Digital Engineering
Implementation across the
Department of Defense

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Digital Engineering Transformation

CURRENT STATE

**People**
Workforce and culture entrenched in traditional practices

**Process**
Static paper-based, manual processes and workflows

**Technology**
Stove-piped tools, technologies, infrastructure that are not state of the art

**Data**
Siloed and scattered across stove-piped systems and organizations in various forms

FUTURE STATE

**People**
Digitally skilled workforce implementing Digital Engineering practices

**Process**
Model-based methods and processes to automate, reuse, and auto-generate digital artifacts

**Technology**
Innovation and collaboration through a shared Digital Ecosystem

**Data**
Authoritative sources of data and models used as a continuum across the lifecycle

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Digital Engineering Core Capabilities

Configurerable Multi-User & Classification Environment

Strategy Alignment

Shared Digital Ecosystem
Digital Engineering Strategy Overview

- **Digital Engineering Strategy**
  - Modernizes how we design, operate, and sustain capabilities to outpace our adversaries
  - Released June 2018

- **Objective**
  - Sets the vision across 5 goals
  - Guides the planning, development, and implementation

- **Expected Impact**
  - Reforms the Department’s business practices for greater performance and agility
Digital Engineering Implementation

Collaborators/Partnerships

- Armed Services
- DoD Components
- Interagency
- Industry/OEMs/Industrial Orgs
- Academic

Strategy & Service Plans

Outlines DoD’s five strategic goals for Digital Engineering initiatives

Activities

- Collaboration
  - Digital Engineering Working Group
  - Systems Engineering Research Center
  - NDIA M&S Subcommittee
  - INCOSE Digital Engineering Information Exchange Working Group
- Policy (In Process)
  - DoD 5000.02 Enclosure 3
  - DoDI Instruction
- DoD Digital Ecosystem
- DoD Digital Engineering Body of Knowledge (DEBoK)

Implementing Digital Engineering Across the Services
Digital Engineering Collaborations

• Digital Engineering Working Group
  • Interagency, DoD Services/Agencies, industry, and academic collaboration
  • Addresses challenges, shares best practices, and facilitates tiger teams to
develop strategy, implementation, policies, and guidance

• Systems Engineering Research Center
  • Sponsors research on metrics, curation, and tool innovation

• NDIA M&S Subcommittee
  • Shapes initiatives to drive digital engineering transformation

• INCOSE Digital Engineering Information Exchange Working Group
  • Provides leadership to transform digital information exchange

Expand collaborations to evolve digital engineering
transformation across R&E, Services, and Agencies
Digital Engineering Policy

DoD DES

1. Drive implementation of DES
2. Leadership Commitment
3. Engages Workforce
4. Requires Resource Allocation
5. Measures Results

Instructs the DoD Enterprise to conduct a comprehensive transformation to embrace digital engineering
Digital Engineering Body of Knowledge (DEBoK) Vision

- Accessible in shared Digital Ecosystem
- Standard terms
- Knowledge sources/references
- Guidelines/best practices
- Flexibility to tailor

Leveraging Digital Engineering Approaches from Services to Implement across the DoD Community

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DoD Digital Ecosystem Vision
Using the Digital Ecosystem

- ACCESS
  - DoD
  - Classification
  - Accessible to stakeholders

- INNOVATE
  - Data Mining
  - Machine Learning
  - GPGPUs Available

- WORKFLOW
  - Storage
  - Tools
  - Compute

- RQTS
  - Tools
  - Software Development

- DESIGN & ANALYSIS
  - Tools
  - Software Development

- MODEL & SIM

- TEST & EVAL
  - Data Collect
  - ASoT Available

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Summary/Next Steps

- Driving Digital Engineering transformation across DoD
- Proposing a Digital Engineering Center of Excellence
  - Builds and enables a community of collaborators
  - Instantiates the tenets of the policy to drive implementation
  - Establishes a body of knowledge to guide implementation
  - Establishes a shared digital ecosystem
  - Executes pilots, measures, and improves results
For Additional Information

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USD(R&E) Mission

- Ensure Technological Superiority for the U.S. Military
  - Set the technical direction for the Department of Defense (DoD)
  - Champion and pursue new capabilities, concepts, and prototyping activities throughout the DoD research and development enterprise

- Bolster Modernization
  - Pilot new acquisition pathways and concepts of operation
  - Accelerate capabilities to the Warfighter

“Our mission is to ensure that we, if necessary, reestablish and then maintain our technical advantage.”
– Under Secretary Griffin, April 2018
Modernization Priorities

“We cannot expect success fighting tomorrow’s conflicts with yesterday’s weapons or equipment.”
– National Defense Strategy

• Hypersonics
• Fully Networked Command, Control, and Communication
• Directed Energy
• Cyber
• Space
• Quantum Science

• Machine Learning / Artificial Intelligence
• Microelectronics
• Autonomy
• Biotechnology

For each modernization priority, a Portfolio Manager (Assistant Director) is responsible for establishing the DoD-wide, mission-focused strategy and execution plan.