



# DoD Mission Engineering Guide 2.0 – Evolving the State of Practice in Defense Mission Engineering (NDIA S&ME Conference)

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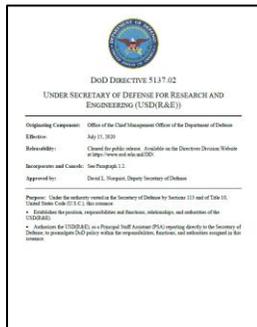
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# Mission Engineering Guide - Background

*Mission engineering is an interdisciplinary process encompassing the entire technical effort to analyze, design, and integrate current and emerging operational needs and capabilities to achieve desired mission outcomes.*

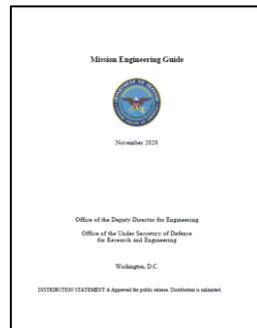
## Policy



### DoDD 5137.02, USD(R&E) Charter

Lead DoD, in coordination with USD(A&S), 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

## Guidance



### Mission Engineering Guide

- The DoD Mission Engineering Guide (MEG) v1 was published in November 2020
- Periodic updates to incorporate best practices, lessons learned, and feedback
- The DoD MEG v2.0 recently published



# ME Guide Purpose

- Speaks to mission engineering practitioners at different levels of proficiency
- Invokes critical thinking throughout the mission engineering process
- Provides overarching guidance and information on ME by:
  - Explaining what is and what is not ME
  - Describes the ME methodology and its main attributes
  - Elaborating on the benefits of using ME
  - Establishing a set of common terms and definitions
- Enables practitioners to formulate problems and build a firm understanding of the main principles involved in mission engineering
- Provides guiding principles for executing mission engineering and developing rigorous analytical products





# ME Guide Development Process

## MEG Guide v1

- Assembled working group consisting of representatives from Army, Navy, Air Force, Joint Staff, OUSD(A&S), MDA, CAPE, and CIO/CDO to collaborate on guide development

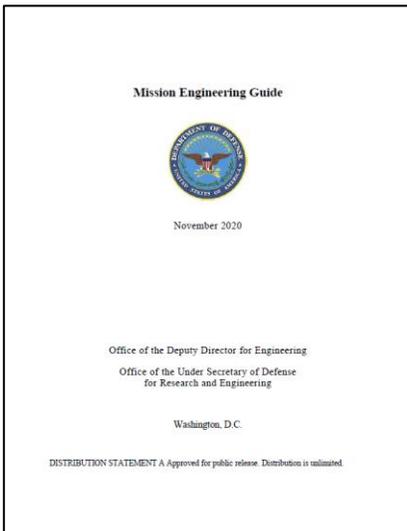


## MEG Guide v2

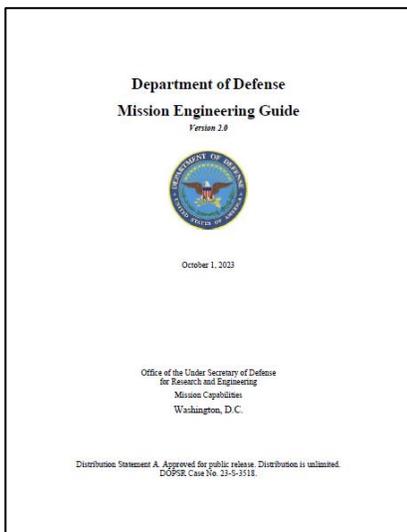
- Initially established a Tiger Team under the Mission Engineering Work Group
- Expanded beyond DoD/Government to include feedback from academia and industry



# Mission Engineering Definition – MEG 1.0 to MEG 2.0



- **Nov 2020 MEG: Mission Engineering (ME)** – The deliberate planning, analyzing, organizing, and integrating of current and emerging operational and system capabilities to achieve desired warfighting mission effects. (DAG Chapter 3/FY 2017 NDAA Section 855 Report to Congress)



- **Oct 2023 MEG 2.0: Mission Engineering (ME)** - an interdisciplinary process encompassing the entire technical effort to analyze, design, and integrate current and emerging operational needs and capabilities to achieve desired mission outcomes. (OUSD(R&E))



# MEG 2.0 Key Changes

Front matter revised to focus on benefits and scalability of the interdisciplinary ME process

ME methodology revised to show applicability beyond studies—inform acquisition, research and development, systems and system of systems (SoS) integration, and evolving concepts of operation

Design of analysis content revised to better depict lessons learned and best practices in planning, resourcing, execution, and curation of findings from ME activities—i.e., types of data and products

Refocused MEG 1.0 content on Government Reference Architectures to the critical elements of Mission Thread and Mission Engineering Thread development; supporting broader application of the ME process

ME terminology definitions revised and expanded to reflect current state-of-practice

References updated to show alignment with current DoDD and DoDI series

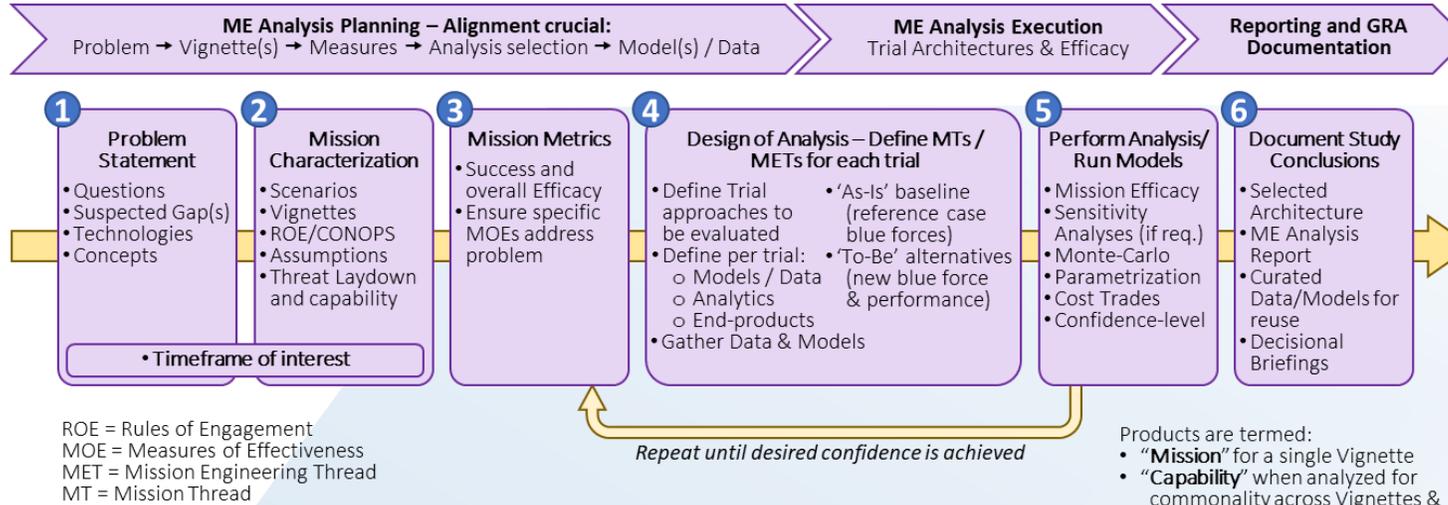
## MEG 2.0 Table of Contents

1.0 Introduction	6.0 Mission Engineering Analysis
1.1 Background	6.1 Complete Design of Analysis
1.2 Purpose of the MEG	6.2 Execute Models, Simulations, and Analysis
2.0 Mission Engineering	6.3 Adjust Mission Threads and Mission Engineering Threads
2.1 Overview	7.0 Results and Recommendations
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2.3 ME Considerations	9.0 Appendix
3.0 Mission Problem or Opportunity	9.1 Mission Engineering Glossary
3.1 Identify Mission and ME Engineering Purpose	9.2 Acronym List
3.2 Determine Investigative Questions	9.3 References
3.3 Identify and Engage with Stakeholders	
4.0 Mission Characterization	
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4.2 Define Mission Measures and Metrics	
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5.3 Develop Baseline and Alternative MTs and METs	

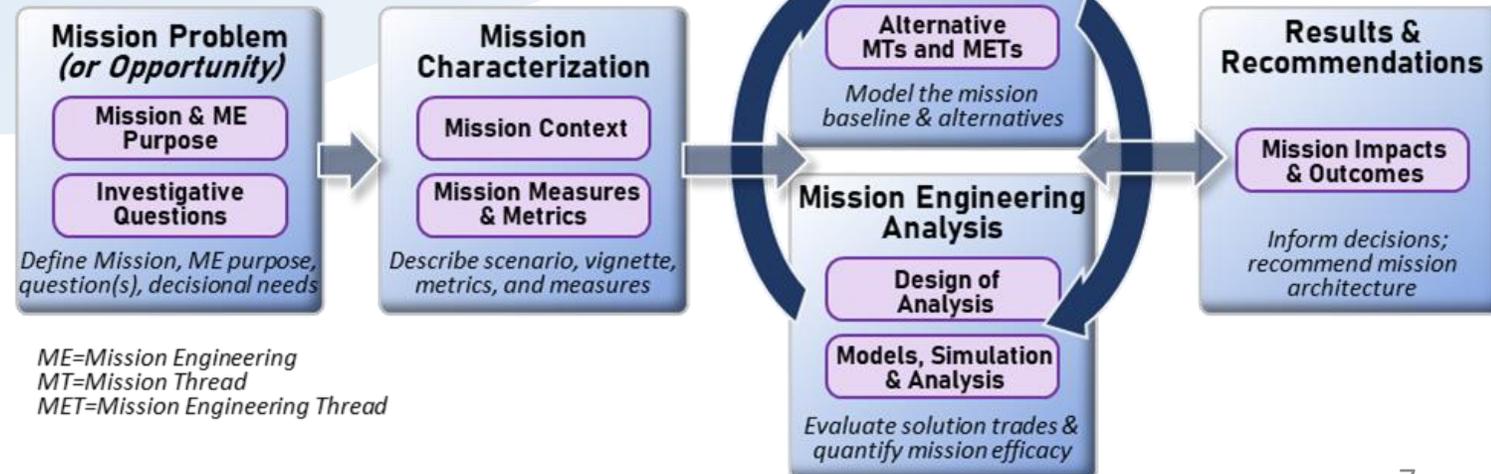


# MEG 1.0—MEG 2.0 ME Process Graphic Evolution

## MEG 1.0



## MEG 2.0

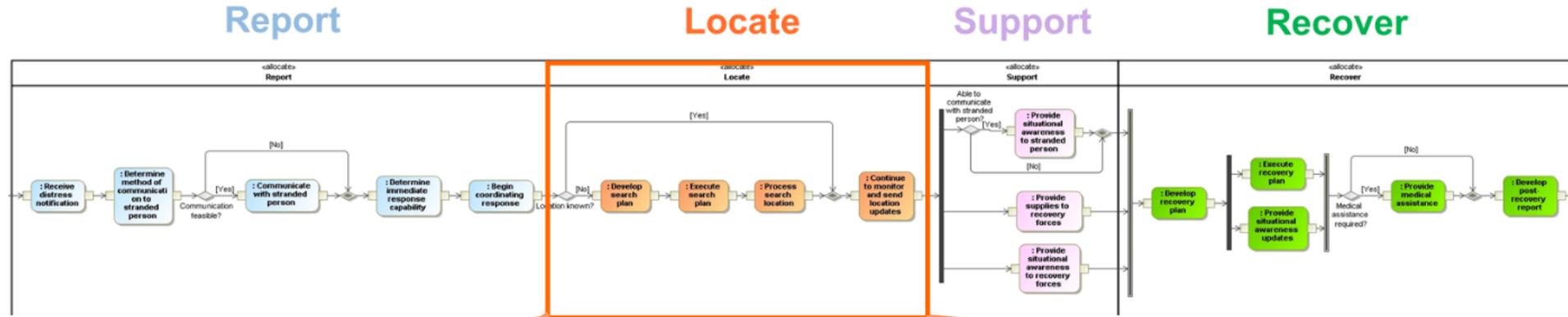




# Example Mission Thread and Mission Engineering Thread Alignment and Decomposition

**Mission Thread:** A sequence of end-to-end mission tasks, activities, and events to be executed to conduct or carry out the mission

**Level of detail:** the activities that make up mission execution

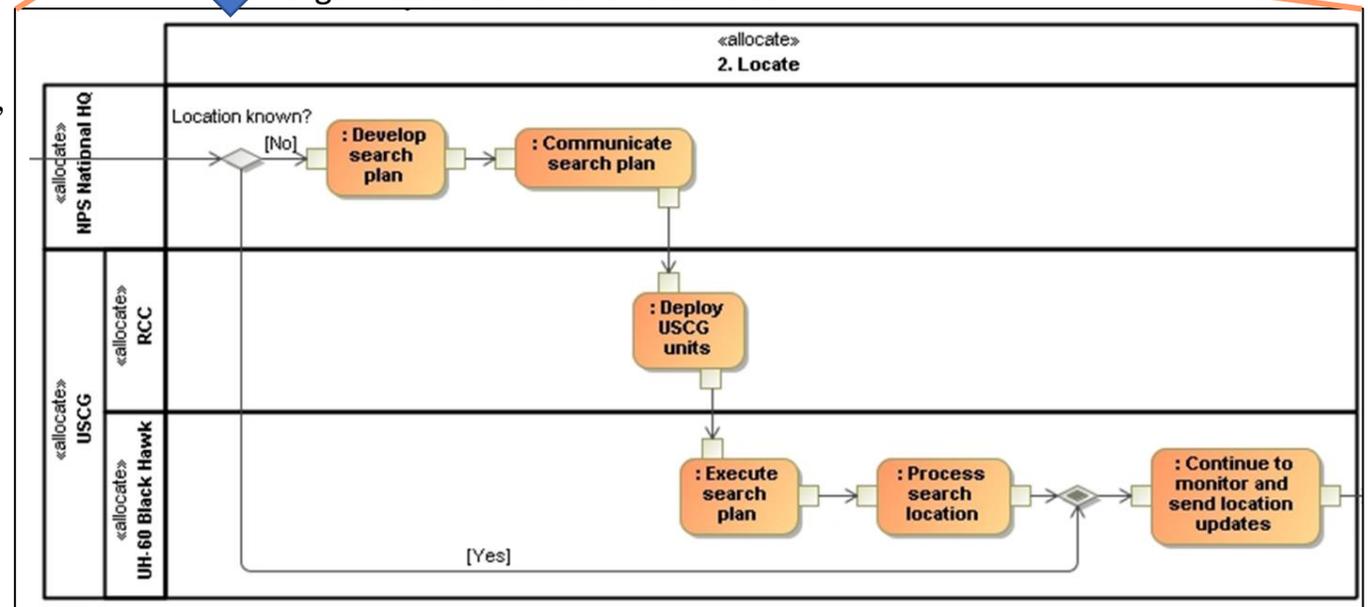


Allocate activities to systems/ organizations and tailor activities

**Mission Engineering Threads:** Mission threads that include the details of the capabilities, technologies, systems, and organizations required to execute the mission

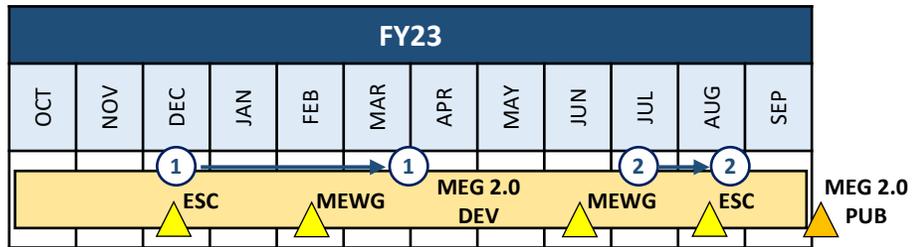
**Level of detail:**

- Systems included in the mission concept
- Organizations involved in mission execution and the activities they execute
- End-to-end systems interactions with the activities they execute
- Integrated sequence of actions aligning systems, organizations, and actors

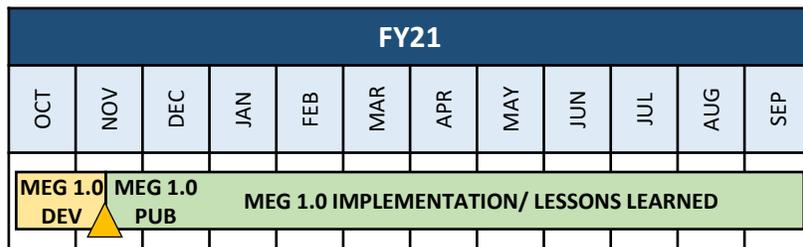
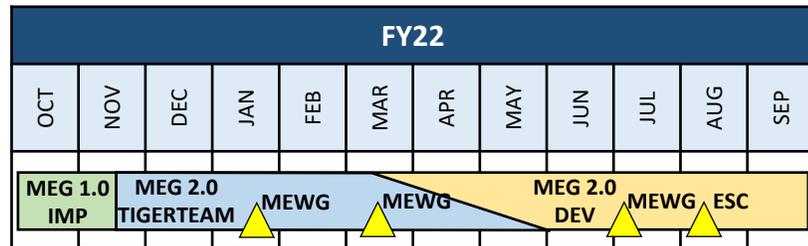




# MEG 2.0 Development and Review Process



# = MEWG DRAFT CONTENT REVIEW  
 ▲ = MEWG/ESC MEETINGS



- Two rounds of review by MEWG members and colleagues during FY23 generated **>600 comments** in total from stakeholders
- Most recent round included **12 critical comments** addressing the philosophy of mission engineering, descriptions of data and analysis methodologies, and the structure of the MEG 2.0
  - *Mission Integration is incorporating relevant changes to the draft MEG 2.0 based on the critical and substantive comments, and revising the entire document to address administrative concerns and readability*
- Following publication (end FY23) of the MEG 2.0 core narrative, the team intend to engage the MEWG members in the development of a series of **annexes or white papers** to showcase mission engineering process implementation.

*Notional topics include:*

- *Mission thread and Mission Engineering Thread development*
- *Mission engineering case studies*
- *Mission engineering tools and techniques*



# Mission Engineering Practitioners Forum

- Background:
  - Established in June 2022 as a collaborative forum for Acquisition, SE, and R&D organizations to improve the **Mission Engineering discipline**
- Purpose:
  - Forum for practitioners to discuss “how” Mission Engineering is being implemented
  - Share best practices and lessons learned
  - Improve “competency” and “methods”
  - Improve Mission Engineering to better inform design / integration activities for SoS/Systems

## Example Topics Discussed:

- ME Methodology
- Mission Engineering Guide
- Mission Architectures
- Mission Engineering Digital Tools
  - Enterprise Architect
  - Mission-Level
- Mission Engineering Pain Points
- Mission Engineering Training & Competency
- Mission Engineering Success Stories
  - Capability Development
  - SoS Design & Integration
  - Prototype & Experimentation

## Who Attends:

**Working Group\*:** GS-15 members and below from OSD, Services (Program Offices, Warfare Centers, Laboratories), and FFRDCs/UARCs

**Executive Steering Council:** Includes GO/FO/SES’s from Government organizations

\*Potential expansion to include industry and allies/partners



# How to Access MEG 2.0

<https://ac.cto.mil/mission-engineering/>



# Questions?

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OUUSD(R&E) Mission Capabilities

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