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Vicki, love to hear your thoughts.

The Pentagon's Coming Killer Robot Army: BGOV Executive Outlook

(Bloomberg Government) -- Beginning today, robot enthusiasts from around the world will converge on Pomona, California, where 25 teams will compete in the finals of the Defense Advanced Research Projects Agency's [Robotics Challenge](#).

Under the banner of disaster relief, DARPA is challenging contestants to build robots that can rescue people and mitigate environmental damage. Ultimately, however, any technology competition run by the Pentagon will eventually focus on developing ways to help the military perform its existential functions: killing people and breaking things.

With the rapid pace of technological development, the era of killer robots will soon be upon us. We need to be asking important questions now about their use on the battlefield. Some fear that robot warriors will unleash unprecedented carnage, but others assert that they could actually make future wars safer for both soldiers and civilians.

Rise of the Machines

The term "killer robots" conjures up images of [Terminators](#) wreaking havoc in suburban Los Angeles, but the military's definition is mundane.

An autonomous weapon system (AWS) is one that "once activated, can select and engage targets without further intervention by a human operator," according to DOD [Directive 3000.09](#). In short, a killer robot chooses its own targets and decides whether to employ lethal force.

The Pentagon wants robots with more autonomy. In November 2014, Frank Kendall, the Pentagon's top acquisition official, [tasked](#) the Defense Science Board with producing, by this summer, "a plan that identifies the barriers to increased operational use of autonomy," and addresses "how might we overcome those limits and expand the use of autonomy in the near term as well as over the next two decades."

Some in industry are already producing autonomous systems. [Israel Aerospace Industries Ltd.](#) (IAI) has produced what is arguably the first operational AWS, the [Harpy](#) anti-radar attack Unmanned Aerial Vehicle (UAV). The Harpy loiters over the battlefield, detects and identifies radars, and then flies itself into the targets to destroy them.

Other autonomous systems, such as [Raytheon Co.](#)'s [Phalanx](#) gun system, which is used by the U.S. Navy, also identify and engage targets autonomously. However, unlike the Harpy, the Phalanx is defensive, protecting ships from incoming missiles just before they strike.

IAI and Raytheon teamed up to offer a version of the Harpy to the U.S. Navy in a [program](#) known as the Combined Uninhabited Target Locate and Strike System (CUTLASS) but it did not become operational.

Hey Hey, Ho Ho, Killer Robots Got to Go

In 2013 several nongovernmental organizations launched the [Campaign to Stop Killer Robots](#), which [calls](#) for "a pre-emptive and comprehensive ban on the development, production, and use of fully autonomous weapons" and seeks an international treaty to enforce the ban. In May of 2014, [Human Rights Watch](#), one of the founders of the campaign, issued a [report](#) that said robots lack judgment and compassion and can't "comprehend or respect the inherent dignity of human beings."

In April, experts and representatives of nations and organizations [met](#) at the United Nations offices in Geneva to discuss the technical, ethical and legal issues of Lethal Autonomous Weapons Systems (LAWS). The U.N. stated that

discuss the technical, ethical and legal issues of Lethal Autonomous Weapons Systems (LAWS). The U.S. [stated](#) that its policy “neither encourages nor prohibits the development of such future systems.”

The evolution of law, policy and regulation usually advances more slowly than technology. Companies developing this technology should be forewarned that the legal landscape is still nebulous.

While the human rights community is concerned that an AWS can't be held accountable for harm to noncombatants on the battlefield, the issue isn't unique to autonomous systems. Today, if any manned weapons system causes unintended harm to noncombatants as a result of a technical failure, there is also no accountability. It isn't clear that autonomous weapons present a new problem.

The Plus Side

Robots may be both safer and cheaper than soldiers, giving the U.S. military good reasons to pursue AWS.

Ever since the first cave-dweller picked up a rock and threw it, warriors have sought to kill from greater distances. From the longbow to the crossbow, musket and cannon and on to the aircraft and intercontinental ballistic missile, soldiers have moved destructive power toward and humans away from danger. An AWS is the next logical step in weapons evolution -- sending machines into harm's way better protects our soldiers.

In addition to concern for the welfare of soldiers, there is the matter of cost. Budget constraints have increasingly forced the U.S. military to choose between paying for generous personnel benefits or better equipping and training the force. Robots don't need health care or a pension. They won't lose a limb, suffer from post-traumatic stress disorder -- or go to college on the GI Bill.

The benefits of lethal robots may not accrue only to the side employing them. While robots lack compassion and judgment, they also lack other less admirable human qualities that emerge in war. Robots don't get tired, angry or drunk. They don't kill based on ethnic, religious or racial hatred. Veterans tell tales of courage and honor, but they also tell of unspeakable horror and cruelty. As Rosa Brooks, a law professor at Georgetown University, wrote in an essay, [In Defense of Killer Robots](#), “Humans, not robots, came up with the bright idea of firebombing Dresden and Tokyo; humans, not robots, planned the Holocaust and the Rwandan genocide.”

Like humans, robots may kill an innocent or destroy an illegitimate target, but it's difficult to imagine a robot committing war crimes such as torture, pillaging, or rape. Robots might follow [international law](#) better than humans. Civilians in a war zone may have less to fear from an invading robot army than from an enemy force of angry and tired soldiers fearing for their own lives.

Robot fighters might offer new, more humane options in battle. In close-quarter combat, infantry soldiers have an instant to decide whether a person coming around a corner is an enemy soldier or a child. Hesitating too long before pulling the trigger could cost the soldier's life. A robot, not programmed for self-preservation, would have more time to decide if engaging the target is appropriate.

Imagine a Marine platoon taking fire in a village where enemy soldiers are interspersed with civilians. The platoon leader might send his Marines house-to-house, placing his troops at [great risk](#). Or the commander could call in an air or artillery strike, protecting his men but resulting in the death of innocents. Sending robots in to clear the houses and take out the enemy soldiers might preserve the lives of both friendly troops and noncombatants.

Robots will make mistakes -- and in fact they already have. In 1979, a worker at an automobile plant was [killed](#) by a robot arm. Robot errors in war will stem from a hardware failure, such as a trigger getting stuck in “fire” position, or a software failure that leaves the robot facing circumstances its programmers didn't anticipate.

What robots won't do is kill the wrong target willfully. Robots could also be [hacked](#) and turned on friendly forces, but as [insider attacks](#) in Afghanistan have shown, human soldiers are also, in a sense, subject to “hacking.”

Costs Versus Benefits

Nobody is claiming that [Google Inc.](#)'s self-driving cars will be error-free, but with an estimated [32,675 people](#) killed in vehicle accidents in the U.S. in 2014, many undoubtedly a result of human mistakes or impairment, it seems that robot vehicles might be the safer option.

When it comes to killer robots, a cost-benefit analysis, similar to the trade-off discussed with robot cars, might be conducted. The key question the military must ask isn't whether it's moral for robots to kill, but whether there are circumstances in which a robot is more militarily effective and less likely to harm noncombatants than a human soldier.

Given the history of human failings in warfare, and the rapid advances in technology, the answer to that critical question probably will be yes.

More War at Lower Prices?

As robots replace some soldiers and reduce the risk inherent in war, might nations become more willing to initiate armed conflict? Will the prospect of a casualty-free war encourage political leaders to abandon diplomatic solutions in favor of military action?

Of course there is another side to this coin. The U.S., reluctant to put “boots on the ground” against Islamic State extremists, is currently striking from the air -- with very little risk to our forces. As a result, the conflict drags on and the victims of the Islamic State multiply. If the U.S. could put killer-robot boots on the ground, might it be more willing and able to end the conflict sooner and reduce the harm the Islamic State is causing?

There are no easy answers to these questions, but with the era of killer robots fast approaching, we certainly should be asking them.

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