



Future Direction of Model-Based Engineering Across the Department of Defense

*Andrew Monje
Office of the Under Secretary of Defense
for Research & Engineering*

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A Need to Move Fast

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

Near-Peer Adversaries

Invest in technologies that mitigate our strengths

Erode traditional U.S. advantage in conventional Warfare



Exploit U.S. vulnerabilities

Field systems more rapidly

Modernization Priorities

- 5G
- Artificial Intelligence and Machine Learning
- Autonomy
- Biotechnology
- Cyber
- Directed Energy
- Fully Networked Command, Control, & Communication
- Hypersonics
- Microelectronics
- Quantum Science
- Space

We now face a renewed power competition



Digital Engineering Transformation



CURRENT STATE

FUTURE STATE

People

Workforce and culture entrenched in traditional practices

Digitally skilled workforce implementing Digital Engineering practices

Process

Static paper-based, manual processes and workflows

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

Technology

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

Innovation and collaboration through a shared Digital Ecosystem

Data

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

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



Digital Engineering Strategy Overview

Digital Engineering Strategy

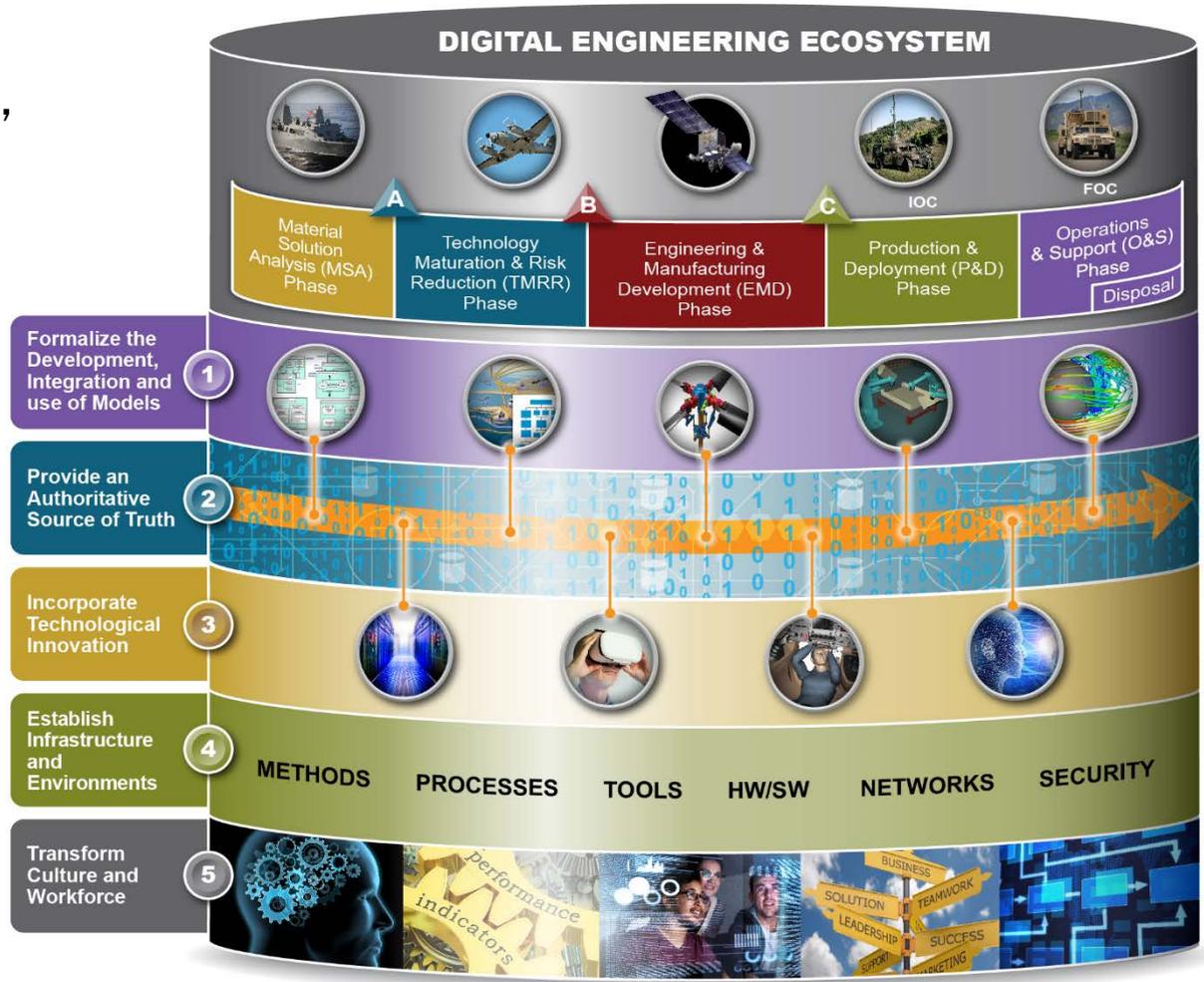
- Modernizes how we design, operate, and sustain capabilities to outpace our adversaries
- Released June 2018

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

Service Implementation

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)

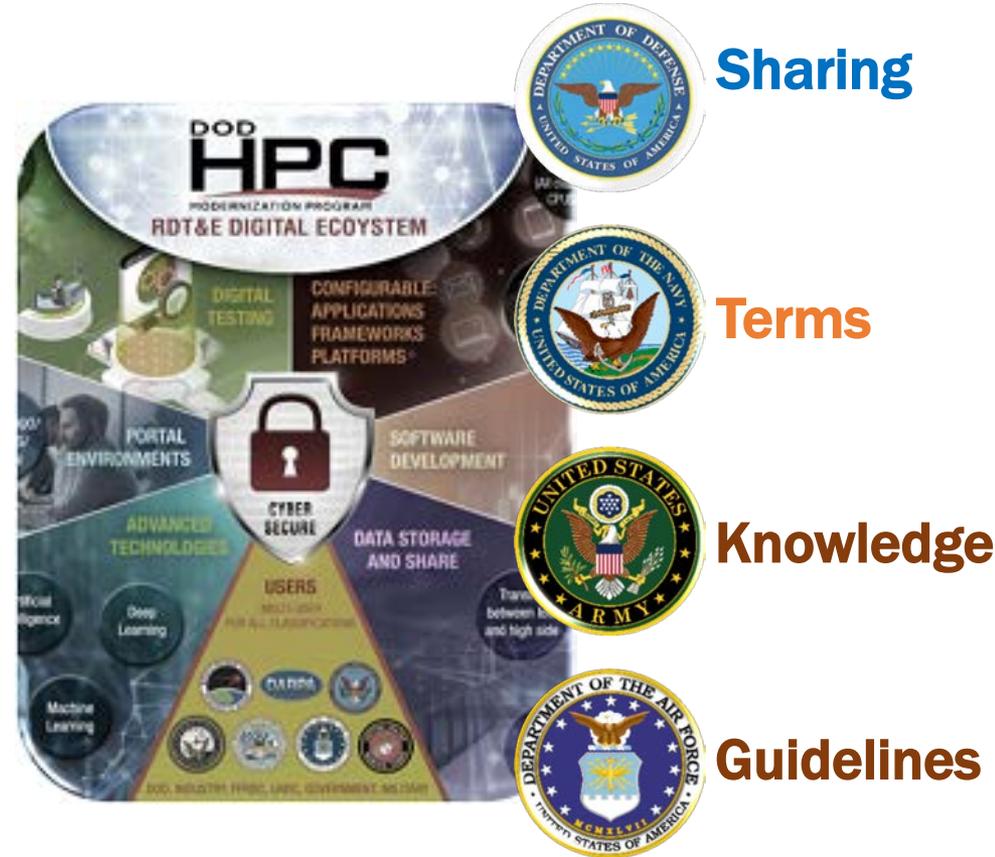
Implementing Digital Engineering Across the Services



Digital Engineering Body of Knowledge (DEBoK) Vision



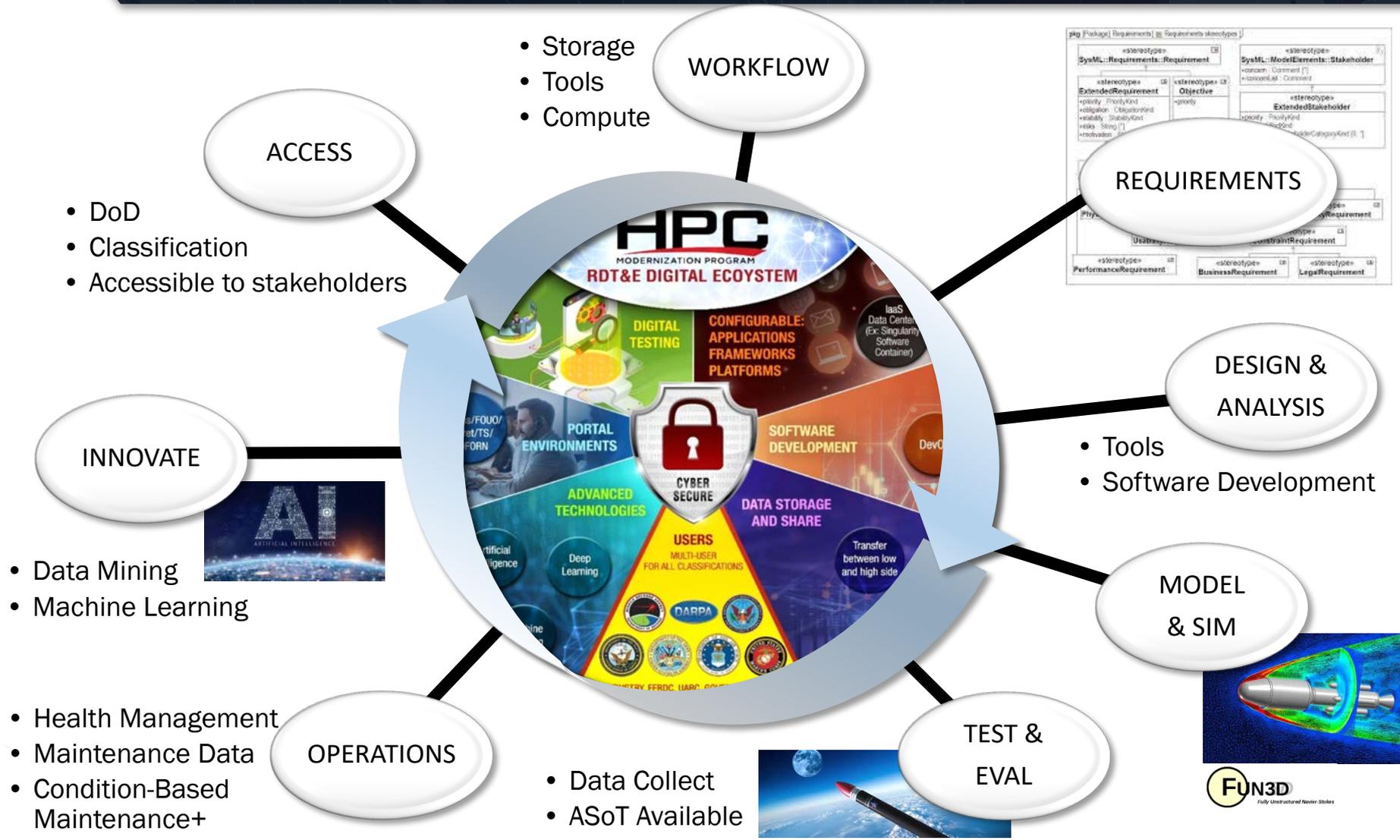
- Accessible in shared Digital Ecosystem
- Standard terms
- Knowledge sources/ references
- Guidelines/best practices
- Flexibility to tailor



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



Using the Digital Ecosystem

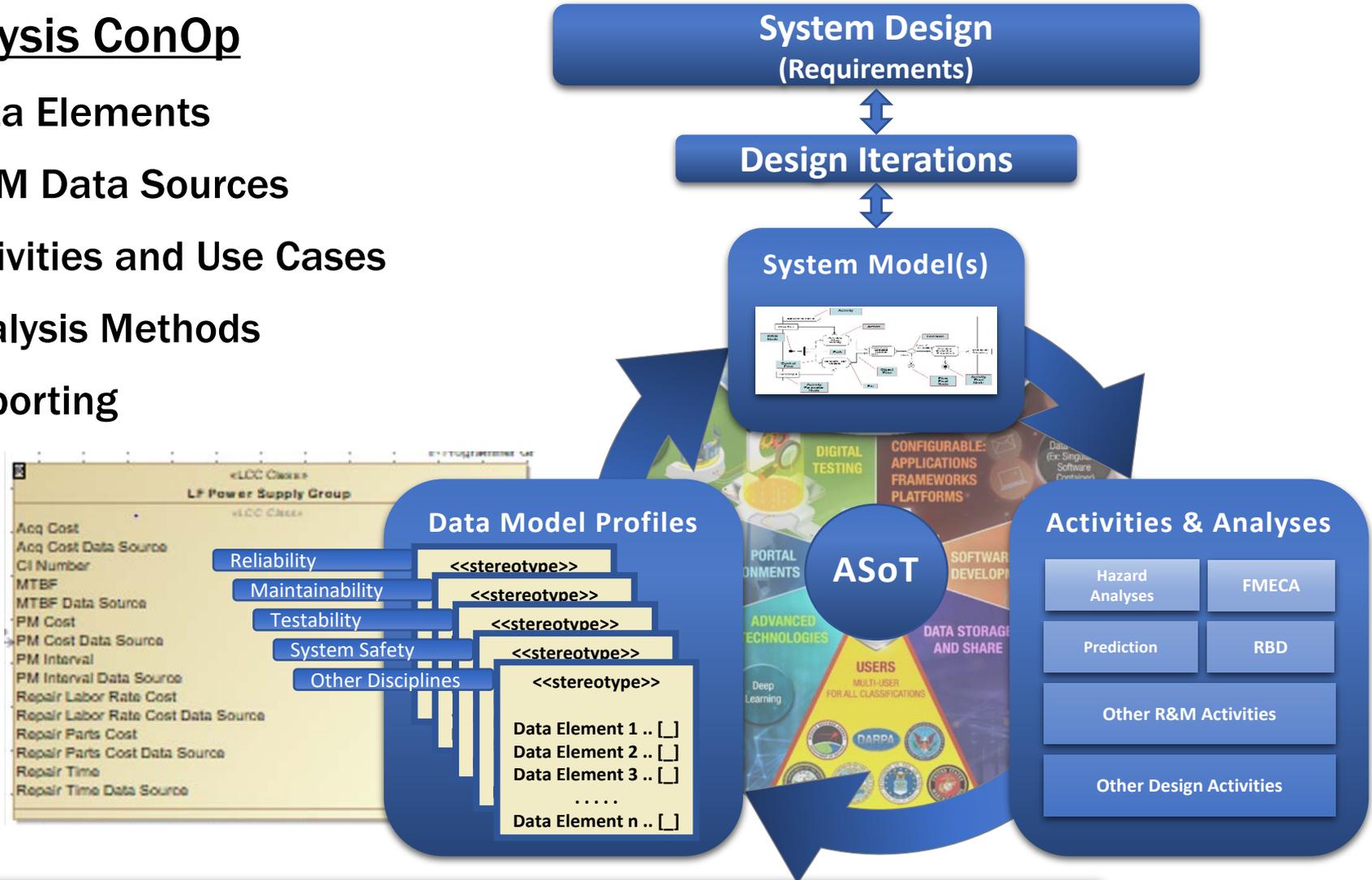


Establish a Digital Ecosystem to Ensure Long Lasting Benefits

MBE Framework

Analysis ConOp

- Data Elements
- R&M Data Sources
- Activities and Use Cases
- Analysis Methods
- Reporting



Integrating R&M into an MBE framework

ASoT - Authoritative Source of Truth
ConOp - Concept of Operations

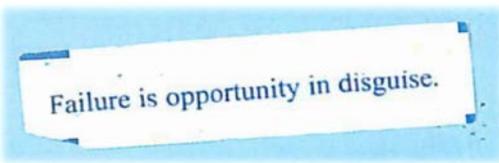
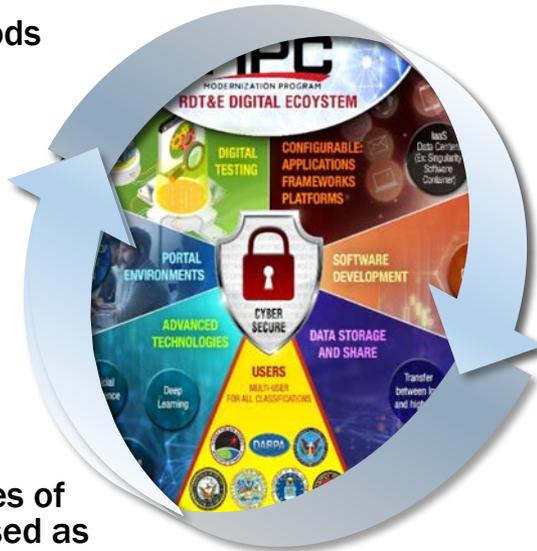


MBE Opportunities and Challenges



Opportunities

- Digitally skilled workforce implementing Digital Engineering practices
- Model-based methods and processes to automate, reuse, and auto-generate digital artifacts
- Innovation and collaboration through a shared Digital Ecosystem
- Authoritative sources of data and models used as a continuum across the lifecycle



Challenges

People

- Culture Transformation (Training, Career Paths, Leadership Buy-In)
- Interaction between Government and Industry
- Workforce Development Needs

Process

- Compatible and interoperable tools
- Data Standards and Formats
- Taxonomies and Definitions

Technology

- Cybersecurity and Information Protection
- Cloud Configuration (Infrastructure)
- Access Control

Data

- Intellectual Property and Data Rights
- Authoritative Source of Truth and Data Quality
- Contracting (i.e. access, digital data, tailoring)
- Lifecycle Data Needs and Implications (e.g. Design, Test, Sustainment)
- Ease of Sharing and collaboration

An integrated, collaborative ecosystem optimizes technology investments aligned to national priorities and mission needs.



For Additional Information



Andrew Monje
OUSD(Research & Engineering)
(703) 692-0841 | andrew.n.monje.civ@mail.mil



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DoD Research and Engineering Enterprise
<https://www.CTO.mil/>

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