



PM 101

DAY 4



SMC ACE

Acquisition Center of Excellence

The SADI Tool
SMC ACE Dashboard Interface (SADI)





MODULE FIFTEEN

Requirements Management



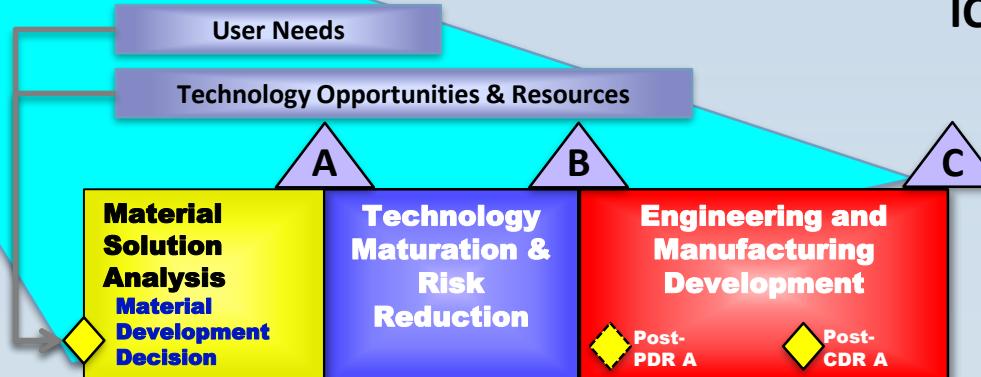
Applying Program Management Principles to DoD Acquisition

Lifecycle



The JCIDS process and the JROC

ICD => CDD=> CPD



AOA => Technology Development Strategy (TDS) => System Requirements Review (SRR)

JCIDS: Joint capability Integration and Development System

JROC: Joint Requirements Oversight Council

ICD: Initial Capabilities Document

CDD: Capabilities Development Document

CPD: Capabilities Production Document

SRR: Systems Requirements Review

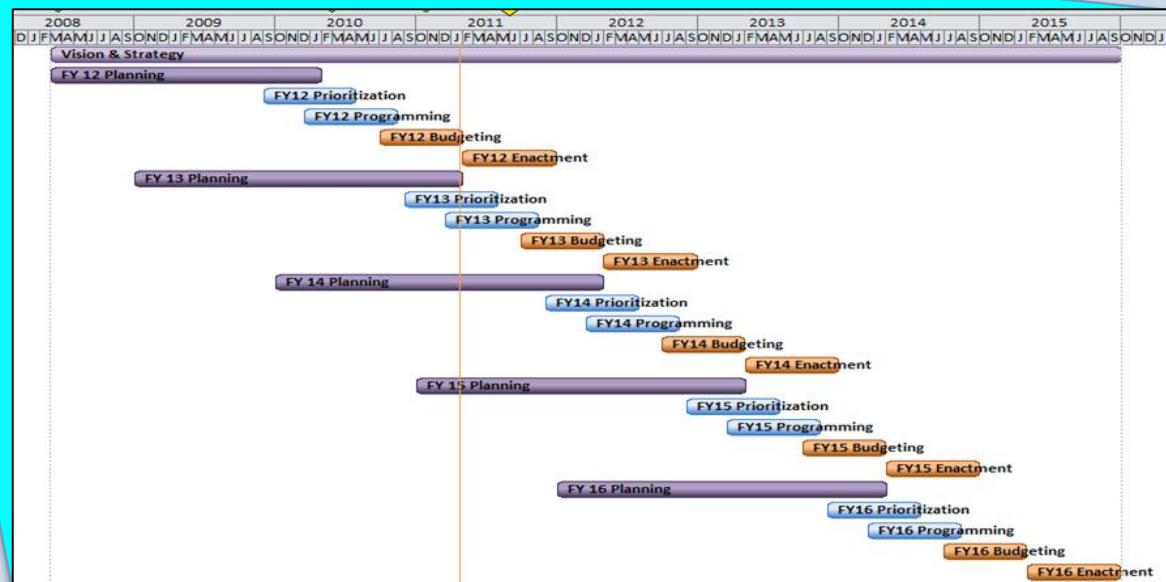
PDR: Preliminary Design Review

CDR: Critical Design Review



Applying Program Management Principles to DoD Acquisition

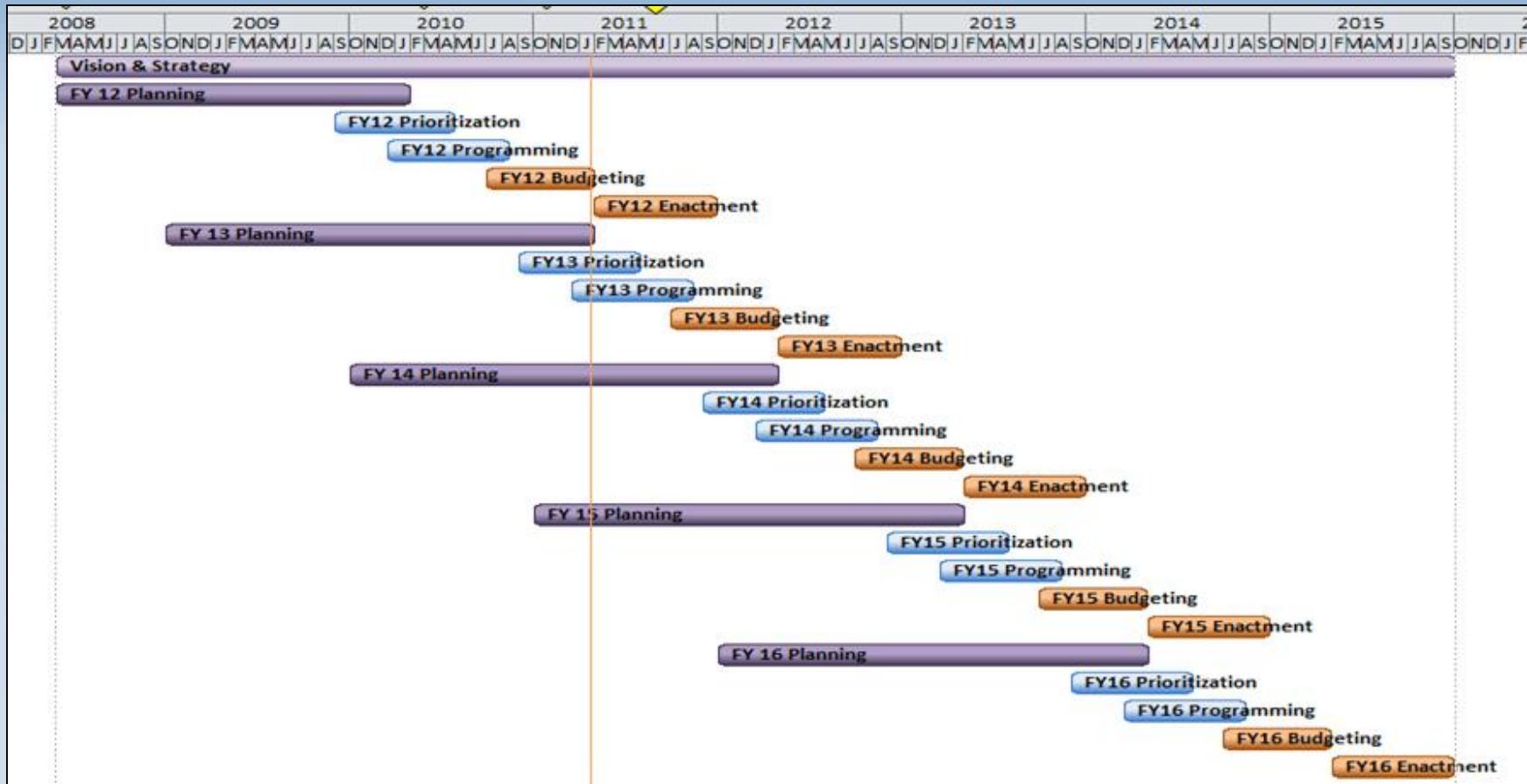
Lifecycle



Requirements drive Resources! When do you need to program for funds? **PPBE!**

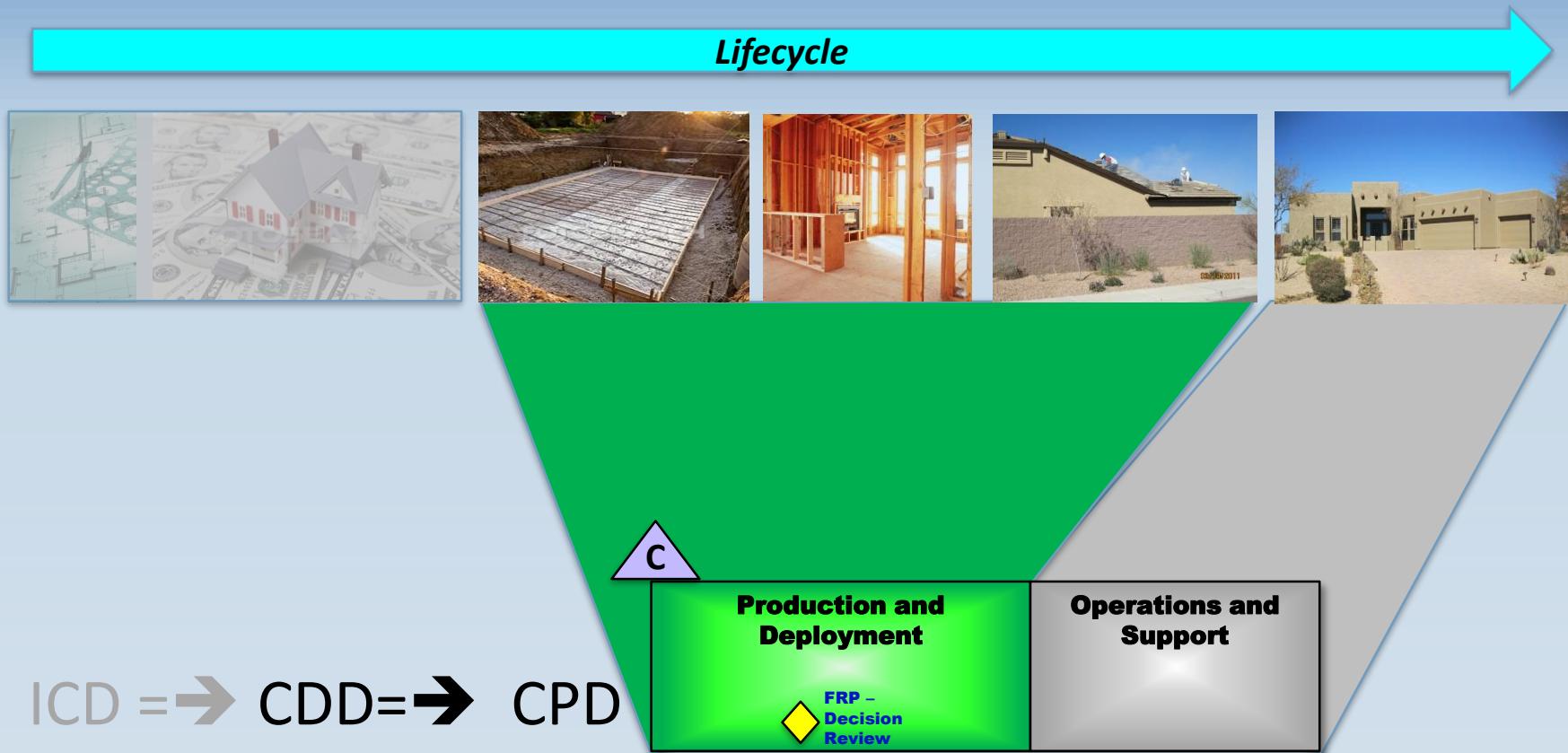


Applying Program Management Principles to DoD Acquisition





Applying Program Management Principles to DoD Acquisition



ICD: Initial Capabilities Document

PDR: Preliminary Design Review

FRP: Full Rate Production

CDD: Capabilities Development Document

CDR: Critical Design Review

FCA/PCA: Functional/Physical Configuration Audit

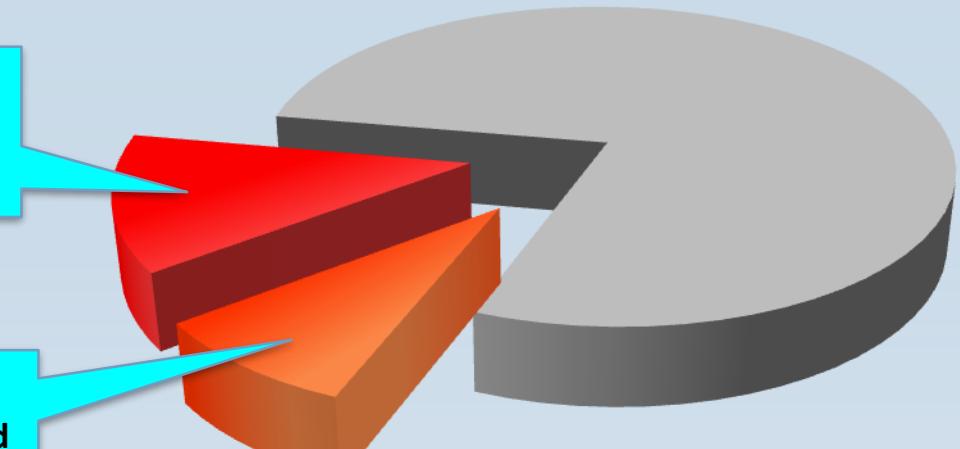


Development of “Needs” & Approval Requirements Management

- ★ Importance of effective requirements management was clearly illustrated in a study published in 1995
 - 21.8% of project failures directly related to requirements management, or lack thereof

"Incomplete requirements" was identified as the leading reason for failure in 13.1% of project failures

"Changing requirements / specification" were identified in a further 8.7% of failed projects



Key takeaway – Once needs are established and requirements identified, requirements change must be controlled

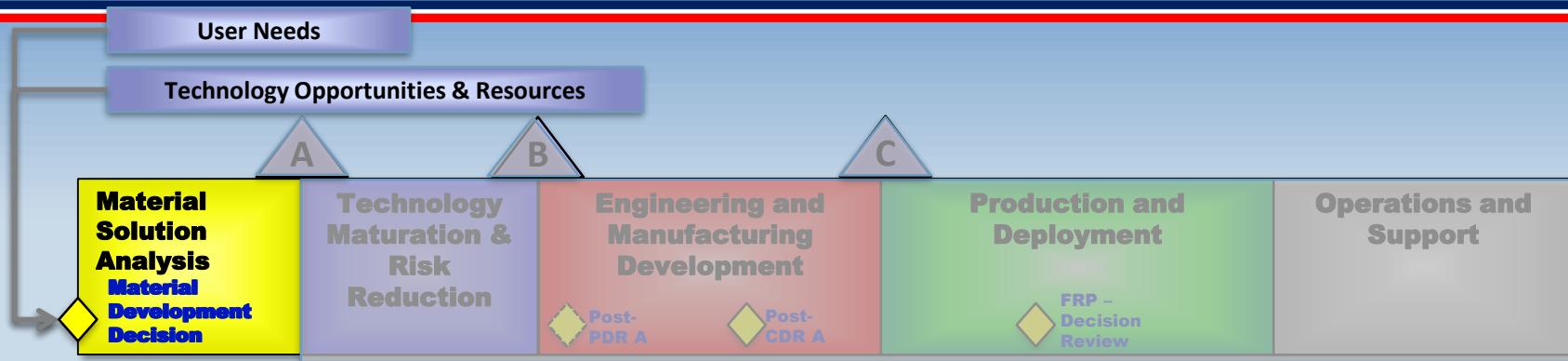


“The most difficult part of requirements gathering is not the act of recording what the users want; it is the **exploratory, developmental activity of helping users figure out what they want.” ~ Steve McConnell**

Steven C. McConnell is an author of software engineering textbooks such as *Code Complete*, *Rapid Development*, and *Software Estimation*. He is cited as an expert in software engineering and project management



Development of “Needs” & Approval



- ★ Desired capability is:
 - Documented
 - Reviewed
 - Validated
 - Approved



MDD => AoA (MSA) => MS A or B?

DOTMLPF => CBA

<u>Integrated Priority list</u>	
IN	3 bedrooms 2 ½ Baths Family room Eat-in kitchen 2 x 6 construction 2 car garage Tile flooring n baths, kitchen, halls Carpet in bedrooms Granite counter tops in kitchen
OUT	Gourmet appliances Expanded garage 14' ceilings Marble flooring Pool Solarium

MDD: Material Development Decision

AOA: Analysis of Alternatives MSA: Material Solution Analysis

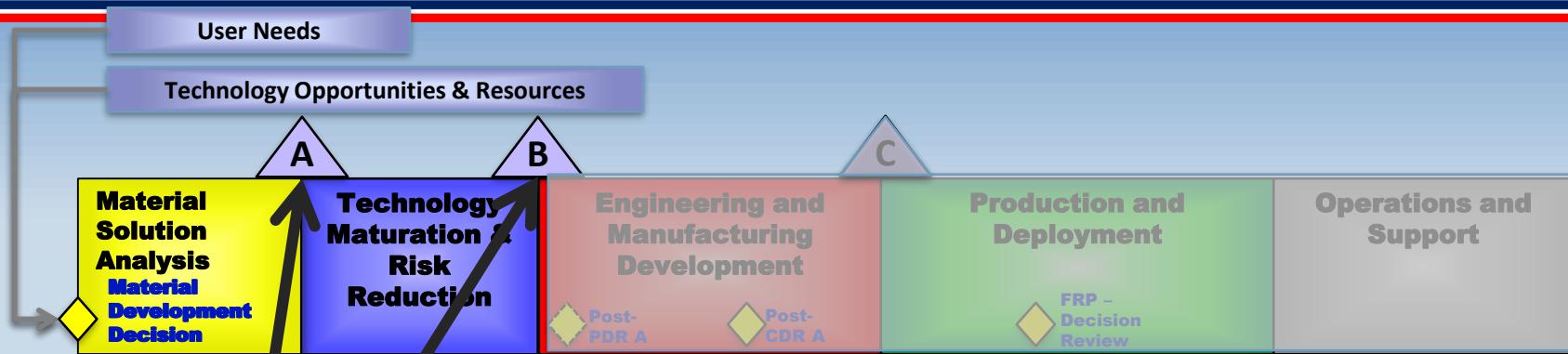
MS: Milestone

DOTMLPF: Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel and Facilities

CBA: Capabilities Based Assessment



Development of “Needs” & Approval

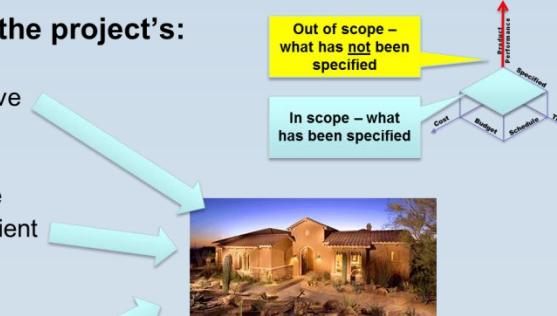


★ Acquisition projects begin with determination of needs and desired capabilities

Milestone A or B?

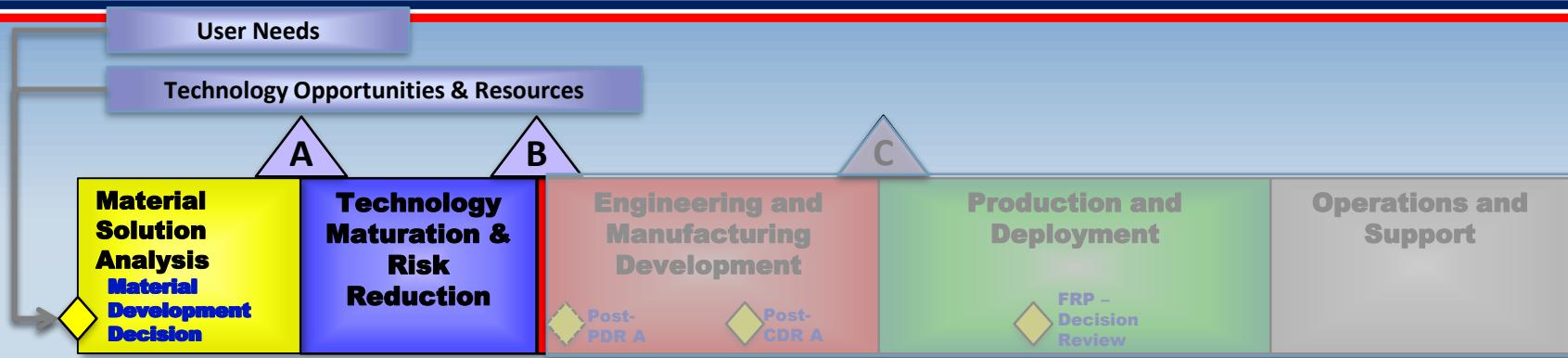
ICD => SRD => Spec

- Clearly identify the project's:
 - Goal
 - A place to live
 - Objectives
 - Comfortable
 - Energy efficient
 - Quiet
 - Main drivers
 - Cost
 - Affordability
 - Schedule
- Success Criteria
 - On Cost
 - On Schedule
 - Performance meet or exceeds requirements

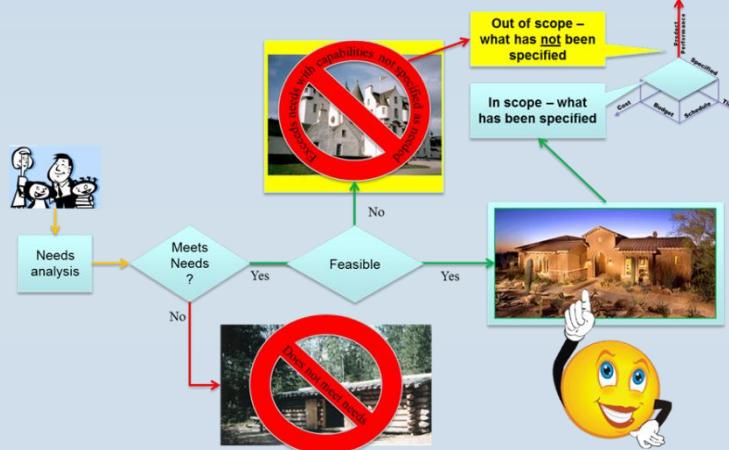




Development of “Needs” & Approval



- ★ Favorable need approval on milestone decision begins the process of determining the most appropriate solution



Acquisition Program Baseline (APB)

- Approved Requirements
- Risks
- Acquisition Strategy
- Technical Approach
- Technical maturity
- Basis of Estimate
- Schedule



Requirements Management

DEFINITION

Needs

Decomposition

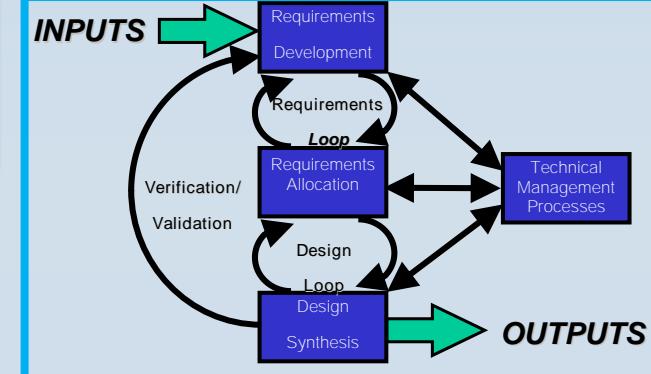
Requirements

- Overarching Need
 - A place to live
- Objectives (Function)
 - Comfortable
 - Quiet
 - Energy efficient
- Main drivers
 - Cost
 - Affordability
 - Size
 - Location
 - Schedule
 - Safe

- Single family house
 - Electrical, plumbing
- 3 bedrooms
- 2 ½ Baths
- Family room
- Eat-in kitchen
- 2 car garage
- Tile flooring in baths, kitchen, halls
- Granite counter tops in kitchen
- Carpet in bedrooms
- 2 x 6 construction
- Meets or exceeds all code

- Architecture

- Components
- ICD



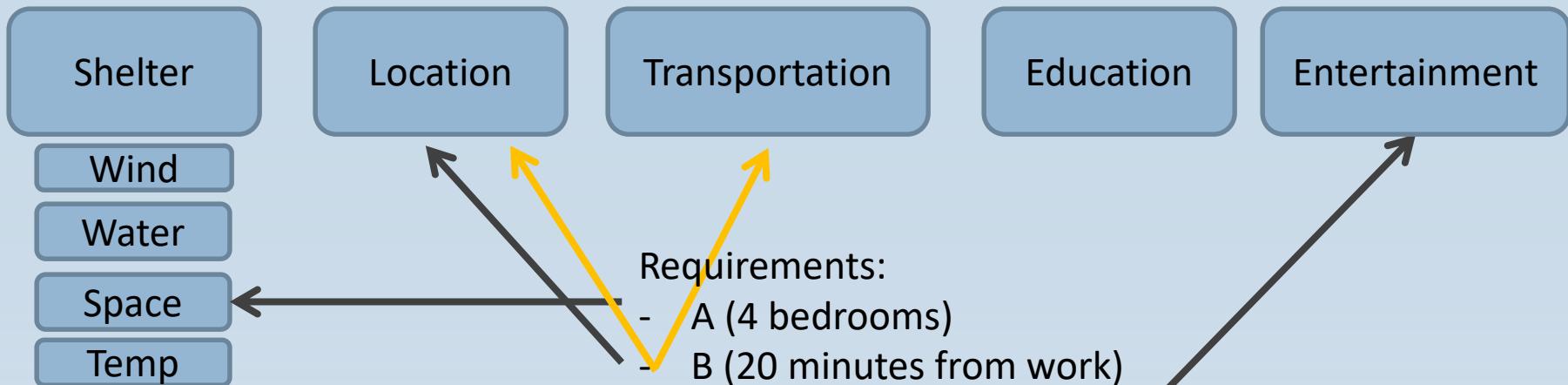


Functional, Allocated, Product BASELINES

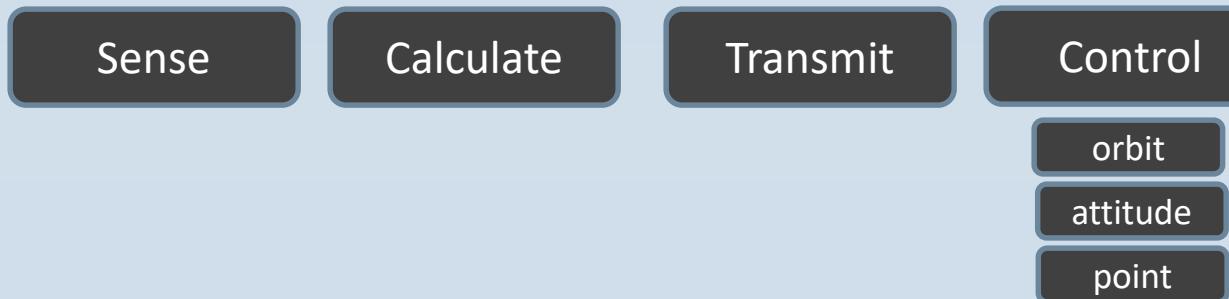
Functional Analysis:

1. Define Functions, 2. Allocate Requirements, 3. Define/Design Products

HOUSE



SATELLITE





Requirements Allocation

Requirements

Allocation



Requirements

- Soil compaction
- Drainage
- Interfaces
- Electrical
- H2O
- Sewage
- Access

Requirements

- Pad strength
- Orientation
- Interfaces
- Electrical
- H2O
- Sewage
- Frame

Requirements

- Frame strength
- Orientation
- Insulation
- Interfaces
- Electrical
- H2O
- Sewage
- Roof

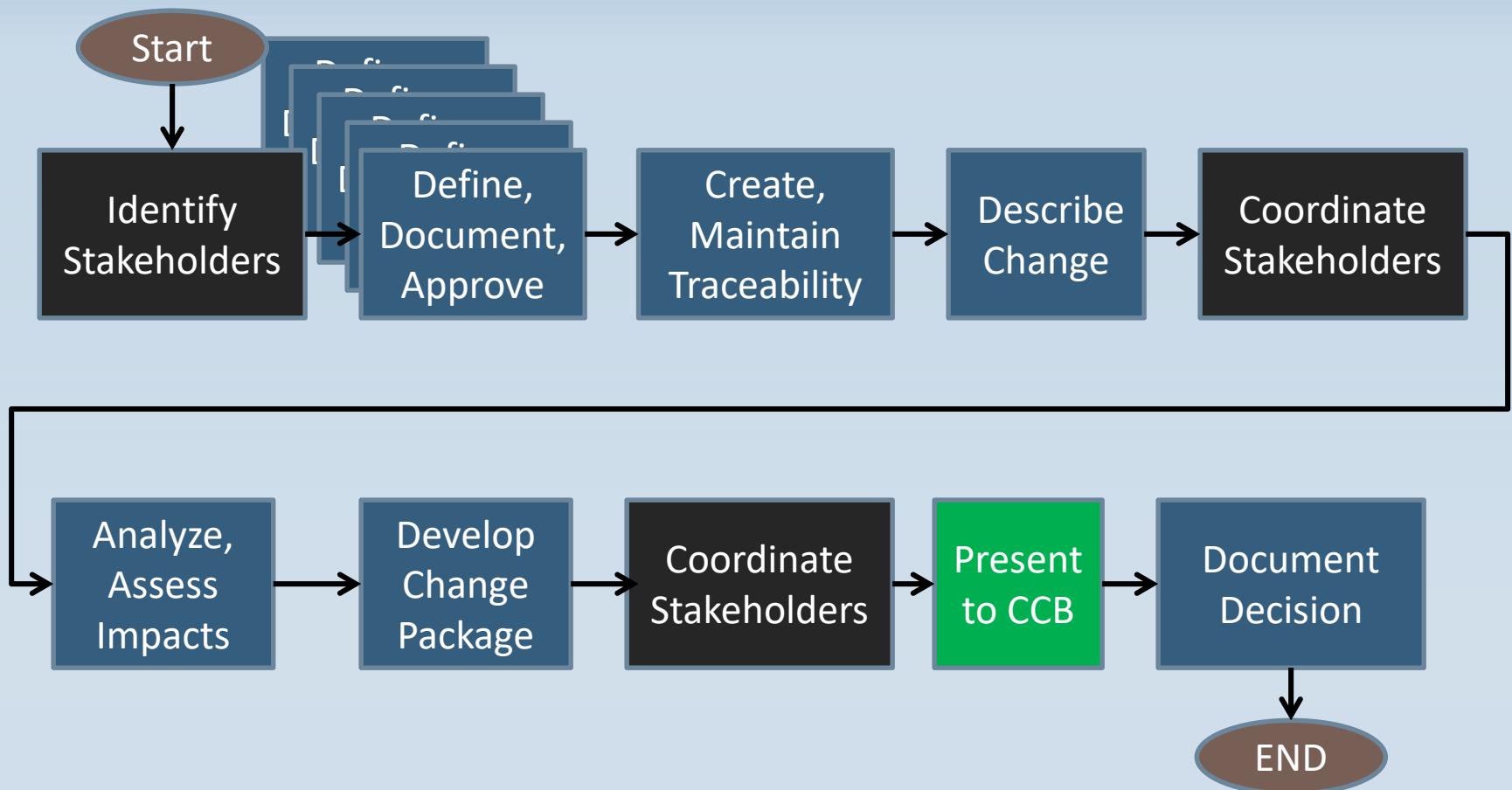
Requirements

- Roof strength
- Water proofing
- Insulation
- Ventilation
- Interfaces
- Frame



Baseline Changes

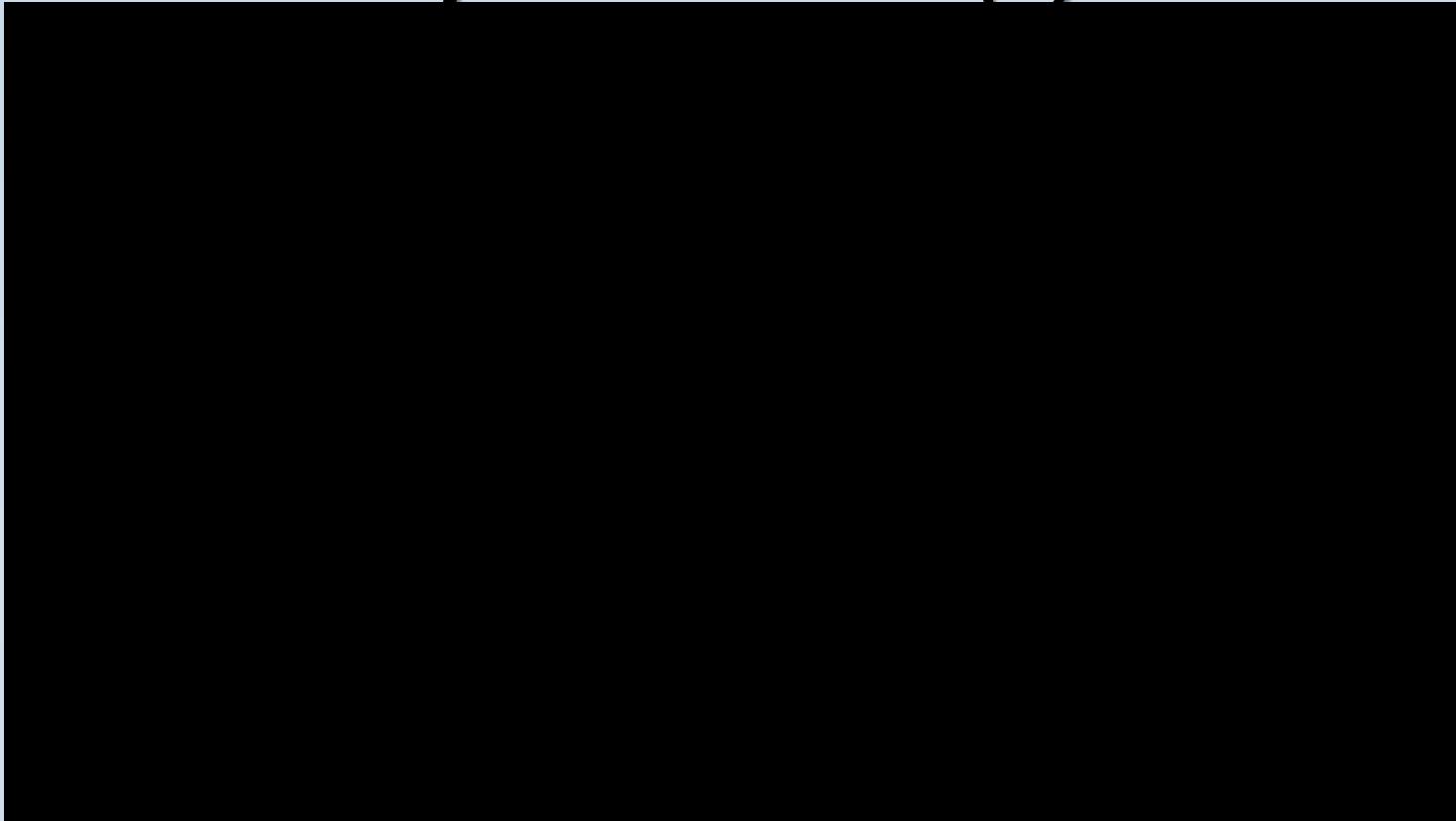
"This must be a very rigorously controlled process!"





Exercise #12

Developing the “Specification(s)”





Requirements Exercise

- ★ **Build a Specification:**
 - Requirements Analysis
 - Requirements Allocation
 - Synthesis
 - Trades
 - Iteration
- ★ **User Requirements (ICD, CDD, CPD)**
- ★ **Technical Requirements**
 - Systems Requirements Document (SRD)
 - System Specification (A Spec)
 - Sub-System Specification (B Spec)
 - Control Item Specification (C Spec)
 - Interface Control Document (ICD)

Specification Sections

1. Scope
2. Applicable Documents
3. Requirements
4. Verification
5. Packaging
6. Notes



MODULE SIXTEEN

Contracting Directorate



Learning Objectives

Better understanding of the:

- ★ Program manager's acquisition challenges and the role contract's plays
- ★ Contracting officer (CO) and a CO's authority
- ★ Roles and responsibilities of contracting personnel
 - ◆ Six phases of acquisition and their contract management relationship
- ★ Public policy effect government contracts can have
- ★ Ways to effectively work with your contracting team



Contract's Role

Expectations:

- ★ Program Appearance of cohesive government team to contracts.
- ★ Government team – maximize working as ensemble.
- ★ All parties work within limits of own authority.
- ★ Discipline in following existing processes.
- ★ Flexibility/imagination to tailor good solutions.



Contract's Role

How expectations are realized:

- ★ Program managers rely on team's various functionals.
- ★ Understand team's interdependencies.
- ★ Limit communications to own area of responsibility.
- ★ All team members read contract and requirements.
- ★ Internal team collaboration and advanced planning.



SMC/PK CONTRACTING

- ★ **The population of all Contracting personnel at Los Angeles AFB**
 - ◆ Matrixed to programs
 - ◆ Centralized staff -- approval officials, support, review, policy
- ★ **PK is the Source of Contracting authority for:**
 - ★ LAAFB
 - ★ Geographically separated units at
 - ★ Peterson AFB
 - ★ Kirtland AFB
 - ★ Cape Canaveral AFS
- ★ **5 paths of direct accountability:**
 - ◆ SMC Commander (SMC/CC) and Air Force Program Executive Officer for Space
 - ◆ Air Force Program Executive Officer for Services
 - ◆ Air Force Deputy Assistant Secretary for Contracting (SAF/AQC)
 - ◆ Air Force Space Command Director of Contracting



What Do We Do In Contracts?

- ★ Ensure the integrity of the contracting process so that both the taxpayer and contractor are treated fairly.
- ★ Remain vigilant stewards of the taxpayers' money and value received.
- ★ Hold the only legal authority to obligate the Government.
- ★ Ensure all legal and regulatory requirements are met



What Do We Do In Contracts?

★ Work as part of an Integrated Product Team (IPT) to:

- ◆ Prepare and permanently record all supporting documents and contractual decision
- ◆ Monitor the contractor's cost, schedule and technical performance after award
- ◆ Prepare and issue modifications or changes to the contract

Collaboration between Program Manager and Contracting Officer is essential for shaping a successful business arrangement that best describes, and clearly communicates the desired technical outcomes into a legally binding contract.



Contract Basics

★ Offer



★ Acceptance



★ Consideration





What is Contract Management?

- ★ Contract management is the process to assure delivery of contracted products and services
 - ◆ Government and commercial processes remarkably similar; across industries, too....
- ★ Team sport—Contracting Officer, by regulation, is uniquely accountable
- ★ Typical activities:
 - ◆ Pre-performance conferences
 - ◆ Monitor deliverables progress
 - ◆ Change control
 - ◆ Contract close-out



What Are Typical Contract Deliverables?

Hardware

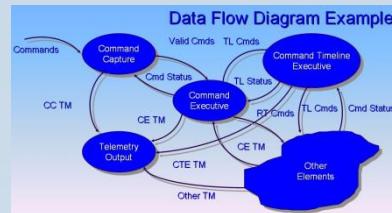


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Software and Technical Data



http://copiesforless.ca/assets/images/Paper_pile_P.gif



Services



[Spacenews.com](http://spacenews.com)





Law (*Statute*), Regulation, Policy Basics

★ Different type of authority and consequence:

Law

The procurement process is governed by two primary laws:

- The Armed Services Procurement Act
- The Federal Property and Administrative Services Act (1949)
- Enforcement tied to Title 18 U.S.C. (Criminal code)

Regulation

The acquisition process is governed by regulations issued pursuant to the statutory authority given by the acquisition statutes. These regulations are included in :

- Code of Federal Regulations ("CFR"),
- the omnibus listing of Government regulations, as Title 48. Chapter 1 of Title 48 is commonly called the *Federal Acquisition Regulation* ("FAR"),
 - supplements to the FAR for specific agencies.

Policy

Acquisition policy is a principle or rule to guide decisions and achieve uniform outcomes on defense procurement. The types are:

- Directives and Directive-Type Memorandums
- Instructions
- Publications
-more....

Compulsory

Fine/Imprisonment

Disciplinary

Fine/Imprisonment/Reprimand

Administrative

Reprimand



Essential “Field of Play”

★ Standardizes practices and provide boundaries

- ◆ **Federal Acquisition Regulation (FAR) most prominent**
- ◆ **Today's FAR reflects 50 years of public and defense policy, budget priorities, congressional interests, lessons learned, case law....and much more...**
 - **FAR**--The Federal Acquisition Regulation (FAR) is the prime authoritative guidance for all defense acquisition
 - **FAR Supplements**--Services and Agencies (such as NASA, DOT,...) issue FAR Supplements to amplify and provide added guidance
 - **Agency Supplements**--AF commands and centers may issue still further guidance and instructions



The Foundation of Competition

It's the Law! - Competition isn't an alternative, it is required!

- ★ The Competition in Contracting Act (CICA) of 1984, as implemented in the Federal Acquisition Regulation (FAR) Part 6 and Department of Defense FAR Supplement (DFARS) Part 206, sets a standard of competition for Federal contracts
 - ◆ Sends the clear message to industry and Federal procurement personnel that, in buying goods and services, the Government will obtain them through competition
- ★ Multi-functional team is responsible for maximizing competition

"When awarding Government contracts, the Federal Government must strive for an open and competitive process. However, executive agencies must have the flexibility to tailor contracts to carry out their missions and achieve the policy goals of the Government. In certain exigent circumstances, agencies may need to consider whether a competitive process will not accomplish the agency's mission. In such cases, the agency must ensure that the risks associated with noncompetitive contracts are minimized."

President Barack Obama

(Excerpt from Memorandum dated March 4, 2009)



Other Important Things You Should Know

- ★ Technical Evaluations
- ★ Data Rights
- ★ How required reviews impact your schedule
- ★ Impact of Constructive Changes
- ★ What COs need to see at Configuration Control Boards
- ★ Meaning of “Scope”
- ★ “No Cost Change” – a rare entity, but frequent misnomer



Roles and Responsibilities

- ★ Common for systems-level programs to use both direct and matrixed functional support that forms a multi-disciplined program office
 - ◆ leadership, contracting, legal, controls, engineering, test, etc.
- ★ Typical contracting structure :
 - ◆ Contracting Officer: warranted and responsible for compliance
 - Contract Manager: Senior day-to-day oversight & responsibility
 - ✓ Contract Specialist: System and subsystem buying
 - ☒ Procurement Analyst: Typically component buying
 - Procurement clerk: Administrative functions
 - Procurement Intern: OJT
 - Contracting Officer's Technical Representative (COTR)
 - Quality Assurance Evaluator (QAE)



Teamwork and Interdependencies

■ Basic Contracting Process Flow

- Identify and Validate Requirement
- Identify Appropriate Funds
- Form a Team
- Develop a schedule
- Determine Acquisition Strategy
- Issue a Sources Sought Synopsis
- Prepare documentation to support Strategy
- Obtain Appropriate Approvals to Proceed
- Prepare a Solicitation or Request for Proposal
- Receive Proposals or Bids
- Evaluate Proposals (DCAA, DCMA, Tech Eval)
- Establish Competitive Range
- Discussions with Offerors
- Final Proposal Revisions
- Pre-award Clearance Review
- Contract Award
- Debrief Unsuccessful Offerors

Green = PM

Black = CO/Buyer

Blue = Team effort

PM primary lead

CO
primary
lead

PM: Program Manager

CO: Contracting Officer

DCAA: Defense Contract Audit Agency

DCMA: Defense Contract Management Agency



Teamwork and Interdependencies

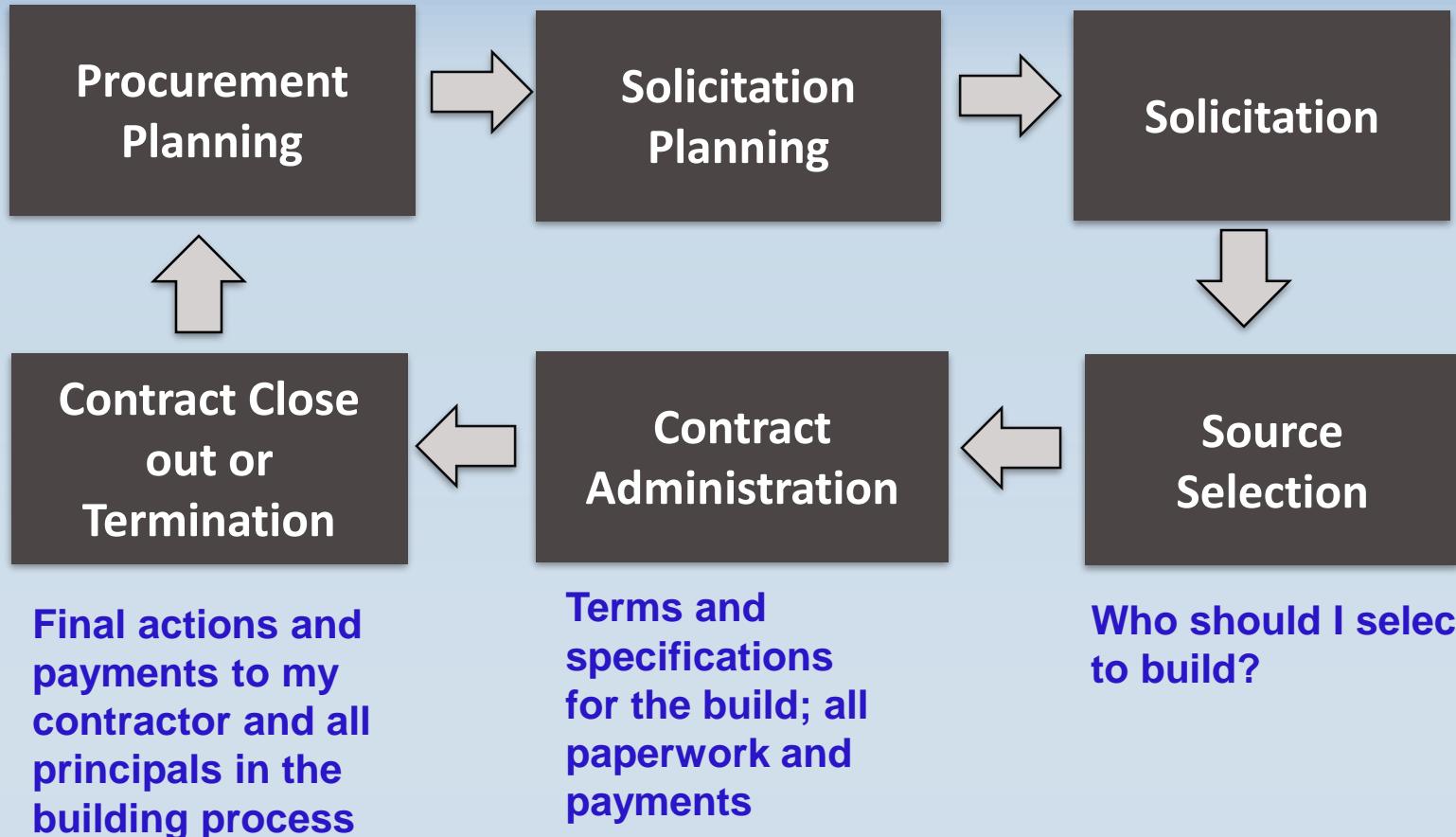
Other common interests/responsibilities of PMs & Cos:

- ◆ Market Research
- ◆ Organizational Conflict of Interest
- ◆ Factfinding
- ◆ Award Fee and Incentives events
- ◆ Configuration Control Boards
- ◆ Scope determinations
- ◆ Cash flow to Contractor



Typical Contract Management Cycle —How This All Works Together

What do I want to build? How describe the build? Who might build it for me?



(Adapted from Rendon and Snider, 2008, p. 164)



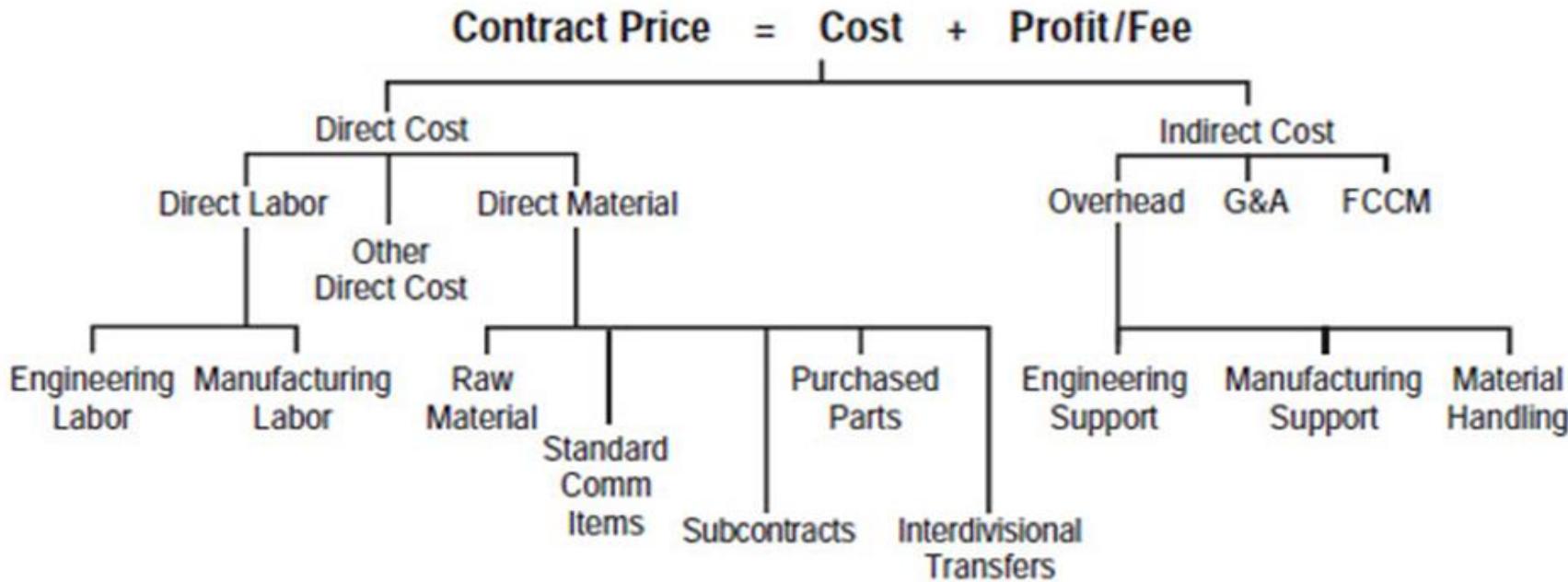
Requirements Development



- ★ Comprehensive requirement(s) specification created
- ★ Statement of objectives; often in commercial buys
- ★ Statement of work; most common in large programs
- ★ These statements;
 - ◆ Describe critical features and performance expectations
 - ◆ May specify materials to be used
 - ◆ May detail unique considerations, such as quality, test, operations, deployability...and more
- ★ Ambiguity in specifications (generally) go against the drafter, typically the government
- ★ “Order of precedence” typical for multiple-spec buys



Estimated Price?



TYPICAL CONTRACT TYPE BY PHASE

MSA	TD	EMD/ISD	EMD/SCMPD	PROD
CPFF, FFP	CPFF, FFP	FPI(F), CPFF, CPIF	CPIF, CPAF	FPI(F), FFP

G&A: General & Administrative

TD: Technology Development

SCMPD: System Capability and manufacturing Process Demonstration

FCCM: Facilities Capitol Cost of Money

EMD: Engineering manufacturing Development

CPFF: Cost Plus Fixed Fee

MSA: Material Solution Analysis

ISD: Integrated Systems Design

FFP: Firm Fixed Price



Contract Types



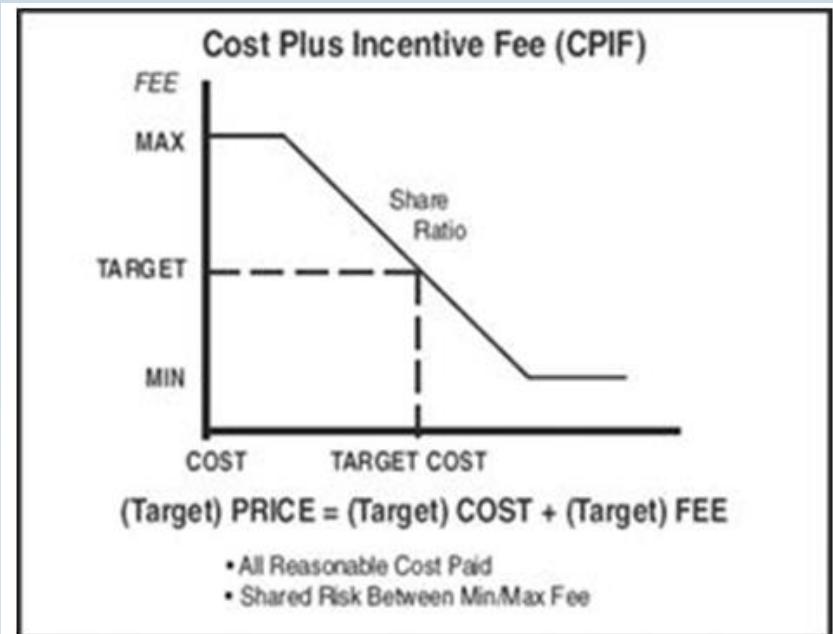
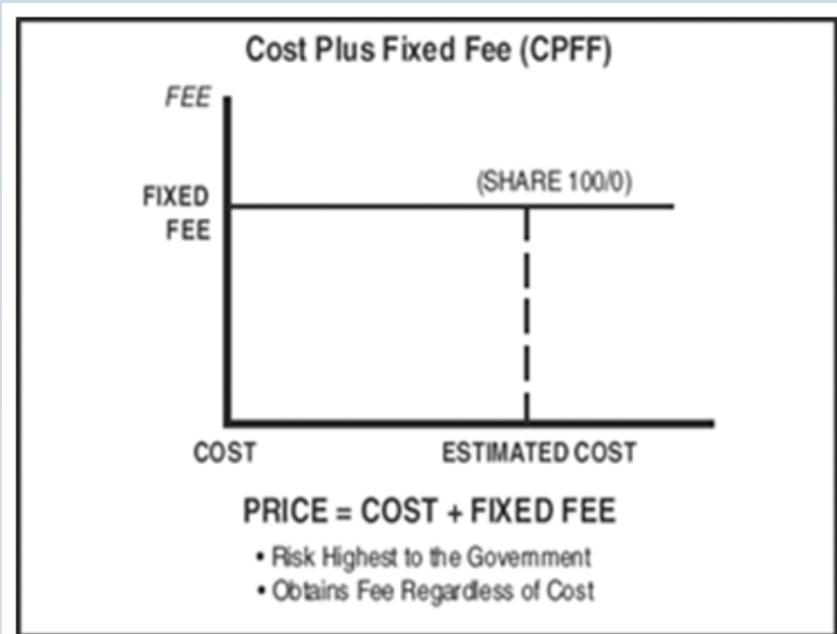
- ★ Broad spectrum of contract types (FAR Part 16) that progressively shift the cost, schedule and performance risks from the Contractor to Government:
 - ◆ Fixed Price Type Contracts - All or majority of cost risk is borne by the contractor
 - ◆ Cost Reimbursement Type Contracts – All or majority of cost risk is borne by the Government
 - ◆ Incentive Contracts – provide additional incentives designed to motivate contractor efforts that might not otherwise be emphasized
 - ◆ Indefinite-Delivery/Quantity Contracts (IDIQ)– used when specific quantities cannot be pre-determined. (Min – Max order qty, task orders, \$, T's & C's pre-negotiated)
 - ◆ Time-and-Materials, Labor-Hour Contracts – reimburses the contractor for all hours and materials used on the effort. (least preferred type)
 - ◆ Letter Contracts – a written *preliminary* contractual instrument that expeditiously authorizes work to begin pending formal definitization of price and other terms.



Contract Share Ratios



- ★ Cost Type Contracts: Fee limit is 15% R&D; 10% prod; 6% CPFF



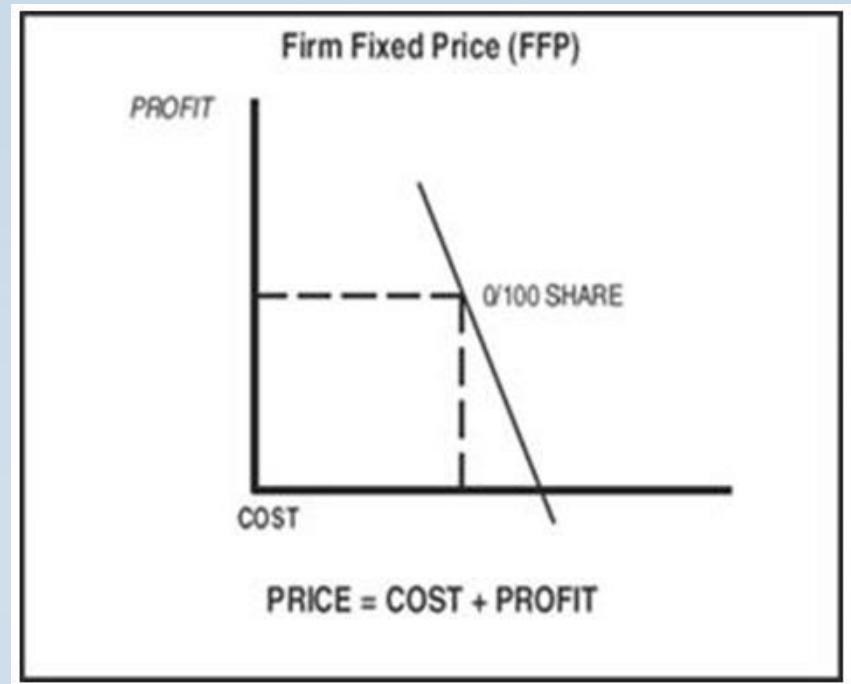
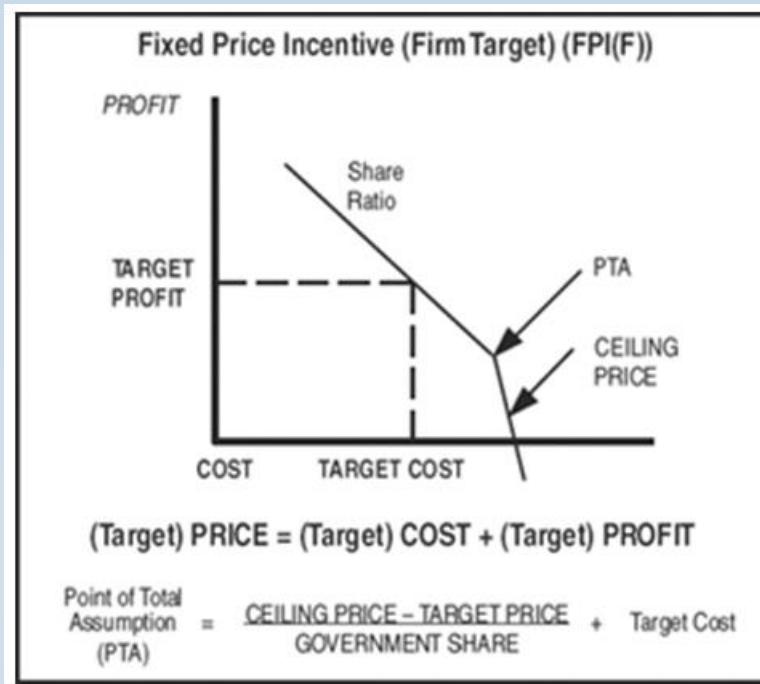
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Contract Share Ratios



- ★ Financial Incentives are matched with the contract type
- ★ Fixed Price Type Contracts:

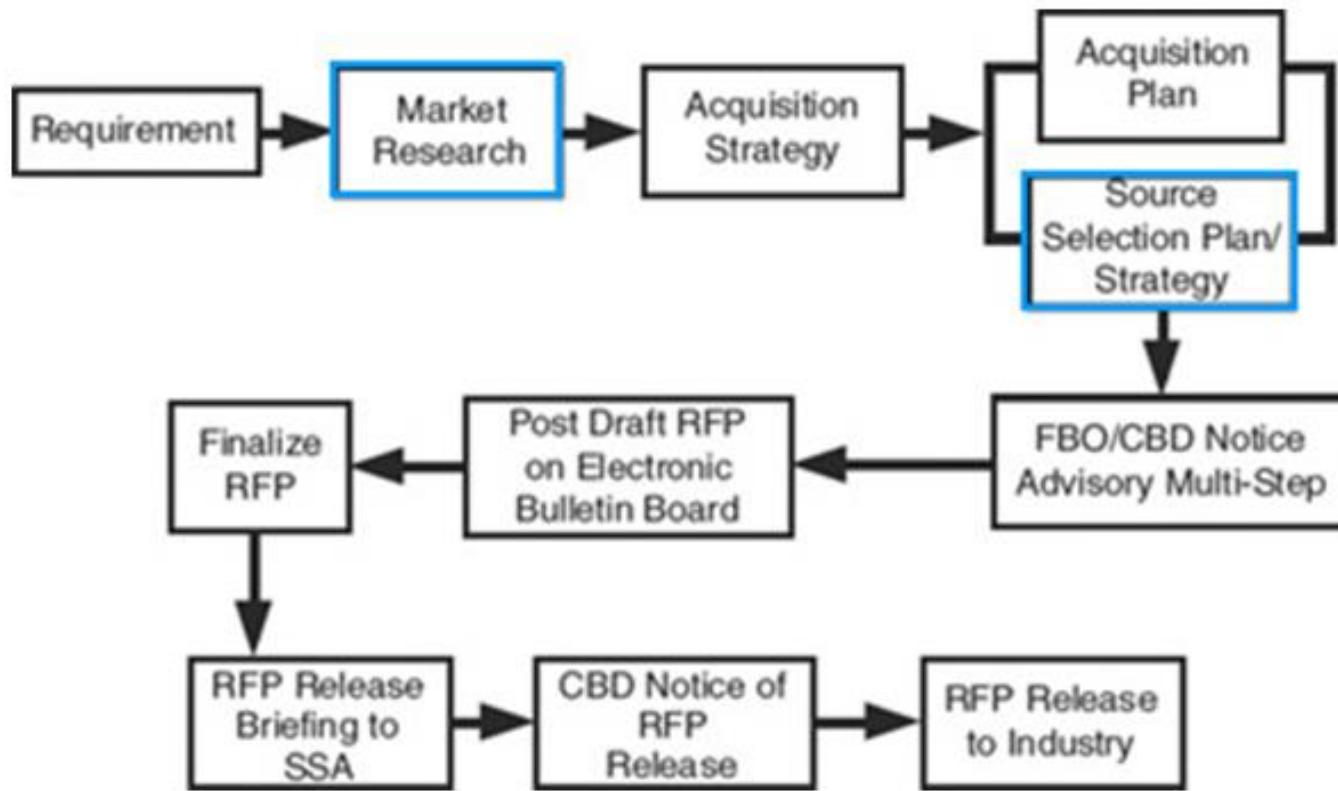




Solicitation Planning



★ Pre-solicitation (Request for Proposal)



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RFP: Request for Proposal

SSA: Source Selection Authority

FBO: FedBizOpps

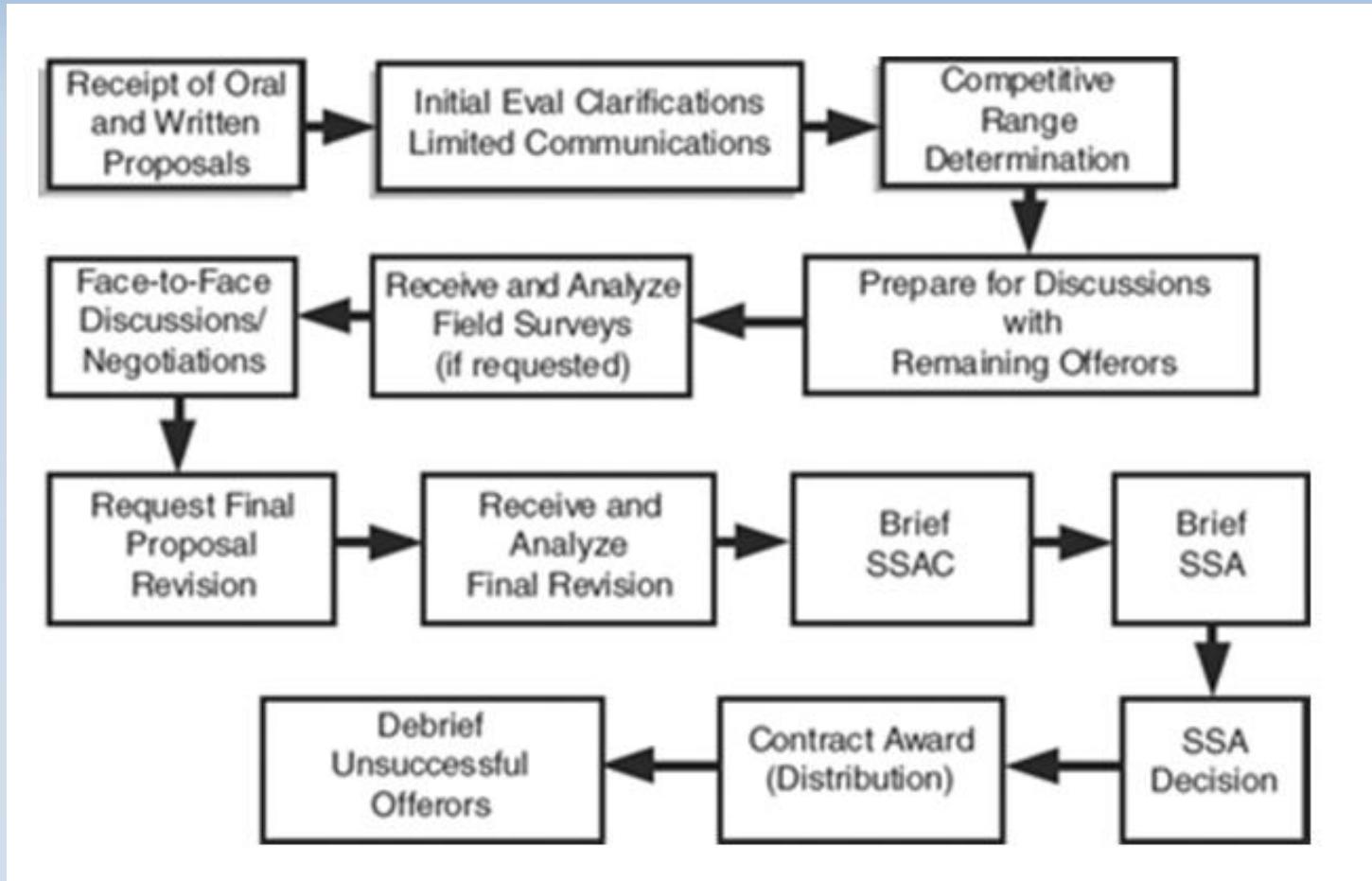
CBD: Commerce Business Daily



Solicitation Planning



★ Post-solicitation





Solicitation



- ★ The FAR specifies a Uniform Contract Format
 - ◆ Composition the same across services and agencies
 - ◆ Section H contract clauses often most unique

Solicitation

Part I- The Schedule
A: Solicitation Form SF33
B: Pricing
C: Description of Service/SOW
D: Packing and Marking
E: Inspection and Acceptance
F: Deliveries or Performance
G: Contract Administration Data
H: Special Contract Requirements
Part II- Contract Clauses
I: Contract Clauses
Part III- List of Attachments
J: List of Attachments
Part IV- Reps and Certs
K: Reps and Certs of Offeror
L: Instructions to Offerors
M: Evaluation Factors for Award

Contract

Part I- The Schedule
A: Solicitation Form SF33
B: Pricing
C: Description of Service/SOW
D: Packing and Marking
E: Inspection and Acceptance
F: Deliveries or Performance
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Part II- Contract Clauses
I: Contract Clauses
Part III- List of Attachments
J: List of Attachments

Most Disagreements

Most Protests

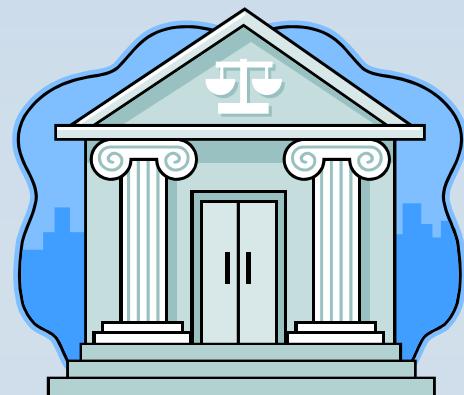
Most Overlooked



Protests



- ★ Two basic types: Pre-Award or Post-Award
 - ◆ If pre-award protest, contracting officer determination of urgent or compelling circumstances may allow continued performance
- ★ Requires “material fact”....no longer, “just a stamp”
 - ◆ Timelines specified by the FAR...very regimented cadence
 - ◆ Burden of proof (generally) is on the protesting entity
- ★ Two avenues (not mutually exclusive)
 - ◆ GAO (often favored for many reasons)
 - ◆ Federal court
- ★ Applies to classified programs, too





Contract Management



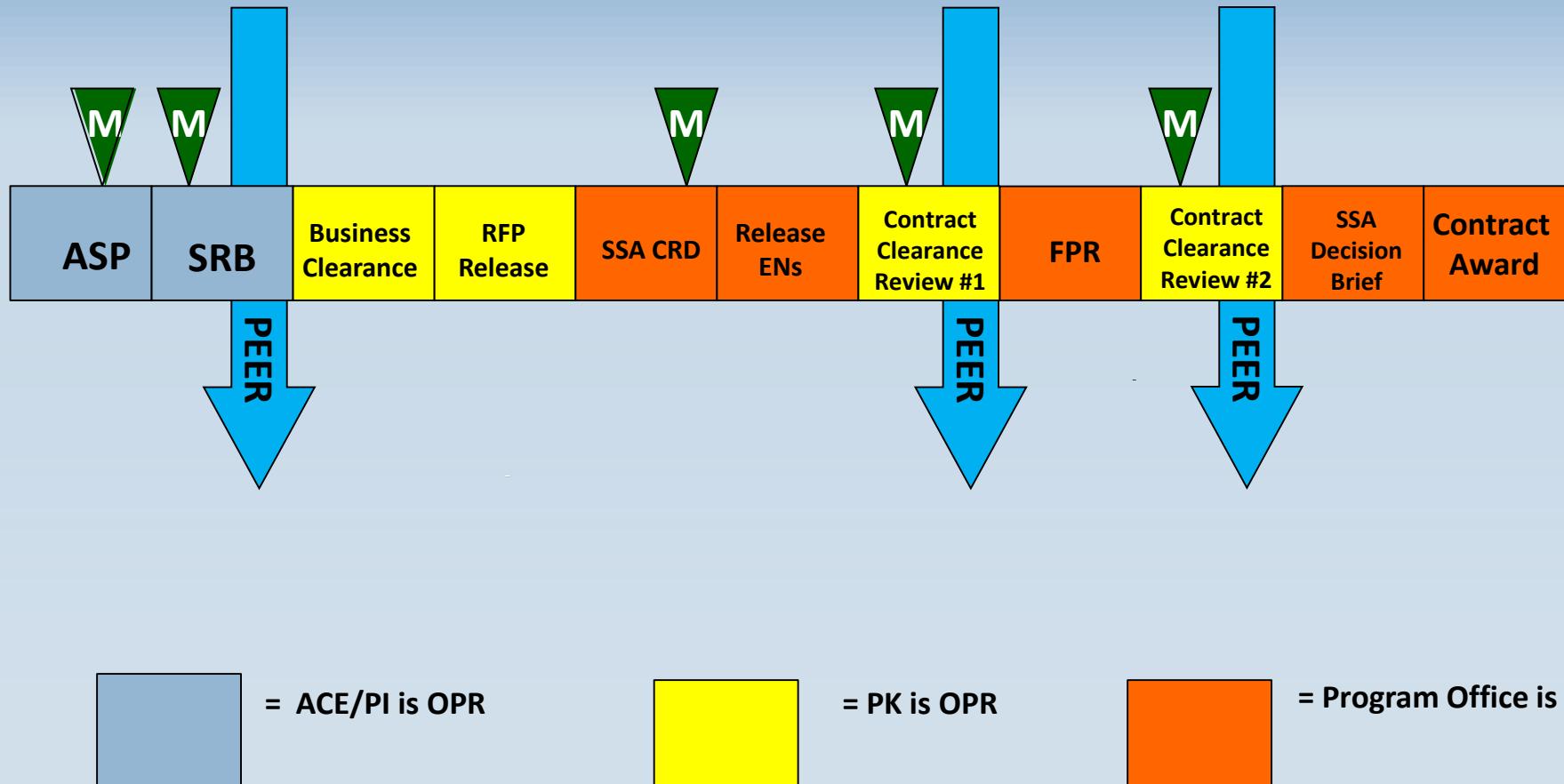
- ★ Multiple organizations can help manage
 - ◆ Contracting Officers Technical Representative (COTR), Administrative Contracting Officer (ACO), Quality Assurance Evaluator (QAE)
 - ◆ Defense Contract Management Agency (DCMA) for war-fighting related products and services
 - ◆ Defense Contract Audit Agency for rates and proposal audits
 - ◆ Contracting officer still responsible—cannot delegate

- ★ Tools in the event “performance”
 - ◆ Renegotiation for consideration
 - ◆ Termination for convenience
 - ◆ Termination for default





MIRTs, Peer Reviews, & Source Selection Process



ASP: Acquisition Strategy Panel

CRD: Competitive Range Determination

OPR: Office of Primary Responsibility

PK: Contracting

SRB: Solicitation Review Board

EN: Evaluations Notices

ACE: Acquisition Center of Excellence

MIRT: Multi-Interdisciplinary Review Team (M)

SSA: Source Selection Authority

FPR: Final Proposal Review

PI: Program Integration



Constructive Changes

★ Definition:

- ◆ A change resulted from Government action or inaction
- ◆ The contractor did not perform voluntarily
- ◆ The change resulted in an increase or decrease in the cost or the time of performance



★ FAR Clause 52.243-7 Notification of Changes- Contractor notification that “conduct” of Government changed the contract notwithstanding the fact that a “change order” was not issued. Contracting Officer may negotiate an equitable adjustment



Configuration Control Board (CCB)

★ Program Director's mechanism

- ◆ Consider making change to contract
- ◆ Ensure full knowledge before – all parties
- ◆ Make appropriate trade offs
- ◆ Avoid unintended consequences



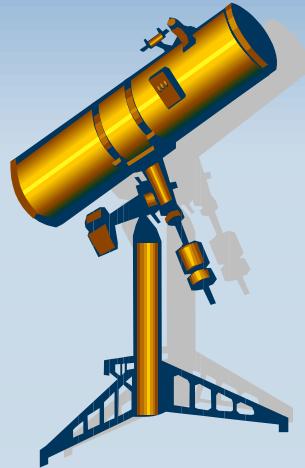
★ Simplified concept:





Contract Changes – Determinations of Scope

- ★ What is “Scope” for an existing contract?
- ★ Where is Scope found in the contract?
 - ◆ Best Place is in the Statement of Work (SOW)
- ★ Why is Scope Important?
 - ◆ Understanding the Scope on your contract will make the decision as to the need for a modification/change more straightforward
- ★ What are the differences between “on contract” and new work?





Contract Changes - Determinations of Scope

★ In-scope versus out-of-scope?

- ◆ In-scope means that you may proceed with a contemplated contract change
- ◆ Out of scope means that a modification to an existing contract will not be possible without approval of a J&A (Justification and Approval)
- ◆ Out of scope means that a competitive action may be required IAW Competition in Contracting Act (CICA)



Promoting Effective Relationships

- ★ Knowing a contracting officer's responsibility goes a long way
- ★ Be open, direct, factual and un-emotional with contract-related information
- ★ Mistakes happen and can be corrected best by working together

“Contracts management is a team activity in which the contracts manager is and should be an unpopular player” * (Really?)

Hirsch, W.J., *The Contracts Management Deskbook*, rev. ed., American Management Association, New York, 1986, p. 4.



Contractor Perspective

- ★ The government does not use a single voice
 - ◆ Often multiple contracts with different terms negotiated by various agencies
- ★ Some processes painfully slow; particularly around the time quarterly filings are due the federal government
 - ◆ Fee booking is often an issue, where misreporting can have tax and wall street implications
- ★ Everyone thinks they are the program manager...
- ★ Everyone thinks they are the contracting officer...
- ★ "Predictability" is prized, and recognize it's mutual



Present Leadership Guidance

- ★ Affordability “mandate”
 - ◆ Contract types and terms; overhead and rates
 - ◆ Return of Fixed Price Incentive
- ★ Incentivize productivity and industry innovation
 - ◆ Contract incentives; Better Buying Power 3.0!
- ★ Real competition
 - ◆ Reasonable bid times; open-system (non-proprietary) designs
 - ◆ Competitive prototyping
- ★ Improve acquisition “tradecraft”
 - ◆ Skilled, educated workforce that fixes root cause issues
- ★ Reduce non-productive processes and bureaucracy
 - ◆ Fewer OSD reviews, low-value statutory processes



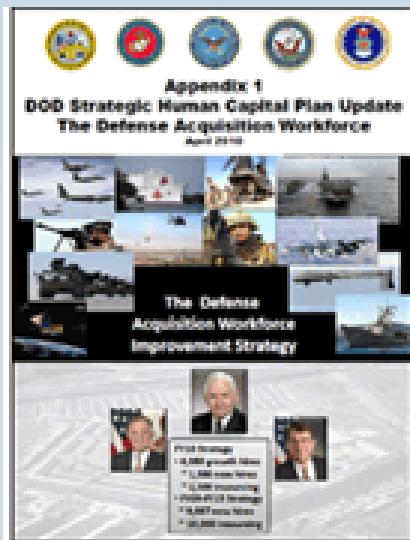
Key History

- ★ Broad congressional authorities are found in article I and II of the constitution and principally pertain to the executive and legislative branches
 - ◆ Major acquisition policies most relevant today over the last 25 years, and in some form, impact your present efforts:
 - 1884, Anti-Deficiency Act (amended 1950 & 1982)
 - 1941, Berry Amendment
 - 1990, Defense Acquisition Workforce Improvement Act
 - 1994, Federal Acquisition Streamlining Act (FASA)
 - 1996, Federal Acquisition Reform Act (FARA)
 - 2003, Services Acquisition Reform Act (SARA)
 - 2008, Freedom of Information Act (FOIA); *Reissued*
 - 2008, DoD 5000.02 Systems Acquisition
 - 2009, Weapons Systems Reform Act
 - 2010, Acquisition Reform

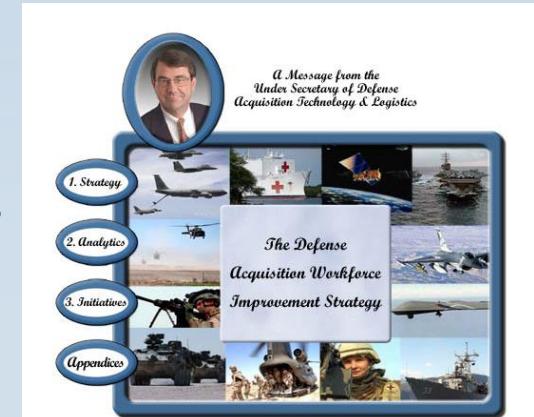


Acquisition Reform, Circa 2010

- ★ Mandate for the Federal Government to have sufficient capacity to manage and oversee its contracting process
- ★ Change the Department's strategic direction and reform the DOD acquisition process



- ★ Better address inherently governmental functions and ensure appropriate oversight of all acquisition activities
- ★ High quality workforce
- ★ having the right competencies
- ★ and skill sets, at the right time



<https://acc.dau.mil/adl/enUS/365272/file/50295/2%20ActionMemo%20TAB%20A%20Carter%20Memo%20v17%20Publish%20D.pdf>

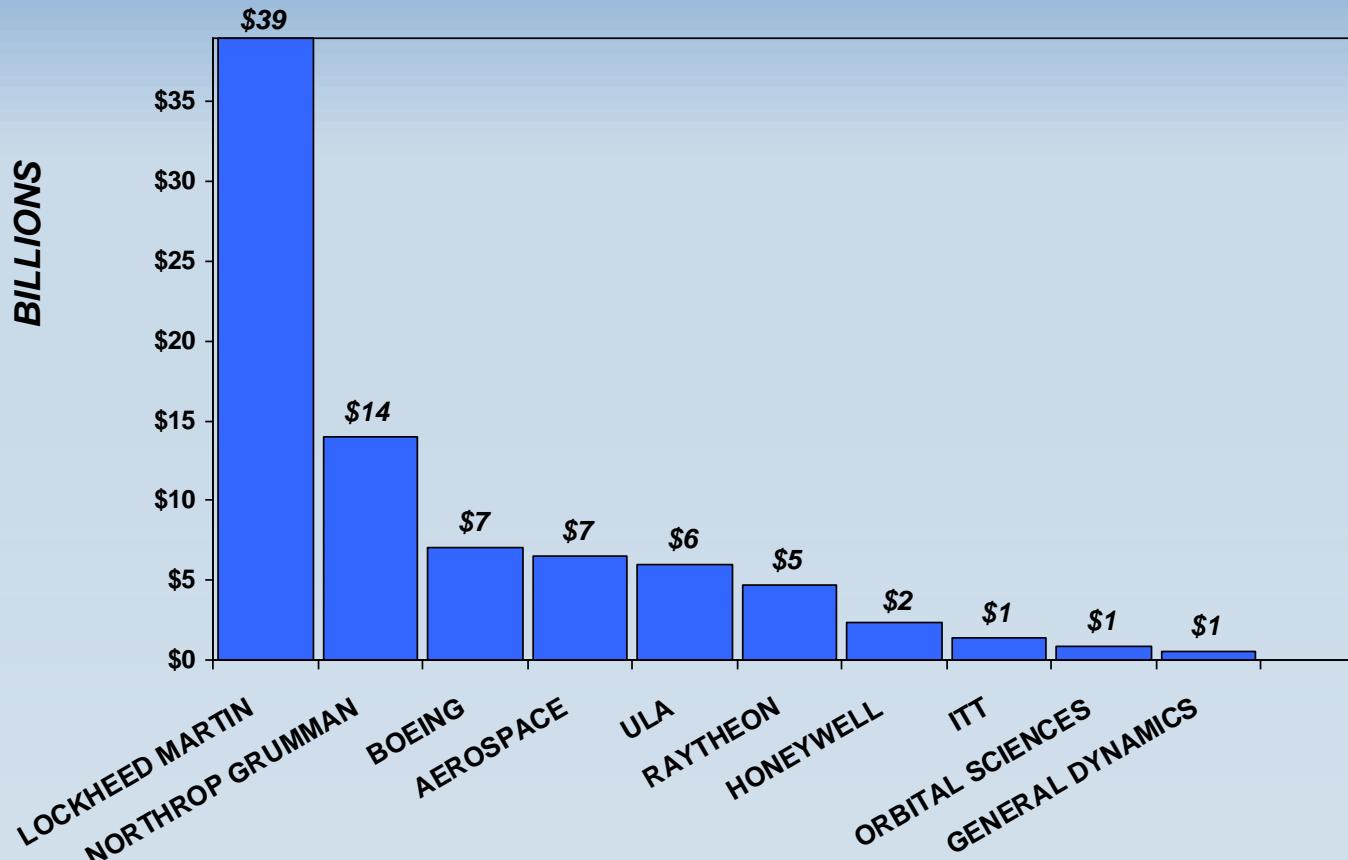


Summary

- ★ The contract management process is the bedrock of our acquisition system providing uniform, policies and procedures for defense acquisition
- ★ The FAR, DFARS and implementing statutes and regulations strive to provide a level playing field and script numerous situations
- ★ Contracting Officer's role is firmly established, but each situation is different
- ★ Contracting is a team and evolving sport
- ★ If you ever appear on the front page of a major newspaper, no substitute for having followed the rules!



SMC'S Top 10 Business Partners by Contract Value (\$B)



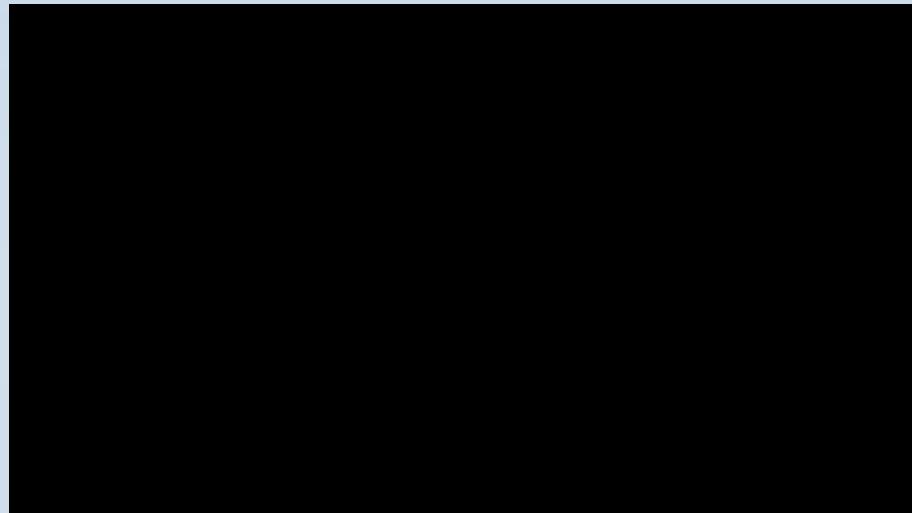
**PK is Managing 740 Active Contracts
Representing over \$87 Billion.**

As of 7 Jan 2004



Exercise #13

Acquisition Strategy Plan (ASP)





MODULE SEVENTEEN

Technical Reviews & Audits

MIL-STD 1521B
SMC-S-021



Major Reviews

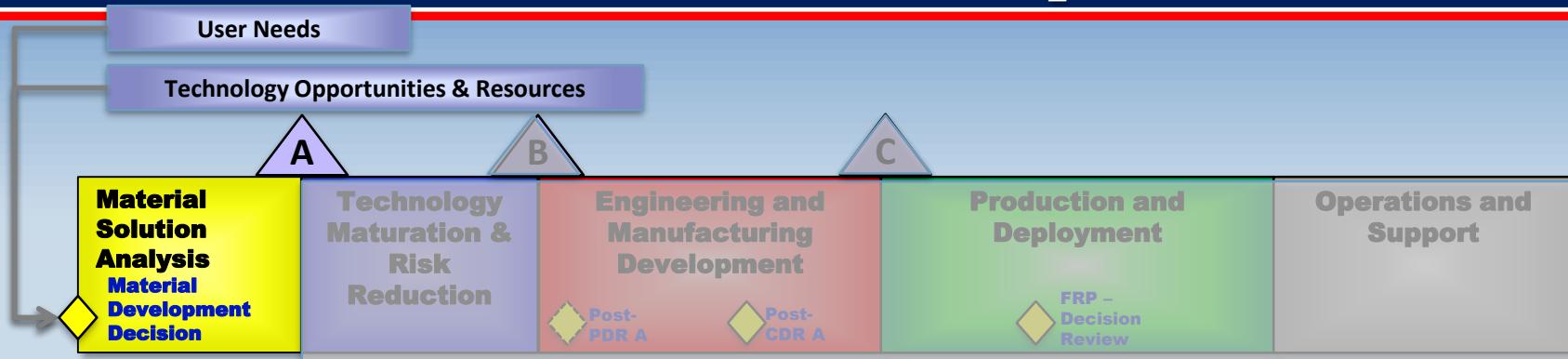
AOA - Analysis of Alternatives

/ TRA - Technology Readiness Assessment

- ★ SRR - Appendix A System Requirements Review
- ★ SFR - Appendix B System Functional Review
- ★ SAR - Appendix C Software Requirements and Architectures Review
- ★ PDR - Appendix D Preliminary Design Review
- ★ CDR - Appendix E Critical Design Review
- ★ TRR - Appendix F Test Readiness Review
- ★ FCA - Appendix G Functional Configuration Audit
- ★ PCA - Appendix H Physical Configuration Audit
- ★ SVR - Appendix I System Verification Review
- ★ M/PRR - Appendix J Manufacturing and Production Readiness Review



Material Solution Analysis & Material Development Decision



- ★ Detailed study refining preferred concepts
 - ◆ Cost-benefit and trade-off analysis are conducted

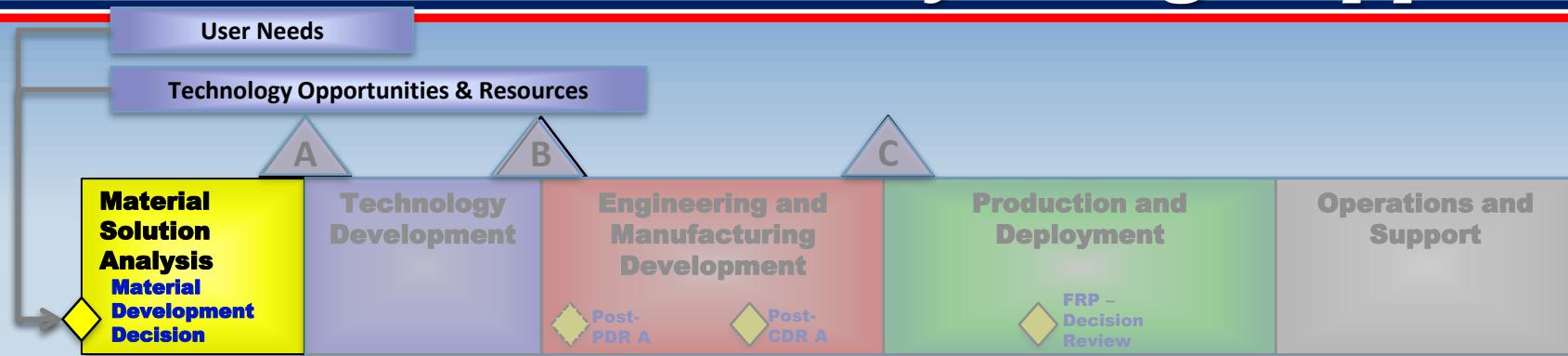


Analysis of Alternatives

Technology Readiness Assessment



Concept Development & Preliminary Design Approval



★ **Review of business case in the acquisition strategy**

Lease

Rent	\$32,400 per year
Insurance	\$2,000 per year
Maintenance	\$1,000 per year (average)
Electricity	\$3,600 per year
Gas	\$ 600 per year
Water	\$1,000 per year

Total per year \$40,600 per year

30 Years \$1,218,000

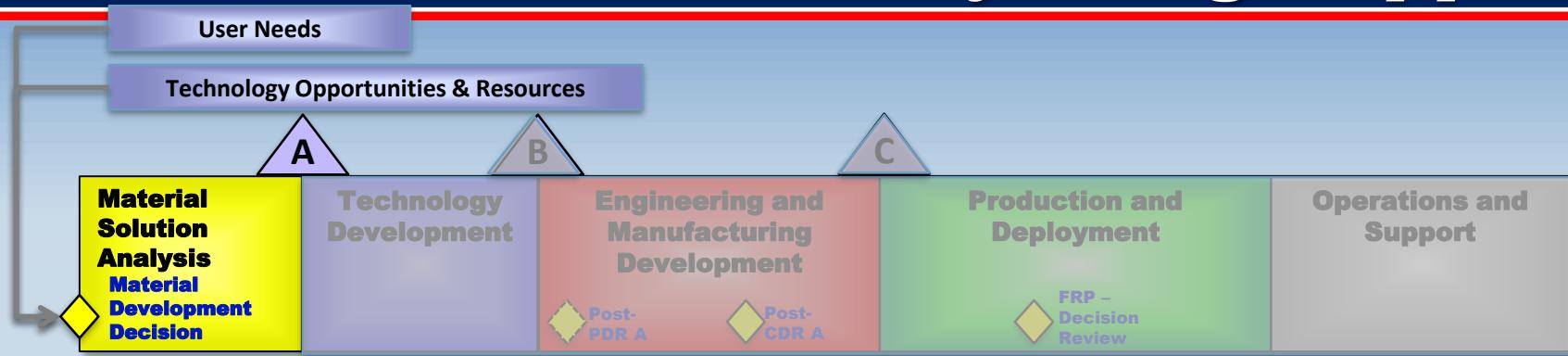


Build

Property tax	\$3,500 per year
Insurance	\$2,000 per year
Maintenance	\$1,000 per year (average)
Electricity	\$3,600 per year
Gas	\$ 600 per year
Water	\$1,000 per year
Etc.	
Total	\$11,700 per year
30 years	\$351,000
Original cost	\$301,000
Interest	\$286,910
Total	\$938,910
Est resale	\$450,000
TOC	\$508,910



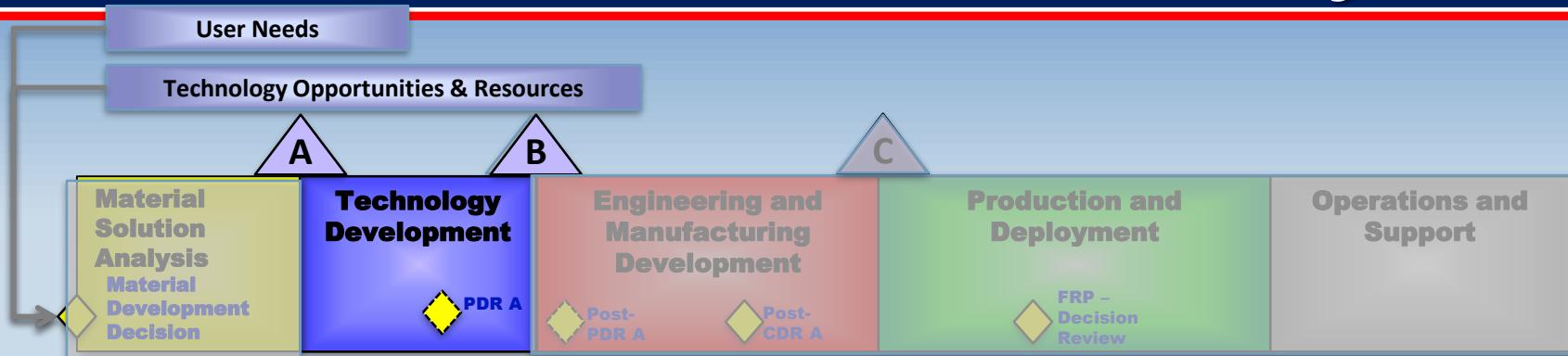
Concept Development & Preliminary Design Approval



- ★ Culminates with the **Material Development Decision** approval to enter milestone decision A which usually:
 - ◆ Represents formal initiation of new program
 - ◆ Approves preceding with the design preferred solution
 - ◆ Approves the acquisition program baseline which describes program in terms of cost, schedule, and performance



Technology Development and Preliminary Design



★ Development and assessment of technologies are emphasized

Basic Technology Research	Level 1	Basic principles observed and reported
Research to Prove Feasibility	Level 2	Technology concept and/or application formulated
Technology Development	Level 3	Analytical and experimental critical functions and/or characteristic proof-of-concept
Technology Demonstration	Level 4	Component and/or bench configured subsystem validation in laboratory environment
System/Subsystem Development	Level 5	Component and/or bench configured subsystem validation in relevant environment
System Test and Operation	Level 6	System/subsystem model or prototype demonstration in a relevant environment
	Level 7	System prototype or system demonstration in an operational environment
	Level 8	Actual system completed and qualified through test and demonstration
	Level 9	Actual system proven through successful mission operations

Technology Development Strategy (TDS)

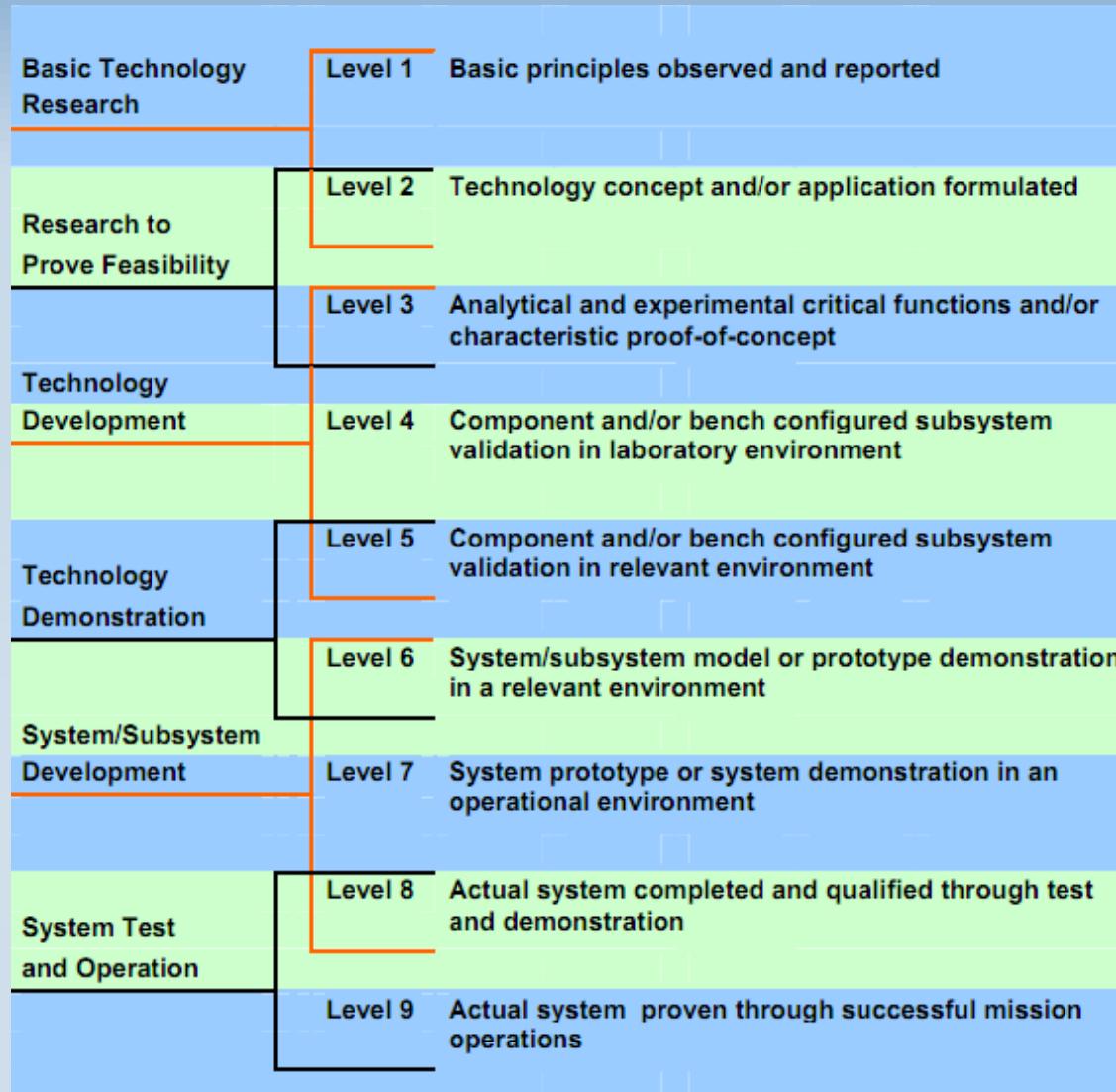
SMART
House





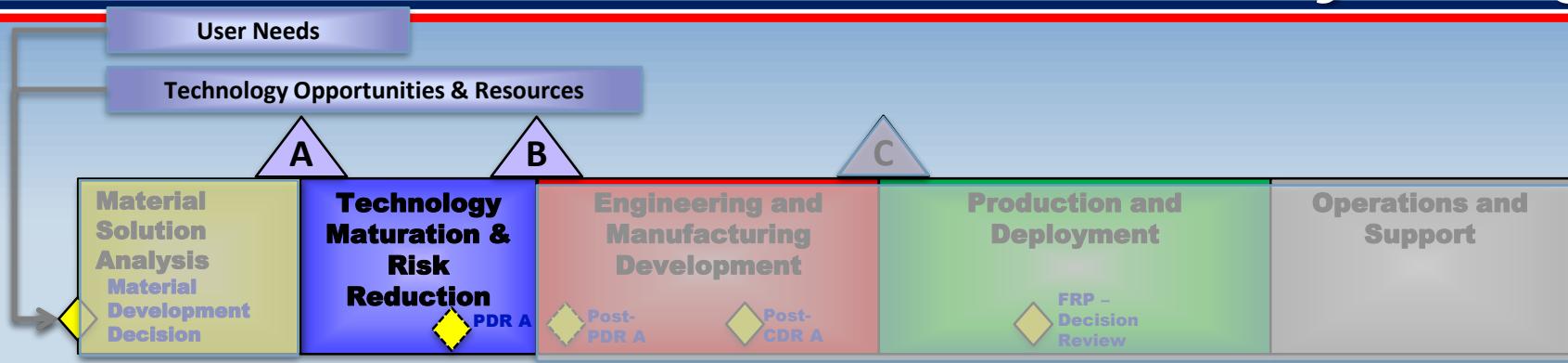
Technology Development

(Technology Readiness Level - TRL)

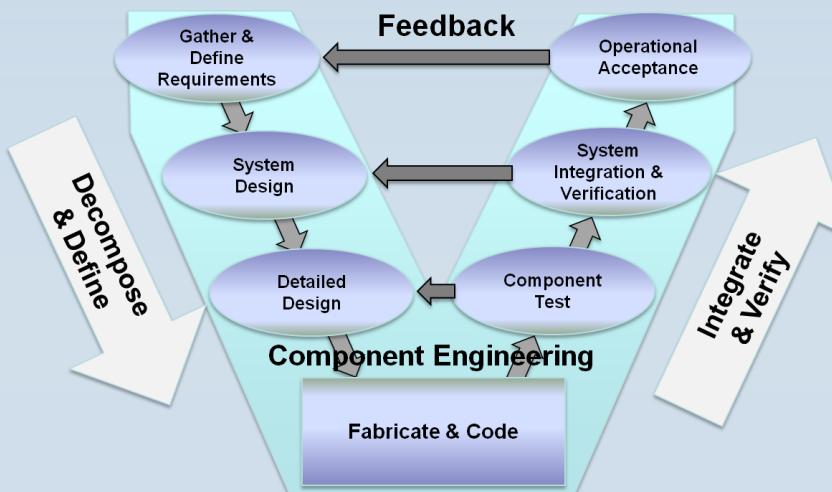




Technology Development and Preliminary Design



- ★ Entails development and definition of specifications for major subsystems, items, and components



Reviews



★ SRR (System Requirements Review)

- Requirements derived **Initial Capabilities Document (ICD)** /draft CDD
- Consistent w/ **cost (program budget), schedule** (program schedule), risk, and other constraints
- Consistency between system **requirements** and preferred **solution** and available **technologies**
- Held well **in advance of Milestone B** (time for issue resolution and executive-level concurrence)
- **Convene(s):** prior to program initiation, technology development and EMD

★ SFR (System Functional Review)

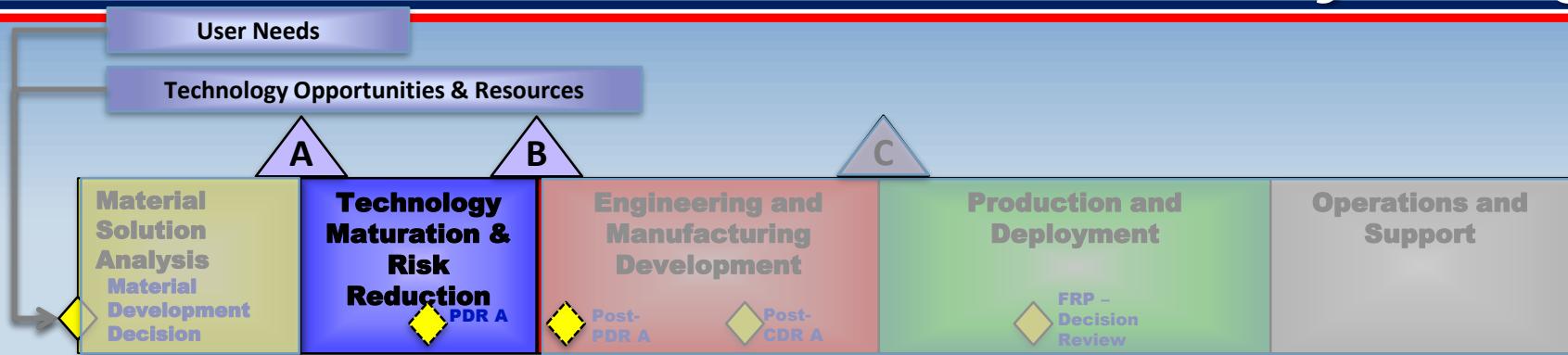
- System can proceed into preliminary design
- Requirements derived from the **Capability Development Document**
- Consistent with cost (program budget), schedule , risk, and other system constraints
- **System specifications (functional baseline)**, performance **fully decomposed** in the FBL
- Updated **risk assessment** for the EMD phase
- Data for **Cost Analysis Requirements Description (CARD)** document, based FBL
- Updated schedule including **system and software critical path drivers**, Approved **SWCI**

★ SAR (Software Requirements and Architecture Review)

- Review(s) software requirements, architecture, and test plan, software development processes
- Current state of the software development for all software items (SI)
- review of the **finalized SI requirements** and operational concept
- Determine Software Requirements Specification(s), Interface Requirements Specification(s), and Software Test Plan Operational Concept Document form a satisfactory basis for proceeding to preliminary software design cycle
- **Note:** Software Configuration Item (**SWCI**) and software item (**SI**) have the same meaning and are used **interchangeably** throughout the technical community



Technology Development and Preliminary Design



- ★ Development and testing models and prototypes is usually a key task



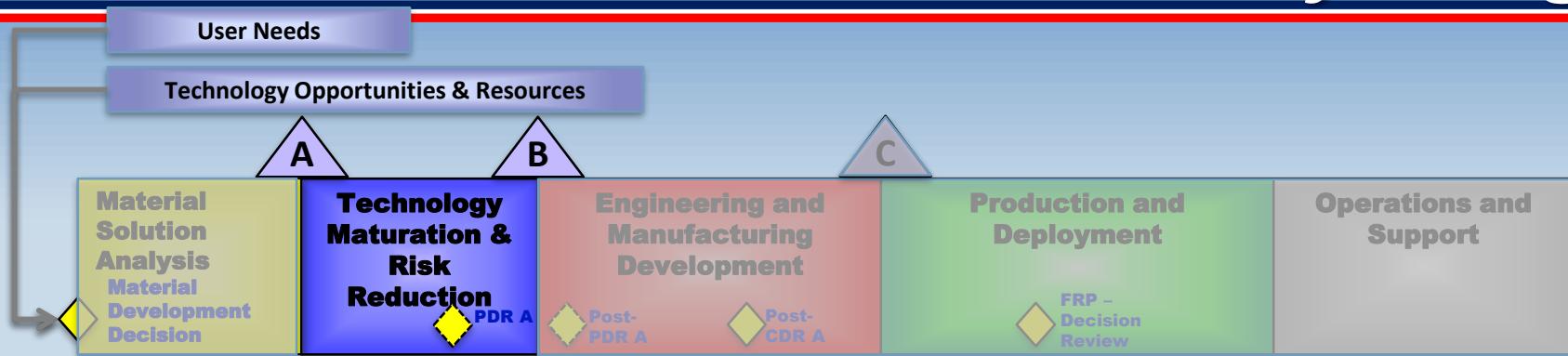
GPS IIR Satellites in Fabrication



GPS Block IIR



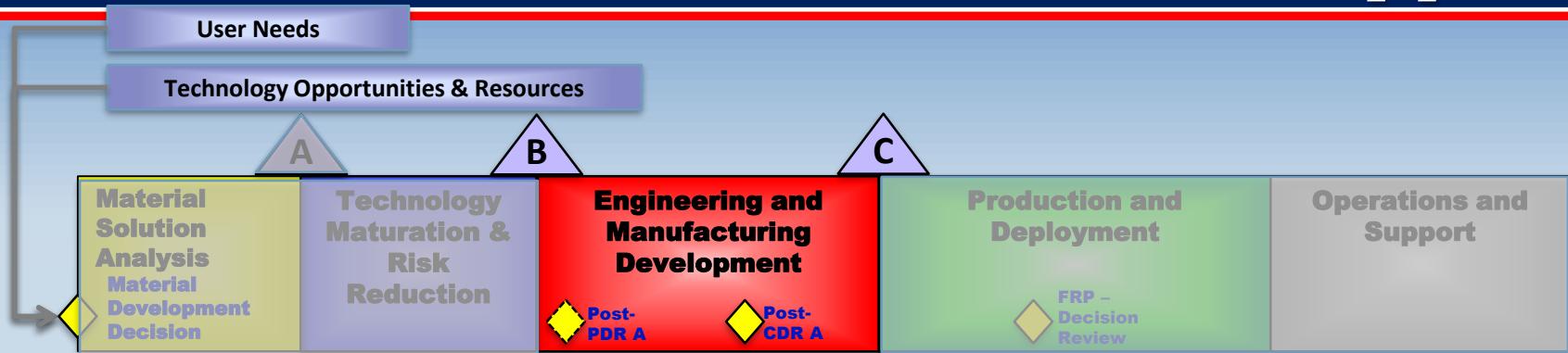
Technology Development and Preliminary Design



- ★ Culminates with the approval to enter EMD milestone decision
 - ◆ Developer determines the design will meet customer requirements within cost and schedule
 - ◆ Completion of approximately 10% of engineering drawings provides evidence of design stability (**PDR A**)
- ★ How does this apply to our House project?
 - ◆ Is the Technology ready? (i.e.; Smart House?)
 - ◆ Is the design matured to the appropriate level?



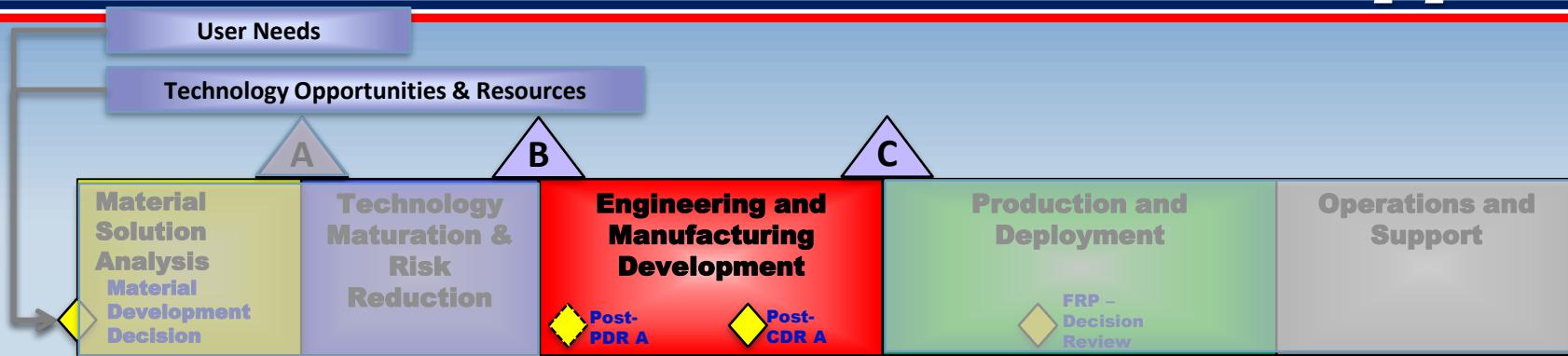
Detailed Design and Production Approval



- ★ Entails completion of design work and preparation for production
 - ◆ Entrance Criteria (is the Technology Ready?)
 - ◆ Release the RFP? (is the Acquisition Strategy Approved?)
 - ◆ Exit Criteria (Is the Design complete? Has it been verified?)
- ★ In the case of our House project the design work is done and construction can begin
 - ◆ Are there any Long Lead items associated with this project?
 - ◆ Is the funding (construction loan?) approved
 - ◆ Time to build the RFP???

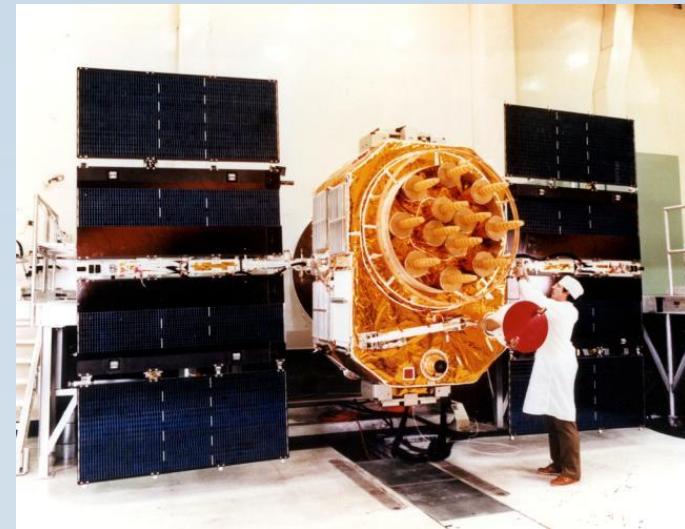


Detailed Design and Production Approval



★ Characterized by:

- ◆ Significant testing on all aspects of system performance including reliability and supportability
- ◆ Demonstrations of production processes, capabilities, and capacities
- ◆ Low rate initial production (LRIP) begins



GPS Block IIF



Reviews

Ensure that the system under review can meet the stated performance requirements within cost (program budget), schedule (program schedule), risk, and other system constraints.

★ PDR (Preliminary Design Review)

- Assesses design in **performance specifications** each **CI** allocated baseline (**ABL**)
- Each function in functional baseline (**FBL**) allocated to one or more of the **CIs**
- Technical **risk** of manufacturing methods and processes
- existence and compatibility of the physical and functional **interfaces**

★ CDR (Critical Design Review)

- establishes the detailed design compatibility among the **CIs**
- assesses **CI risk areas**
- assesses **producibility** analyses
- assesses final design in product specifications for each CI (**product baseline**)

★ TRR (Test Readiness Review)

- verify contractor's readiness begin **formal verification** test event for **end item (EI)**
- Test procedures evaluated for **compliance** with test plans and descriptions
- Adequacy in accomplishing **test requirements**

Reviews



- ★ **FCA** (Functional Configuration Audit)
 - Certify that the Configuration Item (CI) has **met specification requirements**
 - Reviews **operation and support documents**
 - **Validate** CI achieved performance and functional characteristics specified
- ★ **PCA** (Physical Configuration Audit)
 - Verifies that the design documentation **matches** the End Item (EI)
 - Confirms **manufacturing processes, quality control system, measurement and test equipment, and training** are adequately planned, tracked, and controlled
 - Convened prior to the **full-rate production decision**
 - when the Government plans to control the detailed design of the item it is acquiring via the **Technical Data Package** and establishing a **product baseline**
 - Complete when the design and manufacturing **documentation matches the EI**
 - Verifies elements of EI impacted after completion of the System Verification Review (SVR)*

***SVR:** a group of configuration End Items (EI) verified to meet requirements (specifications or equivalent). Does not apply to requirements verified at FCA for individual CIs.



Reviews

★ **MRR** (Manufacturing Readiness Review)

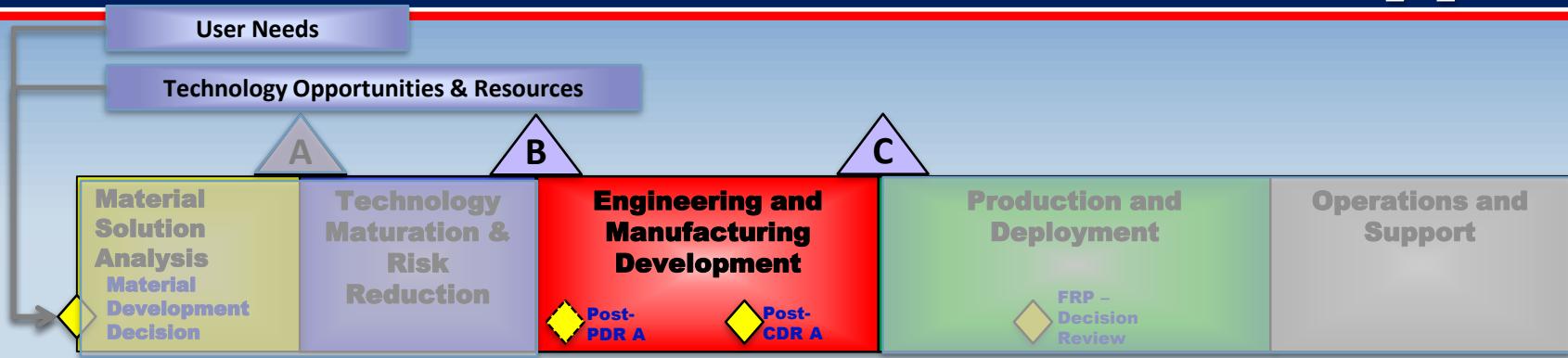
- Readiness to build a quality product with defense-critical manufacturing capabilities
- Before commencing manufacture of a unit or End Item

★ **PRR** (Production Readiness Review)

- Evaluates production risks
- Contractor's methodology to manage risks
- Specifies actions prior to executing a production go-ahead decision.
- Identify high-risk & low-yield manufacturing processes or materials
- Requirement for manufacturing development effort
 - Adequate production planning
 - Facilities allocation
 - Incorporation of producibility-oriented changes
 - Identification and fabrication of tools and test equipment
 - long-lead item acquisition,
- Determines if traceability of system requirements to production system is maintained



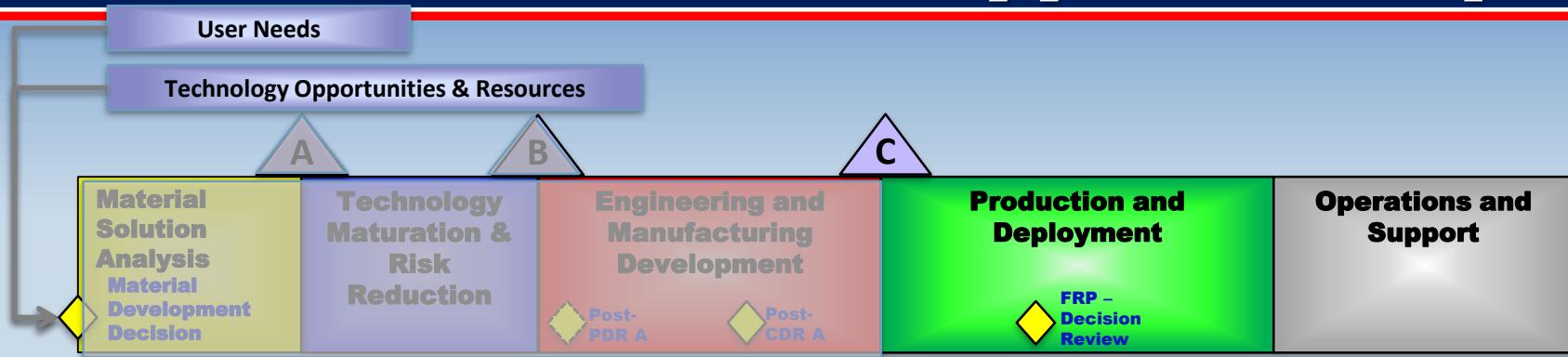
Detailed Design and Production Approval



★ Culminates with the approval to enter full production milestone decision



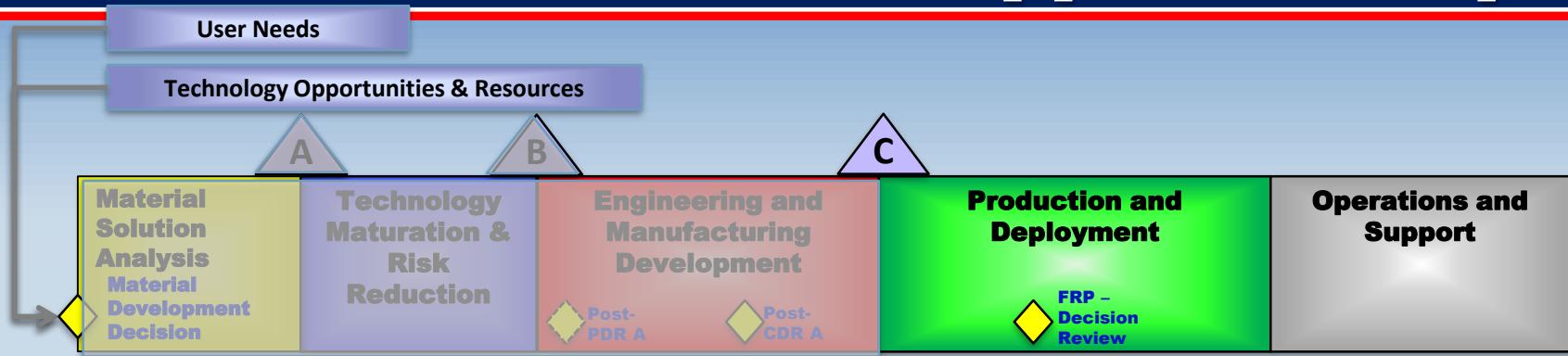
Production, Deployment, Operations, Support, & Disposal



- ★ **The system is:**
 - ◆ Manufactured
 - ◆ Deployed to the user
 - ◆ Supported in operations



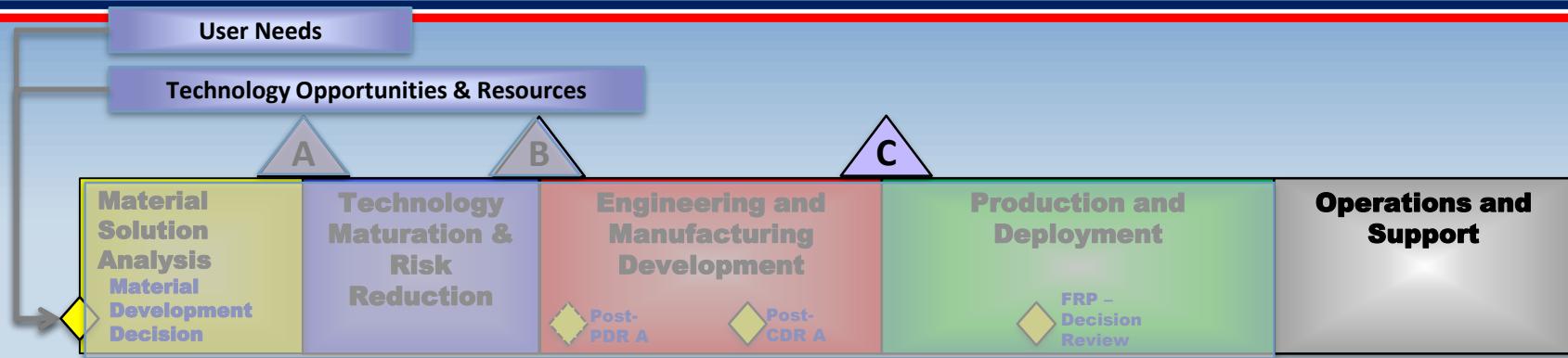
Production, Deployment, Operations, Support, & Disposal



- ★ Testing continues and modifications can be implemented
- ★ A unique spin from the SMC perspective,
 - ◆ Launch!
 - ◆ On Orbit Test and Check out
 - ◆ Operational handover / Acceptance



Production, Deployment, Operations, Support, & Disposal



- ★ Eventually an assessment is made that the system is no longer adequate or necessary and can be discontinued and disposal of the products undertaken



- How do we dispose of launch vehicles? Satellites?
- How do we work Block upgrades?
- Does this apply to our House?



Tailoring the Project Lifecycle

- ★ Project lifecycle is not intended as a rigid set of phases in decisions
 - ◆ Can be adapted or tailored
 - Phases and decision points can be adjusted or eliminated – for example acquisition of a new tanker aircraft
 - What programs are you working on that have tailored the flow



GPS I



GPS III



Summary

- ★ Project management is a fundamental capability that will make or break a program
- ★ No matter what you are tasked with, applying sound project management principles will improve your chances of accomplishing that task on time and within budget while achieving the desired performance



Exercise #14

Request for Proposal (RFP)



★ RFP

- ◆ Model Contract (Section A-H)
- ◆ Contract Clauses (Section I)
- ◆ List of Documents (Section J)
 - Contract Data Requirements List (CDRL)
 - DD Form 254 for Security Requirements
 - SOW/PWS and Specifications
 - Gov't Furnished Property/Equipment/Information (GFP, GFE, GFI)
- ◆ Reps & Certs (Section K)
- ◆ Instructions to the Offeror (Section L)
- ◆ Evaluation Criteria (Section M)



CAPSTONE EXERCISE

- ★ Introduce the CAPSTONE
- ★ Review handouts
- ★ Review Steps 1 through 4!