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Integrated Defense Acquisition, Technology and Logistics Life Cycle Management Framework

1. INTRODUCTION. The Integrated Defense Acquisition, Technology and Logistics Life Cycle Management Framework Chart is a training aid for Defense Acquisition University (DAU) courses. It serves as a pictorial roadmap of key activities in the systems acquisition processes. The chart illustrates the interaction of the three major decision support systems—Capabilities Development (Joint Capabilities Integration & Development System (JCIDS)), Acquisition Management (Defense Acquisition System), and the Planning, Programming, Budgeting, and Execution (PPBE) process. This chart is based on policies and guidance from the following Department of Defense (DoD) documents and Web sites:

DoD Directive 5000.1. *The Defense Acquisition System*, May 12, 2003

DoD Instruction 5000.2. *Operation of the Defense Acquisition System*, May 12, 2003

Defense Acquisition Guidebook (DAG). *http://akss.dau.mil/dag.*

CJCS Instruction 3170.01E. *Joint Capabilities Integration and Development System*, May 11, 2005

CJCS Manual 3170.01B. *Operation of the Joint Capabilities Integration and Development System*, May 11, 2005

CJCS Instruction 6212.01C. *Interoperability of Information Technology and National Security Systems*, November 20, 2003

The following Internet sites provide additional information:

Acquisition, Technology & Logistics Knowledge Sharing System (AKSS). *http://akss.dau.mil*. The AKSS provides links to mandatory and discretionary information and best practices for defense acquisition.

Acquisition Community Connection (ACC). *http://acc.dau.mil* *ACC* provides information on acquisition, technology and logistics processes. ACC has links to acquisition-related Communities of Practice, other special interest areas, and to the DAU Continuous Learning Center.

DAU Continuous Learning Center (CLC). *http://clc.dau.mil*. The *CLC* provides access to lessons for professional development and current information on new initiatives.

Defense Acquisition Policy Center. *http://akss.dau.mil/dapc/index.html*. The *acquisition policy center* provides a tutorial, a multi-media JCIDS presentation, and copies of the latest Service DoD 5000 and CJCS 3170 policy documents.

2. ACQUISITION PROCESS. The acquisition process is structured by DoDI 5000.2 into discrete phases separated by major decision points (called milestones or decision reviews) with a number of key activities to provide the basis for comprehensive management and informed decision making. The number of phases and decision points are tailored to meet the specific needs of individual programs. This is called the "Defense Acquisition Management Framework" and is illustrated on the front of this chart.

The acquisition process begins with the identification of a capability need that requires a materiel solution. The process encompasses the activities of design, fabrication, test, manufacture, operations and support. It may involve modifications, and it ends with disposal/recycling/demilitarization. Major upgrade or modification programs may also follow the acquisition life cycle process.

The policies and principles that govern the operation of the defense acquisition system are divided into five major categories as stated in DoDD 5000.1: 1) Flexibility—tailoring program strategies and oversight, 2) Responsiveness—rapid integration of advanced technologies through evolutionary acquisition, 3) Innovation—adoption of practices that reduce cost and cycle time, 4) Discipline—use of program baseline parameters as control objectives, and 5) Effective Management—decentralization to the extent practicable.

DoD Components first try to satisfy capability needs through non-materiel solutions such as changes in doctrine or tactics. If existing U.S. military systems or other on-hand materiel cannot be economically used or modified to meet the warfighter's need, a materiel solution may be pursued according to the following hierarchy of alternatives:

- Procurement (including modification) of commercially available domestic or international technologies, systems or equipment, or allied systems or equipment
- Additional production or modification of previously developed U.S. and/or allied military systems or equipment
- Cooperative development program with one or more allied nations
- New joint, DoD Component, or Government Agency development program
- New DoD Component-unique development program.

A list of program information requirements to ensure informed decision making is found in Enclosure 3, DoDI 5000.2. The Milestone Decision Authority may tailor this information based on program needs, but normally may not omit documents required by statute or mandatory policy without a waiver (e.g., Acquisition Program Baseline or Initial Capabilities Document). Figure 1 is a simplified chart of information required at milestones and other decision reviews.

Other periodic reports:

Defense Acquisition Executive Summary (DAES) Report. ACAT I and IAM programs. Quarterly. Also upon POM and BES submission. For ACAT I only—upon UCR breach.

Selected Acquisition Report (SAR). ACAT I only. Submitted at Program Initiation for Ships, Milestone B, and annually thereafter. End of quarter following Milestone C, Full-Rate Production Decision Review (FRPDR), and for a baseline breach.

Unit Cost Report (UCR). ACAT I only. Quarterly as part of the Defense Acquisition Executive Summary (DAES) report.

Electronic Warfare (EW) Test and Evaluation Report. Annually for all EW programs on the OSD T&E Oversight List.

Program Deviation Report. ACAT I and IAM only. Immediately upon determination of a potential baseline breach using the format provided in the DAES report.

Earned Value Management System (EVMS) reports. See ANS/EIA 748, and the *Defense Acquisition Guidebook.*

Contractor Cost Data Reports (CCDR). See DoDI 5000.2, encl. 3.

Software Resources Data Report (SRDR). See DoDI 5000.2, encl. 3.

3. MANAGEMENT OF THE ACQUISITION PROCESS. The person responsible for ensuring the acquisition management framework activities result in fulfilling the warfighter's need is the Program Manager (PM). The PM is also the single point of accountability for accomplishing program objectives for Total Life Cycle Systems Management, including sustainment. The PM is responsible for the entire system life cycle (design to disposal) and must consider supportability, life cycle costs, performance, and schedule in making program decisions. Each defense acquisition program is assigned a PM in accordance with DoD and Component policy. The primary program management activities follow:

Planning. One of the first planning activities is the development of an acquisition strategy (see the *Defense Acquisition Guidebook*), an overarching plan that serves as a roadmap for program execution from program initiation through post-production support. It describes how the program will accomplish its objectives in terms of (among others) cost, schedule, performance, risk, and contracting activities.

- ACAT I and IA Programs normally provide information on the strategy elements as noted in Figure 2. The PM may choose to develop the acquisition strategy as a stand-alone document or as part of a multipurpose document (e.g., an Army Modified Integrated Program Summary, a Navy Master Acquisition Program Plan, or an Air Force Single Acquisition Management Plan). Each program's acquisition strategy is tailored to meet the specific needs and circumstances of the program.
- There are two basic strategy approaches — Evolutionary and Single Step to Full Capability. Evolutionary is the preferred approach and delivers an initial capability with the explicit intent of delivering future improved capability. The two approaches to achieve evolutionary acquisition are Spiral Development and Incremental Development.

Figure 1. **Information for Milestone/Decision Reviews**
(See DoDI 5000.2, CJCSI 3170.01D and CJCSI 6212.01C)

Information	CD	A	B	DRR	C	FRP
Acquisition Decision Memorandum[5]	X	X	X	X	X	X
Acquisition Program Baseline[5]			X		X	X
Acquisition Strategy[5] (see Figure 2)			X		X	X
Affordability Assessment			X		X	
Analysis of Alternatives[3&5] (AOA)		X	X		X	X
AOA Plan	X					
Benefit Analysis & Determination[1&8] (bundled acquisitions)			X			
Beyond LRIP Report[2]						X
Capabilities Development Document (CDD)[5]			X			
Capabilities Production Document (CPD)					X	
Certification of Compliance with Clinger-Cohen[7]		X	X		X	X
Certification of Compliance with BEA[7] (FM MAIS only)		X	X		X	X
Clinger-Cohen Act Compliance[5&7] (MS-A, MAIS only)		X	X		X	X
Competition Analysis[1&8] (depot-level maintenance rule)			X			
Compliance with Strategic Plan						X
Component Cost Analysis[5&9] (MAIS; optional MDAP)			X			X
Consideration of Technology Issues		X	X		X	
Cooperative Opportunities[1]			X		X	
Core Logistics/Source of Repair Analysis[1&8]			X			
Cost Analysis Requirements Description[5&9] (MDAP & MAIS)			X		X	X
Economic Analysis (MAIS)[7] (may be combined w/AoA at MS-A)		X	X			X
Exit Criteria[5]		X	X	X	X	X
Industrial Capabilities[1] (n/a MAIS)			X		X	
Independent Cost & Manpower Estimate[7] (MDAPs; n/a MAIS)			X		X	X
Independent Technology Assessment (ACAT ID only) (DDR&E Option)			X		X	
Information Support Plan[1&5]			X		X	
Initial Capabilities Document (ICD)[4&5]	X	X	X		X	
J-6 Interoperability & Supportability Certification			X		X	
J-6 Interoperability & Supportability Validation						X
Live Fire T&E Waiver[2] (covered systems) (n/a MAIS)			X			
Live Fire T&E Report[2] (covered systems) (n/a MAIS)					X	
LRIP Quantities (n/a AIS)			X			
Market Research		X	X			
Operational Test Agency Report of OT&E Results			X		X	X
Post Deployment Performance Review						X
Program Protection Plan[1]			X		X	
PgmEnviron, Safety & Ocup Health[5] (w/NEPA schedule)			X		X	X
Registration of Msn Critical & Msn Essential Info Sys[5&7]			X		X	X
Spectrum Certification Compliance[8]			X		X	
System Threat Assessment[5&6]			X		X	
Systems Engineering Plan		X	X		X	X
Technology Development Strategy		X	X		X	
Technology Readiness Assessment[5]			X		X	
Test & Evaluation Master Plan (T&E Strategy only due at MS A)		X	X		X	X

1. Summarized in Acquisition Strategy
2. OSD T&E oversight programs only
3. MDAP: A, B, C; MAIS: A, B, FRPDR
4. Milestone C if program initiation
5. Program initiation for ships
6. Validated by DIA for ACAT ID; AIS use capstone InfoOps sys threat assessment decision
7. Milestone C if equivalent to FRP
8. Milestone C if no milestone B
9. MAIS whenever an economic analysis is required

Organizing and Staffing. The establishment, organization, and staffing of the program office should be a direct outgrowth of a task analysis that supports the program's acquisition strategy. As the program evolves, the program office organization and staffing should evolve to support the changing task requirements and acquisition environment.

Controlling. The control system consists of standards against which progress can be measured, a feedback mechanism that provides information to a decision maker, and a means to make corrections either to the actions underway or to the standards. Examples of standards include the Acquisition Program Baseline, exit criteria, program schedules, program budgets, specifications, plans and test criteria. Examples of feedback mechanisms for program control, oversight, and risk management include the Joint Requirements Oversight Council, Overarching Integrated Product Team, Defense Acquisition Board, Information Technology Acquisition Board, Defense Space Acquisition Board, Integrated Baseline Review, technical reviews, and developmental and operational test and evaluation.

Figure 2. **Acquisition Strategy Considerations**
(*Defense Acquisition Guidebook*, Chapter 2)

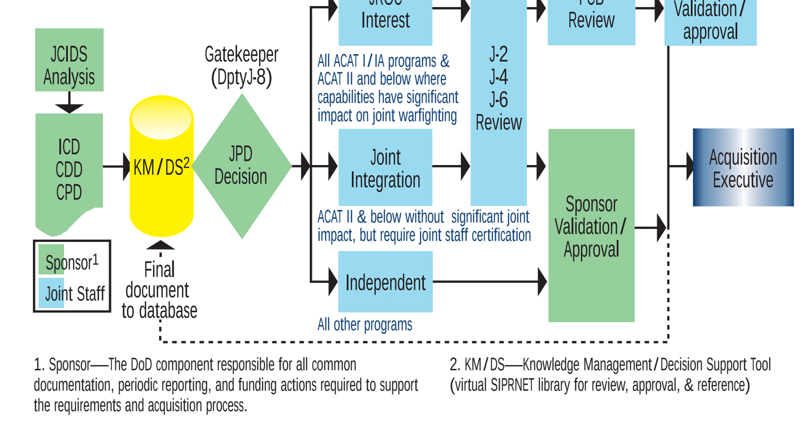
- Program Structure
- Acquisition Approach
- Capability Needs
- Test & Evaluation
- Risk Management
- Resource Management
  - —Funding Under an Evolutionary Acq Strategy
  - —Advance Procurement
- System Engineering Plan
- Interoperability
  - —Information Interoperability
  - —Other-than Information Interoperability
- Information Technology
- Research & Technology Protection
  - —Protection of Critical Information
  - —Anti-Tamper Measures
- Information Assurance
- Product Support Strategy
- Human Systems Integration
- Environmental Safety, and Occupational Health
- Modular Open Systems Approach
- Business Considerations
  - —Competition
    - ◆ Fostering a Competitive Environment
      - –Competition Advocates
      - –Ensuring Future Competition for Defense Products
    - ◆ Building Competition Into Individual Acq Strategies
      - –Applying Competition to Acquisition Phases
      - –Applying Competition to Evolutionary Acq
      - –Competition and Source of Support
      - –Industry Involvement
    - ◆ Potential Obstacles to Competition
      - –Exclusive Teaming Arrangement
      - –Sub-Tier Competition
    - ◆ Potential Sources
      - –Market Research
      - –Commercial and Non-Developmental Items
      - –Dual-Use Technologies
      - –Use of Commercial Plants
      - –Industrial Capability
    - ◆ Small Business Innovative Research (SBIR) Technologies
  - —International Cooperation
    - ◆ International Cooperative Strategy
    - ◆ International Interoperability
    - ◆ International Cooperation Compliance
    - ◆ Testing Required for Foreign Military Sales
  - —Contract Approach
    - ◆ Performance-Based Business Strategy
    - ◆ Modular Contracting
    - ◆ Contract Bundling
    - ◆ Major Contract(s) Planned
    - ◆ Multi-Year Contracting
    - ◆ Contract Type
    - ◆ Contract Incentives
    - ◆ Integrated Contract Performance Management
    - ◆ Special Contract Terms and Conditions
    - ◆ Warranties
    - ◆ Component Breakout
  - —Leasing
  - —Equipment Valuation
    - ◆ Program Description
    - ◆ Accounting Review
    - ◆ Contract Implications
- Best Practices
- Relief, Exemption, or Waiver
- Additional Acq Strategy Topics

Leading. Effective leadership is the key to program success. It involves developing an organization's mission, vision, and goals, and clearly articulating a set of core values. Dominant Leadership roles in program management include strategy setting, consensus/team building, systems integration, and change management. For successful teams, factors such as empowerment, clear purpose, open communication, adequate resources, and a team-oriented behavioral environment are critical.

4. JOINT CAPABILITIES INTEGRATION AND DEVELOPMENT SYSTEM (JCIDS). **JCIDS replaced the Requirements Generation System (RGS) in 2003.** JCIDS is one of the three principal decision support processes for transforming the military forces according to the future DoD vision. The procedures established in the JCIDS support the Chairman, Joint Chiefs of Staff and the Joint Requirements Oversight Council in identifying, assessing and prioritizing joint military capability needs. These needs are reflected in a series of documents that support the acquisition process:

- **Initial Capabilities Document (ICD).** A document that describes the need for a materiel approach to a specific capability gap derived from an initial analysis of materiel approaches. The ICD defines the capability gap in terms of the functional area, the relevant range of military operations, desired effects and time. It summarizes the results of the Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel and Facilities (DOTMLPF) analysis and describes why non-materiel changes alone are not adequate to fully provide the capability. The ICD supports the Concept Decision and Milestone A.

Figure 3. **JCIDS Document Flow**



1. Sponsor—The DoD component responsible for all common documentation, periodic reporting, and funding actions required to support the requirements and acquisition process.
2. KM/DS—Knowledge Management/Decision Support Tool (virtual SIPRNET library for review, approval, & reference)

- **Capability Development Document (CDD).** A document that captures the information necessary to develop a proposed program, normally using an evolutionary acquisition strategy. The CDD outlines an affordable increment of militarily useful, logistically supportable and technically mature capability. The CDD supports program initiation at Milestone B.
- **Capability Production Document (CPD).** A document that addresses the production elements specific to a single increment of an acquisition program. The CPD supports Milestone C.
- **Joint Capability Document (JCD).** The JCD identifies a set of capabilities that supports a defined mission area as identified in the Family of Joint Future Concepts, concept of operations (CONOPS) or Unified Command Plan – assigned missions. The JCD will be used as a baseline for one or more initial capabilities documents or joint DOTMLPF change recommendations, but cannot be used for the development of capability development or capability production documents.

JCIDS Analyses. The JCIDS analysis process is a four-step methodology that defines capability gaps, capability needs and approaches to provide those capabilities within a specified functional or operational area. Based on national defense policy and centered on a common joint warfighting construct, the analyses initiate the development of integrated, joint capabilities from a common understanding of existing joint force operations and DOTMLPF capabilities and deficiencies. See upper left front of chart. The different types of JCIDS analyses are defined in Figure 4.

DOTMLPF Change Recommendation (DCR). A document which focuses on changes that are primarily non-materiel in nature, although there may be some associated materiel changes (additional numbers of existing commercial or non-developmental) required. DCRs are normally referred to as "non-materiel" solutions, while acquisition programs are referred to as "materiel" solutions.

Military Utility Assessment (MUA). Replaces the ICD for an ACTD or ATD, and guides development of CDD and CPD for these efforts.

Interoperability. The policies for interoperability are found in CJCSI 3170.01E, *JCIDS*, and CJCSI 6212.01C, *Interoperability of Information Technology (IT) and National Security Systems (NSS)*. The following are key aspects of this policy:

- **Global Information Grid (GIG).** The globally interconnected, end-to-end set of information capabilities associated processes and personnel for collecting, processing, storing, disseminating, and managing information on demand to warfighters, policy makers, and support personnel. The GIG includes all owned and leased communications and computing systems and services, software, data, security services, and other associated services necessary to achieve information superiority.
- **Information Exchange Requirements (IERs)** characterize the information exchanges to be performed by the proposed system(s). For CDDs, top-level IERs are those information exchanges that are between systems of combatant command/Service/agency, allied, and coalition partners. For CPDs, top-level IERs are those information exchanges that are external to the system with other commands/Services/agencies, allied, and coalition systems. IERs identify who exchanges what information with whom, why the information is necessary, and how the exchange must occur.
- **Integrated Architectures** have multiple views or perspectives (Operational View, Systems View, and Technical Standards View) that facilitate integration and promote interoperability across family-of-systems and system-of-systems and compatibility among related architectures. The linkages among the views of an integrated architecture are illustrated by Figure 5.

The operational architecture view is a description of the tasks and activities, operational elements, and information flows required to accomplish or support a warfighting function.

The systems architecture view is a description, including graphics, of systems and interconnections providing for, or supporting, warfighting functions.

The technical standards architecture view is the minimal set of rules governing the arrangement, interaction, and interdependence of system parts or elements, whose purpose is to ensure that a conforming system satisfies a specified set of requirements.

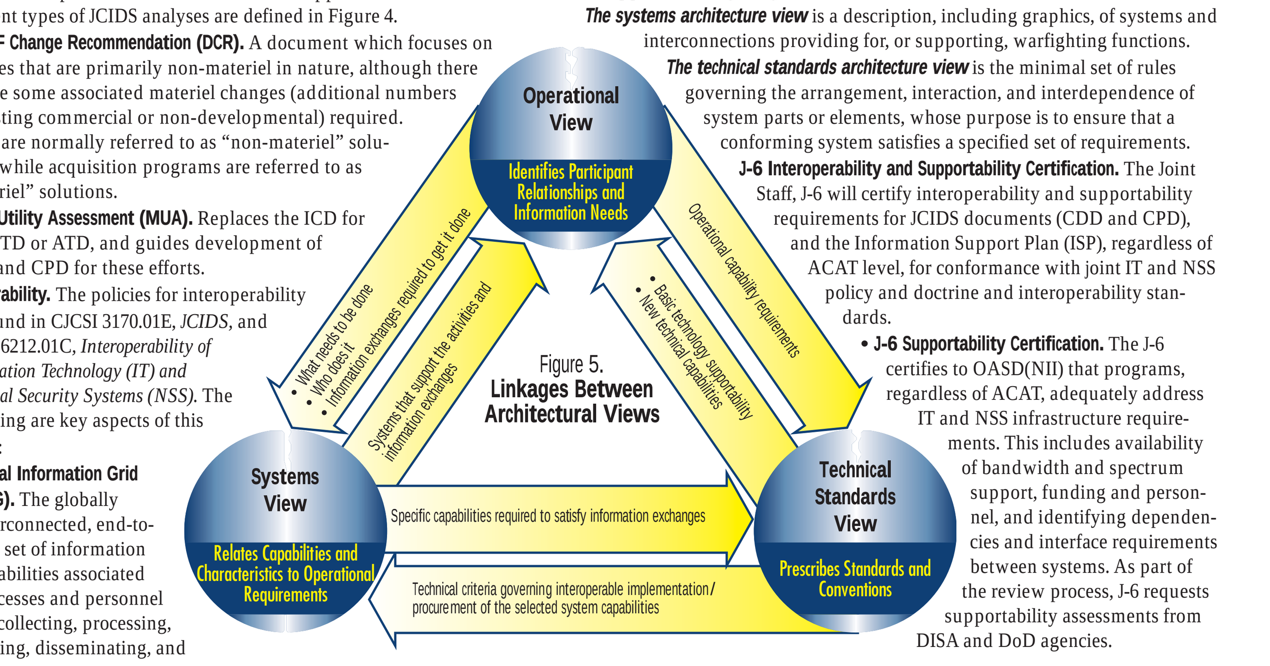


Figure 5. **Linkages Between Architectural Views**

- **J-6 Interoperability and Supportability Certification.** The Joint Staff, J-6 will certify interoperability and supportability requirements for JCIDS documents (CDD and CPD), and the Information Support Plan (ISP), regardless of ACAT level, for conformance with joint IT and NSS policy and doctrine and interoperability standards.
- **J-6 Supportability Certification.** The J-6 certifies to OASD(NII) that programs, regardless of ACAT, adequately address IT and NSS infrastructure requirements. This includes availability of bandwidth and spectrum support, funding and personnel, and identifying dependencies and interface requirements between systems. As part of the review process, J-6 requests supportability assessments from DISA and DoD agencies.

Figure 4. **JCIDS Analysis**

- Functional Area Analysis (FAA)
  —Identify operational task, conditions, and standards needed to accomplish military objectives
  Result: Tasks to be accomplished
- Functional Needs Analysis (FNA)
  —Assess ability of current and programmed capabilities to accomplish the tasks
  Result: List of capability gaps
- Functional Solutions Analysis (FSA)
  —Operational based assessment of DOTMLPF approaches to solving capability gaps
  Result: Potential integrated DOTMLPF approaches to capability gaps
- Post Independent Analysis
  —Independent analysis of approaches to determine best fit
  Result: Initial Capabilities Document

- **J-6 Interoperability System Validation** validates the DISA/Joint Interoperability Test Command (JITC) interoperability system test certification, which is based upon a joint-certified NR-KPP, approved in the CDD and CPD. Validation occurs after receipt and analysis of the JITC interoperability system test certification.

Levels of Information System Interoperability (LISI) is a model used to gain a figure of interoperability between systems. Within LISI, systems are evaluated by their use, application, sharing, and/or exchange of common procedures, software applications, infrastructure, and data. The resultant value indicates interoperable maturity levels: Isolated (0), Connected (1), Functional (2), Domain (3), and Enterprise (4).

Net-Ready Key Performance Parameter (NR-KPP) assesses information needs, timeliness, assurance, and net-ready attributes required for both the technical exchange of information and the end-to-end operational effectiveness of that exchange. NR-KPP consists of verifiable performance measures and associated metrics required to evaluate the timely, accurate, and complete exchange and use of information to satisfy information needs for a given capability. The NR-KPP is comprised of the following elements: 1. Compliance with the Net-Centric Operations and Warfare (NCOW) Reference Model (RM), 2. Compliance with applicable GIG Key Interface Profiles (KIPs), 3. Verification of compliance with DoD information assurance requirements, and 4. Alignment with supporting integrated architecture products required to assess information exchange and use for a given capability.

5. INFORMATION TECHNOLOGY (IT) & NATIONAL SECURITY SYSTEMS (NSS). Software components of defense systems should be tightly linked to and managed as an inherent part of the overall systems engineering processes. Software-specific considerations are:

- Ensuring that software technologies and complex algorithms are matured prior to Milestone B.
- Careful consideration of COTS capabilities & licensing. For COTS IT solutions, specific plans by phase are required. Additionally, use of the DoD Enterprise Software Initiative and "SmartBUY" is required for commercial software purchases whenever appropriate.
- Exploiting software reuse wherever feasible.
- Selecting contractors with systems domain experience, successful past-performance, and mature development capabilities and processes.
- Use of DoD standard data IAW DoDD 8320.1 and compliance with the DoD Net-Centric Data Strategy.
- Early planning for transition to software support.
- Designing extensible and modular software so as to better support incremental life cycle product upgrades
- Evaluating programming languages used in the context of their life cycle costs, support risks, and interoperability.
- Describing, as part of the Acquisition Strategy, the use of independent expert reviews for all ACAT I thru ACAT III software-intensive programs after MS B and prior to Critical Design Review (CDR).
- Emphasis on Information Assurance (IA) considerations throughout the life cycle including certification of foreign nationals who work on key defense system software. Other detailed mandatory IA considerations required by life cycle phase include development of an IA Strategy. Details of the DoD IT Security Certification & Accreditation Process (DITSCAP) can be found in DoD S-3600.1, DoDD 8500.1, DoDI 8580.1, and DoDI 5200.40.
- Other IT & NSS Management Considerations. Defense systems must be inherently joint and network-centric; as such, IT is an inherent enabler of net-centricity. Additionally a number of legal and regulatory considerations apply to IT and NSS systems. These considerations include:
- The GIG (mentioned earlier) [DoDD 8100.1] is the organizing and transforming construct for managing IT throughout the DoD.
- A Net-Centric Operations and Warfare Reference Model (NCOW RM) plus an associated NCOW checklist provide the means to formally assess a program's transition to a net-centric, GIG-compliant architecture and is one element of the Net-Ready KPP.
- Enterprise and domain-specific architectures are key to achieving scalable and interoperable IT systems. Use of the DoD Architecture Framework (DoDAF), which requires programs to document their architectures in a series of specially formatted "views" (operational, systems, and technical), produced at various points in a program's life cycle is mandatory.
- Collections of standards that the DoD has selected as key to facilitating system interoperability have been collected into an online tool, the DoD IT Standards Registry (DISR), which has subsumed the Joint Technical Architecture (JTA).
- The Business Modernization Management Program (BMMP) and certification of compliance with its associated Business Enterprise Architecture (BEA) is legally required for some categories of IT systems.
- AoAs for MAIS typically focus on economic alternatives and are not scenario-driven as for weapons systems. Details can be found in the *Defense Acquisition Guidebook*.
- The Clinger-Cohen Act (CCA) applies to all federal IT and NSS acquisitions. 5000-series processes are inherently CCA-compliant. Formal certification of compliance by MS phase is required for all programs including formal notification to Congress IAW Public Law 108-87. Additionally, PMs are responsible for entering key parameters of their projects into the DoD IT Registry, an online reporting system.
- A special Software Resources Data Report (SRDR) is required for high-cost ACAT I and IA programs. CARD tailoring is typically required for MAIS as well.
- For IT systems, modular contracting IAW FAR 39.103 should be applied to the maximum extent possible.
- A Post-Implementation Review (PIR), equivalent to Post Deployment Performance Review (PDPR), is required to assess how well actual program results have met established performance objectives for any acquisition program.
- For Enterprise Resource Planning (ERP) systems, an online Enterprise Integration Toolkit (EIT) (*http://www.eitoolkit.com*) contains templates, a tailored acquisition life cycle, best practices, and collections of reusable artifacts applicable to ERP development, and is recommended for use by ERP projects.

6. EARNED VALUE. The use of an integrated management system to coordinate work scope, schedule, and cost goals, and objectively measure demonstrated progress toward those goals. (see ANSI/EIA-748)

Earned Value Management Systems (EVMS). Management standards that are used to evaluate an organization's integrated management systems. Some of the elements of EVMS include:

Cost Performance Report (CPR). An objective summary of contract status that includes the following:

- ***Budgeted Cost of Work Scheduled (BCWS).*** Value of work scheduled in budget terms.
- ***Budgeted Cost of Work Performed (BCWP).*** Value of work completed in budget terms.
- ***Actual Cost of Work Performed (ACWP).*** Cost of work completed.

Cost/Schedule Status Report (C/SSR). A reasonably objective, but less detailed, summary of contract status in terms of BCWS, BCWP, and ACWP.

Work Breakdown Structure (WBS). A product-oriented family tree composed of hardware, software, services, and data, which comprise the entire work effort under a program. See MIL-HDBK-881.

Integrated Baseline Review (IBR). A joint Government/Contractor assessment of the performance measurement baseline (PMB). The IBR is led by the Government PM within six months of contract award.

7. CONTRACTING.

Acquisition Plan. A formal written document reflecting the specific actions necessary to execute the approach established in the approved acquisition strategy and guiding contractual implementation. (FAR Subpart 7.1 and DFARS Subpart 207.1)

Source Selection Plan (SSP). Explains the source selection process for a particular acquisition. Typically, the SSP consists of two parts. The first part describes the organization and responsibilities of the source selection team. The second part identifies the evaluation criteria and detailed procedures for proposal evaluation.

A Draft Request for Proposal (RFP) and Pre-solicitation Conferences. Used to ensure that the requirements are understood by industry. Open and honest feedback is essential.

Request for Proposal (RFP). Used in negotiated acquisitions to communicate the government's requirements and to solicit proposals.

Request for Information (RFI). May be used when the Government does not presently intend to award a contract, but wants to obtain price, delivery, and other market information or capabilities for planning purposes. Responses to these notices are not offers and cannot be accepted by the Government to form a binding contract. There is no required format for RFIs.

Figure 6. **Characteristics of Contract Types**

	Cost	Fixed Price
Promise	Best effort	Shall deliver
Risk to contractor	Low	High
Risk to gov't	High	Low
Cash flow	As incurred	On delivery
Financing	None	Progress/performance payments
Administration	Max gov't control	Min gov't surveillance
Fee/profit	CPFF max 15/10 %	No limit

Contract Management is the process of systematically planning, organizing, executing, and controlling the mutually binding legal relationship obligating the seller to furnish supplies and/or services and the buyer to pay for them.

Contract. The formal written agreement between the government and industry. See Figure 6 for the characteristics of the most common contract types. Figure 7 illustrates the most likely contract type for each phase of the acquisition process.

Performance Based Contracting describes the work requirements in terms of outcomes (what the contractor must accomplish) rather than inputs or processes the contractor must provide. Performance-based requirements get the Government out of the "how to" business and into the "what we need" or system output business.

Statement of Work (SOW); Statement of Objectives (SOO); Performance Work Statement (PWS) System Specification; Contract Data Requirement List (CDRL). Documents contained in the solicitation to industry (RFP) that define contractual requirements:

Statement of Work (SOW) details the work the contractor will perform and, when necessary, specifies how the work is to be performed.

Statement of Objective (SOO) Performance-based broad objectives of the product/service. The SOO contains top-level objectives of the program and is usually one to two pages. The contractor is tasked in the RFP to provide a Performance Work Statement (PWS) or a Statement of Work (SOW) in response to the SOO.

Performance Work Statement (PWS) specifies what outcomes the Government wants but does not dictate **HOW** the work will be performed. This allows the contractor to use innovation in the design, development, and manufacturing of the product. DoD prefers the use of a PWS over an SOW.

System Specification sets forth the technical performance requirements the system must achieve (what the system will do).

Contract Data Requirement List (CDRL), DD Form 1423 is a requirement identified in the solicitation and imposed in a contract that lists contract data requirements that are authorized for a specific acquisition.

Cost Type Contract. A family of cost-reimbursement type contracts, where the government pays the cost (subject to specified limitations) and the contractor provides "best efforts." This type may provide for payment of a fee that may consist of an award fee, incentive fee, or fixed fee, or combinations of the three fee types. The government assumes most of the cost risk in this type of contract.

Engineering Change Proposal (ECP). A formal document used to make engineering changes to configuration management baselines. ECPs are implemented by contract modification(s).

Fixed Price Type Contract: Firm Fixed Price (FFP) or Fixed Price Incentive Firm (FPI(F)). A family of fixed-price type contracts where the government pays a price that is subject to specified provisions, and the contractor delivers a product or service. This type may provide for payment of incentives or other sharing arrangements. The contractor bears most of the cost risk in this type of contract.

8. COST ESTIMATING AND FUNDING.

Government Budget Plan. The generic title for an internal government document that plans the long-range budgeting strategy for the life of a given program.

Planning, Programming, Budgeting and Execution (PPBE) Process. The PPBE Process is a time-driven resource allocation process to request funding for all operations, including weapon system development and acquisition. It is essential to convert each program's event-driven acquisition strategy and phasing into the PPBE Process calendar-driven funding profiles to assure the appropriate amount and type of funds are available to execute the desired program.

Planning. In the first year of a new President's administration, a National Security Strategy (NSS) is issued. A Quadrennial Defense Report (QDR) is due concurrently with the President's budget to Congress in the 2nd year of a new administration. The Strategic Planning Guidance (SPG) and Joint Programming Guidance (JPG)—established in "on-years" (even-numbered calendar years)—set forth broad policy objectives and military strategy, and provide programming guidance for the Program Objectives Memorandum (POM). In "off-years" (odd-numbered calendar years), the SPG and JPG are issued at the discretion of the SECDEF.

Programming. The POM, developed by DoD Components, and Program Decision Memoranda (PDM), issued by OSD, are the keystone documents completed in this phase. The POM provides strategies for Components to meet DoD objectives outlined in the JPG. The POM is reviewed by staff officers of the Secretary of Defense, the Commanders of the Unified Commands, and the Joint Chiefs of Staff. The reviews highlight major program issues and alternatives. The Deputy Secretary of Defense reviews the POM issues and decides on the appropriate course of action. The decisions are documented in the PDM(s). In odd (i.e., off) years, the Director, PA&E will provide guidance for program adjustments in lieu of a complete POM.

Budgeting. The Budget Estimate Submission (BES) reflects the first one or two years of the POM. The BES is reviewed by the Under Secretary of Defense Comptroller, and the Office of Management and Budget (OMB) for execution feasibility. Funding changes that are due to execution issues are identified in Program Budget Decisions (PBDs). The updated BES is forwarded to OMB and incorporated into the President's Budget. The President's Budget is due to Congress no later than the first Monday in February. In odd (i.e., off) years, the USD (Comptroller) will provide guidance to the previous on-year budget baseline in lieu of a complete BES.

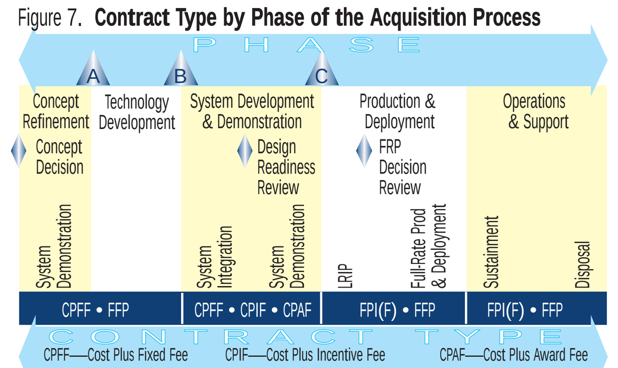
Execution Review. Concurrent with the preparation of the POM/BES, "execution" reviews take place in which the DoD evaluates actual output against planned performance and adjusts resources as appropriate.

Enactment. The process that the Congress uses to develop and pass the Authorization and Appropriations Bills. In the enactment process, the DoD has an opportunity to work with the Congress and defend the President's Budget.

Funding Appropriation Types:

- **RDT&E Budget Activities:**
  1. **Basic Research** includes all efforts and experimentation directed toward increasing fundamental knowledge and understanding in those fields of the physical, engineering, environmental, and life sciences related to long-term national security needs.
  2. **Applied Research** translates promising basic research into solutions for broadly defined military needs, short of development projects. This type of effort may vary from systematic mission-directed research, which is beyond that in Budget Activity 1, to sophisticated breadboard hardware, study, programming, and planning efforts that establish the initial feasibility and practicality of proposed solutions to technological challenges. These funds are normally applied during Concept Refinement.
  3. **Advanced Technology Development** includes all efforts that have moved into the development and integration of hardware for field experiments and tests. The results of this type of effort are proof of technological feasibility and assessment of operability and producibility rather than the development of hardware for service use. These funds are normally applied during Technology Development.
  4. **Advanced Component Development & Prototypes** includes all efforts necessary to evaluate integrated technologies in as realistic an operating environment as possible to assess the performance or cost reduction potential of advanced technology. These funds are normally applied during Technology Development, but could be applied throughout the life cycle.
  5. **System Development & Demonstration** includes those projects in System Development & Demonstration but not yet approved for low-rate initial production at MS C. These funds are normally applied during the System Development and Demonstration Phase of the life cycle.
  6. **RDT&E Management Support** includes test and other types of R&D support. These funds are used to support development efforts throughout the life cycle.
  7. **Operational Systems Development** includes modifications and upgrades to operational systems.
- **Procurement** is used to finance investment items, and should cover all costs integral and necessary to deliver a useful end item intended for operational use or inventory.
- **Military Construction (MILCON)** funds the cost of major construction projects such as facilities. Project costs include architecture and engineering services, construction design, real property acquisition costs, and land acquisition costs necessary to complete the construction project.
- **Military Personnel (MILPERS)** funds the costs of salaries and compensation for active military and National Guard personnel as well as personnel-related expenses such as costs associated with permanent change of duty station (PCS), training in conjunction with PCS moves, subsistence, temporary lodging, bonuses, and retired pay accrual.
- **Operations and Maintenance (O&M)** finances those things that derive benefits for a limited period of time, i.e., expenses, rather than investments. Examples are Headquarters operations, civilian salaries, travel, fuel, minor construction projects of $500K or less, expenses of operational military forces, training and education, recruiting, depot maintenance, purchases from Defense Working Capital Funds, and base operations support.

Figure 7. **Contract Type by Phase of the Acquisition Process**



Cost Estimating is a realistic appraisal of the level of cost most likely to be realized. Types of cost estimating are analogy, parametric, engineering, and extrapolation-from-actual-costs.

- **Analogy** is used early in the acquisition life cycle. A one-to-one comparison of an existing system similar to the system you are designing;
- **Parametric** uses statistical analysis from a number of similar systems and their relationship to your system.
- **Engineering.** A bottoms-up estimate using the detailed WBS structure to price out components discrete components, such as material, design hours, labor, etc.;
- **Extrapolation-from-actual-costs.** Method used late in the acquisition life cycle after actual cost data are available from the same system at an earlier time.

Life Cycle Cost (LCC) is the total cost to the government of acquisition and ownership of the system over its full life time. It includes the cost of development, acquisition, support, and (where applicable) disposal. The USD (AT&L) has defined Defense System Total Ownership Cost (TOC) as Life Cycle Cost.

9. TECHNICAL ACTIVITIES.

Systems Engineering. An interdisciplinary approach encompassing the entire technical effort to evolve and verify an integrated and total life cycle balanced set of system, people, and process solutions that satisfy customer needs. Systems engineering is the integrating mechanism across the technical efforts related to the development, manufacturing, verification, deployment, operations, support, disposal of, and user training for systems and their life cycle processes. Systems engineering develops technical information to support the program management decision-making process. For example, systems engineers manage and control the definition and management of the system configuration and the translation of the system definition into work breakdown structures.

Configuration Management (CM) Baselines:

- **Functional Baseline.** The technical portion of the program requirements (system performance specification) that provides the basis for contracting and controlling the system design. It is normally established by the government at System Functional Review (SFR).
- **Allocated Baseline** defines the performance requirements for each configuration item of the system (item performance specifications). The contractor normally establishes this early in the process [not later than the Preliminary Design Review (PDR)]. Government control is typically deferred until System Verification Review (SVR).
- **Product Baseline** is established by the detailed design documentation for each configurations item (item detail specifications). It includes the process and materials baseline (process and materials specifications). Government control depends on program requirements but, if established, is typically done at Physical Configuration Audit (PCA).

Technical Management Plans:

- **Systems Engineering Plan (SEP)** (required at each milestone) is a comprehensive, living document that defines the program's systems engineering activities, addressing both government and contractor technical activities and responsibilities.
- **Integrated Master Plan (IMP)** (optional) is an event-driven plan that defines a program's major tasks and activities and lays out the necessary conditions to complete them.
- **Integrated Master Schedule (IMS)** (optional) is a time-based planning tool that used a calendar or detailed schedule to demonstrate how work efforts will support tasks and events, often integrated with an IMP.

Reviews and Audits. (These are tailored to the program's acquisition strategy.)

- **Initial Technical Review (ITR).** A multi-disciplined technical review to support a program's initial POM submission.
- **Alternative Systems Review (ARS).** A technical review that demonstrates the preferred concept is cost effective, affordable, operationally effective and suitable, and can be developed to provide a timely solution to a need at an acceptable level of risk.
- **System Functional Review (SFR).** A formal review of the conceptual design of the system to establish its capability to satisfy requirements. It establishes the functional baseline.
- **System Requirements Review (SRR).** A formal, system-level review conducted to ensure that system requirements have been completely and properly identified and that a mutual understanding between the government and contractor exists.
- **Software Specification Review (SSR).** A formal review of requirements and interface specifications for computer software configuration items.
- **Preliminary Design Review (PDR).** A formal review that confirms the preliminary design logically follows the SFR findings and meets the requirements. It normally results in approval to begin detailed design.
- **CDR.** A formal review conducted to evaluate the completeness of the design and its interfaces.
- **Test Readiness Review (TRR).** A formal review of contractors' readiness to begin testing on both hardware and software configuration items.
- **Operational Test Readiness Review (OTRR).** A formal review to establish readiness for Initial Operational Test and Evaluation (IOT&E). Mandatory for programs on the OSD T&E Oversight List.
- **Functional Configuration Audit (FCA).** A formal review conducted to verify that all subsystems can perform all of their required design functions in accordance with their functional and allocated configuration baselines.
- **System Verification Review (SVR).** A formal review conducted to verify that the actual item (which represents the production configuration) complies with the performance specification.
- **Physical Configuration Audit (PCA).** A formal audit that establishes the product baseline as reflected in an early production configuration item.
- **Physical Configuration Review (PCR).** A formal technical review that verifies the product baseline as reflected in the early production configuration of an item, including specifications and the Technical Data Package.
- **Production Readiness Review (PRR).** A formal examination of a program to determine if the design is ready for production, production engineering problems have been resolved, and the producer has accomplished adequate planning for the production phase.
- **In-Service Review (ISR).** A formal technical review that is to characterize in-Service technical and operational health of the deployed system by providing an assessment of risk, readiness, technical status, and trends in a measurable form that will substantiate in-Service support and budget priorities.
- **Pre-Initial Operational Capability (IOC) Supportability Review (SR).** A formal review to confirm design maturity, determine status of correction of deficiencies identified during Operational Test, and certify that product support integrators/providers plan to meet warfighter requirements.
- **System/Product Definition.** This is the natural result of the capabilities-driven JCIDS and the common thread (or area of common interest) among all acquisition functional disciplines.

Test and Evaluation (T&E) is a process by which a system or components are compared against capability needs and specifications through testing. The results are evaluated to assess progress of design, performance, supportability, etc.

- **Beyond Low Rate Initial Production (BLRIP) Report.** Completed by the Director, Operational Test and Evaluation (DOT&E) to assess the IOT&E for MDAPs prior to the FRP Decision Review (or, before proceeding beyond LRIP—hence the name of the report). A copy is provided to the Under Secretary of Defense, (AT&L) and to the Congressional Defense Committees.
- **Combined Developmental and Operational Testing (DT/OT).** Combining DT and OT is encouraged to achieve time and cost savings. The combined approach must not compromise either DT or OT objectives. A final independent phase of IOT&E is required for ACAT I and II and other programs on the OSD T&E Oversight List prior to the FRP decision.
- **Developmental Test and Evaluation (DT&E).** A technical test conducted to provide data on the achievability of critical system performance parameters. This testing is performed on components, subsystems, and system-level configurations of hardware and software.
- **Evaluation Strategy.** A description of how the capabilities in the ICD will be evaluated once the system is developed. The evaluation strategy will evolve into the TEMP, which is first due at Milestone B.
- **Follow-On OT&E (FOT&E).** OT&E needed during and after the production phase to refine estimates from the IOT&E, to evaluate system changes, and to reevaluate the system as it continues to mature in the field. FOT&E may evaluate system performance against new threats or in new environments.
- **IOT&E.** All OT&E that is conducted on production or production representative articles to support a Full-Rate Production decision. It is conducted to provide a valid estimate of expected system operational effectiveness and suitability for ACAT I and II programs and other programs on the OSD T&E Oversight List.
- **Live Fire T&E.** A test process to evaluate the vulnerability and/or lethality aspects of conventional missiles, munitions, or weapon systems. LFT&E is required by law (Title 10 U.S.C. §2366) for covered systems, major munitions programs, missile programs, or product improvements to covered systems major munitions programs, or missile programs, before they can proceed beyond LRIP. A covered system is a system that DOT&E has determined to be ACAT I or ACAT II program, user occupied and designed to provide protection to occupants; or a conventional munitions or missile program; or, a mod to a covered system that is likely to significantly affect the survivability or lethality of the system.
- **Live Fire Test and Evaluation (LFT&E) Report.** Completed by DOT&E for covered systems, that have been subjected to a full-up live fire test prior to FRP Decision Review. Usually included in DOT&E report of IOT&E (BLRIP report) when sent to Congress.
- **Modification T&E.** Testing done after FRP Decision Review to evaluate modifications/upgrades/improvements to an in-production or fielded system.
- **Operational Assessment (OA).** An evaluation of operational effectiveness and suitability made by an independent operational test agency, with user support as required, on other than production systems. An OA conducted prior to Milestone B, or after Milestone B during System Integration, is called an Early Operational Assessment (EOA).
- **Production Acceptance T&E (PAT&E).** T&E of production items to demonstrate that items procured fulfill the requirements and specifications of the procuring contract or agreements.
- **Production Qualification T&E (PQT&E).** A technical test conducted to ensure the effectiveness of the manufacturing process, equipment, and procedures. These tests are conducted on a number of samples taken at random from the first production lot and are repeated if the design or process is changed significantly.
- **Qualification Testing.** Testing that verifies the contractor's design and manufacturing process and provides a performance parameter baseline for subsequent tests. (Best Practice)
- **Test and Evaluation Master Plan (TEMP).** The testing strategy in the TEMP for ACAT I and IA programs shall focus on the overall structure, major elements, and objectives of the test and evaluation program that are consistent with the acquisition strategy.
- **Vulnerability T&E.** Testing a system or component to determine if it suffers definite degradation as a result of having been subjected to a certain level of effects in an unnatural, hostile environment. A subset of survivability.

Manufacturing (also called Production) is the conversion of raw materials into products and/or components through a series of manufacturing procedures and processes. Manufacturing Management is the technique of planning, organizing, directing, controlling, and integrating the use of people, money, materials, equipment, and facilities to accomplish the manufacturing task economically.

An Acquisition Strategy outlines the approach to obtaining a certain amount of a product or system, within a planned timeframe and funding. The desired product or system has to be manufactured/produced, to a quality level that provides confidence the system will perform as advertised. The Production Strategy is the approach to obtaining the total quantity of the system, at some rate, for some cost, and must match up with the Acquisition Strategy.

The role of manufacturing during the pre-production period is to influence the design of the subsystems and systems, and to prepare for production. Once production has been authorized, the role of manufacturing is to execute the manufacturing plan. The overall objective of Manufacturing is to provide a uniform, defect-free product with consistent performance, and a lower cost in terms of both time and money.

- **Design Producibility.** A measure of the relative ease of manufacturing a product design. Emphasis is on simplicity of design and reduction in opportunities for variation during fabrication, assembly, integration and testing of components, processes, and procedures.
- **The Manufacturing Plan** is a formal description of a method for employing the facilities, tooling, and personnel resources to produce the design. The manufacturing plan must ensure that the items produced reflect the design intent, the processes are repeatable, and process improvements are constantly pursued.
- **Industrial Capability Assessment (ICA).** A legal requirement (10 U.S.C. 2440) at each milestone to analyze the industrial capability to design, develop, produce, support, and (if appropriate) restart the program.
- **The "5Ms" are: Manpower, Materials, Machinery, Methods, and Measurement.** These are five major elements of all manufacturing and production efforts, and are referred to during resource requirements risk identification and management.
- **Variation Control.** Identification of key process and product characteristics, and reduction/elimination of significant differences from the nominal values of those characteristics –so that those differences would not cause unacceptable degradation in product cost, quality, delivery schedule, or performance.
- **Process Proofing.** Demonstration of the required manufacturing capability, in a realistic, production-representative facility.
- **Lean.** A fundamental way of thinking, intended to enable flexibility and waste reduction— in order to reduce costs, cycle time, and defective products— by focusing on those actions which will provide value to the end-item customer
- **e-Mfg**. The use of the Internet and all other electronic means to manage the entire manufacturing enterprise.

10. LIFE CYCLE LOGISTICS (LCL) is the planning, development, implementation, and management of a comprehensive, affordable, and effective systems support strategy, within TLCSM. Life cycle logistics encompasses the entire system's life cycle including acquisition (design, develop, test, produce and deploy), sustainment (operations and support), and disposal. The principal goals/objectives of acquisition logisticians are to:

1. Influence product design for affordable System Operational Effectiveness (SOE).
2. Design and develop the support system utilizing Performance Based Logistics (PBL).
3. Acquire and concurrently deploy the supportable system, including support infrastructure.
4. Maintain/improve readiness, improve affordability, and minimize logistics footprint.

Acquisition Logistics. DoD decision makers must integrate acquisition and logistics to ensure a superior product support process by focusing on affordable system operational effectiveness as a key design and performance factor, and emphasizing life cycle logistics considerations in the systems engineering process.

Performance Based Logistics (PBL) is the purchase of support as an integrated, affordable, performance package designed to optimize system readiness and meet performance goals for a weapon system through long-term support arrangements with clear lines of authority and responsibility. PBL is DoD's preferred approach for product support implementation.

The Product Support Strategy (PSS) is part of the acquisition strategy, and addresses life cycle sustainment and continuous improvement of product affordability, reliability, and supportability, while sustaining readiness. It ensures that system support and life cycle affordability considerations are addressed and documented.

The Product Support Integrator (PSI) is an organic or private sector organization that is selected to serve as the single point of accountability for integrating all sources of support necessary to meet the agreed-to support/performance metrics.

Performance-Based Agreements (PBAs) establish a negotiated baseline of performance, and corresponding support necessary to achieve that performance, whether provided by commercial or organic support providers. PBAs with users specify the level of operational support and performance required by users.

Supportability Analyses are a set of analytical tools used as an integral part of the systems engineering process. These tools help determine how to most cost effectively support the system throughout the life cycle and form the basis for design requirements stated in the system performance specification and Product Support Management Plan.

Reliability, Maintainability, and Supportability (RMS) are key components of system operational effectiveness.

The Product Support Package identifies support requirements based upon the inherent reliability and maintainability of the system. This total system Product Support Package identifies the support elements that make up the PBL package. Continuous assessment of in-Service system performance will identify needs for system improvements to enhance reliability, slow obsolescence, and reduce/minimize corrosion or other LCL characteristics. This package details requirements for the following elements:

- Supply Support (spare/repair parts)
- Maintenance Planning
- Test/Support Equipment
- Technical Documentation/IETM
- Manpower & Training/CBT
- Facilities/PHS&T
- Design Interface/Computing Support

Pre-Deployment Evaluations of the system must demonstrate supportability, and life cycle affordability, as entrance criteria for the Production and Deployment Phase.

Post Deployment Evaluations of the system, beginning with the Pre-IOC SR, verify whether the fielded system meets thresholds and objectives for cost, performance, and support parameters, and support continuous improvement.

Key Acquisition Documents that reflect support inputs include the Initial Capabilities Document (ICD), Analysis of Alternatives Plan, Capability Development Document (CDD), Capability Production Document (CPD), Test and Evaluation Master Plan (TEMP), Acquisition Program Baseline (APB), and the contract.

How to Obtain Copies

Download from the Defense Acquisition University publications Web site at: *http://akss.dau.mil/ifc/download_pdf.htm.* To access the Web-enabled version of this chart, go to *http://akss.dau.mil/ifc.*

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