



Defense Acquisition University

# Test and Evaluation Master Plan (TEMP) Lunch & Learn

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# Test & Evaluation Master Plan

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- Documents the overall structure & objectives of the entire T&E program: Developmental Test and Evaluation (DT&E), Operational Test and Evaluation (OT&E) and Life Fire Test and Evaluation (LFT&E)
- Provides a framework to develop detailed T&E plans
- Documents T&E schedule & resource requirements
- Considered a “contract” among the PM, OSD and T&E activities
- Note: The Program Manager should use the DAG TEMP format and content as guidance in formulating DT&E plans.

# Importance of the TEMP

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- The most important part of TEMP planning is the logical thinking that leads up to what testing is needed.
- When done properly, a TEMP should ensure that:
  - All planned tests are actually required
  - All test data collected are used for something (no waste)
  - Data is collected in the most cost effective method (e.g., M&S vs. open-air test)
  - Enough data is collected so that if there is a failure, causes and fixes can be determined
  - Accurate T&E Funding estimates are input into the POM



# Test and Evaluation Master Plan (TEMP) Evolution

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- TEMP is first due prior to the Milestone A decision (updated at MS B and MS C)
  - DAG lists required information & suggested format
  - TEMP development requires early involvement of testers, evaluators, and others
  - Establishes early consensus among T&E WIPT member organizations
- For programs on the OSD AT&L Engagement List for DT&E or DOT&E's oversight list for either OT&E or LFT&E, TEMP is approved by DOT&E and DASD(DT&E)
  - For programs not on the oversight, the CAE, or designated representative (usually the MDA), approves the TEMP

# Evaluation Methodology and Evaluation Overview

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- Starting at MS A, the PM will . . . describe a (developmental) evaluation methodology in the TEMP that will:
  - Provide essential information on programmatic & technical risks
  - Provide information for major programmatic decisions
- Starting at Milestone B, the evaluation methodology will include a (developmental) evaluation framework
- Starting at Milestone B, every TEMP will include an (operational) evaluation overview.

# Major Test Phases & Events

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- Starting at Milestone A, the TEMP should document T&E for acquisition phase completion (major test events required for milestone exit and entrance criteria).
  - Each major test phase or event should have test entrance and test completion criteria.
- Each major test phase or event should have a synopsis of the intended analysis.
  - Synopsis should indicate how the required data for test completion will contribute to one or more standard measures of program progress (COIs, KPPs, CTPs, KSAs)

# Table of Independent Variables

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- Every TEMP will include a table of independent variables (or “conditions,” “parameters,” “factors,” etc.) that may have a significant effect on operational performance.
- Starting at MS B, the updated table of variables will include:
  - anticipated effects on operational performance
  - the range of applicable values (or “levels,” “settings,” etc.)
  - the overall priority of understanding the effects of the variable
  - the intended method of controlling the variable during test (uncontrolled variation, hold constant, or controlled systematic test design)

# Milestone A TEMP Content

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- The MS A TEMP will include sufficient information to describe in detail the T&E approach for execution during the TMRR Phase. The TEMP should include, at a minimum, the following information: For additional information, see the TEMP guides (posted on DASD(DT&E) and DOT&E websites).
  - Description of the evaluation methodology that provides essential information on programmatic, technical risks, and major programmatic decisions.
  - Documentation of the T&E for phase completion, that includes major test events required for milestone exit and entrance criteria.
  - Description, within each test phase or event, of the overview of the intended analysis that includes: COIs, KPPs, KSAs, and CTPs.
  - Inclusion of a table of independent variables that may have significant effect on operational performance.
  - Components rationale for the requirements in the draft CDD.
  - Documentation of the strategy and resources for cybersecurity T&E.

# Milestone A TEMP Content (cont.)

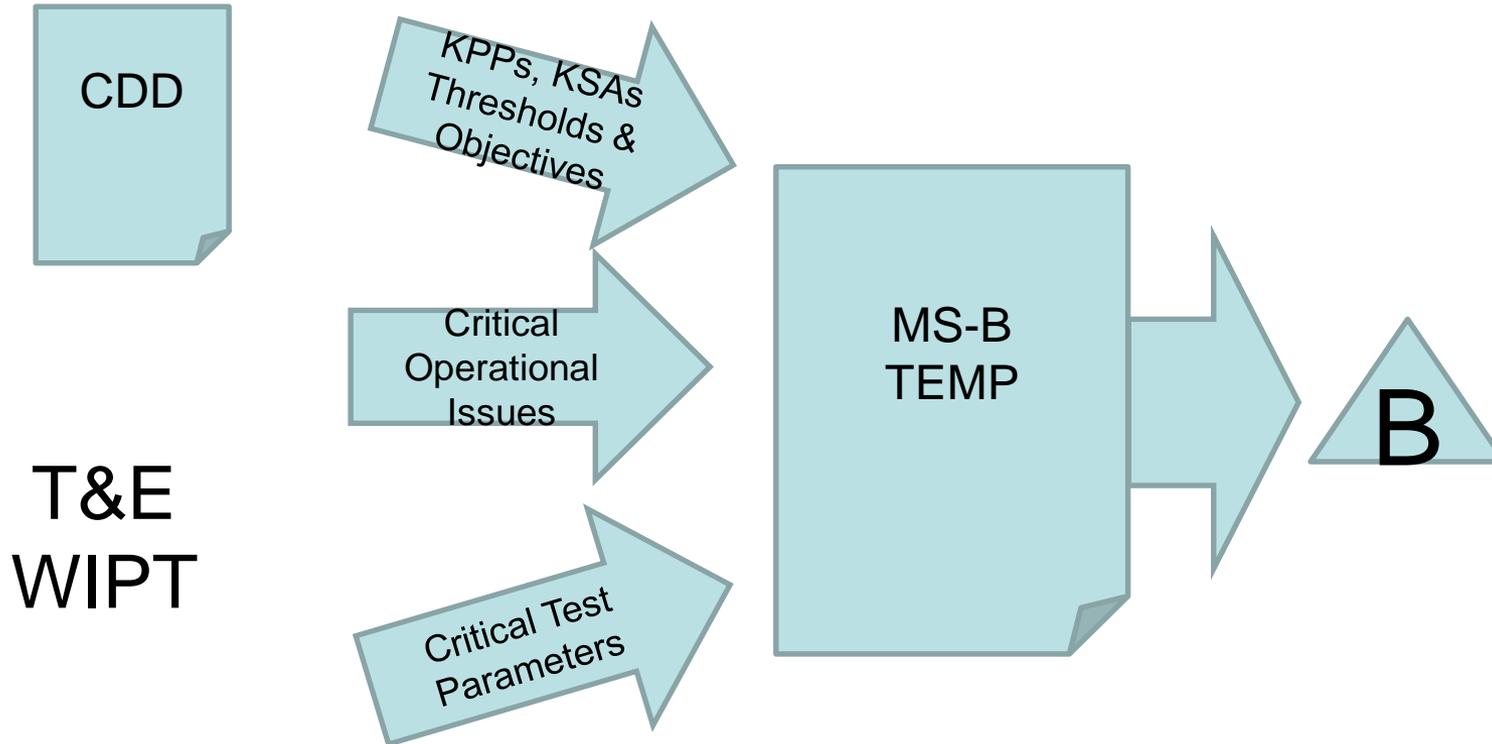
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- For software acquisitions, the lead OTA will conduct an analysis of operational risk to mission accomplishment covering all planned capabilities of features in the system. This analysis will include commercial and non-developmental items. Initial analysis will be documented in the TEMP.
- Identification of the resources required to execute planned T&E activities.
- Documentation of the test Infrastructure, tools, and VV&A strategy.
- Documentation of the T&E program & master schedule for major T&E events.
- Description of the interoperability assessment and resources.
- For MDAPs and MAIS, identification of the Chief Developmental Tester and Lead DT&E Organization.
- Description of the initial understanding of all T&E.
- Identification of the plan for evaluating prototypes, technology, etc.
- Description of the general approach supporting engineering activities, certifications, and system evaluations.
- Discussion of the T&E implications of the CONOPS, including test resource implications.

# **TEMP must include T&E activities, to demonstrate maturity of the critical technologies**

<b>TRL</b>	<b>Technology Readiness Levels</b>
<b>9</b>	<b>Actual system proven through successful mission operations</b>
<b>8</b>	<b>Actual system completed and qualified through test and demonstration</b>
<b>7</b>	<b>System prototype demonstration in an operational environment</b>
<b>6</b>	<b>System/subsystem model or prototype demonstration in a relevant environment</b>
<b>5</b>	<b>Component and/or breadboard validation in a relevant environment</b>
<b>4</b>	<b>Component and/or breadboard validation in a laboratory environment</b>
<b>3</b>	<b>Analytical and experimental critical function and/or characteristic proof-of-concept</b>
<b>2</b>	<b>Formulation of technology concept or application</b>
<b>1</b>	<b>Basic principles observed and reported</b>

# TEMP Evolution



Prior to MS-C the TEMP must be updated based on CPD to focus on remaining LFT&E and OT&E

- **Part I – Introduction**
- **Part II – Test Program Management and Schedule**
- **Part III – Test and Evaluation Strategy**
- **Part IV – Resource Summary**

## **1.1 Purpose**

## **1.2 Mission Description**

## **1.3 System Description**

### **1.3.1 Program Background**

### **1.3.2 Key Interfaces**

### **1.3.3 Key Capabilities**

### **1.3.4 System Threat Assessment**

### **1.3.5 Systems Engineering (SE) Requirements**

### **1.3.6 Special Test or Certification Requirements**

### **1.3.7 Previous Testing**

## **2.1 T&E Management**

### **2.1.1 T&E Organizational Construct**

## **2.2 Common T&E Database Requirements**

## **2.3 Deficiency Reporting**

## **2.4 TEMP Updates**

## **2.5 Integrated Test Program Schedule**

## **Figure 2.1 - Integrated Test Program Schedule**

## 3.1 T&E Strategy

### 3.1.1 Decision Support Key

## 3.2 Developmental Evaluation Approach

### 3.2.1 Developmental Evaluation Framework

### 3.2.2 Test Methodology

### 3.2.3 Modeling and Simulation (M&S)

### 3.2.4 Test Limitations and Risks

## 3.3 Developmental Test Approach

### 3.3.1 Mission-Oriented Approach

### 3.3.2 Developmental Test Events and Objectives

## 3.4 Certification for OT&E

## 3.5 Operational Evaluation Approach

### 3.5.1 Operational Test Events and Objectives

### 3.5.2 Operational Evaluation Framework

### 3.5.3 Modeling and Simulation

### 3.5.4 Test Limitations

## 3.6 Live Fire Evaluation Approach

### 3.4.1 Live Fire Test Objectives

### 3.4.2 Modeling and Simulation

### 3.4.3 Test Limitations

## 3.7 Other Certifications

## 3.8 Reliability Growth

## 3.9 Future Test and Evaluation

# Developmental Evaluation Framework Matrix (DEF)

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- Starting at MS B, TEMP Part III will include a Developmental Evaluation Framework that:
  - Identifies key data (that contributes to assessing progress on) KPPs, KSAs, CTPs, DT objectives, interoperability and cybersecurity requirements, reliability growth, maintainability attributes, DT objectives, and others (as needed)
  - Shows the correlation/mapping between test events, key resources, and decisions supported
  - The DEF will support a MS B assessment of planning, schedule, and resources; and a MS C assessment of performance, reliability, interoperability, and cybersecurity

# DEF Content & Format

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- DEF entries are requirements grouped into 4 critical evaluation areas (Performance, Reliability, Interoperability, Cybersecurity)
  - Each functional evaluation area should list the significant decision points supported (major milestones, and other, program-unique decision points)
  
- A Developmental Evaluation Framework will include elements (columns, rows or cells) bearing essential information

# Operational Evaluation Framework

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- Starting at Milestone B, every TEMP will include an evaluation overview.
- The overview will show how the major test events and test phases link together to form a systematic, rigorous, and structured approach to evaluating system performance across the applicable values of the independent variables.
- Test resources will be derived from the evaluation overview.

# Evaluation Overview Content & Format

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TEMP Part III will include an Evaluation Overview, with the following info.:

- Test Goals
- Mission-oriented T&E measures
- Test design info. (factors, scientific and statistical methods & measures, etc.)
- Test period (OA, IOT&E, FOT&E, etc.)
- High level resources summary (time, people, places, and things) needed to execute an adequate test
- The Evaluation Overview also aids Integrated Testing by identifying opportunities for using DT data for OT evaluation

# Decision Support Key

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- A separate summary of decision points and the information needed to support them should be included in a table, to serve as a quick reference for evaluations in the TEMP

# TEMP Part IV - Resource Summary

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## **4.1 Introduction**

## **4.2 Test Resource Summary**

### **4.1.1 Test Articles**

### **4.1.2 Test Sites**

### **4.1.3 Test Instrumentation**

### **4.1.3 Test Support Equipment**

### **4.1.4 Threat Representation**

### **4.1.5 Test Targets and Expendables**

### **4.1.6 Operational Force Test Support**

### **4.1.7 Models, Simulations and Test-beds**

### **4.1.8 Joint Operational Test Environment**

### **4.1.9 Special Requirements**

## **4.3 Federal, State, Local Requirements**

## **4.4 Manpower/Personnel Training**

## **4.5 Test Funding Summary**

# TEMP Appendices

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- Appendix A – Bibliography
- Appendix B – Acronyms
- Appendix C - Points of Contact
- Appendix D - Scientific Test & Analysis Techniques
- Appendix E - Cybersecurity
- Appendix F - Reliability Growth Plan
- Appendix G - Requirements Rationale (required by DoDI 5000.02)
- Additional Appendices as Needed

# TEMP Summary

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- Documents the overall structure & objectives of the entire T&E program: Developmental Test and Evaluation (DT&E), Operational Test and Evaluation (OT&E) and Live Fire Test and Evaluation (LFT&E)
- Provides a framework to develop detailed T&E plans
- Documents T&E schedule & resource requirements
- Considered a “contract” among the PM, OSD and T&E activities
- Format for TEMP is in the Defense Acquisition Guidebook.

# Acronym List

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- Capabilities Development Document (CDD)
- Critical Operational Issues (COIs)
- Critical Technical Parameters (CTPs)
- Developmental Test and Evaluation (DT&E)
- Follow-on Operational Test & Evaluation (FOT&E)
- Initial Operational Test & Evaluation (IOT&E)
- Key Performance Parameters (KPPs)
- Key System Attributes (KSAs)
- Live Fire Test and Evaluation (LFT&E)
- Operational Test and Evaluation (OT&E)
- Operational Assessment (OA)