

Artificial Intelligence

Myths and Realities

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The Air Force's love affair with technology dates to its formative years in the early twentieth century. The romance quickly became an obsession when its first pilot gripped the yoke of his SPAD (*Société de Production des Aéroplanes Deperdussin*) biplane and took off into the skies. After 70 years, our service is still involved in the ultimate marriage between human and machine, and Airmen have relied on technology to take them to the farthest reaches of space, or to launch satellites that enable the precise application of airpower wherever and whenever America demands it. The Global Positioning System (GPS), for example, not only guides our fifth-generation fighters, such as the F-35 Lightning II, and remotely piloted aircraft, like the MQ-9 Reaper and RQ-4 Global Hawk, it is also the premier means of command and control for all of America's armed services. With GPS' help, combined with the MQ-9 and RQ-4, the USAF has become the undisputed leader of automation in flight today. So it stands to reason that in this century, Airmen and their machine partners are probably as close as two teammates can get.

In reality, Airmen are “in the loop,” that is, the US's satellites and aircraft, both manned and unmanned, are firmly in their hands and under their command. This power dynamic is balanced cautiously in favor of the human side, and endowing computers with artificial intelligence (AI) might upend it. Noah Shachtman, an American journalist who was interviewed by P. W. Singer for his classic book *Wired for War*, explained that this view of the human-machine relationship is understandable. “It helps keep people calm that this isn't the Terminators.” He continued, “The core competency of the military is essentially shooting and blowing up things. So, no one is eager to say, ‘Outsource that to a bunch of machines.’”¹ Sensing that AI's development was at a critical point, billionaire financier Elon Musk, along with 109 scientists and scholars, called upon politicians to gain control before it was too late. In an open letter to the United Nations last year, the group dramatically announced AI “poses a fundamental risk to civilization” and could cause armed conflict “to be fought at a scale greater than ever, and at time scales faster than humans can comprehend.”² Many Airmen, especially those in the intelligence career field, think AI will take precious human factors, such as emotion or experience, out of the decision-

making equation. Others believe that if AI is too involved in intelligence, piloting, or even medicine or manufacturing, human beings will be out of work and obsolete.

The fear of technology's novelty or the myths that surround it is nothing new. The most famous example can be traced to the nineteenth century when English textile workers known as the Luddites smashed their weaving machines to save their jobs. Even so, as the Luddites were grappling with their new reality, US textile weavers were optimizing their labor processes. According to *The Economist*, the introduction of machine laborers caused US textile output to increase 50 times, but the amount of work necessary to create so much cloth decreased by 98 percent.³ Cloth became cheaper, and as demand increased, the requirement for textile machine operators between 1830–1900 quadrupled. The old weaver's job elimination sparked a revolution, but more importantly, it brought about the demand for new technical and managerial expertise that liberated future workers' time to manage multiple machines, analyze their output, and refine schedules to maximize production.

Out with the Old

If it breaks through the myths that surround AI, the Air Force could undergo a similar revolution. Artificially intelligent devices that work in tandem with their human operators could replace jobs that are dangerous, dirty, or just plain dull. "Just as in the civilian economy, automation will likely have a big impact on military organizations in logistics and manufacturing," said Michael Horowitz, a University of Pennsylvania professor and an expert on robots built for warfare. "The U.S. military is very likely to pursue forms of automation that reduce 'back-office' costs over time, as well as remove soldiers from deployments where they might face risk from adversaries on fluid battlefields, such as in transportation."⁴ Robots guided by master technicians could delicately inventory and handle ordnance storage. Convoys of driverless vehicles led by a human driver could deliver supplies to frontline Airmen. According to a recent RAND Corporation study, autonomous vehicles' use might result in fewer crashes, reductions in travel time, and the exploration of alternative energy sources.⁵ The DOD's newest arm, the Defense Innovation Unit-Experimental (DIUx), is attempting to attract Silicon Valley's investment in cutting-edge know-how.⁶ Sometime in the not-so-distant future, a human F-35 pilot will use selective, real-time intelligence to command three semiautonomous wingmen and carry out preprogrammed, or dynamic missions, from his cockpit.⁷ Tanker and logistical aircraft that refuel fighters and bombers and resupply troops across the globe are also ripe candidates for AI and automation. Much like the RQ-4 with its extended loiter time, these aircraft could conceivably stay in the air 12 hours or more and still be available for operations far longer than most pilots might like. The tedium alone that comes with mission administration or writing postmission reports also faces elimination. From the *Washington Post* to the *Associated Press*, AI is already writing sports stories and financial news items that are virtually indistinguishable from reports written by human beings.⁸

With advances in supercomputing, Airmen are leading the development of advanced algorithms that seek out enemy activity from the air—or from space—with

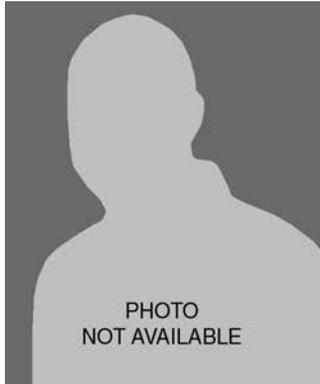
relatively minimal risk and at bargain prices. Human analysts are awash in a sea of data and, in an April 2018 Google-sponsored think-tank event that discussed AI, USAF Vice Chief of Staff Gen. Stephen W. Wilson said, “An intelligence analyst gets it right 75 percent of the time.”⁹ In a \$10 million initiative called Project Maven, computers are fed images of North Korean mobile missile launchers—taken at every angle—from various sources like satellite imagery and parade footage.¹⁰ A computer builds the very fundamentals of its AI as humans teach it to recognize these vehicles and their exact measurements. With increasing speed, computers will also be able to statistically determine normal versus abnormal activity as launchers are geolocated and labeled so that their movements from home garrison to launch pad can be mapped. Hours of searching for targets on the move will be a thing of the past. Someday Airmen might routinely program computers to recognize missile launchers as they are instantly captured by space-based sensors and seek a response from their human operators if the activities are outside predicted norms. Apply this concept to other intelligence disciplines, and it could determine an adversary’s intent and eliminate much of the guesswork. The long hours Airmen spend observing these vehicles and assembling patterns of life could be eliminated. Humans who correctly teach their computers to seek out abnormalities could program them to reprioritize their work and even cue other airborne observers to either investigate the activity or ignore it.

USAF leaders will likely accept a substantial risk before undertaking a serious AI initiative, and Musk and company’s dire warning illustrates the point. Old career fields might wither and die, but new work for algorithm-programming Airmen is yet to come. The techniques these career fields use to process information derived from unmanned reconnaissance assets alone—all the raw full-motion video and geospatial intelligence they produce—is woefully out of date because they lack some means of computerized sense-making. Presently, it’s up to the individual Airman to interpret and collate data into a coherent picture, and the pace of today’s style of warfare demands improvement. In the end, it is difficult to predict where AI might lead the Air Force. In the near-term, the organization will probably internally struggle with relinquishing more control to computers and managing the gap between those who want to develop new skills versus those who simply don’t. At the very least, the Air Force should consider an aggressive public relations campaign that promotes the benefits of AI. Full-fledged partnerships with DIUx and Silicon Valley might even lead to a full-on AI culture shift for the Air Force and a more versatile human-machine team—for better or worse. 🌀

Notes

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