



# Department of Defense REGULATION

March 15, 1996  
NUMBER 5000.2-R

**SUBJECT:** Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs

## **REFERENCES**

- (a) DoD Directive 5000.1, "Defense Acquisition," 1996
- (b) Additional references, see endnotes

## **A. REISSUANCE AND PURPOSE**

This Regulation:

1. Establishes a simplified and flexible management framework for translating mission needs into stable, affordable, and well-managed MDAPs and MAIS Acquisition Programs;
2. Sets forth mandatory procedures for MDAPs and MAISs and, specifically where stated, for other than MDAPs or MAISs;
3. Serves as a general model for other than MDAPs or MAISs;
4. Consistent with statutory requirements, authorizes Milestone Decision Authorities (MDAs) to tailor the procedures as they see fit;
5. Implements **DoD Directive 5000.1** (reference (a)), the guidelines of **OMB Circular A-109<sup>1</sup>**, and current statutes; and,
6. Is effective immediately.

Authority to change this Regulation is hereby delegated to the Under Secretary of Defense (Acquisition and Technology); Director, Operational Test & Evaluation; and Assistant Secretary of Defense (Command, Control, Communications, and Intelligence). All future changes shall be jointly signed by these three officials.

## **B. APPLICABILITY AND PRECEDENCE**

This Regulation applies to:

1. The Office of the Secretary of Defense (OSD), the Military Departments, the Chairman of the Joint Chiefs of Staff, the Unified Combatant Commands, the Defense Agencies, and DoD Field Activities (hereafter referred to collectively as "DoD Components").

2. MDAPs and MAIS Acquisition Programs, and, specifically where stated, less-than-major programs. In some cases, Congress has established mandatory requirements that apply to more than major defense acquisition programs. For example, **10 USC 2366<sup>2</sup>** mandates live fire testing for covered systems, major munitions, or missile programs, as well as related covered product improvements. Some of these systems may be non-major programs. Thus, whenever this Regulation is implementing this type of statute, the Regulation applies beyond just MDAPs.
3. In general, highly sensitive classified programs, cryptologic, and intelligence programs, shall follow the guidance for other programs, depending on their size. The MDA shall approve proposed tailoring. The MDA may waive acquisition documentation requirements, except those required by statute.

### **C. DEFINITIONS**

1. Defense Acquisition Deskbook. The Defense Acquisition Deskbook is an automated repository of information that consists of an electronic Desk Reference Set, a Tool Catalog, and a Forum for the exchange of information. The Reference Set organizes information into two main categories: mandatory guidance and discretionary information.
2. Acquisition Phase. All the tasks and activities needed to bring the program to the next major milestone occur during an acquisition phase. Phases provide a logical means of progressively translating broadly stated mission needs into well-defined system-specific requirements and ultimately into operationally effective, suitable, and survivable systems. An example of an acquisition phase is Program Definition and Risk Reduction.
3. Acquisition Program. A directed, funded effort designed to provide a new, improved or continuing weapons system or AIS capability in response to a validated operational need. Acquisition programs are divided into different categories that are established to facilitate decentralized decision-making, and execution and compliance with statutory requirements.
4. Automated Information System (AIS). A combination of computer hardware and software, data, or telecommunications, that performs functions such as collecting, processing, transmitting, and displaying information. Excluded are computer resources, both hardware and software, that are: physically part of, dedicated to, or essential in real time to the mission performance of weapon systems.
5. Integrated Product and Process Development (IPPD). A management technique that simultaneously integrates all essential acquisition activities through the use of multidisciplinary teams to optimize the design, manufacturing and supportability processes. IPPD facilitates meeting cost and performance objectives from product concept through production, including field support. One of the key IPPD tenets is multidisciplinary teamwork through Integrated Product Teams (IPTs).
6. Major Automated Information System (MAIS) Acquisition Program. An AIS acquisition program that is (1) designated by ASD(C3I) as a MAIS, or (2) estimated to require program costs in any single year in excess of 30 million in fiscal year (FY) 1996 constant dollars, total program costs in excess of 120 million in FY 1996

constant dollars, or total life-cycle costs in excess of 360 million in FY 1996 constant dollars. MAISs do not include highly sensitive classified programs (as determined by the Secretary of Defense). For the purpose of determining whether an AIS is a MAIS, the following shall be aggregated and considered a single AIS: (1) the separate AISs that constitute a multi-element program; (2) the separate AISs that make up an evolutionary or incrementally developed program; or (3) the separate AISs that make up an a multi-component AIS program.

7. Major Defense Acquisition Program (MDAP). An acquisition program that is not a highly sensitive classified program (as determined by the Secretary of Defense) and that is: (1) designated by the Under Secretary of Defense (Acquisition and Technology) (USD(A&T)) as an MDAP, or (2) estimated by the USD(A&T) to require an eventual total expenditure for research, development, test and evaluation of more than 355 million in fiscal year (FY) 1996 constant dollars or, for procurement, of more than 2.135 billion in FY 1996 constant dollars (**10 USC 2430<sup>3</sup>**).
8. Major System. A combination of elements that shall function together to produce the capabilities required to fulfill a mission need, including hardware, equipment, software, or any combination thereof, but excluding construction or other improvements to real property. A system shall be considered a major system if it is estimated by the USD(A&T) to require an eventual total expenditure for RDT&E of more than 75 million in FY 1980 constant dollars (approximately 140 million in FY 1996 constant dollars), or for procurement of more than 300 million in FY 1980 constant dollars (approximately 645 million in FY 1996 constant dollars) (**10 USC 2302(5)<sup>4</sup>**).
9. Major Milestone. A major milestone is the decision point that separates the phases of an acquisition program. MDAP milestones include, for example, the decisions to authorize entry into the engineering and manufacturing development phase or full rate production. MAIS milestones may include, for example, the decision to begin program definition and risk reduction.
10. Milestone Decision Authority (MDA). The individual designated in accordance with criteria established by the USD(A&T), or by the ASD(C3I) for AIS acquisition programs, to approve entry of an acquisition program into the next phase.

Additional definitions appear throughout this Regulation, and in a Glossary at Appendix VII.

## **D. IMPLEMENTATION**

1. This Regulation shall not be supplemented by any DoD Component. Department officials shall keep the issuance of any directives, Regulations, policy memoranda, or regulations necessary to implement the mandatory procedures contained herein to a minimum. Department officials shall provide copies of all such issuances to the Under Secretary of Defense (Acquisition and Technology) (A&T) prior to publication. Waivers or requests for exceptions to the provisions of this Regulation shall be submitted to the USD(A&T) via the DoD Component Acquisition Executive (CAE). Statutory requirements cannot be waived unless the statute specifically provides for waiver of the stated requirements.
2. Policy memorandums and proposed changes to individual sections of this Regulation shall be coordinated with the Director, Acquisition Program Integration (API) prior to Department-wide staffing of the change. The purpose of this policy is to maintain administrative control of this Regulation and is not intended to imply any approval authority on the part of the Director, API.
3. The policies and procedures described in DoD Directive (DoDD) 5000.1 (reference (a)) and this Regulation are mandatory. Both DoDD 5000.1 (reference (a)) and this Regulation are located in the Reference Set of the Defense Acquisition Deskbook. Discretionary acquisition information, practical advice, and lessons learned are also located in the Reference Set.
4. MDAs for other than MDAPs or MAISs shall promulgate mandatory procedures for those programs unless the Component Acquisition Executive has already promulgated such procedures. These procedures shall not exceed the requirements for MDAPs and MAIS Acquisition Programs established in this Regulation (i.e., no DoD Component shall add mandatory requirements to those specified in this Regulation).
5. Unless otherwise directed by the MDA, program documentation prepared in compliance with the requirements of DoDI 5000.2<sup>5</sup> or DoDI 8120.2<sup>6</sup> (both of which are now being cancelled with this reissuance), as of the date of signature of this Regulation, shall not be updated solely to satisfy the requirements of this Regulation.

## **E. TABLE OF CONTENTS**

This Regulation is organized into six major Parts:

1. Acquisition Management Process
2. Program Definition
3. Program Structure
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<sup>1</sup> Office of Management and Budget Circular A-109, Major Systems Acquisition, April 5, 1976

<sup>2</sup> Title 10, United States Code, Section 2366, Major systems and munitions programs: survivability and lethality testing required before full-scale production

<sup>3</sup> Title 10, United States Code, Section 2430, Major defense acquisition program defined (these amounts have been increased pursuant to the statutory notice provided to Congress)

<sup>4</sup> Title 10, United States Code, Section 2302(5), Definitions

<sup>5</sup> DoD Instruction 5000.2, "Defense Acquisition Management Policies and Procedures," February 23, 1991

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<sup>6</sup> DoD Instruction 8120.2, "Automated Information System Life-Cycle Management Process, Review, and Milestone Approval Procedures," January 14, 1993

# Part 1

## **Acquisition Management Process**

### **1.1 Purpose**

This Part establishes a general model for managing Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) acquisition programs. The broad coverage of the general model acknowledges that every acquisition program is different. Any singular MDAP or MAIS need not follow the entire process described below. However, cognizant of this model, the Program Manager (PM) and the Milestone Decision Authority (MDA) shall structure the MDAP or MAIS to ensure a logical progression through a series of phases designed to reduce risk, ensure affordability, and provide adequate information for decision-making that will provide the needed capability to the warfighter in the shortest practical time.

PMs and MDAs for other than MDAPs or MAISs shall generally adhere to the process described in this part; however, they shall tailor the process, as appropriate, to best match the conditions of individual non-major programs.

### **1.2 Overview of the Acquisition Management Process**

The acquisition process shall be structured in logical phases separated by major decision points called milestones. The process shall begin with the identification of broadly stated mission needs that cannot be satisfied by nonmateriel solutions. Acquisition program stakeholders shall consider the full range of alternatives prior to deciding to initiate a new MDAP or MAIS. Threat projections, system performance, unit production cost estimates, life-cycle costs, interoperability, cost-performance-schedule trade-offs, acquisition strategy, affordability constraints, and risk management shall be major considerations at each milestone decision point, including the decision to start a new program.

At program initiation, and after consideration of the views of the Working-Level Integrated Product Team (IPT) and Overarching IPT members, the PM shall propose, and the MDA shall consider for approval, the appropriate milestones, the level of decision for each milestone, and the documentation needed for each milestone. This proposal shall consider the size, complexity, and risk of the program. The determinations made at program initiation shall be reexamined at each milestone in light of then-current program conditions.

### **1.3 Categories of Acquisition Programs and Milestone Decision Authorities**

Upon initiation, size and complexity shall generally categorize acquisition programs. The categories are:

1. Acquisition Category (ACAT) I (MDAPs)
2. ACAT IA (MAIS)
3. ACAT II (major systems)
4. ACAT III (all other acquisition programs)

A complete description of each ACAT follows.

#### **1.3.1 ACAT I**

ACAT I programs are MDAPs. An MDAP is defined as a program estimated by the Under Secretary of Defense (Acquisition and Technology) (USD(A&T) ) to require eventual expenditure for research, development, test, and evaluation of more than \$355 million (FY 1996 constant dollars) or procurement of more than \$2.135 billion (FY 1996 constant dollars), or those designated by the USD(A&T) to be ACAT I (**10 USC §2430**<sup>1</sup>).

ACAT I programs have two sub-categories:

1. **ACAT ID**, for which the MDA is USD(A&T). The “D” refers to the Defense Acquisition Board (DAB), which advises the USD(A&T) at major decision points.
2. **ACAT IC**, for which the MDA is the DoD Component Head or, if delegated, the DoD Component Acquisition Executive (CAE). The “C” refers to Component.

The USD(A&T) designates programs as ACAT ID or ACAT IC.

### 1.3.2 **ACAT IA**

ACAT IA programs are MAISs. A MAIS is estimated by the Assistant Secretary of Defense for Command, Control, Communications, and Intelligence (ASD(C3I)) to require program costs for any single year in excess of \$30 million (FY 1996 constant dollars), total program in excess of \$120 million (FY 1996 constant dollars), or total life-cycle costs in excess of \$360 million (FY 1996 constant dollars), or those designated by the ASD(C3I) to be ACAT IA.

ACAT IA programs have two sub-categories:

1. **ACAT IAM** for which the MDA is the Office of the Secretary of Defense (OSD) Chief Information Officer (CIO) (formerly the Senior IM Official, the ASD(C3I)). The “M” refers to Major Automated Information Systems Review Council (MAISRC).
2. **ACAT IAC**, for which the MDA is the Department of Defense (DoD) Component Chief Information Officer (CIO) (formerly the Senior IM Official). The “C” refers to Component.

The ASD(C3I) designates programs as ACAT IAM or ACAT IAC.

The DoD Component is responsible for notifying the USD(A&T) or ASD(C3I) when cost growth or a change in acquisition strategy results in reclassifying a formerly lower ACAT program as an ACAT I or IA program.

### 1.3.3 **ACAT II\***

ACAT II programs are defined as those acquisition programs that do not meet the criteria for an ACAT I program, but do meet the criteria for a major system. A major system is defined as a program estimated by the DoD Component Head to require eventual expenditure for research, development, test, and evaluation of more than \$75M in fiscal year (FY) 1980 constant dollars (approximately \$140M in FY 1996 constant dollars), or for procurement of more than \$300M in FY 1980 constant dollars (approximately \$645M in FY 1996 constant dollars) , or those designated by the DoD Component Head to be ACAT II (**10 USC §2302(5)**<sup>2</sup>). The MDA is the DoD CAE.

\* Not applicable to ACAT IA programs.

#### **1.3.4 ACAT III**

ACAT III programs are defined as those acquisition programs that do not meet the criteria for an ACAT I, an ACAT IA, or an ACAT II. The MDA is designated by the CAE and shall be at the lowest appropriate level. This category includes less-than-major AISs.

### **1.4 Acquisition Phases & Accomplishments**

All programs, including highly sensitive classified, cryptologic, and intelligence programs, shall accomplish certain core activities (described in DoDD 5000.1 and in this Regulation). How these activities are conducted shall be tailored to minimize the time it takes to satisfy an identified need consistent with common sense and sound business practice. Some activities apply to ACAT I programs only, not to ACAT IA programs. Other important key activities for each phase are described in the remainder of this Regulation and will be applied on a program by program basis through the IPT process.

Tailoring shall give full consideration to applicable statutes. The number of phases and decision points shall be tailored to meet the specific needs of individual PMs, based on objective assessments of a program's category status, risks, the adequacy of proposed risk management plans, and the urgency of the user's need. Tailored acquisition strategies may vary the way in which core activities are to be conducted, the formality of reviews and documentation, and the need for other supporting activities. ACAT II and III program managers shall work with their decision authorities to tailor any documentation and decision points to the needs of the individual program.

#### **1.4.1 Determining Mission Needs and Identifying Deficiencies**

All acquisition programs are based on identified, documented, and validated mission needs. Mission needs result from ongoing assessments of current and projected capability. Mission needs may seek to establish a new operational capability, to improve an existing capability, or to exploit an opportunity to reduce costs or enhance performance. DoD Components shall first try to satisfy mission needs through nonmateriel solutions, such as changes in doctrine or tactics. If a nonmateriel solution is deemed not feasible, the Component shall document its considerations and determine whether the potential materiel solution could result in an ACAT I or ACAT IA (see Hierarchy of Materiel alternatives in DoDD 5000.1). If the potential materiel solution could result in a new ACAT I, the Joint Requirements Oversight Council (JROC) shall review the documented mission need, determine its validity, and establish joint potential. If the potential solution could result in a new ACAT IA, the appropriate OSD Principal Staff Assistant (PSA) or the JROC shall review the documented need, determine its validity, establish joint potential, and confirm that the requirements defined in **DoDD 8000.1**<sup>3</sup> have been met.

#### **1.4.2 Phase 0: Concept Exploration**

Phase 0 typically consists of competitive, parallel short-term concept studies. The focus of these efforts is to define and evaluate the feasibility of alternative concepts and to provide a basis for assessing the relative merits (i. e. advantages and disadvantages, degree of risk) of these concepts at the next milestone decision point. Analysis of alternatives shall be used as appropriate to facilitate comparisons of alternative concepts. The most promising system concepts shall be defined in terms of initial, broad objectives for cost, schedule, performance, software requirements, opportunities for tradeoffs, overall acquisition strategy, and test and evaluation strategy.

#### **1.4.3 Phase I: Program Definition and Risk Reduction**

During this phase, the program shall become defined as one or more concepts, design approaches, and/or parallel technologies are pursued as warranted. Assessments of the advantages and disadvantages of alternative concepts shall be refined. Prototyping, demonstrations, and early operational assessments shall be considered and included as necessary to reduce risk so that technology, manufacturing, and support risks are well in hand before the next decision point. Cost drivers, life-cycle cost estimates, cost-performance trades, interoperability, and acquisition strategy alternatives shall be considered to include evolutionary and incremental software development.

#### **1.4.4 Phase II: Engineering and Manufacturing Development**

The primary objectives of this phase are to: translate the most promising design approach into a stable, interoperable, producible, supportable, and cost-effective design; validate the manufacturing or production process; and, demonstrate system capabilities through testing. Low Rate Initial Production (LRIP) occurs while the Engineering and Manufacturing Development phase is still continuing as test results and design fixes or upgrades are incorporated.

##### **1.4.4.1 Low Rate Initial Production \***

The objective of this activity is to produce the minimum quantity necessary to: provide production configured or representative articles for operational tests, establish an initial production base for the system; and permit an orderly increase in the production rate for the system, sufficient to lead to full-rate production upon successful completion of operational testing.

LRIP quantities for all ACATs shall be minimized. The MDA shall determine the LRIP quantity (**10 USC §2400<sup>4</sup>**) for all ACAT I and II programs as part of the Engineering and Manufacturing Development (EMD) approval. The LRIP quantity (with rationale for quantities exceeding 10% of the total production quantity documented in the acquisition strategy) shall be included in the first SAR after its determination. The LRIP quantity shall not be less than one unit and any increase shall be approved by the MDA. When approved LRIP quantities are expected to be exceeded because the program has not yet demonstrated readiness to proceed to full-rate production, the MDA shall assess the cost and benefits of a break in production versus annual buys.

Note: DOT&E is the decision authority for the number of LRIP articles required for Initial Operational Test and Evaluation (IOT&E) and for Live Fire Test and Evaluation (LFT&E).

\* LRIP is not applicable to ACAT IA programs; however, a limited deployment phase may be.

#### **1.4.5 Phase III: Production, Fielding/Deployment, and Operational Support**

The objectives of this phase are to achieve an operational capability that satisfies mission needs. Deficiencies encountered in Developmental Test and Evaluation (DT&E) and Initial Operational Test and Evaluation (IOT&E) shall be resolved and fixes verified. The production requirement of this phase does not apply to ACAT IA acquisition programs or software-intensive systems with no developmental hardware components. During fielding/deployment and throughout operational support, the potential for modifications to the fielded/deployed system continues.

##### **1.4.5.1 Operational Support**

The objectives of this activity are the execution of a support program that meets the threshold values of all support performance requirements and sustainment of them in the most life-cycle cost-effective manner. A follow-on operational testing program that assesses performance and quality, compatibility, and interoperability, and identifies deficiencies shall be conducted, as appropriate. This activity shall also include the execution of operational support plans, to include the transition from contractor to organic support, if appropriate.

##### **1.4.5.2 Modifications**

Any modification that is of sufficient cost and complexity that it could itself qualify as an ACAT I or ACAT IA program shall be considered for management purposes as a separate acquisition effort. Modifications that do not cross the ACAT I or IA threshold shall be considered part of the program being modified. Modifications may cause a program baseline deviation. Deviations shall be reported using the procedures in Part 6.

#### **1.4.6 Demilitarization and Disposal**

At the end of its useful life, a system must be demilitarized and disposed. During demilitarization and disposal, the PM shall ensure materiel determined to require demilitarization is controlled and shall ensure disposal is carried out in a way that minimizes DoD's liability due to environmental, safety, security, and health issues.

### **1.5 Milestone Decision Points**

The MDA shall establish tailored milestone decision points for each acquisition program as early as possible in the program life cycle.

#### **1.5.1 Milestone 0: Approval to Conduct Concept Studies**

After the JROC validates the mission need for an ACAT I program, the USD(A&T) shall convene a Milestone 0 DAB to review the mission needs statement (MNS), identify possible materiel alternatives, and authorize concept studies, if they are deemed necessary. For ACAT IA programs, the JROC, or the cognizant OSD PSA, validates the mission need and process integrity in compliance with DoDD 8000.1<sup>5</sup>, and the ASD(C3I) convenes a Milestone 0 MAISRC.

A favorable Milestone 0 decision does not yet mean that a new acquisition program has been initiated.

### **1.5.2 Milestone I: Approval to Begin a New Acquisition Program**

The purpose of the Milestone I decision point is to determine if the results of Phase 0 warrant establishing a new acquisition program and to approve entry into Phase I, Program Definition and Risk Reduction.

At Milestone I, the MDA shall approve the following:

1. Acquisition strategy;
2. Cost as an Independent Variable (CAIV) objectives;
3. Acquisition Program Baseline (APB)(**10 USC §2435<sup>6</sup>**, for ACAT I) and,
4. Phase I exit criteria.

The DOT&E and DTSE&E shall approve the Test and Evaluation Master Plan (TEMP) (including alternate LFT&E plan, if applicable) for all OSD test and evaluation oversight programs. If full-up, system-level LFT&E is unreasonably expensive and impractical, a waiver and alternative LFT&E plan must have been submitted and approved by Milestone II. (**10 USC §2366<sup>7</sup>**)

### **1.5.3 Milestone II: Approval to Enter Engineering and Manufacturing Development**

The purpose of the Milestone II decision point is to determine if the results of Phase I warrant continuation of the program and to approve entry into Engineering and Manufacturing Development (or software engineering and development for a software intensive system). The LRIP strategy and decision authority shall be considered at this milestone.

At this milestone, the MDA shall approve the following:

1. Acquisition strategy;
2. CAIV objectives;
3. APB (**10 USC §2435<sup>8</sup>**, for ACAT I);
4. Phase II exit criteria; and
5. LRIP quantities (**10 USC §2400<sup>9</sup>**).\*

\* Not applicable to ACAT IA programs.

The DOT&E and DTSE&E shall approve the TEMP for all OSD test and evaluation oversight programs (**10 USC §2366<sup>10</sup> and §2399<sup>11</sup>**).

### **1.5.3.1 Approval to Enter LRIP**

A favorable LRIP decision authorizes the PM to commence LRIP only. The PM is only authorized to commence full-rate production with further approval of the MDA. There shall be normally no more than one decision (i.e. either low-rate or full-rate) at the DAB level.

### **1.5.4 Milestone III: Production or Fielding/Deployment Approval**

The purpose of the Milestone III decision point is to authorize entrance into production for an ACAT I or into deployment for an ACAT IA program.

At this milestone, the MDA shall approve the following:

1. Acquisition strategy,
2. APB (**10 USC §2435**<sup>12</sup>, for ACAT I), and
3. Phase III exit criteria, if appropriate

**Note:** The decision to proceed beyond LRIP cannot be finalized until the DOT&E Beyond LRIP and LFT&E reports are received by the Congressional Defense Committees (**10 USC §2399**<sup>13</sup> & **10 USC §2366**<sup>14</sup>).\*

\* Not applicable to ACAT 1A programs.

## **1.6 Integrated Product Teams**

The Secretary of Defense has directed that the Department perform as many acquisition functions as possible, including oversight and review, using IPTs. These IPTs shall function in a spirit of teamwork with participants empowered and authorized, to the maximum extent possible, to make commitments for the organization or the functional area they represent. IPTs are composed of representatives from all appropriate functional disciplines working together to build successful programs and enabling decision-makers to make the right decisions at the right time. IPTs operate under the following broad principles:

1. Open discussions with no secrets
2. Qualified, empowered team members
3. Consistent, success-oriented, proactive participation
4. Continuous “up-the-line” communications
5. Reasoned disagreement
6. Issues raised and resolved early

When IPTs include representatives from organizations other than the federal government, PMs shall comply with the Federal Advisory Committee Act (FACA). In addition, PMs shall also remember that the participation of a contractor or a prospective contractor on a IPT should be in accordance with other statutory requirements, such as procurement integrity rules. Prospective contractor involvement on IPTs shall be reviewed by the Component’s legal advisor.

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<sup>1</sup> Title 10, United States Code, 2430, Major defense acquisition program defined (these amounts have been increased pursuant to the statutory notice provided to Congress)

<sup>2</sup> Title 10, United States Code, 2302(5), Definitions

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<sup>3</sup> Department of Defense Directive 8000.1, Defense Information Management (IM) Program, October 27, 1992

<sup>4</sup> Title 10, United States Code, 2400, Low-rate initial production of new systems

<sup>5</sup> Department of Defense Directive 8000.1, Defense Information Management (IM) Program, October 27, 1992

<sup>6</sup> Title 10, United States Code, 2435, Baseline Description

<sup>7</sup> Title 10, United States Code, 2366, Major systems and munitions programs: survivability and lethality testing required before full-scale production

<sup>8</sup> Title 10, United States Code, 2435, Baseline Description

<sup>9</sup> Title 10, United States Code, 2400, Low-rate initial production of new systems

<sup>10</sup> Title 10, United States Code, 2366, Major systems and munitions programs: survivability and lethality testing required before full-scale production

<sup>11</sup> Title 10, United States Code, 2399, Operational test and evaluation of defense acquisition programs

<sup>12</sup> Title 10, United States Code, 2435, Baseline Description

<sup>13</sup> Title 10, United States Code, 2399, Operational test and evaluation of defense acquisition programs

<sup>14</sup> Title 10, United States Code, 2366, Major systems and munitions programs: survivability and lethality testing required before full-scale production

## Part 2 **Program Definition**

### **2.1 Purpose**

Program definition is the process of translating broadly stated mission needs into a set of operational requirements from which specific performance specifications are derived. Use of the mandatory procedures in this part will help ensure that Acquisition Category (ACAT) I and ACAT IA programs approved to proceed into engineering and manufacturing development, and ACAT I programs approaching full-rate production, are well-defined and carefully structured to represent a judicious balance of cost, schedule, and performance; available technology; and affordability constraints. Not all acquisition programs are initiated in response to a specific military threat. Economic benefits, new technological opportunities, or other considerations may cause new programs to be initiated.

### **2.2 Intelligence Support\***

When acquisition programs are initiated in response to a military threat, they shall be based on authoritative, current, and projected threat information.

1. Threat information, including that contained in program documents, shall be validated by the Defense Intelligence Agency (DIA) for acquisition programs subject to review by the Defense Acquisition Board (DAB).
2. Early and continued collaboration among the intelligence, requirements generation, and acquisition management communities shall be maintained to ensure the timely availability of validated threat information. This collaboration will include joint examination of critical threat categories that could significantly influence the effective operation of the deployed system.

Initial system threat assessments shall be prepared by DoD Components to support program initiation usually at Milestone I, Approval to Begin a New Acquisition Program, and maintained in a current and approved or validated status throughout the acquisition process. These threat projections shall be prepared during each phase for consideration at Milestone decision points. They shall be system-specific to the degree of system definition at the time the assessment is made and address the projected threat at IOC and IOC plus ten years. Minimum elements of the threat assessment are:

1. Key intelligence judgements and significant changes in the threat environment.
2. Operational threat environment, the threat to be countered, the system specific threat, reactive threat, and technologically feasible threat will form the central body of the assessment.
3. Fully developed status of the critical intelligence categories. Intelligence production requirements supporting these categories or the employment of systems shall be identified early and included in program plans and cost estimates.
4. Assessment of collection threats to program technologies, impact of technology loss to programs, and identification of essential technologies critical to program success.

\*Normally not applicable to ACAT IA programs.

### **2.2.1 Evaluation of Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) Support**

A C4I support plan shall be prepared for all weapons, systems/programs that interface with C4I systems. The C4I Support Plan shall include a system description, employment concept (including targeting, battle damage assessment, and bomb impact assessment requirements), operational support requirements (including C4I, testing, and training), interoperability and connectivity characteristics, management, and scheduling concerns. An evaluation of compatibility, interoperability, integration, and intelligence support for targeting requirements shall be accomplished for all weapons, systems/programs noted above (see CJCS MOP 77 and CJCSI 6212.01A). In accordance with **CJCS MOP 77**<sup>1</sup>, C4ISR requirements shall be reviewed and updated, as necessary, at every milestone decision and whenever the concept of operations or intelligence requirements change.

### **2.3 Requirements Evolution**

Department of Defense (DoD) Components shall document deficiencies in current capabilities and opportunities to provide new capabilities in a Mission Need Statement (MNS) expressed in broad operational terms. The MNS shall identify and describe the mission deficiency; discuss the results of mission area analysis; describe why non-materiel changes (i.e., doctrine, tactics, etc.) are not adequate to correct the deficiency; identify potential materiel alternatives; and describe any key boundary conditions and operational environments that may impact satisfying the need such as information warfare. The MNS shall be prepared in accordance with **CJCS MOP 77**<sup>2</sup>. System performance objectives and thresholds shall be developed from, and remain consistent with, the initial broad statements of operational capability. The requirements shall be refined at successive milestone decision points, as a consequence of cost-schedule-performance trade-offs during each phase of the acquisition process.

In the process of refining requirements, key concepts that should be adhered to include:

1. keeping all reasonable options open and facilitating trade-offs throughout the acquisition process;
2. avoiding early commitments to system-specific solutions, to include avoiding early commitments to solutions that inhibit future insertion of commercial off-the-shelf equipment or components;
3. defining requirements in broad operational capability terms; and
4. using minimum acceptable operational performance (thresholds) to establish operational test criteria.

At each milestone beginning with program initiation (usually Milestone I), thresholds and objectives initially expressed as measures of effectiveness or performance and minimum acceptable requirements for the proposed concept or system shall be documented by the user or user's representative in an Operational Requirements Document (ORD) (see Appendix II). Thresholds and objectives in the ORD shall consider the results of the analysis of alternatives

and the impact of affordability constraints. Key Performance Parameters (KPPs), validated by the JROC, shall be included in the appropriate Acquisition Program Baseline (APB) (see 3.2.2). A KPP is that capability or characteristic so significant that failure to meet the threshold can be cause for the concept or system selection to be reevaluated or the program to be reassessed or terminated. KPPs are extracted from the ORD and included in the APB. User or user representative participation in each acquisition phase is essential.

Thresholds and objectives are defined below. The values for an objective or threshold and definitions for any specific parameter contained in the ORD, TEMP, and APB shall be consistent.

1. **Threshold.** The threshold value is the minimum acceptable value that, in the user's judgment, is necessary to satisfy the need. If threshold values are not achieved, program performance is seriously degraded, the program may be too costly, or the program may no longer be timely. The spread between objective and threshold values shall be individually set for each program based on the characteristics of the program (e.g., maturity, risk, etc.).
2. **Objective.** The objective value is that desired by the user and which the PM is attempting to obtain. The objective value could represent an operationally meaningful, time critical, and cost-effective increment above the threshold for each program parameter. Program objectives (parameters, and values) may be refined based on the results of the preceding program phase(s).

### **2.3.1 Evaluation of Requirements Based on Commercial Market Potential**

Researching the potential of the commercial marketplace to meet system performance requirements is an essential element of building a sound set of requirements. In developing system performance requirements, DoD Components shall evaluate how the desired performance requirements could reasonably be modified to facilitate the use of potential commercial items, components, specifications, standards, processes, technology, and sources. The results of the evaluation shall be included as part of the initial ORD (**10 USC §2377<sup>3</sup>**).

## **2.4 Analysis of Alternatives**

An analysis of alternatives shall be prepared and considered at appropriate milestone decision reviews of ACAT I programs, beginning with program initiation (usually Milestone I). For ACAT IA programs, an analysis of alternatives shall be prepared by the PSA for consideration at Milestone 0. These analyses are intended to:

1. Aid and Document Decisionmaking by illuminating the relative advantages and disadvantages of the alternatives being considered. Show the sensitivity of each alternative to possible changes in key assumptions (e.g., threat) or variables (e.g., selected performance capabilities). Where appropriate, include discussion of interoperability and commonality of components/systems that are similar in function to other DoD Component programs or Allied programs. The analysis shall aid decisionmakers in judging whether or not any of the proposed alternatives to an existing system offer sufficient military and/or economic benefit to be worth the cost. There shall be a clear linkage between the analysis of alternatives, system requirements, and system evaluation measures of effectiveness.

2. Foster Joint Ownership and Afford a Better Understanding of Subsequent Decisions by early identification and discussion of reasonable alternatives among decision-makers and staffs at all levels. The analysis is intended to be quantitatively based, producing discussion on key assumptions and variables.

#### **2.4.1 Preparation Responsibilities**

The DoD Component (or PSA for ACAT IA programs) responsible for the mission area in which a deficiency or opportunity has been identified normally prepares the analysis of alternatives.

1. The DoD Component Head (or PSA for ACAT IA programs), or as delegated, but not the Program Manager (PM), is responsible for determining the independent activity responsible for preparing the analysis.
2. The lead DoD Component for a joint program is responsible for ensuring that a comprehensive analysis is prepared for a joint program. If the single analysis is to be supplemented by individual DoD Component developed analyses, the lead DoD Component shall ensure that the assumptions and methodologies used are consistent across the analyses.
3. For ACAT ID and ACAT IAM programs, the DoD Component Head or designated official shall ensure coordination with the Under Secretary of Defense (Acquisition and Technology) (USD(A&T)) or Assistant Secretary of Defense (Command, Control, Communications and Intelligence) (ASD(C3I)) staff, the Joint Staff (or PSA) staff, the DOT&E staff, and the Director, Program Analysis & Evaluation (PA&E) staff takes place early in the development of the alternatives analysis. The staffs can make valuable contributions by ensuring that the full range of alternatives is considered; organizational and operational plans are developed with input from the Commanders in Chief of the Unified Commands and are consistent with U.S. military strategy; and joint-service issues, such as interoperability, security, and common use, are addressed. To form the basis for development of an analysis plan, the Director, PA&E shall prepare guidance for the analysis of alternatives in coordination with the offices listed above. This guidance shall be issued by USD(A&T) or ASD(C<sup>3</sup>I).

#### **2.4.2 Milestone Decision Reviews**

Normally, the DoD Component completes the analysis for ACAT I programs and documents its findings in preparation for a program initiation decision (usually Milestone I). The Milestone Decision Authority (MDA) may direct updates to the analysis for subsequent decision points, if conditions warrant. For example, an analysis of alternatives may be useful in examining cost performance trades at Milestone II. An analysis of alternatives is unlikely to be required for Milestone III, unless the program or circumstances (e.g., threat, alliances, operating areas, technology) have changed significantly. If the MDA determines that an analysis of alternatives is required for ACAT IA programs after Milestone 0, the PM shall incorporate the analysis into the cost/benefit element structure and process described in 3.5.1.

### **2.5 Affordability**

These procedures establish the basis for fostering greater program stability through the assessment of program affordability and determination of affordability constraints.

1. Individual program plans and strategies for new acquisition programs shall be consistent with overall DoD planning and funding priorities.
2. Affordability shall be assessed at each milestone decision point beginning with program initiation (usually Milestone I). No acquisition program shall be approved to proceed beyond program initiation unless sufficient resources, including manpower, are programmed in the most recently approved Future Years Defense Program (FYDP), or will be programmed in the next Program Objective Memorandum (POM), Budget Estimate Submission (BES), or President's Budget (PB).
3. Cost Analysis Improvement Group (CAIG) reviews shall be used to ensure cost data of sufficient accuracy is available to support reasonable judgments on affordability for ACAT I programs. The manpower estimate for the program shall address manpower affordability in terms of military end-strength and civilian work years. The Cost/Performance IPT (CPIPT) shall ensure that cost and benefit data of sufficient accuracy is available to support reasonable affordability judgments for ACAT IA programs.
4. DoD Component Heads shall consult with the USD(A&T) or the ASD(C3I), as appropriate, on program objective memoranda (POM) and budget estimate submissions (BES) that contain a significant change in funding for, or reflect a significant funding change in, any program subject to review by the DAB or Major Automated Information Systems Review Council (MAISRC). This consultation shall be accomplished prior to submission of the POM or BES to the Secretary of Defense, as specified in the USD(A&T) Charter, **DoDD 5134.1**<sup>4</sup>.

### **2.5.1 Full Funding of Acquisition Programs Reviewed by the DAB or MAISRC**

When the DAB or MAISRC reviews a program, the DoD Component Head responsible for the program shall submit to the USD(A&T) or ASD(C3I) the funding for that program contained in the FYDP most recently approved by the Secretary of Defense. The DoD Component Head shall also provide a description of the best possible acquisition strategy that could be implemented with the currently approved program funding along with the preferred DoD component approach if they are different.

If, after the DAB or MAISRC has reviewed the program, the USD(A&T) or ASD(C3I) concludes that the FYDP funding for the program will not support the program as presented to the DAB or MAISRC, the DoD Component Head shall commit to incorporate appropriate funding in the next FYDP update.

### **2.6 Supportability**

Supportability factors are integral elements of program performance specifications. However, support requirements are not to be stated as distinct logistics elements, but instead as performance requirements that relate to a system's operational effectiveness, operational suitability, and life-cycle cost reduction.

### **2.7 Advanced Concept Technology Demonstrations (ACTDs)**

ACTDs are a means of demonstrating the use of mature technology to address urgent military needs. ACTDs themselves are not acquisition programs, although they are designed to provide a residual, usable capability upon completion. If the user determines that additional units are desired beyond the residual capability and that these units can be funded, the additional buys shall constitute an acquisition program with an acquisition category generally commensurate with the dollar value and risk of the additional buy. The nature of the acquisition program will depend on what additional development, if any, is needed upon completion of the ACTD, (e.g., an ACTD may result in an acquisition program with a short EMD phase or no EMD phase, depending on the modifications necessary to meet the needs of the user).

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<sup>1</sup> CJCS Memorandum of Procedure (MOP) 77, Requirement Generation System Policies and Procedures

<sup>2</sup> CJCS Memorandum of Procedure (MOP) 77, Requirement Generation System Policies and Procedures

<sup>3</sup> Title 10, United States Code, 2377, Preference for acquisition of commercial items

<sup>4</sup> Department of Defense Directive 5134.1, "Under Secretary of Defense for Acquisition and Technology," June 8, 1994 (Change 1)

## Part 3 **Program Structure**

### **3.1 Purpose**

The purpose of this part is to identify the elements that are necessary to structure a successful program. These elements are contained in strategies that are proposed by the Program Manager (PM) and approved by the Milestone Decision Authority (MDA) or other appropriate authority. Properly tailored program strategies form the basis for sound management, and provide an historical record of the program's maturation and decision process. Program strategies are based on the exercise of good judgment and common sense, and include innovative ways to achieve program success.

The elements identified in this part address what the program will achieve (program goals), how the program will be developed and/or procured (acquisition strategy), how the program will be evaluated against what was intended (test and evaluation), and what resources will be needed for the program (life-cycle resource estimates).

### **3.2 Program Goals**

Every acquisition program shall establish program goals for the minimum number of cost, schedule, and performance parameters that describe the program. These program goals shall be identified as objectives and thresholds.

#### **3.2.1 Objectives and Thresholds**

Each parameter shall include both an objective and a threshold value (see 2.3). If no objective is specified, the threshold value shall be the objective value. Threshold values shall be individually set for each program based on the characteristics of the program (e.g., maturity, risk, etc.). If the threshold values are not otherwise specified, the threshold value for performance shall be the same as the objective value, the threshold value for schedule shall be the objective value plus six months for ACAT I and three months for ACAT IA, and the threshold value for cost shall be the objective value plus 10 percent. Cost, schedule, and performance may be traded-off (see 3.3.2.1 for procedures) within the range between the objective and the threshold (known as the "trade space") without obtaining MDA approval. Trade-offs outside the trade space may not be made without the approval of the MDA and ORD approving authority. In addition, key performance parameters validated by the JROC or by a PSA may not be traded-off without JROC approval or PSA review.

#### **3.2.2 Acquisition Program Baselines**

Every acquisition program shall establish an Acquisition Program Baseline (APB) to document the cost, schedule, and performance objectives and thresholds of that program beginning at program initiation. Performance shall include supportability and, as applicable, environmental requirements. For Acquisition Category (ACAT) I programs, the APB implements the requirement in **10 USC §2220(a)(1)<sup>1</sup> and §2435<sup>2</sup>** beginning at Milestone I. The format for the APB is included in the Consolidated Acquisition Reporting System (CARS) (see Appendix I).

### **3.2.2.1 Preparation and Approval**

The PM, in coordination with the user, shall prepare the APB at program initiation for ACAT I and ACAT IA programs, at each subsequent major milestone decision, and following a program restructure or an unrecoverable program deviation. The Program Executive Officer (PEO) and the Component Acquisition Executive (CAE), as appropriate, shall concur in the APB. The MDA shall approve the APB. For ACAT I and ACAT IA programs, the MDA shall not approve the APB without the coordination of the Under Secretary of Defense (Comptroller) (**10 USC §2220(a)(2)<sup>3</sup>**) and the Joint Requirements Oversight Council (JROC) or, in the case of ACAT IA programs, the Principal Staff Assistant (PSA) in place of the JROC (where applicable).

### **3.2.2.2 APB Content**

The APB shall contain only the most important cost, schedule, and performance parameters. The most important parameters are those that, if the thresholds are not met, the MDA would require a reevaluation of alternative concepts or design approaches. The total number of cost, schedule, and performance parameters in an APB shall be limited as described below. The values of the parameters shall represent the program as it is expected to be produced or deployed.

1. **Performance.** The specificity and number of performance parameters evolve as the program is better defined. At Milestone I, performance parameters shall be defined in broad terms. Measures of effectiveness or measures of performance shall be used in describing needed capabilities early in a program. More specific program parameters shall be added as necessary to the APB as the program requirements become better defined. The total number of performance parameters shall be the minimum number needed to characterize the major drivers of operational effectiveness and suitability, schedule, technical progress, and cost. This minimum number shall include the key performance parameters described in the ORD and validated by the JROC for inclusion in the APB (see 2.3). The value of an objective or threshold in the APB shall not differ from the value for a like objective or threshold in the ORD. In addition, the definitions for like parameters in the APB and ORD shall be consistent. These performance parameters may not completely define operational effectiveness or suitability. Therefore, the MDA may add additional performance parameters not validated by the JROC. For AIS programs, an important performance parameter may involve economic benefit or return on investment.
2. **Schedule.** The schedule parameters shall include program initiation, major milestone decision points, initial operating capability, and any other critical system events. These specific other critical events shall be proposed by the PM and approved by the MDA for each program.
3. **Cost.** The cost parameters shall be limited to Research, Development, Test and Evaluation (RDT&E) costs; procurement costs; military construction costs; the costs of acquisition items procured with operations and maintenance funds, if applicable; total quantity (to include both fully configured development and production units); average unit procurement cost (defined as the total procurement cost divided by total procurement quantity); program acquisition unit cost (defined as the total of all acquisition related appropriations divided by the total quantity of fully configured end items); and any other cost objectives designated by the MDA, (e.g., life-cycle cost objective -- see 3.3.3); all in base year dollars. As the program progresses through

later acquisition phases, procurement costs shall be refined based on contractor actual (or return) costs from program definition and risk reduction, engineering and manufacturing development, or from initial production lots. In all cases, the cost parameters shall reflect the total program and be realistic cost estimates, based on a careful assessment of risks and realistic appraisals of the level of costs most likely to be realized. The amount budgeted shall not exceed the total cost threshold estimated in the APB. For ACAT IA programs, the ACAT I cost parameters apply, with the addition of military pay and Defense Business Operations Fund (DBOF).

No funds shall be obligated for an ACAT I program after that program enters engineering and manufacturing development or production and deployment until an APB has been approved by the MDA, unless the USD(A&T) has specifically approved the obligation, in accordance with **10 U.S.C. §2435(b)**<sup>4</sup>.

### **3.2.3 Exit Criteria**

MDAs shall use exit criteria to establish goals for ACAT I (**10 USC §2220(a)(1)**)<sup>5</sup> and ACAT IA programs during an acquisition phase. At each milestone review, the PM shall propose exit criteria appropriate to the next phase of the program. The MDA shall approve the exit criteria. Exit criteria will normally be selected to track progress in important technical, schedule, or management risk areas. The exit criteria will serve as gates that, when successfully passed or exited, demonstrate that the program is on track to achieve its final program goals and should be allowed to continue with additional activities within an acquisition phase or be considered for continuation into the next acquisition phase. Exit criteria are not part of the APB and are not intended to repeat or usurp the minimum required accomplishments for each phase contained in the APB or this Regulation. They do not cause program deviations. Exit criteria are some level of demonstrated performance (e.g., a level of engine thrust), the accomplishment of some process at some level of efficiency (e.g., manufacturing yield) or successful accomplishment of some event (e.g., first flight), or some other criterion (e.g., establishment of a training program or inclusion of a particular clause in the follow-on contract) that indicates that aspect of the program is progressing satisfactorily. Exit criteria are documented in the ADM. The Defense Acquisition Executive Summary (DAES) report shall be the mechanism for status reporting of exit criteria for ACAT I programs. The MAIS Quarterly Report shall be the mechanism for status reporting of exit criteria for ACAT IA programs.

### **3.3 Acquisition Strategy**

Each PM shall develop and document an acquisition strategy that shall serve as the roadmap for program execution from program initiation through post-production support. A primary goal in developing an acquisition strategy shall be to minimize the time and cost of satisfying an identified, validated need, consistent with common sense and sound business practices. The acquisition strategy shall evolve through an iterative process and become increasingly more definitive in describing the relationship of the essential elements of a program. Essential elements in this context include, but are not limited to, sources, risk management, cost as an independent variable, contract approach, management approach, environmental considerations, and source of support. The PM shall also address other major initiatives that are critical to the success of the program.

The acquisition strategy shall include the critical events that shall govern the management of the program. The event-driven acquisition strategy shall explicitly link program decisions to demonstrated accomplishments in development, testing, initial production, and life-

cycle support. The events set forth in contracts shall support the appropriate exit criteria for the phase, or intermediate development events, established for the acquisition strategy.

The acquisition strategy shall be tailored to meet the specific needs of individual programs, including consideration of incremental (block) development and fielding strategies. The benefits and risks associated with reducing lead time through concurrency shall be specifically addressed in tailoring the acquisition strategy. In tailoring an acquisition strategy, the PM shall address the management requirements imposed on the contractor(s).

The PM shall initially develop the acquisition strategy at program initiation (usually Milestone I), and shall keep the strategy current by updating it whenever there is a change to the approved acquisition strategy or as the system approach and program elements are better defined. The PM shall develop the acquisition strategy in coordination with the Working-level Integrated Product Team. The PEO and CAE, as appropriate, shall concur in the acquisition strategy. The MDA shall approve the acquisition strategy prior to release of the formal solicitation. This approval shall usually precede the milestone review, except at program initiation when the strategy shall usually be approved as part of the initial milestone decision review.

### **3.3.1 Sources**

In developing and updating the acquisition strategy, the PM shall consider all prospective sources of supplies and/or services that can meet the need, both domestic and foreign. Commercial and non-developmental items shall be considered as the primary source of supply. The PM, through the use of Integrated Product Teams (IPTs), shall include in the consideration the national policies on contracting and subcontracting with small business (**15 USC §644(a) & (j)**<sup>6</sup>), small and disadvantaged business (**15 USC §637(d)(4)-(6)**<sup>7</sup>), women-owned small business (**PL 100-533**<sup>8</sup>), and labor surplus areas (**15 USC 644(d)**<sup>9</sup>). Alternatives considered to secure participation of these entities as prime contractors in the initial or later phases of the life cycle will be addressed. In addition, strategies to ensure participation at the subcontract levels will be developed.

#### **3.3.1.1 Commercial and Non-Developmental Items**

Market research and analysis shall be conducted to determine the availability and suitability of existing commercial and non-developmental items prior to the commencement of a development effort, during the development effort, and prior to the preparation of any product description. The PM shall define requirements (including hardware, software, standards, data, and automatic test systems) in terms that enable and encourage offerors to supply commercial and non-developmental items and provide offerors of commercial and non-developmental items an opportunity to compete in any procurement to fill such requirements. The PM shall require prime contractors and subcontractors at all levels to incorporate commercial and non-developmental items as components of items supplied and modify requirements to the maximum extent practicable, to ensure that the requirements can be met by commercial and non-developmental items (**10 USC §2377**<sup>10</sup>). For ACAT I and IA programs, while few commercial items meet requirements at a system level, numerous commercial components, processes, and practices have application to DoD systems. Commercial items supplied shall be based on non-government standards and commercial item descriptions to the maximum extent practicable. Preference shall be given to the use of commercial items first and non-developmental items second. However, the overriding concern is to use the most cost-effective source of supply.

A commercial item is defined as any item, other than real property, that is of a type customarily used for nongovernmental purposes and that: (1) has been sold, leased, or licensed to the general public; or, (2) has been offered for sale, lease, or license to the general public; or any item that evolved through advances in technology or performance and that is not yet available in the commercial marketplace, but will be available in the commercial marketplace in time to satisfy the delivery requirements under a Government solicitation. Also included in the definition are services in support of a commercial item, or a type offered and sold competitively in substantial quantities in the commercial marketplace based on established catalog or market prices for specific tasks performed under standard commercial terms and conditions; this does not include services that are sold based on hourly rates without an established catalog or market price for a specific service performed (**FAR 2.101<sup>11</sup>**).

A modified commercial item is any item with modifications of a type customarily available in the commercial marketplace or minor modifications of a type not customarily available in the commercial marketplace made to meet Federal Government requirements. Such modifications are considered minor if the change does not significantly alter the nongovernmental function or essential physical characteristics of an item or component, change the purpose of the process. Factors to be considered in determining whether a modification is minor include the value and size of the modification and the comparative value and size of the final product. Dollar values and percentages may be used as guideposts, but are not conclusive evidence that a modification is minor.

A non-developmental item is: (1) any previously developed item of supply used exclusively for governmental purposes by a Federal Agency, a State or local government, or a foreign government with which the United States has a mutual defense cooperation agreement; (2) any item described in (1) that requires only minor modification or modifications of the type customarily available in the commercial marketplace in order to meet the requirements of the procuring department or agency; or (3) any item described in (1) or (2) solely because the item is not yet in use (**FAR 2.101<sup>12</sup>**).

Use of commercial or non-developmental items does not exempt the PM from complying with environmental requirements, unless exempted by statute.

### **3.3.1.2 Dual Use Technologies and Use of Commercial Plants**

The PM shall develop an acquisition strategy that encourages offerors to employ dual use technologies or commercial plants and supplies for defense-unique items, to the maximum extent practicable. Dual use technologies are defined as technologies with both a military and a civil application. Market research and analysis should be conducted to identify and evaluate possible dual use technologies and commercial suppliers throughout research and development. Contractors should also be encouraged to integrate military production into commercial production to the maximum extent possible. Finally, system design should facilitate the incorporation and insertion of leading edge dual use technologies and commercial suppliers through the system's life cycle.

### **3.3.1.3 Industrial Capability**

The PM shall structure the acquisition strategy to promote sufficient program stability to encourage industry to invest, plan and bear risks. Program needs shall be met through reliance on a national technology and industrial base sustained primarily by commercial demand, and

minimize the need for new defense-unique industrial capabilities. Foreign sources and international cooperative developments shall be used where advantageous and within limitations of the law (**DFARS Part 225**<sup>13</sup>).

The program acquisition strategy shall analyze the industrial capability to design, develop, produce, support and, if appropriate, restart the program (**10 USC §2440**<sup>14</sup>). This analysis shall identify DoD investments needed to create new industrial capabilities, and the risks of industry being unable to provide program manufacturing capabilities at planned cost and schedule. Prior to production termination, Components shall take actions to ensure there will be adequate industrial capabilities and capacity to meet post-production operational needs. Actions shall address product technology obsolescence, replacement of life limited items, and regeneration options for unique manufacturing processes.

When there is an indication that industrial capabilities needed by DoD are in danger of being lost, Components shall perform an analysis to determine whether government action is required to preserve an industrial capability vital to national security. Additional guidance on performing this analysis is found in the Acquisition Deskbook.

### **3.3.2 Cost, Schedule, and Performance Risk Management**

The PM shall establish a risk management program for each acquisition program to identify and control performance, cost, and schedule risks. The risk management program shall identify and track risk drivers, define risk abatement plans, and provide for continuous risk assessment throughout each acquisition phase to determine how risks have changed. Risk reduction measures shall be included in cost-performance trade-offs, where applicable. The risk management program shall plan for back-ups in risk areas and identify design requirements where performance increase is small relative to cost, schedule, and performance risk. The acquisition strategy shall include identification of the risk areas of the program and a discussion of how the PM intends to manage those risks.

### **3.3.3 Cost as an Independent Variable (CAIV)**

The acquisition strategy shall address methodologies to acquire and operate affordable DoD systems by setting aggressive, achievable cost objectives and managing achievement of these objectives. Cost objectives shall be set to balance mission needs with projected out-year resources, taking into account anticipated process improvements in both DoD and defense industries.

### **3.3.3.1 Cost/Performance Tradeoffs**

The best time to reduce life-cycle costs is early in the acquisition process. Cost reductions shall be accomplished through cost/performance tradeoff analyses, which shall be conducted before an acquisition approach is finalized. To facilitate that process, the Overarching IPT (OIPT) for each ACAT I and ACAT IA (as required) program shall establish a Cost/Performance IPT (CPIPT). The user community shall have representation on the CPIPT. Industry representation, consistent with statute and at the appropriate time, shall also be considered.

Upon approval of a MNS (see 2.3), an approach shall be formulated to set and refine cost objectives. By program initiation (usually Milestone I), each ACAT I and ACAT IA PM shall have established life-cycle cost objectives for the program through consideration of projected out-year resources, recent unit costs, parametric estimates, mission effectiveness analysis and trades, and technology trends. A complete set of life-cycle cost objectives shall include RDT&E, production, operating and support, and disposal costs. At each subsequent milestone review, cost objectives and progress towards achieving them shall be reassessed.

Maximizing the PM's and contractors' flexibility to make cost/performance tradeoffs without unnecessary higher-level permission is essential to achieving cost objectives. Therefore, the number of threshold items in requirements documents and acquisition program baselines shall be strictly limited, the threshold values shall represent true minimums, and requirements shall be stated in terms of capabilities, rather than technical solutions and specifications. RFPs shall include a strict minimum number of critical performance criteria that will allow industry maximum flexibility to meet overall program objectives. Cost objectives shall be used as a management tool. The source selection criteria communicated to industry should reflect the importance of developing a system that can achieve stated production and life-cycle cost thresholds.

The CPIPT (normally led by the PM or the PM's representative) shall be empowered to recommend to the PM performance or engineering and design changes as long as the threshold values in the Operational Requirements Document (ORD) and APB can be achieved. If the changes require ORD/APB threshold value changes, the leader of the CPIPT shall notify the PM and the OIPT leader. The PM shall ensure that the changes are brought before the ORD and/or APB approval authorities for decision. The CPIPT shall have responsibility for integrating and evaluating all cost performance trade-offs analyses conducted.

While the approach outlined here applies to ACAT I and ACAT IA programs, the same principles may be applied to other programs at the discretion of the CAE.

### **3.3.3.2 Cost Management Incentives**

RFPs shall be structured to incentivize the contractor to meet or exceed cost objectives. Whenever applicable, risk reduction through use of mature processes shall be a significant factor in source selection. For industry, competition to win business, along with attendant business profit, is by far the most powerful incentive. Therefore, competition shall be maintained for as long as practicable in all acquisition programs.

Incentives shall be applied to both Government and industry to achieve the objectives of cost as an independent variable. Awards programs (both monetary and non-monetary) and “shared savings” programs shall be used creatively to encourage the generation of cost-saving ideas for all phases of life-cycle costs. Incentive programs shall target both individuals and teams in both government and industry. Incentives shall stress up-front investments to minimize production and/or operation and support costs, where applicable.

### **3.3.4 Contract Approach**

The acquisition strategy shall discuss the types of contracts contemplated for each succeeding phase, including considerations of risk assessment, reasonable risk-sharing by Government and contractor(s), and the incentive structure for contractors to decrease cost. The strategy shall specify if options are to be used for future requirements. Fixed price development contracts of \$25 million or more or fixed price type contracts for lead ships shall not be used without the prior approval of the USD(A&T) (**DFARS 235.006**<sup>15</sup>). Multiyear contracting shall be considered for full rate production and implemented when the requirements of **FAR 17.1**<sup>16</sup> are satisfied. Multiyear contracting shall be done in accordance with **10 USC §2306b**<sup>17</sup>.

#### **3.3.4.1 Competition**

PMs and contracting officers shall provide for full and open competition, unless one of the limited statutory exceptions apply (**FAR 6.3**<sup>18</sup>). PMs and contracting officers shall use competitive procedures best suited to the circumstances of the acquisition program. The acquisition strategy for all acquisition programs will describe plans to achieve competition in all increments and life-cycle phases. Competitive prototyping, competitive alternative sources, and competition with other systems that may be able to accomplish the mission shall be used where practicable.

The PM shall consider component breakout. The acquisition strategy shall address component breakout plans and shall include rationale justifying the component breakout strategy (**DFARS Appendix D**<sup>19</sup>). Component breakout shall be considered on every program and shall be done when there are significant cost savings (inclusive of Government administrative costs), when the technical or schedule risk of furnishing government items to the prime contractor is manageable, and when there are no other overriding Governmental interests (e.g., industrial capability considerations). Components considered for breakout shall be listed, and a brief rationale (based on supporting analyses from a detailed component breakout review (which shall not be provided to the MDA unless specifically requested)) for those major components where a decision was made not to breakout shall be provided. A decision not to break out any components shall also require justification.

The Head of each DoD Component with acquisition responsibilities shall designate a competition advocate for the Component and in each procurement activity as a resource to help the Component Head to achieve a competitive environment and promote the acquisition of commercial items (**41 USC §418**<sup>20</sup> and **10 USC §2318**<sup>21</sup>). The DoD Competition Advocate and the Competition Advocates in the Military Departments shall be at the general/flag officer rank or the senior executive service level (**10 USC §2318**<sup>22</sup>). The advocate for competition for each procuring activity shall be responsible for promoting full and open competition, promoting the acquisition of commercial items, and challenging barriers to such acquisition, including such barriers as unnecessarily restrictive statements of need, unnecessarily detailed specifications, and unnecessarily burdensome contract clauses.

#### **3.3.4.2 Best Practices**

The PM shall avoid imposing government-unique requirements that significantly increase industry compliance costs. Examples of practices designed to accomplish this direction include: IPPD performance-based specifications, management goals, reporting and incentives; open systems approach (that emphasizes commercially supported practices, products, specifications, and standards); replacement of government-unique management and manufacturing systems with common, facility-wide systems; realistic cost estimates and cost objectives, adequate competition among viable offerors; best value evaluation and award criteria; use of past performance in source selection, results of software capability evaluations; government-industry partnerships; and the use of pilot programs to explore innovative practices. The use of best practices shall be addressed at each milestone review.

#### **3.3.4.3 Cost Performance**

The purpose of cost/schedule control systems criteria (C/SCSC) is to provide the contractor and the Government PMs with accurate data to monitor execution of their program and to:

1. Preclude the imposition of specific cost and schedule management control systems by providing uniform evaluation criteria to ensure contractor cost and schedule management control systems are adequate.
2. Provide an adequate basis for responsible decision making by both contractor management and DoD Component personnel by requiring that contractors' internal management control systems produce data that: (a) indicate work progress; (b) properly relate cost, schedule, and technical accomplishment; (c) are valid, timely, and able to be audited; and (d) provide DoD Component managers with information at a practical level of summarization.
3. Bring to the attention of DoD contractors, and encourage them to accept and install management control systems and procedures that are most effective in meeting requirements and controlling contract performance.

When applicable, the contract shall require that any system used by the contractor in planning and controlling the performance of the contract shall meet the criteria set forth in Appendix VI. Nothing in these criteria is intended to affect the basis on which costs are reimbursed and progress payments made, and nothing herein shall be construed as requiring the use of any single system, or specific method of management control of evaluation of performance. The government shall not require the contractor's internal systems to be changed provided they satisfy these criteria.

Unless waived by the MDA or a designated representative, compliance with the C/SCSC shall be required on significant contracts and subcontracts within all acquisition programs, including highly sensitive classified programs and major construction programs. This also includes significant contracts executed for foreign governments and for specialized organizations such as the Defense Advanced Research Projects Agency, and significant acquisition effort performed by Government activities. Significant contracts include research, development, test, and evaluation contracts and subcontracts with a value of \$70 million or more or procurement contracts and subcontracts with a value of \$300 million or more (in FY 1996 constant dollars). Compliance with the C/SCSC on contracts and subcontracts below

these thresholds may be required when, in the DoD Component manager's judgment, the contract risk or management interest requires assurance that the contractor's cost and schedule management control systems are acceptable. On contracts that are determined to be not significant enough for C/SCSC applicability, the cost/schedule status report (C/SSR) (see 6.4.3) shall be required unless excluded in accordance with the following paragraph.

Compliance with the C/SCSC shall not be required on firm fixed price contracts (including firm fixed price contracts with economic price adjustment provisions), time and materials contracts, and contracts which consist mostly of level-of-effort work. Exceptions may be made by the MDA for individual contracts.

#### **3.3.4.4 Advance Procurement\***

In accordance with DoD 7000.14-R<sup>23</sup>, procurement of end items shall be fully funded, i.e., the cost of the end items to be bought in any fiscal year shall be completely included in that year's budget request. However, there are occasions when it is appropriate that some components, parts, material, or effort be procured in advance of the end item buy to preclude serious and costly fluctuation in program continuity. In these instances, the long lead-time material or effort may be procured with advance procurement funds but only in sufficient quantity to support the next fiscal year quantity end-item buy (except for economic order quantity (EOQ) procurement of material to support a multi-year procurement and only to buy those long-lead items necessary to maintain critical skills and proficiencies that would otherwise have to be reconstituted at significantly greater net cost to the Government. Because such use of advance procurement limits the MDA's flexibility, this acquisition technique shall be used only when the cost benefits are significant and only with approval of the MDA.

Exit criteria for awarding of the initial long lead-time items contract and/or for awarding of individual follow-on long lead-time lots shall be established as an integral part of the milestone approval process. These approved exit criteria shall be satisfied before any advance procurement funding may be released. The initiation of advance procurement in support of long lead material shall use a separate contract.

\*Not applicable to ACAT IA programs.

#### **3.3.4.5 Continuous Acquisition and Life-Cycle Support (CALs) (Digital Data)**

Beginning in FY97, all new contracts shall require on-line access to, or delivery of, their programmatic and technical data in digital form, unless analysis shows that life-cycle time or life-cycle costs would be increased by doing so. Preference shall be given to on-line access to contractor developed data through contractor information services rather than data delivery. No on-going contract, including negotiated or priced options, shall be renegotiated solely to require the use of digital data, unless analysis shows that life-cycle costs would be reduced.

Acquisition strategies and plans shall describe the extent of implementation of these requirements in accordance with **DFARS 207.105<sup>24</sup>**. Solicitations shall require specific proposals for an integrated data environment to support systems engineering and logistics activities. The PM shall ensure compatibility of data deliverables with existing internal information systems, and augment such systems as required to provide timely data access and distribution consistent with **DFARS 227<sup>25</sup> and 252<sup>26</sup>**.

### **3.3.5 Management Approach**

The acquisition strategy shall be developed in sufficient detail to establish the managerial approach that shall be used to achieve program goals.

#### **3.3.5.1 Streamlining**

The PM shall streamline all acquisitions so that the acquisitions contain only those requirements that are essential and cost-effective. Contract requirements shall be stated in terms of performance rather than design-specific procedures. Management data requirements shall be limited to those essential for effective control. Acquisition process requirements shall be tailored to meet the specific needs of individual programs. Relief or exemption shall be sought for those requirements that fail to add value, are not essential, or are not cost-effective. Early industry involvement in the acquisition effort, consistent with the Federal Advisory Committee Act (**FACA<sup>27</sup>**), shall be encouraged to take advantage of industry expertise to improve the acquisition strategy.

#### **3.3.5.2 International Considerations\***

The acquisition strategy shall discuss the potential for enhancing reciprocal defense trade and cooperation, including international cooperative research, development, production, logistic support, and the sale of military equipment, consistent with the maintenance of a strong national technology and industrial base, and mobilization capability. This discussion shall meet the requirements specified for the cooperative opportunities reported directed by **10 U.S.C. §2350a(g)<sup>28</sup>**. If foreign competition is restricted for industrial base reasons, USD(A&T) prior approval is required. Prior to entering into a cooperative agreement, the program shall be reviewed by the MDA and be approved as an international program.

The USD(A&T) shall approve any foreign military sale, commitment to sell, or DoD agreement for licensing the export of any ACAT I or II system that has not successfully completed the Operational Test and Evaluation (OT&E) required prior to approval for full rate U.S. production. This policy is not intended to interfere with any legitimate government-sponsored discussions of potential cooperative opportunities for both development and production programs involving key allies, provided only that such discussion include a clear and unambiguous articulation of this policy. This policy is also not intended to interfere with any reasonable advance business planning and marketing discussions with potential foreign customers by defense contractors, provided that authorizing licenses for these discussions include a requirement that the contractor notify in writing potential customers of this policy.

\*Normally not applicable to ACAT IA programs.

### **3.3.5.3 Joint Program Management**

Any acquisition system, subsystem, component, or technology program that involves a strategy that includes funding by more than one DoD Component during any phase of a system's life cycle shall be defined as a joint program. Joint programs shall be consolidated and collocated at the location of the lead Component's program office, to the maximum extent practicable. This includes systems where one DoD Component may be acting as acquisition agent for another DoD Component by mutual agreement or where statute, DoD Directive, or the USD(A&T) or ASD(C3I) has designated a DoD organization to act as the lead (e.g., USSOCOM, BMDO, DARO). In the case of a designated organization given acquisition responsibilities, the CAE of that organization shall utilize the acquisition and test organizations and facilities of the Military Departments to the maximum extent practicable, rather than create new, unique organizations and facilities. The relationship between the designated organization and the Military Departments and Defense Agencies shall be specified in a Memorandum of Agreement (MOA). Mission needs, operational requirements, and program strategies shall be structured to encourage and to provide an opportunity for multi-Component participation. The DoD Components shall periodically review their programs and requirements to determine the potential for cooperation.

The JROC, or Principal Staff Assistant (PSA) for ACAT IA programs, shall review and validate ACAT I or ACAT IA Component MNS and ORDs, as appropriate, and shall recommend establishment of joint programs based on their joint potential. DoD Component Heads shall also recommend establishment of joint programs. The decision to establish a joint program shall be made by the MDA, who shall designate the lead Component as early in the acquisition process as possible. The decision to establish a joint program shall be based on the recommendation of the JROC for programs that shall be reviewed by the Defense Acquisition Board (DAB), the recommendation of the functional PSA and Assistant Secretary of Defense for Command, Control and Communications (ASD(C3I)) for programs that shall be reviewed by the Major Automated Information Systems Review Council (MAISRC), or the recommendation of the DoD Component Head (or a designated representative) for all other programs.

The designated lead DoD Component Head shall select a single qualified program manager for the designated joint program. The selected joint program manager is fully responsible and accountable for the cost, schedule, and performance of the system development. In cases where the joint program is a consolidation of several programs with multiple Component program managers, the joint program manager retains responsibility for overall system development and integration.

A designated joint program shall have one quality assurance program, one program change control program, one integrated test program, and one set of documentation and reports to include one Joint ORD, one Test and Evaluation Master Plan (TEMP), one APB, one DAES, one Quarterly Report for ACAT IA programs, and one Selected Acquisition Report (SAR) for ACAT I programs. The documentation for milestone reviews and periodic reports shall flow only through the lead DoD Component acquisition chain, and shall be supported by the participating DoD Components. Unless otherwise directed by the MDA or agreed to through an Memorandum of Agreement (MOA) signed by all Components, the lead DoD Component shall budget for and manage the common RDT&E funds for assigned joint programs. Individual DoD Components shall budget for their unique requirements. Inter-Component logistics support shall be utilized to the maximum extent practicable, consistent with effective support to the operational forces and efficient use of DoD resources.

A lead organization shall be designated to coordinate all operational test and evaluation involving more than one DoD Component. A single report on operational effectiveness and suitability will be produced.

DoD Components may not terminate or substantially reduce participation in joint ACAT ID programs without the approval of the USD(A&T). Before any such termination or substantial reduction is approved, the proposed termination or substantial reduction shall be reviewed by the JROC. The USD(A&T) may require a Component to continue to provide some or all of the funding necessary to allow the joint program to continue in an efficient manner after approval of a Component request to terminate or substantially reduce that Component's participation (**10 USC §2311(c)**<sup>29</sup>). Substantial reduction is defined as a funding or quantity decrease of 50% or more in the total funding or quantities in the latest President's Budget for that portion of the joint program funded by the Component seeking to reduce its participation.

#### **3.3.5.4 Assignment of Program Executive Responsibility**

Unless a waiver is granted for a particular program by the USD(A&T) or the ASD(C3I), CAEs shall assign acquisition program responsibilities to a PEO for all ACAT I, ACAT IA, and sensitive classified programs, or for any other program determined by the CAE to require dedicated executive management. The CAE shall make this assignment no later than three months after program initiation; or within three months of total program cost reaching the appropriate dollar threshold for ACAT I and ACAT IA programs. CAEs may determine that a specific PM shall report directly, without being assigned to a PEO, whenever such direct reporting is appropriate. The CAE shall notify the USD(A&T) or the ASD(C3I) of the decision to have a PM report directly to the CAE. Acquisition program responsibilities for programs not assigned to a PEO or a direct reporting PM shall be assigned to a commander of a systems, logistics, or materiel command. In order to transition from a PEO to a commander of a systems, logistics, or materiel command, a program shall, at a minimum, have passed Initial Operating Capability (IOC), have achieved full-rate production, and be logistically supportable as planned.

#### **3.3.5.5 Technical Representatives at Contractor Facilities**

PMs shall make maximum use of Defense Contract Management Command (DCMC) personnel at contractor facilities. PMs and DCMC Contract Administration Offices shall jointly develop and approve program support plans for all ACAT I program contracts to ensure agreement on contract oversight needs and perspectives. Assignment of PM technical representatives in a contractor's facility shall occur only as necessary, shall be based on the mutual agreement of the respective PM and the Commander, DCMC, and shall be reflected in a Memorandum of Agreement that specifies the duties to be performed by the technical representative. In these cases, technical representatives shall not perform contract administration duties as outlined in **FAR 42.302(a)**<sup>30</sup>.

### **3.3.5.6 Information Sharing and DoD Oversight**

DoD oversight activities (i.e., contract administration offices, contracting offices, technical activities, and program management offices) shall consider all relevant and credible information that might mitigate risks and the need for DoD oversight before designing and applying direct DoD oversight of contractor operations. DoD buying and technical activities shall provide to the Commander, DCMC copies of reviews of contractor operations and other documents assessing or rating contractor performance or operations. The Commander, DCMC shall make information relating to audits, reviews, or ratings of contractor operations, systems, or performance accessible to DoD buying and technical activities.

### **3.3.6 Environmental, Safety, and Health Considerations**

The acquisition strategy shall include a programmatic environmental, safety, and health (ESH) evaluation. The PM shall initiate the ESH evaluation at the earliest possible time in support of a program initiation decision (usually Milestone I) and shall maintain an updated evaluation throughout the life-cycle of the program. The ESH evaluation describes the PM's strategy for meeting ESH requirements (see 4.3.7), establishes responsibilities, and identifies how progress will be tracked.

### **3.3.7 Source of Support**

It is DoD policy to retain limited organic core depot maintenance capability to meet essential wartime surge demands, promote competition, and sustain institutional expertise. Support concepts for new and modified systems shall maximize the use of contractor provided, long-term, total life-cycle logistics support that combines depot-level maintenance along with wholesale and selected retail materiel management functions. Life-cycle costs and use of existing capabilities, particularly while the system is in production, shall play a key role in the overall selection process. Other than stated above, and with an appropriate waiver, DoD organizations may be used as substitutes for contractor-provided logistics support, such as when contractors are unwilling to perform support, or where there is a clear, well-documented cost advantage. The PM shall provide for long-term access to data required for competitive sourcing of systems support. The waiver to use DoD organizations must be approved by the MDA.

### **3.3.8 Warranties\***

**10 USC 2403<sup>31</sup>** mandates the use of warranties in weapon system production that apply to essential performance requirements as well as design and manufacturing, and materials and workmanship. The PM shall incorporate warranty requirements into program contracts in accordance with **DFARS 246.770<sup>32</sup>**, unless a waiver is approved consistent with **DFARS 246.770-8<sup>33</sup>**.

\*Not applicable to ACAT IA programs.

## **3.4 Test and Evaluation**

Test and evaluation programs shall be structured to integrate all developmental test and evaluation (DT&E), operational test and evaluation (OT&E), live-fire test and evaluation (LFT&E), and modeling and simulation activities conducted by different agencies as an efficient continuum. All such activities shall be part of a strategy to provide information regarding risk

and risk mitigation, to provide empirical data to validate models and simulations, to permit an assessment of the attainment of technical performance specifications and system maturity, and to determine whether systems are operationally effective, suitable, and survivable for intended use.

Test and evaluation objectives for each phase of an ACAT I and ACAT IA program shall be designed to allow assessment of system performance appropriate to each phase and milestone. For ACAT I and II programs for conventional weapons systems designed for use in combat, a beyond low-rate initial production decision shall be supported by completed independent initial operational test and evaluation as required by **10 USC §2399**<sup>34</sup> and by completed live fire test and evaluation as required by **10 USC §2366**<sup>35</sup>. Operational test and evaluation does not include an operational assessment based exclusively on computer modeling, simulation, or an analysis of system requirements, engineering proposals, design specification, or any other information contained in program documents (**10 USC §2399**<sup>36</sup>).

### **3.4.1 Test and Evaluation Strategy**

Test and evaluation planning shall begin in Phase 0, Concept Exploration. Both developmental and operational testers shall be involved early to ensure that the test program for the most promising alternative can support the acquisition strategy and to ensure the harmonization of objectives, thresholds, and measures of effectiveness (MOEs) in the ORD and TEMP. Test and evaluation planning shall address MOEs and measures of performance (MOPs) with appropriate quantitative criteria, test event or scenario description, resource requirements (e.g., special instrumentation, test articles, validated threat targets, validated threat simulators and validated threat simulations, actual threat systems or surrogates, and personnel), and identify test limitations.

1. Test planning, at a minimum, shall address all system components (hardware, software and human interfaces) that are critical to the achievement and demonstration of contract technical performance specifications and operational effectiveness and suitability requirements from the ORD.
2. Quantitative criteria shall be phased so as to provide substantive evidence for analysis of hardware, software and system maturity and readiness to proceed through the acquisition process. Linkage shall exist among the various MOEs and MOPs used in the analysis of alternatives or ORD, and test and evaluation; in particular, the MOEs, MOPs, and criteria in the ORD, the analysis of alternatives, the TEMP and the APB shall be consistent.
3. Test and evaluation planning must provide for completion of Initial Operational Test and Evaluation (IOT&E) and Live Fire Test and Evaluation (LFT&E), as required, before entering full-rate production.
4. Sufficient testing must be conducted on commercial and non-developmental items to ensure performance, operational effectiveness, and operational suitability for the military application. However, the test program shall be tailored to recognize commercial testing and experience.
5. Testing shall be planned and conducted to take full advantage of existing investment in DoD ranges, facilities, and other resources, wherever practical, unless otherwise justified in the TEMP. **DoDD 3200.11**<sup>37</sup> identifies the major ranges and test facilities.

In addition, the potential environmental impacts associated with testing must be considered (**42 USC §4321-4347<sup>38</sup>** and **EO 12114<sup>39</sup>**).

6. Early testing of prototypes in Phase I, Program Definition and Risk Reduction, and early operational assessments shall be emphasized to assist in identifying risks.
7. Modeling and simulation shall be an integral part of test and evaluation planning.

A combined developmental test and operational test (DT/OT) approach is encouraged to achieve time and cost savings. The combined approach shall not compromise either developmental or operational test objectives. A final independent phase of operational test and evaluation shall be required for beyond low-rate initial production (LRIP) decisions.

The Director, Operational Test and Evaluation (DOT&E) and the Director, Test, Systems Engineering and Evaluation (DTSE&E) shall be granted full and timely access to all available developmental, operational and live fire test and evaluation information.

#### **3.4.2 Developmental Test and Evaluation**

Developmental test and evaluation (DT&E) programs shall:

1. Identify potential operational and technological capabilities and limitations of the alternative concepts and design options being pursued;
2. Support the identification of cost-performance trade-offs by providing analyses of the capabilities and limitations of alternatives;
3. Support the identification and description of design technical risks;
4. Assess progress toward meeting Critical Operational Issues, mitigation of acquisition technical risk, achievement of manufacturing process requirements and system maturity;
5. Assess validity of assumptions and conclusions from the analysis of alternatives;
6. Provide data and analysis in support of the decision to certify the system ready for operational test and evaluation; and,
7. In the case of automated information systems, support an information systems security certification prior to processing classified or sensitive data and ensure a standards conformance certification.

The DTSE&E shall: (1) assess compliance with the systems engineering practices and developmental test and evaluation policies and procedures of this Regulation, and (2) ensure that threat target and simulator acquisitions meet developmental and operational test and evaluation requirements, and perform independent oversight of Component validation processes.

The Director, DISA, through the use of the Joint Interoperability Test Command (JITC) shall certify to the developmental and operational testing organizations and to the Chairman of

the Joint Chiefs of Staff that C4I systems and equipment meet the applicable requirements for compatibility, interoperability, and integration based on certification testing.

### **3.4.3 Certification of Readiness for Operational Test and Evaluation.**

The developing agency shall prepare a DT&E Report, and formally certify that the system is ready for the next dedicated phase of operational test and evaluation to be conducted by the DoD Component operational test activity. The developing agency shall also provide software maturity criteria and performance exit criteria necessary for certification for operational test. Risk management metrics, measures, indicators, and associated thresholds shall include cost, schedule, requirements traceability, and fault profile. A mission impact analysis of unmet metrics shall be completed before certification for operational tests.

### **3.4.4 Modeling and Simulation**

Accredited modeling and simulation shall be applied, as appropriate, throughout the system life-cycle in support of the various acquisition activities: requirements definition; program management; design and engineering; efficient test planning; result prediction; and to supplement actual test and evaluation; manufacturing; and logistics support. PMs shall integrate the use of modeling and simulation within program planning activities, plan for life-cycle application, support, and reuse models and simulations, and integrate modeling and simulation across the functional disciplines.

### **3.4.5 Operational Test and Evaluation**

Operational test and evaluation (OT&E) programs shall be structured to determine the operational effectiveness and suitability of a system under realistic conditions (e.g., combat) and to determine if the minimum acceptable operational performance requirements as specified in the ORD have been satisfied. The following procedures are mandatory:

1. Threat or threat representative forces, targets, and threat countermeasures, validated in coordination with DIA, shall be used.\*
2. Typical users shall operate and maintain the system or item under conditions simulating combat stress and peacetime conditions.
3. The independent operational test activities shall use production or production representative articles for the dedicated phase of OT&E that supports the full-rate production decision, or for ACAT IA or other acquisition programs, the deployment decision.
4. The use of modeling and simulation shall be considered during test planning. Whenever possible, an operational assessment shall draw upon test results with the actual system, or subsystem, or key components thereof, or with operationally meaningful surrogates. When actual testing is not possible to support an operational assessment, such assessments may rely upon computer modeling, simulations (preferably with real operators in the loop), or an analysis of information contained in key program documents. However, as a condition for proceeding beyond LRIP, initial operational test and evaluation shall not comprise an operational assessment based exclusively on computer modeling; simulation; or, an analysis of system requirements, engineering proposals, design specifications, or any other information

contained in program documents (**10 USC §2399**<sup>40</sup>). The extent of modeling and simulation usage in conjunction with operational and test evaluation shall be explained in the Test and Evaluation Master Plan (see 3.4.8).

5. All hardware and software alterations that materially change system performance (operational effectiveness and suitability) shall be adequately tested and evaluated. This includes system upgrades as well as changes made to correct deficiencies identified during test and evaluation.
6. Naval vessels, the major systems integral to ship construction, and military satellite programs typically have development and construction phases that extend over long periods of time and involve small procurement quantities. To facilitate evaluations and assessments of system performance (operational effectiveness and suitability), the independent operational test activity shall monitor or participate in all relevant testing and use these results to make operational assessments.
7. Conduct an OT&E before full-rate production to evaluate operational effectiveness and suitability as required by **10 USC §2399**<sup>41</sup> for ACAT I and II programs.
8. Operational Test Agencies shall participate early in program development to provide operational insights to the program office and to acquisition decisionmakers.
9. Operational testing and evaluation shall be structured to take maximum advantage of training and exercise activities to increase the realism and scope of operational testing and to reduce testing costs.

The Director, Operational Test and Evaluation shall: (1), assess the adequacy of OT&E and LFT&E conducted in support of acquisition program decisions, and (2) evaluate the operational effectiveness, operational suitability and survivability, as applicable, of systems under OT&E oversight.

\*Normally not applicable to ACAT IA programs.

#### **3.4.6 Operational Test and Evaluation Plans**

The DOT&E shall approve, in writing, the adequacy of the OT&E plans (including project funding) for all ACAT I and ACAT IA programs and other designated programs prior to the initiation of operational testing. Plans for all operational assessments of programs on DOT&E's oversight list being conducted to support acquisition decisions such as LRIP or release of funds for long lead shall be approved by DOT&E prior to their execution.

DoD Components shall brief the DOT&E on the concepts for the test and evaluation or assessment 120 days prior to commencement and submit the test plan to the DOT&E 60 days prior to commencement. Any major revisions to the operational test shall be reported to the DOT&E. Testing shall not proceed in accordance with the major revision until approved by the DOT&E.

These test plans shall include test objectives, measures of effectiveness, planned operational scenarios, threat simulation, resources, test limitations, and methods of data gathering, reduction, and analysis. The planned test events shall be described in sufficient detail to permit an assessment of operational realism.

### **3.4.7 Use of System Contractors in Support of Operational Test and Evaluation**

The use of system contractors in support of the OT&E conducted to support a decision to proceed beyond low-rate initial production is restricted by **10 USC §2399**<sup>42</sup>. In ACAT I and II programs, contractors may participate only to the extent that is planned for them to be involved in the operation, maintenance, and other support of the system being tested when it is deployed in combat.

A contractor that has participated (or is participating) in the development, production, or testing of a system for a DoD Component (or for another contractor of the DoD) may not be involved in any way in the establishment of criteria for data collection, performance assessment, or evaluation activities for the operational test and evaluation. These limitations do not apply to a contractor that has participated in such development production or testing solely in testing for the federal government.

### **3.4.8 Production Qualification Test and Evaluation\***

Production qualification test and evaluation shall be completed prior to the full rate production decision.

\*Not applicable to ACAT IA programs.

### **3.4.9. Live Fire Test and Evaluation\***

Live Fire Test and Evaluation (LFT&E), as that term is defined in **10 USC §2366**<sup>43</sup> must be conducted on a covered system, major munition program, missile program, or product improvement to a covered system, major munition program, or missile program before it can proceed beyond low-rate initial production. A covered system is any vehicle, weapon platform, or conventional weapon system that includes features designed to provide some degree of protection to users in combat and that is an ACAT I or II program.

Survivability testing shall begin at the component, subsystem, and subassembly level, culminating with tests of the complete covered system or program, or covered product improvement, configured for combat. A covered system, major munitions, a missile program, or a product improvement to a covered system, major munitions, or missile program may not proceed beyond low-rate initial production until realistic survivability or lethality testing is completed and the report required by statute is submitted to the prescribed congressional committees (**10 USC §2366**<sup>44</sup>). Such testing shall be conducted sufficiently early in the development phase of the system or program (including a covered product improvement program) to allow any design deficiency demonstrated by the testing to be corrected in the

design of the system, program, or product improvement before proceeding beyond low-rate initial production.

As delegated by the Secretary of Defense, the USD(A&T), for ACAT ID programs, or the CAE, for less than ACAT ID programs, may waive the requirement for realistic survivability (i.e., full-up, system-level tests) and lethality tests if the USD(A&T) or the CAE, before the system or program enters engineering and manufacturing development, certifies to Congress that live fire testing of such system or program would be unreasonably expensive and impractical. Alternatively, in the case of a covered system (or covered product improvement program for a covered system), the USD(A&T) or the CAE may waive the application of the required survivability and lethality tests and instead allow testing of a system or program by firing munitions likely to be encountered in combat at components, subsystems, and subassemblies, together with performing design analyses, modeling and simulation, and analysis of combat data in lieu of testing the complete system configured for combat. The strategy for such alternative testing shall be included within the waiver request, jointly reviewed by DOT&E and DTSE&E, and approved by DOT&E. Such alternative testing may not be carried out unless the USD(A&T) or the CAE certifies to Congress, before the system or program enters engineering and manufacturing development, that the survivability and lethality testing of such system or program otherwise required would be unreasonably expensive and impracticable.

In either case, the USD(A&T) or the CAE shall include, with any such certification, the DOT&E-approved alternative strategy explaining how the USD(A&T) or the CAE plans to evaluate the survivability or lethality of the system or program and assessing possible alternatives to realistic survivability and lethality testing of the system or program. Waiver of the requirement for realistic survivability testing does not remove the requirement for survivability testing of components, subsystems, and subassemblies.

Waivers and the use of alternative survivability and lethality testing shall be addressed in the TEMP for the covered system, program, or covered product improvement program. CAE certifications and reports required under **10 USC §2366(c)**<sup>45</sup> shall be submitted to Congress through the DOT&E and the USD(A&T). Further LFT&E procedures are contained in Appendix IV.

\*Not applicable to ACAT IA programs.

#### **3.4.10 Foreign Comparative Testing (FCT)**

FCT is a DoD test and evaluation program that is prescribed by **10 USC §2350a(g)**<sup>46</sup> and that is centrally managed by the DTSE&E. FCT provides funding for U.S. test and evaluation of selected equipment items and technologies developed by allied countries when such items and technologies are identified as having good potential to satisfy valid DoD requirements.

#### **3.4.11 Test and Evaluation Master Plan**

The Test and Evaluation Master Plan (TEMP) shall focus on the overall structure, major elements, and objectives of the test and evaluation program that is consistent with the acquisition strategy. It should include sufficient detail to ensure the timely availability of both existing and planned test resources required to support the test and evaluation program.

A TEMP shall:

1. be prepared for all ACAT I and ACAT IA programs and other acquisition programs designated for DOT&E or Office of the Secretary of Defense test and evaluation oversight (**10 USC §2399<sup>47</sup>**);
2. be approved by the DOT&E and the DTSE&E; and,
3. provide a road map for integrated simulation, test, and evaluation plans, schedules, and resource requirements necessary to accomplish the test and evaluation program.

The TEMP format and procedures are provided in Appendix III. This format may be used at the discretion of the MDA for other ACAT II and III programs and highly sensitive classified programs.

### **3.5 Life-Cycle Resource Estimates**

For all ACAT I and IA programs, a life-cycle cost estimate shall be prepared by the program office in support of program initiation (usually Milestone I) and all subsequent milestone reviews. For ACAT I programs, a manpower estimate shall be prepared by the Component's manpower authority in support of Milestone II and Milestone III. For ACAT I programs, the MDA may not approve entry into engineering and manufacturing development or production and deployment unless an independent estimate of the full life-cycle cost of the program and a manpower estimate for the program have been completed and considered by the MDA (**10 USC §2434<sup>48</sup>**). For ACAT IA programs, the estimate shall include life-cycle benefits in addition to life-cycle costs.

#### **3.5.1 Life-Cycle Cost Estimates**

The life-cycle cost estimates shall be:

1. Explicitly based on the program objectives, operational requirements, contract specifications for the system, and, for ACAT I programs, a program DoD work breakdown structure (WBS) or, for ACAT IA programs, a life-cycle cost and benefit element structure agreed upon by the IPT;
2. Comprehensive in character, identifying all elements of cost that would be entailed by a decision to proceed with development, production, and operation of the system regardless of funding source or management control;
3. For ACAT I programs, consistent with the cost estimates used in the analysis of alternatives, the manpower estimates behind the operation and support costs shall be consistent with the manpower estimate; and,

4. Neither optimistic nor pessimistic, but based on a careful assessment of risks and reflecting a realistic appraisal of the level of cost most likely to be realized.

For ACAT I programs, the DoD Component sponsoring the acquisition program shall establish, as a basis for the life-cycle cost estimates, a description of the salient features of the acquisition program and of the system itself. This description, referred to here as a Cost Analysis Requirements Description (CARD), shall be given to the teams preparing the program office life-cycle estimate, component cost analysis, and independent life-cycle cost estimate 180 days in advance of a planned Overarching Integrated Product Team (OIPT) or Component review, unless another due date is agreed to by the OIPT. The CARD shall be flexible, tailored, and make reference to information available in other documents available to the cost estimators. For joint programs, the CARD shall include the common program as agreed to by all participating DoD Components as well as all unique program requirements of the participating DoD Components. For ACAT IA programs, the PM shall prepare the CARD in coordination with the appropriate IPT members.

For all ACAT I programs, the Office of the Secretary of Defense (OSD) CAIG shall prepare an independent life-cycle cost estimate and a report for the appropriate MDA for all Milestone reviews, after Milestone 0. For programs with significant cost risk or high visibility, the CAE may request that a component cost analysis estimate also be prepared in addition to the program office life-cycle cost estimate.

For all ACAT IA programs, the PSA or sponsoring DoD Component shall ensure that a Component cost analysis is created for Milestone I and updated for Milestone II. The MDA may direct an updated analysis for subsequent decisions points, if conditions warrant. At Milestone I, the component may conduct a sufficiency review of the PM's life-cycle cost estimate in lieu of a full analysis. The IPT shall establish the content for the sufficiency review.

### **3.5.2 Manpower Estimates**

The manpower estimate shall:

1. Outline the DoD Component's official manpower position;
2. Address whether the program is affordable from a military end strength and civilian work year perspective;
3. Clearly state the risks associated with achieving manpower numbers reported in the estimate; and
4. Consider the program objectives, but shall base the estimate on a careful assessment of the risks and a realistic appraisal of the level of improvements most likely to be realized.

The manpower estimate shall report the total number of personnel needed to operate, maintain, support, and provide training for the program upon full operational deployment. It shall report the number of military (officer, warrant officer, and enlisted), DoD civilian, and contract manpower requirements for each fiscal year of the program beginning with initial fielding and ending with full operational deployment. A separate estimate should be provided for each Component (for joint programs) and separately for the Active, Reserve, and National Guard forces.

The estimate shall report manpower requirements and authorizations (as military end-strengths and civilian work years) for each fiscal year, and shall indicate if there are any resource shortfalls for any fiscal year covered in the report. The report shall state whether any increase in military end strengths or civilian work years (beyond what is included in the Future Years Defense Program) or whether waivers to existing manpower constraints will be required to support full operational deployment of the system. The report shall also address whether the manpower requirements represent an increase over what was required for the predecessor (replaced) system(s), as appropriate, and whether the manpower objectives and thresholds in the ORD, if established, were met or exceeded. For ACAT ID programs, the office of the Under Secretary of Defense for Personnel and Readiness shall review the report and provide an assessment to the OIPT.

### **3.6 Program Plans**

Program plans belong to the PM and are to be used by the PM to manage program execution throughout the life-cycle of the program. Program plans are a description of the detailed activities necessary to carry out the strategies addressed above. The PM, in coordination with the PEO, determines the type and number of program plans. Program plans, excluding the TEMP, are not required in support of milestone decisions and shall not be used as milestone documentation or as periodic reports.

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<sup>1</sup> Title 10, United States Code, Section 2220(a)(1), Performance based management: acquisition programs

<sup>2</sup> Title 10, United States Code, Section 2435, Baseline description

<sup>3</sup> Title 10, United States Code, Section 2220(a)(2), Performance based management: acquisition programs

<sup>4</sup> Title 10, United States Code, Section 2435(b), Baseline description

<sup>5</sup> Title 10, United States Code, Section 2220(a)(1), Performance based management: acquisition programs

<sup>6</sup> Title 15, United States Code, Section 644(a) Awards or Contracts Determination & (j) Small Purchase Procedures

<sup>7</sup> Title 15, United States Code, Section 637(d)(4)-(6), Additional Powers

<sup>8</sup> Public Law 100-533, Women's Business Ownership Act of 1988

<sup>9</sup> Title 15, United States Code, Section 644(d), Priority

<sup>10</sup> Title 10, United States Code, Section 2377, Preference for acquisition of commercial items

<sup>11</sup> Federal Acquisition Regulation, Part 2.101, Definitions

<sup>12</sup> Federal Acquisition Regulation, Part 2.101, Definitions

<sup>13</sup> Defense Federal Acquisition Regulation Supplement, Part 225, Foreign Acquisition

<sup>14</sup> Title 10, United States Code, Section 2440, Technology and Industrial Base Plans

<sup>15</sup> Defense Federal Acquisition Regulation Supplement, Paragraph 235.006 Contract methods and contracting type

<sup>16</sup> Federal Acquisition Regulation, Part 17.1, Multiyear contracting

<sup>17</sup> Title 10, United States Code, Section 2306b, Multiyear contracts

<sup>18</sup> Federal Acquisition Regulation, Part 6.3, Other Than Full and Open Competition

<sup>19</sup> Defense Federal Acquisition Regulation Supplement, Appendix D, Component Breakout

<sup>20</sup> Title 41, United States Code, Section 418(a), Advocates for competition

<sup>21</sup> Title 10, United States Code, Section 2318, Advocates for competition

<sup>22</sup> Title 10, United States Code, Section 2318, Advocates for competition

<sup>23</sup> DoD 7000.14-R, Volume 2B, "DoD Financial Management Regulation (Budget Formulation and Presentation)," May 1994

<sup>24</sup> Defense Federal Acquisition Regulation Supplement, Section 207.105, Contents of written acquisition plans

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- <sup>25</sup> Defense Federal Acquisition Regulation Supplement, Section 227, Patents, Data and copyrights
- <sup>26</sup> Defense Federal Acquisition Regulation Supplement, Section 252, Solicitation Provisions and Contract Clauses
- <sup>27</sup> Federal Advisory Committee Act, Public Law 92-463, October 6, 1972
- <sup>28</sup> Title 10, United States Code, Section 2350a(g), Cooperative Opportunities Document
- <sup>29</sup> Title 10, United States Code, Section 2311(c), Assignment and delegation of procurement functions and responsibilities, Approval of terms and reductions of joint acquisition programs
- <sup>30</sup> Federal Acquisition Regulation, Part 42.302(a), Contract administration functions
- <sup>31</sup> Title 10, United States Code, Section 2403, Major weapon systems: contractor guarantees
- <sup>32</sup> Defense Federal Acquisition Regulation Supplement, Part 246.770, Warranties
- <sup>33</sup> Defense Federal Acquisition Regulation Supplement, Part 246.770-8, Waivers
- <sup>34</sup> Title 10, United States Code, Section 2399, Operational test and evaluation of defense acquisition programs
- <sup>35</sup> Title 10, United States Code, Section 2366, Major systems and munitions programs: survivability and lethality testing required before full-scale production
- <sup>36</sup> Title 10, United States Code, Section 2399, Operational test and evaluation of defense acquisition programs
- <sup>37</sup> Department of Defense Directive 3200.11, Major Range and Test Facility Base, September 29, 1980 (Changes 1-3)
- <sup>38</sup> Title 42, United States Code, Section 4321-4347, National Environmental Policy Act
- <sup>39</sup> Executive Order 12114, Environmental Effects Abroad of Major Federal Actions
- <sup>40</sup> Title 10, United States Code, Section 2399, Operational test and evaluation of defense acquisition programs
- <sup>41</sup> Title 10, United States Code, Section 2399, Operational test and evaluation of defense acquisition programs
- <sup>42</sup> Title 10, United States Code, Section 2399, Operational test and evaluation of defense acquisition programs
- <sup>43</sup> Title 10, United States Code, Section 2366, Major systems and munitions programs: survivability and lethality testing required before full-scale production
- <sup>44</sup> Title 10, United States Code, Section 2366, Major systems and munitions programs: survivability and lethality testing required before full-scale production
- <sup>45</sup> Title 10, United States Code, Section 2366(c), Major systems and munitions programs: survivability and lethality testing required before full-scale production, Waiver Authority
- <sup>46</sup> Title 10, United States Code, Section 2350a(g), Side-by-Side Testing
- <sup>47</sup> Title 10, United States Code, Section 2399, Operational test and evaluation of defense acquisition programs
- <sup>48</sup> Title 10, United States Code, Section 2434, Independent cost estimates; operational manpower requirements

## Part 4 **Program Design**

### **4.1 Purpose**

The purpose of this part is to establish the basis for a comprehensive, structured, integrated and disciplined approach to the life-cycle design of major weapons and automated information systems, and is applicable to all major acquisition programs.

### **4.2 Integrated Process and Product Development**

The PM shall employ the concept of Integrated Product and Process Development (IPPD) throughout the program design process to the maximum extent practicable. The use of Integrated Product Teams (IPTs) is a key tenet of IPPD.

The IPPD management process shall integrate all activities from product concept through production and field support, using multidisciplinary teams to simultaneously optimize the product and its manufacturing and supportability to meet cost and performance objectives. It is critical that the processes used to manage, develop, manufacture, verify, test, deploy, operate, support, train people, and eventually dispose of the system be considered during program design.

### **4.3 Systems Engineering**

The Program Manager shall ensure that a systems engineering process is used to translate operational needs and/or requirements into a system solution that includes the design, manufacturing, test and evaluation, and support processes and products. The systems engineering process shall establish a proper balance between performance, risk, cost, and schedule, employing a top-down iterative process of requirements analysis, functional analysis and allocation, design synthesis and verification, and system analysis and control.

The systems engineering process shall:

1. Transform operational needs and requirements (reference Appendix II) into an integrated system design solution through concurrent consideration of all life-cycle needs (i.e., development, manufacturing, test and evaluation, verification, deployment, operations, support, training and disposal).
2. Ensure the compatibility, interoperability and integration of all functional and physical interfaces and ensure that system definition and design reflect the requirements for all system elements: hardware, software, facilities, people, and data; and
3. Characterize and manage technical risks.

The key systems engineering activities that shall be performed are:

1. Requirements Analysis. Throughout the acquisition process the program office shall work with the user to establish and refine operational and design requirements that result in the proper balance between performance and cost within affordability constraints. Requirements analysis shall be conducted iteratively with functional

analysis/allocation to develop and refine system level functional and performance requirements, external interfaces and provide traceability among user requirements and design requirements.

2. Functional Analysis/Allocation. Functional analysis/allocation shall be performed iteratively to define successively lower level functional and performance requirements, including functional interfaces and architecture. Functional and performance requirements shall be traceable to higher level requirements. System requirements shall be allocated and defined in sufficient detail to provide design and verification criteria to support the integrated system design.
3. Design Synthesis and Verification. Design synthesis and verification activities shall translate functional and performance requirements into design solutions to include: alternative people, product and process concepts and solutions, and internal and external interfaces. These design solutions shall be in sufficient detail to verify requirements have been met. The verification of the design shall include a cost-effective combination of design analysis, design modeling and simulation, and demonstration and testing. The verification process shall address the design tools, products, and processes.
4. System Analysis and Control. System analysis and control activities shall be established to serve as a basis for evaluating and selecting alternatives, measuring progress, and documenting design decisions. This shall include:
  - a. The conduct of trade-off studies among requirements (operational, functional and performance), design alternatives and their related manufacturing, testing and support processes, program schedule and life-cycle cost at the appropriate level of detail to support decision-making and lead to a proper balance between performance and cost.
  - b. The establishment of a risk management process to be applied throughout the design process. The risk management effort shall address the identification and evaluation of potential sources of technical risks based on the technology being used and its related design, manufacturing, test and support processes, risk mitigation efforts, and risk assessment and analysis. Technology transition planning and criteria shall be established as part of the overall risk management effort.
  - c. A configuration management process to control the system products, processes and related documentation. The configuration management effort includes identifying, documenting, and verifying the functional and physical characteristics of an item; recording the configuration of an item; and controlling changes to an item and its documentation. It shall provide a complete audit trail of decisions and design modifications.
  - d. An integrated data management system to capture and control the technical baseline (configuration documentation, technical data, and technical manuals); provide data correlation and traceability among requirements, designs, decisions, rationale, and other related program planning, and reporting, support configuration procedures, and serve as a ready reference for the systems engineering effort. PMs shall use existing information systems and data formats rather than DoD-unique systems and formats provided they can readily meet the program's information

requirements and do not pose compatibility issues with operational DoD information systems and data.

e. The establishment of performance metrics to provide measures of how well the technical development and design are evolving relative to what was planned and relative to meeting system requirements in terms of performance, risk mitigation, producibility, cost and schedule. Performance metrics must be traceable to performance parameters identified by the operational user.

f. The establishment of interface controls to ensure all internal and external interface requirement changes are properly recorded and communicated to all affected configuration items.

g. A structured review process to demonstrate and confirm completion of required accomplishments and their exit criteria as defined in program planning. Reviews necessary to demonstrate, confirm, and coordinate progress will be incorporated into overall program planning.

The following areas reflect important consideration in the design and shall be part of the systems engineering process. The extent of their consideration and impact on the product design shall be based on the degree to which they impact total system cost, schedule and performance, at an acceptable level of risk.

#### **4.3.1 Manufacturing and Production\***

The producibility of the system design shall be a priority of the development effort. Design engineering efforts shall focus on concurrent development of producible designs, capable manufacturing processes, and process controls to ensure requirements satisfaction and minimize manufacturing costs. The use of existing manufacturing processes shall be capitalized upon whenever possible. When new manufacturing capabilities are required, flexibility (i.e., insensitivity to rate and product configuration) shall be considered.

Full rate production of a system shall not be approved until the system's design has been stabilized, the manufacturing processes have been proven, and the production facilities and equipment are in place (or are being put in place).

\*Not applicable to ACAT IA programs.

#### **4.3.2 Quality**

The PM shall allow contractors the flexibility to define and use their preferred quality management process that meets program objectives. Third party certification or registration of a supplier's quality system shall not be required. The quality management process shall include the following key quality activities:

1. Establishment of capable processes,
2. Monitoring and control of critical processes and product variation,
3. Establishment of mechanisms for feedback of field product performance,
4. Implementation of an effective root cause analysis and corrective action system, and
5. Continuous process improvement.

#### **4.3.3 Acquisition Logistics**

The PM shall conduct acquisition logistics management activities throughout the system development to ensure the design and acquisition of systems that can be cost-effectively supported and to ensure that these systems are provided to the user with the necessary support infrastructure for achieving the user's peacetime and wartime readiness requirements.

##### **4.3.3.1 Supportability Analyses**

Supportability analyses shall be conducted as an integral part of the systems engineering process beginning at program initiation and continuing throughout program development. Supportability analyses shall form the basis for related design requirements included in the system specification and for subsequent decisions concerning how to most cost-effectively support the system over its entire life-cycle. Programs shall allow contractors the maximum flexibility in proposing the most appropriate supportability analyses.

##### **4.3.3.2 Support Concepts**

Acquisition programs shall establish logistics support concepts (e.g., two level, three level) early in the program and refine them throughout the development process. Life-cycle costs shall play a key role in the overall selection process. Support concepts for new and future weapon systems shall provide for cost effective total life-cycle logistics support .

##### **4.3.3.3 Support Data**

Data requirements shall be consistent with the planned support concept and represent the minimum essential to effectively support the fielded system. Government requirements for contractor developed support data shall be coordinated with the data requirements of other program functional specialties to minimize data redundancies and inconsistencies.

##### **4.3.3.4 Support Resources**

Support resources such as operator and maintenance manuals, tools, support equipment, training devices, etc. for major weapon system components shall not be procured before the weapon system/component hardware and software design stabilizes. The PM shall consider the use of embedded training and maintenance techniques to enhance user capability and reduce life-cycle costs. Where they are available, cost-effective, and can readily meet the user's requirements, commercial support resources shall be used.

DoD automatic test system (ATS) families or COTS components that meet defined ATS capabilities shall be used to meet all acquisition needs for automatic test equipment hardware and software. ATS capabilities shall be defined through critical hardware and software elements. The introduction of unique types of ATS into the DoD field, depot, and manufacturing operations shall be minimized.

#### **4.3.4 Open Systems Design**

An open systems approach shall be followed for all system elements (mechanical, electrical, software, etc.) in developing systems. This approach is a business and engineering strategy to choose specifications and standards adopted by industry standards bodies or de facto standards (set by the market place) for selected system interfaces (functional and physical), products, practices and tools. Selected specifications shall be based on performance, cost, industry acceptance, long term availability and supportability, and upgrade potential. For all C4I systems, information systems, and weapons systems that must interface with C4I systems or information systems, mandatory guidance is contained in the Technical Architecture Framework for Information Management (**TAFIM**<sup>1</sup>).

#### **4.3.5 Software Engineering**

Software shall be managed and engineered using best processes and practices that are known to reduce cost, schedule, and technical risks. It is DoD policy to design and develop software systems based on systems engineering principles, to include:

1. Developing software system architectures that support open system concepts; exploit commercial off-the-shelf (COTS) computer systems products; and provide for incremental improvements based on modular, reusable, extensible software;
2. Identifying and exploiting software reuse opportunities, Government and commercial, before beginning new software development;
3. Use of the Ada programming language to develop code for which the government is responsible for life-cycle maintenance and support. Additional guidance is contained in **DoDD 3405.1**<sup>2</sup> ;
4. Use of DoD standard data. Additional guidance is contained in **DoDD 8320.1**<sup>3</sup>;
5. Selecting contractors with the domain experience in developing comparable software systems, a successful past performance record, and a demonstrable mature software development capability and process; and
6. Use of software metrics to effect the necessary discipline of the software development process and assess the maturity of the software product.
7. Ensuring that information warfare risks have been assessed (**DoDD TS-3600.1**<sup>4</sup>).

#### **4.3.6 Reliability, Maintainability and Availability**

The PM shall ensure that reliability, maintainability, and availability activities are established early in the acquisition cycle to assure meeting operational requirements and reduced life-cycle ownership cost. Reliability, maintainability, and availability requirements shall be based on operational requirements and life-cycle cost considerations; stated in quantifiable, operational terms; measurable during developmental and operational test and evaluation; and defined for all elements of the system, including support and training equipment. They shall be derived from and directly support system readiness objectives. Reliability requirements shall address both mission reliability and logistic reliability. Maintainability requirements shall address servicing, preventive, and corrective maintenance. Availability requirements shall address the readiness of the system.

The PM shall plan and execute reliability, maintainability, and availability design, manufacturing development and test activities such that equipment used to demonstrate system performance prior to production reflects the mature design. Demonstrations shall use production representative systems (or as near as possible) and actual operational procedures (e.g., actual technical orders, spare parts, tools, support equipment, and personnel with representative skill levels).

#### **4.3.7 Environment, Safety, and Health**

All programs, regardless of acquisition category, shall comply with this section and be conducted in accordance with applicable federal, state, interstate, and local environmental laws and regulations, Executive Orders (EOs), treaties, and agreements.

Environmental, safety, and health (ESH) analyses shall be conducted, as described below, to integrate ESH issues into the systems engineering process and to support development of the Programmatic ESH Evaluation (see 3.3.6).

##### **4.3.7.1 National Environmental Policy Act**

The PM shall comply with the National Environmental Policy Act (NEPA) (**42 USC 4321-4370d<sup>5</sup>**), implementing regulations (**40 CFR 1500-1508<sup>6</sup>**), and executive orders (**EO 12114<sup>7</sup>** and **EO 11514<sup>8</sup>**) by analyzing actions proposed to occur in upcoming program phases that may require NEPA or EO analysis and providing the MDA with milestones and status for each planned analysis. Any analysis required under either NEPA or EO must be completed before the appropriate official may make a decision to proceed with a proposed action that may affect the quality of the human environment. NEPA and EO analysis is tied to proposed, program-specific actions. NEPA and EO documentation shall be prepared in accordance with DoD Component implementation regulations and guidance. The CAE is the final approval authority for system-related NEPA and EO documentation. The PM shall forward a copy of final NEPA documentation for ACAT I programs to the Defense Technical Information Center for archiving.

##### **4.3.7.2 Environmental Compliance**

Environmental regulations are a source of external constraints that must be identified and integrated into program execution. To minimize the cost and schedule risks that changing regulations represent, the PM shall regularly review environmental regulations and shall analyze the regulations and evaluate their impact on the program's cost, schedule, and performance.

#### **4.3.7.3 System Safety and Health**

The PM shall identify and evaluate system safety and health hazards, define risk levels, and establish a program that manages the probability and severity of all hazards associated with development, use, and disposal of the system. All safety and health hazards shall be managed consistent with mission requirements and shall be cost-effective. Health hazards include conditions that create significant risks of death, injury, or acute chronic illness, disability, and/or reduced job performance of personnel who produce, test, operate, maintain, or support the system.

Each management decision to accept the risks associated with an identified hazard shall be formally documented. The CAE shall be the final approval authority for acceptance of high risk hazards. All participants in joint programs shall approve acceptance of high risk hazards. Acceptance of serious risk hazards may be approved at the PEO level.

**EO 12196<sup>9</sup>** and **DoDI 6055.1<sup>10</sup>** make Federal Occupational Safety and Health Act regulations applicable to all federal employees working in non-military-unique DoD operations and workplaces, regardless of whether work is performed by military or civilian personnel. In the case of military-unique equipment, systems, operations, or workplaces, Federal safety and health standards, in whole or in part, apply to the extent practicable.

#### **4.3.7.4 Hazardous Materials**

The PM shall establish a hazardous material management program that ensures appropriate consideration is given to eliminating and reducing the use of hazardous materials in processes and products rather than simply managing pollution created (**EO 12856<sup>11</sup>**). The selection, use, and disposal of hazardous materials shall be evaluated and managed so the DoD incurs the lowest cost required to protect human health and the environment over the system's life-cycle, consistent with the program's cost, schedule, and performance goals. Where a hazardous material use cannot be avoided, the PM shall plan for later material replacement capability in the system design, if technically feasible and economically practical and shall develop and implement plans and procedures for identifying, minimizing use, tracking, storing, handling, and disposing of such materials and equipment.

#### **4.3.7.5 Pollution Prevention**

In designing, manufacturing, testing, operating, maintaining, and disposing of systems, all forms of pollution shall be prevented or reduced at the source whenever feasible. Pollution that cannot be prevented shall be recycled in an environmentally safe manner. Pollution that cannot be prevented or recycled shall be treated in an environmentally safe manner. Disposal or other releases to the environment shall be employed only as a last resort and must be conducted in an environmentally safe manner. The PM shall establish a pollution prevention program to help minimize environmental impacts and the life-cycle costs associated with environmental compliance. The PM shall identify the impacts of the system on the environment, wastes released to the environment, ESH risks associated with using new technologies, and other information needed to identify source reduction and recycling opportunities.

Many opportunities for pollution prevention can be incorporated into contract documents. In developing work statements, specifications, and other product descriptions, **EO 12873<sup>12</sup>** requires PMs to consider elimination of virgin material requirements, use of recovered materials, reuse of products, life-cycle cost, recyclability, use of environmentally preferable products,

waste prevention (including toxicity reduction or elimination), and ultimately, disposal, as appropriate.

#### **4.3.8 Human Systems Integration (HSI)**

A comprehensive management and technical strategy for human systems integration shall be initiated early in the acquisition process to ensure that: human performance; the burden the design imposes on manpower, personnel, and training (MPT); and safety and health aspects are considered throughout the system design and development processes.

Human factors engineering requirements shall be established to develop effective human-machine interfaces, and minimize or eliminate system characteristics that require extensive cognitive, physical, or sensory skills; require excessive training or workload for intensive tasks; or result in frequent or critical errors or safety/health hazards. The capabilities and limitations of the operator, maintainer, trainer, and other support personnel shall be identified prior to program initiation (usually Milestone I), and refined during the development process. Human-machine interfaces shall comply with the mandatory guidelines for all C4I systems, automated information systems, and weapons systems that must interface with C4I systems or automated information systems, as defined in the **TAFIM**<sup>13</sup>.

Reports, plans, and program decisions made by the HSI communities outside the acquisition infrastructure (e.g., manning documents and personnel occupational specialty decisions) must reflect and, to every extent possible, be reflected in program design decisions, trade-offs, risk assessments, and test results.

#### **4.3.9 Interoperability**

Compatibility, interoperability and integration are key goals that must be satisfactorily addressed for all acquisition programs. These goals shall be specified and validated during the requirements generation process. Satisfaction of these requirements will be addressed throughout the acquisition life-cycle for all acquisition programs. Interoperability of Command, Control, Communications Computer Intelligence (C4I) Systems shall be in compliance with **DoDD 4630.5**<sup>14</sup>, **DoDI 4630.8**<sup>15</sup>, and **CJCSI 6212.01A**<sup>16</sup>.

#### **4.4 Other Design Considerations**

The following requirements shall be considered as part of program design. While all requirements must be considered, it is recognized that all may not apply.

#### **4.4.1 Survivability**

Unless waived by the MDA, mission-critical systems shall be survivable to the threat levels anticipated in their operating environment. Survivability from all threats found in the various levels of conflict shall be considered and fully assessed prior to Milestone II.

#### **4.4.2 Work Breakdown Structure**

A program work breakdown structure (WBS) shall be established that provides a framework for program and technical planning, cost estimating, resource allocations, performance measurements, and status reporting. It is a product of the systems engineering process.

The WBS and associated WBS dictionary shall define the total system to be developed or produced; display the total system as a product-oriented family tree composed of hardware, software, services, data, and facilities; and relate the elements of work to each other and to the end product.

Program offices shall tailor a program WBS for each program using the guidance in MIL-HDBK-881. MIL-HDBK-881 shall be cited in solicitations and contracts "for guidance only" in extending the program WBS to develop the complete contract WBS.

#### **4.4.3 Standardization Documentation**

Preference shall be given to specifications and standards developed under the Defense Standardization Program. This Regulation authorized the publication of DoD 4120.3-M that describes the Defense Standardization and Parts Management Program.

#### **4.4.4 Metric System**

The metric system of measurement shall be used for all elements of defense systems requiring new design, unless waived by the MDA as not in the best interest of the government (**15 USC 205a-205k<sup>17</sup>** , and **EO 12770<sup>18</sup>** ).

#### **4.4.5 Program Protection**

Acquisition programs shall identify elements of the program, classified or unclassified, that require protection to prevent unauthorized disclosure or inadvertent transfer of critical program technology or information. Program protection planning shall begin early in the acquisition life-cycle and be updated as required. The planning process shall incorporate risk management and threat-based countermeasures to provide cost-effective protection. When appropriately applied, the process will meet requirements of information systems security, defensive information warfare, classification management, TEMPEST, physical security, personnel security, operations security, international security, technology transfer, and special access programs.

#### **4.4.6 Information Systems Security**

Information systems security requirements shall be included as part of program and systems design activities to preserve integrity, availability, and confidentiality of critical program technology and information. System security requirements shall be established and maintained throughout the acquisition life-cycle for all ACAT IA programs and others as applicable. All AISs shall meet security requirements in accordance with **DoDD 5200.28**<sup>19</sup> and be accredited by the Designated Approving Authority prior to processing classified or sensitive unclassified data.

#### **4.4.7 Electromagnetic Environmental Effects (E3) and Spectrum Management**

All electric or electronic systems shall be designed to be mutually compatible with other electric or electronic equipment within their expected operational environment. For additional information, see **DoDD 3222.3**<sup>20</sup>.

Systems and equipment that emit or receive hertzian waves shall comply with **OMB Circular A-11**<sup>21</sup> to determine spectrum supportability prior to initiating cost estimates for development or procurement. All DoD components shall obtain spectrum utilization guidance from the Military Communications-Electronics Board (MCEB) in accordance with **DoDD 4650.1**<sup>22</sup>

Systems and equipment shall comply with applicable national and international spectrum management policies and regulations. Requirements for foreign spectrum support shall be forwarded to the MCEB for coordination with host nations where deployment of the system or equipment is planned.

#### **4.4.8 Unplanned Stimuli\***

All munitions/weapons shall be designed to withstand unplanned stimuli and use materials consistent with safety and interoperability requirements. Requirements shall be determined during the requirements validation process and shall be updated as necessary throughout the acquisition cycle for all acquisition programs. Interoperability shall be validated per **CJCS MOP 77**<sup>23</sup>, to include insensitive munition policies. Waivers for munitions/weapons, regardless of ACAT level, shall require validation by the JROC.

\*Not applicable to ACAT IA programs.

#### **4.4.9 Value Engineering**

Value Engineering (VE) shall be applied to projects and programs as required by **OMB Circular A-131**<sup>24</sup>. The PM shall consider an incentive approach and/or a mandatory approach as described in the **FAR 48**<sup>25</sup> and the **DFARS 248**<sup>26</sup>. The VE program can include both internal DoD and contractor activity.

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<sup>1</sup> Department of Defense Technical Architecture Framework for Information Management, Version 2.0, June 30, 1994

<sup>2</sup> Department of Defense Directive 3405.1, Computer Programming Language Policy, April 2, 1987

<sup>3</sup> Department of Defense Directive 8320.1, DoD Data Administration, September 26, 1991

<sup>4</sup> Department of Defense Directive TS-3600.1, Information Warfare, December 21, 1992

<sup>5</sup> Title 42, United States Code, Section 4321-4370d, National Environmental Policy Act

<sup>6</sup> Title 40, CFR 1500-1508, National Environmental Policy Act Regulations

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- <sup>7</sup> Executive Order 12114, Environmental Effects Abroad of Major Federal Actions
- <sup>8</sup> Executive Order 11514, Protection and Enhancement of Environmental Quality
- <sup>9</sup> Executive Order 12196, Occupational safety and health programs for Federal employees
- <sup>10</sup> Department of Defense Instruction 6055.1, DoD Occupational Safety and Health Program (Changes 1-2), October 26, 1984
- <sup>11</sup> Executive Order 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements
- <sup>12</sup> Executive Order 12873, Federal Acquisition, Recycling, and Waste Prevention
- <sup>13</sup> Department of Defense Technical Architecture Framework for Information management, Version 2.0, June 30, 1994
- <sup>14</sup> Department of Defense Directive 4630.5, Compatibility, Interoperability, and Integration of Command, Control, Communications, and Intelligence (C3I) Systems, November 12, 1992
- <sup>15</sup> Department of Defense Instruction 4630.8, Procedures for Compatibility, Interoperability, and Integration of Command, Control, Communications, and Intelligence (C3I) Systems, November 18, 1992
- <sup>16</sup> CJCS Instruction 6212.01A, Compatibility, Interoperability, and Integration of Command, Control, Communications, Computers, and Intelligence Systems, June 30, 1995
- <sup>17</sup> Title 15, United States Code 205, Metric Conversation
- <sup>18</sup> Executive Order 12770, Metric Usage in Federal Government Programs
- <sup>19</sup> Department of Defense Directive 5200.28, Safety Requirements for Automated Information Systems, March 21, 1988
- <sup>20</sup> Department of Defense Directive 3222.3, Department of Defense Electromagnetic Compatibility Program (EMCP), August 20, 1990
- <sup>21</sup> Office of Management and Budget Circular A-11, Preparation and Submission of Budget Estimates, June 17, 1988
- <sup>22</sup> Department of Defense Directive 4650.1, Management and Use of the Radio Frequency Spectrum, June 24, 1987
- <sup>23</sup> CJCS Memorandum of Procedure (MOP) 77, Requirements Generation System Policies and Procedures
- <sup>24</sup> Office of Management and Budget Circular A-131, Value Engineering
- <sup>25</sup> Federal Acquisition Regulation 48, Value Engineering
- <sup>26</sup> Defense Federal Acquisition Regulation Supplement, Part 248, Value Engineering

## Part 5

### **Program Assessments & Decision Reviews**

#### **5.1 Purpose**

This part establishes mandatory policies and procedures for conducting periodic assessments and milestone decision reviews of Acquisition Category (ACAT) I and ACAT IA programs.

#### **5.2 Defense Acquisition Board**

The Defense Acquisition Board (DAB) is the Department's senior-level forum for advising the Under Secretary of Defense (Acquisition and Technology) (USD(A&T)) on critical decisions concerning ACAT ID programs. The DAB is composed of the Department's senior acquisition officials. The Board is chaired by the USD(A&T). The Vice Chairman of the Joint Chiefs of Staff (VCJCS) serves as the vice chairman of the Board. Other principal members of the Board include the Principal Deputy USD(A&T); the Under Secretary of Defense (Comptroller); the Assistant Secretary of Defense (Strategy and Requirements); the Director of Operational Test and Evaluation (DOT&E); the Director of Program Analysis and Evaluation (PA&E); the Acquisition Executives of the Army, Navy, and the Air Force; the cognizant Overarching Integrated Product Team (OIPT) Leader; the cognizant Program Executive Officer(s) (PEOs) and Program Manager (PMs); and the DAB Executive Secretary.

The DAB Chairman is also routinely supported by senior advisors, such as but not limited to: the Director of Defense Research and Engineering; the Assistant Secretary of Defense (Economic Security); the Assistant to the Secretary of Defense (Nuclear, Chemical, and Biological Defense Programs); the Deputy Under Secretary of Defense (Acquisition Reform); the Deputy Under Secretary of Defense (Environmental Security); the Deputy Under Secretary of Defense (Logistics); the Director of Acquisition Program Integration (API); the Director of the Defense Intelligence Agency (DIA); the Director of Defense Procurement (DP); the Director of Test, Systems Engineering and Evaluation (DTSE&E); the Chairman of the Cost Analysis Improvement Group (CAIG); and the Deputy General Counsel (Acquisition and Logistics). Other senior Department officials may be invited by the USD(A&T) to participate in DAB meetings on an as-needed basis.

##### **5.2.1 DAB Readiness Meeting**

Approximately one week prior to the DAB review, a DAB Readiness Meeting (DRM) shall be held to pre-brief the USD(A&T), VCJCS, and the other DAB participants (including cognizant PEO(s) and PM(s)). The purpose of the meeting is to update the USD(A&T) on the latest status of the program and to inform the senior acquisition officials of any outstanding issues. Normally, the Overarching Integrated Product Team (OIPT) Leader shall brief the DRM. If outstanding issues are resolved at the DRM, the USD(A&T) may decide that a formal DAB meeting is not required and issue an Acquisition Decision Memorandum (ADM) following the DRM. ADMs shall be coordinated with the DAB Principals.

### **5.3 Major Automated Information Systems Review Council**

The Major Automated Information Systems Review Council (MAISRC) is the Department's senior level forum for advising the Assistant Secretary of Defense (Command, Control, Communications, and Intelligence) (ASD(C3I)) on critical decisions concerning ACAT IAM programs.

The MAISRC is chaired by the ASD(C3I). Principal members of the MAISRC include representatives from the offices of the Under Secretary of Defense (Comptroller); the Joint Chiefs of Staff; the DOT&E; the DTSE&E; the Director API; the DTSE&E; the Deputy ASD(C3I); the user representatives; and the cognizant Senior Information Management Official(s) or Component Acquisition Executives(s), as appropriate. The Deputy ASD(C3I Acquisition) is the MAISRC Executive Secretary and either leads or designates the leader of the OIPT.

The MAISRC Chairman is also routinely supported by senior advisors (or their representatives), such as, but not limited to, the Under Secretary of Defense (Personnel and Readiness); the Assistant Secretary of Defense (Economic Security); the Assistant Secretary of Defense (Health Affairs); the Assistant Secretary of Defense (Reserve Affairs); the Deputy Under Secretary of Defense (Logistics); the Director DP; the Director, Defense Information Systems Agency (DISA); and the Deputy Assistant Secretary of Defense (Information Management). Other senior Defense officials may be invited by the ASD(C3I) to participate in MAISRC meetings as needed.

### **5.4 Integrated Product Teams in the Oversight and Review Process**

Integrated Product Teams (IPTs) are an integral part of the defense acquisition oversight and review process. For ACAT ID and IAM programs, there are generally two levels of IPTs: the Overarching IPT (OIPT) and Working-Level IPTs (WIPTs). For each program, there will be an OIPT and at least one WIPT. WIPTs will focus on a particular topic such as cost/performance, test, or contracting. An Integrating IPT (IIPT) (which is a WIPT) will coordinate WIPT efforts and cover all topics not otherwise assigned to another IPT. Participation in IPTs is the primary way for any organization to participate in the program. Mandatory guidance relating to these types of IPTs is provided below.

#### **5.4.1 Overarching IPT Procedures and Assessments**

In support of all ACAT ID and IAM programs, an OIPT shall be formed for each program to provide assistance, oversight and review as that program proceeds through its acquisition life-cycle. The OIPT for ACAT ID programs shall be led by the appropriate Office of the Secretary of Defense (OSD) official (typically the Director of Strategic and Tactical Systems, the Assistant Deputy Under Secretary of Defense (Space and Acquisition Management), or the Deputy Assistant Secretary of Defense (C3I Acquisition), depending on the program in question). The DASD (C3I Acquisition) will designate the OIPT Leader for each ACAT IAM program. OIPTs shall be composed of the PM, PEO, Component Staff, Joint Staff, USD(A&T) staff, and the OSD staff principals or their representatives, involved in oversight and review of a particular ACAT ID or IAM program.

The OIPT shall first form upon learning that a program is intended to be initiated to consider the recommendations proposed by the IIPT; the extent of WIPT support needed for the potential program; who shall participate on the WIPTs; the appropriate milestone for program initiation; and, the minimum information needed for the program initiation review. OIPTs shall

meet as necessary over the life of a program. The OIPT Leader shall take action to resolve issues when requested by any member of the OIPT, or when directed by the Milestone Decision Authority (MDA). The goal is to resolve as many issues and concerns at the lowest level possible, and to expeditiously escalate issues that need resolution at a higher level, bringing only the highest level issues to the MDA for decision.

In support of a planned milestone review by the DAB or MAISRC, the OIPT shall normally convene two weeks in advance of the anticipated review to assess information and recommendations being provided to the MDA. Additionally, at that meeting, the PM shall propose the WIPT structure, documentation, and strategy for the next acquisition phase, for approval by the MDA. The OIPT Leader, in coordination with the appropriate CAE, shall recommend to the MDA whether the anticipated review should go forward as planned.

The OIPT leader for ACAT ID or IAM programs shall provide an integrated assessment to the DAB or MAISRC chairs, principals, and advisors at major program reviews and milestone decision reviews using information gathered through the IPT process. The leader's assessment shall focus on core acquisition management issues and shall take account of independent assessments that are normally prepared by OIPT members. These assessments will typically be accomplished in the context of the OIPT review and will be reflected in the OIPT Leader's report. There should be no surprises at this point, because all team members are already working the issues in real time, and they should be knowledgeable of their OIPT leader's assessment.

#### **5.4.2 Working-Level IPTs Procedures, Roles, and Responsibilities**

The PM, or designee, shall form and lead an Integrating IPT (IIPT) to support the development of strategies for acquisition and contracts, cost estimates, evaluation of alternatives, logistics management, cost-performance trade-offs, etc. The IIPT will assist the PM in the development of a WIPT structure to propose to the OIPT. The IIPT will also coordinate the activities of the remaining WIPTs and ensure that issues not formally addressed by other WIPTs are reviewed. WIPTs shall meet as required to help the PM plan program structure and documentation and resolve issues. While there is no one-size-fits-all WIPT approach, there are three basic tenets to which any approach shall adhere:

1. The PM is in charge of the program.
2. IPTs are advisory bodies to the PM.
3. Direct communication between the program office and all levels in the acquisition oversight and review process is expected as a means of exchanging information and building trust.

The Leader of each IPT will usually be the PM or the PM's representative. The OSD action officer may co-chair the IPT meetings, at the invitation of the PM. The following roles and responsibilities apply to all WIPTs:

1. Assist the PM in developing strategies and in program planning, as requested by the PM
2. Establish IPT plan of action and milestones
3. Propose tailored document and milestone requirements
4. Review and provide early input to documents
5. Coordinate WIPT activities with the OIPT members
6. Resolve or elevate issues in a timely manner

7. Assume responsibility to obtain principals' concurrences on issues, as well as with applicable documents or portions of documents

### **5.5 Joint Requirements Oversight Council Review Procedures**

The Joint Requirements Oversight Council (JROC) shall review all deficiencies that may necessitate development of major systems prior to any consideration by the DAB or, as appropriate, MAISRC at Milestone 0. The JROC shall validate an identified mission need, assign a joint potential designator for meeting the need, and forward the Mission Need Statement (MNS) with JROC recommendations to the USD(A&T).

The JROC shall play a continuing role in the validation of key performance parameters in program baselines prior to DAB, or where applicable, MAISRC, reviews of ACAT I or ACAT IA programs (including, unless directed by the Secretary or Deputy Secretary of Defense, highly sensitive classified programs) prior to all successive milestone reviews.

### **5.6 Cost Analysis Improvement Group Procedures \***

The OSD Cost Analysis Improvement Group (CAIG) is established in accordance with **DoDD 5000.4**<sup>1</sup> The DoD Component responsible for acquisition of a system shall work with the CAIG providing cost, programmatic, and technical information required to estimate costs and appraise cost risks, and shall facilitate visits of the CAIG staff to the program office, product centers, test centers, and system contractor(s).

Whether for an ACAT I milestone review or a program review:

1. Documentation of draft program office and component cost analysis life-cycle cost estimates shall be given to the CAIG no later than 45 calendar days in advance of the scheduled OIPT or Component review meeting.
2. The program office and component cost analysis life-cycle cost estimates and/or Component cost position prepared as part of an ACAT I milestone review shall be presented to the OSD CAIG at least 21 calendar days before the scheduled OIPT or Component review meeting. The CAIG will provide feedback based on its independent review of the life-cycle cost estimate(s), validate the methodology used to make the cost estimate(s); and determine whether additional analysis is required.
3. The final program office and component cost analysis (when required by the CAE) life-cycle cost estimates and/or Component cost position shall be given to the CAIG no later than ten calendar days prior to a scheduled OIPT or Component review meeting.

\* Not applicable to ACAT IA programs.

## **5.7 Other Boards and Councils**

The USD(A&T) and ASD (C3I) are advised by numerous boards and councils on acquisition matters. For example, the Joint Space Management Board (JSMB), which is co-chaired by the USD(A&T) and the Deputy Director of Central Intelligence, ensures that defense and intelligence needs for space systems are comprehensively satisfied within available resources, using integrated architectures to the maximum extent possible.

## **5.8 Program Information**

The MDA shall determine what information is necessary to support decisions on an individual ACAT I or ACAT IA program at a particular review point. Information shall be limited to the minimum necessary for the decision. There are two major categories of program information: (1) descriptive information, and (2) information subject to approval or consideration.

Descriptive information is a broad category that might include, for example, a description of the system under development, historical background, and Congressional interest. This information is purely descriptive and does not require explicit approval by acquisition executives.

Information subject to approval requires explicit approval by either DoD acquisition executives or submission to Congress (such as a program's key cost, schedule and performance objectives as documented in the Acquisition Program Baseline). Information subject to consideration, (such as an independent cost estimate) shall be provided to the appropriate authority for his or her consideration. Some of this information is required by statute, while some is required by this Regulation. Some of this information shall be prepared by the PM or DoD Component, while some is prepared by the OSD staff.

Ensuring that the necessary information is produced and distributed to decision-makers is much more important than the particular format in which the information is presented. Thus, in most cases, this Regulation does not mandate a particular format; the few exceptions where specific formats are mandatory are clearly stated elsewhere in this document. It is the Department's policy to "tailor-in" (i.e., include appropriate information for the decision maker considering the risk, values, etc. of the specific program) program information on a case-by-case basis, as program circumstances dictate. Tables are provided in the discretionary section of the Defense Acquisition Deskbook that list mandatory as well as discretionary items for each milestone along with example formats.

Finally, PMs are not required to submit mandatory information as stand-alone documents. At the discretion of the PM, required information may be combined into a single document, to the maximum extent practicable. If stand-alone documents are submitted, PMs shall not include redundant information in each document.

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<sup>1</sup> Department of Defense Directive 5000.4, OSD Cost Analysis Improvement Group, November 24, 1992 (Change 1).

## Part 6 **Periodic Reporting**

### **6.1 Purpose**

Periodic reports provide Milestone Decision Authorities (MDAs) with adequate information to oversee the acquisition process and make necessary decisions. Periodic reports shall be limited to only those required by the MDA or by statute. With the exception of those reports outlined in this Part, the scope and formality of reporting requirements shall be tailored by the MDA.

### **6.2 Cost, Schedule, and Performance Program Reports**

This Part establishes mandatory policies and procedures for accomplishing periodic and phase reporting by:

1. Evaluating program accomplishments and progress towards meeting cost, schedule, and performance goals.
2. Providing periodic reports to MDAs with adequate information to oversee the acquisition process.

#### **6.2.1 Acquisition Program Baseline Reporting**

Program Managers (PMs) shall maintain a current estimate of the program actually being executed and shall report the current estimate of each baseline parameter periodically, as requested, to the MDA. For Acquisition Category (ACAT) I and ACAT IA programs, this reporting shall be done quarterly in the Defense Acquisition Executive Summary (ACAT I) (see 6.2.2) or the Major Automated Information System (MAIS) Quarterly Report (ACAT IA) (see 6.2.3).

##### **6.2.1.1 Program Deviations**

A program deviation occurs when the PM has reason to believe that the current estimate of a performance, schedule, or cost parameter is not within the threshold value (as defined in 3.2.1) for that parameter. When a deviation occurs, the PM shall immediately notify the MDA that a program deviation has occurred. Within 30 days of the occurrence of the program deviation, the PM shall notify the MDA of the reason for the program deviation and the actions that need to be taken to bring the program back within the baseline parameters (if this information was not included with the original notification). Within 90 days of the occurrence of the program deviation: (1) the program shall be back within APB parameters; (2) a new APB (changing only those parameters that breached or are directly affected by the breached parameter) shall be approved; (3) or the PM shall have provided a date for the program to be back within APB parameters or for the submission of a new APB.

For ACAT ID and ACAT IAM programs, if one of these three actions has not occurred within 90 days of the program deviation, the Under Secretary of Defense (Acquisition and Technology (USD(A&T))), for ACAT ID programs, the ASD(C3I) for ACAT IAM programs, or the Component Acquisition Executive (CAE), for ACAT IC and ACAT IAC programs, shall require a formal program review to determine program status.

## **6.2.2 Defense Acquisition Executive Summary\* (DD-ACQ(Q) 1429).**

The purpose of the Defense Acquisition Executive Summary (DAES) report is to highlight both potential and actual program problems to the USD(A&T) before they become significant.

The PM shall propose for USD(A&T) consideration tailoring the content of the DAES Report for each program. At a minimum, the DAES is the vehicle for reporting program assessments, unit cost (**10 USC §2433<sup>1</sup>**), current estimates of the APB parameters (**10 USC §2435<sup>2</sup>**), status reporting of exit criteria, and vulnerability assessments (e.g. APB deviation) (**FMFIA<sup>3</sup>**).

The DAES shall present total costs and total quantities for all years as projected through the end of the acquisition phase. If not identified in the Future Years Defense Program (FYDP), best estimates for costs beyond the FYDP shall be provided in keeping with the concept of total program reporting. The total program concept refers to the entire weapon system acquisition process from concept exploration through production. In the case of programs that are subsystems to platforms and whose procurement is reported in the platform budget line, approved acquisition program funding for such subsystem programs shall be reported. Examples of these subsystem programs include command, control, communications, and intelligence (C3I) electronics, ship electronics suites, and strategic submarine missile weapons equipment that are essentially subsystems of a platform(s).

To facilitate the resolution of data item entry questions and the flow of administrative preparation instructions, DAES report focal points shall be established in the Office of the USD(A&T), the Offices of the DoD CAEs, the Offices of the Program Executive Officers (PEOs), and in the reporting PM's office.

### **6.2.2.1 DAES Reportable Designations**

The USD(A&T) shall designate which ACAT I programs must prepare DAES reports and assign each program to a quarterly reporting group. The PM shall prepare the report using Consolidated Acquisition Reporting System (CARS) (see Appendix I) and shall promptly submit one hard-copy and one disk to the USD(A&T) by the last working day of the program's designated quarterly reporting month. The DAES report shall not be delayed for any reason.

### **6.2.2.2 Out-of-Cycle DAES Reports**

There are two types of out-of-cycle DAES reports:

1. The PM shall submit a DAES report when there is reasonable cause to believe that a Nunn-McCurdy unit cost breach occurred or will occur (**10 USC §2433(c)<sup>4</sup>**). This requirement may be satisfied by submitting a partial DAES consisting of DAES sections 5, 6.2, and 7 (block #28).

2. If the program deviates from the approved APB thresholds as a result of submission of the Component's program objective memoranda (POM) or the budget estimate submission (BES), the PM shall submit a DAES Section 5., 6.2, and 8.

### **6.2.2.3 Consistency of Information with Other Documents and/or Reports**

The information submitted in the DAES report shall be consistent with that in the latest Acquisition Decision Memorandum (ADM) and Acquisition Program Baseline (APB), and other mandatory or approved program documentation.

\*Not applicable to ACAT IA programs.

### **6.2.3 Major Automated Information System Quarterly Report\* DD-C3I(Q) 1799**

The quarterly Major Automated Information System (MAIS) status reporting system is designed to provide executive management at the Component and OSD levels with the program status, progress, issues, risks, and risk reducers. The quarterly report is essential to the early identification of problems and associated plans to initiate corrective actions. The PM shall provide the report to the MDA in a timely manner to permit prompt action to address reported issues and problems.

The PM shall submit a quarterly report, through the PEO, in accordance with the format defined in Appendix V, for all designated ACAT IA programs. The PEO may add comments, but shall not change the PM's assessment. Components shall submit an original and four copies of the quarterly report for all ACAT IA programs, including delegated programs, within 30 days after the close of each quarter. For any ACAT IA program that has been canceled, fully deployed, or is operational, a final close-out report is required for the last reporting period. The initial MAIS Quarterly Status Report is due 30 days after the end of the quarter in which the ACAT IA program is designated a major AIS.

\*Not applicable to ACAT I programs.

### **6.2.4 Selected Acquisition Reports DD-COMP\* (Q&A) 823**

Selected Acquisition Reports (SARs) shall be prepared and submitted to Congress for all ACAT I programs, in accordance with **10 USC §2432<sup>5</sup>**. The SAR shall be prepared using CARS software.

#### **6.2.4.1 SAR Content and Submission**

The SAR provides the status of total program cost, schedule, and performance, as well as program unit cost and unit cost breach information; and, in the case of joint programs, the SAR shall include such information for all joint participants. Each SAR shall also include a full life-cycle cost analysis for the reporting program and its antecedent program.

The SAR for the quarter ending December 31 is called the annual SAR. Each annual (December) SAR, shall be submitted 60 days after the date on which the President transmits the budget to Congress for the following fiscal year. Annual SARs are mandatory for all programs that meet the reporting criteria.

SARs for the quarters ending March 31, June 30, and September 30 are submitted within 45 days after the fiscal year quarter. These quarterly SARs are reported on an exception basis when there has been a:

1. 15 percent or more increase in the current estimate of the Program Acquisition Unit Cost (PAUC) compared to the currently approved APB PAUC, or a 15 percent or more increase in the current estimate of the Average Procurement Unit Cost (APUC) compared to the currently approved APB APUC, both in base year dollars, or
2. six-month or greater delay in the current estimate of any schedule milestone since the current estimate reported in the previous SAR.

Limited reporting is allowed for pre-Milestone II programs. Such programs may submit Research, Development, Test and Evaluation (RDT&E)-only reports that exclude procurement, military construction, and acquisition-related operations and maintenance. DoD Components shall submit the names of those programs for which they intend to submit RDT&E-only SARs to the USD(A&T) 30 days before the end of the reporting quarter. The USD(A&T) will notify Congress 15 days before a report is due of the programs for which limited reports will be submitted.

Whenever the USD(A&T) proposes to make changes in the content of a SAR, the Under Secretary shall submit a notice of the proposed changes to the Committee on Armed Services of the Senate and the Committee on National Security of the House of Representatives. The changes shall be considered approved by the Under Secretary, and may be incorporated into the report, only after the end of a sixty day period beginning on the date on which notice is received by those committees.

#### **6.2.4.2 SAR Waivers**

The Secretary of Defense may waive the requirement for submission of SARs for a program for a fiscal year if:

1. The program has not entered engineering and manufacturing development;
2. A reasonable cost estimate has not been established for such program; and,
3. The system configuration for the program is not well defined.

As delegated by the Secretary of Defense, the USD(A&T) shall submit to the Committee on Armed Services of the Senate and the Committee on National Security of the House of Representatives a written notification of each waiver for a fiscal year not later than 60 days before the President submits the budget to Congress, pursuant to **31 USC §1105<sup>6</sup>** in that fiscal year.

#### **6.2.4.3 SAR Termination**

SAR termination shall be considered by the USD(A&T) when 90 percent of expected production deliveries or 90 percent of planned acquisition expenditures have been made, or when the program is no longer considered an ACAT I program in accordance with **10 USC §2430<sup>7</sup>**.

\*Not applicable to ACAT IA programs.

### **6.2.5 Unit Cost Reports (UCR) COMP\* (Q&AR) 1591**

With the exception of pre-Milestone II programs reporting RDT&E costs only, UCRs shall be prepared for all ACAT I programs for which SARs are submitted, in accordance with **10 USC §2433<sup>8</sup>**.

#### **6.2.5.1 Unit Cost Content and Submission**

Unit cost reporting shall begin with the submission of the initial SAR and shall terminate with the submission of the final SAR.

The PM shall on a quarterly basis, submit to the CAE a written report on the unit costs of the program. The written report shall be in the DAES. The report shall be provided to the DoD CAE by the last working day of the quarter in accordance with the DAES submission procedures.

The PM shall include in each report the following information:

1. The Current Estimate of the PAUC and the APUC (in base-year dollars).
2. The cost and schedule variances in dollars of the major contracts since the contract was entered into.
3. Any changes from program schedule milestones or program performance reflected in the currently approved APB that are known, expected, or anticipated by the PM .

#### **6.2.5.2 UCR Breaches**

The PM shall immediately submit a UCR to the CAE whenever the PM has reasonable cause to believe that:

1. The Current Estimate of either the PAUC or APUC (in base-year dollars) has increased by 15 percent or more over the PAUC or APUC of the currently approved APB (in base year dollars), respectively. This is a Congressionally reportable unit cost breach.
2. The cost of a major contract has increased at least 15 percent or more over the contract cost. This is an internal DoD reportable breach only.

If the CAE determines that there is an increase in the current estimate of the PAUC or APUC cost of at least 15 percent or more over the currently approved APB, the CAE shall inform the USD(A&T) and the DoD Component Head concerned.

If the Component Head concerned subsequently determines that there is, in fact, an increase in the Current Estimate of the PAUC or APUC of at least 15 percent over the currently approved APB, the Component Head shall notify Congress in writing of a breach within 45 days after the end of the quarter in the case of a quarterly report, or 45 days after the date of the report in the case of the reasonable cause report. In either case, the notification will include the date on which the Component Head's determination was made.

In addition, the Component Head shall submit a SAR for either the fiscal year quarter ending on or after the determination date, or for the fiscal year quarter that immediately precedes the fiscal year quarter ending on or after the determination date. This SAR will contain the additional, breach-related information.

If the current estimate of the PAUC or APUC increases by at least 25 percent over the currently approved APB, the USD(A&T) will submit a written certification to Congress before the end of the 30 day period beginning on the day the SAR containing the unit cost information is required to be submitted to Congress. The certification shall state that:

1. Such acquisition program is essential to the national security.
2. There are no alternative programs that will provide equal or greater military capability at less cost.
3. The new estimates of the PAUC or APUC are reasonable.
4. The management structure for the acquisition program is adequate to manage and control the PAUC and the APUC.

If the DoD Component Head makes a determination of either a PAUC or APUC 15 percent or more increase and a SAR containing the additional unit cost breach information is not submitted to Congress as required, or if the DoD Component Head makes a determination of a 25 percent increase in the PAUC or APUC and a certification of the USD(A&T) is not submitted to Congress as required, funds appropriated for RDT&E, procurement, or military construction may not be obligated for a major contract under the program. If an increase in the PAUC or APUC of 25 percent or more results from the termination or cancellation of an entire program, program certification by the USD(A&T) is not required.

\*Not applicable to ACAT IA programs.

#### **6.2.6 Annual T&E Oversight List**

An Annual T&E Oversight List of programs designated for OSD test and evaluation oversight shall be jointly published by the Director of Operational Test and Evaluation (DOT&E) and the Director of Test, Systems Engineering and Evaluation (TSE&E).

#### **6.2.7 Assessing Program Performance for ACAT I Programs\***

In the schedule portion of Section 5, Approved Program Data, of the DAES, the PM shall include in the DAES submission the dates for program initiation and initial operating capability (IOC). CARS software will automatically calculate the total time in number of months between those two dates.

Based on the data provided in the latest DAES report for each ACAT I program, the Director, Acquisition Program Integration (API) shall determine, at the end of each fiscal year, and for each program separately, if, as of the last day of the fiscal year, ten percent or less of the total aggregate number of cost, schedule, and performance parameters for that program are breached against the APB threshold. The Director, API shall also assess whether the average period for converting emerging technology to operational capability has decreased by 50 percent or more from the average period required for such conversion as of October 13, 1994. A similar determination and assessment shall be made by each MDA for other than ACAT I programs for which the MDA has oversight. If that determination shows that more than 10 percent of the aggregate number of parameters for an acquisition program are breached or if the assessment finds that the average period of converting technology has not decreased by 50 percent, the MDA shall report that determination and assessment to the Director, API by November 1 of each year. A summary of these determinations and assessments shall be included in the Secretary of Defense Annual report to Congress, in accordance with **10 USC §2220(b)<sup>9</sup>**. As of October 13, 1994, the average period between program initiation and IOC was 115 months. This number was derived from varied commodities (aircraft, C3I systems, missiles, rockets, satellites, ships, tracked vehicles, and wheeled vehicles), with some requiring more time and some less.

If the Director, API determines that more than 10 percent of the total aggregate number of cost, schedule, and performance parameters for an ACAT I program are in a breach status, the appropriate CAE, and for ACAT ID programs, the appropriate Overarching Integrated Product (OIPT) Leader, or a delegated representative, shall conduct a timely review of the affected ACAT I program. In conducting that review, the CAE and the OIPT Leader, together with the ViceChairman of the Joint Chiefs of Staff (VCJCS), shall determine whether there is a continuing need for the program that is sufficiently behind schedule, over budget, or not in compliance with performance or capability requirements, and shall recommend to the USD(A&T) suitable actions to be taken, including termination, with respect to such program (**10 USC §2220(c)<sup>10</sup>**).

\*Not applicable to ACAT IA programs.

### **6.3 Test and Evaluation Reports**

This section describes mandatory procedures for required test and evaluation reports.

#### **6.3.1 DoD Component Reporting of Test Results**

ACAT I and ACAT IA programs and other programs designated for OSD test and evaluation oversight require test results reporting.

Formal detailed developmental, operational and live fire test and evaluation reports of the results, conclusions, and recommendations shall be prepared at the end of each testing phase. Copies shall be provided to the DOT&E and DTSE&E. For those reports supporting a milestone or other acquisition decision, the reports shall generally be submitted 45 days in advance of that milestone or decision. Test data shall be made available to the DTSE&E and the DOT&E as testing progresses to support timely preparation of the required reports to Congress.

All developmental and operational evaluation agencies shall identify test limitations and report an assessment of the effect of these limitations on system performance and the resulting

effect on the ability of the evaluation agency to assess whether the system tested met technical performance (developmental test and evaluation) or minimum acceptable operational performance requirements (operational test and evaluation).

### **6.3.2 Live Fire Test and Evaluation Report\***

An independent OSD Live Fire Test and Evaluation Report shall be prepared by the DOT&E within 45 days after receipt of the DoD Component's Live Fire Test Report. The Secretary of Defense (or the DOT&E if so delegated) shall approve the OSD Live Fire Test and Evaluation Report and submit the report to Congress prior to the decision to proceed beyond low-rate initial production. The report shall address survivability or lethality testing in the following cases:

1. Realistic survivability testing of ACAT I and II covered systems programs or covered product improvement programs (see 3.4.9 above, for definition of a "covered major program").
2. Realistic lethality testing of ACAT I and II major munitions programs, missile programs, or major munitions or missile covered product improvement programs.
3. Realistic lethality testing of a major munitions program for which more than 1 million rounds (which may be less than an ACAT II program) are planned to be acquired.

\* Not applicable to ACAT IA programs.

### **6.3.3 Beyond Low-Rate Initial Production Report\***

Before an ACAT I or DOT&E-designated program can proceed beyond low-rate initial production, the DOT&E, shall submit a written report to the Secretary of Defense and Congress. This report is required by **10 USC §2399**<sup>11</sup>. This report shall assess:

1. The adequacy of conducted operational test and evaluation, and
2. Whether the test and evaluation results confirm that the items or components tested are operationally effective and suitable for use in combat.

\*Not applicable to ACAT IA programs.

### **6.3.4 Foreign Comparative Test Notifications and Reports to Congress\***

The DTSE&E shall notify Congress a minimum of 30 days prior to the commitment of funds for initiation of new Foreign Comparative Test evaluations. These notifications shall be submitted to the House National Security Committee, the Senate Armed Services Committee, and the Appropriations Committees of the Senate and the House of Representatives. This notification is required by **10 USC §2350a(g)**<sup>12</sup>.

The USD(A&T), as delegated by the Secretary of Defense, shall include the following information in the biennial report to Congress required by **10 USC §2457(d)**<sup>13</sup>:

1. The foreign non-developmental equipment, software, munitions, and technologies evaluated under **10 USC §2350a(g)**<sup>14</sup> and

- (a) developed by allies of the United States and other friendly countries that completed test and evaluation against Service requirements during the previous fiscal year;
  - (b) procured by the Services during the previous fiscal year as a result of successful test and evaluation; and,
  - (c) selected to initiate and/or continue evaluation in the current fiscal year.
2. The obligation of any funds under **10 USC §2350a(g)**<sup>15</sup> for test and evaluation of foreign non-developmental items during the previous fiscal year.

\* Not applicable to ACAT IA programs.

### **6.3.5 Electronic Warfare (EW) Test and Evaluation Reports**

Designated Electronic Warfare programs shall report annually their compliance with the EW Test and Evaluation Process. Report applicability, submission format, and date are contained in the DoD EW plan.

### **6.3.6 Annual Operational Test and Evaluation Reports\***

The DOT&E shall prepare an annual and live fire test and evaluation activities report, in both classified and unclassified form, summarizing all operational test and evaluation and live fire test and evaluation activities within the DoD during the preceding fiscal year. Each such report shall be submitted concurrently to the Secretary of Defense, the USD(A&T), and Congress not later than 10 days after transmission of the President's Budget for the next fiscal year to Congress. This report is required by **10 USC §139**<sup>16</sup>.

USD(A&T) shall report to Congress on the cooperative R&D projects under 10 USC 2350a not later than March 1 of each year. This shall include descriptions of projects, funding, schedules and status both for projects in which the Memoranda of Understanding have been entered into and for proposed projects (**10 USC 2350a(f)**<sup>17</sup>).

\*Not applicable to ACAT IA programs.

## **6.4 Contract Management Reports\***

The reports prescribed by this section shall be used for all applicable defense contracts and are required for effective management of defense acquisitions. Use of electronic media shall be required. The Work Breakdown Structure (WBS) used in preparing the reports covered by this section shall be in conformance with the program WBS (see 4.4.1). Except for high-cost or high-risk elements, the normal level of reporting detail required shall be limited to level three of the contract WBS.

\*Not normally applicable to ACAT IA programs due to the lower dollar value of ACAT IA contracts.

### **6.4.1 Contractor Cost Data Reporting (CCDR)**

Contractor Cost Data Reports (CCDRs) are DoD's primary means of collecting data on

the costs that DoD contractors incur in performing DoD programs. Collection of this data is critical to establishing reasonable estimates of the costs of ACAT I programs, and to other analytical requirements. CCDR coverage shall be from the point of commitment to engineering and manufacturing development through the completion of production in accordance with procedures described in this section. CCDR is also required on advanced development prototype programs.

For CCDR purposes, two categories of procedures are established. Category I procedures apply to all ACAT I programs. Category II procedures apply to selected contracts or to specific line items within Category I. CCDR will not be required on contracts below \$2.4 million (FY 1996 constant dollars).

Unless waived by the Chair, Cost Analysis Improvement Group (CAIG), reporting shall be required on firm fixed price (FFP) contracts or subcontracts when those contracts represent a major share of the research and development or production of a Category I program or component of a Category I program.

CCDR reporting is not required for procurement of commercial systems or for non-commercial systems that are bought under FFP contracts that were competitively awarded (as long as competitive conditions continue to exist). CCDR reporting is required for development contracts, contracts for first class items (such as a lead ship), or low rate initial production.

1. For ACAT I programs, the CCDR plan shall be provided as part of the IPT process to the Chair, CAIG for approval. CCDR approval should be accomplished early, preferably before issuance of a solicitation to industry for advanced development prototype or engineering development contracts. The Contractor Cost Data plan reflects the proposed collection of cost data for a program. The plan shall provide this information by WBS and shall describe the report forms to be used and the reporting frequency.

2. For programs covered under Category II procedures, CCDR plans shall be reviewed and approved in time for the data requirements to be included in the Request for Proposal for the contract on which they will be awarded.

Each DoD component shall designate, by title, an official who shall:

1. Ensure that policies and procedures are established for implementation of CCDR in accordance with this section, including storage of CCDR data and their distribution to appropriate DoD officials.

2. Ensure that all CCDR plans for ACAT I programs, including any changes, are reviewed and concurred in for compliance with CCDR plans and the program WBS, and are forwarded to the CAIG.

3. Advise the Chair, CAIG annually of the status of all acquisition programs for which CCDR plans are approved for implementation, and any delinquencies or deficiencies in CCDR and the action(s) being taken to remedy these delinquencies or deficiencies.

The need for field reviews of contractor implementation of CCDR shall be assessed annually. The Chair, CAIG is responsible for prescribing a format for submission of CCDRs, implementing policies pertaining to the CCDR system, and monitoring its implementation to ensure consistent and appropriate application throughout the DoD.

The following general policies guide the preparation and submission of CCDR data:

1. Level of Cost Reporting. Routine reporting will be at the contract WBS level three for prime contractors and key subcontractors. In addition, detailed (i.e., sub level three) reporting will be required only for those lower elements that address high risk, high value, or high technological interest areas of a program. Identifying these additional elements is a critical early assignment for program Cost Program-level IPT (which may include contractor membership, where appropriate and in accordance with applicable statutes (see 3.3.1)). Each element must be justified in terms of its contribution to efficient decision-making.

2. Frequency. CCDRs are fundamentally a “returned” (or actual) cost reporting system and, as such, do not generally need to be filed while work is still pending. Thus, for production, CCDR reports shall be submitted upon the delivery of each annual lot. Developmental contracts are an exception. While the frequency of reports on these contracts will be defined by the needs of the program for cost data, at a minimum, CCDRs will be filed after major events (e.g., first flight or completion of prototype lot fabrication) or before major milestone reviews. In general, quarterly or annual reporting requirements do not meet the above requirements.

Tailoring the CCDR plan and appropriately defining the program WBS are key to achieving a cost-effective reporting system. Hardware system contractors shall participate early in the program Cost Program-level IPT. The contractors often will have suggestions that reduce reporting costs while preserving the utility of the data for the government.

#### **6.4.2 Cost Performance Report (CPR) DID DI-MGMT-81466 (DoD 5010.12-L<sup>18</sup>)**

The CPR DD Form 2734/1, 2734/2, 2734/3, 2734/4, and 2734/5 shall be used to obtain contract cost and schedule performance information for use in making and validating program management decisions. This report provides early indicators of contract cost and schedule problems and the effects of management action taken to resolve problems affecting cost and schedule performance.

1. CPRs shall be required on all contracts that require compliance with the Cost/Schedule Control Systems Criteria (C/SCSC) (see 3.3.4.3 and Appendix VI).
2. CPRs may be required on flexibly-priced (for example, fixed-price incentive or cost type) contracts that do not require compliance with the C/SCSC, but on which the DoD Components requires more data than is available on the Cost/Schedule Status Report (see 6.4.3). Such applications shall not be used in lieu of a valid

Cost/Schedule Control Systems Criteria requirement. CPR formats, level of detail, frequency, and variance analysis shall be limited to the minimum necessary for effective management control.

3. CPRs shall not be required on firm fixed price contracts unless unusual circumstances require cost and schedule visibility.
4. Data reported on the CPR shall be summarized directly from the same systems used for internal contractor management.
5. The CPR is subject to tailoring to require less data. All reporting provisions shall be negotiated and specified in the contract, including reporting frequency, variance analysis requirements, and the Contract WBS to be reported. The CPR is intended to be a primary means of communication between the contractor and the PM to report cost and schedule trends to date, and permit assessment of their likely affect on future performance on the contract.

#### **6.4.3 Cost/Schedule Status Report (C/SSR) DID DI-MGMT-81467 (DoD 5010.12-L<sup>19</sup>)**

The C/SSR DD Form 2735 shall be used to obtain contract cost and schedule performance information on contracts over 12 months in duration where application of the CPR is not appropriate. No specific application thresholds are established; however, application to contracts of less than \$6 million (FY 1996 constant dollars) shall be evaluated carefully to ensure that only the minimum information necessary for effective management control is required. The C/SSR shall not be required on firm fixed price contracts unless unusual circumstances require cost and schedule visibility.

#### **6.4.4 Contract Funds Status Report (CFSR) DI-MGMT-81468 (DoD 5010.12-L<sup>20</sup>)**

The CFSR, **DD Form 1586**, shall be used to obtain funding data on contracts over six months in duration. The CFSR provides DoD Components with information to assist in updating and forecasting contract fund requirements, planning and decision making on funding changes, developing fund requirements and budget estimates in support of approved programs, and determining funds in excess of contract needs and available for deobligation.

No specific application thresholds are established; however, application to contracts of less than \$1.2 million (FY 1996 constant dollars) shall be evaluated carefully to ensure that only the minimum information necessary for effective management control is required. The CFSR shall not be applied on firm fixed price contracts unless unusual circumstances require specific funding visibility.

1. CFSR may be applied to unpriced portions of firm fixed price contracts that individually or collectively are estimated by the DoD Component to be in excess of 20 percent of the initial contract value.
2. In such cases, the contract shall delineate any specific CFSR requirements to be imposed on the contractor to fit the individual circumstances.

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<sup>1</sup> Title 10, United States Code, Section 2433, Unit cost reports

<sup>2</sup> Title 10, United States Code, Section 2435, Baseline description

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- <sup>3</sup> Federal Managers Financial Integrity Act of 1982, Public Law 97-255
- <sup>4</sup> Title 10, United States Code, Section 2433, Unit cost reports
- <sup>5</sup> Title 10, United States Code, Section 2432, Selected Acquisition Reports
- <sup>6</sup> Title 31, United States Code, Section 1105, Budget contents and submission to Congress
- <sup>7</sup> Title 10, United States Code, Section 2430, Major defense acquisition program defined
- <sup>8</sup> Title 10, United States Code, Section 2433, Unit cost reports
- <sup>9</sup> Title 10, United States Code, Section 2220(b), Performance based management: acquisition programs, Annual Reporting Requirement
- <sup>10</sup> Title 10, United States Code, Section 2220(c), Performance based management: acquisition programs, performance evaluation
- <sup>11</sup> Title 10, United States Code, Section 2399, Operational test and evaluation of defense acquisition programs
- <sup>12</sup> Title 10, United States Code, Section 2350, Side-by-Side Testing
- <sup>13</sup> Title 10, United States Code, Section 2457, Standardization of equipment with North Atlantic Treaty Organization members
- <sup>14</sup> Title 10, United States Code, Section 2350a(g), Side-by-side Testing
- <sup>15</sup> Title 10, United States Code, Section 2350a(g), Side-by-side Testing
- <sup>16</sup> Title 10, United States Code, Section 139, Director of Operational Test and Evaluation
- <sup>17</sup> Title 10, United States Code, Section 2350a(f), Cooperative research and development projects: allied countries
- <sup>18</sup> Department of Defense 5010.12-L, Acquisition Management Systems and Data Requirements Control List, October 1993
- <sup>19</sup> Department of Defense 5010.12-L, Acquisition Management Systems and Data Requirements Control List, October 1993
- <sup>20</sup> Department of Defense 5010.12-L, Acquisition Management Systems and Data Requirements Control List, October 1993

**DoD Regulation 5000.2-R**

**Appendices**

# DoD 5000.2-R Appendices

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\* Not applicable to ACAT IA programs  
\*\* Normally not applicable to ACAT IA programs  
\*\*\* Not applicable to ACAT I programs

## DoD Regulation 5000.2-R

### Appendix I

# Consolidated Acquisition Reporting System Mandatory Procedures and Formats

CARS is a personal computer-based data entry and reporting software package that maintains and reports information on defense programs. Its use is required for all major defense acquisition programs (MDAPs), but may also be used for non MDAP programs. The system consists of three reporting modules that generate the Acquisition Program Baseline (APB), the Selected Acquisition Report (SAR), and the Defense Acquisition Executive Summary (DAES). The Unit Cost Report, an additional statutory requirement, is included in the DAES. CARS also includes some analysis routines (such as the Computational Module that supports the SAR cost change calculations), and SAR and DAES data checks. A CARS Help Line is maintained to support CARS users.

Use of CARS is controlled by a unique program number identification system, which is assigned to each using program by the OUSD(A&T) focal point. Except for narrative/memo type information, the format of the APB, SAR, and DAES is specified by the CARS software.

Some, but not all, of the information is shared between the three reporting modules. This includes the Acquisition Program Baseline, which is reported in the DAES and the SAR, and certain contract information. Some of the information in CARS, such as the SAR and Acquisition Program Baseline, can only be edited by the appropriate OUSD(A&T) or Component focal point. Changes in this information must be approved by the appropriate milestone decision authority. A disk containing the revised/new information is distributed by the appropriate OUSD(A&T) or Component focal point.

The development and maintenance of CARS and upgrades to the system are the responsibility of the OUSD(A&T)API. Questions, including requests for copies of the software, should be directed to that organization. Instructions for preparing the SAR, DAES, and APB and sample reports for the SAR and DAES are provided in the automated Acquisition Deskbook. A sample APB format is attached.

# **SAMPLE APB FORMAT TO BE PROVIDED**

## Appendix II

# Operational Requirements Document Mandatory Procedures and Format

### Introduction and Purpose

This Appendix provides the mandatory format for the Operational Requirements Document (ORD) for ACAT I and IA programs, as mandated by this Regulation and CJCS MOP-77. The ORD is a formatted statement containing operational performance parameters for the proposed concept or system.

Each concept proposed at Milestone I for continued evaluation in later phases will be described in an initial ORD in terms that define the system capabilities needed to satisfy the mission need. The operational performance parameters in the initial ORD shall be tailored to the concept (e.g., satellite, aircraft, ship, missile, or weapon, etc.) and reflect system-level performance capabilities such as range, probability of kill, platform survivability, operational availability, etc. Objectives should also be established for each parameter, and shall represent a measurable, beneficial increment in operational capability or operations and support.

### Preparation and Submittal

The ORD shall be initially prepared by the user or user's representative. The Service Chief of Staff or his/her designated representative (or DoD Component Head if not a Service) shall approve the ORD prior to each milestone decision point and submit it to the DoD Component Acquisition Executive or appropriate milestone decision authority to be used in the preparation of program documentation such as baselines and specifications. For acquisition category I D programs, the Joint Requirements Oversight Council will designate the approval authority for the ORD.

### Mandatory Format

The mandatory ORD format begins on the next page.

## **Mandatory Format**

# **OPERATIONAL REQUIREMENTS DOCUMENT**

## **FOR**

## **PROGRAM TITLE**

1. **General Description of Operational Capability.** Describe the overall mission area, the type of system proposed, and the anticipated operational and support concepts in sufficient detail for program and logistics support planning. Include a brief summary of the mission need. If a documented mission need did not precede the Operational Requirements Document, explain the process that investigated alternatives for satisfying the mission need and developing operational requirements.

2. **Threat.** Summarize the threat to be countered and the projected threat environment. This threat information should reference Defense Intelligence Agency or Service Technical Intelligence Center-approved documents and be validated by the Service Intelligence Director. For major defense acquisition programs (ACAT I), reference the Defense Intelligence Agency (DIA)-validated threat assessment. In some non-warfighting systems, the threat may be listed as not applicable.

3. **Shortcomings of Existing Systems.** Describe why existing systems cannot meet current or projected requirements (do not describe a proposed system).

4. **Capabilities Required.** Identify operational performance parameters (capabilities and characteristics) required. Articulate requirements in operational, output-oriented, and measurable terms. Specify each performance parameter in terms of a minimum acceptable value (threshold) required to satisfy the mission need. Objectives, if stated, should represent a measurable, beneficial increase in capability or operations and support above the threshold.

a. **System Performance.** Describe mission scenarios (wartime and peacetime, if different) in terms of mission profiles, employment tactics, countermeasures, and environmental conditions (all inclusive: natural and man-made, e.g., weather, ocean acoustics, information warfare, etc.). Identify system performance parameters such as range, accuracy, payload, speed, mission reliability, etc. Recommend which parameter should be considered a key performance parameter.

b. **Logistics and Readiness.** Include measures for mission-capable rate, operational availability, frequency and duration of preventive or scheduled maintenance actions, etc. Describe in terms of mission requirements considering both wartime and peacetime logistics operations. Identify combat support requirements including battle damage repair capability, mobility requirements, expected maintenance levels, and surge and mobilization objectives and capabilities.

c. **Other System Characteristics.** A special category of characteristics that tend to be design, cost and risk drivers. Address electronic counter-countermeasures (ECCM) and Wartime Reserve Modes (WARM) requirements; conventional, initial nuclear weapons effects, and nuclear, biological, and chemical contamination (NBCC) survivability; natural environmental factors (such as climatic, terrain, and oceanographic

factors); unplanned stimuli (such as fast cook-off, bullet impact, and sympathetic detonation); and electromagnetic environmental effects (E3) and spectrum certification and supportability for systems and equipment. Identify characteristics (confidentiality, integrity, accuracy, timeliness, and availability) to defend against and survive information warfare attack. Define the expected mission capability (e.g., full, percent degraded, etc.) in the various environments. Include applicable safety parameters such as those related to system, nuclear, explosive, and flight safety. Identify communications, information, and physical and operational security needs.

5. Program Support. Establish support objectives for initial and full operational capability. Discuss interfacing systems (at the system/subsystem, platform, and force levels), specifically those related to command, control, communications, computers, and intelligence (C4I), transportation and basing, and standardization and interoperability. Identify companion Operational Requirements Documents and other Services that may have similar requirements. Assign a joint potential designation (joint, joint interest, or independent).

a. Maintenance Planning. Identify maintenance tasks to be accomplished and time phasing for all levels of maintenance. Include programmed maintenance and surveillance inspections such as nuclear hardness and structural integrity. Describe the envisioned planning approach for contract versus organic repair.

b. Support Equipment. Define the standard support equipment to be used by the system. Describe the test and fault isolation capabilities desired of automatic test equipment at all levels, expressed in terms of realistic and affordable probabilities and confidence levels.

c. Human Systems Integration. Address HSI domains to include: Establish broad manpower constraints for operators, maintainers, and support personnel. Identify requirements for manpower factors that impact system design (utilization rates, pilot-to-seat ratios, maintenance ratios). Establish broad cognitive, physical, and sensory requirements for the operators, maintainers, or support personnel that contribute to, or constrain, total system performance. Establish requirements for human performance that will achieve effective human-system interfaces. Identify requirements for combining, modifying, or establishing new military occupational specialties. Broadly describe the training concept to include requirements for simulators, training devices, embedded training, and training logistics. Include safety or health and critical errors that reduce job performance or system effectiveness given the operational environment. Determine objectives and thresholds for the above requirements, as appropriate.

d. Computer Resources. Identify computer resource constraints (examples include language, computer, data base, architecture, or interoperability constraints). Address all mission critical and support computer resources, including automated test equipment. Describe the capabilities desired for integrated computer resources support. Identify any unique user interface requirements, documentation needs, and special software certifications.

e. Other Logistics Considerations. Describe the provisioning strategy for the system. Specify any unique facility, shelter or environmental compliance requirements. Identify special packaging, handling, and transportation considerations. Define unique

data requirements such as engineering data for depot support and technical orders for the system and depot.

f. Command, Control, Communications, Computers, and Intelligence. Describe how the system will be integrated into the command, control, communications, computers and intelligence architecture that is forecast to exist at the time the system will be fielded. Include data and data fusion requirements (data, voice, video), computer network support, and antijam requirements. Identify unique intelligence information requirements, including intelligence interfaces, communications, and data base support pertaining to target and mission planning activities, threat data, etc.

g. Transportation and Basing. Describe how the system will be moved either to or within the theater. Identify any lift constraints. Detail the basing requirements (main and forward operating bases) and associated facilities needed for training.

h. Standardization, Interoperability, and Commonality. Describe considerations for joint use, NATO cross-servicing, etc. Identify procedural and technical interfaces, and communications, protocols, and standards required to be incorporated to ensure compatibility and interoperability with other Service, joint Service, and Allied systems. Address energy standardization and efficiency needs for both fuels and electrical power as applicable.

i. Mapping, Charting, and Geodesy Support. Identify cartographic materials, digital topographic data, and geodetic data needed for system employment. Where possible, Defense Mapping Agency standard military data will be used.

j. Environmental Support. Identify the standard and unique weather, oceanographic, and astrophysical support required. Include data accuracy and forecast requirements.

6. Force Structure. Estimate the number of systems or subsystems needed, including spares and training units. Identify units or platforms and quantities of these platforms (including other Services' or Government agencies' if appropriate) that will employ the systems or subsystems being developed and procured to satisfy this Operational Requirements Document.

7. Schedule Considerations. Define what actions, when complete, will constitute attainment of Initial and Full Operational Capability (leave flexible for these to be revised as the program is progressively defined and trade-off studies are completed). Clearly specify the operational capability or level of performance necessary to declare Initial and Full Operational Capability. Include the number of operational systems, operational and support personnel, facilities, and organizational, intermediate, and depot support elements that must be in place. If availability in a specific timeframe is important, specify an objective for initial operational capability. Describe the impact if this objective is not achieved and identify a window of acceptability if appropriate.

## Appendix III

# Test and Evaluation Master Plan Mandatory Procedures and Format

### Introduction and Purpose

This Appendix provides the procedures and formats to implement the requirements of Title 10, United States Code, Section 2399(b)(1), "Operational Test and Evaluation." The Test and Evaluation Master Plan (TEMP) documents the overall structure and objectives of the test and evaluation program. It provides a framework within which to generate detailed test and evaluation plans and it documents schedule and resource implications associated with the test and evaluation program. The TEMP identifies the necessary developmental test and evaluation, operational test and evaluation, and live fire test and evaluation activities. It relates program schedule, test management strategy and structure, and required resources to: (1) Critical operational issues; (2) Critical technical parameters; (3) Objectives and thresholds derived from the Operational Requirements Document (ORD); (4) Evaluation criteria; and (5) Milestone decision points.

For multi-Service or joint programs, a single integrated TEMP is required. Component-unique content requirements, particularly evaluation criteria associated with critical operational issues, can be addressed in a Component-prepared annex to the basic TEMP.

For a program consisting of a collection of individual systems, a Capstone TEMP integrating the test and evaluation program for the entire system is required. Individual system-unique content requirements are to be addressed in an annex to the basic Capstone TEMP. The requirement for a Capstone TEMP is dependent upon the degree of integration and interoperability required to satisfy the total system's objectives and thresholds. Capstone TEMPs use may not be appropriate for major weapon platforms (major defense acquisition programs).

### Preparation and Submittal

For Acquisition Category (ACAT) I and IA programs, and other programs designated for OSD test and evaluation oversight, TEMPs should be developed through the IPT process. TEMPs for ACAT I programs shall be submitted to the Director, Test, Systems Engineering and Evaluation (DTSE&E) for OSD approval 30 days prior to first milestone review (excluding Milestone 0) of the program. For other programs designated for OSD T&E oversight, TEMPs shall be submitted within 90 days of such designation.

Multi-Service for Joint Programs. The lead Component is responsible for preparation and coordination of the TEMP. Approval signatures on the TEMP signature page are required for the lead Component as well as all other participating DoD Components.

Requirement for Other DoD Component Coordination. Where a program of any Component must interface with other Components during development and testing or where it will interface operationally with the systems of other Components, coordination of the affected Components must be obtained and indicated in the TEMP before it is submitted to the DTSE&E.

TEMP Updates. Update the TEMP at milestones, when the program baseline has been breached, or on other occasions when the program has changed significantly. Updates may be made by use of "correction pages."

Review and Approval. The Director of Operational Test and Evaluation (DOT&E) and DTSE&E will be the Office of the Secretary of Defense TEMP approval authorities for acquisition category I and IA programs and those other acquisition category programs designated for Office of the Secretary of Defense test and evaluation oversight. Formal submission of the TEMP to DTSE&E for OSD approval shall be accomplished no later than 30 days before the Milestone Review, unless otherwise agreed to in the IPT.

Circumstances When a TEMP Is No Longer Required. When a program's development is completed and critical operational issues are satisfactorily resolved, including the verification of deficiency corrections, TEMP updates are no longer required. The following attributes are examples for which an updated TEMP submission may no longer be required:

1. Fully deployed system with no operationally significant product improvements or block modification efforts.
2. Full production ongoing and fielding initiated with no significant deficiencies observed in production qualification test results.
3. Partially fielded system in early production phase having successfully accomplished all developmental and operational test objectives.
4. Programs for which planned test and evaluation is only a part of routine aging and surveillance testing, service life monitoring, or tactics development.
5. Programs for which no further operational testing or live fire testing is required by any DoD Component.
6. Program for which future testing (e.g., product improvements or block upgrades) has been incorporated in a separate TEMP (e.g., an upgrade TEMP).

### **Mandatory Format**

The mandatory TEMP format begins on the next page.

**TEST AND EVALUATION MASTER PLAN**

**FOR**

**PROGRAM TITLE/SYSTEM NAME**

Program Elements

Xxxxx

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**SUBMITTED BY**

\_\_\_\_\_  
Program Manager

\_\_\_\_\_  
DATE

**CONCURRENCE**

\_\_\_\_\_  
Program Executive Officer  
or Developing Agency (if not under the PEO structure)

\_\_\_\_\_  
DATE

\_\_\_\_\_  
Operational Test Agency

\_\_\_\_\_  
DATE

\_\_\_\_\_  
User's Representative

DATE \_\_\_\_\_

**COMPONENT APPROVAL**

\_\_\_\_\_  
Component Test and Evaluation Director

\_\_\_\_\_  
DATE

\_\_\_\_\_  
DoD Component Acquisition Executive (ACAT I)  
Milestone Decision Authority (for less-than-ACAT I)

DATE \_\_\_\_\_

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**OSD APPROVAL**

(ACAT I and other programs designated for OSD test and evaluation oversight)

\_\_\_\_\_  
Director, Operational Test  
and Evaluation

DATE \_\_\_\_\_

\_\_\_\_\_  
Director, Test Systems  
Engineering and Evaluation  
OUSD (A&T)

## **Mandatory TEMP Format and Content**

### 1. **PART I--SYSTEM INTRODUCTION**

- a. **Mission Description.** Reference the Mission Need Statement or briefly summarize the mission need described therein.
- b. **System Threat Assessment.** Reference the system threat assessment and briefly summarize the threat environment described therein.
- c. **Measures of Effectiveness and Suitability.** List the performance (operational effectiveness and suitability) capabilities and characteristics identified as required in the ORD. The critical operational effectiveness and suitability parameters and constraints include manpower, personnel, training, software, computer resources, transportation (lift), compatibility, interoperability and integration, etc. For each listed required capability or characteristic, provide the minimum acceptable value and the objective from the ORD. If the Operational Test Agency (OTA) or the DOT&E determines that the required capabilities and characteristics contained in the ORD provide insufficient criteria for an adequate OT&E, the OTA or DOT&E shall propose additional criteria through the IPT process. Upon receipt of such a proposal, the ORD approval authority shall establish the level of required performance characteristics.
- d. **System Description.** Briefly describe the system design, or reference another program document that includes the following items:
  - (1) Key features and subsystems, both hardware and software (such as architecture, interfaces, security levels, reserves, etc.), allowing the system to perform its required operational mission.
  - (2) Interfaces with existing or planned systems that are required for mission accomplishment. Address relative maturity and integration and modification requirements for nondevelopmental items. Include interoperability with existing and/or planned systems of other DoD Components or allies.
  - (3) Critical system characteristics or unique support concepts resulting in special test and analysis requirements (e.g., post deployment software support, hardness against nuclear effects; resistance to countermeasures; development of new threat simulation, simulators, or targets).
- e. **Critical Technical Parameters**
  - (1) List in a matrix format the critical technical parameters of the system (including software maturity and performance measures) that have been evaluated or will be evaluated during the remaining phases of developmental testing. Critical technical parameters are derived from the ORD, critical system characteristics and technical performance measures and should include the parameters in the Acquisition Program Baseline. Discuss the relationship between the critical technical parameters and the objectives and thresholds in the ORD.
  - (2) Next to each technical parameter, list the accompanying objectives and thresholds.

- (3) Highlight critical technical parameters that must be demonstrated before entering the next acquisition or operational test phase and ensure that the actual values that have been demonstrated to date are included in the last column.
- (4) Compatibility, interoperability, and integration (CII) issues critical to the operational effectiveness of suitability of the system must be addressed in the user's effectiveness critical operational issues (COI) and associated criteria. Measures of effectiveness (MOEs) and measures of performance (MOPs) developed for each interoperability COI must be stated. Evaluation criteria and data requirements for each interoperability-related MOE/MOP must be clearly defined.

## 2. PART II--INTEGRATED TEST PROGRAM SUMMARY

### a. Integrated Test Program Schedule

- (1) Display on a chart the integrated time sequencing of the critical test and evaluation phases and events, related activities, and planned cumulative funding expenditures by appropriation.
- (2) Include event dates such as milestone decision points; operational assessments, test article availability; software version releases; appropriate phases of developmental test and evaluation; live fire test and evaluation, and operational test and evaluation; low rate initial production deliveries; Full Rate Production deliveries; Initial Operational Capability; Full Operational Capability; and statutorily required reports, such as the Live-Fire T&E Report and Beyond-LRIP Report.
- (3) A single schedule should be provided for multi-Service or Joint and Capstone TEMP's showing all DoD Component system event dates.

### b. Management

- (1) Discuss the test and evaluation responsibility of all participating organizations (developers, testers, evaluators, users).
- (2) Provide the date (fiscal quarter) when the decision to proceed beyond low-rate initial production is planned. (Low-rate initial production quantities required for operational test must be identified for approval by the Director of Operational Test and Evaluation prior to Milestone II for acquisition category I programs and other acquisition category programs designated for Office of the Secretary of Defense test and evaluation oversight).

## 3. PART III--DEVELOPMENTAL TEST AND EVALUATION OUTLINE

- a. Developmental Test and Evaluation Overview. Explain how developmental test and evaluation will: verify the status of engineering and manufacturing development progress; verify that design risks have been minimized; and substantiate achievement of contract technical performance requirements; and be used to certify readiness for dedicated operational test. Specifically, identify:

- (1) Any technology/subsystem that has not demonstrated its ability to contribute to system performance and ultimately fulfill mission requirements.

- (2) The degree to which system hardware and software design has stabilized so as to reduce manufacturing and production decision uncertainties.
  - b. Future Developmental Test and Evaluation. Discuss all remaining developmental test and evaluation that is planned, beginning with the date of the current TEMP revision and extending through completion of production. Place emphasis on the next phase of testing. For each phase, include:
    - (1) Configuration Description. Summarize the functional capabilities of the system's developmental configuration and how they differ from the production model.
    - (2) Developmental Test and Evaluation Objectives. State the test objectives for this phase in terms of the critical technical parameters to be confirmed. Identify any specific technical parameters that the milestone decision authority has designated as exit criteria and/or directed to be demonstrated in a given phase of testing.
    - (3) Developmental Test and Evaluation Events, Scope of Testing, and Basic Scenarios. Summarize the test events, test scenarios and the test design concept. Quantify the testing (e.g., number of test hours, test events, test firings). List the specific threat systems, surrogates, countermeasures, component or subsystem testing, and testbeds the use of which are critical to determine whether developmental test objectives are achieved. As appropriate, particularly if an agency separate from the test agency will be doing a significant part of the evaluation, describe the methods of evaluation. List all models and simulations to be used, explain the rationale for their credible use and provide their source of verification, validation and accreditation (VV&A). Describe how performance in natural environmental conditions representative of the intended area of operations (e.g., temperature, pressure, humidity, fog, precipitation, clouds, blowing dust and sand, icing, wind conditions, steep terrain, wet soil conditions, high sea state, storm surge and tides, etc.) and interoperability and compatibility with other weapon and support systems, as applicable, to include unplanned stimuli, will be tested.
    - (4) Limitations. Discuss the test limitations that may significantly affect the evaluator's ability to draw conclusions, the impact of these limitations, and resolution approaches.
4. PART IV--OPERATIONAL TEST AND EVALUATION OUTLINE
- a. Operational Test and Evaluation Overview
    - (1) The primary purpose of operational test and evaluation is to determine whether systems are operationally effective and suitable for the intended use by representative users before production or deployment.
    - (2) The TEMP will show how program schedule, test management structure, and required resources are related to operational requirements, critical operational issues, test objectives, and milestone decision points. Testing will evaluate the system (operated by typical users) in an environment as operationally realistic as possible, including threat representative hostile forces and the expected range of natural environmental conditions.

b. Critical Operational Issues

- (1) List in this section the critical operational issues. Critical operational issues are the operational effectiveness and operational suitability issues (not parameters, objectives or thresholds) that must be examined in operational test and evaluation to evaluate/assess the system's capability to perform its mission.
- (2) A critical operational issue is typically phrased as a question that must be answered in order to properly evaluate operational effectiveness (e.g., "Will the system detect the threat in a combat environment at adequate range to allow successful engagement?") and operational suitability (e.g., "Will the system be safe to operate in a combat environment?")
- (3) Some critical operational issues will have critical technical parameters and thresholds. Individual attainment of these attributes does not guarantee that the critical operational issue will be favorably resolved. The judgment of the operational test agency is used by the DoD Component to determine if the critical operational issue is favorably resolved.
- (4) If every critical operational issue is resolved favorably, the system should be operationally effective and operationally suitable when employed in its intended environment by typical users.

c. Future Operational Test and Evaluation. For each remaining phase of operational test and evaluation, separately address the following:

- (1) Configuration Description. Identify the system to be tested during each phase, and describe any differences between the tested system and the system that will be fielded including, where applicable, software maturity performance and criticality to mission performance, and the extent of integration with other systems with which it must be interoperable or compatible. Characterize the system (e.g., prototype, engineering development model, production representative or production configuration).
- (2) Operational Test and Evaluation Objectives. State the test objectives including the objectives and thresholds and critical operational issues to be addressed by each phase of operational test and evaluation and the milestone decision review(s) supported. Operational test and evaluation that supports the beyond low rate initial production decision should have test objectives that examine all areas of operational effectiveness and suitability.
- (3) Operational Test and Evaluation Events, Scope of Testing, and Scenarios. Summarize the scenarios and identify the events to be conducted, type of resources to be used, the threat simulators and the simulation(s) to be employed, the type of representative personnel who will operate and maintain the system, the status of the logistic support, the operational and maintenance documentation that will be used, the environment under which the system is to be employed and supported during testing, the plans for interoperability and compatibility testing with other United States/Allied weapon and support systems as applicable, etc. Identify planned sources of information (e.g., development testing, testing of related systems, modeling, simulation, etc.) that may be used by the operational test agency to supplement this phase of operational test and evaluation. Whenever models and simulations are to be

used: identify the planned models and simulations; explain how they are proposed to be used; and provide the source and methodology of the verification, validation, and accreditation underlying their credible application for the proposed use. If operational test and evaluation cannot be conducted or completed in this phase of testing and the outcome will be an operational assessment instead of an evaluation, this should clearly be stated and the reason(s) explained.

- (4) Limitations. Discuss the test limitations including threat realism, resource availability, limited operational (military, climatic, nuclear, etc.) environments, limited support environment, maturity of tested system, safety, etc., that may impact the resolution of affected critical operational issues. Indicate the impact of the test limitations on the ability to resolve critical operational issues and the ability to formulate conclusions regarding operational effectiveness and operational suitability. Indicate the critical operational issues affected in parenthesis after each limitation.
- d. Live Fire Test and Evaluation. See also Appendix IV, "Live Fire Test and Evaluation Guidelines". Include a description of the overall live fire test and evaluation strategy for the item; critical live fire test and evaluation issues; required levels of system vulnerability/lethality; the management of the live fire test and evaluation program; live fire test and evaluation schedule, funding plans and requirements; related prior and future live fire test and evaluation efforts; the evaluation plan and shot selection process; and major test limitations for the conduct of live fire test and evaluation. Discuss, if appropriate, procedures intended for obtaining a waiver from full-up, system-level live fire testing (realistic survivability/lethality testing as defined in Section 2366, Title 10 USC) before Milestone II. Live fire test and evaluation resource requirements (including test articles and instrumentation) will be appropriately identified in the Test and Evaluation Resource Summary.

## 5. PART V--TEST AND EVALUATION RESOURCE SUMMARY

- a. Provide a summary (preferably in a table or matrix format) of all key test and evaluation resources, both government and contractor, that will be used during the course of the acquisition program. Specifically, identify the following test resources:
  - (1) Test Articles. Identify the actual number of and timing requirements for all test articles, including key support equipment and technical information required for testing in each phase by major type of developmental test and evaluation and operational test and evaluation. If key subsystems (components, assemblies, subassemblies or software modules) are to be tested individually, before being tested in the final system configuration, identify each subsystem in the TEMP and the quantity required. Specifically identify when prototype, engineering development, preproduction, or production models will be used.
  - (2) Test Sites and Instrumentation. Identify the specific test ranges/facilities to be used for each type of testing. Compare the requirements for test ranges/facilities dictated by the scope and content of planned testing with existing and programmed test range/facility capability, and highlight any major shortfalls, such as inability to test under representative natural environmental conditions. Identify instrumentation that must be acquired specifically to

conduct the planned test program. Describe how environment compliance requirements will be met.

- (3) Test Support Equipment. Identify test support equipment that must be acquired specifically to conduct the test program.
  - (4) Threat Representation. Identify the type, number, availability, and fidelity requirements for all representations of the threat to be used in testing. Compare the requirements for threat representations with available and projected assets and their capabilities. Highlight any major shortfalls. Each representation of the threat (target, simulator, model, simulation or virtual simulation) shall be subjected to validation procedures to establish and document a baseline comparison with its associated threat and to determine the extent of the operational and technical performance differences between the two throughout the life cycle of the threat representation.
  - (5) Test Targets and Expendables. Identify the type, number, and availability requirements for all targets, flares, chaff, sonobuoys, smoke generators, acoustic countermeasures, etc. that will be required for each phase of testing. Identify any major shortfalls. Each threat target will be subjected to validation procedures, tailored to characteristics of interest, in order to establish and document a baseline comparison with its associated threat and to ascertain the extent of operational and technical performance differences throughout the threat target's life cycle.
  - (6) Operational Force Test Support. For each test and evaluation phase, identify the type and timing of aircraft flying hours, ship steaming days, and on-orbit satellite contacts/coverage, and other critical operating force support required.
  - (7) Simulations, Models and Testbeds. For each test and evaluation phase, identify the system simulations to be used, including computer-driven simulation models and hardware/software-in-the-loop testbeds. Identify the resources required to validate and certify their credible usage or application before their use.
  - (8) Special Requirements. Discuss requirements for any significant non-instrumentation capabilities and resources such as: special data processing/data bases, unique mapping/charting/geodesy products, extreme physical environmental conditions or restricted/special use air/sea/landscapes.
  - (9) Test and Evaluation Funding Requirements. Estimate, by Fiscal Year and appropriation line number (program element), the funding required to pay direct costs of planned testing. State, by fiscal year, the funding currently appearing in those lines (program elements). Identify any major shortfalls.
  - (10) Manpower/Personnel Training. Identify manpower/personnel and training requirements and limitations that affect test and evaluation execution.
- b. The TEMP should project the key resources necessary to accomplish demonstration and validation testing and early operational assessment. The TEMP should estimate, to the degree known at Milestone I, the key resources necessary to accomplish developmental test and evaluation, live fire test and evaluation, and operational test and evaluation. These should include elements of the National Test Facilities Base (which incorporates the Major Range and Test

Facility Base (MRTFB), capabilities designated by industry and academia, and Major Range and Test Facility Base test equipment and facilities), unique instrumentation, threat simulators, and targets. As system acquisition progresses, the preliminary test resource requirements shall be reassessed and refined and subsequent TEMP updates shall reflect any changed system concepts, resource requirements, or updated threat assessment. Any resource shortfalls which introduce significant test limitations should be discussed with planned corrective action outlined.

6. Annex A--BIBLIOGRAPHY

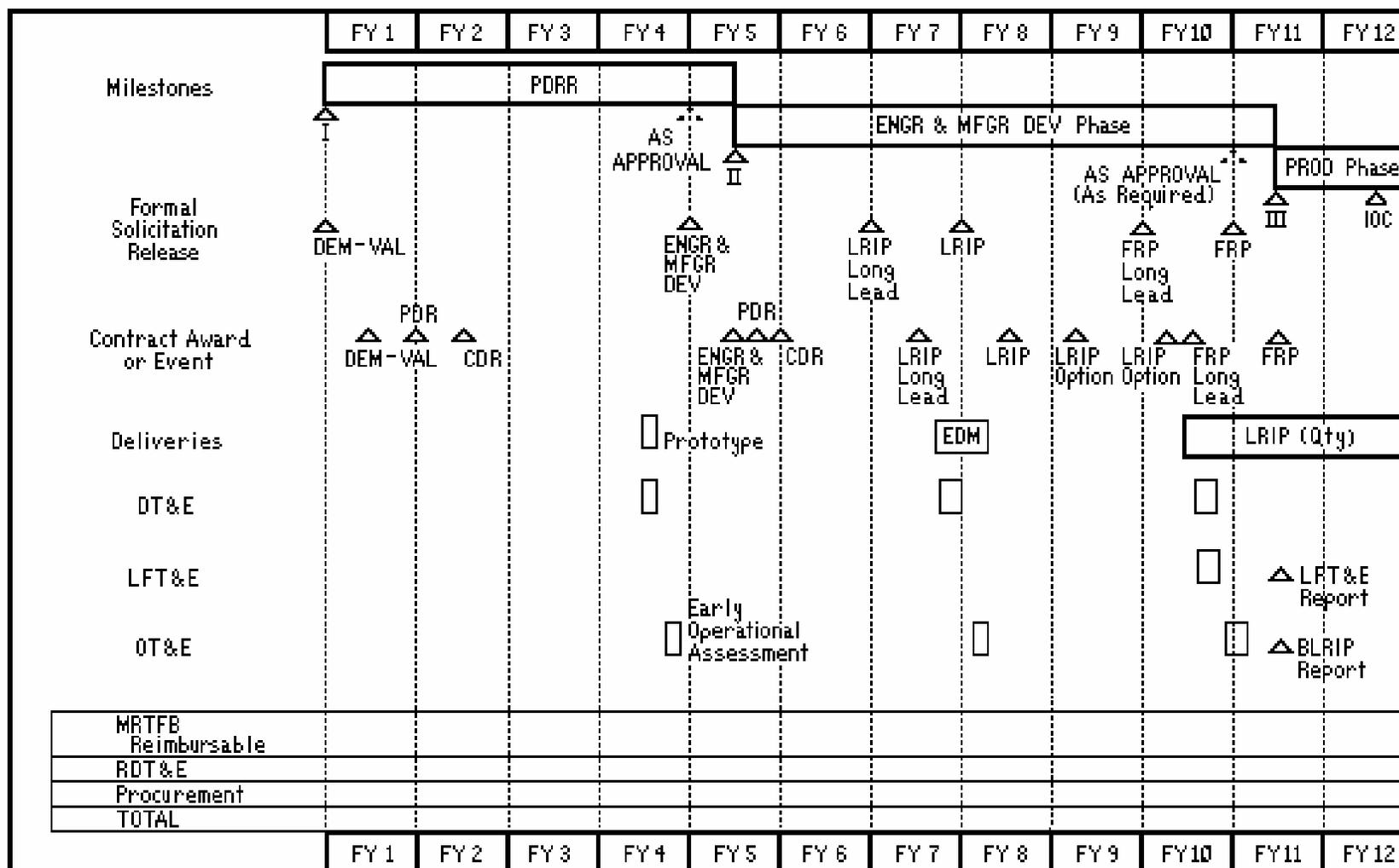
- a. Cite in this section all documents referred to in the TEMP.
- b. Cite all reports documenting technical, live fire, and operational testing and evaluation.

7. Annex B-ACRONYMS. List and define acronyms used in the TEMP.

8. Annex C-POINTS OF CONTACT. Provide a list of points of contact as illustrated by Figure 3.

9. ATTACHMENTS. Provide as appropriate.

**FIGURE 1 - INTEGRATED TEST PROGRAM SCHEDULE**



**FIGURE 2 - PROGRAM POINTS OF CONTACT (FORMAT)**

<u>NAME</u>	<u>ORGANIZATION</u>	<u>TELEPHONE (COMMERCIAL/DSN)</u>
Service Secretary/Agency Director Monitor/Coordinator		
User Representative		
Program Manager		
Development Test Director/Coordinator		
Operational Test Director/Coordinator		
DTSE&E Action Officer	OUUSD(A&T)/DTSE&E	
DOT&E Action Officer	OSD, DOT&E	

## Appendix IV

# Live Fire Test and Evaluation Reports Mandatory Procedures & Formats

### Introduction and Purpose

This Appendix provides guidelines to describe a disciplined management approach for the conduct of Live Fire Test and Evaluation (LFT&E), within the Department of Defense (DoD), which, if followed, will ensure compliance with LFT&E legislation. Section 2366, Title 10, United States Code (USC), contains requirements for vulnerability and lethality Live Fire Testing of covered systems, major munitions programs, and product improvements to covered systems and major munitions programs. The guidelines describe the objective and scope of LFT&E, provide guidance for LFT&E planning, testing, evaluation and documentation, and discuss the responsibilities of LFT&E principals.

The objective of LFT&E is to provide a timely and reasonable assessment of the vulnerability/lethality of a system as it progresses through its development and prior to full-rate production. In particular:

1. to provide information to decision-makers on potential user casualties, vulnerabilities, and lethality, taking into equal consideration susceptibility to attack and combat performance of the system;
2. to ensure that knowledge of user casualties and system vulnerabilities or lethality is based on testing of the system under realistic combat conditions;
3. to allow any design deficiency identified by the testing and evaluation to be corrected in design before proceeding beyond low-rate initial production; and
4. to assess battle damage repair capabilities and issues (while assessment of battle damage repair capability is not a statutory requirement of LFT&E, test officials should exploit opportunities presented by LFT&E to assess such capabilities whenever prudent and affordable).

### Definitions

The legislation covering LFT&E also provides definitions of “covered system,” “major munitions program,” “covered product improvement programs,” “realistic survivability testing,” “realistic lethality testing,” and “configured for combat.” The following definitions are not given in that legislation but are provided here to permit a better understanding of LFT&E requirements:

1. *Full-up Test*: A vulnerability test conducted on a complete or partial system loaded or equipped with all dangerous materials (including flammables and explosives) that would normally be on board in combat (configured for combat). All critical subsystems, which could contribute to the test outcome, must be operating (e.g.,

hydraulic and electrical power) under realistic conditions. For lethality testing, the munitions or missile must be production-representative. The target must be representative of the class of systems that includes the threat, and be sufficiently realistic to demonstrate the lethal effects the weapon is designed to produce. This testing alone may not satisfy 10 USC, Section 2366. See definition 4.

2. System-Level Test: A test conducted on the complete system, but may or may not be a Full-up test. This testing alone may not satisfy 10 USC, Section 2366. See paragraph 4, below.

3. Live Fire Test: A test within the OSD approved LFT&E strategy that involves the firing of actual munitions at target components, target sub-systems, target sub-assemblies or system-level targets (which may or not be configured for combat) to examine personnel casualty, vulnerability and/or lethality issues. This testing alone may not satisfy 10 USC, Section 2366; see definition 4.

4. Full-up, System-Level Test: A LFT&E Strategy for a covered system, major munitions program, or missile program, or covered product improvement program will include Full-up, System-level tests. The term "Full-up, System-level Test" is that testing that fully satisfies the statutory requirement for "realistic survivability testing" or "realistic lethality testing" as defined in Section 2366, Title 10, USC.

5. Survivability: The capability of a system and crew to avoid or withstand a man-made hostile environment without suffering an abortive impairment of its ability to accomplish its designated mission.

6. Vulnerability: The characteristic of a system that causes it to suffer a definite degradation (loss or reduction of capability to perform its designated mission) as a result of having been subjected to a certain (defined) level of effects in an unnatural (man-made) hostile environment. Vulnerability is considered a subset of survivability.

7. Lethality: The ability of a munition (or laser, high power microwave, etc.) to cause damage that will cause the loss or a degradation in the ability of a target system to complete its designated mission(s).

8. Susceptibility: The degree to which a weapon system is open to effective attack due to one or more inherent weakness. (Susceptibility is a function of operational tactics, countermeasures, probability of enemy fielding a threat, etc.) Susceptibility is considered a subset of survivability.

## **Implementation**

An active, well-planned, well-managed and well-executed LFT&E strategy is essential to understanding system vulnerability/lethality and will be an essential element of the information supporting decisions regarding the acquisition of materiel as well as the development of doctrine for its proper tactical employment. The LFT&E strategy for a given system shall be developed as soon as possible after Milestone I, and be structured and scheduled so that any design changes, resulting from that testing and analysis, as described in the strategy, may be incorporated before proceeding beyond low-rate initial production. LFT&E considerations must be included in all phases of the weapon system acquisition cycle, beginning with concept exploration and continuing

until Milestone III. Furthermore, the LFT&E strategy must be managed, including planning and programming, in such a manner that all elements of the test and evaluation process are well-integrated and complementary. The availability of facilities, test sites, instrumentation, personnel, threat targets, munitions, and/or directed energy weapons should be managed throughout all phases of the budget cycle.

LFT&E shall be initiated as early as possible and completed before production and deployment (Milestone III), to identify and assess possible design deficiencies so that appropriate corrective actions can be taken. Beginning with component-level testing and analysis during concept demonstration and validation, live fire vulnerability/lethality test and evaluation continues through engineering and manufacturing development (E&MD) with additional components/subsystem testing, and progresses to Full-up System Level LFT&E of production representative items before the system proceeds beyond low-rate initial production.

The LFT&E strategy shall be structured to provide a timely and reasonable examination and understanding of the vulnerability/lethality of U.S. weapon systems and munitions/directed energy weapons to the full spectrum of validated combat threats/targets. Subsequent product improvements to covered systems/major munitions programs meeting the statutory criteria are also required to undergo LFT&E if there is a significant impact to vulnerability or lethality. If any doubt exists, the system should be assumed to be covered and appropriate action taken. This includes waiver action if the testing would be unreasonably expensive and impractical. Legal counsel should be consulted to verify the final determination of program status. All LFT&E is conducted by the Services with OSD oversight. Non-Developmental Items (NDI) and Advanced Technology Demonstrators/Prototypes that meet the definition of covered system/major munitions program are also required to undergo LFT&E.

LFT&E of all systems shall be predicated upon the DoD Intelligence Community's official assessment of the principal threat systems and capabilities an adversary might reasonably bring to bear in an attempt to defeat or degrade a specific U.S. system as described in the system threat assessment report or equivalent document.

Vulnerability and lethality assessments may require the use of validated modeling/simulation and other analytic techniques. Where modeling/simulation and other analytical efforts are essential elements in a LFT&E strategy, pre-shot predictions shall be included.

The generation of data to resolve critical LFT&E issues in an efficient and cost effective manner to represent realistic environments shall be of paramount concern in the shot-line selection process for live-fire testing. While an element of randomness in shot-line selection is often desirable, total reliance on complete randomness may neither be consistent with the test objectives nor be an efficient use of test resources. Random shot-lines are generated from a realistic distribution of hit points, to include such factors as the weapon system operator, target signatures and weapon seeker characteristics. In most cases a mixture of random shot-lines (shot-lines generated from likely hit points) and engineering shot-lines (i.e., shot-lines specifically selected by the evaluator to address specific vulnerability/lethality issues) will be appropriate. It is required that some portion of the total shots be randomly drawn from a combat distribution of likely hit points, when known.

Although the evaluation of live-fire test results will address kill given a hit (i.e., vulnerability or lethality), the outcome of LFT&E will not necessarily be expressed in terms of probabilities. Rather, Live Fire Testing should address vulnerability or lethality primarily by examining basic damage and kill mechanisms and their interactions with the target system. Further, the evaluation of vulnerability test results will address, where possible, the susceptibility of the system.

Although LFT&E programs may differ significantly in scope and timing, the level of maturity at various stages of the acquisition process is basically the following: By Milestone I, a decision shall be made whether the system meets the legislative criteria for a covered system/major munitions program. Initial draft strategies should identify proposed issues, existing data in support of the issues, and Live Fire Tests to be conducted throughout the acquisition process. By Milestone II, the TEMP must contain a mature strategy. In particular, the strategy must either commit to Full-up, System-Level, Live Fire Testing, or a waiver request and alternative LFT&E plan must have been submitted and approved. The entire LFT&E program, to include testing, evaluation, and reporting, must be completed by Milestone III.

### **Responsibilities**

#### **Director, Operational Test and Evaluation (DOT&E):**

1. Serves as the OSD focal point for review, coordination, and approval of LFT&E policy.
2. Approves LFT&E strategies, as provided in the TEMP (TEMP).
3. Approves candidate systems for LFT&E. Annually reviews all potential systems for inclusion or exclusion from the LFT&E oversight list.
4. Approves Services' Detailed LFT&E Plans identified for DOT&E approval per the matrix of LFT&E phases included in the TEMP.
5. Reviews Services' Detailed LFT&E plans for those phases not requiring DOT&E approval.
6. Reviews Services' LFT&E Reports.
7. Monitors the Services' LFT&E program during its conduct.
8. Conducts an assessment of individual Services' LFT&E programs (to include LFT&E programs conducted under the waiver provisions of Section 2366, Title 10, U.S. Code) and prepares the Secretary of Defense LFT&E assessment report to Congress.

#### **DoD Components:**

1. Recommend candidate systems for LFT&E.
2. Develop and implement the LFT&E strategy for each affected system and ensures this strategy is fully described in the TEMP.
3. Plan, program, and budget research, development, test and evaluation and other procurement funds in support of LFT&E including the acquisition of threat targets/munitions or acceptable surrogates.
4. Identify critical LFT&E issues, prepare and approve required plans, reports and other documentation.
5. Permit on-site monitoring of all LFT&E tests by DOT&E.

6. Conduct engineering assessments of possible design changes resulting from LFT&E and develop programs for incorporating cost effective design changes as early as possible commensurate with the system acquisition strategy.
7. Prepare request for waiver from Full-up, System-Level, Live Fire Testing if such testing is unreasonably expensive and impractical. Prepare alternative plans for evaluating the vulnerability or lethality of the system for inclusion with the request for waiver. Waiver authority resides in the USD(A&T) for ACAT I D programs, and in the Component Acquisition Executive for less-than-ACAT I D programs.
8. Manage Service facilities, resources and provide guidance on operating these test facilities to support LFT&E.

### **LFT&E Documents**

Conduct of LFT&E will require the preparation and submission to OSD of the following documents.

**TEMP:** (See also Appendix III, "TEMP"). The TEMP summarizes where, when, and how the LFT&E issues will be tested/evaluated. Specific LFT&E items considered for inclusion in the TEMP are: a description of the overall Live Fire Test and Evaluation strategy for the item; critical Live Fire Test and Evaluation issues; required levels of system vulnerability/lethality; the management of the Live Fire Test and Evaluation program; Live Fire Test and Evaluation schedule, funding plans and requirements; related prior and future Live Fire Test and Evaluation efforts; the evaluation plan and shot selection process; Modeling and Simulation strategy and VV&A; and major test limitations for the conduct of Live Fire Test and Evaluation. Live Fire Test and Evaluation resource requirements (including test articles and instrumentation) will be appropriately identified early in the development cycle and appear in the Test and Evaluation Resource Summary. The TEMP will include a matrix that will cover all tests within the LFT&E strategy, their schedules, the issues they will address and which planning documents the Services propose for submission to DOT&E for approval and which are proposed to be submitted for information and reviews only.

**Detailed Test and Evaluation Plan:** This document describes the detailed test procedures, test conditions, data collection and analysis processes to be used during the conduct of each Live Fire Test. Annex B provides additional detail on the content of the Detailed Test and Evaluation Plans required for the Full-up System Level Live Fire Tests. The Detailed Test and Evaluation Plan will be submitted to DOT&E for comment at least 30 days before test initiation. DOT&E shall have 15 days for submission of comments subsequent to its receipt of the Detailed Test Plan/ Evaluation Plan.

**Detailed Test and Evaluation Report:** The results and overall evaluation of all testing, identified in the LFT&E strategy, will be documented by the Service and submitted to DOT&E no later than 120 days after test completion. The format of the Report(s) is a Service option; however, to facilitate the DOT&E independent report to Congress, each Service report should include the firing results, test conditions, a description of any deviations approved subsequent to the preparation of the Detailed Test and Evaluation Plan, test limitations, conclusions, and the evaluation of live fire vulnerability/lethality based on available information (if applicable). DOT&E shall have 45 days, from receipt of the final Service Detailed Test and Evaluation Report, for preparation and transmittal of the SecDef assessment report to Congress. Service technical review will normally be requested prior to transmittal.

Additional documentation may be prepared as part of the developmental process to support engineering tests that bear on the Live Fire Test Assessment. Review and approval of this documentation will be at the Service level.

### **Waivers**

The Service requesting a waiver from Full-Up, System-Level Live Fire Testing shall include with the request for waiver a report explaining how the Service plans to evaluate the vulnerability or lethality of the system or program, and assessing possible alternatives to Full-up System-Level Live Fire Testing. With the exception of the requirements for Full-up, System-Level, Live Fire Testing, the requirements for waived LFT&E programs are no less stringent than for non-waived programs, to include the inclusion of an LFT&E strategy in the TEMP and an independent DOT&E assessment report to Congress. Waiver requests will be submitted by the Service Secretaries to the Deputy Secretary of Defense, after formal coordination by DOT&E. Waivers from Full-up, System-Level, Live Fire Testing (realistic survivability/lethality testing as defined in Section 2366, Title 10, USC), for covered systems/major munitions programs, including product improvements that significantly affect vulnerability or lethality, cannot be granted after Milestone II, except through legislative relief.

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**ANNEX A  
REFERENCES**

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1. Section 2366, Title 10, United States Code, "**Major Systems and Munitions Programs: Survivability and Lethality Testing Required before Full-Scale Production**".
2. Department of Defense Directive 5000.1, Defense Acquisition.

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**ANNEX B**  
**DETAILED LIVE FIRE TEST AND EVALUATION PLAN**  
**Mandatory Content**  
\*\*\*\*\*

The following paragraphs outline the mandatory content of the Detailed Live Fire Test and Evaluation Plan. No standard format is prescribed, but the Plan must contain at least the following information:

1. A cover page providing the name of the system, the activity/agency responsible for preparation of the Plan, date, classification, and applicable distribution statement.
2. A coordination sheet containing signatures of Service approval authorities.
3. Administrative information: name, organization, telephone, and E-Mail addresses of key LFT&E personnel.
4. Description of threat weapons or targets that the system is expected to encounter during the operational life of the system, and the key characteristics of these threats/targets that affect system vulnerability/lethality; a reference to the specific threat definition document or authority; a discussion of the rationale and criteria used to select the specific threats/targets and the basis used to determine the number of threats/targets to be tested and evaluated in LFT&E.
5. If actual threats/targets are not available, then the plan must describe the threat/target surrogate to be used in lieu of the actual threat/target, and the rationale for its selection.
6. A statement of the test objectives in sufficient detail to demonstrate that the evaluation procedures are appropriate and adequate.
7. A description of the specific threats/targets to be tested including a detailed configuration and stowage plan (to include payload configuration) for each shot. Describe the rationale or operational scenarios on which the target configuration/stowage was based.
8. A listing of any differences between the system to be tested and the system to be fielded. As specifically as possible, identify the degree to which test results from the tested configuration are expected to be representative of the vulnerability or lethality of the fielded systems.
9. Identification of any test limitations, particularly any potential loss of realism from absence of components, arising from the use of surrogates, from the inserting of fuzes on stowed ammunition, or any other environmental, safety or resource constraints. Identify the impact of these limitations on test results.

10. A description of the shot selection process. Describe the process to be used to establish the test conditions for randomly selected shots, including any rules ("exclusion rules) used to determine whether a randomly generated shot may be excluded from testing. For engineering shots (i.e., shots selected to examine specific vulnerability/lethality issues), describe the issue and the associated rationale for selecting the specific conditions for these shots. List the specific impact conditions and impact points for each shot, and whether it is a random or engineering shot.

11. A detailed description of the test approach, test setup, test conditions, firing procedures, damage assessment and repair process, planned test sequence, instrumentation, data collection and analysis procedures, and responsibilities for collecting and documenting test results. Include any standard forms that will be used to document test results.

12. A prediction of the anticipated results of each shot. These predictions may be based on computer models, engineering principles, or engineering judgment. Detail should be consistent with the technique used for casualty/damage prediction.

13. A detailed description of the analysis/evaluation plan for the Live Fire Test. The analysis/evaluation plan must be consistent with the test design and the data collected. Indicate any statistical test designs used for direct comparisons or for assessing any pass/fail criteria.

14. A general description, including applicable references, of any vulnerability/ lethality models to be used to support shot-line selection, pre-shot predictions, or the analysis/evaluation. This material should include a discussion of model algorithm or input limitations, as well as references to the sources of key model inputs.

15. A detailed description of the approach to analyzing and mitigating the potential environmental impacts, consequences, or effects of the test activities, unless adequately described elsewhere.

## Appendix V

# Major Automated Information System Quarterly Reporting Mandatory Procedures & Formats

### Introduction and Purpose

This Appendix provides mandatory procedures and a format to prepare a Major AIS Quarterly Report. The quarterly Major Automated Information System (MAIS) Status Reporting system is designed to provide senior management at the Component and OSD levels with the program status, progress, issues, risks, and risk reducers. The quarterly report is essential to the early identification of problems and associated plans to initiate corrective actions. It is also essential the report is provided to the Milestone Decision Authority in a timely manner to permit prompt action to address reported issues and problems.

### Mandatory Procedures

For all designated major AISs, Components are required to submit a quarterly report in accordance with the format defined in Report Control Symbol (RCS) DD-C3I(Q) 1799, "Quarterly Major AIS (MAIS) Status Report." See attached format.

The DoD Components shall submit an original and 4 copies of the quarterly report for all major AISs, including delegated programs, within 30 days after the close of each quarter. For any AIS that has been canceled, is fully deployed, or declared fully operational, a final close-out report is required for the last reporting period. The initial MAIS report is due 30 days after the end of the quarter in which the AIS program is designated a major AIS.

### Mandatory Format

The mandatory Major AIS Quarterly Report format begins on the next page.

## **MAJOR AIS QUARTERLY REPORT**

(SYSTEM NAME)

### REPORTING PERIOD

(Submit to the DoD Senior IM Official 30 days after the close of each quarter)

#### I. PROGRAM INFORMATION

A. Designation/Nomenclature. Enter the program designation/nomenclature and name/acronym (if any)

B. DoD Component. Enter the responsible DoD Component.

C. Responsible Office and Telephone Number. Enter the DoD Component's responsible office, address, program manager's name, and DSN and commercial telephone numbers.

D. Brief Program Description. A two or three paragraph description of the AIS mission need; key requirements, objectives, and goals; preferred/selected alternatives; and any other key elements. Additionally, provide a description of the cost and operational benefits expected along with the projected return on investment (ROI), including a description of how the ROI was determined. ROI, in this context, is equivalent to the internal rate of return.

E. Acquisition Strategy and Development Approach. Describe the program architecture, acquisition strategy (i.e., how will hardware/software be purchased-- requirements contracts, open competition), and development approach (software conversion by sites, integration responsibilities, Government-Furnished Equipment, etc.).

F. Management Structure. Describe the program management structure and identify the AIS PM staffing (number authorized vs actual number assigned). Explain how the AIS PM will control the program cost, testing, and schedule. Describe key program and software development measures that support the program management process. The measures should address:

(1) Schedule and Progress - regarding completion of program milestones, significant events, and individual work items.

(2) Growth and Stability - regarding stability of required functionality or capability and the volume of software delivered to provide required capability.

(3) Funding and Personnel Resources - regarding the balance between work to be performed and resources assigned and used.

(4) Product Quality - regarding the ability of delivered product to support the user's need without failure, and problems and errors discovered during testing that result in the need for rework.

(5) Software Development Performance - regarding the developer's productivity capabilities relative to program needs.

(6) Technical Adequacy - regarding software reuse, use of Ada for software development, and use of approved standard data elements.

G. Contracts. Identify for each prime contract the name of the contractor, date the Delegation of Procurement Authority was granted or authority granting Warner Exemption, constraints imposed by the General Services Administration (GSA) (if any), scope of the contract, contract award date (or estimate), contract type, contract duration in years (identify number of option years), and estimated or actual contract value. If there is more than one prime contract, please identify each separately using subparagraphs (e.g., G.1, G.2, G.3).

H. Major AIS Interface. Indicate if this AIS program supports directly or indirectly interfaces with another AIS that supports a Corporate Information Management functional area (Civilian Payroll, Civilian Personnel, Contract Payment, Distribution Centers, Financial Operations, Government Furnished Material, Material Management, or Medical). Succinctly describe the interface or support provided. Also, state compliance with the Technical Architecture Framework for Information Management (TAFIM) and Ada standards. Show how standard data and reused software will be utilized.

I. Current Fiscal Year Appropriation Act. Indicate whether or not the AIS program is in compliance with the law and that funds are not being expended prior to an appropriate life - cycle management review.

## II. QUARTER'S ACTIVITIES AND ACCOMPLISHMENTS

A. Accomplishments. Provide a paragraph on each significant activity or accomplishment during the quarter. Include key management and program events. Be specific on dates and linkage to milestones. In addition, for key program and software development measures, provide the quantified measurement information as of the last day of the reporting period.

B. Changes. Identify and explain any significant change to capability, acquisition strategy, development approach, architecture, baseline, or management structure. Summarize the significant changes from the prior report that impact Section III (Milestones/Schedule), Section IV, (Funding), Section V (Cost), and Section VI (AIS PM Assessment).

C. Oversight Review. Identify any life-cycle management (LCM) oversight in-process or milestone reviews by milestone, date, and Milestone Decision Authority. Summarize resulting guidance.

D. External Interest. Identify GAO, DoD IG, Service IG or Audit Agency review of interest in the program. Describe any Congressional interest, to include whether there were Q&A's, markups, or Congressional guidance/report language (include outcome of testimony).

## III. PROGRAM MILESTONES AND SCHEDULE

A. Milestones and Schedule. Identify all life-cycle milestones and major program events. Include significant program milestones, such as those shown in the System Decision Paper, Research and Development Descriptive Summary, or Congressional Data Sheet. Milestones should encompass the entire period from the point in time the project was first funded through full operating capability. Include key program activities, decision points, and milestones, such as Milestone 0, I, II, III, etc. Identify the milestone decision authority (for example, OSD) and key system-level development milestones, such as contract award, preliminary and critical design reviews, system tests, first delivery, and initial operating capability. Milestones dates shall be interpreted as established program goals.

<u>MILESTONES</u>	<u>APPROVED SCHEDULE</u>	<u>COMPLETED</u>	<u>MODIFIED SCHEDULE</u>
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B. Current Change Explanations. Explain each change (cause and impact) of milestones from the approved schedule to the modified schedule. If the change was authorized by other than the AIS Program Manager, identify the authority directing change and date the change was approved. Use designation of Ch-1, Ch-2, etc., next to the affected milestone as a key to identify the appropriate explanation in this section. Also, identify any impact the change(s) may have on other parts of the report.

#### IV. PROGRAM FUNDING

A. Funding Table. Provide in table form, by appropriation (e.g., procurement, O&M, RDT&E, MEP, DBOF, MILCON, IF, etc.), all the required and approved funding (contract, in-house) for the automated information system. The "Approved" row normally represents the dollars shown in the budget. The "Required" row normally represents what the AIS Program Manager currently estimates is needed for meeting the approved baseline schedule. This information shall be based on the latest economic analysis or life-cycle cost estimate, or functional economic analysis, as appropriate.

B. Current Change Explanations. Explain any change to either the "Required" or "Approved" dollars from the last report. Explain the reason for the "Difference" in this report. "Prior Years" column represents all the sunk cost from the beginning of the Mission Need Statement to the CY. "BY+4" column is separated out in anticipation of a future change to the FYDP five year period. "To Complete" column represents the AIS PM's current estimate of costs, beyond the FYDP and BY+4 column, to completion of the operations phase (termination of the AIS or replacement).

Note that there is no "Approved" program for the "To Complete" column so do not bother to discuss any difference. All dollars are then-year unless noted otherwise by the budget guidance.

#### V. COST

A. Life-Cycle Cost. Life-Cycle cost is the total cost to the Government for an AIS over its full life. It includes the cost of requirements analyses, design, development, acquisition and/or lease, operations, support and, where applicable, disposal. It

encompasses both contract and in-house costs, all cost categories and all related appropriations. Provide both the Approved and Current estimated life-cycle cost for the program, in constant dollars (identify the fiscal year base) and then-year dollars (which includes inflation) in millions of dollars. "Approved" represents the cost estimate, economic analysis, or the functional economic analysis normally validated by the last major milestones review shown in Section III. Current estimate is the latest life-cycle cost estimate, economic analysis, or the functional economic analysis (regardless of any "approved" status from a higher authority). Example is as follows:

Example of Life-Cycle Cost

Approved:	\$120.1M in FY 1996 constant dollars \$149.4M in FY 1998 then-year dollars
Current Est:	\$160.1M in FY 1996 constant dollars \$203.4M in FY 1998 then-year dollars

B. Current Change Explanation. Explain any change from the last report or why the current estimate differs from the approved estimate. If the approved estimate did not change from the prior report, the only explanation needed would be to explain the difference between the Approved and Current estimates.

C. Program Cost. Program Cost is the total of all expenditures, in any appropriation and fund, directly related to the AIS definition, design, development, and deployment, and incurred from the beginning of the "Concept Exploration" phase through deployment at each separate site. For incremental and evolutionary program strategies, program cost includes all increments. Program cost does not include operations and support costs incurred at an individual site after operational cutover of any increment at that site, even though there may exist other sites that have not yet completed deployment. Provide both the Approved and Current estimated program cost in constant and then-year dollars, in millions of dollars. Example is as follows:

Example of Program Cost.

Approved:	\$87.3M in FY 1996 constant dollars \$98.0M in FY 1998 then-year dollars
Current Est:	\$94.1M in FY 1996 constant dollars \$103.4M in FY 1998 then-year dollars

D. Current Change Explanations. Explain any change from the first report or why the current estimate differs from the approved estimate.

E. Program Definition. Provide a clear and concise definition of the program scope which is the basis for the "Program Cost" calculation. Modification costs (technology refreshments) are to be included if effected prior to initial operating capability. Subsequent to acceptance into the inventory, modification costs are considered operating and support costs.

VI.  AIS PROGRAM MANAGER'S ASSESSMENT

A. Summary Assessment Matrix. In this section, the AIS program manager should provide a summary assessment of the status of each major programmatic area identified below, using the codes G (green color), Satisfactory; Y (yellow color), Marginal; or R (red color), Unsatisfactory. Use up or down arrows to indicate an improving or worsening condition within a single assessment level. While additional programmatic areas and assessments may be included, if desired, the ones identified below must be provided. The current quarter should be added on the right of the matrix and the oldest one on the left. The assessment matrix will show a total of four quarters' assessments. If a new system is being reported, much of the matrix will initially be empty for new reports until four reports have been submitted. An example of an AIS program manager assessment matrix is as follows:

MAJOR PROGRAMMATIC AREA	FY93			FY94
	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr
PROGRAM COST	G	G	G	G
APPROVED FUNDING SCHEDULE	Y	Y	G	G
REQUIREMENTS	G	G	G	G
TECHNICAL RISKS	G	G	G	G
CONTRACTS	G	G	G	G
STAFFING	G	R	R	G
TEST & EVALUATION	G	G	G	G
TRAINING	G	G	G	G
OVERALL ASSESSMENT	G	G	G	G

G: Satisfactory is the standard indicating that all is well, program is on track, within cost and schedule, has very minor problems or no problems at all.

B. Status. The AIS program manager should concisely explain all changes in his assessment from the prior quarter. All unsatisfactory assessments must specifically address corrective actions taken. If no improvement has occurred for two quarters (for either a Y or R factor), an explanation of why the situation has not changed is required. The AIS program manager should provide a statement of the overall status of the program.

C. Concerns. Use this space to provide an explanation of any other external factors that might potentially affect the program.

VII. AIS PROGRAM MANAGER CERTIFICATION

\_\_\_\_\_  
 CERTIFIED ACCURATE (must be signed by the PM or Deputy PM)

\_\_\_\_\_  
 Date

## Appendix VI

# Cost/Schedule Control Systems Criteria Mandatory Procedures & Reporting

### Introduction and Purpose

This Appendix provides mandatory procedures to ensure proper implementation of Cost/Schedule Control Systems Criteria (C/SCSC). The contractors' management control systems shall include policies, procedures and methods that are designed to ensure that they will accomplish the considerations reflected herein.

### Organization

- a. Define all authorized work and related resources to meet the requirements of the contract, using the contract work breakdown structure (WBS).
- b. Identify the internal organizational elements and the major subcontractors responsible for accomplishing the authorized work.
- c. Provide for the integration of the contractor's planning, scheduling, budgeting, work authorization and cost accumulation systems with each other, the contract work breakdown structure, and the organizational structure.
- d. Identify the managerial positions responsible for controlling overhead (indirect costs).
- e. Provide for integration of the contract work breakdown structure with the contractor's functional organizational structure in a manner that permits cost and schedule performance measurement for contract work breakdown structure and organizational elements.

### Planning and Budgeting

- a. Schedule the authorized work in a manner that describes the sequence of work and identifies the significant task interdependencies required to meet the development, production, and delivery requirements of the contract.
- b. Identify physical products, milestones, technical performance goals, or other indicators that will be used to measure output.
- c. Establish and maintain a time-phased budget baseline at the cost account level against which contract performance can be measured. Initial budgets established for this purpose will be based on the negotiated target cost. Any other amount used for performance measurement purposes must be formally recognized by both the contractor and the Government.

- d. Establish budgets for all authorized work with separate identification of cost elements (labor, material, etc.).
- e. To the extent the authorized work can be identified in discrete, short span work packages, establish budgets for this work in terms of dollars, hours, or other measurable units. Where the entire cost account can not be subdivided into detailed work packages, identify far term effort in larger planning packages for budget and scheduling purposes.
- f. Provide that the sum of all work package budgets, plus planning package budgets within a cost account equals the cost account budget.
- g. Identify relationships of budgets or standards in work authorization systems to budgets for work packages.
- h. Identify and control level-of-effort activity by time-phased budgets established for this purpose. Only that effort which cannot be identified as discrete, short span work packages or as apportioned effort may be classed as level-of-effort.
- i. Establish overhead budgets for the total costs of each significant organizational component whose expenses will become indirect costs. Reflect in the contract budgets at the appropriate level the amounts in overhead pools that are planned to be allocated to the contract as indirect costs.
- j. Identify management reserves and undistributed budget.
- k. Provide that the contract target cost plus the estimated cost of authorized but unpriced work is reconciled with the sum of all internal contract budgets and management reserves.

### **Accounting**

- a. Record direct costs on an applied or other acceptable basis in a manner consistent with the budgets in a formal system that is controlled by the general books of account.
- b. Summarize direct costs from cost accounts into the work breakdown structure without allocation of a single cost account to two or more work breakdown structure elements.
- c. Summarize direct costs from the cost accounts into the contractor's functional organizational elements without allocation of a single cost account to two or more organizational elements.
- d. Record all indirect costs which will be allocated to the contract.
- e. Identify the bases for allocating the cost of apportioned effort.
- f. Identify unit costs, equivalent unit costs, or lot costs as applicable.
- g. The contractor's material accounting system will provide for:

- (1) Accurate cost accumulation and assignment of costs to cost accounts in a manner consistent with the budgets using recognized, acceptable costing techniques.
- (2) Determination of price variances by comparing planned versus actual commitments.
- (3) Cost performance measurement at the point in time most suitable for the category of material involved, but no earlier than the time of actual receipt of material.
- (4) Determination of cost variances attributable to the excess usage of material.
- (5) Determination of unit or lot costs when applicable.
- (6) Full accountability for all material purchased for the contract, including the residual inventory.

### **Analysis**

a. Identify at the cost account level on a monthly basis using data from, or reconcilable with, the accounting system:

- (1) Comparison of budgeted cost for work scheduled and budgeted cost of work performed;
- (2) Comparison of budgeted cost for work performed and actual (applied where appropriate) direct costs for the same work; and
- (3) Variances resulting from the comparisons between the budgeted cost for work scheduled and the budgeted cost for work performed and between the budgeted cost for work performed and actual or applied direct costs, classified in terms of labor, material, or other appropriate elements together with the reasons for significant variances.

b. Identify on a monthly basis, in the detail needed by management for effective control, budgeted indirect costs, actual indirect costs, and cost variances with the reasons for significant variances.

c. Summarize the data elements and associated variances listed in subparagraphs a.(1) and (2), directly above, through the contractor organization and work breakdown structure to the reporting level specified in the contract.

d. Identify significant differences on a monthly basis between planned and actual schedule accomplishment and the reasons.

e. Identify managerial actions taken as a result of criteria items in paragraphs a. through d., directly above.

f. Based on performance to date, on commitment values for material, and on estimates of future conditions, develop revised estimates of cost at completion for work breakdown structure elements identified in the contract and compare these with the contract budget base and the latest statement of funds requirements reported to the Government.

### **Revisions and Access to Data**

a. Incorporate contractual changes expeditiously, recording the effects of such changes in budgets and schedules. In the directed effort prior to negotiation of a change, base such revisions on the amount estimated and budgeted to the functional organizations.

b. Reconcile original budgets for those elements of the work breakdown structure identified as priced line items in the contract, and for those elements at the lowest level in the program work breakdown structure, with current performance measurement budgets in terms of changes to the authorized work and internal replanning in the detail needed by management for effective control.

c. Prohibit retroactive changes to records pertaining to work performed that would change previously reported amounts for direct costs, indirect costs, or budgets, except for correction of errors and routine accounting adjustments.

d. Prevent revisions to the contract budget base except for Government-directed changes to contractual effort.

e. Document internally the changes to the performance measurement baseline and notify expeditiously the procuring activity through prescribed procedures.

f. Provide the Contracting Officer and the Contracting Officer's authorized representatives with access to the information and supporting documentation necessary to demonstrate compliance with the cost/schedule control systems criteria.