MILITARY DRONES

THE VIDEOGAME WAR

WITH REAL VICTIMS

JUSTÍCIA I PAU

CENTRE DELÀS
D'ESTUDIS
PER LA PAU

REPORT

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Jordi Calvo
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Centre Delàs d'Estudis per la Pau · Justícia i Pau
Barcelona, March 2014

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INDEX

EXECUTIVE SUMMARY

Unmanned aircraft, called 'drones', also known for their acronym UAV, are becoming one of the components most desired by all armies in the world. Their military version in the form of larger-sized unmanned aircraft also comes equipped with the capacity to launch missiles. The military use includes other possibilities as well, such as reconnaissance and virtual patrolling, image caption and other functions related to espionage. In this report we shall focus on the analysis of armed military drones and their most controversial use: the selective assassinations.

The use of armed military drones necessarily calls for an analysis of their legitimacy and appropriateness, both political and military as well as ethical and legal. Even if military and political usefulness of their employment is comprehensible, since it may signify lower economic and human costs for armies that use them, the moral legitimacy and the respect for international law are under question. It is ethically unacceptable to use drones to attack military objectives, since it trivializes the war, facilitates it, and it eliminates the ability to distinguish between civilians and combatants in the theater, by allowing for lethal, remote-controlled attacks, with a distance of more than 10,000 kilometers between the executioner and the victim. The use of military drones is considered obviously illegal when it comes to selective assassinations performed without detention or trial, as well as within the International Humanitarian Law, because of the enormous difficulty in distinguishing between civilians and combatants in situations involving armed conflict.

Finally, it is of great importance to analyze the responsibility that the military industry may have on the development and subsequent general use of the armed drones. A new and attractive product, coming from the field of aeronautics and capable of civilian uses, easily acceptable by the public, represents a business opportunity which will keep the arms industry going during decades to come. Billions of Euros will be designated towards the development of new and more powerful unmanned aircraft, armed to the teeth. And as an industry with ever-growing economic interests gets established, the pressure to purchase and use them will grow and it will be increasingly more difficult to turn the tide back. The US and Israel dominate the market from which the major military powers do not want to be excluded. Spain, with a major military industry in terms of export of arms, does not want to be left out of this controversial business. Fairs, symposiums, meetings and collaboration treaties between companies belonging to the military aeronautics sector are keynotes in this expansion. It seems that the war of the future will be controlled by those in possession of better military drones and other weapons with a functioning capacity that in one way or another may be considered autonomous – a marvelous opportunity to maintain and justify the arms business.

Index of charts, graphs and maps

Annex

REPORT

CENTRE DELÀS D'ESTUDIS PER LA PAU

JUSTÍCIA I PAU

n. 23

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1. INTRODUCTION

What will the introduction of armed unmanned aircraft mean for the twenty-first century conflicts?

It seems that wars of the twenty-first century will be very different from what we have known so far. Robots, unmanned aircraft, non-lethal weapons and cyber attacks are replacing the traditional ways of warfare. One of the most important developments is the unmanned aircraft, also known by its English acronym UAV, or UAS if we also refer to the ground control station, or simply by the noun drone.

This report aims to present an introductory overview to what the introduction of armed drones into the armed conflicts of the twenty-first century may mean, from the definition and understanding of the main technical features of this new weaponry to the legal and ethical considerations of its use, as well as the necessary quantification of its current volume in both major armies and in the military industry. The term unmanned aircraft, its acronym in English UAV or the most common denomination "drone" shall all be used interchangeably. Reports and websites specializing in tracking the use and development of drones have been consulted in the preparation of this document, such as the New America Foundation, The Bureau of Investigative Journalism, Amnesty International, or works of experts on the subject. We have also consulted official sources of information related to the industry and legality of their use, such as the Directory of Defense Companies in Spain, reports by the United Nations and the United States government, as well as analysis of Anglosaxon and Spanish press.

In the first chapter we will present a brief description of drones, which, like any other aircraft, may be civilian or military depending on the use assigned to them. The civilian unmanned aircraft are used for surveillance, investigation and agricultural purposes, and their performance is based on filming by built-in cameras that transmit images to a control center. This case calls forth the debate about legitimacy of policing through drones and about possible violation of the right to privacy, since the use of drones makes it impossible for a person to know when and where she or he will be recorded and monitored by a camera. Moreover, the military drones are used for both recognition and surveillance and bombing military targets. In this report we shall focus exclusively on military drones, and, among these, on those with the ability to perform armed strikes.

Another purpose of this paper is to provide information on the military use of armed drones and their importance in the arms industry and on international and Spanish markets, which involves analysing diverse areas, such as development, acquisition and use. Thus, this paper will provide a brief historical introduction and an analysis of the current use of drones and its implications, and of the industries involved, with special attention to the US, which currently are the main user.

Then the report will delve into the business of drones, since, even though this industry is at an early development stage, it is a growing market, with many countries interested in purchasing or developing their own version of unmanned

Who is responsible when a bombing is done without direct human involvement?

aircraft. Also, despite the budgetary difficulties and the competition from the American and Israeli products, the Spanish market for drones is on the rise. That is why we will include a specific sample of the Spanish military industry related to unmanned combat aircraft.

We will also analyze whether the use of drones as a weapon entails legal issues. We will examine if the use of military attack drones can be considered illegal, given that the states have an obligation to ensure that all existing weapon systems are in accordance with the international law. Thus, we analyzed whether an unmanned aircraft can indeed abide by the international humanitarian law, whether it is a weapon capable of distinguishing between civilians and combatants or measuring the proportionality of attack. In this section we will pay special attention to the case of the US, as a world leader when it comes to their use.

Furthermore, from an ethical point of view, the question is even more evident: Who is responsible when a bombardment is done without a direct human intervention? What if a hacker interferes with the UAS computer system? What if there is a programming bug? Are we entering the era of war as a video game? In the last section we shall analyze whether the military drone war becomes a trivial activity.

2. THE UNMANNED COMBAT AIRCRAFT

2.1 Characteristics

An unmanned aerial vehicle is known for its acronym UAV (Unmanned Aerial Vehicle) or UAS (Unmanned Aircraft System), and in Spanish as VANT (Vehículo Aéreo No Tripulado) or more commonly: drone. According to the US Department of Defense, an unmanned aircraft is an "aircraft that does not carry a human operator and is able to fly under remote control or autonomous programming."[1]

There are two types of lethal drones used primarily by the US: MQ-1B Predator and MQ-9 Reaper. Predator MQ-1B first flew in 1994 and was designed to provide intelligence, surveillance and recognition combined with the ability to kill.[2] Equipped with AGM-114 Hellfire missiles, Predator MQ-1B was the world's first armed drone. Perhaps its best quality is that it can remain in the air for twenty-four hours, flying at an altitude of up to eight kilometers. MQ-9 Reaper is larger and more powerful than MQ-1 Predator and is designed to process targets with persistence and precision.[3]

The two primary types of lethal drones are Predator and Reaper. They may be equipped with missiles

Nowadays, drones can be equipped with powerful cameras, thermal imaging devices, license plate readers and laser radars (LADAR). In the near future, it is foreseeable that they will be equipped with facial recognition systems and "soft biometric recognition" to identify and track individuals based on attributes such as height, age, gender and skin color.[4] Charts 1 and 2 present several existing classifications by types, categories and uses.

1. U.S. Department of State (2012).
2. *United States Air Force (2013).*
3. Richard M. Thompson (2013).
4. Richard M. Thompson (2013).

Table 1. Types of drones according to usage

Civilian	Civilian protection	Police
	Cartography Agriculture Forest services Geology, hidrology and environment Control of works and evaluation of their impact, follow-up of urbanistic planning and asset management	Organized crime Internal surveillance, demonstrations Border control
Military	**Unarmed**	**Armed**
	Espionage/Inteligence Military patrols Reconnaissance, military information	Targets – used to simulate aircraft or enemy attacks on land or air defense systems Combat – *fighting and performing missions that can be very dangerous*

Source: Compiled from data within War, Law & Space "Archive for 'Drones' Category" (2013)

Table 2. Categories of drones and purposes

Categories of drones and purposes			
Name	**Altitude**	**Duration**	**Uses**
High altitude	Over 60,000 feet (above the airspace A Class)	Days/weeks	Vigilance, data colllection, signal retransmission
Medium altitude	18.000 - 60.000 feet (airspace Class A)	Days/weeks	Vigilance, cargo transport
Low altitude	More than 18,000 feet (airspace Class E)	More tan 2 days	Vigilance, signal retransmisión
Very low altitude	Under 1000 feet	Few hours	Reconnaissance, inspection, vigilance

Source: Compiled from data within War, Law & Space "Archive for 'Drones' Category" (2013)

2.2 History of Evolution

The development of the technology of unmanned vehicles dates back to the early twentieth century. In 1913, the US Navy funded research of remote controlled airplanes by creating, in 1915, the Naval Consulting Board (NCB), an organization bent on adopting new ideas and inventions from the private sector and serving as a liaison between the Military and private companies and/or individuals. Thanks to this new impetus, Elmer Sperry and Peter Cooper created what is considered the first drone of history, a torpedo designed to be launched from an aircraft - the Hewitt-Sperry Automatic Airplane.[5]

The NCB served as a launch pad for some famous people who would later create huge companies dedicated to arms development and trade, such as William E. Boeing (Boeing Airplane Company), Glenn L. Martin (founder of Glenn L. Martin Company, now Lockheed Martin), Leroy Grumman (founder of Grumman Aeronautical Engineering Company, now Northrop Grumman) and Allan and Malcolm Lockheed (founders of the Lockheed Aircraft Company, later Lockheed Martin). Then it was the US Military itself that was responsible for weapons production, but, however, private contractors organized themselves to form various asociaciones[6] in order to maximize the technological development of weapons. In 1926, by the Army Air Corps Act, the United States Navy was authorized to

The development of technology of unmanned vehicles dates back to the early twentieth century

5. Barnhart, Richard; Hottman, Stephen; Marshall, Douglas; Shappee, Eric (2012).
6. See American Defense Preparedness Association (ADPA) y National Defense Industrial Association (NDIA).

Drones have been used for vigilance purposes throughout the twentieth century, especially in the Gulf War and conflicts in the Balcans

enter into agreements with private contractors for the development of UAVs. It was in the mid-thirties when Northrop Aircraft was chosen as the corporation responsible for producing the first US military drones, the OQ-2A model. The onset of World War II allowed the connections between arms companies and the military to have more flexibility in the negotiation of contracts,[7] which in turn, together with emerging needs arising from the war, led to the strengthening of such industries, leading also to great advances in weapons'technology and development. The existing link between the army and the aforementioned companies led to an increase in the number of contracts related to drones. In 1939, the Navy contracted Radioplane Co. to produce 15,000 drones intended both for training anti-aircraft gunners and for OQ series drones. Other companies focused on designing a new device, the Katydid Drone,[8] standing up to German V-1 rockets.

After the Second World War, the growing threat to American interests posed by the Soviet Union led to an increase in the resources devoted to the investigation of drones and their role in reconnaissance and intelligence missions. In 1955, the Radioplane Company was able to modify the structure of their drones so that they could be equipped with cameras. The many reconnaissance flights conducted by both superpowers caused 179 casualties on both sides, despite the absence of a declared war between the US and the USSR. The loss of troops on such missions motivated the US Air Force to fund the development of reconnaissance drones by companies like Radioplane and Northrop Grumman. On the other hand, the space race between the US and the USSR and the development of nuclear weapons meant that drones were considered as valuable tools, hence the large number of contracts for the production of drones between the Navy, Army and Air Force with companies like Northrop, Lockheed, Martin or McDonnell. Already in the eighties, the policies of Ronald Reagan based on increasing the military spending fostered rapid development of technology of drones. The new microelectromechanical systems, global positioning systems and microelectronics allowed for a breakthrough regarding drones, greatly demanded in light of the military missions in Grenada, Lebanon and Libya. The valuable information gathered by drone reconnaissance missions over the ground led to an increase in contracts between private companies and the US government, which used them in conflicts in Persian Gulf (1990-91), Bosnia (1992-1995) and Somalia (1992-1995).

Throughout the twentieth century drones have been mainly used for surveillance, especially during the Gulf War and the Balkans conflict in the 90's.[9] Israel used reconnaissance drones in Lebanon in 1982, and again in 1996 to guide piloted fighter-bombers to their targets. However, it was during the NATO campaign in Kosovo in 1999 when, according to Andrew Brookes, from the International Institute for Strategic Studies, "they began to think about the utility of adding a missile to the UAV, which led to the creation of Predator drone, armed with Hellfire missiles." Consequently, the first armed drones flew into Afghanistan in early October 2001.[10]

The 90's saw consolidation of the most important companies involved in the development of UAVs, such as Lockheed Martin and Northrop Grumman. The satisfactory results of the use of drones during the Gulf War marked the final impulse for this new weapon, essential to the new international geopolitical context. It is fitting to add that the American Military was involved in various operations in Somalia, Bosnia and Herzegovina, Rwanda and Kosovo, scenarios where the use of drones proved instrumental in reconnaissance and surveillance.

7. U.S. Department of State (2009).
8. McDonnell Aircraft, company that later on formed part of Boeing.
9. O'Connell, Mary (2010).
10. Schmitt, Eric (2002).

So far, many of the drones that had been deployed had reconnaissance, surveillance and intelligence as the main missions. However, it was in the more recent conflicts in Afghanistan (2001) and Iraq (2003) where, for the first time, armed drones were used.[11] According to David H. Lyon, chief of the Advance Munitions Concepts of US Army Research Laboratory, current international threats impede the deployment of traditional forces. Therefore, new instruments or vehicles that can be deployed anywhere in the world within a maximum of 72 hours are becoming essential.

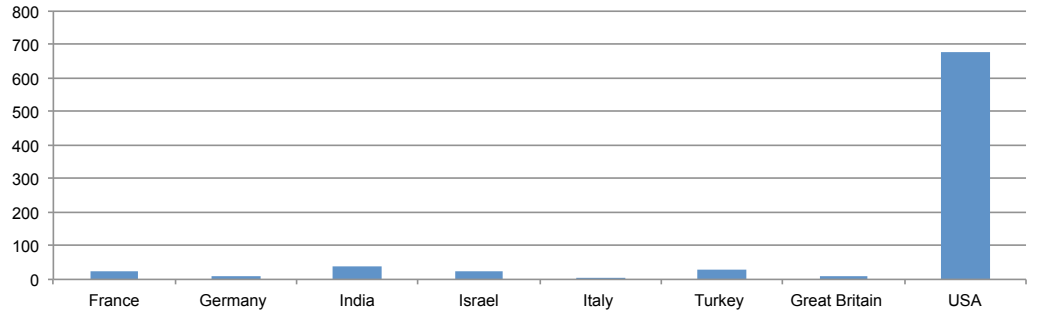
Drones were used in Somalia, Bosnia and Herzegovina, Ruanda and Kosovo for reconnaissance and surveillance purposes

2.3 Where are the drones?

More than 70 countries have drones. Most of them have models for unarmed surveillance and with limited scope, such as Shadow, a US robot weighing about 180kg that can remain in the air for six hours. Although many countries are seeking to acquire armed drones, very few aircraft work as Reaper, manufactured by the US, which is a large vehicle capable of transporting 16 guided missiles and staying aloft for 24 hours.

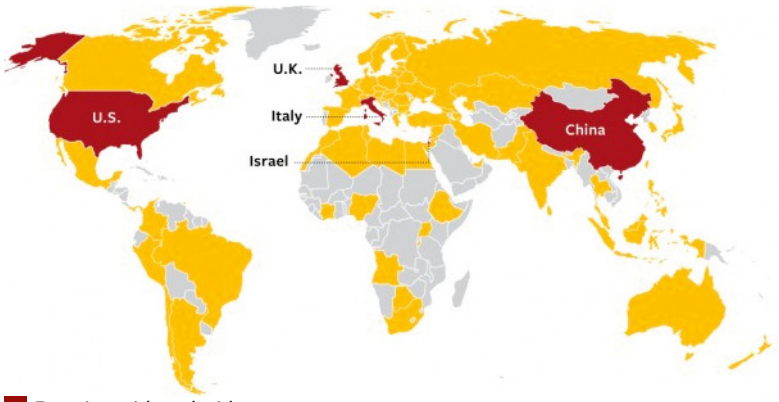
Armed drones were first used in Afganistan and Iraq

Graph 1. Declared stockpiles of drones (2010)



Source: The Guardian with data from IISS (2010)

Map 1. Map of drone stockpiles in the world (2013)



Function with and without weaponry

Function without weaponry

Source: Congressional Budget Office; Government Accountability Office; IISS; Natural Earth, extracted from When the Whole World Has Drones (2013).

More than 70 countries already possess unmanned aircraft

11. First armed drones flew in Afganistan in early October 2001.

Despite the media coverage of the deployment of attack drones by the US, it must be noted that more and more countries have or seek to ackquire this new weapon in the future, either for offensive purposes or mere surveillance. The following chart, containing data provided by the International Institute for Strategic Studies (IISS), presents a list of UAV systems pertaining to various countries:

Table 3. Main armed drones per country

Country	Handler	Type of drone	Number of units
USA	US Army	I-Gnat	3
USA	US Army	RQ-5A Hunter	20
USA	US Army	MQ-1C Grey Eagle	19
USA	US Army	RQ-7A Shadow	236
USA	US Navy	MQ-8B Fire Scout	5
USA	US Navy	RQ-4A Global Hawk	4
USA	US Navy	RQ-2B Pioneer	35
USA	Marines	RQ-7B Shadow	32
USA	Marines Reserves	RQ-7B Shadow	4
	US Air Force	MQ-1B Predator	101
	US Air Force	MQ-9 Reaper	73
	US Air Force	RQ-4B Global Hawk	23
	US Air Force	RQ-170 Sentinel	1
	National Guard	MQ-1B Predator	42
	National Guard	MQ-9 Reaper	14
	Army SOCOM	CQ-10 Snowgoose	28
	Air Force SOCOM	MQ-1B Predator	29
	Air Force SOCOM	MQ-9 Reaper	10
France	Army	Sperwer	20
	Air Forces	Harfang	3
Germany	Army	KZO	6
	Air Forces	Heron	3
Italy	Air Forces	RQ-1B Predator	5

Country	Handler	Type of drone	Number of units
Turkey	Army	Falcon 600	Unknown
	Army	Firebee	Unknown
	Army	CL-89	Unknown
	Army	Gnat	Unknown
	Air Forces	Heron	10
	Air Forces	Gnat 750	18
United Kingdom	Army	Hermes 450	Unknown
	Army	Watchkeeper	Unknown
	Air Forces	MQ-9 Reaper	5
Russia	Army	Tu-143 Reys	Unknown
	Army	Tu-243 Reys/Reys D	Unknown
	Army	Tu-300 Korshun	Unknown
China	Army	BZK-005	Unknown
	Army	WZ-5	Unknown
	Army	ASN-105	Unknown
	Army	ASN-206	Unknown
	Army	ASN-104	Unknown
	Army	WZ-50	Unknown
	Army	WZ-6	Unknown
	Air Forces	CH-1 Chang Hong	Unknown
	Air Forces	Chang Kong 1	Unknown
	Air Forces	Firebee	Unknown
India	Army	Nishant	14
	Army	Searcher Mk I/II	12
	Armed Forces	Heron	4
	Armed Forces	Searcher Mk II	8
	Air Forces	Searcher Mk II	Unknown
Iran	Army	Mohajer IV	Unknown
Israel	Air Forces	Hermes 450	Unknown
	Air Forces	Heron	Unknown
	Air Forces	Heron-TP	4
	Air Forces	RQ-5A Hunter	Unknown
	Air Forces	Searcher Mk II	22

Source: Rodgers, Simons, The Guardian (2012); War, Law & Space (2013)

US has at least 600 armed unmanned aircraft

Despite the lack of information on the number of drones available to each country, we can draw two substantive conclusions from the data above. Firstly, as different news sources had confirmed in recent years, the USA is the country that has the greatest arsenal of armed drones, with 18 different types and with a total of over 600 operating units. Secondly, it is observed that despite the hegemony of the US when it comes to the use of combat UAVs, more and more countries have acquired armed drones, or plan to acquire this new weapon in the future to integrate it into their respective military arsenals.

Countries like Afghanistan, Libya, Iraq, Pakistan, Somalia and Yemen have witnessed attacks by US military drones. However, this new resource is also used for purposes of surveillance or intelligence gathering. Consequently, drones have also been deployed over airspaces of Colombia, Haiti, Mexico, North Korea, Philippines and Turkey.

Military drones have been used in Afghanistan, Libya, Iraq, Pakistan, Somalia, Yemen, Colombia, Haiti, Mexico, North Korea, Philippines and Turkey

In order to maximize the flight time of drones over these countries, the US has articulated a global network of bases for drones that allow for rapid deployment of such devices, counting with the approval of host countries. While the operator in charge of controlling the drone in flight is not present in the base from where the drone is deployed, it is estimated that each base has a team to supervise the takeoff and landing and the ammunition system, as well as a routine maintainanance team.

Below is a list of different North-American drone bases currently set up in the world:

Table 4. Main US unmanned aircraft bases

Location	Mission	Handler
Incirlik, Turkey	Providing information regarding objectives of members of Kurdistan Labor Party	Turkish and US armed forces
Jalalabad, Afghanistan	Control of the afghan-pakistani border	US Air Forces and CIA
Khost, Afghanistan	Inteligence center for gathering information on potential targets. It is also used as a recruiting center for informants	CIA
Kandahar, Afghanistan	Main base for surveillance and attack missions in Afghanistan and Pakistan	US Army
Shindand, Afghanistan	-	CIA
Al-udeid, Qatar	Base for Combined Air and Space Operations Center (CAOC). Command center for drone operations in the Middle East.	US Air Forces
Zamboanga, Philippine	Monitoring supposed Abu Sayyaf militants, a group linked with Al Qaeda.	US Air Forces
Al-Dhafra, United Arab Emirates	Base for the 380th Air Expeditionary Wing.	US Air Forces

Location	Mission	Handler
Al-Anad, Yemen	Surveillance, collecting intelligence and establishing objectives related to militants affiliated with Al Qaeda on the Arab Peninsula	US Air Forces
Arba Minch, Ethiopia	Realization of surveillance missions in Somalia	US Army
Camp Lemonier, Djibouti	Base of the Combined Joint Task Force-Horn of Africa. Allows deployment of drones over Somalia	CIA
Mahe, Islas Seychelles	Tracking pirates in the Indian Ocean and persecution of Al Qaeda militants in Somalia	US Air Forces

Source: Zenko, Micah; WELCH, Emma, Foreign Policy (2013)

The first time a missile was launched from an unmanned aircraft was one month after 9/11, in Afghanistan

3. USE OF MILITARY DRONES

3.1 Attacks by military drones

At the time of the terrorist attacks in the US on September 11, 2001 (9/11), launching missiles from unmanned drones was just becoming possible. The first time a missile was launched from an armed aircraft in an attack in Afghanistan was less than a month after 9/11.

CIA performed its first selective assassination with a drone in February 2002 in Afghanistan

In 2002 the US used drones to strike against Al Qaeda and suspects in Yemen, as well as targets in Iraq before the start of the Second Gulf War. After the terrorist attacks, the Bush administration began a campaign of "selective assassinations" against suspected al-Qaeda members and other armed groups.[12] The CIA reportedly conducted its first targeted killing using a drone in February 2002 in Afghanistan, where an attack killed three men near a base of former mujahideens called Zhawar Kili.[13] Some reports suggest that CIA thought one of the three men might have had the same height as Bin Laden.[14] When asked about the results of the attack, authorities confirmed that it was not Bin Laden and seemed not to know who had been killed, since a Pentagon spokesman said: "We are convinced that it was an appropriate target",[15] but added "we do not know exactly who it was".[16] Another spokesman later added that there were no "indications that these were innocent locals".[17] Reports have suggested that the three individuals were local civilians collecting scrap metal.[18]

On November 3, 2002, the US undertook a program of selective killings in Yemen. US officials operated a drone from a base in Djibouti, killing six men traveling in a vehicle in a sparsely populated area of Yemen.[19] One of the murdered men was Qaed Sinan Harithi, believed to had been one of the planners of the attack on the USS Cole in 2000.[20] In January 2003, the Special Rapporteur the United

In November 2002, US began a program of selective assassinations in Yemen

12. Human Rights Watch (2011).
13. Sifton, John (2012).
14. Id ("CIA observers thought they'd seen bin Laden: a tall man with long robes near Tarnek Farm, bin Laden's erstwhile home near Kandahar. This sighting by an unarmed drone was what led to the first arguments among the White House and CIA about arming drones with missiles.").
15. *Id*.
16. *Id*.
17. *Id*.
18. Mayer, Jane (2009).
19. McManus, Doyle (2013).
20. *Id.*

In 2003 the UN Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions concluded that drone attacks are a clear case of extrajudicial execution

Nations on extrajudicial, summary or arbitrary executions concluded that the attack "constitutes a clear case of extrajudicial execution".[21]

However, the attack in Yemen was the forerunner of what later became a large-scale program of targeted killings by unmanned aircraft in Pakistan. After the US invasion of Afghanistan, a number of Taliban fighters fled across the border into Pakistan and in particular to FATA, located on the border with Afghanistan.[22] From 2002 to 2004, the US used Predator drones to monitor this area. Then in June 2004 the US launched an attack against Nek Muhammad, a Pakistani Taliban commander who had announced his support for Al Qaeda two months earlier.[23] Witnesses initially reported that the missile was launched from an unmanned aircraft circling above, but the Pakistani army denied any involvement of the US, instead taking credit for the operation as their own.[24] At present, it is believed that these were the first US drone attacks in Pakistan.[25]

When President Bush left office in January 2009, the US had, according to the New America Foundation, carried out at least 45 drone strikes, or 52 according to The Bureau of Investigative Journalism (TBIJ) within Pakistan.[26] Since then, President Obama has increased the number of drone attacks fivefold: 292 attacks in just over three years and a half.[27] This dramatic escalation of usage of unmanned aircraft by the US to carry out targeted killings has brought an increase in the tension between the US and Pakistan, as well as questions about the effectiveness and accuracy of these attacks.[28]

First drone attacks in Pakistan date back to June 2004

One of the most striking facts in the US armed drones campaign is that the attacks increased exponentially during the Obama administration. Interventionism and military hegemony, characteristics of the US foreign policy during the presidency of George W. Bush, have not only continued but have been increasing since Obama's arrival to power in 2009. Reports such as "Living under drones" by Stanford University and New York University show a change in the criteria for identifying targets. From individualized attacks by Bush to signature strikes or attacks based on patterns of conduct by the Obama administration.

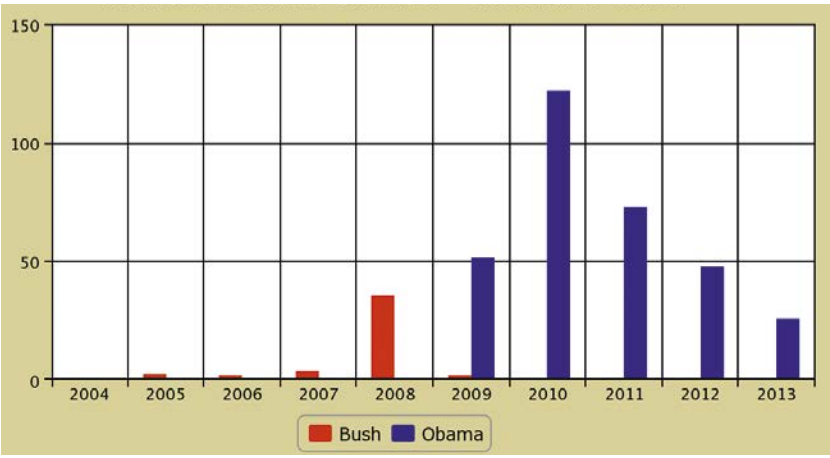
Regarding the use of drones, the numbers are clear: Pakistan, that since the US invasion of its neighbor Afghanistan, supposedly become a transit territory and a haven for terrorist cells, is the region where most covert attacks with drones have been carried out (381 attacks), when compared to Yemen and Somalia, respectively. Taking into account the attacks within that country made by both administrations (Bush and Obama), we get a clear result: compared to those made during the Bush administration, the drone strikes in Pakistan have increased exponentially since President Obama entered the White House.

Attacks with armed drones increased exponentially during the Obama administration

What can explain this change in policy? It seems that the US is not about to give up the so-called "war on terror". However, military campaigns and the deployment of soldiers are not widely accepted by the public, and in this sense the nature of drones or UAVs meant a major step forward. Their use does not require mobilization of large numbers of military personnel, they can be controlled remotely and allow for offensive actions without obvious loss of soldiers; moreover, if we add secrecy and opacity of an intelligence service like the CIA, drones become an invaluable military asset.

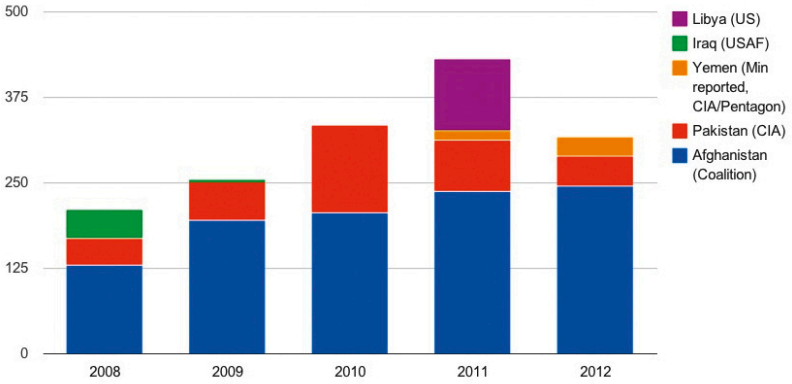
21. Commission on Human Rights (2013).
22. Glyn Williams, Brian (2010).
23. Zubair Shah, Pir (2012).
24. Rohde, David; Khan, Mohammed (2004).
25. Bergen, Peter; Rowland, Jennifer (2012); Bureau of Investigative Journalism (2011).
26. Bergen, Peter; Tiedemann, Katherine (2010); Bureau of Investigative Journalism (2011).
27. See *Covert War on Terror—The Data, supra* note 16.
28. See infra Chapter 5: Strategic Considerations.

Graph 2. Drone attacks performed by the US. From Bush to Obama



Source: New America Foundation, updated on January 17, 2014.

Graph 3. US drone attacks (2008-2012)



Source: The Bureau of Investigative Journalism (2012).

The number of confirmed drone attacks only in the FATA region (Pakistan) reached 376

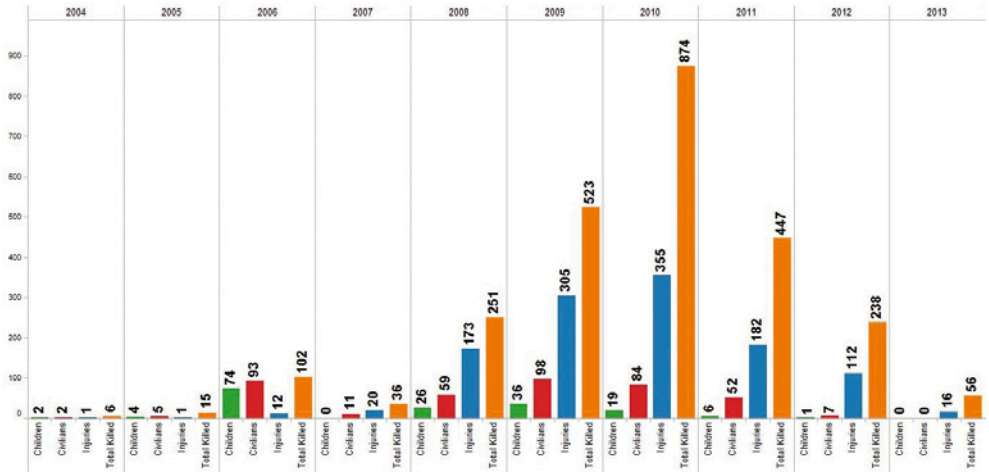
Between 2004 and 2013, as much as 376 drone attacks were confirmed as conducted by the US Central Intelligence Agency (CIA) in the region of FATA.[29] It is a number that increases each day thanks to the intensive use of military drones by the Obama administration since his coming to power in 2009. The strikes are also spreading to countries like Yemen or Somalia under the banner of fighting terrorism.[30]

Afghanistan and Pakistan are countries where most US attacks have been conducted, directed either by the armed forces or the CIA. Through them, the destructive capacity of drones has become evident. Specifically, in the case of Pakistan, the data reveals that the year with the highest rate of fatalities was 2010, with a total of 874 dead. A progressive decrease in the number of fatalities was noticeable later on in 2011, 2012 and 2013, a fact that may attributed to international media pressure towards the US administration. Yemen, the country where the first covert drone strike by the CIA was carried out (2002), is a stage for intermittent attacks, unlike Pakistan. During the period between 2002 and 2009, Yemen was not subject to any attack by drones; however, from 2009 onwards the US administration decided to intensify its campaign of attacks against the alleged threat of terrorist groups linked to Al Qaeda, 2012 being the year when the number of deaths inflicted was greatest (185).

29. Covert The Bureau of Investigative Journalism (2012).
30. Rogers, Simon (2012).

Yemen has also been a battleground for US drones since 2009

Graph 4. Estimate of victims of US drone attacks in Pakistan (2013)



Source: The Bureau of Investigative Journalism (2012).

- Children
- Civilians
- Wounded
- Total fatalities

Table 5. Overall drone attacks by the United Kingdom (2012)

Reason or objective as determined in Royal Air Force reports	
Insurgents attacking/fighting against friendly forces	28
Concentration of insurgents/planning/preparation for attack 11	11
Armed/active insurgents	9
Insurgents performing hostile acts	8
Individual or team for IED placement	13
Hidden weapons/explosive production plants	6
An important operation	1
A "known insurgent"/'high value' insurgent	2
Missile launched but deflected from the civilian population 2	2
Mentioned but without providing details	18
Total in RAF report	98
Unregistered in RAF reports 150	150
Total UK drone attacks until February 28, 2012	248

Fuente: elaboración propia a partir de los datos de Drone Wars UK (2012).

United Kingdom made at least 248 attacks with armed unmanned aircraft

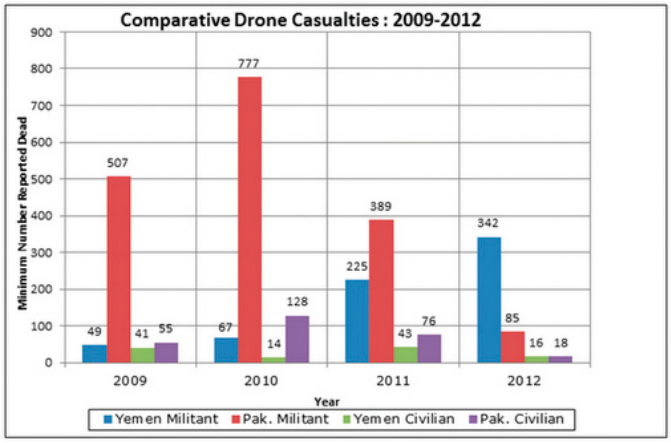
The United Kingdom has also conducted extensive use of armed drones, specifically in Afghanistan. A significant difference when compared to the US is that the use of drones by the United Kingdom has been carried out by RAF (Royal Air Force), a fact that allows for greater access to information about the attacks. As the data in the table shows, the United Kingdom conducted a total of 98 official drone attacks in Afghanistan by February 29, 2012. However, the most significant finding is that, out of 98 officially known attacks, RAF decided on 18 occasions not to provide mission details, despite accountability. Also, it is worthwhile to point out that there is still no information about the number of victims of such attacks and their status as either civilians or potential targets.

3.2 Victims and aftermath of armed drone attacks

The ability to distinguish between civilian and military objectives in drone attacks is being questioned. The percentage of successful attacks is oscilating between 6 and 99%

The calculation of victims caused by drones may differ depending on whether it is considered that an attack has been carried out successfully; ie the identification of combatants or civilians among the victims. Thus, the percentage of successful attacks may oscillate between 6% and 99%, especially having in mind that one of the criteria used to identify military targets for drones is the criterion of "group of men meeting together" (as declared by Harold Koh, legal adviser to the US State Department). Other estimates claim that at least 30% of victims are civilians. Despite the supposed pressure regarding the use of drones[31] is clear that the number of civilian casualties may exceed that of combatants or military objectives.

Graph 5. Victims of US drone attacks



Source: The Bureau of Investigative Journalism (2012).

At first glance, the effects of the deployment of attack drones are death and injuries suffered by their victims but hidden behind each of these attacks are much more subtle and devastating consequences for the civilian population. These consequences are not considered in most geostrategic analysis, but they are certainly equally or more harmful, if that is possible, than those mentioned. One of the papers that provide a thorough study on what those indirect consequences are, was drafted jointly by Stanford University and New York University Schools of Law, titled "Living under drones" and focusing on attacks perpetrated by US drones in the region of FATA (Pakistan). Similar to what happened in Bosnia with the constant barrage of snipers in the city of Sarajevo, and at present in the Syrian war, civilians are indiscriminately used as hostages. That report reveals that in many cases drones attack the same target systematically, in order to prevent medical assistance to victims; a practice that not only discourages humanitarian aid to the wounded by neighbors and witnesses, but also by health care professionals located in the vicinity of the impact.

Such tactics have made various humanitarian organizations rethink the manner they act on the ground, as systematic attacks have not cancelled their intervention but have instead altered their activities, since they no longer consider safe going to the attack area until six hours have passed after the attack. Without any doubt, this fact decreases the effectiveness of their assistance.

A minimum of 30% of victims of armed drones are civilians

Living under the constant watch by drones also negatively affects lives of the civilian population. "Terror" is how different witnesses interviewed in the study

31. Harold Koh, US State Department Legal Advisor, declared in 2010: "Our procedures and practices for identifying targets are completely solid and technological development makes this task even more accurate"

Drone attacks decrease and impede the effectiveness of humanitarian work

describe the experience of hearing a sound of a drone flying over the area. The fear of being potential victims of attack that may happen at any time caused a part of the inhabitants of FATA region to develop "anticipatory anxiety", and others to show signs of posttraumatic stress. The continued presence of armed drones over the region meant that the inhabitants are unable to continue with their lives normally, since acts as ordinary as sleeping are tempered by the fear from a possible attack. Another effect of living in fear of drones is the supression of any meetings or social events, which is particularly damaging in the mentioned region, since it has undermined the observance of Jirga, a tribal assembly fairly common in Pashtun communities that aims for consensus decision-making. The suppression of a system as old as this is seriously jeopardizing the coexistence between different communities living in the region, and has in turn increased tensions between various groups, who fear the presence of informants hired by the CIA in order to point out the targets for drone attacks.

The economic effects of strikes are another impact that drone strikes inflict on the civilian population. The destruction of houses and other structures meant a property loss for a large part of the population, causing the erosion of living standards of those who have survived the attacks unharmed. Similarly, deaths and injuries have originated a redistribution of family roles, since in many cases the males, whose work was the primary source of income for their families, are the main target of the attacks. In other cases, the aftermath of the strikes caused increased health care costs, costs in which most victims and their families found impossible to cover. Unlike Afghanistan, where American authorities have introduced a system of compensation for damages caused to the civilian population, victims of drone attacks in FATA region do not recieve such benefits, despite suffering severe damage. In this sense, the Pakistani government has developed a lower-rate compensation system that their beneficiaries are refusing, considering the quantities offered insufficient to repair the damages or replace the lack of income.

The presence of drones creates a constant feeling of terror in the civilian population and has serious consequences on community life and local economy

4. DRONE BUSINESS AND INDUSTRY

4.1 A business of the future

Drones are a booming weapon, as evidenced by various data related to their use, as well as the number of states that currently have drones or intend to acquire them in the short or medium term.

The conflicts in Afghanistan and Iraq and the "war on terror" have involved great gains for those involved in the development of UAVs, such as Lockheed Martin, Northrop Grumman, Boeing, General Dynamics and General Atomics. This trend is expected to continue as profit forecasts for these corporations are projected to grow to 11.4 billion dollars in one decade. The drone business could eventually have a market volume close to 89 billion dollars, of which 28.5 correspond to R+D+i. [32] These data refer to the global market for drones, including both military and civilian business. Still, NATO on its own possesses 60 types of drones, 2200 ground control stations and 6700 UAS. Globally there are already more UAS pilots than pilots of commercial aircraft, and in the case of Spain, where only the Land Army operates UAVs, there are 17, four of which are deployed in Afganistan.[33]

Locheed Martin, Northrop Grumman, Boeing, General Dynamics and General Atomics have acquired great gains thanks to UAVs

32. TEAL Group Corporation (2012).
33. Chris Cole (2010).

Table 6. Leading produces of military drones

Drone	Producer	Armed	Exported to
Desert Hawk	Lockheed Martin (US)	No	United Kingdom
Harpy	Israel Aerospace Industries	YES	China, South Korea, India, Chile, Turkey
Harop	Israel Aerospace Industries	YES	Turkey, India, Germany
Hermes 450	Elbit Systems Ltd. (Israel)	YES	Georgia, Mexico, Singapur, US, United Kingdom
Heron	Israel Aerospace Industries	No	France, Turkey, Brazil, India
Niti	Armstechno (Bulgaria)	No	Indonesia, Turkey
Predator	General Atomics (US)	YES	United Kingdom, Italy, Turkey
Ranger	RuAG Aerospace (Switzerland)	No	Finland
Reaper	General Atomics (US)	YES	United Kingdom, Italy, Turkey
Searcher	Israel Aerospace Industries	No	Thailand, Turkey, Singapore, Republic of Korea, India
Yarara	Nostromo Defensa (Argentina)	No	US

Source: Compiled from Chris Cole (2010).

NATO on its own has more than 60 types of drones, 2200 land control stations and 6700 UAS.

The industry of drones is still in its first phase. Yet, the projects of many states to acquire or develop their own versions have become apparent, often with help from one of the two main producers: Israel and the US. Also, production and use has increased exponentially in the last 10 years: some 40 countries are developing or using them, and, since the 9/11 attacks, the US have increased their arsenal of Predators from 167 units in 2002 to over 7000 in the present day. [34]

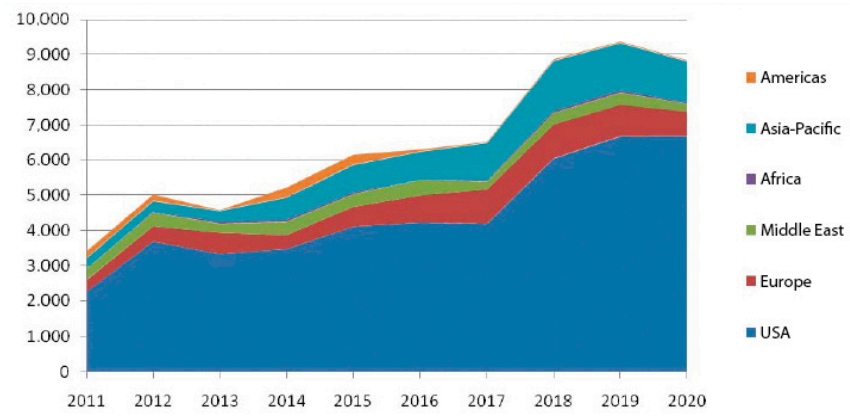
Accordingly, the US dominate the market for drones as it integrates them in all branches of its armed forces, while Israel also represents a major exporter of these unmanned aerial systems. In addition, there is an important demand from European countries, particularly Britain, France and Germany, and there are comprehensive plans for drone purchases from China, India, Japan and South Korea. Also, Visiongain[35] provider of independent information regarding industries of metals, telecommunications, pharmaceutical, defense, and energy, estimates that the market for drones will gain a total of about 71 billion dollars between 2010 and 2020, and that Israel is the world's leading exporter of drones, with annual revenue of around 350 million dollars and more than 1000 sales.[36] [37]

40 countries are developing or using drones. US and Israel dominate the market

34. Webb, Dave; Wirbel, Loring; Sulzman, Bill (2010).
35. Visiongain (2010).
36. Hoyle, Craig (2008).
37. Cole Chris (2010).

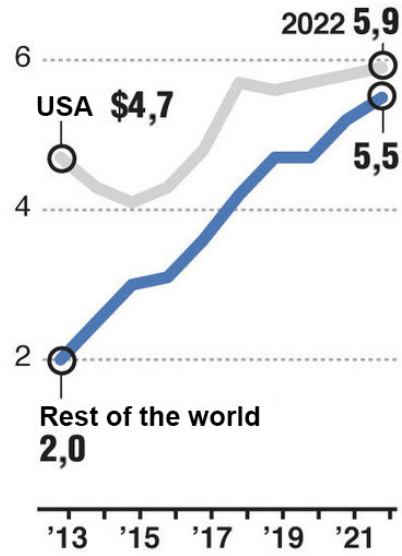
The world unmanned aircraft market is and will be largely dominated by the US

Graph 6. Drone production forecast by region



Source: Teal Group (2011).

Graph 7. Estimated cost for developing and acquiring drones (2013-2021)



Figures in billions of dollars
Source: Teal Group (2012).

Table 7. Main exports of military drones

Country	Directly exported	Assistance in developing
Israel	Germany Australia Canada South Korea Ecuador Spain Phillipines India Mexico Singapore Sri Lanka Thailand Turkey	Finland France Switzerland United Kingdom

The cost of developing and acquiring drones will surpass 11 billion dollars in 2021

Country	Directly exported	Assistance in developing
USA	Belgium Egypt Italy Morocco United Kingdom Turkey	Germany
France	Greece Netherlands Sweden	
South Africa	Sri Lanka	

Source: Compiled from Drone Wars UK (2012).

In Spain there are more than 50 companies developing products and innovations for drones

4.2 The production of drones in Spain

There are currently more than 50 companies in Spain that are involved in developing products and innovation related to drones. The current Spanish Minister of Defense Pedro Morenés said, before he took office in April 2008, that, having joined the program too lat, Spain could not participate in the development of drones as much as he would have liked it, but that he would try to have it participate in the development of platforms that control drones from the ground. Five years later, with Morenés in the Government, the Spanish Navy organized a few conferences in the Madrid Superior Technical School for Naval Weapons' Engineers (*Escuela Técnica Superior de Ingenieros de Armas Navales de Madrid*), in order to present trends in the naval usage of drones, that were attended by the chief executives of companies such as Expal, Lockheed Martin, Ixion, Navantia, Fuve, Isdefe and Saes.

Although the market for drones is faced with budget cuts and the advantage of fully tested American and Israeli products, Spain is the fifth European country in aerospace development and production, and is already part of the drones industry, with EADS (European Aeronautic Defence and Space) having several projects, setting the standard with Cassidian, their defense and security division.[38]

EADS, through Cassidian, is the leading Spanish state-operated manufacturer of unmanned aircraft. Indra, Aries Ingeniería y Sistemas, GMV, Sistemas de Control Remoto (SCR), Aerlyper, CIMSA Ingeniería de Sistemas, Elimco UAS, Saft Baterías, Thales Spain, Tekplus Aerospace and UAV Navigation also stand out for their production

Likewise, Aries Ingeniería y Sistemas has diversified into drones and now cooperates with INTA (*Instituto Nacional de Técnica Aerospacial* – National Institute for Aerospace Technology) and with EADS Atlante (*Avión Táctico de Largo Alcance No Tripulado Español* – Spanish Long Range Unmanned Tactical Aircraft) in manufacturing various types of drone launchers. Companies like UAV Navigation or SCR have also emerged, the first being established in 2004 and specializing in autopilots – small boxes holding the hardware and software that allows drones to fly on their own.

38. *El País* "'Drones' al estilo español", published on February 22, 2012.

Table 8: Main drone industries in Spain

Name	Production	Observations
EADS European Aeronautic Defence and Space Company	• Tactical systems: such as Tracker and ATLANTE, as well as hingh altitude, long endurance (HALE) Euro Hawk	• In February 2013 produced its drone nº 1000 DT 45 • To train air defense units and aircraft crew, to test guided missiles; drones equipped with infrared sensors and radar emitters • Forms part of Cassidian • Forms part of Atlante program
Indra	• PASI (Searcher MK II in Afganistan for the Army). System"Sense and Avoid" (detection and evasión of collisions) for Sweden, France, Italy and Germany • Drone Mantis: mini drone of 20kg observation aircraft for the Army • Drone Pelican: unmanned helicopter of 200kg. For maritime vigilance	• Forms part of Atlante program
Aries Ingeniería y Sistemas	• They produce various types of drone launchers • BuLL EL-01- Bungee light launcher • ALPPuL LP-02- low pneumatic pression launcher	• They integrated into PASI program in 2007, working with EADS (Atlante)
GMV	• Aircraft control, guidance and navigation equipment or FCC (Flight Control Computer) • Automatic take-off and landing subsystem (ATOL).	• Participates in Atlante program, led by EADS
Sistemas de Control Remoto (SCR)	• Produces aircraft for targeting: drones used for targeting in military exercises • They have between 30 and 100kg	
Aerlyper	• It is currently developing a mini-UAV platform with surveillance and reconnaissance capabilities, accuracy of localization, navigation and planning	• First company in Spain to provide the Spanish Land Army a mini-UAV system
CIMSA Ingeniería de Sistemas	• Parachute UAV systems para emergency and recovery situations	• One of the main providers of parachute recovery systems for drones from 5 to 500kg
Elimco UAS	• Specialized in design, development and integration of mini and tactical UAV Systems for military and civilian use	• Aplications for agriculture, communication, defense and security, forestry, emergency management, environment, terrain observation, control of borders and infrastructure, etc.
Saft Baterías	• They produce batteries for hybrid/ electronic, vehicles, satellites and UAV	• Global producer of nickel-cadmium and primary lithium batteries for several markets.
Thales España	• UAV *Fulmar* presented to the European agency for the control of borders • Integra systems for real-time surveillance for control	• UAV for control of maritime zones
Tekplus Aerospace	• Developed the *Centauro* drone	• Panoramic survaillance day/night • Prevention and detection of forest fires • Control of maritime traffic • Control and survaillance of borders
UAV Navigation	• Provider of flight control systems for drones and navigation systems • Land control stations, autonomous flight control units for drones	• Created in 2004

Source: Compiled from data from Directory of Defense Companies in Spain of 2013..

5. LEGALITY AND LEGITIMACY OF MILITARY USE OF DRONES

5.1 Legal analysis of the use of military drones

Drone attacks seek to attack one or more individuals selectively

The use of military attack drones has raised two types of discussions: the ethical and legal debate. However, farther away from the issue of moral acceptability of the possibility to perform attacks by vehicles that are controlled remotely by operators thousands of miles away from their targets, we must also consider whether drone strikes comply with existing international law.

The growing use of unmanned aircraft and the criteria used to discern potential targets for drone strikes pose two major legal uncertainties: firstly, is there a legal justification to legitimize the performance of such attacks? And secondly, are the criteria used to define the targets of the attacks tailored in accordance with the international law?

5.1.1 The legal framework of drone attacks

The attacks by drones seek to achieve a selective killing of a particular individual or a group of individuals because of the threat they pose. The common element in all operations that pursue these goals is the use of intentional lethal force with some level of premeditation against an individual or group of individuals identified as potential threats by the entity that performs the attack. That is why the main objective of the operation, more than being a targeted killing, is the use of lethal force. [39]

There are three legal contexts that may justify a selective assassination: it may occur within an international armed conflict, in a non-international armed conflict, or through the exercise of interstate use of armed force.[40]

In the context of international armed conflict, both the international humanitarian law and the International Law of Human Rights are applicable. To determine which of the above legal frameworks should be applied depends on the interpretation of what is *lex specialis*, having in mind the circumstances of the particular case.

To prove the existence of an international armed conflict turns out to be simpler than it proving an armed conflict that does not involve several states. According to various Geneva Conventions (I to IV) of 1949 and their respective articles number 2, these conventions are to be applied in all cases in which the state of war is declared or an armed conflict exists between two or more States parties to the convention, and even in the case when any of the States concerned has not been recognized by the rest. Therefore, by virtue of the said provision, it is conceivable that attacks by military drones in Pakistan, Somalia and Yemen, performed by the CIA, do not constitute an international armed conflict, given that such operations neither fall within the context of declaration of a state of war nor constitute an armed conflict between states.

For any given conflict to constitute a non-international armed conflict, it must meet the criteria set out in the Geneva Conventions of 1949 and their Additional Protocols, as well as those in the customary law. Firstly, it is necessary that the group or non-state organization has a minimal structure, so that it is possible to identify its members. Secondly, it is imperative that different Geneva Conventions are applicable. The third requirement is that the non-state organization in question constitutes an armed group capable of conducting anti-government activities. Fourth, it is necessary that the State involved in the conflict fights the members of the non-state organization with its military forces on a regular basis.

Drone attacks performed by CIA in Pakistan, Somalia and Yemen can not be considered in the context of an international armed conflict

39. Alston, Philip (2010).
40. Naciones Unidas (1945)

Drone attacks performed up do date can not be considered as part of a non-international armed conflict

The fifth and final requirement is that the conflict in question becomes a subject of discussion within the Security Council or the General Assembly of the United Nations. As for the conflict itself, it is necessary that it has a certain intensity and continuity over time.

If we apply the above criteria or requirements to cases of drone strikes we observe the following issues: the first is that the Additional Protocol II of the 1949 Geneva Convention for the Protection of Victims of Non-International Armed Conflicts is only applicable to those States which are part of it. A rule that made the application towards the US imposible, since they have not signed or ratified the Protocol. The second is that various drone strikes performed in Pakistan, Somalia and Yemen have been carried out by the CIA, not the US armed forces. The third obstacle is that it is difficult to prove a certain level of continued violence in such States, given that attacks by such groups usually have a sporadic character. Consequently, by not meeting the different aforesaid requirements, drone attacks can not be considered a non-international armed conflict.

The last of the legal frameworks that could be used to justify the selective assassinations by military drones is the interstate use of armed force. The UN Charter explicitly prohibits the use of armed force.[41] However, this prohibition has two exceptions:

- That the State in which territory the operations are carried out consents to the use of force within its territory by a third State, or that they are unable to tackle this threat by themselves.
- That the State that uses armed force is entitled to self-defense, be it individual or colective.[42]

With respect to the consent of the State to which the territory belongs to, it legitimizes the use of force in the territory of the State concerned, does not mean that international humanitarian law is not applicable in relation to attacks or military operations carried out. In the case of drone attacks in FATA region, such attacks were initially legitimized on the grounds that the Pakistani government was unable or did not want to tackle the problem of terrorism within its territory. Even the possibility that there was an implicit pact between the US and Pakistan to authorize the drone attacks has been considered. There are, however, multiple examples of disapproval of drone attacks in the region of FATA by various Pakistani government agencies.[43] The Pakistani Prime Minister Nawaz Sharif has condemned drone attacks in Pakistan by stating that such practices "are in violation of international law and the UN Charter".[44] Another symptom of lack of conformity regarding Pakistan's consent is found in the sentence delivered on April 11, 2013, by the Supreme Court of Peshawar, in which it is manifested that drone attacks represent a war crime and a flagrant violation of Human Rights.

The second objection has been a quite recurrent instrument in the American foreign policy in recent years: the right to legitimate defense. For this exception to the use of armed force to result applicable, it is necessary that the use of force is justified by a prior first attack by another State. However, we have witnessed a reformulation of this right after 9/11, with the acceptance of the theory of anticipatory or pre-emptive defense in which this prior first strike is not necessary. Although this new theory can be applied only in very restricted circumstances, its very formulation is clearly contrary to the traditional right of self defense because it eliminates the requirement of preceding armed attack. Another of the most controversial aspects of the right to legitimate defense is whether it can justify the use of armed force against groups or non-state organizations. How-

41. Article 2.4 of United Nations Charter of 1945.
42. United Nations (1945).
43. *The Times of India* (2013).
44. PressTV (2013).

ever, the International Court of Justice has already ruled against such possibility in a case concerning armed activities on the territory of the Democratic Republic of Congo, so it would not be possible to justify drone attacks under the pretext of the right to legitimate defense.

It is not posible to justify drone strikes under the guise of right to self-defense

5.1.2 Regarding the criteria for identification of objectives for drone attacks

According to Harold Koh, Legal Adviser in the US Department of State, "Our procedures and practices for identifying targets are completely robust, and technological development has enabled us to perform this task with even more precision." [45]

The criteria used by the CIA to select the targets of drone strikes are an absolute mystery. During the Bush administration the drone strikes responded to individualized goals according to available information. However, it was during the presidency of Barack Obama that such criteria have been expanded to the point of allowing the identification of objectives by using profiles or generalized patterns of behavior, [46] so any individual whose description fits within the established generic parameters may come under drone attack. The criteria or characteristics that must be met in order to be identified as a possible target have not yet been made public, but we know that it is common that groups of men who meet certain characteristics associated with terrorist activities are being considered objectives in drone strikes.

If we take into account the International Humanitarian Law relating to international armed conflicts, we note that those subjects who are classified as "combatants" can be attacked at any time, while attacks against civilians are only allowed if it is proven that these "participate directly in hostilities and only during their participation",[47] an element that has no definition on the international level and rests on subjective assessment of the States, which is unacceptable because it makes it easier to justify the loss of civilian lives in the attacks. Despite the difficulty of defining what behaviors constitute direct participation in hostilities, only actions like fighting or giving explicit and direct support to those who fight should justify attacking civilians.

It is not easy to define a line between the two types of participation, nor is it easy to establish control mechanisms in order to ensure that various military operations are performed in accordance with such restrictions. Proofs of this are the many civilian victims of drone strikes in Pakistan.[48]

5.1.3 The illegal use of military drones

The drone attacks performed by the US up to date in countries like Pakistan, Yemen or Somalia highlight the illegal use that is being given to this new weapon. The ability to justify the legitimacy of targeted assassinations by drones fades when reviewing the existing international law. Such operations, as we have seen, can not be included within different legal frameworks and this is why it can be said that the use that has so far been given to the attack drones in the mentioned countries is not only unjustified but also illegal.

The drone attacks in the regions already mentioned are a clear violation of Article 6 on the right to life of the International Covenant on Civil and Political Rights of December 16, 1966, agreement to which the US is part of. The cited provision states that: "The right to life is inherent to the human person. This right shall be protected by law. No one shall be arbitrarily deprived of life."

Among the criteria used by CIA to select drone strike targets is identifying targets by profiles and behaviour patterns

45. U.S. Department of State (2010).
46. Klaidman, Daniel (2012); Living Under Drones (2012).
47. Geneva Protocol (1949).
48. The Bureau of Investigative Journalism (2012).

The possibility to justify the legitimacy of drone selective assassinations fades away when existing international law is examined

As evidenced by a recent Amnesty International Report,[49] drone attacks up to date must be legally qualified as extrajudicial executions. In the absence of application of International Humanitarian Law, the only way to justify the persecution and posterior use of lethal force against an individual is by ensuring compliance with the guarantees recognized by the International Human Rights Law. In this context, it must be demonstrated that the use of lethal force against an individual is the only way to protect the right to life of others, when capture of the individual is not possible. These are warranties and guidelines that should be observed in every attack, and failure to do so allows qualification of such actions as extrajudicial executions.

Another controversial issue concerns the criteria used for the identification of objectives in various attacks, criteria that are completely arbitrary because they are based on patterns of behavior and not on accurate and precise information regarding specific individuals, which is a factor that increases the chances for killing innocent people and constitutes a serious violation of International Humanitarian Law.

Dron strikes to date must be legally qualified as extrajudicial executions

At present we do not yet have an explanation or a legal argument from the American government that would legitimize the attacks carried out up to date. However, it is easy to assume that the increasing usage of these new weapons will in the not-too-distant future motivate an *ad hoc* change of the current international legislation and case law in order to legitimize the attacks with armed drones.

5.2 Legitimacy of military drones

The drones are an important military alternative to deployment of troops on the ground, since they are relatively small, well-equipped and allow for much faster performance of attacks. To this we must add that, considering that they are unmanned, they are able to fly over hostile areas longer than ordinary pilotes, bearing in mind that the type of conflict, or military missions the US are carrying out, have little to do with fighting a regular army, but rather focus their warfare on hunting down and persecution of certain individuals. It is likewise very important to note that the use of drones also means a decrease in casualties among military personnel, which, despite having been reduced in recent armed conflicts, remains the focus of media attention.

We conclude that the criteria for identifying targets in various drone strikes are completely arbitrary

There are technical questions regarding drones, some referring to their still high cost and others to numerous accidents that they have experienced (a minimum of 100 since 2007, of which 53 correspond to Predator[50]). This occurs mainly because it is an emerging technology that still incorporates unsafe systems and also because some of their operational elements can be intercepted, as in the case of frequency inhibitors that disrupt the connection between the apparatus and drone operator. However, technological advances in this sector will most likely mean that both of the present weaknesses mentioned will be resolved in the future. In fact, some have already confirmed the benefits of their low cost and higher accuracy, when compared with traditional combat aircraft.

It is very important to note that the use of drones means a decrease in casualties among military personnel, which, despite having been reduced in recent armed conflicts, remain the focus of media attention

There are parts of the military that resist the use of drones, though for reasons very different than ours. More beligerent soldiers oppose it because it gives rise to a less virtuous war; and professional military personnel also shows some reluctance, since 46% of drone operators have received counseling because of the compassion resulting from observing the victim over a long period of time before killing it, therefore retaining visual memory of the victim's everyday life and documented death.

49. Amnesty International (2013).
50. Drone Wars UK (2012).

More precision at a lower cost: the objectification of human life

The famous general Robert E. Lee, who was the Commander of all Southern Confederate armies, is credited with having observed that "it is good that war is horrible, otherwise we would grow fond of it", meaning that, despite arguments related to its occasional justification, war causes horrors and therefore it is good to avoid getting too attracted to it.

War causes horror because it ends human lives; devastates populations, territories and cities; makes crops unusable, contaminates natural resources, poisons the air... destroys industries and infrastructure vital to individuals; terrifies because it puts an endo on plans for the future of thousands of people,, redirecting enormous economic resources and engaging thousands of people in armed conflict. Yes, war causes horror. And, albeit in different proportions, both the conqueror and the vanquished experience this horror.

And especially because both sides lose that which is irreplaceable: their loved ones. Then it is not just horror, it is pain, terror, it is madness. And it is like that both in the field of battle and in the rear; equally when pulling the trigger in direct combat or when driving a tank, a plane or a submarine, and it is also such because of the continuous uncertainty in which civilians are put. War is horrible because killing is always horrible. It is criminal.

So throughout our history of wars, civil and military leaders have tried to agree on certain guidelines, to establish some guiding principles on what is and what is not fair, legal, right, human, moral... Hence the endless conventions, codes of conduct, rights and duties seeking to determine the degree of horror to be caused or to be prevent by both parties from taking place amongst those suffering the outbreak of war. And certainly, with its ups and downs, its violations and observance, one cannot deny that they have been useful to prevent some of the horrors.

But the rules of war change, from stone maces to swords and bows; from crossbows to rifles; from cannons to bombers; from ships to submarines; from manned aircraft to *drones*. And it is with this new gadget from the field of military robotics that the said conclusion of General Lee regarding the nature of war gets partly -but in a substantial part- ammended.

Drones bring a substantial change in the nature of war. If the bow was the beginning of the long-range war, the drone is its culmination. It is no longer the sniper from his trench, or the scope of the current rifles, not even the missiles used in wars of the late twentieth century; now death comes in a pilotless device, with an eye seeking its targets and a grip on a trigger more than 10,000 kilometers away from the objective for termination.

Victim and perpetrator do not see each other, they do not even sense or detect each other... how and what to detect 10,000 kilometers away, living in a country that may not even be in a declared state of war with anyone, and, therefore, in a scenario that does not correspond to a battlefield. It is war from a distance, long distance, so long that depersonalization is total and dehumanization therefore overwhelming. However, not only that the drones are proliferating spectacularly, sweeping the global arms' market, but the United States are already training more "pilots" for drones than pilots for manned aircraft.

Such is the recognition that the Pentagon shows for the effectiveness of drones that, in February 2013, Leo Panetta, US Secretary of Defense, announced the creation of a new medal -the first after World War II- to decorate the actions of drone operators and cyberwarfare military specialists. The reaction from the Association of Veterans of Foreign Wars (VFW), the most important group of veterans of America, was extremely sharp. Its president, John Hamilton, stated in an of-

There are technical questions about the drones, referring to their high cost and numerous accidents they have experienced. But it is a constantly evolving technology that seems to have already invalidated such arguments

Drones bring a substantial change in the nature of war. Drone is the culmination of long-range war

Drone war involves a total depersonalization and, as a consequence, overwhelming dehumanization

With the use of drones there is no place for reconsidering, it can not be reversed; insensitivity prevails

ficial communiqué a strong disagreement with the Pentagon. He acknowledged that those "far from the front have an immediate impact on the battlefield", but noted that "medals that cannot be won except by direct contact during combat should be more valuable than those granted for work in the rear". This was his criticism of the decision to decorate military "whose life is not at stake." The reaction was so overwhelming that the Secretary of Defense was forced to withdraw the proposal.

From another point of view, P. W. Singer in *The New Atlantis* reported statements by army chaplain D. Keith Shurtleff, who warned that "as war becomes safer and easier, as soldiers are removed from the horrors of war and see the enemy not as humans but as blips on a screen, there is a very real danger of losing the deterrent that such horrors provide".[51] The compassion, the ability to associate with the pain of others with the willingness to alleviate their pain, mercy as an expression of reconciliation and forgiveness, and kindness, become absolutely overshadowed, hampered, if not prevented, because of the distance and depersonalization between the one who presses the computer keyboard operating the device and the one who unexpectedly receives the impact. There is no opportunity for reconsideration; there can be no turning back. Insensitivity is imposed.

What are its proponents arguing? Accuracy, low cost, no human cost for the attacker... As argued by an American philosophy professor Bradley Strawser, in an article published in *The Guardian* in August 2012,[52] the defense of the use of drones is based on the accounting ethics, ie not jeopardizing the life of the agent performing the airstrike who, as already indicated, can be in an office thousands of kilometers from the target. On the other hand, attacks by drones have greater precision, which minimizes (but does not prevent) potential non-combatants victims, ie causes less "collateral damage." The professor also dares to suggest that, since operations involving drones, like drones themselves, are cheaper than those made by conventional warfare aircraft, the economic differential could be deducted from the military budget and spend for purposes of "distributive justice" in the society, thus providing a *more ethical balance*. Finally, the professor concludes that the use of drones is a moral obligation.

That moral obligation is being enforced ruthlessly. As Geoffrey Robertson, author of *Crimes Against Humanity*, affirms "to date many of the killings carried out by drones can only be described as 'summary executions', since they deny the right to life, to the presumption of innocence and the right to a fair trial".[53]

There is neither legality nor ethics in drone strikes. Even for those who defend the concept of just war, drones do not "win" wars, they do not "liberate" territories nor "destroy" armies and weaponry. Drones simply and extrajudicially assassinate supposed "terrorists" leaders who undoubtedly end up being replaced by others, or, when this is not the case, their deaths encourage many others to take part in the fighting; infliction of collateral damage will continue because civilians will continue to die, the hatred will increase, as will the resentment from various factions because of the atrocity suffered. Yes, the drones establish a new kind of war: an aseptic war, which will perhaps allow the party which possesses the necessary technological and economic power to contradict General Lee, because war for them will no longer be horrible and it will be easy to become fond of; it will be like playing a video game. The dead are provided by others.

51. Singer, P.W. (2009).
52. *The Guardian* (2012).
53. Robertson (2008).

6. CONCLUSIONS

There is no legality or ethics in drone strikes. Drones simply extrajudicially assassinate supposed "terrorist" leaders, who will unquestionably be replaced by others and their deaths may encourage many to join their cause

Unmanned aircraft are already part of the current reality and future of aviation, presenting a great potential for product development and various options for civil and military uses. While civilian use can be controversial when related to invasion of privacy and possible violation of the right to intimacy that may result from their presence above the streets, we have focused here on their military usage, as combat or attack aircraft.

The huge interest that drones have roused in the military industry, in armies and in the political power circles makes probable the possibility of them becoming one of the weapons with greater presence in a relatively near future.

From the military and political justifications we can infer that there are various reasons to validate the use of drones, primarily from political and military perspective. In fact, they are cheaper than conventional warfare airplanes, they do not require years of training, as is the case with fighter pilots, they do not result in the loss of life of their crew if they are hit by anti-aircraft artillery, and they also make the decision to fire on a military target easier, as shooting targets on a computer screen raises less questions regarding morality than seeing the effects of the attack before your own eyes. Political advantages must be added to the military benefits, because there is nothing more discouraging for a government embarking on military adventures in distant lands like having to explain to the public at home why their compatriots are returning from war in coffins. These justifications that can be further emphasized by stating technological advances related to their autonomy, volume and accuracy.

That is why a weapon of this kind is being developed by world's major military powers, especially the United States and Israel, as countries with the greatest industrial capacity and most competitive products in the field of unmanned military aircraft. Also noteworthy is the interest in military drones demonstrated by Turkey, China, United Kingdom and India. In the context of EU and NATO, there is an expectation that in the coming years military unmanned aircraft will become a vital weapon in both their armies and in armament industries of their member states.

Regarding the use of drones as an offensive weapon, the boost in generalization of their usage came with the US-led War on Terror in 2001. That is why the main data relating to their use have a direct link with the US military missions in Pakistan, Afghanistan and Yemen, countries with military UAV bases that extend their reach to some of the neighboring countries. USA and Israel are countries with most intensive use of armed UAVs. In the case of the US, the areas where most attacks are carried out are Pakistan (FATA region), Yemen and Somalia. Israel on the other hand focuses its operations within Palestinian territories. Despite the difficulties in counting the number of attacks and their victims, statistics show an increase in the number of attacks in Pakistan and Yemen. At the same time, the commitment of current American administration to use drones as a tool to combat terrorism becomes evident.

The clear increase in attacks with military drones since President Barack Obama's arrival to power is particularly noteworthy, being a result of his strategy of withdrawal of troops from American military missions abroad, while at the same time maintaining the objectives of the War on Terror related to elimination of the alleged terrorists linked to Al Qaeda through selective drone strikes. It is precisely in this aspect that the use of drones has generated the most controversy, both in terms of public opinion and respect for international law. In fact, their main uses have been in the form of targeted assassinations that undoubtedly represent illegal actions, for which the Obama Adminstration has been particularly responsible. Beyond the despicable impact on the civilian population, not at all negligible, these attacks are not justified in any way by the existing international

law, since they represent extrajudicial executions. This use is a violation of the International Covenant on Civil and Political Rights and a breach of the international humanitarian law. Note that it also results illegal to use them when we approach the issue from the aspect of the criteria used to identify targets of their attacks, which repeatedly result in numerous civilian victims.

However, their widespread use will very likely produce an ad-hoc change of international law in order to have the attacks with armed drones legitimized. It is so because we are talking about a weapon the production of which is estimated to exceed 10 billion dollars annually in less than a decade. And, of course, its massive presence will make their use more widespread, not only by the US but by many other armies in the world. There are already more than 70 countries that have it. Even Spain already has unarmed drones and has used them in Afghanistan, and also aims to become one of the leading European producers. Not surprisingly, there are already more than a dozen military industries that produce drones or some of their components in Spain, with some of them being the most important in Spanish and European sector.

But beyond the legality or illegality of use of military drones, we must ask ourselves about the ethical legitimacy of their use as weapons of war. Because the use of drones to attack any military target triggers well-founded moral alarms, also shared by the military, because of the fact that the distance between the one who pulls the trigger and his victims may well be 10,000 km, and because people about to be killed are nothing more than images on a computer screen. With drones used as weapons for a military attack, human lives are reified in exchange for the accuracy and lesser moral, economic and political cost for the executioner.

With drones, war, the most terrible of political options that a government may employ, becomes trivial, part of a computer game in which victims are nothing but faint images on a screen that do not generate any empathy. War is an aberration of humanity, and making it look like a videogame is completely repugnant. It is unacceptable that anyone is enriched or gets political benefits for illegal use of armed drones. The temptation is so great that the only option to curb such nonsense is to prohibit the development of these weapons, now that it is still not too late.

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ANNEX

Chart 1. Companies and drones

Producer	Country	Name of drone	Characteristics Class	Structure	Width (from wing to wing)	Lenght	Maximum takeoff weight	Useful cargo	Cruising speed	Maximum flight duration
AAI Corporation	US	RQ-7B Shadow 200	Tactical	High-winged monoplane with booms, double tail and single thrust propeller	4.25m	3.41m	170kg	27kg	90km/h	5 to 7 hours
AAI Corporation	US	Aerosonde 4	LALE	High-winged monoplane with booms, double tail and single thrust propeller	2.9m	2.1m	14kg	5.3kg	50km/h	30 hours
Advanced Technologies and Engineering (ATE)	South Africa	Vulture	Tactical	High-winged monoplane with a single thrust propeller	5.2m	3.1m	100kg	25kg	60km/h	3 a 4 hours
Aeronautics DefenseSystems	Israel	Aerostar	Medium tactical	Flying wing with thrust propeller	7.5m	4.5m	210kg	50kg		14 hours
Aeronautics DefenseSystems	Israel	Orbiter	Short range	Flying wing with thrust propeller	2.2m	1m	6.5kg	1.5kg		1.5 hours
Aerovironment	US	Dragon Eye	Short range	High-winged monoplane matching tractor propellers	1.15m	0.9m	2.7m	225kg	19km/h	45 to 60 minutes
Aerovironment	US	Global Observer GO-1	HALE	High-winged monoplane with eight tractor propellers	48'7m		1805kg	159kg	115km/h	170 hours
Aerovironment	US	Global Observer GO-2	HALE	High-winged monoplane with eight tractor propellers	79'2m		4127kg	454kg	115km/h	192 hours
Aerovironment	US	Mercury	Short range						19km/h	20 seconds
Aerovironment	US	FQM-151A Pointer	Short range		2.7m	1.8m	3.6kg	0.9kg		1.5 hours
Aerovironment	US	Aqua Puma	Short range	High-winged monoplane with a single thrust propeller	2.6m	1.8m	5.5kg			2.5 hours
Aerovironment	US	Puma	Short range		2.6m	1.8m	4.6kg		30km/h	4 hours
Aerovironment	US	RQ-11A Raven	Short range	High-winged monoplane with a single thrust propeller	1.36m	0.91m	2.27kg	0.18kg	25km/h	60-90 minutes (rechargeable batery), of 80 110 minutes (single use bateries)






Producer	Country	Name of drone	Characteristics Class	Structure	Width (from wing to wing)	Lenght	Maximum takeoff weight	Useful cargo	Cruising speed	Maximum flight duration
Aerovironment	US	RQ-11B Raven	Short range	High-winged monoplane with a single thrust propeller	1.4m	0.9m	1.90kg	0.18kg		60 a 90 minutes
Aerovironment	US	Swift	Short range	High-winged monoplane with a single thrust propeller	1.1m	0.9m	2.8kg			60 a 75 minutes
Aerovironment	US	Wasp III		Flies with a single vertical wing and tractor propeller	0.72m	0.38m	0.43kg			45 minutes
Aerovision	Spain	Fulmar	Tactical	With two wings and thrust propeller	3.10m	1.23m	19kg	1kg	54km/h	8 hours
Alenia Aeronautica	Italy	Molynx	MALE	Monoplane with thrust propeller propulsora	25m	12m	3.000kg	600kg	220km/h	30 hours
Alenia Aeronautica	Italy	Neuron	UCAV	Low-power jet	12.5m	9.3m	6500kg		470km/h	Presumably several hours
Alenia Aeronautica	Italy	Sky-X	UCAV	Combat aircraft with single reactive engine	5.8m	7.8m	1450kg	200kg	260km/h	2 hours
Alenia Aeronautica	Italy	Sky-Y	MALE	Monoplane with individual posterior vessels and a thrust propellerosteriores individuales y única thrust propeller	9.9m	9.7m	1200kg	150kg	140km/h	14 hours
American DynamicsFlight Systems	US	BattleHog100x	Tactical	Lifting body with recessed range and increased rear wing	5.18m	3.80m	1455kg	340kg	180km/h	More than 8 hours
Aurora Flight Sciences	US	Excalibur	Tactical	Lifting body with increased wing and propellers	6.40m	7.01m	1180kg	182kg		3 hours
Aurora Flight Sciences	US	GoldenEye 80	Short range	Ducted fan with increased wing	2.92m		81kg	7.2kg	120km/h	8 hours
Aurora Flight Sciences	US	Orion					455kg			5 days
Aurora Flight Sciences	US	Orion HALL	HALL	High-winged monoplane with a single thrust propeller	33.75m	11.91m	2359kg	200kg		100 hours
Aurora Flight Sciences	US	SunLight Eagle			34.7m					
BAE Systems	Great Britain	Coyote	Short range	Folding wing with propeller	1.75m	0.90m	5.50kg		50km/h	1.5 hours
BAE Systems	Great Britain	Demon			2.5m				150km/h	
BAE Systems	Great Britain	Herti XPA-1B	Tactical	Monoplane with a thrust propeller	12.60m	5.10m	500kg	150kg	90km/h	25 hours

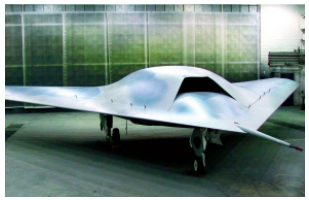





Producer	Country	Name of drone	Characteristics Class	Structure	Width (from wing to wing)	Lenght	Maximum takeoff weight	Useful cargo	Cruising speed	Maximum flight duration
BAE Systems	Great Britain	Mantis			22m		1000kg			Less than 24 hours
BAE Systems	Great Britain	Phoenix	Tactical	With a double tail and a single thrust propeller	5.50m	3.80m	175kg	50kg	85km/h	4 hours
BAE Systems	Great Britain	Taranis	UCAV	With observable wing powered by Turbofan	11m	11m	6000kg			8 hours
Baykar Machine	Turkey	Bayraktar	Short range	High-winged monoplane with individual posterior vesells and double tractor propellers	1.60m	1.20m	5kg	1.5kg		1 hour
Bell Helicopter	US	TR918 Eagle Eye	Tactical	Inclined rotation	7.37m	5.7m	1000kg	90kg	200km/h	>6 hours
Blue Bird Aero Systems	Israel	MicroB		Flying wing with thrust propeller	0.95m		1.1kg	0.2kg	46km/h	1 hours
Boeing	US	MD 530F Unmanned Little Bird	Tactical	Helicopter	8.30m	9.80m	1406kg	684kg	130km/h	8-10 hours
Boeing	US	HALE					910kg			7-10 days
Boeing	US	A160 Hummingbird	MALE	Helicopter	11m	10.60m	2268kg	450kg	140km/h	24 hours
Boeing	US	Phantom Ray								
Boeing	US	Integrator	LALE	Double thrust propeller	4.80m	1.98m	59kg	11kg	90km/h	24 hours
Boeing	US	X-45N	UCAV	Low-power with observable flying wing	21m		16300kg	2720kg		
Cassidian	Great Britain	Advanced UAV - Penetration	Tactical	Combat wing with fuselage and two reactive engines	9.05m	10.30m	9kg			
Cassidian	Great Britain	Advanced UAV - Strategic	MALE	Combat wing with fuselage and two reactive engines	25.25m	0.30m				30 hours
Cassidian	Great Britain	Barracuda			7m	8.25m	3250kg	300kg		
Cassidian	Great Britain	Eagle 1	MALE	Low-wing monoplane with a tail with a double propeller and a propellant	16.60m	9.30m	1250kg	250kg	112km/h	24 hours
Cassidian	Great Britain	Euro Hawk	HALE	Low-wing monoplane	39.90m	9.50m	14628kg	1360kg		30 hours








Producer	Country	Name of drone	Characteristics Class	Structure	Width (from wing to wing)	Lenght	Maximum takeoff weight	Useful cargo	Cruising speed	Maximum flight duration
Cassidian	Great Britain	Neuron	UCAV	Low-power jet	12.50m	9.30m	6500kg		470km/h	Presumably several hours
Cassidian	Great Britain	Orka-1200	Tactical	Helicopter	7.20m	6.22m	680kg	150kg		8 hours
Cassidian	Great Britain	Scorpio 30	Short range	Helicopter	2.20m	2m	38kg	15kg	27km/h	2 hours
Cassidian	Great Britain	Sharc	Tactical	Helicopter	0.70m	2.65m	190kg	60kg	54km/h	4 hours
Cassidian	Great Britain	Tracker	Short range	Double fuselage with matching thrust propellers	1.60m	1.40m	7.50kg	1.80kg	32km/h	>2 hours
Cyberflight	Great Britain	S.O.D. IV		Thrust propeller	0.96m	0.85m	0.50kg	0.25kg	15km/h	1 hour
Dassault Aviation	France	Neuron	UCAV	Low-power jet	12.50m	9.30m	6500kg		470km/h	Presumably several hours
Denel Aerospace Systems	South Africa	Bataleur	MALE	Monoplane with individual posterior vessels and single thrust propeller	15m	8m	1000kg	200kg	135km/h	18-24 hours
DRS Technologies	US	RQ-15 Neptune	Short range	With two tails and thrust propeller	2.13m	1.83m	59kg	9kg	65km/h	13 hours
EMT	Germany	Aladin	Short range	High-winged monoplane with a single thrust propeller	1.46m	1.50m	3kg		25km/h	<1 hour
EMT	Germany	Luna	Tactical	High-winged monoplane with a single thrust propeller	4.17m	2.36m	40kg		37km/h	4 hours
Flight Solutions	Brazil	FS-01 Watchdog	Tactical	High-winged monoplane con doble tail and a thrust propeller	4.07m	2.80m	65kg	30kg	130km/h	
Flying Robots	France	FR 101.v3	Tactical	Glider and fuselage with a single thrust propeller	14.40m	3.20m	600kg	250kg	27km/h	12 hours
General Atomics Aeronautical Systems	US	I-Gnat ER	Tactical	Low-wing monoplane with a thrust propeller	17m	8m	1043kg	204kg	120km/h	40 hours
General Atomics Aeronautical Systems	US	MQ-1 Predator	MALE	Low-wing monoplane with triple posterior wings and a thrust propeller	14.84m	8.20m	1043kg	205kg	70km/h	24 hours
General Atomics Aeronautical Systems	US	MQ-9 Reaper	MALE	Low-wing monoplane with V tail wings and thrust propeller	20.11m	11m	4536kg	1728kg	220km/h	30 hours






Producer	Country	Name of drone	Characteristics Class	Structure	Width (from wing to wing)	Lenght	Maximum takeoff weight	Useful cargo	Cruising speed	Maximum flight duration
General Atomics Aeronautical Systems	US	Sky Warrior	MALE	Low-wing monoplane, triple posterior wings and with a single thrust propeller	17m	8m	1451kg			30 hours
General Atomics Aeronautical Systems	US	MQ-1C Sky Warrior	MALE	Low-wing monoplane, triple posterior wings and with a single thrust propeller	17m	8m	1451kg			30 hours
Gulfstream Aerospace	US	RQ-37	HALE	Low-wing monoplane with reactive engines	28.50m	29.40m	41277kg	2812kg	560km/h	15.5 hours
Hydra Technologies	Mexico	S4 Ehecatl	Tactical	Monoplane with two tractors in line and thrust propellers	3.70m		55kg	9kg	38km/h	8 hours
Innocon	Israel	Micro Falcon	Mini		2m	1m	6kg	1kg	35km/h	1 hours
Innocon	Israel	Mini Falcon I	Tactical		4.50m	3.50m	75kg	20kg	60km/h	5 hours
Innocon	Israel	Mini Falcon II	Tactical		5.50m	4.20m	150kg	35kg		
Insitu	US	Insight/ScanEagle	LALE	Monoplane with pointed wings and propeller	3.10m	1.20m	20kg	1kg	48km/h	20 hours
Insitu	US	Integrator	LALE	Monoplane with thrust propeller	4.80m	1.98m	59kg	11kg	90km/h	24 hours
Israel Aerospace Industries (IAI)	Israel	Eagle 1	MALE	Monoplane with individual posterior vessels and a thrust propeller	16.60m	9.30m	1250kg	250kg	112km/h	24 hours
Israel Aerospace Industries (IAI)	Israel	Heron TP (Eitan)	MALE	Monoplane with individual posterior vessels and a thrust propeller	26m	14m	4650kg	1000kg		36 hours
Israel Aerospace Industries (IAI)	Israel	Heron/Machatz 1	MALE	Monoplane with individual posterior vessels and a thrust propeller	16.60m	8.50m	1150kg	250kg		45 hores
Israel Aerospace Industries (IAI)	Israel	I-View MK250	Tactical	Small monoplane with a V wing	7.10m	4.10m	250kg	60kg	250km/h	8 hours
Israel Aerospace Industries (IAI)	Israel	I-View MK50	Tactical	Small monoplane with a V wing	4m	2.70m	65kg	10kg		6 hours
Israel Aerospace Industries (IAI)	Israel	Malat Heron I	MALE	Small monoplane with individual posterior vessels and a thrust propeller	16.60m	8.50m	250kg		80km/h	52 hours
Israel Aerospace Industries (IAI)	Israel	Searcher II	Tactical	High-winged monoplane with booms, double tail and thrust propeller	8.55m	5.85m	426kg	100kg		15 hours
Kaman Aerospace Corporation	US	Burro/Burro+	Tactical	Helicopter	14.70m	15.83m	5443kg	2722kg	80km/h	3 hours

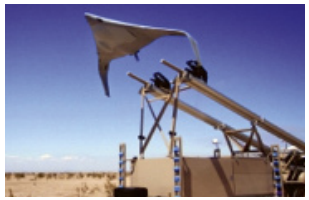





Producer	Country	Name of drone	Characteristics Class	Structure	Width (from wing to wing)	Lenght	Maximum takeoff weight	Useful cargo	Cruising speed	Maximum flight duration
Korea Aerospace Industries	South Korea	Night Intruder 300	Tactical	High-winged monoplane with booms, double tail and thrust propeller	6.40m	5.70m	270kg	45kg		9 hours
L3 BAI Aerosystems	US	XPV-1 Tern	Tactical	High-winged monoplane with matching thrust propellers	3.45m	2.71m	59kg	11kg	45km/h	4 hours
Lockheed Martin	US	Desert Hawk III	Short range	Small monoplane with V tail and a thrust propeller	1.37m	0.91m	1kg			<1.5 hours
Lockheed Martin	US	Sky Spirit	LALE	Small monoplane with individual posterior vessels and a thrust propeller	3.51m	2.54m	81.80kg	34.10kg	100km/h	20 hours
Lockheed Martin	US	RQ-170 Sentinel								
Microdrones	Germany	MD4-200	Short range	Helicopter Quad-rotor			0.90kg	0.20kg		>20min
Mission Technologies (MiTex)	US	Buster	Short range	Biplane with reactive propellent	1.26m	1.04m	4.50kg	1.40kg	35km/h	4 hours
Mist Mobility Integrated Systems Technology Inc. (MMIST)	Canada	CQ-10A SnowGoose	ULAV	Glider and fuselage with a single thrust propeller	2.08m	2.88m	90kg		34km/h	> 10 hours
Northrop Grumman Integrated Systems	US	BAT	Tactical	Flying wing with thrust propeller	3.10m		25'40kg			4-10 hours
Northrop Grumman Integrated Systems	US	Euro Hawk	HALE	Small monoplane	39.90m	14.50m	14628kg	1360kg		30 hours
Northrop Grumman Integrated Systems	US	MQ-8B Fire Scout	Tactical	Helicopter	7m	10.40m	1432kg	226kg	125km/h	5 hours
Northrop Grumman Integrated Systems	US	MQ-5B Hunter	Tactical	Monoplane with booms, doble tail and thrust propeller	10.44m	7.01m	884.50kg	226.80kg		21 hours
Northrop Grumman Integrated Systems	US	RQ-4B Block 20 Global Hawk	HALE	Monoplane	39.90m	14.50m	14628kg	1360kg	310km/h	36 hours
Northrop Grumman Integrated Systems	US	RQ-4B Block 40 Global Hawk	HALE	Monoplane	39.90m	14.50m		1360kg	300km/h	35 hours
Northrop Grumman Integrated Systems	US	RQ-4N Block 20 Global Hawk	HALE	Monoplane	39.90m	14.50m	14628kg	1360kg		36 hours





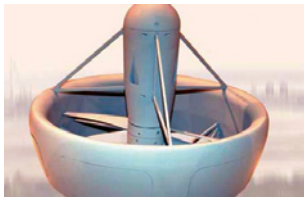
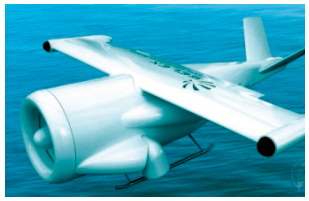



Producer	Country	Name of drone	Characteristics Class	Structure	Width (from wing to wing)	Lenght	Maximum takeoff weight	Useful cargo	Cruising speed	Maximum flight duration
Northrop Grumman Integrated Systems	US	X-47B	UCAV	Low-power jet	18m	11.50m	20909kg	2045kg	460km/h	12 hours
Patria Systems	Finland	Modular Airborne Sensor System	Short range	Monoplane with V tail and a thrust propeller	1.50m	1.05m	3kg	0.5kg	33km/h	< 75minutes
Pioneer uAv	US	RQ-2B Pioneer	Tactical	Monoplane with booms, doble tail and thrust propeller	5.15m	4.27m	204.12kg	45kg	65km/h	5 hours
Prioria	US	Maveric M150	Macro		9m	8m			26km/h	50 minutes
Proxy	US	Skywatcher	Tactical	Canard delta wing with a single thrust propeller	9.45m	6.10m	1451kg	295kg	175km/h	20 hours
Qinetiq	Great Britain	Zephyr 6	HALE	Monoplane with matching thrust propellers	18m	30kg	2kg			
Rafael	Israel	Skylite B-1	Short range	High-winged monoplane with a single thrust propeller	2.40m	1.15m	6.50kg	1.20kg		1.5 hours
Raytheon Missile Systems	US	Cobra	Tactical	Monoplane with a single thrust propeller	3.09m	2.82m	45kg	11.40kg	60km/h	3 hours
Raytheon Missile Systems	US	KillerBee	Tactical	Flying wing with thrust propeller	3m					15 hours
Raytheon Missile Systems	US	KillerBee-4	Tactical	Flying wing with thrust propeller	3.10m	1.92m	22.30kg		45km/h	15 hours
Rheinmetall Defence Electronics	Germany	KZO	Tactical	Ala delta with a single thrust propeller	3.42m	2.28m	161kg	35kg	80km/h	5 hours
Ruag Aerospace - Aviation & Space	Switzerland	Neuron	UCAV	Low-power jet with observable flying wing	12.50m	9.30m	6500kg		470km/h	Presumably several hours
Ruag Aerospace - Aviation & Space	Switzerland	Super Ranger	Tactical	Monoplane Low-wing with individual posterior vessels and a thrust propeller	9.48m	7.11m	500kg	150kg	70km/h	20 hours
Saab Aerosystems	Switzerland	FILUR	UCAV	Flying wing with thrust propeller	2.50m	2.17m	55kg		190km/h	20 minutes
Saab Aerosystems	Switzerland	Neuron	UCAV	Low-power jet with observable flying wing	12.50m	9.30m	6500kg		470km/h	Presumably several hours
Saab Aerosystems	Switzerland	V-150 Skeldar	Short range	Helicopter	4m		150kg			4-5 hours






Producer	Country	Name of drone	Characteristics Class	Structure	Width (from wing to wing)	Lenght	Maximum takeoff weight	Useful cargo	Cruising speed	Maximum flight duration
Sagem Défense Sécurité	France	Sperwer B	Medium tactical	Canard delta wing with a single thrust propeller	6.80m	3.90m	100kg		80km/h	12 hours
Schiebel	Austria	S-100 Camcopter	Short range	Helicopter	1.24m	3.10m	200kg	25kg	55km/h	6 hours
Selex Galileo	Italy	Asio	VTOL	Ring-shaped wing with elevation body	0.60m	0.40m	0.80kg			1 hour
Selex Galileo	Italy	Damselfly	Short range	Winged VTOL with elevation body and V tail	1m	1.20m				
Selex Galileo	Italy	Falco	Tactical	High-winged monoplane with booms, doble tail y thrust propeller	7.20m	5.25m	420kg	70kg	117km/h	14 hours
Selex Galileo	Italy	Strix	Short range	Flying wing with thrust propeller	3m	1.17m	1kg			1.5 hours
Singapore Technologies Aerospace (ST Aerospace)	Singapur	Skyblade II	Short range	High-wing monoplane with single propeller	1.70m	0.70m	5kg		30km/h	1-2 hours
Swift Engineering	US	KB-2 Killer Bee	Tactical	Flying wing with thrust propeller	2m	0.90m	20.40kg			5 hours
Swift Engineering	US	KB-3 Killer Bee	Tactical	Flying wing with thrust propeller	3.05m	1.35m	62kg	13.60kg		15 hours
Swift Engineering	US	KillerBee-4	Tactical	Flying wing with thrust propeller	3.10m	1.92m	22.30kg		55km/h	15 hours
Swiss uAv	Switzerland	KOAX X-240	VTOL	Helicopter	0.50m	1.65m	45kg	8kg		1.5 hours
Swiss uAv	Switzerland	NEO S-300 series	VTOL	Helicopter	0.95m	2.75m	100kg	35kg		1.5 hours
Thales	France	Watchkeeper WK450			10.50m	6.10m	450kg	150kg		30 hours
Ucon System	South Korea	Remoeye 006	Short range	High-winged monoplane with single thrust propeller	2.72m	1.55m	6.50kg		35.13km/h	1.5 hours
United States Research Laboratory	US	Spider	Short range	Helicopter with folding fuselage			18.10kg	2.30kg	40km/h	30 minutes
Urban Aeronautics	Israel	Mule			2.15m	5.90m	318kg		100km/h	4 hours
Yamaha Motor Company	Japan	RMAX G-1	Short range	Helicopter	0.72m	3.63m	94kg	30kg	40km/h	100 minutes
Zala Aero	Russia	ZALA 421-08	Short range	High-winged monoplane with a single thrust propeller	0.79m	0.40m	1.80kg	0.20kg		1 hour

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