

Reconsidering Requirements Development

A Case for Time-Phased Requirements



Frank J. Swehosky, PhD
NDIA Systems Engineering Conference
17 October 2011

Bottom Line Up Front



- **The country is demanding better return on acquisition investment**
- **Congress and Acquisition Community has made significant changes to improve**
- **Requirements must do better to help Acquisition Community succeed**
- **Time-Phased Requirements helps assure warfighters get essential capabilities on-time and within budget**

Background



TSAT/TMOS - \$10B



Comanche - \$8B

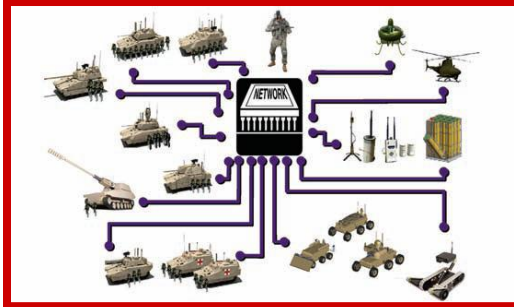


- **Geo-political environment increasingly uncertain**
- **Force structure needs recapitalization and next generation systems conceived**
- **U.S. economic situation demands acquisition efficiency**

Presidential Helo - \$5B



FCS - \$18B




Expeditionary Fighting Vehicle - \$3B



“DoD can no longer buy whatever it can imagine” Frank Kendall, PDUSD AT&L

Acquisition Reform Response

DoD 5000.02
2008

 Department of Defense
INSTRUCTION

NUMBER 5000.02
December 8, 2008
LEP(AT&L)

SUBJECT: Operation of the Defense Acquisition System

References: See Enclosure 1

1. **PURPOSE:** This Instruction:

- Reference (a) to implement DoD Directive 2000 01 (Reference (b)), the guidance of Office of Management and Budget (OMB) Directive No. 11 (Reference (c)), and the weapon development and acquisition Road to Success (R2S) of this instruction.
- Establish a step-by-step and feasible management framework for translating capability needs and technology opportunities, based on approved capability needs, into viable, affordable, and well-managed acquisition programs that include weapon systems, services, and information systems (AIS).
- Coordinate with existing equipment and Reference (b), undertake Milestone Decision Authority (MDA) to make the regulatory reform consistent and acquisition process procedure in the Instruction to achieve cost, schedule, performance goals.

2. **APPLICABILITY AND SCOPE:** This Instruction applies:


- OSD, the Military Departments, the Office of the Chairman of the Joint Chiefs of Staff and the Joint Staff, the Command Component, the Office of the Inspector General of the Department of Defense, the Defense Agency, the DoD Field Activities, and all other organizational entities within the Department of Defense (hereafter referred to collectively as the "DoD Component").
- All defense technology projects and acquisition programs, including acquisition of services. Cost requirements, when stated, apply only to Major Defense Acquisition Programs (MDAPs) or Major Automated Information System (MAIS) programs.
- Highly sensitive classified, cryptologic, and intelligence projects and programs shall follow the Instruction and Reference (b) to the extent practicable.

Serious reform to focus attention on Development Planning Phase to improve upfront technical preparation

DTM 10-017
2010

NDIA Report
Industry's Role



 THE UNDER SECRETARY OF DEFENSE
OFFICE OF OPERATIONAL AND SUPPORT ANALYSIS
WASHINGTON, DC 20304-5000


September 15, 2010

**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, INT ASSESSMENT
DIRECTORS OF THE DEFENSE AGENCIES
DIRECTORS OF THE DOD FIELD ACTIVITIES**

SUBJECT: Directive Type Memorandum (DTM) 10-017 - Development Planning to Inform Material Development Decision (MDD) Reviews and Support Analysis of Alternatives (AOA)

References: (a) DoD Directive 5140.01, "Under Secretary of Defense for Acquisition, Technology, and Logistics (US(AT&L))" December 9, 2003
(b) Public Law 111-23, "Weapon Systems Acquisition Reform Act of 2009" May 22, 2009
(c) DoD Instruction 2000.02, "Operation of the Defense Acquisition System" December 8, 2006
(d) Defense Acquisition Guidebook, current edition

Purpose: This DTM, in accordance with the authority in Reference (a) and pursuant to Reference (b), establishes policy, assigns responsibilities, and provides guidance for development planning in support of defense acquisition. This DTM is effective upon its publication to the DoD Business Website and shall be incorporated into Reference (c). This DTM shall expire effective April 20, 2011.

 NDIA
National Defense Industrial Association

**National Defense Industrial Association
Systems Engineering Division
Development Planning Working Group**

Report - Phase I

September 2010

Industry's Role in Development Planning

1. **Purpose**
This report is a product of the Development Planning Working Group of the National Defense Industrial Association (NDIA) Systems Engineering Division to identify potential industry support roles to the Government's early technical analysis and planning for DoD Acquisition during Development Planning. The report was coordinated with the Deputy Under Secretary of Defense, Systems Engineering (DASSED) and summarizes the findings of the initial Working Group meeting held on June 8-9, 2010.

2. **Background**
The Development Planning capability within the DoD was recently mandated by the Weapon Systems Acquisition Reform Act 2009 (WSARA) and is defined as the upfront technical analysis and planning required for the successful selection and development of a material to be Development Planning a process that is inherently performed by Government personnel and would greatly benefit from the proper application of the intellectual capital that industry can provide.


OSD is implementing the Development Planning initiative through an update to existing OSD acquisition policy and guidance. The National Defense Industrial Association (NDIA) Systems Engineering Division formed a Working Group to explore and provide recommendations for how industry could support the Government's Development Planning activities, specifically to identify potential industry roles in the early technical analysis and planning for DoD Acquisition during Development Planning. The Working Group was established with 95 senior DoD Government/Industry members. A Working Group Workshop was held on June 8-9, 2010, in Alexandria, VA with 55 attendees.

The objective of the Working Group was to:

- Identify specific areas, activities and knowledge in the pre-mission "A" timeframe where industry engagement could inform early technical analysis and engineering for DoD Acquisition Programs.
- Understand the available and potential mechanisms necessary to facilitate industry involvement in the early technical analysis and engineering.
- Recognize the issues, limitations, and questions and formulate recommendations to foster industry involvement in early technical analysis and engineering.



WSARA
2009

 PUBLIC LAW 111-23—MAY 22, 2009
ACT OF 2009

Public Law 111-23
111th Congress

An Act
To improve the organization and procedures of the Department of Defense for the acquisition of major weapon systems, and for other purposes.

Enacted by the Senate and House of Representatives of the United States of America in Congress assembled.

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) **SHORT TITLE.**—This Act may be cited as the "Weapon Systems Acquisition Reform Act of 2009".

(b) **TABLE OF CONTENTS.**—The table of contents for this Act is as follows:

Sec. 1. Short title; table of contents.

SECTION 2.—ACQUISITION ORGANIZATION

Sec. 201. Cost assessment and program evaluation procedures and systems engineering.

Sec. 202. Information requirements and cost assessment and systems engineering.

Sec. 203. Information requirements and cost assessment and systems engineering.

Sec. 204. Allocation of technological maturity of critical technologies of major defense acquisition programs by the Director of Defense Research and Engineering.

Sec. 205. MDD of the commander of the combatant commands to identify past military requirements.

SECTION 3.—ACQUISITION POLICY

Sec. 301. Consideration of trade-offs among cost, schedule, and performance objectives in development of defense acquisition programs.

Sec. 302. Alternative strategies to ensure competition throughout the lifecycle of defense acquisition programs.

Sec. 303. Alternative strategies to ensure competition throughout the lifecycle of defense acquisition programs.

Sec. 304. Alternative strategies to ensure competition throughout the lifecycle of defense acquisition programs.

Sec. 305. Alternative strategies to ensure competition throughout the lifecycle of defense acquisition programs.

SECTION 4.—ACQUISITION PROGRAMS

Sec. 401. Authority for funding of defense acquisition programs.

Sec. 402. Information of initial authority objectives of the national technology and industrial base.

Sec. 403. Information of initial authority objectives of the national technology and industrial base.

Sec. 404. Information of initial authority objectives of the national technology and industrial base.

SECTION 5.—DEFINITIONS

Sec. 501. Definitions.

SEC. 2. DEPOSITION.

In this Act:

(1) The term "congressional defense committees" has the meaning given that term in section 101(a)(16) of title 10, United States Code.

Requirements' Challenge



B-2 Bomber
Programmed: 132 Built: 21

Shift away from the **99-percent** exquisite service-centric platforms that are **so costly and so complex** that they **take forever to build**, and only then in very limited quantities
SECDEF Gates, Army War College, 2009

Need to curb [requirements'] appetite; need to know DoD can finish what it starts -
Frank Kendall, PDUSD AT&L ,
NDIA, 2011

The goal is that any new weapons system should meet benchmarks for cost, schedule and performance while **minimizing “requirements creep”** – the kind of **indiscipline** that leads to \$25 million howitzers, \$500 million helicopters, \$2 billion bombers, and \$7 billion submarines.
SECDEF Gates, 2011

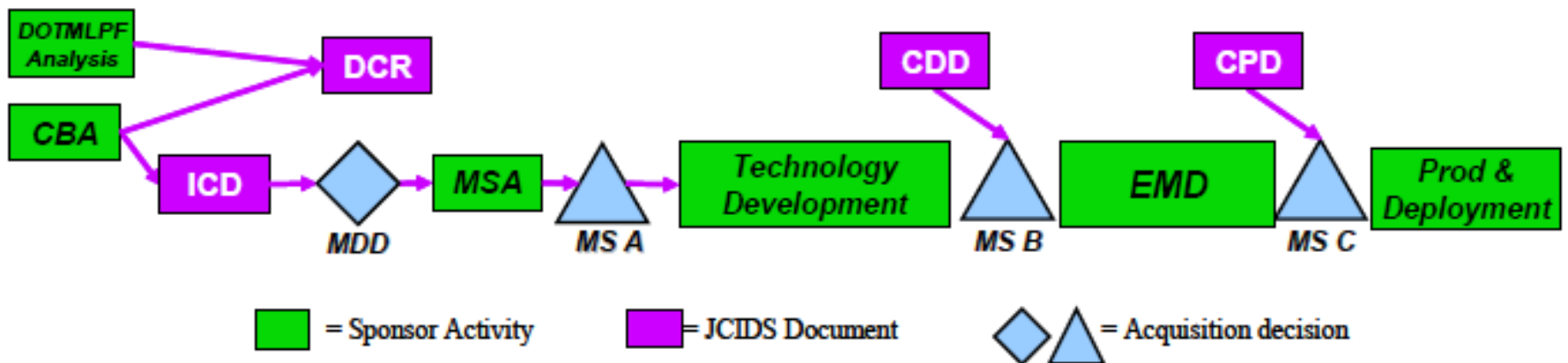
Crusader - \$2B
Built = 0



Gap & CBA Analysis Is Requirements Community's Main Contribution to Successful (Unsuccessful) Acquisition



- Characterize gaps in capabilities in such a way that provides necessary context:
 - Compels validation of need in the face of other pressing operational priorities
 - Convincing that feasible solutions exist (affordability and assurance of timely delivery)
 - Provides sufficient substantiation of gap priorities and operational context for successful early acquisition process

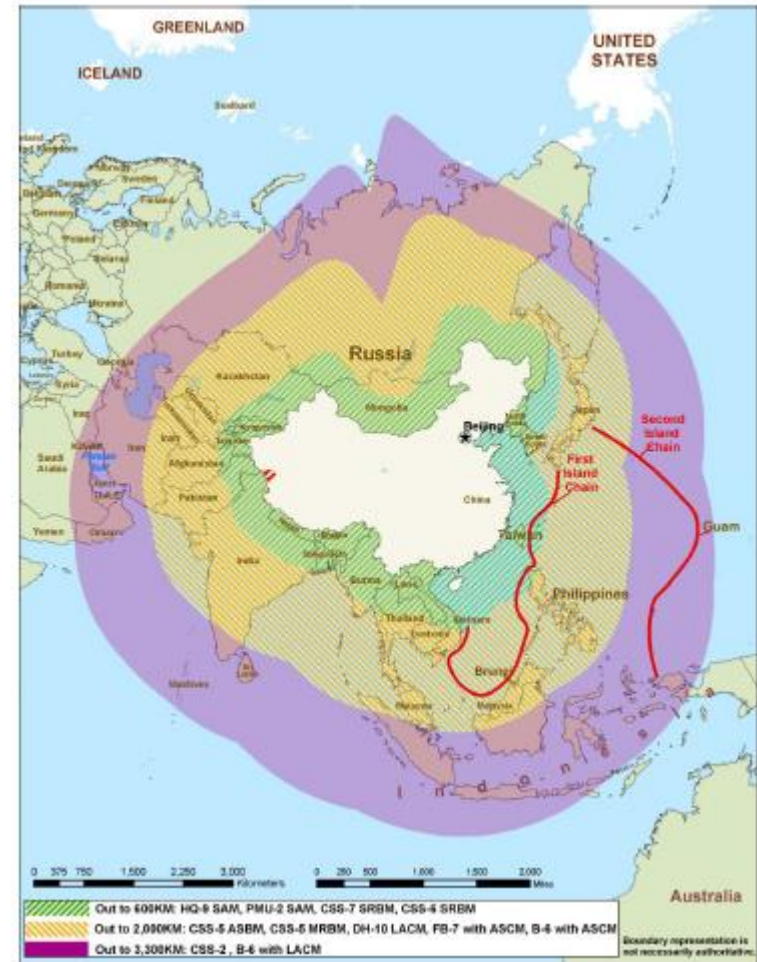


Evolving Context - Evolving Requirements



Understand trends, timing and uncertainty:

- Changing geo-political and economic situation and trends
- National and defense strategic guidance
- Threat environment
- Warfighter plans and force capability
- Resources availability
- Technology/industrial base readiness
- Other (e.g., Allies, partners, friends capabilities)



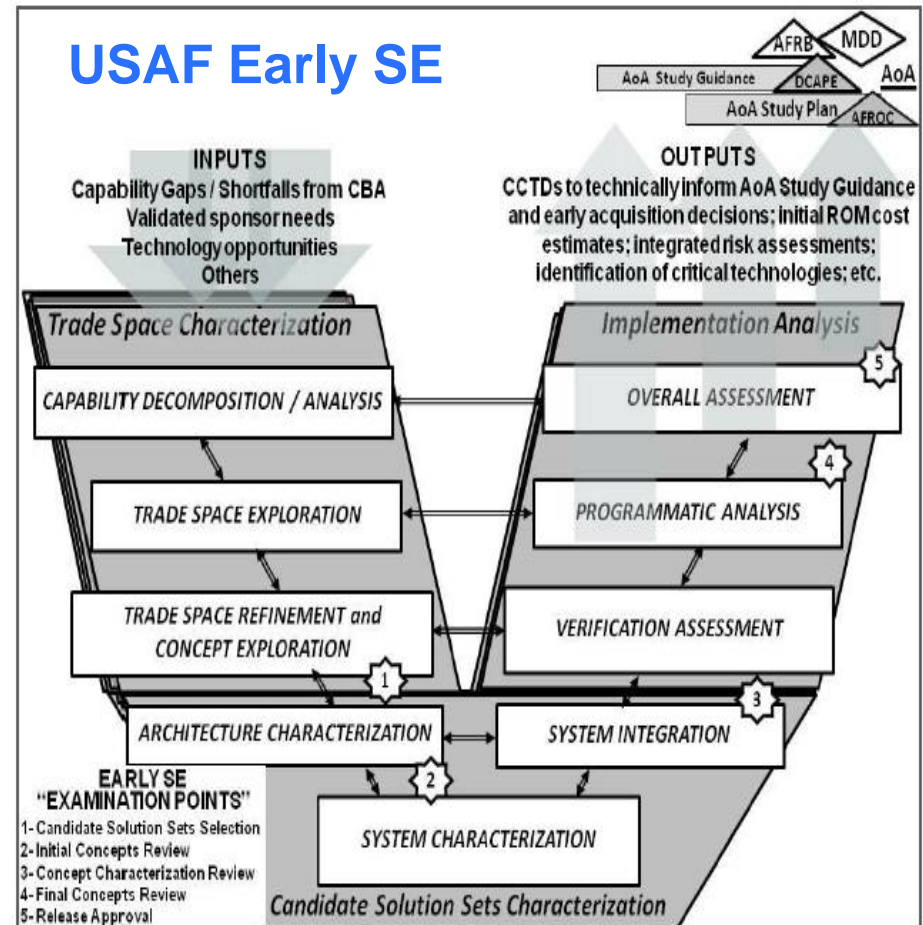
Time-Phased Requirements (TPR) leverages evolving environment to determine critical timing of needed capabilities

Time-Phased Requirements (TPR)



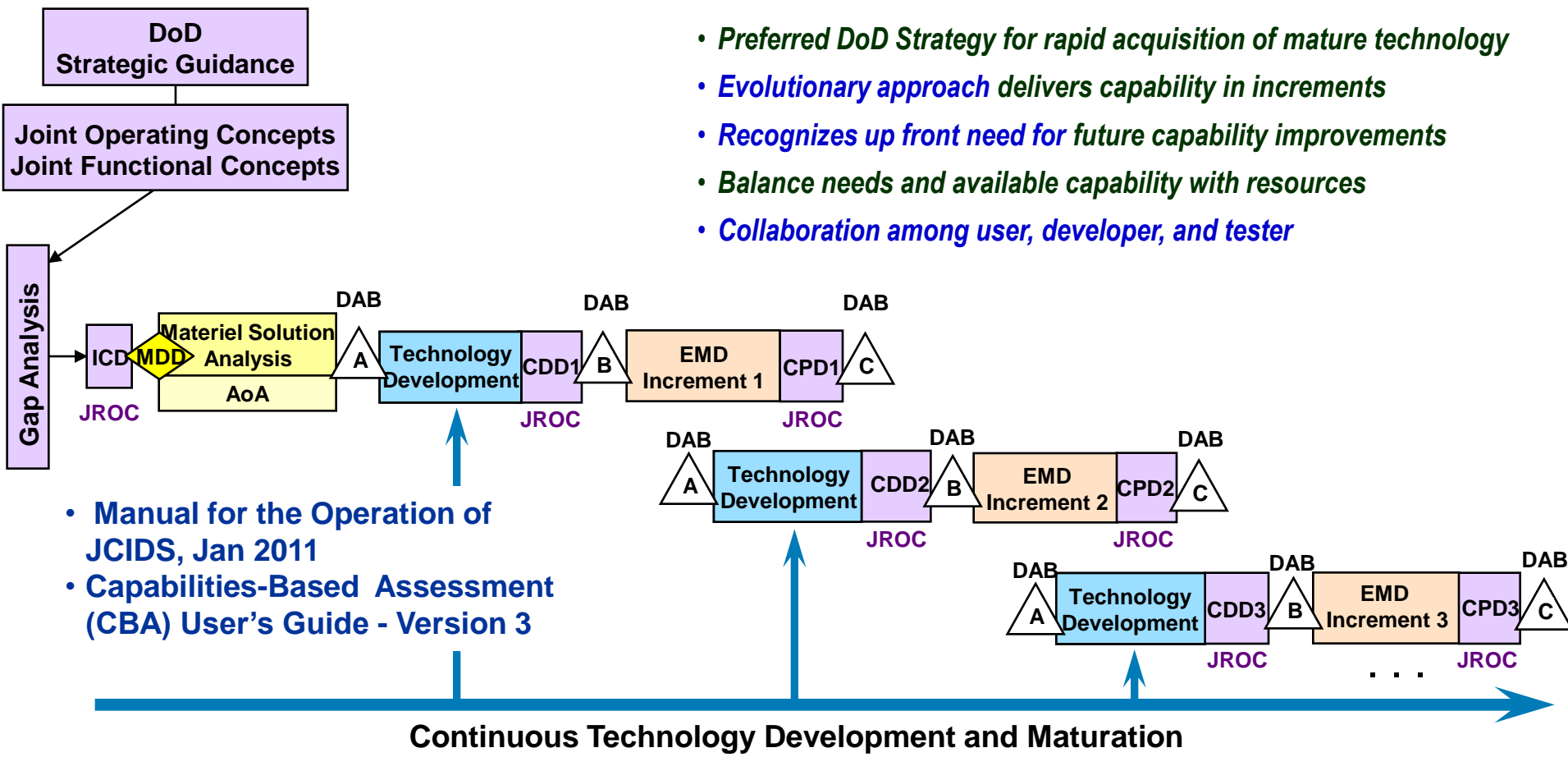
TPR substantiates warfighters' priorities and spiral timeframe for needed critical capabilities

- Seeks timely counter to expected emerging threats, and plan to evolve objective capabilities
- Provides enhanced basis for pre-MDD Solution Analysis efforts
- Provides clear environmental linkages and prioritization for trade studies and concept definitions
- Enables MDA to better assess feasibility of material solutions within funding environment
- Informs AoA community to find and assess appropriate alternatives



Evolutionary Acquisition

- Preferred DoD Strategy for rapid acquisition of mature technology
- Evolutionary approach delivers capability in increments
- Recognizes up front need for future capability improvements
- Balance needs and available capability with resources
- Collaboration among user, developer, and tester



- Manual for the Operation of JCIDS, Jan 2011
- Capabilities-Based Assessment (CBA) User's Guide - Version 3

- Requires phased definition of capability needs, system requirements, and maturation of technologies
- Each increment:
 - Offers militarily useful and supportable operational capability
 - Requires its own set of threshold and objective values set by user
 - Provides increasing capability over time

TPR Starts Acquisition Right



- **Early requirement and prioritization to help fit material solution into evolutionary acquisition process**
- **Help early systems engineering and operations analysis trade studies to define core and objective capabilities**
 - **Help prioritize timing of major increments of capability**
 - **Better inform AoA guidance and study plan**
- **Reduce core and increment risk and be more affordable**
- **Help assess, plan and fit resource stream into economic projections**



Post MDD TPR



- **Improve fidelity and focus of AoA**
 - **Assess feasibility and affordability of timely delivery of early useful capability**
 - **Assess feasibility, robustness and affordability of alternatives to evolve timely needed additional capability**
- **Improve technology development focus and affordability**
- **Prior to MS B, C - Review and update TPR as input to Capability Development and Production Documents**
 - **Enables stakeholders to develop strategy to ensure timely delivery of needed capability within available funding**
 - **Encourages more affordable and faster testing**



Summary - TPR for improved decisions



- **Links requirements timing with evolving operational context**
- **Substantiates priority and timing of operational needs**
- **Provides essential information for early trade space and solution analyses**
- **Guides AoAs to ID affordable, robust, and timely alternatives**
- **Provides stakeholders key information to scope successful program development and incremental upgrades**

“We ... might establish, within the department, a position that says, ‘This is all we can afford,’ ” Assad noted. “In that regard, then you have to make the requirements meet that [dollar figure].” Shay Assad, OSD, Dir, Defense Pricing*

*Source: AF Magazine, Sep 2011

Requirements Is Foundation for Successful Acquisition

