Introduction to Systems Acquisition

Jim Ripley
Marine Corps Systems Command
Mission of the Acquisition System

The mission of the acquisition system is to develop, acquire, modernize and maintain the most advanced combatant capabilities and associated systems, ensuring continuous, cost-effective innovation that advances warfighting capability.
Outline

1. Acquisition Fundamentals
2. The Defense Acquisition System
3. Acquisition Planning
4. Financial Management
5. Contract Management
6. System Engineering
7. Acquisition Logistics
8. Production, Quality and Manufacturing Management
Module One

Acquisition Fundamentals

Key Terms

Authorities

Critical Concepts

Decision Support Systems
Authorities: Statutory Direction

- Acquisition Laws
  - Armed Services Procurement Act (1947) as amended
  - Small Business Act (1963)
  - Competition in Contracting Act (1984)
  - DOD Procurement Reform Act (1985)
  - DOD Reorganization Act (1986) (Goldwater-Nichols)
  - Federal Acquisition Streamlining Act (FASA (1994)
  - Clinger-Cohen Act (1996)

- Fiduciary Laws
  - Budgeting and Accounting Procedures Act
  - Federal Managers Financial Integrity act
  - Anti Deficiency Act
  - Chief Financial Officer Act of 1990
  - Government Performance and Results Act
  - Government Management Reform Act
Authorities: Policy Guidance

- **Acquisition Policy**
  - DODD 5000.1, The Defense Acquisition System
  - DODI 5000.2, Operation of the Defense Acquisition System

- **Financial Management Policy**
  - DOD 7000.14-R, Financial Management Regulation
  - DODD 7045.14, The Planning, Programming, and Budgeting System
  - DODI 7045.7, Implementation of the Planning, Programming, and Budgeting System

- **Federal Acquisition Regulation (FAR)**
Decision Support Systems

- Joint Capabilities and Integration Development System (JCIDS)
- Acquisition Management System
- Planning, Programming, Budgeting and Executing System
- Financial Systems
Acquisition Fundamentals

Critical Concepts

- Up Front and Early
- Risk
- Requirements
- Funding Planning
- Acquisition Strategy
- Teamwork
- Communications
Critical Concept: Program Manager’s Mantra

Up Front And Early

Acquisition Strategy

Fleet Integration (Doctrine and Operations)

T&E

Logistic Support

Cost Estimation

Interoperability

Production

Program Planning
Critical Concept: Risk and Risk Factors

- Risk – the measure of the potential inability to achieve objectives
  - (1) the *probability/likelihood* of failure
  - (2) the *consequence/impact* of the failure

- Risk Factors
  - Technical performance
  - Cost
  - Schedule

- Risk Assessment
Critical Concept: Risk Handling

- Four techniques for handling risk:
  - Control – reducing the probability of occurrence
  - Avoid – changing the source of the potential risk
  - Assume – planning for the potential consequences
  - Transfer – making someone else accountable
Critical Concept: Requirements

- What capability is needed?
- When is the capability needed?
- Can we afford the new capability?
- Does the need flow from Combat Command, Coalition, and Service operational concepts and architectures?
**Critical Concept: Funding Planning**

- **Rule #1**: Establish funding requirements at least nine years prior to the need.

- **Rule #1a**: Consider process schedules in defining when funding will be needed.

- **Rule #2**: Do not reduce front-end funding to save money. It does not work!

- **Rule #3**: Delays during the program – schedule slips – increase total ownership costs.
Acquisition Fundamentals

Critical Concept: Funding Planning

Funding: Start early and know the Rules.

Program Resources ➔ Program Requirement ➔ Budget Submission and Enactment ➔ Contracting Process ➔ Contractor Effort ➔ Product Needed

**Example**

- **IOC**
  - Production Period: IOC FY 0
  - Contract Start: FY -1
  - Contracting: FY -2
  - Budgeting: FY -3
  - Programming Planning: FY -7
  - Start Work: FY 06
  - 1 yr
  - Budget: FY 05
  - FY 04
  - FY 02-03 (Budget FY04)
  - FY 98-01 (POM 04)
  - FY 95-97
Critical Concept: Acquisition Strategy

- **Concurrency**: Parallel planning and development from concept through disposal
  - System development
  - Test and Evaluation
  - Acquisition Logistics
  - Production

- **Evolutionary Acquisition**: the ultimate capability is delivered to the user in two or more blocks with increasing increments of capability.

- **Spiral Development**: continuously expanding versions based on learning from earlier prototypes or development.

- **Pre-Planned Product Improvement (P³I)**: process for adding improved capabilities to a mature system.
Evolutionary Acquisition, Spiral Development, and Pre-Planned Product Improvement (P3I)

Increment  Or Block 1
Spirals

Increment  Or Block 2
Spirals

Increment  Or Block 3
Spirals

Final  Block  Product

1 Plan
2 Design
3 Build
4 Test

FOC

P3I

Slide 16  Introduction to System Acquisition
Critical Concept: Teamwork

- **Teamwork** – the involvement of all stakeholders throughout the entire acquisition process

Stakeholders:
- Science and Technology
- Engineering
- Acquisition Logistics
- Production
- Operations
- T&E/OPTEVFOR
- Program Management

Teamwork: A Cooperative Effort
Critical Concept: Communications

Communications: A Daily Routine

- Program Office
- Requirements Officer
- Resource Sponsor
- Comptroller
- Contracting Officer
- Design Agent
- In-Service Agent
- Fleet
Module Two

Defense Acquisition System

Framework
Needs
Milestones
Phases
Work Efforts
Entrance Criteria
Exit Criteria
The Defense Acquisition System

The Acquisition Life Cycle

- Technology Opportunities and User needs
  - Process entry at Milestones A, B, or C (or within phases)
  - Program outyear funding when it makes sense, but not later than Milestone B (Unless entering at C)

- Concept and Technology Development: Explore, Develop
- System Development and Demonstration: Integrate, Demonstrate
- Production and Deployment: LRIP, OT&E, FRP Decision Review, FRP/Deploy
- Operations and Support: Sustain, Dispose

Relationship to Requirements Process: ICD, CDD, CPD

All validated by Requirements Authority or PSA

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Transitioning through the Acquisition Process

<table>
<thead>
<tr>
<th>Phase Entrance Criteria</th>
<th>Phase Exit Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phase</strong>-specific</td>
<td><strong>Program</strong>-specific</td>
</tr>
<tr>
<td>Documentation</td>
<td>Measurable or observable performance conditions</td>
</tr>
<tr>
<td>Technology maturity</td>
<td>Defined in the Acquisition Decision Memorandum</td>
</tr>
<tr>
<td>Technology risk</td>
<td></td>
</tr>
<tr>
<td>Technology maturation</td>
<td></td>
</tr>
<tr>
<td>and demonstration needs</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>If technical maturity is:</th>
<th>then enter at</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unproven</td>
<td>Milestone A or between A and B</td>
</tr>
<tr>
<td>Proven</td>
<td>Milestone B or between B and C</td>
</tr>
<tr>
<td>Ready or nearly ready for deployment (commercially available)</td>
<td>Milestone C</td>
</tr>
</tbody>
</table>
The Defense Acquisition System

The Acquisition Life Cycle and Risk

A

Concept and Technology Development

Explore

Develop

B

System Development and Demonstration

Integrate

Demonstrate

C

Production and Deployment

OT&E

LRIP

IOC

Operations and Support

Sustain

Dispose

Pre-Systems Acquisition

Technology Risk (Maturity)

Integration/Performance Risk

Production Risk

Support and Sustainment Risk & Program Risk

Introduction to System Acquisition
The Defense Acquisition System

The Acquisition Life Cycle and the Color of Money

A
Concept and Technology Development
Explore
Pre-Systems Acquisition

B
System Development and Demonstration
Integrate
Demonstrate
Systems Acquisition

C
Production and Deployment
LRIP
IOC

FRP Decision
OT&E
Review
FRP/Deploy

FOC
Operations and Support
Sustain
Dispose

Sustainment

RDT&E

Production
OPN

O&MN

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Module Three

Acquisition Planning

- Requirements
- Acquisition Organizations
- Acquisition Categories
- Acquisition Team
- Work Breakdown Structure
- Acquisition Initiatives
- Acquisition Program Baseline
- Acquisition Strategy
Requirements

- The JCIDS Process
- A Top-Down Process
- Functional Analysis
- An Integrative Process
- A Collaborative Effort
- The DoN Requirements Process
- OPNAV Requirements and Programs (N7)
- Influencing Pressures
The Joint Capabilities and Integration Development System (JCIDS)
A Top-Down Process

RGS
Integrated at Department

Systems

Requirements
Bottom Up, Often Stovepiped

JCIDS

National Military Strategy
Joint Concept of Operations
Joint Operating Concepts
Joint Integrated Architecture
Joint Capabilities
Top Down, Born Joint

Joint Vision
Functional Analysis

**Functional Area Analysis (FAA)**
- Threat versus Capability
- Future Threats
- Current and Projected Capabilities
- Opportunities for Change
- Advances in Technology
- Impact of Policy Changes
- Cost Reduction

**Functional Needs Analysis**
- Shortfalls and Duplications
- Opportunities
- Reliability and Maintainability

**Functional Solution Analysis (DOTMLPF)**
- Non-materiel (DOTLPF)
- Materiel (M)

- Assessment of Capability
- Solution Alternatives
- Doctrine
- Organization
- Training
- Materiel
- Leadership
- Personnel
- Facilities (DOTMLPF)

Assessment of Solution Impact On
Acquisition Planning

An Integrated Process

The Requirements/Acquisition Handshake

A. Concept and Technology Development
   - Key Performance Parameters (KPPs)
   - Performance Thresholds
   - Performance Objectives
   - CAIV
   - Interoperability
   - Information Exchange
   - Information Assurance
   - Program Strategy (for achieving full capability)

B. System Development and Demonstration
   - Measures of Effectiveness
   - Refined KPPs
   - Threat Summary
   - Program Summary
   - Shortcomings of systems in place
   - C4ISR architectures
   - Program Support
   - Joint DOTLPF Impact
   - Logistics and Facilities Consideration
   - Interoperability Certification
   - Program Schedule
   - Program Affordability

C. Production And Deployment
   - LRIP
   - OT&E
   - FRP
   - Log Support
   - Deployment

Functional Solution Analysis
   - Capability Gap
   - Range of Military Operations
   - Joint Concepts and Integrated Architectures
   - Threat/Operational Environment
   - DOTMLPF Analysis
   - Capability Sets
   - Analysis of Materiel Approaches
   - Recommended Alternative

ICD

CDD

CPD

Slide 29
Introduction to System Acquisition
Key Acquisition Organizations

- DoD Acquisition Organizations
- OSD Acquisition Functions
- DoN Acquisition Organizations
- Program Executive Offices
- System Commands
- Program Offices
## Acquisition Categories

<table>
<thead>
<tr>
<th>ACAT</th>
<th>Parameters</th>
<th>MDA</th>
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<tbody>
<tr>
<td>ACAT I</td>
<td>&gt;$365M RDT&amp;E/$2.19B Proc or special interest to USD(AT&amp;L)</td>
<td>USD(AT&amp;L with DAB advice</td>
</tr>
<tr>
<td>ACAT ID</td>
<td>MAIS &gt;$32M in a single year or total cost &gt;$126M</td>
<td>Delegated to component head</td>
</tr>
<tr>
<td>ACAT IC</td>
<td>Below ACAT I and II</td>
<td>ASD(C³I)</td>
</tr>
<tr>
<td>ACAT IA</td>
<td>&gt;$140 RDT&amp;E/$660M Proc</td>
<td>Component head</td>
</tr>
<tr>
<td>ACAT II</td>
<td></td>
<td>Component acquisition Executive (ASN(RDA)</td>
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<tr>
<td>ACAT III</td>
<td></td>
<td>Designated by component head</td>
</tr>
<tr>
<td>ACAT IV</td>
<td>Do not affect mil characteristics of ships or aircraft</td>
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</tr>
<tr>
<td></td>
<td>Do not involve combat capability</td>
<td></td>
</tr>
<tr>
<td>ACAT IVT</td>
<td>Requires OT&amp;E</td>
<td></td>
</tr>
<tr>
<td>ACAT IVM</td>
<td>Does not require OT&amp;E</td>
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</table>
Acquisition Strategy

- Comprehensive guidelines for program execution throughout the system’s life cycle
- Event driven linking decisions to demonstrated accomplishments
- Developed using an iterative process
- Documents the major issues in program execution
- Developed prior to program initiation and updated prior to each milestone decision point

The Acquisition Strategy Guidelines:
- Requirements
- Program Structure
- Acquisition Approach
- Risk
- Program Management
- Design Considerations Affecting the Acquisition Strategy
- Support Strategy
- Business Strategy
Acquisition Strategy: Some Examples

Development Strategies
- Evolutionary Acquisition
- Concurrent Development
- Spiral Development

Business and Contracting Strategies
- Full and Open Competition
- Sole Source
- Firm-Fixed Price
- Indefinite Delivery
- Indefinite Quantity
- Cost Plus Fixed Fee

Support Strategies
- Organic
- Contract
  - Contractor Logistic Support
  - Virtual Prime Vendor
  - Contractor Support and Sustainment
Module Four

Financial Management

Cost Estimation → Resource Allocation → Budget Enactment → Budget Execution
Purpose and Definitions

**Purpose**
- To aid executives in planning and controlling their organizational operations
  - Ensure that obligations and costs are within the law
  - Funds, property, and other assets are safeguarded against waste, loss, unauthorized use or misappropriation

**Definitions**
- Budget Authority – legal authorization
- Commitment – administrative reservation of funds
- Obligation – legal reservation of funds
- Expenditure – actual payment of funds
- Outlay – disbursement to suppliers from concept to end of life of funds
Life-Cycle Cost Estimates

- Life-Cycle Costs (LCC)
- Life-Cycle Cost Estimates (LCCEs)
- Life-Cycle Cost Breakdown
  - Appropriations
  - WBS
  - Cost Categories
Financial Management

Estimation Techniques and the Acquisition Life Cycle

<table>
<thead>
<tr>
<th>Gross Estimates</th>
<th>Detailed Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept &amp; Technology Development</td>
<td>System Development &amp; Demonstration</td>
</tr>
</tbody>
</table>

- **Parametric**
- **Analogy**
- **Actual**

MS A | MS B | MS C

Introduction to System Acquisition
Resource Allocation

- Defense Appropriations, Obligation, and Funding Policies
- Planning, Programming, and Budgeting System (PPBS) and the Future Year Defense Program (FYDP)
- PPBS Phases
- Congressional Action
- Budget Reviews and Annual Budget Overlap
- OPNAV Resources, Requirements and Assessments (N8)
<table>
<thead>
<tr>
<th>Appropriation Categories</th>
<th>Type</th>
<th>Obligation Period</th>
<th>Funding Authority</th>
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</thead>
<tbody>
<tr>
<td>RDT&amp;E</td>
<td>Expense &amp; Investment</td>
<td>2 year</td>
<td>Incremental</td>
</tr>
<tr>
<td>Procurement</td>
<td>Investment</td>
<td>3 year</td>
<td>Full</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 year</td>
<td></td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Expense</td>
<td>1 year</td>
<td>Annual</td>
</tr>
<tr>
<td>MILPERS (O&amp;M)</td>
<td>Investment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MILCON (Proc)</td>
<td>Investment</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Defense Appropriation Categories, Obligations and Funding Authority

Financial Management
Introduction to System Acquisition

The Planning, Programming and Budget System (PPBS) and the Future Years Defense Program (FYDP)

Financial Management

Appropriation Categories

Major Force Programs

1- Strategic Forces
2- General Purpose Forces
3- Intelligence and Communications
4- Airlift and Sealift Forces
5- Guard and Reserve Forces
6- Research and Development
7- Central Supply and Maintenance
8- Training, Medical, and Personnel Activities
9- Administration and Associated Activities
10- Support of Other Nations
11- Special Operations Forces

Components

Army
Air Force
Navy
Def Agencies
Other
PPBS Phases

- **Planning Phase (How much defense is enough?)**
  - Defense Planning Guidance (DPG), SECDEF guidance for POM development
  - Service Planning Guidance

- **Programming Phase (How much defense can we afford?)**
  - Program Objectives Memorandum (POM) or (PR) and Program Decision Memorandum (PDM), OSD decisions concerning Service programs

- **Budgeting Phase (Are we executing efficiently?)**
  - OSD/OMB Budget submission
    - Budget Estimate Submission (BES)
    - Budgetary implementation of PDM
    - Program Budget Decisions (PBD)
  - President’s Budget (PB) Submission
Financial Management

Navy PPBS Overview

PPBS Flow

<table>
<thead>
<tr>
<th>PLANNING</th>
<th>PROGRAMMING</th>
<th>BUDGETING</th>
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</thead>
<tbody>
<tr>
<td>NAT'L POLICY</td>
<td>NAVY ISSUES</td>
<td>NAVY BUDGET</td>
</tr>
<tr>
<td>STRATEGIC VISION</td>
<td>PROGRAMMING GUIDANCE</td>
<td>PREPARE</td>
</tr>
<tr>
<td>NSPG / LRPO</td>
<td>SPP</td>
<td>CONGRESS</td>
</tr>
<tr>
<td>MCP/FNC</td>
<td>T-POM</td>
<td>ENSURE</td>
</tr>
<tr>
<td>COMBAT COMMANDS,</td>
<td>POM</td>
<td></td>
</tr>
<tr>
<td>AGENCIES, SERVICES</td>
<td>OSD REVIEW</td>
<td></td>
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<tr>
<td>WORLD SITUATION</td>
<td>OSD/OMB SUBMIT</td>
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<tr>
<td>CPAM ISSUES</td>
<td>OSD/OMB REVIEW</td>
<td></td>
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<tr>
<td>CPAM ANALYSIS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUMMARY CPAM</td>
<td></td>
<td></td>
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<tr>
<td>DPG/FG</td>
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</tbody>
</table>

FY/FY/FY/FY/FY/FY

FY (FY)

PRES. BUDGET

EXECUTE

APPROPRIATION

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PPBS Timeline

**Program Planning**
- Service Inputs for Drafting DG
- Defense Guidance
- Program Planning

**Program Development**
- SPP, T-POM, and POM (Program Objective Memorandum)
- Issue Papers DRB Deliberations
- PDM (Program Decision Memorandum)
- Claimant Budget Submits
- Navcompt Budget Hearings
- Budget Submission to OSD
- OSD/OMB Hearings
- Program Budget Decisions
- Major Budget Issues
- President’s Budget
- Committee Hearings
- Committee Action
- Full House and Senate Action
- Execution

**Timeline**
- Financial Management
- Introduction to System Acquisition
## Annual Budget Overlap

<table>
<thead>
<tr>
<th></th>
<th>CY 02</th>
<th>CY 03</th>
<th>CY 04</th>
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<tbody>
<tr>
<td>FY 02</td>
<td>Execution</td>
<td>Yr 2</td>
<td>Yr 3</td>
</tr>
<tr>
<td>FY 03</td>
<td>Enactment</td>
<td>Execution</td>
<td>Yr 1</td>
</tr>
<tr>
<td>POM 04</td>
<td>Budgeting</td>
<td>Enactment</td>
<td>Execution</td>
</tr>
<tr>
<td>PR 05</td>
<td>Programming</td>
<td>Budgeting</td>
<td>Enactment</td>
</tr>
<tr>
<td>POM 06</td>
<td>Planning</td>
<td>Programming</td>
<td>Budgeting</td>
</tr>
<tr>
<td>PR 07</td>
<td>Planning</td>
<td>Programming</td>
<td>Budgeting</td>
</tr>
</tbody>
</table>
• Acts as CNO’s principal advisor for the allocation of resources
• Assesses strategy, requirements, and resources to achieve military capabilities through the IWAR and CPAM process
• Directs the development of the Navy POM
• Supports the CNO/Secretary in the budget process
• Oversees the CEB and NROC
• Directs the CNO studies program and the Quadrennial Defense Review
• Provides the Fleet CINC, unified CINC, and Navy Component Commanders representation on the OPNAV staff
Budget Enactment (Congressional Action)

- **Cost Estimation**
  - May/June
  - House Budget Committee
  - Senate Budget Committee
  - Conference Resolution

- **Resource Allocation**
  - July/August
  - House Armed Svcs Committee
  - Senate Armed Svcs Committee
  - Conference Resolution
  - House Appropriations Committee
  - Senate Appropriations Committee
  - Conference Resolution

- **Budget Enactment**
  - September/October
  - Conference Resolution

- **Budget Execution**

Financial Management

Introduction to System Acquisition
Financial Management

Budget Execution

- Cost Estimation
- Resource Allocation
- Budget Enactment

- Statutory Requirements
- Congressional Prior Approval Reprogramming
- Internal Reprogramming
- Below Threshold Reprogramming
Budget Execution: Statutory Requirements

- Expiration of Funds
- Cancellation of Funds
- Misappropriation of Funds
  - (Title 31, U.S. Code, Section 1301)
- Anti-Deficiency Act
  - (Title 31, U.S. Code, Section 1517)
Introduction to System Acquisition

Solicitation Planning

- Definition and Elements of a Contract
- The FAR and the Contracting Officer
- Requirements for Competition
- Determination of Requirements
- Contracting Methods
- Contract Types

Solicitation Evaluation and Contract Award

Post Award and Contract Management

Earned Value Management

Contract Management
## Definition and Elements of a Contract

<table>
<thead>
<tr>
<th>Essential Elements</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Offer</strong></td>
<td>Must: 1. Express Intent&lt;br&gt;2. Be communicated&lt;br&gt;3. Have complete terms&lt;br&gt;4. Be clear and unambiguous</td>
</tr>
<tr>
<td><strong>Acceptance</strong></td>
<td>Must be: 1. Timely&lt;br&gt;2. Clear and unequivocal&lt;br&gt;3. A mirror image of the offer</td>
</tr>
<tr>
<td><strong>Consideration</strong></td>
<td>Types include: 1. Promise to perform&lt;br&gt;2. Promise in return for performance&lt;br&gt;3. Sufficiency and adequacy of consideration</td>
</tr>
<tr>
<td><strong>Legal and Binding</strong></td>
<td>Objective or purpose needs to be legal to be enforced in court</td>
</tr>
<tr>
<td><strong>Competent Parties</strong></td>
<td>Both parties must be legally competent for a contract to be binding</td>
</tr>
</tbody>
</table>
The FAR and the Contracting Officer

- The Federal Acquisition Regulation (FAR)
- Types of Contracting Officer
  - Procuring Contracting Officer (PCO)
  - Administrative Contracting Officer (ACO)
  - Termination Contracting Officer (TCO)
### Contract Management

**The Program Manager and the Contracting Officer**

<table>
<thead>
<tr>
<th></th>
<th>Program Manager</th>
<th>Contracting Officer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Authority</strong></td>
<td>Charter</td>
<td>Warrant</td>
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<tr>
<td><strong>Responsibility</strong></td>
<td>Entire Program</td>
<td>Contract</td>
</tr>
<tr>
<td><strong>Background/Training</strong></td>
<td>Technical/Programatic</td>
<td>Business</td>
</tr>
<tr>
<td><strong>Guiding Directives</strong></td>
<td>DoD 5000 Series Regs</td>
<td>FAR</td>
</tr>
<tr>
<td><strong>Organization</strong></td>
<td>IPT</td>
<td>IPT</td>
</tr>
</tbody>
</table>

The only person who can discuss a contract in detail with a contractor is the contracting officer.
### Requirements for Competition

<table>
<thead>
<tr>
<th>Competition Requirements</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirement for full and open competition</td>
<td>All responsible sources are permitted to compete for the effort. The CO decides how full and open competition will be achieved.</td>
</tr>
<tr>
<td>Allowance for full and open competition after exclusion of sources</td>
<td>Excluding sources may be done to facilitate:</td>
</tr>
<tr>
<td>(Sole Source)</td>
<td>1. Establishing or maintaining alternate sources.</td>
</tr>
<tr>
<td></td>
<td>2. Setting aside work for small business concerns.</td>
</tr>
<tr>
<td></td>
<td>3. Fulfilling Small Business Administration’s objectives for Section 8(a)</td>
</tr>
<tr>
<td>Allowance for exceptions to full and open competition</td>
<td>Seven exceptions to full and open competition include:</td>
</tr>
<tr>
<td></td>
<td>1. Only one source will satisfy requirements</td>
</tr>
<tr>
<td></td>
<td>2. Unusual and compelling urgency</td>
</tr>
<tr>
<td></td>
<td>3. Industrial mobilization</td>
</tr>
<tr>
<td></td>
<td>4. International agreement</td>
</tr>
<tr>
<td>Requirement of approval of other than full and open competition</td>
<td>Requested by Justification and Approval (J&amp;A) or a Determination and Finding (D&amp;F)</td>
</tr>
</tbody>
</table>
## Contracting Methods

<table>
<thead>
<tr>
<th>Sealed Bidding</th>
<th>Negotiated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well-defined requirements</td>
<td>Less well-defined requirements</td>
</tr>
<tr>
<td>Adequate competition required</td>
<td>Competitive or sole source</td>
</tr>
<tr>
<td></td>
<td>(can be a defined requirement)</td>
</tr>
<tr>
<td>Uses an Invitation for Bid (IFB) solicitation</td>
<td>Uses a Request for Proposal (RFP) solicitation</td>
</tr>
<tr>
<td>Award based on price and price related factors</td>
<td>Award based on evaluation criteria</td>
</tr>
<tr>
<td>No discussions allowed</td>
<td>Discussions/negotiations expected</td>
</tr>
<tr>
<td>Usually Firm-Fixed Price (FFP)</td>
<td>Usually Cost Plus Fixed Fee (CPFF)</td>
</tr>
</tbody>
</table>
Contract Types

**Fixed-price**
- Low risk to Government
- Moderate risk to contractor
- Well-defined requirements, higher degree of certainty
- Guaranteed delivery by contractor
- Payment after delivery/performance
- Profit based on efficient performance and cost control
- Use of either IFB or RFP

**Cost-reimbursed**
- Higher risk to Government
- Reduces risk to contractor
- Less well-defined requirements, higher degree of uncertainty
- Contractors best efforts
- Payment as cost are incurred
- Fee or formula to compensate the contractor beyond cost
- Use of an RFP
**Comparison of Contract Types**

<table>
<thead>
<tr>
<th></th>
<th>Fixed-Price</th>
<th>Cost-Reimbursement</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is promised</td>
<td>Acceptable goods and services</td>
<td>Best efforts</td>
</tr>
<tr>
<td>When is payment</td>
<td>After delivery (progress payment possible)</td>
<td>As costs are incurred</td>
</tr>
<tr>
<td>Cost risk to Contractor</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Cost risk to Government</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>
### Other Contract Types

<table>
<thead>
<tr>
<th>This type of contract…</th>
<th>Provides for …</th>
<th>And may be used when…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indefinite Delivery: Definite Quantity</td>
<td>Delivery of a definite quantity for a fixed period</td>
<td>1. Definite quantity of supplies or services will be required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. The supplies or services are regularly available</td>
</tr>
<tr>
<td>Indefinite Delivery: Indefinite Quantity</td>
<td>Indefinite quantity within stated limits during a fixed period with performance to be specified in delivery orders</td>
<td>Exact quantity of supplies or services is unknown</td>
</tr>
<tr>
<td>Indefinite Delivery: Requirements</td>
<td>Filling all actual purchase requirements of a designated activity during a specified period with deliveries or performance to be specified in delivery orders</td>
<td>Acquiring any supplies or services on a recurring basis when specific quantities are not known at the outset</td>
</tr>
</tbody>
</table>
Other Contract Types (Continued)

<table>
<thead>
<tr>
<th>This type of contract…</th>
<th>Provides for …</th>
<th>And may be used when…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time and Materials</td>
<td>Acquisition of supplies and services on the basis direct labor and material costs</td>
<td>It is not possible to estimate extent and duration of work or costs with confidence</td>
</tr>
</tbody>
</table>
| Letter                 | Preliminary contractual instrument containing a price ceiling permitting contractor to begin providing services or supplies | 1. Government’s best interest for contractor to begin immediately  
2. Time does not permit negotiating a definitive contract |
| Multyear               | Purchase of supplies or services for more than one, but not more than five, program years | 1. There will be substantial savings of total anticipated cost  
2. Quantity or rate is expected to remain unchanged  
3. Funding is expected to be stable |
Contract Management

Solicitation Evaluation and Award

- Solicitation Planning
- Solicitation Evaluation and Contract Award
- Proposal Evaluation and Source Selection
- Fair and Reasonable Price Determination
- Contract Award

Post Award and Contract Management
Earned Value Management
## Evaluation and Source Selection

<table>
<thead>
<tr>
<th>Key Player</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contracting Officer (CO)</td>
<td>Process compliance with law/regulation</td>
</tr>
<tr>
<td></td>
<td>Proposal compliance with solicitation</td>
</tr>
<tr>
<td></td>
<td>Establishing competitive range for discussions</td>
</tr>
<tr>
<td>Source Selection Evaluation Board (SSEB)</td>
<td>Evaluating proposals for weaknesses and deficiencies</td>
</tr>
<tr>
<td>Technical Evaluation Panel (TRP)</td>
<td>Evaluating the technical proposal against evaluation factors</td>
</tr>
<tr>
<td></td>
<td>Supporting the CO in discussions and negotiations</td>
</tr>
<tr>
<td>Cost Review Panel (CRP)</td>
<td>Conducting price and/or cost analysis of offeror’s proposals</td>
</tr>
<tr>
<td></td>
<td>Supporting the CO in discussions and negotiations</td>
</tr>
<tr>
<td>Source Selection Advisory Council (SSAC)</td>
<td>On request, perform comparative analysis of SSEB evaluations of each proposal</td>
</tr>
<tr>
<td></td>
<td>Forward recommendations to SSA</td>
</tr>
<tr>
<td>Source Selection Authority (SSA)</td>
<td>Appoint qualified personnel to the SSEB and SSAC</td>
</tr>
<tr>
<td></td>
<td>Oversee process, ensure integrity</td>
</tr>
<tr>
<td></td>
<td>Select best value source</td>
</tr>
<tr>
<td>Contracting Officer (CO)</td>
<td>Communicate with offerors</td>
</tr>
</tbody>
</table>
Fair and Reasonable Price Determination

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Definition</th>
<th>Techniques include:</th>
</tr>
</thead>
</table>
| Price Analysis | the process of examining and evaluating a proposed price without evaluating its separate cost elements and proposed profit. | ★ Comparing offerors’ proposed prices  
★ \((#\text{hours} \times \text{hourly rate} + \text{material})\)  
★ Applying rough yardsticks  
★ Comparing with:  
★ Competitive price lists  
★ Government cost estimates  
★ Market prices |
| Cost Analysis  | the process of reviewing and evaluating the separate elements and proposed profit in the contractors cost proposal. | ★ Applying judgmental factors to proposed costs  
★ Examining all cost elements |
Contract Award

**SSA**
- Decides which offer(s) to accept for contract award

**CO**
- Signs and distributes the contract
  - Briefs a higher authority before the selection is approved, if necessary
  - Notifies unsuccessful offerors of the final decision.
  - If requested, debriefs unsuccessful offerors.
Post Award and Contract Administration

- **Post Award Roles and Responsibilities**
  - Agencies
  - Key Personnel

- **Contract Administration**

- **Delivery and Contract Closeout**
  - Contract Modification
  - Contract Closeout
Post-Award Roles and Responsibilities

 Agencies
- Defense Contract Audit Agency (DCAA) – *accounting and financial advisory services*
- Defense Finance and Accounting Service (DFAS) – *timely payment to the contractor*
- Defense Contract Management Agency (DCMA) – *contract administrative services*

 Key Personnel
- Program Integrator (PI) – *contract management office’s POC for a specific program*
- Administrative Contracting Officer (ACO) – *performs administrative functions for the contract*
- Termination Contracting Officer (TCO) – *negotiates equitable settlement with the contractor*
- Contracting Officer Representative (COR) – *designated qualified person authorized to assist in contract administration*
- Procuring Contracting Officer (PCO) – *handles procurement from pre-solicitation through award*
- Technical Point of Contract (TPOC) – *provides technical oversight for a contract or contract task orders*
Contract Administration

- Purpose
- Role
- Functions

- **Contract Management Office Functions**
  - Informal Performance Assessment Reporting System (IPARS)
  - Contractor Performance Assessment Reporting System (CPARS)
Delivery, Modification and Closeout

- **Delivery** – time and place, quantity, method, and person authorized to receive

- **Contract Modification**
  - Bilateral – adjustment to contract price due to change order; definitize letter contracts; and incorporate other agreements
  - Unilateral – administrative changes; issue a change order; make authorized changes; and issue a termination notice
  - Change order – directs contractor to make a change prior to agreement on terms and conditions
  - Constructive Change – an unauthorized change requiring the contractor to perform beyond contract requirements

- **Contract Closeout** – when all deliveries and services have been completed and accepted
Risk In Contracting

- To the Government
- To the Contractor

Why does the contracting process take so long?
Earned Value Management (EVM)

- Definition
- Objectives Measures
- EVM Systems
- EVM Surveillance and Review
EVM: Definition

- EVM is a series of processes that relate scope of the work with schedule and budgets.

<table>
<thead>
<tr>
<th></th>
<th>Scope</th>
<th>Schedule</th>
<th>Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Planned</td>
<td>What work is scheduled?</td>
<td>When is it scheduled?</td>
<td>How much is budgeted?</td>
</tr>
<tr>
<td>Work Completed</td>
<td>What work was done?</td>
<td>When was it done?</td>
<td>How much was budgeted for it?</td>
</tr>
<tr>
<td>Cost of Work</td>
<td>How much was actually spent?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**EVM: Example**

- **Schedule Status** = $10 behind schedule
- **Cost Status** = $37, the planned value plus the value of the task to completed

**Case Two**

<table>
<thead>
<tr>
<th>Time</th>
<th>Money</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$5</td>
</tr>
<tr>
<td>B</td>
<td>$5</td>
</tr>
<tr>
<td>C</td>
<td>$7</td>
</tr>
<tr>
<td>D</td>
<td>$10</td>
</tr>
<tr>
<td>E</td>
<td>$6</td>
</tr>
<tr>
<td>F</td>
<td>$5</td>
</tr>
<tr>
<td>G</td>
<td>$10</td>
</tr>
</tbody>
</table>

The Project Plan

- Actual Cost = $37
- The Plan = $27
- Earned Value = $17
- Time Now
- Finish
Module Six

System Engineering

Test and Evaluation

Software Acquisition

Science and Technology

Software Acquisition
The Systems Engineering Process

- The Feedback Process
- Systems Engineering Disciplines
- Involvement in the Life Cycle
- Influence on the Life Cycle
The System Engineering Process

- Requirements Analysis
- Functional Analysis and Allocation
- System Analysis and Control (Balance)
- Design Synthesis and Verification
- T&E Verification Loop
- Requirements Loop
- Process Input
- Process Output

Process Outputs:
- Specification functions
- Performance-based Specs and Standards
- Program-unique Specifications
- Specification development
- System specifications
- Item specifications
- Process and material specifications
- Specification flowdown
Involvement in the Life Cycle

Technology Opportunities and User needs

Concept and Technology Development
- Explore
- Develop

System Development and Demonstration
- Integrate
- Demonstrate

Technology Opportunities and User needs

Pre-Systems Acquisition

Systems Acquisition
(Engineering and Manufacturing Development, Demonstration, LRIP, and Production)

Production and Deployment
- OT&E
- LRIP
- FRP Decision Review
- FRP/Deploy

Operations and Support
- Sustainment
- Disposal

Relationship to Requirements Process
- ICD
- CDD
- CPD

Block I
Block II

Introduction to System Acquisition
Influence on the Life-Cycle

- System concept
- Preliminary design
- Detailed design
- Fabrication, test, and integration
- Life-cycle costs
  - Concept and Technology Development
  - System Development and Demonstration
  - Production and Deployment
  - Operations and Support

Potential influence on LCC by acquisition phase
**RDT&E Budget Categories**

**Major Force Program 6 Breakdown**

<table>
<thead>
<tr>
<th>6.1 Basic Research</th>
<th>6.2 Applied Research</th>
<th>6.3 Advanced Technology Development</th>
</tr>
</thead>
</table>

- **Science & Technology**
  - Conducted by Office of Naval Research, labs, and Universities, etc.

<table>
<thead>
<tr>
<th>6.4 Program Definition and Risk Reduction</th>
<th>6.5 Engineering and Manufacturing Development</th>
<th>6.6 RDT&amp;E Management Support</th>
<th>6.7 Operational Systems Development</th>
</tr>
</thead>
</table>

- **Research and Development**
  - Conducted and controlled by PEOs and Engineering Activities

**Traditional Acquisition Programs**
- That fall under the DoD 5000 Series for Management oversight

**decreasing risk**
Introducing New Technology Into the System

- Assess pay-off, risks, benefits
- Assess impact on, baseline.
- Pre-planned Product Improvement (P3I)
- P3I, new manufacturing techniques
- Block Upgrades
- Compliance
- Improved Techniques

Concept and Technical Development
System Development and Demo
Production and Deployment
Operations and Support
Demil and Disposal
T&E and the Acquisition Life Cycle

Technology Opportunities and User needs

Concept and Technology Development
- Explore
- Develop

System Development and Demonstration
- Integrate
- Demonstrate

Production and Deployment
- OT&E
- LRIP
- Issues
- FRP Decision
- Review FRP/Deploy

Operations and Support
- Sustainment
- Disposal

Pre-Systems Acquisition

Systems Acquisition
(Engineering and Manufacturing Development, Demonstration, LRIP, and Production)

T&E Planning

Test and Evaluation Master Plan (TEMP)

Block I

Block II
## Developmental and Operational T&E

<table>
<thead>
<tr>
<th></th>
<th>DT&amp;E</th>
<th>OT&amp;E</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What is tested</strong></td>
<td>Measures technical performance against the design specifications in a controlled environment</td>
<td>Determines operational effectiveness and suitability as defined in the Operational Requirements Document (ORD)</td>
</tr>
<tr>
<td><strong>Who conducts tests</strong></td>
<td>Government and Contractor</td>
<td>Government</td>
</tr>
<tr>
<td><strong>Who is responsible</strong></td>
<td>Program manager</td>
<td>OPTEVFOR</td>
</tr>
</tbody>
</table>
Software Acquisition Fundamentals

- Architecture, Open Systems, and Interoperability
- DoD Software Acquisition Guidelines
- System Engineering and Software Development
- Final Thoughts on Software Development

The Growth of Software Dependencies in DoD Systems
Module Seven

Acquisition Logistics

Logistic Elements
Reliability, Availability and Maintainability
Supportability and System Costs
Support Considerations and Analysis

“I don’t know what the hell this ‘Logistics’ is that Marshall is always talking about, but I want some of it.”
Fleet Admiral E. J. King, 1942
Supportability Planning

Support Elements
- Maintenance Planning
- Manpower and Personnel
- Supply Support
- Support Equipment
- Technical Data and the Technical Data Package
- Training and Training Devices
- Computer Resources Support
- Facilities
- Packaging, Handling, Storage, and Transportation
- Design Interface
Acquisition Logistics is
- A multifunction discipline
- Integral to design and development
- Concerned with peacetime and wartime sustainment
Commercial-Off-the-Shelf Items (COTS)

- COTS/Non-developmental items are more affordable
- COTS/Non-developmental items become obsolete quickly
- COTS Support Planning
  - Life-time buy of parts
  - Design for replacement of obsolete parts
  - Buy parts for support until planned upgrade is in place
Reduce supportability costs by:
- Considering supportability during design phase
- Apply system engineering practices to improve reliability, availability, and maintainability
- Use Integrated Product and Process Development (IPPD)
Reliability, Availability, and Maintainability

- **Reliability:** MTBF = \( \frac{\text{Total \# of unit operating hours}}{\text{\# of failures}} \)

- **Maintainability:** MTTR = \( \frac{\text{Total Time for Corrective Actions}}{\text{Total \# of Corrective Actions In a Given Time Period}} \)

- **Availability:** \( A_o = \frac{\text{Up Time}}{\text{Up Time + Down Time}} \)
Support Considerations

- Developing support concepts
- Providing support data
- Acquiring support resources
- Conducting supportability analyses as a part of the systems engineering process
Module Eight

Production, Quality, and Manufacturing Management

- Manufacturing Processes
- Design Goals
- Quality Standards
- Production Problems
Three Step Process
- Influence the design process
- Prepare for production
- Execute the manufacturing plan

Design Goals
- Ease of fabrication
- Ease of assembly
- Multiuse
- Minimize the number of parts
- Maximize the number of common parts
- Maximize the use of COTS Parts

Manufacturing Process
- Manpower
- Measurement
- Method
- Machinery
- Material
Quality

Key Quality Activities
- Establish Capable Processes
- Monitor and Control Critical Product and Process Variations
- Establish mechanism for feedback of field product performance
- Implement an effective root-cause analysis and corrective action system
- Continuous process improvement

Quality Standards and Systems
- ISO 9000
- DI 9000 (Boeing)
- Six Sigma (Motorola)
- AS 9000 (Aerospace Industry)
- QS 9000 (Automotive Industry)
- Quality Function Deployment (QFD)

Statistical Process Control (SPC)

Quality is fitness for use
Production Problems

- Unstable Rates and Quantities
- Design Instability
- Undue Emphasis on Schedule
- Inadequate Configuration Management System
- Inattention to Environmental Impact