



UNDER SECRETARY OF THE ARMY
WASHINGTON

21 MAY 2024

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Army Directive 2024-03 (Army Digital Engineering)

1. References.

- a. Department of Defense (DoD) Instruction 5000.02 (Operation of the Adaptive Acquisition Framework), 23 January 2020, incorporating Change 1, effective 8 June 2022
- b. DoD Instruction 5000.97 (Digital Engineering), 21 December 2023
- c. Office of the Deputy Assistance Secretary of Defense for Systems Engineering (DoD Digital Engineering Strategy), June 2018
- d. Headquarters, Department of the Army General Orders 2020-01 (Assignment of Functions and Responsibilities Within Headquarters Department of the Army), 6 March 2020
- e. Army Digital Transformation Strategy, 12 October 2021
- f. Assistant Secretary of the Army (Acquisition, Logistics and Technology) (ASA (ALT)) policy memorandum (Policy for the Implementation of Digital Engineering Throughout the ASA (ALT) Enterprise)), 11 April 2022

2. Purpose. This directive enables the Army to rapidly adopt and institutionalize modern digital engineering (DE) practices pursuant to references 1a and 1b.

3. Applicability. The provisions of this directive apply to the Regular Army, Army National Guard/Army National Guard of the United States, and U.S. Army Reserve.

4. Background.

a. As the Army is rapidly modernizing to meet emerging threats, the pace of technological change and a constrained fiscal environment require innovation not only in terms of capabilities, but also in the various institutional processes the Army uses to develop, acquire, and maintain them. This includes the engineering processes the Army uses to develop its complex warfighting systems. Historically, the Army has relied on traditional systems engineering processes, which are largely manual, document-intensive, and stove-piped across stakeholder groups. This can often drive cost and development timelines, hindering the Army from delivering cutting-edge capabilities at pace. Greater adoption of DE approaches will allow the Army to identify cost

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drivers in system designs early, enabling system-performance modeling to inform earlier trade-off decisions that improve outcomes in our acquisition process and deliver needed capabilities to Soldiers.

b. DE leverages applications, modeling and simulation, and data to create digital models in place of the legacy paper-based approaches. These digital models provide precise virtual representations of a system as it matures over time and enables a shift from the traditional design-build-test method toward a model-analyze-build approach. The benefits of applying DE are numerous, spanning the design, development, and sustainment phases of a system's lifecycle.

c. In the design and development process, users model requirement tradeoffs and assess their impacts. DE enables program managers to better understand subsystem interdependencies, rapidly determine cost drivers, assess technical and performance risks, and ascertain the impact of design changes. These technologies allow for the digitization of test processes and permit testers to verify proper functionality of systems. Importantly, DE underpins these efforts by eliminating the need for physical prototypes and enabling the Army to make critical decisions and close capability gaps in a more cost-effective manner. As a system moves into sustainment, users and maintainers rely on DE to provide early feedback and train virtually with the support of rapidly developed materials and manuals; sustainers to anticipate, understand, and address deterioration and obsolescence issues; and Soldiers in the field to print spare parts as needed.

d. To fully realize these benefits, the Army is establishing a DE policy that will enable broader adoption of these digital capabilities and practices. This directive outlines the Army's DE objectives, identifying best practices and tools and assessing how these capabilities may be best applied across the Army's various capability development areas. Importantly, as the Army launches this effort, it will leverage lessons learned by its industry partners, many of whom already benefit from the adoption of DE. Companies in the private sector use DE processes and tools to design and test automobiles, aircraft, and other vehicles and to gain internal business process and operations efficiencies. The Army is learning from and collaborating closely with its industry partners and will continue to do so as it seeks to further adopt DE and incorporate these approaches to capability development.

5. Policy. The Army's DE policy comprises four tenets: Establish Digital Engineering Focus Areas, Promote Interoperability and Implementation, Establish and Monitor Pathfinder Programs, and Develop Talent and Expertise.

a. Establish Digital Engineering Focus Areas. Implementing DE capabilities and tools into Army modernization processes necessarily involves cross-functional teams that include the expertise of requirements developers, program managers, testers, maintainers and logisticians, and industry partners. The approaches and tools implicated in this transition vary significantly across commodity and product areas within the Army. For example, successfully adopting DE in the context of aviation versus ground systems will require consideration of different

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commercially available tools, stakeholder needs, and business process changes. The following initial three DE focus areas will allow practitioners to share data, use digital engineering tools, collaborate with different Army organizations and industry, and develop workforce skills aligned to the needs of a major warfighting capability area.

(1) The **Ground Vehicle DE Focus Area** assists ground vehicle programs in effectively applying DE. The automotive industry leverages DE heavily in designing cars and trucks today and has gained tremendous efficiencies and increased quality as a result. Army organizations involved in the development, fielding and sustainment of combat and tactical vehicles already closely coordinate with industry partners.

(2) The **Aviation DE Focus Area** assists the Army's aircraft programs with DE implementation. Aviation platforms are complex systems that require high-performance parameters and rigorous safety standards be met before operation. As industry has already demonstrated, DE is highly beneficial in this portfolio because it allows for the iterative development of digital aircraft designs that are focused on maximizing performance while ensuring continued compliance with rigorous safety requirements.

(3) The **Sensor DE Focus Area** assists developers as they build modular sensors for a variety of platforms. DE tools can help design and model sensors, determine optimal form factors, placement, power budget, and ensure modularity. Digital modeling can sketch out sensor data flows and test the system-of-systems needed to provide commanders with real-time information.

b. **Promote Interoperability and Implementation.** DE tools promote seamless collaboration, streamlined processes, and efficient systems integration. However, early DE tools have not always interoperated well together because they were developed before the availability of interoperability-focused standards. This greatly complicates data sharing between vendor and government-owned environments. The Army will seek to drive commonality and data centrality in DE implementation by working with the appropriate stakeholders across the Army, industry, and standards community to shape practices that facilitate greater interoperability. As part of this effort, the Army will—

(1) Collaborate with commercial DE software tool vendors to embrace open standards that enable interoperability of tools across the industry. These standards are in final stages of development, and most vendors indicate they plan to implement them. The Army will encourage and work to accelerate this migration.

(2) Identify commercially available DE environments that are available for use immediately and advertise them across the Army to promote reuse. This will lower the barrier to entry by reducing the initial investment for DE infrastructure and tools.

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(3) Develop guidelines, best practices, and “recipes” to customize DE environments using commercial tools for situations in which existing commercial DE environments do not suit Army needs. This approach is not meant to be overly prescriptive but will include the building blocks required for a complete DE environment to rapidly meet unique challenges.

(4) Develop standard contract language to clearly communicate the DE capabilities the Army will require. This language will be shared with industry to ensure it is also informed by their feedback and input.

(5) Generate common Contract Data Requirements Lists (CDRLs) to enable consistency in DE products delivered to the Army. All CDRLs will be vetted with industry to ensure they offer value to joint activities in program development, including system design reviews.

(6) Create data governance guidance to ensure data and digital twins can be shared with the appropriate government and industry users while protecting vendor intellectual property.

c. Establish and Monitor Pathfinder Programs. The Army will identify a number of “pathfinder programs” to illustrate DE’s potential contributions, highlight existing policies and processes that may hinder a program’s ability to implement DE, and identify how to advance DE adoption in various contexts. The pathfinders are representative of the Army’s acquisition enterprise—drawn from a diverse array of programs employing DE in different stages of the acquisition lifecycle across various commodity areas. The Army’s initial pathfinders include the following:

(1) XM-30 Mechanized Infantry Combat Vehicle. XM-30 is an acquisition category (ACAT) I ground vehicle program early in the acquisition process.

(2) Future Long-Range Assault Aircraft (FLRAA). FLRAA is an ACAT I aviation program early in the acquisition process.

(3) Integrated Fires Mission Command (IFMC). IFMC is an ACAT I program currently in production.

(4) Joint Targeting Integrated Command and Control Suite (JTIC2S). JTIC2S is an ACAT III program early in the acquisition process.

(5) M113 Armored Personnel Carrier. M113 is a ground vehicle platform in sustainment, and its digital twins apply broadly to the ground vehicle fleet.

(6) Program Executive Office Aviation Logistics Data Analysis Lab (Black Hawk, Apache, Chinook). These programs are all in sustainment.

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d. Develop Talent and Expertise. DE will only serve the Army well if employed by a knowledgeable, skilled, and experienced workforce capable of applying DE tools and techniques in their business areas. Successful adoption across the Army can only occur if DE is used by the requirements, test, and sustainment communities—not just engineers and developers. A trained, capable workforce can use DE tools to reduce sustainment costs, identify requirements tradeoffs early on, and augment operational testing with digital twins, among other applications. In this line of effort, the Army will—

(1) Upskill both the acquisition and non-acquisition workforce by curating and sharing options for DE training across the Army. The options will be informed by the pathfinder programs as well as industry and academia. Training will be tailored to the different ways in which members of the workforce can employ DE in the context of their jobs. While members of the test community may need to develop highly technical skills to run digital simulations, individuals writing training manuals will need to learn how to use authoritative data to build manuals and training aids.

(2) Provide the workforce with opportunities to leverage various “Training With Industry” programs. This will provide employees exposure to industry DE implementation lessons learned, as well as hands-on training. These exchanges will enhance a broader dialogue between the Army and industry aimed at making sure the Army can leverage ongoing innovation.

(3) Formalize length, timing, and scope of training with industry based on current exchanges through the Public-Private Talent Experience Program and cooperative research and development agreements.

6. Responsibilities.

a. The ASA (ALT) will lead implementation of this policy across the Army, providing quarterly updates to the Under Secretary of the Army as part of monitoring to ensure continued progress.

b. DE stakeholders and integrators—including the ASA (Installations, Energy and Environment), Deputy Chief of Staff, G-8, Chief of Engineers, U.S. Army Futures Command, U.S. Army Test and Evaluation Command, U.S. Army Training and Doctrine Command, and U.S. Army Materiel Command—will coordinate with the ASA (ALT) to implement DE pursuant to reference 1d and this directive.

7. Proponent. The Under Secretary of the Army is the proponent of this policy.

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8. Duration. This directive is in effect until rescinded.



Gabe Camarillo

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