



**Systems Engineering Updates
and
Goals for Parts Management**

October 15, 2009



Institute for Defense Analyses
4850 Mark Center Drive • Alexandria, Virginia 22311-1882

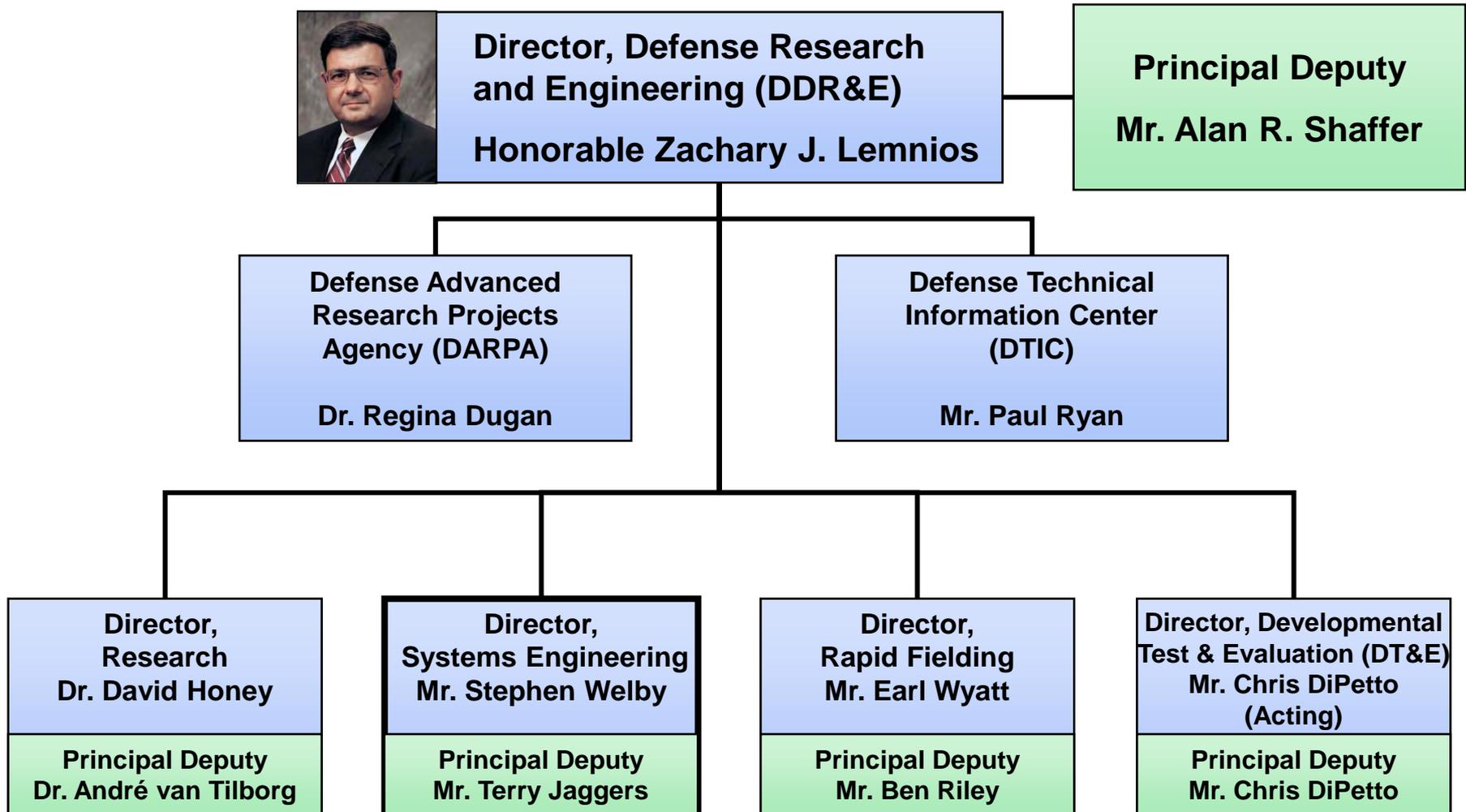
Agenda

- **SE organizational overview**
- **Weapon System Acquisition Reform Act effects on SE**
- **SE goals for DMSMS**
- **SE goals, activities and opportunities for parts management**



Adapted from “Parts Management in Systems Engineering” by Chet Bracuto as presented to the DMSMS and Standardization Conference 24 September 2009

Director, Defense Research & Engineering (DDR&E)



Director, Systems Engineering (DDR&E SE)



Director,
Systems Engineering
Steve Welby

Principal Deputy
Terry J. Jaggers

System Analysis
Kristen Baldwin

- Red teaming
- System trades
- System complexity analysis
- Modeling & Simulation Coordination Office
- Developmental planning
- System of Systems SE
- Program Protection Plan Policy & Guidance/Acquisition Cyber Security
- SE Research Center

Major Program Support
Jim Thompson

- Program Support Reviews
- System Engineering Plans
- Program Auditing functions
- OIPT/DAB/DSAB Support
- DAES Database Analysis and Support
- Measurements and Analysis
- T&E Oversight List

Mission Assurance
Nic Torelli

- SE and SW Policy and Guidance
- Specialty Engineering *Chet Bracuto*
- DoD Standardization Program Office *Greg Saunders*
- Workforce Development
- Mission Assurance Assessment
- Acquisition Reform Planning and Reporting for SE

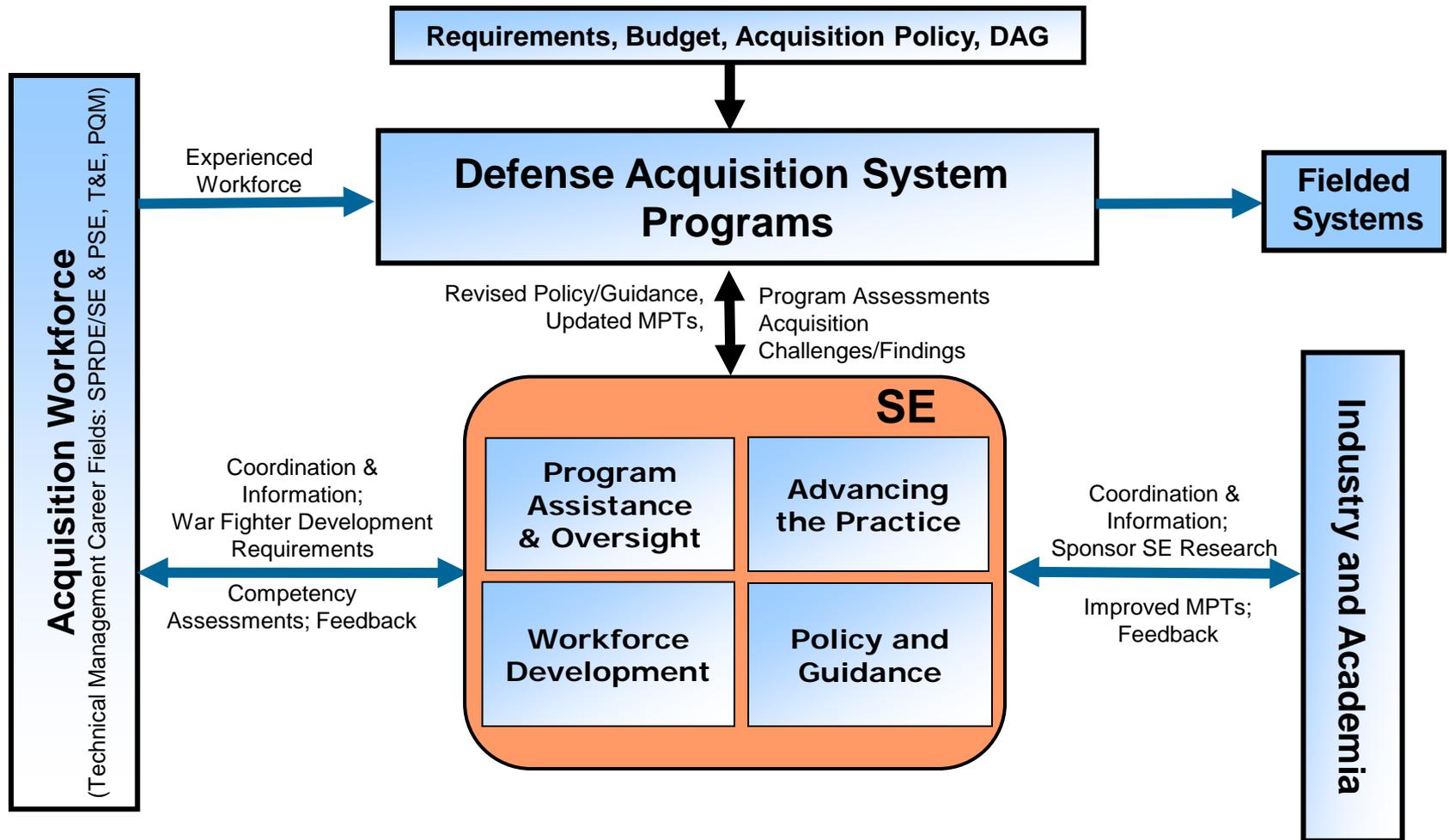
Responsible to provide technical support, systems engineering (SE) oversight, program development and mission assurance certification to USD(AT&L) in support of planned and ongoing acquisition programs

OSD SE Mission Assurance

Specialty Engineering - Chet Bracuto

- **Reliability, Availability, and Maintainability (RAM)** - Chet Bracuto (Grant Schmieder, Ceasar Sharper)
- **Supportability** - Chet Bracuto (Ceasar Sharper)
- **Quality, and Manufacturing and Producibility** - Chet Bracuto (Dr. Jay Mandelbaum, IDA)
- **Parts Management and DMSMS** - Chet Bracuto (Dr. Jay Mandelbaum, IDA)
- **Human Systems Integration (HSI)** - Chet Bracuto (Stuart Booth)
- **Value Engineering (VE)/ Reduction in Total Ownership Cost (RTOC)** - Chet Bracuto (Danny Reed, Dr. Jay Mandelbaum, Dick Roemer IDA)
- **Lean Six Sigma Training & Certification** - Sarah Rogers
- **Modeling & Simulation (M&S)** - Nicholas Torelli (Mike Truelove, Jim Hollenbach, Steve Swensen, Marcy Stutzman)

SE's Methodology and Approach



DAG: Defense Acquisition Guidebook
MPT: Methods, Processes, Tools
TRA: Technology Readiness Assessment

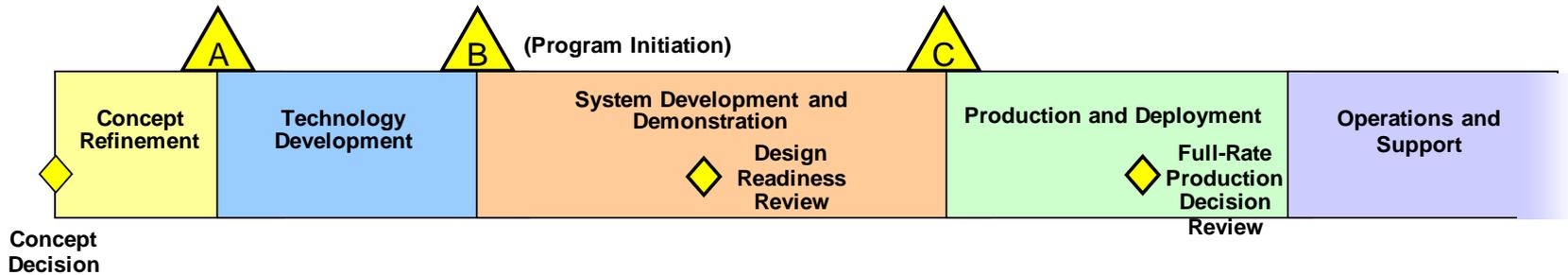
Impacts of New Statute and Policy ...

- **DoD 5000.02 changes (December 2008) emphasize early stages of pre-systems acquisition - prior to Milestone B (MS B)**
 - Reduce risk before making business commitment
 - Improve likelihood of being able to meet these commitments
- **The Weapon Systems Acquisition Reform Act of 2009 (WSARA) furthers this emphasis with additional certification requirements at MS A and B, mandatory competitive prototyping, and system-level Preliminary Design Review before MS B for all Major Defense Acquisition Programs (MDAPs)**

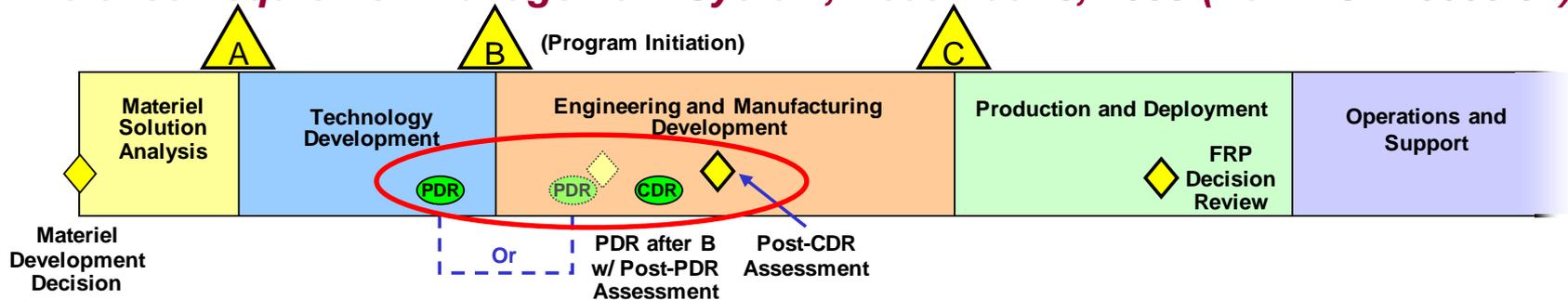
Knowledge-based Acquisition – Starting Programs Right!

Acquisition Lifecycle Comparisons

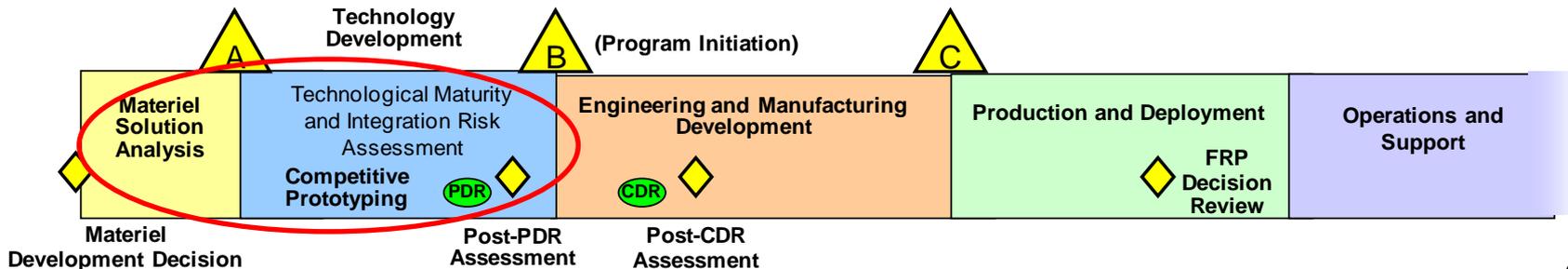
Defense Acquisition Management System, May 12, 2003



Defense Acquisition Management System, December 8, 2008 (new DODI 5000.02)



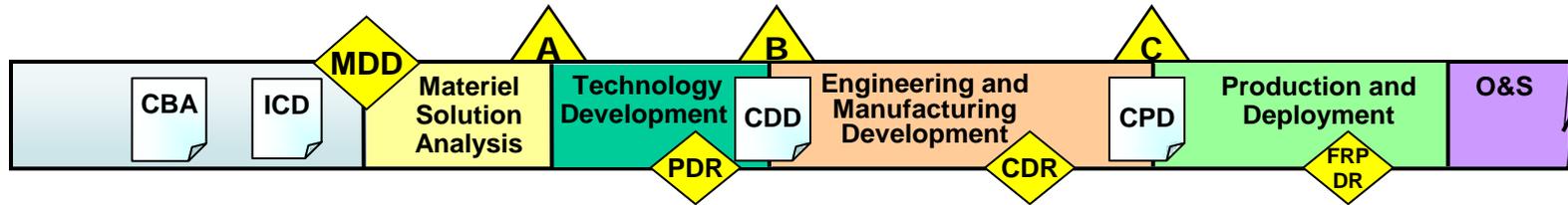
Defense Acquisition Management System, May 22, 2009 (WSARA)



Impact of Acquisition Reform Legislation on Early Acquisition Policy

- Establishes Director, Systems Engineering (D, SE) and Director, Developmental Test and Evaluation (D, DT&E) as principal advisors to the Secretary of Defense and the USD(AT&L) on systems engineering and development planning and on developmental T&E, respectively
- Mandates documented assessment of technological maturity and integration risk of critical technologies for MDAPs during the Technology Development (TD) phase
- Establishes D, DT&E and D, SE joint tracking and Congressional reporting on MDAP achievement of measurable performance criteria
- Mandates competitive prototyping and MDA completion of a formal Post-Preliminary Design Review Assessment for all MDAPs before MS B; additional MDA certification to both at MS B
- Strengthens technical analysis of cost and schedule breaches during the Technology Development (pre-MS B) and the Engineering and Manufacturing Development (post-MS B) phases

New Emphasis on Development Planning and Early SE



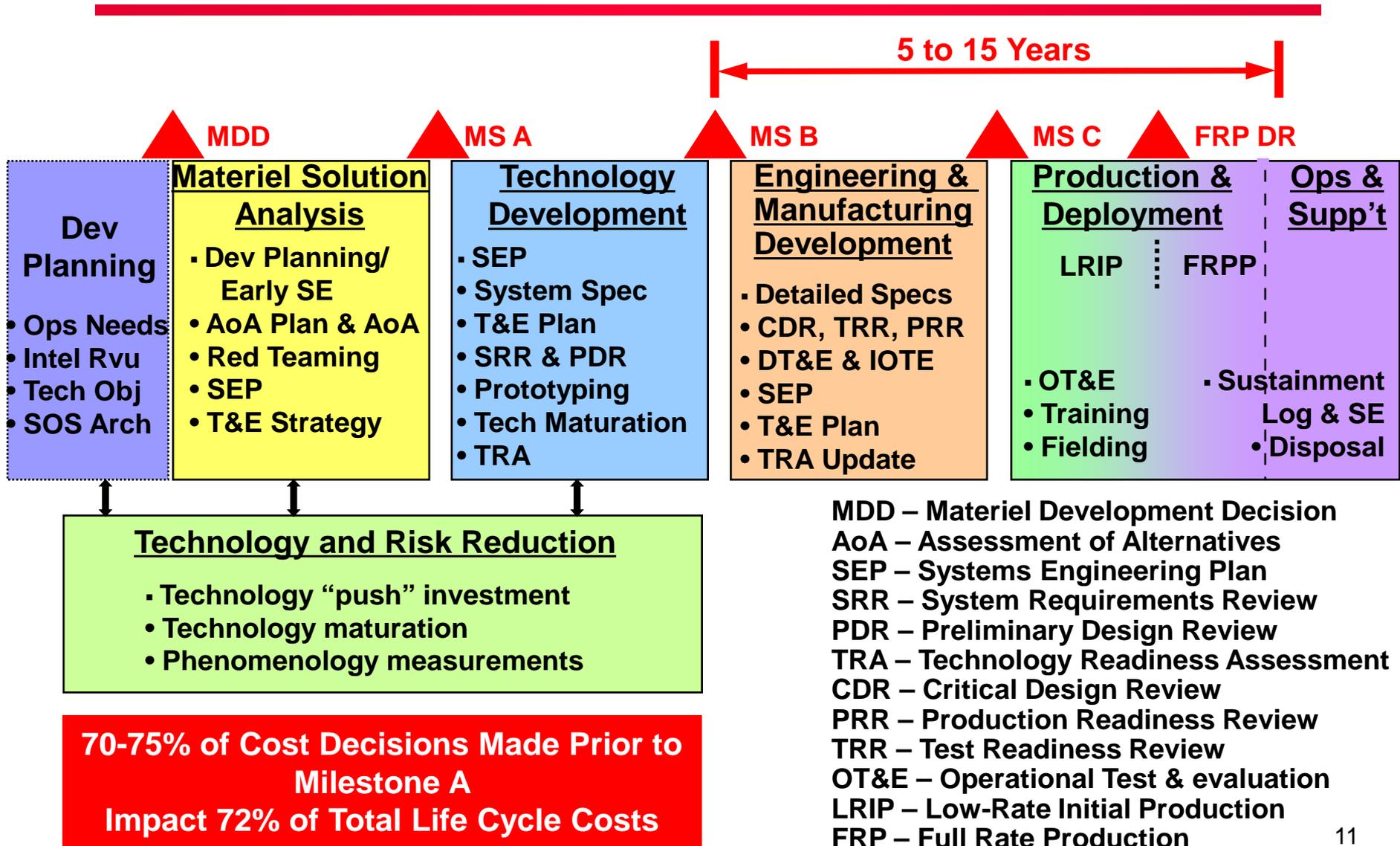
Development Planning

Development



- DP: Development Planning
- DT&E: Developmental Test and Evaluation
- LCS: Life Cycle Sustainment
- SE: System Engineering
- CBA: Capabilities Based Assessment
- CDD: Capability Development Document
- CPD: Capability Production Document
- ICD: Initial Capabilities Document
- MDD: Materiel Development Decision

Defense Acquisition Lifecycle



Defense Acquisition Guidebook

Welcome to the Interim Defense Acquisition Guidebook Homepage [ACC] - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <https://acc.dau.mil/dag>

Browse

ACC Home Up one level

Welcome to the Interim Defense...

- Foreword
- Chapter 1
- Chapter 2
- Chapter 3
- Chapter 4
- Chapter 5
- Chapter 6
- Chapter 7
- Chapter 8
- Chapter 9
- Chapter 10
- Chapter 11
- DoD Directive 5000.01
- DoD Instruction 5000.02

The significant policy revisions associated with the re-issuance of DoD Instruction 5000.02 in December 2008 prompted a complete review and revision of the DAG content. The revised DAG with all the current functionality, and more (including implementation guidance resulting from the Weapon System Acquisition Reform Act of 2009), will be completed and on-line several months from now. While that task is being completed, this site provides an *Interim* DAG with the same business practice and policy content as the final, but with fewer internal and external navigation options. The objective: To provide you with the information you need to manage your programs while we make the DAG more user friendly. We hope you find the *Interim* Guidebook a useful resource and look forward to your feedback.

ACC Practice Center Version 2.0

Local intranet

<https://acc.dau.mil/dag>

DAG Chapter 4 Update for Parts Management

- **An overview of the goals of Parts Management**
 - **Reduce logistics footprint and lower total life cycle costs**
 - **Mitigate parts obsolescence due to DMSMS**
- **What a part is and its relationship to other system elements and CI's**
- **Discussion of parts management strategy**
 - **Consideration over the entire life cycle of a system**
 - **Based on the fundamental SE technical and technical management processes**
 - **Configuration management, technical assessment, decision analysis, design solution, implementation, verification and evaluation at technical reviews**
 - **A Parts Management Plan should be documented in the SE Plan**
- **Parts selection should be based on trade-offs and cost-benefit analysis**
- **References MIL-STD-3018, SD-19 and industry guides for additional implementation details**

Progress has been made, but there is more to do

SE Goals for DMSMS

- **Ensure SE design trades appropriately take DMSMS concerns into consideration**
- **Conduct outreach to PMs and senior leadership on the importance and benefits of a proactive DMSMS approach**
- **Improve the early identification and dissemination of potential DMSMS issues and warnings**
- **Improve the methodological foundation of the DMSMS risk management process**

SE Goals for Parts Management

- **Ensure parts management is adequately reflected in SE policy and guidance**
- **Exploit parts management contributions to manufacturing readiness**
- **Build on the parts management relationship to RAM**
- **Conduct outreach on the importance and benefits of a proactive parts management approach**

Ensure Parts Management is Adequately Reflected in SE Policy and Guidance

- **Current activities**
 - **DAG Chapter 4 completed**
- **Opportunities**
 - **Develop parts management considerations for inclusion in**
 - **DAPS methodology**
 - **SE technical review checklists**
 - **SEP preparation guide**
 - **SE contracting guide**

Exploit Parts Management Contributions to Manufacturing Readiness

- **Current activities**
 - Efforts underway to augment policy on measuring manufacturing risk
 - Handbook on conducting assessments of manufacturing readiness
 - Uses Manufacturing Readiness Levels and manufacturing threads (Technology and the Industrial Base, Design, Cost and Funding, Materials, Process Capability and Control, Quality Management, Manufacturing Personnel, Facilities, Manufacturing Management) as standard measurement criteria
- **Opportunities**
 - Incorporate parts management considerations into the manufacturing threads

Build on the Parts Management Relationship to RAM

- **Current activities**
 - **Substantial activity in RAM community**
 - RAM guide published
 - RAM policy memo issued
 - Sustainment KPP established
 - “How to” standard under development
 - Reliability ROI model in works
 - Reliability readiness levels planned
- **Opportunities**
 - **Parts management considerations need to be integrated in this body of work**
 - **Quantitative measures of effect of parts management on RAM should be calculated**

Conduct Outreach on the Importance and Benefits of a Proactive Parts Management Approach

- **Current activities**
 - **Parts Standardization & Management Committee (PSMC) Conference and other activities**
 - **DAU distance learning course**
 - **MIL-STD-3018 (Parts Management)**
 - **SD-19 (Parts Management Guide)**
 - **Contributions to annual DMSMS and Standardization Conference**
- **Opportunities**
 - **Need to spread the word in other venues**
 - **AT&L Journal**
 - **Industry associations**
 - **Logistics and SE conferences**
 - **PEO/SYSCOM conferences**

Summary

- **Importance of systems engineering (and the specialty engineering disciplines associated with it) to successful acquisition has been recognized; the time is right to emphasize often neglected areas such as DMSMS and parts management**
- **Efforts undertaken to revitalize parts management and its relationship to DMSMS have made substantial progress; work in this area should continue**
- **Additional opportunities to accelerate progress toward revitalizing parts management have been identified; these initiatives need the attention and action of the parts management community**