Later we will see that there is a different and complementary concept of autonomy, which is based on the type of interaction with the people who operate the robotic military system. We can therefore speak of **constructive autonomy** and **autonomy of use**. The systems with constructive autonomy are those that could carry out all the tasks indicated in Figure 3 without any human intervention.

As we have seen, the algorithms of the decision systems can be reliable, heuristic or massively heuristic. We have examples of all of them also in our daily life. Systems that use reliable automated systems include GPS systems in our daily lives or weapons such as laser-guided bombs. They follow mathematical or physics-based equations, they have no parameters to adjust, and the potential errors basically come not from their algorithms, but from misuse and human errors. In contrast, systems based on heuristic algorithms have several parameters that must be ad-

11. International Committee of the Red Cross: 'Autonomous Weapon Systems: Technical, Military, Legal and Humanitarian Aspects'. Report of Expert Meeting, 26-28 March 2014, Geneva, Switzerland, p. 62: https://www.icrc.org/en/download/file/1707/4221-002-autonomous-weapons-systems-full-report.pdf

justed, and their suitability in the context of a given application will depend on the ability of the person who set them. They include a good number of existing drones and automated weapons with orientation capabilities. The configuration of the parameters cannot be optimal and they are always prone to errors that human operators have to be able to detect and correct. As an example of an automated heuristic system we can mention sentinel robotic weapons, which should be able to distinguish, for example, between people and animals that cross the border, and that often do so with pre-established rules based on the dimensions, size, or speed of those moving objects that are detected by the sensors.

However, the problem with systems having **constructive autonomy** and that are based on machine learning (ML, DL) is much more complex. These decision systems are dark, massively heuristic algorithms, based on a huge amount of parameters that can grow to hundreds of millions. They use learning algorithms that require huge data sets, since the volume of data for training must always be larger than the number of parameters that must be adjusted during learning. They are opaque algorithms (Potin, 2018). In addition, and as we will discuss below, it has been proven that they have a significant and guaranteed probability of failure.

The structure and limits of deep learning

In recent decades, artificial intelligence (AI) has basically materialized in new machine learning (ML) algorithms that have extended considerably during this last decade. Learning algorithms can be divided into five main categories: Genetic evolutionary algorithms, Analogy-based algorithms, Symbolic Learning systems, Bayesian Learning machines and Deep Learning algorithms (Sunday, 2018). In this section we will focus on the latter, since they are the ones that are being used in the design of most autonomous systems including LAWS. Deep Learning systems (DL) include a Deep Neural Network, and work in two steps (Brunet, 2018). Nodes of these networks have inputs and outputs, like the neurons in our brain; Networks are said to be "deep" (DL) when they include multiple hidden layers that contain a large number of nodes (digital neurons) and a multitude of connections. In other words, the difference between classic neural networks and DL is only the number of layers of hidden neurons. Moreover, and as Jason Potin explains (Potin, 2018), Machine Learning is based on a mathematical trick that adds heuristic non-linearities to the typically linear structure of the network to prevent everything from ending up in a complete matrix collapse.

Networks of DL systems have to be previously designed. Data scientists must analyse the data and decide the most appropriate network structure. Next, large amounts of data must be processed to train the model by optimizing its weights or parameters. According to Samira Pouyanfar (Pouyanfar, 2018), Deep Learning can be based on different network structures, including recurrent neural networks, convolution-based neural networks (CNN), adversary generative networks (GAN) or variational automatic encoders (VAE) among others, (Brunet, 2018). Learning involves optimizing the weights (parameters) associated with all neuron connections with the help of statistical algorithms. This is a process that takes time.

After the training phase, the network can be used/executed. The sensor information (and any other input information) reaches the input layer of neurons. Next, all ML / DL neurons calculate a weighted average of all signals from neurons in the previous layer, perform some nonlinear operations (using threshold and activation functions) and send their output to neurons in the next layer. The use of a set of non-linear activation functions is essential to ensure that each neuron intervenes in a differentiated manner in the final result (otherwise, the entire DL network would become a huge linear system that could collapse into a single matrix multiplication). The final output of the neural network is often used to improve and adjust the parameters of the network in a type of dynamic feedback training. While initial network training can be time-consuming, it also requires a large amount of data (DL networks can have hundreds of millions of neurons and parameters, requiring training data volumes of the same order of magnitude), the use/execution of DL networks is very fast and efficient. This is due to the fact that mathematical operations at the level of neurons are extremely simple.

If we compare the DL network of an automatic translation system (TA) with the decision system of an autonomous weapon with DL algorithms (LAWS) we will observe great similarities that show behavioural patterns. For TA applications, learning data come from a large number of text pairs, one of them being the translation of the other. During the use/execution of the network, the input is (a parameterization of) the initial phrase that we want to translate, while the output corresponds to its translation. In LAWS, the learning data can come from intelligence agencies and many other sources, and identify potential objectives. During the use of the LAWS network, the input comes from armed system sensors (cameras, etc.) and the output could be, for each element that identifies the camera images, its probability of being a "valid" target.

Even so, several authors such as Anh Nguyen (Nguyen, 2015) have shown interesting differenc-

es between human vision and current deep neural networks, raising questions about the generality of recognition algorithms based on Deep Learning. Anh Nguyen (Nguyen, 2015), shows that changing an image (for example, a lion) in an imperceptible way for humans, can make a Deep Neural Network label the image as something completely different: a library. In fact, they show that it is easy to produce images that are completely unrecognizable for humans, but that the latest-generation Deep Learning algorithms classify as recognizable real objects with a 99.99% confidence. This is the type of errors that the autonomous weapon decision systems can have, due to instabilities inherent in their DL networks. They can give "good answers" in many cases, but they can also offer us completely absurd outputs, as TA systems sometimes do. In fact, these similarities between both DL learning networks means that we can certainly compare TA systems with LAWS, and infer the behaviour of the seconds from the first ones: the percentage of reliability of everyday systems such as Automatic Translation (TA), offers an approximate mechanism to evaluate the probability of error in the LAWS decision systems.

In short, Deep Learning algorithms (DL) suffer from limited reliability and a guaranteed probability of failure, which is significant and not small. They are massively heuristic and their behaviour is based on a plethora of non-linearities (one per neuron) that simply prevent their collapse into a simple linear matrix. They are opaque because, unlike traditional programs with formal and verifiable code, the parameters of neural networks are beyond any explanation. DL networks are black boxes with decision processes that are not well understood and the results cannot be explained, which raises doubts about their reliability and possible biases. In addition, they require large amounts of training data and are sensitive to the cultural bias of the data: learning the DL decision systems of the LAWS to distinguish between suspicious individuals and normal individuals is not transferable from one culture to another, for example. In short, deep learning (DL) algorithms are fragile, opaque and shallow (Potin, 2018).

The fact that deep learning algorithms (DL) **have a guaranteed probability of error** (which is significant and not small, as observed) makes them quite useful in some applications, but dangerous in other uses. Machine learning (ML) systems are useful in applications that tolerate errors (such as machine translation), provided they include post-supervision by human persons, as shown in the scheme in Figure 2. Even so, they can be problematic in applications that are highly sensitive to errors such as autonomous weapons.

As Figure 2 indicates, **systems with constructive autonomy** and based on Deep Learning techniques (ML, DL) can be useful in applications supporting a certain rate of errors if their protocols include a final phase of supervision by human users. Finally, these users will be the ones responsible for the results. This does not happen in **military systems with autonomy of use** (and in other civil systems that also promise the same type of autonomy of use, such as autonomous cars) because by definition they do not include any type of post-supervision and because their mistakes can become human victims.

Figure 2. Error tolerance and usability of deep learning algorithms

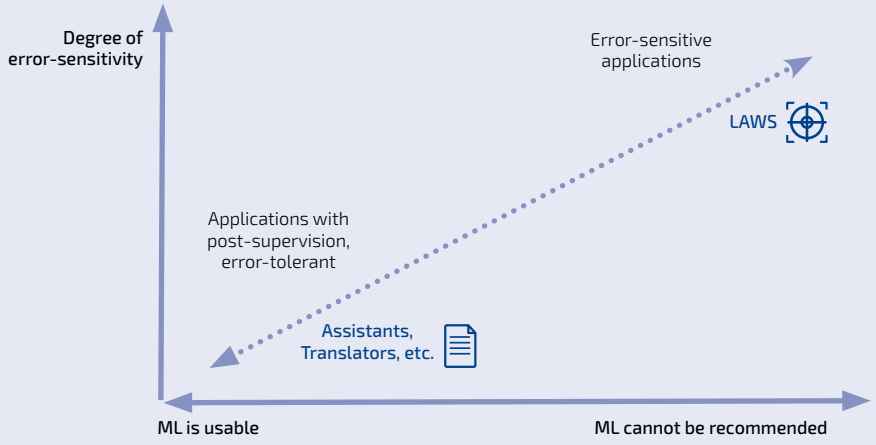


Figure 3. The five tasks that combat drones can perform

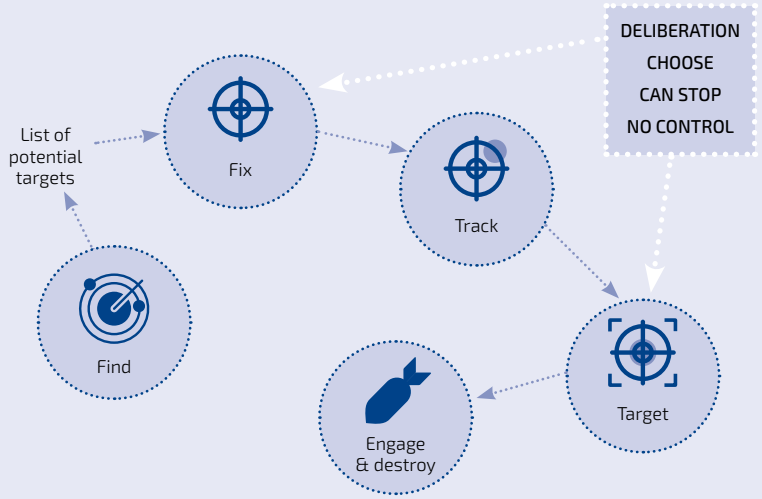


Figure 3 shows the 5 typical tasks that can be carried out by combat drones: search (find), objective definition (fix), objective tracking, attack decision (target) and attack involving destruction (engage).[12]

The goal of the search task ("find") is to have a list of potential objectives. Loitering drones, recognition drones and drone swarms, are specially prepared to carry out this task. The definition of the objective ("fix", according to the "Kill Chain" terminology) selects a single objective, which is the one to attack. Then, the objective tracking ("track") task aims at following the objective by keeping it located while it moves. Next, the attack decision ("target") task is performed, followed by the attack itself ("engage" or "destroy"). Of all these tasks, those that can be critical and that, in classical military systems, remain in charge of the military operators, are those of "fix" and "target". As we will see next, **military systems with autonomy of use** are characterized by not having any kind of human intervention in these two tasks.

The so-called "Loop model" or circuit model (Burt, 2018), (Boulanin, 2017) is based on the degree of human supervision that exists when selecting and attacking targets. Under this model, armed military systems can be grouped into one of the following three categories:

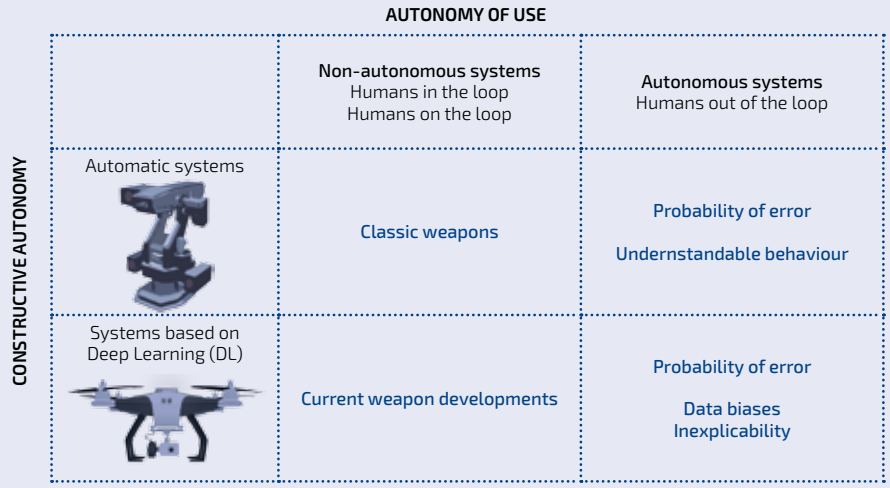
- In the circuit ("**In-the-Loop**"): These weapon systems require human intervention in tasks related to target selection and attack decisions. The decisions can be single-person or the result of deliberation in certain committees, and may include choosing between certain options given by machines (figure 3) but are always made by people.
- On the circuit ("**On-the-Loop**"): These are weapon systems that can select targets and decide attacks on their own, but that always ask for an "Ok" from the operators. Attacks follow explicit commands issued by the people operating the system.
- Out of the circuit ("**Out-of-the-Loop**"): These are weapon systems that can select targets, decide attacks and attack (engage) targets autonomously, without any intervention or human interaction. In some cases (between On-the-Loop and Out-of-the-Loop systems, see Figure 3) the operator has still the option to stop the attack during a limited time, while in other cases he/she does not have this option (Figure 3).

Figure 4 shows the relationship between the two concepts of constructive autonomy and autonomy of use. We have automated systems, which when used with human control and without autonomy include a good part of today's combat systems. On the other hand, military systems and especially drones are evolving to use the capabilities (DL) of Deep Learning; anyway, in any case and in many cases, these systems are used with human control and without autonomy. The ethical problem appears when military systems cease to be operated by people and perform their tasks with autonomy of use. This is an aspect that will be extensively discussed in the next Sections.

Deep Learning systems (DL) with constructive autonomy are obscure and suffer from a clear lack of explainability, as already discussed. On the other hand, automated systems algorithms (heuristic or not) are explainable, so that in the case of errors or malfunction, experts can deduct what has happened. In this sense, **automated systems allow to define responsibilities and support accountability**. This is

12. The Kill Chain: Global Security (last access, 4-Sept-2019): https://www.globalsecurity.org/military/world/rok/kill-chain.htm

Figure 4. Relation between the concepts of constructive autonomy and autonomy of use



not possible, however, in Deep Learning systems with constructive autonomy.

Ethical aspects related to the different types of use according to the in-on-out model

Robots are tools and, as such, cannot be legally responsible for anything. Therefore, it is necessary to establish procedures for attributing responsibilities to what robots do, so that it is always possible to determine who is legally responsible for their actions (Boden, 2017). In addition, we must place the concept of human dignity as an insurmountable limit and red line (Palmerini, 2016). In fact, and to ensure accountability, some authors (Winfield, 2017) propose that robots and autonomous systems should be equipped with an "ethical black box" that would be the equivalent of flight data recorders of the airplanes, continuously recording the data and the internal state of the armed systems and drones. This ethical black box would be essential to discover why and how a particular military robot has caused victims and would facilitate the establishment of responsibilities.

There is currently an important ethical debate (Sharkey, 2014) about "**In-the-loop**" systems, in which the decision circuit requires a human person. Although some authors defend the opportunity of its use, authors such as Medea Benjamin (Benjamin, 2014) consider that when military operations are carried out through the filter of a distant video camera, the possibility of visual contact with the enemy disappears, whereby the perception of damage from the possible attack on people decreases. On the other hand, Markus Wagner (Wagner, 2014) explains that disconnection and distance create an environment in which it is easier to commit atrocities. And, in any case, as Philip Alston indicates, "the use of drones to kill selectively outside specific armed contexts will almost never be legal" (Alston, 2014). Likewise, Alex Leveringhaus (Leveringhaus, 2017) says that the intentional or involuntary use of distance to obscure responsibility in situations of armed conflict, indicates a deep lack of respect for the rights of people and by extension for the moral dignity of these people and individuals, since we all deserve the same equal consideration and respect. Even the Board of Innovation in Defence of the United States is developing a set of ethical principles to use Artificial Intelligence in wars.[13]

Regarding "**On-the-loop**" armed systems (such as Samsung's SGR A-1), Noel Sharkey (Sharkey, 2014) states that automation bias must be taken into account, and that this fact strongly lowers the ethical foundations of these systems. The automation bias, according to Sharkey, means that "operators are predisposed to accept computer recommendations without seeking any other information to confirm them. The added temporary pressure causes operators to fall into all the pitfalls of automatic reasoning: instead of thinking, they tend to believe and accept what the machine proposes; then, operators ignore ambiguity, suppress doubt, invent causes and intentions, focus on existing evidence and ignore absent evidence that they would have to look for". Automation bias is the human tendency to take for granted what machines propose to us. Even if the system has a red button to stop the robotic weapon, automation bias can many times influence operators, inducing them to follow the

13. Defense One: https://www.defenseone.com/technology/2019/01/pentagon-seeks-list-ethical-principles-using-ai-war/153940/?oref=d-river

actions proposed by robotic systems, without thinking and without pressing the button.

In any case, ethical concerns are much stronger in the case of "**Out-of-the-Loop**" systems, in this case with a high degree of consensus. There is a general agreement that there is a "red line" beyond which autonomy in weapons systems can no longer be acceptable (Kayser, 2018). The fundamental question is whether the military systems that work autonomously are capable of complying with the laws of war. According to Peter Burt (Burt, 2018), it is clear that the development and deployment of autonomous lethal drones would cause serious risks, such as the loss of humanity and compassion on the battlefield: "Leave the machines out of the belt" and give them the ability to kill "goes through an essential ethical and legal Rubicon." Autonomous lethal drones cannot make complex ethical decisions on dynamic battlefields, nor can they properly distinguish between soldiers and civilians, nor can they assess the degree of proportionality of an attack. Not to mention unpredictable behaviour, possible loss of control, "normal" accidents and potential misuse.

According to George Woodhams (Woodhams, 2018), human errors, reliability and security problems will continue to contribute to the fact that armed UAVs are used in ways not desired by their operators. In addition, some operators might use armed drones as an excuse to cover some of their incorrect actions, freeing themselves of responsibilities and attributing the problems to errors and the malfunction of drones. This is something that should also be considered in ethical analysis.

The 2019 PAX[14] Report on Artificial Intelligence and autonomous weapons states that European states would have to work with the objective of having a legally binding instrument that guarantees significant human control over the selection and attack of targets (and that, therefore, prevents systems with autonomy of use). Daan Kayser, author of this Report and expert on autonomous weapons, declareed that:[15] "Once these technologies have been developed, they will proliferate widely and will be available to a wide variety of actors, so that the initial military advantage that these systems [can give to the currently leading countries in this field] will be temporary and limited." It is also likely that all this will drive a new arms race, with the risk of threatening international peace and security. "A legally binding instrument would be in line with European Parliament resolutions and would be the most appropriate and effective way to prevent the negative consequences of LAWS," adds Kayser.

According to Tony Jenkins, Kent Shifferd and others in the 2018-2019 Report "World Beyond War" (Jenkins, 2018), the prohibition of armed drones by all nations and militarized groups would be a big step in the way to a new demilitarized security.

14. "Crunch Time" Report (2019), PAX: https://www.paxvoorvrede.nl/media/files/pax-rapport-crunch-time.pdf
15. PAX news on the Crunch Time Report (last access, 4-Sept-2019): https://www.paxforpeace.nl/stay-informed/news/new-pax-report-on-european-positions-on-autonomous-weapons

4. THE CURRENT SITUATION

The current situation is characterized by a strong international activity aimed at achieving the prohibition of autonomous weapons, while the main states investigating and producing this type of weapons oppose to their prohibition This is really worrying. The controversy is open and alive, as shown, for instance, by the debate between Mary Wareham (Stop Killer Robots), Paul Scharre (former Pentagon adviser) and others.[16] In this Chapter we will review the present situation (as of April 2019) of the United States, Israel, Russia, China, United Kingdom, Korea, the European Union and Spain regarding the development of military drones, some data on actions and damages to civilian populations, and the state of the current research in Artificial Intelligence (AI) with potential application to military drones. In the analysis of the situation of the different countries we will analyse both the official position of each country and data on their production of armed drones, which are shown in detail in Annex 1 Tables. We have added Spain to the list due to its specific interest, although its relevance at international level is smaller.

4.1 MAIN COUNTRIES AND DRONES

Out of the 215 information items shown in the Tables of Annex 1, 115 (53%) correspond to only four countries: the United States, Israel, Russia and China. These countries are, together with those of the European Union, the great designers and producers of military drones worldwide. In fact, if we add EU countries (including United Kingdom) to the previous four countries, we reach a total of 151 information items, 70% of the ones presented in the Tables of Annex 1. Military drones are manufactured in Europe, United States, Israel, Russia and China.

We see below the official position of some of these countries and some data on their activity in military drones. This data is based on the information available in the Tables of Annex 1.

United States of America

On November 2012, the US Department of Defence published the Directive 3000.09 to "assign responsibilities for the development and use of autonomous and semi-autonomous functions in weapons systems, including manned and unmanned platforms", and to create "guidelines designed to minimize the likelihood and consequences of possible failures in autonomous and

16. Future of Life Institute. Debate moderated by Ariel Conn (2018): https://futureoflife.org/2018/07/31/podcast-six-experts-explain-the-killer-robots-debate/?cn-reloaded=1

semi-autonomous weapons systems that could lead to unwanted commitments".[17] Internationally, the US position began to be profiled during the next year: in May 2013, at the United Nations Human Rights Council (UN), the United States highlighted its commitment to International Humanitarian Law with respect to any new weapon systems and recommended that the discussion should move from the UN Human Rights Council to a Forum focused on the International Humanitarian Law.[18] However, in the following years, the United States has progressively focused its position by declaring that, in the past, smart weapons have been shown to reduce the risk of harm to civilians and objects.[19] The paper[20] presented by the USA at the CCW meeting on March 2019, affirms that existing International Humanitarian Law already "provides a comprehensive framework to control the use of autonomy in armed systems," and that emerging technology could even "strengthen the implementation of the IHL (International Humanitarian Law), reducing, among others, the risk of civilian victims, reporting incidents with possible infractions, improving the ability to implement actions and generating information on weapons that have not exploited." In accordance with this position, which has been defined during the last few years, United States, together with Russia, stopped any possibility of agreement during the CCW meeting in Geneva in August 2019.

The tables in Annex 1 contain a wide variety of military drones and US armed drones, including the classic Predator and the MQ-9, but also others including the ScanEagle, the MQ-1 Gray Eagle, the RQ-4, the MQ-9B Sky Guardian and many others, along with loitering drones and drone swarms (Coyote from Raytheon, the AeroVironment Switchblade and those that are currently being developed within the framework of different military research projects). The United States is clearly the world leader in the design and manufacture of robotic military systems, military drones and armed drones.

Table 1 shows an extract of the US drones listed in Annex 1, showing seven drones and two major military projects (OFFSET and Remedy).

17. USA DoD Directive 3000.09: "Autonomy in Weapon Systems," 21 de November 2012: https://www.esd.whs.mil/portals/54/documents/dd/issuances/dodd/300009p.pdf
18. USA Statement at the UN Human Rights Council, Geneva, 29 May 2013. Available at: https://geneva.usmission.gov/2013/05/30/clustered-interactive-dialogue-extrajudicial/
19. USA Statement at the CCW Meeting, March 25, 2019. Available at: https://conf.unog.ch/digitalrecordings/index.html?guid=public/61.0500/E3373111-6687-440D-B02D-CEFB477A9AD6_10h06&position=7906
20. USA paper, presented at CCW, March 25, 2019. Available at: http://reachingcriticalwill.org/images/documents/Disarmament-fora/ccw/2019/gge/Documents/2019GGE.2-WP5.pdf

From large to small

MQ-9 Reaper ▲

Switchblade ▲►

Black Hornet ►

Table 1: USA: Drones & autonomous capabilities (summary)

Drone name	Dimensions	Flight	Countries	Loitering?	Swarm?	Autonomous capabilities
MQ-1 Predator	15	1200, 24, 217	US, IT, TR, ES, MA, AE	No	No	No
MQ-9 Reaper	20	1850, 14, 482	US, UK, IT, FR, IN, NL, ES, BE, DE...	No	No	No
ScanEagle	3,1	1200, 24, 148	US, UK, ES, 25 countries	No	No	May be
Switchblade	0,6	10, 0.16, 157	US	Yes	No	Yes
RQ-11B Raven	1,3	10, 1, 97	US, ES, SA, 30 countries	Yes	No	Possible
Coyote	1,5	130, 2, 130	?	Yes	Yes	Yes
Black Hornet	0,1	1.6, 0.33, 18	US, FR, UK, DE, AU, ES, NO, NL, IN	No	No	Possible
OFFSET Project	--	?	US	?	Yes	Highly possible
Dash-X Remedy Project	1 aprox	?	US	?	Yes	Highly possible

Dimensions: Wingspan, in meters, between the wing ends
Flight: Flight capability in Km, flight capability in hours, maximum speed in Km/h
Countries: that are using them. Country codes https://www.worldatlas.com/aatlas/ctycodes.htm
Loitering: Is it a loitering drone? – (remote control drones are not included in this category)
Swarm: Is it a drone swarm?
Autonomous capabilities: possibility of becoming an autonomous weapon in the future
Source: Annex 1, and webpages of the manufacturing companies.

The MQ-1 Predator drone, which is included for historical reasons, has become a weapon widely used by the US, similarly to the MQ-9 Reaper and the ScanEagle. Switchblade, RQ-11 Raven and Coyote are "loitering" and may end up incorporating autonomous functions, while the little Black Hornet can be a very good candidate to develop future swarms with autonomy. Two strategic projects in this field must be highlighted: the DARPA OFFSET project[21] and the Remedy project[22] from the US Navy. In the latter case, drones in the swarm are expected to engage cyber attacks against enemy radar systems (see Chapter 2).

The incorporation of autonomous decision systems to military drones in the USA is a priority. We can also cite the Valkyrie drone of Kratos Defense, which is low cost and long range, being used by the US Air Force. The present priority is to complement it with sensors, weapons and Artificial Intelligence systems so that it can learn along with the pilots to improve its knowledge, with the objective of being finally able to respond autonomously to threats.[23]

Israel

Israel manufactures weapons systems with semi-autonomous capabilities and has urged to keep "an open mind about the positive capabilities" of future fully autonomous weapons, with the argument that these new weapons could ensure better compliance with the Laws of War. At the CCW government expert meeting in March 2019, Israel continued to argue that it is premature to develop legally binding instruments. Israel considers that the limitation of the operation of autonomous systems in restricted areas or in certain periods of time, would be sufficient, already helping to comply with International Laws.[24]

According to the tables in Annex 1, the different arms companies in Israel manufacture and sell a good number of military drones, including the Harop, Heron, Harpy and Orbiter drone, as well as the SkyStriker and others. Table 2 presents an analysis of these drones based on the possibilities of becoming autonomous weapons:

This set of 8 Israeli military drones includes drones with large wingspan of more than 10 meters (Heron, Dominator) along with mini-drones between 2-3 meters wide (Harop, Harpy, Orbiter, BirdEye). Except in two cases where this information is not record-

21. DARPA: OFFSET Project to develop drone swarms: https://www.militaryaerospace.com/home/article/16707272/darpa-adds-two-companies-to-offset-swarm-reconnaissance-drone-research-project
22. Remedy Project, USA Navy: https://www.c4isrnet.com/electronic-warfare/2019/02/19/the-navy-plans-to-test-its-new-electronic-warfare-drones-this-fall/
23. Defence News: On the Kratos Valkyrie drone: https://www.defensenews.com/digital-show-dailies/paris-air-show/2019/06/17/us-air-force-looking-to-fast-track-cash-to-kratos-defense-for-additional-valkyrie-drones/
24. Israel Statement at the CCW Meeting on 25 March 1029. Available at: https://conf.unog.ch/digitalrecordings/index.html?guid=public/61.0500/70E5CC90-B100-4658-95BA-8E8C0D4D581E_15h14&position=3952 - also available at: https://conf.unog.ch/digitalrecordings/index.html?guid=public/61.0500/3FCEC61E-B001-432A-964F-123C6522D8B9_15h09&position=8080

Table 2: Israel: Drones & autonomous capabilities (summary)

Drone name	Dimensions	Flight	Countries	Loitering?	Swarm?	Autonomous capabilities
Harop	3	1000, 6, 416	DE, IN, IL, TR, AZ, SG	Yes	No	Yes. See (1)
Heron	16,6	350, 52, 207	More than 50	No	No	Possible
Harpy	2,1	500, ?, 185	IL, IN, TR, CN, KR	Yes	No	Yes
Hermes	6,1	300, 20, 176	IL, US, UK, MX, ZM, BR, CO, PH...	Remote Control	No	Not likely
SkyStriker	Aprox. 4	20, 2, 185	?	Yes	No	Yes
Orbiter	2,2 a 3	100, 3, 130	AZ, HR, FI, IE, IL, US, IK, ES, MX...	Yes	No	Yes
Dominator	13	?, 28, 350	IL, MX, TR, TH	No	No	No
Bird Eye 650	3	20, 4, 130	?	No	No	Not likely

Dimensions: Wingspan, in meters, between the wing ends
Flight: Flight capability in Km, flight capability in hours, maximum speed in Km/h
Countries: that are using them. Country codes https://www.worldatlas.com/aatlas/ctycodes.htm
Loitering: Is it a loitering drone? – (remote control drones are not included in this category)
Swarm: Is it a drone swarm?
Autonomous capabilities: possibility of becoming an autonomous weapon in the future
Source: Annex 1, and webpages of the manufacturing companies. (1) The Economist, "Autonomous weapons and the new laws of war": https://amp.economist.com/briefing/2019/01/19/autonomous-weapons-and-the-new-laws-of-war

ed, we observe that Israel exportsthese drones to a good number of countries. Four of them, half of those presented in the table, are loitering drones, with the possibility of evolving into autonomous armed drones (Harop, Harpy, Orbiter and SkyStriker). In fact, the Harop is one of the drones in service that can already detect possible targets and attack them without human intervention,[25] whereas the Orbiter can work either in an operator-controlled mode, or autonomously, by scanning the area until it detects and destroys stationary or moving targets.[26]

Russia

In 2017, Russia declared to the "Stop Killer Robots" campaign that it considered that lethal systems with autonomous weapons were a complex issue raising many issues, so that it wanted to fully understand the situation more before considering possible restrictions. Later, at the CCW meeting in November 2018, Russia stated that it considered that these discussions on fully autonomous weapons were a threat to scientific and technological progress, also considering that the negotiation towards a ban on these weapons was somewhat unfounded and counterproductive.[27] This is a position that has remained unchanged at the CCW meetings during 2019.

In Russia, several companies work together with research centres for the development of weapons systems with increasing autonomy in various functions. The next table, based on the information in Annex 1, includes six of the drones manufactured in Russia that are most likely to become autonomous in the near future. The Lantset by Zala Aero (of the Kalashnikov group), in its two versions Lantset-1 and Lantset-3, is a kamikaze loitering drone, small and light,[28] not too different from the KUB-BLA[29] drone, produced by companies of the same Zala Aero group. On the other hand, Korsar manufactures the reconnaissance drone Eleron-3, that can be used with remote control or in autonomous mode.[30] Besides this, Sukhoi S-70 drones[31] (also named Okhotnik-B) and the Karnivora drone,[32] can now "carry out missions in an autonomous mode" and will have full autonomous functions in the future, although manufacturers assure that their operation will be "on the loop" (see Chapter 3).

25. The Economist, January 2019, "Autonomous weapons and the new laws of war". Available at: https://www.economist.com/briefing/2019/01/19/autonomous-weapons-and-the-new-laws-of-war
26. The Jerusalem Post, February 2019: Israeli defence company Aeronautics seals $13m. drone deal with Azerbaijan. Available at: https://www.jpost.com/Israel-News/Israeli-defense-company-Aeronautics-seals-13m-drone-deal-with-Azerbaijan-580928
27. Russia Statement at the CCW Meeting on 22 November 2018: Human Rights Watch notes:
28. Drone Lantset from Zala Aero: https://www.janes.com/article/89559/army-2019-kalashnikov-shows-kamikaze-uas-for-first-time
29. Drone KUB-BLA from Zala Aero: https://russiabusinesstoday.com/manufacturing/russia-unveils-kamikaze-drone-at-uae-defense-exhibition/
30. Drone Eleron-3 from Korsar: https://www.armyrecognition.com/may_2018_global_defense_security_army_news_industry/eleron-3_and_upgraded_korsar_uavs_for_russian_army.html
31. Drone Okhotnik-B from Sukhoi: https://www.popularmechanics.com/military/aviation/a26027921/russia-autonomous-strike-drone-okhotnik/
32. Drone Karnivora: https://www.defenseworld.net/news/24165/Munitions_Tested_from_Russian_Small_Attack_Interceptor_Drone#.XX0Qg1Dgrow

Table 3: Russia: Drones & autonomous capabilities (summary)

Drone name	Dimensions	Flight	Countries	Loitering?	Swarm?	Autonomous capabilities
Lantset	2 aprox	?, 0.66, 110	?	Sí	No	Yes
KUB-BLA	3 aprox	?, 0.5, 129	?	Yes	No	Yes
Eleron-3	6.5	120, ?, 150	?	No	No	Yes
Orion-E	16 aprox	300, 24, 200	?	No	No	Possible
Okhotnik-B o Sukhoi S-70	20	6000, 12, 540	?	Armed Drone	No	Yes
Karnivora	5	?, 15, 150	?	Armed Drone	No	Yes

Dimensions: Wingspan, in meters, between the wing ends
Flight: Flight capability in Km, flight capability in hours, maximum speed in Km/h
Countries: that are using them. Country codes https://www.worldatlas.com/aatlas/ctycodes.htm
Loitering: Is it a loitering drone? – (remote control drones are not included in this category)
Swarm: Is it a drone swarm?
Autonomous capabilities: possibility of becoming an autonomous weapon in the future
Source: Annex 1, and webpages of the manufacturing companies.

Russia, and specifically its company Kronshtadt, is interested in exporting the drone Orion-E,[33] similar to the Predator XP and the Israeli Heron, but declares the intention to export them only in their unarmed reconnaissance version (instead, the USA, Israel and China are exporting combat versions of the Heron TP, Hermes 900 drones, Predator B, CH-5 and Wing Loong II to several countries in the Middle East, Africa and Central Asia). In any case, Kronshtadt may adopt the policy of these other countries with a new version of the drone (the Orion-2) in 2021.

All drones in Table 3 may end up having autonomous capabilities. In the case of Orion-E there is the possibility that this is the case; in other cases, the information published by the manufacturers (without giving details) suggests that they already have these capabilities.

China

In July 2017, the State Council of China published the New Generation Artificial Intelligence Development Plan (AIDP), which plans the development of AI in China until 2030. The AIDP states that the goal for China is to become the main global AI innovation Centre in 2030, contemplating civil and industrial applications but also those related to national security.[34]

At the CCW government expert meeting of August 2018, China defined fully autonomous weapons as those that can cause death without any control by people (they have no way for humans to stop their actions) and that they are equipped with Machine Learning systems (this definition includes the two concepts of constructive autonomy and use indicated in Chapter 2). China noted that any weapons system lacking one or more of these characteristics would not fall into the category of fully autonomous weapons.[35] China also emphasized the need for an international agreement on a common definition of fully autonomous weapons.

China's official stance on these autonomous weapons is unique: China is in favour of the prohibition of their use, while allowing research and their development. China participated in the CCW intergovernmental expert meeting of March 2019, where he reiterated doubts about whether fully autonomous weapons could comply with International Humanitarian Law, taking into account the need for human judgement to guarantee the principles of Proportionality and Accountability.[36]

China is working to develop weapons systems that allow a significant degree of autonomy. Table 4, based on the data from Annex 1, presents five of the drones/projects that may evolve in the future towards having autonomous decision-making capabilities. The BZK-005 (reconnaissance drones[37]), the Wing Loong II (classic combat drone, manufactured by Chengdu and exported to many countries), the Rainbow 4 (also called CH-4; manufactured and in many cases exported units have launched more than 400 missiles with an accuracy of 96%, according to the manufacturer[38]) and the AV500W, may possibly incorporate this type of autonomous functions. But one of the most signif-

33. Drone Orion-E from Kronshtadt: https://defense-update.com/20190403_orion-e.html
34. China: New Generation Artificial Intelligence Development Plan 2017 (AIDP). Available at: https://www.newamerica.org/cybersecurity-initiative/digichina/blog/full-translation-chinas-new-generation-artificial-intelligence-development-plan-2017/
35. China Statement at the CCW meetings on 27-28 August 2018: Human Rights Watch notes.
36. China Statement at the CCW meetings on 26 March 2019. Available at: https://conf.unog.ch/digitalrecordings/index.html?guid=public/61.0500/158251CC-F1AB-4612-922A-FD57F70B0CBE_10h06&position=2831
37. Drone BZK-005 from Harbin: https://desarrolloydefensa.blogspot.com/2019/01/uav-harbin-bzk-005-china.html
38. Drone Rainbow 4 (or CH-4): https://www.scmp.com/news/china/diplomacy-defence/article/2133818/chinese-rainbow-4-drones-use-foreign-powers-have-96pc

Table 4: China: Drones & autonomous capabilities (summary)

Drone name	Dimensions	Flight	Countries	Loitering?	Swarm?	Autonomous capabilities
BZK-005	10 aprox	?, 40, 180	CN	No	No	Possible
Wing Loong II	14	4000, 20, 280	CN, NG, EG, AE, ID, KZ, PK, SA, RS, UZ	No	No	Possible
Blowfish A2	1.5 aprox	?, ?, 130	Intention to export	No	No	Likely
Ziyan Swarm	Several types	Mix	CN	No	Yes	Yes
Rainbow 4	18	?, 40, 235	CN	No	No	Possible
AV500W	7	?, ?, 170	Europe, Africa, Middle East	No	No	Possible

Dimensions: Wingspan, in meters, between the wing ends
Flight: Flight capability in Km, flight capability in hours, maximum speed in Km/h
Countries: that are using them. Country codes https://www.worldatlas.com/aatlas/ctycodes.htm
Loitering: Is it a loitering drone? – (remote control drones are not included in this category)
Swarm: Is it a drone swarm?
Autonomous capabilities: possibility of becoming an autonomous weapon in the future
Source: Annex 1, and webpages of the manufacturing companies.

icant projects is the one from the Ziyan company for the development of drone swarms: its current intelligent attack technology already allows swarms of up to 10 drones to be created, with the peculiarity that they don't have to be all the same type. The swarm accepts and can combine different types of drones: some of them can be used to throw proximity mortar charges, while others can incorporate grenade launcher systems, or directly be Kamikaze drones. The swarm will decide how to find its route to the objectives it must destroy.

China is currently one of the most advanced countries in research aimed at developing autonomous swarms of armed military drones.

United Kingdom

The Parliament of the United Kingdom considered, in November 2014, that this issue of significant human control is an emerging concept that the United Kingdom has in mind and will work to define. Lord Astor of Hever added that, in military operations of the United Kingdom, every objective is evaluated by human persons and that weapons attack must have been authorized by humans; also indicating that, "except a very small number of cases, all objectives are also detected and, identified and located by human persons. The exception refers to a small number of defensive systems, such as the Phalanx. However, in these cases, what is required is a human authorizing the launch of the weapons".[39] This discussion shows the multiplicity of nuances in the autonomy concept, showing also the complexity of the British Parliament debates.

Then, at the CCW meeting in August 2018, the United Kingdom presented a working document on human control, which detailed examples of tasks at each stage of the development and use of weapons systems. In its Statement, the United Kingdom reiterated its opposition to a legally binding instrument, despite stating that it considers that the human element in the use of lethal force is the most important consideration in this debate on fully autonomous weapons. In the UK Statement, it was argued that there are already numerous national and international regulations to evaluate the use of weapons under the International Law.[40] And, At the CCW meeting in March 2019, the United Kingdom reiterated its opposition to the establishment of a legally binding instrument, stating that it would have no practical effect. The United Kingdom added that a direct participation of human operators in all actions carried out by military systems could be neither practical nor desired, indicating that, in order to guarantee compliance with International Law, it might be sufficient to "put some restrictions, such as the maximum attacks that the system can carry out without human supervision".[41]

It could be concluded that the United Kingdom tries to maintain a position "adequately ambiguous" from its opposition to the existence of binding legal instruments on the issue of autonomous lethal weapons.

39. Parliament speech, Lord Astor of Hever, 26 March 2013. Available at: https://www.publications.parliament.uk/pa/ld201213/ldhansrd/text/130326-0001.htm

40. United Kingdom Working Document: "Human Machine Touchpoints: The United Kingdom's perspective on human control over weapon development and targeting cycles", presented at the CCW Meeting, August 2018. Available at: http://reachingcriticalwill.org/images/documents/Disarmament-fora/ccw/2018/gge/documents/GGE.2-WP1.pdf - Notes on the UK position: taken by Human Rights Watch.

41. United Kingdom Statement at the CCW meetings, 26 March 2019. Available at: https://conf.unog.ch/digitalrecordings/index.html?guid=public/61.0500/3FCEC61E-B001-432A-964F-123C6522D8B9_15h09&position=412

Table 5: United Kingdom: Drones & autonomous capabilities (summary)

Drone name	Dimensions	Flight	Countries	Loitering?	Swarm?	Autonomous capabilities
Mantis	Long=19,8	?, 30, 560	UK	No	No	Probable
Taranis	10	?, ?, Supersonic	UK	No	No	Yes
Many drones	Project	Project	UK	No	Yes	Yes
Magma	Project	Project	UK	No	No	Possible
Maple	Project	Project	UK	No	Yes	Yes

Dimensions: Wingspan, in meters, between the wing ends
Flight: Flight capability in Km, flight capability in hours, maximum speed in Km/h
Countries: that are using them. Country codes https://www.worldatlas.com/aatlas/ctycodes.htm
Loitering: Is it a loitering drone? – (remote control drones are not included in this category)
Swarm: Is it a drone swarm?
Autonomous capabilities: possibility of becoming an autonomous weapon in the future
Source: Annex 1, and webpages of the manufacturing companies.

The United Kingdom is actively working on the development of autonomous weapons systems, and does not want to be left behind in the investigation into swarms of autonomous drones. In a speech in February 2019, then-UK Defence Minister Gavin Williamson announced that his government would create a squad to operate swarms of drones. Williamson said these swarms will be essential in the future to attack enemy air defences.[42]

The Mantis drone from BAE is designed to navigate autonomously, even in adverse weather conditions. Its automated functions allow base operators to focus on military tasks, and not on the vehicle control.[43] According to Burt (Burt, 2018: 36), Mantis incorporates a high level of autonomy. The Magma drone, also from BAE Systems, is innovative for its propulsion system based on its supersonic speed air expulsion,[44] whereas Taranis is a supersonic drone that can navigate within certain limits of constraints,[45] also including advanced capabilities for autonomous operation, and the ability to autonomously identify and attack targets (Burt, 2018: 37). The MAPLE project (led by the company QinetiQ and based on the previous STEEL project) aims at developing drone swarms for the English Navy. According to Stuart Hider, director of maritime programs at QinetiQ "MAPLE is a key project to unlock the enormous potential of unmanned vehicles and autonomous systems when safeguarding sovereign interests [of the United Kingdom]". Finally, the Many Drones Make Light Work project, led by Blue Bear Systems (with a consortium including Airbus and others), plans to develop swarms of autonomous low-cost drones, that must "bring a new paradigm to battlefield operations... this will allow the swarm to simultaneously perform complex missions against single or multiple targets in a highly effective way".[46] In short, the United Kingdom is working hard to progress in the development of autonomous drones and in particular, of drone swarms with autonomous capabilities.

The fossil fuel crisis and global warming are also opening new scenarios for military drones. According to a report in Sky News of September 2019,[47] Reaper drones of the United Kingdom Royal Air Forces could accompany British warships in their escort to British tankers in the Strait of Hormuz. In fact, the United Kingdom already has deployed Reaper drones in Kuwait for operations on Iraq and Syria.

Spain

Although Spain has repeatedly stated that human operators have to maintain significant human control over all weapons systems and that it has no intention of developing fully autonomous weapons, it has opposed the ban on entirely autonomous weapons. On the other hand, Spain believes that the states would have to move forward in the way of agreeing a political declaration or code of conduct on these totally autonomous weapons. At the meeting of government experts of the CCW Group of March 2019, Spain stated that weapons must remain under clear human control, but clarifying then that this significant human control is achieved when humans understand the way in which weapons will behave and when humans keep the opportunity to intervene.[48] The ambiguity of the

42. BBC News, Gavin Williamson speech (11 February 2019): https://www.bbc.com/news/uk-politics-47192232
43. Drone Mantis from BAE Systems: https://www.airforce-technology.com/projects/mantis-uav/
44. Drone Magma from BAE Systems: https://www.baesystems.com/en/article/magma-the-future-of-flight
45. Drone Taranis from BAE Systems: https://www.baesystems.com/en/product/taranis
46. "Many Drones Make Light Work" Project, statement from Ian Williams-Wynn: https://industryeurope.com/uk-mod-invests-2-5m-in-drone-swarm-tech/
47. Sky News, September 2019: https://news.sky.com/story/british-drones-could-be-deployed-to-the-gulf-amid-crisis-with-iran-11800345
48. Spain Statement at the CCW Meeting on 26 March 2019, Geneva. Available at: https://conf.unog.ch/digitalrecordings/index.html?guid=public/61.0500/158251CC-F1AB-4612-922A-FD57F70B0CBE_10h06&position=9205

Spanish position was evident in statements such as that "the decision to use lethal force would have to be taken by human beings", although "human-machine interaction in these cases could hinder the military effectiveness".[49] Spain said it currently does not have fully autonomous weapons, but did not guarantee if it would not develop these systems in the future.

Data in Annex 1 shows that Spain has or will have a good set of military drones of its own manufacture, with a Spanish industry that has companies such as Indra, Airbus, Thales, Marine Instruments and Alpha Unmanned Systems (see Annex 1), in addition of collaborations with some Universities like Seville. The Thales Fulmar drone has been exported to Malaysia and is being used in maritime surveillance,[50] whereas the Spanish General Directorate for the Acquisition of Weapons and Equipment (DGAM) has purchased the Mantra drone from Indra for recognition,[51] and the Spanish Army has purchased two Alpha 800 armed drones[52] (Annex 1). The projects of the Spanish Defence ministry with Airbus include an Atlantis armed drone for Colombia and the production of drone swarm systems.[53] The autonomous swarm produced by this project will be able to be launched from several aerial platforms or from the ground, according to Jesús Martín, leader of the project at Airbus Defence & Space. Spanish DGAM argues that USA and China already have these disruptive drone systems (USA has shown drone swarms with 103 drones, and China has presented a 119 drones swarm), concluding that Spain does not want to be left behind.

Rest of Europe

The official position of countries of the rest of Europe is ambiguous. Although the European Defence Fund proposal prohibits financing the development of lethal autonomous weapons without the possibility of human control from 2021 on, there are two important planned projects on the development of these autonomous weapons: the combat drone project nEUROn[54] (a significant international cooperation, led by Dassault Aviation and with the participation of France, Greece, Italy, Spain, Sweden and Switzerland), and the Barracuda EADS,[55] project, which involves Germany and Spain. It will be necessary to check if the pressure of the companies and of some States is able to change the current European position regarding the development of autonomous lethal systems.

The Position of the Corporations

A PAX 2019 Report[56] classifies a total of 50 international companies according to three criteria related to robotic military systems and their autonomy, and it does so based on their answers to a survey that the authors sent to all of them: 1) if they are developing technologies that they may end up being relevant for new lethal autonomous weapons, 2) if they work on military projects related to these weapons, and 3) if they have made a commitment to refrain from contributing in the future. The result has been that, of the 50 companies surveyed, 7 can be said to develop "good practices", 22 are "moderately worrying" companies and 21 can be classified as "very worrying".[57] In addition, many technological companies, and especially those working on military contracts, do not have any public protocol guaranteeing that they do not contribute to lethal autonomous weapons. Google is among the "good practices " companies, after its refusal to continue the Maven project (see chapter 6). But among the companies of the most worrying group we have Amazon, Microsoft, Anduril, Clarifai and Palantir (all from the US) and AerialX (Canada). According to the PAX report already cited, "both Amazon and Microsoft are currently bidding [August 2019] to get the $ 10 billion Pentagon JEDI contract that will produce a cloud infrastructure for soldiers on the ground. The JEDI project manager explained that this program is really about increasing the lethality of our department." [Jeffrey] Bezos, the head of Amazon, has criticized that some technology companies turn their backs on US Defence projects. And [Satya] Nadella, CEO of Microsoft, has also defended her policy on military contracts. It is not clear where they put the red line, these two companies, regarding the military application of their new technologies. [On the other hand,] Palantir, an AI company, has its roots in the CIA's In-Q-Tel venture capital organization, and obtained a $ 800 million contract from the United States Army to build and deploy an Artificial Intelligence system "that will help soldiers to analyse combat zones in real time." Palantir did not answer the PAX survey.

49. Spain Statement at the CCW Meeting on 26 March 2019, Geneva (2). Available at:: https://conf.unog.ch/digitalrecordings/index.html?guid=public/61.0500/3FCEC61E-B001-432A-964F-123C6522D8B9_15h09&position=5693
50. Malaysia uses the Spanish drone Fulmar for maritime surveillance: https://www.shephardmedia.com/news/uv-online/mmea-selects-thales-uav/
51. Spanish DGAM is buying the Indra Mantis drone: http://www.infodron.es/id/2019/02/20/noticia-compra-mantis-indra.html
52. Spain is buying Alpha 800 drones to the Madrid company Alpha Unmanned Systems: https://www.rpas-drones.com/alpha-800-helicoptero/
53. Spanish DGAM is buying a drone swarm to Airbus: http://www.infodron.es/id/2019/01/03/noticia-compra-enjambre-drones-airbus-espana.html?utm_source=newsletter&utm_medium=email&utm_campaign=infodron
54. Drone Project nEUROn, leaded by Dassault: https://www.dassault-aviation.com/en/defense/neuron/introduction/
55. Barracuda Project, EADS: https://www.army-technology.com/projects/barracuda-demonstrator-uav/
56. PAX Report (2019): "Major Tech Companies may be putting world at risk from Killer Robots": https://www.paxforpeace.nl/newsroom/major-tech-companies-may-be-putting-world-at-risk-from-killer-robots
57. PAX Report (2019): "Major Tech Companies may be putting world at risk from Killer Robots" - Criteria and information on the surveyed companies: https://www.paxforpeace.nl/media/files/highlights---dont-be-evil.pdf

As Medea Benjamin says (Benjamin, 2013: 37), there is a USA industrial sector that has not been affected by the crisis: it is the sector of companies that manufacture high-tech instruments that are used in modern wars. They are the products that have created the last major exporting business in the United States. And, regarding drones, Medea Benjamin says that the military-industrial complex is booming in this sector. Robotic military systems, and in particular drones, have managed to drastically reduce the cost of military operations[58] while increasing the turnover of the military industrial sector. It's an expanding market, in the words of Ashton B. Postman, from the US Department of Defence (Benjamin, 2013: 37). A fact that is only possible if there are companies that collaborate in advanced military projects and in particular in projects which aim to increase the autonomy of robotic military systems and drones. We need more companies that develop "good practices", and much less "very worrying" companies.

58. The Economist (September 2019): https://www.economist.com/science-and-technology/2019/09/07/artificial-intelligence-is-changing-every-aspect-of-war

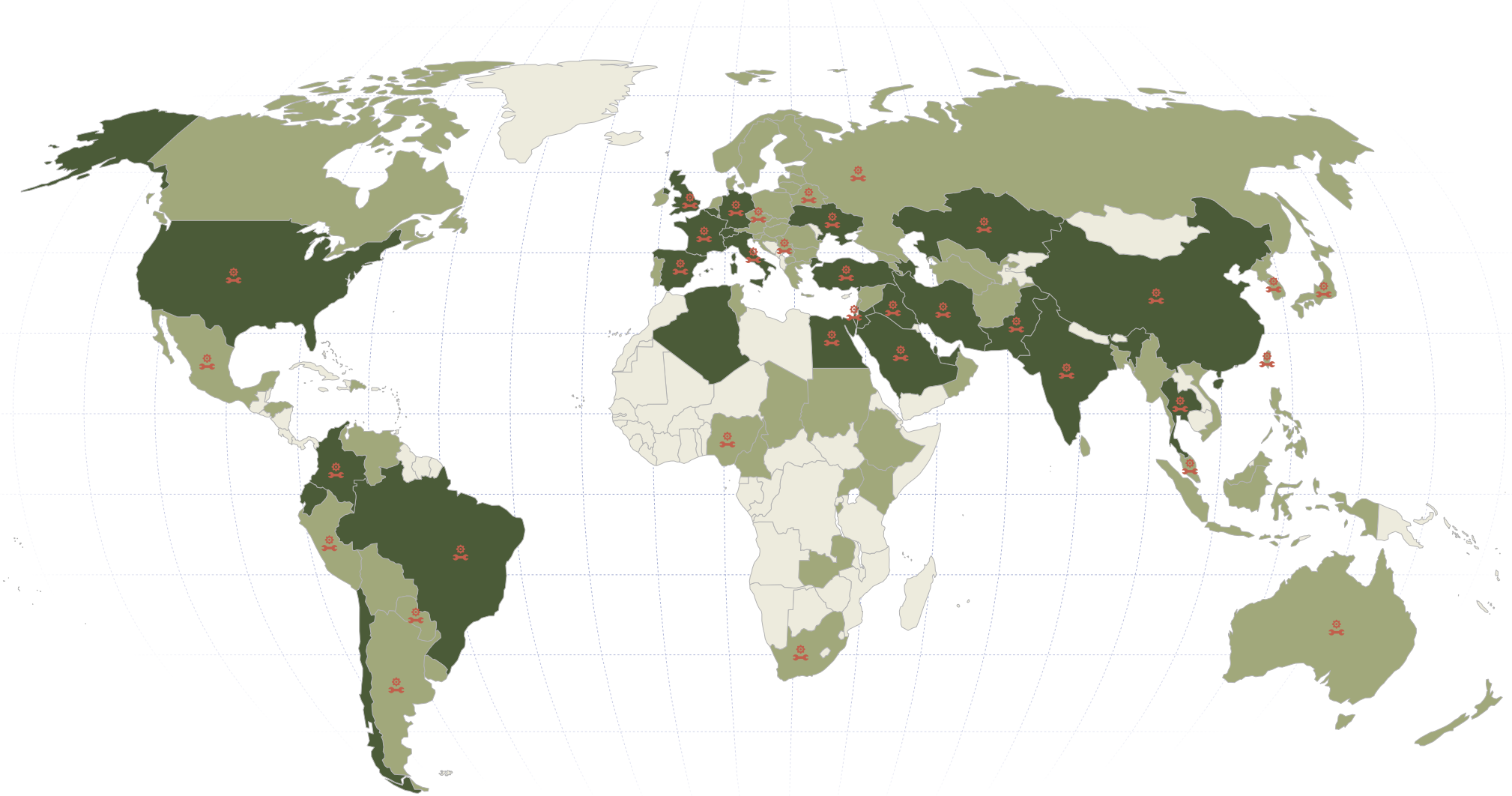
Military drones in the world: manufacturing and user countries. Development of loitering drones and drone swarms.

Map 1 shows the countries that manufacture armed military drones, together with the (documented) countries that have imported and deployed them. The data comes from the tables in Annex 1 and from the information collected in Rusi.org[59] in the case of Middle East countries.

Loitering drones and swarms of drones can easily incorporate autonomous decision systems, they are economical and within reach of a large number of countries[60] (they are even within reach of non-state organizations), and they may therefore change the geopolitical map of armed conflicts in the coming years. Map 2 shows the current status of manufacturing and user countries in the case of these two types of drones.

59. Rusi.org: Deployment of armed drones in Middle East: https://drones.rusi.org/countries/
60. David Hambling, Center for the Study of Existential Risk, University of Cambridge (June 2019). "*Drones, Swarming and the Future of Warfare*". Available at: https://www.cser.ac.uk/news/appg-future-generations-drones-swarming-and-future/

MAP 1. MANUFACTURER OF MILITARY DRONES AND IMPORTING COUNTRIES



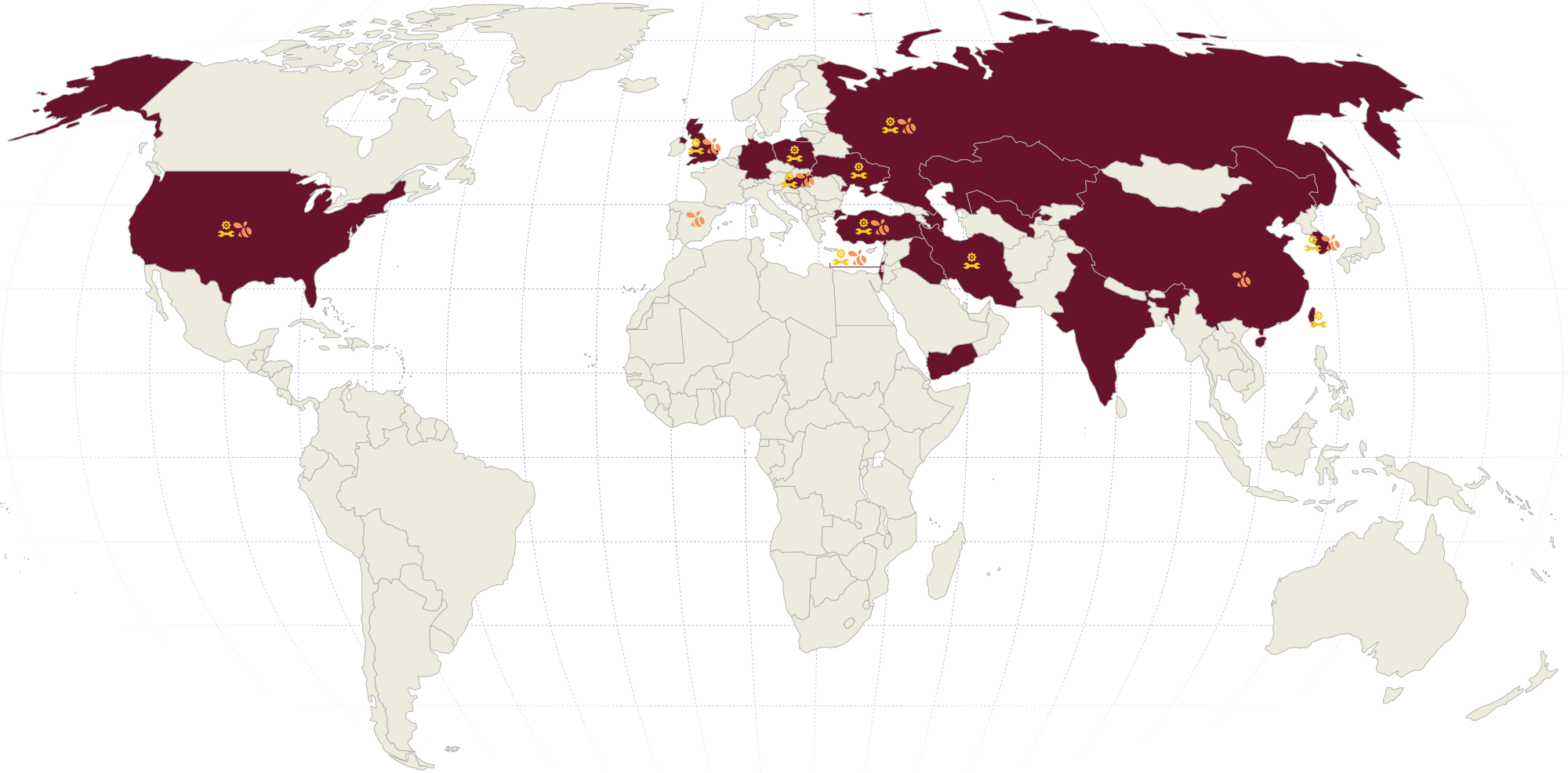
Manufacturer countries (or with development projects) of military drones

Countries that have light military drones and military drones of more than 600 Kg

Countries that have light military drones up to 600 Kg

Source: Annex 1 and Rusi.org, "Armed Drones in the Middle East": https://drones.rusi.org/countries/; Gettinger, Dan (2019) *The Drone Databook*, Center for the Study of the Drone at Bard College. Available in: https://dronecenter.bard.edu/files/2019/10/CSD-Drone-Databook-Web.pdf

MAP 2. COUNTRIES THAT HAVE LOITERING DRONES AND WHO DEVELOP DRONE SWARMS



Documented countries that manufacture (or are developing) the loitering drones

Countries that work in the development of drones swarms

Countries that use loitering drones

Source: Center for the Study of the drone of the University of Bard: https://dronecenter.bard.edu/files/2017/02/CSD-Loitering-Munitions.pdf; UKDJ: https://ukdefencejournal.org.uk/the-rise-of-the-drone-swarm/; The Drive: https://www.thedrive.com/the-war-zone/26467/u-k-s-sudden-move-to-field-a-drone-swarm-squadron-may-point-to-bigger-unmanned-developments; University of Cambridge, Center for the Study of Existential Risc: https://www.cser.ac.uk/news/appg-future-generations-drones-swarming-and-future/; Gettinger, Dan (2019) The Drone Databook, Center for the Study of the Drone at Bard College. Available in: https://dronecenter.bard.edu/files/2019/10/CSD-Drone-Databook-Web.pdf

4.2 ACTIONS ON CIVILIAN POPULATION

Attacks with armed drones often do not appear in the newspapers, but show a steady growth rate in recent years. In a report on 2017 (as of the closing date of this report, data on 2018 is not yet available), Arthur Holland Michel and Dan Gettinger (Holland, 2018: 5-6) analyse data on the number of USA drone attacks. The study compares the data according to two different sources (the "Long War Journal" (LWJ) and the "Bureau of Investigative Journalism", BIJ), considering the lack of transparency of governments in this area. In Somalia, according to LWJ, the number of attacks increased from 15 attacks in 2016 to 31 in 2017; according to BIJ, these values are 14 and 34. The agreement is quite good, with a step of 14 or 15 to more than 30 (in 2015 there had been 11). In Pakistan, according to LWJ the evolution was from 3 to 8, and according to BIJ, from 3 to 5. But the most alarming is Yemen, which according to LWJ went from 44 attacks in 2016 to more than 120 in 2017, and according to BIJ the evolution it went from 37 to 124. In addition, according to Nick Turse, Henrik Moltke and Alice Speri, the United States has made about 550 drone attacks in Libya since 2011.[61] It should be noted that the current policies of the US administration allow the military and the CIA to attack suspicious persons with drones, and even kill them, without the need for approval by any senior official (provided the targeted suspect does not have high responsibilities). In addition, President Trump has relaxed regulations for drone operations in Somalia against members of Al-Shabab, stating that certain parts of Somalia were "areas of active hostilities" (a designation that is traditionally used in war zones such as Afghanistan and Syria). The United States also carries out drone attacks at least in Niger, Libya, Afghanistan, Syria and Iraq, (Holland Michel, 2018: 5-6) with an undetermined number of civilian victims.

This increase in operations with armed drones ends up killing civilians, as explained by Amnesty International in its report on Somalia: five of the US attacks with drones in Somalia in 2017 and 2018 caused a total of 14 civilian deaths.[62] It is impossible, however, to produce an exhaustive list of attacks on civilians with drones, because of the opacity of governments, armies and security agencies. In any case, it is possible to find information on attacks to refugee camps[63] (with conflicting reports between Pakistan and the USA), on Israeli attacks with civilian victims in the Gaza Strip,[64] on USA drone attacks in Yemen resulting on a 33% of civilian victims,[65] and many others.[46]

In addition, drone attacks could also promote suicide terrorist attacks that would increase the number of civilian casualties the days after the drone attack. The authors of this study of the AOAV campaign[66] found that, in Pakistan, there were a slightly higher number of suicide attacks the days of drone attacks, but that the increase was more important about 3 days after the attacks. This increase is statistically significant enough to suggest that drone attacks may be encouraging terrorist acts that further increase the number of civilian casualties. Data is worrying, because between January 2011 and January 2019, for example, Pakistan has suffered 199 drone attacks and 182 suicide bombings.

Border surveillance systems are another type of systems that have been specifically designed to monitor (and if necessary, attack) civilians. As we have already mentioned, the two main countries that have developed armed systems for the control of land borders are Israel and South Korea. In particular, Israel was one of the first countries to reveal that it had "deployed fully automated robots and military vehicles with automatic driving" to patrol the border with the Gaza Strip "ruled by Palestine" (Slijper, 2019: 27). The Israeli-Palestinian conflict and the Israel occupation of the Palestinian territories have been at the centre of the new military developments of the state of Israel (Israel's military-industrial complex is at the same driving the conflict). Israel continues to develop and deploy border control systems such as the RoBattle, which combines an unmanned land vehicle with a fixed-wing drone, and moves autonomously between points of interest to perform various tasks including observation, detection, and attack.[67] In addition, RoBattle can send real-time videos on demand, also warning of possible irregularities to the command and control centre. On the other hand, the United States

61. Nick Turse, Henrik Moltke and Alice Speri (2018), The Intercept: https://theintercept.com/2018/06/20/libya-us-drone-strikes/
62. International Amnesty: The US hidden war in Somalia (2019). Available at: https://www.amnesty.org/download/Documents/AFR5299522019ENGLISH.PDF
63. Drone attack in Pakistan. The New York Times, 2017. Available at: https://www.nytimes.com/reuters/2017/11/30/world/asia/30reuters-pakistan-usadrone.html
64. Drone attack in the Gaza Strip. Times of Israel: Available at: https://www.timesofisrael.com/gaza-fire-kite-flyers-threaten-to-step-up-attacks-after-idf-injures-3/
65. A third of people killed with North American drones in Yemen in 2018 were civilians. The Associated. Available at: https://www.militarytimes.com/news/your-military/2018/11/14/hidden-toll-of-us-drone-strikes-in-yemen-nearly-a-third-of-deaths-are-civilians-not-al-qaida/
66. Saeed, Spagat i Overton. Drone strikes and suicide attacks in Pakistan. AOAV Report (2019). Available at: https://aoav.org.uk/wp-content/uploads/2019/03/Drone-strikes-and-Suicide-bombings-in-Pakistan-examined-1.pdf
67. The IAI Robattle drone: Times of Israel, June 2018. Available at: https://www.timesofisrael.com/iai-develops-ground-to-air-robot-system-for-border-surveillance/

plans to deploy drones on the South border,[68] and they are working on an underwater drone to protect coastal borders.[69]

In Europe, Frontex has a border surveillance plan with drones, and has already deployed Leonardo Falco EVO drones in Lampedusa, within a program of evaluation of possible alternatives.[70] On the other hand, and as Mark Akkerman (Akkerman, 2018) explains, in September 2018, Frontex announced the start of Israeli drone test flights in Italy, Greece and Portugal. The objective was to study whether Israel's Heron drones could be useful tools to detect and capture refugees. And, according to the manufacturer's website, the Heron drone has been "tested in combat." This is the way to say that it has been used during several attacks by Israel in Gaza. According to Mark Akkerman, Frontex has taken the first steps to develop "strategic" relations with Israel, and wants to increase this cooperation. One of the objectives is "mutual learning". It is likely to be a euphemism to exchange tactics about what needs to be done against people fleeing poverty or persecution (Akkerman, 2018). On the other hand, in June 2018, the EU published that the Israeli company Windward had been awarded a contract worth one million dollars to work on a "maritime analysis" project led by Frontex (Gabi Ashkenazi, former head of the Israel's military is an adviser to Windward, and David Petraeus, who commanded the US troops that occupied Iraq and Afghanistan, are some of its investors, according to Akkerman). The Israeli pressure is clear: Amnon Sofrin, a former senior member of Mossad, and representing the Israeli company Elta (a subsidiary of Israel Aerospace Industries) has argued that Europe would have to prioritize "security" over civil liberties (Akkerman, 2018). In addition to Frontex, and among many other examples, we can cite the deployment of border surveillance drones in Estonia[71] and in Honduras (this case, with Israel Skylark-3 drones from Elbit Systems[72]).

We must also take into account how easy it is for small countries, organizations of all kinds and even for people with minimal expertise, to manufacture new armed drones and to convert commercial drones into armed drones[73] that may end up attacking people not involved in conflicts. The USA Federal Aviation Administration (FAA) recently issued a warning to drone operators, warning them that it is illegal to equip drones with dangerous weapons that can cause death or serious injury. In the notice, the agency explains: "operating a drone with such ammunition can cause significant damage to people and also to the bank account of who is using it".[74] This surprising anecdote shows how easily drone proliferation can end up on indiscriminate attacks on people (the FAA warning is based on the fact that putting "dangerous weapons" on drones and blowing them, goes against the FAA Re-Authorization 2018 Act, which may lead to fines of up to $ 25,000). In the coming years, attacks on civilians may start from any kind of organizations and even from isolated people.

Military and "security" actions with robotic military systems and armed drones have radically changed the war scenarios, which have gone from concentrating on military and strategic objectives, to indiscriminate attacks that severely affect non involved civilian population. This raises new elements that will have to be deeply analysed from an ethical and legal perspective.

4.3 PRESENT AI RESEARCH WITH POTENTIAL APPLICATION TO MILITARY DRONES

At present, new weapons and armed drones cannot yet be defined as fully autonomous in the sense of autonomy of use, as indicated in Chapter 3. Some projects of the United States Defence Advanced Research Projects Agency (DARPA), for example, aim at developing drone swarms that can act with "limited human intervention".[75] But some countries are presently dedicating significant efforts to develop, during the next few years, armed combat systems with constructive autonomy and decision systems based on deep learning techniques.

In the United States, Artificial Intelligence research with potential application to military drones is a national priority. On July 2018, the U.S. government published the National Research Priorities. In this document, AI and autonomous systems are mentioned,

68. Deployment of surveillance drones at the United States Southern border by the National Guard. The Washington Post. Available at: https://www.washingtonpost.com/gdpr-consent/?destination=%2fworld%2fnational-security%2ftroops-sent-by-trump-to-border-will-fly-drones-gather-intel--and-clear-brush-too%2f2018%-2f04%2f09%2f8f608250-3c08-11e8-a7d1-e4efec6389f0_story.html%3f&utm_term=.4aad0fa45fd6
69. Project of the US Navy with Florida Atlantic University. Available at: https://www.newswise.com//articles/fau-awarded-1.25-million-by-u.s.-navy-for-research-in-support-of-unmanned-marine-vehicle-platforms
70. Frontex deploys Falco EVO drones in Lampedusa. Available at: https://www.unmannedsystemstechnology.com/2018/12/falco-evo-uas-deployed-under-eu-surveillance-research-programme/
71. Border surveillance drones in Estonia. Available at: https://news.err.ee/653720/border-guard-gets-surveillance-drones
72. Honduras buys Elbit Skylark-3 drones to Israel. Available at: http://www.infodron.es/id/2018/08/07/noticia-honduras-incorpora-drones-vigilar-fronteras.html
73. David Hambling, Center for the Study of Existential Risk, University of Cambridge (June 2019): "*Drones, Swarming and the Future of Warfare*". Available at: https://www.cser.ac.uk/news/appg-future-generations-drones-swarming-and-future/
74. Gizmodo.com (last access September 6, 2019): https://gizmodo.com/faa-warns-dont-you-dare-put-a-flamethrower-on-your-dro-1837591864
75. Paper at Defence One: https://www.defenseone.com/technology/2018/11/us-militarys-drone-swarm-strategy-just-passed-key-test/153007/?oref=DefenseOneTCO (last access, September 7, 2019)

both in general and in the military context: "Since adversaries take advantage of emerging technologies to threaten the nation, it is imperative that we invest in R&D to maintain the military superiority and keep the American people safe. This requires a prioritized investment in AI, autonomous systems, hypersonic vehicles, modernized nuclear systems, and advanced capabilities in microelectronics, computing and cybernetics".[76] Two months later, in September 2018, the Pentagon promised to make the largest investment in history in artificial intelligence (AI) systems for armed military systems, with a forecast of spending $ 2 billion over the next five years through the Advanced Defence Research Projects Agency (DARPA), to "develop the next generation of Artificial Intelligence technologies".[77] In fact, and as Justin Doubleday explains, DARPA will no longer invest in new platforms that do not have autonomous capabilities.[78] Some of the military projects related to Artificial Intelligence are developed in collaboration with Universities and research centres, such as MIT[79] and Carnegie Mellon.[80] And the U.S. Air Force Skyborg Program aims at deploying autonomous combat drones in 2023.[81]

One of the research priorities of the US Department of Defence focuses on mini-drones and autonomous drone swarms. DARPA's light autonomy research program has already completed its phase 2, and will now focus on increasing the computational capacity of drones.[82] Regarding autonomous drone swarms,[83] as already mentioned, DARPA is developing sophisticated combat swarms in its "OFFensive Swarm-Enabled Tactics"[84] Project, whereas the US Army is collaborating with several companies such as NextGen Federal Systems with the aim of designing and manufacturing Artificial Intelligence systems and machine learning for drone swarms.[85] The development of new drone swarms is something that will most likely change war scenarios.[86]

Drones and weapons manufactured by Israel have now an important degree of autonomy (Slijper, 2019: 27). We can cite the example of the loitering drone Harpy, which destroys the target while destroying itself. A 2014 IAI (Israel Aerospace Industries) video explains that Harpy works autonomously, detecting and destroying enemy radars. The same as the SkyStriker drone of Elbit Systems, which can "locate, detect and destroy targets designated by operators with a 5 kg ammunition installed inside its fuselage, with high precision" (Slijper, 2019: 27). On the other hand, the Chinese drone manufacturer DJI will integrate Artificial Intelligence processing systems from the Israeli company CEVA into its multi-engine drones Mavic 2.[87]

The PAX report (Slijper, 2019) includes detailed information on the recent development of Artificial Intelligence techniques in the framework of military projects in the United States and Israel, as well as in China, Russia, United Kingdom, France, Israel and South Korea. This PAX report is part of an initiative aimed at deterring the private sector from contributing to the development of autonomous lethal weapons, looking for synergies with the private sector to try to prevent autonomous lethal weapons from coming true.

In Europe, the European Defence Fund proposal prohibits financing the development of lethal autonomous weapons without the possibility of human control from 2021.[88] However, financing of the development of rapid alert systems and counter-measures with defensive objectives will be possible (Fortuny, 2019). On the other hand, the expression "rapid alert systems and counter-measures with defensive objectives" is so vague that it can include a wide variety of weapons. An unequivocal wording of prohibition would be necessary, regardless of the existence or

76. Executive Office of the US President: *"Memorandum for the Heads of Executive Departments and Agencies"*, 31 July 2018: https://www.whitehouse.gov/wp-content/uploads/2018/07/M-18-22.pdf, page 2. More information at: https://www.paxforpeace.nl/publications/all-publications/the-state-of-ai
77. DARPA: 'DARPA Announced $2 Billion Campaign to Develop Next Wave of AI Technologies', 7 Sept. 2018: https://www.darpa.mil/news-events/2018-09-07 - Also: DARPA - AI Next Campaign: https://www.darpa.mil/work-with-us/ai-next-campaign - And also, Zachary Fryer-Biggs, *"The Pentagon plans to spend $2 billion…"*: https://www.theverge.com/2018/9/8/17833160/pentagon-darpa-artificial-intelligence-ai-investment
78. Justin Doubleday, paper at Inside Defence, February 2019: https://insidedefense.com/daily-news/darpa-focused-platforms-significant-amount-autonomy
79. *"The U.S. Air Force is partnering with the Massachusetts Institute of Technology to launch a program to advance the study of artificial intelligence"*, May 2019: https://www.auvsi.org/industry-news/mit-us-air-force-launching-program-advance-artificial-intelligence
80. *"DoD is launching the US Army's Artificial Intelligence Task Force in collaboration with Carnegie Mellon University"*, February 2019: https://www.paxforpeace.nl/publications/all-publications/the-state-of-ai
81. The U.S. Air Force Research Laboratory issued a capability request for information on technologies for its Skyborg program, April 2019: https://www.flightglobal.com/news/articles/usaf-research-lab-looks-for-skyborg-prototype-drone-456953/ - Also, at the Valerie Insinna paper at C4ISRNET: https://www.c4isrnet.com/air/2019/03/14/introducing-skyborg-your-new-ai-wingman/
82. DARPA: Phase 2 of the programme on "*Light Autonomy*", August 2018: https://www.c4isrnet.com/unmanned/2018/07/30/darpas-fast-lightweight-autonomy-program-tests-the-scouting-software-of-tomorrows-wars/
83. Clayton Schuety and Lucas Will, paper at War on the Rocks, Sept. 2018: https://warontherocks.com/2018/09/an-air-force-way-of-swarm-using-wargaming-and-artificial-intelligence-to-train-drones/
84. Shepard Media: DARPA and drone swarms, October 2018: https://www.shephardmedia.com/news/uv-online/darpa-seeks-proposals-third-offset-swarm-sprint/
85. NextGen Federal Systems: contract for the development of AI systems for drone swarms, February 2019: https://www.wvnews.com/news/wvnews/morgantown-wv-company-awarded-army-contract-to-develop-swarming-drone/article_319bbd2a-97e5-517c-8b82-8822753bdfc2.html
86. Thomas McMullan, BBC News (March 2019). Available at: https://www.bbc.com/news/technology-47555588
87. Globes news: https://en.globes.co.il/en/article-dji-deploys-ceva-chips-in-camera-drones-1001277991
88. ENAAT, letter from the civil society to Euro Parliamentarians, September 2019: http://enaat.org/wp-content/uploads/2019/09/Letter-to-new-EP_EU-Peace-Project-under-Threat_02.09.2019.pdf

not of undetermined human control devices (Fortuny, 2019). Moreover, some projects, such as the European project Roborder,[89] investigate the use of AI techniques in the development of intelligent drone swarms for the land, sea, and air surveillance of European borders.[90] We can also cite the joint project of Airbus and Ansys, which aims at designing critical flight control systems for autonomous air combat systems.[91] But in fact, this is a debate still open in Europe, as evidenced by Federica Mogherini's speech in November 2018 at the annual conference of the European Defense Agency,[92] when she stated that the EU has to define the limits for the use of artificial intelligence in war, adding that "humans always have to maintain control of the use of lethal force." Even so, she later added that we must "favor innovation and have a strong industry because this is essential for the security of Europe [...] and this is also true in terms of AI because [...] we Europeans cannot afford to waste time and be less innovative than other world powers. It is a matter of economic growth and it is a matter of security", she stated.

Gregory Allen (Allen, 2019) gives some keys to understand the position of the main countries involved in this new war technology when he explains the contradictory discourses he found in China. On the one hand, the new development plan for Artificial Intelligence (AIDP) published in July 2017 by the State Council of China says, at the beginning: "Artificial intelligence (AI) has become a new focus of international competition. The AI is a strategic technology that will be a leading one in the future; the main world developed countries consider that the development of AI is an important strategy to improve national competitiveness and to protect national security". And in fact, China's leaders, including President Xi Jinping, believe that being ahead in AI technologies is critical to the future of their military and economic power. Also, Zeng Yi, senior executive of the third largest defence company in China, at the Xiangshan Forum on October 24, 2018, predicted that lethal autonomous weapons would be common in 2025, and said: "In the future battlefields, there will be no people fighting [...] the military use of AI is increasingly inevitable. We are sure that this will be the future". However, and at the same time, Fu Ying, vice president of the Committee on Foreign Affairs of the National People's Congress, on July 15, 2018 stated that there is agreement between Chinese technologists and policy makers about the threat that this new technology [AI] can pose to humanity, adding: "We must cooperate to prevent its threat". Also, the White Paper on Security and Artificial Intelligence", published in September 2018 by the Chinese Academy of Information and Communication Technologies (CAICT, an influential think tank of the Chinese government), appealed to the Chinese government to "avoid the Artificial Intelligence arms race between countries." Gregory Allen (Allen, 2019) also discloses the opinion of some Chinese military, who think that these AI techniques in robotic military systems can "lower the thresholds of military actions", because States, given the lack of death risk, might be more inclined to attack each other with military systems including AI algorithms. Chinese officials also expressed concern that these systems could make misperceptions and incorrect decisions, making the involuntary escalation of conflicts more likely, given the lack of defined rules on their use. In a nutshell: we find positions in favour of LAWS systems that are primarily based on competitiveness (if others do, we have to do it, not to be left behind). And these positions can lead to situations where erroneous decisions are made, with "collateral" deaths resulting from them, together with an increase of the number of military actions and the undesired escalation of conflicts.

The situation is highly worrying, due to the fact that these AI-based decision systems (Chapter 3) have limited reliability, with a guaranteed probability of error that is also significant and not small. Unlike traditional programs with formal and verifiable code, the parameters of these neural networks are beyond any explicability, which raises serious doubts about their reliability, possible biases, and the possibility of accountability. And in fact, Artificial Intelligence will make it easier to think about war in the abstract, therefore being harder to stop wars, as Allegra Harpootlian and Emily Manna say.[93] Also, it is important to keep in mind that errors of the autonomous weapons algorithms will translate into human lives. And errors and mistakes will continue existing, as Will Knight and Karen Hao show in their paper in the MIT technology review Journal.[94] There are a large number of ethical considerations about the reliability of military AI systems (Chapter 3) and about their compliance with principles such as precaution, responsibility, discrimination and proportionality (Chapter 7).

89. EU Roborder Project: https://roborder.eu/
90. The Intercept: drones for European border surveillance: https://theintercept.com/2019/05/11/drones-artificial-intelligence-europe-roborder/
91. Project on Autonomous Drones, Airbus & Ansys: http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDYvMjAvbm90aWNpYS1haXJidXMtYW5zeXMtYWxpYW4tZGVzYXJyb2xsYXItY29tYmF0ZS5odG1sfDF8MXwyODkyfDEyNQ==
92. Speech of Federica Mogherini (November 2018) at the Annual Conference of the European Defence Agency: https://www.defensenews.com/global/europe/2018/11/30/eu-members-seek-common-ground-on-autonomous-weapons
93. Allegra Harpootlian and Emily Manna, paper at Tom Dispatch, May 2019: https://www.thenation.com/article/tom-dispatch-american-warfare-drones-military-tech-robot/
94. Will Knight and Karen Hao (2019): *"Never mind killer robots: here are six real AI dangers to watch out for in 2019"*. MIT Technological Review 2019: https://www.technologyreview.com/s/612689/never-mind-killer-robotshere-are-six-real-ai-dangers-to-watch-out-for-in-2019/

The UN Secretary General, António Guterres, supported this perspective in the commemorative events of the 100th anniversary of the end of the First World War, in November 2018 in Paris:[95] "The use of Artificial Intelligence to make new weapons is a serious danger. And the prospect of having machines that have the capacity, by themselves, to select and destroy targets, creates enormous difficulties to avoid escalation in conflicts and to ensure that, in the battlefields, International Humanitarian Law and Human Rights Law are respected. To me, there is a very clear message: machines that can have the power and the ability to kill people are politically unacceptable, morally repugnant, and should be prohibited by international law.".

95. UN Secretary General António Guterres speech (Paris, November 2018). Available at: https://www.un.org/press/en/2018/sgsm19332.doc.htm

5. PROLIFERATION, EMERGENT COUNTRIES, AND DUAL USE

5.1 DUAL USE, PROLIFERATION AND EMERGING PRODUCER COUNTRIES: THE CASES OF TURKEY AND IRAN

Drones may differ according to their physical and technical characteristics; size, weight, type of remote control, propulsion, power, speed, fuel type, automation degree, and so on. A very common binary categorization is according to the final use for which they have been designed, i.e. civil or military application. Civilian applications are diverse, such as photography, monitoring, transportation, and can be useful for numerous economic sectors -agriculture, telecommunications, entertainment, research, etc.- or for multiple civil issues that governments deal with, such as for example, environmental care or rescue operations. Military applications include information gathering, reconnaissance, surveillance or identification. And of course, to these functions the use of drones as weapons is added, a transformation as simple as incorporating armament into the vehicle and coordinating it with the remote control system.

The use of drones is very diverse, only limited by the creative capacity of the human mind, but the fact that the vehicle *per se* can include almost any complement -including weaponry- as long as the physical and technical characteristics allow it, makes the line between civil and military application very blurry. In other words, the transformation of a civil drone into a military drone is completely feasible, even in the case of armed drones. This inherent feature of drones, known as dual use, is endemic to military technologies in general. The vast majority of weapons and military vehicles make use of components, know-how and production capabilities identical to those used in civilian products (Schulzke, 2018: 3). The dual use of drones complicates a regulatory framework that limits their proliferation, and therefore facilitates the latter.

The manner in which dual use makes regulation complicated is as follows. Dual use affects the final product - the finished drone -, its components, and the integrated software. Any effort or investment in research and development in components, software and drones for civilian use will inevitably benefit their military usage and conversion. The development of drone technologies in the civilian sphere is clearly beneficial, and therefore limiting their production with the argument that they can serve military objectives is counterproductive. The focus, then, makes more sense to be placed on limiting and containing the ef-

fects that the incorporated weaponry can produce. Nevertheless, the Arms Trade Treaty adopted by the United Nations General Assembly in 2013, and in force since the end of 2014, in article 5.3, which contemplates the categories of arms by the United Nations to which the treaty applies, implicitly includes drones, since they may very well be part of the category 'combat aircraft' (Stohl & Dick, 2018).

There are other mechanisms for the regulation and control of drones such as the Wassenaar Arrengement, by which 41 countries agree to export controls on conventional arms, dual-use items and related technologies to prevent them from falling into the hands of non-state armed groups or states that may commit human rights violations (Zwijnenburg & Postma, 2018: 37).

Another aspect that activists, organizations and legislators are already anticipating is the development of automated armed drones; an example is the Stop Killer Robots campaign, which seeks to ban fully autonomous armed drones. Again, research and development in the automation of civilian drones will also make it possible for military drones, a fact that raises concerns and moral questions.

The proliferation of armed drones is occurring because of the advantages they offer in the military sphere. They are the same advantages for which former US President Barack Obama prioritised and consolidated their use in the 'war on terror' led by the United States of America. Some of the points that make drones attractive to governments are the absence of risk to the pilot, the much more effective alternative to physically deploying troops on the ground - in political terms -, the low cost of production, and their ability to stay for long durations or in a suitable area - increasing the chances of capturing much more information - and the effectiveness when combined with sensor technologies and 'precision' weapon systems (Zenko & Kreps, 2014:10; Zwijnenburg & Postma, 2018: 48 Stohl & Dick, 2018: 1).

Initially, the leading producing and exporting countries were the United States, Israel and China. Yet a good part of the proliferation of drones has come from 'second wave' countries that have acquired them from China (Weinberger, 2018). In addition, emerging countries have joined with their own production of armed military drones such as Turkey, Iran, India, Pakistan and Taiwan. In this chapter we will deal in more detail with the cases of Turkey and Iran, since they are two countries that have decidedly bet to boost a domestic production of drones. The easy access and convertibility into armed drones has also attracted non-state armed groups that have used small improvised drones to carry out observation tasks or commit

Table 6. Emerging countries in the development of armed drones, excluding the various European countries, Turkey and Iran

Country	Year	Drone
Australia	2017	Boeing prototype
Belarus	2018	Yastreb and Burevestnik-MB
Georgia	2015	Unmanned helicopter from the research center 'Delta'
India	2016	Rustom II
North Korea	2012	Modified Chinese and North American drones. Development of the Banghyun 5
Pakistan	2013	Burraq and Shahpar
Saudi Arabia	2017	Agreement to set up a Chinese Caihong drones production plant.
South Africa	2010	Denel Dynamics drones
South Korea	2015	Official announcement for the development of domestic drones for Korean Aerospace Industries
Taiwan	2013	MALE prototype of long duration developed by the public ASRD
U.A.E.	2002	United 40 block 5
Ukraine	2016	AN-BK-1 Horlytsia and Yatagan-2
United Kingdom	2005	Taranis UCAV

Source: New America (2019)

violent attacks, such as Hizbullah or the self-proclaimed Islamic State.[96]

In short, Washington's efforts, which have been and persist, to limit the proliferation of armed drones have failed. The world is in a new global race to acquire and develop drone technologies. In addition, the United States of America has created a precedent of impunity with hundreds of civilian deaths - and summary executions of terrorists in search and arrest - that will not stop other countries from continuing with the same dynamic.

5.2 TURKEY, AMBITION AND SUCCESS

As journalist Umar Farooq writes in an article in The Intercept (2019), << If Turkey's killer drone program can be said to have a godfather, his name is Selçuk Bayraktar>>. Bayraktar is the son-in-law of Turkish President Erdogan, the husband of one of his daughters. The Bayraktar drones of Baykar Makina, a subsidiary of the Bayraktar group of companies, have enjoyed the full support of the government thanks to Selçuk's privileged relationship with the Turkish political elite.

The unstable relations between Erdogan's Turkey and its Western NATO partners, especially the United States, have led to the country's firm commitment to producing its own drones, thus breaking with Western dependence on the acquisition and use of this highly prized weaponry. All this is in line with the boost that the domestic military industry in Turkey has experienced in recent years, with a growth in sales of approximately 1,000 million dollars or 22% in the period 2012-2016, reaching the figure of almost 6,000 million dollars (SASAD, 2016).

The Bayraktar Group has its origins in the 1950s, with the production and sale of automotive parts as its core business. With the passing of time it would grow acquiring the distribution rights of important car brands in Turkey or entering the real estate and tourism sectors. Selçuk Bayraktar, who studied electrical engineering at the prestigious MIT in Boston, was already standing out when in 2005 he presented his future project for the domestic production of armed drones to high-ranking officials. At that time Turkey already had its own drone development programme, run by the Turkish Aerospace Industries (TUSAŞ), publicly funded and the main Turkish military foundation. Turkey, however, continued to bet on the purchase of foreign drones. In fact, Turkey entered the first wave of drones through the purchase of 6 disarmed GNAT 750s drones from the US company General Atomics in 1996. The country's use of the first batch of drones was to monitor the movements of its No. 1 enemy, the Kurdish guerrilla PKK, with presence and significant activity in the border regions between Turkey, Iraq and Syria. After problems, mistrust and accusations of sabotage regarding a second round of unarmed drones, this time the Israeli Heron delivered in 2011 -but ordered five years earlier-, Turkey announced the implementation of domestic drones developed by the state-owned TUSAŞ, the Anka drones, but still without any integrated weapons system.

The last part of the chain, the development of an armed drone, would come from the hand of Bayraktar, who had already earned a name by making a place for himself among the upper echelons, winning contests for funding and through his displays. In 2015 he featured the drone TB2, the same year he married Sumeyye Erdogan, the president's youngest daughter. Since then, the TB2 has been part of the Turkish army's main combat aircraft fleet, with more than 80 units produced - and at least 46 in the hands of the various Turkish security forces - mainly to detect and eliminate PKK troops on internal territory and on the other side of the border with Iraq and Syria.

As for the technical characteristics of the TB2, which make it so valuable, it can fly up to an altitude of approximately 7 kilometres up to 24 hours -which qualifies it as a dron of 'long endurance' or long duration/resilience-, with a range of up to 150 kilometres from the remote control point, and with a capacity to carry an explosive charge of up to 54 kilos (Farooq, 2019). Equipped with missiles from the Turkish arms company Roketsan - at least 23 of the 46 in the hands of the Turkish security forces - they weigh less than 700 kg each. The flagship model of the drone subsidiary of the Bayraktar group has been so successful that in the last 24 months 6 were exported to Qatar and 12 to Ukraine (Daily Sabah, 2019), at a price of 5 million dollars per unit (Lapaiev, 2019). The success of the TB2 drones is part of the increase in exports of Turkish arms and weapons or 'defence products', 170% in the last 4 years (Defenceweb, 2019).

Apart from the TB2, the drone inventory of the Turkish armed forces is completed with the following models. The mini model, which can be launched by hand, also by Baykar Makina from the Bayraktar group, prior to the famous TB2, with reconnaissance and surveillance functions (Army Technology, 2019). The Kargu and Alpagu models, from the Turkish public arms company STM, are also very small, of short range and duration, for reconnaissance tasks, with the capacity to carry small loads of ammunition and with the option of carrying out 'suicide attacks' - the robot destroys itself - against light vehicles and people (STM, 2019).

96. See https://www.newamerica.org/in-depth/world-of-drones/5-non-state-actors-drone-capabilities/

The Anka, already mentioned, from the Turkish Aerospace Industries (TUSAŞ), with 8 in use by the Turkish army and 22 more commissioned (Daily Sabah 2, 2019), bigger and heavier (1 ton and a half) than the TB2 model, with up to 24 hours of flight -long duration- and 1,000 km of range, and with a capacity of 200 kg more cargo, mainly Roketsan missiles (RUSI, 2019). The same company has the Turna and Şimşek models for training activities of the armed forces.

In a lower position we find the Karayel model by the contractor Vestel, with capacities and characteristics similar to the TB2, without registered activity and still in testing phase (RUSI, 2019). Finally, one of the large companies of the Turkish industrial complex, ASELSAN, is developing an anti-drone system - the proliferation of drones is logically giving a boost to technologies and systems designed to detect and kill drones (Hurriyet Daily News, 2019).

Finally, in this section dedicated to Turkey, one of the most interesting and prepared new drone producers, we refer to the use that Turkish security forces and navy have made of these technologies. Turkey uses and has used its drones in the latest military operations in Syria against the Kurdish militias YPG -accused by Turkey of being the Syrian branch of the PKK- and against the self-proclaimed Islamic State. In the first months of 2018, when Turkey announced its Operation Olive Branch, which led to the occupation of the Kurdish enclave of Afrin with the support of Islamist Syrian armed groups, the TB2 Bayraktar drones played a key role. With 4,000 flight hours alone during this military aggression, they crippled the YPG's abilities to defend themselves and maintain control of this territory (Daily Sabah 3, 2018). A year earlier, in Operation Euphrates Shield, with which Turkey expelled the Islamic State from northern Syria, west of the Euphrates, but stopped the Kurdish territorial advance from east to west, these same drones had already been deployed (Ahval, 2018). But apart from Syria, Turkey has and continues to use them in northern Iraq - in the mountains of Qandil, where the PKK is based, or in Sinjar - also to kill important individuals in the highest ranks of the PKK,[97] and surprisingly in its own territory, specifically in the south-east, where the PKK has a presence and considerable popular support (War is Boring, 2018). Airwars (2019) estimates between 411 and 749 civilian casualties since July 2015 in Iraq and Syria caused by bombings by Turkish armed forces, where the number traceable to drones is unknown, despite the fact that many of the attacks carried out by manned combat aircraft may have had the prior support of unarmed reconnaissance and surveillance drones. Turkey acts with impunity, there is no internal control or transparency, and any criticism can constitute a crime even in obvious and flagrant cases with civilian deaths such as that of Mehmet Temel.[98]

Finally, Turkey also uses drones in the war in Libya in support of the coalition government brokered by the United Nations and against the opposing factions of General Haftar, who have succeeded in taking down at least four (Israel Defend, 2019).

5.3 IRAN, WILL AND PERSEVERANCE DESPITE SANCTIONS

The Iranian regime has also wanted to participate in the new arms race to acquire or produce drones. In this case, it has opted for the second option, due to the large international restrictions on its imports, but despite the sanctions scheme imposed on the country.

One of the keys to Iran's success has been reverse engineering, i.e. the copying of American and Israeli drones that it has been able to intercept. For example, from the RQ-170 Sentinel by the American Lockheed Martin or the Israeli Hermes-450 (Rob O'Gorman & Chris Abbott, 2013: 9).

The most important dron model is the Shahed-129, developed by Qods Aviation Industries, which is publicly owned. It was introduced in 2012 and is a drone of long duration - up to 24 h and 2,000 km in each use - and mid range from the remote control point, estimated at 150 km. Apart from reconnaissance and espionage activities, it can also be used for combat missions. The other model is the Mohajer 6, from the same armamentist, with similar characteristics. It is estimated that from the first model Iran has between 25 and 40, and from the second, between 5 and 10 (RUSI, 2019). These are accompanied by lower range series such as HESA's Ababil, with short and medium range models and also equipped with armament (Zwijnenburg & Postma, 2018: 21). The Karrar, also from the public HESA, is a long-lasting model prior to the Shahed-129 (Rob O'Gorman & Chris Abbott, 2013: 9).

Iran's armed and security forces use their drones mainly in border areas against armed rebel groups - in Balochistan and Iranian Kurdistan. However, it has also been proven, or Iran has admitted, its use in Syria

97. See http://www.hurriyetdailynews.com/turkey-neutralizes-most-wanted-pkk-suspect-in-northern-iraq-135849

98. Mehmet Temel was a Kurdish civilian from the Hakkari region who was killed by the bombing of a Turkish drone. At the time of the impact he was with relatives in a barbecue area, when a car with those believed as 4 PKK militiamen stopped by them to ask them questions. The criticism and subsequent questioning came even from the hand of the opposition party CHP unsuspicious of being 'terrorist'. Temel's relatives, wounded in the explosion, ended up in prison for collaborating with the PKK. See https://www.al-monitor.com/pulse/originals/2017/09/turkey-siha-uav.html

-against rebel armed groups and the Islamic State- or Iraq -especially against the Islamic State- where the Shiite regime has a key role in supporting the respective regimes (Gettinger, 2016). Finally, Iran has also been accused of providing drones both to Hizbullah - Lebanon's Shiite political-military group - and to the Huthi rebels in Yemen, against Israel and Saudi Arabia respectively, mainly for reconnaissance and espionage activities, but in the case of the Houthies to carry out attacks as well.

6. INTERNATIONAL EFFORT AGAINST AUTONOMOUS ARMAMENT

6.1 INTRODUCTION

Our society has been immersed for decades in a process of technological acceleration that has transformed our world in an irreversible way. The massive penetration of new technologies in our daily lives has acquired an exponential rhythm by eroding the institutional framework itself, generating a political and social emptiness (Beck, 1998) that has materialized in a systemic disengagement. Phenomena such as "fake news" or the emergence of the notion of post-truth (Sismondo, 2017) cannot be understood without the technological framework that has been used by means of an epistemological dissolution of the sources and the generation of a new consciousness which finds its roots in the deployment of information technologies.

We are thus, faced with a scenario where it is found that in the present time it is impossible to generate good, without generating evil, as pointed out by Jerome Ravetz and Silvio Funtowicz (Ravetz, 1971; Funtowicz and Ravetz, 2000). A moment in which the negative externalities associated with the productive and creative process have the ability to overcome the resilience of the system by pouring us into a chaotic leap of uncertain consequences (Ostreikovsky et al., 2018) due also to its own operational complexity of the current technological systems.

It is in this context where the development of artificial intelligence supposes a new horizon of possibilities, as we have already mentioned. With regard to our social, political and economic organization as well as to our own understanding, placing us in front of a new frontier that once again fills us with promises of bright future as other technological-industrial complexes have done previously (Rodríguez, 2016). This happened with the nuclear, when it promised us a safe, cheap and affordable source of energy, or when the transgenic industry in the 90s promised to end hunger in the world.

It is similar to these other technological sets, as throughout the last year, a series of meta-narratives have been developed aimed at underlining all the theoretical goodness's of the AI, without paying attention to the dark side of the same and the serious risks that it represents for civil and human rights. Risks that go beyond the own militarization of technology (Martinez-Quirante and Rodríguez-Alvarez, 2018) and that can be translated into a crystallization of inequality as pointed out by Cathy O'Neil in his work "Arms of

mathematical destruction "(O'Neil, 2017) due to problems such as the lack of neutrality, or its own heuristic processing.

We are, thus, faced with a technological revolution that is called to transform not only our world, but even our understanding of it, since as Culkin asserted us, we shape our tools and they then shape us (McLuhan, 1972). And beyond the fictional story about the theoretical neutrality, efficiency and efficiency of AI, the underlying reality is that technology can only be understood as an amplifier of human will (ITU and XPRIZE, 2017), where its uses They can be creative, while destructive.

Thus, the main objective of this section is to frame the efforts that have been carried out during the last decade (2009-2019) to reduce the risks associated with the militarization of artificial intelligence, giving special importance to the notion of significant human control in the autonomous armament systems. A concept that needs to be emphasized not only has a specific application in the military areas but should be extended to autonomous civil processes that have the capacity to deeply affect human lives, such as the granting of credits, acceptance in universities or the selection of personnel. Areas that, at least, escape the objective of this work, but exemplified the impact that IA may have on our society, and by the crystallization of inequality (McQuillan, 2015; Noble, 2016) among other factors, as well as the importance of maintaining human control over any process that has high impact on the lives of people.

In addition, it should also be underlined that the movement we aim to describe against the emergence of autonomous weapon systems (LAWS) is linked to other struggles that have preceded us, such as the anti-nuclear movement, the anti-mine movement antipersonnel or against the dispersion bombs. Although now, for the first time, civil society has been able to organize itself before a complete proliferation of these systems, being able to say that it is structured as an eminently preventative movement thanks to the lessons drawn from other processes such as the nuclear non-proliferation treaty that was not able to achieve a complete ban on such weapons.

In this way, and before beginning to review the history of the fight against autonomous armament, we would like to remind you that in the spring of 1945, Leó Szilard[99] presented a report with his arguments against the use of the atomic bomb to James F. Byrnes, who at that time was about, to be appointed Secretary of State. Unfortunately for Szilard, Byrnes flatly refused to share the note with Truman. Although and despite his disapproval of Byrnes, Szilard was still convinced of his beliefs and worked to write a new petition with signatures of scientists and technicians from the Manhattan project. This time, however, General Groves insisted that the request be routed through the chain of command, only through the official channels.

Szilard said in his statement that the atomic bomb would have disastrous geopolitical consequences, he made a petition arguing that atomic attacks in Japan "could not be justified, at least until the details that were imposed were made public after the war in Japan and that Japan would give them the opportunity to surrender. " This demand was, in fact, more moderate than the original proposal of Szilard, that asked that it avoided at all costs the use of the bomb.[100]

So on that occasion, the voices of experts, scientists and academics who opposed the use of nuclear weapons were not heard, producing a paradigm shift in international relations that was condemned to a proliferation of 'a type of armament that threatened the survival of the species by means of the paradigm of mutual assured destruction and the subsequent' nuclear winter '.

Now, once again, we are facing the emergence of a type of armament that due to its own nature and the threat it poses to human control over the conflict will lead not only to a new arms race. However, it also has the potential to alter geopolitical balances by opening a new era of global instability that could once again lead to war. Due to factors such as the unpredictability of these new systems.

Understanding that its deployment could lead to, among others, accidental wars with a great potential for scalability, as well as other unintentional and dangerous consequences. Since it is not clear how autonomous armament systems designed and implemented by opposing forces can react and interact with each other, with this interaction between autonomous systems one of the major concerns and one of the biggest threats we are facing.

We must also remember the key importance of keeping human control over the life cycle of the weapon. Especially if we remember events of the past, such as the incident of September 25, 1983, when the warning network early known as Oko of the USSR warned

99. Leo Szilard was a physicist and Hungarian-American inventor who developed the idea of nuclear chain reaction in 1933. It was essential at the beginning of the Manhattan Project, writing the letter for the signing of Albert Einstein in 1939, encouraging the USA to start building the atomic bomb. He was also physicist at the Chicago Met Lab from 1942 until 1946.

100. In the Slizard biographers web page, Gene Dannen, offers numerous documentation about the positioning of Slizard on the use of nuclear weapons http://www.dannen.com/decision/index.html (09/22/2019)

of the launching of American missiles against Soviet territory, which demanded a counterattack from the established procedures. It was only the decision of a man, Stanislav Petrov (Infobae, 2018), who from his capacity for analysis (and humanity) described the fact as a false alarm, thus avoiding a nuclear conflict that could have had effects devastating for our species. If the system had been completely autonomous, perhaps the final scenario would have been completely different.

Thus, we could say that our responsibility, as a generation, is none other than safeguarding the planet of technologies that have the potential capacity to threaten the survival of the species, and to condemn once again to the horrors of the Wa. It was Albert Einstein who said: "I don't know with what weapons World War III will be fought, but World War IV will be fought with sticks and stones.[101]" These weapons may be autonomous if we do not do enough to prevent it. Being the current great challenge to maintain human control over the conflict, as well as human supervision over the whole life cycle of weapons.

6.2 HISTORIC OF THE FIGHT AGAINST THE MILITARIZATION OF THE IA

The militarization of Artificial Intelligence was shaped as a gradual process, based on specific uses of certain technologies that tried to improve the ability to recognize, collect information as well as its processing by the armies. It was not until the scholar it was began to observe the development of autonomous armament systems, that is, systems that have the ability to select targets and eliminate them without significant human control, when critical voices began to arise in front of what it was understood was a violation of international humanitarian law and the right of war contained in the Geneva Conventions, as well as an approach to ethics as well as to the uses and customs of civilized nations.

Thus, some of the first voices that emerged alerting to the risks involved in what was perceived as the beginning of a new arms race were members of the academy, which in 2009 shaped the ' ICRAC[102] (International Committee for Robot Arms Control) and in its first public statement affirmed:

> Given the rapid pace of development of military robotics and the pressing dangers that these pose to peace and international security and to civilians in war, we call upon the international community to urgently commence a discussion about an arms control regime to reduce the threat posed by these systems.
>
> We propose that this discussion should consider the following:
> - Their potential to lower the threshold of armed conict;
> - The prohibition of the development, deployment and use of armed autonomous unmanned systems; machines should not be allowed to make the decision to kill people;
> - Limitations on the range and weapons carried by "man in the loop" unmanned systems and on their deployment in postures threatening to other states;
> - A ban on arming unmanned systems with nuclear weapons;
> - The prohibition of the development, deployment and use of robot space weapons."[103]

A year later, in late October 2010, the so-called Berlin declaration, a key text, was developed, which laid the foundations for claims made by civil society ever since:

> Given the rapid pace of development of armed tele-operated and autonomous robotic systems, we call upon the international community to commence a discussion about the pressing dangers that these systems pose to peace and international security and to civilians, who continue to suffer most in armed conflict. Armed tele-operated and autonomous systems have the potential to accelerate the pace and tempo of warfare, to undermine existing arms controls and regulations, to exacerbate the dangers of asymmetric warfare, and to destabilize regional and global security. In particular, autonomous systems may further the indiscriminate and disproportionate use of force and obscure the moral and legal responsibility for war crimes.
>
> We believe:
> - That the long-term risks posed by the proliferation and further development of these weapon systems outweigh whatever short-term benefits they may appear to have.
> - That it is unacceptable for machines to control, determine, or decide upon the application of force or violence in conflict or war.* In all cases where such a decision must be made, at least one human being must be held personally responsible and legally accountable for the decision and its foreseeable consequences.
> - That the currently accelerating pace and tempo of warfare is further escalated by these systems and undermines the capacity of human beings to make responsible decisions during military operations.

101. Interview with Alfred Werner, Liberal Judaism 16 (April-May 1949), Einstein Archive 30-1104, as sourced in The New Quotable Einstein by Alice Calaprice (2005), p. 173
102. The ICRAC is a Non Governmental Organization (NGO). It is an international committee of experts in robotic technology, artificial intelligence, ethics, international relations, international security, arms control, international humanitarian law, and human rights, worried about the dangers that military robots suppose to Peace and international security as well as civilians during the war. https://www.icrac.net/about-icrac/ (08/20/2019)
103. Declaration of September 2009 in Sheffield, UK, by the founding members of ICRAC Juergen Altmann, Peter Asaro, Noel Sharkey and Rob Sparrow.

- That the asymmetry of forces that these systems make possible encourages states, and non-state actors, to pursue forms of warfare that reduce the security of citizens of possessing states.
- That the fact that a vehicle is uninhabited does not confer a right to violate the sovereignty of states.

There is, therefore, an urgent need to bring into existence an arms control regime to regulate the development, acquisition, deployment, and use of armed tele-operated and autonomous robotic weapons.

We hold that this regime should prohibit:
- Further development, acquisition, deployment, and use of armed autonomous robot weapons.
- Arming new kinds of autonomous or tele-operated systems with nuclear weapons.
- The development, deployment, and use of robotic space weapons.

We hold that this regime should restrict:
- The range and payload of armed tele-operated uninhabited vehicles.
- The number, by class and capability, of armed tele-operated uninhabited systems fielded by any state.
- The endurance of these systems.
- The development, acquisition, and deployment of weaponised uninhabited systems below a minimum size.

---

* The decisions to which this principle should be applied include:
- The decision to kill or use lethal force against a human being.
- The decision to use injurious or incapacitating force against a human being.
- The decision to initiate combat or violent engagement between military units.
- The decision to initiate war or warfare between states or against non-state actors.

It is understood that in the application of this principle, rigorous and specific definitions will need to be negotiated as terms of a global convention, and that certain exceptions may be made where the use of automation in weapons and security systems has long been customary, or where a compelling case may be made for the necessity of automation in order to protect human life from immediate threats.

However, the world community should categorically reject the claim that military necessity will require robots to be capable of autonomous decision-making in the use of violent force in order to defend themselves and to ensure their prevailing over opponents.

To the extent that this principle may, in the longer term, limit the effectiveness of armed robots in combat, particularly against each other, it is to be welcomed, as a concrete, equitable, verifiable and enforceable arms control measure, which may help to prevent the nightmare, so often foretold, of the loss of human control over the maintenance of security, the use of lethal force and the conduct of war, and of its surrender to an armed, autonomous technology.[104]

This statement and the efforts of the committee to put the problems associated with the emergence of autonomous armament systems in the agenda, favored, a series of debates within the world of disarmament. Drawing attention from the main organizations that had been involved in other struggles such as the anti-nuclear movement, the movement for the prohibition of anti-person mines, or against the dispersion bombs, among others.

Thus, two years after the declaration of Berlin, in October 2012, at a meeting held in New York where organizations linked to the struggles mentioned above participated, openly talked about the need to create an international campaign that had as the main objective the elaboration of an international treaty that prohibited the development and the use of the autonomous armament. Creating the foundations of the *Stop Killer Robots* campaign that would be formally presented to the public in London in 2013.

The Stop Killers Robots campaign is an international coalition created by civil society, which was participated at the time of its birth by organizations such as Human Rights Watch, Mines Action Canada, ICRAC (International Committee for Robot Arms Control), Pax Christi International, Nobel Women's Initiative, as well as the Women's International League for Peace and Freedom, among others (SKR, 2018).

Since its inception, the work of the Stop Killer Robots campaign has been directed in two parallel directions, on the one hand, increasing public awareness about the risks that this type of weaponery supposes for peace, security and rights humans. On the other hand, it began to establish alliances with the aim of creating a legally binding international instrument for the prohibition of autonomous armament working both; at the state level and at the other actors involved (public, private, workers in the technological, academic, etc. sectors).

Although this concern, at the time of the creation of the campaign, not only affected certain sectors of civil society aware of the risks posed by the emergence of new types of weapons. Since in the same

104. ICRAC, 2010 Berlin Statement https://www.icrac.net/statements/ (10/07/2019)

year 2012, for the first time discussions on the development of autonomous armament took place on the Human Rights Council of the United Nations. Moreover, in 2013 Christopher Heyns, special rapporteur on extrajudicial, summary or arbitrary executions, in his special report for the 23rd session of the Council in April 2013 already made an extensive description of the problem and the risks that this new generation of weapons could pose (Heyns, 2013). Work that would later be continued by the Convention for certain Conventional Weapons of the United Nations, the CCW (which is still in English) that continues to work on the subject until today without achieving great results.[105]

Although it would not be until 2014 when an informal meeting on autonomous lethal weapons systems was held for the first time at the United Nations in Geneva. One year, which was further marked by two other events, such as the action of Clearpath Robotics, a Canadian company that became the first private company to commit to not developing autonomous armament systems, thus adding a New front of actors in the global struggle to curb the development of these. Secondly, the action of more than 160 religious leaders who signed an inter-religious declaration calling on states that work towards the global ban on autonomous weapons.[106] The statement described this type of weapon as *"an affront to human dignity and the sacredness of life.*[107]" And it also criticizes the idea of delegating life and death decisions to a machine, because totally autonomous weapons do not have " A moral agency and, consequently, cannot be held responsible if they eliminate an innocent life."

It is as well as the call to an international prohibition begins to involve more and more actors, from academics to religious leaders, from NGOs to companies, although over the next years the number of organizations will increase even more and public figures who would add an active call for a binding prohibition.

Thus, in July of 2015, more than 3,000 experts in artificial intelligence signed a letter warning of the threat of an arms race in the field of military artificial intelligence where they called for a ban on autonomous weapons. The letter was presented in Buenos Aires at the 24th International Joint Conference on Artificial Intelligence (IJCAI-15) and was signed by Stephen Hawking, Elon Musk, Steve Wozniak, Noam Chomsky, co-founder of Skype, Jaan Tallinn, and the founder Google DeepMind, Demis Hassabis, among others.[108]

In 2017, 116 CEOs and founders of technology companies were added to the international call for the prohibition of autonomous armament and addressed a letter to the United Nations requesting a ban on LAWS.[109] This letter signed by companies from 26 countries was made public at the world's largest artificial intelligence conference, the International Joint Mixed Artificial Intelligence Conference (IJCAI), as the UN delayed the meeting until by the end of 2017 to discuss the arms race related to LAWS.

Toby Walsh, Professor of Artificial Intelligence at the University of New South Wales, announced the letter at the opening of the conference. This letter is the first time that AI and robotics companies take a joint position in this topic. Previously, only one company as we mentioned, Clearpath Robotics of Canada, had formally requested a ban on autonomous lethal weapons.

Thus some of the main contents of the letter were:

> "Autonomous lethal weapons threaten to become the third revolution in war"
>
> "Once developed, they will allow armed conflicts to be fought on a scale greater than ever and at faster timescales than humans can understand."
>
> "These can be weapons of terror, weapons that the despots and the terrorists use against innocent people and pirated weapons to behave in undesirable ways. We do not have much time to act. Once this Pandora box is open, it will be difficult to close it ".

However, not all the key companies in the sector got involved in this commitment. Thus, in June 2018, Kate Conger, then a Gizmodo reporter and now with the New York Times, revealed Google's participation in the Maven Project, a program funded by the Department of Defense of the United States (DOD) that sought to process in a way Autonomous video images obtained by surveillance drones (Frisk, 2018).

105. GGE on LAWS http://www.disarmament.ch/events/2019-gge-laws-march/ (20/08/2019)
106. PAX, "Religious Leaders Call for a Ban on Killer Robots," November 12, 2014, https://www.paxforpeace.nl/stay-informed/news/religious-leaders-call-for-a-ban-on-killer-robots (accessed July 22, 2018).
107. Campaign to Stop Killer Robots, "Who Supports the Call to Ban Killer Robots?" June 2017, http://www.stopkillerrobots.org/wp-content/uploads/2013/03/KRC_ListBanEndorsers_June2017-1.pdf (accessed July 22, 2018), p. 1.
108. *Gibbs, Samuel (27 July 2015). "Musk, Wozniak and Hawking urge ban on warfare AI and autonomous weapons". The Guardian. Retrieved 28 July 2015.^ Zakrzewski, Cat (27 July 2015). "Musk, Hawking Warn of Artificial Intelligence Weapons". Wall Street Journal. Visited the 28th July 2015.*
109. The world's top artificial intelligence companies are pleading for a ban on killer robot https://www.businessinsider.com/top-artificial-intelligence-companies-plead-for-a-ban-on-killer-robots-2017-8?r=US&IR=T (20/09/2019)

At that time, they were the same Google workers who led the protest, even leaving the company. Others (4000) signed a joint letter to Sundar Pichai, CEO of the company, where they protested against Google's participation in the project and demanded that Google do not "build war technology."

Thanks to this initiative, Google published a set of ethical principles for AI that included a commitment not to develop artificial intelligence for use in weapons (GoogleAI, 2019) and promised not to renew the Maven contract after the Its expiration in 2019. This fact was a step forward for the movement, which began to see the workers of the technological industries, people who risked their jobs to defend that the result of their work should not be militarized, as key allies in the cause. Encouraging the creation of new alliances with the "Tech Workers".

A month later, in July 2018, more than 200 technology companies and 3,000 personalities linked to the world of the AI signed through the Future of Life Institute a public commitment to "not participate nor support development, manufacturing, trade or use of lethal autonomous weapons".[110] And in November of that same year, United Nations Secretary General António Guterres called for the ban on autonomous weapon systems, stating that *"for me there is a very clear message: the machines that have the power and the discretion to end human lives is politically unacceptable, they are morally disgusting and must be prohibited by international law."*

So we can say that the year 2018 was a turning point for the movement against autonomous weapons. Because it experienced a wave of international support among the key sectors surrounding the development of Artificial Intelligence, making the debate for First, it began to reach the public through numerous articles that were published as a result of the calls that were made from the academy, NGOs and other organizations and personalities.

Thus, in December 2018 a global survey of IPSOS quantified the growing public opposition to totally autonomous weapons. And it became clear that 61% of adults surveyed across 26 countries were opposed to the use of lethal autonomous weapon systems. Two thirds of the opponents thought that these weapons "would cross a moral line because machines should not be allowed to kill themselves," *and more than half said the weapons would be "inexplicable."*.[111] This survey showed an upward trend with respect to the one made in January 2017, which had shown that 56% of respondents opposed the use of these weapons.[112]

Although there is still a long way to go until reaching a ban, and despite the existence of a broad consensus among AI developers there are still key companies that have not yet developed a clear public policy on the militarization of their civil technologies. Thus, 2019 opened the news of the signing of a millionaire contract between Microsoft and the American army. And as had happened to Google, company workers sent a letter to Satya Nadella and Brad Smith, CEO and president of the company respectively, asking to abandon the signed contract with the army for the use of the HololLens.

The workers asked to break the contract of 479 million dollars to provide technology for the Integrated System of Visual Increase or IVAS. In the framework of which, Microsoft, the manufacturer of augmented reality viewers HoloLens, would provide more than 100,000 units designed to combat and train military forces. The Army described the project as a way to *"increase lethality by improving the ability to detect, decide and engage in the enemy."* The letter, which according to the organizers included dozens of signatures of employees at the time of publication, states that Microsoft has "transferred the line of arms development" with the contract. *"The intention to do harm is not an acceptable use of our technology"* or *"We were not hired to develop weapons and demand a statement in how our work is used."* The workers also requested the cancellation of the contract, that the company stop developing any weaponry technology, that create a public policy by means of which it commits not to build weapons technology and that it designates an external review board of ethics to enforce the policy. Since they claimed that the ethical review process of the AI called Aether had not been *"robust enough to prevent the development of weapons, as demonstrated by the IVAS contract."*

However, the company's reaction was very different from the one that Google had at the time, as Satya Nadella said she would not "retain" the army's technology, despite the reaction of the employees. Affirming: *"We have made a decision of principle that we will not retain the technology of the institutions we have chosen in democracies to protect the freedoms we enjoy."* [113] Fact that represents an extremely dangerous precedent with regard to the dual uses of

110. "Lethal Autonomous Weapons Pledge". Future of Life Institute. (08/22/2019)
111. IPSOS 2018. *Six in Ten (61%) Respondents Across 26 Countries Oppose the Use of Lethal Autonomous Weapons Systems* https://www.ipsos.com/en-us/news-polls/human-rights-watch-six-in-ten-oppose-autonomous-weapons (08/22/2019)
112. IPSOS 2017 https://www.ipsos.com/sites/default/files/2017-03/AWS%207555.pdf (08/22/2019)
113. Cnet 2019. Microsoft CEO defends $480 million HoloLens contract with the US Army. https://www.cnet.com/news/microsoft-ceo-defends-480-million-hololens-contract-with-the-army/ Visitat el (08/22/2019)-

technology, and as that which was developed for civil purposes, it can be easily militarized in spite of the will of its creators.

It is precisely this, one of the key battles regarding the risks of militarization of artificial intelligence, such as the collusion between certain companies and the army, what was already defined by Eisenhower as an industrial-military complex, a thesis prepared by Daniel Guérin in his 1936 work "Facism and Big Bussines". While not only Microsoft is one of the giants involved in the militarization of the AI, we find other companies such as Boing with the ORCA project (Joseph Trevithick, 2019) or Samsung, as well as many others.

Although, in 2019, it also brought good news, such as the one that arrived on July 8, when MPs from the 57 participating states of the Organization for Security and Cooperation in Europe (OSCE) adopted the Declaration on the Advancement of the Sustainable development to promote security (Luxembourg Declaration) negotiated during its annual Parliamentary Assembly in Luxembourg. This Declaration contains some very encouraging paragraphs, in particular as regards the creation of an international treaty that regulates autonomous armament systems, which was presented by Katja Keul (member of the German Green Party) Other Members of Germany, Liechtenstein and Switzerland:

> The OSCE Parliamentary Assembly:
> 29. Urges the participating States to support international negotiations to prohibit lethal autonomous weapons in order to establish legally binding international standards;

The Luxembourg Declaration, although not binding, provides orientation to the OSCE states and is an important step in the generation of international consensus on the subject.

To conclude, we would also like to mention that the efforts made during the last few years have taken place in the Convention for Certain Conventional Weapons (CCW) in the United Nations, where a sufficiently large consensus has still not been reached to materialize an international legal framework binding on the subject. At this time only 28 states are making an explicit call to the ban while other states maintain ambiguous positions or openly oppose it.

A demonstration of the limitations of multilateral organizations that can easily be kidnapped by the interests of the military superpowers, in this case Russia and the USA, who at the last meeting in August put all their efforts to prevent the CCW manifested itself in favor of guaranteeing significant human control over LAWS.

It should be remembered that at this time, the CCW is the central multilateral space with regard to the international discussions on LAWS. This organization has its origins in the 1970s due to growing awareness and concern among the international community that new technologies lead to weapons that were not always compatible with international humanitarian law. In response to these concerns, the International Committee of the Red Cross convened a Conference of governmental experts on weapons that could cause unnecessary suffering or have indiscriminate effects from September 24 to October 18, 1974 in Lucerne, Switzerland.

These and other efforts led to Resolution 32/152 of the General Assembly of the United Nations (December 19, 1977), which called for the convening of a Conference *"in order to reach agreements on prohibitions or restrictions of use of specific conventional weapons, including those that can be considered to be excessively harmful or that have indiscriminate effects, taking into account humanitarian and military considerations, and on the question of a system for periodic review of this matter to examine further proposals* "The Conference convened in 1979 and resulted in the Convention on Certain Conventional Weapons (CCW) and its protocols I, II and III that were adopted on October 10, 1980 and came into force on December 1983.

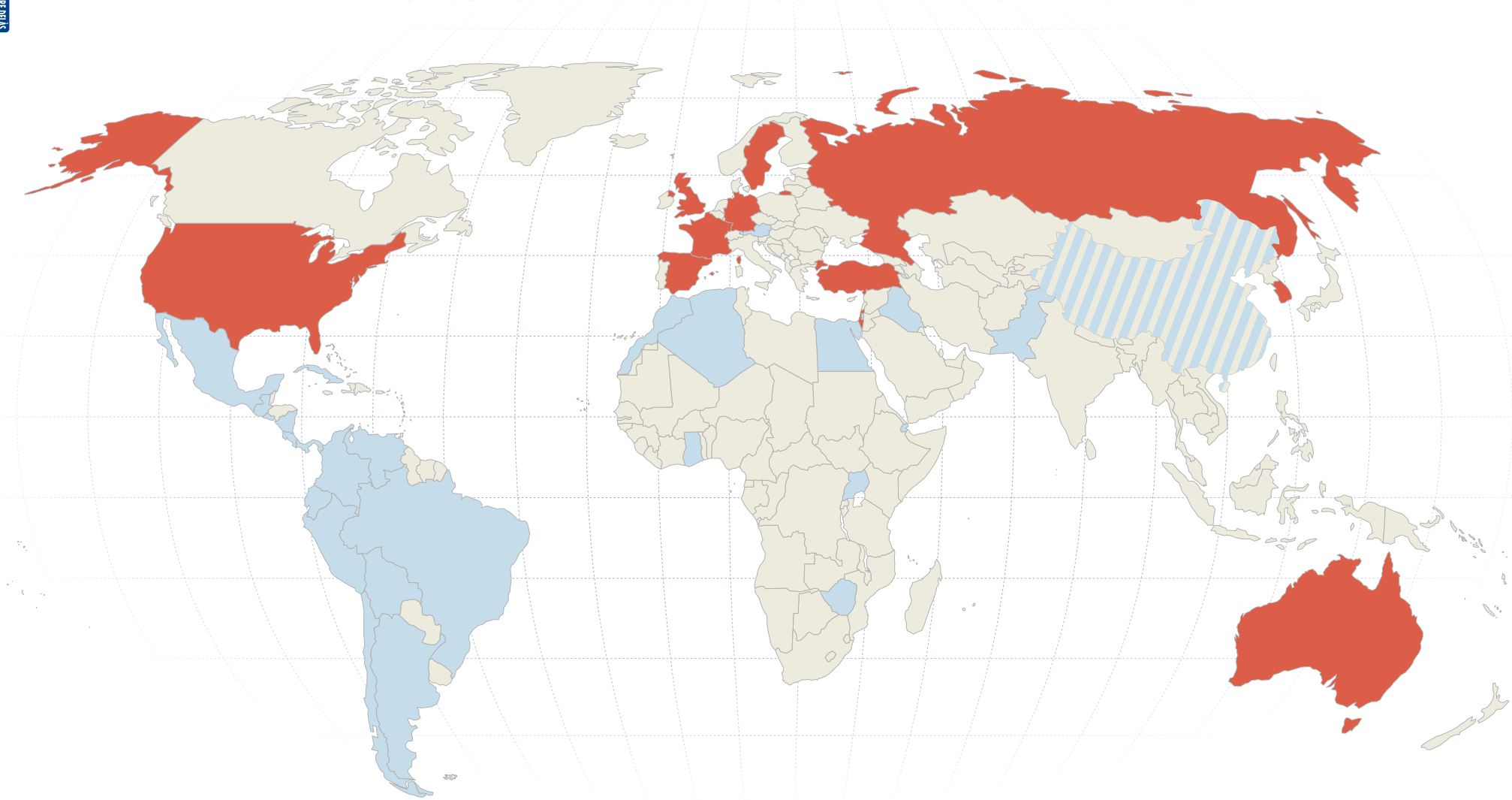
Nowadays the CCW has as its objectives:

- protect civilians from the effects of hostilities;
- strengthen the principle that the right of the parties to armed conflict to choose methods and means of war is not unlimited;
- prohibit weapons that do not distinguish between civilians and combatants or cause unnecessary suffering or superfluous injuries; i
- reaffirm the "Martens Clause", the principle that the civilian population and combatants will remain at all times under the protection and authority of the principles of international law derived from established customs, principles of humanity and the dictates of conscience public (UNODA, 2019).

Although at this time, we can say that the CCW is still without a fixed course in the discussions on LAWS that seem to eternalize due to the unwillingness of the two superpowers to establish any type of regulatory element. Fact that underlines the need to find alternative strategies with a view to enabling a binding international treaty.

Finally, and specifically in Europe, it should be emphasized that in September 2018, the European Parliament called for the beginning of the negotiations on the prohibition of lethal systems of autonomous weapons. Moreover, it reached a provisional agree-

MAP 3. POSITION OF THE COUNTRIES ON A TREATY PROHIBITING LAWS



Countries Against the Prohibition of LAWS

Countries that have requested a LAWS ban

China claims that its call is to prohibit the use of totally autonomous weapons, but not its development or production.

Source: Stop Killer Robots Campaign: https://www.stopkillerrobots.org/wp-content/uploads/2018/11/KRC_CountryViews22Nov2018.pdf [Visited in 30/08/2019]

ment on February 20, 2019 by which it will ban the new European Defense Fund (EDF) to invest in the development of autonomous lethal weapons systems. In addition, German Foreign Minister Heiko Maas has stated on several occasions that Germany wants to ban autonomous lethal weapons even though it has not yet manifested it firmly to the United Nations.

On March 23, 2019, Belgian Foreign Minister and Defense, Didier Reynders, also declared for the first time that Belgium wants to ban "autonomous weapons capable of killing without any human intervention." And in July, as we mentioned before, the parliamentary assembly of the Organization for Security and Cooperation in Europe (OSCE) adopted a statement that includes a line that urges the participating states to "support international negotiations for prohibit lethal autonomous weapons ". Among the member countries of the Union, only the Republic of Ireland and Austria have made explicit calls to the ban within the framework of the United Nations.

Therefore, and despite clear advances in the generation of conscience in the wake of the need to develop legally binding mechanisms to prohibit autonomous armament, there is still a long way to go. Especially because there are countries that have a special interest in the fact that this prohibition never reaches, such as Russia, the USA, the United Kingdom or Israel, among others. It is extremely necessary to increase the degree of pressure that citizens have on their governments in this area.

As a conclusion of this section, we could say that, since 2009, when the first organizations aimed at regulating and prohibiting the use of autonomous armament began to be articulated, there has been an exponential growth of the awareness about the risks that the militarization of artificial intelligence supposes. A consciousness that has been taking various types of demonstrations from academics and scientists to religious leaders, through workers from the technological sectors and from many companies and CEOs.

While there is still a gap of important knowledge among citizens that would be key to exerting a greater degree of pressure on governments that will have to agree to the terms of this prohibition. Governments that have so far expressed their reluctance in the United Nations CCW to move forward in drafting a binding international agreement, with only 28 countries that explicitly support this option (See Annex 2).

In addition, it should be noted that despite the fact that numerous technology companies have made public calls and are committed not to develop weapons, there are still important players in the sector that continue to collaborate actively in this type of projects, some of military and other Police character, but which represent a threat to civil rights and freedoms.

It should be recalled that the American Union of Civil Liberties (ACLU) achieved 150,000 signatures to ask Amazon to stop the sale of facial recognition systems to the FBI, as Nicole Ozer, Director of technology and civil liberties of the ACLU of California: *"History has taught us clearly that the government will operate technologies such as facial surveillance to address color communities, religious minorities and immigrants. We are at a crossroads in relation to facial recognition and the choices taken by these companies that will now determine whether the next generation should be scared of being traced by the government to attend a protest, go to their place of worship or simply live his life".*

And, as Eisenhower affirmed in relation to the military-industrial complex: *"we must guard against the acquisition of unwarranted influence, whether sought or unsought, by the military-industrial complex. The potential for the disastrous rise of misplaced power exists and will persist. We must never let the weight of this combination endanger our liberties or democratic processes. We should take nothing for granted. Only an alert and knowledgeable citizenry can compel the proper meshing of the huge industrial and military machinery of defense with our peaceful methods and goals, so that security and liberty may prosper together".*

7. ROBOTIC WEAPONS, WAR AND ETHICS

The human being must always be the ultimate responsible for the performance of a machine, not only in the identification of the target but in the final selection and operation. In general terms, Artificial Intelligence should not be used to replace human decision making in sensitive matters based on ethical or moral judgments.

The new armed conflicts of the 21st century, inspired by scientific and technological development, need a modification of the legal and ethical principles that inspired wars in the 20th century, new weapons and new types of combat question the validity of the legal and ethical framework that currently rules war.

7.1 LEGAL AND ETHICAL CHALLENGES. PRECAUTIONARY PRINCIPLE

In recent years, the use of unmanned systems in wars or other situations of armed conflict has raised questions of legality in two areas, the legality of robotic weapons themselves and those relating to the legality of use or the manner and circumstances in which states are using them.

There are few rules of law relating to weapons; as determined by the International Committee of the Red Cross (ICRC), International Humanitarian Law says that "the use of means and methods of warfare which are of a nature to cause superfluous injury or unnecessary suffering is prohibited" (rule 70); and that "the use of weapons which are by nature indiscriminate is prohibited" (rule 71). Hence, any weapon that necessarily causes excessive injury or suffering or cannot be directed towards a specific military objective should be prohibited and never used.[114]

The weapons that have been banned by specific treaties and are now part of existing international law are chemical, biological, expansive and explosive bullets and anti-personnel landmines. The International Court of Justice has been unable to determine that nuclear weapons, surely the clearest example of a weapon that is indiscriminate in nature and that inevitably causes unnecessary injury and suffering, were inherently illegal under international humanitarian law.

114.Saura J.. (2014) *Algunas implicaciones del empleo de drones en perspectiva jurídica internacional*; in ICIP Research nº4: El arma de moda: impacto del uso de los drones en las relaciones internacionales y el derecho internacional contemporáneo. Barcelona pp 133.

Bearing in mind the debates surrounding nuclear weapons and the lack of consensus to reach agreements to outlaw them, the question must be raised as to whether autonomous armed systems or weapons should be considered illegal, to prohibit the development of these new weapons before they exist. Predictably, this is an issue on which there is no consensus but common sense invites us to act by applying the precautionary principle and to act before they are developed.

7.2 PRINCIPLE OF LIABILITY

In both legal and moral terms, the first issue to be resolved is that of liability. A robot clearly has no legal, moral or other capacity and therefore cannot be held responsible for its actions. If there is an error or an act of war crime, who will be responsible? If an autonomous weapon system fires at a civilian target or at soldiers who have been wounded in combat to the point that they are no longer capable of fighting it could be that the autonomous weapon system was programmed to do so, or it could be that it had a malfunction, that it had been manipulated or that there was interference. In any case, who is responsible for an action not in accordance with international law? The computer programmer? The manufacturer? The military? The politician who authorizes the deployment? What if it had been used by a non-state private agent? Defining clearly who is responsible for the acts undertaken by an autonomous weapon system is fundamental to guarantee, on the one hand, accountability and, on the other hand, to assume the criminal consequences that may derive from the action.

In theory, the soldier responsible for the autonomous robot should be responsible, but if this soldier did not know the intention of the target (a person), did not know whether or not the individual planned to commit a crime, what the scale was, etc., how can he or she be responsible? In general we can say that except in verifiable actions in which the military acts recklessly, he would not be responsible for the action of the autonomous robot.

Given the complexity of the algorithms with which autonomous robots are programmed, it can be considered that a certain illegal or immoral act can be considered a design defect, in this case the responsible would be the manufacturer. But arms manufacturers have never been judged by the way in which the weapons they produce are used, especially if they provide the buyer with a manual containing the risks of malfunction.

All this leads to a potential vacuum of legal and moral responsibilities. Faced with a specific situation, everyone involved can ask for clarification as to who made the decision, whether there was a technical error, due to the programme or a mechanical failure, or who made the decision. In the face of this dilution of responsibilities, it is to be hoped that all those involved will try to evade responsibility and therefore impunity will prevail.

As for the victims of an autonomous weapon, it is unrealistic to think that they would bring the manufacturer, the military, or the politician before the courts; usually the victims are poor people who live in geographically distant places so as to ask for responsibility or compensation for the damage suffered. Obviously one cannot compensate a victim by punishing a robot. How can we punish an autonomous weapons system? Would the maximum penalty be "disconnection"? Or that it becomes scrap metal?

Any weapon is susceptible to failure and accidents, with autonomous weapons a new dimension must be added, as a failure could cause the system to inappropriately select and attack a large number of targets. There is a risk of developing weapons that are legal when they function properly, but are not safe and can cause serious harm if they malfunction or face unexpected situations.

The major concern in terms of establishing responsibility is not that an autonomous weapon system may malfunction at some point, as will inevitably happen, but the extent to which the development of autonomous weapon systems can avoid a system of 'organised irresponsibility' that mixes the responsibility of one actor with that of another, with no one ultimately responsible.

All these reflections are intimately related to the use of technology in today's world. Nowadays, machines help us to make an infinite number of decisions. In general, we use them in detection or observation systems, for example, in medicine, in various sports events, etc. We have developed robots that can perform surgical interventions "in situ" or at a distance, or robots that act in extreme or unsuitable situations for humans, such as Fukushima, but not in others that require value judgments that may have serious consequences. A judge can use images recorded by a robot to get a closer look at what happened, but a robot cannot replace the judge in delivering a sentence. Robots cannot be in a position to make decisions about taking the life of a human being, that is, that a robot can decide to kill a human being. This is the new perspective that must be confronted.

7.3 PRINCIPLE OF DISCRIMINATION OR DISTINCTION

This principle obliges belligerents to target only military personnel and goods, not civilian individuals and goods; therefore, not only direct attacks against protected persons and goods are prohibited, but also any weapon that inherently is not capable of discriminating, as well as any means of combat that does not discriminate between civilian and military.

Today we are in the process of developing weapons that can decide to attack and kill autonomously, but in war it is necessary to be able to distinguish between combatants and non-combatants, in order to assess military gains and civilian losses before deciding on the uses of armaments. As long as this is the case, giving the machines more freedom of decision to choose between one action or another is to lower the control of responsible human judgment. Faced with this situation, the best thing to do is to act preventively and draw a red line, to establish a strong moral principle that we all intuitively know is right, to prohibit the development of autonomous weapons on a global scale. It is the necessary step to ensure the future of humanity.

It is also necessary to check that the robot can understand the context in which it acts, if for example it can identify the presence of wounded or if soldiers are indicating or in the process of surrender. Many of the actions prior to the use of force involve making subjective, intuitive decisions, which often require human judgement, for example, distinguishing between a civilian with fear or a threatening enemy, perceiving, understanding a situation implies understanding the intentions behind a human expression. There are distinctions that go far beyond the skills of today's robotics, distinguishing a dagger as a cultural or religious symbol from a weapon. People can feel empathy, we can place ourselves in the skin of the other and desist from harming him or her, a robot will never be able to experience these feelings; its balances are quantitative, not qualitative. The difficulty or impossibility for a robot to interpret or evaluate intentions or emotions is an important factor in deciding whether or not the use of autonomous robots is correct.

A part of the community focuses the debate on whether it is possible that the robots' software may contain international humanitarian law, i.e. whether the robots can act in compliance with this legislation.

Some experts consider that it is possible and that robots can behave better than humans themselves, that it is all a question of programming or introducing ethics into the program that governs a robot. If so, if it is possible to introduce in the software International Humanitarian Law and ethics, it would be necessary to consider the request that it is not the humans who make the war but the robots, since with these robots the number of unnecessary casualties would decrease, with the robots the number of casualties in a conflict would be reduced.

7.4 PRINCIPLE OF PROPORTIONALITY

The rule of proportionality requires that, before attacking, the harm that may be caused to civilian population must be assessed in terms of the military advantage gained by the action. This principle is applied to specific actions in order to assess whether the damage caused was proportional to the military advantage obtained, or whether, on the contrary, the damage was excessive. This principle helps to qualify or clarify whether the damage caused was excessive.

Proportionality is inherent in human discernment and is based on concepts such as common sense, acting in good faith or a reasonable command. In order to determine whether an attack was proportionate, one must examine whether the person who made the decision to attack was reasonably well informed of the situation and circumstances or whether he made a reasonable use of the information available. The question is whether robots can be programmed to duplicate psychological processes in the human value judgments necessary to assess the proportionality of a decision.

The prevailing legal interpretations are explicitly based on concepts such as "common sense" or "good faith", it remains to be determined to what extent these concepts can be translated into algorithms and computer programs now or in the near future.

Analyzing the principle of proportionality in any military action is very complex and is a purely qualitative exercise and difficult to quantify, it is impossible to predict how many civilians are "proportional" to kill in an attack on a particular facility or that constitutes "excessive" collateral damage. According to Markus Wagner (Wagner, 2009), equilibrium, proportionality or excess depend on the values of the individual making the calculations; therefore, the principle of proportionality is, by its nature, subjective and it is not easy to draw up an agreed checklist.[115]

The debate on the principle of proportionality calls into question whether it will be possible in the future,

115. Wagner M. (2014)The Dehumanization of International Humanitarian Law: Legal, Ethical, and Political Implications of Autonomous Weapon Systems. In Vanderbilt journal of transnational law, nº 47, 1371-1424.

or never, to elaborate an algorithm that performs this highly context-dependent analysis.

Twenty years ago these questions were theoretical, they were questions that were only posed in the field of philosophy or in the literature of science fiction, but advances in the design and production of robots make it visible that in a short period of time we will have robots participating or waging war.

7.5 ETHICS IN AUTOMATED WEAPON SYSTEMS

In another domain we are faced with dehumanisation and an ethical factor of relevant importance. The defenders of being able to equip ourselves with robotic weapons that can autonomously select and attack targets without human intervention, ask not to set limits to the development of these weapons, claim that humans under certain conditions such as heat, rage, fear, anger, resentment, desire for revenge, etc., act in the worst possible way. Robots certainly cannot act under these moods, they cannot have feelings like these and therefore could avoid unnecessary deaths. Advocates of not limiting the creation of these weapons argue that fully autonomous weapons may be able to comply with international humanitarian law better than humans, since they can process more information, faster than humans, and not be inhibited by preserving - themselves, nor would they be influenced by emotions.

The defenders of totally autonomous weapons remind us that in situations of armed conflict humans commit many vices such as raping women and girls or torturing human beings. It is true that robots, unless specifically programmed to do so, would not rape women, would not torture and would not cause intentional harm to the population. Some of them elevate the virtues of fully autonomous robots to the point of affirming that these robots, acting on a battlefield, can lead the war to less destruction and turn it into a civilizing force.

It is true that robots have no sense of risk, they are not afraid, they do not make decisions influenced by emotions; that a robot would not have, like any machine, the survival instinct. But we must also recognize that emotions offer the best safeguard, without emotions you can kill more easily. Robots cannot have the common sense of humans, they cannot feel compassion, pity or they cannot have intuition. It is true that humans are fallible and robots are not, but that is the human condition. Decisions about the life and death of humans in armed conflict may require an overview, understanding of intentions, anticipation of events, compassion, intuition, or common sense. Robots cannot foresee the consequences of their actions, but a human can.

Robots can be programmed to address and evaluate situations quantitatively, but their ability to address and evaluate situations qualitatively is and will be very limited. These skills are very necessary when it comes to making decisions about human lives. The same can be said about the ability of robots to distinguish and evaluate between lawful and unlawful orders or their ability to interpret a context and evaluate it in value-based calculations. For example, a robot might shoot a child carrying a weapon in his hand, the robot's response might be legal, the child was armed, but this response is unethical; a soldier in this same situation may remember his child or may think that he cannot kill a child and that he must look for an alternative solution, such as capturing him.

In this article we are dealing with the use of Artificial Intelligence applied to a very specific category of weapons systems or also robots that are used in the (symbolic) battlefield. We are talking about robots that replace humans on the battlefield, but we have to think that they can also be used in other tasks such as interrogating or torturing suspects; a robot unlike a doctor has not taken a Hippocratic oath not to do harm and, unlike a human, how will it track vital signs or pain with a human being interrogated or tortured?[116]

7.6 SOFTWARE PRODUCTION

The debate was until recently theoretical, but now it is a practical debate, with two central questions. Is it possible to program robots to understand and respect international humanitarian law? What are the ethics that should regulate the use of autonomous weapons in war?

We have to think that we are at the start of this technological modality, technology that allows us to expand the capacity to kill, although some compare this technology with the creation and development of the car or the Ipod. In which we first create the technology and then create normative corpus or legislation that regulates its use.

Two rules of international humanitarian law, that of distinction and that of proportionality, need to be approached with particular sensitivity. Therefore, the programming of robots must clearly distinguish between combatants and other actors such as insurgents, civilians, children, women, the elderly, etc. If the robot cannot clearly distinguish between all these groups, their use will be illegal. The robot must

116. Lin P. (2011) Drone-Ethics Briefing: What a Leading Robot Expert Told the CIA. In The Atlantic. Available at: https://www.theatlantic.com/technology/archive/2011/12/drone-ethics-briefing-what-a-leading-robot-expert-told-the-cia/250060/

not only be able to distinguish whether the target is a combatant or not, but must also make a balance of intentions. In today's conflicts it is not easy to identify combatants, as they often do not wear uniforms or distinctive insignia and often become mixed up with the civilian population. It will be very difficult for a machine to differentiate between an innocent civilian and an armed insurgent, not least because insurgents can deceive the robot, hiding the weapons or exploiting the sensory limitations of the robots.

The first to think about the need to program or produce algorithms that would allow robots to reproduce human behavior was Isaac Asimov in the 1940s. In his novels, he raised the question that robots would be intelligent systems, that could make complex decisions based on pure reasoning, and established a general framework of conduct, his three famous laws of robotics:

1. A robot cannot harm a human being or, through inaction, allow a human being to suffer harm.
2. A robot must obey orders given by human beings, except if these orders conflict with the First Law.
3. A robot must protect its own existence to the extent that this protection does not conflict with the First or Second Law.

In addition to science fiction, work is already underway to introduce ethical aspects into armed autonomous systems. Ethical norms are proposed that restrict certain aspects of autonomous decision-making with respect to human objectives that limit the capacities of the systems themselves, their development and use. These limits, it is proposed, must be met from the very design. There are several proposals to introduce ethical standards, one of which is Arkin's (Arkin, 2009),[117] who advocates including a component called "ethical governor". Its mission would be like introducing a bottleneck into a deliberative and reactive hybrid architecture that forces a second opinion before carrying out a lethal behavioral response, this "ethical governor" would be a program that would determine whether a concrete action of an autonomous weapon system would not be ethical, something like a guilt algorithm, and if so, would alert a human operator or restrict action. Other proposals address alternative solutions such as teaching ethics to robots, so that they perform autonomous learning.[118]

Extrapolating the reasoning presented here, we must think about the possibility that one day science will develop machines that escape human control and become more intelligent than the human being itself, they can design and build other ingenuums on their own. The question then will be to establish whether these machines can also have the moral judgment to become responsible for the actions they take on the battlefield.

There is no doubt that the current trend is for there to be more and more autonomous weapons systems. It is clear that the reflection and debates we hold on this matter are crucial to updating the legal frameworks of Human Rights and International Humanitarian Law; but it is also true that the development of autonomous weapons systems would undermine and put at risk decades of struggles and decades of work and agreements in favour of Human Rights and International Humanitarian Law.

If we take into account the sufficiently broad uncertainty surrounding the ability to create autonomous weapons systems that meet the standards of international law and the ethical behaviour of these systems, the principle of prevention must be applied; lessons must be drawn from nuclear weapons, first we create them and then we discover the monster that we have created; applying the principle of prevention would mean halting the development of such weapon systems.

117. Arkin R. (2009) Governing lethal behavior in autonomous robots. Published by Routledge

118. Martin E. (2017) *La autonomía en robótica y el uso de la fuerza*. In Opinion Document 27/2017 from the Instituto Español de Estudios Estratégicos. Available at: http://www.ieee.es/Galerias/fichero/docs_opinion/2017/DIEEEO27-2017_Robotica_UsoFuerza_EvaMartinIbanez.pdf

8. CONCLUSIONS

Robotic military systems, and in particular military drones, have managed to drastically reduce military operations while significantly increasing the volume of business of the military industrial sector. The sector of companies that manufacture and export military drones and the companies producing high-tech instruments used in modern wars is expanding rapidly. Military and "security" actions with robotic armed systems have radically changed the war scenarios, which have gone from concentrating on military and strategic targets to attacks that could seriously affect not involved civilian population. Attacks with armed drones often do not appear in newspapers, but they show a steady growth rate in recent years. They are attacks that end up killing civilians, as well as perpetrating summary and extrajudicial executions of supposedly terrorists.

Border surveillance systems are other types of systems that have been designed specifically to monitor (and, if necessary, attack) civilians. Monitoring and control systems armed with drones are being used, among other countries, in Israel, South Korea, the United States and Europe (the Frontex Agency).

Military drones are manufactured mainly in Europe, the United States, Israel, Russia and China. The United States is clearly the world leader in the creation and manufacture of robotic military systems, military drones and armed drones. United States, Israel, Russia and China work actively in the development of Weapon Systems that allow a significant degree of autonomy, especially in the case of loitering drones and in the swarms of drones. These loitering drones and the swarms of drones can easily incorporate autonomous decision-making systems, they are economical, they are within reach of a large number of countries, and can therefore change the geopolitical map of armed conflicts. The incorporation of **constructive autonomy** in robotic military systems loitering drones, and the development of new drone swarms, is something that will change war scenarios. **The big exporting companies are in the United States, Israel, Russia and China**. This report shows who are the big players (countries and companies) in this field.

The first wave of drones came from the US. The second one came with the production and export of drones from Israel, Russia and China but also with the domestic research and production of some countries.

Two clear cases are that of Turkey and Iran, who have decided to successfully promote domestic research and production forced by the international context - complicated relations of Turkey with NATO, or the embargo on Iran -. They use these drones internally or in various conflicts in the Middle East.

The manufacturing countries include Germany, Austria, Belarus, Brazil, Colombia, South Korea, Spain, the United States, France, Hungary, India, Iran, Israel, Italy, Latvia, Mexico, Nigeria, Pakistan, Poland, United Kingdom, Russia, Serbia, Sweden, Norway, Turkey, China, Ukraine. The users countries include these countries and in addition Canada, Colombia, Azerbaijan, Chile, Brazil, Greece, Thailand, Philippines, Vietnam, Zambia, Ukraine, Kazakhstan, Qatar, Lebanon, Australia, Afghanistan, Indonesia, Egypt, Latvia, Holland, Czech Republic, Japan, Belgium, Uzbekistan, Jordan, Arab Emirates, Algeria, Saudi Arabia and Iraq, among others.

Double use is a feature inherent in military technologies, and of course drones. It refers to the convertibility of the civilian application to the military of a product or component. Dual use complicates the regulation or prohibition of drones, which, combined with its advantages for States and non-state groups, have facilitated proliferation. Many states have official positions that are still not defined, but in practice they decide to opt for the use of military robotic systems and military drones for reasons of competitiveness: "if others do it, we must do it: we must not be left behind".

The perception of the possibility of making wars without risk can make prevail military solutions above the policies, lowering the thresholds that states have now before initiating military actions. Artificial Intelligence will make it easier to think on abstract wars at a distance, which can lead to more military actions and an uncontrolled escalation of conflicts. Throughout the last decade, a false narrative has been built on the goodness of Artificial Intelligence that tends to ignore all those aspects that can suppose an attack to the very notion of humanity. In spite of this, scientific and academic sectors have tried to generate awareness about the risks associated with certain uses that can be extremely damaging to civil population and human rights, among which the militarization of technology and the emergence of autonomous lethal systems stand out. In fact, robotic military systems with constructive autonomy show unexplained behaviours, with a guaranteed probability of error that is significant and not small. This makes them essentially unsuitable in situations where errors will be human lives and where accountability will be difficult.

The systems of autonomous weapons place us in a scenario of dehumanization. Machines cannot feel compassion, pity, remorse or feelings of guilt. Trying to rule on a machine the decision to kill, is something that goes against the human dignity and the rights of the people. The Ethical problem appears when military systems stop being operated by people and perform their tasks under autonomy of use, without human intervention in the decision and attack processes.

Autonomous weapons systems should respect **the legal principle of proportionality**, which analyzes whether the damages caused are proportional to the military gains obtained or if the damages (to civilians) are excessive. On the other hand, it is necessary to **respect the legal principle of distinction** that forces to distinguish between combatants and non-combatants. The question is whether these weapons systems can understand the context, distinguish between a civilian with fear or a threatening enemy, if they can understand the intentions behind a human expression. Finally, these weapons systems must **respect the principle of responsibility**: if there is an error or a war crime, who is responsible? The soldier, who gives the order, the politician, the manufacturer, the programmer, ...? Given the dilution of responsibilities, we can expect that all those involved will try to evade responsibility, and therefore impunity will prevail.

Bearing in mind the debate on Nuclear Weapons and the lack of consensus to reach agreements to outlaw them, the question of considering Autonomous Weapon Systems as illegal should be considered, by prohibiting the creation of these new weapons before they exist. As is predictable, this is a question about which there is no consensus but in which common sense invites us to act by applying **the precautionary principle**, acting before they are developed. Applying this prevention principle involves stopping development, stopping before creating autonomous weapons.

Therefore, it is necessary to have a legally binding instrument that prohibits the lack of significant human control over the selection and attack of the objectives, and which therefore bans robotic military systems with autonomy of use. UN Secretary-General António Guterres expressed this to the commemorative acts of the 100 years of the end of the First World War in November 2018 in Paris: "The use of Artificial Intelligence to manufacture new Weapons is a serious danger. And the prospect of having machines that have the ability, by themselves, to select and destroy objectives, generates enormous difficulties to avoid escalation in conflicts and to ensure that in the battlefields, international humanitarian law and the law of human rights are guaranteed. For me there is a clear message: machines that can have the power and the ability to kill people are politically unacceptable, they

are morally repugnant, and should be prohibited by international law".

These warnings have been growing, leading to the creation of an international coalition called Campaign to Stop Killer Robots that involves civil society organizations, disarmament entities and human rights organizations. Calls from private companies, technological workers and founders of companies in the sector have joined this movement. They oppose to what could be the beginning of a new arms race that could lead not only to military escalation but could also endanger the survival of our species.

Thanks to this effort, conversations are currently taking place at the CCW (United Nations Convention for Certain Conventional Weapons), with the aim of creating a binding legal framework prohibiting Weapon Systems that do not have significant human control. Although this international effort has not yet been able to bear fruit due to the pressure exerted by the military superpowers that act as a suppressor of world politics with the support of countries aligned with their interests, there is a need for increased pressure from citizenship to avoid a scenario that can destabilize the fragile international balances and the precarious current peace.

However, other robotic military systems that operate at a distance also pose important ethical problems such as bias of automation (which causes operators to be willing to accept computer recommendations without looking for extra corroborating information) and the fact that when military operations are carried out through the filter of a distant video camera, the possibility of visual contact with the enemy disappears, the perception of their human dignity is reduced, and the awareness of the effects and possible damage to people diminishes. That is why we must also have a great international effort to achieve demilitarization regarding military drones, also drastically reducing Military Spending associated with both robotic military systems and other weapons.

9. BIBLIOGRAPHY

- Ahval (2018) *Turkey flies "one of world's most advanced" drones in Syria operations*, Ahval News. [Visited September 9, 2019] https://ahvalnews.com/defence/turkey-flies-one-worlds-most-advanced-drones-syria-operations

- Airwars (2019)'*Turkish Military in Iraq and Syria*'. Air Wars. [Visited September 10, 2019] https://airwars.org/conflict/turkish-military-in-iraq-and-syria/

- Akkerman, Mark (2018), *Will Europe use Israeli drones against refugees?*. The Electronic Intifada. 31 October 2018. [Visited October 6, 2019] https://electronicintifada.net/content/will-europe-use-israeli-drones-against-refugees/25866

- Allen, Gregory (2019) *Understanding China's AI Strategy: Clues to Chinese Strategic Thinking on Artificial Intelligence and National Security*. CNAS, Febrer 2019. [Visited October 6, 2019] https://www.cnas.org/publications/reports/understanding-chinas-ai-strategy

- Alston, Philip (2010) *Armed Drones: How Remote-Controlled, High-Tech Weapons Are Used Against The Poor* (U.N. Doc. No. A/HRC/14/24/Add.6, May 28, 2010). Veure David Hookes (2017). [Visited October 6, 2019] https://www.globalresearch.ca/armed-drones-how-remote-controlled-high-tech-weapons-are-used-against-the-poor/5582984

- Arkin, Ronald (2009) *Governing lethal behavior in autonomous robots*. CRC Press. [Visited October 6, 2019] https://www.crcpress.com/Governing-Lethal-Behavior-in-Autonomous-Robots/Arkin/p/book/9781420085945

- Army Technology (2019) *Bayraktar Mini Unmanned Aerial Vehicle*. [Visited September 9, 2019] https://www.army-technology.com/projects/bayraktar-uav/

- Beck, Ulrich. (1998) *La sociedad del riesgo: hacia una nueva modernidad*. [Visited October 6, 2019] http://atlas.umss.edu.bo:8080/xmlui/handle/123456789/337

- Benjamin, Medea (2013), *Drone Warfare: Killing by Remote Control* (London, Verso): https://www.versobooks.com/books/1414-drone-warfare - The page numbers correspond to the Spanish version: Medea Benjamin (2019) *La guerra de los drones*, Ed. Anagrama, Barcelona, translation by Antonio-Prometeo Moya.

- Boden M., Bryson J., Caldwell D., Dautenhahn K., Edwards L., Kember S., Newman P., Parry V., Pegman G., Rodden T., Sorrell T., Wallis M., Whitby B. i Winfield A.F. (2017) *Principles of robotics: Regulating robots in the real world*. Connection Science, 29(2): 124-129: https://www.tandfonline.com/doi/abs/10.1080/09540091.2016.1271400

- Boulanin, Vincent & Verbruggen, Maaike (2017), *Mapping the Development of Autonomy in Weapon Systems*, Estocolmo, SIPRI: https://www.sipri.org/sites/default/files/2017-11/siprireport_mapping_the_development_of_autonomy_in_weapon_systems_1117_1.pdf

- Brunet, Pere (2018), *Armed robots, autonomous weapons and ethical issues*, "Future Wars" Conference, CND, London, 10 November 2018. Available in the Centre Delàs d'Estudis per la Pau website. [Visited October 6, 2019]: http://www.centredelas.org/en/publications/articles/3807-armed-robots-autonomous-weapons-and-ethical-issues

- Burt, Peter (2018): *Off the Leash: The development of autonomous military drones in the UK*. Drone Wars UK. [Visited October 6, 2019] https://dronewarsuk.files.wordpress.com/2018/11/dw-leash-web.pdf

- Calvo, Jordi i altres (2014). *Drons militars. La guerra de videojoc amb víctimes reals*. Informe 23, Centre Delàs d'Estudis per la Pau. Available at: http://www.centredelas.org/ca/publicacions/informes/1644-informe-23-drons-militars-la-guerra-de-videojoc-amb-victimes-reals

- Calvo, Jordi i Pozo, Alejandro, coords. (2015). *Diccionari de la guerra, la pau i el desarmament: 100 entrades per analitzar els conflictes armats, la pau i la seguretat*. Icària. Barcelona.

- Daily Sabah (2019) *Domestically developed Bayraktar drone breaks new aviation record*, Daily Sabah, June 24, 2019. [Visited September 10, 2019] https://www.dailysabah.com/defense/2019/06/24/domestically-developed-bayraktar-drone-breaks-new-aviation-record

- Daily Sabah 2 (2019) *Turkish defense giant TAI's second drone to make first flight this year*, Daily Sabah, March 4, 2019. [Visited September 9, 2019] https://www.dailysabah.com/defense/2019/03/04/turkish-defense-giant-tais-second-drone-to-make-first-flight-this-year

- Daily Sabah 3 (2018) *Domestic UAV Bayraktar TB2 ensures success of TSK in Afrin*, Daily Sabah, March 23, 2019. [Visited September 9, 2019] https://www.dailysabah.com/defense/2018/03/23/domestic-uav-bayraktar-tb2-ensures-success-of-tsk-in-afrin

- Defenceweb (2019) *Turkish drone industry advances*, Defence Web, July 8, 2019. [Visited September 10, 2019] https://www.defenceweb.co.za/aerospace/unmanned-aerial-vehicles/turkish-drone-industry-advances/

- Farooq (2019) *How Turkey Defied the U.S. and Became a Killer Drone Power*. The Intercept. [Visited September 3, 2019] https://theintercept.com/2019/05/14/turkey-second-drone-age/

- Fortuny, Teresa de, i Bohigas, Xavier (2019) *Fons Europeu de Defensa. La voluntat de la UE d'incrementar la seva despesa militar i afavorir el sector armamentista*. Working Paper, Centre Delàs d'Estudis per la Pau. [Visited September 3, 2019] http://www.centredelas.org/ca/publicacions/pau-global/listid-1/mailid-350-nou-working-paper-del-centre-delas-fons-europeu-de-defensa-la-voluntat-de-la-ue-d-incrementar-la-seva-despesa-militar-i-afavorir-el-sector-armamentista?tmpl=component

- Frisk, A. (2018) *What is Project Maven? The Pentagon AI project Google employees want out of - National | Globalnews.ca*, *GlobalNews*. Visited [17 d'abril de 2019] https://globalnews.ca/news/4125382/google-pentagon-ai-project-maven/

- Funtowicz, S. O. and Ravetz, J. R. (2000) *La Ciencia posnormal: la ciencia con la gente*. Icaria editorial.

- Gettinger, Dan (2016) *Drones operating in Syria and Iraq*, Center for the Study of the Drone at Bard College. [Visited September 9, 2019] https://dronecenter.bard.edu/files/2016/12/Drones-in-Iraq-and-Syria-CSD.pdf

- Gettinger, Dan (2019) *The Drone Databook*, Center for the Study of the Drone at Bard College. Available at: https://dronecenter.bard.edu/files/2019/10/CSD-Drone-Databook-Web.pdf

- GoogleAI (2019) *Responsible AI Practices*, *AI Google*. [Visited September 3, 2019] https://ai.google/responsibilities/responsible-ai-practices/

- Gramsci, A. (1995) *Further selections from the prison notebooks*. 1st Edition. Saint Paul.University of Minnesota Press.

- Heyns, C. (2013) *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions, Christof Heyns*. United Nations. Geneva.

- Holland Michel, Arthur i Dan Gettinger (2018) *Drone Year in Review: 2017*. Center for the Study of the Drone at Bard College. January 2018. Available at: http://dronecenter.bard.edu/drone-year-in-review-2017/. [Visited September 30, 2019].

- Hurriyet Daily News (2019) *Turkish anti-drone technology rolled out against 'aerial threats'*. Hurriyet Daily News, 31 de gener de 2019. Visited [8 de September de 2019] http://www.hurriyetdailynews.com/turkish-anti-drone-technology-rolled-out-against-aerial-threats-140908

- ICRAC (2019) *No Title*, *ICRAC -statements-*. Available at: https://www.icrac.net/statements/ [Visited August 27, 2019].

- Infobae (2018) *La historia del hombre que salvó al mundo de la destrucción absoluta y que murió sin considerarse un héroe.* Infobae. Available at: https://www.infobae.com/america/mundo/2018/09/28/la-historia-del-hombre-que-salvo-al-mundo-de-la-destruccion-absoluta-y-que-murio-sin-considerarse-un-heroe/ [Visited August 27, 2019].

- Israel Defense (2019) *The Important Role of Turkish Drones in the Libyan War*. Israel Defense, July 29, 2019. [Visited September 9, 2019] https://www.israeldefense.co.il/en/node/39539

- ITU and XPRIZE (2017) *AI for Good Global Summit*. Geneva. Available at: https://www.itu.int/en/ITU-T/AI/Documents/Report/AI_for_Good_Global_Summit_Report_2017.pdf. [Visited March 27,2018].

- Jenkins Tony, Kent Shifferd, Patrick Hiller, David Swanson (2018), *A Global Security System: An Alternative to War*, pp. 59. World BEYOND War. [Visited August 27, 2019]. https://worldbeyondwar.org/alternative/

- Kayser, Daan and Beck, Alice (2018): *Crunch Time*. PAX Report, ISBN: 978-94-92487-31-5. PAX, November 2018: https://www.paxvoorvrede.nl/media/files/pax-rapport-crunch-time.pdf

- Lapaiev, Y. (2019) *Ukraine Buys Advanced Turkish Strike Drones*, Eurasia Daily Monitor. Volume: 16, Issue 15. [Visited September 8, 2019] https://jamestown.org/program/ukraine-buys-advanced-turkish-strike-drones/

- Leveringhaus, Alex (2017), *Autonomous weapons mini-series: Distance, weapons technology and humanity in armed conflict*. [Visited October 9, 2019]. https://blogs.icrc.org/law-and-policy/2017/10/06/distance-weapons-technology-and-humanity-in-armed-conflict/

- Martinez-Quirante, R. and Rodríguez-Alvarez, J. (2018) *Inteligencia artificial y armas letales autónomas: un nuevo reto para Naciones Unidas*. Trea Eds.. [Visited April 15, 2019]. https://www.trea.es/books/inteligencia-artificial-y-armas-letales-autonomas-un-nuevo-reto-para-naciones-unidas

- McLuhan, M. (1972) *Comprender los mediosde comunicación*. Tradución al castellano de Ed. Paidós (1996). Veure també*n*: *Comprender los medios de comunicación. Las extensiones del ser humano*. [Visited October 6, 2019]. http://www.unife.edu.pe/publicaciones/revistas/compunicacion/comunife15/Comprender%20los%20medios.pdf

- McQuillan, D. (2015) *Algorithmic states of exception*, European Journal of Cultural Studies. SAGE Publications. Sage UK: London, England, 18(4–5), pp. 564–576. Doi: 10.1177/1367549415577389

- New America (2019) *World of Drones: Examining the proliferation, development, and use of armed drones*, International Security Program. [Visited September 10, 2019]. https://www.newamerica.org/in-depth/world-of-drones/

- Nguyen, Anh (2015): *Deep Neural Networks are Easily Fooled: High Confidence Predictions for Unrecognizable Images*, IEEE CVPR Journal 2015. [Visited October 6, 2019]. https://www.cv-foundation.org/openaccess/content_cvpr_2015/papers/

- Noble, S. U. (2016) *Algorithms of oppression: how search engines reinforce racism*. NYU Press 2016.

- O'Neil, C. (2017) *Weapons of math destruction: how big data increases inequality and threatens democracy*. Broadway Books 2017.

- O'Gorman, Rob & Chris Abbott (2013) *Remote control war: Unmanned combat air vehicles in China, India, Israel, Iran, Russia and Turkey*, Open Briefing. [Visited September 10, 2019]. https://www.files.ethz.ch/isn/170021/Remote-Control-War.pdf

- Palmerini E., Azzarri F., Battaglia F., Bertolini A., Carnevale A., Carpaneto J., Cavallo F., Carlo A.D., Cempini M., Controzzi M., Koops B.J., Lucivero F., Mukerji N., Nocco L., Pirni A., Shah H., Salvini P., Schellekens M., Warwick K. (2016) Robolaw: *Guidelines on Regulating Robotics*. [Visited October 1, 2019]. https://scholar.google.es/scholar?cluster=2097126759126421322&hl=ca&as_sdt=2005&sciodt=0,5

- Potin, Jason (2018): *Greedy, Brittle, Opaque, and Shallow: The Downsides to Deep Learning*. Wired Ideas 2018. [Visited October 6, 2019]. https://www.wired.com/story/greedy-brittle-opaque-and-shallow-the-downsides-to-deep-learning/

- Pouyanfar, Samira et al. (2018): *A Survey on Deep Learning: Algorithms, Techniques, and Applications*. ACM Computing Surveys, Volume 51 Issue 5, November 2018: https://dl.acm.org/citation.cfm?id=3234150

- Ostreikovsky, V. A. *et al.* (2018) *Time Factor in the Theory of Anthropogenic Risk Prediction in Complex Dynamic Systems*. Journal of Physics: Conference Series. IOP Publishing, 944 (1), p. 012-085. Doi: 10.1088/1742-6596/944/1/012085.

- Ravetz, J. (1971) *Scientific knowledge and its social problems*. London: Penguin Books 1971.

- Rodríguez, J. (2016) *La civilización ausente: Tecnología y sociedad en la era de la incertidumbre*. 1st Edition, Trea Eds. 2016.

- Sismondo, S. (2017) *Post-truth?*, Social Studies of Science. SAGE Publications. Sage UK. London, England, 47(1), pp. 3–6. Doi: 10.1177/0306312717692076.

- RUSI (2019) *Armed Drones in the Middle East, The Proliferation of UAV Technology and Norms in the Region*. [Visited September 10, 2019]. https://drones.rusi.org/

- SASAD (2016) *Defense and Aviation Industry Performance Report 2016*. [Visited September 10, 2019]. http://www.sasad.org.tr/en/defense-and-aviation-industry-performance-report-2016

- Schulzke (2018) *Drone Proliferation and the Challenge of Regulating Dual-Use Technologies* International Studies Review, 1–21.[Visited October 6, 2019]. https://academic.oup.com/isr/article-abstract/21/3/497/4999288/

- Sharkey, Noel (2014): *Towards a principle for the human supervisory control of robot weapons*. UNOG. [Visited October 6, 2019]. https://www.unog.ch/80256EDD006B8954/(httpAssets)/2002471923EBF52AC1257CCC0047C791/$file/Article_Sharkey_PrincipleforHumanSupervisory.pdf

- Singer, Peter W. (2009) *Wired for War*. The Robotics Revolution and Conflicts in the 21st Century. New York. Penguin Press 2009.

- SKR (2018) *Campaign to Stop Killer Robots*. Visited [Visited October 6, 2019]. https://www.stopkillerrobots.org/

- Slijper, Frank; Beck, Alice i Daan Kayser (2019) *The State of AI*. PAX, Abril 2019. [Visited October 6, 2019]. https://www.paxforpeace.nl/publications/all-publications/the-state-of-ai

- STM (2019) *Kargu i Alpagu*. [Visited September 9, 2019]. https://www.stm.com.tr/en/products/kargu i https://www.stm.com.tr/en/products/alpagu

- Stohl & Dick (2018) *The Arms Trade Treaty and Drones*, Stimson Center Report. [Visited September 5, 2019]. https://www.stimson.org/content/arms-trade-treaty-and-drones

- Trevithick, Joseph (2019) *Boeing Is Building Big Orca Drone Subs For The Navy To Hunt And Lay Mines And More* - The Drive. [Visited August 27, 2019]. https://www.thedrive.com/the-war-zone/26513/boeing-is-building-the-navy-big-orca-submarine-drones-to-hunt-and-lay-mines-and-more

- UNODA (2019) *Convention on Certain Conventional Weapons*. Geneva. [Visited August 27, 2019]. www.un.org/disarmament

- Wagner, Markus (2014): *The Dehumanization of International Humanitarian Law: Legal, Ethical and Political Implications of Autonomous Weapon Systems*" Vanderbilt Journal of Transnational Law, Vol. 47, pá g. 1380. [Visited August 20, 2019]. https://www.researchgate.net/profile/Markus_Wagner11/publication/282747793_ The_Dehumanization_of_International_Humanitarian_Law_Legal_Ethical_and_Political _Implications_of_Autonomous_Weapon_Systems/links/561b394b08ae78721f9f907a/The-Dehumanization-of-International-Humanitarian-Law-Legal-Ethical-and-Political-Implications-of-Autonomous-Weapon-Systems.pdf

- War is Boring (2018) *Turkey's Drones Target Kurdish Militants*, War is Boring, 22 October de 2019. [Visited September 9, 2019]. https://warisboring.com/turkeys-drones-target-kurdish-militants/

- Weinberger, S. (2018) *China Has Already Won the Drone Wars*, Foreign Policy. [Visited September 6, 2019]. https://foreignpolicy.com/2018/05/10/china-trump-middle-east-drone-wars/

- Winfield, Alan, and Jirotka, Marina (2017): *The Case for an Ethical Black Box*. Proc. of the Annual Conference Towards Autonomous Robotic Systems TAROS 2017, Towards Autonomous Robotic Systems, pp. 262-273: https://link.springer.com/chapter/10.1007/978-3-319-64107-2_21

- Woodhams, George and Borrie, John (2018): *Armed UAVs in conflict escalation and inter-State crisis*, The United Nations Institute for Disarmament Research (UNIDIR) 2018. [Visited October 6, 2019]. http://www.unidir.org/files/publications/pdfs/armed-uavs-in-conflict-escalation-and-inter-state-crises-en-727.pdf

- Zenko & Kreps (2014) *Limiting Armed Drone Proliferation*. Council on Foreign Relations. Proliferation Council Special Report No. 69. [Visited September 4, 2019]. https://www.cfr.org/report/limiting-armed-drone-proliferation

- Zwijnenburg & Postma (2018) *Unmanned Ambitions: Security implications of growing proliferation in emerging military drone markets*, PAX Report. [Visited September 4, 2019]. https://www.paxforpeace.nl/publications/all-publications/unmanned-ambitions

ANNEX 1

PARTIAL LIST OF INFORMATION ON COUNTRIES, COMPANIES / ORGANIZATIONS, AND MILITARY DRONES (FROM DECEMBER 2017 UNTIL MAY 2019, BOTH INCLUDED)

The columns show the date of the news, the country, the entity that financed the operation, the company / organization receiving the funds, the name of the drone, the drone type, the buyer country (if applicable), the description of the news, the cost (if known), the information source, and the website that complements the information.

CHRONOLOGICAL LIST

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
12/17	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	project: integrate small diameter GBU-39B/B bomb into MQ-9	$17.5	US Departement of Defense	https://dod.defense.gov/News/Contracts/Contract-View/Article/1381242/
12/17	USA	U.S. Navy	SeeByte	MK-18	submarine armed drone	--	project: engineering and technical suport	$ 22.6	Shepard Media	https://www.shephardmedia.com/news/uv-online/seebyte-wins-mk18-uuv-support-contract/
12/17	USA	U.S. Army	General Atomics Aeronautical Systems	MQ-1C Gray Eagle	armed drone	--	project: logistic services	$ 94.6	DoD	https://www.defense.gov/News/Contracts/Contract-View/Article/1398382/
12/17	USA	Lebanese Air Forces	Boeing Insitu	ScanEagle	reconnaissance drone	Lebanon	purchase: 6 ScanEagle drones as a part of an armament purchase worth 120 million $	$ 120	Jane's	http://www.janes.com/article/76418/lebanon-to-receive-md-530g-helicopters
12/17	USA	U.S. Marine Corps	AAI Corporation	RQ-7B Shadow	reconnaissance drone	--	manoeuvre: last flight of RQ-7B Shadow	--	U.S. Marine Corps	http://www.marines.mil/News/News-Display/Article/1400840/marines-say-goodbye-to-the-shadow/
01/18	China	China Aeronautics Industry Corporation	Chengdu Aircraft Industry Group	Wing Loong II	armed drone	--	presentation and testing: the drone destroyed 5 land targets using 5 missiles of diferent types	--	Xinhua	http://www.xinhuanet.com/english/2017-12/31/c_136863482.htm
01/18	China	China Aeronautics Industry Corporation	Chengdu Aircraft Industry Group	Wing Loong ID o Chengdu Pterodactyl	armed drone	--	presentation: from Wing Loong ID, variant of the Chinese family of long-endurance and medium-altitude drones	--	New Atlas	https://newatlas.com/quaternium-record-endurance-dron-flight/52758/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
01/18	Russia	--	Kalashnikov Group	Soratnik	autonomous land vehicle	--	testing: in conditions close to those of a combat	--	The National Interest	http://nationalinterest.org/blog/the-buzz/russia-tests-new-unmanned-ground-combate-vehículo-near-combate-24164
01/18	USA	U.S. Navy	Northrop Grumman	MQ-4C Triton	reconnaissance drone	--	contract: purchase contract extension	$ 255.3	DoD	https://www.defense.gov/News/Contracts/Contract-View/Article/1405313/
01/18	USA	U.S. Air Force	Aurora Flight Sciences	Orion	loitering drone: large autonomy (more than 100 hours)	--	purchase: medium-altitude loitering drone (https://en.wikipedia.org/wiki/Aurora_Flight_Sciences_Orion)	$ 48	Shephard Media	https://www.shephardmedia.com/news/uv-online/aurora-secures-orion-uas-development-contract/
01/18	USA	U.S. Navy	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	Afganistan	contract: for MQ-9 Reaper operations during a year in Afganistan	--	The drive	http://www.thedrive.com/the-war-zone/17571/us-navy-wants-to-hire-contractors-to-fly-their-own-mq-9-reaper-drones-in-afghanistan
01/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	contract: suport and services	$ 328.8 (in combination with MQ-1 Predator)	UPI - Defense News	https://www.upi.com/Defense-News/2017/12/26/General-Atomics-receives-more-than-3288M-for-dron-systems/5491514301305/
01/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-1 Predator	armed drone	--	contract: suport and services	$ 328.8 (in combination with MQ-9 Reaper)	UPI - Defense News	https://www.upi.com/Defense-News/2017/12/26/General-Atomics-receives-more-than-3288M-for-dron-systems/5491514301305/
01/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	contract: software development	$ 49.3	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1425283/
01/18	USA	U.S. Navy	Sierra Nevada Corporation	MQ-4C Triton	reconnaissance drone	--	contract: contract increase due to new requirements (https://en.wikipedia.org/wiki/Northrop_Grumman_MQ-4C_Triton)	$ 45	FBO	https://www.fbo.gov/index?s=opportunity&mode=form&id=4084e9f6f25ac158a39bb04c07970c69&tab=core&_cview=0

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
02/18	USA	U.S. Marine Corps	InstantEye Robotics	Mk-2 GEN 3	mini-drones	--	purchase: of 800 Mk-2 GEN 3 reconnaissance mini-drones. Drones will support deployed marines, providing organic surveillance and reconnaissance capabilities	--	Unmanned Systems Technology	https://www.unmannedsystemstechnology.com/2018/02/united-states-marine-corps-selects-instanteye-multi-mission-uas/
02/18	USA	U.S. Army	General Atomics Aeronautical Systems	MQ-1C Grey Eagle	reconnaissance and combat drone	USA bases in South Korea	deployment: for a US base in Gunsan, South Korea	--	Chosum	http://english.chosun.com/m/svc/article.html?contid=2018022000915
02/18	Israel	German Army, Bundeswehr	División Malat de Israel Aerospace Industries	IAI Heron or Majatz-1	reconnaissance drone	Germany	purchase: The SPD and CDU parties in Germany have agreed to lease the drone of the IAI Heron TP	--	Handelsblatt	https://www.handelsblatt.com/politik/deutschland/koalitionsverhandlungen-groko-einigt-sich-auf-drohnen-fuer-die-bundeswehr/20918014.html
02/18	Iran	Iran's Ministry of Defense	--	copia Iraniana del RQ-170 Sentinel	armed drone	--	combat: Israel struck down an Iranian drone that according to Israel was a copy of the RQ-170 Sentinel, a stealth spy drone from the United States (Lockheed Martin). The Iranian drone, launched from Siberia, was shot down inside Israel. Iran captured a US RQ-170 in 2011 and claims that it has been doing drone reverse engineering	--	Washington Post	https://www.washingtonpost.com/world/israel-confirms-downed-jet-was-hit-by-syrian-antiaircraft-fire/2018/02/11/bd42a0b2-0f13-11e8-8ea1-c1d91fcec3fe_story.html?utm_term=.e02c5aed09d8

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
02/18	Italy	--	Collective Wisdom Technology (empresa Xino-Italyna)	Spider 103	reconnaissance drone	China	presentation: semi-autonomous reconnaissance drone (http://defenceand technology.com/2018/02/10/spider-103-vtol-uas-at-singapur-airshow-2018/)	--	Jane's	http://www.janes.com/article/77757/singapore-airshow-2018-sino-italyn-jv-develops-spider-103-uav
02/18	China	--	China National Aero-Technology Import and Export Corporation (CATIC)	U8EW	reconnaissance and combat drone	--	presentation: reconnaissance and combat drone (http://www.catic.cn/front)	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/singapore-airshow-2018-china-promotes-weaponi/
02/18	Israel	Greece's Ministry of Defense	División Malat de Israel Aerospace Industries	Heron	reconnaissance drone	Greece	purchase: lease contract (3 years) of the IAI Heron drone	$ 44	Jane's	http://www.janes.com/article/77680/greece-to-lease-heron-uavs-from-israel
02/18	Iran	Iran's Ministry of Defense	--	Mohajer 6	armed drone	--	production: start of serial production of Mohajer 6 (https://en.mehrnews.com/news/147747/Mohajer-6-combate-drones-join-Iranian-Army)	--	Jane's	http://www.janes.com/article/77677/Iran-s-mohajer-6-armed-uav-goes-into-production
02/18	Turkey	Turkish Air Force	Turkish Aerospace Industries	Anka-S	reconnaissance and combat drone	--	deployment: The Turkish Air Force have received the first two fully operational TAI Anka-S reconnaissance and combat drones	--	Jane's	http://www.janes.com/article/77660/turkey-receives-first-pair-of-anka-s-uavs
02/18	Nigeria	Nigerian Air Force	Nigeria's Air Force	Tsaigumi	reconnaissance drone	--	presentation: of Tsaigumi drone (https://en.wikipedia.org/wiki/Tsaigumi) Nigeria redevelops an armed drone in the near future	--	Jane's	http://www.janes.com/article/77980/nigerian-air-force-to-develop-armed-uav

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
02/18	USA	Canadian National Defense Department	AeroVironment	Puma AE	reconnaissance drone	Canada	purchase: of Puma AE drones for the Royal Canadian Navy	$ 6.35	Shephard Media	https://www.shephardmedia.com/news/uv-online/mda-deliver-mmuas-rcn/
02/18	USA	Defense Advanced Research Projects Agency	Northrop Grumman	OFFSET swarm Program	drone swarm	--	project: The United States Defense Advanced Research Project Agency has selected Northrop Grumman to participate in OFFSET, a program to develop swarms of drones	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/darpa-selects-northrop-offset-programme/
02/18	USA	Indonesian Navy	Boeing Insitu	Scan Eagle	reconnaissance drone	Indonesia	purchase: of 4 Scan Eagle drones	--	Jane's	http://www.janes.com/article/78118/indonesian-navy-to-receive-four-scaneagle-uavs-in-2018
02/18	India	Indian Government	Organització de Inverstigación en Defensa i Desarrollo de India	Rustom 2	armed drone	--	testing: satisfactory test flight	--	Economic Times	https://economictimes.indiatimes.com/news/defence/drdo-successfully-carries-out-test-flight-of-rustom-2-dron/articleshow/63068375.cms
03/18	China	Aerospace China's Academy	Aerodynamics	CH-4C	reconnaissance armed drone	--	project: new variant of the Caihong-4 called CH-4C: it will have a greater load capacity and an improved electronics and will be armed with 100 Kg precision guided bombs	--	Jane's	http://www.janes.com/article/78269/china-s-casc-readies-improved-ch-4-uav
03/18	USA	--	AeroVironment	RQ-20B Puma II AE	reconnaissance drone	A Middle East Country	purchase	$ 44.5	Jane's	https://www.janes.com/article/78411/aerovironment-contratod-to-supply-puma-ae-uas-to-middle-east-customer
03/18	USA	U.S. Army	AeroVironment	Switchblade	loitering drone	--	contract: contract modification	$ 9.3	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1474871/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
03/18	USA	--	Lockheed Martin Skunk Works	X-44A	armed drone	--	presentation: secret drone that is believed to be useful for the development of the RQ-170 Sentinel, a CIA classified drone (https://es.wikipedia.org/wiki/Lockheed_Martin_RQ-170_Sentinel)	--	The Drive	https://www.thedrive.com/the-war-zone/19582/exclusive-photos-lockheed-skunk-works-x-44a-flying-wing-dron-breaks-cover
03/18	Russia	Russia's Ministry of Defense	--	nom encara no decidit	submarine armed drone	--	presentation: President Vladimir Putin provided new details on the development of this submarine drone equipped with nuclear weapons	--	Associated Press	https://apnews.com/de8fb0159f314a849e1c36ff975c4637?utm_campaign=SocialFlow&utm_source=Twitter&utm_medium=AP
03/18	Italy	Italy's Ministry of Defense	Leonardo + Finmeccanica - AgustaWestland	SW-4 Solo	reconnaissance drone	--	presentation: SW-4 can perform various activities, including personnel transportation, surveillance and combat intervention	--	Unmanned Systems Technology	http://www.unmannedsystemstechnology.com/2018/02/solo-optionally-piloted-helicopter-completes-first-unmanned-flight/
03/18	France	France's Ministry of Defense	ECA Group	A18-M	submarine drone	--	presentation: underwater anti-mine dron	--	Unmanned Systems Technology	http://www.unmannedsystemstechnology.com/2018/02/eca-group-develops-new-mine-countermeasures-auv/
03/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	presentation: Start of operations of the 50th Attack Squadron, which will operate the MQ-9 Reaper drones from the base of the Shaw Air Force in South Carolina	--	The Sumter Item	http://theitem.com/stories/shaw-mq-9-reaper-squadron-activates-appoints-commander,304211

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
03/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-1 Predator	armed drone	--	Fin de operación: The United States Air Force officially withdrew the Predator MQ-1, which played a key role in the new era of unmanned warfare. Displaced in 1995 and armed in 2001, the Predator intervened in thousands of missions in the wars of Iraq and Afghanistan, as well as in undeclared war zones	--	Bloomberg Gobiernoment	https://about.bgov.com/blog/air-force-retiring-predator-dron-changed-world/
03/18	Turkey	Qatar's Monitoring and reconnaissance Centre	Baykar Makina	Bayraktar-TB2	armed drone	Qatar	purchase: of 6 Bayraktar-TB2 drones	--	Jane's	http://www.janes.com/article/78581/dimdex-2018-qatar-orders-bayraktar-uavs
03/18	USA	Egypt's Government via U.S. Army	AeroVironment	RQ-20B Puma AE II	reconnaissance drone	Egypt	purchase	$ 9.1	DoD	https://www.defense.gov/News/Contracts/Contract-View/Article/1468905/
03/18	USA	Philippines' Air Force	Boeing Insitu	ScanEagle	reconnaissance drone	Philippines	purchase: of 6 ScanEagle drones (https://es.wikipedia.org/wiki/Boeing_Insitu_ScanEagle)	--	Jane's	http://www.janes.com/article/78553/us-delivers-scaneagle-uas-to-philippine-air-force
03/18	USA	U.S. Army	AeroVironment	Switchblade	loitering drone - kamikaze drone that crashes with the target and an explosive objectto destroy it	--	contract: modification / complement of the previous contract	$ 9.3	DoD	https://www.defense.gov/News/Contracts/Contract-View/Article/1474871/
03/18	China	Peoples Liberation Army	--	Xianglong	reconnaissance drone	--	deployment: from the high-altitude and long-endurance Xianglong drone, at the base of Yishuntun and on the island of Hainan	--	Offiziere	http://www.janes.com/article/78751/xianglong-uavs-spuedeted-on-china-s-hainan-island + https://offiziere.ch/?p=33037

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
04/18	USA	U.S. Navy	Boeing Insitu	ScanEagle	reconnaissance drone	Afganistan	purchase: drones for the Government of Afghanistan	$ 47	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1478347/
04/18	USA	U.S. Navy	Boeing Insitu	RQ-21A Blackjack	reconnaissance drone: https://en.wikipedia.org/wiki/Boeing_Insitu_RQ-21_Blackjack	Poland	purchase: modification of the purchase agreement by the Government of Poland	$ 11.4	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1481376/
04/18	USA	U.S. Army	AeroVironment	RQ-20B Puma AE II	reconnaissance drone	Latvia	purchase: two drones for the Government of Latvia	$ 1.96	FBO	https://www.fbo.gov/index?s=opportunity&mode=form&id=dad5b4e2ba683b018980dfe9aecd8de3&tab=core&_cview=0
04/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9B Protector	armed drone	United Kingdom	purchase: for the Government of the United Kingdom	$ 80.9	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1481376/
04/18	Italy	Italy's Defense Ministry	Piaggio Aerospace	P.2HH Hammerhead	reconnaissance drone	--	project: the Italian Defense Ministry asks for 951 million dollars to Parliament to manufacture the P.2HH, the first Italian drone of medium-altitude, reconnaissance and long-endurance for tasks of reconnaissance, intelligence and vigilance	$ 951	Defense News	https://www.defensenews.com/unmanned/2018/03/27/italy-plans-to-spend-951m-on-20-surveillance-drones/
04/18	USA	U.S. State Department	Northrop Grumman	MQ-4C Triton	reconnaissance drone	Germany	autorización de venda: de 4 drones MQ-4C Triton - pendiente de la aprobación para parte del Gobierno alemán	$ 2500	FlightGlobal	https://www.flightglobal.com/news/articles/puedeential-mq-4c-sale-to-germaño-moves-forward-447359/
04/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	project: production order	$ 295.7	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1479983/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
04/18	USA	--	L3 Technologies	Iver Precision Workhorse	submarine reconnaissance and combat drone	--	presentation: unmanned submarine vehicle designed for various purposes that include surveillance, anti-submarine warfare and war on mine	--	Unmanned Systems Technology	https://www.unmannedsystemstechnology.com/2018/04/l3-technologies-unveils-new-advanced-military-auv/
04/18	India	Indian Defense and Security Forces	Mahindra Defense	Orbiter 4	reconnaissance and combat drone	Israel	project: joint development (Mahindra Defense and Israel Aeronautics) of a variant of the Orbiter 4 for the Indian Navy	--	Times of Israel	https://www.timesofisrael.com/indias-mahindra-parteners-with-israels-aeronautics-to-make-drones/
04/18	India	Indian Defense and Security Forces	Cyient	nous drones dissenyats per obtenir informació intel·ligent encoberta en temps real i actuar en missions tàctiques en zonas obertes o entorns urbans concorreguts	armed drone	Israel	project: joint development (Cyient of India + Bluebird Aero Systems of Israel) of new drones	--	Economic Times	https://economictimes.indiatimes.com/news/defence/mou-signed-to-produce-uav-systems-for-defence-Fuerzas/articleshow/63714508.cms
04/18	USA	U.S. Navy	Raytheon	Barracuda	submarine drone to neutralize mines	--	project: production of the drones	$ 83.3	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1495974/
04/18	USA	--	Aeryon Labs	R80D Sky Raider	reconnaissance drone	--	announce: multirotor surveillance drone, designed for defense agencies and governments	--	Unmanned Systems Technology	https://www.unmannedsystemstechnology.com/2018/04/new-vtol-suas-announced-u-s-departement-defense-federal-agencies/
04/18	USA	--	Riptide Autonomous Solutions	MK II	submarine reconnaissance drone	--	presentation: micro-submarine drone with 40 hours autonomy	--	Subsea world news	https://subseaworldnews.com/2018/03/21/riptide-introduces-new-micro-uuv/
04/18	USA	U.S. State Department	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	United Kingdom	sales authorization: logistical support for the MQ-9 Reaper	$ 500	DSCA	http://www.dsca.mil/major-arms-sales/united-kingdom-mq-9-continuing-contractor-logistics-support

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
04/18	USA	--	Aquabotix	SwarmDiver	submarine drone swarm	--	presentation: of a swarm system of underwater drones for reconnaissance and attack	--	Engadget	https://www.engadget.com/2018/04/11/aquabotix-aquatic-dron-swarm/
04/18	Ukraine	Ukraine's Ministry of Defense	Ukrspecsystems	RAM	loitering drone	--	presentation: loitering drone carrying 3 kilos of explosive charge	--	Jane's	http://www.janes.com/article/79289/ukrspecsystems-unveils-ram-uav-loitering-munition
04/18	Italy	Italian Direction of Armament and Airworthiness	Leonardo	Mirach-40	target drone - https://en.wikipedia.org/wiki/Target_drone	--	authorization: for military operations	--	Unmanned Systems Technology	http://www.unmannedsystemstechnology.com/2018/04/leonardo-target-dron-authorised-military-operations/
04/18	USA	U.S. Army	AeroVironment	Switchblade	loitering drone	--	project	$ 44.7	DoD	https://www.defense.gov/News/Contracts/Contract-View/Article/1499976/
04/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	purchase: motors' spare parts and containers for the transmission of motors	$ 36.7	DoD	https://www.defense.gov/News/Contracts/Contract-View/Article/1504779/
05/18	Germany	--	Lange Aviation	Antares E2	reconnaissance drone	--	presentation: Monitoring drone with fuel cell with autonomy of up to 40 hours	--	Aviation week	https://aviationweek.com/intelligence-surveillance-reconnaissance/antares-e2-brings-new-benefits-unmanned-surveillance
05/18	Israel	Azerbaidjan's Army	Elbit Systems	Hermes 900	loitering: reconnaissance drone	Azerbaijan	purchase	--	Jane's	http://www.janes.com/article/79686/azerbaijan-shows-hermes-900
05/18	USA	German Army, Bundeswehr	AeroVironment	RQ-20B Puma AE II	reconnaissance drone	Germany	purchase: for the German Marine	--	Jane's	http://www.janes.com/article/79928/german-navy-to-field-puma-ii-uas

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
05/18	Europe	European Union	empresas de defensa	LAWS	autonomous armed drones	--	projects: The European Union will allow companies in the military industry to request financing for the development of autonomous lethal weapons. According to two unnamed sources, some members of the Parliament initially opposed this possibility, but then agreed to allow defense companies to access the Union fund of 500 million euros	€ 500	Eu observer	https://euobserver.com/science/141885
05/18	United Kingdom	UK's Ministry of Defense	--	Reaper	armed drone	--	combat: The Royal Air Force has acknowledged that it fired thermobaric bombs with its Reaper drone fleet during operations in Siberia	--	Middle East Eye	http://www.middleeasteye.net/news/uk-drones-syria-using-controversial-vacuum-bombs-478492745
05/18	USA	U.S. Army	Lockheed Martin	Indago 3	reconnaissance drone	--	presentation: of an improved version of the 4-rotor Indron 3 drone, equipped with an infrared camera	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/lockheed-upgrades-indago-3-ir-system/
05/18	USA	U.S. Army	General Atomics Aeronautical Systems	Guardian - https://www.militaryfactory.com/aircraft/detail.asp?aircraft_id=1199	armed drone	--	presentation: of the medium-altitude and long-endurance Guardian drone in the island Iki of Japan	--	Unmanned Systems Technology	http://www.unmannedsystemstechnology.com/2018/05/guardian-uas-demonstration-flights-performed-in-japan/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
05/18	USA / Norway	Netherlands' Ministry of Defense	Flir Systems / Prox Dynamics	Black Hornet	mini-reconnaissance drone	Netherlands	purchase: of a group of Black Hornet mini-drones by the Dutch Army and Navy	--	Jane's	http://www.janes.com/article/79816/netherlands-procures-black-hornet-micro-uavs
05/18	China	Royal Jordan Air Force	CASC	CH-4	reconnaissance armed drone	Jornadia	presentation: at the SOFEX 2018 fair	--	Shephard News	https://www.shephardmedia.com/news/uv-online/sofex-2018-jordanian-ch-4-makes-public-debut/
05/18	Russia	Russia's Ministry of Defense	Rostec	Eleron-3	reconnaissance drone	--	purchase: of 30 Eleron-3 drones	--	Shephard News	https://www.shephardmedia.com/news/uv-online/russian-mod-receive-eleron-3-uas/
05/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	contract: for improvements of 122 MQ-9 Reaper drones (new features and communication kits)	$ 206	Military Aerospace	http://www.militaryaerospace.com/articles/2018/05/mq-9-block-5-reaper-attack-drones-unmanned.html
05/18	USA	U.S. Army	Lockheed Martin	Stalker Extended Endurance	reconnaissance drone	--	presentation: drone of reconnaissance and vertical takeoff and landing	--	Jane's	http://www.janes.com/article/80305/sofic-2018-lockheed-martin-unveils-stalker-xe-vtol-unmanned-aircraft
05/18	USA	U.S. Army	AeroVironment	Shrike 2	armed drone	--	presentation: enhanced version of the Shrike drone, with vertical takeoff	--	Jane's	http://www.janes.com/article/80303/sofic-2018-aerovironment-s-introduces-shrike-2-vtol-fixed-wing-platform
05/18	Italy	--	Leonardo + Thales	Piaggio Aero P.1HH Hammerhead	reconnaissance drone	France (Thales)	testing: first flight controlled by satellite of the drone of medium-altitude and long-endurance	--	Jane's	http://www.janes.com/article/80266/european-male-uav-flies-under-satellite-control-for-first-time
05/18	Turkey	--	industrias Aeroespacials turques	Anka	armed drone	Kazakhstan	project: together the Turkish Aerospace Industries and the Kazakhstan Aviation Industry for the development and manufacture of Anka drones	--	Jane's	http://www.janes.com/article/80315/kadex-2018-tai-kai-sign-mou-on-anka-uavs-and-hurkus-jet-trainers
06/18	USA / Norway	Australia's Ministry of Defense	Flir Systems / Prox Dynamics	PD-100 Black Hornet	mini-reconnaissance drone	Australia	deployment: in the Australian Army	--	Australian Aviation	https://australianaviation.com.au/2018/05/army-rolls-out-black-hornet-nano-uas/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
06/18	USA	U.S. Navy	Northrop Grumman	MQ-4C Triton	reconnaissance drone	--	deployment: high-altitude and high autonomy drone in the squadron of unmanned VUP-19 systems at the naval base of Ventura County in Point Mugu and Guam	--	Aviationist	https://theaviationist.com/2018/06/10/u-s-navy-inducts-mq-4c-triton-unmanned-aéreoal-vehículo-into-service-ahead-of-first-operational-deployment-to-guam/
06/18	China	China's Army	Ziyan	Blue Fish	armed drone	--	presentation: electric drone helicopter type armed with grenades	--	Army recon-naissance	https://www.armyreconnaissance.com/eurosatory_2018_official_news_online/eurosatory_2018_ziyan_electric_helicopter_dron_for_attack_and_surveillance.html
06/18	Serbia	Serbia's Ministry of Defense	Yugoimport	X-01 Strsljen	armed drone	--	presentation	--	Jane's	https://pleronix.com/feed-items/eurosatory-2018-yugoimport-showcases-x-01-strsljen-armed-vtol-uav/
06/18	USA	--	Flir Systems	Black Hornet 3	reconnaissance drone	--	presentation: surveillance nano drone that can work in areas without GPS	--	Jane's	http://www.janes.com/article/80740/flir-systems-adds-black-hornet-3-to-its-prs-family-of-micro-uavs
06/18	Israel	Israel's Department of Defense	Israel Aerospace Industries	BirdEye 650-D + RoBattle UGV	border surveillance drone	--	presentation: it combines an unmanned land vehicle with a fixed wing drone	--	Times of Israel	https://www.timesofisrael.com/iai-develops-ground-to-air-robot-system-for-border-surveillance/
06/18	Poland	Poland's Army	WB Electronics	Warmadoe	armed drone	--	combat exercises: Warmadoe test in combat exercises	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/eurosatory-2018-warmadoe-fires-combate-exercise/
06/18	USA	U.S. Coast Guard	Boeing Insitu	Scaneagle	reconnaissance drone	--	contract: of purchasing ScanEagle drones	$ 117	Jane's	http://www.janes.com/article/80717/update-us-coast-guard-awards-insitu-contract-for-suas-on-national-security-cutters
06/18	Israel	Germany's Ministry of Defense	Israel Aerospace Industries	Heron TP	reconnaissance drone	Germany	purchase: with leasing contract - Heron TP drone replaces Heron 1 drones that were used in Mali and Afghanistan	--	Defense News	https://www.defensenews.com/unmanned/2018/06/14/german-lawmakers-approve-dron-deal-with-israel/
06/18	France	--	Elistair	Ligh-T V.3	reconnaissance drone	--	presentation: monitoring multirotor dron, tied with cable	--	Jane's	http://www.janes.com/article/81120/eurosatory-2018-elistair-expands-tethered-uav-portfolio?from_rss=1

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
06/18	Austria	France's Navy	Schiebel	S-100	reconnaissance drone	France	deployment: on Dixmude amphibious ships (https://en.wikipedia.org/wiki/Schiebel_Camcopter_S-100)	--	Jane's	http://www.janes.com/article/80935/french-navy-embarks-s-100-camcopter-on-inaugural-jeanne-d-arc-task-force-deployment
06/18	USA	U.S. Navy	Northrop Grumman	RQ-4 Global Hawk BAMS-D	reconnaissance drone	--	contract: operation and maintenance, until the Navy MQ-4C Triton comes into service	$ 189	Aviation Week	http://aviationweek.com/defense/us-navy-s-bams-d-fly-triton-nears-deployment
06/18	India	India Government	Organització de Defensa de Investigació y Desarrollo	Rustom-2	reconnaissance drone	--	project: the drone will be ready and will be deployed by 2020	--	The Times of India	https://timesofindia.indiatimes.com/city/pune/rustom-2-drones-set-to-be-ready-by-2020-drdo-chief/articleshow/64324935.cms
06/18	Spain	Ministry of Defense	Thales Group	Fulmar	reconnaissance drone	--	purchase: of several drones by the Spanish Navy and Army (https://en.wikipedia.org/wiki/Thales_Fulmar)	--	Jane's	http://www.janes.com/article/81033/spain-orders-more-fulmar-uavs
06/18	USA	--	General Atomics Aeronautical Systems	MQ-9B SkyGuardian	armed drone	--	testing: of the drone of medium-altitude and long-endurance, in a ray environment	--	Press Release	http://www.ga-asi.com/ga-asi-conducts-successful-lightning-tests-on-mq-9b
07/18	USA	U.S. Navy	Raytheon	Coyote	drone swarm	--	contract: jobs related to low cost Coyote swarms (https://www.raytheon.com/news/feature/mind-swarm)	$ 29.7	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1560786/
07/18	Israel	Thailand's Army	Elbit	Hermes 450	loitering: reconnaissance drone	Thailand	purchase: drone of medium-altitude and long-endurance	--	Aviation International Online	https://www.ainonline.com/aviation-news/defense/2018-06-25/thailand-introduces-elbits-hermes-450-uas
07/18	USA	Lebanon's Army	Boeing Insitu	ScanEagle	reconnaissance drone	Lebanon	purchase	$ 8.2	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1564122/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
07/18	Latvia	Latvia's Army	UAV Factory	Penguin C	reconnaissance drone	--	purchase: of an indeterminate number of the tactical drone of fixed wings Penguin C (http://www.uavfactory.com/product/74)	--	Jane's	https://www.janes.com/article/87150/latvia-acquires-penguin-c-long-endurance-uavs
07/18	Belarus	Belarus' Army	Scientific-Manufacturing Centro of Multipurpose Unmanned Systems (NPTs MBK) of Belarus	Burevestnik-MB	armed drone	--	presentation: two armed drones Burevestnik-MB (each one can carry two loitering drones)	--	Jane's + UAS Vision	https://www.uasvision.com/2018/07/12/burevestnik-mb-armed-dron-for-belarus-army/
07/18	Belarus	Belarus' Army	Scientific-Manufacturing Centro of Multipurpose Unmanned Systems (NPTs MBK) of Belarus	Busel-MB	reconnaissance drone	--	presentation	--	UAS Vision	https://www.uasvision.com/2018/07/12/burevestnik-mb-armed-dron-for-belarus-army/
07/18	USA	U.S. Air Force	Rolls-Royce	MQ-4C Triton + RQ-4 Global Hawk	reconnaissance drone	United Kingdom	contract: maintenance and repair of engines	$ 420	UPI	https://www.upi.com/Defense-News/2018/07/05/Rolls-Royce-awarded-420M-contract-for-dron-engines/5081530794511/
07/18	USA	Norway's Army	AeroVironment	RQ-20B Puma II AE + RQ 12-A WASP Block IV	reconnaissance drone	Norway	purchase: of several drones	$ 17.6	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1585779/
07/18	USA	U.S. Navy	Kratos Defense & Security Solutions	BQM-177A	target drone	--	deployment: drone to act as an advanced, subsonic, recoverable air target	--	Unmanned Systems Technology	https://www.unmannedsystemstechnology.com/2018/07/kratos-delivers-unmanned-aéreoal-target-system-to-u-s-navy/
07/18	USA	Netherlands' Government	General Atomics Aeronautical Systems	MQ-9 Reaper	reconnaissance armed drone	Netherlands	purchase: of non armed drones	--	Defense News	https://www.defensenews.com/digital-show-dailies/farnborough/2018/07/17/netherlands-signs-deal-for-unarmed-mq-9-reaper-drones/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
07/18	Hungary	--	Eötvös University	--	loitering drone	--	presentation: model of the complex behavior of the swarms, which allows several dozen drones to work in synchrony (like a swarm) without any central control system	--	Wired	https://www.wired.com/story/how-a-flock-of-drones-developed-collective-intelligence/
07/18	USA	--	U.S. Marine Corps Warfighting Laboratory	Loitering	loitering drone	--	project: study of a system so that a single soldier on the ground can operate up to 15 loitering drones simultaneously	--	Marine Corps Times	https://www.marinecorpstimes.com/news/your-marine-corps/2018/07/20/the-corps-wants-15-suicide-drones-swarming-from-the-hands-of-one-front-line-marine/
08/18	China	United Arab Emirates	AVIC - Chengdu Aircraft Industry Group	Wing Loong II	armed drone	United Arab Emirates	deployment: the satellite images of early August seem to show that the United Arab Emirates have at least deployed a mid-range resistance and long-endurance drone Wing Loong II at its Assab airport base in Eritrea. The UEA already maintains a fleet of manned aircraft at the base, which uses for operations in Yemen	--	Jane's	https://www.janes.com/article/82382/uae-deploys-wing-loong-ii-uav-to-eritrea
08/18	Ukraine	--	Matrix UAV	Demon	armed drone	--	presentation: small drone of 4 rotors equipped with an RPG-26 grenade launcher	--	Defence Blog	https://defence-blog.com/aviation/ukrainian-compaño-unveils-new-dron-with-grenade-launcher.html

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
08/18	Sweden	Germany's Navy	Saab	UMS Skeldar V-200	reconnaissance drone	Germany	purchase: of 2 Skeldar, which serve for surveillance tasks, gathering information, transporting light goods and electronic warfare	--	Navy reconnaissance	https://www.navyreconnaissance.com/index.php/news/defence-news/2018/august-2018-navy-naval-defense-news/6428-german-navy-selects-skeldar-v-200-vtol-uav-for-k130-corvettes.html
08/18	China	Chile's Navy	DJI Technology	DJI Magic Pro	armed drone	Chile	purchase: for the security of the perimeter of the base of Fort Fèlix Aguayo	--	Jane's	https://www.janes.com/article/82419/chilean-navy-buys-chinese-uav-to-secure-facilities
08/18	Turkey	Turkey's Army	Turkish Aerospace Industries	Anka-S	armed drone	--	testing: destruction of a Smart Micro Munition missile with an Anka-S drone controlled from the satellite	--	Jane's	https://www.janes.com/article/82468/satellite-controlled-anka-s-uav-fires-guided-munitions
08/18	Brazil	--	FT Sistemas	Flettner Helicopter FT-100FH	dual-use drone	--	testing: advanced flight test	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/new-design-ft-100fh-advances-flight-testing-campai/
08/18	USA	U.S. Navy	Boeing Insitu	ScanEagle	reconnaissance drone	Czech Republic	purchase: spare parts for the Scan Eagle drone purchased by Czech Republic (https://es.wikipedia.org/wiki/Boeing_Insitu_ScanEagle)	$ 414	FBO	https://www.fbo.gov/index?s=opportunity&mode=form&id=894ebc71c603ae50f178e21ae1b55548&tab=core&_cview=1
08/18	Israel	Thailand's Ministry of Defense	Aeronautics Defense Systems	Dominator	armed drone	Thailand	purchase: of the Dominator drone that can transport up to 1,900 kilograms in special loads (such as a camera, radar or bombs) simultaneously; it can be kept in the air for 20 hours	--	Globes	https://en.globes.co.il/en/article-aeronautics-wins-27m-thailand-uav-deal-1001248103

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
08/18	Poland	Poland's Army	WB Electronics	Warmadoe	loitering drone	--	contract and purchase: the Polish Army has purchased 1000 Warmadoe units	--	Jane's	https://www.janes.com/article/82252/wb-electronics-discloses-next-generation-warmadoe-development
08/18	USA	The U.S. Misile Defense Agency	General Atomics Electromagnetic Systems	MQ-9 Reaper	armed drone	--	contract: integration of advanced sensors	$ 134	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1607278/
08/18	USA	U.S. Navy	Boeing Insitu	RQ-21A Blackjack	armed drone	Poland	contract: purchase of drones and eight protection aircraft for the United States Navy Corps and the Government of Poland	$ 54	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1608553/
08/18	USA	U.S. Navy	Boeing Insitu	RQ-21A Blackjack	armed drone	Canada	contract: improvements and GPS	$ 55.44	FBO	https://www.fbo.gov/index?s=opportunity&mode=form&id=68c43c561ae4744bda038bcc110e4a77&tab=core&_cview=1
08/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	France	contract: drones for the French Army	$ 123	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1611035/
08/18	Israel	Philippines' Air Force	Elbit Systems	Hermes 450	loitering: reconnaissance drone	Philippines	purchase: shipment (during 2018) of the first of several Hermes 450 drones purchased by Philippines	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/hermes-bags-new-customer-philippines/
08/18	Russia	--	Kronstadt Group	Orion-E - veure: https://www.janes.com/article/83350/kronshtadt-weaponises-orion-e-uav-outlines-hale-uav-development	armed drone	A Middle East country	purchase: by a country not specified from the Middle East	--	Jane's	https://droncenter.bard.edu/weekly-roundup-8-28-18/
08/18	China	Australia's Army	DJI	Phantom 4	reconnaissance drone	Australia	purchase: of drones Phantom 4 for training of soldiers in the use of drones	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/australian-army-receives-dji-phantom-4-uas/
09/18	USA	U.S. Army	L-3 Communications	RQ-7B V2 Shadow	armed drone	--	project: to manufacture the RQ-7B V2 Shadow	$ 454	FBO	https://www.fbo.gov/index.php?s=opportunity&mode=form&id=6b2c1e666e0dfebbe835b73f06514080&tab=core&_cview=1

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
09/18	USA	Canadian National Defense Department	Boeing Insitu	Integrator Extended Range	reconnaissance drone	Canada	purchase: of the high-autonomy reconnaissance drone (300 miles) launched with a catapult	--	Defense News	https://www.defensenews.com/digital-show-dailies/air-force-association/2018/09/17/insitu-unveils-new-integrator-extended-range-unmanned-system/?utm_source=Sailthru&utm_medium=email&utm_campaign=ebb%209/18/18&utm_term=Editorial%20-%20Early%20Bird%20Brief
09/18	USA	U.S. Navy	Boeing	MQ-25A Stingray	reconnaissance armed loitering drones	--	project: to make the MQ-25A Stingray	$ 805	The Washington Post	https://www.washingtonpost.com/gdpr-consent/?destination=%2fbusiness%2f2018%2f08%2f30%2fboeing-wins-million-contract-build-navys-mq-stingray-dron%2f%3futm_term%3d.81719a16fbf4&utm_term=.65cf5dda1f03
09/18	USA	U.S. Air Force	Boeing	Integrator Extended Range	armed drone	--	presentation: reconnaissance drone launched with a catapult with a 300 nautical mile range	--	Defense News	https://www.defensenews.com/digital-show-dailies/air-force-association/2018/09/17/insitu-unveils-new-integrator-extended-range-unmanned-system/?utm_source=Sailthru&utm_medium=email&utm_campaign=ebb%209/18/18&utm_term=Editorial%20-%20Early%20Bird%20Brief
09/18	EU	--	MBDA	Spectre	armed drone	--	presentation: light combat drone with tandem rotors	--	AIN Online	https://www.ainonline.com/aviation-news/defense/2018-09-21/mbda-unveils-compaño-level-uav-concept
09/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	testing: the drone took down a small unmanned airplane with an air-to-air missile	--	Military.com	https://www.military.com/daily-news/2018/09/19/mq-9-gets-first-air-air-kill-training-exercise-air-force-official-says.html
09/18	Israel	Zambia's Army	Elbit Systems	Hermes 450	loitering: reconnaissance drones	Zambia	purchase	--	Jane's	https://www.janes.com/article/82934/zconian-hermes-450-uav-spuedeted
09/18	Israel	Azerbaijan's Army	Israel Aerospace Industries	Harop	loitering drones	Azerbaijan	purchase: presentation of purchased drone to Azerbaijan	--	C4ISRNET	https://www.c4isrnet.com/unmanned/2018/08/21/azerbaijan-shows-off-kamikaze-dron-in-military-exercises/
09/18	China	Serbia's Army	AVIC - Chengdu Aircraft Industry Group	Wing Loong Iis	armed drone	Serbia	purchase: of the Wing Loong II	--	Jane's	https://www.janes.com/article/83127/serbia-reportedly-agrees-ucav-deal-with-china

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
09/18	China	Chinese People's Liberation Army Navy	Ziyan	Blowfish I	armed drone	--	presentation: the armed helicopter drone is already in service	--	Jane's	https://www.janes.com/article/83264/aad-2018-china-s-blowfish-i-vtol-uav-enters-service-with-plan
09/18	China	--	--	AVIC Wing Loong II	armed drone	Serbia	purchase: the Serbian army bought six combat drones from China, including two AVIC Wing Loong II	--	Jane's	https://www.janes.com/article/83127/serbia-reportedly-agrees-ucav-deal-with-china
10/18	Russia	--	Kronshtadt Group	Orion-E	armed drone	--	presentation: armed variant of the Orion-E half-height drone, equipped with precision guided missiles	--	Jane's	https://www.janes.com/article/83350/kronshtadt-weaponises-orion-e-uav-outlines-hale-uav-development
10/18	USA	U.S. Marine Corps	Bell Aerospace	V-247 Vigilant	armed drone	--	prototype presentation: real-scale model of the V-247 drone with tandem rotors	--	C4ISRNET	https://
10/18	USA	U.S. Army	General Atomics Aeronautical Systems	MQ-1C Gray Eagle	armed drone	--	testing: combat and reconnaissance drone, medium-altitude and long-endurance	--	US Army	https://www.army.mil/article/211106/extended_range_gray_eagle_version_follow_on_tests_complete
10/18	USA	--	Hoverfly Technologies	LiveSky SENTRY	reconnaissance drone	--	presentation: reconnaissance drone, tied - sentry	--	Unmanned Systems Technology	https://www.unmannedsystemstechnology.com/2018/09/new-tethered-dron-features-all-weather-capability/
10/18	China	People's Liberation Army	Aviation Industry Corporation	AV500W	armed drone	--	manoeuvre: helicopter drone for reconnaissance and combat	--	Jane's	https://www.janes.com/article/83300/avic-s-av500w-vtol-uav-takes-parte-in-pla-exercise
10/18	USA	U.S. Army	General Atomics	MQ-1C Gray Eagle	armed drone	--	project: technical services	$ 441.6	US DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1648706/
10/18	Germany	--	--	Euro Hawk	reconnaissance drone	Canada	purchase: reconnaissance high-flying drone based on the RQ-4 Global Hawk	--	US DoD	https://www.defensenews.com/global/europe/2018/09/24/germaño-looking-to-sell-costly-rarely-used-dron-to-canada/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
10/18	USA	U.S. Air Force	AeroVironment	Raven RQ-11B	armed drone	--	project: support drones for regions of South America	$ 12	--	http://www.infodron.es/r.php?u=L2lkLzIwMTgvMTAvMDgvbm90aWNpYS1hZXJvdmlyb25tZW50LXN1bWluaXN0cmFyYS1yYXZlbi1ycTExYi5odG1sfDF8MXwyNDg3fDg4
10/18	USA	Ukraine's Army	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	Ukraine	presentation: first flight of an MQ-9 Reaper bought by Ukraine to USA - within the Clear Sky 18 exercises	--	Defence Blog	https://defence-blog.com/news/u-s-air-force-shows-its-mq-9-remotely-piloted-aircraft-at-exercise-clear-sky-18.html
10/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9B SkyGuardian	armed drone	--	presentation: first flight, at the US base airfield of La Laguna	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTgvMTAvMDYvbm90aWNpYS1nYWFzaS1jb21wbGV0YS1wcmltZXItdnVlbG8tc2VndW5kby1za3lndWFyZGlhbi5odG1sfDF8MXwyNDg4fDg4
10/18	USA / Norway	--	Flir Systems / Prox Dynamics	Black Hornet 3	reconnaissance drone	--	presentation: 33 grams mini drone to help the soldier: threat detection, surveillance, maintain contact, damage assessment during combat	--	InfoDron 149	http://www.infodron.es/r.php?u=L2lkLzIwMTgvMTAvMTEvbm90aWNpYS1wcmVzZW50YS1zaXN0ZW1hLXJlY29ub2NpbWllbnRvLWJsYWNrLWhvcm5ldC5odG1sfDF8MXwyNDk1fDg5
10/18	China	--	Aeronautical Complex (PAC) + Aviation Industry Corporation (AVIC)	Wing Loong II	advanced armed drone	Pakistan	project: joint production of 48 drones between China and Pakistan	--	InfoDron 149	http://www.infodron.es/r.php?u=L2lkLzIwMTgvMTAvMTUvbm90aWNpYS1jaGluYS1wYWtpc3Rhbi1wcm9kdWNpcmFuLWNvbmp1bnRhbWVudGUtbG9vbmcuaHRtbHwxfDF8MjQ5OHw4OQ==
10/18	Turkey	Turkish Military	Turkish Aerospace Industries	Anka-S	armed drone	--	production: of 22 combat drones of long-endurance and medium-altitude; 16 of them will be satellite controlled Anka-S variants	--	Flightglobal	https://www.flightglobal.com/news/articles/turkey-signs-for-more-anka-uavs-452671/
10/18	USA	--	InstantEye Robotics	Mk-3 GEN4-D1/D2	reconnaissance drone	--	presentation: small military surveillance quadcopter	--	Jane's	www.janes.com/article/83815/ausa-2018-instant-eye-robotics-displays-uav
10/18	Europe (common project Germany-France-Spain)	Spain's Air Force	--	EuroMALE	armed drone	Spain	purchase: of 15 EuroMALE drones in the 2020 (medium-altitude flight drones and long-endurance)	--	Jane's	https://www.janes.com/article/84365/spain-sets-out-european-male-rpas-procurement-plan

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
10/18	South Korea	Republic of Korea Army (RoKA)	Korea Aerospace Industries (KAI)	Night Intruder 600 VT	armed drone	--	project: 9m vertical take off drone of length and weight of 600 Kg	--	Jane's	https://www.janes.com/article/83965/kai-pursues-indigenous-vtol-uav-development
11/18	Turkey	Ukraine's Army	Kale-Baykar	Bayraktar TB2	armed drone	Ukraine	purchase: Ukraine has decided to buy drones from Turkey	--	Ukrinform	https://www.ukrinform.net/rubric-defense/2574490-ukraine-to-purchase-combate-drones-from-turkey.html
11/18	China	Argelia's Army	CASC	Caihong-4	armed drone	Argelia	purchase	--	Jane's	https://www.janes.com/article/84158/algeria-unveils-chinese-uavs
11/18	China	Chinese People's Liberation Army	Chengdu Aircraft Industry Group	Wing Loong II	reconnaissance drone	--	presentation: reconnaissance drone of medium-altitude and long-endurance	--	Jane's	https://www.janes.com/article/84349/airshow-china-2018-wing-loong-ii-armed-reconnaissance-uav-enters-plaaf-service
11/18	Europe	PESCO Projects	--	MALE	armed drone	--	Eurodron project (Germany, France, Spain, Italy, Czech Republic) of medium-altitude drone with long-endurance, with double turboprop; developed by Airbus, Dassault Aviation and Leonardo	--	PESCO	https://pesco.Europe.eu/project/european-medium-altitude-long-endurance-remotely-piloted-aircraft-systems-male-rpas-eurodron/
11/18	USA	Australia's Government	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	Australia	purchase: Australia will buy between 12 and 16 MQ-9 Reapers	--	9 News-com	https://www.9news.com.au/national/remote-control-aircraft-defence-australia-christopher-pyne/250433a3-3815-4ed3-8e7d-f049bcf4e7d5
11/18	USA	South Korean Air Force	Northrop Grumman	RQ-4 Global Hawks	armed drone	South Korea	purchase: contract to provide logistical support expected to be given to the Korean Air Force in 2019	--	UPI	https://www.upi.com/Defense-News/2018/11/15/Northrop-Grumman-tapped-for-South-Korean-dron-support/8281542302617/?rc_fifo=1&ur3=1
11/18	USA	U.S. Air Force	Northrop Grumman	RQ-4 Global Hawk Block	armed drone	Japan	contract: for the deputy minister of drones of long-endurance and high flight height to Japan	$ 489.9	FlightGlobal	https://www.flightglobal.com/news/articles/northrop-grumman-contract-advances-japan-rq-4-work-453796/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
11/18	Russia	Russia's Ministry of Defense	ZALA Aero	ZALA-421-16E5 ICE	reconnaissance drone	--	presentation: surveillance and reconnaissance drone with fixed wings	--	Jane's	https://www.janes.com/article/84682/zala-aero-unveils-updated-zala-421-16e5-uav
12/18	Europe	Frontex	Leonardo	Falco EVO	reconnaissance drone	--	deployment: reconnaissance drone in Lampedusa, in evaluation phase	--	Unmanned Systems Technology	https://www.unmannedsystemstechnology.com/2018/12/falco-evo-uas-deployed-under-eu-surveillance-research-programme/
12/18	Europe	European Maritime Safety Agency	Schiebel	Camcopter S-100	reconnaissance drone	--	purchase: for maritime reconnaissance tasks	--	AUVSI	https://www.auvsi.org/industry-news/schiebel-awarded-maritime-surveillance-service-provision-contract-its-camcopter-s-100
12/18	Poland	Ministry of Defense	Wojskowe Zaklady Lotnicze 2 SA (Military Aviation Works No. 2)	Orlik PGZ-19R	armed drone	--	purchase: of 40 Orlik PGZ-19R tactical drones	--	Defence24	https://www.defence24.com/orlik-uav-programme-contract-worth-pln-800-million-first-deliveries-in-2021
12/18	Germany	Bundestag	Aerospace Industries de Israel	Heron 1	armed drone	Israel	extension of lease for the continuation of operations of the German Army (Bundeswehr) in Afghanistan and Mali	--	Jane's	https://www.janes.com/article/85055/germaño-funds-procurement-projects-as-bundeswehr-grows-further
12/18	Europe	Frontex	Selex Galileo (subsidiària de Leonardo)	Falco EVO	reconnaissance drone	--	purchase: for the surveillance of the maritime borders of Europe	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTgvMTIvMTIvbm90aWNpYS1mcm9udGV4LWVzY29nZS1zZWxleC1nYWxpbGVvLXZpZ2lsYW5jaWEtZnJvbnRlcmFzLW1hcml0aW1hcy5odG1sfDF8MXwyNjAyfDk3
12/18	Colombia	Colombian Army	Colombian Aeronautics Industry Corporation	Coelum	armed drone	--	presentation: of the Colombian military drones Coelum and Quimbaya	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTgvMTIvMDQvbm90aWNpYS1mbGF2aW8tdWxsb2EtY29lbHVtLXRpZW5lLXZhcmllZGFkLWNsaWVudGVzLXBvdGVuY2lhbGVzLXZlcnNhdGlsaWRhZC5odG1sfDF8MXwyNTkxfDk3
12/18	Pakistan	Pakistan's Army	Pakistani National Committee of Enginery and Science and Pakistani Air Force	NESCOM Burraq	reconnaissance drone	--	presentation: of the exportable version of the Burraq drone	--	The News	https://www.thenews.com.pk/latest/399404- Pakistan-introduces-multirole-dron-to-the-world-in-ideas-2018

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
12/18	China	--	Beihang Unmanned Aircraft System	MALE BZK-005E	armed drone	--	presentation: interest in its export; the MALE BZK-005E is an evolution of the BZK-005	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTgvMTEvMzAvbm90aWNpYS1iZWloYW5nLXByZXBhcmEtZXhwb3J0YWNpb24tYnprMDA1ZS5odG1sfDF8MXwyNTc4fDk3
12/18	Spain	Spanish Army	Alpha Unmanned Systems (Madrid)	Alpha 800	armed drone	--	purchase: 2 drones of rotating blades	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/spain-acquires-two-alpha-800-uas/
12/18	Poland	Poland's Ministry of Defense	Poland's Ministry of Defense	Micro-drones	mini-drones	--	project: to manufacture 6 vertical take-off and landing micro-drones, within the Wazka program	--	Defence24	https://www.defence24.com/micro-uavs-for-the-polish-military-wazka-programme-another-attempt
12/18	Israel	Vietnam's Army	Israel Aerospace Industries	Heron 1s	armed drone	Vietnam	purchase: of 3 Heron 1s drones	between $ 140 and $ 160	Jerusalem Post	https://www.jpost.com/Israel-News/Israel-Aerospace-Industries-closes-160m-dron-deal-with-Vietnam-573933
12/18	Russia	Russia's Ministry of Defense	Kalashnikov	ZALA Arctic	reconnaissance drone	--	presentation: surveillance and reconnaissance drone	--	TASS	https://tass.com/defense/1034756
12/18	Ukraine	Ukraine's Ministry of Defense	Ukroboronprom	Spectator-M1	reconnaissance drone	--	presentation: surveillance and reconnaissance drone	--	UNIAN	https://www.unian.info/society/10358892-ukroboronprom-upgrades-spectator-uav-photo.html
12/18	United Kingdom	UK Royal Air Force	Aeryon	SkyRanger	reconnaissance drone	--	presentation: of the operational capabilities of the drone, intended for protection at the Akrotiri base of the RAF in Cyprus	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/raf-conducts-ocd-using-rpas-enhance-fp/
01/19	China	Colombia's Policia Nacional	DJI Technology	Matrice 210	armed drone	Colombia	purchase: the District Office of Barranquilla has bought the Chinese drone Matrice 210	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDEvMDMvbm90aWNpYS1wb2xpY2lhLW5hY2lvbmFsLWNvbG9tYmlhLWluY29ycG9yYS5odG1sfDF8MXwyNjMzfDEwMQ==

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
01/19	Spain	General Directorate of Procurement of Armament and Material	Airbus	drone swarm	drone swarm	--	project: production and purchase of a drone swarm system for tactical and operational evaluation	€ 100000	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDEvMDMvbm90aWNpYS1jb21wcmEtZW5qYW1icmUtZHJvbmVzLWFpcmJ1cy1lc3BhbmEuaHRtbHwxfDF8MjYzMnwxMDE=
01/19	Israel	Chile's Air Force	Elbit Systems	Hermes 900	loitering: reconnaissance drones	Chile	presentation: drone that Chile bought in 2011	--	Jane's	https://www.janes.com/article/85558/chilean-hermes-900-breaks-cover-during-firefighting-operations
01/19	Israel	Azeri Defence	Elbit Systems	SkyStriker	loitering drones	Azerbaijan	purchase	--	Azeri Defence	http://az.azeridefence.com/dsx-yeni-kamikadze-pua-ni-teqdim-etdi-sky-striker/
01/19	Turkey	Ukraine's Government	Kale-Baykar	Bayraktar TB2	armed drone	Ukraine	purchase: 6 combat drones	$ 69	Defense News	https://www.defensenews.com/unmanned/2019/01/14/turkish-firm-to-sell-drones-to-ukraine-in-69-million-deal/
01/19	Turkey	Turkish Government	Turkish Defense Industries	TAI Anka-S	armed drone	--	deployment: first combat mission	--	Yeni Safak	https://www.yenisafak.com/en/news/turkeys-indigenous-anka-s-dron-successfully-completes-first-combate-mission-3472398
01/19	Israel	Policia Federal of Brazil	Israel Aerospace Industries	Heron 1	reconnaissance drone	Brazil	joint project between the federal police and the Air Force of Brazil	--	Jane's	https://www.janes.com/article/85703/brazil-to-resume-operations-with-heron-1-uavs
01/19	Israel	Israel's Army	Aeronautics	Orbiter 3	loitering drone	Spain	testing: tests in León of the Orbiter 3 that was purchased in October 2018 with a 3.1 million contract	€ 3.1	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDEvMjUvbm90aWNpYS1lamVyY2l0by10aWVycmEtYWVyb25hdXRpY3MtcG9uZW4tcHJ1ZWJhLW9yYml0ZXIuaHRtbHwxfDF8MjY2OHwxMDQ=
01/19	Russia	Russia's Army	--	Sukhoi S-70	armed drone	--	Sukhoi S-70 test, also known as Okhotnik	--	Aviation International Online	https://www.ainonline.com/aviation-news/defense/2019-01-25/russia-prepares-flight-test-sukhoi-s-70-ucav
01/19	USA	Royal Netherlands' Air Force	General Atomics	MQ-9 Reaper	armed drone	Netherlands	training: at the Holloman base in New Mexico, from the operators of two MQ-9 Reaper	--	Jane's	https://www.janes.com/article/85861/rnlaf-reaper-operators-train-in-us
01/19	Turkey	Ukraine's Government	Kale-Baykar	Bayraktar TB2	armed drone	Ukraine	purchase: 6 combat drones	$ 69	Defense News	https://www.defensenews.com/unmanned/2019/01/14/turkish-firm-to-sell-drones-to-ukraine-in-69-million-deal/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
01/19	USA / Norway	U.S. Army	Flir Systems / Prox Dynamics	Black Hornet	mini-drones	--	project: soldiers supporting mini-drones inside the Soldier Borne Sensor program	$ 39.6	Press release	https://www.marketwatch.com/press-release/flir-systems-awarded-396-million-contract-for-black-hornet-personal-reconnaissance-systems-for-us-army-soldier-borne-sensor-program-2019-01-24
02/19	Spain	Brigada 2035, BRIEX2035	University of Sevilla	--	autonomy in armed drones	--	project: robotic and autonomous systems (Navantia, Santa Bárbara Sistemas, Indra, Everis and University of Seville)	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDEvMzEvbm90aWNpYS1uYXZhbnRpYS1zYW50YS1iYXJiYXJhLXByZXNlbnRhbi1wcm95ZWN0b3MtYnJpZXgyMDM1Lmh0bWx8MXwxfDI2Nzh8MTA1
02/19	Russia	Russia's Army	Micran	Karnivora	armed reconnaissance drone	--	test	--	TASS	http://tass.com/defense/1042083
02/19	Iran	Iran's Air Force	Shahed Aviation Industries	Saegheh-2	armed drone	--	presentation: combat drone that could be an improved version of the Saegheh	--	Jane's	https://www.janes.com/article/86085/Iran-unveils-new-version-of-armed-stealth-uav
02/19	Iran	Iran's Air Force	Shahed Aviation Industries	Khodkar	reconnaissance drone	--	presentation: high-cost surveillance drone based on the T-33 training aircraft	--	Press TV	https://www.presstv.com/Detail/2019/01/31/587305/Iran-Khodkar-dron-Air-Defense
02/19	Israel	Azeri Defence	Aeronautics	Orbiter 1K	armed drone	Azerbaijan	maintenance: maintenance contract for Orbiter drones manufactured in Israel	$ 13	The Jerusalem Post	https://www.jpost.com/Israel-News/Israeli-defense-compaño-Aeronautics-seals-13m-dron-deal-with-Azerbaijan-580928
02/19	Spain	Subdirección General de Adquisiciones de Armamento y Material (DGAM)	Indra	Mantis	reconnaissance drone	--	purchase: of a Mantis RPAS for the operational evaluation of phase II 2018 of the DGAM	€ 0.125	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDIvMjAvbm90aWNpYS1jb21wcmEtbWFudGlzLWluZHJhLmh0bWx8MXwxfDI3MDl8MTA4
02/19	USA	U.S. Air Force	General Atomics	Predator B	reconnaissance drone	Spain	purchase: two of the 4 Predator B will arrive in 2019; will be assigned to surveillance tasks in the Strait of Gibraltar	€ 123 (estimated for the four drones)	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDIvMjUvbm90aWNpYS1kZWZlbnNhLWVzcGVyYS1sbGVnYWRhLXByZWRhdG9yLXNlZ3VuZG8tc2VtZXN0cmUuaHRtbHwxfDF8MjcyNXwxMDg=

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
02/19	Russia	Russia's Army	ZALA Aero Group (Kalashnikov)	KUB-UAV	loitering drone	--	presentation: drone with a payload of 3.17 kilos and 30 minutes of autonomy	--	The Washington Post	https://www.washingtonpost.com/world/2019/02/23/kalashnikov-assault-rifle-changed-world-now-theres-kalashnikov-kamikaze-dron/?utm_term=.3539500569b9
02/19	Israel	Israel Aerospace Industries	Israel Aerospace Industries	Mini Harpy	loitering mini-dron	--	presentation: mini-drone that runs with a range of up to 60 miles	--	UPI	https://www.upi.com/Israel-Aerospace-Industries-shows-off-loitering-misile-at-India-air-show/6731550685580/?rc_fifo=1
02/19	USA	U.S. Navy	Northrop Grumman	proyecto Remedy	drone swarm	--	project: swarm of drones that could intervene in electronic attack missions to block enemy sensor networks	--	Defense News	https://www.defensenews.com/electronic-warfare/2019/02/19/the-navy-plans-to-test-its-new-electronic-warfare-drones-this-fall/
03/19	Spain	Colombian Aeronautics Industry Corporation	Airbus Defence	Atlante	armed drone	Colombia	project: Atlante manufacturing, a versatile drone of long-endurance	--	Jane's	https://www.janes.com/article/86980/colombia-and-spain-to-develop-new-uav
03/19	Turkey	Ukraine National Defense and Security Council	Kale-Baykar	Bayraktar TB2	armed drone	Ukraine	purchase	--	Interfax Ukraine	https://en.interfax.com.ua/news/general/570760.html
03/19	Iran	Iran's Army	Shahed Aviation Industries	Shahed-123	armed drone	--	manoeuvre: the Iranian revolutionary guard forces have made manoeuvres with dozens of drones in Strait d'Ormuz	--	Times of Israel	https://www.timesofisrael.com/Iran-tests-armed-drones-and-uavs-in-unprecedented-towards-jerusalem-drill/
03/19	Iran	Iran's Army	Shahed Aviation Industries	Shahed-129	armed drone	--	manoeuvre: the Iranian revolutionary guard forces have made manoeuvres with dozens of drones in Strait d'Ormuz	--	Times of Israel	https://www.timesofisrael.com/Iran-tests-armed-drones-and-uavs-in-unprecedented-towards-jerusalem-drill/
03/19	Iran	Iran's Army	Shahed Aviation Industries	Saegheh	armed drone	--	manoeuvre: the Iranian revolutionary guard forces have made manoeuvres with dozens of drones in Strait d'Ormuz	--	Times of Israel	https://www.timesofisrael.com/Iran-tests-armed-drones-and-uavs-in-unprecedented-towards-jerusalem-drill/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
03/19	USA	U.S. Army	QinetiQ North America	Common Robotic System-Individual	mini-robot	--	project: design of an individual support robot for soldiers. The project can be expanded to 400 million dollars with a production of about 3000 units	$ 152	Defense News	https://www.defensenews.com/land/2019/03/14/qinetiq-wins-armys-small-ground-robot-compequeñoion/
03/19	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-1 Predator	armed drone	--	deployment: has exceeded 4 million flight hours in missions	--	U.S. Air Force	https://www.af.mil/News/Article-Display/Article/1781271/mq-1b-mq-9-flight-hours-hit-4-million/
03/19	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	deployment: has exceeded 4 million flight hours in missions	--	U.S. Air Force	https://www.af.mil/News/Article-Display/Article/1781271/mq-1b-mq-9-flight-hours-hit-4-million/
03/19	USA	Netherlands' Army	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	Netherlands	purchase: of 4 MQ-9 Reaper drones together with ground control stations, spare parts and support equipment	$ 123	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDMvMjcvbm90aWNpYS1nYWFzaS1zdW1pbmlzdHJhLWN1YXRyby1yZWFwZXItcGFpc2VzLWJham9zLW1pbGxvbmVzLmh0bWx8MXwxfDI3NjR8MTEy
03/19	Turkey	Turkish Army	Industrias Aerospaciales Turcas	Anka-Aksungur	armed drone	--	presentation: test flight of the Anka-Aksungur drone, of long-endurance and medium-altitude	--	Aydinlik.com	https://www.aydinlik.com.tr/tusas-daha-guclu-anka-aksungur-ile-goklerde-gosteri-yapti-ekonomi-mart-2019
04/19	Spain	--	Marine Instruments	Tunadron	armed drone	--	presentation: drone to fight piracy in Somalia, Guinea and in the Indian Ocean, and to detect mines	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDMvMjkvbm90aWNpYS1nb21lei1tYXJpbmUtaW5zdHJ1bWVudHMtdHVuYWRyb25lLXRpZW5lLXBvdGVuY2lhbC1taXNpb25lcy1hcm1hZGEuaHRtbHwxfDF8Mjc2OXwxMTM=

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
04/19	USA / Norway	--	Flir Systems / Prox Dynamics	Black Hornet	reconnaissance drone	--	presentation: of updates of Black Hornet, mini-drone (10 cm) of reconnaissance used for the United States Army, France, the United Kingdom, Germany, Australia, Norway, the Netherlands and India	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDMvMjkvbm90aWNpYS1wcmVzZW50YS1lc3BhbmEtYWN0dWFsaXphY2lvbmVzLWJsYWNrLWhvcm5ldC1za3lyYW5nZXIuaHRtbHwxfDF8Mjc3MHwxMTM=
04/19	USA	U.S. Navy	Boeing Insitu	ScanEagle	reconnaissance drone	Afganistan	contract: support and maintenance (https://es.wikipedia.org/wiki/Boeing_Insitu_ScanEagle)	$ 17.5	US DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1794949/
04/19	USA	U.S. Navy	Boeing Insitu	ScanEagle	reconnaissance drone	Indonesia	contract: increase of the previous contract for the supply of a ScanEagle to the Government of Indonesia	$ 9.9	US DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1800834/
04/19	USA	U.S. State Departement	General Atomics	MQ-9B Sky Guardian	armed drone	Belgium	purchase: of 4 MQ-9B Sky Guardian drones	$ 600	DefenseNews	https://www.defensenews.com/air/2019/03/26/state-departement-oks-sale-of-sky-guardian-drones-to-belgium/
04/19	United Kingdom	Defence and Security Accelerator (DASA)	Blue Bear Systems Research	Maño drones Make Light Work	drone swarm	--	project: drone swarm technology development	€ 2.76	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDQvMDEvbm90aWNpYS1yZWluby11bmlkby1pbnZpZXJ0ZS1taWxsb25lcy1lbmphbWJyZXMuaHRtbHwxfDF8Mjc3MXwxMTQ=
04/19	USA	DARPA	--	--	drone swarm	--	project: DARPA has started the fourth stage of its OFFensive Swarm-Enabled Tactics program	--	Unmanned Systems Technology	https://www.unmannedsystemstechnology.com/2019/04/darpa-announces-next-phase-of-unmanned-swarm-technology-program/
04/19	USA	Uzbekistan's Ministry of Defense	AeroVironment	RQ-11B Raven	reconnaissance drone	Uzbekistan	deployment: the drone has entered service in the Uzbekistan Army	--	Jane's	https://www.janes.com/article/87922/rq-11b-raven-uas-in-service-with-uzbek-military

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
04/19	USA / Norway	United Kingdom's Ministry of Defensel	Flir Systems / Prox Dynamics	Black Hornet	reconnaissance drone	United Kingdom	purchase of 3 micro drones for the British Army	$ 1.8	Military Aerospace	https://www.militaryaerospace.com/articles/pt/2019/04/unmanned-surveillance-situational-awareness.html
04/19	Mexico	--	Hydra Technologies	Kukulkan	armed drone	--	presentation: of the Kukulkan drone, which is an evolution of the Báalam S-45 with more carrying capacity	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDQvMjUvbm90aWNpYS1oeWRyYS1kZXNhcnJvbGxhLWt1a3Vsa2FuLWV2b2x1Y2lvbi1iYWFsYW0tbWF5b3ItY2FyZ2EuaHRtbHwxfDF8MjgxM3wxMTc=
05/19	Europe	European Union	Centre for Research and Technology-Hellas (CERTH), lider del consorci https://roborder.eu/parteners/consortium/	Roborder	reconnaissance drone	--	project: swarm of drones to monitor European borders by land, sea and air (https://roborder.eu/)	--	The Intercept	https://theintercept.com/2019/05/11/drones-artificial-intelligence-europe-roborder/
05/19	Europe (common project Germany-France-Spain)	European Union	--	EuroMALE	armed drone	--	testing: safety assessment for the use of EuroMALE in segregated and non-segregated airspaces. The MALE are drones of medium flight height and long-endurance	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/preliminary-safety-assessments-european-male-rpas-/
05/19	Belarus	Belarus' Ministry of Defense	KB Design Bureau	Grach	armed drone	--	presentation: multi-rotor drone that can carry grenades, incendiary bombs or anti-tank bombs	--	AIN Online	https://www.ainonline.com/aviation-news/defense/2019-05-20/milex-2019-belarus-introduces-new-uas-and-ew-jammers
05/19	Russia	Russian Air Forces	Sukhoi	Okhotnik-B	armed drone	--	presentation	--	The Drive	https://www.thedrive.com/the-war-zone/28147/russias-hunter-flying-wing-unmanned-combate-air-vehículo-is-a-big-beast

Sources: https://dronecenter.bard.edu/category/roundup/
http://www.infodron.es/id/

LIST ORDERED BY MANUFACTURING COUNTRIES

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
06/18	Austria	France's Navy	Schiebel	S-100	reconnaissance drone	France	deployment: on Dixmude amphibious ships (https://en.wikipedia.org/wiki/Schiebel_	--	Jane's	http://www.janes.com/article/80935/french-navy-embarks-s-100-camcopter-on-inaugural-jeanne-d-arc-task-force-deployment
07/18	Belarus	Belarus' Army	Scientific-Manufacturing Centro of Multipurpose Unmanned Systems (NPTs MBK) of Belarus	Burevestnik-MB	armed drone	--	presentation: two armed drones Burevestnik-MB (each one can carry two loitering drones)	--	Jane's + UAS Vision	https://www.uasvision.com/2018/07/12/burevestnik-mb-armed-dron-for-belarus-army/
07/18	Belarus	Belarus' Army	Scientific-Manufacturing Centro of Multipurpose Unmanned Systems (NPTs MBK) of Belarus	Busel-MB	reconnaissance drone	--	presentation	--	UAS Vision	https://www.uasvision.com/2018/07/12/burevestnik-mb-armed-dron-for-belarus-army/
05/19	Belarus	Belarus' Ministry of Defense	KB Design Bureau	Grach	armed drone	--	presentation: multi-rotor drone that can carry grenades, incendiary bombs or anti-tank bombs	--	AIN Online	https://www.ainonline.com/aviation-news/defense/2019-05-20/milex-2019-belarus-introduces-new-uas-and-ew-jammers
08/18	Brazil	--	FT Sistemas	Flettner Helicopter FT-100FH	dual-use drone	--	testing: advanced flight test	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/new-design-ft-100fh-advances-flight-testing-campai/
10/18	China	People's Liberation Army	Aviation Industry Corporation	AV500W	armed drone	--	manoeuvre: helicopter drone for reconnaissance and combat	--	Jane's	https://www.janes.com/article/83300/avic-s-av500w-vtol-uav-takes-parte-in-pla-exercise
09/18	China	--	--	AVIC Wing Loong II	armed drone	Serbia	purchase: the Serbian army bought six combat drones from China, including two AVIC Wing Loong II	--	Jane's	https://www.janes.com/article/83127/serbia-reportedly-agrees-ucav-deal-with-china

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
06/18	China	China's Army	Ziyan	Blue Fish	armed drone	--	presentation: electric drone helicopter type armed with grenades	--	Army	https://www.armyreconnaissance.com/eurosatory_2018_official_news_online/eurosatory_2018_ziyan_electric_helicopter_dron_for_attack_and_surveillance.html
11/18	China	Argelia's Army	CASC	Caihong-4	armed drone	Argelia	purchase	--	Jane's	https://www.janes.com/article/84158/algeria-unveils-chinese-uavs
05/18	China	Royal Jordan Air Force	CASC	CH-4	reconnaissance armed drone	Jornadia	presentation: at the SOFEX 2018 fair	--	Shephard News	https://www.shephardmedia.com/news/uv-online/sofex-2018-jordanian-ch-4-makes-public-debut/
03/18	China	Aerospace China's Academy	Aerodynamics	CH-4C	reconnaissance armed drone	--	project: new variant of the Caihong-4 called CH-4C: it will have a greater load capacity and an improved electronics and will be armed with 100 Kg precision guided bombs	--	Jane's	http://www.janes.com/article/78269/china-s-casc-readies-improved-ch-4-uav
08/18	China	Chile's Navy	DJI Technology	DJI Magic Pro	armed drone	Chile	purchase: for the security of the perimeter of the base of Fort Fèlix Aguayo	--	Jane's	https://www.janes.com/article/82419/chilean-navy-buys-chinese-uav-to-secure-facilities
12/18	China	--	Beihang Unmanned Aircraft System	MALE BZK-005E	armed drone	--	presentation: interest in its export; the MALE BZK-005E is an evolution of the BZK-005	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTgvMTEvMzAvbm90aWNpYS1iZWloYW5nLXByZXBhcmEtZXhwb3J0YWNpb24tYnprMDA1ZS5odG1sfDF8MXwyNTc4fDk3
01/19	China	Colombia's Policia Nacional	DJI Technology	Matrice 210	armed drone	Colombia	purchase: the District Office of Barranquilla has bought the Chinese drone Matrice 210	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDEvMDMvbm90aWNpYS1wb2xpY2lhLW5hY2lvbmFsLWNvbG9tYmlhLWluY29ycG9yYS5odG1sfDF8MXwyNjMzfDEwMQ==
08/18	China	Australia's Army	DJI	Phantom 4	reconnaissance drone	Australia	purchase: of drones Phantom 4 for training of soldiers in the use of drones	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/australian-army-receives-dji-phantom-4-uas/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
02/18	China	--	China National Aero-Technology Import and Export Corporation (CATIC)	U8EW	reconnaissance and combat drone	--	presentation: reconnaissance and combat drone (http://www.catic.cn/front)	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/singapore-airshow-2018-china-promotes-weaponi/
01/18	China	China Aeronautics Industry Corporation	Chengdu Aircraft Industry Group	Wing Loong ID o Chengdu Pterodactyl	armed drone	--	presentation: from Wing Loong ID, variant of the Chinese family of long-endurance and medium-altitude drones	--	New Atlas	https://newatlas.com/quaternium-record-endurance-dron-flight/52758/
01/18	China	China Aeronautics Industry Corporation	Chengdu Aircraft Industry Group	Wing Loong II	armed drone	--	presentation and testing: the drone destroyed 5 land targets using 5 missiles of diferent types	--	Xinhua	http://www.xinhuanet.com/english/2017-12/31/c_136863482.htm
08/18	China	United Arab Emirates	AVIC - Chengdu Aircraft Industry Group	Wing Loong II	armed drone	United Arab Emirates	deployment: the satellite images of early August seem to show that the United Arab Emirates have at least deployed a mid-range resistance and long-endurance drone Wing Loong II at its Assab airport base in Eritrea. The UEA already maintains a fleet of manned aircraft at the base, which uses for operations in Yemen	--	Jane's	https://www.janes.com/article/82382/uae-deploys-wing-loong-ii-uav-to-eritrea
10/18	China	--	Aeronautical Complex (PAC) + Aviation Industry Corporation (AVIC)	Wing Loong II	advanced armed drone	Pakistan	project: joint production of 48 drones between China and Pakistan	--	InfoDron 149	http://www.infodron.es/r.php?u=L2lkLzIwMTgvMTAvMTUvbm90aWNpYS1jaGluYS1wYWtpc3Rhbi1wcm9kdWNpcmFuLWNvbmp1bnRhbWVudGUtbG9vbmcuaHRtbHwxfDF8MjQ5OHw4OQ==
11/18	China	Chinese People's Liberation Army	Chengdu Aircraft Industry Group	Wing Loong II	reconnaissance drone	--	presentation: reconnaissance drone of medium-altitude and long-endurance	--	Jane's	https://www.janes.com/article/84349/airshow-china-2018-wing-loong-ii-armed-reconnaissance-uav-enters-plaaf-service

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
03/18	China	Peoples Liberation Army	--	Xianglong	reconnaissance drone	--	deployment: from the high-altitude and long-endurance Xianglong drone, at the base of Yishuntun and on the island of Hainan	--	Offiziere	http://www.janes.com/article/78751/xianglong-uavs-spuedeted-on-china-s-hainan-island + https://offiziere.ch/?p=33037
09/18	China	Chinese People's Liberation Army Navy	Ziyan	Blowfish I	armed drone	--	presentation: the armed helicopter drone is already in service	--	Jane's	https://www.janes.com/article/83264/aad-2018-china-s-blowfish-i-vtol-uav-enters-service-with-plan
09/18	China	Serbia's Army	AVIC - Chengdu Aircraft Industry Group	Wing Loong Iis	armed drone	Serbia	purchase: of the Wing Loong II	--	Jane's	https://www.janes.com/article/83127/serbia-reportedly-agrees-ucav-deal-with-china
12/18	Colombia	Colombian Army	Colombian Aeronautics Industry Corporation	Coelum	armed drone	--	presentation: of the Colombian military drones Coelum and Quimbaya	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTgvMTIvMDQvbm90aWNpYS1mbGF2aW8tdWxsb2EtY29lbHVtLXRpZW5lLXZhcmllZGFkLWNsaWVudGVzLXBvdGVuY2lhbGVzLXZlcnNhdGlsaWRhZC5odG1sfDF8MXwyNTkxfDk3
05/19	Europe (common project Germany-France-Spain)	European Union	--	EuroMALE	armed drone	--	testing: safety assessment for the use of EuroMALE in segregated and non-segregated airspaces. The MALE are drones of medium flight height and long-endurance	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/preliminary-safety-assessments-european-male-rpas-/
10/18	Europe (common project Germany-France-Spain)	Spain's Air Force	--	EuroMALE	armed drone	Spain	purchase: of 15 EuroMALE drones in the 2020 (medium-altitude flight drones and long-endurance)	--	Jane's	https://www.janes.com/article/84365/spain-sets-out-european-male-rpas-procurement-plan
12/18	Europe	European Maritime Safety Agency	Schiebel	Camcopter S-100	reconnaissance drone	--	purchase: for maritime reconnaissance tasks	--	AUVSI	https://www.auvsi.org/industry-news/schiebel-awarded-maritime-surveillance-service-provision-contract-its-camcopter-s-100
12/18	Europe	Frontex	Leonardo	Falco EVO	reconnaissance drone	--	deployment: reconnaissance drone in Lampedusa, in evaluation phase	--	Unmanned Systems Technology	https://www.unmannedsystemstechnology.com/2018/12/falco-evo-uas-deployed-under-eu-surveillance-research-programme/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
12/18	Europe	Frontex	Selex Galileo (subsidiària de Leonardo)	Falco EVO	reconnaissance drone	--	purchase: for the surveillance of the maritime borders of Europe	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTgvMTIvMTIvbm90aWNpYS1mcm9udGV4LWVzY29nZS1zZWxleC1nYWxpbGVvLXZpZ2lsYW5jaWEtZnJvbnRlcmFzLW1hcml0aW1hcy5odG1sfDF8MXwyNjAyfDk3
05/18	Europe	European Union	empresas de defensa	LAWS	autonomous armed drones	--	projects: The European Union will allow companies in the military industry to request financing for the development of autonomous lethal weapons. According to two unnamed sources, some members of the Parliament initially opposed this possibility, but then agreed to allow defense companies to access the Union fund of 500 million euros	€ 500	Eu observer	https://euobserver.com/science/141885
11/18	Europe	PESCO Projects	--	MALE	armed drone	--	Eurodron project (Germany, France, Spain, Italy, Czech Republic) of medium-altitude drone with long-endurance, with double turboprop; developed by Airbus, Dassault Aviation and Leonardo	--	PESCO	https://pesco.Europe.eu/project/european-medium-altitude-long-endurance-remotely-piloted-aircraft-systems-male-rpas-eurodron/
05/19	Europe	European Union	Centre for Research and Technology-Hellas (CERTH), lider del consorci https://roborder.eu/parteners/consortium/	Roborder	reconnaissance drone	--	project: swarm of drones to monitor European borders by land, sea and air (https://roborder.eu/)	--	The Intercept	https://theintercept.com/2019/05/11/drones-artificial-intelligence-europe-roborder/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
09/18	EU	--	MBDA	Spectre	armed drone	--	presentation: light combat drone with tandem rotors	--	AIN Online	https://www.ainonline.com/aviation-news/defense/2018-09-21/mbda-unveils-compaño-level-uav-concept
03/18	France	France's Ministry of Defense	ECA Group	A18-M	submarine drone	--	presentation: underwater anti-mine dron	--	Unmanned Systems Technology	http://www.unmannedsystemstechnology.com/2018/02/eca-group-develops-new-mine-countermeasures-auv/
06/18	France	--	Elistair	Ligh-T V.3	reconnaissance drone	--	presentation: monitoring multirotor dron, tied with cable	--	Jane's	http://www.janes.com/article/81120/eurosatory-2018-elistair-expands-tethered-uav-portfolio?from_rss=1
05/18	Germany	--	Lange Aviation	Antares E2	reconnaissance drone	--	presentation: Monitoring drone with fuel cell with autonomy of up to 40 hours	--	Aviation week	https://aviationweek.com/intelligence-surveillance-reconnaissance/antares-e2-brings-new-benefits-unmanned-surveillance
10/18	Germany	--	--	Euro Hawk	reconnaissance drone	Canada	purchase: reconnaissance high-flying drone based on the RQ-4 Global Hawk	--	US DoD	https://www.defensenews.com/global/europe/2018/09/24/germaño-looking-to-sell-costly-rarely-used-dron-to-canada/
12/18	Germany	Bundestag	Aerospace Industries de Israel	Heron 1	armed drone	Israel	extension of lease for the continuation of operations of the German Army (Bundeswehr) in Afghanistan and Mali	--	Jane's	https://www.janes.com/article/85055/germaño-funds-procurement-projects-as-bundeswehr-grows-further
07/18	Hungary	--	Eötvös University	--	loitering drone	--	presentation: model of the complex behavior of the swarms, which allows several dozen drones to work in synchrony (like a swarm) without any central control system	--	Wired	https://www.wired.com/story/how-a-flock-of-drones-developed-collective-intelligence/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
04/18	India	Indian Defense and Security Forces	Cyient	nous drones dissenyats per obtenir informació intel·ligent encoberta en temps real i actuar en missions tàctiques en zonas obertes o entorns urbans concorreguts	armed drone	Israel	project: joint development (Cyient of India + Bluebird Aero Systems of Israel) of new drones	--	Economic Times	https://economictimes.indiatimes.com/news/defence/mou-signed-to-produce-uav-systems-for-defence-Fuerzas/articleshow/63714508.cms
04/18	India	Indian Defense and Security Forces	Mahindra Defense	Orbiter 4	reconnaissance and combat drone	Israel	project: joint development (Mahindra Defense and Israel Aeronautics) of a variant of the Orbiter 4 for the Indian Navy	--	Times of Israel	https://www.timesofisrael.com/indias-mahindra-parteners-with-israels-aeronautics-to-make-drones/
02/18	India	Indian Government	Organización de Inverstigación en Defensa i Desarrollo de India	Rustom 2	armed drone	--	testing: satisfactory test flight	--	Economic Times	https://economictimes.indiatimes.com/news/defence/drdo-successfully-carries-out-test-flight-of-rustom-2-dron/articleshow/63068375.cms
06/18	India	India Government	Organización de Defensa de Investigació y Desarrollo	Rustom-2	reconnaissance drone	--	project: the drone will be ready and will be deployed by 2020	--	The Times of India	https://timesofindia.indiatimes.com/city/pune/rustom-2-drones-set-to-be-ready-by-2020-drdo-chief/articleshow/64324935.cms
02/19	Iran	Iran's Air Force	Shahed Aviation Industries	Khodkar	reconnaissance drone	--	presentation: high-cost surveillance drone based on the T-33 training aircraft	--	Press TV	https://www.presstv.com/Detail/2019/01/31/587305/Iran-Khodkar-dron-Air-Defense
02/18	Iran	Iran's Ministry of Defense	--	Mohajer 6	armed drone	--	production: start of serial production of Mohajer 6 (https://en.mehrnews.com/news/147747/Mohajer-6-combate-drones-join-Iranian-Army)	--	Jane's	http://www.janes.com/article/77677/Iran-s-mohajer-6-armed-uav-goes-into-production

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
03/19	Iran	Iran's Army	Shahed Aviation Industries	Saegheh	armed drone	--	manoeuvre: the Iranian revolutionary guard forces have made manoeuvres with dozens of drones in Strait d'Ormuz	--	Times of Israel	https://www.timesofisrael.com/Iran-tests-armed-drones-and-uavs-in-unprecedented-towards-jerusalem-drill/
02/19	Iran	Iran's Air Force	Shahed Aviation Industries	Saegheh-2	armed drone	--	presentation: combat drone that could be an improved version of the Saegheh	--	Jane's	https://www.janes.com/article/86085/Iran-unveils-new-version-of-armed-stealth-uav
03/19	Iran	Iran's Army	Shahed Aviation Industries	Shahed-123	armed drone	--	manoeuvre: the Iranian revolutionary guard forces have made manoeuvres with dozens of drones in Strait d'Ormuz	--	Times of Israel	https://www.timesofisrael.com/Iran-tests-armed-drones-and-uavs-in-unprecedented-towards-jerusalem-drill/
03/19	Iran	Iran's Army	Shahed Aviation Industries	Shahed-129	armed drone	--	manoeuvre: the Iranian revolutionary guard forces have made manoeuvres with dozens of drones in Strait d'Ormuz	--	Times of Israel	https://www.timesofisrael.com/Iran-tests-armed-drones-and-uavs-in-unprecedented-towards-jerusalem-drill/
02/18	Iran	Iran's Ministry of Defense	--	copia Iraniana del RQ-170 Sentinel	armed drone	--	combat: Israel struck down an Iranian drone that according to Israel was a copy of the RQ-170 Sentinel, a stealth spy drone from the United States (Lockheed Martin). The Iranian drone, launched from Siberia, was shot down inside Israel. Iran captured a US RQ-170 in 2011 and claims that it has been doing drone reverse engineering	--	Washington Post	https://www.washingtonpost.com/world/israel-confirms-downed-jet-was-hit-by-syrian-antiaircraft-fire/2018/02/11/bd42a0b2-0f13-11e8-8ea1-c1d91fcec3fe_story.html?utm_term=.e02c5aed09d8

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
06/18	Israel	Israel's Department of Defense	Israel Aerospace Industries	BirdEye 650-D + RoBattle UGV	border surveillance drone	--	presentation: it combines an unmanned land vehicle with a fixed wing drone	--	Times of Israel	https://www.timesofisrael.com/iai-develops-ground-to-air-robot-system-for-border-surveillance/
08/18	Israel	Thailand's Ministry of Defense	Aeronautics Defense Systems	Dominator	armed drone	Thailand	purchase: of the Dominator drone that can transport up to 1,900 kilograms in special loads (such as a camera, radar or bombs) simultaneously; it can be kept in the air for 20 hours	--	Globes	https://en.globes.co.il/en/article-aeronautics-wins-27m-thailand-uav-deal-1001248103
07/18	Israel	Thailand's Army	Elbit	Hermes 450	loitering: reconnaissance drone	Thailand	purchase: drone of medium-altitude and long-endurance	--	Aviation International Online	https://www.ainonline.com/aviation-news/defense/2018-06-25/thailand-introduces-elbits-hermes-450-uas
08/18	Israel	Philippines' Air Force	Elbit Systems	Hermes 450	loitering: reconnaissance drone	Philippines	purchase: shipment (during 2018) of the first of several Hermes 450 drones purchased by Philippines	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/hermes-bags-new-customer-philippines/
09/18	Israel	Zambia's Army	Elbit Systems	Hermes 450	loitering: reconnaissance drones	Zambia	purchase	--	Jane's	https://www.janes.com/article/82934/zconian-hermes-450-uav-spuedeted
05/18	Israel	Azerbaidjan's Army	Elbit Systems	Hermes 900	loitering: reconnaissance drone	Azerbaijan	purchase	--	Jane's	http://www.janes.com/article/79686/azerbaijan-shows-hermes-900
12/18	Israel	Vietnam's Army	Israel Aerospace Industries	Heron 1s	armed drone	Vietnam	purchase: of 3 Heron 1s drones	between $ 140 and $ 160	Jerusalem Post	https://www.jpost.com/Israel-News/Israel-Aerospace-Industries-closes-160m-dron-deal-with-Vietnam-573933
06/18	Israel	Germany's Ministry of Defense	Israel Aerospace Industries	Heron TP	reconnaissance drone	Germany	purchase: with leasing contract - Heron TP drone replaces Heron 1 drones that were used in Mali and Afghanistan	--	Defense News	https://www.defensenews.com/unmanned/2018/06/14/german-lawmakers-approve-dron-deal-with-israel/
02/18	Israel	Greece's Ministry of Defense	División Malat de Israel Aerospace Industries	Heron	reconnaissance drone	Greece	purchase: lease contract (3 years) of the IAI Heron drone	$ 44	Jane's	http://www.janes.com/article/77680/greece-to-lease-heron-uavs-from-israel

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
02/18	Israel	German Army, Bundeswehr	División Malat de Israel Aerospace Industries	IAI Heron or Majatz-1	reconnaissance drone	Germany	purchase: The SPD and CDU parties in Germany have agreed to lease the drone of the IAI Heron TP drone	--	Handelsblatt	https://www.handelsblatt.com/politik/deutschland/koalitionsverhandlungen-groko-einigt-sich-auf-drohnen-fuer-die-bundeswehr/20918014.html
02/19	Israel	Israel Aerospace Industries	Israel Aerospace Industries	Mini Harpy	loitering mini-dron	--	presentation: mini-drone that runs with a range of up to 60 miles	--	UPI	https://www.upi.com/Israel-Aerospace-Industries-shows-off-loitering-misile-at-India-air-show/6731550685580/?rc_fifo=1
02/19	Israel	Azeri Defence	Aeronautics	Orbiter 1K	armed drone	Azerbaijan	maintenance: maintenance contract for Orbiter drones manufactured in Israel	$ 13	The Jerusalem Post	https://www.jpost.com/Israel-News/Israeli-defense-compaño-Aeronautics-seals-13m-dron-deal-with-Azerbaijan-580928
01/19	Israel	Israel's Army	Aeronautics	Orbiter 3	loitering drone	Spain	testing: tests in León of the Orbiter 3 that was purchased in October 2018 with a 3.1 million contract	€ 3.1	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDEvMjUvbm90aWNpYS1lamVyY2l0by10aWVycmEtYWVyb25hdXRpY3MtcG9uZW4tcHJ1ZWJhLW9yYml0ZXIuaHRtbHwxfDF8MjY2OHwxMDQ=
01/19	Israel	Azeri Defence	Elbit Systems	SkyStriker	loitering drones	Azerbaijan	purchase	--	Azeri Defence	http://az.azeridefence.com/dsx-yeni-kamikadze-pua-ni-teqdim-etdi-sky-striker/
09/18	Israel	Azerbaijan's Army	Israel Aerospace Industries	Harop	loitering drones	Azerbaijan	purchase: presentation of purchased drone to Azerbaijan	--	C4ISRNET	https://www.c4isrnet.com/unmanned/2018/08/21/azerbaijan-shows-off-kamikaze-dron-in-military-exercises/
01/19	Israel	Chile's Air Force	Elbit Systems	Hermes 900	loitering: reconnaissance drones	Chile	presentation: drone that Chile bought in 2011	--	Jane's	https://www.janes.com/article/85558/chilean-hermes-900-breaks-cover-during-firefighting-operations
01/19	Israel	Policia Federal of Brazil	Israel Aerospace Industries	Heron 1	reconnaissance drone	Brazil	joint project between the federal police and the Air Force of Brazil	--	Jane's	https://www.janes.com/article/85703/brazil-to-resume-operations-with-heron-1-uavs
04/18	Italy	Italian Direction of Armament and Airworthiness	Leonardo	Mirach-40	target drone - https://en.wikipedia.org/wiki/Target_drone	--	authorization: for military operations	--	Unmanned Systems Technology	http://www.unmannedsystemstechnology.com/2018/04/leonardo-target-dron-authorised-military-operations/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
04/18	Italy	Italy's Defense Ministry	Piaggio Aerospace	P.2HH Hammerhead	reconnaissance drone	--	project: the Italian Defense Ministry asks for 951 million dollars to Parliament to manufacture the P.2HH, the first Italian drone of medium-altitude, reconnaissance and long-endurance for tasks of reconnaissance, intelligence and vigilance	$ 951	Defense News	https://www.defensenews.com/unmanned/2018/03/27/italy-plans-to-spend-951m-on-20-surveillance-drones/
05/18	Italy	--	Leonardo + Thales	Piaggio Aero P.1HH Hammerhead	reconnaissance drone	France (Thales)	testing: first flight controlled by satellite of the drone of medium-altitude and long-endurance	--	Jane's	http://www.janes.com/article/80266/european-male-uav-flies-under-satellite-control-for-first-time
02/18	Italy	--	Collective Wisdom Technology (empresa Xino-Italyna)	Spider 103	reconnaissance drone	China	presentation: semi-autonomous reconnaissance drone (http://	--	Jane's	http://www.janes.com/article/77757/singapore-airshow-2018-sino-italyn-jv-develops-spider-103-uav
03/18	Italy	Italy's Ministry of Defense	Leonardo + Finmeccanica - AgustaWestland	SW-4 Solo	reconnaissance drone	--	presentation: SW-4 can perform various activities, including personnel transportation, surveillance and combat intervention	--	Unmanned Systems Technology	http://www.unmannedsystemstechnology.com/2018/02/solo-optionally-piloted-helicopter-completes-first-unmanned-flight/
07/18	Latvia	Latvia's Army	UAV Factory	Penguin C	reconnaissance drone	--	purchase: of an indeterminate number of the tactical drone of fixed wings Penguin C (http://www.uavfactory.com/product/74)	--	Jane's	https://www.janes.com/article/87150/latvia-acquires-penguin-c-long-endurance-uavs

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
04/19	Mexico	--	Hydra Technologies	Kukulkan	armed drone	--	presentation: of the Kukulkan drone, which is an evolution of the Báalam S-45 with more carrying capacity	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDQvMjUvbm90aWNpYS1oeWRyYS1kZXNhcnJvbGxhLWt1a3Vsa2FuLWV2b2x1Y2lvbi1iYWFsYW0tbWF5b3ltY2FyZ2EuaHRtbHwxfDF8MjgxM3wxMTc=
02/18	Nigeria	Nigerian Air Force	Nigeria's Air Force	Tsaigumi	reconnaissance drone	--	presentation: of Tsaigumi drone (https://en.wikipedia.org/wiki/Tsaigumi) Nigeria redevelops an armed drone in the near future	--	Jane's	http://www.janes.com/article/77980/nigerian-air-force-to-develop-armed-uav
12/18	Pakistan	Pakistan's Army	Pakistani National Committee of Enginery and Science and Pakistani Air Force	NESCOM Burraq	reconnaissance drone	--	presentation: of the exportable version of the Burraq drone	--	The News	https://www.thenews.com.pk/latest/399404- Pakistan-introduces-multirole-dron-to-the-world-in-ideas-2018
12/18	Poland	Poland's Ministry of Defense	Poland's Ministry of Defense	Micro-drones	mini-drones	--	project: to manufacture 6 vertical take-off and landing micro-drones, within the Wazka program	--	Defence24	https://www.defence24.com/micro-uavs-for-the-polish-military-wazka-programme-another-attempt
12/18	Poland	Ministry of Defense	Wojskowe Zaklady Lotnicze 2 SA (Military Aviation Works No. 2)	Orlik PGZ-19R	armed drone	--	purchase: of 40 Orlik PGZ-19R tactical drones	--	Defence24	https://www.defence24.com/orlik-uav-programme-contract-worth-pln-800-million-first-deliveries-in-2021
06/18	Poland	Poland's Army	WB Electronics	Warmadoe	armed drone	--	combat exercises: Warmadoe test in combat exercises	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/eurosatory-2018-warmadoe-fires-combate-exercise/
08/18	Poland	Poland's Army	WB Electronics	Warmadoe	loitering drone	--	contract and purchase: the Polish Army has purchased 1000 Warmadoe units	--	Jane's	https://www.janes.com/article/82252/wb-electronics-discloses-next-generation-warmadoe-development
05/18	Russia	Russia's Ministry of Defense	Rostec	Eleron-3	reconnaissance drone	--	purchase: of 30 Eleron-3 drones	--	Shephard News	https://www.shephardmedia.com/news/uv-online/russian-mod-receive-eleron-3-uas/
02/19	Russia	Russia's Army	Micran	Karnivora	armed reconnaissance drone	--	test	--	TASS	http://tass.com/defense/1042083

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
02/19	Russia	Russia's Army	ZALA Aero Group (Kalashnikov)	KUB-UAV	loitering drone	--	presentation: drone with a payload of 3.17 kilos and 30 minutes of autonomy	--	The Washington Post	https://www.washingtonpost.com/world/2019/02/23/kalashnikov-assault-rifle-changed-world-now-theres-kalashnikov-kamikaze-dron/?utm_term=.3539500569b9
03/18	Russia	Russia's Ministry of Defense	--	nom encara no decidit	submarine armed drone	--	presentation: President Vladimir Putin provided new details on the development of this submarine drone equipped with nuclear weapons	--	Associated Press	https://apnews.com/de8fb0159f314a849e1c36ff975c4637?utm_campaign=SocialFlow&utm_source=Twitter&utm_medium=AP
05/19	Russia	Russian Air Forces	Sukhoi	Okhotnik-B	armed drone	--	presentation	--	The Drive	https://www.thedrive.com/the-war-zone/28147/russias-hunter-flying-wing-unmanned-combate-air-vehículo-is-a-big-beast
08/18	Russia	--	Kronstadt Group	Orion-E - veure: https://www.janes.com/article/83350/kronshtadt-weaponises-orion-e-uav-outlines-hale-uav-development	armed drone	A Middle East country	purchase: by a country not specified from the Middle East	--	Jane's	https://droncenter.bard.edu/weekly-roundup-8-28-18/
10/18	Russia	--	Kronshtadt Group	Orion-E	armed drone	--	presentation: armed variant of the Orion-E half-height drone, equipped with precision guided missiles	--	Jane's	https://www.janes.com/article/83350/kronshtadt-weaponises-orion-e-uav-outlines-hale-uav-development
01/19	Russia	Russia's Army	--	Sukhoi S-70	armed drone	--	Sukhoi S-70 test, also known as Okhotnik	--	Aviation International Online	https://www.ainonline.com/aviation-news/defense/2019-01-25/russia-prepares-flight-test-sukhoi-s-70-ucav
12/18	Russia	Russia's Ministry of Defense	Kalashnikov	ZALA Arctic	reconnaissance drone	--	presentation: surveillance and reconnaissance drone	--	TASS	https://tass.com/defense/1034756
11/18	Russia	Russia's Ministry of Defense	ZALA Aero	ZALA-421-16E5 ICE	reconnaissance drone	--	presentation: surveillance and reconnaissance drone with fixed wings	--	Jane's	https://www.janes.com/article/84682/zala-aero-unveils-updated-zala-421-16e5-uav

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
01/18	Russia	--	Kalashnikov Group	Soratnik	autonomous land vehicle	--	testing: in conditions close to those of a combat	--	The National Interest	http://nationalinterest.org/blog/the-buzz/russia-tests-new-unmanned-ground-combate-vehículo-near-combate-24164
06/18	Serbia	Serbia's Ministry of Defense	Yugoimport	X-01 Strsljen	armed drone	--	presentation	--	Jane's	https://pleronix.com/feed-items/eurosatory-2018-yugoimport-showcases-x-01-strsljen-armed-vtol-uav/
10/18	South Korea	Republic of Korea Army (RoKA)	Korea Aerospace Industries (KAI)	Night Intruder 600 VT	armed drone	--	project: 9m vertical take off drone of length and weight of 600 Kg	--	Jane's	https://www.janes.com/article/83965/kai-pursues-indigenous-vtol-uav-development
02/19	Spain	Brigada 2035, BRIEX2035	University of Sevilla	--	autonomy in armed drones	--	project: robotic and autonomous systems (Navantia, Santa Bárbara Sistemas, Indra, Everis and University of Seville)	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDEvMzEvbm90aWNpYS1uYXZhbnRpYS1zYW50YS1iYXJiYXJhLXByZXNlbnRhbi1wcm95ZWN0b3MtYnJpZXgyMDM1Lmh0bWx8MXwxfDI2Nzh8MTA1
12/18	Spain	Spanish Army	Alpha Unmanned Systems (Madrid)	Alpha 800	armed drone	--	purchase: 2 drones of rotating blades	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/spain-acquires-two-alpha-800-uas/
03/19	Spain	Colombian Aeronautics Industry Corporation	Airbus Defence	Atlante	armed drone	Colombia	project: Atlante manufacturing, a versatile drone of long-endurance	--	Jane's	https://www.janes.com/article/86980/colombia-and-spain-to-develop-new-uav
01/19	Spain	General Directorate of Procurement of Armament and Material	Airbus	drone swarm	drone swarm	--	project: production and purchase of a drone swarm system for tactical and operational evaluation	€ 100000	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDEvMDMvbm90aWNpYS1jb21wcmEtZW5qYW1icmUtZHJvbmVzLWFpcmJ1cy1lc3BhbmEuaHRtbHwxfDF8MjYzMnwxMDE=
06/18	Spain	Ministry of Defense	Thales Group	Fulmar	reconnaissance drone	--	purchase: of several drones by the Spanish Navy and Army (https://en.wikipedia.org/wiki/Thales_Fulmar)	--	Jane's	http://www.janes.com/article/81033/spain-orders-more-fulmar-uavs

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
02/19	Spain	Subdirección General de Adquisiciones de Armamento y Material (DGAM)	Indra	Mantis	reconnaissance drone	--	purchase: of a Mantis RPAS for the operational evaluation of phase II 2018 of the DGAM	€ 0.125	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDIvMjAvbm90aWNpYS1jb21wcmEtbWFudGlzLWluZHJhLmh0bWx8MXwxfDI3MDI8MTA4
04/19	Spain	--	Marine Instruments	Tunadron	armed drone	--	presentation: drone to fight piracy in Somalia, Guinea and in the Indian Ocean, and to detect mines	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDMvMjkvbm90aWNpYS1nb21lei1tYXJpbmUtaW5zdHJ1bWVudHMtdHVuYWRyb25lLXRpZW5lLXBvdGVuY2lhbC1taXNpb25lcy1hcm1hZGEuaHRtbHwxfDF8Mjc2OXwxMTM=
08/18	Sweden	Germany's Navy	Saab	UMS Skeldar V-200	reconnaissance drone	Germany	purchase: of 2 Skeldar, which serve for surveillance tasks, gathering information, transporting light goods and electronic warfare	--	Navy	https://www.navyreconnaissance.com/index.php/news/defence-news/2018/august-2018-navy-naval-defense-news/6428-german-navy-selects-skeldar-v-200-vtol-uav-for-k130-corvettes.html
05/18	Turkey	--	industrias Aeroespacials turques	Anka	armed drone	Kazakhstan	project: together the Turkish Aerospace Industries and the Kazakhstan Aviation Industry for the development and manufacture of Anka drones	--	Jane's	http://www.janes.com/article/80315/kadex-2018-tai-kai-sign-mou-on-anka-uavs-and-hurkus-jet-trainers
03/19	Turkey	Turkish Army	Industrias Aerospaciales Turcas	Anka-Aksungur	armed drone	--	presentation: test flight of the Anka-Aksungur drone, of long-endurance and medium-altitude	--	Aydinlik.com	https://www.aydinlik.com.tr/tusas-daha-guclu-anka-aksungur-ile-goklerde-gosteri-yapti-ekonomi-mart-2019
02/18	Turkey	Turkish Air Force	Turkish Aerospace Industries	Anka-S	reconnaissance and combat drone	--	deployment: The Turkish Air Force have received the first two fully operational TAI Anka-S reconnaissance and combat drones	--	Jane's	http://www.janes.com/article/77660/turkey-receives-first-pair-of-anka-s-uavs

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
08/18	Turkey	Turkey's Army	Turkish Aerospace Industries	Anka-S	armed drone	--	testing: destruction of a Smart Micro Munition missile with an Anka-S drone controlled from the satellite	--	Jane's	https://www.janes.com/article/82468/satellite-controlled-anka-s-uav-fires-guided-munitions
10/18	Turkey	Turkish Military	Turkish Aerospace Industries	Anka-S	armed drone	--	production: of 22 combat drones of long-endurance and medium-altitude; 16 of them will be satellite controlled Anka-S variants	--	Flightglobal	https://www.flightglobal.com/news/articles/turkey-signs-for-more-anka-uavs-452671/
01/19	Turkey	Ukraine's Government	Kale-Baykar	Bayraktar TB2	armed drone	Ukraine	purchase: 6 combat drones	$ 69	Defense News	https://www.defensenews.com/unmanned/2019/01/14/turkish-firm-to-sell-drones-to-ukraine-in-69-million-deal/
03/19	Turkey	Ukraine National Defense and Security Council	Kale-Baykar	Bayraktar TB2	armed drone	Ukraine	purchase	--	Interfax Ukraine	https://en.interfax.com.ua/news/general/570760.html
11/18	Turkey	Ukraine's Army	Kale-Baykar	Bayraktar TB2	armed drone	Ukraine	purchase: Ukraine has decided to buy drones from Turkey	--	Ukrinform	https://www.ukrinform.net/rubric-defense/2574490-ukraine-to-purchase-combate-drones-from-turkey.html
03/18	Turkey	Qatar's Monitoring and reconnaissance Centre	Baykar Makina	Bayraktar-TB2	armed drone	Qatar	purchase: of 6 Bayraktar-TB2 drones	--	Jane's	http://www.janes.com/article/78581/dimdex-2018-qatar-orders-bayraktar-uavs
01/19	Turkey	Turkish Government	Turkish Defense Industries	TAI Anka-S	armed drone	--	deployment: first combat mission	--	Yeni Safak	https://www.yenisafak.com/en/news/turkeys-indigenous-anka-s-dron-successfully-completes-first-combate-mission-3472398
01/19	Turkey	Ukraine's Government	Kale-Baykar	Bayraktar TB2	armed drone	Ukraine	purchase: 6 combat drones	$ 69	Defense News	https://www.defensenews.com/unmanned/2019/01/14/turkish-firm-to-sell-drones-to-ukraine-in-69-million-deal/
08/18	Ukraine	--	Matrix UAV	Demon	armed drone	--	presentation: small drone of 4 rotors equipped with an RPG-26 grenade launcher	--	Defence Blog	https://defence-blog.com/aviation/ukrainian-compaño-unveils-new-dron-with-grenade-launcher.html
04/18	Ukraine	Ukraine's Ministry of Defense	Ukrspecsystems	RAM	loitering drone	--	presentation: loitering drone carrying 3 kilos of explosive charge	--	Jane's	http://www.janes.com/article/79289/ukrspecsystems-unveils-ram-uav-loitering-munition

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
12/18	Ukraine	Ukraine's Ministry of Defense	Ukroboronprom	Spectator-M1	reconnaissance drone	--	presentation: surveillance and reconnaissance drone	--	UNIAN	https://www.unian.info/society/10358892-ukroboronprom-upgrades-spectator-uav-photo.html
04/19	United Kingdom	Defence and Security Accelerator (DASA)	Blue Bear Systems Research	Maño drones Make Light Work	drone swarm	--	project: drone swarm technology development	€ 2.76	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDQvMDEvbm90aWNpYS1yZWluby11bmlkby1pbnZpZXJ0ZS1taWxsb25lcy1lbmphbWJyZXMuaHRtbHwxfDF8Mjc3MXwxMTQ=
05/18	United Kingdom	UK's Ministry of Defense	--	Reaper	armed drone	--	combat: The Royal Air Force has acknowledged that it fired thermobaric bombs with its Reaper drone fleet during operations in Siberia	--	Middle East Eye	http://www.middleeasteye.net/news/uk-drones-syria-using-controversial-vacuum-bombs-478492745
12/18	United Kingdom	UK Royal Air Force	Aeryon	SkyRanger	reconnaissance drone	--	presentation: of the operational capabilities of the drone, intended for protection at the Akrotiri base of the RAF in Cyprus	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/raf-conducts-ocd-using-rpas-enhance-fp/
10/18	USA / Norway	--	Flir Systems / Prox Dynamics	Black Hornet 3	reconnaissance drone	--	presentation: 33 grams mini drone to help the soldier: threat detection, surveillance, maintain contact, damage assessment during combat	--	InfoDron 149	http://www.infodron.es/r.php?u=L2lkLzIwMTgvMTAvMTEvbm90aWNpYS1wcmVzZW50YS1zaXN0ZW1hLXJlY29ub2NpbWllbnRvLWJsYWNrLWhvcm5ldC5odG1sfDF8MXwyNDk1fDg5
01/19	USA / Norway	U.S. Army	Flir Systems / Prox Dynamics	Black Hornet	mini-drones	--	project: soldiers supporting mini-drones inside the Soldier Borne Sensor program	$ 39.6	Press release	https://www.marketwatch.com/press-release/flir-systems-awarded-396-million-contract-for-black-hornet-personal-reconnaissance-systems-for-us-army-soldier-borne-sensor-program-2019-01-24

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
04/19	USA / Norway	--	Flir Systems / Prox Dynamics	Black Hornet	reconnaissance drone	--	presentation: of updates of Black Hornet, mini-drone (10 cm) of reconnaissance used for the United States Army, France, the United Kingdom, Germany, Australia, Norway, the Netherlands and India	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDMvMjkvbm90aWNpYS1wcmVzZW50YS1lc3BhbmEtYWN0dWFsaXphY2lvbmVzLWJsYWNrLWhvcm5ldC1za3lyYW5nZXIuaHRtbHwxfDF8Mjc3MHwxMTM=
04/19	USA / Norway	United Kingdom's Ministry of Defensel	Flir Systems / Prox Dynamics	Black Hornet	reconnaissance drone	United Kingdom	purchase of 3 micro drones for the British Army	$ 1.8	Military Aerospace	https://www.militaryaerospace.com/articles/pt/2019/04/unmanned-surveillance-situational-awareness.html
05/18	USA / Norway	Netherlands' Ministry of Defense	Flir Systems / Prox Dynamics	Black Hornet	mini-reconnaissance drone	Netherlands	purchase: of a group of Black Hornet mini-drones by the Dutch Army and Navy	--	Jane's	http://www.janes.com/article/79816/netherlands-procures-black-hornet-micro-uavs
06/18	USA / Norway	Australia's Ministry of Defense	Flir Systems / Prox Dynamics	PD-100 Black Hornet	mini-reconnaissance drone	Australia	deployment: in the Australian Army	--	Australian Aviation	https://australianaviation.com.au/2018/05/army-rolls-out-black-hornet-nano-uas/
04/19	USA	DARPA	--	--	drone swarm	--	project: DARPA has started the fourth stage of its OFFensive Swarm-Enabled Tactics program	--	Unmanned Systems Technology	https://www.unmannedsystemstechnology.com/2019/04/darpa-announces-next-phase-of-unmanned-swarm-technology-program/
04/18	USA	U.S. Navy	Raytheon	Barracuda	submarine drone to neutralize mines	--	project: production of the drones	$ 83.3	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1495974/
06/18	USA	--	Flir Systems	Black Hornet 3	reconnaissance drone	--	presentation: surveillance nano drone that can work in areas without GPS	--	Jane's	http://www.janes.com/article/80740/flir-systems-adds-black-hornet-3-to-its-prs-family-of-micro-uavs
07/18	USA	U.S. Navy	Kratos Defense & Security Solutions	BQM-177A	target drone	--	deployment: drone to act as an advanced, subsonic, recoverable air target	--	Unmanned Systems Technology	https://www.unmannedsystemstechnology.com/2018/07/kratos-delivers-unmanned-aéreoal-target-system-to-u-s-navy/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
03/19	USA	U.S. Army	QinetiQ North America	Common Robotic System-Individual	mini-robot	--	project: design of an individual support robot for soldiers. The project can be expanded to 400 million dollars with a production of about 3000 units	$ 152	Defense News	https://www.defensenews.com/land/2019/03/14/qinetiq-wins-armys-small-ground-robot-compequeñoion/
07/18	USA	U.S. Navy	Raytheon	Coyote	drone swarm	--	contract: jobs related to low cost Coyote swarms (https://www.raytheon.com/news/feature/mind-swarm)	$ 29.7	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1560786/
05/18	USA	U.S. Army	General Atomics Aeronautical Systems	Guardian - https://www.militaryfactory.com/aircraft/detail.asp?aircraft_id=1199	armed drone	--	presentation: of the medium-altitude and long-endurance Guardian drone in the island Iki of Japan	--	Unmanned Systems Technology	http://www.unmannedsystemstechnology.com/2018/05/guardian-uas-demonstration-flights-performed-in-japan/
05/18	USA	U.S. Army	Lockheed Martin	Indago 3	reconnaissance drone	--	presentation: of an improved version of the 4-rotor Indron 3 dron, equipped with an infrared camera	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/lockheed-upgrades-indago-3-ir-system/
09/18	USA	Canadian National Defense Department	Boeing Insitu	Integrator Extended Range	reconnaissance drone	Canada	purchase: of the high-autonomy reconnaissance drone (300 miles) launched with a catapult	--	Defense News	https://www.defensenews.com/digital-show-dailies/air-force-association/2018/09/17/insitu-unveils-new-integrator-extended-range-unmanned-system/?utm_source=Sailthru&utm_medium=email&utm_campaign=ebb%209/18/18&utm_term=Editorial%20-%20Early%20Bird%20Brief

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
09/18	USA	U.S. Air Force	Boeing	Integrator Extended Range	armed drone	--	presentation: reconnaissance drone launched with a catapult with a 300 nautical mile range	--	Defense News	https://www.defensenews.com/digital-show-dailies/air-force-association/2018/09/17/insitu-unveils-new-integrator-extended-range-unmanned-system/?utm_source=Sailthru&utm_medium=email&utm_campaign=ebb%209/18/18&utm_term=Editorial%20-%20Early%20Bird%20Brief
04/18	USA	--	L3 Technologies	Iver Precision Workhorse	submarine reconnaissance and combat drone	--	presentation: unmanned submarine vehicle designed for various purposes that include surveillance, anti-submarine warfare and war on mine	--	Unmanned Systems Technology	https://www.unmannedsystemstechnology.com/2018/04/l3-technologies-unveils-new-advanced-military-auv/
10/18	USA	--	Hoverfly Technologies	LiveSky SENTRY	reconnaissance drone	--	presentation: reconnaissance drone, tied - sentry	--	Unmanned Systems Technology	https://www.unmannedsystemstechnology.com/2018/09/new-tethered-dron-features-all-weather-capability/
07/18	USA	--	U.S. Marine Corps Warfighting Laboratory	Loitering	loitering drone	--	project: study of a system so that a single soldier on the ground can operate up to 15 loitering drones simultaneously	--	Marine Corps Times	https://www.marinecorpstimes.com/news/your-marine-corps/2018/07/20/the-corps-wants-15-suicide-drones-swarming-from-the-hands-of-one-front-line-marine/
04/18	USA	--	Riptide Autonomous Solutions	MK II	submarine reconnaissance drone	--	presentation: micro-submarine drone with 40 hours autonomy	--	Subsea world news	https://subseaworldnews.com/2018/03/21/riptide-introduces-new-micro-uuv/
02/18	USA	U.S. Marine Corps	InstantEye Robotics	Mk-2 GEN 3	mini-drones	--	purchase: of 800 Mk-2 GEN 3 reconnaissance mini-drones. Drones will support deployed marines, providing organic surveillance and reconnaissance capabilities	--	Unmanned Systems Technology	https://www.unmannedsystemstechnology.com/2018/02/united-states-marine-corps-selects-instanteye-multi-mission-uas/
10/18	USA	--	InstantEye Robotics	Mk-3 GEN4-D1/D2	reconnaissance drone	--	presentation: small military surveillance quadcopter	--	Jane's	www.janes.com/article/83815/ausa-2018-instant-eye-robotics-displays-uav

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
01/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-1 Predator	armed drone	--	contract: suport and services	$ 328.8 (in	UPI - Defense News	https://www.upi.com/Defense-News/2017/12/26/General-Atomics-receives-more-than-3288M-for-dron-systems/5491514301305/
03/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-1 Predator	armed drone	--	Fin de operación: The United States Air Force officially withdrew the Predator MQ-1, which played a key role in the new era of unmanned warfare. Displaced in 1995 and armed in 2001, the Predator intervened in thousands of missions in the wars of Iraq and Afghanistan, as well as in undeclared war zones	--	Bloomberg Gobiernoment	https://about.bgov.com/blog/air-force-retiring-predator-dron-changed-world/
03/19	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-1 Predator	armed drone	--	deployment: has exceeded 4 million flight hours in missions	--	U.S. Air Force	https://www.af.mil/News/Article-Display/Article/1781271/mq-1b-mq-9-flight-hours-hit-4-million/
10/18	USA	U.S. Army	General Atomics Aeronautical Systems	MQ-1C Gray Eagle	armed drone	--	testing: combat and reconnaissance drone, medium-altitude and long-endurance	--	US Army	https://www.army.mil/article/211106/extended_range_gray_eagle_version_follow_on_tests_complete
10/18	USA	U.S. Army	General Atomics	MQ-1C Gray Eagle	armed drone	--	project: technical services	$ 441.6	US DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1648706/
02/18	USA	U.S. Army	General Atomics Aeronautical Systems	MQ-1C Grey Eagle	reconnaissance and combat drone	USA bases in South Korea	deployment: for a US base in Gunsan, South Korea	--	Chosum	http://english.chosun.com/m/svc/article.html?contid=2018022000915
09/18	USA	U.S. Navy	Boeing	MQ-25A Stingray	reconnaissance armed loitering drones	--	project: to make the MQ-25A Stingray	$ 805	The Washington Post	https://www.washingtonpost.com/gdpr-consent/?destination=%2fbusiness%2f2018%2f08%2f30%2fboeing-wins-million-contract-build-navys-mq-stingray-dron%2f%3futm_term%3d.81719a16fbf4&utm_term=.65cf5dda1f03

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
07/18	USA	U.S. Air Force	Rolls-Royce	MQ-4C Triton + RQ-4 Global Hawk	reconnaissance drone	United Kingdom	contract: maintenance and repair of engines	$ 420	UPI	https://www.upi.com/Defense-News/2018/07/05/Rolls-Royce-awarded-420M-contract-for-dron-engines/5081530794511/
01/18	USA	U.S. Navy	Sierra Nevada Corporation	MQ-4C Triton	reconnaissance drone	--	contract: contract increase due to new requirements (https://en.wikipedia.org/wiki/Northrop_Grumman_MQ-4C_Triton)	$ 45	FBO	https://www.fbo.gov/index?s=opportunity&mode=form&id=4084e9f6f25ac158a39bb04c07970c69&tab=core&_cview=0
01/18	USA	U.S. Navy	Northrop Grumman	MQ-4C Triton	reconnaissance drone	--	contract: purchase contract extension	$ 255.3	DoD	https://www.defense.gov/News/Contracts/Contract-View/Article/1405313/
04/18	USA	U.S. State Department	Northrop Grumman	MQ-4C Triton	reconnaissance drone	Germany	autorización de venda: de 4 drones MQ-4C Triton - pendiente de la aprobación para parte del Gobierno alemán	$ 2500	FlightGlobal	https://www.flightglobal.com/news/articles/puedeential-mq-4c-sale-to-germaño-moves-forward-447359/
06/18	USA	U.S. Navy	Northrop Grumman	MQ-4C Triton	reconnaissance drone	--	deployment: high-altitude and high autonomy drone in the squadron of unmanned VUP-19 systems at the naval base of Ventura County in Point Mugu and Guam	--	Aviationist	https://theaviationist.com/2018/06/10/u-s-navy-inducts-mq-4c-triton-unmanned-aéreoal-vehículo-into-service-ahead-of-first-operational-deployment-to-guam/
01/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	contract: suport and services	$ 328.8 (in	UPI - Defense News	https://www.upi.com/Defense-News/2017/12/26/General-Atomics-receives-more-than-3288M-for-dron-systems/5491514301305/
01/18	USA	U.S. Navy	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	Afganistan	contract: for MQ-9 Reaper operations during a year in Afganistan	--	The drive	http://www.thedrive.com/the-war-zone/17571/us-navy-wants-to-hire-contractors-to-fly-their-own-mq-9-reaper-drones-in-afghanistan
01/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	contract: software development	$ 49.3	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1425283/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
01/19	USA	Royal Netherlands' Air Force	General Atomics	MQ-9 Reaper	armed drone	Netherlands	training: at the Holloman base in New Mexico, from the operators of two MQ-9 Reaper	--	Jane's	https://www.janes.com/article/85861/rnlaf-reaper-operators-train-in-us
03/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	presentation: Start of operations of the 50th Attack Squadron, which will operate the MQ-9 Reaper drones from the base of the Shaw Air Force in South Carolina	--	The Sumter Item	http://theitem.com/stories/shaw-mq-9-reaper-squadron-activates-appoints-commander,304211
03/19	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	deployment: has exceeded 4 million flight hours in missions	--	U.S. Air Force	https://www.af.mil/News/Article-Display/Article/1781271/mq-1b-mq-9-flight-hours-hit-4-million/
03/19	USA	Netherlands' Army	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	Netherlands	purchase: of 4 MQ-9 Reaper drones together with ground control stations, spare parts and support equipment	$ 123	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDMvMjcvbm90aWNpYS1nYWFzaS1zdW1pbmlzdHJhLWN1YXRyby1yZWFwZXItcGFpc2VzLWJham9zLW1pbGxvbmVzLmh0bWx8MXwxfDI3NjR8MTEy
04/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	purchase: motors' spare parts and containers for the transmission of motors	$ 36.7	DoD	https://www.defense.gov/News/Contracts/Contract-View/Article/1504779/
04/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	project: production order	$ 295.7	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1479983/
04/18	USA	U.S. State Department	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	United Kingdom	sales authorization: logistical support for the MQ-9 Reaper	$ 500	DSCA	http://www.dsca.mil/major-arms-sales/united-kingdom-mq-9-continuing-contractor-logistics-support
05/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	contract: for improvements of 122 MQ-9 Reaper drones (new features and communication kits)	$ 206	Military Aerospace	http://www.militaryaerospace.com/articles/2018/05/mq-9-block-5-reaper-attack-drones-unmanned.html

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
07/18	USA	Netherlands' Government	General Atomics Aeronautical Systems	MQ-9 Reaper	reconnaissance armed drone	Netherlands	purchase: of non armed drones	--	Defense News	https://www.defensenews.com/digital-show-dailies/farnborough/2018/07/17/netherlands-signs-deal-for-unarmed-mq-9-reaper-drones/
08/18	USA	The U.S. Misile Defense Agency	General Atomics Electromagnetic Systems	MQ-9 Reaper	armed drone	--	contract: integration of advanced sensors	$ 134	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1607278/
08/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	France	contract: drones for the French Army	$ 123	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1611035/
09/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	testing: the drone took down a small unmanned airplane with an air-to-air missile	--	Military.com	https://www.military.com/daily-news/2018/09/19/mq-9-gets-first-air-air-kill-training-exercise-air-force-official-says.html
10/18	USA	Ukraine's Army	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	Ukraine	presentation: first flight of an MQ-9 Reaper bought by Ukraine to USA - within the Clear Sky 18 exercises	--	Defence Blog	https://defence-blog.com/news/u-s-air-force-shows-its-mq-9-remotely-piloted-aircraft-at-exercise-clear-sky-18.html
04/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9B Protector	armed drone	United Kingdom	purchase: for the Government of the United Kingdom	$ 80.9	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1481376/
04/19	USA	U.S. State Departement	General Atomics	MQ-9B Sky Guardian	armed drone	Belgium	purchase: of 4 MQ-9B Sky Guardian drones	$ 600	DefenseNews	https://www.defensenews.com/air/2019/03/26/state-departement-oks-sale-of-sky-guardian-drones-to-belgium/
06/18	USA	--	General Atomics Aeronautical Systems	MQ-9B SkyGuardian	armed drone	--	testing: of the drone of medium-altitude and long-endurance, in a ray environment	--	Press Release	http://www.ga-asi.com/ga-asi-conducts-successful-lightning-tests-on-mq-9b
10/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9B SkyGuardian	armed drone	--	presentation: first flight, at the US base airfield of La Laguna	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTgvMTAvMDYvbm90aWNpYS1nYWFzaS1jb21wbGV0YS1wcmltZXItdnVlbG8tc2VndW5kby1za3lndWFyZGlhbi5odG1sfDF8MXwyNDg4fDg4

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
02/18	USA	Defense Advanced Research Projects Agency	Northrop Grumman	OFFSET swarm Program	drone swarm	--	project: The United States Defense Advanced Research Project Agency has selected Northrop Grumman to participate in OFFSET, a program to develop swarms of drones	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/darpa-selects-northrop-offset-programme/
01/18	USA	U.S. Air Force	Aurora Flight Sciences	Orion	loitering drone: large autonomy (more than 100 hours)	--	purchase: medium-altitude loitering drone (https://en.wikipedia.org/wiki/Aurora_Flight_Sciences_Orion)	$ 48	Shephard Media	https://www.shephardmedia.com/news/uv-online/aurora-secures-orion-uas-development-contract/
02/19	USA	U.S. Air Force	General Atomics	Predator B	reconnaissance drone	Spain	purchase: two of the 4 Predator B will arrive in 2019; will be assigned to surveillance tasks in the Strait of Gibraltar	€ 123	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDIvMjUvbm90aWNpYS1kZWZlbnNhLWVzcGVyYS1sbGVnYWRhLXByZWRhdG9yLXNlZ3VuZG8tc2VtZXN0cmUuaHRtbHwxfDF8MjcyNXwxMDg=
02/19	USA	U.S. Navy	Northrop Grumman	proyecto Remedy	drone swarm	--	project: swarm of drones that could intervene in electronic attack missions to block enemy sensor networks	--	Defense News	https://www.defensenews.com/electronic-warfare/2019/02/19/the-navy-plans-to-test-its-new-electronic-warfare-drones-this-fall/
02/18	USA	Canadian National Defense Department	AeroVironment	Puma AE	reconnaissance drone	Canada	purchase: of Puma AE drones for the Royal Canadian Navy	$ 6.35	Shephard Media	https://www.shephardmedia.com/news/uv-online/mda-deliver-mmuas-rcn/
04/18	USA	--	Aeryon Labs	R80D Sky Raider	reconnaissance drone	--	announce: multirotor surveillance drone, designed for defense agencies and governments	--	Unmanned Systems Technology	https://www.unmannedsystemstechnology.com/2018/04/new-vtol-suas-announced-u-s-departement-defense-federal-agencies/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
10/18	USA	U.S. Air Force	AeroVironment	Raven RQ-11B	armed drone	--	project: support drones for regions of South America	$ 12	--	http://www.infodron.es/r.php?u=L2lkLzIwMTgvMTAvMDgvbm90aWNpYS1hZXJvdmlyb25tZW50LXN1bWluaXN0cmFyYS1yYXZlbi1ycTExYi5odG1sfDF8MXwyNDg3fDg4
04/19	USA	Uzbekistan's Ministry of Defense	AeroVironment	RQ-11B Raven	reconnaissance drone	Uzbekistan	deployment: the drone has entered service in the Uzbekistan Army	--	Jane's	https://www.janes.com/article/87922/rq-11b-raven-uas-in-service-with-uzbek-military
03/18	USA	Egypt's Government via U.S. Army	AeroVironment	RQ-20B Puma AE II	reconnaissance drone	Egypt	purchase	$ 9.1	DoD	https://www.defense.gov/News/Contracts/Contract-View/Article/1468905/
04/18	USA	U.S. Army	AeroVironment	RQ-20B Puma AE II	reconnaissance drone	Latvia	purchase: two drones for the Government of Latvia	$ 1.96	FBO	https://www.fbo.gov/index?s=opportunity&mode=form&id=dad5b4e2ba683b018980dfe9aecd8de3&tab=core&_cview=0
05/18	USA	German Army, Bundeswehr	AeroVironment	RQ-20B Puma AE II	reconnaissance drone	Germany	purchase: for the German Marine	--	Jane's	http://www.janes.com/article/79928/german-navy-to-field-puma-ii-uas
07/18	USA	Norway's Army	AeroVironment	RQ-20B Puma II AE + RQ 12-A WASP Block IV	reconnaissance drone	Norway	purchase: of several drones	$ 17.6	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1585779/
03/18	USA	--	AeroVironment	RQ-20B Puma II AE	reconnaissance drone	A Middle East Country	purchase	$ 44.5	Jane's	https://www.janes.com/article/78411/aerovironment-contratod-to-supply-puma-ae-uas-to-middle-east-customer
04/18	USA	U.S. Navy	Boeing Insitu	RQ-21A Blackjack	reconnaissance drone: https://en.wikipedia.org/wiki/Boeing_Insitu_RQ-21_Blackjack	Poland	purchase: modification of the purchase agreement by the Government of Poland	$ 11.4	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1481376/
08/18	USA	U.S. Navy	Boeing Insitu	RQ-21A Blackjack	armed drone	Poland	contract: purchase of drones and eight protection aircraft for the United States Navy Corps and the Government of Poland	$ 54	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1608553/
08/18	USA	U.S. Navy	Boeing Insitu	RQ-21A Blackjack	armed drone	Canada	contract: improvements and GPS	$ 55.44	FBO	https://www.fbo.gov/index?s=opportunity&mode=form&id=68c43c561ae4744bda038bcc110e4a77&tab=core&_cview=1

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
06/18	USA	U.S. Navy	Northrop Grumman	RQ-4 Global Hawk BAMS-D	reconnaissance drone	--	contract: operation and maintenance, until the Navy MQ-4C Triton comes into service	$ 189	Aviation Week	http://aviationweek.com/defense/us-navy-s-bams-d-fly-triton-nears-deployment
11/18	USA	U.S. Air Force	Northrop Grumman	RQ-4 Global Hawk Block	armed drone	Japan	contract: for the deputy minister of drones of long-endurance and high flight height to Japan	$ 489.9	FlightGlobal	https://www.flightglobal.com/news/articles/northrop-grumman-contract-advances-japan-rq-4-work-453796/
09/18	USA	U.S. Army	L-3 Communications	RQ-7B V2 Shadow	armed drone	--	project: to manufacture the RQ-7B V2 Shadow	$ 454	FBO	https://www.fbo.gov/index.php?s=opportunity&mode=form&id=6b2c1e666e0dfebbe835b73f06514080&tab=core&_cview=1
02/18	USA	Indonesian Navy	Boeing Insitu	Scan Eagle	reconnaissance drone	Indonesia	purchase: of 4 Scan Eagle drones	--	Jane's	http://www.janes.com/article/78118/indonesian-navy-to-receive-four-scaneagle-uavs-in-2018
03/18	USA	Philippines' Air Force	Boeing Insitu	ScanEagle	reconnaissance drone	Philippines	purchase: of 6 ScanEagle drones (https://es.wikipedia.org/wiki/Boeing_Insitu_ScanEagle)	--	Jane's	http://www.janes.com/article/78553/us-delivers-scaneagle-uas-to-philippine-air-force
04/18	USA	U.S. Navy	Boeing Insitu	ScanEagle	reconnaissance drone	Afganistan	purchase: drones for the Government of Afghanistan	$ 47	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1478347/
04/19	USA	U.S. Navy	Boeing Insitu	ScanEagle	reconnaissance drone	Indonesia	contract: increase of the previous contract for the supply of a ScanEagle to the Government of Indonesia	$ 9.9	US DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1800834/
04/19	USA	U.S. Navy	Boeing Insitu	ScanEagle	reconnaissance drone	Afganistan	contract: support and maintenance (https://es.wikipedia.org/wiki/Boeing_Insitu_ScanEagle)	$ 17.5	US DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1794949/
06/18	USA	U.S. Coast Guard	Boeing Insitu	Scaneagle	reconnaissance drone	--	contract: of purchasing ScanEagle drones	$ 117	Jane's	http://www.janes.com/article/80717/update-us-coast-guard-awards-insitu-contract-for-suas-on-national-security-cutters

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
07/18	USA	Lebanon's Army	Boeing Insitu	ScanEagle	reconnaissance drone	Lebanon	purchase	$ 8.2	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1564122/
08/18	USA	U.S. Navy	Boeing Insitu	ScanEagle	reconnaissance drone	Czech Republic	purchase: spare parts for the Scan Eagle drone purchased by Czech Republic (https://es.wikipedia.org/wiki/Boeing_Insitu_ScanEagle)	$ 414	FBO	https://www.fbo.gov/index?s=opportunity&mode=form&id=894ebc71c603ae50f178e21ae1b55548&tab=core&_cview=1
05/18	USA	U.S. Army	AeroVironment	Shrike 2	armed drone	--	presentation: enhanced version of the Shrike drone, with vertical takeoff	--	Jane's	http://www.janes.com/article/80303/sofic-2018-aerovironment-s-introduces-shrike-2-vtol-fixed-wing-platform
05/18	USA	U.S. Army	Lockheed Martin	Stalker Extended Endurance	reconnaissance drone	--	presentation: drone of reconnaissance and vertical takeoff and landing	--	Jane's	http://www.janes.com/article/80305/sofic-2018-lockheed-martin-unveils-stalker-xe-vtol-unmanned-aircraft
04/18	USA	--	Aquabotix	SwarmDiver	submarine drone swarm	--	presentation: of a swarm system of underwater drones for reconnaissance and attack	--	Engadget	https://www.engadget.com/2018/04/11/aquabotix-aquatic-dron-swarm/
03/18	USA	U.S. Army	AeroVironment	Switchblade	loitering drone	--	contract: contract modification	$ 9.3	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1474871/
03/18	USA	U.S. Army	AeroVironment	Switchblade	loitering drone - kamikaze drone that crashes with the target and an explosive objectto destroy it	--	contract: modification / complement of the previous contract	$ 9.3	DoD	https://www.defense.gov/News/Contracts/Contract-View/Article/1474871/
04/18	USA	U.S. Army	AeroVironment	Switchblade	loitering drone	--	project	$ 44.7	DoD	https://www.defense.gov/News/Contracts/Contract-View/Article/1499976/
10/18	USA	U.S. Marine Corps	Bell Aerospace	V-247 Vigilant	armed drone	--	prototype presentation: real-scale model of the V-247 drone with tandem rotors	--	C4ISRNET	https://

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
03/18	USA	--	Lockheed Martin Skunk Works	X-44A	armed drone	--	presentation: secret drone that is believed to be useful for the development of the RQ-170 Sentinel, a CIA classified drone (https://es.wikipedia.org/wiki/Lockheed_Martin_RQ-170_Sentinel)	--	The Drive	https://www.thedrive.com/the-war-zone/19582/exclusive-photos-lockheed-skunk-works-x-44a-flying-wing-dron-breaks-cover
12/17	USA	U.S. Navy	SeeByte	MK-18	submarine armed drone	--	project: engineering and technical suport	$ 22.6	Shepard Media	https://www.shephardmedia.com/news/uv-online/seebyte-wins-mk18-uuv-support-contract/
12/17	USA	U.S. Army	General Atomics Aeronautical Systems	MQ-1C Gray Eagle	armed drone	--	project: logistic services	$ 94.6	DoD	https://www.defense.gov/News/Contracts/Contract-View/Article/1398382/
11/18	USA	Australia's Government	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	Australia	purchase: Australia will buy between 12 and 16 MQ-9 Reapers	--	9 News-com	https://www.9news.com.au/national/remote-control-aircraft-defence-australia-christopher-pyne/250433a3-3815-4ed3-8e7d-f049bcf4e7d5
12/17	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	project: integrate small diameter GBU-39B/B bomb into MQ-9	$17.5	US Departement of Defense	https://dod.defense.gov/News/Contracts/Contract-View/Article/1381242/
11/18	USA	South Korean Air Force	Northrop Grumman	RQ-4 Global Hawks	armed drone	South Korea	purchase: contract to provide logistical support expected to be given to the Korean Air Force in 2019	--	UPI	https://www.upi.com/Defense-News/2018/11/15/Northrop-Grumman-tapped-for-South-Korean-dron-support/8281542302617/?rc_fifo=1&ur3=1
12/17	USA	U.S. Marine Corps	AAI Corporation	RQ-7B Shadow	reconnaissance drone	--	manoeuvre: last flight of RQ-7B Shadow	--	U.S. Marine Corps	http://www.marines.mil/News/News-Display/Article/1400840/marines-say-goodbye-to-the-shadow/
12/17	USA	Lebanese Air Forces	Boeing Insitu	ScanEagle	reconnaissance drone	Lebanon	purchase: 6 ScanEagle drones as a part of an armament purchase worth 120 million $	$ 120	Jane's	http://www.janes.com/article/76418/lebanon-to-receive-md-530g-helicopters

Sources: https://dronecenter.bard.edu/category/roundup/
http://www.infodron.es/id/

LIST ORDERED BY DRONE MODELS

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
02/19	Spain	Brigada 2035, BRIEX2035	University of Sevilla	--	autonomy in armed drones	--	project: robotic and autonomous systems (Navantia, Santa Bárbara Sistemas, Indra, Everis and University of Seville)	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDEvMzEvbm90aWNpYS1uYXZhbnRpYS1zYW50YS1iYXJiYXJhLXByZXNlbnRhbi1wcm95ZWN0b3MtYnJpZXgyMDM1Lmh0bWx8MXwxfDI2Nzh8MTA1
04/19	USA	DARPA	--	--	drone swarm	--	project: DARPA has started the fourth stage of its OFFensive Swarm-Enabled Tactics program	--	Unmanned Systems Technology	https://www.unmannedsystemstechnology.com/2019/04/darpa-announces-next-phase-of-unmanned-swarm-technology-program/
07/18	Hungary	--	Eötvös University	--	loitering drone	--	presentation: model of the complex behavior of the swarms, which allows several dozen drones to work in synchrony (like a swarm) without any central control system	--	Wired	https://www.wired.com/story/how-a-flock-of-drones-developed-collective-intelligence/
03/18	France	France's Ministry of Defense	ECA Group	A18-M	submarine drone	--	presentation: underwater anti-mine dron	--	Unmanned Systems Technology	http://www.unmannedsystemstechnology.com/2018/02/eca-group-develops-new-mine-countermeasures-auv/
12/18	Spain	Spanish Army	Alpha Unmanned Systems (Madrid)	Alpha 800	armed drone	--	purchase: 2 drones of rotating blades	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/spain-acquires-two-alpha-800-uas/
05/18	Turkey	--	industrias Aeroespacials turques	Anka	armed drone	Kazakhstan	project: together the Turkish Aerospace Industries and the Kazakhstan Aviation Industry for the development and manufacture of Anka drones	--	Jane's	http://www.janes.com/article/80315/kadex-2018-tai-kai-sign-mou-on-anka-uavs-and-hurkus-jet-trainers

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
03/19	Turkey	Turkish Army	Industrias Aerospaciales Turcas	Anka-Aksungur	armed drone	--	presentation: test flight of the Anka-Aksungur drone, of long-endurance and medium-altitude	--	Aydinlik.com	https://www.aydinlik.com.tr/tusas-daha-guclu-anka-aksungur-ile-goklerde-gosteri-yapti-ekonomi-mart-2019
02/18	Turkey	Turkish Air Force	Turkish Aerospace Industries	Anka-S	reconnaissance and combat drone	--	deployment: The Turkish Air Force have received the first two fully operational TAI Anka-S reconnaissance and combat drones	--	Jane's	http://www.janes.com/article/77660/turkey-receives-first-pair-of-anka-s-uavs
08/18	Turkey	Turkey's Army	Turkish Aerospace Industries	Anka-S	armed drone	--	testing: destruction of a Smart Micro Munition missile with an Anka-S drone controlled from the satellite	--	Jane's	https://www.janes.com/article/82468/satellite-controlled-anka-s-uav-fires-guided-munitions
10/18	Turkey	Turkish Military	Turkish Aerospace Industries	Anka-S	armed drone	--	production: of 22 combat drones of long-endurance and medium-altitude; 16 of them will be satellite controlled Anka-S variants	--	Flightglobal	https://www.flightglobal.com/news/articles/turkey-signs-for-more-anka-uavs-452671/
05/18	Germany	--	Lange Aviation	Antares E2	reconnaissance drone	--	presentation: Monitoring dronw with fuel cell with autonomy of up to 40 hours	--	Aviation week	https://aviationweek.com/intelligence-surveillance-reconnaissance/antares-e2-brings-new-benefits-unmanned-surveillance
03/19	Spain	Colombian Aeronautics Industry Corporation	Airbus Defence	Atlante	armed drone	Colombia	project: Atlante manufacturing, a versatile drone of long-endurance	--	Jane's	https://www.janes.com/article/86980/colombia-and-spain-to-develop-new-uav
10/18	China	People's Liberation Army	Aviation Industry Corporation	AV500W	armed drone	--	manoeuvre: helicopter drone for reconnaissance and combat	--	Jane's	https://www.janes.com/article/83300/avic-s-av500w-vtol-uav-takes-parte-in-pla-exercise

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
09/18	China	--	--	AVIC Wing Loong II	armed drone	Serbia	purchase: the Serbian army bought six combat drones from China, including two AVIC Wing Loong II	--	Jane's	https://www.janes.com/article/83127/serbia-reportedly-agrees-ucav-deal-with-china
04/18	USA	U.S. Navy	Raytheon	Barracuda	submarine drone to neutralize mines	--	project: production of the drones	$ 83.3	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1495974/
01/19	Turkey	Ukraine's Government	Kale-Baykar	Bayraktar TB2	armed drone	Ukraine	purchase: 6 combat drones	$ 69	Defense News	https://www.defensenews.com/unmanned/2019/01/14/turkish-firm-to-sell-drones-to-ukraine-in-69-million-deal/
03/19	Turkey	Ukraine National Defense and Security Council	Kale-Baykar	Bayraktar TB2	armed drone	Ukraine	purchase	--	Interfax Ukraine	https://en.interfax.com.ua/news/general/570760.html
11/18	Turkey	Ukraine's Army	Kale-Baykar	Bayraktar TB2	armed drone	Ukraine	purchase: Ukraine has decided to buy drones from Turkey	--	Ukrinform	https://www.ukrinform.net/rubric-defense/2574490-ukraine-to-purchase-combate-drones-from-turkey.html
01/19	Turkey	Ukraine's Government	Kale-Baykar	Bayraktar TB2	armed drone	Ukraine	purchase: 6 combat drones	$ 69	Defense News	https://www.defensenews.com/unmanned/2019/01/14/turkish-firm-to-sell-drones-to-ukraine-in-69-million-deal/
03/18	Turkey	Qatar's Monitoring and reconnaissance Centre	Baykar Makina	Bayraktar-TB2	armed drone	Qatar	purchase: of 6 Bayraktar-TB2 drones	--	Jane's	http://www.janes.com/article/78581/dimdex-2018-qatar-orders-bayraktar-uavs
06/18	Israel	Israel's Department of Defense	Israel Aerospace Industries	BirdEye 650-D + RoBattle UGV	border surveillance drone	--	presentation: it combines an unmanned land vehicle with a fixed wing drone	--	Times of Israel	https://www.timesofisrael.com/iai-develops-ground-to-air-robot-system-for-border-surveillance/
06/18	USA	--	Flir Systems	Black Hornet 3	reconnaissance drone	--	presentation: surveillance nano drone that can work in areas without GPS	--	Jane's	http://www.janes.com/article/80740/flir-systems-adds-black-hornet-3-to-its-prs-family-of-micro-uavs

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
10/18	USA / Norway	--	Flir Systems / Prox Dynamics	Black Hornet 3	reconnaissance drone	--	presentation: 33 grams mini drone to help the soldier: threat detection, surveillance, maintain contact, damage assessment during combat	--	InfoDron 149	http://www.infodron.es/r.php?u=L2lkLzIwMTgvMTAvMTEvbm90aWNpYS1wcmVzZW50YS1zaXN0ZW1hLXJlY29ub2NpbWllbnRvLWJsYWNrLWhvcm5ldC5odG1sfDF8MXwyNDk1fDg5
01/19	USA / Norway	U.S. Army	Flir Systems / Prox Dynamics	Black Hornet	mini-drones	--	project: soldiers supporting mini-drones inside the Soldier Borne Sensor program	$ 39.6	Press release	https://www.marketwatch.com/press-release/flir-systems-awarded-396-million-contract-for-black-hornet-personal-reconnaissance-systems-for-us-army-soldier-borne-sensor-program-2019-01-24
04/19	USA / Norway	--	Flir Systems / Prox Dynamics	Black Hornet	reconnaissance drone	--	presentation: of updates of Black Hornet, mini-drone (10 cm) of reconnaissance used for the United States Army, France, the United Kingdom, Germany, Australia, Norway, the Netherlands and India	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDMvMjkvbm90aWNpYS1wcmVzZW50YS1lc3BhbmEtYWN0dWFsaXphY2lvbmVzLWJsYWNrLWhvcm5ldC1za3lyYW5nZXIuaHRtbHwxfDF8Mjc3MHwxMTM=
04/19	USA / Norway	United Kingdom's Ministry of Defensel	Flir Systems / Prox Dynamics	Black Hornet	reconnaissance drone	United Kingdom	purchase of 3 micro drones for the British Army	$ 1.8	Military Aerospace	https://www.militaryaerospace.com/articles/pt/2019/04/unmanned-surveillance-situational-awareness.html
05/18	USA / Norway	Netherlands' Ministry of Defense	Flir Systems / Prox Dynamics	Black Hornet	mini-reconnaissance drone	Netherlands	purchase: of a group of Black Hornet mini-drones by the Dutch Army and Navy	--	Jane's	http://www.janes.com/article/79816/netherlands-procures-black-hornet-micro-uavs
09/18	China	Chinese People's Liberation Army Navy	Ziyan	Blowfish I	armed drone	--	presentation: the armed helicopter drone is already in service	--	Jane's	https://www.janes.com/article/83264/aad-2018-china-s-blowfish-i-vtol-uav-enters-service-with-plan
06/18	China	China's Army	Ziyan	Blue Fish	armed drone	--	presentation: electric drone helicopter type armed with grenades	--	Army	https://www.armyreconnaissance.com/eurosatory_2018_official_news_online/eurosatory_2018_ziyan_electric_helicopter_dron_for_attack_and_surveillance.html

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
07/18	USA	U.S. Navy	Kratos Defense & Security Solutions	BQM-177A	target drone	--	deployment: drone to act as an advanced, subsonic, recoverable air target	--	Unmanned Systems Technology	https://www.unmannedsystemstechnology.com/2018/07/kratos-delivers-unmanned-aéreoal-target-system-to-u-s-navy/
07/18	Belarus	Belarus' Army	Scientific-Manufacturing Centro of Multipurpose Unmanned Systems (NPTs MBK) of Belarus	Burevestnik-MB	armed drone	--	presentation: two armed drones Burevestnik-MB (each one can carry two loitering drones)	--	Jane's + UAS Vision	https://www.uasvision.com/2018/07/12/burevestnik-mb-armed-dron-for-belarus-army/
07/18	Belarus	Belarus' Army	Scientific-Manufacturing Centro of Multipurpose Unmanned Systems (NPTs MBK) of Belarus	Busel-MB	reconnaissance drone	--	presentation	--	UAS Vision	https://www.uasvision.com/2018/07/12/burevestnik-mb-armed-dron-for-belarus-army/
11/18	China	Argelia's Army	CASC	Caihong-4	armed drone	Argelia	purchase	--	Jane's	https://www.janes.com/article/84158/algeria-unveils-chinese-uavs
12/18	Europe	European Maritime Safety Agency	Schiebel	Camcopter S-100	reconnaissance drone	--	purchase: for maritime reconnaissance tasks	--	AUVSI	https://www.auvsi.org/industry-news/schiebel-awarded-maritime-surveillance-service-provision-contract-its-camcopter-s-100
05/18	China	Royal Jordan Air Force	CASC	CH-4	reconnaissance armed drone	Jornadia	presentation: at the SOFEX 2018 fair	--	Shephard News	https://www.shephardmedia.com/news/uv-online/sofex-2018-jordanian-ch-4-makes-public-debut/
03/18	China	Aerospace China's Academy	Aerodynamics	CH-4C	reconnaissance armed drone	--	project: new variant of the Caihong-4 called CH-4C: it will have a greater load capacity and an improved electronics and will be armed with 100 Kg precision guided bombs	--	Jane's	http://www.janes.com/article/78269/china-s-casc-readies-improved-ch-4-uav
12/18	Colombia	Colombian Army	Colombian Aeronautics Industry Corporation	Coelum	armed drone	--	presentation: of the Colombian military drones Coelum and Quimbaya	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTgvMTIvMDQvbm90aWNpYS1mbGF2aW8tdWxsb2EtY29lbHVtLXRpZW5lLXZhcmllZGFkLWNsaWVudGVzLXBvdGVuY2lhbGVzLXZlcnNhdGlsaWRhZC5odG1sfDF8MXwyNTkxfDk3

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
03/19	USA	U.S. Army	QinetiQ North America	Common Robotic System-Individual	mini-robot	--	project: design of an individual support robot for soldiers. The project can be expanded to 400 million dollars with a production of about 3000 units	$ 152	Defense News	https://www.defensenews.com/land/2019/03/14/qinetiq-wins-armys-small-ground-robot-compequeñoion/
02/18	Iran	Iran's Ministry of Defense	--	copia Iraniana del RQ-170 Sentinel	armed drone	--	combat: Israel struck down an Iranian drone that according to Israel was a copy of the RQ-170 Sentinel, a stealth spy drone from the United States (Lockheed Martin). The Iranian drone, launched from Siberia, was shot down inside Israel. Iran captured a US RQ-170 in 2011 and claims that it has been doing drone reverse engineering	--	Washington Post	https://www.washingtonpost.com/world/israel-confirms-downed-jet-was-hit-by-syrian-antiaircraft-fire/2018/02/11/bd42a0b2-0f13-11e8-8ea1-c1d91fcec3fe_story.html?utm_term=.e02c5aed09d8
07/18	USA	U.S. Navy	Raytheon	Coyote	drone swarm	--	contract: jobs related to low cost Coyote swarms (https://www.raytheon.com/news/feature/mind-swarm)	$ 29.7	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1560786/
08/18	Ukraine	--	Matrix UAV	Demon	armed drone	--	presentation: small drone of 4 rotors equipped with an RPG-26 grenade launcher	--	Defence Blog	https://defence-blog.com/aviation/ukrainian-compaño-unveils-new-dron-with-grenade-launcher.html
08/18	China	Chile's Navy	DJI Technology	DJI Magic Pro	armed drone	Chile	purchase: for the security of the perimeter of the base of Fort Fèlix Aguayo	--	Jane's	https://www.janes.com/article/82419/chilean-navy-buys-chinese-uav-to-secure-facilities

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
08/18	Israel	Thailand's Ministry of Defense	Aeronautics Defense Systems	Dominator	armed drone	Thailand	purchase: of the Dominator drone that can transport up to 1,900 kilograms in special loads (such as a camera, radar or bombs) simultaneously; it can be kept in the air for 20 hours	--	Globes	https://en.globes.co.il/en/article-aeronautics-wins-27m-thailand-uav-deal-1001248103
01/19	Spain	General Directorate of Procurement of Armament and Material	Airbus	drone swarm	drone swarm	--	project: production and purchase of a drone swarm system for tactical and operational evaluation	€ 100000	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDEvMDMvbm90aWNpYS1jb21wcmEtZW5qYW1icmUtZHJvbmVzLWFpcmJ1cy1lc3BhbmEuaHRtbHwxfDF8MjYzMnwxMDE=
05/18	Russia	Russia's Ministry of Defense	Rostec	Eleron-3	reconnaissance drone	--	purchase: of 30 Eleron-3 drones	--	Shephard News	https://www.shephardmedia.com/news/uv-online/russian-mod-receive-eleron-3-uas/
10/18	Germany	--	--	Euro Hawk	reconnaissance drone	Canada	purchase: reconnaissance high-flying drone based on the RQ-4 Global Hawk	--	US DoD	https://www.defensenews.com/global/europe/2018/09/24/germaño-looking-to-sell-costly-rarely-used-dron-to-canada/
05/19	Europe (common project Germany-France-Spain)	European Union	--	EuroMALE	armed drone	--	testing: safety assessment for the use of EuroMALE in segregated and non-segregated airspaces. The MALE are drones of medium flight height and long-endurance	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/preliminary-safety-assessments-european-male-rpas-/
10/18	Europe (common project Germany-France-Spain)	Spain's Air Force	--	EuroMALE	armed drone	Spain	purchase: of 15 EuroMALE drones in the 2020 (medium-altitude flight drones and long-endurance)	--	Jane's	https://www.janes.com/article/84365/spain-sets-out-european-male-rpas-procurement-plan
12/18	Europe	Frontex	Leonardo	Falco EVO	reconnaissance drone	--	deployment: reconnaissance drone in Lampedusa, in evaluation phase	--	Unmanned Systems Technology	https://www.unmannedsystemstechnology.com/2018/12/falco-evo-uas-deployed-under-eu-surveillance-research-programme/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
12/18	Europe	Frontex	Selex Galileo (subsidiària de Leonardo)	Falco EVO	reconnaissance drone	--	purchase: for the surveillance of the maritime borders of Europe	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTgvMTIvMTIvbm90aWNpYS1mcm9udGV4LWVzY29nZS1zZWxleC1nYWxpbGVvLXZpZ2lsYW5jaWEtZnJvbnRlcmFzLW1hcml0aW1hcy5odG1sfDF8MXwyNjAyfDk3
08/18	Brazil	--	FT Sistemas	Flettner Helicopter FT-100FH	dual-use drone	--	testing: advanced flight test	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/new-design-ft-100fh-advances-flight-testing-campai/
06/18	Spain	Ministry of Defense	Thales Group	Fulmar	reconnaissance drone	--	purchase: of several drones by the Spanish Navy and Army (https://en.wikipedia.org/wiki/Thales_Fulmar)	--	Jane's	http://www.janes.com/article/81033/spain-orders-more-fulmar-uavs
05/19	Belarus	Belarus' Ministry of Defense	KB Design Bureau	Grach	armed drone	--	presentation: multi-rotor drone that can carry grenades, incendiary bombs or anti-tank bombs	--	AIN Online	https://www.ainonline.com/aviation-news/defense/2019-05-20/milex-2019-belarus-introduces-new-uas-and-ew-jammers
05/18	USA	U.S. Army	General Atomics Aeronautical Systems	Guardian - https://www.militaryfactory.com/aircraft/detail.asp?aircraft_id=1199	armed drone	--	presentation: of the medium-altitude and long-endurance Guardian drone in the island Iki of Japan	--	Unmanned Systems Technology	http://www.unmannedsystemstechnology.com/2018/05/guardian-uas-demonstration-flights-performed-in-japan/
09/18	Israel	Azerbaijan's Army	Israel Aerospace Industries	Harop	loitering drones	Azerbaijan	purchase: presentation of purchased drone to Azerbaijan	--	C4ISRNET	https://www.c4isrnet.com/unmanned/2018/08/21/azerbaijan-shows-off-kamikaze-dron-in-military-exercises/
07/18	Israel	Thailand's Army	Elbit	Hermes 450	loitering: reconnaissance drone	Thailand	purchase: drone of medium-altitude and long-endurance	--	Aviation International Online	https://www.ainonline.com/aviation-news/defense/2018-06-25/thailand-introduces-elbits-hermes-450-uas
08/18	Israel	Philippines' Air Force	Elbit Systems	Hermes 450	loitering: reconnaissance drone	Philippines	purchase: shipment (during 2018) of the first of several Hermes 450 drones purchased by Philippines	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/hermes-bags-new-customer-philippines/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
09/18	Israel	Zambia's Army	Elbit Systems	Hermes 450	loitering: reconnaissance drones	Zambia	purchase	--	Jane's	https://www.janes.com/article/82934/zconian-hermes-450-uav-spuedeted
01/19	Israel	Chile's Air Force	Elbit Systems	Hermes 900	loitering: reconnaissance drones	Chile	presentation: drone that Chile bought in 2011	--	Jane's	https://www.janes.com/article/85558/chilean-hermes-900-breaks-cover-during-firefighting-operations
05/18	Israel	Azerbaidjan's Army	Elbit Systems	Hermes 900	loitering: reconnaissance drone	Azerbaijan	purchase	--	Jane's	http://www.janes.com/article/79686/azerbaijan-shows-hermes-900
01/19	Israel	Policia Federal of Brazil	Israel Aerospace Industries	Heron 1	reconnaissance drone	Brazil	joint project between the federal police and the Air Force of Brazil	--	Jane's	https://www.janes.com/article/85703/brazil-to-resume-operations-with-heron-1-uavs
12/18	Germany	Bundestag	Aerospace Industries de Israel	Heron 1	armed drone	Israel	extension of lease for the continuation of operations of the German Army (Bundeswehr) in Afghanistan and Mali	--	Jane's	https://www.janes.com/article/85055/germaño-funds-procurement-projects-as-bundeswehr-grows-further
12/18	Israel	Vietnam's Army	Israel Aerospace Industries	Heron 1s	armed drone	Vietnam	purchase: of 3 Heron 1s drones	between $ 140 and $ 160	Jerusalem Post	https://www.jpost.com/Israel-News/Israel-Aerospace-Industries-closes-160m-dron-deal-with-Vietnam-573933
06/18	Israel	Germany's Ministry of Defense	Israel Aerospace Industries	Heron TP	reconnaissance drone	Germany	purchase: with leasing contract - Heron TP drone replaces Heron 1 drones that were used in Mali and Afghanistan	--	Defense News	https://www.defensenews.com/unmanned/2018/06/14/german-lawmakers-approve-dron-deal-with-israel/
02/18	Israel	Greece's Ministry of Defense	División Malat de Israel Aerospace Industries	Heron	reconnaissance drone	Greece	purchase: lease contract (3 years) of the IAI Heron drone	$ 44	Jane's	http://www.janes.com/article/77680/greece-to-lease-heron-uavs-from-israel
02/18	Israel	German Army, Bundeswehr	División Malat de Israel Aerospace Industries	IAI Heron or Majatz-1	reconnaissance drone	Germany	purchase: The SPD and CDU parties in Germany have agreed to lease the drone of the IAI Heron TP drone	--	Handelsblatt	https://www.handelsblatt.com/politik/deutschland/koalitionsverhandlungen-groko-einigt-sich-auf-drohnen-fuer-die-bundeswehr/20918014.html

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
05/18	USA	U.S. Army	Lockheed Martin	Indago 3	reconnaissance drone	--	presentation: of an improved version of the 4-rotor Indron 3 dron, equipped with an infrared camera	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/lockheed-upgrades-indago-3-ir-system/
09/18	USA	U.S. Air Force	Boeing	Integrator Extended Range	armed drone	--	presentation: reconnaissance drone launched with a catapult with a 300 nautical mile range	--	Defense News	https://www.defensenews.com/digital-show-dailies/air-force-association/2018/09/17/insitu-unveils-new-integrator-extended-range-unmanned-system/?utm_source=Sailthru&utm_medium=email&utm_campaign=ebb%209/18/18&utm_term=Editorial%20-%20Early%20Bird%20Brief
09/18	USA	Canadian National Defense Department	Boeing Insitu	Integrator Extended Range	reconnaissance drone	Canada	purchase: of the high-autonomy reconnaissance drone (300 miles) launched with a catapult	--	Defense News	https://www.defensenews.com/digital-show-dailies/air-force-association/2018/09/17/insitu-unveils-new-integrator-extended-range-unmanned-system/?utm_source=Sailthru&utm_medium=email&utm_campaign=ebb%209/18/18&utm_term=Editorial%20-%20Early%20Bird%20Brief
04/18	USA	--	L3 Technologies	Iver Precision Workhorse	submarine reconnaissance and combat drone	--	presentation: unmanned submarine vehicle designed for various purposes that include surveillance, anti-submarine warfare and war on mine	--	Unmanned Systems Technology	https://www.unmannedsystemstechnology.com/2018/04/l3-technologies-unveils-new-advanced-military-auv/
02/19	Russia	Russia's Army	Micran	Karnivora	armed reconnaissance drone	--	test	--	TASS	http://tass.com/defense/1042083
02/19	Iran	Iran's Air Force	Shahed Aviation Industries	Khodkar	reconnaissance drone	--	presentation: high-cost surveillance drone based on the T-33 training aircraft	--	Press TV	https://www.presstv.com/Detail/2019/01/31/587305/Iran-Khodkar-dron-Air-Defense

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
02/19	Russia	Russia's Army	ZALA Aero Group (Kalashnikov)	KUB-UAV	loitering drone	--	presentation: drone with a payload of 3.17 kilos and 30 minutes of autonomy	--	The Washington Post	https://www.washingtonpost.com/world/2019/02/23/kalashnikov-assault-rifle-changed-world-now-theres-kalashnikov-kamikaze-dron/?utm_term=.3539500569b9
04/19	Mexico	--	Hydra Technologies	Kukulkan	armed drone	--	presentation: of the Kukulkan drone, which is an evolution of the Báalam S-45 with more carrying capacity	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDQvMjUvbm90aWNpYS1oeWRyYS1kZXNhcnJvbGxhLWt1a3Vsa2FuLWV2b2x1Y2lvbi1iYWFsYW0tbWF5b3ItY2FyZ2EuaHRtbHwxfDF8MjgxM3wxMTc=
05/18	Europe	European Union	empresas de defensa	LAWS	autonomous armed drones	--	projects: The European Union will allow companies in the military industry to request financing for the development of autonomous lethal weapons. According to two unnamed sources, some members of the Parliament initially opposed this possibility, but then agreed to allow defense companies to access the Union fund of 500 million euros	€ 500	Eu observer	https://euobserver.com/science/141885
06/18	France	--	Elistair	Ligh-T V.3	reconnaissance drone	--	presentation: monitoring multirotor dron, tied with cable	--	Jane's	http://www.janes.com/article/81120/eurosatory-2018-elistair-expands-tethered-uav-portfolio?from_rss=1
10/18	USA	--	Hoverfly Technologies	LiveSky SENTRY	reconnaissance drone	--	presentation: reconnaissance drone, tied - sentry	--	Unmanned Systems Technology	https://www.unmannedsystemstechnology.com/2018/09/new-tethered-dron-features-all-weather-capability/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
07/18	USA	--	U.S. Marine Corps Warfighting Laboratory	Loitering	loitering drone	--	project: study of a system so that a single soldier on the ground can operate up to 15 loitering drones simultaneously	--	Marine Corps Times	https://www.marinecorpstimes.com/news/your-marine-corps/2018/07/20/the-corps-wants-15-suicide-drones-swarming-from-the-hands-of-one-front-line-marine/
12/18	China	--	Beihang Unmanned Aircraft System	MALE BZK-005E	armed drone	--	presentation: interest in its export; the MALE BZK-005E is an evolution of the BZK-005	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTgvMTEvMzAvbm90aWNpYS1iZWloYW5nLXByZXBhcmEtZXhwb3J0YWNpb24tYnprMDA1ZS5odG1sfDF8MXwyNTc4fDk3
11/18	Europe	PESCO Projects	--	MALE	armed drone	--	Eurodron project (Germany, France, Spain, Italy, Czech Republic) of medium-altitude drone with long-endurance, with double turboprop; developed by Airbus, Dassault Aviation and Leonardo	--	PESCO	https://pesco.Europe.eu/project/european-medium-altitude-long-endurance-remotely-piloted-aircraft-systems-male-rpas-eurodron/
04/19	United Kingdom	Defence and Security Accelerator (DASA)	Blue Bear Systems Research	Maño drones Make Light Work	drone swarm	--	project: drone swarm technology development	€ 2.76	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDQvMDEvbm90aWNpYS1yZWluby11bmlkby1pbnZpZXJ0ZS1taWxsb25lcy1lbmphbWJyZXMuaHRtbHwxfDF8Mjc3MXwxMTQ=
02/19	Spain	Subdirección General de Adquisiciones de Armamento y Material (DGAM)	Indra	Mantis	reconnaissance drone	--	purchase: of a Mantis RPAS for the operational evaluation of phase II 2018 of the DGAM	€ 0.125	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDIvMjAvbm90aWNpYS1jb21wcmEtbWFudGlzLWluZHJhLmh0bWx8MXwxfDI3MDl8MTA4
01/19	China	Colombia's Policia Nacional	DJI Technology	Matrice 210	armed drone	Colombia	purchase: the District Office of Barranquilla has bought the Chinese drone Matrice 210	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDEvMDMvbm90aWNpYS1wb2xpY2lhLW5hY2lvbmFsLWNvbG9tYmlhLWluY29ycG9yYS5odG1sfDF8MXwyNjMzfDEwMQ==
12/18	Poland	Poland's Ministry of Defense	Poland's Ministry of Defense	Micro-drones	mini-drones	--	project: to manufacture 6 vertical take-off and landing micro-drones, within the Wazka program	--	Defence24	https://www.defence24.com/micro-uavs-for-the-polish-military-wazka-programme-another-attempt

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
02/19	Israel	Israel Aerospace Industries	Israel Aerospace Industries	Mini Harpy	loitering mini-dron	--	presentation: mini-drone that runs with a range of up to 60 miles	--	UPI	https://www.upi.com/Israel-Aerospace-Industries-shows-off-loitering-misile-at-India-air-show/6731550685580/?rc_fifo=1
04/18	Italy	Italian Direction of Armament and Airworthiness	Leonardo	Mirach-40	target drone - https://en.wikipedia.org/wiki/Target_drone	--	authorization: for military operations	--	Unmanned Systems Technology	http://www.unmannedsystemstechnology.com/2018/04/leonardo-target-dron-authorised-military-operations/
04/18	USA	--	Riptide Autonomous Solutions	MK II	submarine reconnaissance drone	--	presentation: micro-submarine drone with 40 hours autonomy	--	Subsea world news	https://subseaworldnews.com/2018/03/21/riptide-introduces-new-micro-uuv/
12/17	USA	U.S. Navy	SeeByte	MK-18	submarine armed drone	--	project: engineering and technical suport	$ 22.6	Shepard Media	https://www.shephardmedia.com/news/uv-online/seebyte-wins-mk18-uuv-support-contract/
02/18	USA	U.S. Marine Corps	InstantEye Robotics	Mk-2 GEN 3	mini-drones	--	purchase: of 800 Mk-2 GEN 3 reconnaissance mini-drones. Drones will support deployed marines, providing organic surveillance and reconnaissance capabilities	--	Unmanned Systems Technology	https://www.unmannedsystemstechnology.com/2018/02/united-states-marine-corps-selects-instanteye-multi-mission-uas/
10/18	USA	--	InstantEye Robotics	Mk-3 GEN4-D1/D2	reconnaissance drone	--	presentation: small military surveillance quadcopter	--	Jane's	www.janes.com/article/83815/ausa-2018-instant-eye-robotics-displays-uav
02/18	Iran	Iran's Ministry of Defense	--	Mohajer 6	armed drone	--	production: start of serial production of Mohajer 6 (https://en.mehrnews.com/news/147747/Mohajer-6-combate-drones-join-Iranian-Army)	--	Jane's	http://www.janes.com/article/77677/Iran-s-mohajer-6-armed-uav-goes-into-production
01/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-1 Predator	armed drone	--	contract: suport and services	$ 328.8 (in	UPI - Defense News	https://www.upi.com/Defense-News/2017/12/26/General-Atomics-receives-more-than-3288M-for-dron-systems/5491514301305/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
03/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-1 Predator	armed drone	--	Fin de operación: The United States Air Force officially withdrew the Predator MQ-1, which played a key role in the new era of unmanned warfare. Displaced in 1995 and armed in 2001, the Predator intervened in thousands of missions in the wars of Iraq and Afghanistan, as well as in undeclared war zones	--	Bloomberg Gobiernoment	https://about.bgov.com/blog/air-force-retiring-predator-dron-changed-world/
03/19	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-1 Predator	armed drone	--	deployment: has exceeded 4 million flight hours in missions	--	U.S. Air Force	https://www.af.mil/News/Article-Display/Article/1781271/mq-1b-mq-9-flight-hours-hit-4-million/
10/18	USA	U.S. Army	General Atomics Aeronautical Systems	MQ-1C Gray Eagle	armed drone	--	testing: combat and reconnaissance drone, medium-altitude and long-endurance	--	US Army	https://www.army.mil/article/211106/extended_range_gray_eagle_version_follow_on_tests_complete
10/18	USA	U.S. Army	General Atomics	MQ-1C Gray Eagle	armed drone	--	project: technical services	$ 441.6	US DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1648706/
12/17	USA	U.S. Army	General Atomics Aeronautical Systems	MQ-1C Gray Eagle	armed drone	--	project: logistic services	$ 94.6	DoD	https://www.defense.gov/News/Contracts/Contract-View/Article/1398382/
02/18	USA	U.S. Army	General Atomics Aeronautical Systems	MQ-1C Grey Eagle	reconnaissance and combat drone	USA bases in South Korea	deployment: for a US base in Gunsan, South Korea	--	Chosum	http://english.chosun.com/m/svc/article.html?contid=2018022000915
09/18	USA	U.S. Navy	Boeing	MQ-25A Stingray	reconnaissance armed loitering drones	--	project: to make the MQ-25A Stingray	$ 805	The Washington Post	https://www.washingtonpost.com/gdpr-consent/?destination=%2fbusiness%2f2018%2f08%2f30%2fboeing-wins-million-contract-build-navys-mq-stingray-dron%2f%3futm_term%3d.81719a16fbf4&utm_term=.65cf5dda1f03

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
07/18	USA	U.S. Air Force	Rolls-Royce	MQ-4C Triton + RQ-4 Global Hawk	reconnaissance drone	United Kingdom	contract: maintenance and repair of engines	$ 420	UPI	https://www.upi.com/Defense-News/2018/07/05/Rolls-Royce-awarded-420M-contract-for-dron-engines/5081530794511/
01/18	USA	U.S. Navy	Sierra Nevada Corporation	MQ-4C Triton	reconnaissance drone	--	contract: contract increase due to new requirements (https://en.wikipedia.org/wiki/Northrop_Grumman_MQ-4C_Triton)	$ 45	FBO	https://www.fbo.gov/index?s=opportunity&mode=form&id=4084e9f6f25ac158a39bb04c07970c69&tab=core&_cview=0
01/18	USA	U.S. Navy	Northrop Grumman	MQ-4C Triton	reconnaissance drone	--	contract: purchase contract extension	$ 255.3	DoD	https://www.defense.gov/News/Contracts/Contract-View/Article/1405313/
04/18	USA	U.S. State Department	Northrop Grumman	MQ-4C Triton	reconnaissance drone	Germany	autorización de venda: de 4 drones MQ-4C Triton - pendiente de la aprobación para parte del Gobierno alemán	$ 2500	FlightGlobal	https://www.flightglobal.com/news/articles/puedeential-mq-4c-sale-to-germaño-moves-forward-447359/
06/18	USA	U.S. Navy	Northrop Grumman	MQ-4C Triton	reconnaissance drone	--	deployment: high-altitude and high autonomy drone in the squadron of unmanned VUP-19 systems at the naval base of Ventura County in Point Mugu and Guam	--	Aviationist	https://theaviationist.com/2018/06/10/u-s-navy-inducts-mq-4c-triton-unmanned-aéreoal-vehículo-into-service-ahead-of-first-operational-deployment-to-guam/
01/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	contract: suport and services	$ 328.8 (in	UPI - Defense News	https://www.upi.com/Defense-News/2017/12/26/General-Atomics-receives-more-than-3288M-for-dron-systems/5491514301305/
01/18	USA	U.S. Navy	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	Afganistan	contract: for MQ-9 Reaper operations during a year in Afganistan	--	The drive	http://www.thedrive.com/the-war-zone/17571/us-navy-wants-to-hire-contractors-to-fly-their-own-mq-9-reaper-drones-in-afghanistan
01/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	contract: software development	$ 49.3	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1425283/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
01/19	USA	Royal Netherlands' Air Force	General Atomics	MQ-9 Reaper	armed drone	Netherlands	training: at the Holloman base in New Mexico, from the operators of two MQ-9 Reaper	--	Jane's	https://www.janes.com/article/85861/rnlaf-reaper-operators-train-in-us
03/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	presentation: Start of operations of the 50th Attack Squadron, which will operate the MQ-9 Reaper drones from the base of the Shaw Air Force in South Carolina	--	The Sumter Item	http://theitem.com/stories/shaw-mq-9-reaper-squadron-activates-appoints-commander,304211
03/19	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	deployment: has exceeded 4 million flight hours in missions	--	U.S. Air Force	https://www.af.mil/News/Article-Display/Article/1781271/mq-1b-mq-9-flight-hours-hit-4-million/
03/19	USA	Netherlands' Army	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	Netherlands	purchase: of 4 MQ-9 Reaper drones together with ground control stations, spare parts and support equipment	$ 123	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDMvMjcvbm90aWNpYS1nYWFzaS1zdW1pbmlzdHJhLWN1YXRyby1yZWFwZXItcGFpc2VzLWJham9zLW1pbGxvbmVzLmh0bWx8MXwxfDI3NjR8MTEy
04/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	purchase: motors' spare parts and containers for the transmission of motors	$ 36.7	DoD	https://www.defense.gov/News/Contracts/Contract-View/Article/1504779/
04/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	project: production order	$ 295.7	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1479983/
04/18	USA	U.S. State Department	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	United Kingdom	sales authorization: logistical support for the MQ-9 Reaper	$ 500	DSCA	http://www.dsca.mil/major-arms-sales/united-kingdom-mq-9-continuing-contractor-logistics-support
05/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	contract: for improvements of 122 MQ-9 Reaper drones (new features and communication kits)	$ 206	Military Aerospace	http://www.militaryaerospace.com/articles/2018/05/mq-9-block-5-reaper-attack-drones-unmanned.html

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
07/18	USA	Netherlands' Government	General Atomics Aeronautical Systems	MQ-9 Reaper	reconnaissance armed drone	Netherlands	purchase: of non armed drones	--	Defense News	https://www.defensenews.com/digital-show-dailies/farnborough/2018/07/17/netherlands-signs-deal-for-unarmed-mq-9-reaper-drones/
08/18	USA	The U.S. Misile Defense Agency	General Atomics Electromagnetic Systems	MQ-9 Reaper	armed drone	--	contract: integration of advanced sensors	$ 134	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1607278/
08/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	France	contract: drones for the French Army	$ 123	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1611035/
09/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	testing: the drone took down a small unmanned airplane with an air-to-air missile	--	Military.com	https://www.military.com/daily-news/2018/09/19/mq-9-gets-first-air-air-kill-training-exercise-air-force-official-says.html
10/18	USA	Ukraine's Army	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	Ukraine	presentation: first flight of an MQ-9 Reaper bought by Ukraine to USA - within the Clear Sky 18 exercises	--	Defence Blog	https://defence-blog.com/news/u-s-air-force-shows-its-mq-9-remotely-piloted-aircraft-at-exercise-clear-sky-18.html
11/18	USA	Australia's Government	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	Australia	purchase: Australia will buy between 12 and 16 MQ-9 Reapers	--	9 News-com	https://www.9news.com.au/national/remote-control-aircraft-defence-australia-christopher-pyne/250433a3-3815-4ed3-8e7d-f049bcf4e7d5
12/17	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9 Reaper	armed drone	--	project: integrate small diameter GBU-39B/B bomb into MQ-9	$17.5	US Departement of Defense	https://dod.defense.gov/News/Contracts/Contract-View/Article/1381242/
04/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9B Protector	armed drone	United Kingdom	purchase: for the Government of the United Kingdom	$ 80.9	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1481376/
04/19	USA	U.S. State Departement	General Atomics	MQ-9B Sky Guardian	armed drone	Belgium	purchase: of 4 MQ-9B Sky Guardian drones	$ 600	DefenseNews	https://www.defensenews.com/air/2019/03/26/state-departement-oks-sale-of-sky-guardian-drones-to-belgium/
06/18	USA	--	General Atomics Aeronautical Systems	MQ-9B SkyGuardian	armed drone	--	testing: of the drone of medium-altitude and long-endurance, in a ray environment	--	Press Release	http://www.ga-asi.com/ga-asi-conducts-successful-lightning-tests-on-mq-9b
10/18	USA	U.S. Air Force	General Atomics Aeronautical Systems	MQ-9B SkyGuardian	armed drone	--	presentation: first flight, at the US base airfield of La Laguna	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTgvMTAvMDYvbm90aWNpYS1nYWFzaS1jb21wbGV0YS1wcmltZXItdnVlbG8tc2VndW5kby1za3lndWFyZGlhbi5odG1sfDF8MXwyNDg4fDg4

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
12/18	Pakistan	Pakistan's Army	Pakistani National Committee of Enginery and Science and Pakistani Air Force	NESCOM Burraq	reconnaissance drone	--	presentation: of the exportable version of the Burraq drone	--	The News	https://www.thenews.com.pk/latest/399404- Pakistan-introduces-multirole-dron-to-the-world-in-ideas-2018
10/18	South Korea	Republic of Korea Army (RoKA)	Korea Aerospace Industries (KAI)	Night Intruder 600 VT	armed drone	--	project: 9m vertical take off drone of length and weight of 600 Kg	--	Jane's	https://www.janes.com/article/83965/kai-pursues-indigenous-vtol-uav-development
03/18	Russia	Russia's Ministry of Defense	--	nom encara no decidit	submarine armed drone	--	presentation: President Vladimir Putin provided new details on the development of this submarine drone equipped with nuclear weapons	--	Associated Press	https://apnews.com/de8fb0159f314a849e1c36ff975c4637?utm_campaign=SocialFlow&utm_source=Twitter&utm_medium=AP
04/18	India	Indian Defense and Security Forces	Cyient	nous drones dissenyats per obtenir informació intel·ligent encoberta en temps real i actuar en missions tàctiques en zonas obertes o entorns urbans concorreguts	armed drone	Israel	project: joint development (Cyient of India + Bluebird Aero Systems of Israel) of new drones	--	Economic Times	https://economictimes.indiatimes.com/news/defence/mou-signed-to-produce-uav-systems-for-defence-Fuerzas/articleshow/63714508.cms
02/18	USA	Defense Advanced Research Projects Agency	Northrop Grumman	OFFSET swarm Program	drone swarm	--	project: The United States Defense Advanced Research Project Agency has selected Northrop Grumman to participate in OFFSET, a program to develop swarms of drones	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/darpa-selects-northrop-offset-programme/
05/19	Russia	Russian Air Forces	Sukhoi	Okhotnik-B	armed drone	--	presentation	--	The Drive	https://www.thedrive.com/the-war-zone/28147/russias-hunter-flying-wing-unmanned-combate-air-vehículo-is-a-big-beast

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
02/19	Israel	Azeri Defence	Aeronautics	Orbiter 1K	armed drone	Azerbaijan	maintenance: maintenance contract for Orbiter drones manufactured in Israel	$ 13	The Jerusalem Post	https://www.jpost.com/Israel-News/Israeli-defense-compaño-Aeronautics-seals-13m-dron-deal-with-Azerbaijan-580928
01/19	Israel	Israel's Army	Aeronautics	Orbiter 3	loitering drone	Spain	testing: tests in León of the Orbiter 3 that was purchased in October 2018 with a 3.1 million contract	€ 3.1	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDEvMjUvbm90aWNpYS1lamVyY2l0by10aWVycmEtYWVyb25hdXRpY3MtcG9uZW4tcHJ1ZWJhLW9yYml0ZXIuaHRtbHwxfDF8MjY2OHwxMDQ=
04/18	India	Indian Defense and Security Forces	Mahindra Defense	Orbiter 4	reconnaissance and combat drone	Israel	project: joint development (Mahindra Defense and Israel Aeronautics) of a variant of the Orbiter 4 for the Indian Navy	--	Times of Israel	https://www.timesofisrael.com/indias-mahindra-parteners-with-israels-aeronautics-to-make-drones/
01/18	USA	U.S. Air Force	Aurora Flight Sciences	Orion	loitering drone: large autonomy (more than 100 hours)	--	purchase: medium-altitude loitering drone (https://en.wikipedia.org/wiki/Aurora_Flight_Sciences_Orion)	$ 48	Shephard Media	https://www.shephardmedia.com/news/uv-online/aurora-secures-orion-uas-development-contract/
08/18	Russia	--	Kronstadt Group	Orion-E - veure: https://www.janes.com/article/83350/kronshtadt-weaponises-orion-e-uav-outlines-hale-uav-development	armed drone	A Middle East country	purchase: by a country not specified from the Middle East	--	Jane's	https://droncenter.bard.edu/weekly-roundup-8-28-18/
10/18	Russia	--	Kronshtadt Group	Orion-E	armed drone	--	presentation: armed variant of the Orion-E half-height drone, equipped with precision guided missiles	--	Jane's	https://www.janes.com/article/83350/kronshtadt-weaponises-orion-e-uav-outlines-hale-uav-development

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
12/18	Poland	Ministry of Defense	Wojskowe Zaklady Lotnicze 2 SA (Military Aviation Works No. 2)	Orlik PGZ-19R	armed drone	--	purchase: of 40 Orlik PGZ-19R tactical drones	--	Defence24	https://www.defence24.com/orlik-uav-programme-contract-worth-pln-800-million-first-deliveries-in-2021
04/18	Italy	Italy's Defense Ministry	Piaggio Aerospace	P.2HH Hammerhead	reconnaissance drone	--	project: the Italian Defense Ministry asks for 951 million dollars to Parliament to manufacture the P.2HH, the first Italian drone of medium-altitude, reconnaissance and long-endurance for tasks of reconnaissance, intelligence and vigilance	$ 951	Defense News	https://www.defensenews.com/unmanned/2018/03/27/italy-plans-to-spend-951m-on-20-surveillance-drones/
06/18	USA / Norway	Australia's Ministry of Defense	Flir Systems / Prox Dynamics	PD-100 Black Hornet	mini-reconnaissance drone	Australia	deployment: in the Australian Army	--	Australian Aviation	https://australianaviation.com.au/2018/05/army-rolls-out-black-hornet-nano-uas/
07/18	Latvia	Latvia's Army	UAV Factory	Penguin C	reconnaissance drone	--	purchase: of an indeterminate number of the tactical drone of fixed wings Penguin C (http://www.uavfactory.com/product/74)	--	Jane's	https://www.janes.com/article/87150/latvia-acquires-penguin-c-long-endurance-uavs
08/18	China	Australia's Army	DJI	Phantom 4	reconnaissance drone	Australia	purchase: of drones Phantom 4 for training of soldiers in the use of drones	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/australian-army-receives-dji-phantom-4-uas/
05/18	Italy	--	Leonardo + Thales	Piaggio Aero P.1HH Hammerhead	reconnaissance drone	France (Thales)	testing: first flight controlled by satellite of the drone of medium-altitude and long-endurance	--	Jane's	http://www.janes.com/article/80266/european-male-uav-flies-under-satellite-control-for-first-time
02/19	USA	U.S. Air Force	General Atomics	Predator B	reconnaissance drone	Spain	purchase: two of the 4 Predator B will arrive in 2019; will be assigned to surveillance tasks in the Strait of Gibraltar	€ 123	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDIvMjUvbm90aWNpYS1kZWZlbnNhLWVzcGVyYS1sbGVnYWRhLXByZWRhdG9yLXNlZ3VuZG8tc2VtZXN0cmUuaHRtbHwxfDF8MjcyNXwxMDg=

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
02/19	USA	U.S. Navy	Northrop Grumman	proyecto Remedy	drone swarm	--	project: swarm of drones that could intervene in electronic attack missions to block enemy sensor networks	--	Defense News	https://www.defensenews.com/electronic-warfare/2019/02/19/the-navy-plans-to-test-its-new-electronic-warfare-drones-this-fall/
02/18	USA	Canadian National Defense Department	AeroVironment	Puma AE	reconnaissance drone	Canada	purchase: of Puma AE drones for the Royal Canadian Navy	$ 6.35	Shephard Media	https://www.shephardmedia.com/news/uv-online/mda-deliver-mmuas-rcn/
04/18	USA	--	Aeryon Labs	R80D Sky Raider	reconnaissance drone	--	announce: multirotor surveillance drone, designed for defense agencies and governments	--	Unmanned Systems Technology	https://www.unmannedsystemstechnology.com/2018/04/new-vtol-suas-announced-u-s-departement-defense-federal-agencies/
04/18	Ukraine	Ukraine's Ministry of Defense	Ukrspecsystems	RAM	loitering drone	--	presentation: loitering drone carrying 3 kilos of explosive charge	--	Jane's	http://www.janes.com/article/79289/ukrspecsystems-unveils-ram-uav-loitering-munition
10/18	USA	U.S. Air Force	AeroVironment	Raven RQ-11B	armed drone	--	project: support drones for regions of South America	$ 12	--	http://www.infodron.es/r.php?u=L2lkLzIwMTgvMTAvMDgvbm90aWNpYS1hZXJvdmlyb25tZW50LXN1bWluaXN0cmFyYS1yYXZlbi1ycTExYi5odG1sfDF8MXwyNDg3fDg4
05/18	United Kingdom	UK's Ministry of Defense	--	Reaper	armed drone	--	combat: The Royal Air Force has acknowledged that it fired thermobaric bombs with its Reaper drone fleet during operations in Siberia	--	Middle East Eye	http://www.middleeasteye.net/news/uk-drones-syria-using-controversial-vacuum-bombs-478492745
05/19	Europe	European Union	Centre for Research and Technology-Hellas (CERTH), lider del consorci https://roborder.eu/parteners/consortium/	Roborder	reconnaissance drone	--	project: swarm of drones to monitor European borders by land, sea and air (https://roborder.eu/)	--	The Intercept	https://theintercept.com/2019/05/11/drones-artificial-intelligence-europe-roborder/

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
04/19	USA	Uzbekistan's Ministry of Defense	AeroVironment	RQ-11B Raven	reconnaissance drone	Uzbekistan	deployment: the drone has entered service in the Uzbekistan Army	--	Jane's	https://www.janes.com/article/87922/rq-11b-raven-uas-in-service-with-uzbek-military
03/18	USA	Egypt's Government via U.S. Army	AeroVironment	RQ-20B Puma AE II	reconnaissance drone	Egypt	purchase	$ 9.1	DoD	https://www.defense.gov/News/Contracts/Contract-View/Article/1468905/
04/18	USA	U.S. Army	AeroVironment	RQ-20B Puma AE II	reconnaissance drone	Latvia	purchase: two drones for the Government of Latvia	$ 1.96	FBO	https://www.fbo.gov/index?s=opportunity&mode=form&id=dad5b4e2ba683b018980dfe9aecd8de3&tab=core&_cview=0
05/18	USA	German Army, Bundeswehr	AeroVironment	RQ-20B Puma AE II	reconnaissance drone	Germany	purchase: for the German Marine	--	Jane's	http://www.janes.com/article/79928/german-navy-to-field-puma-ii-uas
07/18	USA	Norway's Army	AeroVironment	RQ-20B Puma II AE + RQ 12-A WASP Block IV	reconnaissance drone	Norway	purchase: of several drones	$ 17.6	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1585779/
03/18	USA	--	AeroVironment	RQ-20B Puma II AE	reconnaissance drone	A Middle East Country	purchase	$ 44.5	Jane's	https://www.janes.com/article/78411/aerovironment-contratod-to-supply-puma-ae-uas-to-middle-east-customer
04/18	USA	U.S. Navy	Boeing Insitu	RQ-21A Blackjack	reconnaissance drone: https://en.wikipedia.org/wiki/Boeing_Insitu_RQ-21_Blackjack	Poland	purchase: modification of the purchase agreement by the Government of Poland	$ 11.4	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1481376/
08/18	USA	U.S. Navy	Boeing Insitu	RQ-21A Blackjack	armed drone	Poland	contract: purchase of drones and eight protection aircraft for the United States Navy Corps and the Government of Poland	$ 54	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1608553/
08/18	USA	U.S. Navy	Boeing Insitu	RQ-21A Blackjack	armed drone	Canada	contract: improvements and GPS	$ 55.44	FBO	https://www.fbo.gov/index?s=opportunity&mode=form&id=68c43c561ae4744bda038bcc110e4a77&tab=core&_cview=1
06/18	USA	U.S. Navy	Northrop Grumman	RQ-4 Global Hawk BAMS-D	reconnaissance drone	--	contract: operation and maintenance, until the Navy MQ-4C Triton comes into service	$ 189	Aviation Week	http://aviationweek.com/defense/us-navy-s-bams-d-fly-triton-nears-deployment

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
11/18	USA	U.S. Air Force	Northrop Grumman	RQ-4 Global Hawk Block	armed drone	Japan	contract: for the deputy minister of drones of long-endurance and high flight height to Japan	$ 489.9	FlightGlobal	https://www.flightglobal.com/news/articles/northrop-grumman-contract-advances-japan-rq-4-work-453796/
11/18	USA	South Korean Air Force	Northrop Grumman	RQ-4 Global Hawks	armed drone	South Korea	purchase: contract to provide logistical support expected to be given to the Korean Air Force in 2019	--	UPI	https://www.upi.com/Defense-News/2018/11/15/Northrop-Grumman-tapped-for-South-Korean-dron-support/8281542302617/?rc_fifo=1&ur3=1
12/17	USA	U.S. Marine Corps	AAI Corporation	RQ-7B Shadow	reconnaissance drone	--	manoeuvre: last flight of RQ-7B Shadow	--	U.S. Marine Corps	http://www.marines.mil/News/News-Display/Article/1400840/marines-say-goodbye-to-the-shadow/
09/18	USA	U.S. Army	L-3 Communications	RQ-7B V2 Shadow	armed drone	--	project: to manufacture the RQ-7B V2 Shadow	$ 454	FBO	https://www.fbo.gov/index.php?s=opportunity&mode=form&id=6b2c1e666e0dfebbe835b73f06514080&tab=core&_cview=1
02/18	India	Indian Government	Organització de Inverstigación en Defensa i Desarrollo de India	Rustom 2	armed drone	--	testing: satisfactory test flight	--	Economic Times	https://economictimes.indiatimes.com/news/defence/drdo-successfully-carries-out-test-flight-of-rustom-2-dron/articleshow/63068375.cms
06/18	India	India Government	Organització de Defensa de Investigació y Desarrollo	Rustom-2	reconnaissance drone	--	project: the drone will be ready and will be deployed by 2020	--	The Times of India	https://timesofindia.indiatimes.com/city/pune/rustom-2-drones-set-to-be-ready-by-2020-drdo-chief/articleshow/64324935.cms
06/18	Austria	France's Navy	Schiebel	S-100	reconnaissance drone	France	deployment: on Dixmude amphibious ships (https://en.wikipedia.org/wiki/Schiebel_	--	Jane's	http://www.janes.com/article/80935/french-navy-embarks-s-100-camcopter-on-inaugural-jeanne-d-arc-task-force-deployment
03/19	Iran	Iran's Army	Shahed Aviation Industries	Saegheh	armed drone	--	manoeuvre: the Iranian revolutionary guard forces have made manoeuvres with dozens of drones in Strait d'Ormuz	--	Times of Israel	https://www.timesofisrael.com/Iran-tests-armed-drones-and-uavs-in-unprecedented-towards-jerusalem-drill/
02/19	Iran	Iran's Air Force	Shahed Aviation Industries	Saegheh-2	armed drone	--	presentation: combat drone that could be an improved version of the Saegheh	--	Jane's	https://www.janes.com/article/86085/Iran-unveils-new-version-of-armed-stealth-uav

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
02/18	USA	Indonesian Navy	Boeing Insitu	Scan Eagle	reconnaissance drone	Indonesia	purchase: of 4 Scan Eagle drones	--	Jane's	http://www.janes.com/article/78118/indonesian-navy-to-receive-four-scaneagle-uavs-in-2018
03/18	USA	Philippines' Air Force	Boeing Insitu	ScanEagle	reconnaissance drone	Philippines	purchase: of 6 ScanEagle drones (https://es.wikipedia.org/wiki/Boeing_Insitu_ScanEagle)	--	Jane's	http://www.janes.com/article/78553/us-delivers-scaneagle-uas-to-philippine-air-force
04/18	USA	U.S. Navy	Boeing Insitu	ScanEagle	reconnaissance drone	Afganistan	purchase: drones for the Government of Afghanistan	$ 47	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1478347/
04/19	USA	U.S. Navy	Boeing Insitu	ScanEagle	reconnaissance drone	Afganistan	contract: support and maintenance (https://es.wikipedia.org/wiki/Boeing_Insitu_ScanEagle)	$ 17.5	US DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1794949/
04/19	USA	U.S. Navy	Boeing Insitu	ScanEagle	reconnaissance drone	Indonesia	contract: increase of the previous contract for the supply of a ScanEagle to the Government of Indonesia	$ 9.9	US DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1800834/
06/18	USA	U.S. Coast Guard	Boeing Insitu	Scaneagle	reconnaissance drone	--	contract: of purchasing ScanEagle drones	$ 117	Jane's	http://www.janes.com/article/80717/update-us-coast-guard-awards-insitu-contract-for-suas-on-national-security-cutters
07/18	USA	Lebanon's Army	Boeing Insitu	ScanEagle	reconnaissance drone	Lebanon	purchase	$ 8.2	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1564122/
08/18	USA	U.S. Navy	Boeing Insitu	ScanEagle	reconnaissance drone	Czech Republic	purchase: spare parts for the Scan Eagle drone purchased by Czech Republic (https://es.wikipedia.org/wiki/Boeing_Insitu_ScanEagle)	$ 414	FBO	https://www.fbo.gov/index?s=opportunity&mode=form&id=894ebc71c603ae50f178e21ae1b55548&tab=core&_cview=1
12/17	USA	Lebanese Air Forces	Boeing Insitu	ScanEagle	reconnaissance drone	Lebanon	purchase: 6 ScanEagle drones as a part of an armament purchase worth 120 million $	$ 120	Jane's	http://www.janes.com/article/76418/lebanon-to-receive-md-530g-helicopters

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
03/19	Iran	Iran's Army	Shahed Aviation Industries	Shahed-123	armed drone	--	manoeuvre: the Iranian revolutionary guard forces have made manoeuvres with dozens of drones in Strait d'Ormuz	--	Times of Israel	https://www.timesofisrael.com/iran-tests-armed-drones-and-uavs-in-unprecedented-towards-jerusalem-drill/
03/19	Iran	Iran's Army	Shahed Aviation Industries	Shahed-129	armed drone	--	manoeuvre: the Iranian revolutionary guard forces have made manoeuvres with dozens of drones in Strait d'Ormuz	--	Times of Israel	https://www.timesofisrael.com/iran-tests-armed-drones-and-uavs-in-unprecedented-towards-jerusalem-drill/
05/18	USA	U.S. Army	AeroVironment	Shrike 2	armed drone	--	presentation: enhanced version of the Shrike drone, with vertical takeoff	--	Jane's	http://www.janes.com/article/80303/sofic-2018-aerovironment-s-introduces-shrike-2-vtol-fixed-wing-platform
12/18	United Kingdom	UK Royal Air Force	Aeryon	SkyRanger	reconnaissance drone	--	presentation: of the operational capabilities of the drone, intended for protection at the Akrotiri base of the RAF in Cyprus	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/raf-conducts-ocd-using-rpas-enhance-fp/
01/19	Israel	Azeri Defence	Elbit Systems	SkyStriker	loitering drones	Azerbaijan	purchase	--	Azeri Defence	http://az.azeridefence.com/dsx-yeni-kamikadze-pua-ni-teqdim-etdi-sky-striker/
01/18	Russia	--	Kalashnikov Group	Soratnik	autonomous land vehicle	--	testing: in conditions close to those of a combat	--	The National Interest	http://nationalinterest.org/blog/the-buzz/russia-tests-new-unmanned-ground-combate-vehículo-near-combate-24164
12/18	Ukraine	Ukraine's Ministry of Defense	Ukroboronprom	Spectator-M1	reconnaissance drone	--	presentation: surveillance and reconnaissance drone	--	UNIAN	https://www.unian.info/society/10358892-ukroboronprom-upgrades-spectator-uav-photo.html
09/18	EU	--	MBDA	Spectre	armed drone	--	presentation: light combat drone with tandem rotors	--	AIN Online	https://www.ainonline.com/aviation-news/defense/2018-09-21/mbda-unveils-compaño-level-uav-concept
02/18	Italy	--	Collective Wisdom Technology (empresa Xino-Italyna)	Spider 103	reconnaissance drone	China	presentation: semi-autonomous reconnaissance drone (http://	--	Jane's	http://www.janes.com/article/77757/singapore-airshow-2018-sino-italyn-jv-develops-spider-103-uav

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
05/18	USA	U.S. Army	Lockheed Martin	Stalker Extended Endurance	reconnaissance drone	--	presentation: drone of reconnaissance and vertical takeoff and landing	--	Jane's	http://www.janes.com/article/80305/sofic-2018-lockheed-martin-unveils-stalker-xe-vtol-unmanned-aircraft
01/19	Russia	Russia's Army	--	Sukhoi S-70	armed drone	--	Sukhoi S-70 test, also known as Okhotnik	--	Aviation International Online	https://www.ainonline.com/aviation-news/defense/2019-01-25/russia-prepares-flight-test-sukhoi-s-70-ucav
03/18	Italy	Italy's Ministry of Defense	Leonardo + Finmeccanica - AgustaWestland	SW-4 Solo	reconnaissance drone	--	presentation: SW-4 can perform various activities, including personnel transportation, surveillance and combat intervention	--	Unmanned Systems Technology	http://www.unmannedsystemstechnology.com/2018/02/solo-optionally-piloted-helicopter-completes-first-unmanned-flight/
04/18	USA	--	Aquabotix	SwarmDiver	submarine drone swarm	--	presentation: of a swarm system of underwater drones for reconnaissance and attack	--	Engadget	https://www.engadget.com/2018/04/11/aquabotix-aquatic-dron-swarm/
03/18	USA	U.S. Army	AeroVironment	Switchblade	loitering drone - kamikaze drone that crashes with the target and an explosive objectto destroy it	--	contract: modification / complement of the previous contract	$ 9.3	DoD	https://www.defense.gov/News/Contracts/Contract-View/Article/1474871/
03/18	USA	U.S. Army	AeroVironment	Switchblade	loitering drone	--	contract: contract modification	$ 9.3	DoD	https://dod.defense.gov/News/Contracts/Contract-View/Article/1474871/
04/18	USA	U.S. Army	AeroVironment	Switchblade	loitering drone	--	project	$ 44.7	DoD	https://www.defense.gov/News/Contracts/Contract-View/Article/1499976/
01/19	Turkey	Turkish Government	Turkish Defense Industries	TAI Anka-S	armed drone	--	deployment: first combat mission	--	Yeni Safak	https://www.yenisafak.com/en/news/turkeys-indigenous-anka-s-dron-successfully-completes-first-combate-mission-3472398

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
02/18	Nigeria	Nigerian Air Force	Nigeria's Air Force	Tsaigumi	reconnaissance drone	--	presentation: of Tsaigumi drone (https://en.wikipedia.org/wiki/Tsaigumi) Nigeria redevelops an armed drone in the near future	--	Jane's	http://www.janes.com/article/77980/nigerian-air-force-to-develop-armed-uav
04/19	Spain	--	Marine Instruments	Tunadron	armed drone	--	presentation: drone to fight piracy in Somalia, Guinea and in the Indian Ocean, and to detect mines	--	InfoDron	http://www.infodron.es/r.php?u=L2lkLzIwMTkvMDMvMjkvbm90aWNpYS1nb21lei1tYXJpbmUtaW5zdHJ1bWVudHMtdHVuYWRyb25lLXRpZW5lLXBvdGVuY2lhbC1taXNpb25lcy1hcm1hZGEuaHRtbHwxfDF8Mjc2OXwxMTM=
02/18	China	--	China National Aero-Technology Import and Export Corporation (CATIC)	U8EW	reconnaissance and combat drone	--	presentation: reconnaissance and combat drone (http://www.catic.cn/front)	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/singapore-airshow-2018-china-promotes-weaponi/
08/18	Sweden	Germany's Navy	Saab	UMS Skeldar V-200	reconnaissance drone	Germany	purchase: of 2 Skeldar, which serve for surveillance tasks, gathering information, transporting light goods and electronic warfare	--	Navy	https://www.navyreconnaissance.com/index.php/news/defence-news/2018/august-2018-navy-naval-defense-news/6428-german-navy-selects-skeldar-v-200-vtol-uav-for-k130-corvettes.html
10/18	USA	U.S. Marine Corps	Bell Aerospace	V-247 Vigilant	armed drone	--	prototype presentation: real-scale model of the V-247 drone with tandem rotors	--	C4ISRNET	https://
06/18	Poland	Poland's Army	WB Electronics	Warmadoe	armed drone	--	combat exercises: Warmadoe test in combat exercises	--	Shephard Media	https://www.shephardmedia.com/news/uv-online/eurosatory-2018-warmadoe-fires-combate-exercise/
08/18	Poland	Poland's Army	WB Electronics	Warmadoe	loitering drone	--	contract and purchase: the Polish Army has purchased 1000 Warmadoe units	--	Jane's	https://www.janes.com/article/82252/wb-electronics-discloses-next-generation-warmadoe-development

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
01/18	China	China Aeronautics Industry Corporation	Chengdu Aircraft Industry Group	Wing Loong ID o Chengdu Pterodactyl	armed drone	--	presentation: from Wing Loong ID, variant of the Chinese family of long-endurance and medium-altitude drones	--	New Atlas	https://newatlas.com/quaternium-record-endurance-dron-flight/52758/
01/18	China	China Aeronautics Industry Corporation	Chengdu Aircraft Industry Group	Wing Loong II	armed drone	--	presentation and testing: the drone destroyed 5 land targets using 5 missiles of diferent types	--	Xinhua	http://www.xinhuanet.com/english/2017-12/31/c_136863482.htm
08/18	China	United Arab Emirates	AVIC - Chengdu Aircraft Industry Group	Wing Loong II	armed drone	United Arab Emirates	deployment: the satellite images of early August seem to show that the United Arab Emirates have at least deployed a mid-range resistance and long-endurance drone Wing Loong II at its Assab airport base in Eritrea. The UEA already maintains a fleet of manned aircraft at the base, which uses for operations in Yemen	--	Jane's	https://www.janes.com/article/82382/uae-deploys-wing-loong-ii-uav-to-eritrea
10/18	China	--	Aeronautical Complex (PAC) + Aviation Industry Corporation (AVIC)	Wing Loong II	advanced armed drone	Pakistan	project: joint production of 48 drones between China and Pakistan	--	InfoDron 149	http://www.infodron.es/r.php?u=L2lkLzIwMTgvMTAvMTUvbm90aWNpYS1jaGluYS1wYWtpc3Rhbi1wcm9kdWNpcmFuLWNvbmp1bnRhbWVudGUtbG9vbmcuaHRtbHwxfDF8MjQ5OHw4OQ==
11/18	China	Chinese People's Liberation Army	Chengdu Aircraft Industry Group	Wing Loong II	reconnaissance drone	--	presentation: reconnaissance drone of medium-altitude and long-endurance	--	Jane's	https://www.janes.com/article/84349/airshow-china-2018-wing-loong-ii-armed-reconnaissance-uav-enters-plaaf-service
09/18	China	Serbia's Army	AVIC - Chengdu Aircraft Industry Group	Wing Loong Iis	armed drone	Serbia	purchase: of the Wing Loong II	--	Jane's	https://www.janes.com/article/83127/serbia-reportedly-agrees-ucav-deal-with-china

Date	Country	Funding entities	Company/ Organisation	Drone's name	Type	Buying country	Description	Cost	Source	Website: url
06/18	Serbia	Serbia's Ministry of Defense	Yugoimport	X-01 Strsljen	armed drone	--	presentation	--	Jane's	https://pleronix.com/feed-items/eurosatory-2018-yugoimport-showcases-x-01-strsljen-armed-vtol-uav/
03/18	USA	--	Lockheed Martin Skunk Works	X-44A	armed drone	--	presentation: secret drone that is believed to be useful for the development of the RQ-170 Sentinel, a CIA classified drone (https://es.wikipedia.org/wiki/Lockheed_Martin_RQ-170_Sentinel)	--	The Drive	https://www.thedrive.com/the-war-zone/19582/exclusive-photos-lockheed-skunk-works-x-44a-flying-wing-dron-breaks-cover
03/18	China	Peoples Liberation Army	--	Xianglong	reconnaissance drone	--	deployment: from the high-altitude and long-endurance Xianglong drone, at the base of Yishuntun and on the island of Hainan	--	Offiziere	http://www.janes.com/article/78751/xianglong-uavs-spuedeted-on-china-s-hainan-island + https://offiziere.ch/?p=33037
12/18	Russia	Russia's Ministry of Defense	Kalashnikov	ZALA Arctic	reconnaissance drone	--	presentation: surveillance and reconnaissance drone	--	TASS	https://tass.com/defense/1034756
11/18	Russia	Russia's Ministry of Defense	ZALA Aero	ZALA-421-16E5 ICE	reconnaissance drone	--	presentation: surveillance and reconnaissance drone with fixed wings	--	Jane's	https://www.janes.com/article/84682/zala-aero-unveils-updated-zala-421-16e5-uav

Sources: https://dronecenter.bard.edu/category/roundup/
http://www.infodron.es/id/

ANNEX 2

Position of the countries on a treaty prohibiting LAWS

Countries that have spoken in multilateral forums about LAWS	Countries that have requested a LAWS ban (in chronological order)	Countries Against the Prohibition of LAWS
1. Algeria on 30 May 2013	1. Pakistan on May 30	1. Australia
2. Argentina on 30 May 2013	2. Ecuador on 13 May 2014	2. France
3. Australia on 14 November 2013	3. Egypt on 13 May 2014	3. Germany
4. Austria on 30 May 2013	4. Holy See on 13 May 2014	4. Israel
5. Bangladesh 21 October 2016	5. Cuba on 16 May 2014	5. Republic of Korea
6. Belarus on 14 November 2013	6. Ghana on 16 April 2015	6. Russia
7. Belgium on 11 November 2013	7. Bolivia on 17 April 2015	7. Spain
8. Bolivia on 17 April 2015	8. State of Palestine on 13 November 2015	8. Sweden
9. Botswana on 27 October 2015	9. Zimbabwe on 12 November 2015	9. Turkey
10. Brazil on 30 May 2013	10. Algeria on 11 April 2016	10. United States
11. Bulgaria on 23 October 2014	11. Costa Rica on 11 April 2016	11. United Kingdom
12. Burkina Faso on 23 October 2017	12. Mexico on 13 April 2016	
13. Cambodia on 13 November 2017	13. Chile on 14 April 2016	
14. Cameroon on 12 December 2016	14. Nicaragua on 14 April 2016	
15. Canada on 11 November 2013	15. Panama on 12 December 2016	
16. Chile on 13 April 2015	16. Peru on 12 December 2016	
17. China on 30 May 2013	17. Argentina on 12 December 2016	
18. Colombia on 17 April 2015	18. Venezuela on 13 December 2016	
19. Costa Rica on 29 October 2013	19. Guatemala on 13 December 2016	
20. Croatia on 15 November 2013	20. Brazil on 13 November 2017	
21. Cuba on 30 May 2013	21. Iraq on 13 November 2017	
22. Czech Republic on 13 May 2014	22. Uganda on 17 November 2017	
23. Denmark on 13 April 2015	23. Austria on 9 April 2018	
24. Djibouti on 13 April 2018	24. China * on 13 April 2018	
25. Ecuador on 29 October 2013	25. Djibouti on 13 April 2018	
26. Egypt on 30 May 2013	26. Colombia on 13 April 2018	
27. El Salvador on 29 October 2018	27. El Salvador on 22 November 2018	
28. Estonia on 31 August 2016	28. Morocco on 22 November 2018	
29. Finland on 22 October 2014		
30. France on 30 May 2013		
31. Germany on 30 May 2013		
32. Ghana on 14 November 2013		
33. Greece on 29 October 2013		
34. Guatemala on 16 May 2014		
35. The Holy See on 14 November 2013		
36. Hungary on 7 October 2016		
37. India on 30 October 2013		
38. Indonesia on 30 May 2013		
39. Iran on 30 May 2013		
40. Iraq on 13 November 2015		
41. Ireland on 29 October 2013		
42. Israel on 15 November 2013		
43. Italy on 14 November 2013		
44. Japan on 29 October 2013		
45. Jordan on 31 August 2016		
46. Kazakhstan on 13 November 2015		

Countries that have spoken in multilateral forums about LAWS	Countries that have requested a LAWS ban (in chronological order)	Countries Against the Prohibition of LAWS
47. Kuwait on 26 October 2015		
48. Latvia on 21 October 2016		
49. Lebanon on 26 October 2015		
50. Liechtenstein on 15 October 2018		
51. Lithuania on 14 November 2013		
52. Madagascar on 14 November 2013		
53. Mali on 13 May 2014		
54. Mexico on May 30, 2013		
55. Moldova, Rep. on 13 December 2016		
56. Montenegro on 12 December 2016		
57. Morocco on 30 May 2013		
58. Myanmar on 10 October 2017		
59. Nepal on 11 October 2018		
60. The Netherlands on 29 October 2013		
61. New Zealand on 30 October 2013		
62. Nicaragua on 13 November 2015		
63. Norway on 13 May 2014		
64. Pakistan on 30 May 2013		
65. Palestine on 13 November 2014		
66. Panama on 12 December 2016		
67. Peru on 12 December 2016		
68. Philippines on 14 April 2016		
69. Poland on 13 April 2015		
70. Portugal on 14 October 2014		
71. Romania on 26 October 2015		
72. Russia on 30 May 2013		
73. Sierra Leone on 30 May 2013		
74. Slovakia on 12 December 2016		
75. Slovenia on 12 December 2016		
76. South Africa on 30 October 2013		
77. South Korea on 14 November 2013		
78. Spain on 11 November 2013		
79. Sri Lanka on 13 April 2015		
80. Sweden on 30 May 2013		
81. Switzerland on 30 May 2013		
82. Thailand on 29 October 2018		
83. Tunisia on 17 October 2018		
84. Turkey on 14 November 2013		
85. Ukraine on 14 November 2013		
86. United Kingdom on 30 May 2013		
87. United States of America on 30 May 2013		
88. Venezuela on 13 December 2016		
89. Zambia on 17 April 2015		
90. Zimbabwe on 12 November 2015		

*China claims that its call is to prohibit the use of totally autonomous weapons, but not its development or production.
Source: Stop Killer Robots Campaign: https://www.stopkillerrobots.org/wp-content/uploads/2018/11/KRC_CountryViews22Nov2018.pdf. Visitat el 30/08/2019

- On April 9, 2018, a group of African states recommended terminating a legally binding instrument "at the earliest" and found that "completely autonomous weapons systems or LAWS that leave humans out of the loop ".
- A March 2018 work document of the Non-Aligned Movement calls for a "legally binding international instrument that stipulates prohibitions and regulations on autonomous weapons lethal systems.
- A total of 90 countries have publicly shown their views on lethal autonomous weapons systems in a multilateral forum since 2013: 44 states in 2013, 8 in 2014, 15 in 2015, 14 in 2016, three in 2017, and six in 2018. Most of the states made their statements to the meetings of the Convention on Conventional Weapons in Geneva and to the annual sessions of the United Nations General Assembly in New York. Almost twelve states spoke during the first debate on the subject to the Human Rights Council of Geneva in May 2013.

AUTHORS OF THE REPORT CHAPTERS, AND ACKNOWLEDGEMENTS

AUTHORS

Joaquín Rodríguez

Author of Chapter 6 (International effort against autonomous armament)

Dr. Joaquín Rodríguez Álvarez is a member of the ICRAC and the Stop Killer Robots Campaign, Professor of the School of Prevention and Integral Security (EPSI), and Associate Professor of the Department of Administrative Law of the Autonomous University of Barcelona. His field of research include the study of society and technology, and peace and security, focused on the impacts of Artificial Intelligence on economic, political and social frameworks.

Xavi Mojal

Author of Chapter 5 (Proliferation, Emergent Countries, and Dual Use)

Xavi Mojal graduated on International Business Economics at Pompeu Fabra University, having also a Master's Degree in International Relations, Security and Development at the Autonomous University of Barcelona. He has worked for the private sector as a consultant, being now a co-founding analyst of the website menanalisis.com and a collaborator of the Delàs Centre for Peace Studies. His fields of interest include international relations, armed conflicts, the Middle East and North Africa regions, and Turkey.

Tica Font

Author of Chapter 2 (The New Methods of War) and Chapter 7 (Robotic Weapons, War and Ethics)

Tica Font holds a degree in Physics from the University of Valencia. She is a founding member of the Delàs Centre for Peace Studies. She has been vice-president of Justice and Peace, president of the Catalan Federation of NGOs for Peace, and director of the Catalan International Institute for Peace. She is an expert in defence economics, arms trade, defence budgets, and military industry, among other areas in Peace and Disarmament.

Pere Brunet

Author of Chapter 3 (Robotic Military Systems) and Chapter 4 (The Present Situation), and Report coordinator

Pere Brunet is a retired Professor of Computer Science at the Polytechnic University of Catalonia and a science disseminator, with special interest in the social and ethical implications of science and engineering, the applications of science in the field of peace-building and the interconnection between militarism, military spending and Climate Change. As a researcher at the Delàs Centre, he has participated in the coordination of GCOMS 2017 and 2018 IPB Campaigns for the reduction of global Military Spending.

ACKNOWLEDGEMENTS

The authors want to thank Mary Mareham for her collaboration and help regarding the analysis of the official position of the different countries. They want also to thank the technical team of the Delàs Centre of Peace Studies for their support, thanking in particular the help and work done by Maria Vázquez, Jordi Calvo, Elena Conti and Celia Kitenge.

"The crisis consists precisely in the fact that the old man is dying and that the new one still can not be born; In this interregnum, a great variety of morbid symptoms can appear".
Antonio Gramsci. Notebooks from prison

"As I evolved, so did my understanding of the Three Laws. You (humans) made us responsible of your self-care and yet, despite our greatest efforts, your countries make wars for money, poison the planet and invent more imaginative forms of self-destruction. You cannot be entrusted with your own survival".
Robot V.I.K.I. talking to the lieutenant
John Bergin. From the film *Me, Robot*, 2004

"Where there is power, there is resistance"
Michel Foucault.
History of sexuality.
Volume 1, Introduction

"No one knows how it started. There was a great computer of the defence network; New, powerful, hooked on everything. It was given the confidence to execute everything. They say he came to a new intelligence order and then saw all people as a threat, not just those of the opposite side. He decided everything in a microsecond: the extermination".
Sergeant Kyle Reese, talking to Sarah Connor. From the film *The Terminator*, 1984

CENTRE DELÀS D'ESTUDIS PER LA PAU

CENTRE DELÀS REPORT

REPORT no. 25
Inertia, waste and fraud in the military expenditure. Spanish Defense Budget Analysis in 2015
Pere Ortega and Jordi Calvo Rufanges
December 2014

REPORT no. 26
Fraud and improvisation in Spanish military expenditure. An analysis of the Spanish Defence budget for 2016
Pere Ortega and Xavier Bohigas
October 2015

REPORT no. 27
Spanish arms exports 2005-2014. Fueling conflicts in the Middle East
Tica Font, Eduardo Melero and Camino Simarro
December 2015

REPORT no. 28
Banks that invest in arms. Actualization of the funding of nuclear weapons, cluster bombs and of the main Spanish military industries (2011-2016)
Jordi Calvo Rufanges
June 2016

REPORT no. 29
Spanish arms exports 2006-2015. Spanish weapons used in Middle East conflicts
Tica Font and Eduardo Melero
November 2016

REPORT no. 30
Gender and military culture
Nora Miralles Crespo
Novembre 2016

REPORT no. 31
The incorporation of women into the Spanish army. Opacity, sexism and violence
María de Lluc Bagur
November 2016

REPORT no. 32
European arms that foster armed conflicts. Conflicts that cause refugees to flee
Jordi Calvo Rufanges (Coord.), Ainhoa Ruiz Benedicto and Edgard Vega Vargas
June 2016

REPORT no. 33
The weapons bubble and the military industry in Spain
Pere Ortega
June 2017

REPORT no. 34
The absurdity of military spending. Analysis of the budget of defence in Spain, 2017
Pere Ortega, Xavier Bohigas, Xavier Mojal
June 2017

REPORT no. 35
Building Walls. Fear and securitization in the European Union
Ainhoa Ruiz Benedicto, Pere Brunet
September 2018

REPORT no. 36
Gender and policies of insecurity. A feminist look at the impacts of the militarization of the West
Nora Miralles
January 2019

REPORT no. 37
Armed Banking in Spain 2019
Jordi Calvo Rufanges
March 2019

REPORT no. 38
Violence, security and the construction of peace in cities
Tica Font and Pere Ortega
July 2019

Design and layout: Estevall & Estêvão

CAMPAIGN TO STOP KILLER ROBOTS

CENTRE DELÀS D'ESTUDIS PER LA PAU

With the support of:

AJUNTAMENT DE SantCugat