Ahead of a deployment to Afghanistan, soldiers from the 2nd Security Force Assistance Brigade train on new Integrated Tactical Network capabilities 1 May 2019 at the Joint Readiness Training Center at Fort Polk, Louisiana. The U.S. Army Combat Capabilities Development Command is focusing its network development efforts in part on resilience, with the goal of building a network that can remain operational in a contested, near-peer conflict. (Photo by Joint Readiness Training Center Public Affairs)

Sustaining Our People Advantage in Data-Centric Warfare

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Modern conflicts around the world show that technology rapidly changes how militaries and proxy forces engage in armed conflict, creating lethal effects through the innovative and rapid adaptation of commercial tech. The speed of change in all aspects of technology, from artificial intelligence to robotics, makes it difficult to predict what a conflict will look like in the future, but we can get close by first controlling for the knowns—the nature of war. The largest "known" for future war is that it will continue to remain a human endeavor. Fortunately for the U.S. Army, *our people are our number one asymmetric advantage*. We have the best soldiers, noncommissioned officers (NCOs), leaders, and commanders of any army in the world. Our priority must be to maintain this advantage, even while the character of war is in a period of rapid, disruptive change.

Experience and observation demonstrate that a primary source of change comes from the proliferation of sensing networks and integration of technology into every aspect of daily life. These networks capture significant amounts of data for both the United States and its potential adversaries. Our Army must be prepared to compete and win in an environment where a force's ability to rapidly make sense of large amounts of data across echelons increases effectiveness in future conflict—we must become a data-centric force.[1] A data-centric force is one in which both our technological networks and our people are organized in such a way that data is visible, accessible, and understandable to commanders and their formations at the appropriate echelon. Our networks also must be secure and interoperable to ensure the seamless sharing of data globally.[2] As the Army becomes more data-centric, we will require a more data-literate force. Leaders at echelon need to be data literate and technologically competent to maximize the advantages of employing human-machine integrated formations, advanced networks, and all-arms maneuver. Because *technology will punish unskilled commanders and untrained units*, it is imperative that our Army start now with a holistic, Total Army approach to address war's changing characteristics while continuing to enhance our greatest strengths.

Forging Data-Centric Skills

The Army already has several ways to increase technological competence and data literacy throughout the force. Branches, functional areas, and military occupational specialties range from data science to offensive and defensive cyber operations. There are also organizations that provide opportunities for small numbers of soldiers to build on tech competencies and, in some cases, earn advanced degrees. These are fantastic programs, but they do not reach the entire Army. To prepare for the future fight, our soldiers, NCOs, warrant officers, civilian professionals, and officers need a systemic approach to establish, maintain, evaluate, and retain the skills necessary to operate on a battlefield inundated with advanced technologies and vast amounts of data. The institutional Army retains responsibility for synchronizing efforts across DOTMLPF-P.[3] In some cases, we will create new career programs, functional areas, and military occupational specialties for emerging skill sets. In all cases, through our training, our doctrine, and our leader development, we will establish the expectation for how every member of our data-centric force operates.

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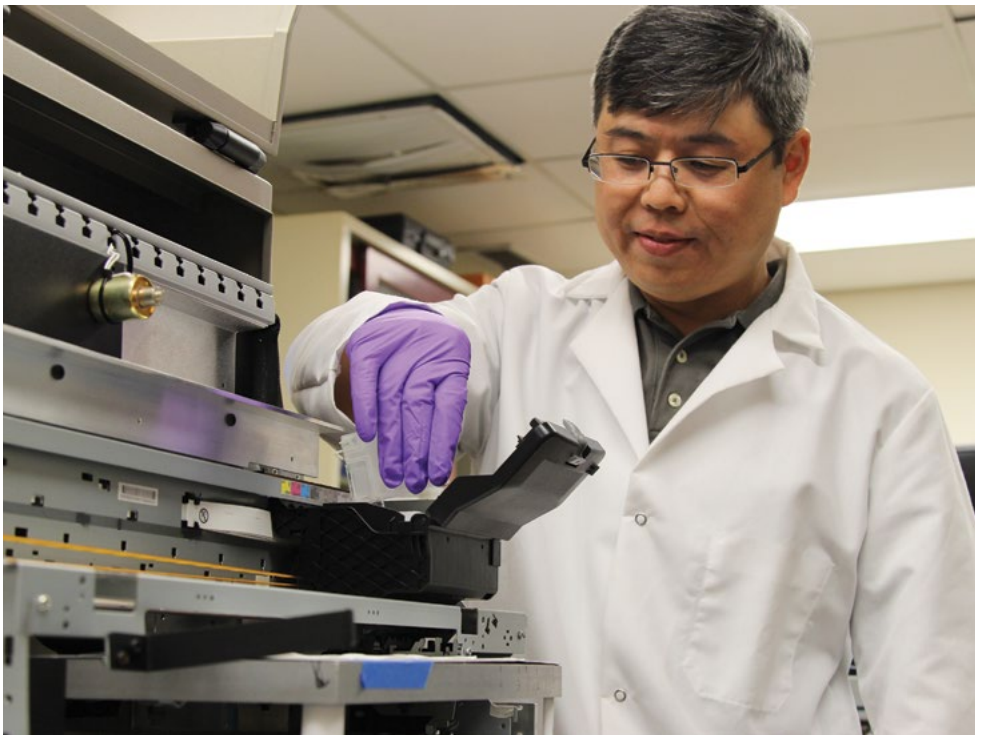
Not every soldier will need the level of training that our Cyber Corps soldiers and leaders receive or the ability to code at the level of Army Software Factory graduates, just as not every airborne soldier needs to be a jumpmaster. However, we expect every member of the force to have a fundamental vocabulary and technological knowledge to successfully apply or integrate new solutions without struggling with basic concepts. Baseline knowledge and technical skills, known as techcraft, will become another part of our soldiers' tasks and battle drills included in the *Soldier's Manual of Common Tasks*.[4]



Software engineer Kevin Hung loads a modified inkjet printer cartridge into the system for testing 14 November 2023 at the Spectroscopy Branch's inkjet printing laboratory at the U.S. Army Combat Capabilities Development Command's Chemical Biological Center, Aberdeen Proving Ground, Maryland. (Photo by Ellie White, U.S. Army)

The quality of our NCO corps is unmatched, largely in part to a rigorous and comprehensive NCO Education System (NCOES). However, NCOES must evolve to emphasize technical competencies that advance commensurate with rank and responsibility. The same goes for our officers and warrant officers. These leaders and commanders require a level of technical knowledge that allows them to make more, better, and faster decisions. We are already incorporating data-literacy training in existing programs such as the Pre-Command Course, which now includes data-literacy instruction. Later this summer, we will undertake efforts to ensure data-literacy concepts are incorporated into all professional military education. To keep up with the pace of change, we are also working to improve processes for how we train and certify instructors. Additionally, we are leveraging courses through civilian colleges and universities to further educate leaders across the Army.

If we expect soldiers and leaders to achieve this level of tech literacy, then the Army must institute evaluation mechanisms and hold members of the profession accountable. Inserting stations or lanes into the Expert Soldier, Infantryman, and Field Medical Badge testing is a possible first step. Soldiers will not only need to know tactical tasks such as land navigation, but they will also need to know baseline technical skills such as manipulating data sets or integrating autonomous systems to produce effects. Just as command assessment programs like the Battalion Commander and Colonels Command Assessment Programs require the Army Combat Fitness Test, so too can they require attendees to be able lead in a data-centric Army.[5] Commanders should demonstrate the knowledge and ability to ask the right questions of their staffs and subordinates, informed by an understanding of what is possible.

The Army must also continue to devote resources to the operational domain of training when it comes to building and maintaining our data-centric Army. Incorporating challenges during experimentation, combat training center rotations, and division- and corps-level Warfighter exercises that require leaders

to demonstrate their data-literacy through the application of force incentivizes units to exercise their systems for integrating new and emerging technologies. It also helps us improve our organizational knowledge and update tactics, techniques, and procedures. However, for this to be most effective, we need to continue developing range complexes, improving home-station training capabilities, and investing in Synthetic Training Environment resources that enable leaders to train their units and refine their ability to incorporate data and analytics to inform guidance and bring a data-centric force to bear for operational effect. These training environments will allow leaders to build on a baseline of data-literacy.

In addition to incorporating changes to education and training, the Army has undertaken efforts to update our publications to better enable leaders to access resources with ease. U.S. Army Training and Doctrine Command, specifically the Combined Arms Center, is in the process of updating Army doctrine to better reflect our understanding of the modern battlespace, and last November it introduced Army Doctrine Publication 3-13, *Information*.[6] This is the Army's first doctrinal publication to address our approach to data and information.[7] The Army also continues to examine processes that facilitate knowledge sharing to keep up with the pace of change.

Talent Management

As the nature of war remains a human endeavor, we have an incredible opportunity to take advantage of unique generational characteristics that exist within our formations. Members of Generation Z and younger millennials grew up living in a data-saturated environment but may not fully appreciate its opportunities and risks in a military context. Conversely, many Generation X and older millennial soldiers have a fuller appreciation of opportunities and risks in warfare but are working to better understand how to incorporate and streamline networks and more modern technology. We have the opportunity to combine these strengths. Additionally, our Army must recruit, develop, and incentivize the retention of data-literate leaders and soldiers with technical skills that allow us to fully leverage a data-centric Army.

Nested with innovations to Army recruiting efforts, marketing and advertising Army career paths that require technical and data-savvy young men and women presents an opportunity for the Army to recruit a board base of talent. Promoting opportunities to serve in specialized career fields as a soldier, NCO, or warrant officer offers unique opportunities for potential recruits to pursue their current civilian interests in uniform. Additionally, the creation of additional skill identifiers will allow the Army to better manage talent and place service members in critical areas where their skills are most needed and best utilized. The Warrant Officer Corps exists to be our Army's technical experts. They will require additional technical specialties within their branches that promote specialized application of digital skills. Similarly, officers should have the ability to pursue broadening educational opportunities and additional data-based functional areas, to include dual-track approaches. This would allow them to advance their technical knowledge and better apply that knowledge to their basic branches. Finally, civilians are our Army's best opportunity to develop deep mastery and continuity in advancing technologies. Expanding civilian career program job series to include more opportunities for technology and data skill sets enhances the already incredible talent of our civilian workforce.

Recognizing that soldiers who are technologically fluent are as important as those soldiers who possess language fluency, we can incentivize technical competencies in the form of reenlistment bonuses or special pay. We are currently conducting a systematic evaluation to determine the skills our Army needs to establish, maintain, evaluate, and retain across our NCOs, warrant officers, officers, and civilian professionals to operate on a battlefield inundated with advanced technologies and vast amounts of data. However, at its most basic, leaders in every formation can afford time and opportunities for soldiers with technical skills to conduct rigorous training of their craft. Allowing soldiers to apply their valuable, perishable tech-craft with both predictability and a sense of accomplishment contributes to our effort to build a data-centric force.

Conclusion

The acceleration of technology and the exponentially growing amounts of data available to our adversaries as well as inside our own formations necessitate rapid change to ensure we remain the greatest Army in the world and preserve our people as are our number one

Robotic Combat Vehicle (Light) prototypes demonstrate their capabilities during soldier experimentation at the National Training Center, Fort Irwin, California. The exercise ran from July to September 2023. (Photo by Savannah Baldwin, PEO Ground Combat Systems)

asymmetric advantage. Soldiers and leaders will need the knowledge and ability to utilize technology to create mission impact and solve tactical problems on the future battlefield. With this advanced knowledge, the force will be better able to integrate warfighting systems that enable multidomain operations. Institutional changes to how we recruit, develop, and retain a technologically competent and data-literate force are critical to preserving our asymmetric advantage. *As technology continues to advance, so too must our Army.* ■

Notes

1. Christine E. Wormuth, "Message from the Secretary of the Army to the Force," Army.mil, 8 February 2022, https://www.army.mil/article/253814/message_from_the_secretary_of_the_army_to_the_force.

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3. *DoD Dictionary of Military and Associated Terms* (Washington, DC: Joint Staff, January 2024 [CAC required]), s.v. "DOTMLPF-P," https://jdeis.js.mil/jdeis/new_pubs/dictionary.pdf. DOTMLPF-P stands for doctrine, organization, training, materiel, leadership and education, people, facilities, and policy.

4. Soldier Training Publication (STP) 21-1-SMCT, *Soldier's Manual of Common Tasks: Warrior Skills, Level 1* (Washington, DC: U.S. Government Publishing Office [GPO], October 2023 [CAC required]); STP 21-24-SMCT, *Soldier's Manual of Common Tasks: Warrior Leader Skills, Level 2, 3, and 4* (Washington, DC: U.S. Government Printing Office, September 2008 [CAC required]).

5. Erik Davis, "The Need to Train Data-Literate U.S. Army Commanders," War on the Rocks, 17 October 2023, https://warontherocks.com/2023/10/the-need-to-train-data-literate-u-s-army-commanders/.

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