"New … Improved"

Test & Evaluation Master Plan

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Developmental Test & Evaluation

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New TEMP Content & Format

- **Current TEMPs have become bloated bureaucratic packages**
  - Excessive detail
  - Late to need – frequently completed after testing has started
  - Limited discussion of evaluation
  - Allowed "stovepiping" within T&E community

- **Need to improve TEMP relevance, utility, and timeliness**
  - Focus on *evaluations*
  - Facilitate integrated testing
  - Show support for Acq Strategy & SE linkage
  - Elevate discussion level to T&E strategy

- **New TEMP Content & Format in DAG update**

T&E – From Concept to Combat

Revised TEMP Concept

Part I Introduction	Part II Mgmt & Sched	Part III T&E Strategy	Part IV Resources
Brief mission description paragraph	Describe T&E management	The philosophy recognizes a T&E continuum & emphasizes evaluations	Include in para form or table:
System description	Common Data	Evaluation Framework ties T&E knowledge to decisions, requirements, etc	•Test articles needed/event
Brief Threat Assessment	Deficiency Reporting		•Special equip/ instr costs
Program Background	TEMP Updates		•Target / expendable costs
Key Capabilities	Overarching integrated schedule that includes sequencing of T&E activities (CT, DT, OT, LFT, M&S)	Developmental	•Threat representation costs
		Live Fire	•Manpower needs
		IOT&E Readiness Cert	•M&S costs
		Operational	
		Certifications	
		Reliability Growth	
		Future Testing	

Linkage of decisions to evaluations, requirements, test phases, and resources

What   *Who, When*   *Why, How*   Resources required

Include Joint requirements throughout

T&E – From Concept to Combat

Test Planning Hierarchy

Scope

System Life Cycle
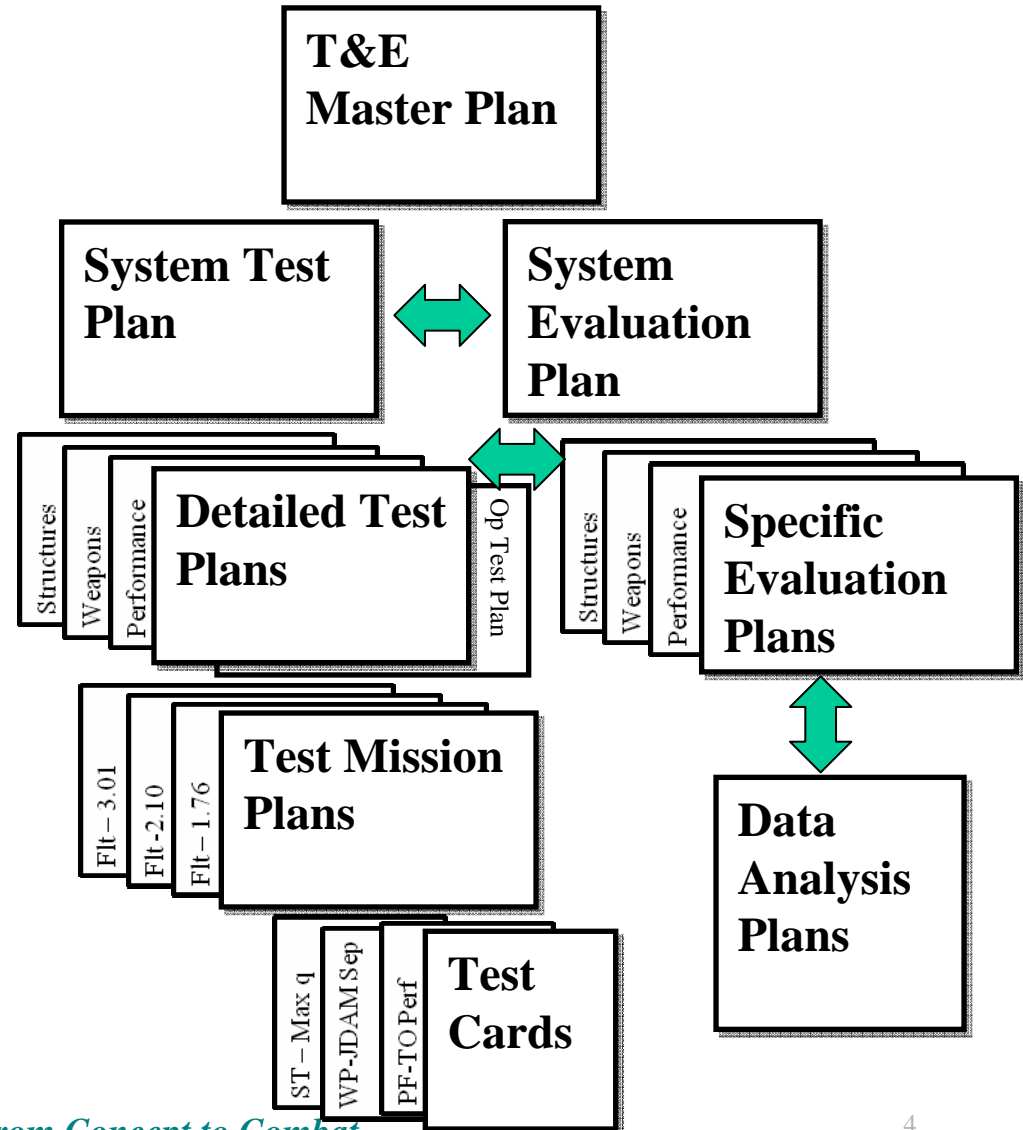
Acquisition Phase

Test Type

Test Missions

Individual Test Event

T&E Master Plan

System Test Plan

System Evaluation Plan

Detailed Test Plans
- Structures
- Weapons
- Performance
- Op Test Plan

Specific Evaluation Plans
- Structures
- Weapons
- Performance

Test Mission Plans
- Flt – 3.01
- Flt -2.10
- Flt – 1.76

Data Analysis Plans

Test Cards
- ST – Max q
- WP-JDAM Sep
- PF-TO Perf

T&E – From Concept to Combat

4

Current vs New Outline

Current

PART I: SYSTEM INTRODUCTION
- Mission Description
- System Description
- System Threat Assessment
- Measures of Effectiveness and Suitability
- Critical Technical Parameters

PART II: INTEGRATED TEST PROGRAM SUMMARY
- Integrated Test Program Schedule
- Management

New

PART I: INTRODUCTION
1.1. Purpose
1.2. Mission Description
1.3. System Description
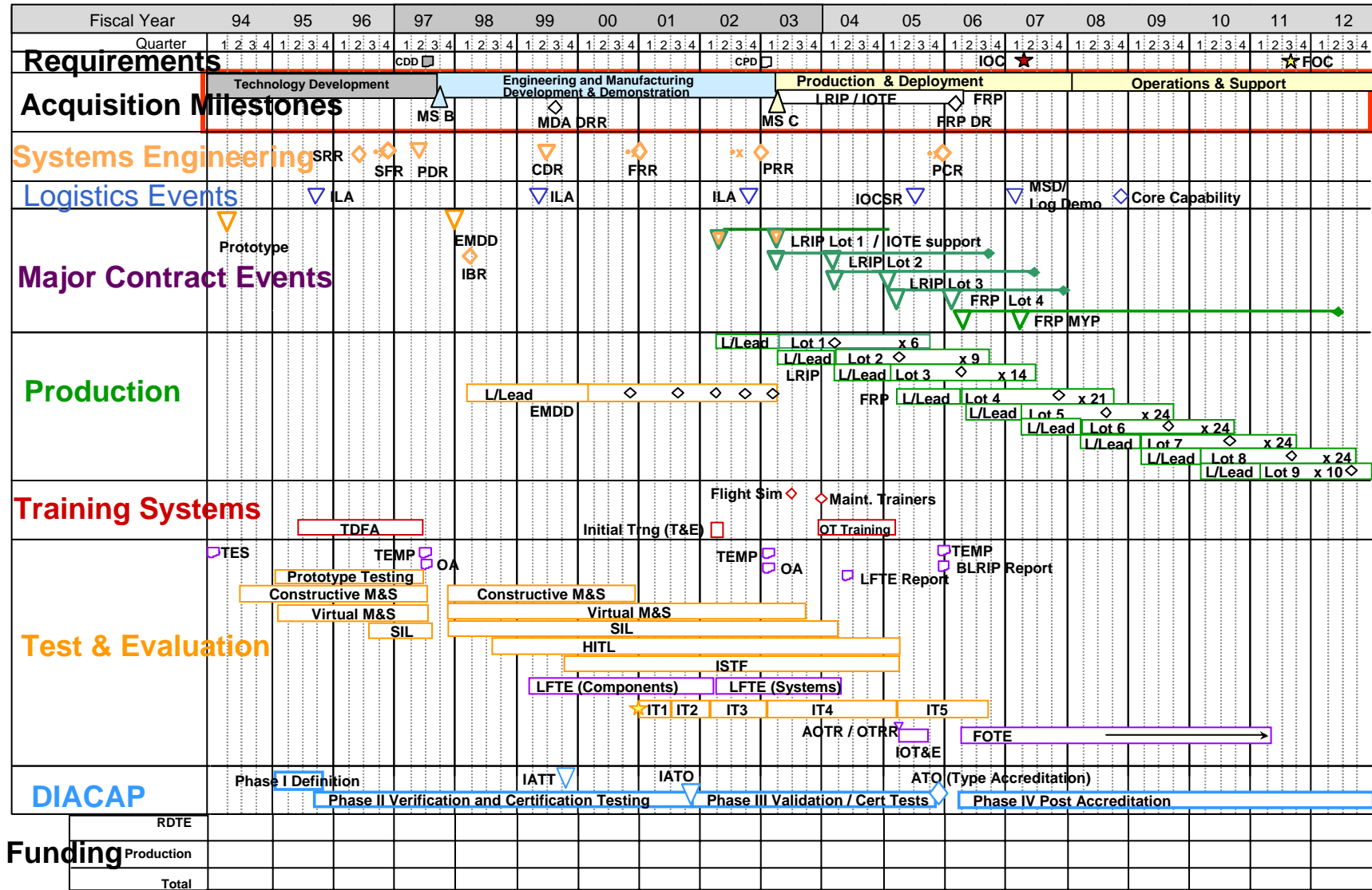- Sys Threat Assessment
- Program Background
- Key Capabilities

PART II: T&E PROGRAM MANAGEMENT & SCHEDULE
2.1. T&E Management
2.2. Common T&E Data Base Requirements
2.3. Deficiency Reporting
2.4. TEMP Updates
2.5. Integrated Test Program Schedule

Sample Integrated Schedule

DEVELOPMENTAL TEST & EVALUATION

Fiscal Year	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12

Requirements — CDD, CPD, IOC, FOC

Acquisition Milestones
- Technology Development
- Engineering and Manufacturing Development & Demonstration
- Production & Deployment
- Operations & Support
- MS B, MDA DRR, LRIP / IOTE, MS C, FRP, FRP DR

Systems Engineering — SRR, SFR, PDR, CDR, FRR, PRR, PCR

Logistics Events — ILA, ILA, ILA, IOCSR, MSD/Log Demo, Core Capability

Major Contract Events
- Prototype
- EMDD
- IBR
- LRIP Lot 1 / IOTE support
- LRIP Lot 2
- LRIP Lot 3
- FRP Lot 4
- FRP MYP

Production
- L/Lead Lot 1 — x 6
- L/Lead Lot 2 — x 9
- LRIP L/Lead Lot 3 — x 14
- L/Lead EMDD
- FRP L/Lead Lot 4 — x 21
- L/Lead Lot 5 — x 24
- L/Lead Lot 6 — x 24
- L/Lead Lot 7 — x 24
- L/Lead Lot 8 — x 24
- L/Lead Lot 9 — x 10

Training Systems
- Flight Sim
- Maint. Trainers
- TDFA
- Initial Trng (T&E)
- OT Training

Test & Evaluation
- TES
- TEMP, OA
- TEMP, OA
- TEMP, BLRIP Report
- Prototype Testing
- Constructive M&S
- Constructive M&S
- Virtual M&S
- Virtual M&S
- SIL
- SIL
- HITL
- ISTF
- LFTE (Components)
- LFTE (Systems)
- LFTE Report
- IT1, IT2, IT3, IT4, IT5
- AOTR / OTRR
- IOT&E
- FOTE

DIACAP
- Phase I Definition
- IATT
- IATO
- ATO (Type Accreditation)
- Phase II Verification and Certification Testing
- Phase III Validation / Cert Tests
- Phase IV Post Accreditation

Funding
- RDTE
- Production
- Total

T&E – From Concept to Combat

Current vs New Outline

Current

PART III: DEVELOPMENT TEST AND EVALUATION OUTLINE

> Development Test and Evaluation Overview

> Future Developmental Test and Evaluation Limitations

PART IV OPERATIONAL TEST AND EVALUATION OUTLINE

> Operational Test and Evaluation Overview
> Critical Operational Issues
> Future Operational Test and Evaluation Limitations
> Live Fire Test and Evaluation

New

PART III: T&E STRATEGY

3.1 Introduction

3.2 Evaluation Framework
- Evaluation Framework Matrix (Annex)

3.3 Developmental Evaluation Approach
- Mission Oriented Context
- Test Objectives
- M&S
- Test Limitations

3.4 Live Fire Evaluation Approach
- Test Objectives, M&S, Limitations

3.5 Certification for IOT&E

3.6 Operational Evaluation Approach
- Test Objectives, M&S, Limitations

3.7 Other Certifications

3.8 Reliability Growth

3.9 Future Testing

Example Evaluation Framework

DEVELOPMENTAL TEST & EVALUATION

Key Requirements and T&E Measures				Test Methodologies/Key Resources (M&S, SIL, MF, ISTF, HITL, OAR)	Decisions Supported
Key Reqs	COIs	Key MOEs/ MOSs	CTPs & Threshold		
Combat Radius KPP#1:	**COI #1.** Can the UAV locate and engage the XXX enemy threat at a range and time that will ensure survivability of friendly troops?	**MOE 1.1.** Range	Fuel Consumption	Aero + Propulsion M&S Engine stand Performance profiles – OAR	PDR CDR MS-C
		MOE 1.2. Speed	Airspeed	Wind Tunnel Performance M&S Performance Flt Test - OAR	PDR CDR MS-C
	COI #2. Is the XXX suitable for…	**MOE 1.3.**			Post-CDR FRP
KPP #2		**MOS 2.4.**	Data link		MS-C SR

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Current vs New Outline

Current

PART V TEST AND EVALUATION RESOURCE SUMMARY
- ➢ Test Articles
- ➢ Test Sites and Instrumentation
- ➢ Test Support Equipment
- ➢ Threat Representation
- ➢ Test Targets and Expendables
- ➢ Operational Force Test Support
- ➢ Simulations, Models, and Test Beds
- ➢ Special Requirements
- ➢ Test and Evaluation Funding Requirements
- ➢ Manpower/Personnel Training

New

PART IV: RESOURCE SUMMARY

4.1 Introduction
- • Test Articles
- • Test Sites and Instrumentation
- • Test Support Equipment
- • Threat Representation
- • Test Targets and Expendables
- • Operational Force Test Support
- • Models, Simulations, and Test Beds
- • Joint Operational Test Environment
- • Special Requirements

4.2 Federal, State, Local Requirements

4.3 Manpower/Personnel Training

4.4 Test Funding Summary
- • Resource Summary Matrix

Critical Technical Parameters

- CTPs are not well defined or productively implemented
- A short review
  - What are they?
  - How should they be determined?
  - How should they be used?

DEVELOPMENTAL TEST & EVALUATION

- **Pick the CTPs -**

- Radar Target Location Error
- Interoperability
- MTBF
- Software Functionality
- Support Internet Protocol

- Range Safety
- Position Accuracy
- Operational Availability
- Critical field length
- Jammer Duty Cycle
- Range

- Single Mission Sortie
- Open Architecture Certification
- Interoperability Certification
- Handling Qualities

- **Definition:** A CTP is a measurable critical system characteristic that, if not achieved, preclude the fulfillment of desired operational performance capabilities.

- CTPs are technical measures derived from desired user capabilities.
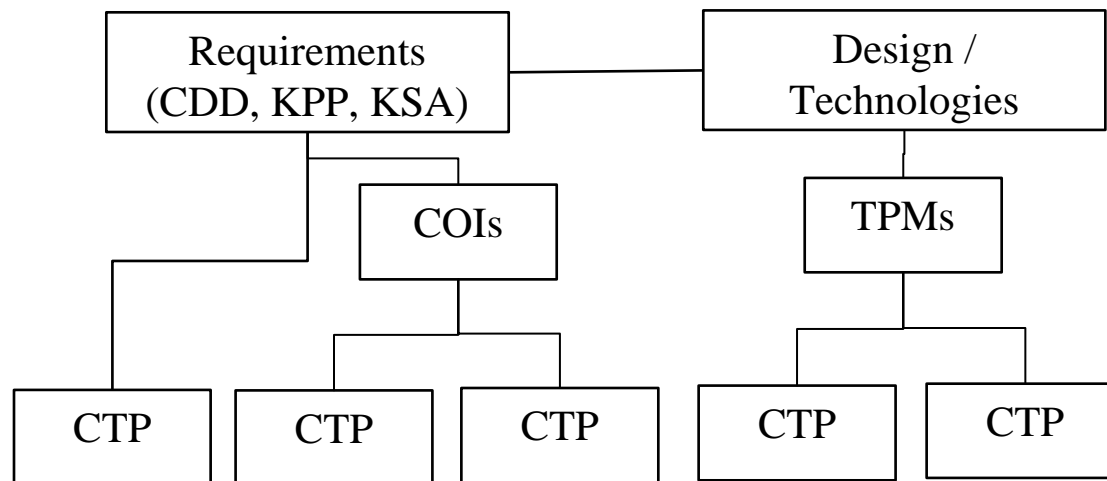
- CTPs are NOT a percentage of KPPs!

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Critical Technical Parameters
How Derived?

- **CTP development process is the responsibility of the program test manager**
- **Lead Systems Engineer plays a key role in determining CTPs**

```
┌─────────────────────┐                      ┌─────────────────────┐
│    Requirements     │──────────────────────│      Design /       │
│  (CDD, KPP, KSA)     │                      │    Technologies     │
└─────────────────────┘                      └─────────────────────┘
            │         │                                  │
            │    ┌─────────┐                        ┌─────────┐
            │    │  COIs   │                        │  TPMs   │
            │    └─────────┘                        └─────────┘
            │    │    │    │                         │        │
        ┌──────┐ ┌──────┐ ┌──────┐              ┌──────┐ ┌──────┐
        │ CTP  │ │ CTP  │ │ CTP  │              │ CTP  │ │ CTP  │
        └──────┘ └──────┘ └──────┘              └──────┘ └──────┘
```

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Critical Technical Parameters
How Used?

- While not user requirements, CTPs are technical measures derived from desired user capabilities.

- Testers use CTPs as reliable indicators that the system is on (or behind) the planned development schedule or will likely (or not likely) achieve an operational capability.

- CTPs should be significant from a T&E program perspective – should drive scope / magnitude of the T&E program.

- **Mission-oriented context:**

  - ➢ Ability to relate evaluation results to an impact on the warfighters' ability to execute their tasks

  - ➢ More robust test environment allows ID of design issues that may not be discovered in a pure DT environment

  - ➢ Opportunity to influence design, increase reliability, performance

- **Integrated Testing:**

  "Integrated testing is the **collaborative planning** and collaborative **execution** of test phases and events to provide **shared data** in support of **independent analysis, evaluation**, and reporting by all stakeholders particularly the developmental (both contractor and government) and operational test and evaluation communities"

Mission-Oriented Context

Mission-oriented DT&E is not a dress rehearsal that is conducted just prior to IOT&E. It is the focus throughout the DT program to ensure the design of the system will meet the user's needs.

- Part of policy to emphasize robust DT&E
  - ➢ Discover operational failure modes in time to fix them

- Mission-oriented DT and Integrated Testing will increase efficiencies and reduce risk

Bonus – New TES Sneak Peak

- **T&E Strategy required at Milestone A**
- **TEMP format – 4 parts**
- **Less detail – similar to "draft" TEMP**
- **Includes T&E life cycle concept**
- **Includes TDS test plan**

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- **New TEMP Content**
  - **Brings evaluation focus into TEMP**
  - **Assumes a continuum of T&E**
  - **Life cycle view versus scoping to next milestone**
  - **Facilitates Integrated Testing & Mission-oriented context**
  - **Additional test plan details shifted to System Test Plan**
- **In next revision to DAG – Chapter 9**
  - **Applies to new programs, restructured programs, & others if desired**

DEVELOPMENTAL TEST & EVALUATION

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