Digital Engineering Implementation across the Department of Defense

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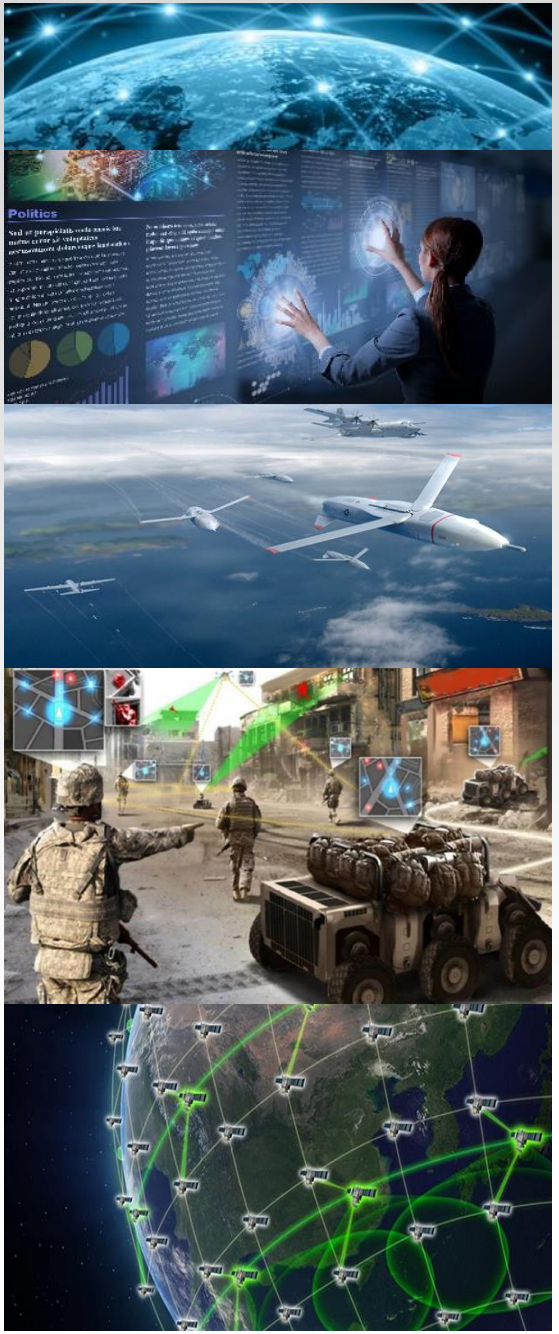
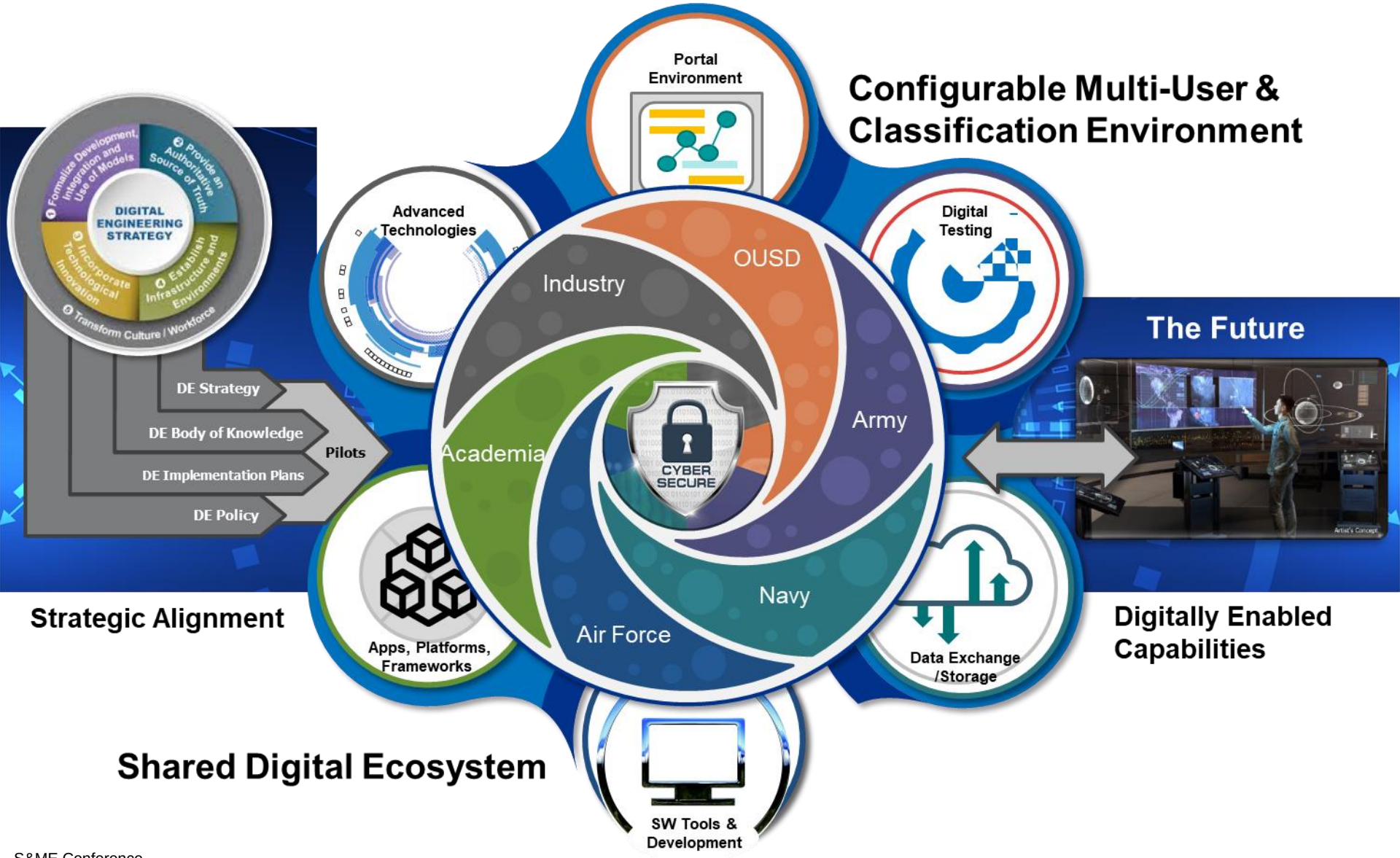


Digital Engineering Transformation

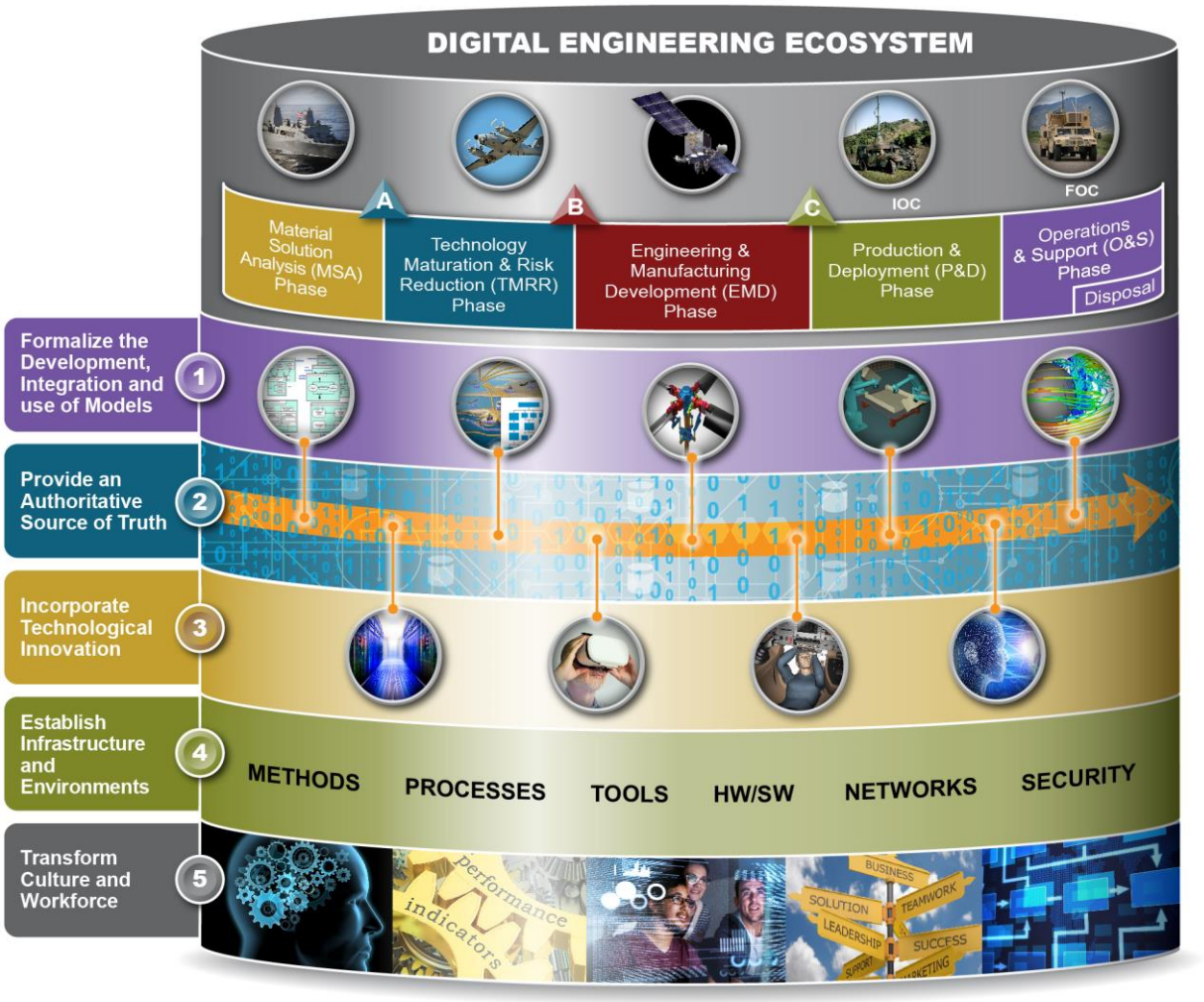
	CURRENT STATE	FUTURE STATE
People	Workforce and culture entrenched in traditional practices	Digitally skilled workforce implementing Digital Engineering practices
Process	Static paper-based, manual processes and workflows	Model-based methods and processes to automate, reuse, and auto-generate digital 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 Core Capabilities



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

U.S.ARMY

U.S. AIR FORCE

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

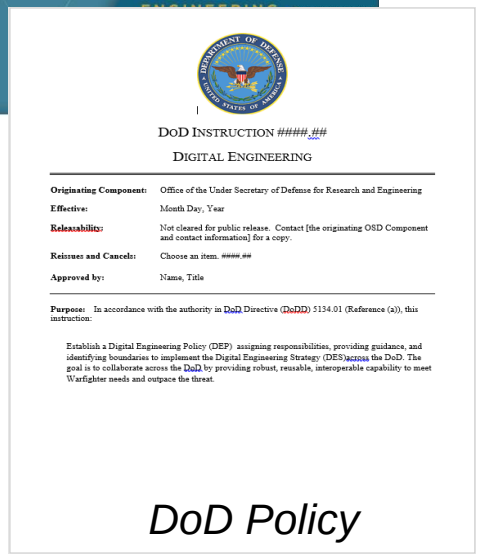
Digital Engineering Collaborations

- **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



DoD INSTRUCTION ##### ##

DIGITAL ENGINEERING

Originating Component:	Office of the Under Secretary of Defense for Research and Engineering
Effective:	Month Day, Year
Releasability:	Not cleared for public release. Contact [the originating OSD Component and contact information] for a copy.
Reissues and Cancels:	Choose an item. #####.##
Approved by:	Name, Title

Purpose: In accordance with the authority in DoD Directive (DoDD) 5134.01 (Reference (a)), this instruction:

Establish a Digital Engineering Policy (DEP) assigning responsibilities, providing guidance, and identifying boundaries to implement the Digital Engineering Strategy (DES) across the DoD. The goal is to collaborate across the DoD by providing robust, reusable, interoperable capability to meet Warfighter needs and outpace the threat.

DoD Policy

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

Sharing

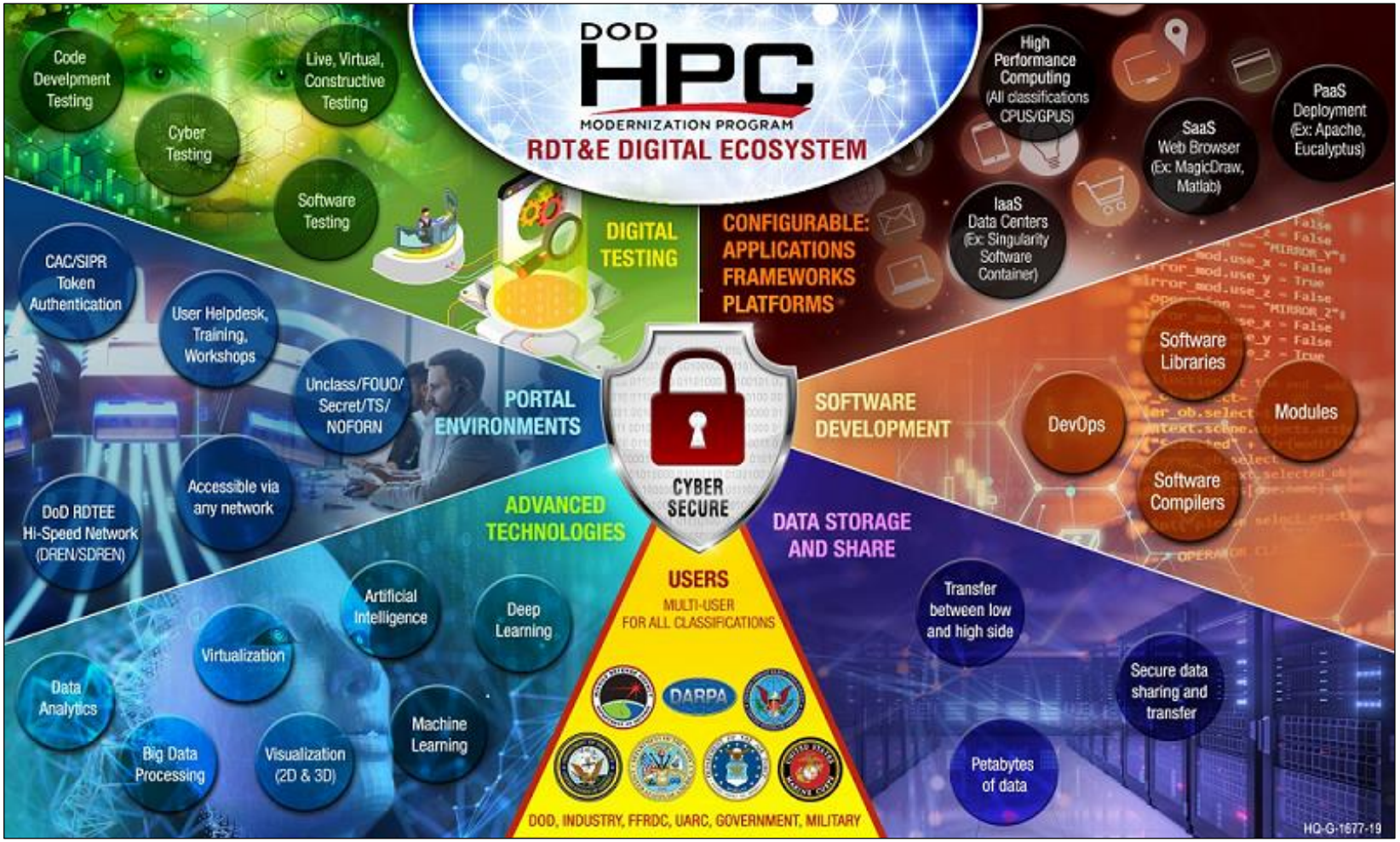
Terms

Knowledge

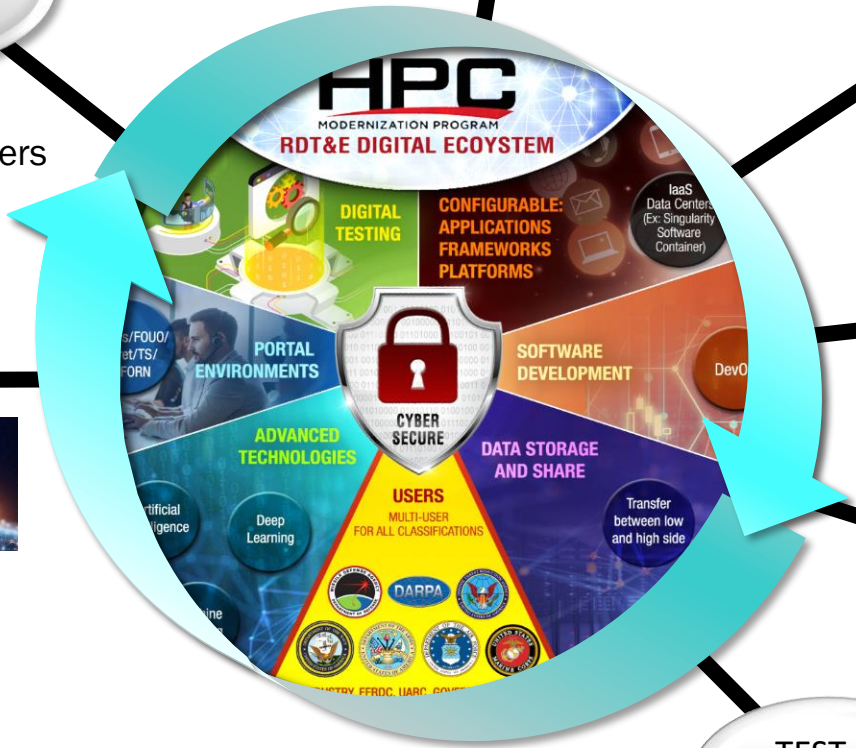
Guidelines

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

DoD Digital Ecosystem Vision



Using the Digital Ecosystem



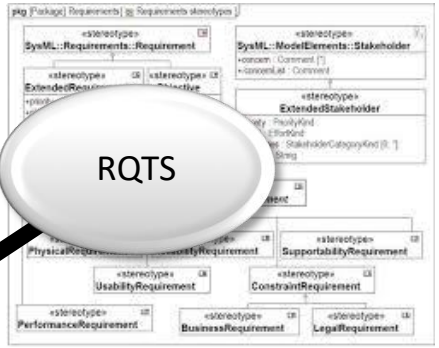
WORKFLOW

- Storage
- Tools
- Compute

ACCESS

- DoD
- Classification
- Accessible to stakeholders

RQTS



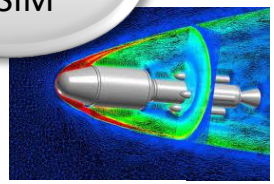
DESIGN & ANALYSIS

- Tools
- Software Development

INNOVATE

- Data Mining
- Machine Learning
- GPGPUs Available

MODEL & SIM



FUN3D
Fully Unstructured Navier-Stokes

TEST & EVAL

- Data Collect
- ASoT Available

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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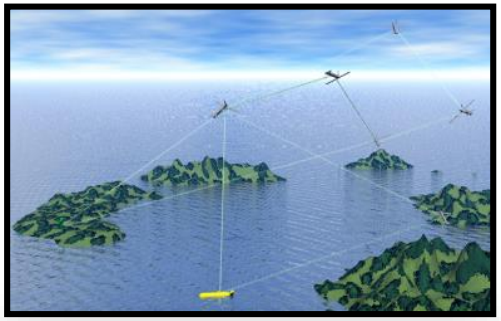
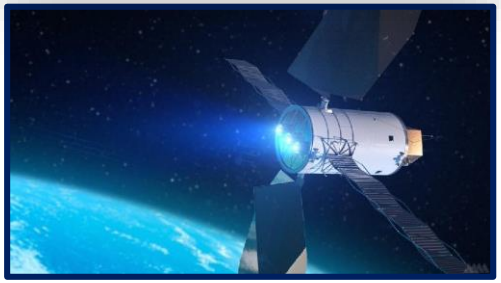
USD(R&E) Mission

- **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