



Test Readiness and Test Readiness Reviews (TRR)s

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- **Background**
- **TRR a Systems Engineering Technical Review (SETR)**
- **Guidance**
 - DoDI 5000.02
 - AR PAM 73-1, NAVAIRINST 4355.19D
 - TRR Checklist
- **TRR Checklist**
- **Reference Vectors**
- **Interactions**
 - SEP
 - Cyber
 - Risk Management
 - Reliability Growth
 - Tech Performance Measures
- **Summary**

Hardware

Software

Software Incremental

Figure 3. Model 1: Hardware Intensive Program

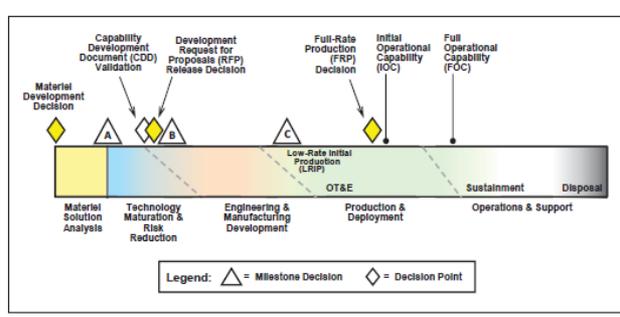


Figure 4. Model 2: Defense Unique Software Intensive Program

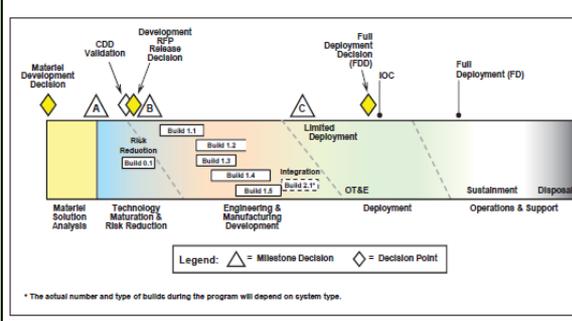
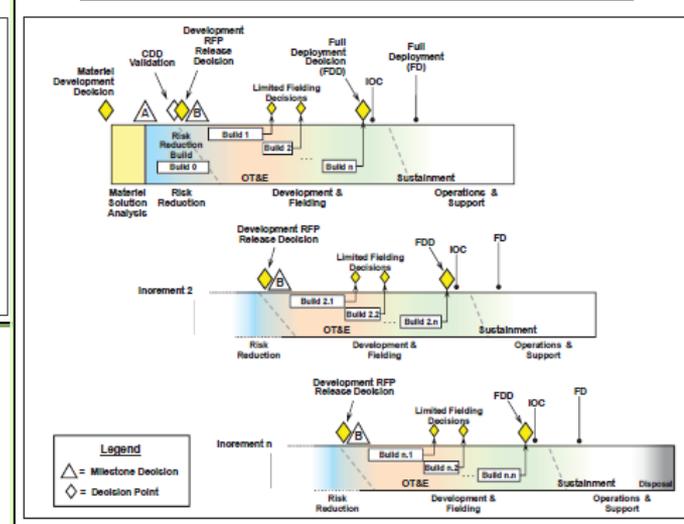


Figure 5. Model 3: Incrementally Fielded Software Intensive Program



6 Acquisition Models "Starting Points"

Accelerated

Hybrid #1

Hybrid #2

Figure 6. Model 4: Accelerated Acquisition Program

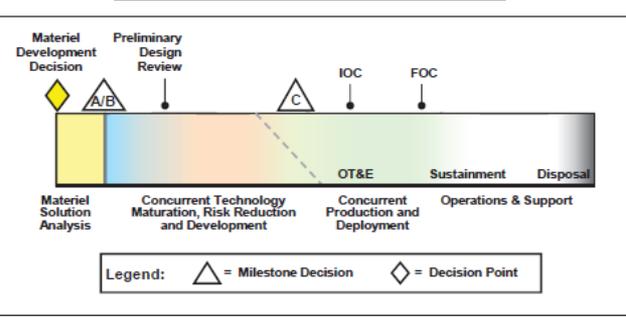


Figure 7. Hybrid Program A (Hardware Dominant)

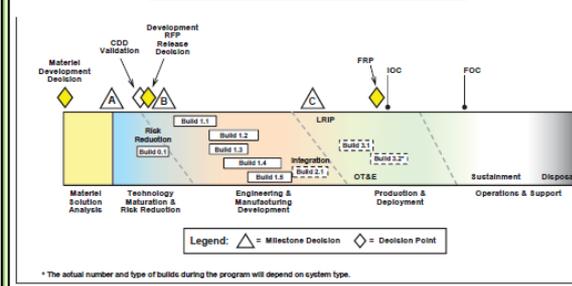
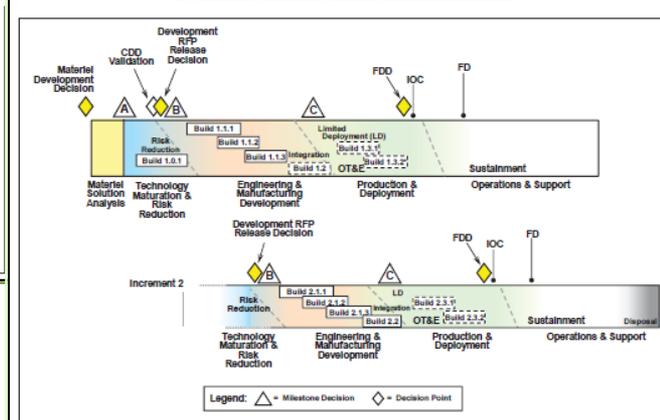
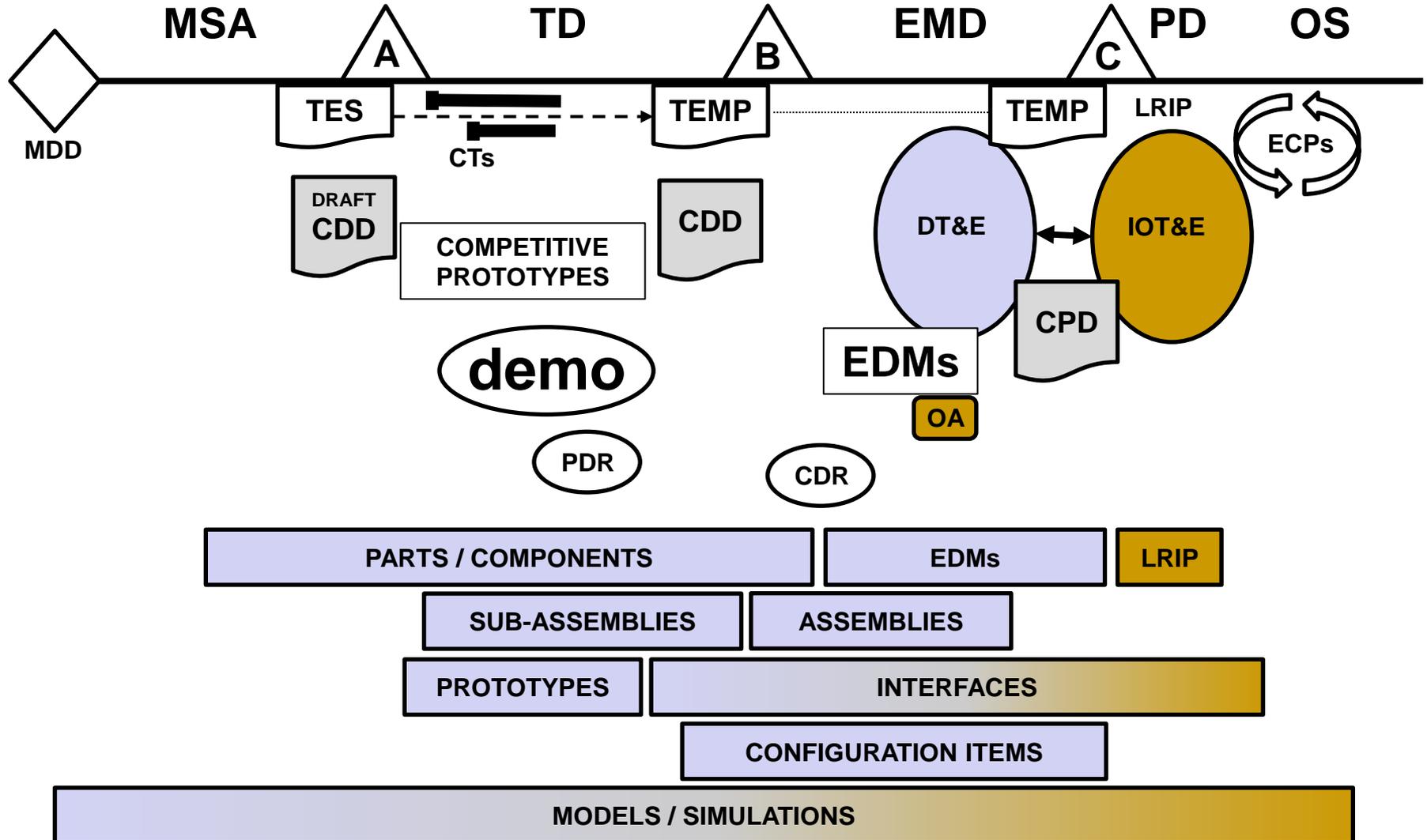
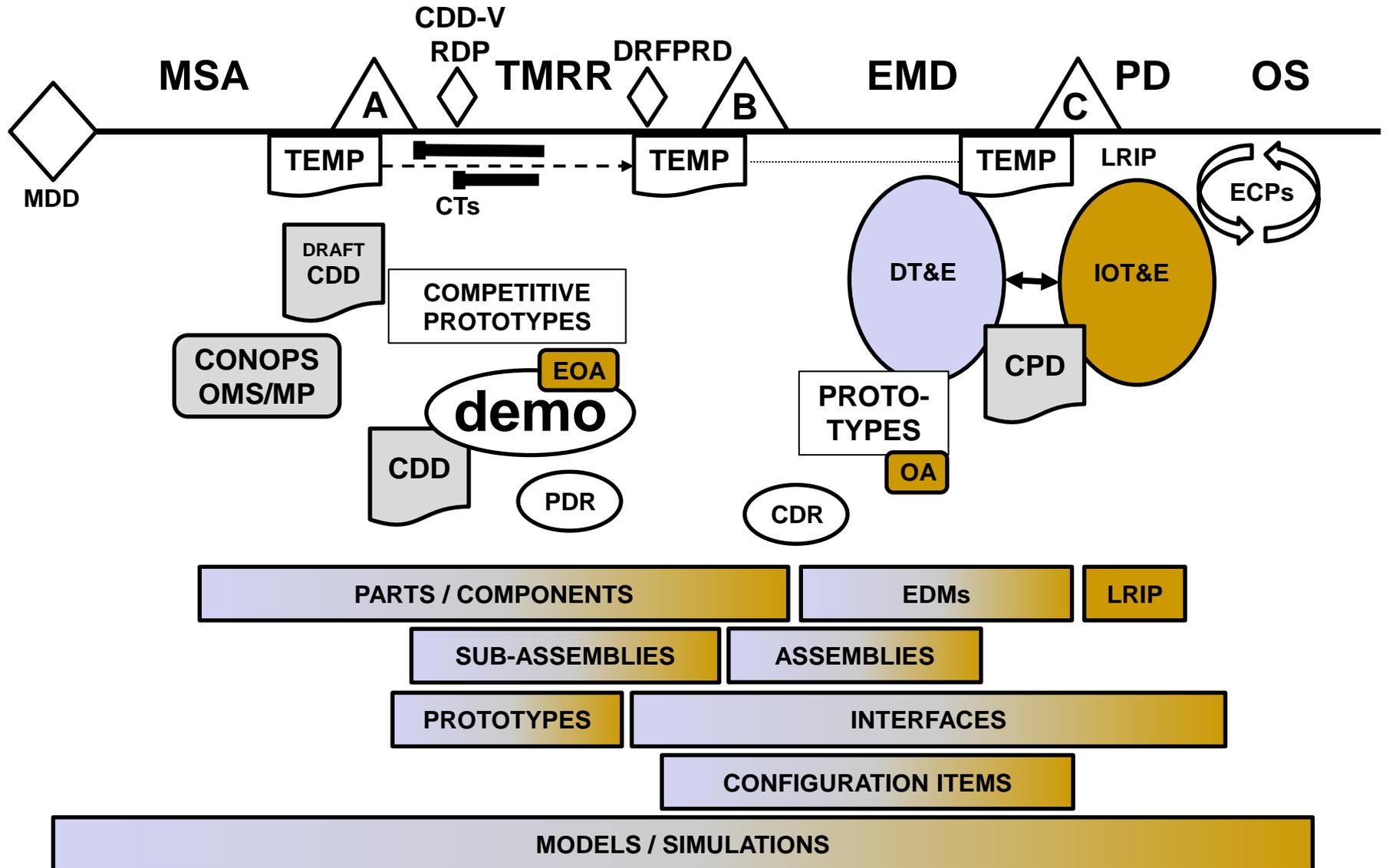


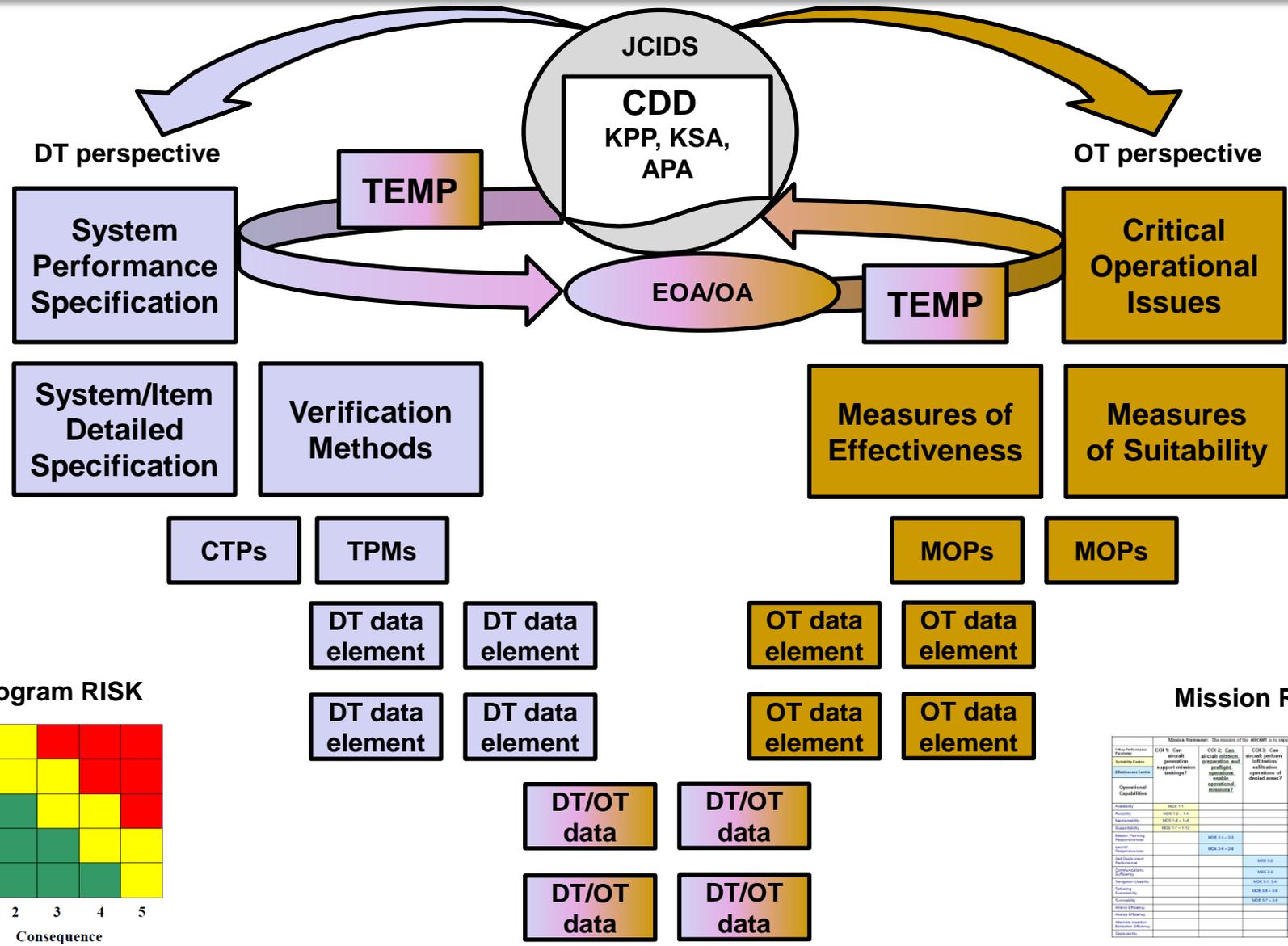
Figure 8. Hybrid Program B (Software Dominant)



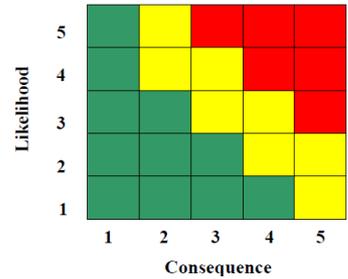




Test Perspective Reconciliation



Program RISK



Mission RISK

	Mission Statement: "The mission of the aircraft is to support operations."				
	COI 1: Can aircraft generate support mission tasks?	COI 2: Can aircraft generate, disseminate, and modify operational missions?	COI 3: Can aircraft perform operations of desired areas?	COI 4: Can aircraft perform intelligence in support of operations?	COI 5: Can aircraft perform self-deployment in support of operations?
Operational Capabilities					
Availability	MOR 1-1				
Reliability	MOR 12-14				
Maintainability	MOR 15-16				
Supportability	MOR 17-18				
Weight		MOR 21-23			
Maneuverability		MOR 24-26			
Endurance			MOR 27		MOR 27
Performance			MOR 30	MOR 41	MOR 50
Comprehensiveness			MOR 31	MOR 42	MOR 50
Integration Usability			MOR 34-36	MOR 37	MOR 58
Delays			MOR 38-39		
Flexibility			MOR 40-43		
Connectivity			MOR 44-46		
Access Efficiency			MOR 47-49		
Resource Efficiency			MOR 51-53		
Operational Efficiency			MOR 54-56		MOR 52-54

Systems Engineering Technical Review Timing

https://acc.dau.mil/docs/technicalreviews/dod_tech_reviews.htm



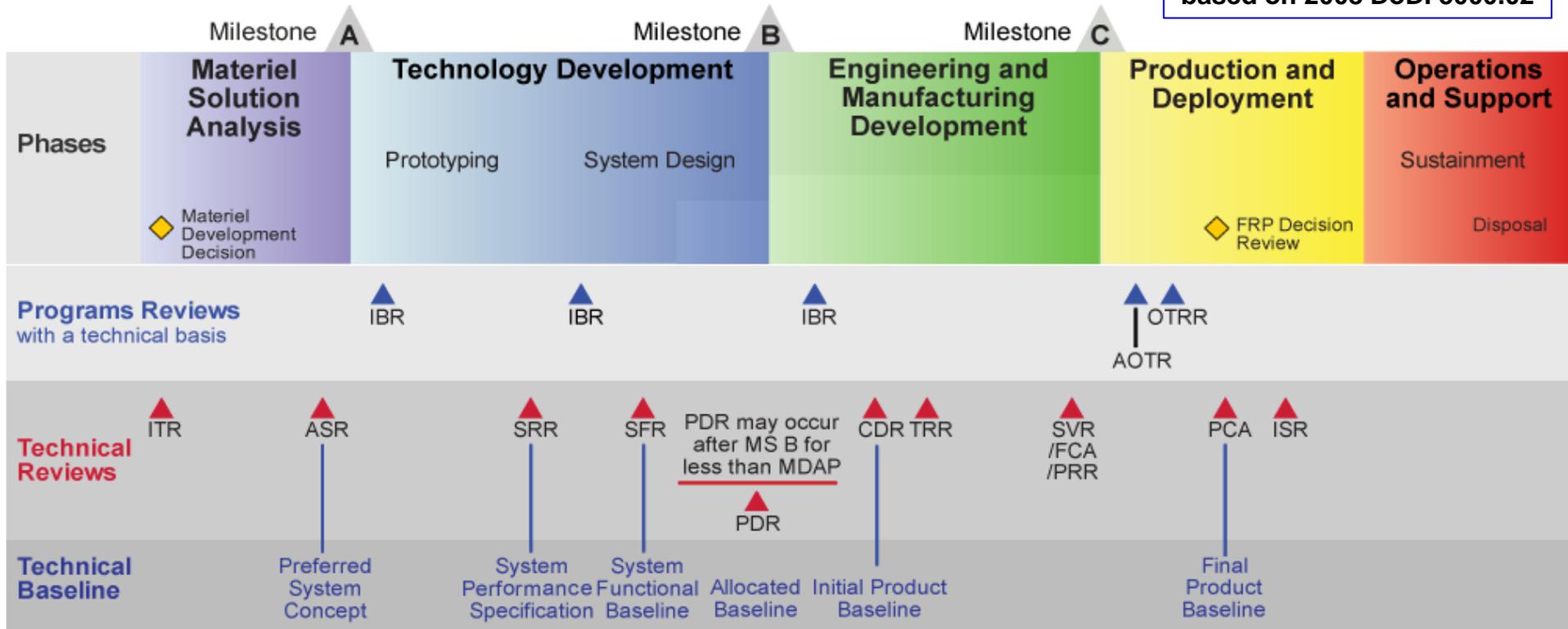
Overview of Technical Reviews

Key Points

Lessons Learned

Feedback

based on 2008 DoDI 5000.02



- ▼ Technology Readiness Assessment
- ▲ Technical Reviews and Audits
- ▲ Program Reviews
- ◆ Decision Point
- ▲ Milestone Review

- AOTR - Assessment of Operational Test Readiness
- ASR - Alternative System Review
- CDR - Critical Design Review
- FCA - Functional Configuration Audit
- FRP - Full Rate Production
- IBR - Integrated Baseline Review
- ISR - In-Service Review
- ITR - Initial Technical Review
- OTRR - Operational Test Readiness Review

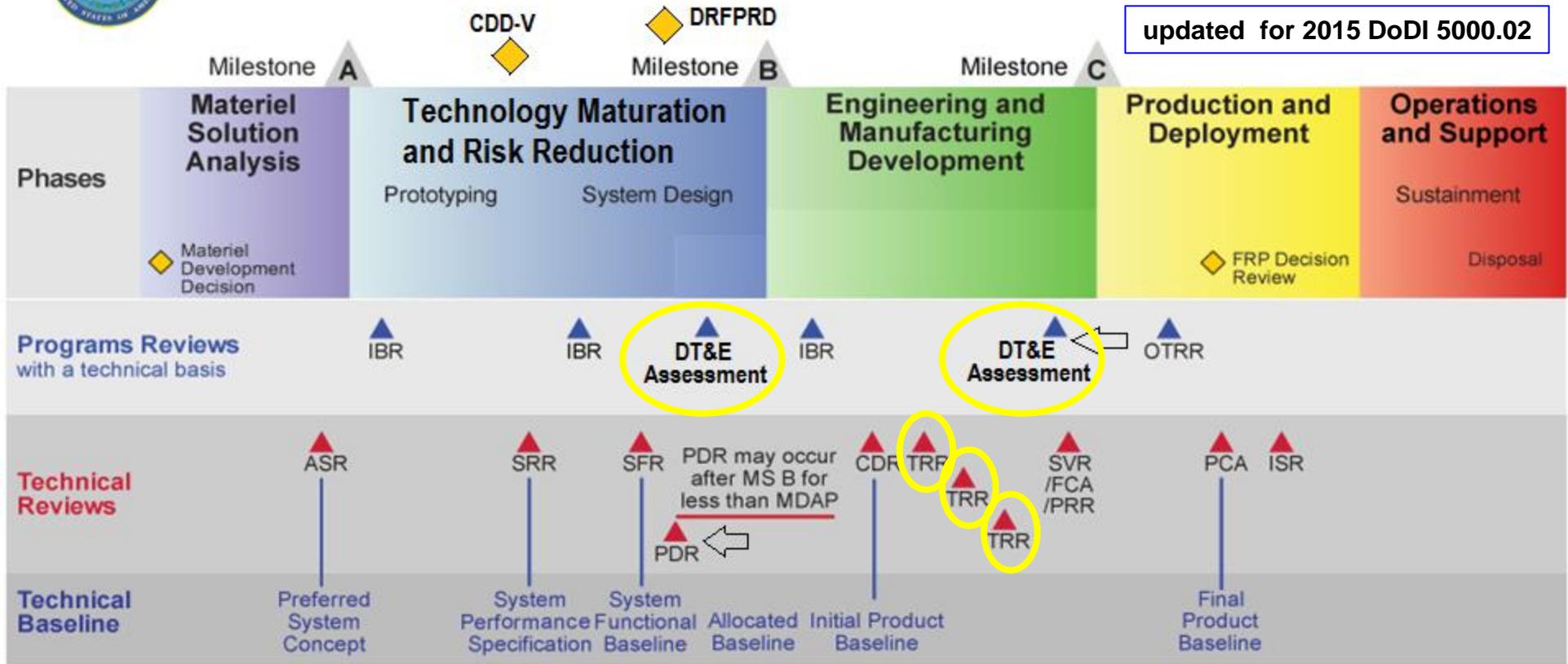
- PCA - Physical Configuration Audit
- PDR - Preliminary Design Review
- PRR - Production Readiness Review
- SFR - System Functional Review
- SRR - System Requirements Review
- SVR - System Verification Review
- TRR - Test Readiness Review

Systems Engineering Technical Review Timing



Overview of Technical Reviews Key Points Lessons Learned Feedback

updated for 2015 DoDI 5000.02



DT&E Assessment

- ▼ Technology Readiness Assessment
- ▲ Technical Reviews and Audits
- ▲ Program Reviews
- ◆ Decision Point
- ▲ Milestone Review

- OTRR - Assessment of Operational Test Readiness
- ASR - Alternative System Review
- CDR - Critical Design Review
- FCA - Functional Configuration Audit
- FRP - Full Rate Production
- IBR - Integrated Baseline Review
- ISR - In-Service Review
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- OTRR - Operational Test Readiness Review

- PCA - Physical Configuration Audit
- PDR - Preliminary Design Review
- PRR - Production Readiness Review
- SFR - System Functional Review
- SRR - System Requirements Review
- SVR - System Verification Review
- TRR - Test Readiness Review



DEFINITION

The TRR is a multi-disciplined technical review designed to ensure that the subsystem or system under review is ready to proceed into formal test. The TRR assesses test objectives, test methods and procedures, scope of tests, and safety and confirms that required test resources have been properly identified and coordinated to support planned tests.



General Information/Narrative

- TRR verifies the traceability of planned tests to program requirements and user needs
- TRR determines the completeness of test procedures and their compliance with test plans and descriptions
- TRR as a tool can be used to support all tests in all phases of an acquisition program
- TRR should be tailored to the specific acquisition phase, the specific planned tests, and the identified level of risk within the program
- TRR scope should align with the requirements verification matrix in the programs SEP



TRR should answer the following questions:

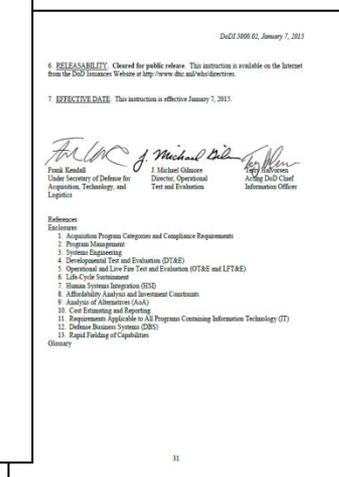
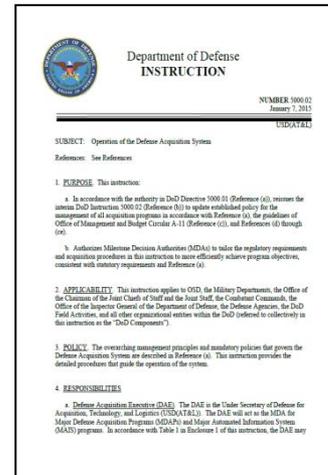
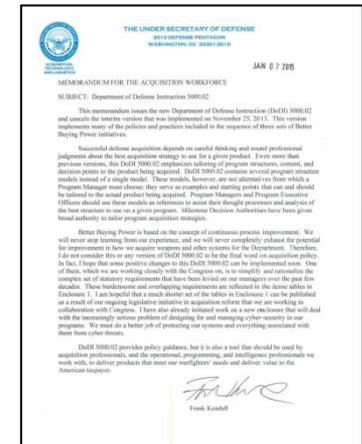
- Why are we testing? What is the purpose of the planned test? Does the planned test verify a requirement that is directly traceable back to a system specification or other program requirement?
- What are we testing (subsystem, system, system of systems, other)? Is the configuration of the system under test sufficiently mature, defined, and representative to accomplish planned test objectives and/or support defined program objectives?
- Are we ready to begin testing? Have all planned preliminary, informal, functional, unit-level, subsystem, system, and qualification tests been conducted, and are the results satisfactory?
- What is the expected result and how can/do the test evaluation results affect the program?
- Is the planned test properly resourced (people, test article or articles, facilities, data systems, support equipment, logistics, etc.)?
- What are the risks associated with the tests and how are they being mitigated?
- What are the hazards and ESOH risks associated with the specific testing?
- Have the necessary Safety Releases from the PM been provided to developmental and operational testers prior to any test using personnel?
- What is the fall-back plan should a technical issue or potential showstopper arise during testing?

A look at DoDI 5000.02

DODI 5000.02 released 7 Jan 2015 – signed by USD/AT&L, DOT&E and DoD CIO (acting).

154 TOTAL PAGES

- Regulation - 31 pages
- Table of Contents - 7 pages
- References - 4 pages (83 references)
- Enclosure 1: Acquisition Program Categories and Compliance Requirements - 30 pages
- Enclosure 2: Program Management - 8 pages
- Enclosure 3: Systems Engineering - 8 pages
- Enclosure 4: Developmental Test and Evaluation (DT&E) - 8 pages
- Enclosure 5: Operational and Live Fire Test and Evaluation (OT&E and LFT&E) - 14 pages
- Enclosure 6: Life-Cycle Sustainment - 6 pages
- Enclosure 7: Human Systems Integration (HSI) - 2 pages
- Enclosure 8: Affordability and Investment Constraints - 5 pages
- Enclosure 9: Analysis of Alternatives (AOA) - 2 pages
- Enclosure 10: Cost Estimating and Reporting - 7 pages
- Enclosure 11: Requirements Applicable to All Programs Containing Information Technology (IT) – 5 pages
- Enclosure 12: Defense Business Systems (DBS) - 4 pages
- Enclosure 13: Rapid Fielding of Capabilities - 10 pages
- Glossary: vector to <https://dap.dau.mil/pages/default.aspx>



6 Acquisition Models: serve as examples and starting points that can and should be tailored to the actual product being acquired

So what does DODI 5000.02 say about TRRs?

“Test Readiness” appears 6 times

- **Enclosure 1:** Table 6. Exceptions, Waivers, and Alternative Management and Reporting Requirements

DT&E EXCEPTION REPORTING	•	Case 1: When an MDAP proceeds with implementing a TEMP that includes a developmental test plan disapproved by DASD(DT&E). Case 2: When an MDAP proceeds to IOT&E following an assessment by DASD(DT&E) that the program is not ready for operational testing.	SEC. 904, P.L. 112-239 (Ref. (I))	Program Manager to USD(AT&L) to Congress
	STATUTORY <ul style="list-style-type: none"> ▪ The report due for Case 1 must include a description of the specific aspects of the DT&E plan determined to be inadequate; an explanation of why the program disregarded the DASD(DT&E)'s recommendations; and identification of the steps taken to address the concerns of the DASD(DT&E). ▪ The report due for Case 2 must include an explanation of why the program proceeded to IOT&E despite the DASD(DT&E) findings; a description of the aspects of the TEMP that had to be set aside to enable the program to proceed to IOT&E; a description of how the program addressed the specific areas of concern raised in the assessment of operational test readiness; and a statement of whether IOT&E identified any significant shortcomings in the program. ▪ The USD(AT&L) will compile all such exception reports and annually, not later than 60 days after the end of each fiscal year through 2018, submit a report on each case to the congressional defense committees. 			

- **Enclosure 4:** Developmental Test and Evaluation (DT&E)

5. DT&E PLANNING CONSIDERATIONS

a. The Program Manager will:

(4) Identify each developmental test phase or major developmental test event as a contractor or government DT&E. All programs will plan for the conduct of DT&E and/or integrated testing to provide confidence in the system design solution. Each major developmental test phase or event (including **Test Readiness Reviews**) will have test entrance and exit criteria. The developmental test completion criteria (customer needs) will dictate what data are required from the test event.

DODI 5000.02 Test Readiness References (continued)

- **Enclosure 4: Developmental Test and Evaluation (DT&E)**
 - 6. DT&E EXECUTION, EVALUATION, AND REPORTING
 - a. DT&E Execution. As the Program Manager executes the program's strategy for the DT&E, the Program Manager and test team will develop detailed test plans for each developmental test event identified in the TEMP. Test plans must consider the potential impacts on personnel and the environment in accordance with 10 U.S.C. 4321-4347 (Reference (ag)) and Executive Order 12114 (Reference (ah)). The Program Manager, in concert with the user and T&E community, will provide safety releases (to include National Environmental Policy Act documentation, safety, and occupational health risk acceptance in accordance with section 16 in Enclosure 3 of this instruction) to testers prior to any test that may impact safety of personnel. A **Test Readiness Review will be conducted for those events identified in the TEMP.**

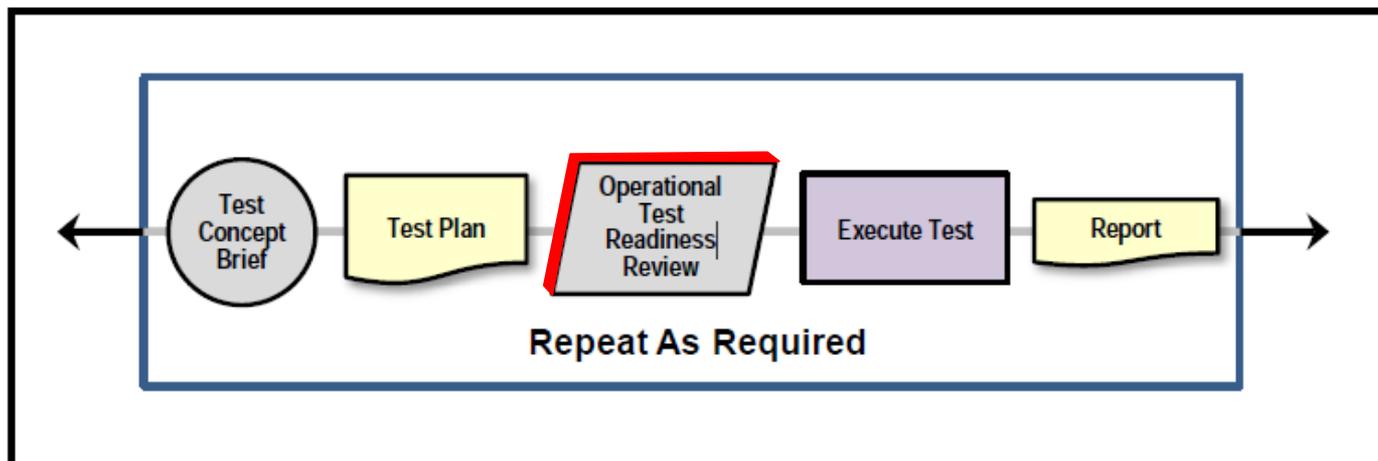
- **Enclosure 4: Developmental Test and Evaluation (DT&E)**
 - 6. DT&E EXECUTION, EVALUATION, AND REPORTING
 - b. DASD(DT&E) Program Assessments. For MDAPs, MAIS programs, and USD(AT&L)-designated special interest programs, the DASD(DT&E) will provide the MDA with a program assessment at the Development Request for Proposal Release Decision Point, Milestones B and C, and **updated to support the Operational Test Readiness Review** or as requested by the MDA or Program Manager. The program assessment will be based on the completed DT&E and any Operational T&E activities completed to date, and will address the adequacy of the program planning, the implications of testing results to date, and the risks to successfully meeting the goals of the remaining T&E events in the program.

DODI 5000.02 Test Readiness References (continued)

- **Enclosure 5:** Operational and Live Fire Test and Evaluation (OT&E and LFT&E)

11. OPERATIONAL AND LIVE FIRE T&E EXECUTION.

Figure 9. Operational or Major Live Fire Test Event: Planning, Approval, Execution, and Reporting



- **Enclosure 5:** Operational and Live Fire Test and Evaluation (OT&E and LFT&E)

12. **OPERATIONAL TEST READINESS.** The DoD Components will each establish an **Operational Test Readiness Review** process to be executed for programs on DOT&E oversight prior to any Operational Test. Prior to IOT&E, the process will include a review of DT&E results, an assessment of the system's progress against the key performance parameters, key system attributes, and critical technical parameters in the TEMP, an analysis of identified technical risks to verify that those risks have been retired or mitigated to the extent possible during DT&E and/or OT&E, a review of system certifications, and a review of the IOT&E entrance criteria specified in the TEMP.

- **Failed DT&E Assessment informing OTRR Requires Exception Reporting**
- **DT&E TRRs must have Entrance/Exit Criteria**
- **DT&E events identified in TEMP require TRR**
- **DT&E Assessment supports OTRR**
- **OTRR required as part of each OT&E**
- **OTRR process required for programs on DOT&E oversight**
 - review of DT&E results
 - assessment of system's progress against KPPs, KSAs and CTPs
 - analysis of identified technical risks to verify retired/mitigated during DT&E / OT&E
 - review of system certifications
 - review of the IOT&E entrance criteria specified in the TEMP

TRR should answer the following questions:

1. Why are we testing?
2. What is the purpose of the planned test?
3. Does the planned test verify a requirement that is directly traceable back to a system specification or other program requirement?
4. What are we testing (subsystem, system, system of systems, other)?
5. Is the configuration of the system under test sufficiently mature, defined, and representative to accomplish planned test objectives and or support defined program objectives?
6. Are we ready to begin testing?
7. Have all planned preliminary, informal, functional, unit level, subsystem, system, and qualification tests been conducted, and are the results satisfactory?
8. What is the expected result and how can/do the test evaluation results affect the program?
9. Is the planned test properly resourced (people, test article or articles, facilities, data systems, support equipment, logistics, etc.)?
10. What are the risks associated with the tests and how are they being mitigated?
11. What are the hazards and ESOH risks associated with the specific testing?
12. Have the necessary "Safety Releases" from the Program Manager (PM) been provided to developmental and operational testers prior to any test using personnel?
13. What is the fall-back plan should a technical issue or potential showstopper arise during testing?

TRR Success Criteria

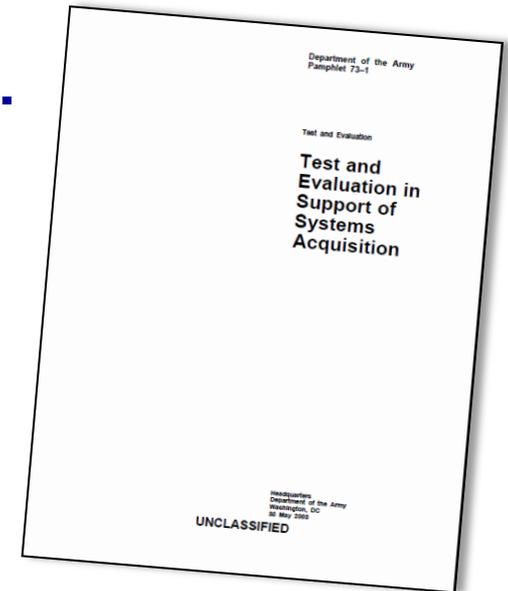
Typical TRR success criteria including the following:

- Completed and approved test plans for the system under test,
- Completed identification and coordination of required test resources,
- The judgment that previous component, subsystem, and system test results form a satisfactory basis for proceeding into planned tests, and
- Identified risk level acceptable to the program leadership.

- **A TRR is usually used for system-level DT, but can be used prior to other test phases**
 - Testers often conduct TRRs at various pre-determined points, leading up to the start of test
 - Some organizations conduct a TRR prior to every scheduled test event
- **PMs typically chair & execute TRRs for major developmental test events (such as the TRR prior to the start of a major test phase)**
 - Chief Developmental Testers also chair TRRs, in some organizations

from Army PAM 73-1

- **Objective:** Assess the readiness of the system, concept, or force development product; support packages; instrumentation; test planning; evaluation planning; and any other area required to support the successful conduct of the test or experiment.
- **Members:** Minimum membership includes the PM / Materiel Developer, the operational and developmental testers, and the system evaluator.
- **Four principal components of a TRR:**
 - System under test
 - Test plan
 - Test resources
 - Pre-test training



Army TRR Working Group

- **TRR objective is to determine what actions are required to assure resources, training, and test hardware will be in place to support the successful conduct of the test, and to ensure that T&E planning, documentation, design maturity/configuration, and data systems have been adequately addressed.**
- **TRR working group is typically composed of the principal T&E WIPT members / stakeholders:**
 1. PM / Materiel Developer / Chief Developmental Tester.
 2. Requirements / user community representative (TRADOC Capability Manager, for the Army)
 3. Lead DT&E Organization.
 4. Operational Tester.
 5. Test Analyst / System Evaluator.
 6. Logistician.
 7. Trainer.
 8. Others, as required.

Reference: Army Pamphlet 73-1

Army TRR Package

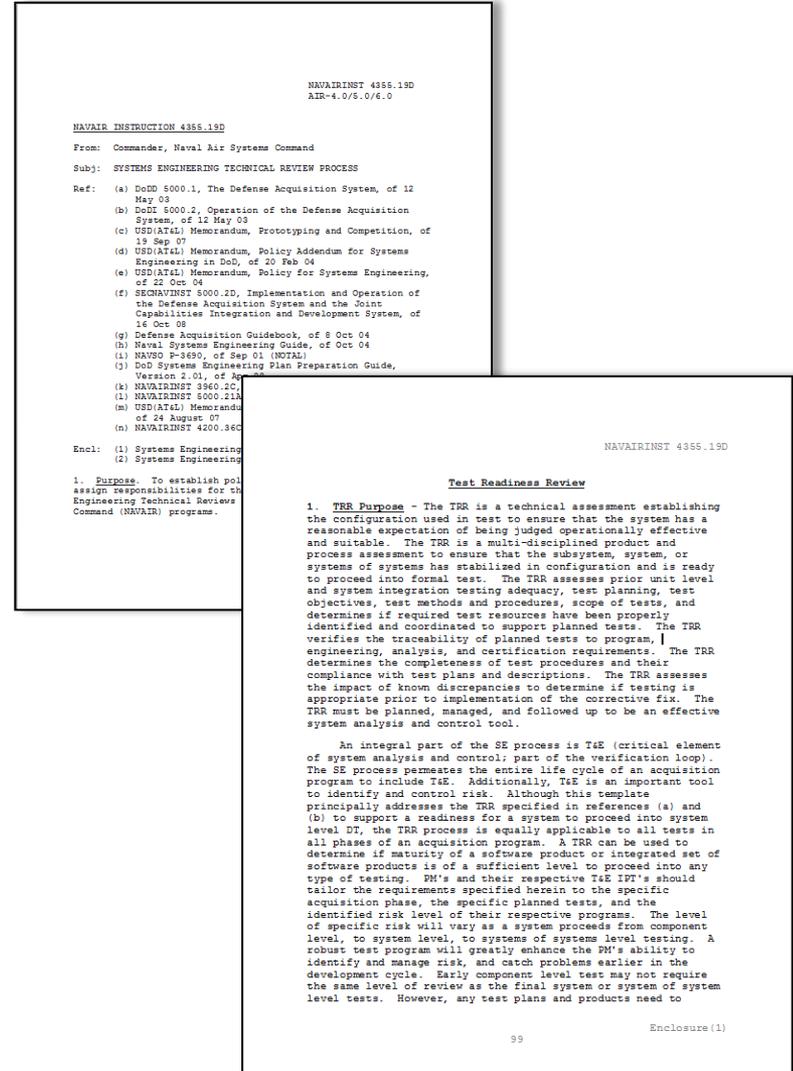
- **TRR package consists of the following:**
 - (1) Coordinated TEMP.
 - (2) Test Plans.
 - (3) Safety Assessment Report (60 days prior to start of test).
 - (4) Environmental Impact Documents (120 days prior to start of test).
 - (5) Description of test item configuration.
 - (6) RAM Failure Definition/Scoring Criteria.
 - (7) Status of System Support Package (SSP), New Equipment Training, MANPRINT, Instrumentation, Data Collection/Reduction Facilities.
 - (8) Supportability IPT approved Supportability Strategy.
 - (9) Airworthiness release or statement, if required.
 - (10) Status of software.
 - (11) Safety Release.
 - (12) Contractor or other test data.
 - (13) Test milestones.

NAVAIRINST 4355.19D

Enclosure (1) Systems Engineering Technical Review Process Handbook

• Test Readiness Review

- (1) Coordinated TEMP.
- (2) Test Plans.
- (3) Safety Assessment Report (60 days prior to start of test).
- (4) Environmental Impact Documents (120 days prior to start of test).
- (5) Description of test item configuration.
- (6) RAM Failure Definition/Scoring Criteria.
- (7) Status of System Support Package (SSP), New Equipment Training, MANPRINT, Instrumentation, Data Collection/Reduction Facilities.
- (8) Supportability IPT approved Supportability Strategy.
- (9) Airworthiness release or statement, if required.
- (10) Status of software.
- (11) Safety Release.
- (12) Contractor or other test data.
- (13) Test milestones.



TRR Checklist

<http://acqnotes.com/Attachments/DoD%20Test%20Readiness%20Review%20Checklist.xls>



“Systems Engineering for Mission Success”

~ 145 Questions

Test Readiness Review

Program Risk Assessment Checklist (17 May 2007 version)

OVERVIEW: Although the checklist can be printed and completed as a "hard copy", it is designed to be completed electronically as an Excel spreadsheet. When viewed electronically, the small number buttons in the upper left corner of the screen are used to select the level of indenture for the questions in the checklist. A left mouse click on a number button will expand or collapse the entire checklist to the desired level. A left click on the "+" symbol in the left margin of the spreadsheet will expand the level of indenture for that section. A left click on the "-" symbol in the left margin of the spreadsheet will collapse the level of indenture for that section. The buttons in Row 11 run specific macros. The buttons in Column A allow a user to designate and sort specific questions as "Special Interest" (i.e., High Priority, Flagged, Question). The colored buttons in Row 11, Column C allow the user to sort questions by Technical Discipline, to provide a Level 1 roll-up of the risk characters assigned, or to hide specific information. For example selecting the "Logistics" button results in the display of all Level 1 Logistics-related questions and assigned information. All other questions will be hidden.

COMPLETING THE CHECKLIST:

- In the upper right corner of the checklist, enter the name of the program being reviewed, the date(s) of the review, along with the name, code and technical specialty of the person(s) completing the checklist.
- A "Risk Character" (i.e., R / Y / G / U / NA) should be assigned for each question by direct entry or left clicking in each box to activate the "drop down" menu. The assigned Risk Characters will automatically total and display in the Level 1 (and Level 2, as applicable) row(s). Selection of a summary tab (Excel "Sheet") at the bottom of the checklist will provide a summary of all questions assigned a particular risk character (e.g., selecting

CAUTION: Entries, changes, deletions or comments should only be made on the checklist. Any entries entered directly on the summary pages will no be recorded within the checklist and will disable linkage between the checklist and the summary pages.

SAVING THE CHECKLIST: Save the completed checklist in a new file with a unique name such as "UAV TRR 8Feb07ajo".

High Priority

Flagged

Question

Show All

Level 1

Programmatic

Production

Interoperability

Technology

Software

Risk

Logistics

Training

EVM

T&E

HSI

Hide TD

Unhide TD

Hide NA

Unhide NA

Risk Character

R = Red, Y = Yellow, G = Green, U = Unknown / Unavailable, NA = Not Applicable

- Based on NAVAIRINST 4355.19D
- TRR Planning
 - Logistics
 - Test Program Schedule
 - Test Program Staffing
 - Test Plan/Process Review
 - Management Metrics relevant to Planned Test
 - Test Program Risk Assessment
 - System Under Test Requirements
 - System Under Test
 - Completion/Exit Criteria

Special Interest	Technical Discipline	Item	Legend: R Y G U NA	Item	Comments / Mitigation
	Level 1, programmatic, T&E, technology, training, software	1. Test Readiness Review (TRR) Planning	R Y G U NA	1	
			0 0 0 0 0		

<http://www.dote.osd.mil/>



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Guidance

2014

- Procedures for OT&E of Cybersecurity in Acquisition Programs *2014 August*
- Guidance on the Use and Design of Surveys in OT&E *2014 June*

2013

- Best Practices for Assessing the Statistical Adequacy of Experimental Designs Used in Operational Test and Evaluation *2013 July*

2012

- Changes to Approved Operational Test Plans *2012 December*
- Independent OT&E Suitability Assessments *2012 October*

2011

- Timeliness of OT&E Plans *2011 June*

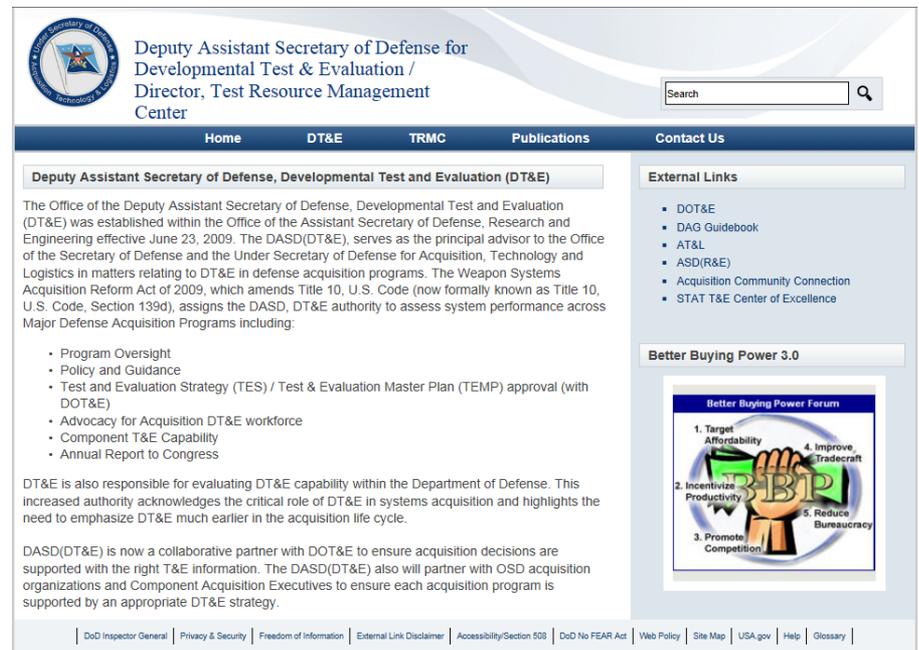
2010

- Guidance on the use of DOE in OT&E *2010 October*
- Use of Production-Representative Test Articles for IOT&E *2010 October*
- Designation of Programs for OSD Operational & LFT&E Oversight *2010 September*
- Guidelines for OT&E of Information & Business Systems *2010 September*
- Timely Provision of Test Data *2010 May*
- Standardization of Hard Body Armor Testing *2010 April*
- Timely Analysis & Reporting of T&E Results *2010 April*
- Reporting of OT&E Results *2010 January*

2009

- T&E Initiatives *2009 November*
- Modification of Systems Subject to Survivability Testing Oversight *2009 May*
- Using DOE for OT&E *2009 May*

<http://www.acq.osd.mil/dte-trmc/index.html>



Deputy Assistant Secretary of Defense for Developmental Test & Evaluation / Director, Test Resource Management Center

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Deputy Assistant Secretary of Defense, Developmental Test and Evaluation (DT&E)

The Office of the Deputy Assistant Secretary of Defense, Developmental Test and Evaluation (DT&E) was established within the Office of the Assistant Secretary of Defense, Research and Engineering effective June 23, 2009. The DASD(DT&E), serves as the principal advisor to the Office of the Secretary of Defense and the Under Secretary of Defense for Acquisition, Technology and Logistics in matters relating to DT&E in defense acquisition programs. The Weapon Systems Acquisition Reform Act of 2009, which amends Title 10, U.S. Code (now formally known as Title 10, U.S. Code, Section 139d), assigns the DASD, DT&E authority to assess system performance across Major Defense Acquisition Programs including:

- Program Oversight
- Policy and Guidance
- Test and Evaluation Strategy (TES) / Test & Evaluation Master Plan (TEMP) approval (with DOT&E)
- Advocacy for Acquisition DT&E workforce
- Component T&E Capability
- Annual Report to Congress

DT&E is also responsible for evaluating DT&E capability within the Department of Defense. This increased authority acknowledges the critical role of DT&E in systems acquisition and highlights the need to emphasize DT&E much earlier in the acquisition life cycle.

DASD(DT&E) is now a collaborative partner with DOT&E to ensure acquisition decisions are supported with the right T&E information. The DASD(DT&E) also will partner with OSD acquisition organizations and Component Acquisition Executives to ensure each acquisition program is supported by an appropriate DT&E strategy.

External Links

- DOT&E
- DAG Guidebook
- AT&L
- ASD(R&E)
- Acquisition Community Connection
- STAT T&E Center of Excellence

Better Buying Power 3.0



1. Target Affordability 2. Incentivize Productivity 3. Promote Competition 4. Improve Tradeoffs 5. Reduce Bureaucracy

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Systems Engineering

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Overview

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Policy

Guidance & Tools

Special Studies

Web Resources

POLICY

This page provides links to DoD policy related to [defense acquisition](#) including [Service systems engineering policies](#), [modeling and simulation](#), [program protection and system assurance](#), and [system safety](#).

[Expand All](#) [Collapse All](#)

☐ [Defense Acquisition and Systems Engineering](#)

☐ [Department of Defense Directive 5000.01, The Defense Acquisition System](#)
May 12, 2003, Certified Current as of November 20, 2007

☐ [Interim Department of Defense Instruction 5000.02, Operation of the Defense Acquisition System](#)
November 25, 2013

☐ [Department of Defense Instruction 5134.16, Deputy Assistant Secretary of Defense for Systems Engineering \(DASD\(SE\)\)](#)
August 19, 2011

☐ [Department of Defense Instruction 4140.67, DoD Counterfeit Prevention Policy](#)
April 26, 2013

☐ [Department of Defense Instruction 4245.14, DoD Value Engineering \(VE\) Program](#)
October 26, 2012

☐ [OUSD\(AT&L\) Memorandum, Document Streamlining - Life-Cycle Sustainment Plan \(LCSP\)](#)
September 14, 2011

☐ [OUSD\(AT&L\) Memorandum, Expected Business Practice: Document Streamlining - Program Protection Plan, Attachment: Program Protection Plan Outline and Guidance](#)
July 18, 2011

☐ [OUSD\(AT&L\) Memorandum, Expected Business Practice: Document Streamlining- Program Strategies and Systems Engineering Plan, Attachments: Systems Engineering Plan \(SEP\) Outline, Version 1.0 | Technology Development Strategy/Acquisition Strategy \(Sample Outline\)](#)
April 20, 2011

☐ [OUSD\(AT&L\) Memorandum, Expected Business Practice: Post-Critical Design Review Reports and Assessments](#) [PDF, 47KB]
February 24, 2011

Mandatory SEP Tables

SEP Update Record

Memoranda of Agreements

Certification Requirements ★

IPT Team Details ★

Technical Performance Measures ★

Technical Review Details ★

Design Considerations

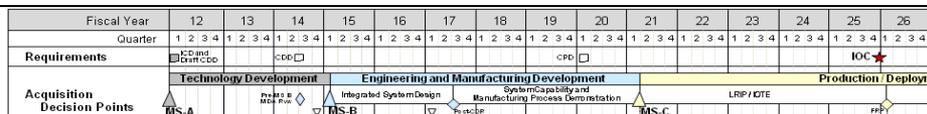
R&M Activity Planning and Timing ★

Engineering Tools

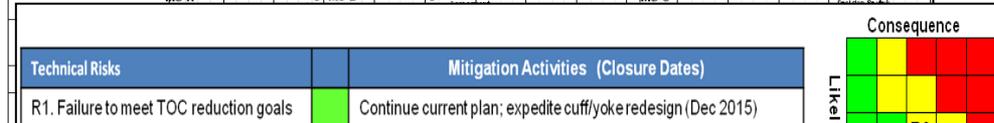
Data-driven SEPs enable assessment of Execution to Plan

Revision Number	Date	Log of Changes Made and Description of Reason Changes	Approved By					
0.7		Addressed Lead Systems Engineer's (LSE's)						
REQUIRED MEMORANDA OF AGREEMENT								
Interface	Cooperating Agency	Interface Control Authority	Required By Date					
Certification	PMO Team/PoC	Activities to Obtain Certification ¹	Certification Authority					
Airworthiness	Airframe IPT		20 FY2					
Person	Team Membership (by Function or Organization)	Team Role, Responsibility, and Authority	Products and Metrics					
SE	Program Office	Role: IPT Purpose	Products: SEP					
Name	Responsible Position /IPT	KPP or KSA	Performance Spec.	PDR Status Actual	MS B Status Actual	CDR Status Actual	MS C Status Planned	FRP Status Planned
Amic Drag	SE IPT		<222	225	223	220	187	187
XXX Details Area		XXX Review Details (For this acquisition phase, fill out tailored criteria, etc.)						
Chairperson		Identify the Technical Review Chair (Normally the LSE)						
Mapping Key Design Considerations into Contracts								
Name (Reference)	Cognizant PMO Org	Certification	Documentation (hot link)	Contractual Requirements (CDRL #)	Description/Comments			
SE Tradeoff Analysis for			(MS B)		Provide the systems engineering trade-off analysis			
R&M Engineering Activity			Planning and Timing					
R&M Allocations								
Engineering Tool			Purpose			Position/IPT Responsibility		
IMS								
Failure Scoring			Requirements Traceability and Verification Methodology and Completion			SE IPT/Rqmts Manager		
Failure Criticality (FMECA)			Requirements Verification Matrix (RVM)					

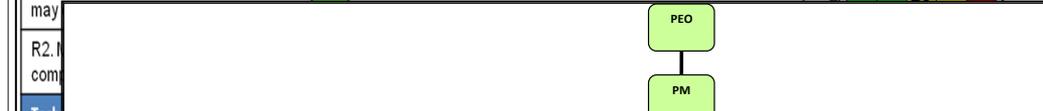
Mandatory SEP Figures



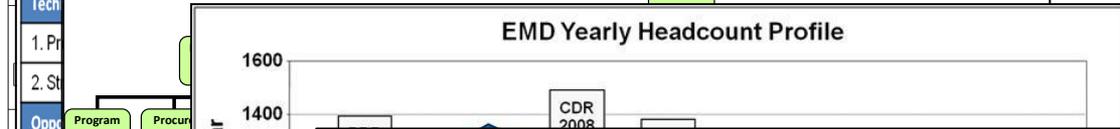
Technical Schedule ★



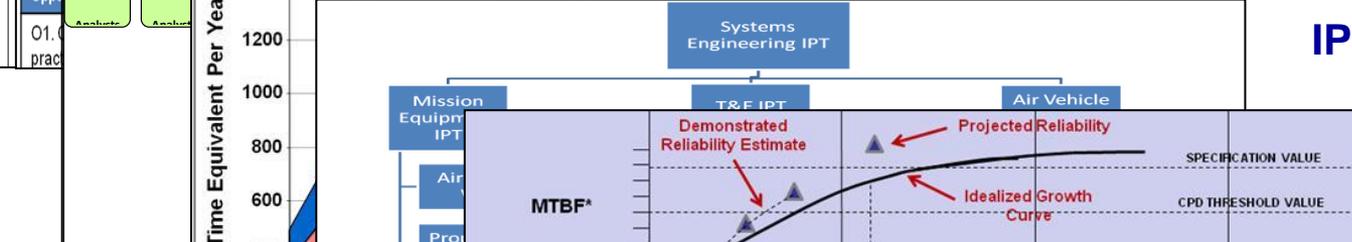
Risk Matrix ★



Program Office Organization ★



Program Technical Staffing ★

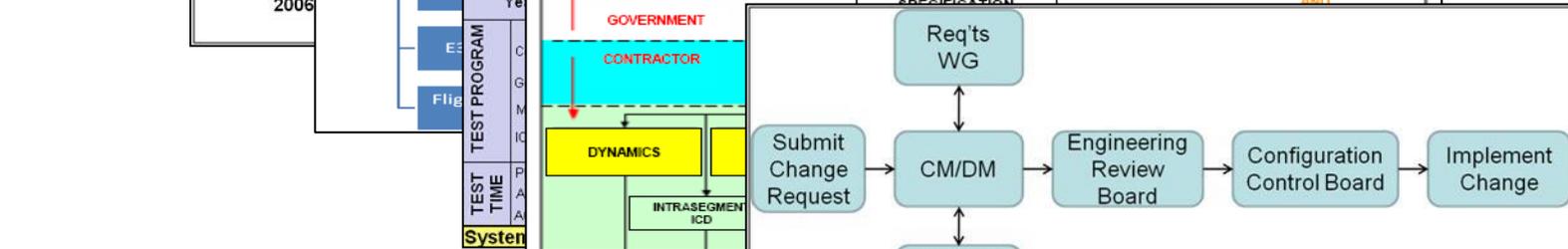


IPT/WG Team Hierarchy

Reliability Growth Curve ★



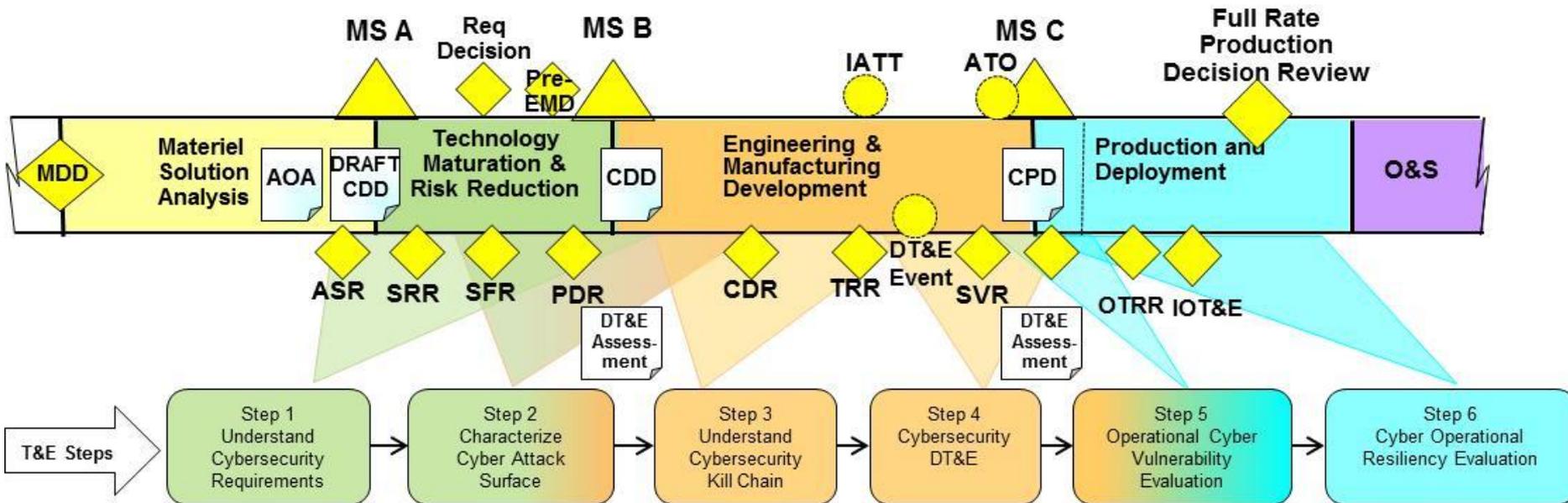
Specification Tree



Configuration Management Process

Cybersecurity T&E Process Overview

- A key feature of the Cybersecurity T&E Process is early T&E involvement in test planning and execution.
- Test planning occurs in all six steps and is reflected in the TEMP.
- The Cybersecurity T&E Process is iterative, i.e., steps may be repeated several times in different lifecycle phases due to changes in the system architecture, new or emerging threats, and changes to the system environment.
- All steps are performed regardless of where the system enters the process.



Technical Performance Measures

Requirement

- Provide an overview of measurement planning and metrics selection process, including approach to monitor execution to established plan, and identification of roles, responsibilities, and authorities for this process
- Identify a minimum set of TPMs and intermediate goals and the plan to achieve them with as-of dates
 - Examples include TPMs for software, reliability, manufacturing, and integration

Expectation

- Programs use metrics to measure progress
 - Understand how to measure performance-to-plan
 - What to measure with how much margin

from Mandatory SEP Outline 2011

Mandatory Table

Name	Responsible Position /IPT	KPP or KSA	Performance Spec.	PDR Status Actual	MS B Status Actual	CDR Status Actual	MS C Status Planned	FRP Status Planned
Aerodynamic Drag (count)	SE IPT		<222	225	223	220	187	187
Thermal Utilization (kW)	SE IPT		<60	56	59	55	51	50
Electrical Power Usage (kW)	SE IPT		<201	150	185	123	123	123
Operating Weight (lb)	SE IPT		<99,000	97,001	101,001	97,001	85,540	85,650
Range (nm)	SE IPT		>1,000	1,111	1,101	1,111	1,122	1,130
Average Flyaway Unit Cost (number)	SE IPT		<1.5	1.3	1.58	1.37	1.35	1.32

Tailoring Guidance

- Use TPMs and metrics appropriate for predicting success with the current phase of the program.

PSR Lessons Learned

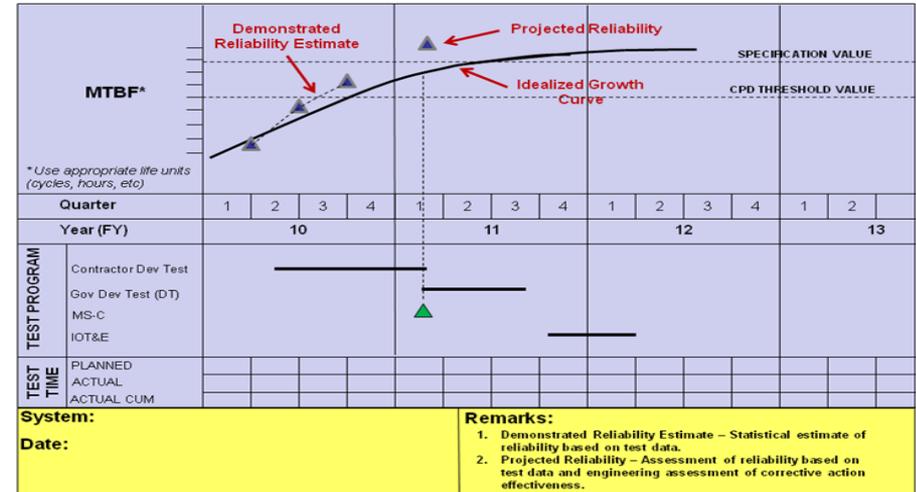
- Management metrics are not collected, or are not collected frequently enough, or used to monitor program health
- EVMS does not provide insight and does not reflect work being done
- Lack of software metrics prevent accurate awareness of software activities

Reliability Growth

Requirement

- Use a reliability growth curve to plan, illustrate, and report progress
 - Growth curves will be stated in a series of intermediate goals and tracked through fully integrated, system-level test and evaluation events

Mandatory Figure



Expectation

- Understand the amount of testing, test schedule and resources available
 - Develop the growth curve as a function of appropriate life units (hours, cycles, etc.,)
 - Understand how starting point was determined
 - Tie rate of growth to realistic metrics of initial failure rate to be addressed by corrective actions and corrective action fix effectiveness
 - Describe growth tracking & projection methodology

Tailoring Guidance

PSR Lessons Learned

- Optimistic software productivity, reuse and growth estimates
- Insufficient efforts to design-in reliability and maintainability, including diagnostics
- Highly concurrent, success oriented test schedules
- Aggressive schedule lacks adequate time for corrective actions

Additional Policy Changes

- **Chief Developmental Tester (CDT)**
- **LEAD Developmental Test Organization (LDTO)**
- **STAT - Factors/Levels**

Summary: “It depends”



“All programs will plan for the conduct of DT&E and/or integrated testing to provide confidence in the system design solution... customer needs will dictate what data are required from the test event...”

DoDI 5000.01 7 JAN 2015

“DOT&E has no default criteria for acceptable test risks. The rationale for the selection of test risks should derive from the specifics of each program....”

DOT&E TEMP Guidebook 28 May 2013

Questions

