News Articles Appendix

Killer Robots and a Revolution in Warfare by Bernd Debusmann, *Reuters*, 22 April 2009

WASHINGTON, April 22 (Reuters)–They have no fear, they never tire, they are not upset when the soldier next to them gets blown to pieces. Their morale doesn't suffer by having to do, again and again, the jobs known in the military as the Three Ds–dull, dirty and dangerous.

They are military robots and their rapidly increasing numbers and growing sophistication may herald the end of thousands of years of human monopoly on fighting war. "Science fiction is moving to the battlefield. The future is upon us," as Brookings scholar Peter Singer put it to a conference of experts at the U.S. Army War College in Pennsylvania this month.

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Ground-based robots in Iraq have saved hundreds of lives in Iraq, defusing improvised explosive devices, which account for more than 40 percent of U.S. casualties. The first armed robot was deployed in Iraq in 2007… Its mounted M249 machinegun can hit a target more than 3,000 feet away with pin-point precision.

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The Predators are flown by operators sitting in front of television monitors in cubicles at Creech Air Force Base in Nevada, 8,000 miles from Afghanistan and Taliban sanctuaries… The cubicle pilots in Nevada run no physical risks whatever, a novelty for men engaged in war.

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How do you get a robot to tell an insurgent from an innocent? Can you

program the Laws of War and the Rules of Engagement into a robot? Can you imbue a robot with his country's culture? If something goes wrong, resulting in the death of civilians, who will be held responsible? The robot's manufacturer? The designers? Software programmers? The commanding officer in whose unit the robot operates? Or the U.S. president…

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You need to be an optimist to think that political leaders will opt for negotiation over war once combat casualties come home not in flag-decked coffins but in packing crates destined for the robot repair shop.

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Filling the Skies with Assassins by Tom Engelhardt, *antiwar.com,* 8 April 2009

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…World War II,,, ended, of course, with the Manhattan Project… which produced the first atomic bomb, and so the Cold War nuclear arms race that followed.

In that 45-year-long brush with extinction, the United States and the Soviet Union each mobilized a military-industrial complex to build ever newer generations of ever more devastating nuclear weaponry and delivery systems for a MAD (mutually assured destruction) world. At the peak of that two-superpower arms race, the resulting arsenals had the mad capacity to destroy eight or 10 planets our size.

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Today, the most advanced UAV, the Reaper, housing up to four Hellfire missiles and two 500-pound bombs, packs the sort of punch once reserved for a jet fighter. Dispatched to the skies over the farthest reaches of the American empire, powered by a 1,000-horsepower turbo prop engine at its rear, the Reaper can fly at up to 21,000 feet for up to 22 hours (until fuel runs short), streaming back live footage from three cameras (or sending it to troops on the ground)–16,000 hours of video a month.

No need to worry about a pilot dozing off during those 22 hours. The human crews "piloting" the drones, often from thousands of miles away, just change shifts when tired. So the planes are left to endlessly cruise Iraqi, Afghan, and Pakistani skies relentlessly seeking out, like so many terminators, specific enemies…

Approximately 5,500 UAVs, mostly unarmed–less than 250 of them are Predators and Reapers–now operate over Iraq and the Af-Pak (as in the Afghanistan-Pakistan) theater of operations. Part of the more-than-century-long

development of war in the air, drones have become favorites of American military planners...

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According to Christopher Drew of the New York Times... the pilots sit unglamorously "at 1990s-style computer banks filled with screens, inside dimly lit trailers."... All of this is remarkably mundane–pilot complaints generally run to problems "transitioning back to wife and children after a day at the joystick over battle zones...

In those dimly lit trailers, the UAV teams have taken on an almost godlike power. Their job is to survey a place thousands of miles distant (and completely alien to their lives and experiences), assess what they see, and spot "targets" to eliminate...

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Our drone wars also represent a new chapter in the history of assassination...

Today, we increasingly display our assassination wares with pride. To us, at least, it seems perfectly normal for assassination aerial operations to be a part of an open discussion in Washington and in the media. Consider this a new definition of "progress" in our world.

This brings us back to arms races... don't for a minute imagine that those hunter-killer skies won't someday fill with the drones of other nations. After all, one of the truths of our time is that no weapons system, no matter where first created, can be kept for long as private property. Today, we talk not of arms races, but of "proliferation," which is what you have once a global arms race of one takes hold.

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...Air power has had a remarkably stellar record when it comes to causing death and destruction, but a remarkably poor one when it comes to breaking the will of nations, peoples, or even modest-sized organizations...

...Peter Singer saying of our Predators and Reapers: "[T]hese systems today are very much Model T Fords. These things will only get more advanced."

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...drone armaments will undoubtedly grow progressively more powerful and "precise."...

...As Robert S. Boyd of McClatchy reported recently, "The Defense Department is financing studies of autonomous, or self-governing, armed robots that could find and destroy targets on their own. Onboard computer programs, not flesh-and-blood people, would decide whether to fire their weapons."

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In the meantime, the skies of our world are filling with round-the-clock assassins. They will only evolve and proliferate...

...True, the UAV enthusiasts, who are already imagining all-drone wars run by "ethical" machines, may never see anything like their fantasies come to pass...

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Israel's Military Avatar: Robots on the Battlefield
By Ora Coren, *Haaretz*, December 30, 2009

When armies clash in the not-too-distant future, remotely-operated robotic weapons will fight the enemy on land, in the air and at sea, without a human soldier anywhere on the battlefield.

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Spy satellites that today weigh several tons will be shrunk down to anything between one and 100 kilograms or less, with engines the size of postage stamps. Infantry rifles will be computerized and fire "smart" rounds telling them when and where to explode. New rockets will also be able to think by themselves to enhance their accuracy.

... says Roni Postman, vice president for R&D at Rafael Advanced Defense Systems. "It can get close up to a terrorists' boat, address it through a loudspeaker, and open fire at it. In the past, a thing like this required a boat with seven or eight crewmen who were in constant danger. This type of remote control is one of the clearest characteristics of the future battlefield. It will be a battlefield devoid of troops, with vehicles doing what soldiers have done until now."

Unmanned boats, land vehicles and aircraft will be either controlled remotely or will function autonomously, pre-programmed to carry out a mission from start to finish...

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The Age of the Killer Robot is no longer a Sci-fi Fantasy by Johann Hari, *The Independent*, 22 January 2010

...the autonomous killer robot... will become the dominant method of war for rich countries in the 21st century. These facts sound, at first, preposterous. The idea of machines that are designed to whirr out into the world and make their own decisions to kill is an old sci-fi fantasy... But we live in a world of such whooshing technological transformation that the concept has leaped in just five years from the cinema screen to the battlefield—with barely anyone back home noticing.

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…Every time you hear about a "drone attack" against Afghanistan or Pakistan, that's an unmanned robot dropping bombs on human beings… Its robot-cousin on the battlefields below is called SWORDS: a human-sized robot that can see 360 degrees around it and fire its machine-guns at any target it "chooses". Fox News proudly calls it "the GI of the 21st century."…

…insurgents are always inventing new ways to block the signal from the control centre, which causes the robot to shut down and "die". So the military is building "autonomy" into the robots: if they lose contact, they start to make their own decisions, in line with a pre-determined code.

…Humans have been developing weapons that enabled us to kill at ever-greater distances and in ever-greater numbers for millennia, from the longbow to the cannon to the machine-gun to the nuclear bomb. But these robots mark a different stage.

The earlier technologies made it possible for humans to decide to kill in more "sophisticated" ways—but once you programme and unleash an autonomous robot, the war isn't fought by you any more: it's fought by the machine. The subject of warfare shifts.

The military claim this is a safer model of combat. Gordon Johnson of the Pentagon's Joint Forces Command says of the warbots: "They're not afraid. They don't forget their orders. They don't care if the guy next to them has been shot. Will they do a better job than humans? Yes." Why take a risk with your soldier's life, if he can stay in Arlington and kill in Kandahar? Think of it as War 4.0.

But the evidence punctures this techno-optimism. We know the programming of robots will regularly go wrong—because all technological programming regularly goes wrong. Look at the place where robots are used most frequently today: factories. Some 4 per cent of US factories have "major robotics accidents" every year—a man having molten aluminium poured over him, or a woman picked up and placed on a conveyor belt to be smashed into the shape of a car. The former Japanese Prime Minister Junichiro Koizumi was nearly killed a few years ago after a robot attacked him on a tour of a factory. And remember: these are robots that aren't designed to kill.

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Robots find it almost impossible to distinguish an apple from a tomato: how will they distinguish a combatant from a civilian? You can't appeal to a robot for mercy; you can't activate its empathy. And afterwards, who do you punish?…

Robots do make war much easier—for the aggressor. You are taking much less physical risk with your people, even as you kill more of theirs…

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There is some evidence that warbots will also make us less inhibited in our killing. When another human being is standing in front of you, when you can stare into their eyes, it's hard to kill them. When they are half the world away and little more than an avatar, it's easy...

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...while terror makes some people shut up, it makes many more furious and determined to strike back.

...when Lebanon was bombarded by largely unmanned Israeli drones in 2006, it only "enhanced the spirit of defiance" and made more people back Hezbollah.

...The scientists who were essential to developing the nuclear bomb—including Albert Einstein, Robert Oppenheimer, and Andrei Sakharov—turned on their own creations in horror and begged for them to be outlawed. Some distinguished robotics scientists, like Illah Nourbakhsh, are getting in early, and saying the development of autonomous military robots should be outlawed now.

There are some technologies that are so abhorrent to human beings that we forbid them outright. We have banned war-lasers that permanently blind people along with poison gas. The conveyor belt dragging us ever closer to a world of robot wars can be stopped—if we choose to.

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