

SYSTEMATIC ACQUISITION IMPROVEMENTS

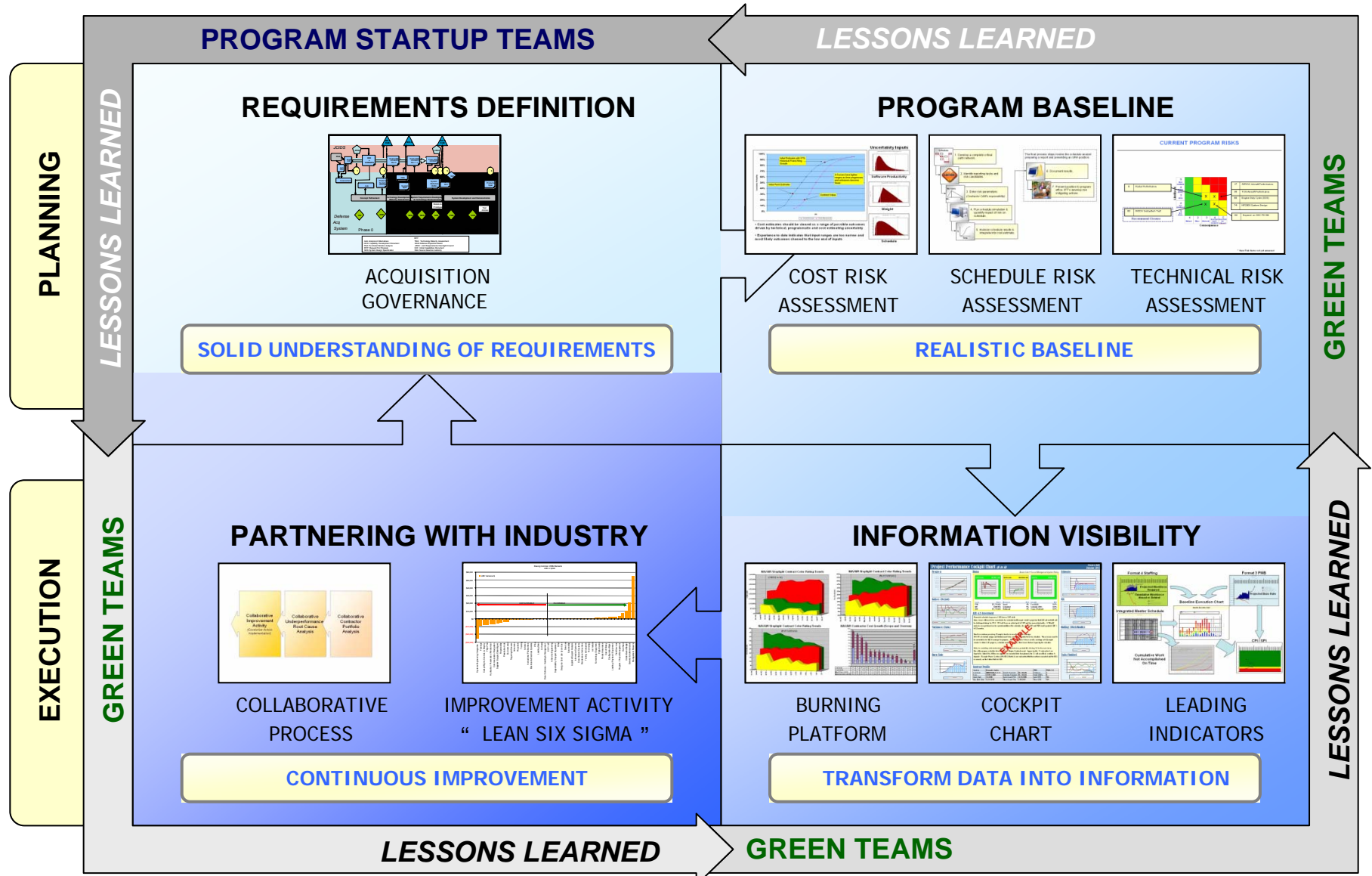
Brief to NDIA/ICPM

January 13, 2009

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AIR-4.1



IMPROVEMENT CONTINUUM





4 Phase System Development Process

- **Framework** for an *integrated, disciplined* approach to system development
- Framework
 - Discrete phases which must be resourced with adequate funding and schedule to allow for a disciplined approach
 - Provides the required input for the 2 Pass/6 Gate Acquisition Governance Process
- Integrated
 - Brings the Enterprise together at key points in the development process to continue to ensure the emerging system is optimized for cost, schedule, capability and supportability
- Disciplined
 - Deliberate, systematic approach focused on system optimization
 - Begins with requirements and continues through design, development and verification
 - Proactive balancing: minimize development timeline while retaining the trade space necessary for system optimization

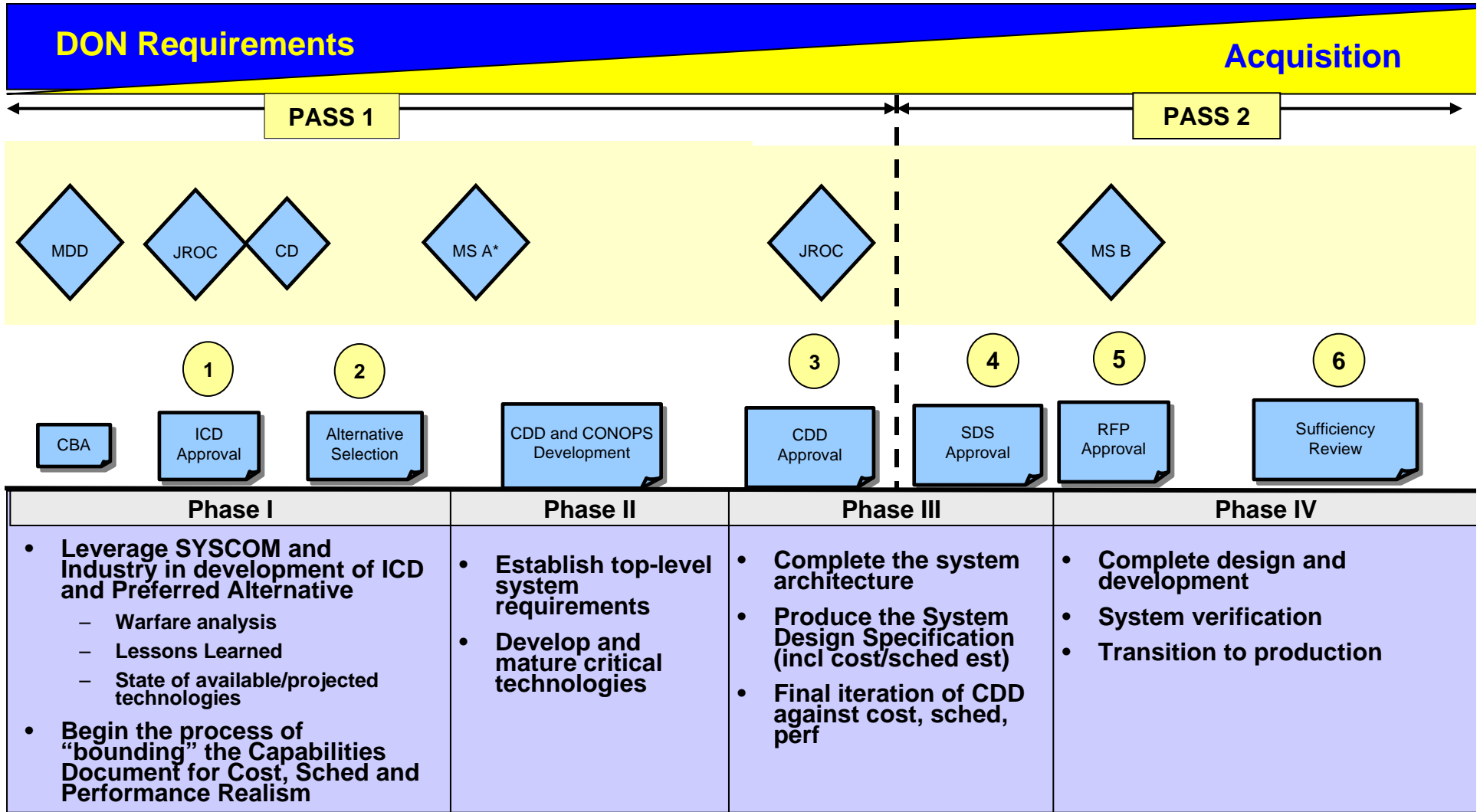


System Development Phases

- Phase I – Material Solution Analysis (MSA)
 - **Establish initial set of Operational Capabilities and resolve to a Material Solution (aviation, ship, ground)**
 - **Broad focus to ensure all types of solutions receive appropriate consideration**
 - **Maximize leverage of gov't and industry knowledge base**
- Phase II – System Requirements & Technology Development (SRTD)
 - **Establish system performance requirements and detailed CONOPS**
 - **Develop critical technologies**
 - **Relatively broad focus to maximize leverage of emerging technologies (stay ahead of the threat)**
- Phase III – System Architecture & Technology Demonstration (SATD)
 - **Complete the system architecture – requirements derivation and decomposition to subsystems**
 - **Demonstrate maturity of critical technologies**
 - **Narrowing focus down to a complete system architecture and preliminary design while allowing for optimization against cost and schedule**
- Phase IV –Engineering and Manufacturing Development (EMD)
 - **Complete the design, development and verification**
 - **Deliver the compliant weapon system to Operational Test/IOC**



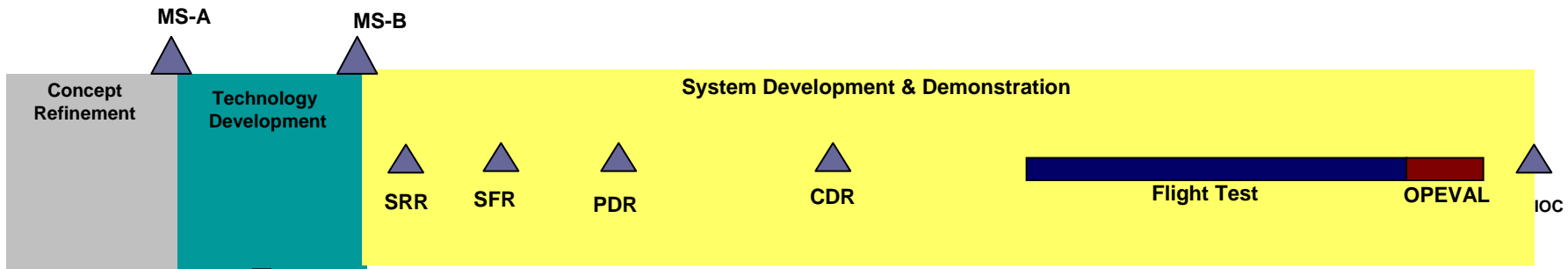
ACQUISITION GOVERNANCE AND 4 PHASE SYSTEM ENGINEERING PROCESSES



4 PHASE SYSTEMS ENGINEERING PROCESS IS A CRITICAL UNDERPINNING OF EFFECTIVE ACQUISITION GOVERNANCE

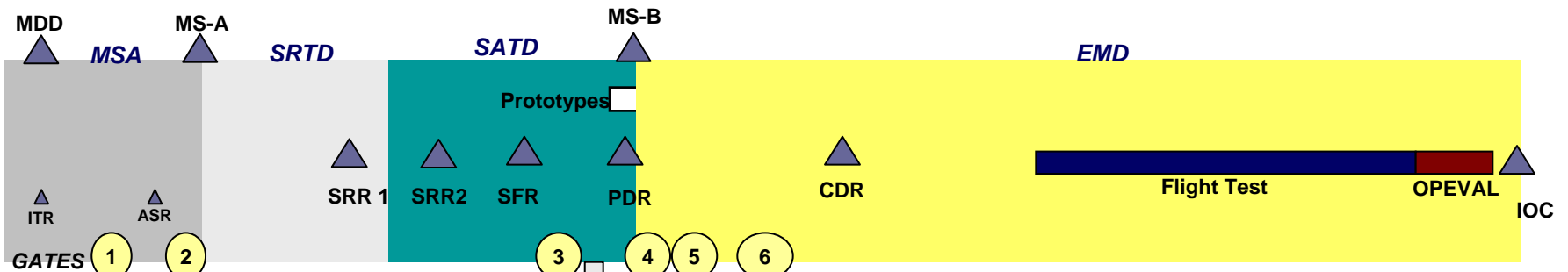


SE PROCESS Before and After



CDD, Program Baseline

- TD phase is optional
- CDD locked down, cost and schedule established before any systems engineering occurs
 - trade space constrained too early to allow for system optimization across cost, schedule and performance
 - major program investment decisions based on inaccurate data
 - results in cost/schedule overruns and/or requirements shedding

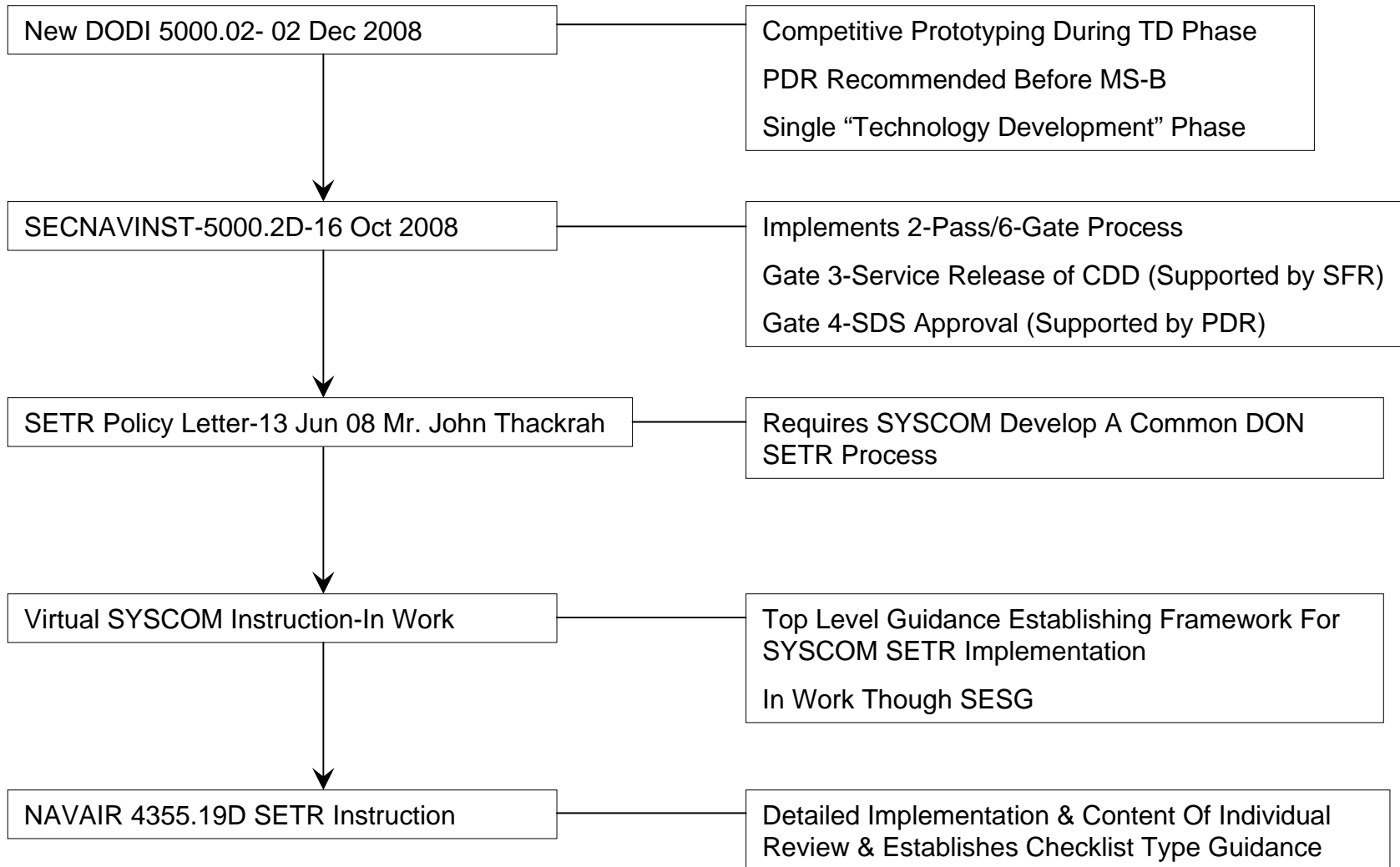


CDD, Program Baseline

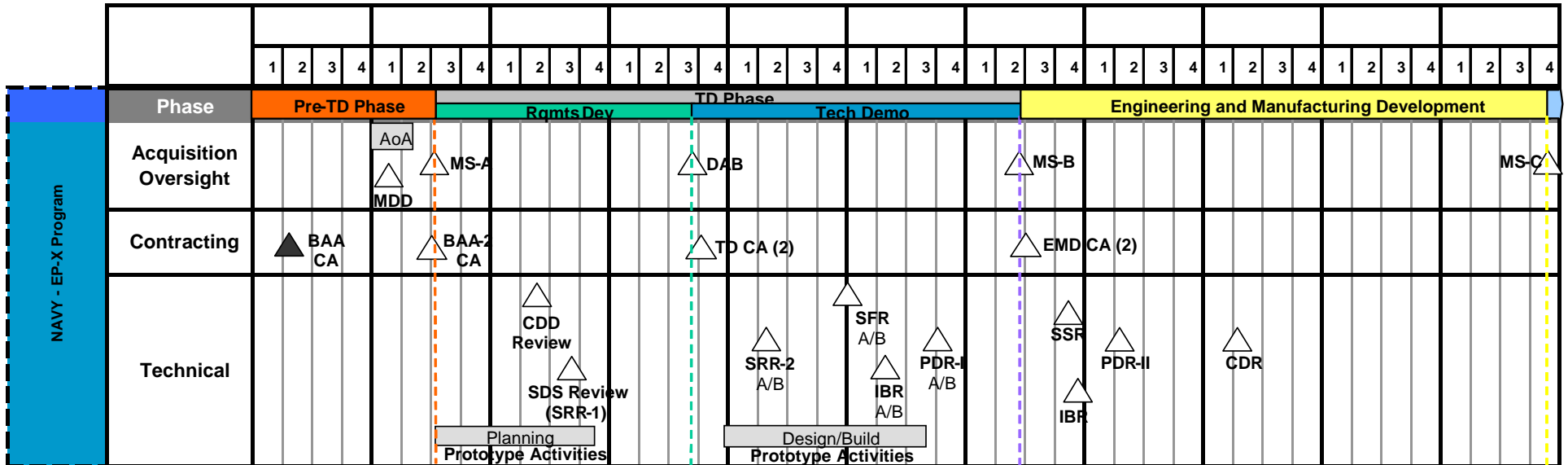
- CDD and APB locked down after full scope of program established
- Gain advantages of competition at minimized cost
- Substantiate offerors' management systems and staffing before EMD contract award



Implementing Guidance



FOUR-PHASE FRAMEWORK APPLICATION



4-Phase SE process	Phase I	Phase II	Phase III	Phase IV
	<ul style="list-style-type: none"> Analyze alternative solutions & associated costs Develop initial system requirements Draft CDD Initial System Concepts developed by Industry Cost, schedule and performance drivers identified Initial cost estimate established 	<ul style="list-style-type: none"> Establish achievable and affordable requirements Final CDD and Govt SDS, with requirements guided by: <ul style="list-style-type: none"> Mission accomplishment TOC avoidance and reduction R&D Production Sustainment Prototype and M&S plans developed TOC avoidance and reduction opportunities identified Cost estimate updated 	<ul style="list-style-type: none"> Reduce cost, schedule, and tech risk prior to EMD Develop detailed cost, sched, and tech data to inform MS B and the EMD source selection Establish system functional baseline requirements Identify resource and sched requirements Complete prototyping activities Establish TOC models to validate analyses Analyze and recommend TOC avoidance and reduction opportunities and trades Complete Independent Cost Estimate 	<ul style="list-style-type: none"> Complete system design, development, and T&E Implement TOC avoidance and reduction designs, programs, and initiatives Deliver Initial Operational Capability
	<ul style="list-style-type: none"> Outcomes 	<ul style="list-style-type: none"> Outcomes 	<ul style="list-style-type: none"> Outcomes 	<ul style="list-style-type: none"> Outcomes
				<p><u>Acronym Key</u></p> <ul style="list-style-type: none"> BAA (Broad Agency Announcement study contract) CA (Contract Award) AoA (Analysis of Alternatives) MDD (Material Development Decision) MS (Milestone) CDD (Capabilities Development Document) SDS (System Functional Specification) DAB (Defense Acquisition Board) TD (Technology Development) SRR (System Requirements Review) SFR (System Functional Review) IBR (Integrated Baseline Review) PDR (Preliminary Design Review) SSR (System Software Review) CDR (Critical Design Review)

SCHEDULE REALISM + S.E. = PROGRAM EXECUTION PRECISION

SUMMARY

- Advanced processes and tools in place to significantly raise tide of program performance
- Back to basics approach delivers real results
- Necessary allocation of schedule and funding prior to Milestone B are essential enablers – “Start Slow to Go Fast”
- Next steps include comprehensive standard work/standard skills implementation and workforce training
- Successful outcomes require synchronization of government and industry initiatives

UNIQUE OPPORTUNITY FOR GENERATIONAL CHANGE



BACKUP

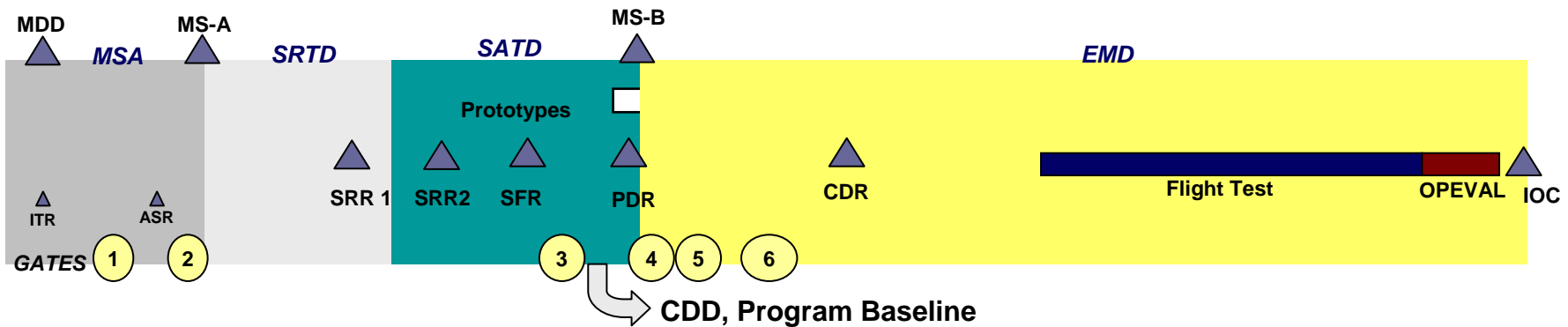


System Development Phases and TOC

- **Phase I – Material Solution Analysis (MSA)**
 - Warfare analysis, modeling and simulation, provide initial “sensitivity analyses” on impacts to TOC of the various alternatives being assessed. These analyses inform the ICD and initial version of the CDD that emerges post m/s A
- **Phase II – System Requirements & Technology Development (SRTD)**
 - Identify TOC “levers” – attributes of the weapon and support system that significantly influence TOC
 - Develop top level system requirements that reflect the TOC objectives
 - Begin the process of driving TOC levers into the design in a discrete and measurable way
- **Phase III – System Architecture & Technology Demonstration (SATD)**
 - Decompose and allocate the TOC levers to appropriate subsystems, driving further into the design
- **Phase IV –Engineering and Manufacturing Development (EMD)**
 - Verify that TOC objectives have been met



4 Phase Process Enables TOC Control

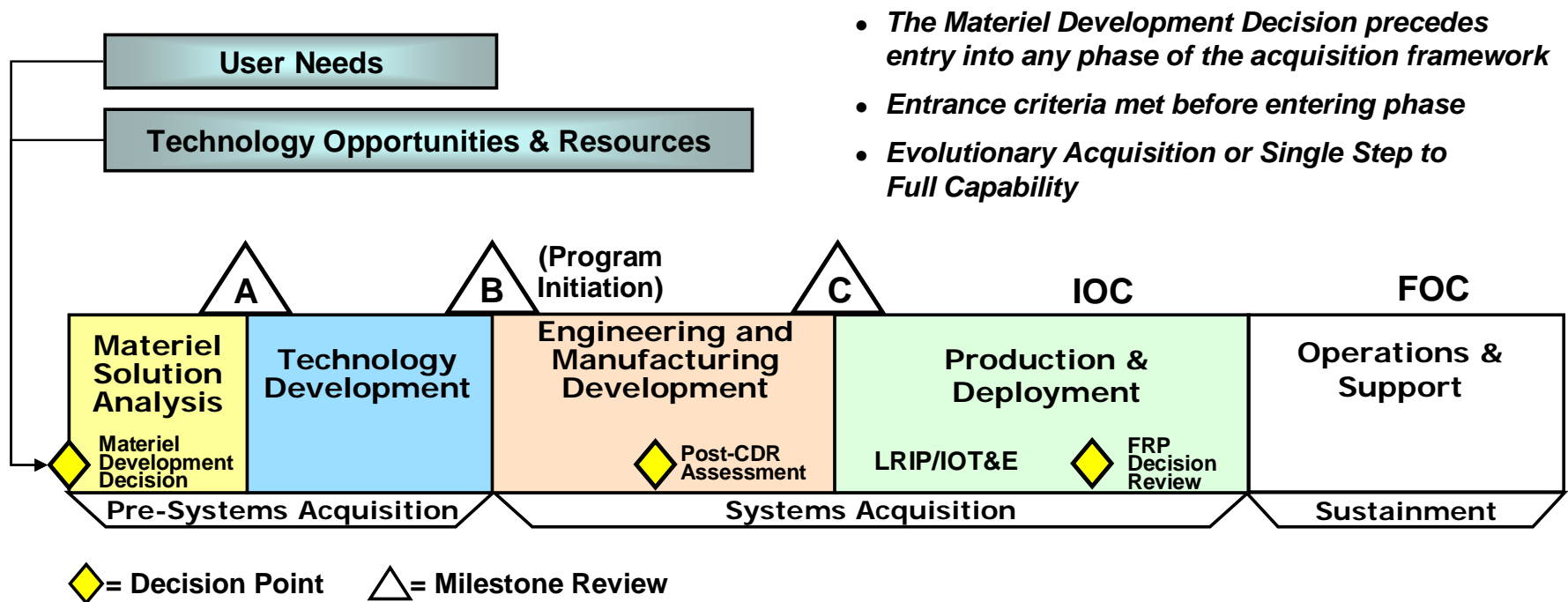


- Offerors' subcontractor management and overall cost performance demonstrated in Phase III can be factored into source selection (RDT&E)
- Fewer surprises during EMD when burn rates are much higher (RDT&E)
- Investment cost projections far more accurate at MS-B (RDT&E, Prod, O&S)
- Trade space held open to allow for system optimization (RDT&E, Prod, O&S)
 - TOC “levers” identified, opportunities to emphasize as part of downselect to EMD
 - Competitive prototyping can be aimed at TOC levers in addition to critical technology elements



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- IMPLEMENTS COMPETITION AND PROTOTYPING
- SYSTEM LEVEL PDR PRIOR TO MS B





KEY ELEMENTS OF APPROACH

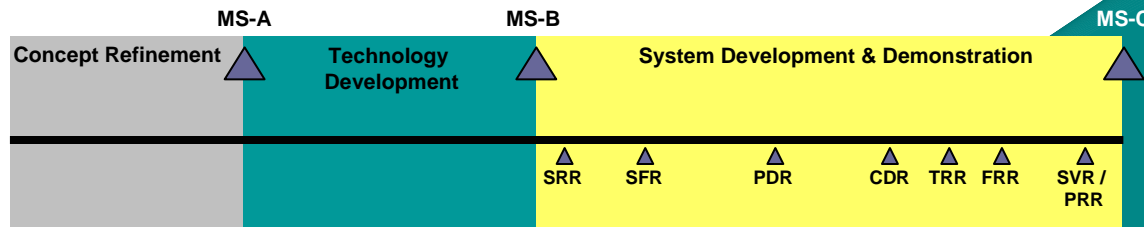
- Advanced Systems Engineering (SE) Processes Set Conditions For Successful Development, Production And Sustainment Phases
 - “Back To Basics” SE Approach
 - Essential Partnership Between Fleet, Resources/Requirements And Acquisition
- Systematic Pre-MS B Planning & Precise Post-MS B Execution
- Pre-Milestone B Activity
 - CBA/AoA Revitalization To Set Program Foundation
 - Adherence To Systems Engineering Technical Review (SETR) Process
 - Methodical Optimization Exercise To Balance Performance/Cost/Schedule
 - Produce High Fidelity, Decision-quality Data For Use In The Acquisition Governance Process
 - Targeted 80-90% Solution With Open Architecture Design Enabling Spiral Strategy
- Post-Milestone B Activity
 - Disciplined Execution With Strict Focus On Affordability And Total Operating Cost
 - Success Driven By Advanced Leading Indicators/Metrics
- 4-Phase Acquisition Framework Proposed For Navy-Wide Application

START “SLOW” TO GO FAST!



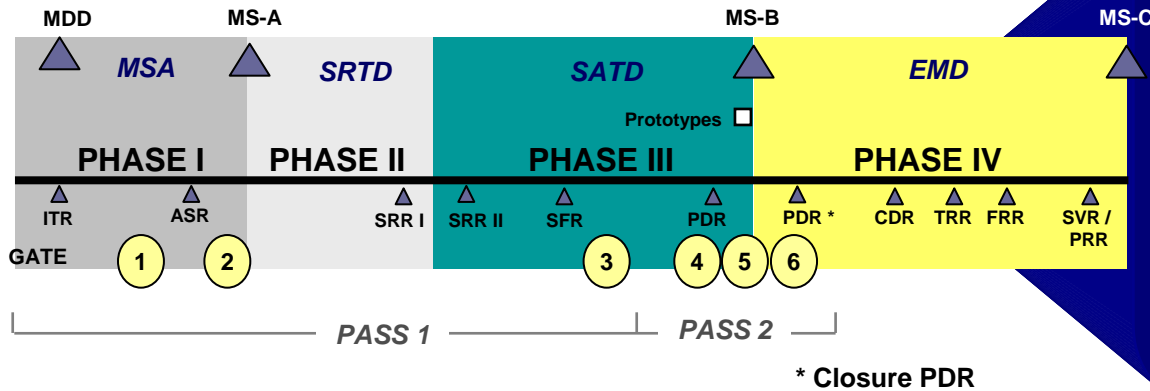
IMPROVED SE PROCESS

AS IS



- ENTER MS-B WITH AN IMMATURE SYSTEM SPECIFICATION
- RESULTS IN LESS INFORMED MILESTONE DECISIONS
- FOSTERS POORLY DEFINED PROGRAM ASSUMPTIONS & BASELINES
- LEADS TO COST / SCHEDULE GROWTH DURING EXECUTION

TO BE...

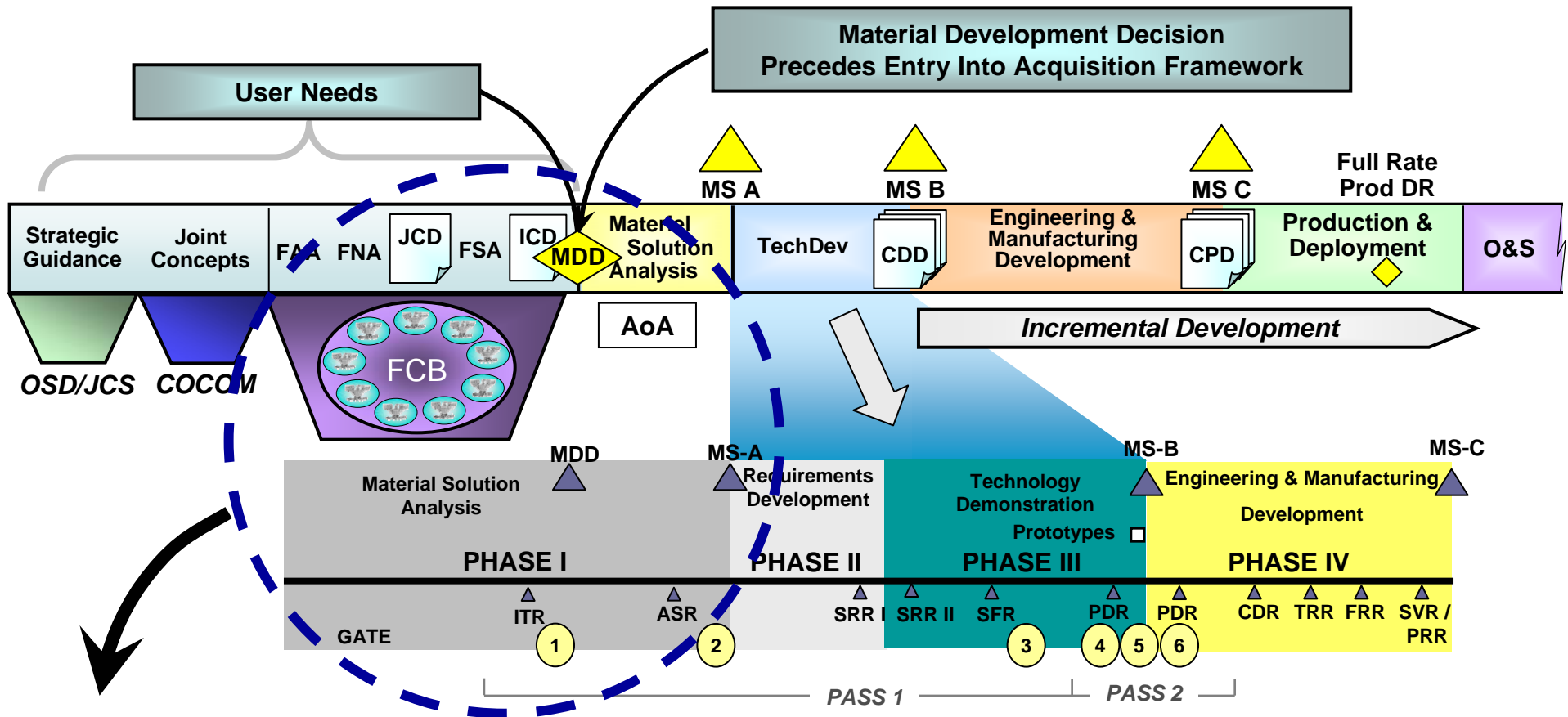


- OUTPUT OF EACH PHASE MEETS INPUT CRITERIA FOR GATE REVIEWS
- GREATER OPPORTUNITY FOR MATURING CRITICAL TECHNOLOGIES
- ALLOWS FOR COMPETITIVE PRESSURES TO BETTER OPTIMIZE COST/SCHED/PERFORMANCE
- GREATLY IMPROVED LIKELIHOOD OF MEETING COST/SCHED

...Build A Better Execution Plan



IMPLEMENTED BY 4-PHASE PROCESS



Early Involvement Supports User Led Studies By Providing Informed Technical, Cost and Risk Considerations for Possible Design Solutions And Enhancing Acquiring SYSCOM Understanding of Operational Needs, Technology Implications

Result is a User-Technical-Programmatic Team to Execute After MDD, Support AoA with Needed Expertise and Develop Better Defined and Disciplined Program Strategy by MS A



IMPORTANCE OF PHASE I

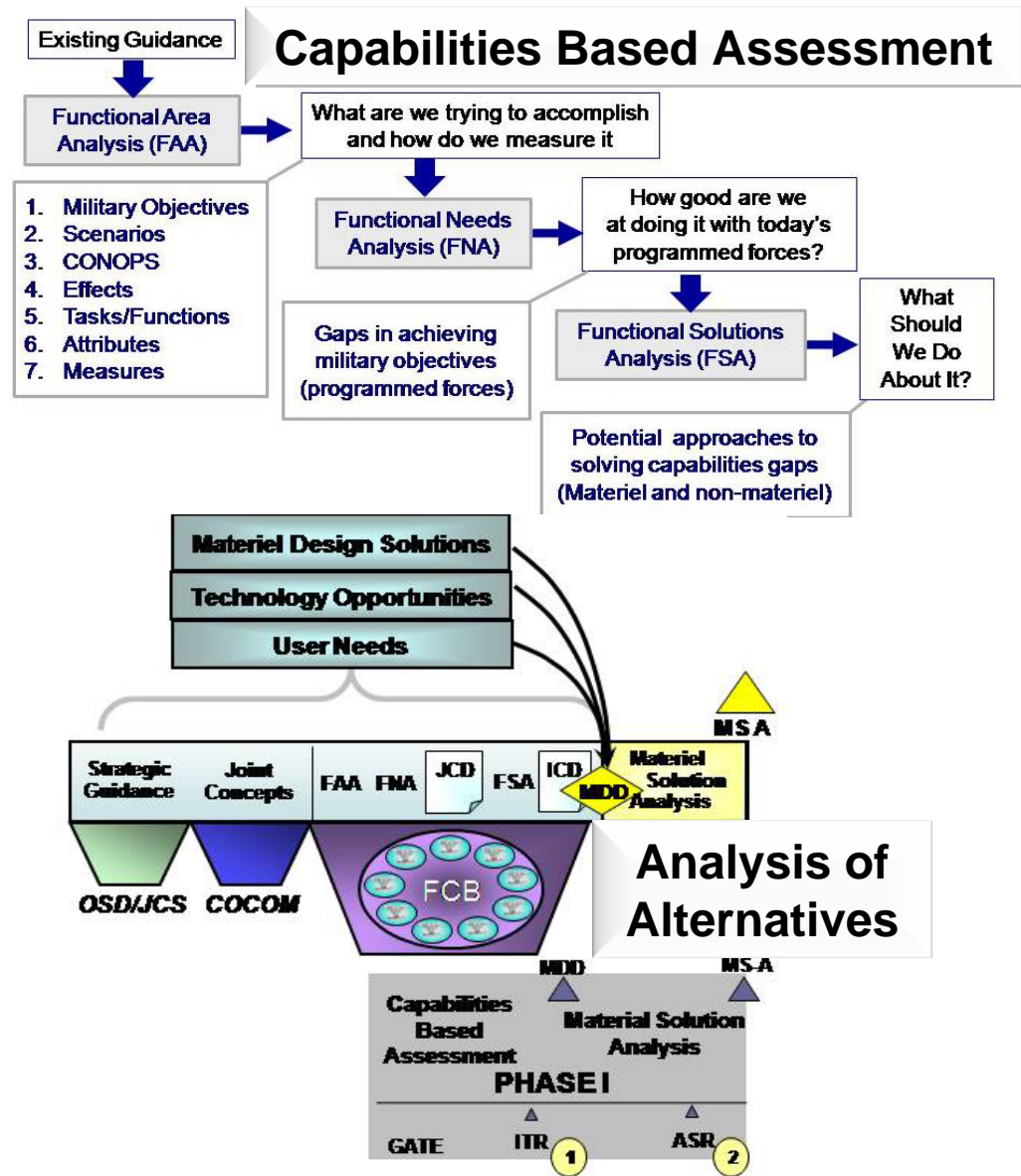
Involvement in CBA Enables Better Understanding of the Operational Context Necessary to Define and Analyze Derived Requirements

CBA is Scenario Driven (Based on DoD/Navy Analytic Agenda) and Provides Foundation for Future Requirements and How We Verify

AoA Provides Basis For:

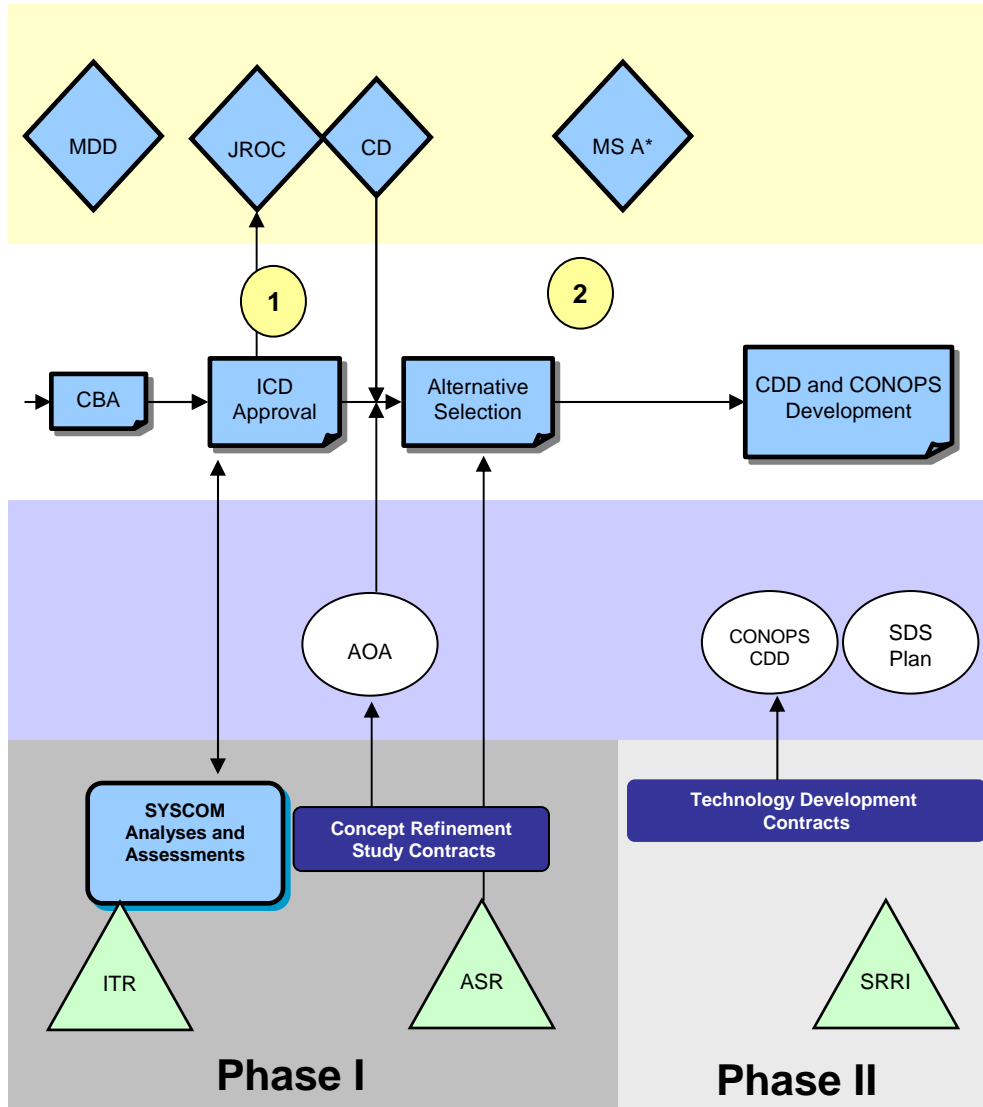
- Preferred System Concept
- Key Performance Parameters (KPP) and Key System Attributes (KSA)
- Technology Development Strategy (TDS)
- Threshold/Objective Values for Capabilities Development Document (CDD)
- Linkage of MOEs to Performance (MOPs)
- T&E Strategy
- Input to Preliminary Specification

SYSCOM/PEO Support/Involvement Key to Program Understanding and Success





ACQUISITION GOVERNANCE SYSCOM-LEVEL IMPLEMENTATION PHASE I/II



PHASES I AND II FEEDS CBA (FAA, FNA, & FSA) GATES 1, & 2

- **CBA – FAA, FNA, AND FSA**

- SYSCOM M&S TEAMS AND S&T OFFICE
 - INFORM WARFARE ANALYSIS
 - PROVIDE CURRENT TECHNOLOGY READINESS & MANAGE S&T PORTFOLIO
- SYSCOM TECHNICAL TEAMS
 - INFORM PREFERRED SYSTEM ARCHITECTING
 - CAPTURE FOUNDATION OF ANALYSIS & REQS

- **GATE 1 – ICD APPROVAL**

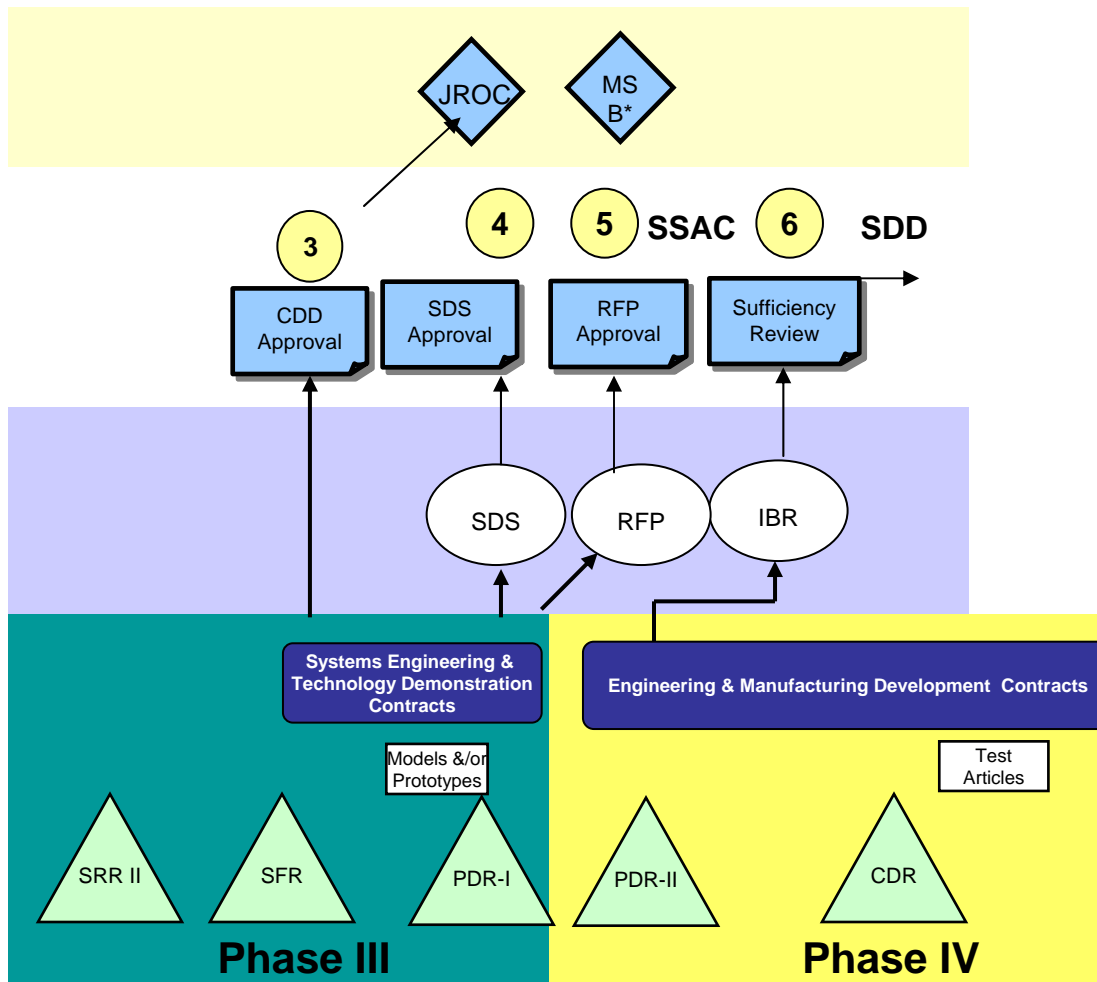
- SYSCOM ASSESSMENT OF EMERGING ICD
 - BATTLESPACE, INTEROPERABILITY AND KILL-CHAIN ANALYSES
 - STATE OF TECHNOLOGY
 - SUFFICIENT DEFINITION TO SUPPORT TECHNICAL BASELINE DEVELOPMENT
- INITIAL TECHNICAL REVIEW (ITR)
 - INFORM ICD AND AoA PLAN BEGIN DEVELOPING THE PROGRAM BASELINE

- **GATE 2 – ALTERNATIVE SELECTION**

- ALTERNATE SYSTEM REVIEW (ASR)
 - DEVELOP INITIAL SYSTEM REQUIREMENTS FULLY LINKED TO ICD AFTER AoA
 - COST EFFECTIVENESS / AFFORDABILITY
 - OPERATIONAL EFFECTIVENESS AND SUITABILITY
 - COMPREHENSIVE RATIONALE FOR PREFERRED SOLUTION
 - TECHNOLOGY DEVELOPMENT STRATEGY (TDS)



ACQUISITION GOVERNANCE SYSCOM-LEVEL IMPLEMENTATION PHASE III/IV



PHASE III FEEDS GATES 3, 4 & 5 (SDS, CDD & RFP APPROVAL)

• GATE 3 – CDD AND CONOPS APPROVAL

- INFORM CDD & CONOPS APPROVAL
 - INDUSTRY ARCHITECTS PREFERRED SYSTEM IN COMPETITIVE ENVIRONMENT
 - BOUND TECHNICAL RISK, COST AND SCHEDULE
 - ESTABLISH CDD TO SDS TRACEABILITY
 - EVALUATE KPP, KSA COMPLIANCE

• GATE 4 & 5 – SDS & RFP APPROVAL

- DEVELOP THE TECHNICAL BASELINE AND COMPLETE SYSTEM DEFINITION – **PRODUCE THE SDS**
- DETAILED COST AND SCHEDULE ESTIMATES (IBR QUALITY)
- DEMONSTRATE CRITICAL TECHNOLOGIES
 - MODELS / PROTOTYPES
- PDR & PDR REPORT FOR MS-G
- RFP FOR EMDD

PHASE IV FEEDS GATE 6

• GATE 6 – SUFFICIENCY REVIEW

- CONDUCT INTEGRATED BASELINE REVIEW (IBR)
- CDR, SYSTEM QUALIFICATION & DEMONSTRATION

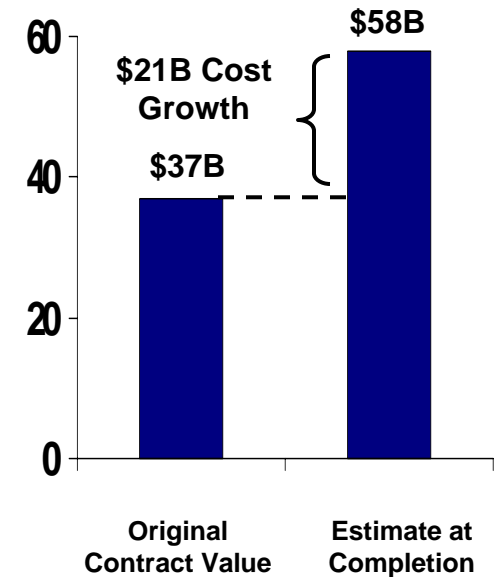
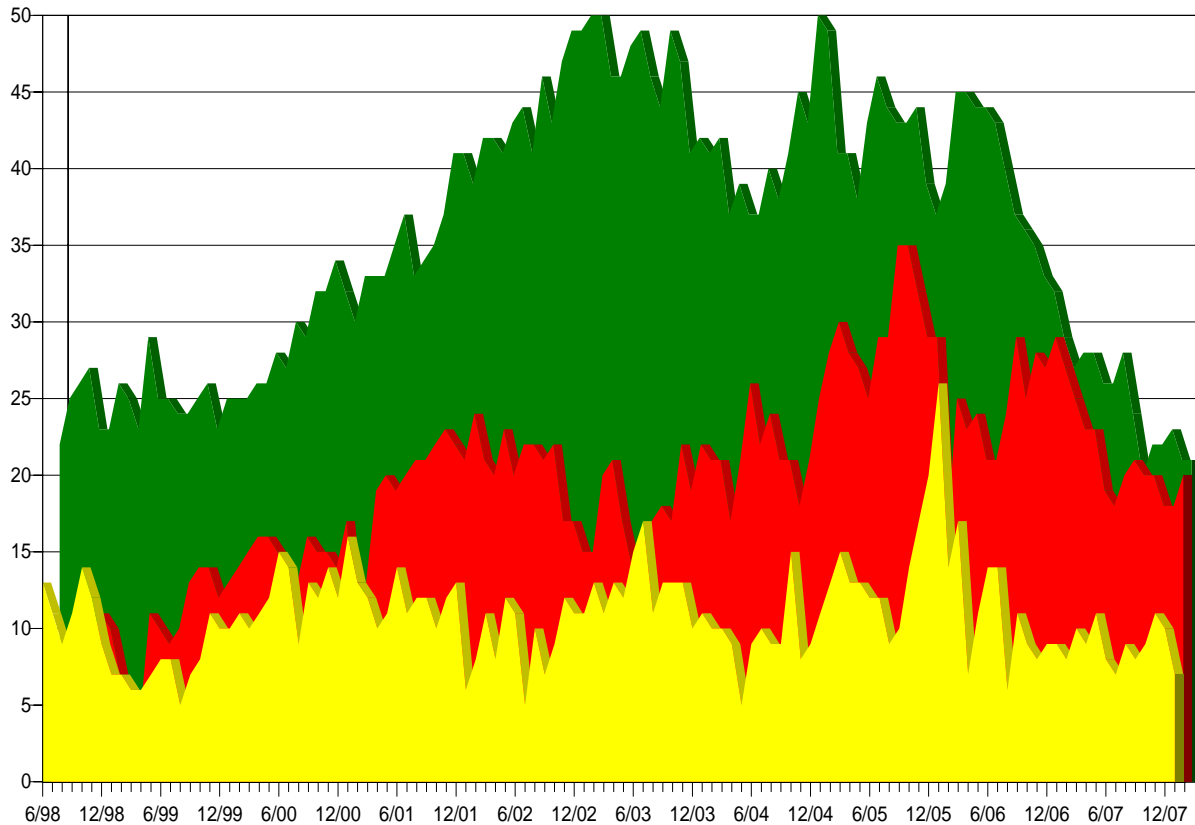


Burning Platform

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Contract Color Rating Trends (# of Contracts – Jun '98-Feb '08)

- G** \geq .95 SPI, CPI or \leq +/- 5% VAC
- R** \leq .90 SPI, CPI or \leq +/- 10% VAC
- Y** = .90-.95 SPI, CPI or 0-10% VAC



Experiencing \$21B Cost Growth In System Development & Demonstration Contracts



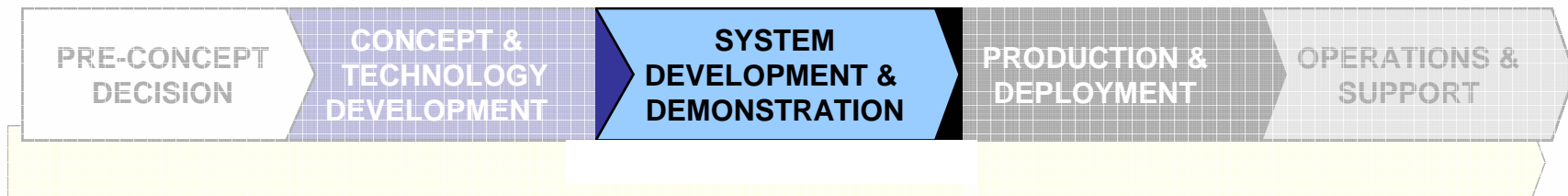
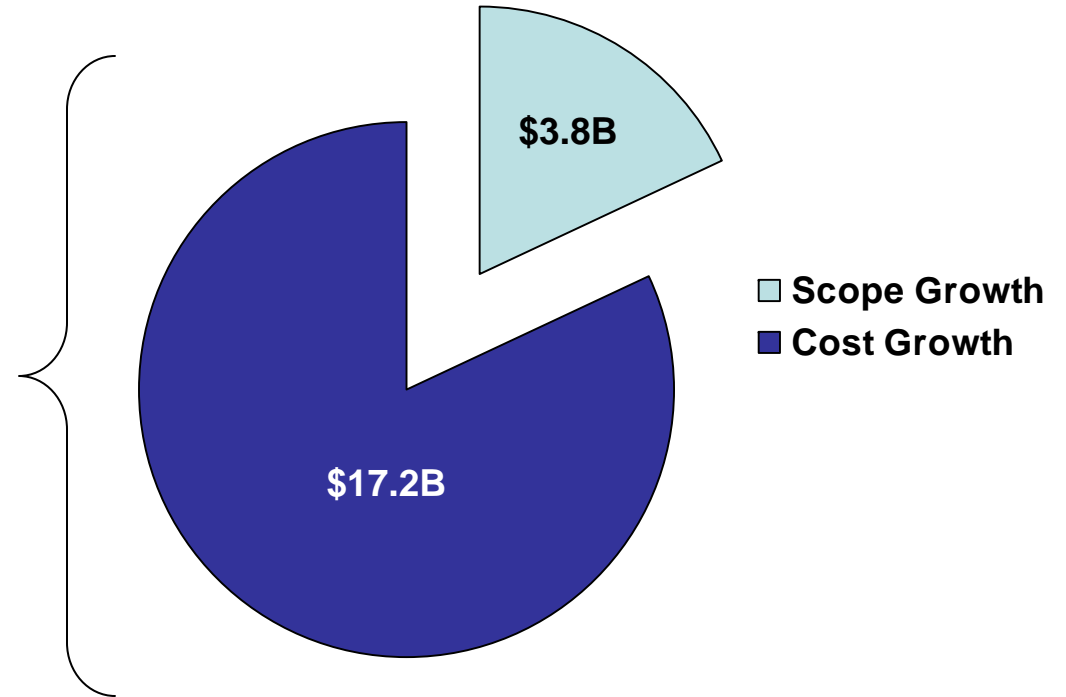
Cost Growth

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Active Contract Growth on 48 NAVAIR Contracts providing Earn Value Data*



\$21B is roughly equal to 260-270 F/A-18E/Fs in today's dollars



*For Official Use Only – Based on APR 08 AIR-4.2 EVM Data



Program Performance

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