

THE ORGANIZATION OF AL QAEDA'S DRONE COUNTERMEASURES

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There are areas in the Pakistani tribal territories and in Afghanistan that have been under round-the-clock monitoring by US MQ-1 Predator and MQ-9 Reaper combat drones for years now. The video cameras on the drones record every move made by the entire population, every detail of daily life in the area of operations. This data is saved for years and analyzed for indications of potential hideouts of Al Qaeda terrorists. The population concerned lives a second life on the screens of the CIA analysts in the United States. As soon as a suspicious movement in the area of operations is observed, the drones attack. In most cases, these are tactical attacks against individual presumed fighters or their sympathizers. Only rarely can a high-ranking leader be killed on these occasions.

On 19 October 2013, a UN inquiry report on US drone operations stated that there had been more than 376 drone attacks in Pakistan since 2004. 3,613 people were killed and 600 people severely injured in these drone attacks. There were also 407 to 926 civilians among the dead. The UN demanded the US administration surrender all documents about the US drone attacks in other countries, too, such as in Somalia, Yemen and Libya to be able to determine the number of killed civilians in these countries, as well.

The number of countries where US reconnaissance and combat drones operate continues to increase. Since 2009, the big US drone fleet has borne the brunt of fighting Al Qaeda all over the world. The US forces left Iraq in 2011, and by the end of 2014 the majority of the ISAF combat forces will be withdrawn from Afghanistan, too. Then combat drones will have to be employed against the terrorist groups even more than today.

Al Qaeda is the first global non-governmental terror organization in the history of our planet and has cells in about 70 countries with a total strength of more than 40,000 fighters. During the years between 2009 and 2014, Al Qaeda operations have been conducted in 58 nations. The CIA's combat and reconnaissance drones are turning more and more into a lethal daily threat for all Al Qaeda units all over the world.

How has Al Qaeda responded to this existential challenge?
How are Al-Qaida's drone countermeasures organized?

In 2013 only one high-ranking Al Qaeda leader was killed by US drone attacks

Date	Location	Target
22 JAN 2013	Yemen	Said al-Shihri, deputy Al-Qaida emir in the Arab Peninsula (AQAP)
29 MAY 2013	Near Miranshah in North Waziristan	Wali-Ur Rehman, Number 2 of the Pakistani Taliban (TTP), military leader of the TTP
28 OCT 2013	Training camp 50 km east of Binswor in southern Somalia	Ibrahim Ali Abdi (code name: Anta-Anta), one of the Al Shabab's leading bomb construction experts
31 OCT 2013	North Waziristan	Hakimullah Mehsud, leader of the Pakistani Taliban (TTP)

US Drone Operations against Al Qaeda in More than Twelve Nations in 2013

Country	Beginning of the Attacks/ Reconnaissance Flights
Afghanistan	February 2002
Yemen	3 November 2002

Iraq	23 December 2002
Pakistan (only FATA)	2004
Libya	Since 24 April 2011 during the course of the war in Libya against Gaddafi's regime. Official request of the US government submitted to the government of Libya in early August 2013 seeking permission to employ US combat drones against Al Qaeda terrorists on Libyan territory.
Tunisia	Being prepared for 2014
Somalia	Late June 2011
Philippines	2 February 2012
Syria	Mid-February 2012
Sahel region	Early June 2012 (only reconnaissance with an unarmed MQ-9 Reaper)
Northern Nigeria	Mid-2013 (only reconnaissance)
Indian Ocean	Since 2009 (only reconnaissance operations against pirates and Al-Shabab in Somalia)

Al Qaeda's Central Drone Countermeasures Research Group

The various versions of Predator and Reaper being employed belong to the first generation of combat drones. They are almost omnipotent in areas of operations where the US Air Force has absolute control of the airspace. This will change in Afghanistan and in Pakistan when the ISAF combat forces withdraw. In the Sahel region or in Somalia, the protection screen provided by US combat aircraft does not exist anyway.

The Predators and Reapers will then increasingly prove to have their weaknesses, too: They are capable of aerial combat only to a limited extent and can be easily shot down by helicopters and small aircraft. Drones also rarely carry air-to-air missiles. In addition, they are vulnerable to bad weather conditions. They can also be caused to crash by the gusts

caused by the rotor of a helicopter. They are not agile enough. They lack swarm intelligence. They cannot identify threats facing them. A well-organized air defense is very likely to be able to engage drones effectively.

Over the last few years Al Qaeda has established a Central Drone Countermeasures Research Cell which is attached to the operational command level. Scientists, engineers and students doing research for Al Qaeda look for weaknesses of the drones and try to develop countermeasures. Edward Snowden disclosed the NSA's knowledge about this Central Research Cell.

On 5 September 2013 the "Washington Post" reported that research was focused on interrupting the data flow between the drone and the satellite by means of jammers, causing the drone to crash. If the Central Research Cell managed to make this drone countermeasure system operational and to provide it to all regional organizations, this would become a game changer in drone warfare. However, there is no evidence available yet to suggest that Al Qaeda may have managed to shoot down a US drone by using jammers. (Fig. 1)

Additionally, the Central Research Group is also working on methods to blind the sensors of drones by means of lasers which can damage the highly sensitive sensors, thereby disabling the drone.

Another drone countermeasure method is to introduce viruses into the drones' data flow by means of hacking. In early October 2011 several US drones were non operational due to a virus disabling their control systems.

Moreover, most of the 14 Al Qaeda regional organizations have additional research cells of their own, some of which are presumably also working on drone countermeasure methods. On 22 October 2010, the Turkish police succeeded in arresting five Turkish students who were working on a computer program on behalf of Al Qaeda in the Aegean (a sub-organization of Al Qaeda in Europe) to hack the drones' data

flow and then be able to control the drone. The following example shows that this could be a promising drone countermeasure approach. In 2011 the Iranian secret service managed to hack a US RQ-170 "Sentinel" reconnaissance drone that was then brought down in a controlled manner to land on an Iranian airfield.

Drone Countermeasure Security Measures at the Strategic and Operational Levels of Command – Osama bin Laden's Seven Abbottabad Letters

On 2 May 2011, the US Navy Seals seized more than 6,000 documents in Osama bin Laden's house in Abbottabad. These were analyzed by the Combating Terrorism Center CTC at the US Military Academy West Point, where all documents that have ever been captured from Al Qaeda are collected in the "Harmony" database and made available to NATO.

The documents captured in Abbottabad also included Osama bin Laden's seven "Abbottabad Letters" concerning the organization of the security measures to be taken at the strategic and operational levels of command.

The Al Qaeda leaders were to respond to the permanent surveillance of areas by moving to cities or into densely wooded mountain areas. All Al Qaeda leaders were recommended to withdraw from the villages in North Waziristan, with the densely wooded Kunar and Nuristan provinces in Afghanistan and the Shawal Valley in North Waziristan being recommended as alternatives. Many leaders and fighters withdrew to big cities such as the 15 million metropolis of Karachi in Pakistan due to the threat posed by drones. Important Al Qaeda leaders as well as some 7,000 fighters of the Pakistani Taliban (TTP) have allegedly gone into hiding there. There are no US drone attacks at all in the big cities. Some Al Qaeda leaders are also purported to have withdrawn to Iranian territory, since no US drone attacks are conducted there, either.

Additionally, Al Qaeda leaders and fighters are said to have adopted the living habits of the population in their individual areas of operations, generally wearing the local style of clothes to avoid being detected by drones.

Communication at the strategic and operational levels of command has been changed to messenger communication. The messengers are only allowed to meet at busy bazaars under roofs or tent sheets to avoid the threat posed by drones. The training camps have been de-centralized, better concealed and moved to the peripheries of cities. Now exercise marches may only be conducted in small groups.

Since the drones with their “Hellfire” missiles attack vehicles of the Al Qaeda leaders, public transportation means should be used. Additionally, leaders and fighters are instructed to walk or to use bicycles and motorbikes.

Minor and major operations are increasingly conducted using the uniforms of the security forces and in captured vehicles. This also applies in general to all Al Qaeda combat brigades that often move hundreds of kilometers in army uniforms and vehicles and then attack targets. In Yemen, for instance, there are illegal tailor shops producing army and police uniforms for Al Qaeda.

Since drones generally only attack when the sky is clear, important operations are conducted when visibility is reduced by rain, clouds or sandstorms.

Al Qaeda tries to protect itself against drones by constructing extensive tunnel systems under villages and cities. When the Pakistani military conquered about 80 percent of Miranshah in North Waziristan on 10 July 2014, a tunnel system of about 40 km in length was discovered. The tunnel system had been built by Al Qaeda in Khorasan.

Since it is often native CIA agents who look for the targets and illuminate them with lasers to enable the drones to attack

with their missiles even when visibility is impaired by clouds and rain, Al Qaeda has established special units to hunt down the CIA agents. There are two such special units in the Pakistani FATA tribal territories that are assigned the mission to find and kill the spies within 24 hours: 1. Lashkar-e-Khorasan (Khorasan Mujahideen) and 2. Saif ul-Furqan commanded by Gul Bahadur.

On 9 October 2012 Al Qaeda in the Arab Peninsula (AQAP) tortured three Yemenites in Marib Province because they had attached GPS transmitters to the vehicles of Al Qaeda leaders on behalf of the CIA so that they could be targeted by drones. The Yemenites were decapitated, and their heads were thrown to the dogs for food. On 13 February 2012, three AQAP fighters were publicly decapitated in the Abyan and Shabwa provinces because they had spied out targets for drone attacks on behalf of the CIA. The corpses were then exhibited in public.

Al Qaeda has been trying to force an end to the US drone attacks by taking hostages. In Lahore Al Qaeda abducted the US citizen Warren Weinstein in 2011. In 2012 Ayman al Zawahiri demanded the termination of all US drone attacks in Afghanistan, in Pakistan, in Somalia and in Yemen in return for his release.

Revenge Attacks after Drone Attacks

On 4 June 2012 the then presumed No. 2 of Al Qaeda, Abu Yahya al-Libi (real name: Hasan Qaiid), was killed in a US drone attack in Suhail village near Miranshah in North Waziristan. In the night the drone fired a missile into a house in which Abu Yahya al-Libi was assumed to be. Thereupon a crowd gathered on the village square. However, the drone then discovered the Al Qaeda leader in the crowd using its face recognition sensors system and fired a second missile fifteen minutes after the first attack. Abu Yahya al-Libi and fifteen passers-by were killed.

Then, on 10 September 2012, Ayman al Zawahiri announced a revenge attack for his deputy's death. Only one day later, on 11 September 2012, about 50 Al Qaeda fighters of the Libyan-Islamic fighting Group (LIFG) raided the US consulate in Benghazi, Libya. US ambassador Christopher Stevens, three other US citizens and three Libyan guards were killed. Five US citizens were wounded.

Al Qaeda recommends its followers in the US to set fires in US forests as revenge attacks for US drone attacks. In the Al Qaeda magazine "Inspire", issue No. 9/2012, a fatwah issued by Harith Al Nadari was published which explicitly calls for fires to be set in US forests. For this purpose, detailed suggestions on how to set fires were published on several pages: Where should the incendiary material be placed? In the tree tops or on the ground? Which kind of kindling should be used? How do the direction of the wind, the time of day and the season influence the development of the fire?

The Structure of Al Qaeda Drone Units

Al Qaeda has begun to establish a drone fleet of its own. As early as 14 September 2005, Pakistani soldiers managed to capture a Chinese reconnaissance drone in a raided Al Qaeda camp in North Waziristan that can also be armed with weapons. However, Al Qaeda is more interested in procuring micro-drones that are transported concealed in a backpack and can also be launched in big cities from balconies or house roofs. These drones are able to hack computers, to tap telephones, to observe target persons and to engage them, too, with weapons that are easy to install. Drones armed with weapons of mass destruction such as anthrax, for instance, can also be expected above conurbations.

On 1 June 2013, an Al-Qaeda research cell in Iraq that produced the toxic gas sarin was neutralized in Baghdad. The sarin was intended to be sprayed over big cities in the US or in the EU by remotely controlled model aircraft.

As early as 28 September 2011 the FBI announced that a US engineer had been arrested who had loaded three commercially available remotely controlled model aircraft (two F-86 “Sabre”, one F-4 “Phantom”) with C-4 explosive and planned an attack against the cupola of the Capitol in Washington. The model aircraft were intended to be launched and guided to the target from a nearby park in the US capital. Then the engineer, who had been inspired by Al Qaeda to conduct the attack, intended to follow this up by launching an infantry assault with a Kalashnikov rifle and hand grenades.

Tactical Drone Countermeasures on the Battlefield

Al Qaeda of the Islamic Maghreb (AQIM) was preparing itself as early as in the autumn of 2012 to deal with the threat posed by US combat drone attacks to be expected. All combat units were withdrawn from the cities of Kidal, Gao and Timbuktu and deployed under camouflage in rugged mountains. Only the Islam Police remained in the cities. A drone countermeasures information leaflet comprising 22 suggestions was distributed to the Al Qaeda fighters. Recommendations included listening out for interference noises in mobile phones and other electronic devices such as radio sets since these are often caused by drones. Protection against drones was to be sought under densely leafed trees. Drones could be deceived by means of mirrors. In addition to this, French soldiers captured small transportable radar sets in Mali by means of which AQIM had established an airspace surveillance system in some areas to be able to identify and engage drones.

Al Qaeda has several thousands of “Strela” man-portable air defense systems (MANPADS) at its disposal for the purpose of air defense, most of which were captured in Libyan arsenals. Fortunately these missiles are operational only to a limited extent since the maximum storage period of the batteries has been exceeded and the sensors of the weapon occasionally fail. However, skilled operators are able to shoot down drones with the “Strela.” (Fig. 2) Shooting down drones is also possible with the mostly Russian anti-aircraft

machineguns and twin anti-aircraft guns that Al Qaeda also often uses. Predator drones often operate at an altitude of up to 5,000 meters where it is possible to shoot them down. The Reapers fly at altitudes of up to 15,000 meters, where they are safe from MANPADS and light anti-aircraft guns.

The fact that Predator drones can be shot down even by simple tribal fighters is shown by an example from Yemen that was reported in the Al Qaeda magazine "Inspire." In the spring of 2011 the tribal fighters near Lawdar in Abyan province shot down an MQ-1 "Predator" with their small arms. (Fig. 3)

In addition to this, Al Qaeda has identified one of the key deficiencies of the drones. The drone responds with a time delay of two seconds due to the long transmission path of the control signal from the base in the US to the area of operations, i.e. when the drone warrior in the US launches the Hellfire missile, the target continues to move in the meantime. This is the main reason for the deaths of many civilian passers-by as a result of US drone attacks. If they spot a drone, the Al Qaeda fighters switch off their mobile phones and jump into their cars; then they speed off zigzagging in different directions. As a result, it is almost impossible to engage them accurately with the drone.

Drone countermeasures at the tactical level also include attacks against airfields where drones are based.

Crashes and Downings of MQ-1 "Predator" Drones from 2007 to June 2013

Country	Quantity
Iraq	18
Afghanistan	45
Total	63

The reasons for the crashes were technical malfunctions, pilot errors, bad weather conditions and countermeasures

taken by insurgents. There is no data available yet about crashes of US combat drones in other areas of operations.

Al Qaeda Adjusting Increasingly Successfully to the Drone Attacks

It should be noted that Al Qaeda has been adjusting itself ever better to the existential threat posed by US drones. The number of Al Qaeda leaders killed by US drones continued to decrease in 2013. Only one high-ranking Al Qaeda leader died in Yemen from the wounds he had already suffered in a US drone attack in 2012. Consequently, in formal terms not a single senior Al Qaeda leader was killed by a drone in 2013. However, the two killed leaders of the Pakistani Taliban (TTP) must be added since the TTP closely cooperates with Al Qaeda and may also have secretly joined Al Qaeda.

The majority of the terrorists killed in US drone attacks were simple fighters or presumed Al Qaeda sympathizers.

In North Waziristan, in Afghanistan and in Yemen the US combat drones were increasingly employed in "free hunt" missions against armed insurgents due to the lack of high value targets. If this trend is confirmed in 2014/2015, the drone force will have become less important for the engagement of Al Qaeda. This could have dramatic consequences for the domestic security of numerous Islamic nations. The example of Syria shows how strong Al Qaeda units can become without the threat posed by US combat drones.

Source: Pletschacher, Peter (Ed.): *Fliegerkalender 2015. Internationales Jahrbuch der Luft- und Raumfahrt*, Hamburg/Berlin/Bonn 2014, p. 60-68.

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Fig.1: The research carried out by Al Qaeda's Drone Countermeasures Central Research Cell is focused on interrupting the data flow from the drone to the satellite by means of jammers. If the drone loses contact via satellite with the pilot in the US, it crashes.

Image: Hans Krech



Fig. 2: AQAP fighters with "Strela" man-portable air defense missile system (MANPADS), Source: Inspire, 6/2011, p. 50.

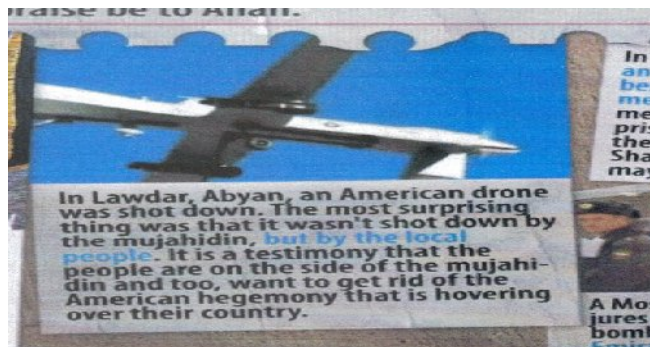


Fig. 3: Report on the downing of the MQ-1 Predator drone over Lawdar in Yemen in the spring of 2011. Source: News Flash, in: Inspire, 5/2011, p. 6.