



## Strategic Insights: The Landpower Robot Revolution Is Coming

December 10, 2014 | Dr. Steven Metz

Military technical revolutions have a distinct pattern. When new technology becomes available, it initially is used to augment existing operational methods and tactics. In Europe, for instance, the first firearms were used to give formations of pikemen more punch. On the battlefields of World War I, tanks were moveable pill boxes supporting slogging infantry attacks. Airplanes were used like old-fashioned cavalry, scouting for the infantry and artillery. Later, they supplemented infantry and artillery by strafing and bombing. Even the first atomic weapons were simply a very effective way to do the work of traditional 500 pound bombs and incendiaries. Only later was the revolutionary potential of these new technologies unleashed when visionaries devised radically new ways to use them and different formations to optimize their impact. Over and over, technological innovation came first, and revolution followed.

Now this is happening again with military robots. Their potential is clear and stunning, particularly for America's ground forces. Robots may help the Army resolve its most pressing strategic dilemmas: first, finding a way to have wide ranging, protracted presence with a deployed force small enough to avoid becoming an "antibody" in a foreign culture and economical enough to leave in the field for an extended time and, second, surviving in environments replete with sensors and precision weapons. As Paul Scharre of the Center for a New American Security explains:

Uninhabited systems can help bring mass back to the fight by augmenting human-inhabited combat systems with large numbers of lower cost uninhabited systems to expand the number of sensors and shooters in the fight. Because they can take more risk without a human onboard, uninhabited systems can balance survivability against cost, affording the ability to procure larger numbers of systems.<sup>1</sup>

Robots, when paired with a small number of troops or possibly even operating alone,

could provide a saturating, long-term presence in an economical, politically palatable way, but only if revolutionaries create effective concepts and organizations.

It is, of course, impossible to predict exactly how the Landpower robot revolution will unfold. Like many revolutions, this one will first see competing concepts which will be tested via wargaming, experimentation and, in the the ultimate measure of viability, on the battlefield. What works will be emulated and improved; what does not will be abandoned. There may be dead ends—the Maginot Line of robots. Yet, even though the precise course of the robot revolution is unclear, the questions that must shape its initial phase are slowly coming into focus.

The first is: What is the appropriate mix of humans and robots? The answer, of course, depends on the nature of the operation and the capability of the robots. It seems likely that counterinsurgency, stabilization, or peacekeeping missions which require a saturating presence over a long period of time will be performed by military units with many robots and few humans. This would limit the ability of insurgents or other enemy forces to operate unseen or hidden in complex terrain like megacities or to erode American will by maximizing U.S. casualties. It would also minimize the hostility that large numbers of American troops can generate among the population in an operating area. Similarly, missions such as resupply or the distribution of humanitarian relief could be performed by robot dominated units. Very dangerous missions such as opposed assaults or operations in a contaminated post-nuclear or post-plague environment might be done by military units with no humans on location.

The optimal mix of humans and robots may change during an operation. In a stabilization operation, the initial entry force might be robot heavy until enemy opposition is suppressed; then human dominated to establish relationships and confidence among the local population; then robot dominated or robot-exclusive to sustain situational awareness and a saturated presence over a period of months or years and lower the visibility of U.S. forces. One thing that the upcoming robot revolution must grapple with is the specific operational conditions that trigger a shift in the proportion of robots and humans. How would a commander know when it is time to go robot heavy and robot light?

A second big question for the architects of the revolution will be: How autonomous should the robots be? Because everyone is familiar with science fiction novels, stories, and movies where robots become sentient and turn on their human creators, there is a sense that autonomous systems should not be **too** autonomous. Often that translates into an insistence that there always be a human “in the loop” when a robot uses deadly force. However sound in theory, that has not been the case for a century. Mines, booby traps, and improvised explosive devices essentially make “kill” decisions based on design

without a specific human authorization. And in many cases, the decision to shoot or not may happen too quickly for a human to make a yes or no decision, particularly in robot-on-robot engagements. Like it or not, part of the upcoming Landpower robot revolution will be designing algorithms which determine when a robot is authorized to use force on its own. As with the question of force mix, there may be no single right answer. Whether to set the bar high or low for a robot to use force without explicit approval from a human may vary according to the mission, operating environment, nature of the enemy, and political guidance.

The third question is: What type of people will be needed for robot heavy Landpower formations? Those who deploy to the battlefield with robots will need the same physical and intellectual attributes that have characterized soldiers throughout most of history. But what of those who partner with robots from a distance? It is already clear that drone operators do not need exactly the same skill set as a pilot in a manned fighter aircraft. This would also be true for a robot centric Landpower organization. Using robot operators who do not have to meet the physical or age requirements of soldiers in the field would greatly expand the recruiting pool. On one hand, there is no obvious reason why a robot centric Army could not have separate branches for robot partners and field soldiers with different reward structures and career patterns. But forging an effective team with such a bifurcated arrangement will be a challenge.

The fourth question is: What effect will robot centric Landpower have on American national security policy? It seems likely that a future president would find it easier to deploy a heavily or completely robotic unit and to keep it in the field for an extended time. This could help with deterrence and crisis containment. But by making it easier to use force, a robot centric military could also tempt a future president into conflicts and crises that the United States might otherwise avoid. This could have a number of adverse effects, including provoking terrorism attacks on Americans and embroiling the United States in quagmires. The Founding Fathers intentionally made it difficult for the United States to use force. Robots, like airpower, will erode this firebreak. Americans must consider whether this will be a good thing or not. A future Landpower robot revolution needs not only an operational and force development component, but a strategic one as well to help policymakers decide when, why, and how to use the robot centric military formations.

The final question which the architects of the upcoming Landpower robot revolution must consider is what to do about enemy robots. Given that most of the innovation in the field of robotics comes from the private sector, not government labs, it would be foolhardy to believe that the U.S. military is the only entity that will integrate robots or even that American robots and robot centric Landpower formations will always be better than the enemy's. This means that concepts like force protection, robot evacuation, and

repair will be important. The issue of how much autonomy a U.S. robot will be given also applies here. Will it make sense to say that a robot has full autonomy to engage and destroy other robots, but not humans? Perhaps the time is coming when it will be difficult to distinguish a robot and a human, whether because robots become more human-like to better interact with local populations or through a melding of machine and human—what futurists call the “singularity.”<sup>2</sup>

An old aphorism says that people “don’t know what they don’t know.” That certainly applies to the upcoming Landpower robot revolution. There are likely to be other tactical, operational, strategic, organization, psychological, and ethical questions which prove even more important. Identifying them will be vital during the first stages of the robot revolution. Even though it is clear that a revolution will happen, it is hard to tell where it will take place. Will it be the Army’s existing network for innovation, including the schools in the professional military educational system, the battle labs, and the various “centers of excellence”? Will it be in the offices of mavericks outside the formal system of innovation? Will it be in cutting edge corporations? Or will it be led by America’s enemies, with the U.S. military reacting as it falls behind?

At this point, it is possible to discern the questions, but the answers await. Even in a time of severe resource constraints, the Army must grapple with them lest it be surprised by a Landpower robot revolution that began without it.

## ENDNOTES

1. Paul Scharre, *Robotics on the Battlefield Part II: The Coming Swarm*, Washington, DC: Center for a New American Security, 2014, p. 6.

2. Ray Kurzweil, *The Singularity Is Near: When Humans Transcend Biology*, New York: Viking Press, 2005.

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