

# Building the Army's Artificial Intelligence Workforce

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Artificial intelligence (AI) is a set of algorithmic tools and technologies that enable machines to perform tasks that normally require human intelligence—such as perceiving the world, learning from experience, reasoning through information, representing knowledge, acting, and adapting.<sup>[1]</sup> Given the multitude of rapid technological advancements in AI, computing, big data analytics and autonomy, the 2018 National Defense Strategy (NDS) emphasized the importance of leveraging the “very technologies that ensure we will be able to fight and win the wars of the future.”<sup>[2]</sup> The 2018 NDS flags ways to modernize key capabilities in “address[ing] the scope and pace of our competitors’ and adversaries’ ambitions and capabilities,”<sup>[3]</sup> and the need to “invest broadly in military application of autonomy, AI, and machine learning, including rapid application of commercial breakthroughs, to gain competitive military advantages.”<sup>[4]</sup>

Introducing AI capabilities into the military will impact virtually all Army warfighting functions, including: mission command (e.g., battlefield virtual assistant for command and control), movement and maneuver (e.g., self-driving tanks, helicopters, and other vehicles), fires (e.g., autonomous weapon systems and AI-enabled targeting), sustainment (e.g., predictive maintenance and logistics), protection (e.g., anomaly detection to protect critical infrastructures), intelligence (e.g., AI-based information collection, data fusion and analysis), and special operations. Creating a robust AI workforce challenges the Army’s organizational capacity to best leverage and grow AI talent. At a minimum, changes are needed to ensure that resources will be available to complement the AI workforce changes, but that they will be available in a way that will better support the Army’s operating forces.

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In response to the 2018 NDS, the Office of the Department of Defense (DoD) Chief Information Officer (CIO) established the Joint Artificial Intelligence Center (JAIC) with the “overarching goal of accelerating the delivery of AI-enabled capabilities, scaling the Department-wide impact of AI, and synchronizing DoD AI activities to expand Joint Force advantages.”<sup>[5]</sup> To fulfill the DoD AI Strategy, JAIC’s main focus areas will be recruiting, training, promoting, and retaining a leading AI workforce.<sup>[6]</sup> To buttress JAIC’s efforts, the Army established the Army-AI Task Force (A-AI TF) under the U.S. Army Futures Command (AFC) to “rapidly integrate and synchronize AI activities across the Army.”<sup>[7]</sup> One key task is to “develop a talent management plan for the acquisition and retention of necessary skillsets to support Army machine learning and AI activities today and into the future.”<sup>[8]</sup> The U.S. Army Combat Capabilities Development Command (CCDC), formerly the U.S. Army Research, Development and Engineering Command (RDECOM) underscored this need for “AI-fluent scientists and engineers, and to establish opportunities for developing AI-fluency in the current workforce.”<sup>[9]</sup> Integrating AI into the Army means accommodating, growing, and maintaining the requisite skilled AI workforce. Similar to the distinctive way that network and cyber expertise have evolved, AI will require personnel with specialized talents. To create and grow the Army’s AI workforce will require key changes to the existing force structure and AI career management.

For Army officers in all applicable components (COMPO), an existing career management field (CMF), such as Functional Area 49 (FA49) Operations Research/Systems Analysis (ORSA), will require change. While the FA49 officer “introduces quantitative and qualitative analysis to the military’s decision-making processes by developing and applying probability models, statistical inference, simulations, optimization

and economic models,”<sup>[10]</sup> FA49 officers will have an unprecedented opportunity to refine the delivery of their tradecraft. In particular, the FA49 Proponent Office seeks FA49 officers who will “take advantage of the cloud, the open source environment, big data, and algorithms.”<sup>[11]</sup> Over the past few years, the FA49 Proponent Office has heavily invested in providing opportunities to integrate data science and more advanced ORSA skills into the FA49 training pipeline via graduate schooling, continuing education, training with industry, and professional military education. As a result, the bench of FA49 officers equipped with the latest data science skills has grown considerably. In order to certify, track and manage the Army’s FA49 officers with data science qualifications, the Headquarters, Department of the Army (HQDA) G-1 in conjunction with the FA49 Proponent Office established the Personnel Development Skill Identifier (PDSI) R1J for Data Scientist, which certifies that the FA49 officer has met specific graduate degree (master’s or doctorate) requirements and has requisite experience working with distributed computing platforms along with one or more programming languages (R, Python, etc.), structured query language (SQL), and Linux command-line interface commands.<sup>[12]</sup>

While the supply of data science-trained officers has increased, so too has the demand. More and more organizations across the Joint Force seek FA49 officers to lead data science efforts. Indeed, along with the creation of JAIC and A-AI TF organizations, and publication of the DoD AI Strategy, demand for FA49 officers armed with AI skills has grown exponentially. In terms of AI talent, the FA49 Proponent Office wants FA49 officers to “become the experts in not just understanding how the algorithms work, but how to put together the team to make the algorithms work properly.”<sup>[13]</sup> While several FA49 officers have the necessary education, training and technical leadership experience to serve as Army AI experts and leaders, the bench remains relatively small given the high demand across the Joint Force. Further, AI-savvy FA49 officers currently are not managed in a distinct military occupational specialty (MOS); the FA49 CMF has only one managed MOS, 49A, for a generalist ORSA. Typically, the 49A MOS does not require FA49 officers to possess the expert mathematical, computational, cognitive, and software development skills such as machine learning engineering, evolutionary computation algorithm design, and human systems integration, that are necessary for the AI tradecraft. This dearth of managed AI talent and respective force structure requires a fix to this obvious DoD and Army-wide capability gap.

Creating and definitizing a managed 49B MOS for an Army AI career specialty within the FA49 CMF would help enable and enhance the Army’s ability to recruit, train, promote and retain AI personnel required by the Joint Force. This would mean major changes to the Army’s FA49 force structure, and to AI personnel policies and career management, AI education/training, and AI workforce development. Moreover, the timely creation of this managed AI career specialty within the FA49 CMF would help move the Army in the right direction for building a leading AI workforce. The creation and management of the 49B MOS career

specialty and resulting force structure would jump start and help sustain recruiting, training, promoting, and retaining talented FA49 officers who can lead the design, development, testing, evaluation, assessment, and implementation of AI tools and technologies across the Army's operating and generating forces. AI talent management within the FA49 CMF requires effective processes and procedures, and is essential if we are to optimize AI capabilities as an integral part of the Army's warfighting functions.

This proposed solution helps build, grow, and manage a talented and leading Army AI workforce needed to operationalize AI capabilities into the DoD to "fight and win the wars of the future."<sup>[14]</sup> Further, this solution directly supports the recommendations of the National Security Commission on Artificial Intelligence (NSCAI) for recruiting, training and retaining a world-class, AI-ready workforce in accordance with its recently established common AI Workforce Model developed in partnership with the Defense Innovation Board and the JAIC to guide DoD AI workforce needs.<sup>[15]</sup>

## NOTES

1. Department of Defense, *Summary of the 2018 Department of Defense Artificial Intelligence Strategy: Harnessing AI to Advance Our Security and Prosperity* (Washington DC, 2018), 5.
2. Department of Defense, *Summary of the 2018 National Defense Strategy (NDS) of the United States of America: Sharpening the American Military's Competitive Edge* (Washington DC, 2018), 3.
3. *Ibid.*, 6.
4. *Ibid.*, 7.
5. Patrick M. Shanahan, Acting Secretary of Defense, *Establishment of the Joint Artificial Intelligence Center* (Washington DC, 2018), 1.
6. DoD AI Strategy, 14.
7. Mark T. Esper, Secretary of the Army, *Army Directive 2018-18 (Army Artificial Intelligence Task Force in Support of the Department of Defense Joint Artificial Intelligence Center)* (Washington DC, 2018), 1.
8. *Ibid.*, 3.
9. U.S. Army Research, Development and Engineering Command. *RDECOM Artificial Intelligence Study* (Aberdeen Proving Ground MD, 2018), 1.
10. Headquarters, Department of the Army, *Department of the Army Pamphlet 600-3. Chapter 31* (Washington DC, 2014), 310.
11. MG John G. Ferrari, FA49 Executive Agent, *FA49 Proponent Update* (Washington DC, 2018), 5.
12. Headquarters, Department of the Army, *Department of the Army Pamphlet 611-21. Chapter 1, Table 1-2 (PDSI)* (Washington DC, 2018), Table 1-2.
13. MG John G. Ferrari, 6.
14. Department of Defense, *2018 National Defense Strategy*, 3.
15. United States of America, National Security Commission on Artificial Intelligence, *Interim Report for Congress* (Washington DC, 2019), 35, 61-65.