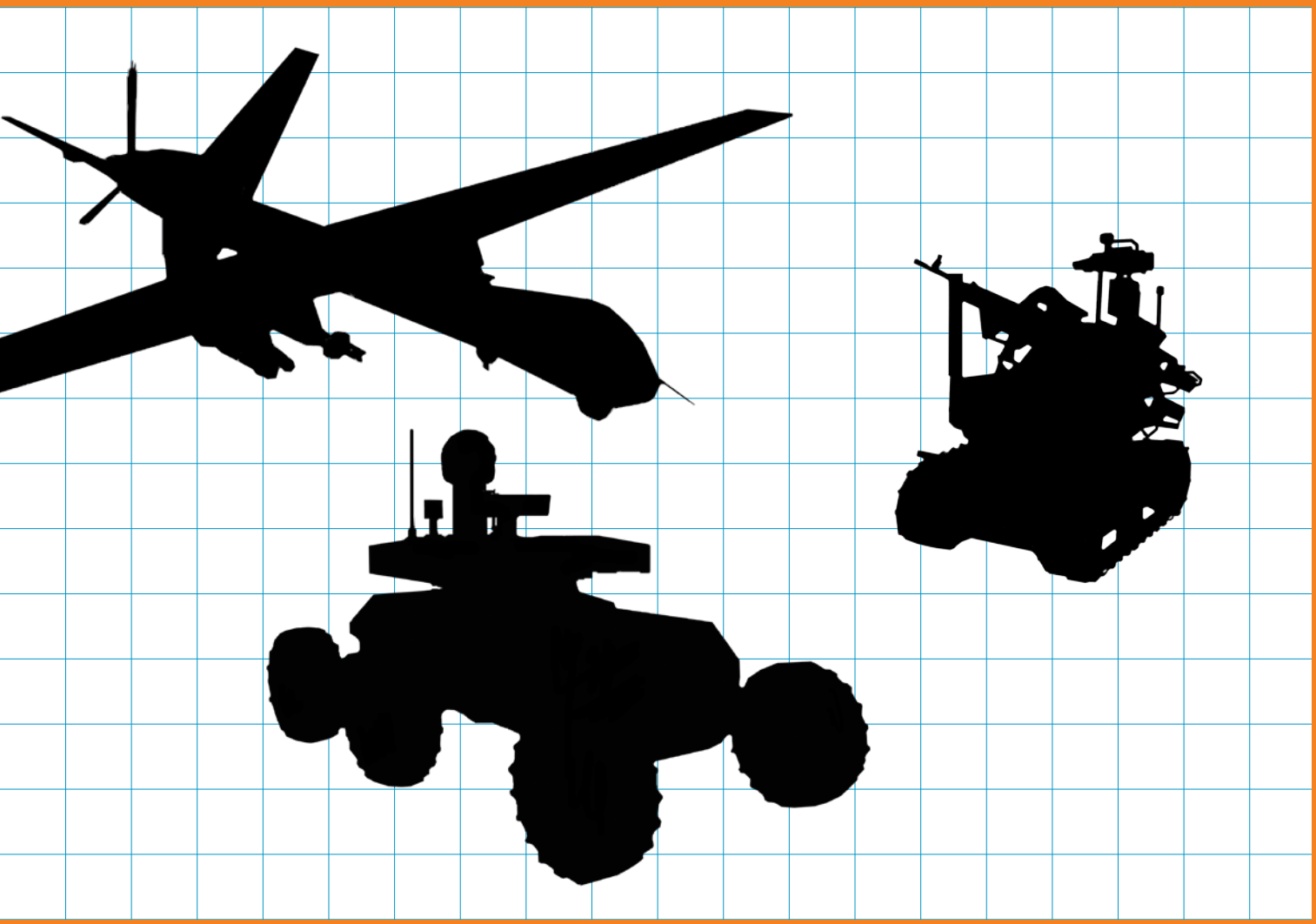
Does Unmanned Make Unacceptable?

Exploring the Debate on using Drones and Robots in Warfare



IKV PAX CHRISTI

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IKV Pax Christi works for peace, reconciliation and justice in the world. We work together with people in war zones to build a peaceful and democratic society. We enlist the aid of people in the Netherlands who, like IKV Pax Christi, want to work for political solutions to crises and armed conflicts. IKV Pax Christi combines knowledge, energy and people to attain one single objective: peace now!

If you have questions, remarks or comments on this report you can send them to info@ikvpaxchristi.nl. See also: www.ikvpaxchristi.nl.

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Table of Contents

Introduction

Human security is the guiding principle in the work and thinking of IKV Pax Christi. Protecting civilians is the main purpose of our work in the various areas of conflict in which we – and our partners – operate. Our 'Security and Disarmament' team gives impetus to this goal in areas of conflict via research, political action and lobbying. Examples of the Security and Disarmament team's work include exploring the future of the Dutch armed forces, nuclear disarmament, the criteria for exporting arms and calling into question the use of explosive weapons in populous areas. We also campaign for universal implementation of treaties prohibiting the use of anti-personnel mines and cluster munitions, as well as for research into the impact of weapons with depleted uranium. This report fits in this tradition.

Ever more armies are deploying unmanned systems – robots and unmanned planes – in their operations. In some cases – for example using robots to sweep for mines– these systems can support troops. In other cases, unmanned systems replace manned systems or take complete charge of operations that troops would normally carry out. Israel, the US, and recently the UK, have used unmanned planes to attack targets in the Palestinian territories, Afghanistan and Pakistan. Predator series drones, on their own, have racked up more than a million flight hours. Operations with drones and the civilian victims that fall to them have called into question the deployment of this type of plane and the legitimacy of such attacks. This discussion also has implications for the Netherlands: various sources hint that the Dutch Ministry of Defence is interested in acquiring armed drones.

The deployment of unmanned systems in war zones is a matter of human lives. That is why a firm ethical discussion is important. Although troops are unarguably safer when unmanned systems do the work, it is not evident that these unmanned systems are also safer for civilians in war zones. So far relatively little has been published on the implications for military strategy, and the political, ethical and legal domains in using robots to wage war. This discussion must be carried out now, because right now it is still possible to guide and focus the inevitable developments in the use of unmanned planes and robots. This report outlines the most recent developments and use of unmanned planes and robots, and then goes into the pros and cons for military strategy and the ethical and legal questions that the use of this technology raises. The authors of this report published an article in *Internationale Spectator* that presents the same arguments in condensed form. [1]

1 See: Zwijnenburg, W. and Oudes, C.J. (2011) *Onbemand maakt onbemind: consequenties van gebruik van onbemande systemen.* In: Internationale Spectator, Jg. 65, no. 3, pp. 141-145.

An American Predator MQ-1 ready for departure.
© U.S. Department of Defense

As peace organisation, IKV Pax Christi wants to take a stand in the discussions on technological developments in the domain of war and peace. These developments, of which the use of robots to wage war is one, raise new ethical, political and legal questions. IKV Pax Christi wants to give these questions a place in their own right in this discussion. It goes without saying that the impact on civilians plays a leading role in our considerations. This report focuses on whether the use of drones and robots helps to protect civilians, or whether it puts civilians in war zones in greater danger. We believe that political and public discussion of this question is necessary for a better understanding of this issue. We hope that this report will be a modest contribution to this objective.

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1 Unmanned systems: definitions and developments

The different names used for a variety of unmanned systems can cause confusion in the present discussion. The most familiar term is drones. It refers to unmanned aerial vehicles (UAVs), which are unmanned planes. The word 'drone' comes from the zooming noise (droning) that the planes make during flight. Besides UAVs, there are also unmanned ground vehicles (UGVs) used to clear roadside bombs (also known as IEDs or improvised explosive devices), for reconnaissance, surveillance or for offensive operations (in that latter case they are called 'combat vehicles', UCAVs, UGCVs, etc.) This category is subdivided into small, remote control robots and entire ground vehicles. For operations at sea there are unmanned underwater/surface vehicles (UUVs/USVs) remote controlled vessels for underwater tasks, like mine sweeping or for reconnaissance. Early experiments with unmanned systems, dating from WW I, used radio-controlled vehicles. Small robots were used to move goods through trenches. WW II sparked an increase in research on both sides. Examples are Germany's V1 and V2, remote controlled bombs. America and Britain also experimented with remote controlled systems.

Often used abbreviations for unmanned systems	
Air	UAV
Land	UGV
Sea	UUV / USV

1.1 Unmanned Aerial Vehicles

Small reconnaissance drones were used during the Vietnam War. Drones were also used for reconnaissance, intelligence gathering and sighting in the Balkan wars, but now on a larger scale. It appears that prior to the attacks on 11 September, drones had observed Osama Bin Laden several times, but because they were not yet armed, they could do no more than observe. At that time Bin Laden was already wanted for attacks on American embassies and the USS Cole. The events of September 11 were one reason for deciding to arm drones so that they could eliminate important persons, known as high value assets (HVAs), in enemy groups. One of the best known first attacks was the rocket attack in Yemen on a car containing Al-Qaeda suspects. This attack sparked an immediate discussion on the legitimacy and effectiveness of drones.[2] The drone changed from an unmanned aerial vehicle into an unmanned combat aerial vehicle (UCAV).

Duties UAV	**Types UAV**
Intelligence: eavesdropping	RQ-4 Global Hawk, RQ-1, RQ-11
Surveillance	RQ-4, GNAT 750, Sperwer, MQ-1 Predator
Reconnaissance	MQ-1B Predator, RQ-4 , RQ-170 Sentinel, GNAT 750, Sperwer. Small versions: RQ-11 Raven, ScanEagle, WASP II, EMT Aladin
Combat tasks	MQ-1B Predator, MQ-9 Reaper, MQ-5 A/B, Hunter, Elbit Hermes 450
Electronic warfare	Under development. Probably RQ-170 and RQ-9 Avenger.

Table 1: UAV tasks and types

Since then there has been a strong increase in the number of UAV attacks on targets in Iraq, Afghanistan and Pakistan. Nowadays, more UAV pilots are being trained than regular pilots.[3] MQ-1[4] drones on their own have accumulated more than 1 million flight hours and 80,000 missions since 2006. 85% of these were combat missions.[5] In the coming years these numbers will rise even more sharply, given the greater number of drones on battlefields and their popularity with army commanders.[6] UAVs can be subdivided into several categories. There are the larger UAVs that are controlled from the US. These are mainly used for intelligence gathering, reconnaissance and surveillance, but also to give close air support (CAS) for ground troops or to eliminate HVAs. A new high-tech function for these drones is electronic warfare: disrupting radar signals and attacking electronic systems with electromagnetic beam weapons. In addition to this, ground troops can take along small, portable drones that they can control and use to get aerial views, or as they put it, 'to look beyond the next hill'.

British BAE Systems Taranis prototype. © BAE Systems

Swarms or a cluster of drones programmed to work together is another interesting development. These swarms consist of an

2 BBC (2002) *CIA 'killed Al-Qaeda suspects' in Yemen*. http://news.bbc.co.uk/2/hi/2402479.stm (17-03-2011)

3 Vanden Brook, T. (2009) *More training on UAVs than bombers, fighters.* http://www.airforcetimes.com/news/2009/06/gns_airforce_uav_061609w/ (04-01-2011)

4 'MQ' and 'RQ' are designations for drones within the U.S. armed forces. 'Q' refers to an unmanned system, 'M' refers to 'multi-role' and 'R' refers to 'reconnaissance'.

5 Jennings, G. (2010) *Predator-series UAVs surpass one million flight hours.* http://www.janes.com/news/defence/jdw/jdw100409_1_n.shtml (23-02-2011)

6 Ackerman, S. (2010) *Obama: Never Mind Afghanistan, It's All About The Drones.* http://www.wired.com/dangerroom/2010/12/never-mind-afghanistan-its-all-about-the-drones/ (04-01-2011)

assigned number of drones that perform a mission in unison via coordinated ground control. The idea to use swarms of drones and robots for offensive operations or reconnaissance has stimulated research into the possibility of autonomous control.[7] We will treat autonomous robots somewhat further on.

UAV and UCAV technology is moving rapidly. Every year 4.9 billion dollars are invested in the use and development of UAVs. This seems likely to increase to 11.5 billion annually in 10 years' time.[8] Right now several manufacturers are running test projects that give a hint of what's in store for UAVs. It appears that stealth (invisibility to radar) and arming will become more important for drones. General Atomics, the designer of the MQ-1 Predator, already has a test version of the MQ-9 Reaper's successor. This MQ X Avenger has stealth abilities, is larger, can carry a greater payload (weight in sensors or arms) and can remain aloft longer. Britain's BAE Systems has ambitious plans to develop its Taranis UCAV[9], while the Northrop Grumann X47B shows that future UCAVs will very likely become miniature F117s (a manned bomber).[10] At present, Lockheed Martin's RQ-170 Sentinel is the first of this type being tested in Afghanistan.[11] There are also options for building an unmanned Joint Strike Fighter F-35. According to experts this would require a relatively simple alteration. These plans have not yet been put into practice.[12]

Furthermore, a good deal of research is being done into both small and very large UAVs. One person can carry and launch a miniature UAV that could act as ground troops' eyes and ears. Examples are the Raven and Desert Eagle, which are currently deployed in Iraq and Afghanistan. Their use will probably become an indispensable element in intelligence, surveillance and reconnaissance (ISR) tasks. Drones the size of an insect are also under development. A number of very large UAVs that can remain aloft for several days is now undergoing tests. When equipped with ultra-high-power cameras and electronic eavesdropping equipment, they can be ground troops' strategic eyes and ears. There are also plans on the drawing board to place UAV platforms in the stratosphere that can serve as launching pads for smaller drones and are able to stay in float for several years. The extent to which these revolutionary ideas will become reality remains to be seen, given the scale by which defence costs will have to be cut in the West.

7 See: Kumar, V. (2011) *Scalable Swarms of Autonomous Robots and Mobile Sensors (SWARMS) project.* www.swarms.org (07-03-2011) & DID (2009) *SWARMS Project: Swarming Drones to Sting the Enemy?* http://www.defenseindustrydaily.com/Swarming-Drones-Will-Be-Able-to-Sting-Enemy-05540/ (04-01-2011)

8 Teal Group (2010) *Teal Group Predicts Worldwide UAV Market Will Total Over $80 Billion In Its Just Released 2010 UAV Market Profile and Forecast* http://www.tealgroup.com/index.php?option=com_content&view=article&id=62:uav-study-release&catid=3&Itemid=16 (04-01-2011)

9 BAE (2010) *Taranis. Informing the future force mix.* http://www.baesystems.com/Sites/Taranis/index.htm (04-01-2011)

10 Marks, W. (2010) *X-47B Unmanned Combat Air System Taking Shape On Board Lincoln* http://www.navy.mil/search/display.asp?story_id=51239 (04-01-2011)

11 Defence Aviation (2011) *New photos of USAF RQ-170 Sentinel released.* http://www.defenceaviation.com/2011/01/new-photos-of-usaf-rq-170-sentinel-released.html (07-03-2011)

12 Flightglobal (2006) *Pilotless F35 breaks cover.* http://www.flightglobal.com/articles/2006/08/22/208525/pilotless-f-35-breaks-cover.html (17-03-2011)

1.2 Unmanned Ground Vehicles

The importance of robots for ground warfare has increased sharply in recent years. This development started during WW II, when Germans and Russians designed and deployed remote controlled tanks. Later, unmanned systems focussed on reconnaissance and defusing land mines and bombs. The wars in Iraq and Afghanistan have spurred investment in detecting and dismantling IEDs. Manufacturers are now producing armed robots that can localise the source of enemy fire and return it, robots that can comb out houses and robot patrol cars to use in surveillance.

Robots are becoming increasingly popular with ground troops. By way of illustration: in 2004, 150 robots were deployed; in 2008 this number rose to 12,000. There are various types of robots; more than 24 are in use today.[13] The main advantage of using ground robots is the ability to use them for tasks considered dull, dirty and dangerous. Locating and dismantling booby-traps and IEDs can now be done in a manner that is much safer for humans. The use of robots is more efficient for reconnaissance in residential areas, houses, and rooms. Because they can be equipped with high-tech video and audio hardware, robots are efficient instruments for surveillance at border areas and military bases. They are used in the field to increase ground troops' situational awareness or to serve as mechanical mule to carry ammunition and supplies. Specialist robots can be equipped with sensors to detect biological and chemical weapons; researchers are now studying whether robots can be designed to give first aid to the wounded.

German radio mini-tanks with explosives in World War II.

All these types of robots are remote controlled machines that can be operated manually. Right now researchers are looking into the place of autonomous robots with independent decision-making ability. We will return to this later. Most NATO member countries have UGVs for detecting bombs and clearing mines. The multi-functionality of robot's has greatly increased their deployability. The growing investment in these robots suggests that the future has even more applications and options in store. Worldwide investments in 2010 probably approached USD 410 million.[14] The US government foresees many efficient applications for UGVs as troop support and envisages deploying armed versions.[15] A somewhat dated (2008) report from the Institute for

13 Singer, P. (2009) *Robots at War, The New Battlefield*. http://www.wilsonquarterly.com/article.cfm?aid=1313 (06-01-2011)

14 Companies and Markets (2010) *The Unmanned Ground Vehicles (UGV) Market 2010-2020: Military Robots for EOD & Counter-IED.* http://www.companiesandmarkets.com/Market-Report/the-unmanned-ground-vehicles-(ugv)-market-2010-2020-military-robots-for-eod-counter-ied-329174.asp (04-01-2011)

15 USA Department of Defense (2006) *Report to Congress: Development and Utilization of Robotics and Unmanned Ground Vehicles.*

Duties UGV	Types UGV
Surveillance	CRUSHER, MDARS, GUARDIUM
Reconnaissance	Talon, VIPER, PackBot, MARCbot, Dragon Runner, AvantGuard
Combat purposes	SWORD, REDOWL, MAARS, Gladiator, ACER, VIPER RAAS
Detecting and clearing bombs	Andros, Talon, PackBot, RONS
Detecting chemical and biological weapons	PackBot, Scorpion, CUGR, GUARDION
Medical assistance	Bloodhound, REX-REV
Logistics	CRUSHER, MULE, Scorpion

Table 2: UGV tasks and types

Defense Analysis shows that there is growing interest in investing in military applications for robot technology. Canada, France, Germany and Israel, like the US, are large investors; China, too, has expanded its research budgets by more than 200%.[16] Future UGV applications seem to revolve mainly around disarming IEDs and landmines and around ISR. Despite the fact that armed robots already exist, they have not yet been deployed (or at least there is no evidence that they have). However, the US Defense Department would like to be able to deploy armed robots. Given the speed of current developments, that will probably not take long.

1.3 Unmanned Underwater Vehicles and Unmanned Surface Vehicles

The role of unmanned vessels under and at sea is growing. The first remote controlled vessels were mainly mine sweepers. They were small subs with special sonar devices to detect mines; later versions could use various techniques to detonate them. These remotely operated vehicles (ROVs) have become essential to underwater operations. The growing interest in remote control led to the development and deployment of unmanned surface vehicles (USVs). One example was the use of the Spartan Scout in 2003, during the Iraq war. This USV had a loudspeaker; it could stop suspect boots and, via a translator, could question their crews.[17] Besides patrolling, UUVs and USVs were also frequently used to track and destroy or sometimes to lay mines, to guard larger ships and ports and to collect intelligence by intercepting enemy communications from the coast or an enemy fleet. The potential for using these vessels for offensive operations is also being explored. In addition to this, they can perform logistic functions and can aid electronic warfare by disrupting enemy radar.

However, underwater operations are constrained simply because they take place under water. Most UUVs are controlled via small cables

16 IDA (2008) *International Assessment of Unmanned Ground Vehicles.* http://www.jointrobotics.com/documents/studies/International%20Assessment%20of%20Unmanned%20Ground%20Vehicles.pdf (04-01-2011)

17 Singer, P. (2009) *Wired for War*. New York, 2005

because water is not a good conductor for radio or laser signals. That is why the idea of autonomous UUVs is so attractive. These vessels are however also limited by the complex circumstances in which they must operate under water. Think of water pressure, current and the need to adjust to height differences in the seabed. Complex sensors and guidance systems are needed to anticipate this accurately. What is more, salt water affects the vessels. This has consequences for operational time and maintenance costs.

The armed USV 'Protector', in use with the navies of Singapore and Israel. © Rafael Advanced Defense Systems

Future developments of UUVs/USVs seem to be mostly aimed at ISR tasks and less toward offensive tasks, given their limited striking power. In December 2010, it was announced that the Netherlands would take part in a European project aimed at developing an unmanned maritime system (UMS). The tasks of this planned system will lie mainly in mine clearance, but this is dependent on the customer's preferences. Development could also turn toward other tasks, like ISR or offensive tasks.[18]

Tasks UUV en USV	Types UUV and USV
Intelligence	Seastar, Silver Marlin, Fleet Class
Surveillance	Piraya, Piranha, Protector
Reconnaissance	Rafael Protector, Spartan Scout
Offence	Piranha, Spartan, Fleetclass
Detecting and clearing mines	AN-SQL-48 Mine Neutralisation, REEMUS 600
Anti-sub operations	Piraya, Silver Marlin, Fleet Class
Special forces support	Seastar, Sentinel
Electronic warfare	Rafael Protector, Seastar, Harbor Class

Table 3: UUV and USV tasks and types

18 EDA (2010) *Factsheet: European Unmanned Maritime Systems (UMS).* http://www.eda.europa.eu/WebUtils/downloadfile.aspx?FileID=1254 (04-01-2011)

1.4 Autonomous versus remote controlled

The rapid development in computer technology and artificial intelligence has created greater opportunities to have computers control some of the robots' tasks. This is happening on a large scale and works like the autopilot in a passenger plane. There are various reasons for wanting greater autonomy for unmanned systems. One is money. Robots with increased autonomy require fewer people to control them. Operators are only needed for monitoring. Technical reasons are that robots can respond more quickly than people can and can process larger amounts of data simultaneously. Autonomous robots also reduce or eliminate the risk of having a mission thwarted when signals between operator and robot suffer disruption. This is particularly true of underwater robots that are more difficult to control because of the difficulty of underwater signalling. Drones and robots will also have to respond to danger in the field. For the time being, unmanned systems can use lasers to designate a target, but it is still a human being that decides whether to fire or not. Because a robot's response time is faster than a human's, it seems logical to have the robot do this. There are already robots that can localise, recognise, follow and knock out the source of enemy fire in milliseconds.[19]

Greater autonomy does not automatically mean that robots would be completely autonomous. For now, autonomy seems restricted to standard procedures. Research on robots that can choose and attack targets is however gaining momentum as defence forces are more interested in this application. The USAF assumes that autonomous armed planes will be operational by 2047.[20] Some experts believe that these will not be self-directed robots but will entail some form of cooperation between robots and people.[21] A human (a 'man in the loop') will probably always be needed as the last link that completes a process and so keeps control over the robot's actions, especially its hostile actions.

Although complete autonomy is still far away, the number of autonomous tasks that can now be performed does raise questions. How can a nearly completely automated system distinguish between friend and foe, combatant and civilian? People seem to be fading from sight. We will treat the questions about the psychological and ethical consequences of this in chapters 3 and 4.

19 Hambling, D. (2009) *Army Tests Flying Robo-Sniper.* http://www.wired.com/dangerroom/2009/04/army-tests-new/ (23-02-2011)

20 USAF (2009) *Unmanned Aircraft Systems Flight Plan 2009-2047*. Washington. pp. 16 51 50 -51. Via: http://www.aviationweek.com/media/pdf/UnmannedHorizons/17312080-United-States-Air-Force-Unmanned-Aircraft-Systems-Flight-Plan-20092047-Unclassified.pdf (04-01-2011)

21 Singer, P. (2009) *Wired for War*. New York, 2005 pp. 132.

2 Unmanned systems: deployment and use

2.1 International use of unmanned systems

The best-known users of drones are the US and Israeli governments. The US Central Intelligence Agency (CIA – a civilian service) and various units of the US and Israeli armies use drones. Table 4 summarises the use of drones during various conflicts. The first experiments on equipping drones with laser designators to identify targets were conducted in the Kosovo war. In 2001, a drone successfully fired a Hellfire rocket; this marked the era of the armed drone.[22] Peter W. Singer explains how political support for unmanned systems led to a strong increase in their deployment.[23] The US Senate was convinced that the public opinion was less and less willing to accept military casualties. Given that, more unmanned systems were needed to ensure a credible military component to foreign policy. In the 2001 *National Defense Authorization Act*, the Senate gave the army the following goal: "It shall be a goal of the Armed Forces to achieve the fielding of unmanned, remotely controlled technology such that— (1) by 2010, one-third of the aircraft in the

A British MQ-9 Reaper, an armed UAV.
© UK MOD Crown Copyright

22 Global Security (2011) *Intelligence. MQ-1B Armed Predator.* http://www.globalsecurity.org/intell/systems/armed-predator.htm (23-02-2011)

23 Singer, P. (2009) *Wired for War*. New York, 2005 pp. 60.

operational deep strike force aircraft fleet are unmanned; and (2) by 2015, one-third of the operational ground combat vehicles are unmanned."[24]

Armed drones were used for offensive operations in Afghanistan in 2001. Since then, they have also been used in Iraq, Yemen, the Gaza Strip and Libya. Insofar as we know, only the US, UK and Israel use armed UAVs.[25] The US also uses the Predator for border control.[26] The UN reporter for extrajudicial killings notes that 40 countries now have drones. Russia, Turkey, China, India, Iran and France have or are developing armed drones, but there are no reports on these countries' using them. The United Arab Emirates (UAE) have expressed their willingness to purchase armed drones from the US.[27] The trade in drones falls under the Missile Technology Control Regime (MTCR) in which member states have promised one another to be very hesitant to distribute technology for unmanned weapons systems. It is unclear whether the MTCR is adequate to regulate trade in drones and UAV technology. Israel is not a member of the MTCR.[28]

In 2005, non-state organisation Hezbollah claimed to have launched a UAV from Lebanon to reconnoitre Israeli territory. The Israeli defence ministry confirmed this and claimed that it was an Iranian UAV. This is the only known case of UAV use by a non-state organisation.[29]

Armed drones are generally used for three types of tasks. First is for what the military calls close air support. This is giving support to troops on the ground by firing from the air. The second task is to eliminate specific targets.[30] The third task is continuous surveillance of a specific area to allow suspected objects to be attacked immediately.

Robots are another category of unmanned system. By robots we understand all remote control ground systems. As with UAVs, this category can be subdivided into unarmed UGVs and armed systems. Unarmed systems are used for defusing explosives. The US currently has 6000 systems deployed in Iraq. The British army uses Talisman UGVs AND UAVs to eliminate IEDs.[31]

24 USA DoD (2000) *National Defense Authorization, Fiscal year 2001.* http://www.dod.gov/dodgc/olc/docs/2001NDAA.pdf, p. 38

25 UK MoD (2008) *RAF Reaper fires weapons for first time.* http://webarchive.nationalarchives.gov.uk/+/http://www.mod.uk/DefenceInternet/DefenceNews/EquipmentAndLogistics/RafReaperFiresWeaponsForFirstTime.htm (28-02-2011)

26 Singer, P. (2009) *Wired for War*. New York, 2005 pp. 40.

27 Rawnsley, A. (2010) *Wikileaks reveals everybody's Christmas list: the world wants drones.* http://www.wired.com/dangerroom/2010/11/wikileaks-reveals-everybodys-christmas-list-the-world-wants-drones/

28 MTCR (1987) *MTCR Guidelines and the Equipment, Software and Technology Annex.* http://www.mtcr.info/english/guidelines.html (07-02-2011)

29 BBC (2004) *Hezbollah drone flies over Israel*. http://news.bbc.co.uk/2/hi/3990773.stm (04-01-2011)

30 *FOR (2010)* Convenient Killing: *Armed Drones and the PlayStation Mentality.* pp. 6.

31 UK MoD (2010) '*Flying robot' pilot helps find IEDs in Helmand.* http://www.mod.uk/DefenceInternet/DefenceNews/EquipmentAndLogistics/flyingRobotPilotHelpsFindIedsInHelmand.htm (04-01-2011)

Deployment area	Deploying country	Armed or intelligence?
Lebanon (1982)	Israel	Both [i, ii]
Bosnia and Herzegovina, 1993-1996	France (Crecerelle), UN (Fox AT), US (Gnat 750, Pioneer, Predator)	Intelligence
Kosovo (1998-1999)	Germany (CL-289), France (CL-289, Hunter), UK (Phoenix), US (Hunter, Pioneer, Predator)	Intelligence
Australia (2001)	US (Predator)	Probably for testing
Afghanistan/Pakistan (2001-present)	Australia (ScanEagle), Germany (Aladin, LUNA), France (SIDM, Skorpio), UK (DesertHawk, Herti, Predator B), Canada (Sperwer, SkyLark, C 170 Heron), Netherlands (Sperwer, Aladin), US (Dragon Eye, Global Hawk, Pointer, Predator, Reaper Shadow 200), UAE (S-100)	Intelligence: Netherlands, Australia, US, France, Canada, UAE, Italy Offensive: US, UK
Yemen (2002)	US (Predator)	Intelligence/Offence
East Timor (2002)	Australia (Aerosonde III)	Intelligence
Iraq (2003 to present)	Australia (ScanEagle, SkyLark), UK (Desert Hawk, Hermes 450, Phoenix), Italy (Predator), Japan (RMax), Romania (Shadow 600), US (Desert Hawk, Dragon Eye, Global Hawk, I.Gnat, Hunter, Pioneer, Predator, Reaper, Puma, Raven, ScanEagle, Shadow 200, SilverFox, SnowGoose, Tern, Wasp)	Intelligence: UK, Italy, Japan, Romania, US Offensive: US
South Korea (2003)	US (Shadow 200)	Intelligence
Solomon Islands (2003)	Australia (Aerosonde III, Avatar)	Intelligence
Angola (2003 to present)	Israel (Aerostar)	Intelligence
Ivory Coast (2004)	Israel (Aerostar)	Intelligence (This is moot. There are no completely reliable sources that confirm this)
Kosovo (2005)	Belgium (Hunter)	Intelligence
Congo (2006)	Belgium (Hunter)	Intelligence
Lebanon (2005)	Hezbollah (Iranian drone) and Israel	Intelligence: Hezbollah Offensive[iii]
Lebanon (2006)	Belgium (Hunter), France (Sperwer)	Intelligence
Ivory Coast (2006)	France (Skorpio)[iv]	Intelligence
Gaza Strip (2009)	Israel	Intelligence/Offence[v]
Seychelles (2009)	US	Intelligence[vi]
Libya	US (Global Hawk, Predator)	Intelligence/Offence[vii]

Table 4: Deployment of drones (UAVs)

i Economist (2007) *Unmanned and Dangerous.* http://www.economist.com/node/10202603 (10-01-2011)

ii The Israel Defense Forces used a high number of drones in 1982, to disturb the radar- and anti-air systems of of the Lebanese Army. Right after, manned armed aircraft conducted bombardments.

iii La Franchi, P. (2006) *Israel fields armed UAVS in Lebanon*. http://www.flightglobal.com/articles/2006/08/08/208315/israel-fields-armed-uavs-in-lebanon.html (10-01-2011)

iv First two columns are based on: Eick, V. (2009) *The Droning of the Drones*. http://www.statewatch.org/analyses/no-106-the-droning-of-drones.pdf (04-01-2011)

v HRW (2009) *Precisely wrong, Gaza Civilians Killed by Israeli Drone-Launched Missiles*. http://www.hrw.org/en/reports/2009/06/30/precisely-wrong-0 (04-01-2011)

vi AFRICOM (2009) *Seychelles President James Michel Hails Strengthening of Surveillance Cooperation with the United States*. http://www.africom.mil/getArticle.asp?art=3311&lang=0 (04-01-2011)

vii Defensetech (2011) *Global Hawk Drone and E-8 JSTARS may be helping the Libya Fight*. http://defensetech.org/2011/03/22/e-8-jstars-and-global-hawk-drone-may-be-helping-the-libya-fight/ (11-04-2011)

Drones and the US, some figures	2006	2010
Budget	USD 1.7 billion	USD 4.2 billion
Number of drones	3000	6500
Drone strikes in Pakistan	9 (from 2004-2007)	53

Source: FOR (2010) *Convenient Killing: Armed drones and the playstation mentality.* pp. 7.
Table 5: Drones and the US, some figures

Drones (Packbots) were also used after September 11 to search for victims under the rubble of the collapsed Twin Towers.[32]

The Israeli army uses armed, remote controlled vehicles to guard border crossings and other objects.[33] The Israeli manufacturer of the Avantguard UGCV also produces semi-autonomous vehicles that travel pre-programmed routes. The Avantguard UGCV is remote controlled, not autonomous.[34] The US is also developing armed robots.[35] An example is the TALON, a basic platform on which other systems, like the SWORDS, can be built. While the basic platform was used to help clear explosives (e.g. in Bosnia and Herzegovina in 2000), the SWORDS, is an armed tele-operated robot that was available for use in Iraq as of 2007. However, the US army never used it. It ultimately withdrew the robots.[36] P.W. Singer tells how soldiers in Iraq used a remote controlled robot to eliminate rebels.[37] The robot was not armed with anything more dangerous than cameras. However, the soldiers attached a mine to the device, rode it to a spot where rebels had been seen and then detonated the mine.

The use of robots on or under water also has a military and civilian component. Companies use UUVs for soil surveys for resource development or research. Military use of UUVs is mainly oriented toward clearing sea mines. USVs have mainly military applications. Israeli and Singaporean sailors have armed, remote controlled boats. Israel uses these primarily for patrol duties along its own coast. In 2005, Singapore used such boats before the coast of Iraq during a peacekeeping operation there.[38]

32 Singer, P. (2009) *Wired for War*. New York, 2005 pp. 40.

33 Skinner, T. and White, A. (2010) *Eurosatory 2010: G-Nius unveils AvantGuard UGCV.* Via: http://www.shephard.co.uk/news/uvonline/eurosatory-2010-g-nius-unveils-avantguard-ugcv/6540/ (14-06-2011)

34 GNIUS (2008) *Avantguard UGCV.* http://g-nius.co.il/unmanned-ground-systems/avantguard.html (04-01-2011)

35 Lockheed Martin (2011) *Multifunction Utility/Logistics and Equipment Vehicle (MULE).* http://www.lockheedmartin.com/products/mule/index.html (04-01-2011)

36 Global Security (2011) *Intelligence. TALON Small Mobile Robot.* http://www.globalsecurity.org/military/systems/ground/talon.htm (04-01-2011) & Popular Mechanics (2009) *The Inside Story of the SWORDS Armed Robot "Pullout" in Iraq: Update*. http://www.popularmechanics.com/technology/gadgets/4258963 (04-01-2011)

37 Singer, P. (2009) *Wired for War*. New York, 2005 pp. 32.

38 Singapore MoD (2010) *Unmanned Surface Vehicles.* http://www.mindef.gov.sg/imindef/mindef_websites/atozlistings/navy/assets/unmannedsurfacevehicles.html (04-01-2011)

2.2 Dutch use of unmanned systems at home and abroad

The Ministry of Defence was asked to comment on the information in this section (2.2), but declined to do so. The US embassy in Den Haag was also asked for clarification. It stated that it did not comment on Wikileaks cables.

The Dutch army has several drones that it uses to gather intelligence. Right now, the Netherlands has no armed drones capable of offensive action. The Dutch army uses two types of drones, the Sperwer and the Raven. The Sperwer (Dutch for sparrow hawk) is a tactical resource for aerial intelligence gathering.[39] The Netherlands also has the Aladin system, with lower capacity than the Raven. The use of this system was terminated in 2007.[40]

Up to 2007, the Netherlands invested in acquiring a MALE (medium altitude long endurance) UAV system that could remain airborne longer, designed for intelligence gathering.[41] The MALE UAV was intended to serve four purposes: observation, reconnaissance, target selection and battle damage assessment. The Dutch defence department curtailed its investment in this weapon due to budget cuts.

In Afghanistan, the Dutch armed forces used the Sperwer and Aladin. In early 2009, Dutch personnel could no longer operate the Sperwer due to the fact them having served their maximum tours of duty. After that reconnaissance tasks with UAVs were contracted out to an Israeli company that worked with British technicians.[42] The Dutch defence department also used the Raven for civil-military cooperation in the Netherlands. At the turn of the year 2009-2010, the police and fire departments used Raven UAVs to keep an eye on areas where there had been troubles earlier. A drone was also employed when evicting squatters in 2008. The Dutch police have a drone with sensors for pinpointing cannabis plantations.[43]

The Dutch army also has a robot, called the Wheelbarrow.[44] The Explosives Ordinance Disposal (EOD) Unit uses it for reconnaissance in situations where explosives could be present and it is used to dismantle explosives. The Wheelbarrow can also been equipped with remote control weapons. The EOD Unit has a remotely operated vehicle (ROV) for similar purposes at sea.[45] At the end of 2010 the European Defence Agency (EDA) announced that several European countries, among which the Netherlands, would invest 53 million EUR in unmanned maritime systems, mainly for mine sweeping, but possibly also to protect ports from submarines.[46]

39 Dutch MoD (2008) *Kamerbrief onbemande vliegtuigen.* KST 30 806, no. 4

40 See: http://www.defensie.nl/onderwerpen/materieel/vliegtuigen_en_helikopters/onbemande_vliegtuigen/aladin_uav (04-01-2011)

41 Dutch MoD (2007) *Kamerbrief Defensiebeleid op hoofdlijnen.* 2 juli 2007, kenmerk: HDAB2007018939

42 Derix, S. (2009) *Defensie gaat inlichtingenwerk Uruzgan uitbesteden.* http://www.nrc.nl/binnenland/article2129426.ece/Defensie_gaat_inlichtingenwerk_Uruzgan_uitbesteden (04-01-2011)

43 Cannachopper (2009) *Cannachopper helps Dutch Police Force in combating illegal growth of cannabis.* http://www.cannachopper.com/ (04-01-2011)

44 Dutch MoD (2011) *Explosievenrobot Wheelbarrow.* http://www.defensie.nl/onderwerpen/materieel/voertuigen/genievoertuigen/explosievenrobot_wheelbarrow (04-01-2011)

45 Dutch MoD (2011) *Materieel.* http://www.defensie.nl/landmacht/eenheden/explosieven_opruimingsdienst_defensie/materieel (04-01-2011)

46 EDA (2010) *Factsheet: European Unmanned Maritime Systems (UMS).* http://www.eda.europa.eu/WebUtils/downloadfile.aspx?FileID=1254 (04-01-2011)

The Dutch Ministry of Defence has no other investments in research on drones or robots. The Netherlands Organisation for Applied Scientific Research (TNO) has halted its study of this field due to spending cutbacks. A Dutch army's roadmap for developing UGVs came to a dead end.[47] The *Explorations,* a study of the future of the Dutch armed forces, does treat the issue of robots. Given the personnel shortage, the background documentation to the explorations takes into account the option of using robots for surveillance, transport, reconnaissance and ordinance disposal.[48] Although we do not intend to trip the ministry with its use of words, it has not excluded the deployment of armed robots: "We have to reserve use of our scarce military personnel for the places where they are really needed: not as operator and fighter, but as negotiator, manager and leader. Other tasks will be assigned to robots".[49]

In the spring of 2011, the government decided to acquire a MALE UAV system with four UAVs. The resolution was part of an budget cut package, but entailed an investment of 100 million EUR. That the Dutch government chose for this investment despite cutbacks showed that the government wants to take part in developing the tools of unmanned warfare. According to the current government, the emphasis is on devices that will be used to reinforce the intelligence position.[50] However, there is no guarantee that, once acquired, the systems would not be armed.

A Raven drone.
© U.S. Department of Defense

According to Wikileaks cables, the Dutch ministry of defence has been dealing with the purchase of Predator B (MQ-9). Lo Casteleijn, policy director at the Dutch ministry of defence, is said to have called the purchase of this drone "vital", and its delay or cancellation "a setback". The same leaked message shows that upcoming cutbacks require Dutch defence leaders to turn to 'creative' methods to reserve room in the budget to purchase drones.[51] It later appeared that the Netherlands wanted to postpone these plans due to budget restrictions, but the plans have remained scheduled.[52] A cable from 2009 shows that the Netherlands was

47 See for the roadmap: DUTCH ARMY (2009) *Robots beslissen in het gevecht, bouwen aan veiligheid?!* http://afdelingen.kiviniria.net/media-afdelingen/DOM100000140/Activiteiten2009/0414Kooysymposium/Bert_Stam_-_Robots_beslissen_het_gevecht.pdf. (28/02/2011)

48 Dutch MoD (2010) *Deelverkenning III: Aanbodzijde, houvast voor de krijgsmacht van de toekomst.* pp. 30.-32.

49 Ibid.

50 Dutch MoD (2011) *Defensie na de kredietcrisis: een kleinere krijgsmacht in een onrustige wereld.* Kenmerk BS2011011591.

51 US Embassy The Hague (2007) Netherlands: hard decisions on the defense budget. http://213.251.145.96/cable/2007/01/07THEHAGUE105.html (01-03-2011)

52 US Embassy The Hague (2007) Netherlands: Defence budget woes. http://cablesearch.org/cable/view.php?id=07THEHAGUE63&hl=UAV (01-03-2011)

A British Wheelbarrow dismantling explosives.
© UK MOD Crown Copyright

offered an opportunity to have two pilots train with drones in Nevada since the Netherlands would be purchasing MQ-1 or MQ-9 drones within 12 to 18 months. The Netherlands is said to have shown interest in these types given its experiences in Afghanistan. This probably refers to the US results with these drones.[53] The MQ-9 is
specially designed for a larger weapons payload; MQ-1 can also be armed.[54] This suggests that the Netherlands was, and probably still is, interested in these armed drones.

Several companies in the Netherlands are taking part in developing robot technology. Condor UAV is working on the Birdseye UAV for civil surveillance and security services.[55] Heering Unmanned Aerial Services (UAS) is using the Easy Star for 3-D land surveys;[56] Delft Dynamics is developing an unmanned helicopter for surveillance.[57] Geocopter is working with DSM/Dyneema, Eonic, Imagem, Siemens Nederland and Ten Cate Advanced Composites to develop unmanned military helicopters.[58] Thales Netherlands is also part of the abovementioned MALE UAV programme. This company is developing sensor and radar technology for UAVs.[59]

53 US Embassy The Hague (2009) Netherlands: http://cablesearch.org/cable/view.php?id=09THEHAGUE328&hl=UAV (01-03-2011)

54 USAF (2010) *MQ-9 Reaper factsheet.* http://www.af.mil/information/factsheets/factsheet.asp?id=6405 01-03-2011)

55 Steketee, M. (2006) *Robotvliegtuigje ook voor burgerdoeleinden geschikt.* In: Technisch Weekblad (18/06/2006)

56 Technisch Weekblad (2009) *3D landmetingen met onbemand vliegtuig.* In: Technisch Weekblad (18/06/2006)

57 Jongeneel, C. (2005) *Geen brevet nodig voor miniheli.* In: Technisch Weekblad (18/06/2006)

58 NIDV (2009) *NIDV-dag over strijd tegen bermbommen.* In: Nederlandse Industrie voor Defensie en Veiligheid Magazine Nr.1 2009 (via www.nidv.eu)

59 Janes (2006) *Netherlands' aerospace companies aim fro stake in RNLAF Male UAV programme.* In: Janes's International Defence Review (26/08/2006)

3 The effect and dangers of unmanned systems on a battleground

That robots can operate more effectively than their human counterparts seems to be an important argument in the discussion on the growing number or robots on the battlefield. This section will briefly compare several arguments with a view to arriving at an overall picture. This discussion will start by looking at how drones and robots are used in warfare today. It will also briefly look into new technological developments, their battlefield applications, their consequences for the armed forces as a whole and for the individual soldiers in the field.

3.1 Pros and cons of unmanned systems

As was indicated earlier, there are various reasons for the increase in investment in military unmanned systems. These reasons can differ per type of robot. Drones are able to circle (loiter) above a battlefield for long hours to gather intelligence better than manned systems. Better intelligence can lead to more accurate situation assessments that soldiers, in their turn, can take into account and so reduce avoidable civilian casualties.[60] This would make drones an effective means for intelligence gathering and surveillance that would create better situational awareness for soldiers in the field. Drones also stand up better to the forces of nature; high speed, so called gravity- or G-forces. Human pilots can only tolerate a given G-force, but a drone does not suffer from this. Moreover, a shot-down drone is easily replaceable; they keep human pilots out of harm's way. Also, drones can perform some risky manoeuvres that manned planes cannot.[61] Ground robots are known for performing work considered dull, dirty and dangerous, work better left to machines than to humans. Robots are indispensable when it comes to detecting and dismantling IEDS and they have saved many lives. Drones or robots can prove added value for reconnaissance.

Drones can circle above a battlefield longer, all the while providing ground troops with intelligence or fire support. This is an advantage over manned aircraft and helicopters that are more limited in their capability to circle over a battlefield for longer periods. Although F16s can be used for photo intelligence flights, they cannot remain circling above a territory permanently with live video signals like drones can. Drones and robots seem to complement the current arsenal effectivly; many soldiers have indicated that they are not willing to participate in operations that have no drone support. That shows technology's impact on the conduct of war: the extra information that drones can provide has become vital in preventing undue risk.

Nevertheless, we do have some reservations. There is still too little objective information on the efficiency of attacks with armed drones in Afghanistan and Pakistan. For the time being, the CIA, US Army and Taliban propaganda all have their own figures on the number of victims. This makes it difficult to properly evaluate the use of and need for armed drones. We wish to draw attention to three problems that have been raised. They are (1) the by-products of attacks, (2) the weaknesses in military strategy and (3) technological proliferation.

Side effects

Despite the fact that the CIA occasionally succeeds in eliminating a few Taliban and Al-Qaeda leaders, these operations are not always performed without a hitch. It took 16 attacks and between 204 and 321 victims to eliminate Pakistani Taliban leader Mehsud.[62] Obviously every civilian casualty is one too many. But large numbers of civilian casualties also erode support for the peace the US strives for. Every civilian killed means increased chances for the Taliban and Al-Qaida to recruit their families as fighters.[63] Deploying unmanned systems on the ground or in the air also creates other issues. The enemy can interpret failure to deploy human soldiers on the ground during battle as cowardice. This perception can increase local resistance groups' willingness to fight.[64] Or as Singer writes, "Using robots in war can create fear, but also unintentionally reveal it".[65]

Weaknesses in military strategy

Seen from the perspective of military strategy, drones are not a panacea for future conflicts. In all likelihood, the conduct of war in the future will be primarily asymmetrical; one side will always technologically outgun the other. Non-state actors will play a more prominent role and will want to show that neither military might nor drones and robots can bring them to their knees. If anything, the use of drones could drive war further into urban areas where armed fighters are more difficult to locate and attack. There also is a danger that from a military strategy point of views, the expectations from unmanned technology will be to high and unrealistic. A 2008 RAND study on terrorism shows that military violence is nearly never the reason why armed non-state actors end their struggle.[66]

Ali Abu Shahla is an IKV Pax Christi partner. He lives in the Gaza Strip. He reports that unarmed drones were used in Gaza in 1987 to gather intelligence. As of 2000, drones were armed at some times and they operated in combination with helicopters and fighter jets, including to eliminate targeted people. "Civilians in Gaza have become accustomed to the presence of drones, despite the disturbing and terrifying noise that they produce. They do, however, make everyone feel unsafe. You never know whether the car in front of you or behind you may be its target. Life goes on; everyone still has to get to work and do the shopping. People have grown accustomed to always being in danger."

60 See: HRW (2009) *Precisely wrong, Gaza Civilians Killed by Israeli Drone-Launched Missiles*. And: Singer, P. (2009) *Wired for War*. New York, 2005 pp. 394.

61 See: Graham, A. (2010) *Drone operators rise on winds of change in Air Force.* http://uavc.mckeon.house.gov/2010/03/drone-operators-rise-on-winds-of-change-in-air-force.html (04-01-2011)

62 Mayer, J.(2009) *The Predator War. What are the risks of the C.I.A.'s covert drone program?* http://www.newyorker.com/reporting/2009/10/26/091026fa_fact_mayer

63 Ghosh, B. and Thompson, M. (2009) *The CIA's silent war in Pakistan.* http://www.time.com/time/magazine/article/0,9171,1900248,00.html (28-02-2011)

64 Kilcullen, D. and Exum, A.M. (2009) *Death from above, outrage from below.* http://www.nytimes.com/2009/05/17/opinion/17exum.html (04-01-2011)

65 Singer, P. (2009) *Wired for War*. New York, 2005 pp. 312.

66 Jones, S.G and Libick, M.C. (2008) *How terrorist groups end. Lessons for Countering al Qa'ida.* RAND. http://www.rand.org/content/dam/rand/pubs/monographs/2008/RAND_MG741-1.pdf (04-01-2011)

The West's technological domination on the battlefield is providing a good occasion to field-test new technologies. Current opponents have few, if any, adequate responses to drones. Thus far they have been only able to intercept video feeds. These signals had been sent to ground stations unencrypted and could be monitored with cheap equipment.[67] Right now specialists are working hard to encrypt these signals. But when fighting against a more technologically sophisticated opponent with better anti-aircraft systems, drones will be inadequate. Because of their limmited speed, drones are still very vulnerable and hence their use in risky missions will be very expensive. In short, technological supremacy will not produce victory in present, complex, cross-border conflicts. There is greater need for a strategy that will remove or reduce the causes of the conflict. Relying too heavily on the supremacy of military technology will only increase resisters' resentment.

Technological proliferation

Finally, we want to examine the risk of proliferation. The growth in use of drones has led to an enormous investment in robot technology. Around 50 countries now develop and use drones. This number will probably only continue to grow in the future as the technology spreads. The price of manufacturing drones and robots is low compared to that of manned systems. Small commercial drones can be bought off the shelf. Drones are currently cheaper than manned planes and supply more intelligence. However, as was the case with manned planes, the price will probably go up as the technology develops. Despite these rising costs, there is a chance of a spill-over effect, meaning that interested parties can find earlier technology on the market at relatively low prices.

In the long-term, drones are not really a cheaper alternative for manned systems. The number of drones will grow much more strongly than the number of manned planes. Each drone unit usually consists of three people: a pilot, an arms expert and a sensor analyst. Drones' sophisticated surveillance technology also requires maintenance. As we showed above, there is a growing interest in using drones and robots for military purposes, but their prices are likely to rise. For now, however, the costs of training drone pilots as well as for fuel are lower.[68] Because some drone technology is based on open source research, non-state actors and governments of fragile and repressive states can easily gain access to this cheap and simple technology. The rapid spread of technological knowledge about armed robots could lead to their use in attacks. Used at the right time in a crowded place, an armed robot can cause many casualties and a drone with explosives can be an efficient means for an attack. That is why the appeal to regulate this technology is growing. The International Committee for Robot Arms Control (ICRAC) – consisting of experts in the field of artificial intelligence (AI), robotics and bio-ethics – has launched an appeal to regulate robot technology in universally applicable arms control.[69]

There is also the question whether present large-scale investment in developing military technology is justified. Growth in the use of drones and robots can (and probably will) lead to a new arms race and the imaginable increase in tension this entails. Notwithstanding the inevitable development of this technology, we must question the extent to which we want to acquiesce to this. Another problem that might arise is lowering the threshold for dangerous (spying) operations when the risk for personnel is lowered through the use of drones. However, if a drone hovers or is shot down over hostile territory this could exacerbate tensions between nations. So far, we do not know how shooting down a drone affects the *ius ad bellum* (right to wage war), but it may well lead to conflict escalation. We will return to this in Chapter 4.

In summary we can conclude that drones and robots can do a lot to support ground troops in specific types of conflict, especially when it comes to detecting and clearing mines and to ISR operations. Their deployment will very probably grow, but it is not certain that their use will be decisive when it comes to military strategy. Human action on the ground is more important than cameras in the air and press-button warfare. The ease with which the technology can be spread also increases the chance that terrorist groups will use armed drones.

3.2 Dehumanising warfare

A much heard objection against using remote controlled drones and robots is that it removes human contact from (dehumanises) war. The new generation of drone pilots grew up with computer games like Medal of Honor and Call of Duty. These are called first person shooters where the player assumes the persona of a soldier on a battlefield. In more recent editions of these games, players can also use drones to localise and eliminate an enemy. When the US army goes out to recruit drone operators, it looks for people who grew up playing these games. The line between the virtual world and the destruction that operators can cause on the ground becomes blurry because their work is very far from the physical experience of war. There is a legitimate concern about whether operators can distinguish between a game and reality. One illustration of this is the comment by a drone pilot in Qatar, "It's like a video game. It can get a little bloodthirsty. But it's fucking cool".[70]

The distance to the battlefield where the drones operate has its pros and cons. Apart from the direct physical danger that soldiers face on a battlefield, using drones avoids another serious problem: physical presence on the battlefield cuts a soldier's response speed and thus his/her ability to reach a

67 Gorman, S., Dreazen Y.J., and Cole, A. (2009) *Insurgents hack U.S. Drones.* http://online.wsj.com/article/SB126102247889095011.html (28-02-2011)

68 Hoffman, M. (2009) *UAV pilot career field could save $1.5B.* http://www.airforcetimes.com/news/2009/03/airforce_uav_audit_030109/ (04-01-2011)

69 ICRAC (2010) *The statement of the 2010 Expert Workshop on Limiting Armed Tele-Operated and Autonomous Systems.* http://www.icrac.co.uk/Expert%20Workshop%20Statement.pdf (28-02-2011)

70 Singer, P. (2009) *Wired for War*. New York, 2005 pp. 332.

The cockpit of drone-pilots in Nevada.
© U.S. Department of Defense

correct assessment. This increases the chance of making an incorrect decision. The drone operator's distance from the battlefield is one way to resolve this problem. Drone operators can also base their decisions on a range of supporting data types.[71]

Yet an impersonal war where operators launch computer-guided smart weapons from remote locations can lead to psychological numbing in those operating the weapons. Because the drone operators are physically distant from the battlefield, they need fear no physical harm. They do, however, participate in the battle. They are in direct video and audio communication with the field. They do experience (on another level) emotional stimuli and stress when they see and hear their friends come under fire or when they can see (often in detail) the effect of their own actions.[72] Creating modified interfaces that show no direct images is one way being considered to eliminate these stress stimuli. The downside to this is that research shows that using interfaces can lead to greater emotional distance from the enemy. Replacing an enemy with a symbol can lead to a failure to recognise him/her as a person and thus to dehumanisation. Soldiers are intentionally conditioned to remain emotionless when seeing the enemy; this is to increase their tolerance for violence without increasing their stress levels. Or, to use the words of Royakkers and Van Est "cubicle warriors lose sight of means and their ethical implications and start concentrating only on the ends or outcomes".[73] Royakkers and Van Est research' shows that dehumanising leads to moral detachment. The target is no longer seen as subject in its own moral framework. This makes pilots more likely to display behaviour that deviates from their own ethical norms. Reasons for this are the disconnection between their own behaviour, responsibility for this behaviour and the consequences of this behaviour. Enlarging the distance to the real battlefield and the actual context makes it easier for soldiers to kill because they are less aware of the consequences and are programmed to consider their own objectives as more important. Singer quotes research by David Grossman, an army psychologist, who posits that soldiers do not tend by nature to kill their adversaries.[74] According to Grossman, military training aims to dehumanise adversaries. He adds that distance is one factor that makes killing easier. The greater the physical and emotional distance to a target, the easier it is to kill someone. Singer recounts that the drone operators' armed battle is so easy that they sometimes seem to forget that there are real people under their drone and that they are not gods that hold sway over life and death. Are drone operators really able to make an ethically supportable decision?

Yet as we noted, distance does have negative consequences for pilots of unarmed drones. Some drone operators note that their immediate environments give them no opportunity to come to terms with their experiences because they were not present on the battlefield. Whereas in a normal war situation soldiers are continually with one another where they can share and assimilate their experiences, these cubicle warriors miss out on this experience. At the end of the day, they get in their cars and drive back home to their civilian lives. The need to process the war experiences is essential to psychological stability; its absence creates psychological problems. In short, the effects of war with unmanned systems on the human experience of conflict are too diverse to make an unequivocal judgement.

71 Spiegel Online (2010) *It is not a videogame: Interview with a drone pilot.* Der Spiegel. http://www.spiegel.de/international/world/0,1518,682842,00.html

72 Ibid. And see also: Cult McCloskey, M. (2009) *The war room: daily transition between battle, home takes toll on drone operators.* http://www.stripes.com/news/the-war-room-daily-transition-between-battle-home-takes-a-toll-on-drone-operators-1.95949. (28/02/2011)

73 Royakkers, L. And Van Est, R. (2010) *The cubicle warrior: the marionette of digitalized warfare*. In: Ethics and Information Technology, no. 12, pp. 289-296.

74 Singer, P. (2009) *Wired for War*. New York, 2005 pp. 395. See: Grossman, D. (1998) *On Killing*. Back Bay Books, New York. 3, pp. 99-133.

4 Ethical and legal issues and reflections

Developments in international law and the law of war occur mainly as responses to new technology. That is why it is important to develop ethical judgements on unmanned systems and the use of drones right now, when their use is increasing and their implications for international human law are not certain. This section examines six separate subjects from ethical and legal perspectives. They are the cultural context, the use of unarmed drones, the use of armed drones and the use of autonomous drones. Finally, this section turns briefly to using drones for extra-judicial killings and the friction between public and private. This section intends to draw attention to ethical questions that need answering before using drones. Human dignity is the main principle underlying these ethical questions. From it springs the criterion that armed action must contribute to human security.

4.1 Risk-free warfare

C. Coker describes how Western societies concentrate increasingly on reducing exposure to danger, even when waging war.[75] Coker explains that ever since the end of the Middle Ages, states have called their citizens to serve as soldiers in wars. It was a civic duty to take part in the state's armed struggle. Niccolo Macchiavelli called this 'courage', Hegel a 'vocation' and a 'public service'. In their days, courage and social service were linked to the state's objectives, which had to be fought for or defended, whether or not by force of arms. Clausewitz also explicitly linked the state, civilians and soldiers. For Clausewitz, the soldier served the community, the nation state. Contemporary authors, among which Primo Levi and Ulrich Beck, show that risk-aversion, not courage, is today's driving principle. This development occurred mainly in Western countries. They no longer wage war because of their principles or for what is 'right', but to minimise the chance of terrorist attack or nuclear proliferation. According to Coker, courage or social service are no longer the fundamental principles used in making a decision to deploy soldiers; rather, it is based on the uncertainty about how it will affect the individual soldier. Also Clausewitz' links with the nation state are weakened or gone.[76] Public opinion demands that soldiers avoid dangerous situations. Coker illustrates this by referring to the choice to use air force in Kosovo, where NATO aircraft were forbidden to fly under 15,000 feet to protect pilots. Because the West is obsessed by danger, our societies see war in that frame. Peril to Western soldiers is one of the most important criteria in deciding to call out armies. Robot warfare is an inseparable part of this. Allowing robots to do the most dangerous work helps keep Western soldiers out of harm's way. There seem to be fewer answers to the question why to deploy soldiers at all. The link between the nation state and the common good has weakened and we want to keep soldiers as safe as we can. That makes the following questions more pressing : what do soldiers really do? What are we really fighting for?

Of course we also have to look at the risks for those who do not have the means to let robots do the fighting. We believe that the most important element in the ethical assessment of the use of drones is the safety of civilians in war zones. Does using robots enhance or decrease their safety? When it comes to protecting civilians, RAND Corporation and other think tanks draw attention to having sufficient soldiers and police officers on the ground.[77] Of course, unmanned systems can provide support, but they cannot create safety for civilians or order on the ground. Only physical presence can do that. When protecting civilians serves as guiding principle one must inevitably accept that soldiers will run risks. To put it mildly, that does not mesh with Western society's need to avoid risks. Unmanned systems cannot replace boots on the ground.

We also wish to mention that nowadays the desire to use unmanned systems to reduce the danger of war is drawing enormous investments into technology and research. Financial resources that could be used for socio-economic advancement are now being used for military-industrial development. We would also like to draw attention to the possibility that these developments could lead to an arms race of which one could question the desirability.

4.2 Unarmed systems

We would like to note first that some unmanned systems can save lives and can help increase human security. The use of robots to dismantle explosives is an obvious example. Unmanned drones can add significantly to intelligence gathering. They allow soldiers to see around corners and over hills. Theoretically, this greatly expands their ability to protect civilians. When military commanders have better information on where civilians and combatants are located, they can direct attacks more accurately or decide not to use it. In theory, civilians are much safer when soldiers use drones during an armed conflict. Of course, pictures from drones are not enough. Often these images are without context; other sources of information must provide that. Another concern is that of information overload.[78] Analysis of an event that occurred in Afghanistan in 2010 shows what this overload can lead to. US helicopters barraged several cars that they thought contained Taliban fighters. This conclusion relied on an analysis of pictures. A drone was one source of these pictures. The conclusion was wrong. The passengers were civilians, including women and children.[79] The analysis of this incident points to too much

Evert-Jan Grit works on IKV Pax Christi's Middle East team. He visited the West Bank and Gaza during the second intifada. While there, he had a close-up view of the impact that drones had on life on the ground. "As soon as you hear the drones coming you know that you are being watched. Although local people were indifferent and complained mainly about disrupted TV reception, I felt mainly fear and apprehension. I realised that, theoretically, I could become a target at any moment, that maybe someone was watching me and that I was never really safe. That is intimidating."

75 This paragraph is mainly based on: Coker, C. (2001) *Humane warfare.* London, Routledge. pp. 44.-66.

76 3, pp. 90-94.

77 RAND (2008) *Establishing law and order after conflict.* RAND. pp. 19.

78 Shanker, T. and Richtell, M. (2011) *In new military, data overload can be deadly.* New York, 2005 http://www.nytimes.com/2011/01/17/technology/17brain.html?pagewanted=2&_r=1 (06-04-2011)

79 See for the complete report: Cloud, D.S. (2011) *Anatomy of an Afghan war tragedy.* Los Angeles Times, 19 September 2005. http://www.nyu.edu/ccpr/LA%20TImes%20OpEd_9.19.05.pdf http://www.latimes.com/news/nationworld/world/la-fg-afghanistan-drone-20110410,0,2818134,full.story (18-04-2011)

information as the cause. The use of drones for intelligence can only contribute to human security when used alongside other methods for gathering intelligence and when there are adequate resources for interpreting the information.

There are two ethical objections to using drones to gather intelligence. The first is privacy. This applies especially when using drones to gather information for civilian purposes, i.e. when there is no armed conflict. In such situations, civilian and military authorities can use drones to prevent or fight crime. Using drones is then comparable to hanging up cameras. Since January 1 2004, the law requires that the public be notified when cameras are used for surveillance in public places in the Netherlands.[80] This notification is more complicated when (small) drones are used instead of normal cameras. In the case mentioned above when a Raven was used during New Year eve, it's use was announced in the media, but this is not an option for systematic use. Smaller drones are quieter than the helicopters or jets, now sometimes used for civil observation.

When drones are used to gather intelligence during armed conflicts, this is military use. In such situations only the 'slippery slope' argument is valid. The reasoning is that once you start using drones to gather information, it is just a small step to arming them. Fundamentally, this argument is easy to defend, especially when you think that armed drones are just grown-up versions of intelligence drones.

Stories from IKV Pax Christi's partners focus on the fear that drones evoke in civilians. It is important to realise that civilians have no way of knowing whether a drone is armed or not. For them, the sound of a (larger) drone means that a rocket can strike at any moment. Commanders who consider using drones should give serious thought to the permanent fear that this arouses in civilian populations. There are strategic (antipathy to which the use of drones leads) and ethical grounds for this.

4.3 Armed systems

The use of armed systems increases the distance between the soldier and his/her target. What new ethical and legal questions does this raise?

Human Rights Watch (HRW) investigated the use of armed drones by the Israeli army in the Gaza Strip in December 2008 and January 2009. According to the HRW, drones fall under the law of war just like other weapons systems. According to the HRW, drone operators are bound by the law of war in the same way as any other soldier. A striking point in the report is that HRW extensively discusses the benefits of armed drones over fighter planes or helicopters. HRW repeatedly states that the Israeli army did not take advantage of these benefits during the period studied. It draws attention to drones' improved accuracy and to the responsibility this places on their users to reduce civilian casualties. When drones do cause civilian casualties, the user cannot hide behind the weapon system's imperfections. HRW did not object to drones as a matter of principle.[81]

Because drones are used for extrajudicial killings in some situations, the UN appointed rapporteur on this subject addressed the ethical implications of using unmanned systems. The rapporteur draws attention to several matters. First of all, when drones are used as arms, their use must be judged under international humanitarian law. Furthermore, the rapporteur noted that because using drones is easy and risk-free, there is a danger that armed forces will stretch the interpretation of international humanitarian law too far since the danger to one's own personnel is minor. The rapporteur warned commanders to respect the rules in international humanitarian law regardless of the weapon systems used. The rapporteur also highlighted the chance of creating a play station mentality in which drone operators tend to regard their actions as a computer game.[82] In chapter 3, we described the operative psychological mechanism here as dehumanisation. Some experts think that increasing the distance between target and the person firing will make it easier for the latter to use violence. To some extent, long-range artillery and bombers have the same problem, but in the case of drone operators it is taken to an extreme degree. That adds weight to the ethical objection that increasing distance makes killing easier.

Another drone-related ethical issue concerns the claim that using drones improves the ability to protect civilians. In the past , the same has been said of bombs. During the First Gulf War, laser-guided (smart) bombs replaced free-fall or gravity (dumb) bombs. These laser-guided bombs are much more precise, can better discriminate between civilians and combatants and can drastically reduce the number of civilian casualties. In practice, however, these bombs tend to be overused simply because they are better able to discriminate. After all, there are fewer risks, right? For this reason, precision bombs are used in situations where free-fall bombs would not be used due to the risk of civilian deaths. The number of targets is expanding to include sites close to civilian locations. Yet, the margin of error resulting from incorrect intelligence remains the same. Becasuse of this the number of civilian casualties could perhaps increase. In theory, drones increase precision, but we do wonder whether they might not follow the same path as precision bombing. A range of estimates on the number of drone-related civilian casualties are going around. A report by the Fellowship of Reconciliation (FoR) lists several of them. The New American Foundation[83], a US think tank, believes that one-third of the casualties in Pakistan are civilians. FOR draws on Pakistani sources (Pakistani Body Count), that claim that 50 civilians die for every militant killed.[84]

80 Engelfriet, A. (2010) *Cameratoezicht, filmen en fotograferen van mensen.* http://www.iusmentis.com/maatschappij/privacy/filmen-cameratoezicht/#openbareruimte (07-03-2011)

81 Human Rights Watch (2009) *Precisely Wrong. Gaza Civilians Killed by Israeli Drone-Launched Missiles*. http://www.hrw.org/en/reports/2009/06/30/precisely-wrong-0 (04-01-2011)

82 Alston, P. (2010) *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions.* UN no. A/HRC/14/24/Add.6. pp. 24.-25.

83 Bergen, P. and Tiedemann, K. (2010) *The year of the drone: an analysis of U.S. drone strikes in Pakistan, 2004-2010.* New America Foundation

84 *FOR (2010) Convenient Killing: Armed Drones and the PlayStation Mentality.* pp. 6. See also: Pakistan Bodycount (2011) *Pakistan Body Count.* http://www.pakistanbodycount.org/ (07-02-2011)

Protest in Pakistan against attacks with drones.

As of this writing there has been no extensive analysis based on accurate data about the number of civilian casualties resulting from the use of drones. Once we have such figures, we will know whether drones cause more or fewer civilian casualties than their manned alternatives would cause. Only when we have those figures will we really be sure whether drones help or hinder human security. It is important that states using drones submit the figures to examination, and undertake to examine, whether drones really do reduce or whether they might not possibly increase the chance that civilians will be killed.

There are also legal issues alongside the ethical ones. Singer asks whether drone operators could be considered combatants under international human law.[85] Under present rules, this is the case. That means that they and their home bases – in the case of the US, there is a major control centre for drones near Las Vegas – are legitimate targets. Another important legal question concerns responsibility. That a degree of responsibility devolves upon drone operators is obvious. But what about senior hierarchy? Is the drone operator's immediate commander responsible or is it the field commander who requested the drone's deployment? Royakkers and Van Este pose a similar question.[86] They stress that automated systems already make many decisions for drone operators. These systems create an abstract picture with information that the operator cannot verify. Royakkers and Van Est argue that operators (cubicle warriors) cannot reasonably be held responsible for decisions on whether or not to fire, because they have no control over the information (see also chapter 3). A clear definition of this responsibility is essential for abiding by the law of war.

4.4 Autonomous systems

Autonomous drones, too, can be armed or not. Each type has its own ethical questions and objections. Autonomous drones raise an important new objection. Who is to be held responsible for an autonomous drone's actions when people are 'out of the loop'? Of course, this question is even more pressing when the drones are armed. Who is to be held responsible when an armed drone's actions result in civilian deaths? The company that manufactured it? The person/team that programmed it? Or does responsibility remain stuck somewhere in the middle? These are important questions because the law of war is largely based on the idea that someone can be held responsible for the violence used.

85 Singer, P. (2009) *Wired for War*. New York, 2005 pp. 386.

86 Royakkers, L. and Van Est, R. (2010) *The cubicle warrior: the marionette of digitalized warfare*. In: Ethics and Information Technology, no. 12, pp. 289-296.

They are also important because there is never a simple answer to the question of whether using violence is legitimate. War situations are never completely clear-cut. The questions they raise never have yes or no answers. Autonomous systems, programmed in a binary language, are not able to act with respect for human dignity during very complicated war situations. Is it permissible to target anti-aircraft guns located on a school roof? May an enemy unit be attacked when it has taken cover in a busy marketplace? In such situations only human judgement can take into account the human dignity of civilians that could be in danger. Therefore autonomous arms systems seem unsuitable for use in war zones.[87]

Many authors studying the use of robots refer to fictional works by Isaac Asimov, a US scientist and science fiction author. In his series of books on robots, he formulated three ethical laws of robotics.

1. A robot may not injure a human being or, through inaction, allow a human being to come to harm.
2. A robot must obey any orders given to it by human beings, except where such orders would conflict with the First Law.
3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

Later Asimov prefixed law zero. "A robot may not harm humanity, or, by inaction, allow humanity to come to harm." Asimov used the term 'robots' to refer to autonomous systems. These laws forbid robots from being used in combat. This is science fiction that has become reality. The restrictions that Asimov placed on the use of robots have become important in the ethical discussion of autonomous armed systems. C. Homan refers to Prof. Coker (cited above) who said that while robots may gather intelligence, they have no knowledge.[88] Autonomous systems may be able to analyse, but they cannot assess a situation in a manner that respects reality. Singer offers the example of a computer that cannot tell the difference between an apple and a tomato. Its digital sensors respond the same to both. Singer also quotes a manufacturer of autonomous army vehicles, "If it's a child, you want to stop. If it's a guy with an RPG-7 [a rocket-propelled grenade launcher], you want to run him over."[89] But what if it's a kid with an RPG? Or a wounded enemy soldier? Can a robot tell the difference? More importantly, can a robot respond to this situation as a human would? Can a robot calm a child and convince him to hand over his weapon? A presentation by an army officer on the roadmap for UGVs posits that robots cannot replace people because they cannot measure the violence used or interact with people.[90] We consider this a valid reasoning.

87 Singer, P. (2009) *Wired for War*. New York, 2005 pp. 389.

88 Homan, C. (2009) *Op weg naar de ethisch geprogrammeerde gevechtsrobot?* In: Atlantisch Perspectief no. 6, pp. 4-9.

89 Singer, P. (2009) *Wired for War*. New York, 2005 pp. 80.

90 Dutch Army (2009) *Robots beslissen in het gevecht, bouwen aan veiligheid?!* http://afdelingen.kiviniria.net/media-afdelingen/DOM100000140/Activiteiten2009/0414Kooysymposium/Bert_Stam_-_Robots_beslissen_het_gevecht.pdf. (28/02/2011)

Grey area

The use of autonomous robots creates a relatively large grey area. By way of example: many armed and unarmed UAVs fly for long distances on automatic pilot. At such moments the drones are more or less autonomous, although the operator can always assume control. Is this an autonomous system?

More pressing is the question whether armed systems may take autonomous armed action. One example that clearly belongs to the grey area is the systems used to render fired projectiles harmless. The Netherlands' Goalkeeper (made by Thales) is one such system designed for installation on ships. People are too slow and too inaccurate to eliminate all fired projectiles. The autonomous goalkeeper system can do this.[91] Other countries use similar systems. The US and UK use a modified version of the system to protect bases in Iraq against projectiles.[92] In 2007, an error with this type of weapon caused 9 deaths and wounded 14 when South African soldiers tested the system.[93]

Moreover, much of the technology aimed at processing intelligence falls in the grey area. Many arms systems are equipped with software that identifies elements in the line of sight or fire as friend or foe and specifies the type. Often the decision to shoot at an element in the line of sight or fire depends largely on information that this autonomous system supplies. The destruction of an Iranian civilian aircraft by an US warship in 1988 suggests that these systems can also make mistakes. No conclusive explanation was ever given for this error. Some attribute it to this kind of software. It is said to have been responsible for the officers responsible for firing the anti-aircraft guns mistaking the passenger plane for a fighter.[94] Many nations' armed forces use such automated systems, the foregoing example shows the problems to which they can give rise. The grey area shows that it is essential to think about the limits of automation. In some cases, like Goalkeeper, it is clear that automation contributes to soldiers' safety. The other cases mentioned show that they can also be dangerous.

An Israeli armed UGCV.
© G-Nius Unmanned Ground Systems

91 Thales (2011) *Goalkeeper - close-in weapon system.* http://www.thalesgroup.com/goalkeeper/?pid=1568 (04-01-2011)

92 Scott, R. (2007) *Raytheon eyes defence at the speed of light.* http://www.janes.com/events/exhibitions/dsei2007/sections/daily/day2/raytheon-eyes-defence-at-.shtml (04-01-2011)

93 Shachtman, N. (2007) *Robot Cannon kills 9, wounds 14.* http://www.wired.com/dangerroom/2007/10/robot-cannon-ki/ (04-01-2011)

94 See for instance the report in the Washington Post, in 1988: Wilson, G.C. (1988) *Navy Missile Downs Iranian Jetliner.* http://www.washingtonpost.com/wp-srv/inatl/longterm/flight801/stories/july88crash.htm (04-01-2011)

4.5 Extrajudicial killings

The question of using drones is closely linked to that of the legitimacy (and legality) of extrajudicial killings. As other means can also be used for extrajudicial killing this subject must be treated independently a. The discussion on these killings is not identical to that about drones. Nevertheless, there is a link. The threshold for extrajudicial killings in Pakistan seems to be much lower simply because of the ability to use unmanned arms systems.

Amitai Etzioni defends the extrajudicial killings of combatants belonging to a non-state group.[95] According to Etzioni, because these combatants abuse their civilian status they forfeit the right to be treated as civilians during a conflict. Etzioni's reasoning is that because irregular soldiers hide among the civilian population where they are difficult to capture, they must be eliminated before they can hide among civilians. For Etzioni, drones are ideally suited for this. A US government official explained extrajudicial killings in this way: "In this ongoing armed conflict, the United States has the authority under international law, and the responsibility to its citizens, to use force, including lethal force, to defend itself, including by targeting persons such as high-level al Qaeda leaders who are planning attack."[96]

Others ask whether there is not a risk that extrajudicial killing may become the new norm. Jeffrey Smith, a former senior CIA official, says that these executions can suggest that this is normal behaviour. He warns against a boomerang effect that could make US officials targets of extrajudicial killings.[97] Extrajudicial killing can be an argument for opponents to attack very specific targets in the countries that perform these executions. This enlarges the battlefield in a way that can have unforeseeable consequences.

The UN rapporteur for extrajudicial killings judged that these could be legal under strict conditions.[98] The rapporteur posited that when states decide to carry out extrajudicial killings, they must clearly make known the international rules on which this action is based. And also the civilian casualties must be counted.

Video stills of an attack on armed insurgents in Northern Baghdad, 2008. The attack killed 6 people. Source: Defense Video & Imagery Distribution System

95 Etzioni, A. (2010) *Unmanned Aircraft Systems: the Moral and Legal Case.* In: Joint Forces Quarterly, Issue 57 2010. pp. 66.-72.

96 Johnson, K. (2010) *US defends legality of killing with drones.* http://online.wsj.com/article/SB10001424052702303450704575159864237752180.html (04-01-2011)

97 Mayer, J. (2009) *The Predator war: what are the risks of the CIA's covert drone program?* http://www.newyorker.com/reporting/2009/10/26/091026fa_fact_mayer (10-01-2011)

98 Alston, P. (2010) *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions.* UN no. A/HRC/14/24/Add.6. pp. 27.-29.

Marjan Lucas is responsible for IKV Pax Christi's programme in Pakistan. For her work she often speaks with Pakistanis about their country. She says that the public is indignant about the drone attacks on Pakistani territory. Many consider it an outrage that the US thinks it can resolve problems this way. The fact is that the Pakistani people and army must bear the brunt of the Taliban's retaliation for the drones.

However, off the record, military officials and political leaders admit that the drones are effective and that "they must be unmanned", sais Lucas. Pakistan would never have permitted manned aircraft in its own airspace, just like it does not accept foreign combat troops on its territory. But because the aircraft are unmanned, there is an essential psychological difference and Pakistan tolerates them as necessary evil." Unmanned means that the rules of state sovereignty can be side-stepped because it is nearly impossible to explain to one's own population that a foreign intervention is taking place on Pakistani soil.

She has her doubts about the legitimacy, and certainly about the effectiveness of using drones. "The effect seems to be contrary. There are many civilian casualties and this results in more jihadis. When drones kill people, this only confirms the rhetoric of martyrdom that is so essential in recruitment for the jihad. Because of the drones, leaders flee to Karachi and other overpopulated cities. Moreover, because drones are available, no thought goes to alternatives like ideological counter-attack based on knowledge of extremist networks. This knowledge and information can be extracted when arrests are made. The point should be uprooting extremism; using drones is only about uprooting extremists."

The reporter also asked the High Commissioner for Human Rights to join states, the Red Cross, and other organisations in thinking about when someone can be regarded as participating in an armed struggle. To be specific, the rapporteur says that it is the drone operator's responsibility to ensure that the commander bases his/her decision on visual confirmation. Furthermore, the civilian population in the immediate vicinity must be warned of the attack.

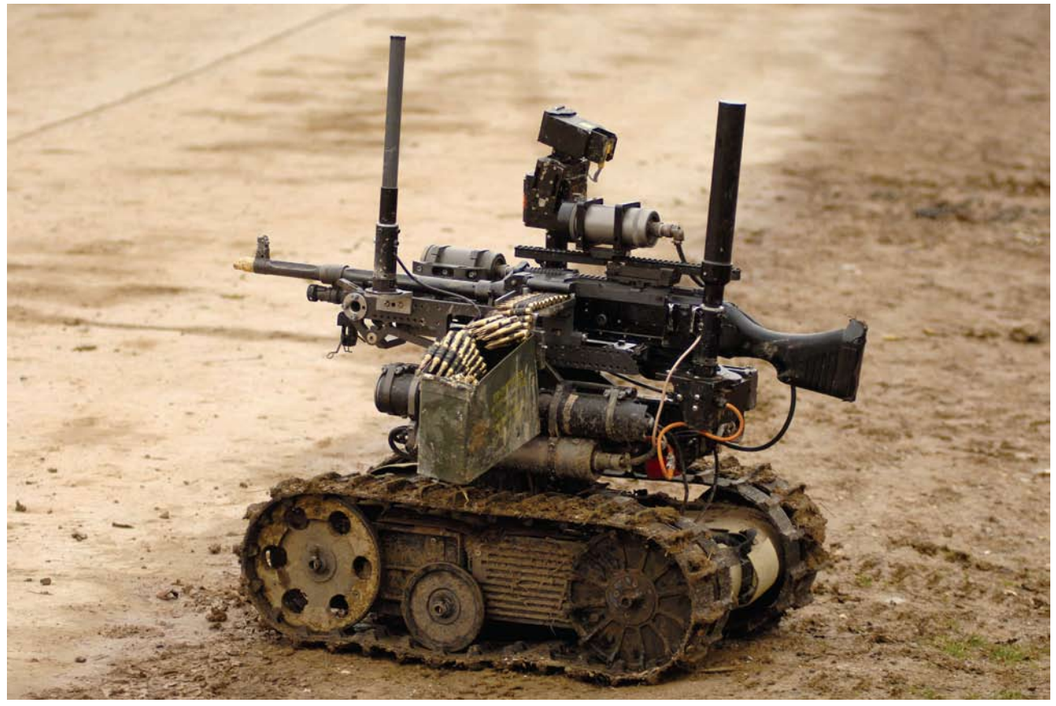
In any case, it is clear that international law has an insufficient legal framework on the use of drones for extrajudicial killings (and probably for any use of them). This framework should be put into place as quickly as possible. When doing so, the discrimination principle should be central: civilians musts not become the victims of armed violence.

4.6 Unmanned systems and friction between public and private

Civilian effort in military matters is by definition a matter of debate. Military action has its own category within international law. Legal uncertainty arises as soon as civilians become involved in military actions. At the end of this document we note that more civilian actors are involved in the armed operations of unmanned systems, than of manned systems. One clear example is the civilian CIA's use of drones for armed intervention in Afghanistan and Pakistan. This raises the question whether this is an act of war, and depending on the answer, what law governs the act. Another example is hiring civilian actors to operate unmanned systems. The Netherlands hired an Israeli company to use UAVs to collect intelligence for troops in Uruzgan. The question here, of course, is the status of these civilian actors.[99] Are they a legitimate target? Who is responsible if they make mistakes?

Drones are also used for civilian purposes, usually to collect information for government investigations services. That raises questions about who may use the pictures taken, where they may be stored and where drones may be used. Should it be required to notify civilians that government services are using drones in the same way that they are notified about cameras?

There is some, but too little, international discussion on unmanned or autonomous warfare. Drone manufacturers and military experts tend to create an imaginary world in which robots are a technological solution for the political problem of legitimating war and the casualties this can cause. This seems to lead to techno-fetishism in which a robot becomes a magical object onto which needs for a risk-free war can be projected. In this conceptualisation, unmanned systems save lives and minimise loss. However, this characterisation ignores the greater impact that using armed robots has on the legitimacy of warfare and the possibility of risk-free entry onto a battlefield. Will this not make going to war too easy? We need independent critical analysis to examine the extent to which such ideas coincide with the real benefits of using drones and robots.[100]



A prototype armed SWORDS.
© UK MOD Crown Copyright

99 Homan, C. (2009) *Op weg naar de ethisch geprogrammeerde gevechtsrobot?* In: Atlantisch Perspectief no. 6, pp. 1418.

100 Roderick, I. (2010) *Mil-bot Fetishism: The Pataphysics of Military Robots.* In: TOPIA, Issue 23-24, November 2010.

5 Conclusions

In recent decades, the use of drones has risen sharply. At the same time, only a few states use armed drones. It is certain, however, that further development in robotics for military use will lead to more countries facing the decision of whether to acquire armed and even autonomous robots.

This report has argued that unmanned systems can play a useful role in supporting troop operations. At the same time it has drawn attention to the downside of unmanned systems: unmanned systems cannot win a war. Basically it is always, and possibly even more so now, a matter of boots on the ground. Moreover, there are several important ethical objections to using armed, unmanned systems. Does using drones not make it too easy to kill? Does a drone operator located thousands of miles away from his/her target have adequate information to make life or death decisions? Can the anxiety and antagonism that drones arouse in the civilian population be justified?

It is clear that there have been civilian casualties in operations involving armed drones. So far however, an extensive analysis is lacking. It is also unclear what the legal implications of deploying drones are. Are drone operators a legitimate target? Does this expand the battlefield? What are the rules for the proliferation of robot technology? There are also many questions about extrajudicial killings. Are they legal? If they are, are they effective? In other words, do they contribute to stabilising a conflict situation?

The Netherlands now uses mainly small robots and drones with a short operational time span. In the spring of 2011, the government decided to acquire four UAVs for intelligence gathering. Sooner or later the question of acquiring armed drones and robots will arise in the Netherlands as well. Moreover, the Netherlands takes part in missions with countries that do use armed drones. When considering using drones, it is important to take into account their ethical and legal implications and not just their practical military pros and cons. This is not simply about in technological progress, but a question of the responsible use of new technology. Unmanned warfare is not by definition a good idea. Responsible decisions must include a reliable assessment of the objections. States currently using drones must be more open about disclosing their use and their effects on the ground. How many civilian casualties do they make? How do civilians living in the areas where they are used perceive them?

IKV Pax Christi considers it important for new weapon technologies to be validated against ethical and juridical principles before they are put to use.

We are convinced that the deciding factor and core value must be whether or not deployment of new technology in combat improves human security. There must be a responsible balance between the safety of soldiers and the safety of civilians. The deployment of robots is much safer for soldiers, but do they benefit the civilians these soldiers are supposed to be protecting?

Initial assessment against ethical and juridical principles leaves us with negative feelings about the deployment of armed or autonomous robots. Armed unmanned systems satisfy a desire in our society to wage war without putting our own people at risk. This urge seems to be based on the misconception that wars can be waged clinically. Deploying robots and drones can make it easier to use violence, and that, in turn, can result in escalation of violence and conflict. Humans must remain in control if they engage in warfare. They are the ones who must draft the interpretations and make the decisions. This may never be left to computers or computer-generated data. Unarmed and unmanned aircraft can help soldiers to distinguish better between combatants and civilians. But the footage and intelligence gathered are only useful when they can be processed and interpreted. Continuous aerial surveillance without adequate interpretation or corroboration from other sources -can lead to a one-dimensional approach to the complex situation on the ground. This approach also leads to more civilian applications and surveillance duties for drones while side-stepping discussions on their desirability and effectiveness.

Obviously we also condemn extrajudicial killings as morally unacceptable. These executions may appear to remove a short-term threat, but there is a serious chance that they will only nourish long-term antipathy to ‘Western’ behaviour. Unarmed robots can probably help enhance civilian security when they are used to reinforce boots on the ground. It is essential that states now using armed robots be more open about their effectiveness. Do they really make people on the ground safer?

We aim for debate on the use of robots – internationally and in Dutch military affairs – before the decision whether or not to acquire robots becomes hard. We hope that this report is a constructive contribution to that discussion.

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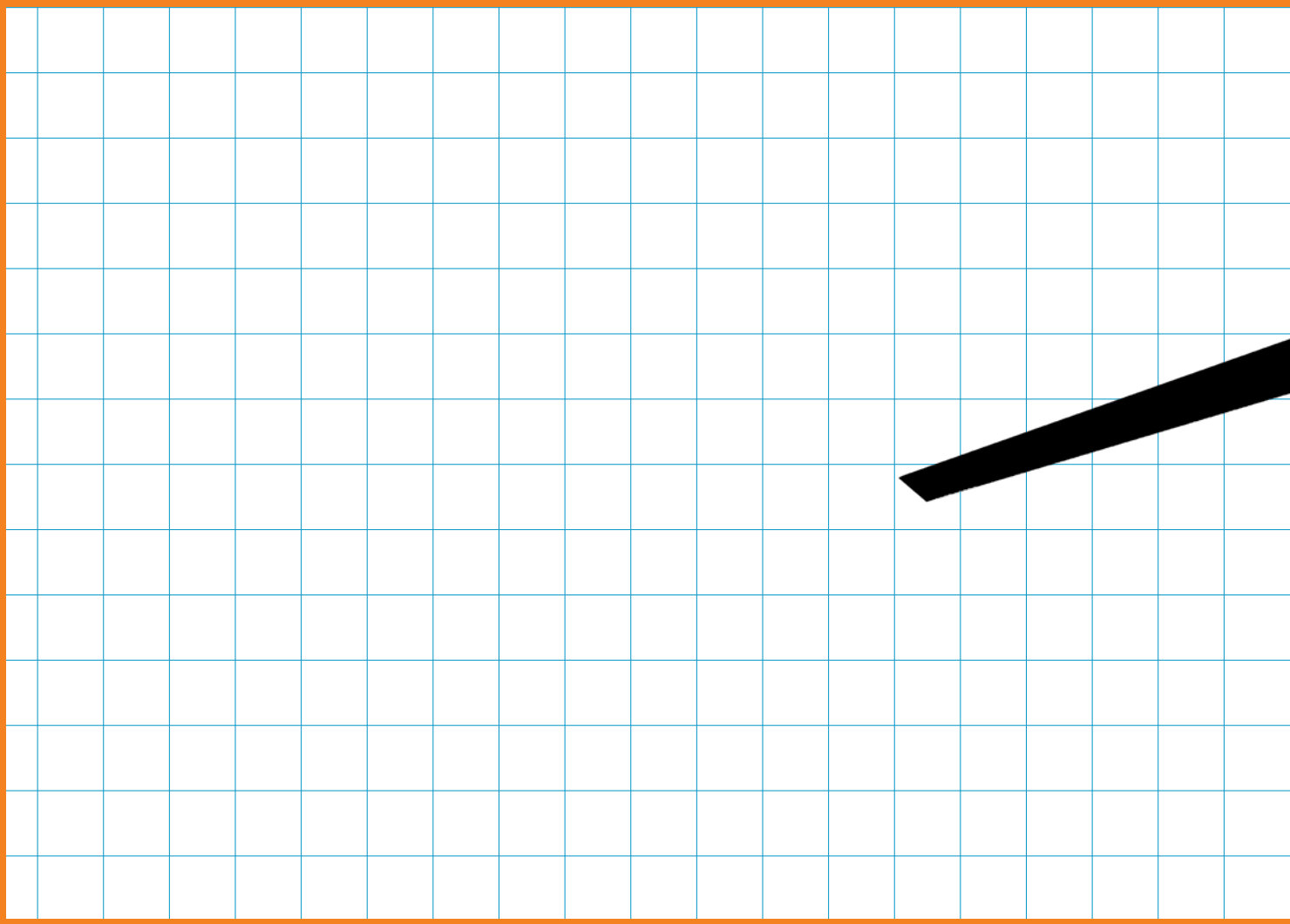

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