The Rise of the Humans – The Future of War is Not a Machine

Every civilization has sought the strategic, operational, tactical, and technological edge in war. Every generation has also believed they were on the cusp of a technological revolution that would give them a decisive and enduring advantage. The 21st century has been no different. Yet the earliest known treatise on warfare, Sun Tzu's *The Art of War*, is a guide to anticipating and exploiting human behavior. Fast forward to the 19th century where the most influential military thinker, Karl von Clausewitz, reaffirmed that war is, at its very essence, a human endeavor. This is not to diminish the importance of technology. The addition of cyber and space to the complex cross domain environment of land, sea, and air, the unprecedented flow of information in all its forms, and the intensifying competition for resources and influence necessitate innovative approaches. As warfare is increasingly characterized by the automated, the autonomous, the augmented, and the artificial, the most decisive advantage continues to be the human.

All the technology that glitters is not gold

People are naturally dazzled by what's new or futuristic, from the coolest stealth jet to drone swarms, or the potential impact of artificial intelligence. Cutting-edge technology certainly underpins peer state competition and drives other security factors. However promising new technologies might be, they will not evolve evenly or simultaneously. Technology is often mixed and messy. The U.S., its allies and competitors will inevitably operate with a mixture of old and new, obsolescent and cutting edge. Modern battles employ relatively low-tech weapons, such as IEDs and (human) suicide bombers. Moreover, national security organizations function in bureaucratic, rigid, outdated structures, with constrained budgets dictating hard choices between capability and capacity. "Technological developments are empowering, infatuating, and frequently irresistible. But they carry real risks that are obscured by complexity, bureaucratic momentum, misunderstanding, and the thirst that individuals and organizations have for enhanced capabilities."[1] The U.S. must learn how to fight through and succeed despite these challenges.

The desire to substitute technological superiority for both mass and human lives is inherent in the American way of war. The pursuit for the single point solution – the proverbial silver bullet that would make warfare less bloody and messy – skews the perception of technologies' application and value. Yet, single point solutions are all too often single point failures. Consider the Maginot Line that was supposedly impossible to penetrate, but easy to get around (at the point where it was believed unlikely to happen). Likewise, every new weapon is effectively born with the countermeasure already imbedded in it. Sooner or later, that countermeasure would render the silver bullet an expensive, but useless, relic. The U.S.' creation (and use) of the atomic bomb dramatically demonstrated an increase in lethality different from any other kinetic weapon or technology ever created. Yet the advantage did not last long, as Russia rushed successfully to develop the capability (a decade earlier than the U.S. believed they could). Meanwhile the democratization of technology levels the battlefield as it becomes cheaper and accessible (e.g. jammers and drones), complicating and competing with their pricier counterparts.

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[1] Richard Danzig, "Technology Roulette: Managing Loss of Control as Many Militaries Pursue Technological Superiority," *Center for a New American Security*, June 2018, https://s3.amazonaws.com/files.cnas.org/documents/CNASReport-Technology-Roulette-Final.pdf.

Many believe that technology can compensate for human deficiencies. Systems and algorithms can be designed to analyze, process, and even decide more efficiently. Yet humans create the technology and design the machines. As a result, machines inherit their assumptions and biases, which technology is usually not designed to detect or deflect. The essence of technology, whether it's GPS or artificial intelligence, is to find the most efficient solution, which might also be the least appropriate or moral approach. For example, the best way to take out a high value target may not care that it might destroy an orphanage or hospital. Even an algorithm that accounts for such factors still doesn't prevent second and third order effects. While machine learning can provide curated intelligence and AI can provide best decisions, "you don't always want to make the best decision. There could be political reasons to not make what is the best logical decision. That's for humans to do and that will always be for humans to do."[2] The advance and value of technology will always rely on the human.

The meeting of minds and machines

The challenge that lies ahead is integration. As much as technology grows in scope and complexity, it is still driven by human intentions and instincts. Integration needs to be framed by human capabilities and considerations. The first is control. Hal, the sentient computer in *2001: A Space Odyssey*, usurps power from its human protagonist to conceal both his malfunctions and the true purpose of the mission from the astronauts. Now reality has begun to approach and potentially pass this fiction. Human control over advanced technologies must proactively define the degree of autonomy that is acceptable in various situations. "These include areas such as the impact on strategy development, the 'barrier for entry' for conflict, civil-military relations, rules of engagement and establishing responsibility for the actions of robots and advanced algorithms."[3] More importantly, it will be necessary to define control in terms of ethical constraints, from which decisions should be solely human to the human impact. Adversaries may well be willing to remove the human from the loop to gain any advantage or inflict damage. Although others may operate from different ethical and legal standards, ceding the moral high ground has never been a successful long-term strategy.

The second consideration is cultural. Innovation must become part of a shared and ingrained mindset, where the flow of ideas meets the willingness to try them out. This goes beyond networks and systems. It also means establishing common strategic goals, streamlining bureaucratic structures, training for human-machine teaming, and adapting career paths to new roles and capabilities. The challenge of creating this advanced technology-ready culture will be that "human operators must trust and understand the technology enough to use it effectively, but not so much as to become too reliant upon automated assistance."[4]

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[2] Mark Pomerlau, "Here's how intelligence agencies will take advantage of machine learning and AI," *C4ISRNet*, May 2, 2018, https://www.c4isrnet.com/intel-geoint/2018/05/01/heres-how-intelligence-will-take-advantage-of-machine-learning-and-ai/.

[3] Maj. Gen. Mick Ryan, AUS, "How to Plan for the Coming Era of Human-Machine Teaming," *Defense One*, April 25, 2018, https://www.defenseone.com/ideas/2018/04/how-plan-coming-era-human-machine-teaming/147718/.

[4] Elsa B. Kania, "The critical human element in the machine age of warfare," *Bulletin of the Atomic Scientists*, November 15, 2017, https://thebulletin.org/critical-human-element-machine-age-warfare11277.

Answering this challenge requires empowerment. Investment in the human element will become a critical advantage, as advanced technologies both support and supplant many functions. Users will have to learn to account for technology limitations, and learn how to avoid blind faith in and addiction to machines. Case in point, the Naval Academy in 2016 reinstituted celestial navigation a requirement for third-year students to make up for any GPS/PNT failures. Machines and AI are still susceptible to built-in biases and false alarms. The thresholds for alerts and decisions by machines and AI will continue to be set and adjusted by people, as long as they remain in charge.

As technology unburdens everything from data collection to tactical decisions, a new burden on the human is to get the analysis and action right. This means context. Understanding adversaries' motivations and needs go beyond standard military training. Warfighting has moved beyond traditional battlefields into urban areas, social media, and other gray zones. Warfighters have become analysts and diplomats, necessitating training in languages and cultures, adversaries' socio-economic and geo-political history, psychological motivation, and communications. Anticipating, negotiating, and resolving conflicts ultimately comes down to the parties agreeing on both the problems and the solutions. There has also been an increased focus on leadership and ethics, representing how these changing, global dynamics require new perspectives and frameworks. At the opening of the College of Leadership and Ethics at the Naval War College in April 2018, Chief of Naval Operations Adm. John Richardson pointed to world-class leadership based on both competence and character as a decisive advantage over adversaries.

The final consideration is that of imagination. Failures of imagination have been the eternal human flaw in warfare, just as ingenuity and foresight have always been the keys to victory. The diffusion of technologies also challenges assumptions of what adversaries might do with it. The virtual recruitment of alienated youth out of their rooms in the U.S. and Europe demonstrated ingenuity and insight by terrorist groups at the surprise of many experts. Few imagined such immense and effective Russian interference in other countries' elections though social media manipulation and Soviet-style propaganda tactics. Peer state and non-state adversaries better understand the human terrain where they employ innovative tactics and tools. "Artificial intelligence could boost a wide range of violent non-state actors' criminal activities, including extortion and kidnapping, through the automation of social engineering attacks. The militant recruiters of the near-future may boost their online radicalization efforts with chatbots, which played a 'small but strategic role' in shaping the Brexit vote."[5] Imagination can no longer be left to technological innovation, but must be applied to human motivations and actions as the gap between what's possible and probable shrinks.

Technology will continue to change warfare. However, the nature of war is immutable: a human endeavor and a clash of wills. War will always be about blood, sweat and tears of both those who fight and those who support and sustain them. If technology advances without these human considerations, then the most important advantage is forfeited. No war can be prevented or won if this is lost.

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[5] Daveed Gartenstein-Ross, "Terrorists Are Going to Use Artificial Intelligence," *DefenseOne*, May 3, 2018, https://www.defenseone.com/ideas/2018/05/terrorists-are-going-use-artificial-intelligence/147944/.