



Changing The Way DoD Does Business With Respect to Reliability, Availability and Maintainability (RAM)

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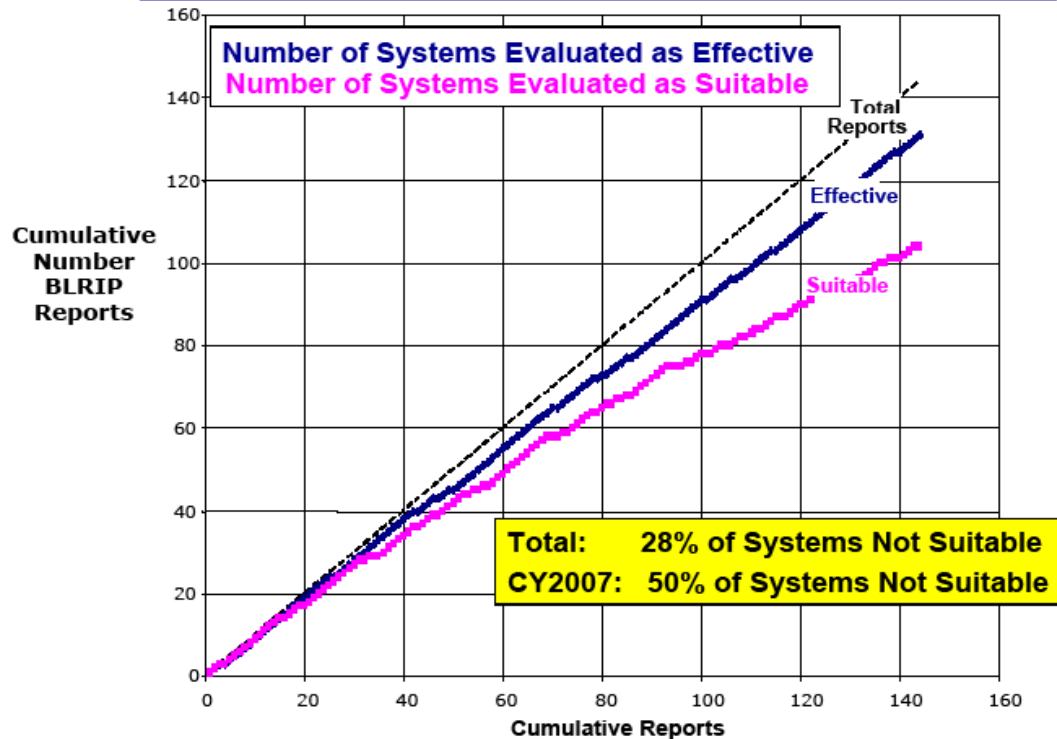
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Problem Statement: Our Systems Do Not Meet Requirements

Cumulative IOT&E Results Thru CY2007



"Operational effectiveness is the overall degree of mission accomplishment of a system when used by representative personnel in the environment planned or expected for operational employment of the system considering organization, doctrine, survivability, tactics, vulnerability and threat.

"Operational suitability is the degree to which a system can be satisfactorily placed in field use, with consideration given to reliability, availability, compatibility, transportability, interoperability, wartime usage rates, maintainability, safety, human factors, manpower supportability, logistics supportability, documentation, training requirements, and natural environmental effects and impacts.



Discussion Topics

- *Defense Science Board (DSB) Task Force on Developmental Test and Evaluation (DT&E)*
- *Reliability Improvement Working Group (RIWG) Charter*
- *RIWG Sub-Group Activities /Achievements*
- *Path Ahead: Desired Outcomes*



DSB Task Force on DT&E Task Force Charter

- ***Assess (from a Test & Evaluation Perspective)***
 - OSD Organizational Roles and Responsibilities
 - Policy and Practices in Oversight of Acquisition Programs
 - Changes required to establish statutory authority for OSD DT&E oversight
 - Initial Operational Test & Evaluation (IOT&E) failures due to lack of Operational Suitability



DSB Task Force on DT&E Task Force Findings

- ***Eight Major Findings***

1. High Suitability failure rates were caused by lack of a disciplined systems engineering process, including a robust reliability growth program, during system development.
2. Workforce cuts in the last ten years had have a significant adverse impact of DoD Acquisition capability.
3. Acquisition personnel reductions combined with loss of guidance documents and retirement of experienced senior industry and government personnel have exacerbated the adverse impact.
4. Strong OSD and Service leadership commitment is vital to solving the major acquisition problems with include widespread suitability deficiencies



DSB Task Force on DT&E Task Force Findings (Continued)

5. The implementation of Acquisition Reform proved flexibility but, when combined with an eroding workforce, sometimes resulted in less discipline in program formulation and execution
6. DT&E needs improvement, but changes in test processes will not remedy systemic program formulation and execution deficiencies
7. Reliability, Availability and Maintainability (RAM) shortfalls are frequently identified in DT, but program constraints (schedule and funding) often preclude incorporating fixes and delaying IOT&E.
8. Additional emphasis on integrated testing will improve T&E process efficiency as well as allow for program cost reductions.

<http://www.acq.osd.mil/sse/dte/docs/USD-ATLMemo-Final-DSB-Rpt-DTE-6Jun08.pdf>



DSB Task Force on DT&E Recommendations

- ***Seven Major Recommendations***

1. Identify and define RAM requirements during the Joint Capabilities Integration Development System (JCIDS), and incorporate them in the Request for Proposal (RFP) as a mandatory contractual requirement
2. During source selection, evaluate the bidders' approaches to satisfying RAM requirements
 - Ensure flow-down of RAM requirements to subcontractors
 - Require development of leading indicators to ensure RAM requirements are met
3. Make RAM, to include a robust reliability growth program, a mandatory contractual requirement and document progress as part of every major program review



DSB Task Force on DT&E Recommendations (Continued)

4. Ensure that a credible reliability assessment is conducted during the various stages of the technical review process and that reliability criteria are achievable in an operational environment
5. Strengthen program manager accountability for RAM-related achievements
6. Develop a military standard for RAM development and testing that can be readily referenced in future DoD contracts
7. Ensure an adequate cadre of experienced RAM personnel is part of the Service acquisition and engineering office staffs



DUSD(A&T) / DOT&E Memo 15 Feb 2008

- ***Noted Defense Science Board Task Force on Developmental T&E Findings***
 - “...poor operational suitability primarily as a result of RAM deficiencies”
 - “...appropriate time to change how we do business with regard to RAM”
 - ***Established Reliability Improvement Working Group (RIWG)***
 - **WG I** Ensure programs are formulated to execute a viable systems engineering strategy from the beginning, including a reliability growth program, as an integral part of design and development
 - **WG II** Ensure government organizations reconstitute a cadre of experienced T&E and RAM personnel.
 - **WG III** Implement mandated integrated DT and OT, including the sharing and access to all appropriate contractor and government data and the use of operationally representative environments in early testing.
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Work Group I Ensure Program Formulation

- ***USD(AT&L) Memorandum on RAM Policy***
- ***Develop Sample RFP Language***
- ***Facilitate Early RAM Planning***
- ***Develop Standard Evaluation Criteria***



Working Group I

USD(AT&L) Memorandum on RAM Policy

- ***Directs Services To Establish A Reliability Acquisition Policy***
 - Ensure effective collaboration between the requirements and acquisition communities in the establishment of RAM requirements that balance funding and schedule while ensuring system suitability and effectiveness in the anticipated operating environment.
 - Ensure development contracts and acquisition plans evaluate RAM during system design
 - Evaluate the maturation of RAM through each phase of the acquisition life cycle
 - Evaluate the appropriate use of contract incentives to achieve RAM objectives



Working Group I

USD(AT&L) Memorandum on RAM Policy

- ***Outlines USD Policy and Implementing Actions***
 - Integrate RAM within Systems Engineering processes,
 - Document RAM in the Systems Engineering Plan and Life Cycle Sustainment Plan
 - Assess RAM during Technical Reviews, Test & Evaluation and Program Support Reviews
 - Include RAM policy in DoD 5000.2
 - Develop RAM-C Rationale Report Manual
 - Update the Defense Acquisition Guidebook/Directives/Instructions



Working Group I

USD(AT&L) Memorandum on RAM Policy

- ***Defines Desired Outcome***

- Establishing reliability improvement policy in each Service, with appropriate oversight, will better implement the mandatory Materiel Availability Key Performance Parameter (KPP) and Materiel Reliability and Ownership Cost Key System Attributes (KSAs).”



Working Group I References / Hyperlinks

- ***USD(AT&L) Memorandum, Reliability, Availability and Maintainability Policy***
 - <http://www.acq.osd.mil/sse/dte/docs/USD-ATLMemo-RAM-Policy-21Jul08.pdf>
 - ***Sample Reliability Language for DoD Acquisition Contracts***
 - <https://acc.dau.mil/CommunityBrowser.aspx?id=219127&lang=en-US>
 - ***Early Reliability, Availability, and Maintainability Planning***
 - <http://www.acq.osd.mil/sse/docs/RAM-Planning-Template.xls>
 - ***Reliability Section in Defense Acquisition Program Support (DAPS) Assessment Methodology***
 - http://www.acq.osd.mil/sse/docs/DAPS-Subsection-5_2-Suitability-RIWG-Draft-08-15-08.pdf
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Working Group II Ensure Reconstitution of Cadre of Trained RAM / T&E Personnel

- ***Policy to Enable Workforce Reconstitution***
- ***Reconstitute Cadre of RAM and T&E Personnel***
- ***Train and Educate RAM and T&E Workforce***



Working Group II Policy Initiatives

- ***Proposed USD(AT&L) Memorandum to Service Acquisition Executives (In Staffing)***
 - Recognize the value afforded by having RAM and T&E expertise within the workforce by designating RAM and T&E as critical skill sets to be supported and developed by the NDAA 2008 Section 852 fund
 - Use all other means to revitalize RAM and T&E expertise
- ***Desired Outcome:***
 - Enable the Services to establish and staff Centers of Excellence with qualified RAM and T&E personnel
 - Ensure RAM and T&E expertise influence Acquisition programs throughout the Acquisition Process



Working Group II

Workforce 852 Funding Initiatives

In Support of RAM & T&E Critical Competencies

- **Recruiting**

- Recruiting Incentive Program (Hiring Bonus)
- Scholarships, College Student Recruitment, Student Loan Repayment
- Internal Referral Bonus
- Outreach

- **Hiring**

- Increased Number of Interns
- Advanced Skill Hiring and Development

- **Development**

- Talent Management
- Tuition Assistance
- Leadership Development
- Mentoring
- PCS Funding and Bonuses
- Advanced Degree/Sabbatical
- Cross-Training

- **Retention**

- Key Leader Incentive Pay
- Performance/Retention Bonuses

- **Workforce Management**

- Knowledge, Skills and Abilities (KSA)
- Position Descriptions and performance requirements



Working Group II ***Focused RAM and T&E Training Resources***

- ***Defense Acquisition University (DAU)***
 - Current DAU Curriculum
 - Requirements Management Certification Training
 - Targeted Training / Community of Practice / Special Interest Areas
 - ***OSD & Service Sponsored “Near-Term Gap Filler” Courses***
 - Operational Reliability Course
 - AMSAA “1-Day” Road Show
 - Naval Post Graduate School (NPGS)
 - Air Force Institute of Technology (AFIT)
 - US Army Logistics Management College (ALMC)
 - Undergraduate, Graduate and Post Graduate Degrees/Certifications
 - ***Highly Specialized Technical Training***
 - Commercial RAM Software Packages
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Working Group III Policy Initiatives Definition of Integrated Testing

- ***DOT&E / DUSD(A&T) Joint Memorandum 25 Apr 2008***
 - 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 committees.”
 - “The Reliability Improvement Working Group is charged with implementing the mandate to integrate developmental and operational testing and will provide guidance to include this definition in the next update to the Defense Acquisition Guidebook.”



Working Group III Policy initiatives Integrated Test Processes

- ***USD(AT&L) – DOT&E Memorandum***

- Mandates Services incorporate Integrated Test processes into T&E strategies.
 - Developmental and operational test activities shall be integrated and seamless throughout the systems life cycle.
 - To maximize efficiency of the T&E process and more effectively integrate developmental and operational T&E, evaluations shall take into account all available and relevant data and information from contractor and government sources.”



Working Group III DT&E Initiatives

- **Early T&E involvement in requirements and RFP development**
 - DOT&E Apr 17, 2008 Memo “Engagement in the Joint Capabilities Integration and Development System (JCIDS)”
- **Contractual language template for data sharing**
 - Draft T&E Contracting Guide in NDIA SE/T&E review for Industry perceptive
- **Synch the TEMP and Systems Engineering Guide (SEP)**
 - TEMP development via SEP established Program SE Methodology
 - TEMP activities planned to tech reviews and milestones established in SEP
 - Strengthen T&E WIPT link to SE IPTs and Boards
 - T&E value and requirements in reviews
- **New TEMP format and Focus**
 - Crosswalk Of Requirements – COI – MOS – MOE – CTP
 - Mission Oriented Context
 - Integrate Test Planning



RIWG Recommended Actions

- ***Adopt acquisition policy defining a specific early warning mechanism to identify systems that are off-track from reliability objectives***
 - ***Use proposed reliability contract language in solicitations and contracts***
 - ***Use proposed guidance for early RAM planning and evaluation of program compliance***
 - ***Designate “Champions” to sustain reliability initiatives***
 - ***Reconstitute trained RAM and T&E personnel across the workforce***
 - ***Implement integrated T&E policy***
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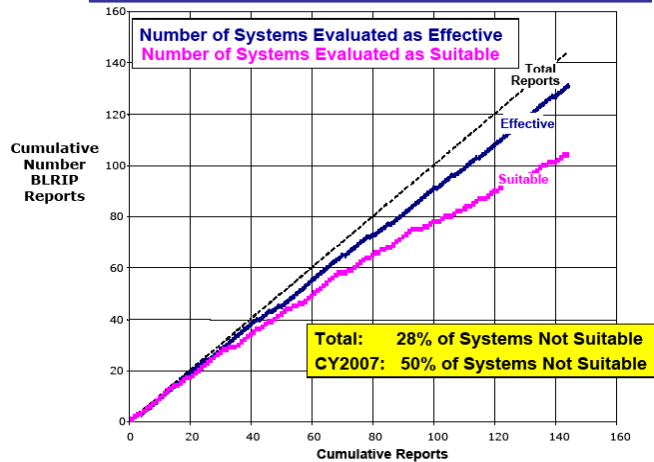


Path Ahead Desired Outcomes

From: Unacceptable Performance

- Lack of robust Systems Engineering Process
- Loss of focus on Reliability Growth
- Loss of Critical RAM and T&E Skills
- Workforce Cuts
- Delayed incorporation of fixes due to program constraints

Cumulative IOT&E Results Thru CY2007



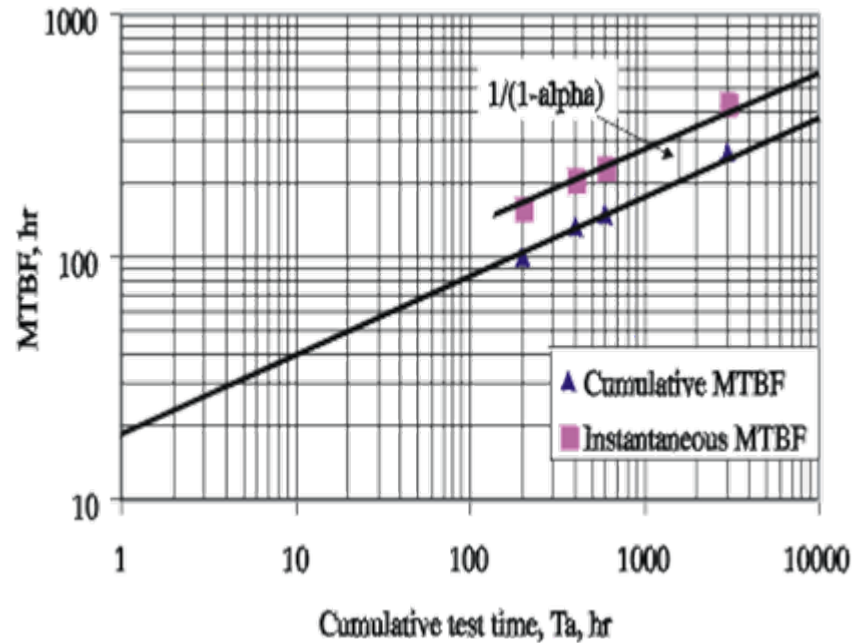
To: Suitable and Affordable Systems

- ★ Life Cycle Focus on RAM and T&E
 - Policy and Guidance
 - Capabilities & Requirements
 - Design Excellence
 - Cutting-Edge Tool Kits
 - Critical Evaluation / Governance
- ★ Highly Trained Workforce
- ★ “Right-Sized” and “Right-Placed” Mix of Skills & Oversight
- ★ Collaborative Environment
 - PM / SE / RAM / T&E / Log
- ★ Full Participation
 - OSD / Services
 - DAU / Universities
 - Industry



Questions ?

- In 1962, J. T. Duane published a report in which he presented failure data of different systems during their development programs. While analyzing the data, it was observed that the cumulative MTBF versus cumulative operating time followed a straight line when plotted on log-log paper.***



Remember. Reflect. Renew.