R&M: Critical to Success in a Technology Reliant World

Andrew Monje

Office of the Deputy Assistant Secretary of Defense for Systems Engineering

Reliability and Maintainability Symposium

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DASD, Systems Engineering Mission

Systems Engineering focuses on engineering excellence – the creative application of scientific principles:

- To design, develop, construct and operate complex systems
- To forecast their behavior under specific operating conditions
- To deliver their intended function while addressing economic efficiency, environmental stewardship and safety of life and property

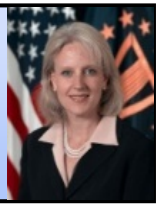
DASD(SE) Mission: Develop and grow the Systems Engineering capability of the Department of Defense – through engineering policy, continuous engagement with component Systems Engineering organizations and through substantive technical engagement throughout the acquisition life cycle with major and selected acquisition programs.

A Robust Systems Engineering Capability Across the Department Requires Attention to Policy, People and Practice

- ***US Department of Defense is the World's Largest Engineering Organization***
- ***Over 108,000 Uniformed and Civilian Engineers***
- ***Over 39,000 in the Engineering (ENG) Acquisition Workforce***

DASD, Systems Engineering

DASD, Systems Engineering
Stephen Welby
Principal Deputy *Kristen Baldwin*

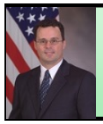


Homeland Defense Capability Development
Robin Hicks

Major Program Support
James Thompson

Supporting USD(AT&L) Decisions with Independent Engineering Expertise

- **Engineering Assessment / Mentoring of Major Defense Programs**
- **Program Support Assessments**
- **Overarching Integrated Product Team and Defense Acquisition Board Support**
- **Systems Engineering Plans**
- **Systemic Root Cause Analysis**
- **Development Planning/Early SE**
- **Program Protection**



Engineering Enterprise
Robert Gold

Leading Systems Engineering Practice in DoD and Industry

- **Systems Engineering Policy and Guidance**
- **Technical Workforce Development**
- **Specialty Engineering (System Safety, Reliability and Maintainability, Quality, Manufacturing, Producibility, Human Systems Integration)**
- **Security, Anti-Tamper, Counterfeit Prevention**
- **Standardization**
- **Engineering Tools and Environments**

Providing technical support and systems engineering leadership and oversight to USD(AT&L) in support of planned and ongoing acquisition programs

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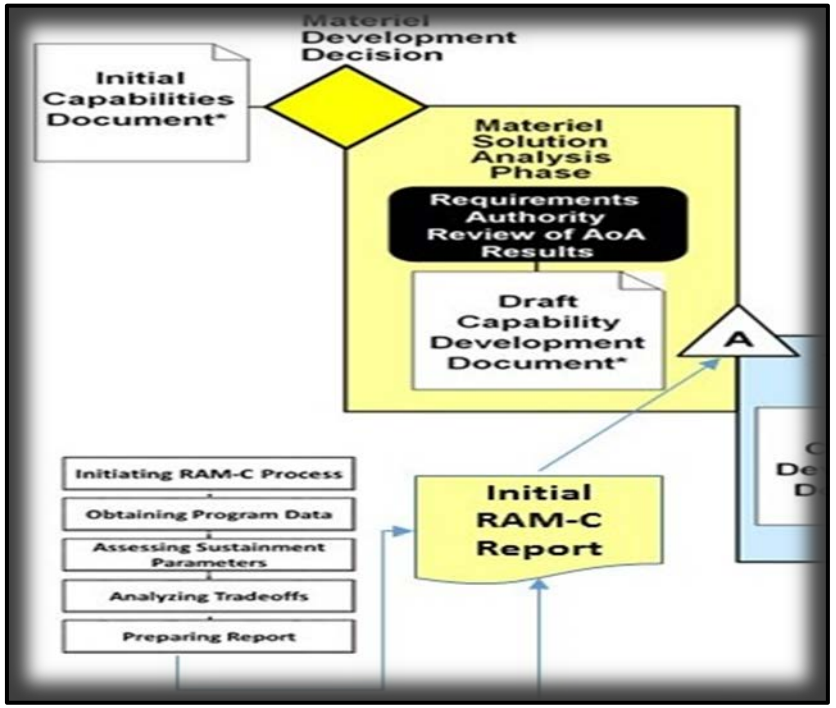
R&M Lessons Learned
"The Deadly Sins"

1. Lack of Management Dedication
2. Lack of Adequate Resources
3. Unrealistic Performance Requirements
4. Unrealistic Schedules
5. Lack of Tailored R&M Engineering Activities
6. Misunderstanding of the differences between Acquisition and Operational (Field) Measures of R&M
7. Inadequate Failure Reporting Analysis and Corrective Action System (FRACAS)

Get Your Requirements Right

- **Provide early R&M assessments of alternative concepts, including early formulation of maintenance and support concepts**
- **Support the Operational Mode Summary/Mission Profile (OMS/MP), Concept of Operations, and maintenance concepts**
- **Ensure correct balance between the R&M, availability, and cost metrics**



OMS/MP Example

Table 1 - Marine Corps and Army Joint Major Combat Ope			
Operational Mode Summery (OMS)		Offense	
Full Spectrum Element MCO War Game Phases	littoral/Air Assult	Movement to contact	A
Duration (hours)	5.7	11.4	1
Distance (miles)	4.6	128.9	1
[illegible] Operations			
Dynamic Operation or Movement Time	0.9	6.4	4
Static Operation or Idle Time	1.2	1.6	2
Total Operating Time (Dynamic + Static)	2.1	8.0	6

Ensuring requirements are realistic and correct can provide early risk reduction

Get Your Requirements Right

- Use the best information available at the time with an understanding of the underlying assumptions.
- Verifies that the definitions of failure for each parameter are understood.
- Develop a model of the composite system based on comparison data and current state of the art, and determine feasibility.
- Conduct comprehensive analysis using techniques appropriate to the information available and acquisition phase. (Analogy, parametric, engineering, M&S)
- Demonstrate an understanding of the alternatives available within the trade space and show how this information is used to make better program sustainment decisions.

Getting the Requirements Right Up-Front will Ensure R&M in a Technology Reliant World