

JPEO-CBRND DIGITAL TRANSFORMATION SMART BOOK

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use and share data more efficiently and effectively

Engineering engineering CBRND solutions using digital technology

DIGITAL LITERACY CAMPAIGN

As part of the JPEO-CBRND's focus on workforce development, the Digital Literacy Campaign is a dedicated effort to provide learning opportunities and adapt our culture to embrace digital technologies.

Benefits:

- **Increased Accessibility:** Access digital products anywhere, anytime if connected to the Internet or network
- Enhanced Virtual Collaboration: Facilitate telework, long-٠ distance collaboration, and continuity of operations
- Faster Technology Adoption: Use new digital technology, processes, and tools at a faster rate with fewer issues
- Improved Information Sharing: Find, use, and compare information from subject matter experts

Learning Opportunities

- **DAU** Training
- Carnegie Mellon University's Digital Data Leaders Course
- **DigitalU Training**
- Udemy Training

For information and resources, visit the JPEO-CBRND Digital Transformation Teams channel For learning opportunities, visit the JPEO-CBRND People Operations Teams channel

JPEO-CBRND DIGITAL TRANSFORMATION

Digital Transformation adds value for the warfighter and workforce by delivering successful acquisition outcomes. As a leadership and organizational priority, Digital Transformation leverages digital technologies to transform business processes, empower the workforce, and develop capabilities that serve the Joint Force.

FUNCTIONAL AREAS

The Digital Transformation Smart Book outlines how each digital technology will benefit and impact day-to-day operations for each of the JPEO-CBRND functional areas.







JPEO-CBRND DIGITAL TRANSFORMATION 101

OVERVIEW

Digital Transformation is the adoption of digital technologies to enhance business processes, empower the workforce, and improve capability development.

JPEO-CBRND's Digital Transformation aligns with and is driven by:

- DoD Digital Modernization Strategy
- Army Digital Transformation Strategy

FOCUS AREAS:

- Data
- Engineering
- Software
- Workforce Development

Real World Examples:



and ability to adapt to change
WHAT'S NEXT

Digital Literacy Campaign – Training opportunities focused on Digital Transformation are available! The list of classes, as well as additional information and resources can be found on the People Operations Digital Transformation Information in Acquisition Workforce Teams channel.

Ask Questions and Share Your Feedback – Digital Transformation is a continuous process that affects each functional area. Talk with your functional leads about how digital transformation can benefit you and your team.

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DIGITAL TRANSFORMATION ENTERPRISE DATA MANAGEMENT, ANALYTICS, & VISUALIZATION

Focus Area: Data

Real World Examples:

OVERVIEW

- Enterprise Data Management is the process of inventorying and governing your business' data.
- Data Analytics is the process of turning data into useful information to drive decision making.
- Data Visualization is the process of delivering information or data in an easy to read, easy-tounderstand graphic.

Core Principles:

- Data has value; manage it as an asset
- Data management requirements are business requirements
- Data management requires diverse skills
- Data management is lifecycle management



BENEFITS

- Increase the speed and efficiency of decision-making
- Work directly with updated authoritative data
- Explore the data through analytics
- Tell an effective story to internal and external decision makers
- Prepare to present the narrative, including responding to ad hoc questions
- Eliminate time spent creating slides and spreadsheets
- Integrate visual analytics across functional areas and business processes

DOD Analytics Tools

DAY-TO-DAY IMPACT



All Functional Areas

- · Easier access to data throughout the acquisition lifecycle
- Improved accuracy of data
- Informed decision making



Project Management Resource Tools



Army Digital Analytic Platform



DIGITAL TRANSFORMATION CLOUD COMPUTING

Focus Area: Data

OVERVIEW

- Cloud computing is a digital technology that allows users to access data and use services over the Internet from any device or location.
- A cloud consists of many computer servers connected and managed by a cloud provider.
- Cloud users interact with the cloud "as-a-service." They don't need to worry about hardware or computer infrastructure.

BENEFITS

- Accessibility: Access data from anywhere if connected to the Internet or the organization's network
- Scalability: Adjust storage needs as data increases or requirements change without worrying about physical limitations (e.g., available hard drive space on a laptop)
- Cost Savings: Leverage the pay-as-you-go pricing model and pay for only for the storage space needed



- Collaboration: Share files and folders, control access permissions, and collaborate on documents in real-time
- Data Protection and Redundancy: Cloud providers manage continuous cybersecurity updates and maintenance
- Streamline Application Development: Shorter development timelines with integrated software development and deployment environments

DAY-TO-DAY IMPACT



All Functional Areas

- · Cost savings using cloud services
- Deliver and deploy systems faster
- · Gov. cloud environments approved to store CUI and classified data



Finance and Contracting

- Contract language specific to cloud providers (e.g., metrics)
- Contract cost considerations for cloud services



Engineering & Logistics

- Develop software faster
- No need to maintain server infrastructure and hardware

DOD Cloud Providers



cArmy



Cloud One



DIGITAL TRANSFORMATION ARTIFICIAL INTELLIGENCE

Focus Area: Data

OVERVIEW

- Artificial Intelligence (AI) is a digital technology that enables computers to perform tasks that would be considered intelligent if done by a human.
- Data science is a field of study closely associated with AI. A data scientist uses mathematics and computers to extract useful knowledge from data.
- Al applications often require vast amounts of data to function. • Data engineering methods are used to design systems that collect and use data.



BENEFITS

- Automation: Automate many manual tasks and improve workforce efficiency
- Analysis: Assess new data guickly to provide insights and predictions
- **Customization:** Create user experiences that are tailored based on preferences and environment
- Complex Problem Solving: Process large amounts of data guickly and provide potential solutions without a subject matter expert
- Minimize Errors: Perform repetitive tasks and provide quality assurance checks

DAY-TO-DAY IMPACT



All Functional Areas

- Identify trends, risks, and warnings earlier and frequently
- Automate tasks such as data entry
- Enhanced decision-making models



Finance and Contracting

Contract and cost requirements





to improve AI tools

Test & Evaluation

Measure and test

Cybersecurity

Develop trusted AI models

AI/ML Powered Acquisition Programs



CBRN Support to Command & Control (CSC2)









Integrated Visual Augmentation System (IVAS)



DIGITAL TRANSFORMATION DIGITAL BANKING

Focus Area: Data

OVERVIEW

- Digital Banking is the digitization of banking activities and services traditionally available at physical bank branches.
- Digital Banking combines online banking and mobile banking ٠ allowing access to banking features and services using a mobile device, including money deposit/withdrawal/transfer and other convenient features such as peer-to-peer payments through payment applications.



BENEFITS

- **Security:** Receive banking alerts when significant changes happen (e.g., low balance or fraud) and reduce risk from human error
- Speed: Improve speed of financial transactions Accessibility: Access financial data from due to reduced human interaction
- Traceability: View and trace a log of transactions outlining money deposits and withdrawals data
 - anywhere with connection to the internet

DAY-TO-DAY IMPACT



All Functional Areas

- Access financial resources 24/7
- Increase operational efficiency
- Eliminate paper transactions



Finance

Lower operational costs

Cybersecurity

- Safer money transactions
- Protect financial data



Digital Banking

Accounting Service (DFAS)



General Fund Enterprise Business System (GFEBS)



DIGITAL TRANSFORMATION METADATA

Focus Area: Data

Real World Examples:

OVERVIEW

- Information that describes and explains data, sometimes referred to as "data about data".
- Metadata is the means that enables digital materials to be organized and sorted.
- Metadata exists everywhere we save or retrieve data. Every piece of data has some type of metadata associated with it.

Types of Metadata:

- Descriptive: title, description, author, keywords
- Structural: tables, columns, keys, indexes
- Administrative: file type, date and time created or modified
- Reference: methods, concepts, scope, classification
- Legal: author information, copyright, public licensing
- ...and many more

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Feb 17	45,000	41,934	-3,066			2.1 Overall Style
Mar 17	45,000	42,163	-2,837			2.1 The Page
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BENEFITS

- **Customization:** Tailored to fit and adequately describe any fidelity of data
- Artificial Intelligence (AI): Well-structured data enables AI and Machine Learning applications
- Efficiency: Accelerated digital transformation by making data more searchable, accessible, and useful
- Security: Supports data compliance and data security by documenting data sources, standards and policies

DAY-TO-DAY IMPACT



All Functional Areas

- Easy navigation of data
- Better traceability between different products
- Consistency of data across functional areas



Metadata in the DOD



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FACT SHEET

DIGITAL TRANSFORMATION MODEL BASED SYSTEM ENGINEERING

Focus Area: Data & Engineering

OVERVIEW

- Model Based System Engineering (MBSE) is a digital transformation approach used to design and manage complex systems.
- MBSE replaces traditional text-based, static documents with digital models to represent systems.
- The approach enables better understanding, communication, and data-driven decision making for projects, from defense systems to infrastructure development.



BENEFITS

- Quality: Improved organization and uniformity of knowledge about the system
- · Communication: Shared understanding of the system across development team and other stakeholders
- Collaboration: Provides a centralized platform for teams to collaborate
- · Verification and Validation: Cost savings from virtual model-based verification and validation
- Authoritative Source of Truth: Provides a single, reliable place for system information

DAY-TO-DAY IMPACT





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FACT SHEET

DIGITAL TRANSFORMATION AUTONOMOUS DEVICES

Focus Area: Engineering

OVERVIEW

- Autonomous Devices can operate independently and perform tasks without human intervention by using Artificial Intelligence algorithms.
- Autonomous technology uses situational data to make calculations, define probabilities, and make logical decisions according to the set task/goal.
- Autonomous devices differ from automatic devices which follow a set of rules that define the device's behavior regardless of context changes.

BENEFITS

- Efficiency: Performance of tasks without constant human supervision leading to improved productivity
- Safety: Operation conducted in hazardous situations or environments reducing risk of accidents
- **Precision and Accuracy:** Consistent execution of tasks leading to minimized errors

DAY-TO-DAY IMPACT



All Functional Areas

- · Offload repetitive, dangerous, or menial tasks
- · Flexible tasking and decision making



Test and Evaluation

- · Reduce human exposure or hazards
- · Repurpose existing devices to support new tests



Logistics

 Predictive and automated support at point and time of need



 Coding to teach or repurpose autonomous devices

Autonomous Devices



Real World Examples:

REWALK EXOSKELETO

Cost Savings: Reduce operational costs by optimizing resource utilization and reducing manual labor

AMAZON SCOUT

- **24/7 Operation:** Continuous operation of devices leading to increased productivity
- **Scalability:** Easily adapted based on demand, task requirements and flexibility in various industries

in the DOD









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FACT SHEET

DIGITAL TRANSFORMATION DIGITAL ENGINEERING

Focus Area: Engineering

OVERVIEW

- Digital Engineering (DE) is a digital technology that uses computer models and data to design complex systems.
- DE uses shared data and digital models in place of static documents (e.g., PDFs and spreadsheets) to perform engineering tasks.
- Model Based System Engineering (MBSE) is a digital transformation approach used to design and manage complex systems.

BENEFITS

- **Collaboration:** Central platform for information sharing and communication
- **Rapid Prototyping:** Accelerate time to market by evaluating design alternatives, testing hypotheses, and creating solutions before prototyping
- **Cost Savings:** Create prototypes and test or rework before production

DAY-TO-DAY IMPACT



All Functional Areas

- · Eases integration and product reuse
- Simplified version control
- · Improves digital collaboration across industry, academia, and government
- · Early design and performance risk identification



Finance and Contracting

- Intellectual property costs of data
- Contract language requires DE practices and industry/DoD standardized tools



Engineering and Logistics

- 24/7 model accessibility
- Assess and manage the lifecycle needs for your project or product

Real World Examples:



- Streamlined Testing: Improved models can create cost savings and accelerate testing
- Efficiency: Automation of repetitive tasks and reduced human errors
- **Design and Analysis:** Create digital representations of products and systems to improve understanding of performance, behavior, and potential issues

Digital Engineering in the DOD



3DS MagicDraw



IBM Rational



DAU Digital Engineering Credential



DIGITAL TRANSFORMATION
DIGITAL TWIN

Focus Area: Engineering

OVERVIEW

- A digital twin is a virtual representation of a real-world physical product, system, or process.
- Digital Twins are linked to real data sources from the environment, which means that the digital twin updates in real time to reflect the original version.
- Digital Twins also comprise a layer of behavioral insights and visualizations derived from data.
- Digital Twins aid in Product Lifecycle Management.

Real World Examples:

FACT SHEET



BENEFITS

- **Safety:** Accelerate risk assessment and maintenance prediction through scenario-based testing and system monitoring
- Collaboration: Provide shared, data-rich models, improving communication and informed decision making
- Traceability: Link and trace Digital Twins to other models and the originating documents
- Cost Savings: Identify inefficiencies and predict future product needs, allowing for resource planning and reducing expenses
- Rapid Prototyping: Allow rapid iterations and optimization of product designs, accelerating time to market

DAY-TO-DAY IMPACT



All Functional Areas

- Enhanced decision making
- Earlier identification of risks and warnings



Engineering, Test & Evaluation

- 24/7 model accessibility
- Analyze simulation performance for product improvement



Finance and Contracting

 Contract cost considerations for modeling software/ services





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DIGITAL TRANSFORMATION PRODUCT LIFECYCLE MANAGEMENT

Focus Area: Engineering

OVERVIEW

- Product Lifecycle Management (PLM) is the management of a product throughout its entire lifecycle from concept to disposal.
- Digital PLM creates and manages this process digitally by building a digital thread.
- The concept of a digital thread links all data related to a product's lifecycle together to create a centralized data source, also referred to as a single source of truth.

BENEFITS

- **Traceability:** Digital artifacts are linked and can be traced back to originating documents
- Synchronized Actions: Centralized digital artifacts are easier to manage, maintain, and reference
- Faster Development Time: Design teams can collaborate and work on the same data in real time, decreasing the chances for errors
- Reduced Compliance Risk: Centralized data can be easily audited to ensure compliance with the latest standards
- Innovation: Collaborative teams across the organization can easily access, review, and create
- Increased Productivity: Digital artifacts and workflows can be automated and streamlined

DAY-TO-DAY IMPACT



All Functional Areas

- · Digitization of existing documents and data
- Standardized data sharing requirements
- · Requires near constant access to centralized data
- Manage your data the same as any other asset



Contracting

 Contract language specific to data rights and IP considerations



Finance, Engineering, Test, & Logistics

Linking digital tools and data to create
 the digital thread



PLM in the DOD Popular PLM tools used across the Services and large

defense vendors

EVELOPMENT

PLM

RODUCT LIFECYC

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FACT SHEET

DIGITAL TRANSFORMATION AUGMENTED AND VIRTUAL REALITY

Focus Area: Engineering

OVERVIEW

- Augmented Reality (AR) layers digital objects over your physical surroundings using a camera.
- Virtual Reality (VR) is a completely immersive experience that transforms your physical surroundings into a digital environment using a head-mounted display.
- The merging of virtual and augmented reality, called mixed reality, uses graphics overlaid with physical space that a user can see and interact with using a head-mounted display.

Real World Examples:



BENEFITS

- **Minimize Risk:** Allow real-time training and errors without the consequences or risk or injury
- Accessibility: Enable remote and flexible training without the need for travel or physical equipment
- **Innovation:** Create scenarios that otherwise are impossible to create in the physical world
- **Performance Measurement:** Provide immediate, detailed feedback on performance

DAY-TO-DAY IMPACT



All Functional Areas

- Widely available training opportunities
- · Identify risks and common mistakes earlier and more often



Engineering

 Build digital architecture for simulations and training scenarios



Test and Evaluation

 Measure and test simulation performance and user interaction

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Logistics

Provide feedback to improve simulations

AR and VR in the DOD



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DIGITAL TRANSFORMATION DEVSECOPS AND AGILE

Focus Area: Software

OVERVIEW

- DevSecOps (short for development, security, and operations) and Agile are software development methods that focus on an expedited delivery of a minimum viable product (MVP) with small updates at frequent intervals to add or improve features and security.
 - The focus of DevSecOps is to shorten the overall software development lifecycle.
 - The focus of Agile is to incrementally deliver software by combining collaborative, cross functional teams with end users.

BENEFITS

- **Speed:** Commitment to an agreed upon MVP improves speed of initial capability delivery
- **Cyber Threats:** Incorporating cybersecurity in the development process addresses controls and testing early and throughout
- Flexibility: Priorities can be adjusted at delivery intervals (also known as sprints)

iTunes App Store Windows Update Google Play Store

Real World Examples:

- User Feedback: Users provide valuable feedback throughout the development process
- **Early Testing:** Cross functional teams include testers and expedite the testing cycles
- Automatic Updates: Frequent updates can be deployed automatically and seamlessly to the user

DAY-TO-DAY IMPACT



Program Management

 Delegation of responsibilities for sprint planning and execution

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 Contracting
 Contract language specific to agile contracting and

deliverables



Engineering,

Testing, & CyberTightly integrated

- development teams
- Collaborative problem solving

Agile Software Development Values*

- Individuals and interactions over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a plan

* Derived from the <u>Agile Manifesto</u>



MULTI-FACTOR AUTHENTICATION

BIOMETRICS

FACT SHEET

TRUSTED DEVICES

NETWORK MONITORING

DIGITAL TRANSFORMATION ZERO TRUST ARCHITECTURE

Focus Area: Software

OVERVIEW

- Zero Trust Architecture is a cybersecurity strategy that continuously monitors and validates user access, rights, and privileges.
- Zero Trust assumes that no user or device can be "trusted" with unlimited access even within the organization's network.
 - Traditional security models trust users and devices within the network and only require authentication from outside the network (i.e., login with a password).

BENEFITS

- **Safety:** Limit damage to systems by preventing attacks and increasing action time with faster threat detection
- Accessibility: Support security for any device and network, anywhere and at any time
- Efficiency: Improve time allocation towards incident response by preventing redundant security tasks and maintenance
- Flexibility: Enable networks to securely support remote users, bring your own device (BYOD), and cloud-based resources

Real World Examples:

- **Reduced Compliance Risk:** Ensure compliance with latest standards and system requirements through continuous monitoring
- **Improved Privacy:** Protect user privacy and sensitive information by restricting access to data and resources

DAY-TO-DAY IMPACT



 Track access across networks and users Contract cost considerations for Zero Trust Network Access



Cisco VPN Network

HELPFUL RESOURCES



JPEO-CBRND Digital Transformation

- Digital Transformation 101 Briefing
- People Operations Workforce Development Teams page
- Office Hours: Have questions? The monthly Office Hour is an open forum for all things Digital Transformation! Join Fred Buchanan on the first Tuesday of every month to ask questions, discuss topics of concern, or just to geek out. The line will stay open for the entire hour so feel free to pop in for a minute or stay for the whole hour. See you there!

Date: First Tuesday of every month **Time:** 3pm-4pm (ET) **Where:** <u>Digital Transformation Office Hours via Teams</u>

TRAINING

- DAU Training
- <u>Carnegie Mellon's Digital Data Leaders Course</u>
- DigitalU Training
- <u>Udemy Training</u>
 - Digital Transformation Masterclass
 - Agile Samurai Bootcamp
 - Product Management for AI and Data Science

STRATEGIES & GUIDANCE

- DoD Digital Modernization Strategy (July 2019)
- <u>Army Digital Transformation Strategy (October 2021)</u>
- DoD Digital Engineering Strategy (June 2018)
- Director, Acquisition Career Management (DACM) Newsletter on Digital Transformation (January 2023)
- Manifesto for Agile Software Development

GLOSSARY



TERM	DESCRIPTION
Agile	Software development method that combines collaborative, cross functional teams with end users to incrementally deliver software
Artificial Intelligence (AI)	The ability of machines to perform tasks that normally require human intelligence— recognizing patterns, learning from experience, drawing conclusions, making predictions, taking action, and more
Augmented Reality (AR)	Layers digital objects over your physical surroundings using a camera
Autonomous Devices	Are devices that can operate independently and perform tasks without human intervention by using Artificial Intelligence algorithms
Cloud	Remote, computer servers connected and managed by a cloud provider
Cloud Computing	Digital technology that allows users to access data and services over the Internet from any device or location
Command, Control, and Communications (C3)	Information systems, incorporating strategic and tactical systems, that are typically employed by a military organization
Cybersecurity	The practice of protecting systems, networks, and programs from digital attack
DASA(DES)	The Deputy Assistant Secretary of the Army for Data, Engineering and Software (DASA(DES)) position is newly established within the Assistant Secretary of the Army (Acquisition, Logistics and Technology) to lead Digital Transformation and software modernization efforts
Data Analytics	Process of turning data into useful information to drive decision making
Data Engineering	Designing and building systems that collect and analyze data
Data Science	Field of study often associated with Artificial Intelligence and Machine Learning that focuses on finding useful information from data by analyzing it carefully
Data Scientist	An expert who uses mathematics and computers to extract useful knowledge from data
Data Visualization	Process of delivering information or data in an easy to read, easy-to-understand graphic
DevSecOps	Method to shorten the software development lifecycle; natural extension of Agile methods and encompasses the tools, services, and standards that enable IT development, security, and operations disciplines to come together in the development, deployment, and operation of applications in a secure, flexible, and interoperable fashion*

*Content derived from: DOD Digital Modernization Strategy

GLOSSARY



TERM	DESCRIPTION
Digital Banking	The digitization of banking activities and services traditionally available at physical bank branches
Digital Engineering	Digital technology that uses computer models and data to design complex systems
Digital Literacy (Army)	Army initiative to support upskilling the Acquisition workforce. Intended to create a common understanding of topics such as digital transformation, agile software development, DevSecOps, cloud foundations, data science, machine learning, human centered design, artificial intelligence, and cybersecurity
Digital Literacy Campaign (JPEO-CBRND)	Combination of training and culture shift within the JPEO-CBRND workforce to adopt, use, and acquire digital technologies
Digital Thread	Linking all lifecycle product data together creating a centralized data source, also referred to as a "single source of truth"
Digital Transformation	Leveraging digital technologies to transform business processes, empower organizations, and develop capabilities
Enterprise Data Management	Process of managing and governing business data
Expert Systems	Computers making decisions that replicate what human experts would make
Internet of Things (IoT)	Assortment of embedded sensors and connected devices to gain the ability to sense, predict, and respond to our needs and can be integrated into our decision-making processes and natural behaviors*
Machine Learning (ML)	Programs and systems that improve performance over time
Metadata	Information that describes and explains data, allowing it to be easily stored, organized and sorted
Minimum Viable Product (MVP)	The first version of a product that has just enough features to be usable by an initial user to solicit feedback
Model Based Systems Engineering (MBSE)	Use of a collaborative, digital model to document and track the systems engineering process from end to end
Natural Language Processing	Computers understanding human language
Product Lifecycle Management (PLM)	Management of a product from concept to disposal
Robotics	Machines performing tasks autonomously based on data about its environment

*Content derived from: DOD Digital Modernization Strategy

GLOSSARY



TERM	DESCRIPTION
Speech Recognition	Computers converting spoken audio into usable data
Virtual Reality (VR)	A completely immersive experience that transforms your physical surroundings into a digital environment using a head-mounted display
Vision	Computers understanding and interpreting information from images or videos
5G	The 5th generation of mobile network technologies that encompasses wireless standards, emerging technologies, and mobile platform delivery services designed to deliver enhanced mobile broadband and machine to machine communications*

*Content derived from: DOD Digital Modernization Strategy