Development Planning Update: State of the Practice

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14th Annual NDIA Systems Engineering Conference
San Diego, CA | October 25, 2011

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Outline

- **Background of Development Planning**
- **Update on Recent Development Planning Efforts**
- **Next Steps**

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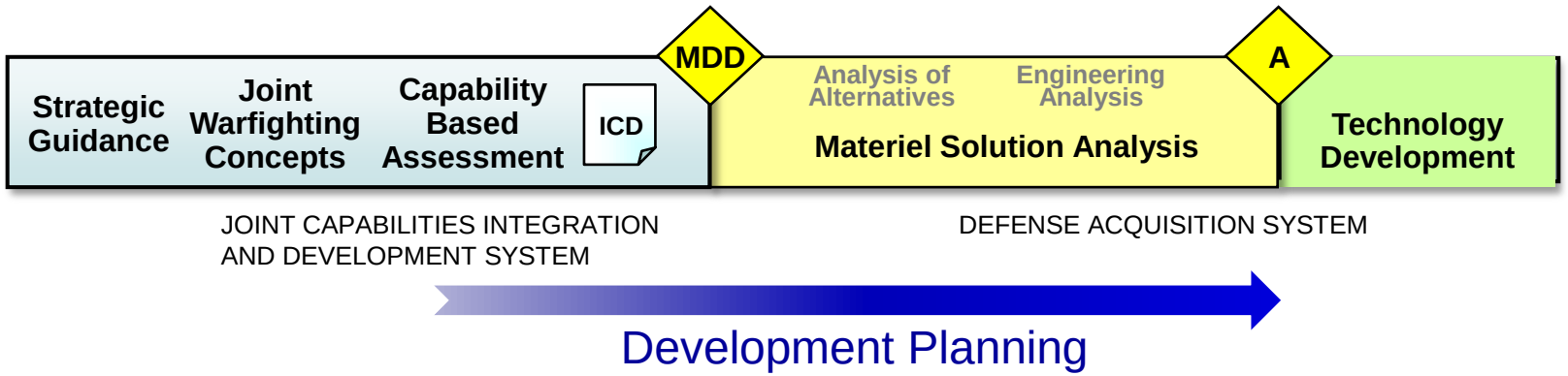
Development Planning



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

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Why Conduct Development Planning?

- **Provides the Milestone Decision Authority (MDA) adequate information to decide when and how an investment will be made to investigate potential materiel solutions**
  - Formal entry point into the acquisition process - mandatory for all programs
  - Enables successful Materiel Development Decision (MDD) review
- **Enables successful selection and development of a materiel solution to best meet war fighter's needs**
- **Enables an early understanding of technical and engineering risks so those risks can be successfully managed and/or mitigated**

Initiate programs with the foundation needed for success

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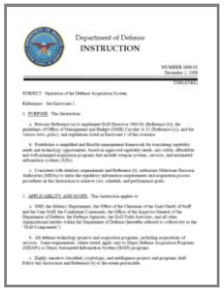
Pre-Acquisition Technology Development / Early System Engineering (SE)

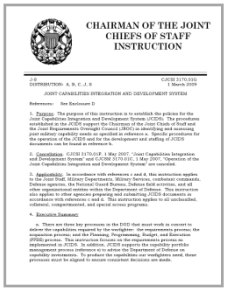
National Research Council

"Pre-Milestone A and Early-Phase Systems Engineering" Jan 2008

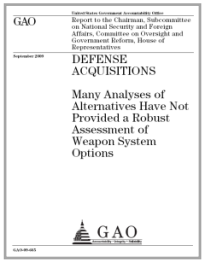
DoD 5000.02
December 2008


Department of Defense
INSTRUCTION

CJCSI 3170
March 2009


CHAIRMAN OF THE JOINT CHIEFS OF STAFF INSTRUCTION

GAO Report
September 2009


GAO
Report to the Chairman, Subcommittee on National Security and Foreign Affairs, Committee on Oversight and Government Reform, House of Representatives
DEFENSE ACQUISITIONS
Many Analyses of Alternatives Have Not Provided a Robust Assessment of Weapon System Options
GAO

WSARA
May 2009

- **National Academies of Sciences Study**
  - All programs destined to fail without early [pre-MS A] SE
  - Development planning can implement pre-MS A early SE
- **DoD Acquisition Regulations [DoDI 5000.02] Update**
  - Increased focus on early pre-acquisition phases
  - Implication for added early SE
- **Joint Capabilities Integration and Development System (JCIDS) [CJCSI 3170] Update**
  - Focused on rapidly validating capability gaps
- **GAO Report on AoA Process (GAO-09-665)**
  - Robust AoA can be a key element for a sound, executable program
  - AoAs have narrow scope and limited risk analysis due to:
    - Program sponsor choosing solution too early in process
    - AoA conducted under compressed timeframe
- **Weapon Systems Acquisition Reform Act of 2009 (WSARA)**
  - Directs SE responsibilities to reinvigorate Development Planning

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WSARA and Development Planning

- ***Development Planning*** **is a new function identified in the 2009 legislation**

- **Law specifically requires DASD(SE) to:**
  - Monitor and review systems engineering and *development planning* activities of the major defense acquisition programs
  - Provide advocacy, oversight, and guidance to elements of the acquisition workforce responsible for systems engineering and *development planning*
  - Provide input on the inclusion of systems engineering requirements in the process for consideration of joint military requirements by the Joint Requirements Oversight Council
  - Periodically review the organizations and capabilities of the military departments with respect to systems engineering and *development planning* capabilities

How best to implement?

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Recent Development Planning Efforts

- **Updated DoD 5000 and the Defense Acquisition Guidebook to include Development Planning**
- **Developed Materiel Development Decision (MDD) Templates**
- **Established Development Planning Working Group**
- **Engaged with 21 MDDs and 12 Analyses of Alternatives (AoAs)**
- **Conducted Outreach**

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Development Planning Definition

- **Encompasses the engineering analysis and technical planning activities that provide the foundation for informed investment decisions on the fundamental path a materiel development will follow to effectively and affordably meet operational needs.**
- **Initiated prior to the Materiel Development Decision (MDD), continues throughout the Materiel Solution Analysis (MSA) phase, and eventually transitions to the program environment.**

Fact of Life Update to the Defense Acquisition Guidebook

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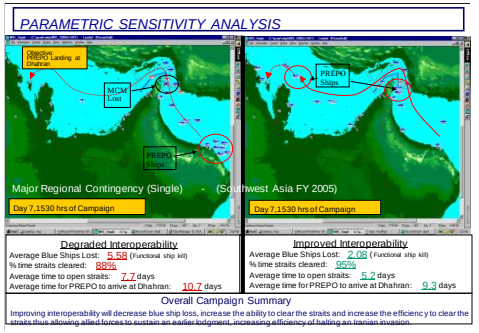
Materiel Solution Approach(s) Which Could Address the Capability Gap

Template - DTM 1 & 2

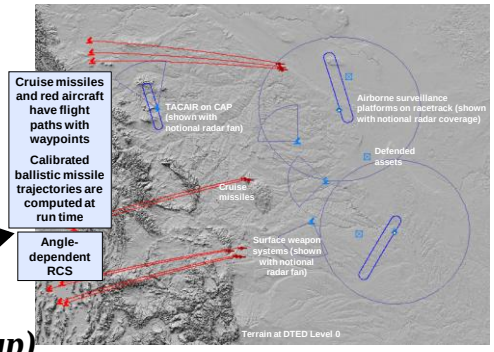
- **What materiel approaches (i.e. 'materiel concepts') could address the capability gap?**
- **What is the evidence that these approaches provide the desired operational attributes?**
- **Which materiel approaches are included in the AoA guidance and/or analysis plan?**

Simulation-based analysis used to validate approach



Example

Materiel Approaches	Potential Operational Impact	Supporting Evidence	Included in AoA?
Sensors	…..	…..	*Yes*
Weapons			
Network			
….			
….			



Supporting evidence (backup)

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Alternatives Considered and Included in the AoA

Template - DTM 1 & 2

- **What alternatives were considered for inclusion in the AoA? (Alternative ways to implement the viable approaches)**
- **Technical Feasibility**
  - The basic capabilities of the alternatives has the ability to fill the capability gap (mission effectiveness) and can do so within the needed timeframe
  - Summarize the available evidence that the alternatives included in the AoA are technically feasible (e.g. models, analysis, prototypes, existing systems)
- **For each alternative, what are the implications or dependencies?**
  - Depending on the context this may include portfolio implications, existing system impacts, related ICDs, additional capabilities needed to address the gap
- **How are these dependencies factored into the planned analysis of alternatives?**

Example

Alternative Considered	Technical Assessment	Evidence of Technical Feasibility	External Dependencies	How are dependencies reflected in AoA Plan?
Alternative 1				
Alternative 2				
Alternative 3				
Alternative 4				
Alternative 5				
Alternative 6				

Assessment of Each Alternative

Alternative Concept Name and ID

Evaluations – Identify evaluations performed and results that support this concept
- Parametric studies
- M&S
- Prototyping (performed and planned)
- Analyses

- Conclusions from all evaluations

Description: Describe this concept.

Conclusions: Conclusions about this concept.

Risk Assessment:
- Operational:
- Program (cost, schedule, performance):
- Technology:
- Intelligence:
- Overall Risk Assessment:

Program characterization
- Cost and schedule
- Design characteristics
- Critical Technology Elements and maturity
- Test and Evaluation
- Operating Concept and DOT_LPF Implications
- Supportability

Basis for assessment

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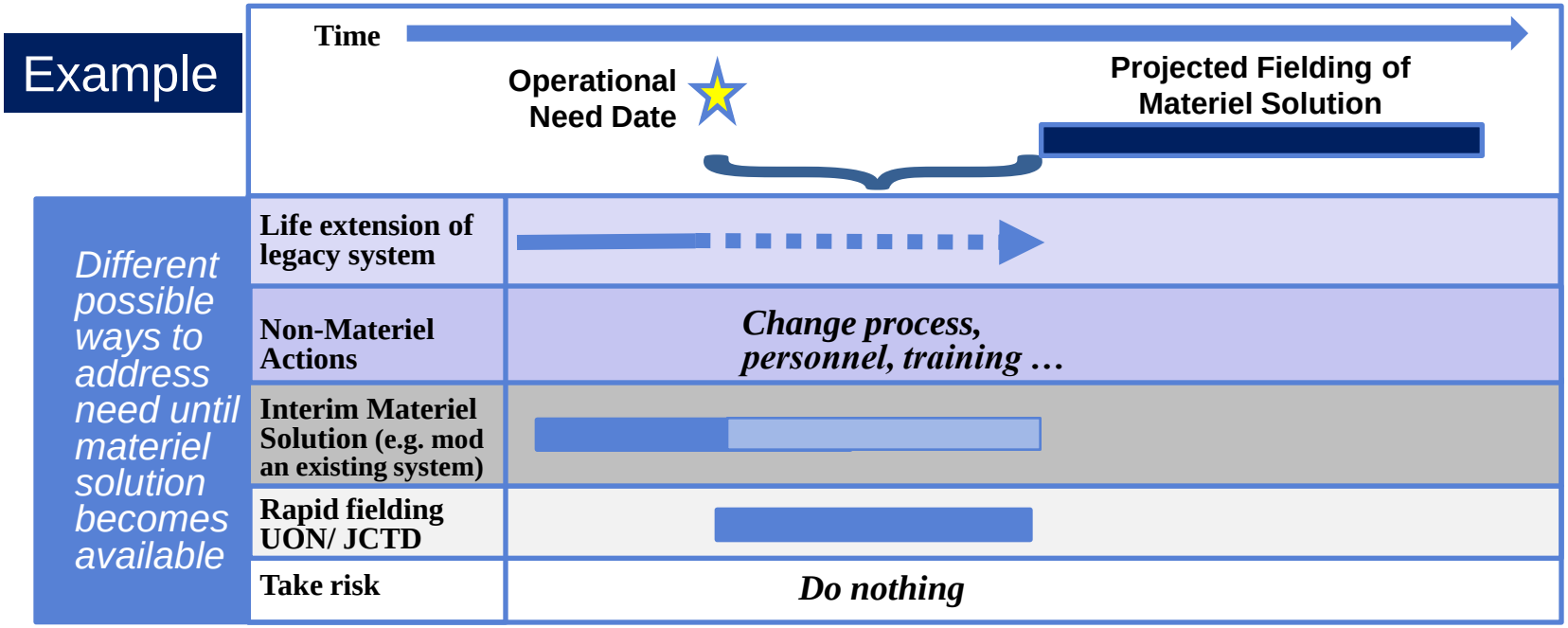
Timeliness to Capability Need

Template - DTM 3

- **When is the capability needed?**
  (Documented need date? Supporting evidence?)
- **When do we expect a proposed materiel solution be available?**
  (Based on acquisition timelines of similar solutions)
- **If necessary, what is being done to address the gap until the materiel solution becomes available?**



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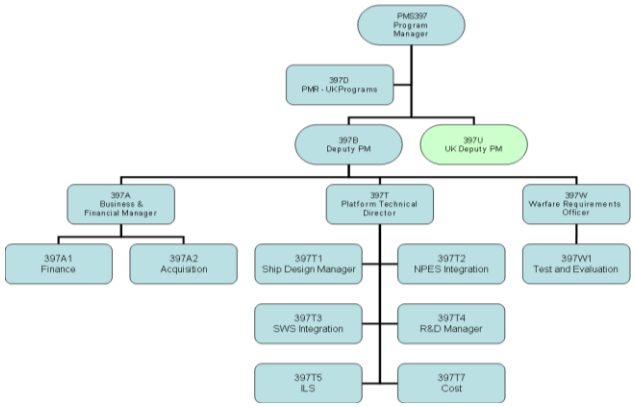
Next Phase Funding & Staffing

Template - DTM 4

- **Propose entry point into the acquisition process and provide plans for the next phase including funding and staffing plans (organization chart)**
- **For MSA phase, for example, include all funding and staffing plans for the AoA and the engineering analysis and planning for the next milestone including the milestone certification requirements**
  - People, organization, function, and funding to conduct the AoA
  - People, organization, function, and funding to conduct the engineering analysis of Potential System Solution(s)
    - Engineering analysis to develop and document sound technical planning (TDS, SEP, TES, RAM-C)
    - Engineering analysis to develop contractual technical documentation (SRD) for the next phase of acquisition
    - Engineering analysis to inform the Milestone A Independent Cost Estimate (ICE)

Examples

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Month 13	Month 14	Month 15	Month 16	Month 17	Month 18
Analysis Of Alternatives	AoA Study Plan		AoA Execution							AoA Report								
Engineering Analysis																		
Planning																		
Staffing																		
Org 1 - Cat	#	#	#	#	#	#	#	#	#	#	#							
Org 2 - Cat							#	#	#	#	#	#	#	#				
Org 4 - Cat							#	#	#	#	#	#	#	#				
Org 3 - Cat									#	#	#	#	#	#	#	#	#	#
Funding	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$



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OSD's Development Planning Working Group (DPWG)

- **Created to support policy implementation and establish a community of practice**
- **Initiated March 2011 and meets monthly; FY12 cadence will be increased to bi-monthly meetings**
- **Representatives from DoD Components (Army, Navy, Air Force), OSD organizations (CAPE, DTRA, S&TS, SE), and Joint Staff (J8)**
- **FY11 Objectives:**
  1) Improve Development Planning awareness and advocacy in order to obtain and sustain adequate Development Planning resources.
  2) Clear guidance on the adequacy of engineering/technical analysis and planning that the MDA expects for the Materiel Development Decision and Milestone A.
  3) Identify and address interdependencies between current Development Planning policy and other acquisition and requirements policy/guidance.

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OSD's Development Planning Working Group (DPWG), cont.

- **Principal FY11 benefits of DPWG (per the representatives):**
  - Common understanding of Development Planning policy objectives making it easier to implement its intent
  - Greater visibility into OSD, Joint Staff and Services' Development Planning implementation efforts
- **Proposed FY12 objectives:**
  1) Update guidance (including MDD templates) to incorporate pertinent examples of adequate engineering/technical analysis at MDD
  2) Develop a clear understanding of the engineering/technical analysis needed to support Milestone A
  3) Develop recommended changes to acquisition policy and guidance to more fully address Development Planning
  4) Continue to facilitate, and serve as a forum for, the sharing of Development Planning information
- **Conduct focused working sessions to support FY12 objectives**

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Best Practices for Successful MDD

- **Involve stakeholders early**
  - Provide timely MDD information for success MDD collaboration
- **Ensure capabilities needed from Materiel Solution are well articulated, including its dependencies with other systems**
  - Measures of Effectiveness (MOEs) used in AoA should be consistent
- **Ensure capability need date is understood and addressed**
  - Articulate strategy to best meet capability within required timeframe
- **Ensure Materiel Solution Analysis (MSA) Phase plans are well articulated, support Milestone A requirements and support follow-on contract needs**
  - Plans should include tasking, staffing and funding

Based on MDD engagement with 21 acquisition program concepts

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Outreach is an Objective

- **Defense Acquisition University (DAU) PMT401 Program Manager's Course**
- **National Defense Industry Association (NDIA) Industrial Committee for Program Management (ICPM)**
- **Military Operations Research Society (MORS) Special Meeting**

Two-Way Information Sharing

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WG 3 – Development Planning

Theme –

"What type and level of analytics are needed to support informed investment decisions throughout development planning period – Pre- MDD thru MS A"

– Mr. Kendall, Principal Deputy, OSD(ATL)

Objectives –

- What analytics are required to support informed Acquisition decisions?
  - How to bound and manage Pre-MDD?
  - How to bound and manage Pre-Milestone A?
- Where are the gaps?

Department has made progress emphasizing Development Planning analytics, but more work is needed.

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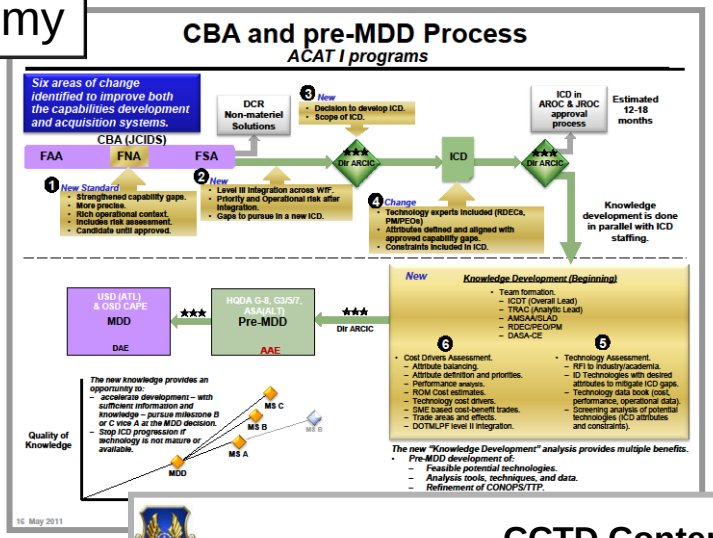
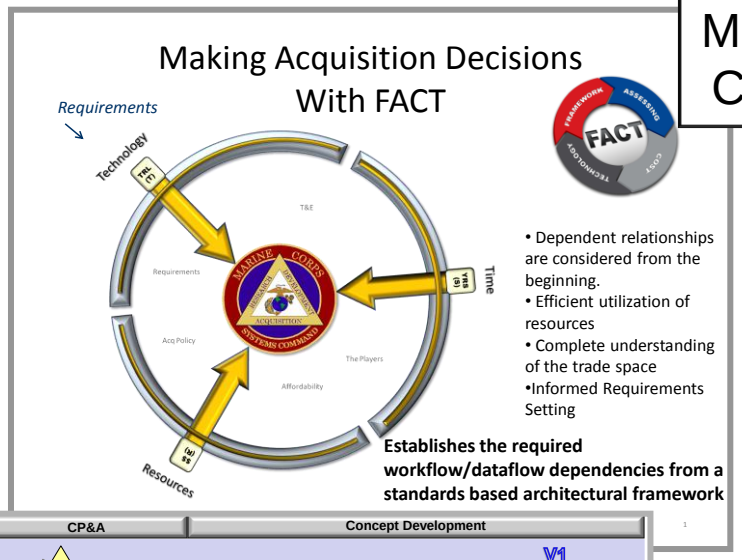
Several Development Planning Best Practice Examples

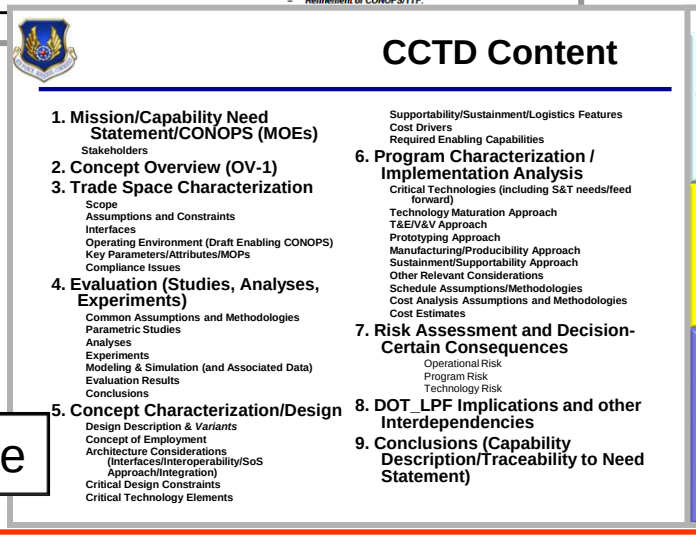
Army

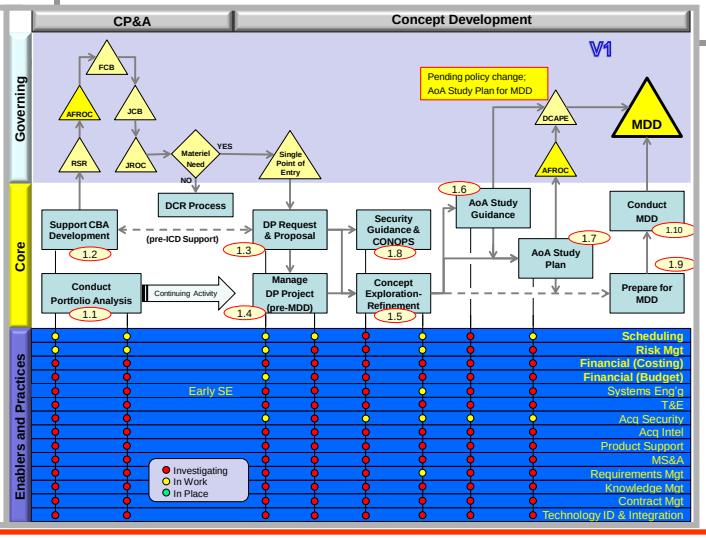


Marine Corps



Air Force





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Next Steps

- **Development Planning Working Group – 2012 Objectives**
  - Update guidance (including MDD templates) to incorporate pertinent examples of adequate engineering/technical analysis at MDD
  - Develop a clear understanding of the engineering/technical analysis needed to support Milestone A
  - Develop recommended changes to acquisition policy and guidance to more fully address Development Planning
  - Continue to facilitate, and serve as a forum for, the sharing of Development Planning information
- **National Defense Industrial Association (NDIA) Development Planning Working Group**
  - Assist by recommending solutions to MORS Workshop identified industry gaps
    - Lack of operational context for Concept RFIs
    - Limited early involvement

Potential additional areas to address:

1. How to engage with industry in a non-Intellectual Property environment to inform Development Planning?
2. What are effective analytical tools and techniques for Development Planning?

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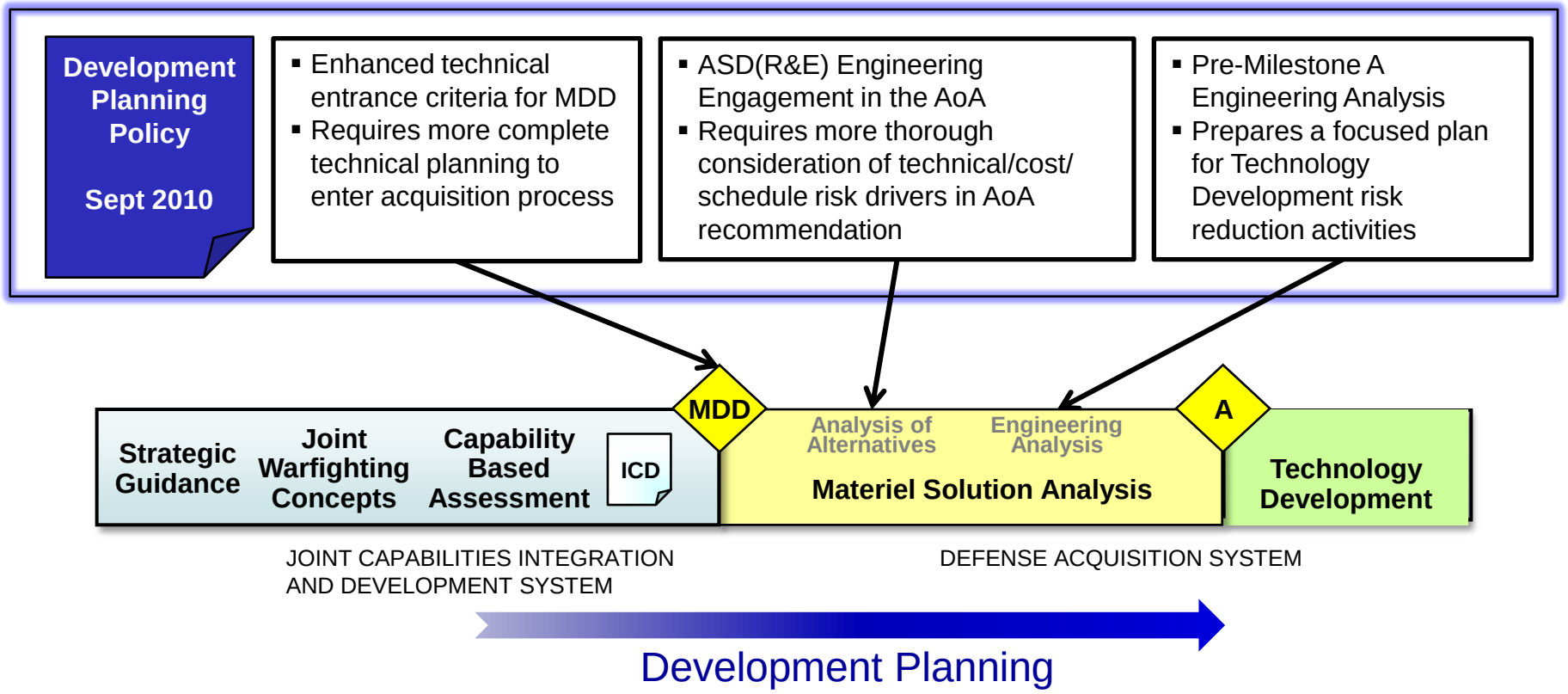
Development Planning



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

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For Additional Information:
www.acq.osd.mil/se/initiatives/init_devplng

For Questions:
devplng@osd.mil

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Back-up

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WSARA – DP Language in Law

(b) DIRECTOR OF SYSTEMS ENGINEERING.—

(1) APPOINTMENT.—There is a Director of Systems Engineering, who shall be appointed by the Secretary of Defense from among individuals with an expertise in systems engineering and *development planning*.

(2) PRINCIPAL ADVISOR FOR SYSTEMS ENGINEERING AND *DEVELOPMENT PLANNING*.—The Director shall be the principal advisor to the Secretary of Defense and the Under Secretary of Defense for Acquisition, Technology, and Logistics on systems engineering and *development planning* in the Department of Defense.

(3) SUPERVISION.—The Director shall be subject to the supervision of the Under Secretary of Defense for Acquisition, Technology, and Logistics and shall report to the Under Secretary.

(4) COORDINATION WITH DIRECTOR OF DEVELOPMENTAL TEST AND EVALUATION.—The Director of Systems Engineering shall closely coordinate with the Director of Developmental Test and Evaluation to ensure that the developmental test and evaluation activities of the Department of Defense are fully integrated into and consistent with the systems engineering and *development planning* processes of the Department.

(5) DUTIES.—The Director shall—

(A) develop policies and guidance for—

(i) the use of systems engineering principles and best practices, generally;

(ii) the use of systems engineering approaches to enhance reliability, availability, and maintainability on major defense acquisition programs;

(iii) the development of systems engineering master plans for major defense acquisition programs including systems engineering considerations in support of lifecycle management and sustainability; and

(iv) the inclusion of provisions relating to systems engineering and reliability growth in requests for proposals;

(B) review and approve the systems engineering master plan for each major defense acquisition program;

(C) monitor and review the systems engineering and *development planning* activities of the major defense acquisition programs;

(D) provide advocacy, oversight, and guidance to elements of the acquisition workforce responsible for systems engineering, *development planning*, and lifecycle management and sustainability functions;

(E) provide input on the inclusion of systems engineering requirements in the process for consideration of joint military requirements by the Joint Requirements Oversight Council pursuant to section 181 of this title, including specific input relating to each capabilities development document;

(F) periodically review the organizations and capabilities of the military departments with respect to systems engineering, *development planning*, and lifecycle management and sustainability, and identify needed changes or improvements to such organizations and capabilities; and

(G) perform such other activities relating to the systems engineering and *development planning* activities of the Department of Defense as the Under Secretary of Defense for Acquisition, Technology, and Logistics may prescribe.

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Development Planning Policy Memo (DTM 10-017)

Additional MDD Technical Considerations

The DoD Components shall provide evidence at the MDD Review that will facilitate the MDA's determination that:

1. **The candidate materiel solution approaches have the potential to effectively address the capability gap(s), operational attributes and associated dependencies.**
2. **There exists a range of technically feasible solutions generated from across the entire solution space, as demonstrated through early prototypes, models, or data.**
3. **Consideration has been given to near term opportunities to provide a more rapid interim response to the capability need.**
4. **The plan to staff and fund analytic, engineering, and programmatic activities supports the proposed milestone entry requirements.**

Post-MDD ASD(R&E) [formerly DDR&E] Engagement

- **Cooperate with the Director, Cost Assessment and Program Evaluation, and, as agreed upon with that organization, serve as a standing participant and technical advisor in the development of AoA Study Guidance and on the AoA Study Advisory Group for potential programs under USD(AT&L) oversight to facilitate the consideration of technology and engineering risks for the alternatives under consideration.**
- **Monitor and review the effectiveness of the policy in this DTM and develop additional development planning guidance as needed for incorporation into acquisition policy and the Defense Acquisition Guidebook**

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