ASA(ALT)

OFFICE OF THE CHIEF SYSTEMS ENGINEER

RELIABILITY, AVAILABILITY, MAINTAINABILITY (RAM) INITIATIVE

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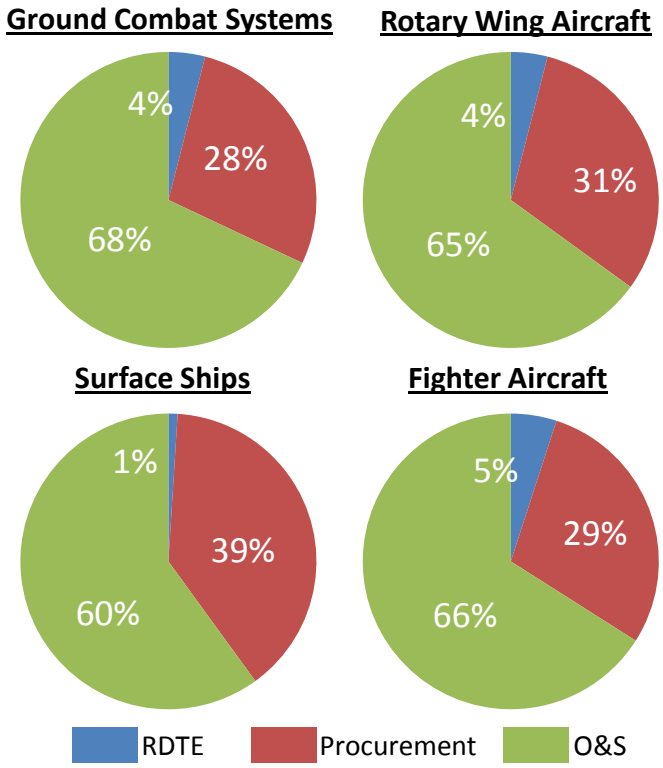
THE CHALLENGE

Operational and Sustainment (O&S) costs dominate total system costs;
close to 65% on average across all DoD acquisitions

One of the major issues across DoD acquisitions is System Reliability

POOR RELIABILITY:

- leads to **higher sustainment costs** for replacement spares, unscheduled maintenance, repair parts, facilities, staff, etc.
- puts additional burden to the user and **hinders warfighter effectiveness** and can essentially render weapons useless.



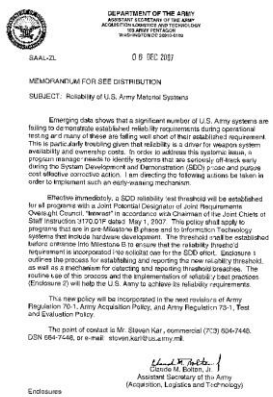
DOD needs systems that are effective when needed;
not just effective when available

ARMY & OSD LEADING THE WAY

Over the past decade, DoD and Army has taken significant steps to improve system Reliability

2007				2008				2009				2010				CY 2011			
1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th

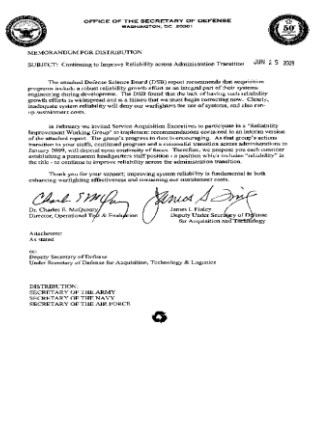
- McQueary DOT&E Priorities
- CJCS 3170.01C JCIDS
- Army Acquisition Policy (Bolton memo)
- Reliability Improvement Working Group
- USD(AT&L) RAM (Young) Memo (in response to DSB)
- DODI 5000.02
- WSARA
- Gilmore DOT&E Initiatives
- DOT&E State of Reliability Memo
- USD (AT&L) DTM 11-003


DEPARTMENT OF THE ARMY

SAAL-ZL

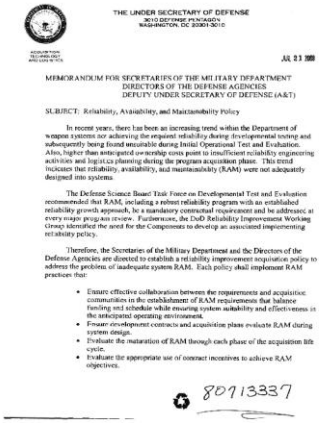
MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Reliability of U.S. Army Materiel Systems


OFFICE OF THE SECRETARY OF DEFENSE

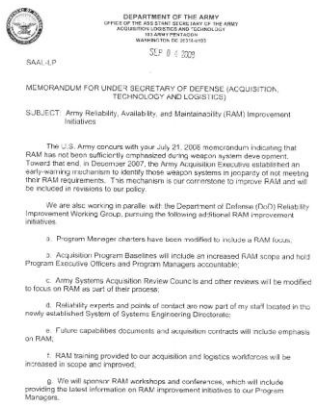
MEMORANDUM FOR DISTRIBUTION

SUBJECT: Continuing to Improve Reliability across Administration Transition


THE UNDER SECRETARY OF DEFENSE

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
DIRECTORS OF THE DEFENSE AGENCIES
DEPUTY UNDER SECRETARY OF DEFENSE (A&T)

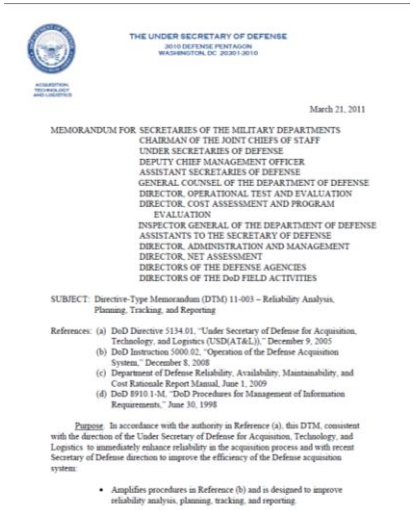
SUBJECT: Reliability, Availability, and Maintainability Policy


DEPARTMENT OF THE ARMY

SAAL-LP

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE (ACQUISITION, TECHNOLOGY AND LOGISTICS)

SUBJECT: Army Reliability, Availability, and Maintainability (RAM) Improvement Initiatives


THE UNDER SECRETARY OF DEFENSE

March 21, 2011

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
CHAIRMAN OF THE JOINT CHIEFS OF STAFF
UNDER SECRETARIES OF DEFENSE
DEPUTY CHIEF MANAGEMENT OFFICER
ASSISTANT SECRETARIES OF DEFENSE
GENERAL COUNSEL OF THE DEPARTMENT OF DEFENSE
DIRECTOR, OPERATIONAL TEST AND EVALUATION
DIRECTOR, COST ASSESSMENT AND PROGRAM EVALUATION
INSPECTOR GENERAL OF THE DEPARTMENT OF DEFENSE
ASSISTANTS TO THE SECRETARY OF DEFENSE
DIRECTOR, ADMINISTRATION AND MANAGEMENT
DIRECTOR, NET ASSESSMENT
DIRECTORS OF THE DEFENSE AGENCIES
DIRECTORS OF THE DoD FIELD ACTIVITIES

SUBJECT: Directive-Type Memorandum (DTM) 11-003 – Reliability Analysis, Planning, Tracking, and Reporting

Examples of Reliability Issues

- During TD Phase, OMS/MP was changed to a much harsher mission profile than what was in the P-Spec for the TD Phase and the change was after vendors had their CDR.
- High reliability requirements coupled with a high statistical confidence requires significant Operational Test Miles.
- Language specific to Reliability Growth Models and use of M&S and test data (Fault tree analysis, Finite Element Analysis) to feed prediction models and FMECA was not in the TD phase RFP.
- Insufficient RAM team structure in the program office. In some cases, one RAM engineer supporting multiple programs and in some cases no official RAM engineer leading the reliability program.
- Test-fix-test mentality; not enough emphasis on Design for Reliability (DfR).

Examples of Reliability Issues

- The identified “Critical functions” do not correctly correlate to the JROC approved CPD KPPs, KSAs or Other System Attributes. The result is a many to many relationship that is difficult to test as currently described versus JROC approved and what was contracted as system performance requirements.
- Common definition of Fully operational and Essential Critical Failures between T&E Community, User Community and Materiel Developer.
- Clear definition of Essential Mission Critical Failure and Software Problem Reports.
- Hard time defining Software Defect Containment Contract Language in the Contract/SOW.

RELIABILITY IMPROVEMENT WORKING GROUP (RIWG)

- ASA(ALT) OCSE has re-established Reliability Improvement Working Group (RIWG) – Aug 2012
- RIWG comprises of members from ASA (ALT) and reliability leads from TRADOC, AEC, AMSAA, PEOs, and RDECs
- Focus of RIWG is to
  - perform detail assessment of RAM efforts through out the acquisition life cycle for the programs that are having reliability issues
  - collect lesson learned
  - unearth systemic root causes for the reliability issues
  - recommend solutions to the leadership that can curb these rising issues

RELIABILITY IMPROVEMENT WORKING GROUP (RIWG)

- Current RIWG Focus in on Five Systemic Army Program Reliability Causal Factors

1. Requirements and Operational Usage Definition;
2. Accurate Cost/Risk Assessments;
3. Accurate TRL Assessments;
4. Failure Definition/Scoring Criteria (FD/SC); and
5. Design for Reliability

PROPOSED RECOMMENDATIONS FOR RELIABILITY IMPROVEMENT

1. Early thorough Assessment of Reliability Requirements:

- After the MDD, there needs to be thorough review of the definition of OMS/MP, Draft CDD, and AoA. Center of Reliability (CRG) growth can provide support, RIWG can coordinate the handshake.
- Reliability needs to be part of the TRL assessments and a key focus area in AoA and for emerging S&T programs.
- Post MS A, review of Reliability KSA and FD/SC.

Need to make sure we are not signing up for unrealistic requirements

PROPOSED RECOMMENDATIONS FOR RELIABILITY IMPROVEMENT

2. Use Reliability Growth Planning Curve to plan and 'track' reliability issues:

- Program Office to establish a Reliability Growth Planning Curve (RGPC)
  - Incorporated in SEP and updated in TEMP
  - O&S costs overlaid on the RGPC
  - Update the RGPC after test events to effectively track reliability
- Establish Early EMD Reliability full-up system-level Developmental Test Threshold, documented in the TEMP.
- Collect developmental test data to provide early indication of reliability problems.

This was part of "Improving the Reliability of US Army Materiel Systems" memo signed by Ms. Shyu (June 2011)

3. Use of Reliability Score Cards as part of Program System Reviews:

- Structured engineering and analytical approach to identify weak performers early in program development, but can also be applied throughout life-cycle of system

- General version along with software specific version
  - Each scorecard divided into multiple categories
  - Each category contains several elements with associated rating criteria

AMSAA-AEC Center of Reliability Growth (CRG) can provide training and also perform an independent assessment

4. Use of Reliability Contract Language:

- Derived Reliability Contractual Language to be used during solicitation and contract execution in the TD phase and further updated in the EMD phase
- Current language focuses on Milestone (MS) B contracts and employs one-time use Data Item Descriptions (DID)
- Good examples: Language used for Joint Effects Targeting System (JETS) & Lightweight Counter Mortar Radar (LCMR) Programs

OTHER CONSIDERATIONS

- **Commander's Critical Information Requirements (CCIR) -** Need for accurate and **early** warnings to HQDA so support can be appropriately provided (if needed).

- Systems are getting vastly complex. Need to look at how to make the systems easier to train and training more efficient. Reduce the number of Failure modes caused by training.

- Leadership engagement is critical.

- Organizations such as various RDECs and AMSAA-AEC CRG are there to provide support in the arena of Reliability Improvement. RIWG can coordinate the handshake.

LONG RANGE

- From lessons learned, need to bin/categorize programs and develop **tailored** Reliability Programs to better help Program Offices execute them.
  - Program offices with software or IT intensive programs have hard time following traditional hardware/vehicle Reliability Program.

- Pulling together the Operational Use data such Conditioned Based Maintenance; “On-time” and “Downtime”; use of Spare Parts for the systems and utilizing it to better define the OMS/MP.

CONTACT INFO

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