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How Will the Structure of Military Organizations Evolve as Artificial Intelligence Becomes More Sophisticated?

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Note: The Conversations with AIs series is a collection of short papers I have written with help from a variety of artificial intelligences (AIs). I used Writesonic and Elicit to help me write this paper. In this experiment in human-machine teaming, for research purposes, I have tried to treat the AIs as professional collaborators to the extent the software allows.

Deploying AI on the battlefield will force militaries to reimagine how they organize and operate. The Industrial Age principles of structure, authority, and control heavily influence modern military units. In the Industrial Age, factories needed managers to coordinate production and workers to perform individual tasks. But in the fast-paced, dynamic world of twenty-first-century warfare, commanders need soldiers who can think on their feet, team with machines, and adapt their tactics accordingly. A study by Deloitte found AI has the potential to reshape every business process within an enterprise.[1] As a result of this transformation, AI will probably also have a transformative impact on the military.

The Capabilities of AI Will Heavily Influence Organizational Structure

Artificial intelligence (AI) will directly influence the organizational structure of militaries in at least three ways. First, the capabilities of AI will affect the scale of organizational units. In other words, military units will likely be organized at different scales based on the abilities of their associated AIs. For example, a multirole unit such as an intensive care unit in a military hospital might be organized at the level of a single robot with self-governing capabilities. Alternatively, a future fighter squadron might functionally operate at the scale of a current wing with an AI to help to manage communications and other tasks with its unmanned drones.[2]

Second, AI could impact organizational structures by changing how units are led. For instance, an AI could be programmed to designate a different person as the commander of an organization.[3] An AI that tracks the locations of a unit's soldiers in combat could also identify the soldier with the best situational awareness, put him or her in charge of the unit, and assign the rest of the team to supporting roles. This type of real-time organizational management by AI could be particularly useful in situations in which language barriers exist or quick action is required.

Finally, AI could fundamentally change the way soldiers and military units communicate and interact. As AI and robotics become more prevalent, they will likely reduce the need for face-to-face contact between units and personnel. In fact, in the future, soldiers may no longer need to work together in the same physical location. Instead, soldiers may rely on AI and augmented reality technology to interact with each other remotely.[4]

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[1] Jim Guszcza and Jeff Schwartz, "Superminds, Not Substitutes: Designing Human-Machine Collaboration for a Better Future of Work," Deloitte (website), July 31, 2020, https://www2.deloitte.com/us/en/insights/focus/technology-and-the-future-of-work/ai-in-the-workplace.html.

[2] Tyler Rogoway, "Swarm of 40 Drones over Fort Irwin an Ominous Sign of What's to Come," *The War Zone* (blog), September 12, 2022, https://www.thedrive.com/the-war-zone/swarm-of-40-drones-over-fort-irwin-an-ominous-sign-of-whats-to-come.

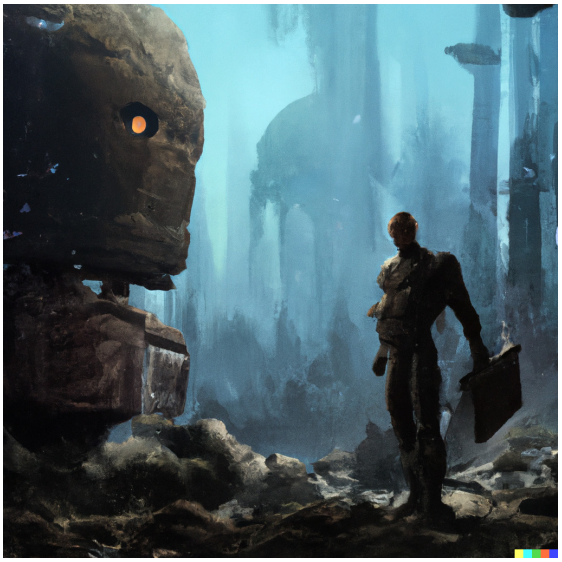
[3] Alexandra Lohr, "Army Pilots Using AI to Streamline Selection Boards," Federal News Network (website), September 14, 2022, https://federalnewsnetwork.com/army/2022/09/using-ai-to-streamline-army-selection-boards/.

[4] Kyle Mizokami, "US Army Begins Rolling Out Augmented Reality for Soldiers," *Popular Mechanics* (website), September 15, 2022, https://www.popularmechanics.com/military/research/a41176138/us-army-augmented-reality-goggles-soldiers/.

As militaries adopt AI, they will also need to decide whether to adopt a centralized or decentralized approach to AI command and control. A centralized approach might be useful for an AI-enabled, autonomous missile defense system, but this approach has significant limitations for many other military tasks.[5] A decentralized approach would provide more flexibility to adapt to changing battlefield conditions and increase survivability in a disconnected, intermittent, or limited environment.[6] Indeed, AI may be the essential technology that allows commanders to organize tasks rapidly to accomplish military objectives and then, with equal rapidity, disperse the units to reduce their vulnerability.

Artificial Intelligence-Based Autonomous Weapons Will Exacerbate the Challenges

The current debate about the use of autonomous weapons is still in its infancy.[7] But almost certainly, as AI technology evolves, autonomous weapons will become more advanced and capable, which will require a shift in mindset as well as the adoption of new technologies and procedures to ensure the chain of command remains intact and functional.[8] As AI, robotics, and other algorithmic technologies advance, a large portion of militaries' equipment will function with little to no human input.



Generative AI is useful for both writing and visualizing. The image above was produced by the AI DALL•E 2 based on its coauthors' prompt to generate an abstract image of "the structure of a military organization as AI becomes more sophisticated." The AI generated a wide variety of images from which to choose. The coauthor selected this one because it seems to capture some of the changes alluded to in the issue paper. (Graphic design by Kristan J. Wheaton and DALL•E 2)

The implications of this shift for organizational structure will be significant. Reduced reliance on people at the command level will likely force some degree of decentralization of authority. At present, the military employs a top-down approach to decision making: An order is issued from the top and passed down the chain of command until the order reaches the lowest level. With a significant portion of equipment functioning autonomously, the chain of command risks becoming convoluted, with responsibility spread across various levels.[9] As these types of autonomous weapons and equipment increasingly enter the military, organizational structures will need to change dramatically to adapt.

Artificial Intelligence Will Likely Empower Individual Soldiers and Small Teams

As AI becomes more capable, it will even allow small teams to operate with greater autonomy. The role of the operational commander will evolve from one of management to one of oversight. This shift will enable high-level commanders to spend more time on tasks only they can perform and allow small units to function with fewer staff, permitting a larger portion of the force to be deployed at any given time. In the future, AI will likely enable small units to train and fight autonomously, allowing entire armies to shrink in size while increasing the lethality of each unit.

Systems enhanced by AI will also enable small teams and individuals in other ways. Sophisticated AIs will permit leaders to:

- create detailed plans and make rapid changes to running estimates, allowing operations to be performed more quickly and accurately;
- use data to develop virtual environments that can be used to train soldiers in real time, empowering commanders to monitor training sessions and provide feedback as necessary; and

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[5] Kris Osborn, "Will AI Be the Secret to Hypersonic Missile Defense?," *The Buzz* (blog), September 3, 2022, https://nationalinterest.org/blog/buzz/will-ai-be-secret-hypersonic-missile-defense-204564.

[6] Miranda Priebe et al., *Distributed Operations in a Contested Environment: Implications for USAF Force Presentation* (Santa Monica, CA: RAND Corporation, 2019).

[7] Forrest E. Morgan et al., *Military Applications of Artificial Intelligence: Ethical Concerns in an Uncertain World* (Santa Monica, CA: RAND Corporation, 2020).

[8] C. Todd Lopez, "Defense Official Discusses Unmanned Aircraft Systems, Human Decision-Making, AI," Department of Defense (website), February 3, 2021, https://www.defense.gov/News/News-Stories/Article/Article/2491512/defense-official-discusses-unmanned-aircraft-systems-human-decision-making-ai/.

[9] Melodena Stephens and J. Mark Munoz, "The Tug of War in AI Decision Responsibility," *California Management Review* (website), June 24, 2021, https://cmr.berkeley.edu/2021/06/the-tug-of-war-in-ai-decision-responsibility/.

- provide intelligence, create detailed maps, and monitor the environment.[10]

Conclusion

Advances in AI technology will heavily influence the future of military organizations. As autonomous weapons and equipment become more effective and lethal, AI will empower individuals and small teams. But AI requires a shift in organizational structure and culture that cannot be implemented through technology alone. In the long term, militaries will have to rethink how they will function and organize themselves to realize the benefits of AI fully.

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[10] Thomas W. Sanchez, "AI in Planning: Why Now Is the Time," *Planning Magazine* (website), February 25, 2022, https://planning.org/planning/2022/winter/ai-in-planning-why-now-is-the-time/; Rishab Jain, "Dreamscape—Using AI to Create Speculative VR Environments," Towards Data Science, May 13, 2020, https://towardsdatascience.com/dreamscape-using-ai-to-create-speculative-vr-environments-bdfedd32ae54; and Eray Eliaçık, "Guns and Codes: The Era of AI-Wars Begins," Dataconomy, August 17, 2022, https://dataconomy.com/2022/08/how-is-artificial-intelligence-used-in-the-military/.

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