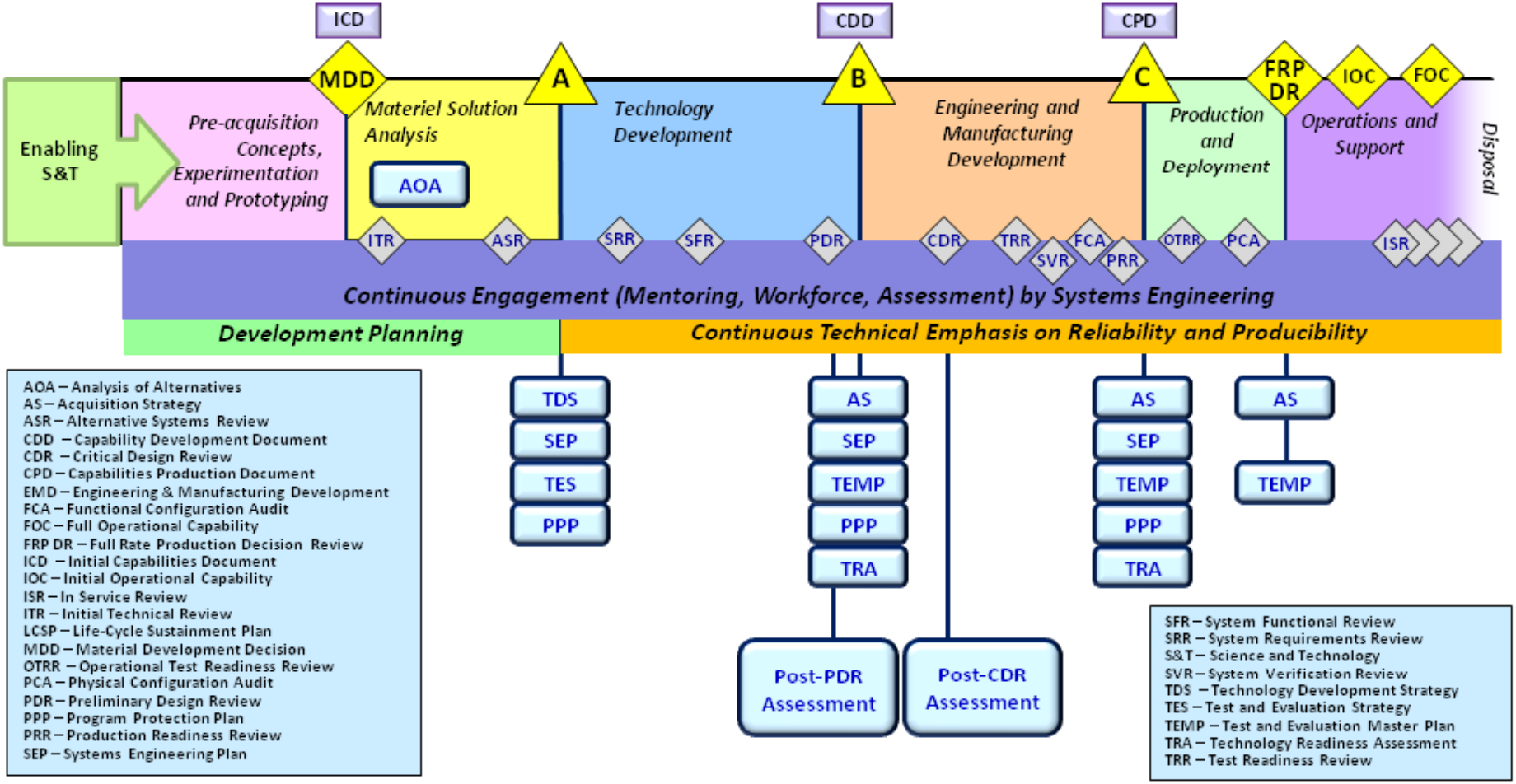
Update on Systems Engineering Policy and Guidance

Nicholas M. Torelli
Director, Mission Assurance
Office of the Deputy Assistant Secretary of Defense for Systems Engineering

14th Annual NDIA Systems Engineering Conference
San Diego, CA | October 26, 2011

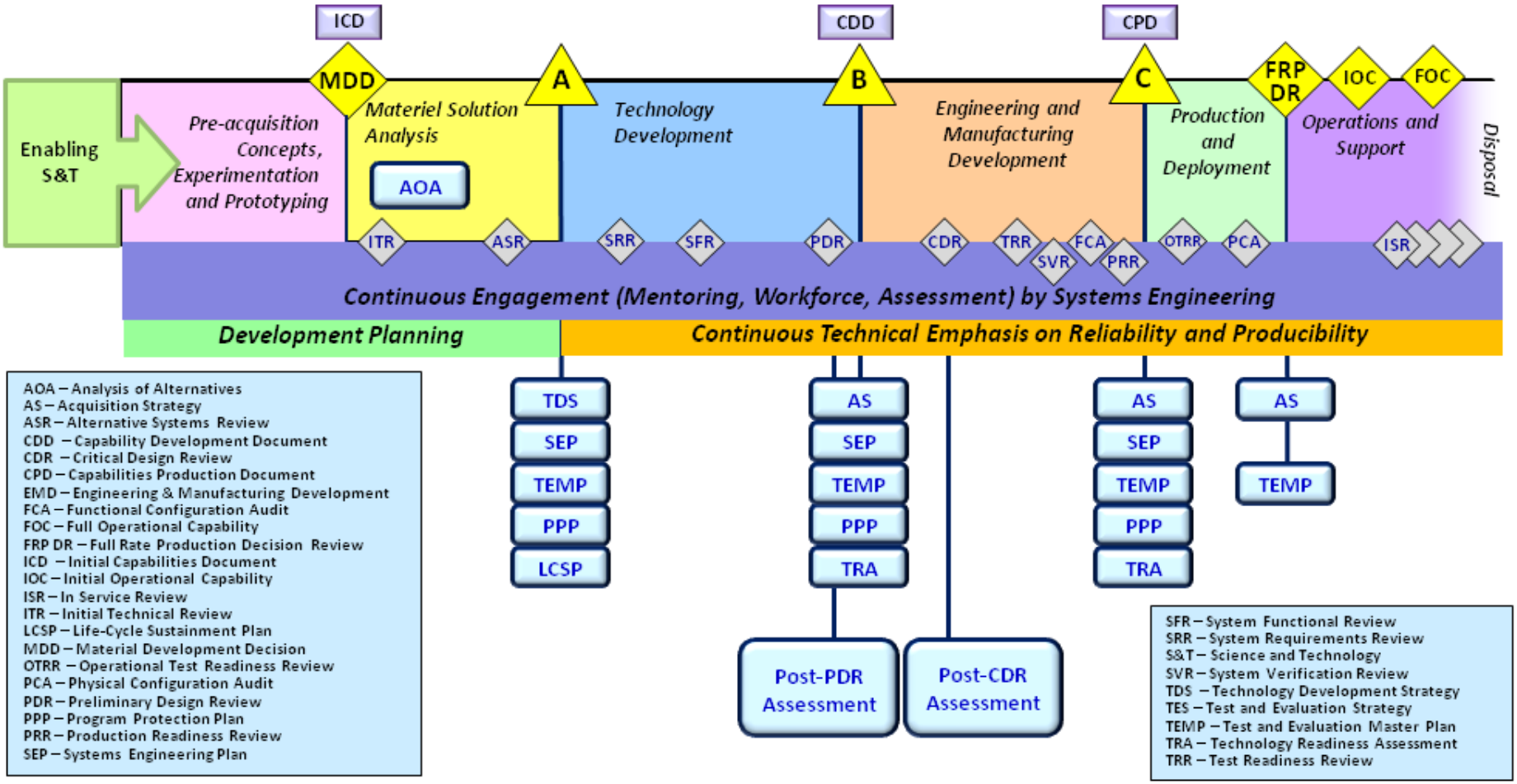
Systems Engineering (SE) Acquisition Process Engagement

Previous Acquisition Process



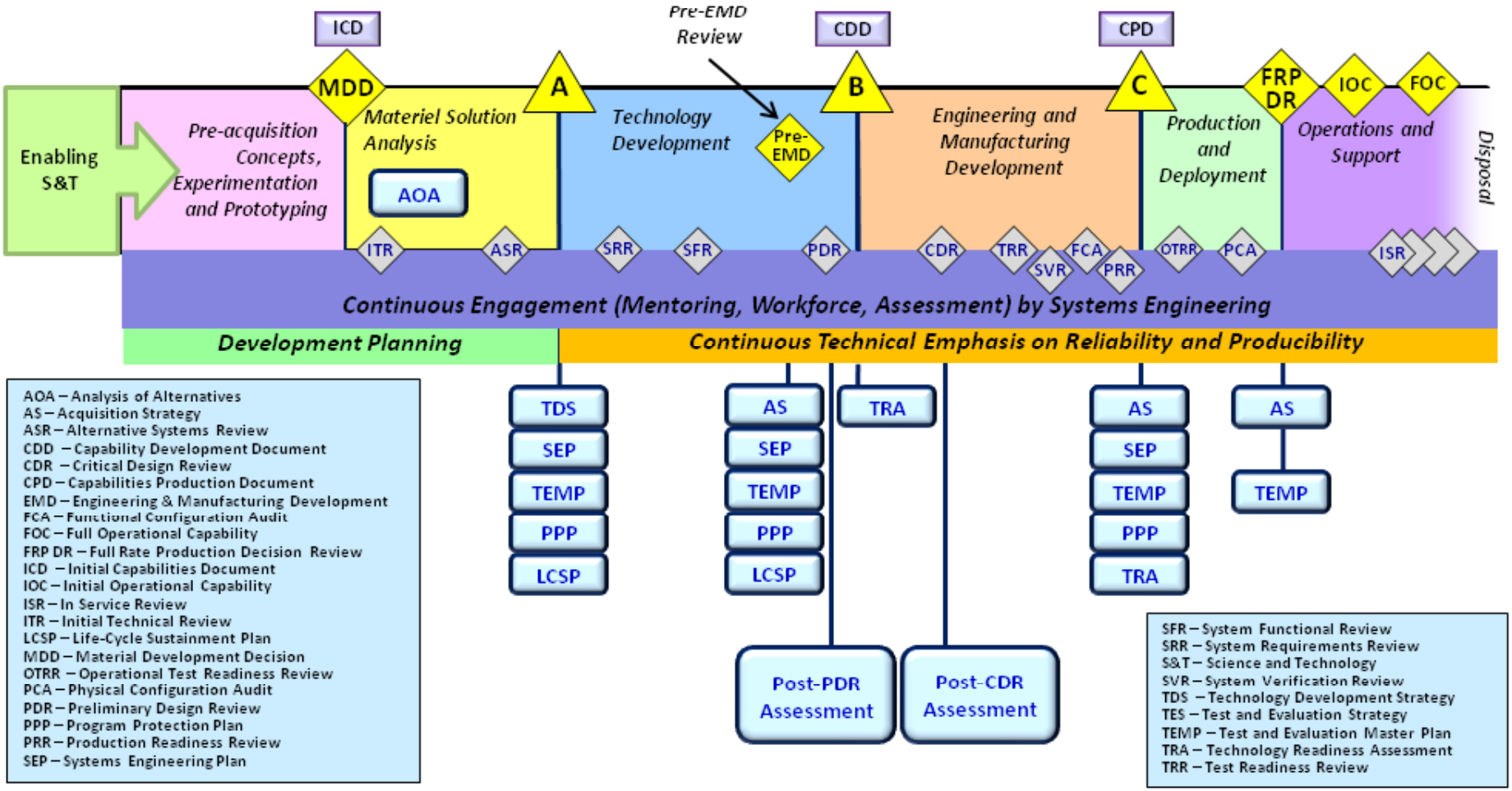
Systems Engineering (SE) Acquisition Process Engagement

Changes to Milestone A



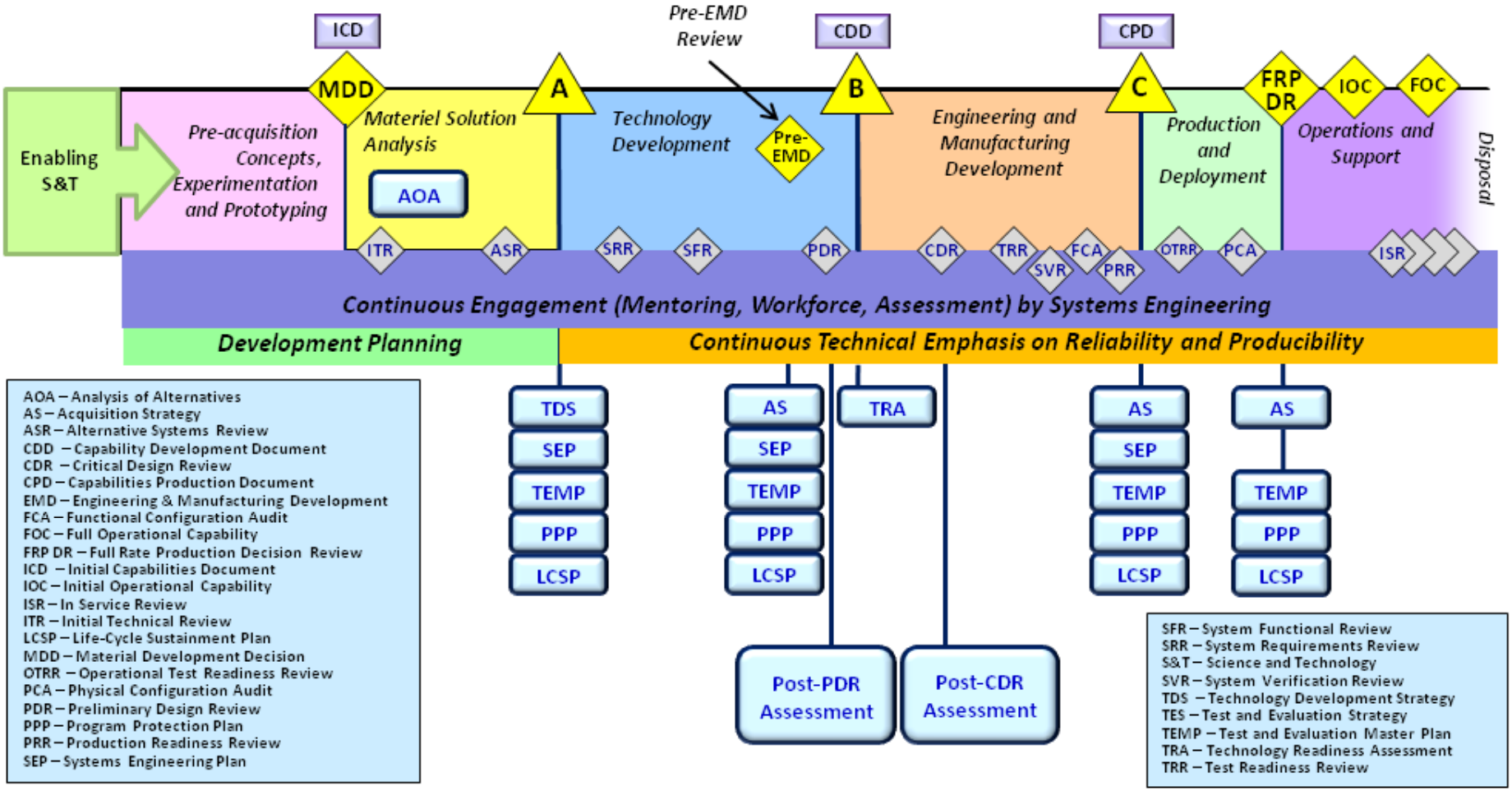
Systems Engineering (SE) Acquisition Process Engagement

Changes to Milestone B



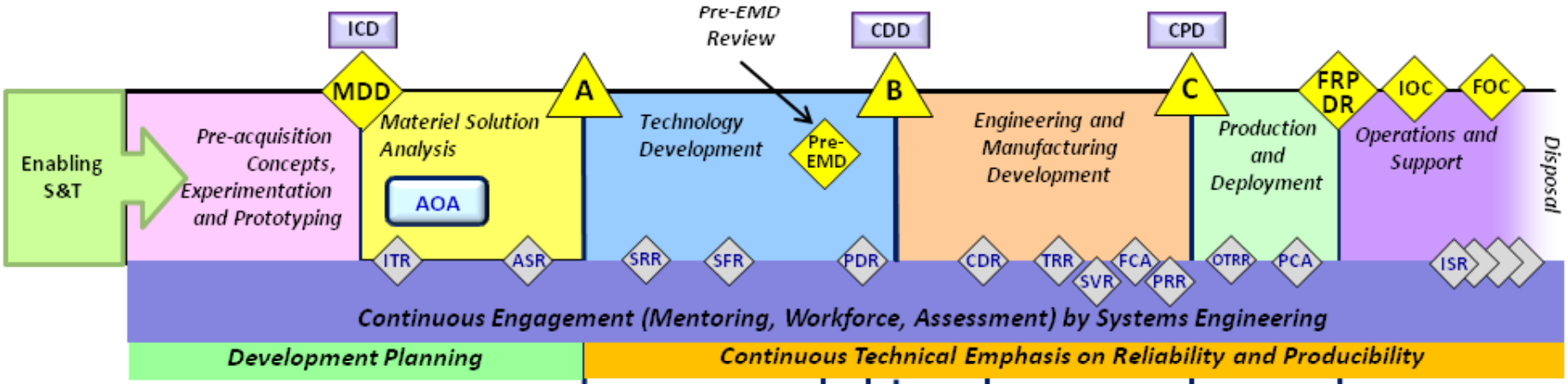
Systems Engineering (SE) Acquisition Process Engagement

Changes to Milestone C



Systems Engineering (SE) Acquisition Process Engagement

Updated Acquisition Process



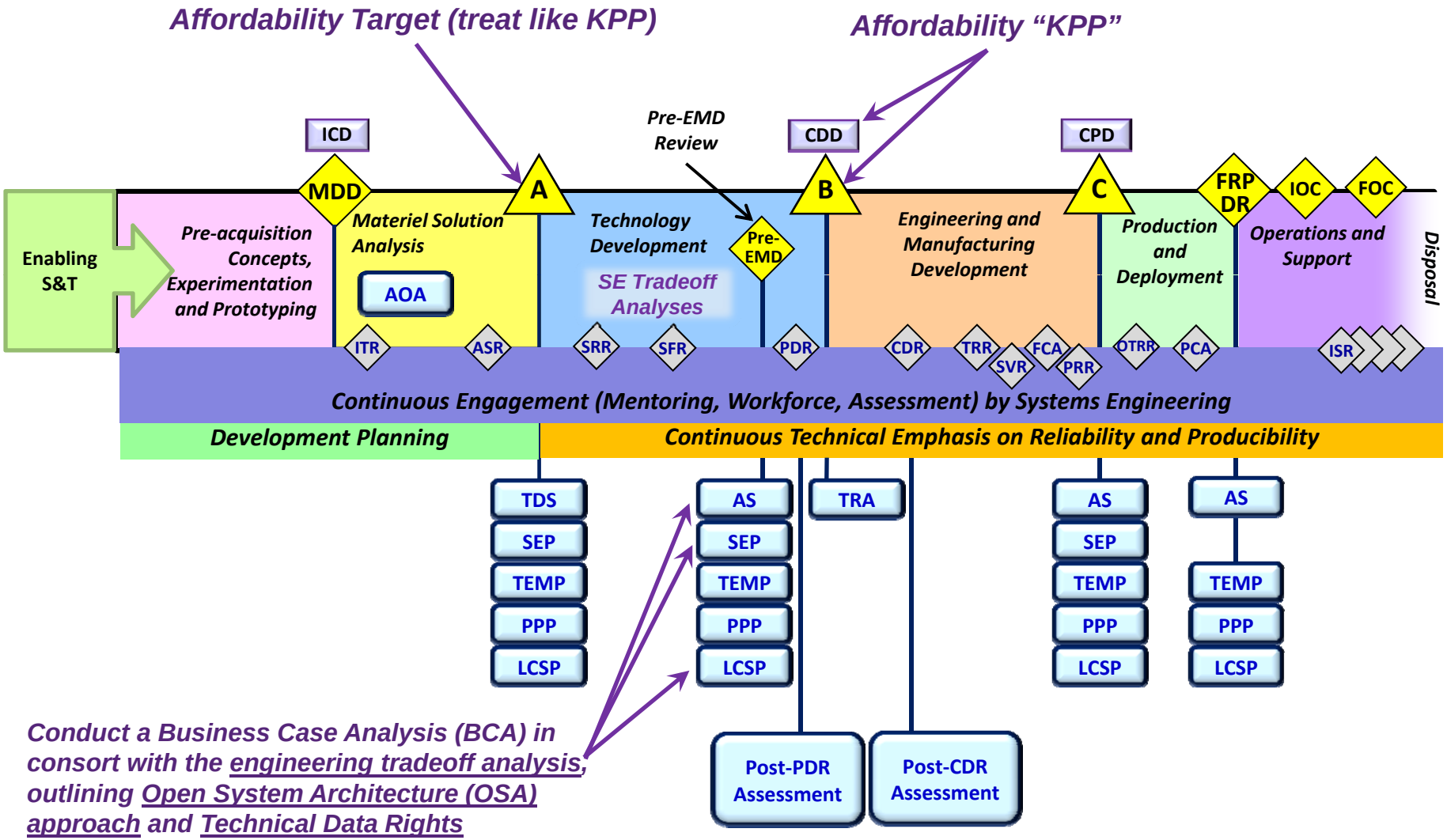
AOA – Analysis of Alternatives
AS – Acquisition Strategy
ASR – Alternative Systems Review
CDD – Capability Development Document
CDR – Critical Design Review
CPD – Capabilities Production Document
EMD – Engineering & Manufacturing Development
FCA – Functional Configuration Audit
FOC – Full Operational Capability
FRP DR – Full Rate Production Decision Review
ICD – Initial Capabilities Document
IOC – Initial Operational Capability
ISR – In Service Review
ITR – Initial Technical Review
LCSP – Life-Cycle Sustainment Plan
MDD – Material Development Decision
OTRR – Operational Test Readiness Review
PCA – Physical Configuration Audit
PDR – Preliminary Design Review
PPP – Program Protection Plan
PRR – Production Readiness Review
SEP – Systems Engineering Plan

SFR – System Functional Review
SRR – System Requirements Review
S&T – Science and Technology
SVR – System Verification Review
TDS – Technology Development Strategy
TES – Test and Evaluation Strategy
TEMP – Test and Evaluation Master Plan
TRA – Technology Readiness Assessment
TRR – Test Readiness Review

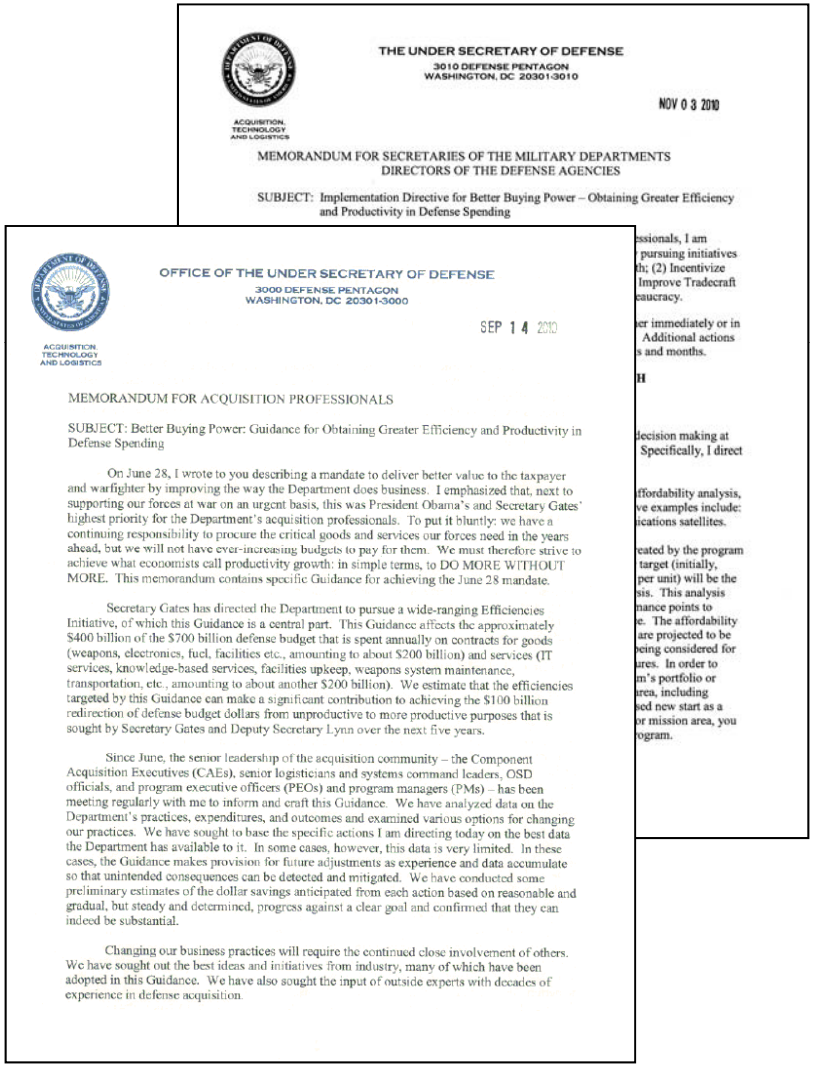
Outline

- Better Buying Power – Obtaining Greater Efficiency and Productivity in Defense Spending
- Acquisition Documentation Streamlining
- Improving Milestone Process Effectiveness
- Other AT&L Initiatives
- New Systems Engineering Policies
- New Systems Engineering Guidance
- Future Policy and Guidance
- Summary

Better Buying Power



Under Secretary (AT&L) Implementation Directive for Better Buying Power



THE UNDER SECRETARY OF DEFENSE
3010 DEFENSE PENTAGON
WASHINGTON, DC 20301-3010

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ACQUISITION, TECHNOLOGY AND LOGISTICS

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
DIRECTORS OF THE DEFENSE AGENCIES

SUBJECT: Implementation Directive for Better Buying Power – Obtaining Greater Efficiency and Productivity in Defense Spending

OFFICE OF THE UNDER SECRETARY OF DEFENSE
3000 DEFENSE PENTAGON
WASHINGTON, DC 20301-3000

SEP 14 2010

ACQUISITION, TECHNOLOGY AND LOGISTICS

MEMORANDUM FOR ACQUISITION PROFESSIONALS

SUBJECT: Better Buying Power: Guidance for Obtaining Greater Efficiency and Productivity in Defense Spending

On June 28, I wrote to you describing a mandate to deliver better value to the taxpayer and warfighter by improving the way the Department does business. I emphasized that, next to supporting our forces at war on an urgent basis, this was President Obama's and Secretary Gates' highest priority for the Department's acquisition professionals. To put it bluntly: we have a continuing responsibility to procure the critical goods and services our forces need in the years ahead, but we will not have ever-increasing budgets to pay for them. We must therefore strive to achieve what economists call productivity growth: in simple terms, to DO MORE WITHOUT MORE. This memorandum contains specific Guidance for achieving the June 28 mandate.

Secretary Gates has directed the Department to pursue a wide-ranging Efficiencies Initiative, of which this Guidance is a central part. This Guidance affects the approximately $400 billion of the $700 billion defense budget that is spent annually on contracts for goods (weapons, electronics, fuel, facilities etc., amounting to about $200 billion) and services (IT services, knowledge-based services, facilities upkeep, weapons system maintenance, transportation, etc., amounting to about another $200 billion). We estimate that the efficiencies targeted by this Guidance can make a significant contribution to achieving the $100 billion redirection of defense budget dollars from unproductive to more productive purposes that is sought by Secretary Gates and Deputy Secretary Lynn over the next five years.

Since June, the senior leadership of the acquisition community – the Component Acquisition Executives (CAEs), senior logisticians and systems command leaders, OSD officials, and program executive officers (PEOs) and program managers (PMs) – has been meeting regularly with me to inform and craft this Guidance. We have analyzed data on the Department's practices, expenditures, and outcomes and examined various options for changing our practices. We have sought to base the specific actions I am directing today on the best data the Department has available to it. In some cases, however, this data is very limited. In these cases, the Guidance makes provision for future adjustments as experience and data accumulate so that unintended consequences can be detected and mitigated. We have conducted some preliminary estimates of the dollar savings anticipated from each action based on reasonable and gradual, but steady and determined, progress against a clear goal and confirmed that they can indeed be substantial.

Changing our business practices will require the continued close involvement of others. We have sought out the best ideas and initiatives from industry, many of which have been adopted in this Guidance. We have also sought the input of outside experts with decades of experience in defense acquisition.

- **Target affordability and control costs**
- **Incentivize productivity and innovation in industry**
- **Promote real competition**
- **Improve tradecraft in service acquisition**
- **Reduce non-productive processes and bureaucracy**

"Better Buying Power" Guidance Roadmap

Target affordability and control cost growth

- ***Mandate affordability as a requirement***
- ***Implement "should cost" based management***
- Eliminate redundancy within war-fighter portfolios
- Achieve stable and economical production rates
- ***Manage program timelines***

Incentivize productivity & innovation in industry

- Reward contractors for successful supply chain and indirect expense management
- Increase use of FPIF contract type
- Capitalize on progress payment structures
- Institute a preferred supplier program
- Reinvigorate industry's independent research and development

Promote real competition

- Emphasize competitive strategy at each program milestone
- Remove obstacles to competition
  - Allow reasonable time to bid
  - Require non-certified cost and pricing data on single offers
  - ***Enforce open system architectures and set rules for acquisition of technical data rights***
- Increase small business role and opportunities

Improve tradecraft in acquisition of services

- Assign senior managers for acquisition of services
- Adopt uniform services market segmentation (taxonomy)
- Address causes of poor tradecraft
  - Define requirements and prevent requirements creep
  - Conduct market research
- Increase small business participation

Reduce non-productive processes and bureaucracy

- Reduce frequency of OSD level reviews
- Work with Congress to eliminate low value added statutory requirements
- Reduce the volume and cost of Internal and Congressional Reports
- Reduce non-value added requirements imposed on industry
- Align DCMA and DCAA processes to ensure work is complementary
- Increase use of Forward Pricing Rate Recommendations (FPRRs) to reduce administrative costs

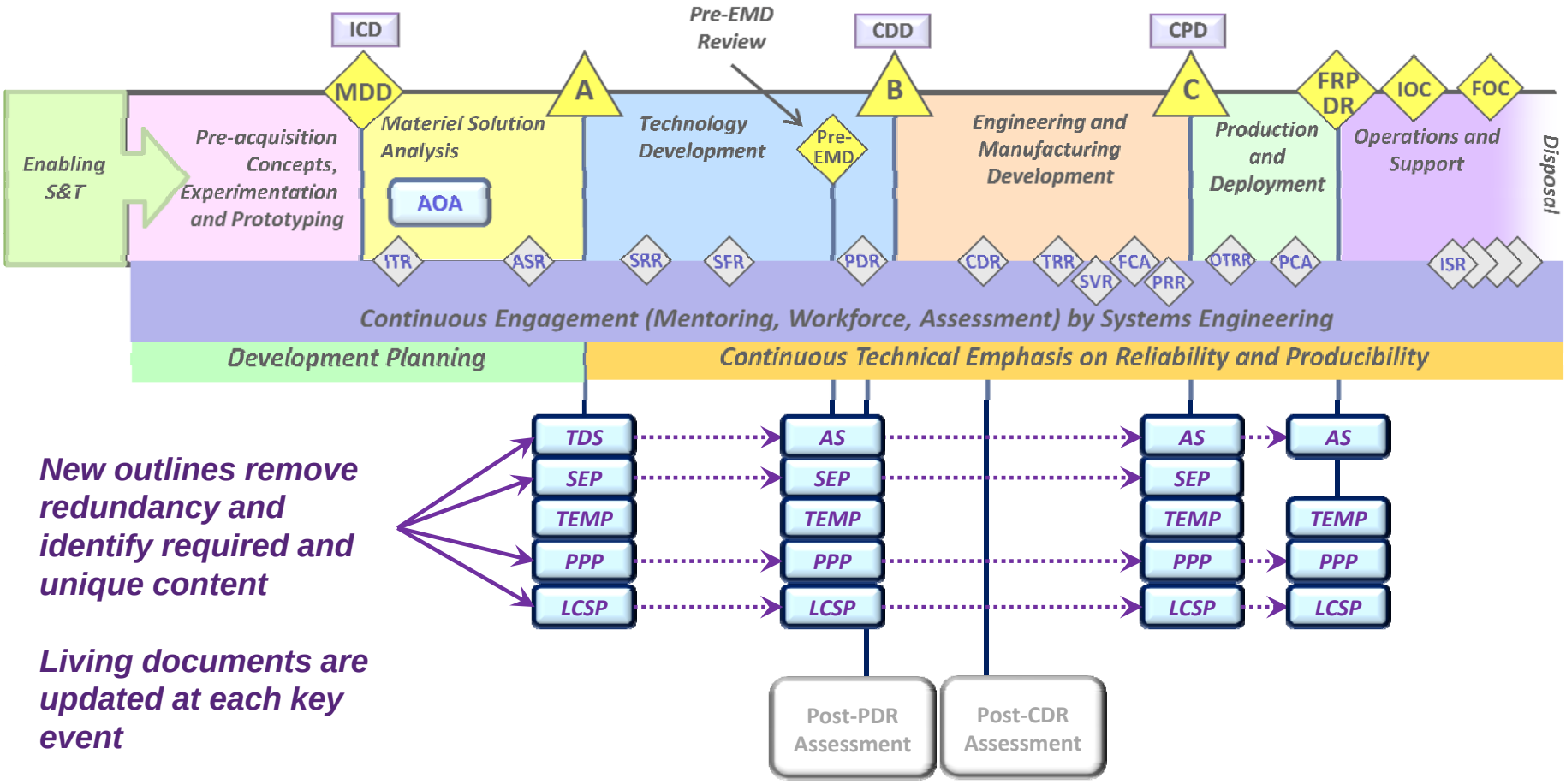
Systems Engineering is key to controlling program costs

Affordability Analyses and Will Cost vs. Should Cost

- **Affordability analyses**
  - ***Prior to Milestone B:*** Define and achieve affordability targets (established quantified goals for unit production costs and sustainment costs driven by what the Department or Service can pay)
  - ***Post Milestone B:*** Define and achieve 'should cost estimates'
- **Will cost**
  - Independent Cost Estimates (ICE) and/or Program Estimates identified early in the program
- **Should cost**
  - A tool to manage all costs, throughout life cycle – identifying reductions and savings against the Will Cost
  - Implements the affordability target as a design constraint (KPP-like)
  - Where SE is critical to meeting cost goals and objectives

Systems Engineer's role is in developing and achieving the "should cost" (Developing DAG guidance)

Acquisition Documentation Streamlining



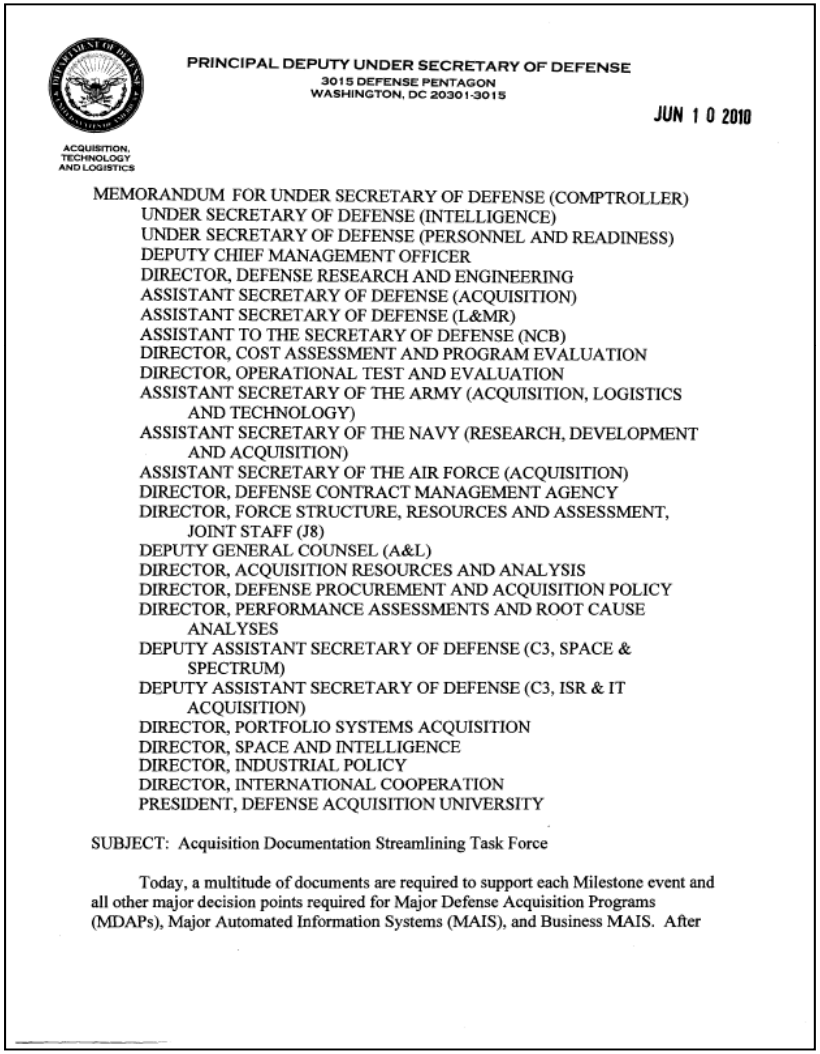
New outlines remove redundancy and identify required and unique content

Living documents are updated at each key event

Acquisition Documentation Streamlining: USD(AT&L) Direction of June 10, 2010

REDUCE NON-PRODUCTIVE PROCESSES AND BUREAUCRACY

- ***Review DAB documentation requirements to eliminate non-relevant content***
- ***Reduce by half, the volume and cost of internal and congressional reports***
  - ***… conduct a bottom-up review of all internally-generated reporting requirements .. by 1 March 2011*…*** **[required by DoD Instruction 5000.02] (Direction to Dir. ARA)**



PRINCIPAL DEPUTY UNDER SECRETARY OF DEFENSE
3015 DEFENSE PENTAGON
WASHINGTON, DC 20301-3015

JUN 10 2010

ACQUISITION, TECHNOLOGY AND LOGISTICS

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE (COMPTROLLER)
UNDER SECRETARY OF DEFENSE (INTELLIGENCE)
UNDER SECRETARY OF DEFENSE (PERSONNEL AND READINESS)
DEPUTY CHIEF MANAGEMENT OFFICER
DIRECTOR, DEFENSE RESEARCH AND ENGINEERING
ASSISTANT SECRETARY OF DEFENSE (ACQUISITION)
ASSISTANT SECRETARY OF DEFENSE (L&MR)
ASSISTANT TO THE SECRETARY OF DEFENSE (NCB)
DIRECTOR, COST ASSESSMENT AND PROGRAM EVALUATION
DIRECTOR, OPERATIONAL TEST AND EVALUATION
ASSISTANT SECRETARY OF THE ARMY (ACQUISITION, LOGISTICS AND TECHNOLOGY)
ASSISTANT SECRETARY OF THE NAVY (RESEARCH, DEVELOPMENT AND ACQUISITION)
ASSISTANT SECRETARY OF THE AIR FORCE (ACQUISITION)
DIRECTOR, DEFENSE CONTRACT MANAGEMENT AGENCY
DIRECTOR, FORCE STRUCTURE, RESOURCES AND ASSESSMENT, JOINT STAFF (J8)
DEPUTY GENERAL COUNSEL (A&L)
DIRECTOR, ACQUISITION RESOURCES AND ANALYSIS
DIRECTOR, DEFENSE PROCUREMENT AND ACQUISITION POLICY
DIRECTOR, PERFORMANCE ASSESSMENTS AND ROOT CAUSE ANALYSES
DEPUTY ASSISTANT SECRETARY OF DEFENSE (C3, SPACE & SPECTRUM)
DEPUTY ASSISTANT SECRETARY OF DEFENSE (C3, ISR & IT ACQUISITION)
DIRECTOR, PORTFOLIO SYSTEMS ACQUISITION
DIRECTOR, SPACE AND INTELLIGENCE
DIRECTOR, INDUSTRIAL POLICY
DIRECTOR, INTERNATIONAL COOPERATION
PRESIDENT, DEFENSE ACQUISITION UNIVERSITY

SUBJECT: Acquisition Documentation Streamlining Task Force

Today, a multitude of documents are required to support each Milestone event and all other major decision points required for Major Defense Acquisition Programs (MDAPs), Major Automated Information Systems (MAIS), and Business MAIS. After

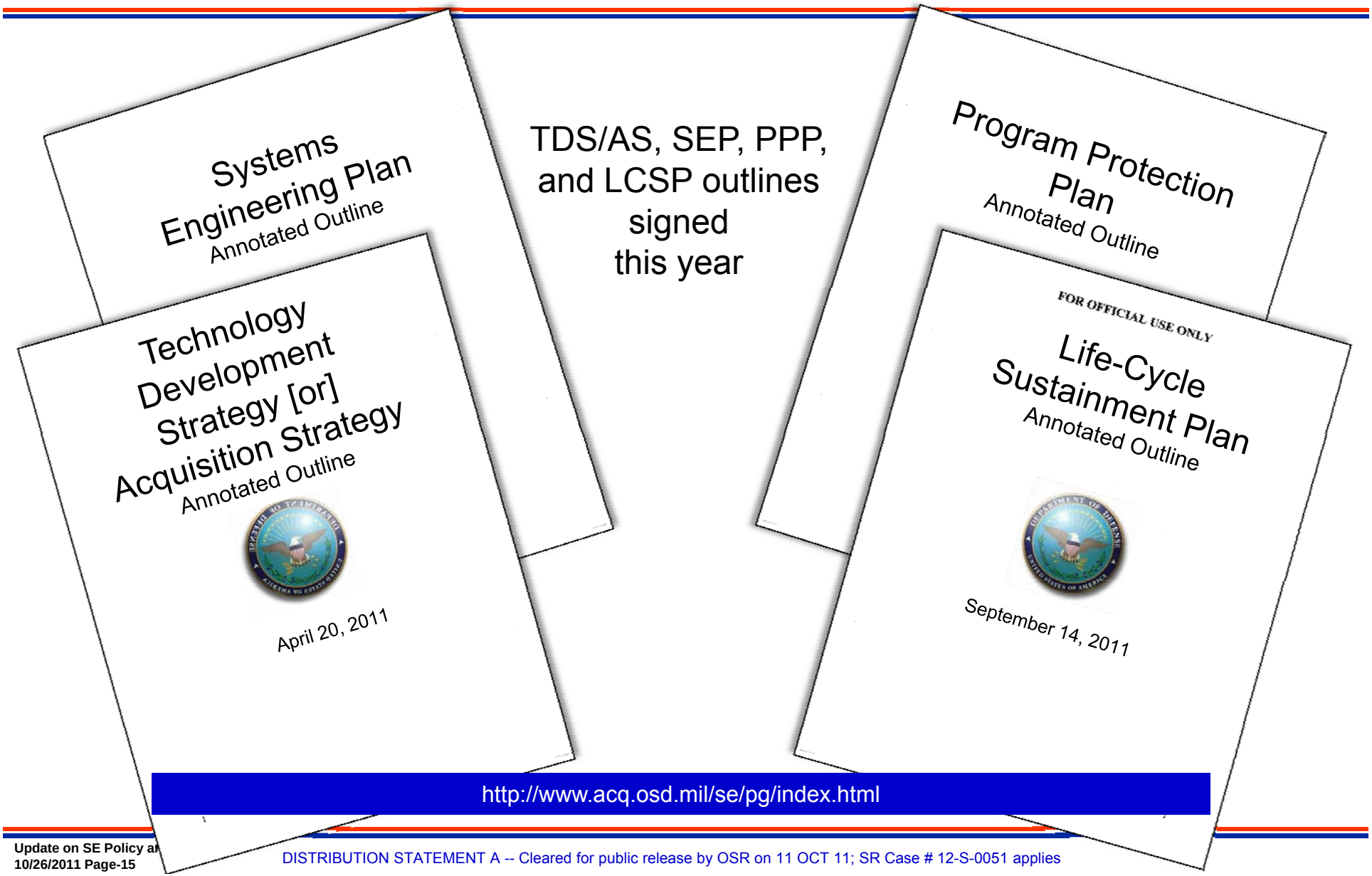
Why Streamline Documentation?

- Prepared for senior management with little meaning for the preparers
- Too many pages; too little or irrelevant content
- Too much duplication of common information
- Insufficient planning and contracting detail
- Accretion of information requirements over time
- Should be applicable at all levels of the Enterprise

INTENT: **Documents that the Program team will actually use to manage their Program:**

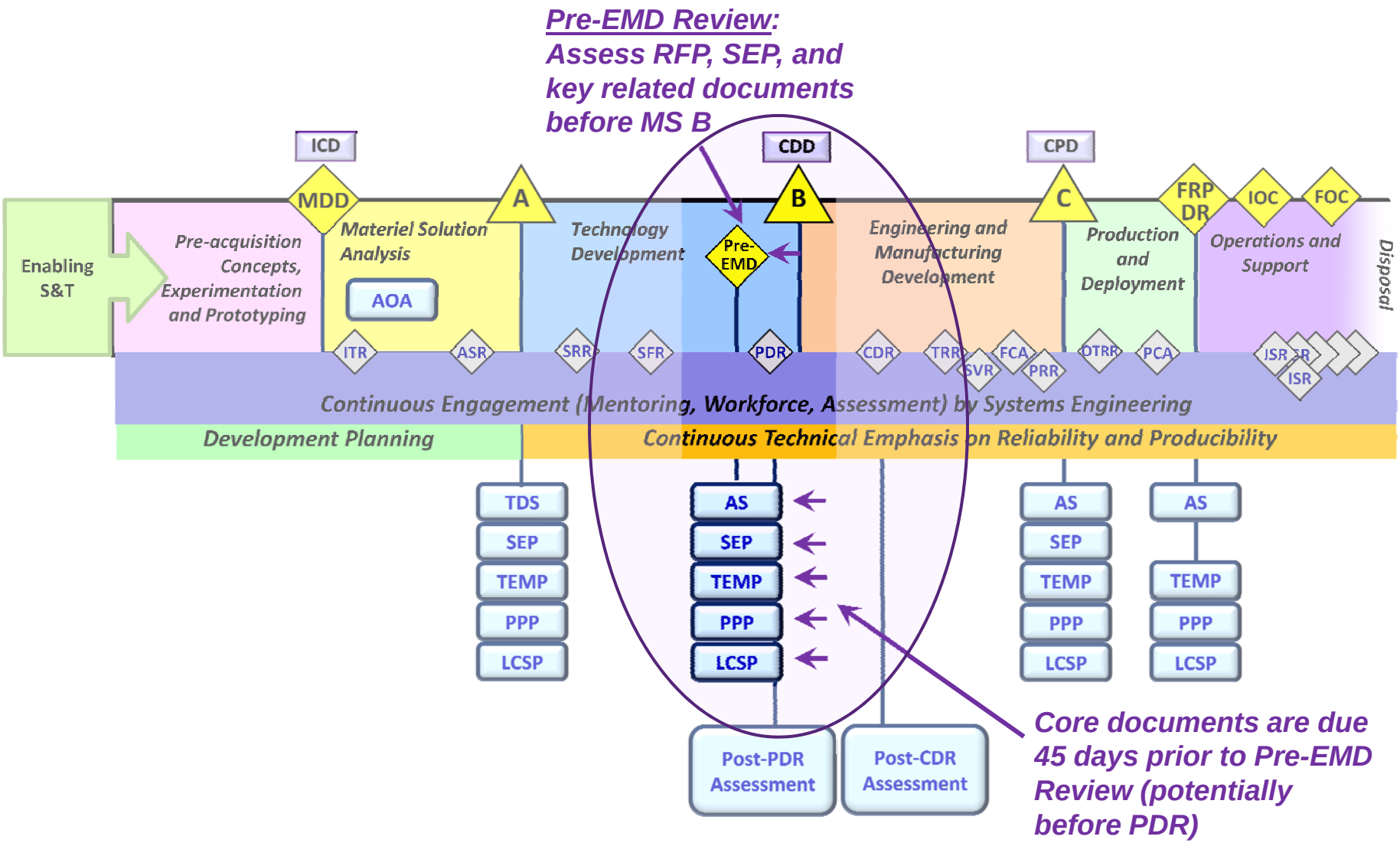
Concept → Design → Sustainment

Annotated Outlines Released as "Expected Business Practice"

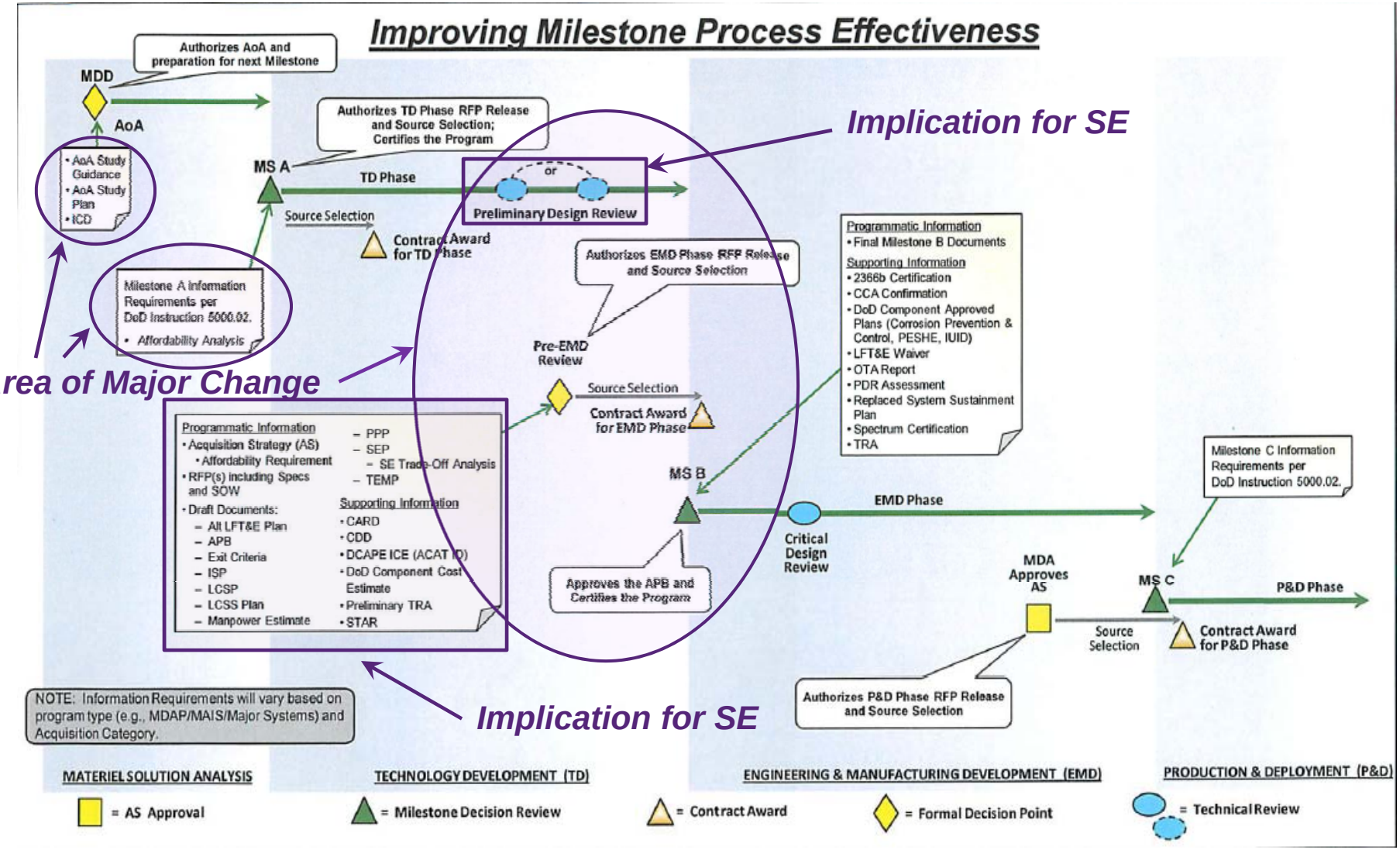


http://www.acq.osd.mil/se/pg/index.html

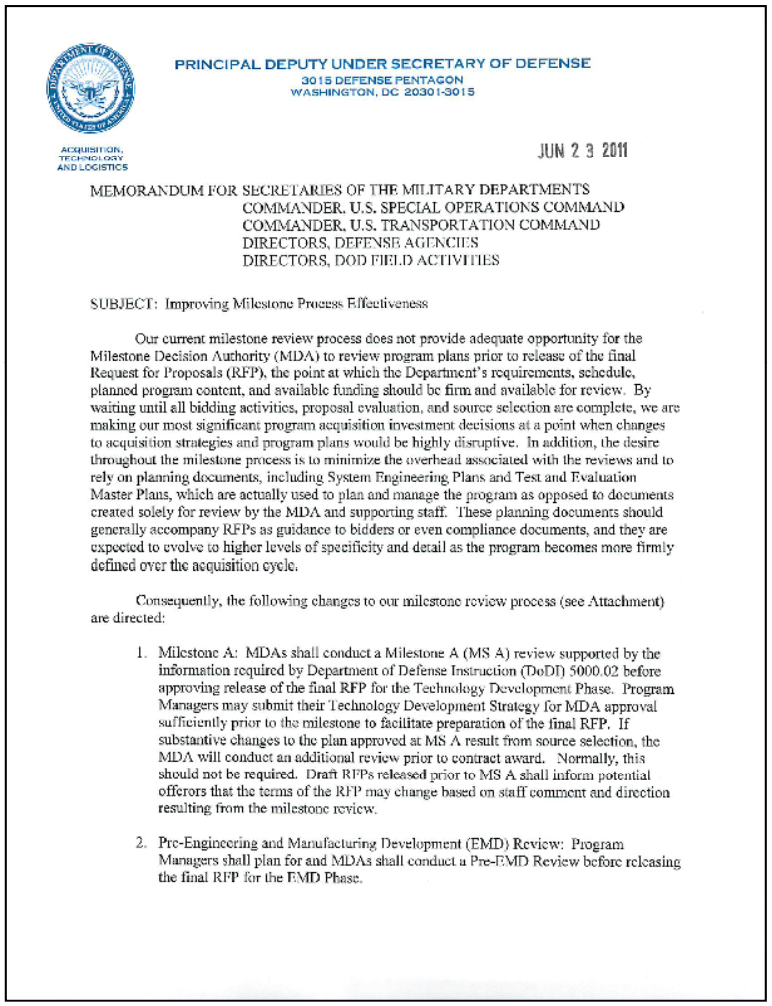
Improving Milestone Process Effectiveness



Dr. Carter's Chart of Updated Milestone Process



Improving Milestone Process Effectiveness



PRINCIPAL DEPUTY UNDER SECRETARY OF DEFENSE
3015 DEFENSE PENTAGON
WASHINGTON, DC 20301-3015

ACQUISITION, TECHNOLOGY AND LOGISTICS

JUN 2 3 2011

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
COMMANDER, U.S. SPECIAL OPERATIONS COMMAND
COMMANDER, U.S. TRANSPORTATION COMMAND
DIRECTORS, DEFENSE AGENCIES
DIRECTORS, DOD FIELD ACTIVITIES

SUBJECT: Improving Milestone Process Effectiveness

Our current milestone review process does not provide adequate opportunity for the Milestone Decision Authority (MDA) to review program plans prior to release of the final Request for Proposals (RFP), the point at which the Department's requirements, schedule, planned program content, and available funding should be firm and available for review. By waiting until all bidding activities, proposal evaluation, and source selection are complete, we are making our most significant program acquisition investment decisions at a point when changes to acquisition strategies and program plans would be highly disruptive. In addition, the desire throughout the milestone process is to minimize the overhead associated with the reviews and to rely on planning documents, including System Engineering Plans and Test and Evaluation Master Plans, which are actually used to plan and manage the program as opposed to documents created solely for review by the MDA and supporting staff. These planning documents should generally accompany RFPs as guidance to bidders or even compliance documents, and they are expected to evolve to higher levels of specificity and detail as the program becomes more firmly defined over the acquisition cycle.

Consequently, the following changes to our milestone review process (see Attachment) are directed:

1. Milestone A: MDAs shall conduct a Milestone A (MS A) review supported by the information required by Department of Defense Instruction (DoDI) 5000.02 before approving release of the final RFP for the Technology Development Phase. Program Managers may submit their Technology Development Strategy for MDA approval sufficiently prior to the milestone to facilitate preparation of the final RFP. If substantive changes to the plan approved at MS A result from source selection, the MDA will conduct an additional review prior to contract award. Normally, this should not be required. Draft RFPs released prior to MS A shall inform potential offerors that the terms of the RFP may change based on staff comment and direction resulting from the milestone review.

2. Pre-Engineering and Manufacturing Development (EMD) Review: Program Managers shall plan for and MDAs shall conduct a Pre-EMD Review before releasing the final RFP for the EMD Phase.

- **Major change occurs to MS B**
  - Pre-Engineering and Manufacturing Development (EMD) Review
    - Assesses the RFP, SEP, and key related documents
    - Documents due 45 days prior to Pre-EMD Review
  - Requires programs to have key planning documents Component approved before MS B
- **Implications to SE**
  - PDR not required before Pre-EMD Review → changes to documents may be required after the PDR
  - Contracting implications regarding multiple PDRs before down select
  - Consistency issue between documents for Pre-EMD Review
  - Simultaneously generating and submitting documents for Component approval

Risk of disconnect between the RFP and the results of the PDR

Other AT&L Initiatives

- **Government Performance of Critical Acquisition Functions: Key Leadership Positions**
  - Program Lead Systems Engineer is a mandatory key leadership position for MDAPs/MAIS (Acquisition Categories I and IA) when the function is required based on the phase or type of acquisition program.
- **Post-Critical Design Review (CDR) Reports and Assessments**

  PD USD(AT&L) Memo of Feb 24, 2011 - **Eliminates the Program Manager's reporting responsibility for the CDR Report**
  - DASD(SE) will participate in all MDAP CDRs and prepare and submit a brief assessment of the program's design maturity and technical risks which may require Milestone Decision Authority (MDA) attention.
- **Improving Technology Readiness Assessment (TRA) Effectiveness**
  - New instructions for conducting TRAs http://www.acq.osd.mil/ddre/publications/docs/TRA2011.pdf
  - Conducted and reported by the PM
  - For MDAPs only, and only at MS B (or subsequent milestone if there is no MS B)

New Systems Engineering Policy

- **DoDI 5134.16, Deputy Assistant Secretary of Defense for Systems Engineering**
- **DTM 11-003, Reliability Analysis, Planning, Tracking, and Reporting**
- **DoDI 4120.24, Defense Standardization Program**

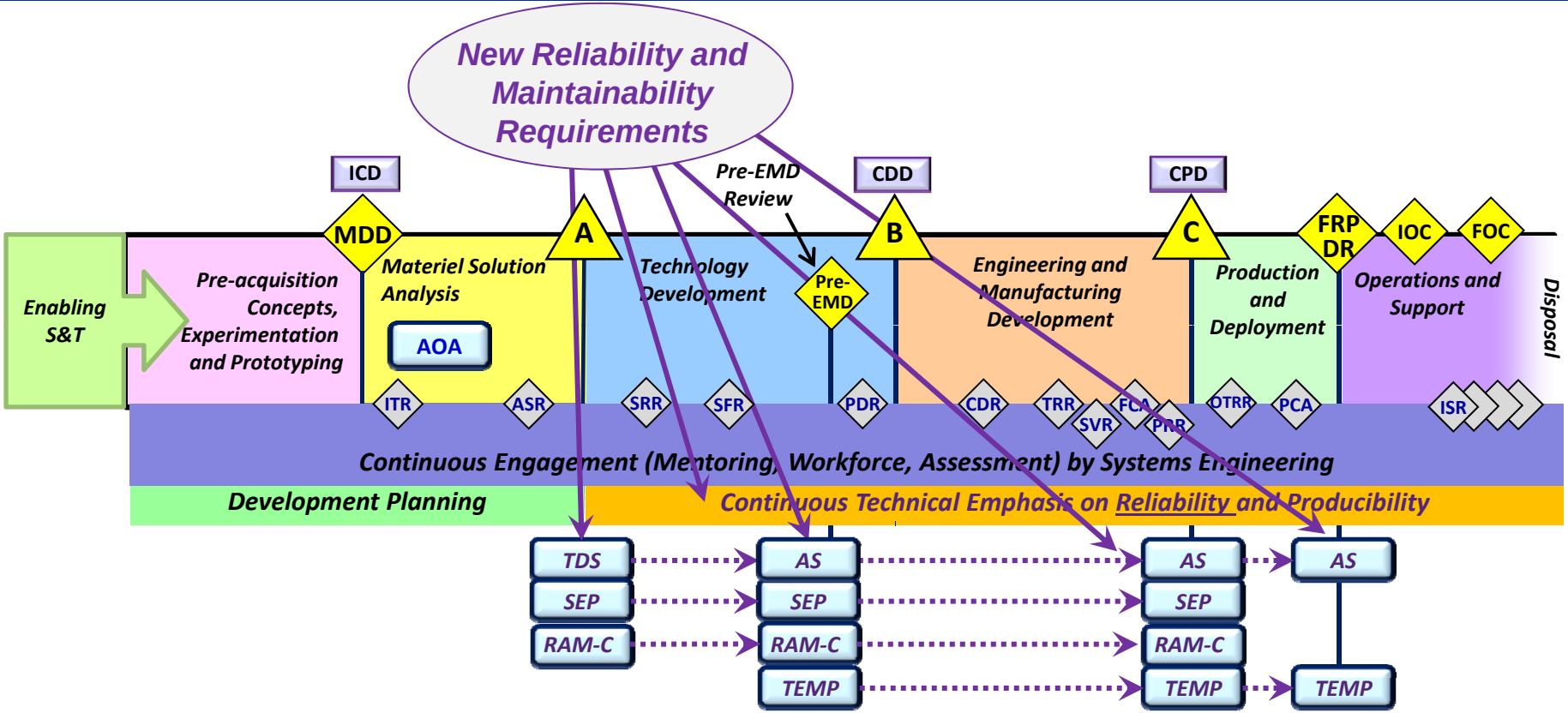
DoDI 5134.16, Deputy Assistant Secretary of Defense for Systems Engineering

Implementing statutory authorities provided under WSARA:

- **Performing continuous technical engagement, oversight, and review of Service acquisition programs' SE and Development Planning capabilities**
  - Continuous engagement with Services' acquisition enterprises
  - Sharing best practices across the department
- **Directly advising USD(AT&L) on SE and Development Planning (including Defense Business Systems and National Intelligence Programs)**
  - Active participant in MDAP and MAIS major milestone decision making
- **Reviewing and approving MDAP and MAIS Systems Engineering Plans (SEPs)**
- **Developing SE, Development Planning, Manufacturing, and Reliability and Maintainability policy and guidance**
- **Influencing Pre-MDD and MS A activities (CAPE and JROC)**
- **Participating in AoA policy, guidance, and oversight**

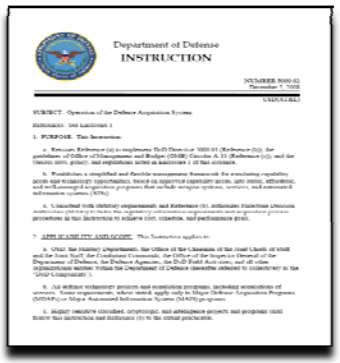
WSARA – Weapon Systems Acquisition Reform Act of 2009

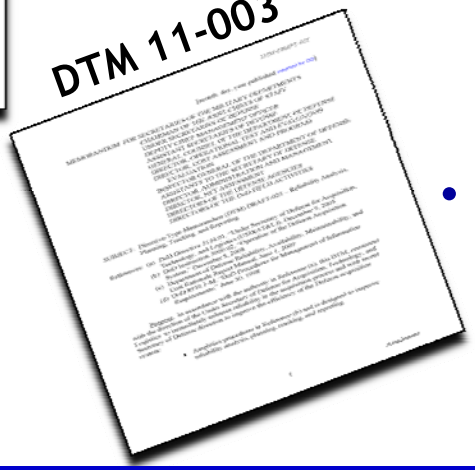
New Reliability and Maintainability (R&M) Policy



Directive Type Memorandum 11-003
Reliability Analysis, Planning, Tracking and Reporting

DoDI 5000.02





- **Impetus for reliability policy**
  - Directed by Dr. Carter in response to memo from DOT&E
  - DASD(SE) to assess existing reliability policy and propose actions to improve effectiveness
- **DoD Acquisition Policy (DoDI 5000.02)**
  - Does not adequately or uniformly consider R&M engineering activities throughout the acquisition process
  - Fails to capture Reliability and Maintainability planning in new or existing acquisition artifacts to inform acquisition decision making
- **DTM 11-003 Reliability and Maintainability**
  - Amplifies current DoDI 5000.02 by requiring PMs to perform reliability activities
  - Institutionalizes planning and reporting timed to key acquisition activities

http://www.dtic.mil/whs/directives/corres/pdf/DTM-11-003.pdf

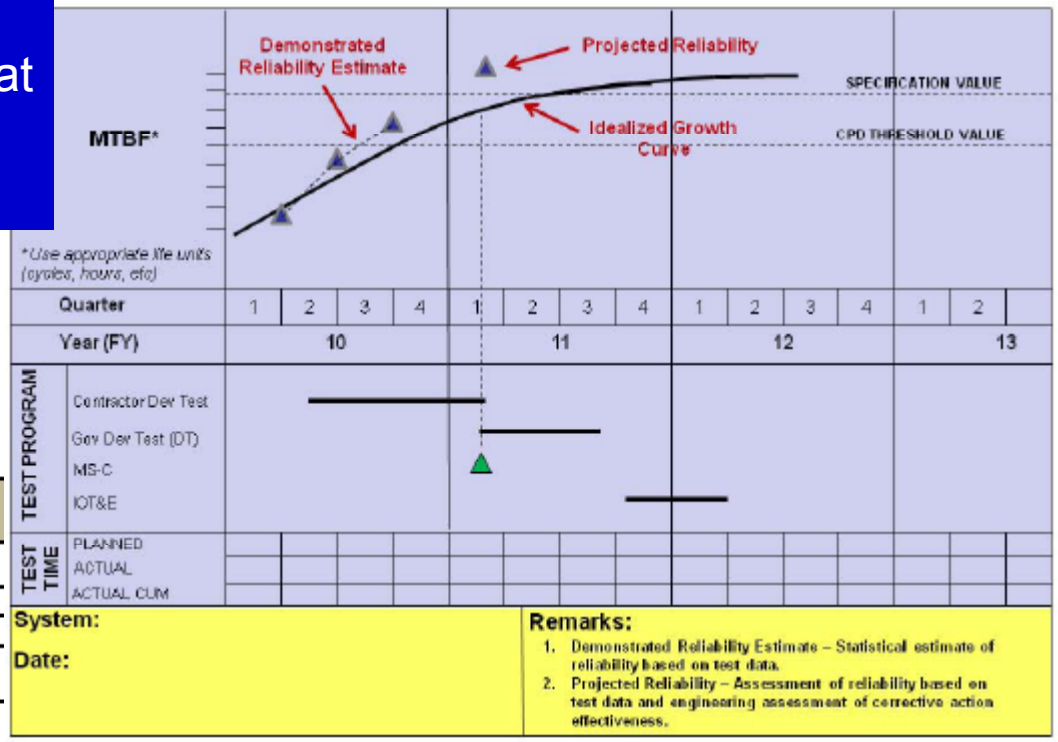
Directive Type Memorandum 11-003
Reliability Analysis, Planning, Tracking and Reporting

- **Formulate a comprehensive Reliability and Maintainability program consisting of key engineering activities (e.g., R&M allocations, predictions, failure definitions and scoring criteria, FMECA, maintainability and Built-In Test demos, FRACAS, and system/subsystem reliability growth testing)**
- **Develop the preliminary RAM-C Report in support of MS A; update for MS B and C**
- **Specify (in the TDS/AS and SEP) how the JCIDS sustainment thresholds have been translated into R&M design requirements for use in contract specifications**
- **Document system-level reliability growth curves in the SEP beginning at MS A and update in the TEMP beginning at MS B**
  - Establish intermediate goals for reliability growth curves that will be tracked through fully integrated system-level test and evaluation events until the threshold is achieved
  - Assess reliability growth required to achieve the reliability threshold during Initial Operational Test and Evaluation
- **Report status of reliability objectives and/or thresholds as part of the formal design review and systems engineering technical review process**
- **Incorporate Reliability Growth Curves into the Defense Acquisition Executive Summary (DAES) review process**

http://www.dtic.mil/whs/directives/corres/pdf/DTM-11-003.pdf

New Reliability Reporting

Document the Reliability Growth Curve beginning at MS A, updated at each successive milestone, …



Implementation of New Reliability Policy

R&M Engineering Activity	Planning and Timing
R&M Allocations	
R&M Block Diagrams	
R&M Predictions	
Failure Definitions and Scoring Criteria	
Failure Mode, Effects, and Criticality Analysis (FMECA)	
Maintainability and Built-in Test Demonstrations	
Reliability Growth Testing at the System and Subsystem Level	
Failure Reporting , Analysis, and Corrective Action System (FRACAS)	

and report planning to generate R&M artifacts.

New Systems Engineering Guidance

- **Defense Acquisition Guidebook (DAG) Chapter 4, Fact-of-Life Updates (reflecting policy changes)**
- **Manufacturing (National Defense Authorization Act (NDAA) for FY11, Section 812)**
- **Development Planning**

Defense Acquisition Guidebook (DAG) Revision – Phase I

- Made minimum chapter revisions necessary to align with approved policy/business practice
- Designed a plan of action for Chapter 4, SE
- Coordinated with other chapter editors
- Established no new policy

Revised DAG to be released in Fall 2011

Manufacturing

- **FY11 NDAA Section 812 required comprehensive guidance on the implementation of Manufacturing Readiness Levels:**
  - The DAG (4.4.14.2) was updated with manufacturing readiness assessment exit criteria at each phase
  - The guidance also recommends assessment reporting at each technical review
  - DFARS was updated to include manufacturing as a consideration during source selection
- **Near-term focus is on identifying standard documentation that applies consistent manufacturing practice on all defense acquisition programs.**
- **Mid-term focus is on addressing gaps where manufacturing, reliability, and quality are integrated as a "Design for" activity in transitioning-to-production.**

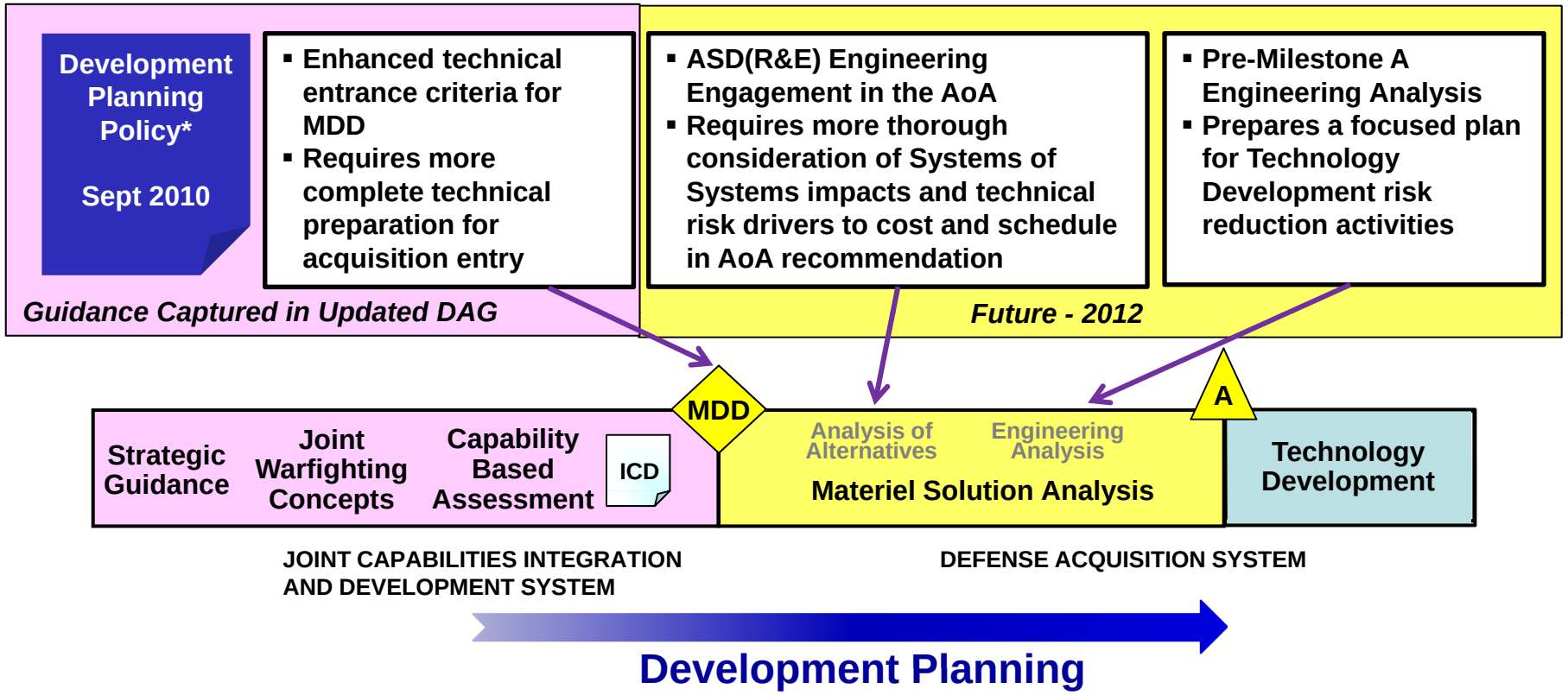
Manufacturing Guidance

DoD policy (DoDI 5000.02) now makes manufacturing a special-interest topic for all Program Support Reviews (PSR), including at Full-Rate Production Decision Reviews (FRP DR).

Technology alone cannot drive development.

Assessment of manufacturing is critical for managing risk and provides evidence for producibility.

Development Planning



Development Planning is the early technical preparation to ensure successful selection and development of a materiel solution.

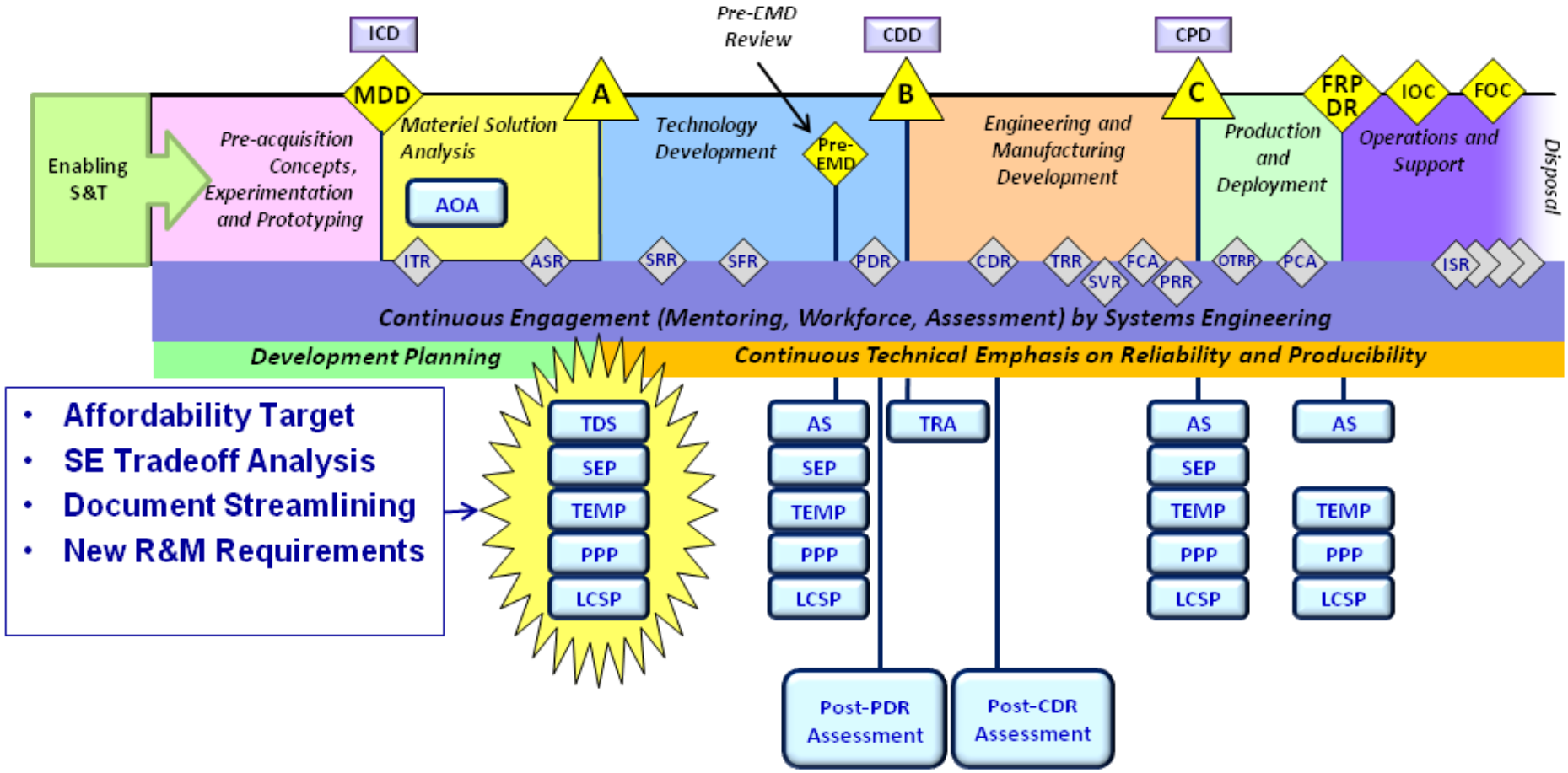
* DTM 10-017, Development Planning to Inform Materiel Development Decision (MDD) Reviews and Support Analyses of Alternatives (AoA)

Future Policy and Guidance

- DAG Revision (Phase II) responding to DoDI 5000.02 update, including Ch 4, Systems Engineering
- Open Systems Architecture
- SE Trade-off Analysis
- Guide for Integrating SE into Acquisition Contracting
- Development Planning for Materiel Solution Analysis Phase
- Standards revision and re-adoption

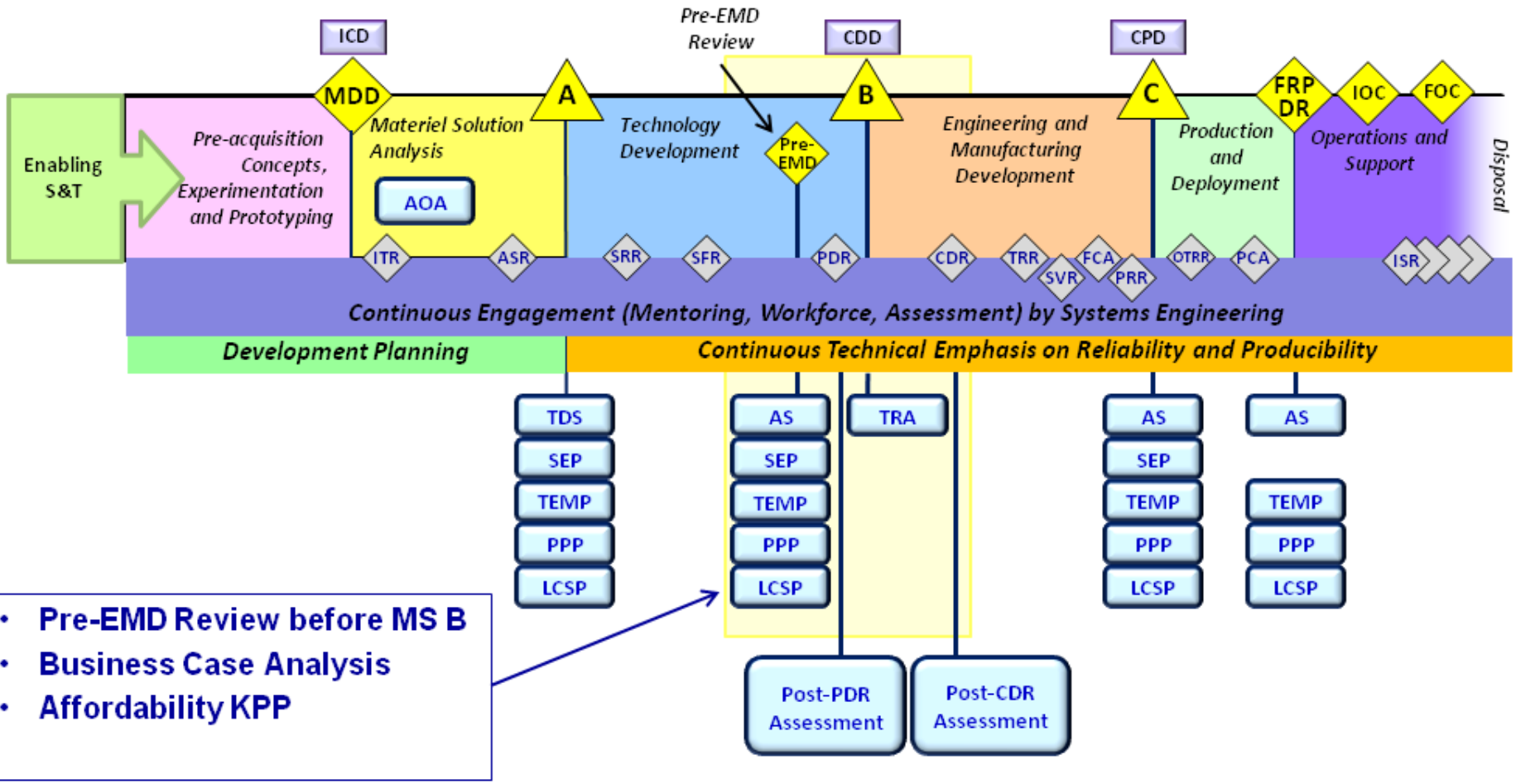
Systems Engineering Acquisition Process Change Summary

New Technical Documents at MS A



Systems Engineering Acquisition Process Change Summary

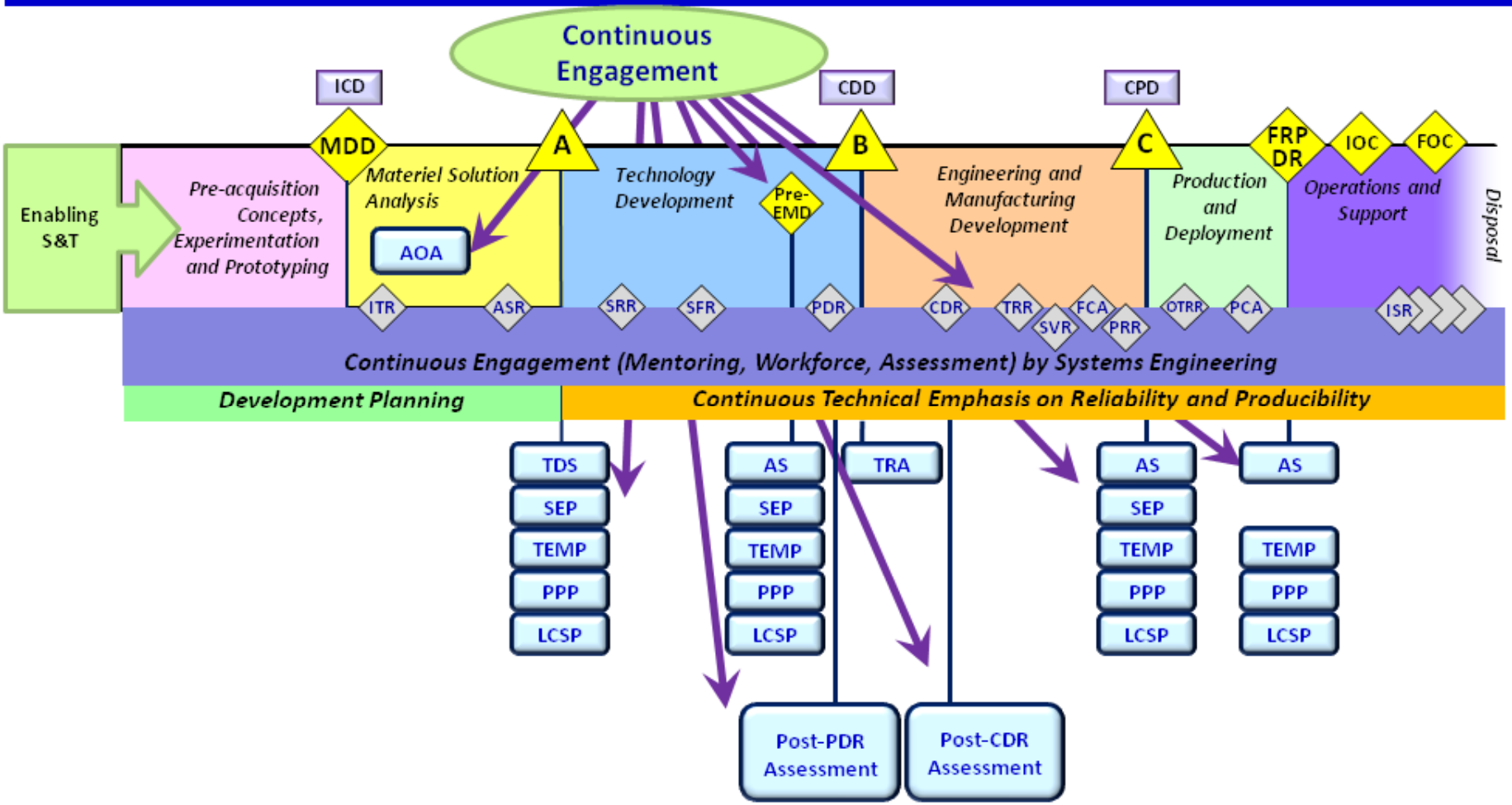
New Timing and Technical Documents at MS B



- **Pre-EMD Review before MS B**
- **Business Case Analysis**
- **Affordability KPP**

Systems Engineering Acquisition Process Change Summary

SE has a role in all major acquisition program milestone decisions and oversees and executes critical acquisition risk management processes to reduce program cost, acquisition time and risk.



Policy and Guidance Documents

- Implementation Directive for Better Buying Power: http://www.acq.osd.mil/docs/USD(AT&L)_Implementation_Directive_Better_Buying_Power_110310.pdf
- Systems Engineering Plan: http://www.acq.osd.mil/se/docs/PDUSD-Approved.SEP_Outline-04-20-2011.docx
- Acquisition Strategy/Technology Development Strategy: http://www.acq.osd.mil/se/docs/PDUSD-Approved-TDS_AS_Outline-04-20-2011.pdf
- Program Protection Plan: http://www.acq.osd.mil/se/docs/PPP-Outline-and-Guidance-v1-July2011.pdf
- Life-Cycle Sustainment Plan: http://www.acq.osd.mil/se/ (for LCSP)
- Government Performance of Critical Acquisition Functions: https://acc.dau.mil/adl/en-US/392195/file/52955/USD AT_L Memo Government Performance of Critical Acquisition Functions (25 Aug 10).pdf
- Expected Business Practice Memo: Post-Critical Design Review Reports and Assessments: http://www.acq.osd.mil/se/docs/PDUSD-ATLMemo-Expected-Bus-Practice-Post-CDR-24Feb11.pdf
- Improving Technology Readiness Assessment Effectiveness: https://dap.dau.mil/policy/Lists/Policy Documents/Attachments/3291/20110511-ImprovingTRAEffect.pdf
- Improving Milestone Process Effectiveness: https://dap.dau.mil/policy/Lists/Policy Documents/Attachments/3293/20110623-ImproveMilestoneProcess.pdf
- DTM 11-003, Reliability Analysis, Planning, Tracking, and Reporting: http://www.acq.osd.mil/se/docs/USD-ATLMemo-DTM-11-003-Reliability-21Mar11.pdf
- DoDI 5134.16, Deputy Assistant Secretary of Defense for Systems Engineering: http://www.dtic.mil/whs/directives/corres/pdf/513416p.pdf

Backup

DAG Phase II – Next Steps

- **Content:**
  - Update based on approved DoDI 5000.02 to be issued Fall 2011
  - Update based on other approved policy/business practice
  - Reexamine and revise Chapter 4: contents, structure, message
- **Convene a stakeholder working group to identify current chapter's strengths and weaknesses leading to codification of revision requirements**
- **Generate a detailed outline of the revised chapter that fulfills the requirements**
- **Assign writing assignments to group members**
- **Consolidate revisions and place under configuration control for technical editing, coordination, and publication**