USD(R&E)

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Digital Mission Architecture

Foundation for Mission Engineering and Integration Across the Defense Enterprise

Mr. Jaime J. Bestard, Chief Engineer for Digital Mission Architecture
National Defense Industrial Association, 27th Annual Systems and Mission Engineering Conference, October 30, 2024

Our Mission

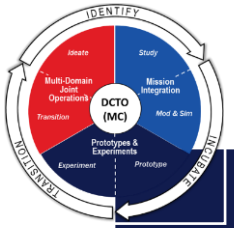
Department of Defense

To provide the military forces needed to deter war and ensure our nation's security.

Under Secretary of Defense for Research and Engineering

To ensure continuous advancement of technology and innovation within the Defense enterprise.

Assistant Secretary of Defense for Mission Capabilities



Deliver Joint Warfighting Concepts to Prototype Capabilities. Transition the Valley of Death.

Chain of Command

Mr. Joseph R. Biden, Jr.
President of the United States

Mr. Lloyd J. Austin, III
United States Secretary of Defense

Ms. Heidi Shyu
Under Secretary of Defense for Research and Engineering

Mr. Thomas J. Browning
Performing the Duties of the Assistant Secretary of Defense for Mission Capabilities

Mr. Elmer L. Roman
Deputy Assistant Secretary of Defense for Mission Integration

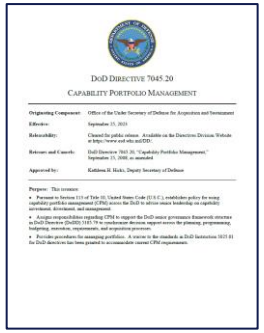
Mr. Jaime J. Bestard
Chief Engineer for Digital Mission Architecture

Authorities and Guidance for Mission Engineering

NDAA 2017, Sec. 855. Mission Integration Management (MIM)

The Secretary of Defense shall establish MIM activities for […] mission areas that involve multiple Armed Forces and multiple programs and, at a minimum, include the following:

- *Close air support*
- *Air defense and offensive and defensive counter-air*
- *Interdiction*
- *Intelligence, surveillance, and reconnaissance*
- *Any other overlapping mission area of significance, as jointly designated by the Deputy Secretary of Defense and the Vice Chairman of the Joint Chief of Staff for purposes of this subsection.*



DoDD 7045.20 Capability Portfolio Management

In addition to the responsibilities in Paragraph 2.1., the USD(R&E):

a. Provides CPM oversight for activities within USD(R&E)'s purview in accordance with Section 133a of Title 10, U.S.C. and DoDD 5137.02.

b. Leads execution of MIM and provides guidance on mission engineering activities, pursuant to the Mission Engineering Guide. Develops mission threads and identifies capability assessment criteria to enable portfolio management.

DoDD 5137.02 Under Secretary of Defense for Research and Engineering (USD(R&E))

Leads the DoD […] in mission engineering policy, practices, and tools for analysis of warfighting concepts of operation, functions, systems, and technologies in an end-to-end mission context.

[…] supports MDAPs and other acquisition programs in the areas within which the USD(R&E) has direct or shared mission equities, including: […] Conduct of program and technology assessments, system engineering, technical risk, joint mission engineering, joint architectures, prototyping and experimentation outcomes, and technology-related recommendations.

DoDI 5000.88 Engineering of Defense Systems

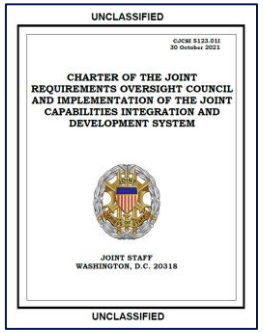
The DoD will conduct a comprehensive engineering program for defense systems, including the engineering management activities necessary to guide the development of defense systems.

a. The engineering management activities include, but are not limited to:

(1) Mission engineering (ME).

(2) Systems engineering.

(3) Technical risk assessments.

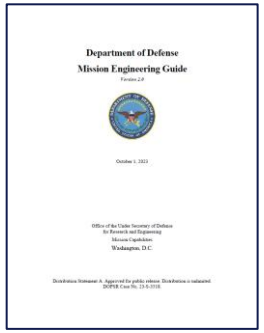


CJCSI 5123.01I Charter of the Joint Requirements Oversight Council and Implementation of the Joint Capabilities Integration and Development System

USD(R&E). Serves as the DoD Chief Technology Officer advancing technology and innovation IAW Title 10, U.S. Code, Section 133a. […]

Serves as the principal advisor to the Secretary of Defense on MIM activities IAW Section 855 of the FY 2017 NDAA. […]

Leads the DoD in mission engineering policy, practices, studies, and tools for analysis of warfighting concepts of operation, functions, systems, and technologies in an end-to-end mission context.



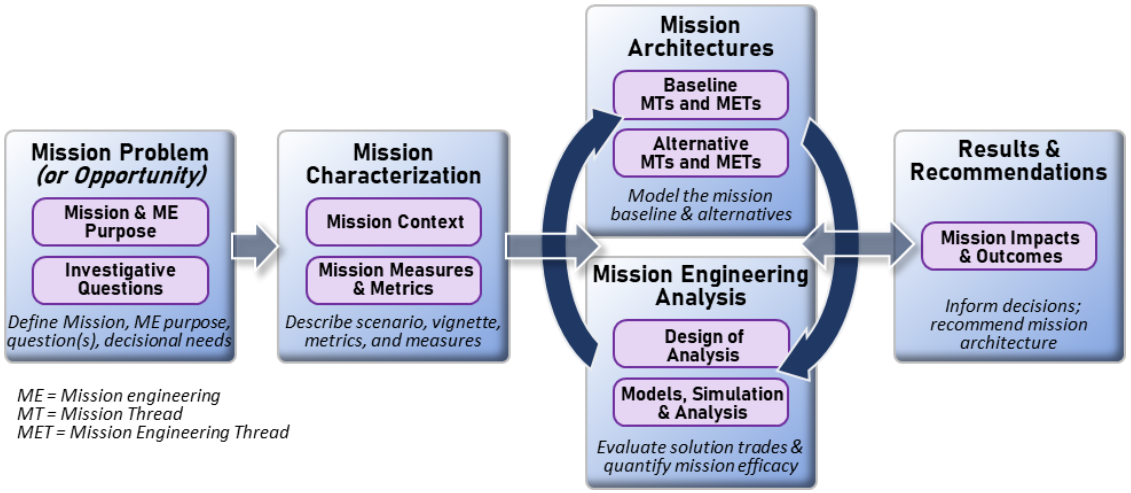
Department of Defense Mission Engineering Guide 2.0

[…] key document that provides practitioners and subject enthusiasts a strong overview and understanding of mission engineering.

- *Describes the mission engineering methodology and its main attributes*
- *Provides guiding principles for executing mission engineering and developing rigorous analytical products*
- *Advises best practices and considerations when conducting mission engineering*
- *Informs mission engineering practitioners at different levels of proficiency and from diverse disciplinary backgrounds about the processes used to conduct mission engineering activities*
- *Defines mission engineering terminology*

What is Mission Engineering?

Not just modeling and simulation

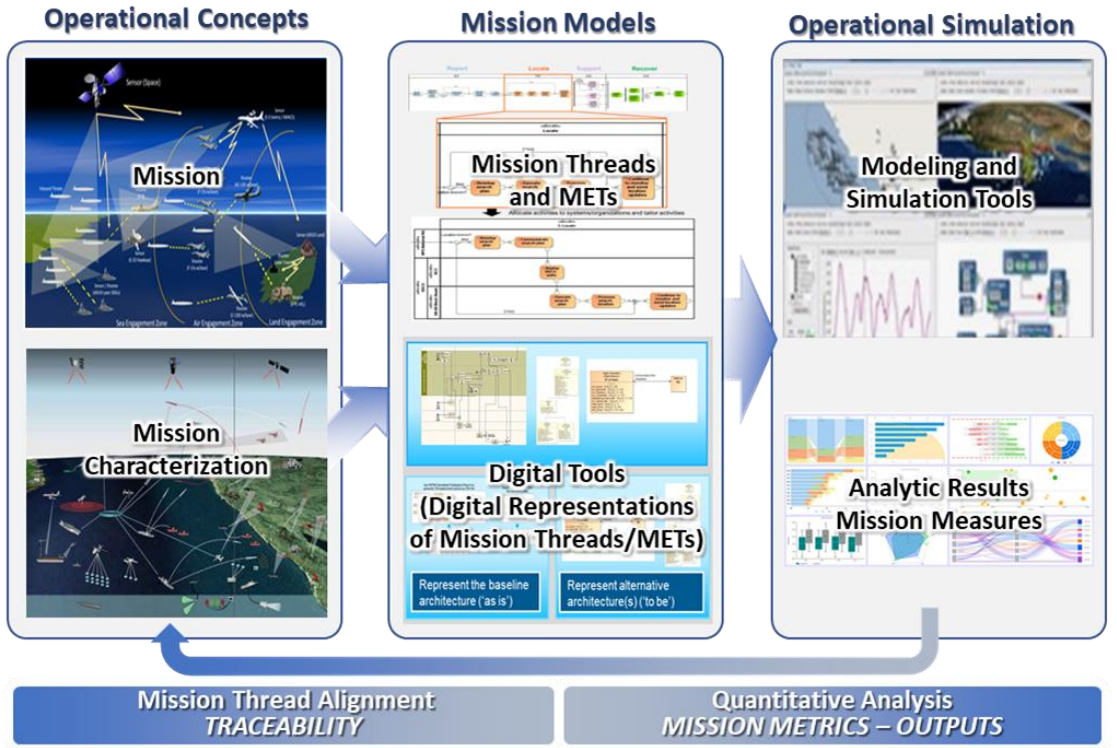


Interdisciplinary analysis

Model kill chains / webs
Operations research and analysis
Enable advanced technology transition

The goal is to engineer missions

Assess mission impact of technologies
Eliminate / disrupt adversarial kill chains
Deliver superior Joint Force kill chains



Mission Integration Across the Defense Enterprise

Mission Architecture Initiatives

Promote Uniformity

- **Publish and Employ Mission Architecture Style Guide**
- **Apply Existing Approved Standards**
  - Universal Joint Task List (UJTL) / Service Task Lists and Related Measures
  - MIL-STD-881F Work Breakdown Structure
  - Joint Common System Function List (JCSFL)
- **Inform and Implement Next-Generation Standards**
  - Systems Modeling Language (SysML) 2.0
  - Unified Architecture Framework (UAF) 2.0

Enable Mission Integration

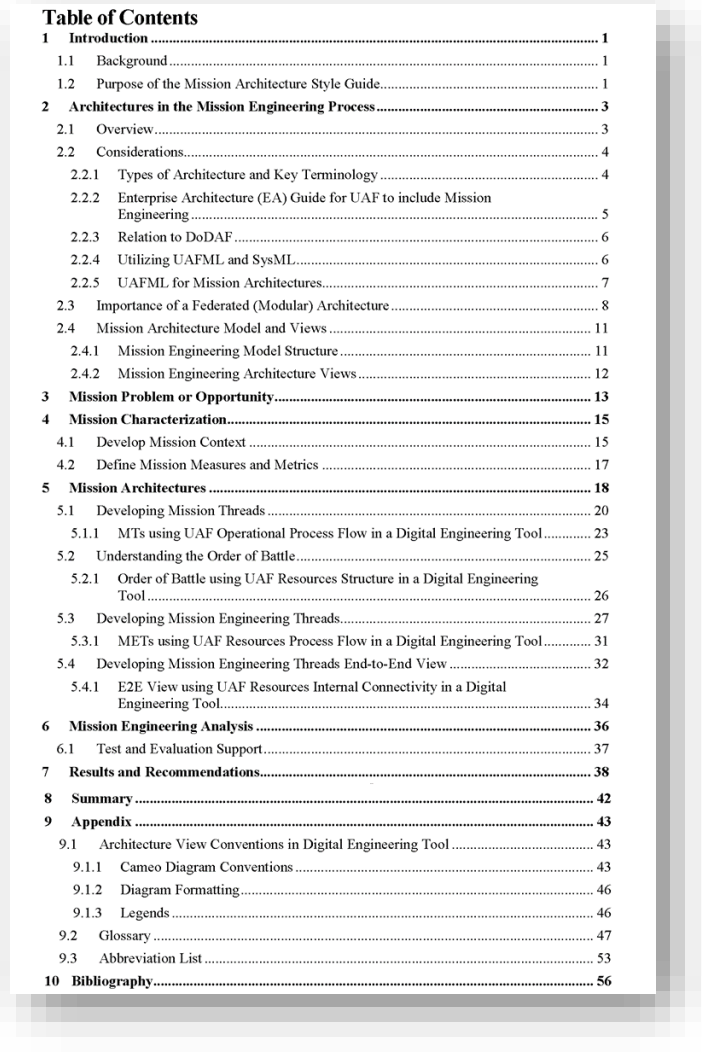
- **Federate Mission Architecture Development**
- **Mission-Informed Decisions**
  - Capability Investments
  - Operational Employment
- **Research, Development, Test and Evaluation Synergy**
  - Joint-Mission Alignment of Prototypes and Experiments
  - Developmental Test and Evaluation as a Continuum (dTEaaC)
  - Joint Test Concept (JTC)

Advance Mission Engineering

- **Mission Architecture Development and Analysis**
  - State-Dependent Behaviors
  - Architecture-Based Mission Risk Analysis
- **Leverage Emerging Technologies to Automate and Scale**
  - Generative Artificial Intelligence and Large Language Models
- **Knowledge Management**
  - Model Documentation
  - Configuration Control
  - Architecture Sharing and Collaboration

Mission Architecture Style Guide

- Harmonize production and integration of authoritative mission architectures
- Guide modelers to develop uniform mission architectures that support defense capability development
- Recommend best practices for presentation of mission architectures to decision makers



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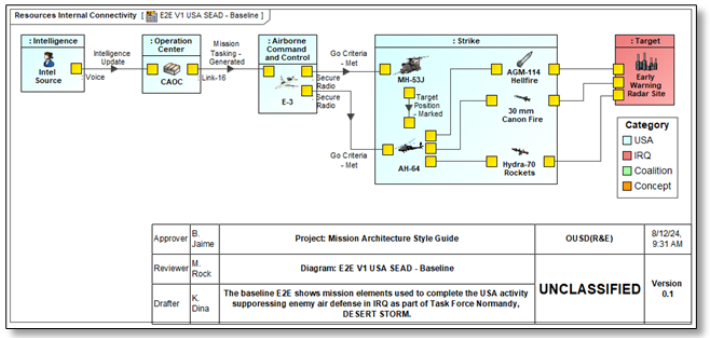
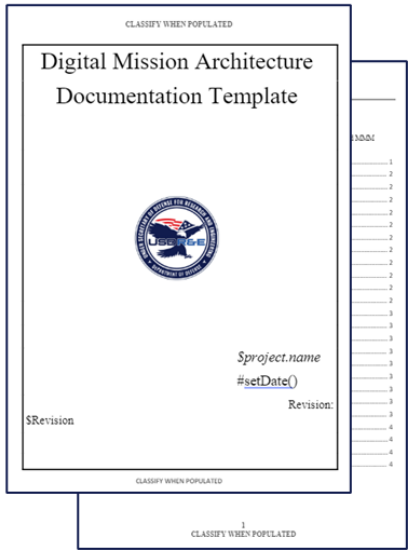
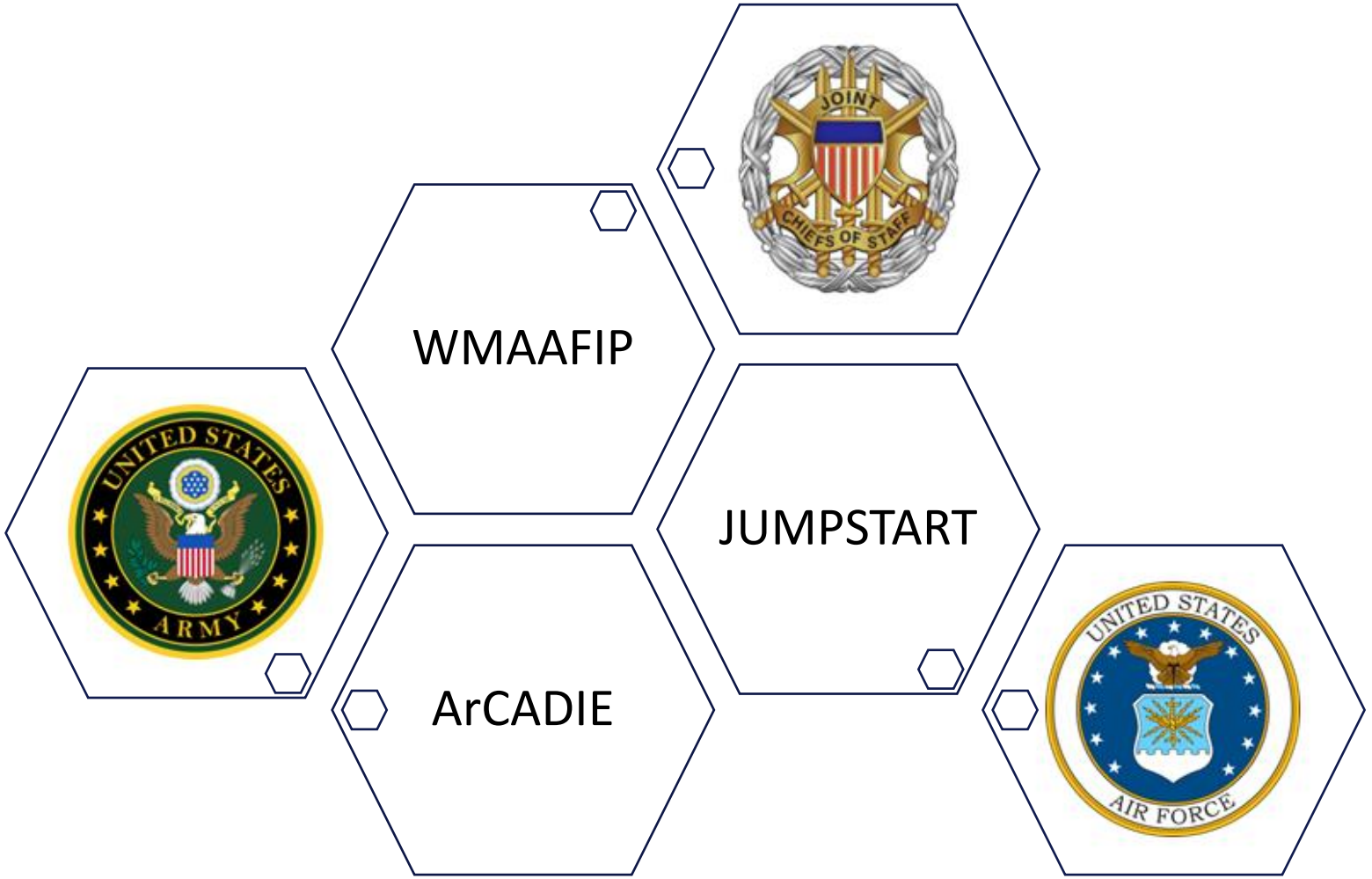
Mission Architecture Documentation

- Provide current model information across the Department and beyond
- Leverage model-based architectures and automate documentation development
- Identify opportunities and challenges to develop constructive models





Knowledge Management



Useful Links and Resources

Training

- CLE 084 Models, Simulations, and Digital Engineering
- CLE 066 Systems Engineering for Systems of Systems
- CLE 069 Technology Transfer
- ETM 1020 Mission and Systems Thinking Fundamentals
- ETM 1030 Requirements Definition and Analysis Fundamentals
- ETM 1040 Technical Management Fundamentals
- MITRE Modular Open Systems Engineering (MOOSE)

References (Public Domain)

- Mission Engineering Overview: https://ac.cto.mil/mission-engineering/
- Mission Engineering Guide: https://ac.cto.mil/wp-content/uploads/2023/11/MEG_2_Oct2023.pdf

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