

T&E: “WHY WE HAVE TO DO IT”

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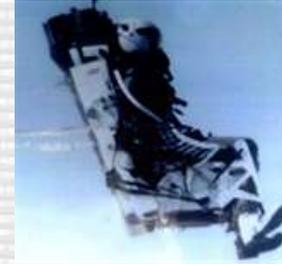


OBJECTIVES

- **Describe the policy changes in test and evaluation**
- **Discuss the impacts focus areas and hot items within the test community**

AGENDA

- **DASD (DT&E) Focus Areas**
- **DOT&E Hot Items and Guidance**
- **Early Involvement**
- **Test and Evaluation Master Plan**
- **T&E Changes in DoDI 5000.02**
- **Reliability**
- **Key thoughts regarding DT&E**
- **Oversight Hints for Success**
- **Resources**



DASD (DT&E) FOCUS AREAS

- **Shift Left Initiative**
 - **Interoperability DT&E Guidance**
 - **Cybersecurity DT&E Guidance**
 - **Reliability T&E Guidance**
 - **Developmental Evaluation Framework**
- **DASD/DT&E Program Assessments**
- **Institutionalizing the Developmental Evaluation Framework**

DASD (DT&E) FOCUS AREAS

- **Improve Acquisition Outcomes by Helping Programs to Succeed – Insight vs. Oversight**
- **Improve Efficiency of DT&E Activities**
- **Scientific Test and Analysis Techniques (STAT) in T&E**
- **Acquisition Workforce Qualification Initiative (AWQI)**
- **DAG & Cybersecurity Update**
- **Chief Developmental Tester**
- **Lead DT&E Organization**
 - <http://www.afit.edu/STAT>



RECENT DOT&E “HOT” ITEMS

- **Rigorous, Defensible, Efficient Testing**
 - Continued emphasis on scientific rigor in test design and analysis
 - Test program should be designed to characterize combat missions across operational envelope
 - Re-emphasis on use of STAT in data analysis
 - Implementation is far from widespread across all DOT&E communities
 - Improved design and use of surveys in OT&E
 - Using all information in Operational Evaluations



http://www.dote.osd.mil/docs/TempGuide3/Intro_to_DOTE_TEMP_Guidebook_3.0.pdf

RECENT DOT&E “HOT“ ITEMS (CONT'D)

- **Improving System Reliability**
 - Improving policy implementation but not in OT results
 - 9 of 24 (38%) met reliability requirements
 - 7 of 8 programs w/ reliability KPPs achieved reliability requirements
 - Essential elements
 - Including reliability growth programs in contracting documents
 - Having reliability based entrance criteria
 - Early involvement of OT community in data scoring process

RECENT DOT&E “HOT“ ITEMS (CONT'D)

- **Cybersecurity Operational Testing and assessment During Exercises**
 - Layered to stop primary attacks proved effective at defending some networks
- **TEMP Guidebook 3.0**
 - http://www.dote.osd.mil/docs/TempGuide3/Intro_to_DO_TE_TEMP_Guidebook_3.0.pdf

DOT&E GUIDANCE

2016

- Guidance on the Validation of Models and Simulation used in Operational Test and Live Fire Assessments 2016 March

2015

- Discussion on Including Neutral Responses on Survey Questions 2015 April
- Discussion on the Use and Design of Surveys 2015 February
- Cyber Economic Vulnerability Assessments (CEVA) 2015 January

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

EARLY INVOLVEMENT OF T&E

- **Weak links between requirements, acquisition, and testing have been noted**
 - Requirements must be measurable, testable, and achievable for effective DT&E
 - End-to-End mission-oriented metrics are essential for determining operational effectiveness and suitability
 - Evaluation of mission accomplishment across the operational envelope is necessary
 - The So-What factor helps with trade space and assessment

EARLY INVOLVEMENT OF T&E (CONT'D)

- **Testing community can contribute valuable information to the requirements process**
 - Knowledge of current and legacy system performance; can provide input at early requirements development
 - Unrealistic, unaffordable, untestable, and/or not technically feasible requirements can be improved
 - Current operational threat environment and what investments will be needed in test resources and infrastructure

EARLY INVOLVEMENT OF T&E (CONT'D)

- **Constructing requirements with test implications understood can result in a significant reduction in required test resources**
 - Converting to a continuous metric from a binary response metric maximizes test efficiency

TEST AND EVALUATION MASTER PLAN (TEMP)

- **Describes total T&E planning from development through operational T&E into production and fielding**
- **Identifies the required type and amount of T&E events, along with their resource requirements**
- **Program Manager, along with T&E WIPT, is responsible for producing**
- **Considered a contract between PM, OSD, and T&E Activities**

TEST AND EVALUATION MASTER PLAN (TEMP) (CONT'D)

- **Must be consistent with other key acquisition documents**
 - Acquisition Strategy
 - Systems Engineering Plan
 - Life Cycle Support Plan
- **For MDAPs, must be approved by DASD/DT&E & DOT&E**
- **DAG is the authoritative reference for TEMPs**
- **DOT&E TEMP Guide**
 - http://www.dote.osd.mil/docs/TempGuide3/Intro_to_DOTE_TEMP_Guidebook_3.0.pdf

T&E SPECIFIC DODI 5000.02

- ▶ **Shift Left CDT/LDTO**
- ▶ **Reliability Growth**
- ▶ **Modelling & Simulation**
- ▶ **Facilities**
- ▶ **Software**
- ▶ **Early Operational Assessment**
- ▶ **Cyber Security / Integrated Testing**



T&E SPECIFIC DODI 5000.02 (1/7/15) CHANGES

- T&E planning moved to left
- Prior to completion of Material Solutions Analysis Phase, Combat Developer will provide a CONOPs / OMS/MP to PM. It will be provided to Industry as an attachment to next Acquisition phase RFP (Pg. 17)
- Chief Developmental Tester for MDAPs & MAISs (Pg. 91)
- Lead DT&E (Government) Organization for MDAPs (Pg. 91)

T&E SPECIFIC DODI 5000.02 (1/7/15) CHANGES (CONT'D)

- **DT&E activities will start when requirements are being developed to ensure key technical requirements are measureable, testable, and achievable (Pg. 92)**
- **TEMP will be a source document when developing the request for proposal (Pg. 93)**
- **All programs will plan for the conduct of DT&E and /or Integrated Testing (Pg. 94)**

T&E SPECIFIC DODI 5000.02 (1/7/15) CHANGES (CONT'D)

- **Reliability Growth Curve(s) included in the MS B TEMP (updated in all future TEMPS) (Pg. 94)**
 - Beginning at MS B, the TEMP will include T&E for reliability growth and reliability growth curves for the whole system and the reliability of critical systems, sub-systems, components, and sub-components (Pg. 103)
 - For software (in any system) reliability growth will be measured by software maturity at regular intervals (Pg. 103)

T&E SPECIFIC DODI 5000.02 (1/7/15) CHANGES (CONT'D)

- **Requires the use of Government T&E capabilities, unless an exception can be justified (Pg. 95)**
- **For accelerated acquisition and urgent programs, levels of developmental testing required will be highly tailored to emphasize schedule over other considerations (Pg. 96)**
- **For programs on oversight, DASD/DT&E will provide MDA with a program assessment at Developmental RFP release Decision Point, MS B/C, & OTRR (Pg. 96)**

T&E SPECIFIC DODI 5000.02 (1/7/15) CHANGES (CONT'D)

- **Unless specifically waived, the test-related documentation that is required for MDAP programs will be required for all programs on the DOT&E Oversight List (Pg. 99)**
- **Force protection equipment will be subject to DOT&E oversight, as determined by DOT&E. DOT&E will approve required LFTPs and/or LF strategies for such systems (Pg. 99)**

T&E SPECIFIC DODI 5000.02 (1/7/15) CHANGES (CONT'D)

- **The lead OTA for the program will provide an assessment of the T&E implications of the initial concept of operations provided by the user as soon as practical after the MDD (Pg. 101)**
- **Beginning at MS A, lead OTA will provide an active link in the TEMP to a living document in which the Component's rationale for the requirements in the Draft CDD or equivalent requirements document (Pg. 101)**

T&E SPECIFIC DODI 5000.02 (1/7/15) CHANGES (CONT'D)

- **Requirements for early use of Operational Assessment in support of Acquisition Decision Points (Pg. 102)**
- **An up to date TEMP will be provided prior to release of RFP for MS B/C (Pg. 103)**
- **Added discussion of use of Scientific Test and Analysis Techniques throughout T&E Program Planning (Pg. 101)**

T&E SPECIFIC DODI 5000.02 (1/7/15) CHANGES (CONT'D)

- **Revised Modeling and Simulation (M&S) discussion (Pg. 103)**
 - Require any M&S that utilize or portray threat characteristics or parameters must have that portrayal accredited by the Defense Intelligence Agency
 - For programs under DOT&E oversight, its use for the operational evaluation will be approved by DOT&E

T&E SPECIFIC DODI 5000.02 (1/7/15) CHANGES (CONT'D)

- **New section on Software Testing (Pg. 104-105)**
 - Use of Operational Assessments (OA) for Incrementally Deployed Software Intensive Program model ; all limited deployments require OT or OA (Pg. 105)
 - Includes Human-Systems Interface (HSI) assessment and realistic test environment (Pg. 104)

T&E SPECIFIC DODI 5000.02 (1/7/15) CHANGES (CONT'D)

- **Added discussion that cybersecurity testing applies to all systems, not just software systems (Pg. 105) (while this was original intent, previous organization made this unclear)**
 - PM, LDTO, and OTA conduct periodic risk assessments to determine appropriate testing (Pg. 105)

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 - PM, LDTO, and OTA conduct periodic risk assessments to determine appropriate testing (Pg. 105)
- **Clarified Integrated Testing (Pg. 107)**
 - DOT&E must approve OTAs plan for use of integrated testing data before the start of testing; approval will be based on understanding of the realism of the test scenario(s) used and the pedigree (test conditions and methodologies) of the data

THOUGHTS ABOUT RELIABILITY

- **DTM 11-003- Reliability Analysis, Planning, Tracking, and Reporting – Incorporated into new DoDI 5000.02**
 - Purpose is to enhance reliability in the acquisition process
- **DOT&E FY 2012 Annual Report states**
 - *“Inadequate design margins and systems management combine to account for 76% of the root causes for reliability failures...”*

THOUGHTS ABOUT RELIABILITY

- **System reliability should always be tracked on the program's Risk Management chart**
- **Use agreed to reliability growth numbers as entrance criteria for OT events**
 - Realistic based on period of the system's life cycle
- **Strongly recommend that all contracts require the system engineering practices of ANSI/GEIA STD-0009**

SPECIAL THOUGHTS ABOUT DT&E

- **Developmental testing is about “can the system perform what we want it to do”, Operational testing is about the mission accomplishment**
 - Realistically stress a system in DT&E
 - Test in mission context as early as practicable
 - Don't send a capability to OT w/o testing properly in DT&E

DT is to LEARN, OT is to CONFIRM

SPECIAL THOUGHTS ABOUT DT&E

- **DT reliability is NOT the same as OT reliability**
 - DT should be a “period of discovery”
 - OT should be a “period of confirmation”
- **Schedule driven is not a path to success**
- **Do not skimp on prototypes or LRIP items**

DT is to LEARN, OT is to CONFIRM

HINTS FROM AN OVERSIGHT PERSPECTIVE

- **Contracting**
 - Incentivize success in the DT&E program
 - Use T&E personnel in developing SOW/RFP and participants on the technical assessment team
 - Clearly define roles & responsibilities during all phases

“Just because you can doesn’t mean you should!” Henry Ford

HINTS FROM AN OVERSIGHT PERSPECTIVE (CONT'D)

- **Requirements**

- Remember, they must be:
 - Measureable
 - Testable
 - Achievable
- Must have a realistic CONOPs and OMS/MPs
- Understand why requirements are requirements and KPPs

“Just because you can doesn’t mean you should!” Henry Ford

HINTS FROM AN OVERSIGHT PERSPECTIVE (CONT'D)

- **Financial Management**

- PM's are worried about cost, schedule, and performance; testers are primarily concerned about performance
- PM must plan to fund ALL T&E activities (Air Force has their own PE)
- Ensure funding, resources, and schedule are well thought out & doable

“Just because you can doesn't mean you should!” Henry Ford

HINTS FROM AN OVERSIGHT PERSPECTIVE (CONT'D)

- **General OT**
 - Consider Operational effectiveness as the “overall degree of mission success of a properly trained and manned unit equipped with a system when employed in the operationally realistic environment planned for its use.”
 - Systems do not have missions
 - Involve the OTA early
 - PM/PEO should know the DOT&E Deputy and Action Officer

HINTS FROM AN OVERSIGHT PERSPECTIVE (CONT'D)

- **Test against a realistic, living, breathing threat intent on winning – the enemy has a vote**
- **Never place a program at unnecessary risk; do not bet a program on a single test**
 - “Everything works in PowerPoint!”
- **Ensure the program is ready before going to operational test before a program is ready**

TEST AND EVALUATION RESOURCES

- **T&E found online at**
 - <http://www.acq.osd.mil/dte-trmc>
- **DOT&E TEMP Guidebook located online at**
 - <http://www.dote.osd.mil/docs/Defense-Acquisition-Guidebook.pdf>
- **The new Milestone Document Identification (MDID) tool at**
 - <https://dap.dau.mil/mdid>
 - Lets you view and filter a list of documents prescribed by DoDI 5000.02 for programs at specific milestones, and for specific ACAT levels

TEST AND EVALUATION RESOURCES (CONT'D)

- **Aligns with policy and guidance**
 - DoDI 5000.2 – DoDI 5000.02 update this year
 - Defense Acquisition Guide (DAG), chapter 9 -- <https://akss.dau.mil/DAG/DoD5000.asp?view=document>
 - FY 15 DOT&E Annual Report to Congress-
<http://www.dote.osd.mil/pub/reports/FY2015>

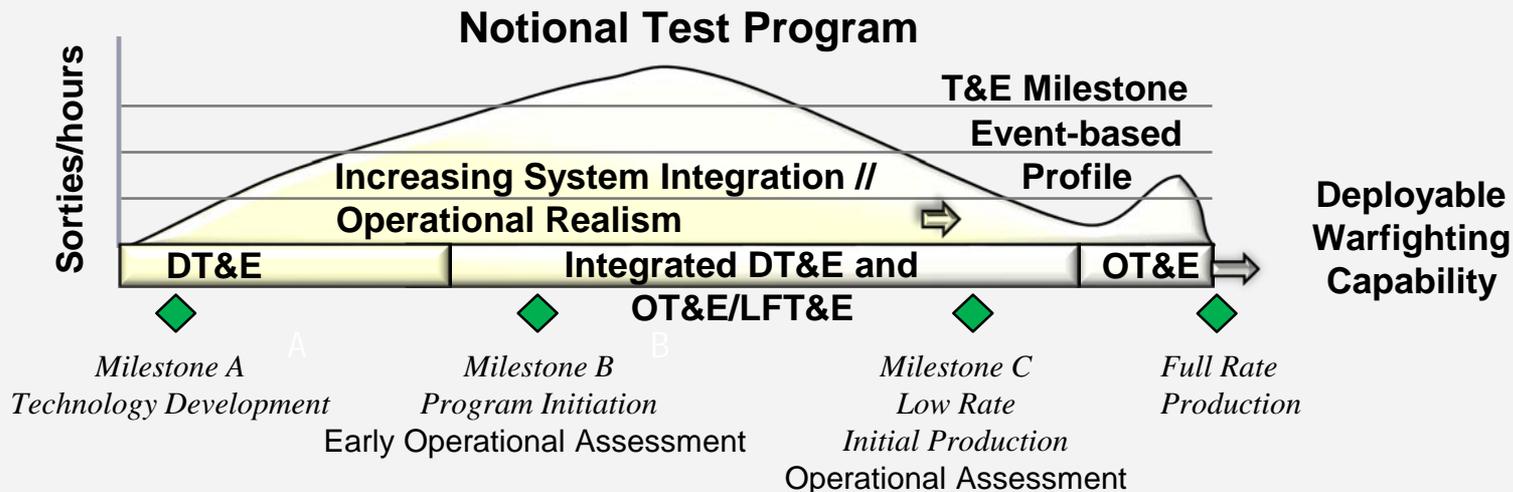




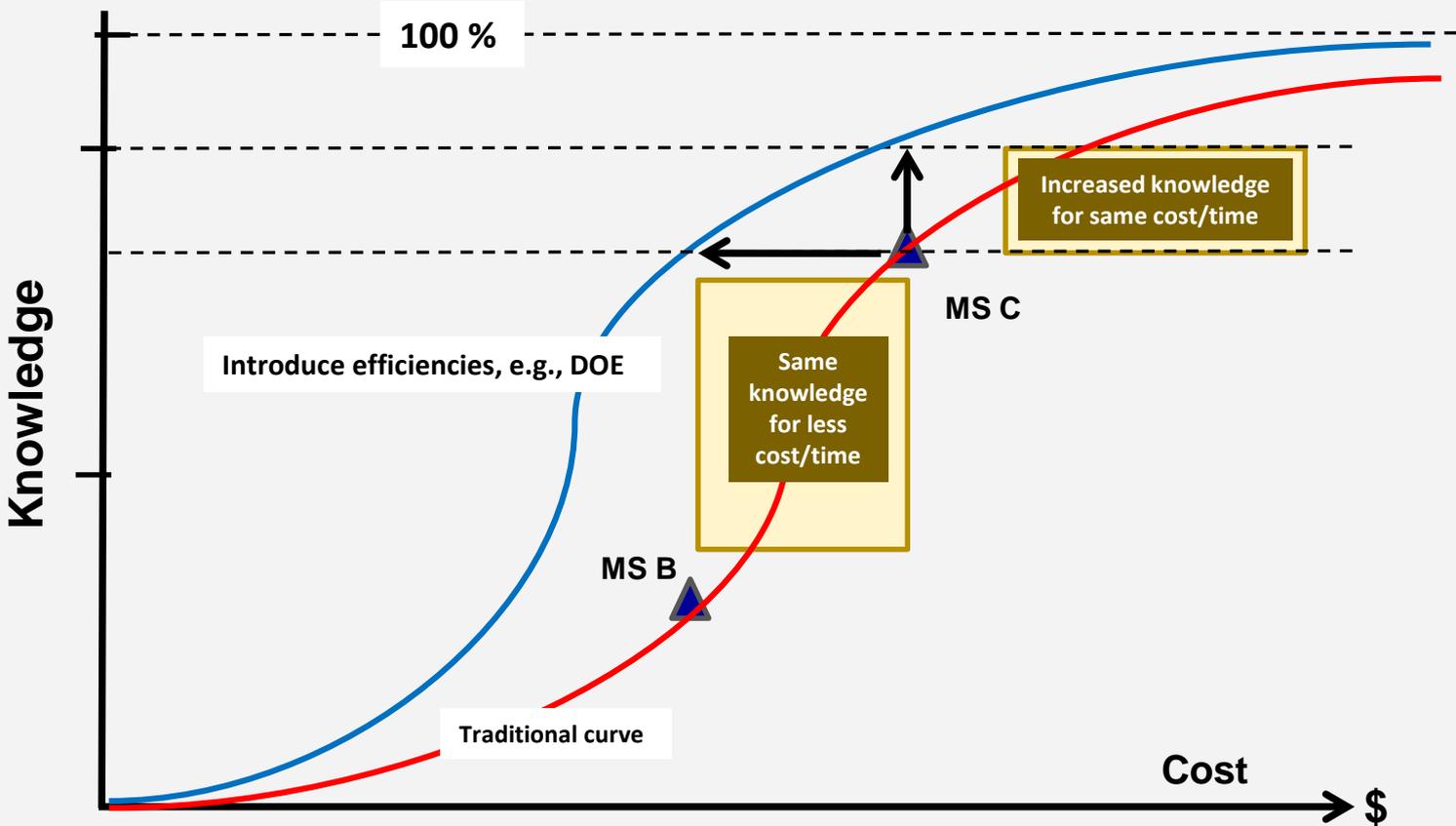
BACK UP

INTEGRATED TESTING

- **Integrated Testing - CT, DT, OT, LFT&E**
 - OT still a requirement
 - Strive for early discovery
 - “Use all the data” to support independent evaluations
 - Mission context



KNOWLEDGE VS. COST



T&E Challenge: most knowledge for the least resources