



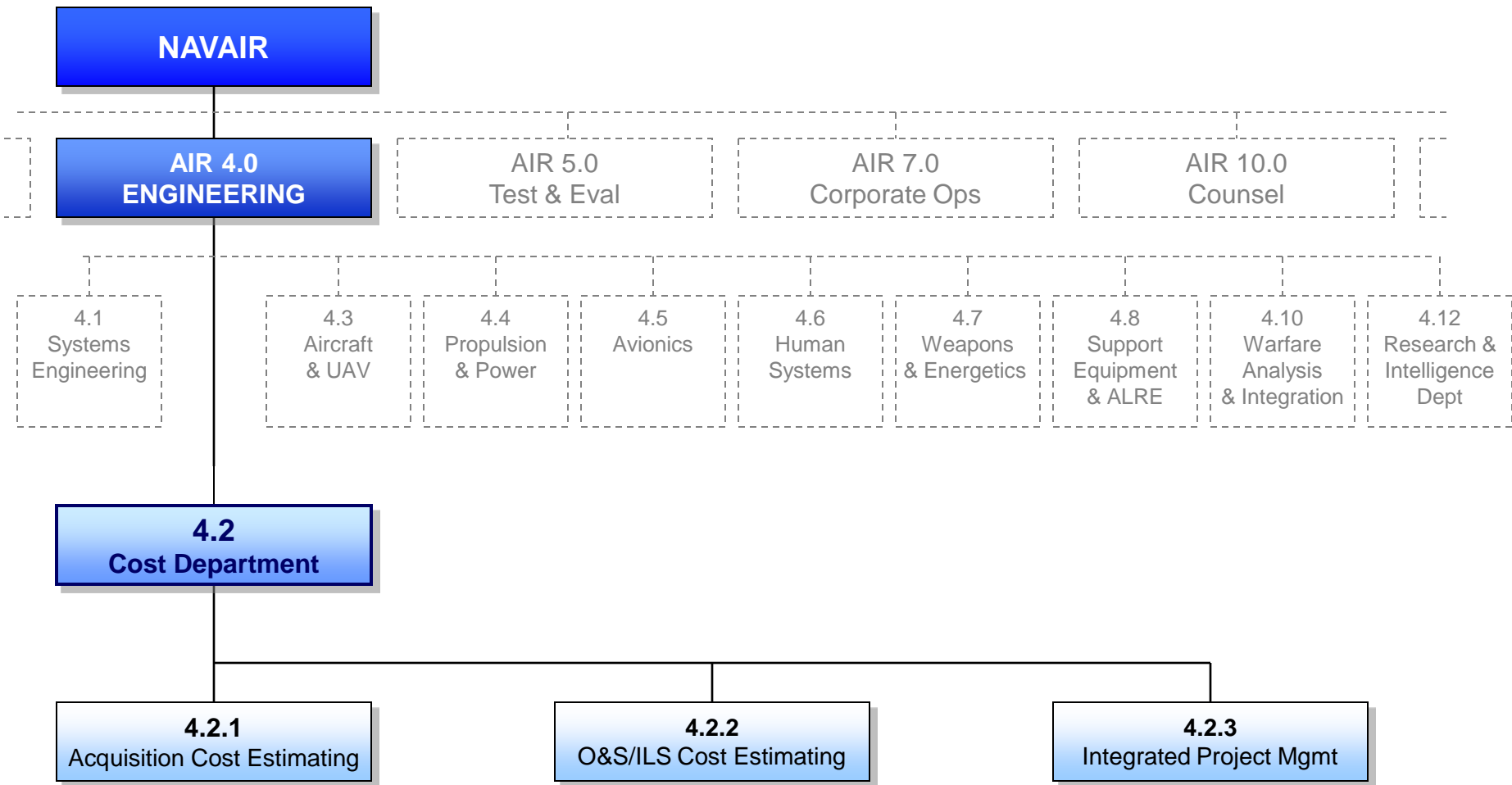
COST ANALYSIS OVERVIEW

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NAVAIR COST DEPARTMENT ORGANIZATION



INTEGRAL PART OF ENGINEERING COMPETENCY



NAVAIR COST DEPARTMENT

EXAMPLE PRODUCTS

Traditional Focus

Life Cycle Cost Estimating 4.2.1 & 4.2.2

- M/S LCC Estimates
- Risk/Uncertainty Analysis
- Source Selection Cost Evaluations
- Trade Studies
- Special Studies
- PPBS Estimates

Integrated Project Management 4.2.3

- Program Performance Analysis
- Estimates To Complete (EAC)
- Schedule Risk Assessments (SRA)
- Management Systems Assessments (MSA)
- Integrated Baseline Reviews (IBR)

Increased Focus

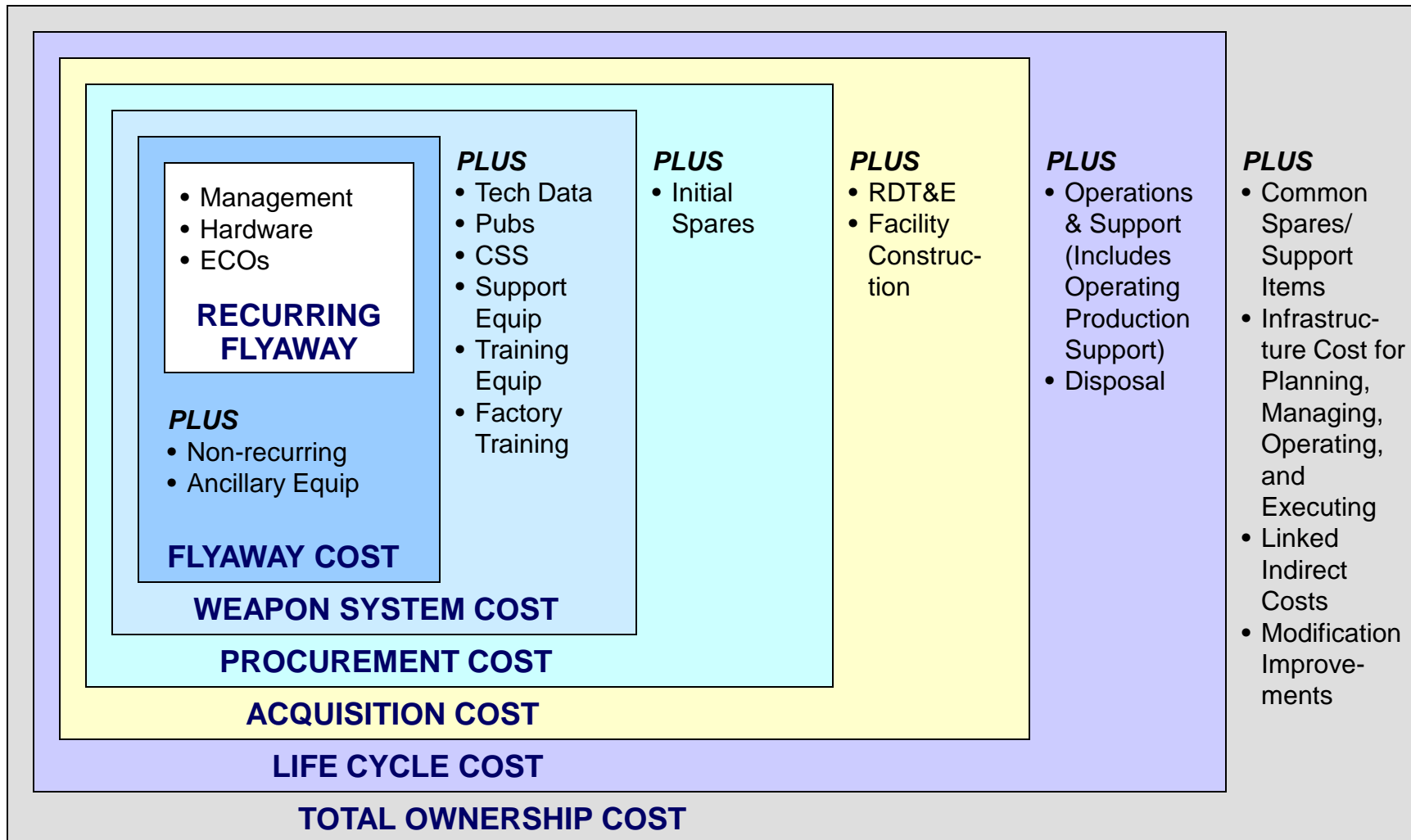
Program Performance Team SR&A, ICE, PS&T

- Strategic Research & Analysis (SR&A)
 - Business Intelligence
 - Root Cause Cost Growth Analysis
 - Hypothesis Testing
- Industry Collaborative Improvement
 - Industry Collaborative Exchanges (ICE)
- Program Support & Training (PS&T)

DATA-DRIVEN, ACCURATE ANALYSIS



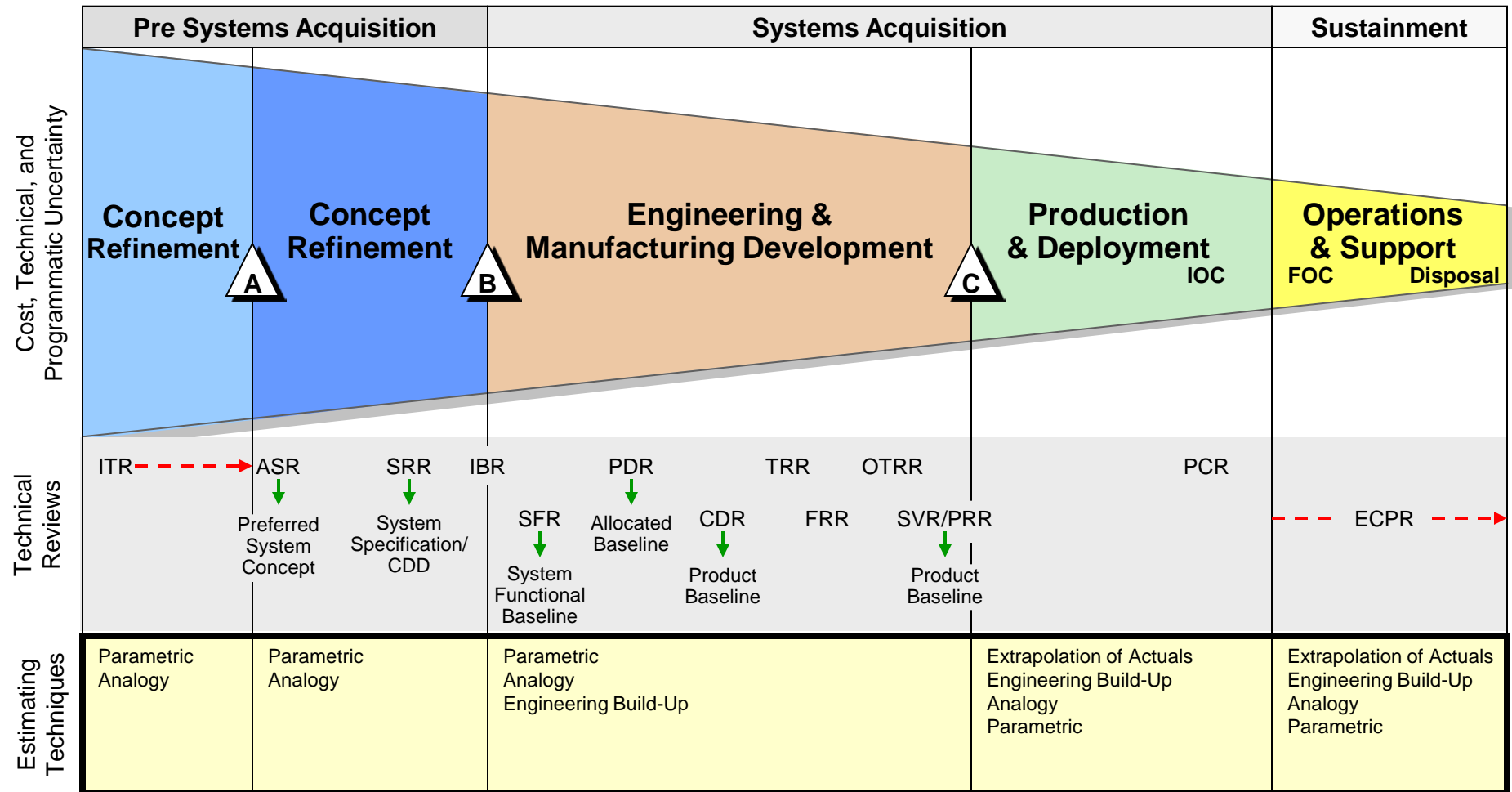
AIRCRAFT TOTAL OWNERSHIP/LIFE CYCLE COST COMPOSITION



RESPONSIBLE FOR ENTIRE COST SPECTRUM



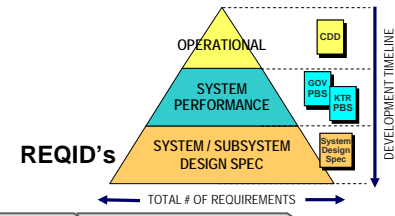
PROGRAM DEFINITION UNCERTAINTY vs. TIME



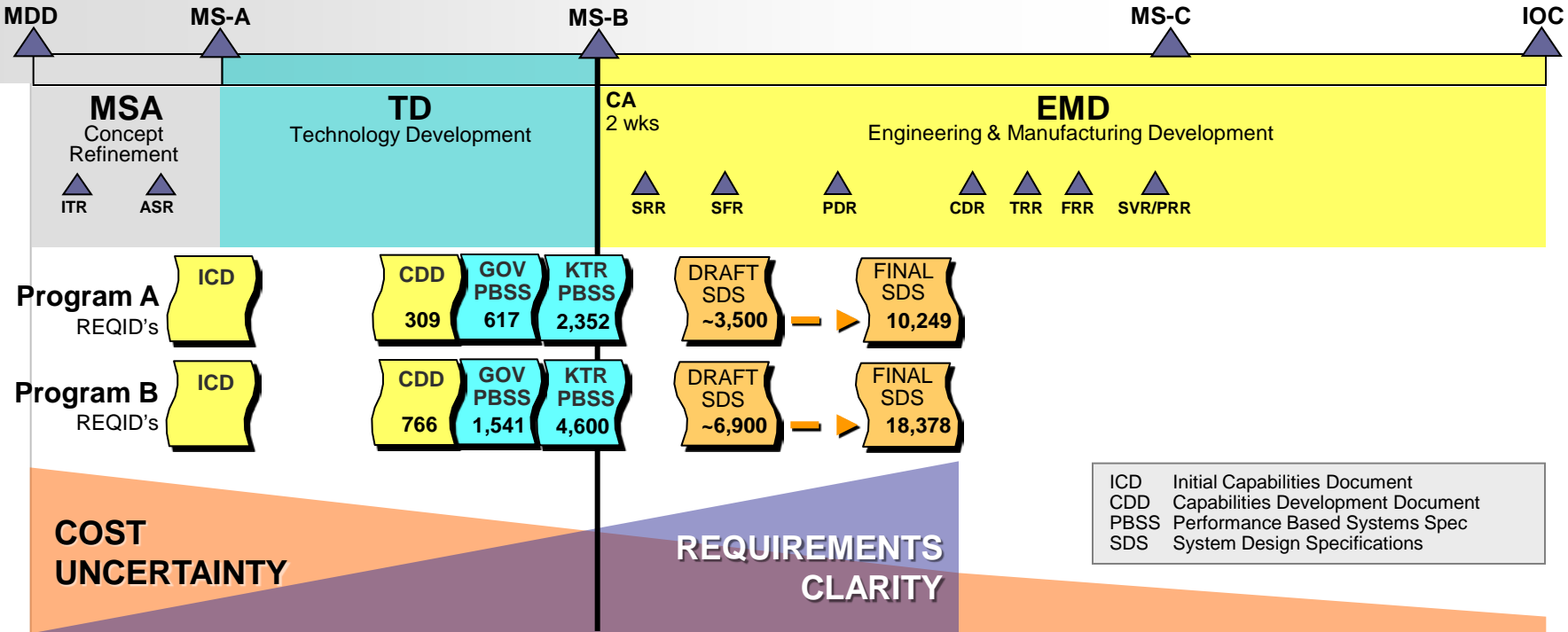
UNCERTAINTY LESSENS OVER TIME



SYSTEMS ENGINEERING PROCESS REQUIREMENTS DEVELOPMENT "AS IS"



AS IS ... DoD 5000.2



ICD Initial Capabilities Document
 CDD Capabilities Development Document
 PBSS Performance Based Systems Spec
 SDS System Design Specifications

**REQUIREMENTS & COST UNCERTAINTY
HIGH UNTIL WELL AFTER MILESTONE B**



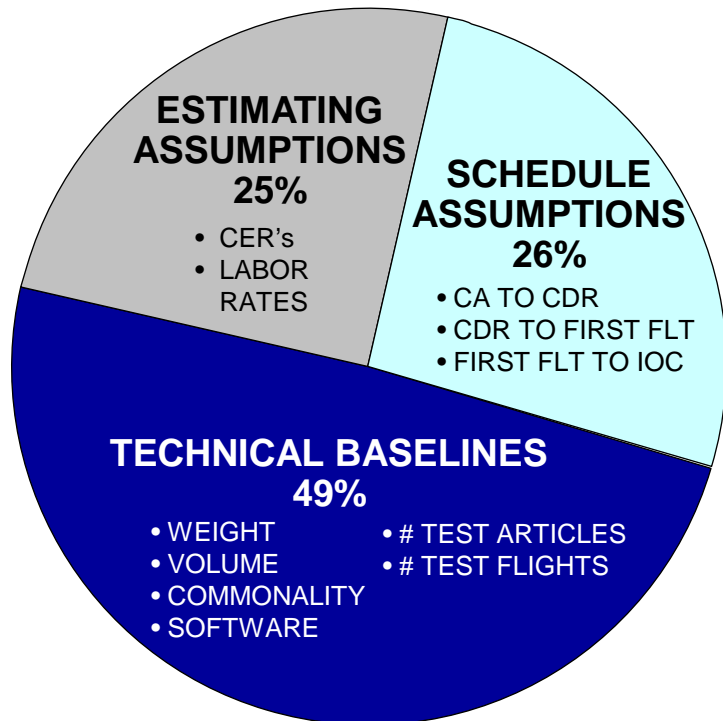
HISTORICAL COST GROWTH

(SAR2007 w/o V-22, VH-71)

RDT&E (E&MD)

**AVG RDT&E (E&MD)
COST GROWTH FROM APB***
(ACROSS ALL PROGRAMS)

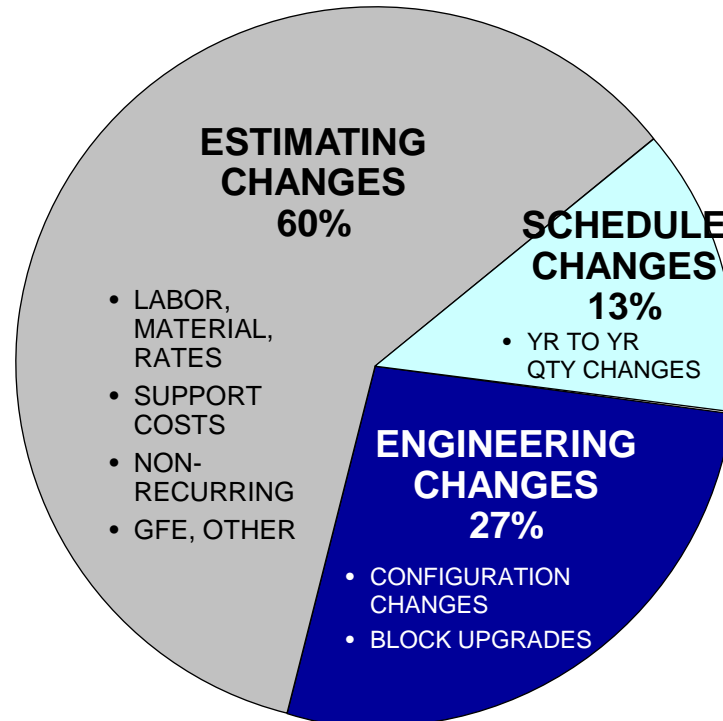
44%



PRODUCTION

**AVG UNIT PRODUCTION
COST GROWTH FROM APB***
(ACROSS ALL PROGRAMS)

31%

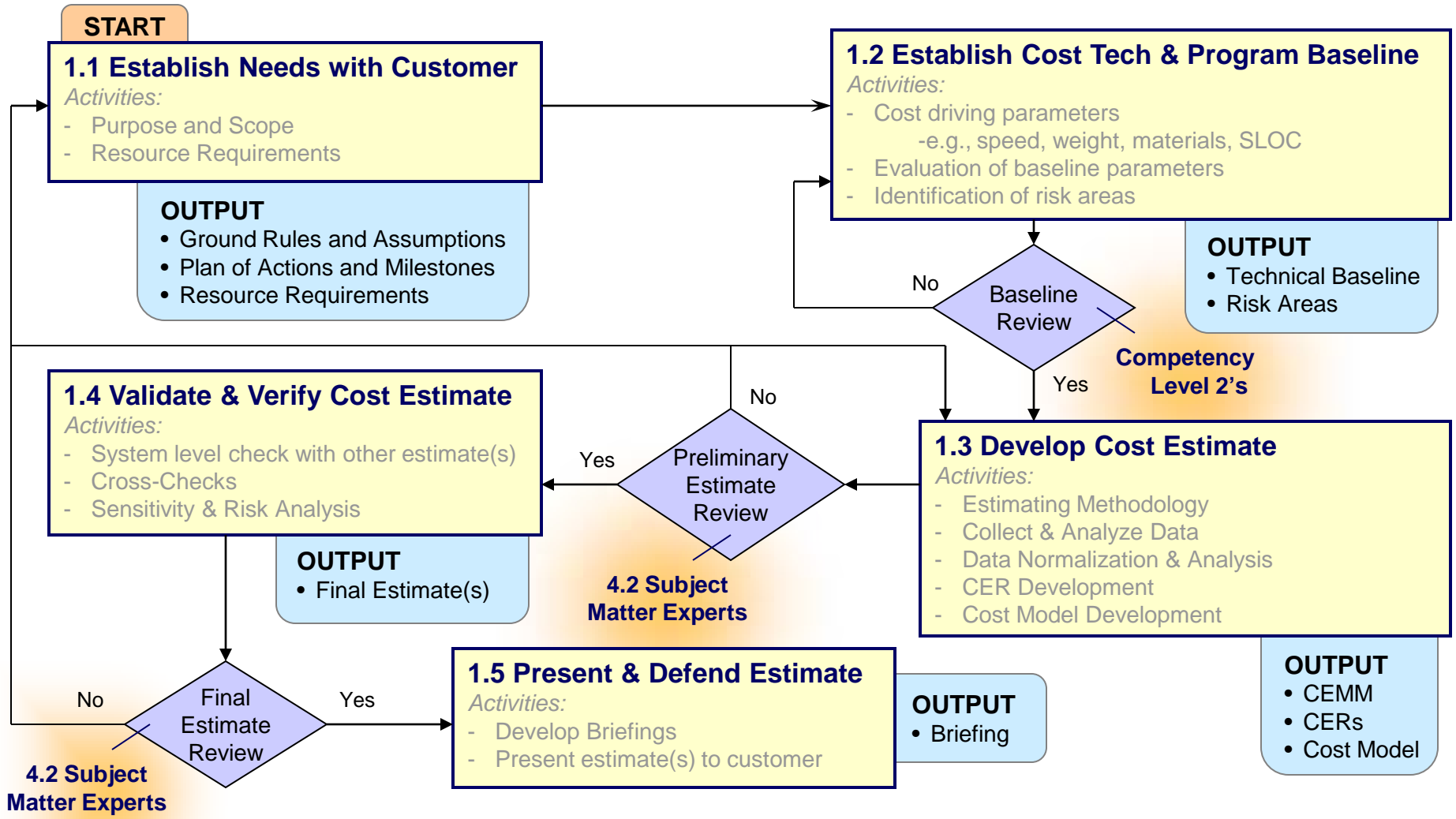


*MEASURED FROM INITIAL SAR SUBMISSION-MS-B

SIGNIFICANT APB COST GROWTH IN BOTH E&MD & PRODUCTION



PERFORM LIFE-CYCLE COST ESTIMATING PROCESS FLOW



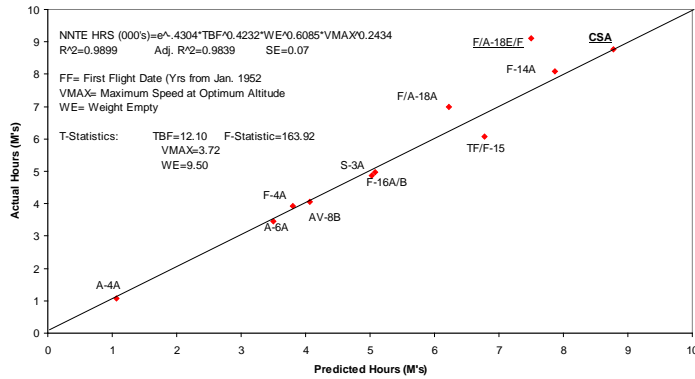
MAXIMIZE USE OF SUBJECT MATTER EXPERTS TO ENSURE QUALITY



COST ESTIMATING TECHNIQUES

Parametric

- Use when little or no historical cost information is available on the system being estimated, nor are there acceptable analogies; but there are similar systems with cost, logistic, technical, physical, and performance data available



Analogy

- Estimate cost by applying historical information of similar systems
- Use when there is data available on a system(s) that is similar to the one being estimated
- Adjust analogous cost data to reflect expected impact caused by differences in complexity, support concept, technical, programmatic, and operations

Single Platform

Example 1 (ICAP III Channelized Receiver: Non-Recurring Development FY00\$M \$31.1)

Analogy FY00\$M	Commonality	ACF	Technology Level	TF	# of Platforms	PCF	Cost FY00\$M		
\$31.1	New	1	More Complex	1.2	One	1	= \$6.2		
	Modified	0.5	ICAP III Tech Level	1.1					
	Common	0.2		0.9				Two	0.60
				0.8				Three	0.47

Example 2 (ICAP III Channelized Receiver: Non-Recurring Development FY00\$M \$31.1)

Analogy FY00\$M	Commonality	ACF	Technology Level	TF	# of Platforms	PCF	Cost FY00\$M		
\$31.1	New	1	More Complex	1.2	One	1	= \$34.2		
	Modified	0.5	ICAP III Tech Level	1					
	Common	0.2		0.9				Two	0.60
				0.8				Three	0.47

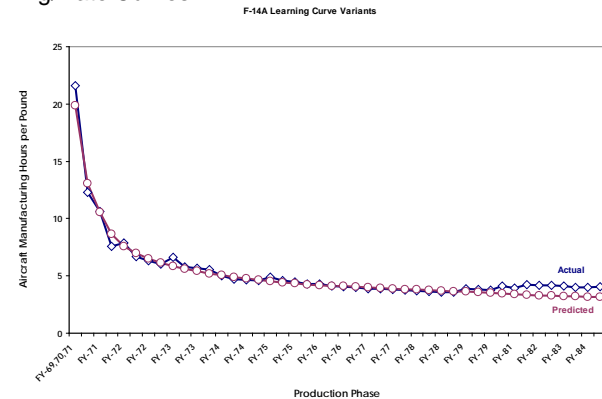
Engineering Build-Up

- Develop detail cost for each component of an item and summarize to the appropriate level
- Use when you have specific, detail data on the components of the item being estimated

I/O Card Assembly	
Sub-Task A	12.00
Sub-Task B	40.50
Sub-Task C	13.00
Std Hours @ T-100 (Min.)	65.50
Personal, Fatigue, and Delay	15%
Efficiency Factor (Realization)	90%
Proposed Hour @ T-100	82.90
T-25 at 90% Learning Curves	102.30

Extrapolation From Actuals

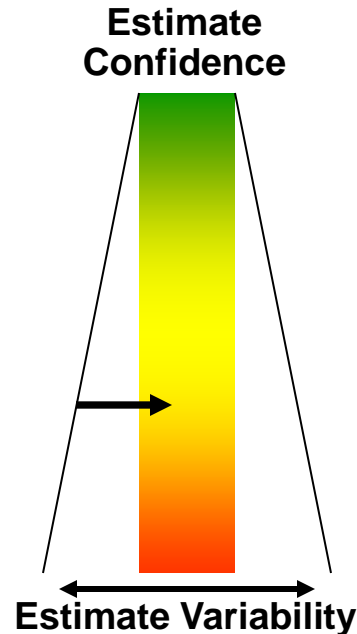
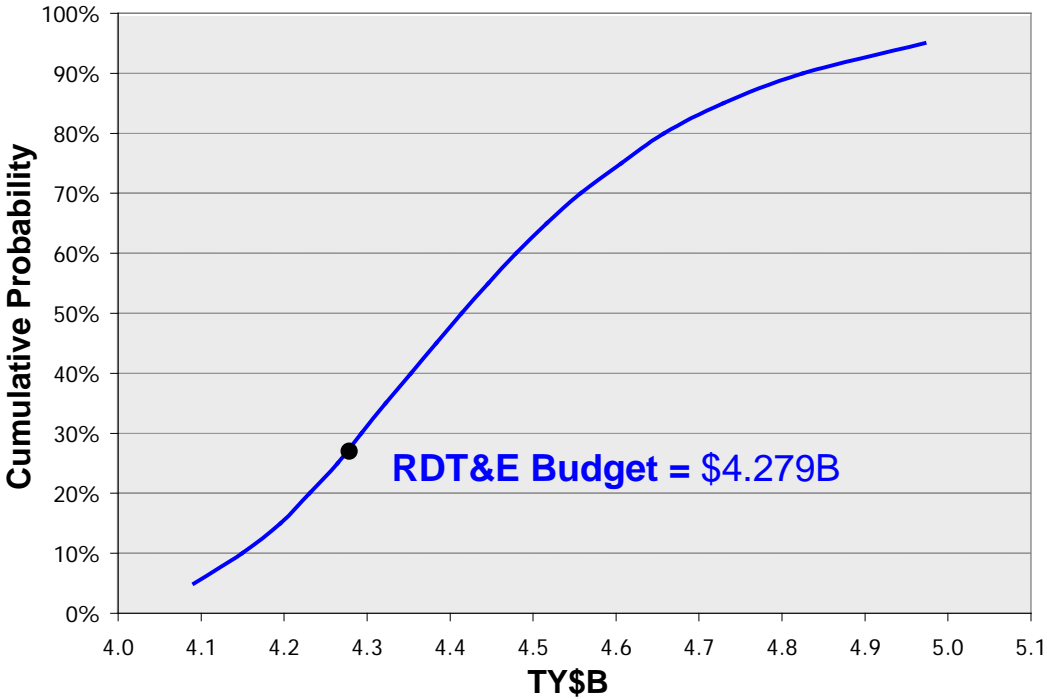
- Estimate hours/cost from previous system historical data using
 - Regression
 - Learning/Rate Curves



SAMPLE



IMPROVING PLANNING COST RISK ESTIMATES – TOTAL E&MD



Percentile	TY\$B
10%	\$4.149
20%	\$4.231
30%	\$4.293
40%	\$4.353
50%	\$4.414
60%	\$4.479
70%	\$4.557
80%	\$4.658
90%	\$4.825

- **Cost pressures**
 - Profit assumptions
 - Subcontract awards
 - Weight management
 - SETR schedule

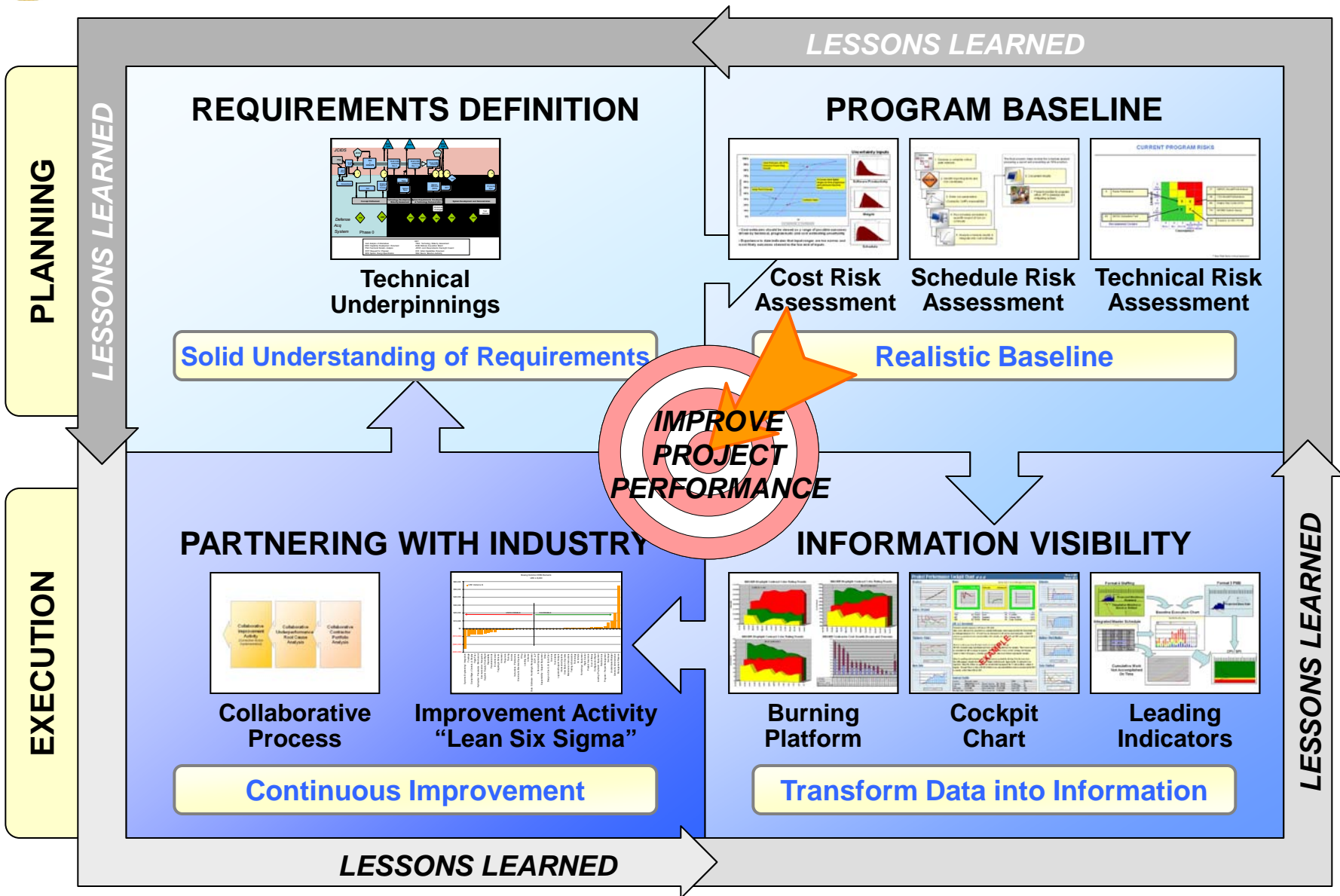
Top Cost Risk Contributors

Risk Element	Low	Estimate	High
Weight Empty (Lbs.)	40,950	42,614	42,830
Helicopter SW Productivity (Hrs/SLOC)	0.35	1.27	2.16
Ground SW Productivity (Hrs/SLOC)	0.22	0.88	1.42
Contractor Test (FY06\$M)	311.0	311.5	414.3

* Risk curve and budget reflect costs from E&MD CA in Apr 06 through IOC in Sept 15 (\$.215 FY06 + \$4.064 to FY15)

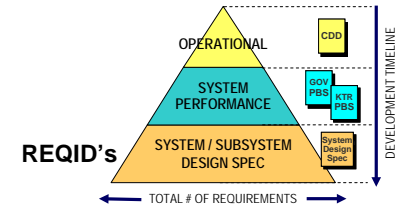


PROGRAM PERFORMANCE SUPPORT ANALYSIS AND TOOLS

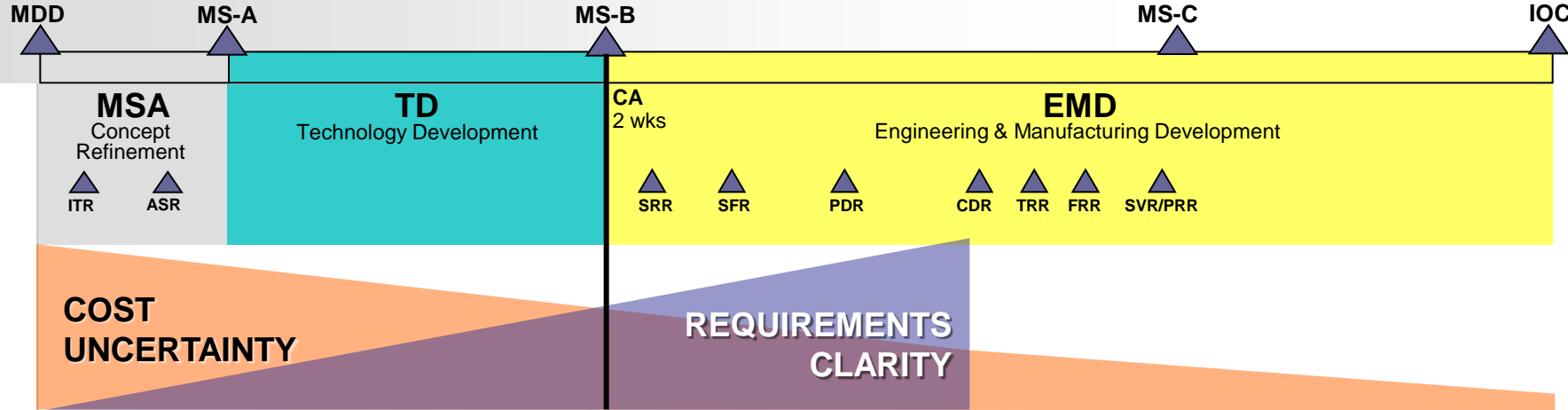




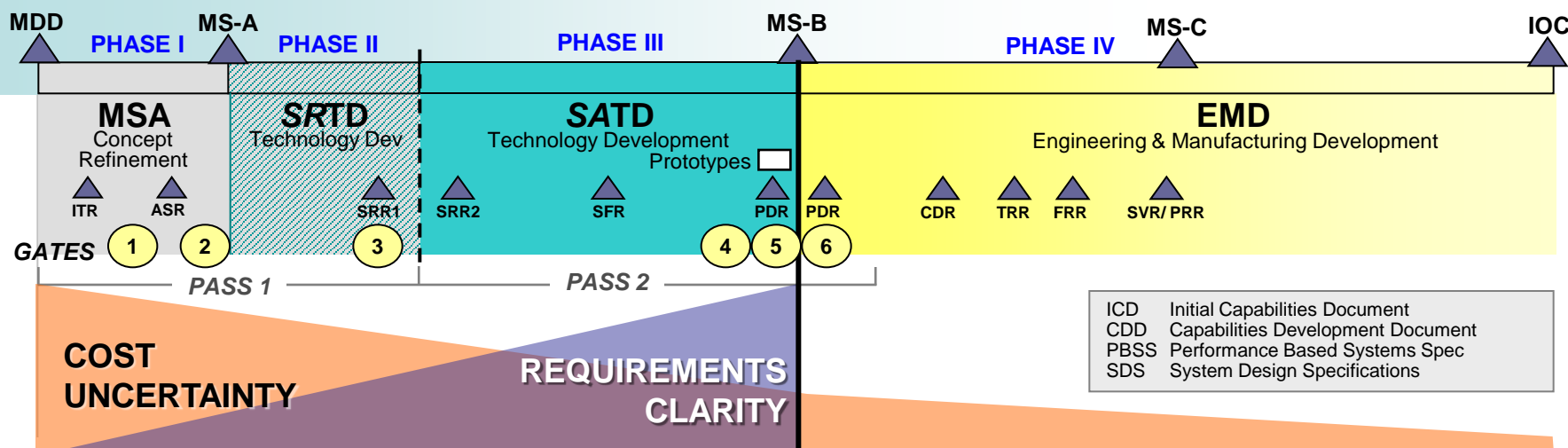
SYSTEMS ENGINEERING PROCESS REQUIREMENTS DEVELOPMENT "AS IS" & "TO BE"



AS IS ... DoD 5000.2



TO BE ...



- ICD Initial Capabilities Document
- CDD Capabilities Development Document
- PBSS Performance Based Systems Spec
- SDS System Design Specifications



PILLARS OF A GOOD PROGRAM

- A well understood requirement with flow down to performance spec and temp
- A genuine integrated schedule with associated Earned Value Management
- An independent cost estimate (one that isn't a part of the missionary movement where folks are trying to sell a program and to force fit it within available funds)
- Full and stable funding
- A culture of drawing in outside competency (from the contractor, from the syscom, from academia...)
- A willingness to ask the hard questions, and the courage and energy to not quit until you gain understanding
- A recognition that it takes requirements, resources, and acquisition, all working together, to get the dog to hunt

“Program success is made difficult by missing any one of these, missing two does not lead to a good place...”

Vice Admiral (Ret.) Dyer, September 29, 2002

ON COST, ON SCHEDULE, AND MEETING ALL TECHNICAL REQUIREMENTS



ACRONYMNS

Sequential in SE Process

MDD	Material Development Decision
CD	Concept Decision
ITR	Initial Technical Review
ASR	Acquisition Strategy Review
SRA	System Requirements Assessment
SRR	System Requirements Review
TRA	Technical Readiness Assessment
IBR	Integrated Baseline Review
SRR	System Requirements Review
SFR	System Functional Review
PDR	Preliminary Design Review
CDR	Critical Design Review
DRR	Design Readiness Review
TRR	Test Readiness Review
FRR	Flight Readiness Review
SVR	System Verification Review
FCA	Functional Configuration Audit
PRR	Production Readiness Review
LRIP	Low Rate Initial Production
OTRR	Operational Testing Readiness Review
IOTE	Initial Operating Test & Evaluation
PCA	Physical Configuration Audit
FRP	Full Rate Production, Decision Review
IOC	Initial Operating Capability
FOC	Full Operating Capability
ISR	In-Service Review
MSA	Material Solution Analysis
SRTD	Sys Rqmts & Technology Devel
SATD	Sys Architecture & Technology Devel

Alphabetical listing

ASR	Acquisition Strategy Review
CD	Concept Decision
CDR	Critical Design Review
DRR	Design Readiness Review
FCA	Functional Configuration Audit
FOC	Full Operating Capability
FRP	Full Rate Production, Decision Review
FRR	Flight Readiness Review
IBR	Integrated Baseline Review
IOC	Initial Operating Capability
IOTE	Initial Operating Test & Evaluation
ISR	In-Service Review
ITR	Initial Technical Review
LRIP	Low Rate Initial Production
MDD	Material Development Decision
OTRR	Operational Testing Readiness Review
PCA	Physical Configuration Audit
PDR	Preliminary Design Review
PRR	Production Readiness Review
SFR	System Functional Review
SRA	System Requirements Assessment
SRR	System Requirements Review
SRR	System Requirements Review
SVR	System Verification Review
TRA	Technical Readiness Assessment
TRR	Test Readiness Review
MSA	Material Solution Analysis
SATD	Sys Architecture & Technology Devel
SRTD	Sys Rqmts & Technology Devel