

Mad, Mad Killer Robots
By Lieutenant Colonel David W. Szelowski, USMCR (Ret.)

A frequent theme of science fiction writers has been the attack of robots and computers against humanity. *I Robot*, *Red Planet* and *Stealth* posit unnerving scenarios of robots run amuck; *2001 A Space Odyssey* depicts a computer making disastrous decisions because of contradictory orders. Then there are *Colossus*, *Eagle Eye* and *The Terminator*, in which supercomputers, once having become sentient, decide humans are a bit of a nuisance and so these machines take over the Earth. All the above are cautionary tales of fiction, yet the lessons they teach have spilled over into the world of fact. Thus, current fears are that a new generation of autonomous robots will independently commit illegal and unethical acts. Some critics are so alarmed that they have even called for new international laws to restrict the use of autonomous robots.

Most of these fears center around false comparisons, poor logic and ignorance. Critics have drawn comparisons between current Unmanned Aerial Vehicle (UAV) operations and hypothetical autonomous robot operations. Assertions have been made that autonomous robots are wholly independent and free of all constraints. Critics argue that by being free of all constraints autonomous robots will with reckless abandonment violate international law. In fact some argue that the very existence of autonomous robots violates The Law of Land Warfare.

Noel Sharkey of the University of Sheffield, among others, has expressed concern that autonomous robotic operations might be unethical, and bases his argument upon current UAV strikes against the Taliban. He hypothesizes that the more distant from the battlefield humans are, the more unethical military behavior will become. This is

reminiscent of the old expression “morality at 20,000 feet,” which was used to limn out the ethical issues of unrestricted aerial bombing.¹ Depending upon the source, however, current UAV attacks in Pakistan have had a Taliban-to-civilian kill ratio of 1-to-.4, far lower than the Professor’s calculations of 1-to-49.² Yet, his argument is about policy, not robots, and does not treat the reality that the effects of a Hellfire missile fired from a manned F/A-18, or from a remotely controlled UAV, or from an autonomous robot are identical.

What must be understood is what autonomous robots are and what they are not. The fact is that many confuse the term “autonomous” with the term “independent.” In a strict sense all humans are autonomous, but in militaries no link in the chain of command is truly independent. This is, of course, not absolute, as humans do have free will and can and have gone rogue in the past. However, robots by their very nature cannot go rogue. By integrating autonomous robots into military units, we ensure that they will be subject to a chain of command, which in turn guarantees proper command and control.

An autonomous robot, by definition, is able to, *on command*, launch, perform a mission and return. It receives its orders by being programmed to perform a specific mission, although being autonomous means that the robot also will analyze its physical environment as how best to accomplish the mission assigned. Generally this means what path to use to traverse from the assembly area to the objective and back. This does not make the robot independent; it just makes it a tool.

Yes, robots are tools, just as a hammer is a tool. The proper use of a hammer is to strike a nail. To take that same hammer and murder your neighbor with it is unethical, but the hammer has no self-awareness to evaluate the difference. The person wielding the

hammer has the responsibility to decide the ethical use of that tool. Autonomous robots work in the same way as does the hammer. An air-to-air fire-and-forget missile, which is a primitive kind of autonomous robot, does not evaluate if it is ethical to destroy the target it was told to destroy. That ethical responsibility lies with the commander who selected the target.

The scenario most objectionable to critics occurs when a robot is deployed to secure an area and must unilaterally discriminate among targets. In other words the robot decides if a target is legitimate or not. To some the concept that a robot—a machine—would make a determination to shoot or not is unethical. What is not realized is that humans will have formed the mission's criteria prior to deployment of such a robot, much in the same manner as is done with today's anti-missile systems. Currently, when commanders feel that there is an immediate threat of high speed-missiles, they can place their anti-missile batteries on automatic. This means, in effect, that any target meeting a specific profile will be attacked instantly without direct human intervention. However, in this situation the decision and the ethical responsibility rest with the commander and are based upon the threat situation.

The autonomous robot is just another tool in a commander's toolbox. How it is used will be based upon capabilities of the robot and evaluation of the tactical situation. Part of that evaluation concerns the rules of engagement (ROE). The ROE is not something programmed into the robot; rather, how the robot is deployed reflects the ROE as interpreted by the commander. This situation is not unique, as all weapon systems are deployed in this manner. Instructions and deployment of these robots is a command decision.

Will there be errors? Yes. Any complex machine breaks down over time. The most likely error for an autonomous robot to make is not to shoot or not to complete a mission. But errors of judgment are always human. Examine two famous and tragic shootdowns. On April 14, 1994, as part of Operation Northern Watch, two F-15s shot down two US Army Blackhawk helicopters, mistaking them for Saddam Hussein's Mi-24 Hind attack helicopters. In this case the pilot, who had visually identified the target as an Mi-24s, was authorized to shoot by a controller on an Airborne Warning and Control System E-3 airplane. If an autonomous robot had been flying that mission is it likely it would have shot down the two American helicopters as well, because it was an airborne controller who gave the order "weapon free." But it also is possible that a robot would have noticed the physical configurations did not meet that of a Hind.³ In the case where the USS *Vincennes* shot down an Iranian Airbus A300, the captain of the ship was distracted by a surface engagement and thought the ascending Airbus was a descending F-14.⁴ An autonomous robot would have detected the difference in attitude but might have engaged the Airbus if the ROE air defense bubble had been breached. Clearly, robots could have made the same errors, but they still would have been errors of human judgment, because it was humans who created the criteria to shoot or not to shoot.

Replacing humans in the cockpit or at the helm does not alter international standards in war. Autonomous robots are tools, they are weapon systems, which are, and will be, incredibly complex, but they do not represent a weapon whose effects are unique. A missile fired from an autonomous robot has the same effect on a target as one fired by a human and The Law of Land Warfare is specifically concerned with effect. The purposes of The Law of Land Warfare are severalfold: mitigate against undue suffering

among combatants, protect non-combatants, reduce unnecessary destruction and limit the duration of war. This law took customary battlefield restraints, *jus in bello*, and codified them by treaty.

One of the earliest efforts to ban a cruel weapon was in 1139 when Pope Innocent II banned the use of the crossbow against fellow Christians. In the modern era the St. Petersburg Convention of 1865 banned exploding bullets over a specific size. In 1898 the Germans proposed the banning of expanding bullets, so-called dum-dum bullets, and this was later to become accepted as an agreed-to international standard maintained to this day. The aim of such efforts was to reduce unnecessary suffering of the combatants and this trend has continued over the years.

Protection of non-combatants was equally important. The original Hague Conventions specifically addressed protection of non-combatants. This has continued as codified in the Geneva Conventions. Humane treatment of prisoners of war and the prohibitions against attacking medical staff and facilities were added in 1949.

There are two other important concepts contained in The Law of Land Warfare: distinction and proportionality. Commanders have to discriminate between lawful combatants and non-combatants, and to do this combatants must wear distinctive uniforms and openly display their weapons. As weapons become more precise this discrimination becomes more important. In 1997 the Ottawa Treaty that banned the use of landmines was signed.⁵ This treaty was to protect against indiscriminate killing—a land mine (or Improvised Explosive Device, IED) cannot determine the difference between combatant and non-combatant.

A quote from medieval days about proportionality in warfare—“Kill them all and let God sort them out”⁶—is hardly applicable today. Commanders on today’s battlefield must use the proper proportion of force to accomplish the mission. In other words, to kill a lone sniper it might be more appropriate to use a rocket against a single room in a building than to order a massive air strike that destroys a city block in which that building is located. The problem is that it might require the lives of a dozen soldiers to get such a rocket in place. While military necessity does allow a commander to destroy the city block to kill the sniper if it means fewer casualties or to protect non-combatants, it is also the case that selecting the correct weapon under The Law of Land Warfare is a command, and very human, responsibility.

The legal principle of Command Responsibility was instituted by the Hague Convention in 1907. It established that a commander is responsible for his/her actions, inactions and the activities of his/her subordinates. Thus it is a war crime for a commander to execute non-combatants or to allow non-combatants to be executed. Through the use of ROE, which can differ from battle to battle, the commander shapes the conduct of his/her command. Protected areas, such as religious and cultural sites, are designated as such. What weapons to use also falls under command responsibility. Using the principles previously discussed, targets are attacked with the proper weapons available. This requires human judgment.

Robots are tools and in war will be used like any other weapon. Autonomous does not mean robots will be given the responsibility to make judgments regarding the rules under The Law of Land Warfare any more than a cruise missile makes such judgments. Humans use judgment; robots compute. When a K9 police officer launches an attack dog

against a suspect, the dog cannot evaluate the ethical or legal issues involved, as that responsibility lies with the police officer. In turn, an autonomous robot cannot be programmed with ethics. It requires human judgment to know when to use a robot and assign it the appropriate weapons. Robots will be more precise than their human counterparts, but it will always be humans who assign the missions, the means and the constraints.

Can autonomous robots be used unethically? Yes. Any tool can be used unethically. Current international law is attentive to the unethical use of any weapon but does not prevent deliberate mis-use; the ongoing war crimes trials reflect that fact. New international standards are unnecessary, as the ones in place are more than adequate. The alternative proposal of programming an autonomous robot with The Law of Land Warfare instructions is dangerous—dangerous to the body of international law already established. While the concept of designing a weapon with ethical self-restraint sounds ideal, even if this were possible it would attempt to shift responsibility for a robot's actions from human commanders to the robot.

Autonomous robots will have a place on the battlefield. Their very existence is not unethical, although some people find the concept unpalatable and frightening. How and when robots are deployed is a function of human judgment. Integration of robots into existing units will insure these new weapons are subject to human will and it will be the commanders who are held accountable for their use.

¹ Palmer, Jason, “Call for Debate on Killer Robots,” BBC News August 3, 2009, <http://news.bbc.co.uk/2/hi/technology/8182003.stm>

² See Bergen, Peter and Tiedemann, Katherine, “The Year of the Drone, An Analysis of U.S. Drone Strikes in Pakistan, 2004-2010,” New American Foundation, February 24, 2010 updated July 15, 2010. <http://counterterrorism.newamerica.net/drone> provides a detailed analysis of UAV attacks from multiple sources less biased than Professor Sharkey’s calculations.

³ The Hind main rotor rotates clockwise, the opposite direction of American-made helicopters, and its tail rotor is on the starboard side; the Blackhawk’s is on the port.

⁴ In both blue-on-blue examples the issues are very complex and the precise nature of why they occurred will always be subject to speculation and alternative theories.

⁵ The United States is not a signatory to this treaty.

⁶ modern-day France.

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