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Department of Defense
DEFICE OF PREPUBLICATION AND SECURITY REVIEW



# DoD Instruction (DoDI) 5000.98 Operational Test and Evaluation (OT&E) and Live Fire Test and Evaluation (LFT&E)

#### Mr. Paul Lowe

Acting Deputy Director, Operational Test and Evaluation for Strategic Initiatives, Policy and Emerging Technologies

Policy Overview Information Session
December 12, 2024

# **Agenda**

**Policy Overview** 

**Issuance Information** 

Responsibilities

**OT&E and LFT&E Overview** 

**OT&E and LFT&E Process** 

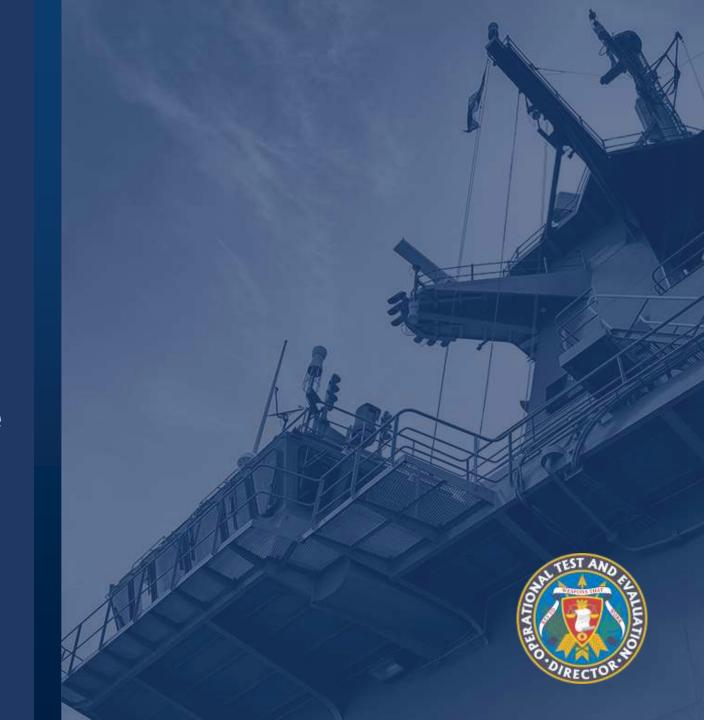
OT&E and LFT&E for Adaptive Acquisition Framework Pathways

**New DoD Manuals** 

**Appendix** 



# Policy Rollout Overview and Timeline



## **New DOT&E Policy and Guidance**

DoDI 5000.98 on OT&E and LFT&E, plus 5 DoDMs (TEMP/TES, M&S VV&A, Full Spectrum Survivability and Lethality, Software, Al-Enabled Autonomous Systems).

#### **DoD Instruction 5000.98**

Operational Test and Evaluation and Live Fire Test and Evaluation

#### **ORIGINATING COMPONENT:**

Office of the Director of Operational Test and Evaluation

#### **EFFECTIVE:**

December 9, 2024

#### **RELEASABILITY:**

Cleared for public release. Available on the <u>Directives</u> <u>Division Website</u> at: https://www.esd.whs.mil/DD/

#### **APPROVED BY:**

Douglas C. Schmidt, Director of Operational Test and Evaluation



#### PURPOSE

In accordance with the authority in DoD Directive (DoDD) 5141.02, this issuance establishes policy, assigns responsibilities, and prescribes procedures for operational test and evaluation (OT&E) and live fire test and evaluation (LFT&E) of DoD systems and services (referred to in this issuance as "DoD systems") acquired via the Defense Acquisition System.



# **General Overview | DOT&E Policy**

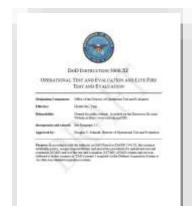
The issuance of the DoDI 5000.98 and related DoDMs will impact DOT&E and the wider T&E ecosystem. Over the coming months, several materials will be disseminated, and events will take place to aid in this strategic change and adoption of policy.

#### **Current Draft Status**

☑ Stage 3: Formal Coordination

☑ Stage 4: Pre-signature, Legal Sufficiency, and Security Reviews

☑ Stage 5: Approval and Publication



**DoDI 5000.98** OT&E LFT&E



**DoDM 5000.100** TEMP/TES



DoDM 5000.102 M&S VV&A



DoDM 5000.99 Full Spectrum



DoDM 5000.96 Software



DoDM 5000.101 AI-Enabled and Autonomous Systems <sup>5</sup>

DOT&E was motivated to create a policy update through DoDI 5000.98 to achieve some of the goals detailed below.

• The U.S. military operates in an era of accelerating technological advancements, increasingly complex operational environments, and complex global challenges. The Department of Defense must rapidly and rigorously test and evaluate its systems to ensure that they are not only effective and suitable but also survivable and lethal across contested domains.



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- Emphasize the importance of science and technology-based OT&E and LFT&E, digital engineering, digital tools, and data management in T&E.



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- Emphasize the importance of science and technology-based OT&E and LFT&E, digital engineering, digital tools, and data management in T&E.
- Clarifies applicability to all acquisition pathways and provides high-level T&E requirements for each.



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- Emphasize the importance of science and technology-based OT&E and LFT&E, digital engineering, digital tools, and data management in T&E.
- Clarifies applicability to all acquisition pathways and provides high-level T&E requirements for each.
- Emphasize the importance of using all relevant data to inform OT&E and LFT&E planning and evaluation to include the need for rigorous VV&A of M&S for T&E.



## What Is New, Changed, Or Re-emphasized In The DoDI?

This slide highlights the major shifts introduced by the DoDI 5000.98, as they relate to planning and content or documentation.

#### PLANNING

#### NEW

- Input into acquisition contracts and requirements
- Risk-based level of test assessment
- Mission-based risk assessment (MBRA)
- Tailoring (as applicable) for the acquisition pathway
- Testing throughout M&S, iterative model-test-validate-fix
- Emphasis on use of digital tools when possible
- Pre-Integrated Testing OT&E and LFT&E concepts

#### **RE-EMPHASIZED**

- Science- and technology-based TEMP/TES
- T&E across the acquisition lifecycle

#### **UPDATED**

- Integrated Decision Support Key (IDSK)
- Full spectrum survivability and lethality

#### CONTENT OR DOCUMENTATION

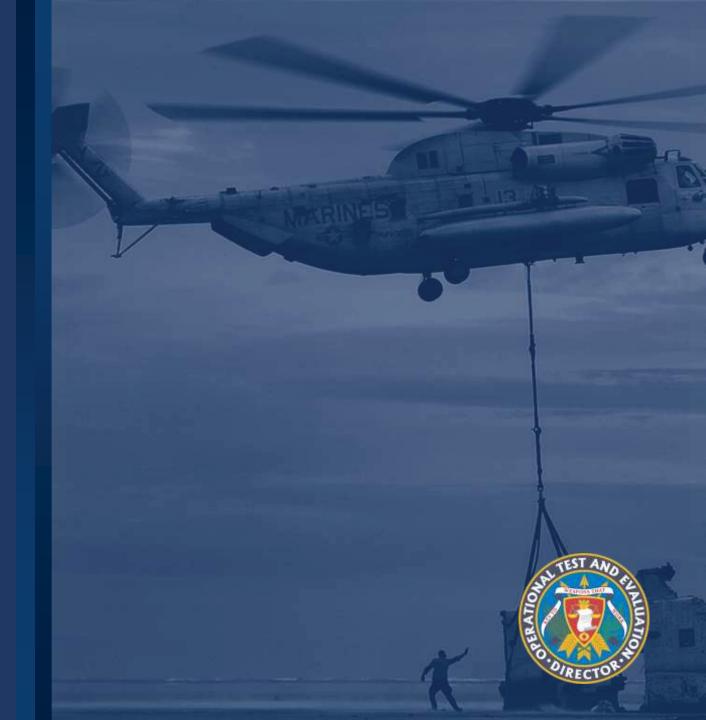
#### NEW

- TEMP/T&E strategy Data Management Plan
- Additional Considerations for Al-enabled systems

#### **UPDATED**

- TEMP/T&E Strategy
  - Integrated Decision Support Key (IDSK)
  - M&S VV&A Strategy or Master Plan
- M&S V&V Plans

# Section 1: Issuance Information



### **Section 1: General Issuance Information**

This Instruction applies to all systems and services acquired via the Defense Acquisition System (DAS) pursuing any Adaptive Acquisition Framework (AAF) pathway.

#### Working with stakeholders across the Acquisition Lifecycle, OT&E and LFT&E will...

1

...employ the latest science and technology to evaluate the operational effectiveness, suitability, survivability, and lethality of DoD systems efficiently and with rigor.

2

...integrate with contractor and developmental T&E planning, execution, analysis, and resourcing as the system matures across the acquisition life cycle for optimization.

3

...engage early in the acquisition program, to inform the development of requirements, acquisition contracts, and the TEMP/T&E strategy.

4

...support characterization of risk to the program, the TEMP/T&E Strategy, the warfighter, the Secretary of Defense, and the Congress.

5

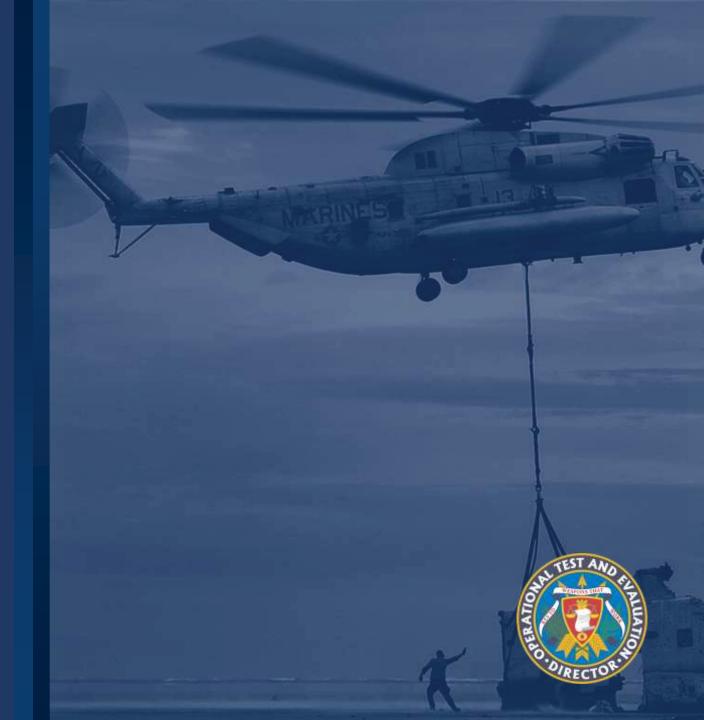
...test planning will consider the time and resources required to support the correction deficiencies and vulnerabilities prior to the next phase of testing or acquisition decision.

6

...use the latest intelligence community knowledge and be conducted in operationally representative, multi-domain environments including full-spectrum of kinetic and non-kinetic threats and targets.\*

<sup>\*</sup>Includes kinetic, cyber; electromagnetic spectrum (EMS); chemical, biological, radiological and nuclear (CBRN); directed energy weapons; space-based; and other operationally relevant threats and targets within the program's expected life cycle.

# Section 2: Responsibilities



# **Key Responsibilities and Actors (1/2)**

The responsibilities laid out in DoDM 5000.98 are organized by key policy stakeholders, highlighted and introduced on this slide.



#### **Director, Operational Test and Evaluation (DOT&E)**

- Designates DoD systems for OT&E and LFT&E oversight; publishes and manages the T&E oversight list.
- Monitors, reviews and reports on activities and resources on the oversight list.
- Serves as an advisor to the Joint Requirements Oversight Council to inform and influence requirements, concepts, capabilities-based assessments, and CONOPS.
- Reviews and recommends budgetary and financial matters relating to OT&E and LFT&E.



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

- Assesses the adequacy and approved DT&E strategies documented in the TEMP/T&E Strategy for acquisition category ID programs on T&E oversight for DT&E.
- For all other acquisition programs on DT&E oversight, advises the MDA by conducting an independent analysis of test data, reports, M&S results and the adequacy of the DT&E plan in the TEMP/T&E strategy.



#### Under Secretary of Defense for Acquisition and Sustainment (USD(A&S))

- Directs acquisition decision authorities and program managers to implement the intent and requirements for programs over which they have control.
- When serving as MDA, considers OT&E and LFT&E activities and reports to inform acquisition and sustainment risk decisions, in coordination with DTO&E.

# **Key Responsibilities and Actors (2/2)**

The responsibilities laid out in DoDM 5000.98 are organized by key policy stakeholders, highlighted and introduced on this slide.



#### **DoD Chief Information Officer (DoD CIO)**

Coordinates with the DOT&E, USD(R&E), USD(A&S), and USD(I&S) to synchronize OT&E and LFT&E processes with the DoD Cybersecurity Program and the DoD Strategic Cybersecurity Program.



#### Under Secretary of Defense for Intelligence and Security (USD(I&S))

 Oversees intelligence support to the acquisition life cycle and advises the DOT&E concerning intelligence supportability requirements that affect OT&E and LFT&E.



#### **Chief Digital and Artificial Intelligence Officer (CDAO)**

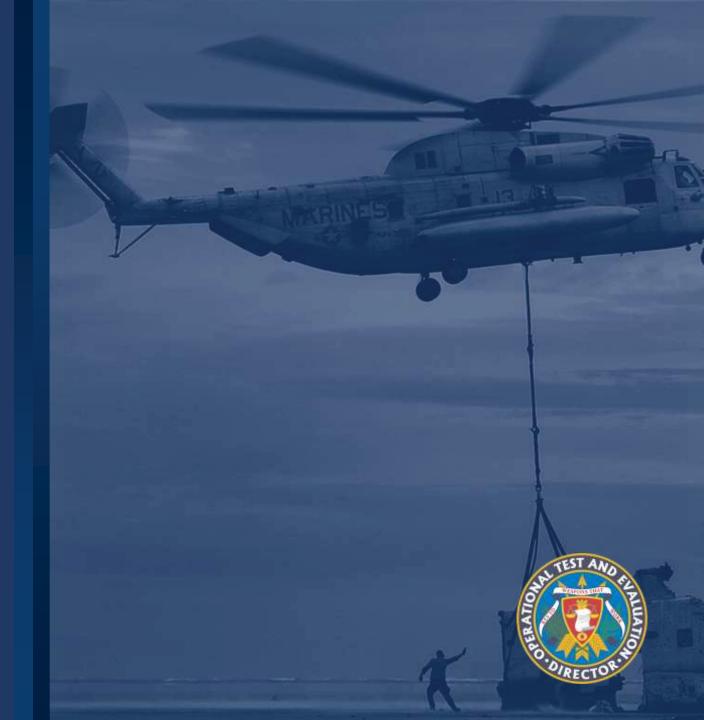
- Establishes policy and issues guidance on requirements and testability for Al-enabled systems.
- Issues guidance, methodologies, and best practices on T&E for AI capabilities.
- Coordinates with the USD(R&E) and DOT&E on common tools for T&E and V&V of AI capabilities.



#### **DoD Component Heads**

- Plan, fund, execute, and report on OT&E and LFT&E of DoD systems through, (1) Component acquisition executives, (2) Program managers, (3) LFT&E organization, and (4) their designated OTA.
- Establishes OT&E and LFT&E readiness review process to determine and certify program readiness.

# Section 3: OT&E and LFT&E Overview



### Section 3: OT&E and LFT&E Overview

OT&E and LFT&E activities incorporate the latest scientific advancements and take place throughout the acquisition lifecycle. They leverage data and results from integrated T&E events, OT&E and LFT&E events, M&S results, and data in real-world conditions.

#### Science- and Technology-based OT&E and LFT&E

**SCIENCE** – use of applied math/statistics in planning and analysis

TECHNOLOGY - modelbased engineering, data repositories, data analytics, digital twins, generative AI, M&S



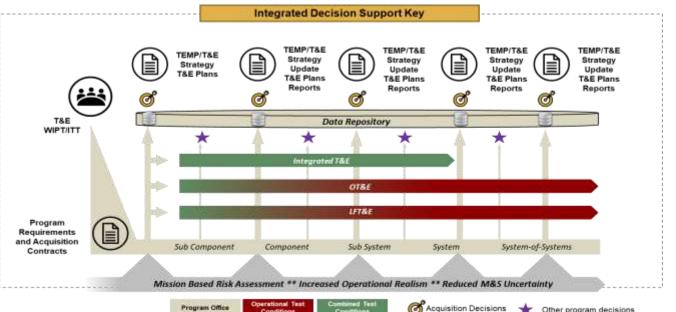
Evaluation of performance from multiple data sources (i.e., CT, DT, LFT, OT data and M&S results). Improved sequential testing using Bayesian or similar inference methods paired with improved data management methods are critical to optimizing the planning and execution of integrated T&E across the acquisition life cycle.

OT&E and **LFT&E Across** the Acquisition Lifecycle

Integrated T&E

OT&E

LFT&E



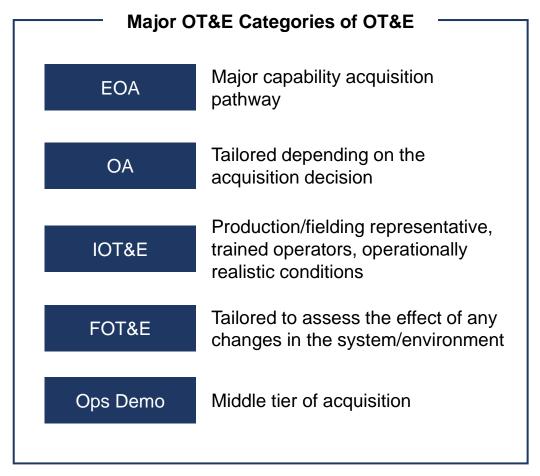




# Section 3: Operational Test and Evaluation (OT&E) Overview

OTAs must plan and execute OT&E to support the evaluation of operational effectiveness and suitability while taking into equal consideration survivability and lethality.

- OT&E must be executed in operationally relevant and representative multi-domain environments in the presence of all supporting and interoperable systems that could affect operational performance.
- OT&E must include the evaluation of the production- or fielding- representative system with its applicable operators, including cyber defenders, as it would be used in multi-domain operations.
- For each OT&E event, the lead OTA will generate a detailed plan and a report. OTA will develop a T&E concept, prior to the start of integrated test data collection and reporting. Future DOT&E Guidance will inform and establish expectations.



# **Section 3: Full Spectrum Survivability and Lethality**

LFT&E involves full-spectrum testing of combat-loaded systems in operationally relevant contested, congested, and constrained environments. This includes the use of live kinetic and non-kinetic threats and targets (or surrogates), to simulate combat conditions.

The OTA will work with LFT&E organizations and related test teams to coordinate the collection of live data and M&S results need to support full spectrum survivability and lethality evaluations.



#### Survivability

#### **Full Spectrum Survivability**

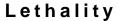
Cyber, EMS, directed energy weapons, CBRN, kinetic, and other operationally relevant threats to include their synergistic effects.



WIPT/ITT to evaluate mission critical functions and the potential threat effects that could affect those mission-critical functions.

#### **Uncrewed Systems and Weapons**

May be subject to LFT&E to evaluate system survivability and lethality, and their criticality to mission success.



#### **Full Spectrum Lethality**

Evaluation of lethal effects of the offensive capabilities (kinetic or non-kinetic) on operationally relevant and representative targets configured for combat.

#### **Lethal Effects**

Include an evaluation of the number of required weapons needed to achieve the desired lethal effect on the target of interest.

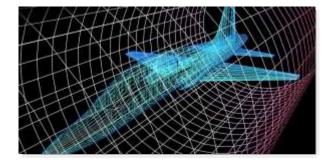


# Section 3: Modeling and Simulation (M&S) Overview

M&S includes any physical, mathematical, or otherwise logical representation of a system, entity, environment, phenomenon or process critical to meeting OT&E and/or LFT&E objectives.

#### M&S Verification, Validation, and Accreditation (VV&A)

- Continue current M&S VV&A practices; additional guidance will be provided in the M&S guidebook.
- All M&S, when used to support OT&E and LFT&E, will not be accredited until a
   V&V has been completed for the intended evaluation in the intended domain or
   region of the operational envelope.
- M&S will be integrated with OT and LFT across the acquisition lifecycle in a series of model-test-validate activities to feed applicable OT and LFT data back into the M&S to support M&S VV&A and improvements.





M&S tools are crucial for delivering results-for-record that substitute for live data, which is essential for meeting the objectives of OT&E and LFT&E.

Through M&S, the DoD safeguards that systems are rigorously tested and evaluated in a controlled yet realistic digital environment, enhancing their predictability and safety before they are deployed in real-world scenarios.

## **Section 3: T&E Program Management**

This slide lays out the roles and respective responsibilities of the key actors involved in management of the T&E Program.

#### **Program Manager**



- Charters the T&E WIPT/ITT and the subgroups
- Includes T&E WIPT in development of acquisition contracts and requirements
- Directs the development of the TEMP/T&E Strategy, IDSK and MBRA
- Secures the funding and has a contingency plan for correcting deficiencies

- Integrates the intelligence requirements into T&E
- Develops a data management plan and a data repository
- Leverages digital engineering and digital tools
- Confirms no T&E interference
- Creates a deficiency report tracker

#### **T&E WIPT/ITT**

(T&E Working-level Integrated Product Team / Integrated Test Team)

- Forum for collaboration to confirm OT&E and LFT&E equities are equally represented
- Includes users, intelligence, test leads, requirements, safety, statisticians, experts in focus areas
- Defines OT&E and LFT&E requirements to inform acquisition contracts and informs requirements
- Plans and executes the MBRA
- Develops the TEMP/T&E strategy

#### **Organizational Test Agency (OTA)**

- Plans and executes OT&E to supply data
- Coordinates live data and M&S collection with LFT&E organizations
- Serves as the accreditation authority for M&S tools used to support the evaluation of operational effectiveness and suitability

#### **LFT&E Organizations**

- Comprise the LFT&E Working Group (WG)
- Responsible for full spectrum survivability and lethality T&E
- Accredit M&S and support VV&A
- Provide oversight of LFT&E planning
- Report data, analysis, and reports

OT&E and LFT&E will, to the largest extent possible, implement the DoD Data Strategy and the five "DoD Data Decrees" from the May 5, 2021, SecDef Memorandum. This ensures collection, storage, and usage of data that is secure, efficient, and cost-effective.

- A data management plan and common T&E data repository will make data visible, accessible, understandable, linked, trustworthy, interoperable, and secure (VAULTIS).
- Datasets and process flow will be promptly accessible to cleared and need-to-know stakeholders as data is available.
- Datasets will include but are not limited to program records, ongoing
   CT-, DT-, OT-, and LFT-related records.
- Data pedigree will be transparent, with all relevant metadata captured
   including description, conditions, and context of capture.



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# **Section 3: T&E Oversight Management**

DOT&E manages the T&E Oversight List. DOT&E will provide formal notification to a Service when a program is being added to the T&E Oversight List.

#### **DOT&E** Oversight

- Defines criteria for placing programs on oversight. Includes critical MTA programs and similar prototyping and fielding activities
- Approves the adequacy of TEMPs/T&E strategies, detailed OT&E and LFT&E test plans, and related funding.
- Coordinates draft TEMPs/T&E strategies, OT&E, and LFT&E plans with Program office and OTAs. Reviews and M&S V&V plans to ensure they support the TEMP/TES.

 For programs on T&E oversight, submits an independent report to support all acquisition decisions.

#### **DOT&E's Role**



According to the latest T&E Oversight List, the agency oversees a few hundred programs – from munitions to aircraft to radar systems and more.

### **Key Figures of DOT&E Oversight\***

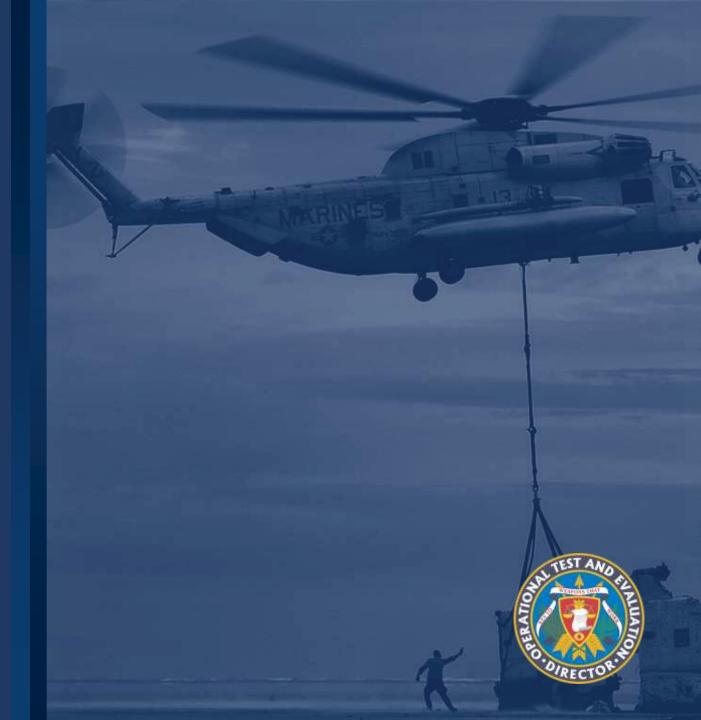




265
Total
Programs

\*This does not include classified and sensitive programs subject to T&E oversight. Stats, component categorizations, and figures sourced from the publicly available T&E Oversight List on 8 October 2024

# Section 4: OT&E and LFT&E Process



## **Section 4: OT&E and LFT&E Process**

This slide provides an overview to the contents of Section 4 of the DODI 5000.98.



#### T&E PLANNING

Begins at program inception

TEMP/T&E strategy

Test and M&S plans

Resource needs

Apply latest advances in science and technology



# PREPARATION AND EXECUTION

Test readiness reviews prior to OT&E and LFT&E events

All elements of an approved test plan must be satisfied by end of an OT, LFT, or M&S event

DOT&E must approve test plan deviations



#### ANALYSIS AND EVALUATION

Results inform the evaluation of requirements, effectiveness, suitability, survivability, and lethality

OTAs, lead LFT&E organization, and DOT&E conduct independent analysis of available test data

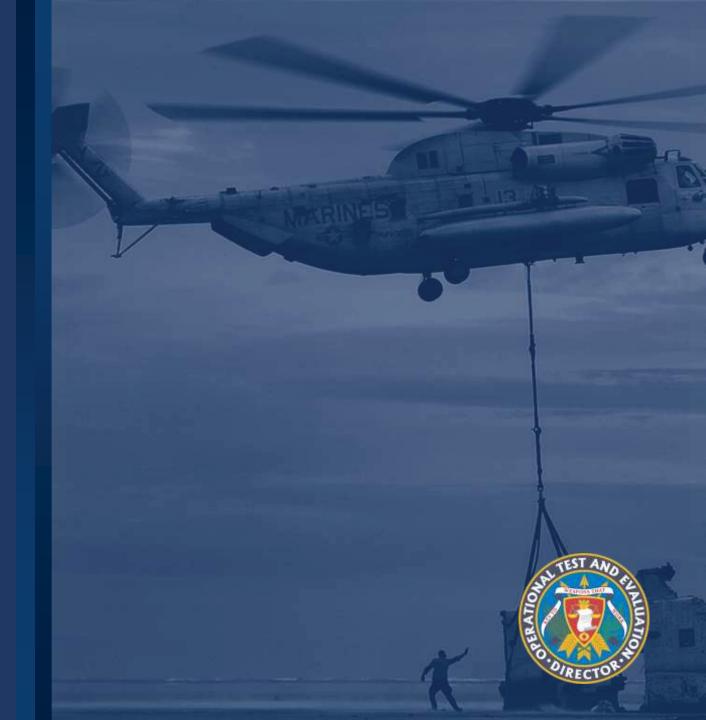


#### TEST REPORTING

DOT&E will report on test adequacy, operational effectiveness, suitability, survivability, & lethality in time to support acquisition decisions to include preliminary such evaluations

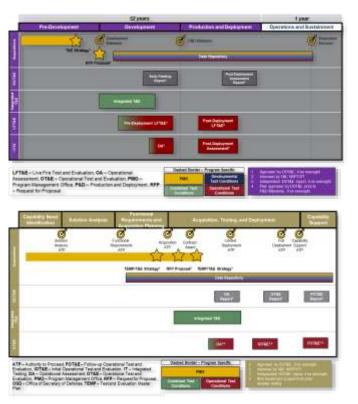
An MDAP may not proceed beyond low-rate initial production until DOT&E has submitted the IOT&E report to the SecDef the report & the congressional defense committees have received that report

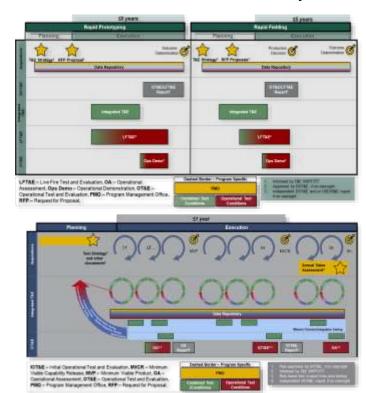
Section 5: OT&E and LFT&E for Adaptive Acquisition Framework Pathways

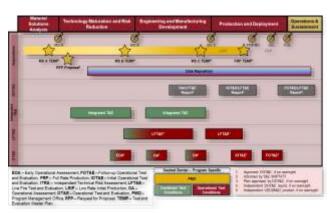


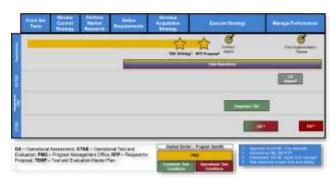
# Section 5: OT&E and LFT&E for Adaptive Acquisition Framework Pathways

The Adaptive Acquisition Framework (AAF) supports the Defense Acquisition System (DAS) with the objective of delivering effective, suitable, survivable, sustainable, and affordable solutions to the end user in a timely manner.



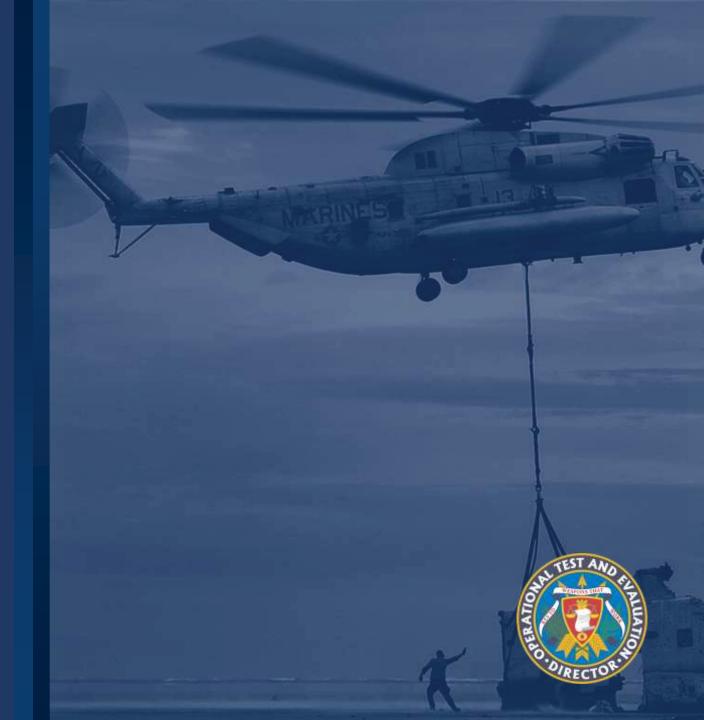






Pursuant to DoDD 5000.01 and DoDI 5000.02, the program manager will develop an acquisition strategy for the MDA approval that aligns with the specific policies and procedures highlighted in the specific DoDIs for each of the six acquisition pathways depicted in Figure 2. This section details the unique OT&E and LFT&E procedures and requirements for each of the six acquisition pathways.

# DOT&E Focus Areas and Manuals



# **New DOT&E Policy and Guidance**

DoDI 5000.98 on OT&E and LFT&E plus five related DoDMs – focused on TEMP/TES, M&S V&V, Full Spectrum Survivability and Lethality, Software, and AI-enabled Autonomous Systems.



#### **DoD Manual 5000.100**

Test and Evaluation Master Plans and Test and Evaluation Strategies



#### **DoD Manual 5000.102**

Modeling and Simulation Verification, Validation, and Accreditation for Operational Test and Evaluation and Live Fire Test and Evaluation



#### **DoD Manual 5000.99**

Realistic Full Spectrum
Survivability and Lethality Testing



#### **DoD Manual 5000.96**

Operational and Live Fire Test and Evaluation of Software



#### **DoD Manual 5000.101**

Operational Test and Evaluation and Live Fire Test and Evaluation of Artificial Intelligence-Enabled and Autonomous Systems

## **Next Steps**

Developing Policy and Guidance Resource Section of DOT&E Website – Available Soon!

- Signed DoDI and DoDMs
- Fact sheets
- Slide Overviews for each Manual
- Videos

Developing **Frequently Asked Questions** page - please share your questions and comments via the DOT&E website

Developing **Guidebooks** in collaboration with DTE&A and the Services - your comments and questions inform DOT&E on where guidebooks are needed!

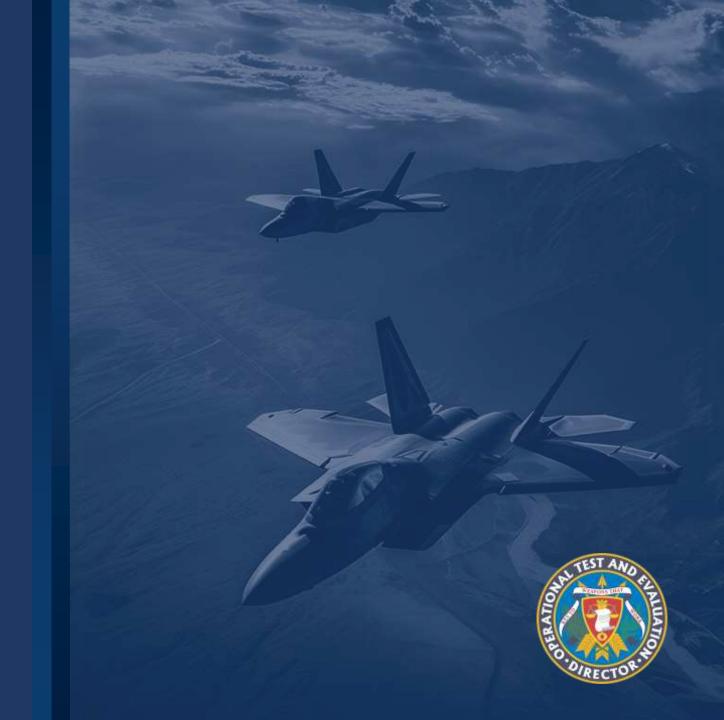
Looking for Program and Service Partners!

 DOT&E wants to support programs and work with the community to develop best practices in implementing this guidance, please connect with us via the Website FAQ/Comment forum with partnership ideas!





# Appendix



# **Section 2: Responsibilities**

Section 2 of DoDI 5000.98 details the main responsibilities and key actors related to the policy, and references several sections of Title 10 of the US Code.



#### **Director, Operational Test and Evaluation (DOT&E)**

- Designates DoD systems for OT&E and LFT&E oversight; publishes and manages the T&E oversight list.
- Monitors, reviews and reports on activities and resources on the oversight list.
- Serves as an advisor to the Joint Requirements Oversight Council to inform and influence requirements, concepts, capabilities-based assessments, and CONOPS.
- Reviews and recommends budgetary and financial matters relating to OT&E and LFT&E.

The above information is pursuant to Sections 139, 4171, 4172, and 4231 of Title 10 U.S.C., Section 223 of Public Law 117-81, and DoDD 5141.02.

#### Other Key Organizations

For additional information on key organizations and specific responsibilities, please refer to this deck's Appendix.











