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Meet A.I. Joe

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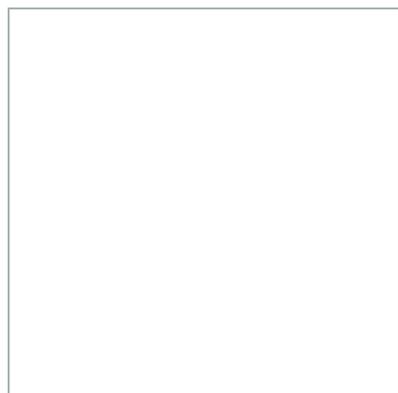
Isaac Asimov's laws of robotics, first codified in his 1942 short story "Runaround," sought to steer use of artificial intelligence in peaceful directions. AIs were never to harm humans, or by inaction allow them to come to harm. Within months of the elucidation of these laws, however, an extremely primitive robot, the Norden Bombsight, was being put to lethal use by the U.S. Army Air Corps. The bombsight combined a computer that calculated various factors affecting an aircraft's arrival over a target with an autopilot. Touted for its accuracy from high altitude, the Norden nevertheless tended to miss the aim point by an average of a quarter-mile. Yet pilots routinely turned over control to the machine for the final run to target.

In the 70 years since the end of World War II, AI has advanced enormously – and the U.S. military (more about others later) has continued to show a steady appetite for acquiring lethal robots. For example, Tomahawk cruise missiles, the great-grandchildren of the Norden, once launched find their own way to far-distant targets over even the most complicated terrain. Yet the enemy sometimes eludes the Tomahawks, which end up killing the wrong people.   The Phalanx ship-defense system is another important military robot – many missiles move too fast for human reflexes – but Phalanx, limited to close-in, Gatling-gun-like defensive fire, is unlikely ever to cause collateral damage to noncombatants.

For all the advances in AI, however, there remains a significant reluctance to embrace the notion of fully autonomous action by machines. Hence the popularity today of remotely controlled aircraft and ground combat systems. Indeed, the growth in the number of drone pilots has been explosive, and soldiers on the ground have become very attached to their machine buddies; there have even been instances when ground drones have been given medals, and have been ceremonially buried when "killed in action." It is fascinating to see the great emotional appeal of the machines juxtaposed with the intellectual fear of what robots might do in the future, when they become more able to act independently.

And that fear is more than just the residue of the dark tropes of the Terminator and Matrix film franchises – not to mention Ultron – or of the Battlestar Galactica series reboot. Or, for that matter, of the worries about robots most recently expressed by luminaries like Stephen Hawking. There are real and practical concerns about autonomy and flawed machine judgment. How is a robot to determine the difference between enemy soldiers and noncombatants? This is a difficult-enough problem for human soldiers in the irregular wars of our time. Other questions are, when should a robot keep fighting or stop shooting if the foe is wounded? Or is trying to surrender? And in the case of a robot-piloted attack aircraft, can it discriminate between military and civilian targets adequately?

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Even worse, can robots be hacked? The Iranians claim to have hacked an American drone and brought it down safely on their territory back in 2011. However it happened, they have it, and refused to return it when President Obama somewhat cheekily asked for it back. This incident should prompt us to consider the question: what if robots could be taken over and turned on their masters? A coup of this sort would require a high level of technological sophistication and an absolute mastery of the radio-electromagnetic spectrum, but the consequences of one side being able to do this would be catastrophic for the side whose robots were taken over.

Strategic concerns aside, on the political front, ethical and practical concerns about robots have been raised at the United Nations, which in April 2013 released a report calling for an immediate moratorium on the development and deployment of "lethal autonomous robots" (LARs). The report is part of a valiant effort to stave off the onset of an AI arms race, but indicators, from many places, are that the race is already on. In Britain, for example, the Taranis combat aircraft (named for the Celtic god of thunder) has quite autonomous capabilities, unlike the Predators and other types of drones that we have become familiar with over the past decade. The British are also moving toward fielding robot soldiers. Their humanoid Porton Man – unlike most other army robots, which look like armed tracked vehicles about the size of Hot Wheels – reflects exceptional sophistication of design.

The Russians are not far behind, although their Strelok sharpshooter and Metalliste machine gun and grenade launcher systems, while apparently having some autonomous capability, seem to be kept under fairly close human control. But don't count on it staying that way.

Similarly, the Chinese military is making swift advances in both remote-controlled and autonomous systems, on land, at sea, and in the air. Their advances in naval mine warfare, which cannot be adequately addressed in this open forum, include weapons that can sense the type of ship coming along and move stealthily to attack it. There is also evidence of Chinese sea mines with a capability to detect and then attack helicopters flying above them.

Against these rising threats, the United States Navy is developing some autonomous mine-clearing technologies – giving the undersea fight an increasingly robot v. robot flavor.

The same is true in cyberspace, where the sheer speed and complexity of offensive and defensive operations are driving a shift to reliance on robots for waging cyberwars. Again, this is an area about which little can be said openly, save that here is yet more evidence that the arms race the United Nations seeks to prevent is well under way. That suggests it is high time for an international conference – and an accompanying discourse – on the prospects for crafting robotic arms control agreements. In this way, we can keep alive the ideal of peaceful robotics that Isaac Asimov introduced so long ago.

There may be no way, ultimately, to stop the spread of killer robots; but at the very least, they should be obligated to observe the laws of armed conflict, like their human counterparts.

John Arquilla is professor and chair of defense analysis at the United States Naval Postgraduate School. The views expressed are his alone.

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