THE UNDER SECRETARY OF DEFENSE
3010 DEFENSE PENTAGON
WASHINGTON, DC 20301-3010

ACQUISITION,
TECHNOLOGY
AND LOGISTICS

June 10, 2001

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
CHAIRMAN OF THE JOINT CHIEFS OF STAFF
UNDER SECRETARIES OF DEFENSE
ASSISTANT SECRETARIES OF DEFENSE
GENERAL COUNSEL OF THE DEPARTMENT OF DEFENSE
INSPECTOR GENERAL OF THE DEPARTMENT OF DEFENSE
DIRECTORS OF DEFENSE AGENCIES

SUBJECT: The New DoD Regulation 5000.2-R

The Department's new vision for acquisition was published in DoD Directive 5000.1 and DoD Instruction 5000.2, effective October 23, 2000. We also published interim guidance (conforming to the new policy) for the DoD Regulation 5000.2-R while we completed work on the revised regulation. That third piece of the DoD 5000 policy series is now complete and is attached for immediate implementation. This memorandum outlines my view for putting our new vision into practice.

DoD's new acquisition vision provides a process that promotes the kind of acquisition, technology, and logistics excellence that enables us to maintain our technological superiority by fielding (to our users) the best systems with available technologies that are supportable, interoperable, and affordable in less time and at less cost. In changing our strategy for systems development and acquisition, as outlined in our new DoD 5000 policy documents, my objective is to reduce cycle time and achieve an average of five to seven years from program launch to production. My staff is developing a set of metrics to measure our progress. I will provide additional information on our metrics in a separate memorandum.

Achieving these goals will require us to change the way we think about new systems. We will have to rely more heavily on commercial technologies and products, particularly in our subsystems and components. This will require much more market research and a willingness to use the cost-as-an-independent-variable process to work with the requirements community to adjust performance parameters based on the results of that market research. We also have to move forward through the development process based upon accumulating knowledge that is validated by simulation or test.

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We must also take on new roles. The science and technology community must be more actively engaged in enabling the rapid transition of mature technologies to product developers and must actively participate in integrated product teams where technology managers can provide independent assessments of technology maturity. The system development and requirements communities must be more willing to create evolutionary strategies in order to deploy systems more quickly and then update them as more advanced technology is proven. The test and evaluation community must capitalize on the benefits of using modeling and simulation throughout the acquisition process to facilitate learning during development, and must ensure that confirmation tests align with evolutionary requirements. The support community must be more open to innovative support strategies that focus on availability and innovation, and less on traditional approaches. In short, we must change our organizational culture and environment.

Doing business as we have in the past will not allow DoD to continue to put superior systems into the hands of our users. We must adopt a new business approach with revolutionary changes in business practices aimed at obtaining a force that is more mobile, lethal, and easily supportable by incorporating today's best technologies and leaping ahead to generation-after-next technologies in order to maintain superiority. We now have the policy tools and a more flexible process that facilitates streamlined decision making to support our vision of acquisition, technology, and logistics excellence. To focus senior leadership attention and reduce decision delay, I have restructured the Defense Acquisition Board (DAB) to include the Service Secretaries and have decreased overall DAB membership. However, our policy documents and new process do not provide all of the answers on how to operate. We will continue to learn as we go, using a process of catalytic change in which we will develop the right procedures as we strive to achieve our objectives. To accomplish this goal, we all will have to apply our best judgements and common sense in structuring acquisition strategies. Together we must seize this opportunity. We can do no less for our soldiers, sailors, airmen, and marines.

I look forward to your active support of our new process, and your participation, as we work together to make our vision of acquisition, technology, and logistics excellence a reality.

Attachment:
As stated

MANDATORY PROCEDURES FOR MAJOR DEFENSE ACQUISITION PROGRAMS (MDAPS) AND MAJOR AUTOMATED INFORMATION SYSTEM (MAIS) ACQUISITION PROGRAMS

June 2001

Office of Under Secretary of Defense (Acquisition, Technology, and Logistics)

Office of Assistant Secretary of Defense (Command, Control, Communications, and Intelligence)

Office of Director, Operational Test and Evaluation

OFFICE OF THE SECRETARY OF DEFENSE
1000 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-1000

FOREWORD

This Regulation is issued under the authority of Department of Defense (DoD) Instruction 5000.2, "Operation of the Defense Acquisition System," October 23, 2000 (reference (a)) and is effective immediately. This Regulation sets forth mandatory procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) acquisition programs and, specifically where stated, for other than MDAPs or MAIS acquisition programs; serves as a general model for other than MDAPs or MAIS acquisition programs to include highly sensitive classified, cryptologic, and intelligence programs; implements DoD Instruction 5000.2 (reference (a)), the guidelines of Office of Management and Budget (OMB) Circular A-11 (reference (b)), and current statutes; and contains formats to be used to prepare various milestone documentation, periodic in-phase status reports, and statutory certifications.

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

No DoD Component shall supplement this Regulation. DoD Component officials shall keep the issuance of implementing documents to a minimum, and provide copies of all such issuances to the Under Secretary of Defense (Acquisition, Technology, and Logistics) (USD(AT&L)) prior to publication. DoD Component Acquisition Executives (CAEs) shall submit waivers or other requests for exceptions to the provisions of this Regulation to USD(AT&L), the Director, Operational Test & Evaluation (DOT&E), or the Assistant Secretary of Defense (Command, Control, Communications, and Intelligence) (ASD(C3I))/DoD Chief Information Officer (CIO), as appropriate. Signatories shall not waive statutory requirements except in compliance with, and unless, statute specifically allows such waiver. DoD Components shall forward copies of proposed policy memoranda affecting or related to individual sections of this Regulation to the Defense Acquisition Policy Steering Group (DAPSG) Executive Secretary prior to Department-wide staffing of the change. This policy shall not imply approval authority on the part of the Executive Secretary.

Milestone Decision Authorities (MDAs) for other than MDAPs or MAIS acquisition programs shall promulgate mandatory procedures for those programs, unless the CAE has already promulgated such procedures. These procedures shall not exceed the requirements for MDAPs and MAIS acquisition programs established in this Regulation.

Unless otherwise directed by the MDA, neither DoD Components nor program managers (PMs) shall update program documentation prepared in compliance with the requirements of the cancelled DoD 5000.2-R (in reissuance as DoD Instruction 5000.2 (reference (a)) and this Regulation), as of the date of signature of this Regulation, solely to satisfy the requirements of this Regulation.

The DAPSG shall receive and consider proposals for, and, as necessary, generate changes to this Regulation. The DAPSG shall submit proposed changes to USD(AT&L), DOT&E, and ASD(C3I)/DoD CIO, who have the sole authority to change this Regulation. All three officials shall jointly sign changes. The Director, Acquisition Resources and Analysis shall maintain administrative control of this Regulation and shall publish all signed changes. Send recommended changes to:

Under Secretary of Defense (Acquisition, Technology, and Logistics)
ATTN: Director, Acquisition Resources and Analysis
3000 Defense Pentagon
Washington, DC 20301-3000

DoD Components may obtain copies of this Regulation through their own publication channels. Other Federal Agencies and the public may obtain copies from the U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Road, Springfield VA 22151.

Under Secretary of Defense (Acquisition, Technology, and Logistics)	Acting Assistant Secretary of Defense (Command, Control, Communications, and Intelligence)	Acting Director, Operational Test and Evaluation

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AL1. ACRONYM LIST

AL1.1.	ACAT	Acquisition Category
AL1.2.	ADM	Acquisition Decision Memorandum
AL1.3.	APB	Acquisition Program Baseline
AL1.4.	APUC	Average Procurement Unit Cost
AL1.5.	ASD(C3I)	Assistant Secretary of Defense (Command, Control, Communications, and Intelligence)
AL1.6.	ATS	Automatic Test System
AL1.7.	BES	Budget Estimate Submission
AL1.8.	C4ISP	Command, Control, Communications, Computers, and Intelligence Support Plan
AL1.9.	C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
AL1.10.	CAE	Component Acquisition Executive
AL1.11.	CAIG	Cost Analysis Improvement Group
AL1.12.	CAIV	Cost as an Independent Variable
AL1.13.	CARD	Cost Analysis Requirements Description
AL1.14.	CARS	Consolidated Acquisition Reporting System
AL1.15.	CCDR	Contractor Cost Data Reporting
AL1.16.	CFSR	Contract Funds Status Report
AL1.17.	CJCS	Chairman of the Joint Chiefs of Staff
AL1.18.	COI	Critical Operational Issue
AL1.19.	COTS	Commercial, Off-the-Shelf
AL1.20.	CPI	Critical Program Information
AL1.21.	CPR	Cost Performance Report
AL1.22.	CRD	Capstone Requirements Document
AL1.23.	C/SSR	Cost/Schedule Status Report
AL1.24.	DAB	Defense Acquisition Board
AL1.25.	DAPSG	Defense Acquisition Policy Steering Group
AL1.26.	DCMA	Defense Contract Management Agency
AL1.27.	DEW	Directed Energy Weapon
AL1.28.	DFARS	Defense Federal Acquisition Regulation Supplement
AL1.29.	DIA	Defense Intelligence Agency
AL1.30.	DLA	Defense Logistics Agency
AL1.31.	DoD	Department of Defense
AL1.32.	DoD CIO	Department of Defense Chief Information Officer
AL1.33.	DOT&E	Director, Operational Test and Evaluation
AL1.34.	D,S&TS	Director, Strategic and Tactical Systems
AL1.35.	DT	Developmental Testing

AL1.36.	DT&E	Developmental Test And Evaluation
AL1.37.	DUSD(IA)	Deputy Under Secretary of Defense (Industrial Affairs)
AL1.38.	DUSD(S&T)	Deputy Under Secretary of Defense (Science and Technology)
AL1.39.	E3	Electromagnetic Environmental Effects
AL1.40.	EA	Economic Analysis
AL1.41.	E.O.	Executive Order
AL1.42.	ESOH	Environment, Safety, and Occupational Health
AL1.43.	EVMS	Earned Value Management System
AL1.44.	EW	Electronic Warfare
AL1.45.	FACA	Federal Advisory Committee Act
AL1.46.	FAR	Federal Acquisition Regulation
AL1.47.	FCT	Foreign Comparative Testing
AL1.48.	FFP	Firm Fixed-Price
AL1.49.	FOT&E	Follow-On Operational Test and Evaluation
AL1.50.	FTE	Full-Time Equivalent
AL1.51.	FYDP	Future Years Defense Program
AL1.52.	GIG	Global Information Grid
AL1.53.	HFE	Human Factors Engineering
AL1.54.	HSI	Human Systems Integration
AL1.55.	IER	Information Exchange Requirement
AL1.56.	IIPT	Integrating Integrated Product Team
AL1.57.	IOC	Initial Operational Capability
AL1.58.	IOT&E	Initial Operational Test and Evaluation
AL1.59.	IPPD	Integrated Product and Process Development
AL1.60.	IPT	Integrated Product Team
AL1.61.	IT	Information Technology
AL1.62.	IT OIPT	Information Technology Overarching Integrated Product Team
AL1.63.	JROC	Joint Requirements Oversight Council
AL1.64.	JITC	Joint Interoperability Test Command
AL1.65.	JTA	Joint Technical Architecture
AL1.66.	KPP	Key Performance Parameter
AL1.67.	LCCE	Life-Cycle Cost Estimate
AL1.68.	LFT&E	Live Fire Test and Evaluation
AL1.69.	LRIP	Low-Rate Initial Production
AL1.70.	M&S	Modeling and Simulation
AL1.71.	MAIS	Major Automated Information System
AL1.72.	MDA	Milestone Decision Authority
AL1.73.	MDAP	Major Defense Acquisition Program
AL1.74.	MNS	Mission Needs Statement
AL1.75.	MOE	Measure of Effectiveness
AL1.76.	MOP	Measure of Performance

AL1.77.	NATO	North Atlantic Treaty Organization
AL1.78.	NEPA	National Environmental Policy Act
AL1.79.	NSS	National Security Systems
AL1.80.	OA	Operational Assessment
AL1.81.	OIPT	Overarching Integrated Product Team
AL1.82.	ORD	Operational Requirements Document
AL1.83.	OSD	Office of the Secretary of Defense
AL1.84.	OT	Operational Testing
AL1.85.	OT&E	Operational Test and Evaluation
AL1.86.	OTA	Operational Test Agency
AL1.87.	OTRR	Operational Test Readiness Review
AL1.88.	OUSD(P&R)	Office of the Under Secretary of Defense (Personnel & Readiness)
AL1.89.	PA&E	Program Analysis and Evaluation
AL1.90.	PAUC	Program Acquisition Unit Cost
AL1.91.	PBBE	Performance-Based Business Environment
AL1.92.	PESHE	Programmatic Environment, Safety, and Occupational Health Evaluation
AL1.93.	PEO	Program Executive Officer
AL1.94.	PM	Program Manager
AL1.95.	PNO	Program Number
AL1.96.	POM	Program Objective Memorandum
AL1.97.	PSA	Principal Staff Assistant
AL1.98.	RAM	Reliability, Availability, and Maintainability
AL1.99.	RDT&E	Research, Development, Test and Evaluation
AL1.100.	RFP	Request for Proposal
AL1.101.	ROI	Return on Investment
AL1.102.	SAE	Service Acquisition Executive
AL1.103.	SAR	Selected Acquisition Report
AL1.104.	SBA	Simulation-Based Acquisition
AL1.105.	SBIR	Small Business Innovation Research
AL1.106.	SEI	Software Engineering Institute
AL1.107.	SSAA	System Security Authorization Agreement
AL1.108.	SUPSHIP	Supervisor of Shipbuilding, Conversion, and Repair
AL1.109.	T&E	Test and Evaluation
AL1.110.	TEMP	Test and Evaluation Master Plan
AL1.111.	TOC	Total Ownership Cost
AL1.112.	TRL	Technology Readiness Level
AL1.113.	U.S.C.	United States Code
AL1.114.	UCR	Unit Cost Report
AL1.115.	USD(AT&L)	Under Secretary of Defense (Acquisition, Technology, and Logistics)
AL1.116.	USJFCOM	United States Joint Forces Command

AL1.117. WBS	Work Breakdown Structure
AL1.118. WIPT	Working-Level Integrated Product Team

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(qqqq) DoD Manual 4120.24-M, "Defense Standardization Program (DSP) Policies and Procedures," March 2000

(rrrr) Sections 205a-205k of Title 15, United States Code, "Metric Conversion"

(ssss) Executive Order (E.O.) 12770, "Metric Usage in Federal Government Programs"

(tttt) Joint Technical Bulletin TB 700–2/NAVSEAINST 8020.8B/TO 11A-1-47/DLAR 8220.1, "Department of Defense Ammunition and Explosives Hazard Classification Procedures," January 5, 1998

(uuuu) Section 432 of Title 41, United States Code, "Value Engineering"

(vvvv) Office of Management and Budget (OMB) Circular No. A-131, "Value Engineering," May 21, 1993

(wwww) Federal Acquisition Regulation (FAR), Part 48, "Value Engineering," current edition

(xxxx) Section 794d of Title 29,United States Code, "Section 508 of the Rehabilitation Act of 1973"

(yyyy) DoD Directive 3222.3, "Department of Defense Electromagnetic Compatibility Program (EMCP)," August 20, 1990

(zzzz) Chapter 8 of Title 47, United States Code, "National Telecommunications and Information Administration"

(aaaaa) Section 300.1 of Title 47, Code of Federal Regulations, "Incorporation by reference of the Manual of Regulations and Procedures for Federal Radio Frequency Management"

(bbbbb) DoD Directive 4650.1, "Management and Use of the Radio Frequency Spectrum," June 24, 1987

(ccccc) U.S. Supplement-1 (C1) to Allied Communication Publication 190, "Guide to Frequency Planning," 1991

(ddddd) DoD Directive 5200.39, "Security, Intelligence, and Counterintelligence Support to Acquisition Program Protection," September 10, 1997

(eeeee) Title 10, United States Code, "Armed Forces"

(fffff) DoD Directive 5015.2, "DoD Records Management Program," March 6, 2000

(ggggg) Section 3101 et seq. of Title 44, United States Code, "Records Management by Federal Agencies"

(hhhhh) DoD Directive 5530.3, "International Agreements," June 11, 1987

(iiiii) DoD Directive 5000.4, "OSD Cost Analysis Improvement Group," November 24, 1992

(jjjjj) DoD Directive 5000.1, "The Defense Acquisition System," October 23, 2000

(kkkkk) DoD Directive 5010.38, "Management Control (MC) Program," August 26, 1996

(lllll) Section 2433 of Title 10, United States Code, "Unit cost reports"

(mmmmm) Public Law 97-255, "Federal Managers Financial Integrity Act of 1982"

(nnnnn) Section 2432 of Title 10, United States Code, "Selected Acquisition Reports"

(ooooo) Section 1105 of Title 31, United States Code, "Budget contents and submission to Congress"

(ppppp) Section 2430 of Title 10, United States Code, "Major defense acquisition program defined"

(qqqqq) Section 2220 of Title 10, United States Code, "Performance based management: acquisition programs," Paragraph (b), "Annual Reporting Requirement"

(rrrrr) Section 2220 of Title 10, United States Code, "Performance based management: acquisition programs," Paragraph (c), "Performance Evaluation"

(sssss) Section 2222 of Title 10, United States Code, "Biennial financial management improvement plan"

(ttttt) DoD 5010.12-L, "Acquisition Management Systems and Data Requirements Control List," October 1, 1997

(uuuuu) Section 2350a of Title 10, United States Code, "Cooperative research and development projects: allied countries," Paragraph (f), "Reports to Congress"

C1. CHAPTER 1
PROGRAM GOALS

C1.1. GOALS

Every acquisition program shall establish program goals–thresholds and objectives–for the minimum number of cost, schedule, and performance parameters that describe the program over its life cycle. The Department shall link program goals to the DoD Strategic Plan and other appropriate subordinate strategic plans, such as Component and Functional Strategic Plans and the Strategic Information Resources Management Plan (44 U.S.C. 3506 (reference (c))).

C1.2. THRESHOLDS AND OBJECTIVES

C1.2.1. Each parameter shall have a threshold value and an objective value.

C1.2.1.1. For performance, "threshold" shall mean the minimum acceptable value that, in the user's judgment, is necessary to satisfy the need. For schedule and cost, "threshold" shall mean the maximum allowable value. If performance threshold values are not achieved, program performance may be seriously degraded, and the utility of the system may become questionable. If schedule threshold values are not achieved, the program may no longer be timely. If cost threshold values are not achieved, the program may be too costly, and the affordability of the system may become questionable.

C1.2.1.2. The objective value is the value desired by the user, and the value the PM tries to obtain. The objective value represents an incremental, operationally meaningful, time-critical, and cost-effective improvement to the threshold value of each program parameter.

C1.2.1.3. Program goals (parameters and values) may be refined based on the results of the program's preceding phase(s).

C1.2.1.4. For each parameter, if no objective is specified, the threshold value shall also serve as the objective value. As a general rule, if no threshold is specified, the performance objective value shall also serve as the performance threshold value; the schedule objective value plus 6 months for Acquisition Category (ACAT) I or 3 months for ACAT IA shall serve as the schedule threshold value; or the cost objective value plus 10 percent shall serve as the cost threshold value. Despite these guidelines, if no threshold is specified, the PM may propose an appropriate threshold value to optimize program trade-space, subject to MDA and user approval.

C1.2.2. Maximizing PM and contractor flexibility to make cost/performance trade-offs is essential to achieving cost objectives. Trade-offs—within the objective-to-threshold "trade space"—shall not require higher-level permission, but shall require coordination with the

operational requirements developer. The operational requirements developer shall strictly limit the number of threshold and objective items in requirements documents and acquisition program baselines (APBs). Performance threshold values shall represent true minimums, with requirements stated in terms of capabilities rather than as technical solutions and specifications. Cost threshold values shall represent true maximums. Cost objectives shall be used as a management tool.

C1.2.3. When a program has time-phased requirements and utilizes an evolutionary acquisition strategy, each block shall have a set of parameters with thresholds and objectives specific to the block.

C1.3. COST AS AN INDEPENDENT VARIABLE (CAIV)

C1.3.1. In establishing realistic objectives, the user shall treat cost as a military requirement. The acquisition community, including technology and logistics, and the requirements community shall use the CAIV process to develop total ownership cost (TOC), schedule, and performance thresholds and objectives. They shall address cost in the Operational Requirements Document (ORD), and balance mission needs with projected out-year resources, taking into account anticipated process improvements in both DoD and defense industries (5 U.S.C. 306 (reference (d)) and Pub. L. 104-106 (1996), Section 5123 (reference (e))). CAIV trades shall consider the cost of delay and the potential for early operational capability.

C1.3.2. Upon ORD approval (see Chairman of the Joint Chiefs of Staff (CJCS) Instruction 3170.01B (reference (f))), the PM shall formulate a CAIV plan, as part of the acquisition strategy, to achieve program objectives. Upon program initiation, each ACAT I and ACAT IA PM shall document TOC objectives as part of the APB. The cost portion of the baseline shall include the complete set of TOC objectives: research, development, test and evaluation (RDT&E); procurement; military construction; operating and support; and disposal costs; as well as other indirect costs attributable to the system, and infrastructure costs not directly attributable to the system. The MDA shall re-assess cost objectives, and progress towards achieving them, at each subsequent milestone.

C1.3.3. Cost/Schedule/Performance Trade-Offs

C1.3.3.1. The best time to reduce TOC and program schedule is early in the acquisition process. Continuous cost/schedule/performance trade-off analyses shall accomplish cost and schedule reductions.

C1.3.3.2. Cost, schedule, and performance may be traded within the "trade space" between the objective and the threshold without obtaining MDA approval. Trade-offs outside the trade space (i.e., program parameter changes) shall require approval of both the MDA and the ORD approval authority. Validated key performance parameters (KPPs) may not be traded-off

without Requirements Authority approval. The PM and the operational requirements developer shall jointly coordinate all trade-off decisions.

C1.3.4. Management Incentives

C1.3.4.1. Incentives shall apply to both Government and industry, to both individuals and teams, to achieve CAIV and schedule objectives. Incentives shall stress up-front investments to minimize production cost, operating and support cost, and/or cycle time, where applicable. Awards programs (both monetary and non-monetary) and "shared savings" programs shall creatively encourage the generation of cost- and schedule-saving ideas throughout all phases of the life cycle.

C1.3.4.2. The PM, via the Contracting Officer, shall structure Requests for Proposal (RFPs) and resulting contracts to incentivize the contractor to meet or beat program objectives. Whenever applicable, risk reduction through use of mature processes shall be a significant factor in source selection. RFPs and resulting contracts shall include a strict minimum number of critical performance criteria (i.e., threshold and objective requirements) to allow industry maximum flexibility in meeting overall program objectives. The source selection criteria communicated to industry shall reflect the importance of developing a system that can achieve stated production and TOC objectives within schedule and performance objectives.

C1.3.4.3. For industry, competition to win business, along with attendant business profit, is by far the most powerful incentive. Therefore, the PM shall maintain competition as long as practicable in all acquisition programs.

C1.4. ACQUISITION PROGRAM BASELINE (APB)

C1.4.1. Every acquisition program shall establish an APB beginning at program initiation. The PM shall base the APB on users' performance requirements, schedule requirements, and estimate of total program cost. Performance shall include interoperability, supportability and, as applicable, environmental requirements. The department shall not obligate funds for ACAT I or ACAT IA programs beyond Milestone B until the MDA approves the APB, unless the USD(AT&L) (for ACAT I) or the ASD(C3I) (for ACAT IA) specifically approves the obligation (10 U.S.C. 2435(b) (reference (g))). The APB satisfies requirements derived from both 10 U.S.C. 2220(a)(1) (reference (h)) and reference (g).

C1.4.2. Preparation and Approval

C1.4.2.1. The PM, in coordination with the user, shall prepare the APB at program initiation; and shall revise the APB subsequent to milestone reviews, program restructurings, or unrecoverable program deviations. The Program Executive Officer (PEO) and the CAE, as appropriate, shall concur in the APB. For ACAT I and IA programs, the MDA shall retain

approval authority, but shall not approve the APB without coordination of the Under Secretary of Defense (Comptroller) (10 U.S.C. 2220(a)(2) (reference (h))) and the Requirements Authority.

C1.4.2.2. The APB is part of the Consolidated Acquisition Reporting System (CARS). The PM shall use CARS to prepare the APB (see Appendix 1).

C1.4.3. APB Content. APB parameter values shall represent the program as it is expected to be produced or deployed. In the case of delivering systems under an evolutionary acquisition strategy, the APB shall include parameters for the next block and, if known, for follow-on blocks. The APB shall contain only those parameters that, if thresholds are not met, will require the MDA to reevaluate the program and consider alternative program concepts or design approaches. The following considerations apply:

C1.4.3.1. Performance

C1.4.3.1.1. The total number of performance parameters shall be the minimum number needed to characterize the major drivers of operational performance, supportability, and interoperability (10 U.S.C. 2435 (reference (g))). This minimum number shall include the KPPs identified in the ORD. The value of a threshold or objective in the APB shall not differ from the value for a like threshold or objective in the ORD, and their definitions shall be consistent. The MDA may add additional performance parameters not validated by the Joint Requirements Oversight Council (JROC).

C1.4.3.1.2. The number and specificity of performance parameters increase with time. Early in a program the PM shall use a minimum number of broadly defined, operational-level, measures of effectiveness (MOEs) or measures of performance (MOPs) to describe needed capabilities. As program, system-level requirements become better defined, the PM may designate a limited number of additional, specific, program parameters, as necessary.

C1.4.3.2. Schedule. Schedule parameters shall minimally include dates for program initiation, major decision points, and the attainment of initial operating capability (IOC). The PM may propose, for MDA approval, other, specific, critical, system events, as necessary. In accordance with 10 U.S.C. 181 (reference (i)), the JROC shall evaluate program schedule criteria, including critical schedule dates, for ACAT I programs.

C1.4.3.3. Cost

C1.4.3.3.1. Cost parameters shall identify TOC (broken-out into direct costs: research, development, test, and evaluation costs, procurement costs, military construction costs, operating and support costs (to include environmental, safety, and occupational health compliance costs), and the costs of acquisition items procured with operations and maintenance funds, if applicable; indirect costs attributable to the systems; and infrastructure costs not directly

attributable to the system); total quantity (including both fully configured development and production units) costs; average procurement unit 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 other cost objectives designated by the MDA. For reporting purposes, the PM shall use life-cycle costs as defined in DoD 5000.4-M (reference (j)). The PM shall present cost figures in base year dollars.

C1.4.3.3.2. Cost figures shall reflect realistic estimates of the total program, including a thorough assessment of risk. As the program progresses, the PM shall refine procurement costs based on contractor actual (return) costs from component advanced development, system integration, and system demonstration, as available, and from low-rate initial production (LRIP). The PM shall include the refined estimate in the next required submittal of the APB. Budgeted amounts shall not exceed the total cost thresholds in the APB. For ACAT IA programs, ACAT I cost parameters shall apply with the addition of military pay and the cost of acquisition items procured with Defense Working Capital Funds. The JROC shall evaluate program cost criteria for ACAT I programs (10 U.S.C. 181 (reference (i))).

C1.4.4. Evolutionary Acquisition

C1.4.4.1. The APB for a program using an evolutionary acquisition strategy shall contain separate entries for each block. The APB shall be consistent with the ORD, as follows:

C1.4.4.1.1. If a single, time-phased ORD defines multiple capability levels, the APB shall contain multiple sets of parameter values, each defining a block.

C1.4.4.1.2. If the users incrementally update and validate a single ORD to define increasing capability, the PM shall incrementally update APB performance parameter values.

C1.4.4.1.3. If the users submit multiple ORDs, the PM shall prepare separate APBs, each defining a block.

C1.4.4.1.4. If users submit an ORD defining objective capability and initially acceptable capability, without defining intermediate capability levels, the PM shall prepare an APB with a complete set of parameter values for block 1 and as many parameter values of objective capability as are provided in the ORD.

C1.4.4.2. The details required for each block in an evolutionary acquisition program shall adhere to the guidance provided in C1.4.3.

C1.4.5. Program Deviations

C1.4.5.1. PMs shall maintain a current DoD Component and/or PM estimate of the parameters of the program being actually executed. The current estimate shall reflect the current President's Budget, adjusted for fact-of-life changes (i.e., already happened or unavoidable).

C1.4.5.2. A program deviation occurs when the PM has reason to believe that the current estimate for the program indicates that a performance, schedule, or cost threshold value will not be achieved. The PM shall immediately notify the MDA when a deviation occurs. 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, one of the following shall have occurred: the program shall be back within APB parameters; a new APB (changing only those parameters that breached) shall have been approved; or an Overarching Integrated Product Team (OIPT)-level program review shall have been conducted for ACAT ID or ACAT IAM programs to review the PM's proposed baseline revisions and make recommendations to the MDA.

C1.4.5.3. For ACAT I programs, if one of these three actions has not occurred within 90 days of the program deviation, the USD(AT&L) for ACAT ID programs, the ASD(C3I) for ACAT IAM programs, or the CAE, for ACAT IC and/or ACAT IAC programs, shall require a formal program review to determine program status.

C1.4.6. Information Technology (IT) Program Deviations. The CAE shall identify, in DoD's Strategic Information Resource Management Plan, major information technology acquisition programs that have significantly deviated from the cost, performance, or schedule goals established for the program (40 U.S.C. 1427 (reference (k))).

C1.4.7. Clinger-Cohen Act Compliance. DoD Instruction 5000.2, (reference (a)) establishes minimum planning requirements for the acquisition of information technology systems, as required by Section 811 of the FY 01 Authorizations Act (reference (l)) (see reference (a), sections 4.7.3.1.5 and 4.7.3.2.3.2.).

C2. CHAPTER 2
ACQUISITION STRATEGY

C2.1. GENERAL CONSIDERATIONS FOR THE ACQUISITION STRATEGY

C2.1.1. Each PM shall develop and document an acquisition strategy to guide program execution from initiation through reprocurement of systems, subsystems, components, spares, and services beyond the initial production contract award and during post-production support. 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. A primary goal of the strategy shall be to minimize the time and cost it takes, consistent with common sense and sound business practices, to satisfy identified, validated needs, and to maximize affordability throughout a program's useful life cycle.

C2.1.2. In developing the acquisition strategy, the PM shall consider all policy and guidance in this chapter. In documenting the acquisition strategy, the PM shall provide a complete picture of the strategy for the decision makers who will be asked to coordinate on or approve the strategy document. The PM shall ensure the document satisfies the requirements in this chapter for the acquisition strategy to identify, address, describe, summarize, or otherwise document specific, major aspects or issues of the program or strategy.

C2.1.3. When to Prepare and Update the Acquisition Strategy. The PM shall develop the acquisition strategy in preparation for program initiation, prior to the program initiation decision, and update it prior to all major program decision points or whenever the approved acquisition strategy changes or as the system approach and program elements become better defined. The PM shall engage the Working-Level Integrated Product Team (WIPT) and Operational Test Agency (OTA) in the development of the acquisition strategy, and obtain concurrence of the PEO and CAE, as appropriate.

C2.1.4. Approval of Acquisition Strategies. The MDA shall approve the acquisition strategy prior to the release of the formal solicitation. Approval shall usually precede each decision point, except at program initiation, when the acquisition strategy shall usually be approved as part of the milestone decision review.

C2.2. REQUIREMENTS

C2.2.1. The acquisition strategy shall provide a summary description of the requirement the acquisition is intended to satisfy. The summary shall highlight aspects of the requirement (1) driven by family-of-systems or mission area requirements for interoperability, and (2) that reflect dependency on planned capability being achieved by other programs. The summary shall also state whether the requirement is structured to achieve full capability in time-phased increments

or in a single step. For time-phased requirements, define the block about to be undertaken, as well as subsequent blocks.

C2.2.2. Approved Source Documents. The acquisition strategy shall identify approved source documents constituting the authoritative definition of the requirement. Such documents include the ORD, Capstone Requirements Document (CRD), and APB.

C2.2.3. Status of In-Process Source Documents. The acquisition strategy shall describe the status of source documents as of a specified date. Identify any significant aspects of the requirement that are unsettled, and the impact this uncertainty has on the acquisition strategy. The acquisition strategy shall be flexible enough to accommodate the requirements decisions ultimately made, either through providing alternative strategies when potential outcomes are limited and known, or through providing for a strategy update.

C2.3. PROGRAM STRUCTURE

C2.3.1. The acquisition strategy shall prescribe accomplishments for each acquisition phase, and shall identify the critical events that govern program management. The event-driven acquisition strategy shall explicitly link program decisions to demonstrated accomplishments in development, testing, initial production, life-cycle support, and the availability of capabilities, to be provided by other programs, on which this program depends. The acquisition strategy shall specifically address the benefits and risks associated with reducing lead-time through concurrency and the risk mitigation and tests planned if concurrent development is used. Events set forth in contracts shall support the appropriate exit criteria for the phase or intermediate development events, established for the acquisition strategy.

C2.3.2. The acquisition strategy shall define the relationship among acquisition phases, work efforts, decision points, solicitations, contract awards, systems engineering design reviews, contract deliveries, test and evaluation (T&E) activities, production lots, and operational deployment objectives. The PM shall depict these relationships in a summary diagram as part of the strategy.

C2.4. ACQUISITION APPROACH

C2.4.1. The acquisition strategy shall identify the approach the program will use to achieve full capability: an evolutionary approach or a single step approach. Consistent with DoD Instruction 5000.2, paragraph 4.7.3.2.3.3 (reference (a)), the acquisition strategy shall provide the rationale for choosing the approach. If an evolutionary approach is being used, the acquisition strategy program structure shall describe Block 1 (the initial deployment capability), and how it will be funded, developed, tested, produced, and supported, and the approach to treatment of subsequent blocks.

C2.4.2. If the ORD includes a firm definition of requirements to be satisfied by each block, the acquisition strategy shall define each block of capability and how it will be funded, developed, tested, produced, and operationally supported.

C2.4.3. If the ORD does not allocate to specific subsequent blocks the remaining requirements that must be met to achieve full capability, the acquisition strategy shall define the full capability the acquisition is intended to satisfy; the funding and schedule planned to achieve the full capability to the extent it can be described; and the management approach to be used to define the requirements for each subsequent block and the acquisition strategy applicable to each block, including whether end items delivered under earlier blocks will be retrofitted with later block improvements.

C2.5. RISK

The acquisition strategy shall address risk management. The PM shall identify the risk areas of the program and integrate risk management within overall program management. The strategy shall explain how the risk management effort shall reduce system-level risk to acceptable levels by the interim progress review preceding system demonstration and by Milestone C.

C2.6. PROGRAM MANAGEMENT

The acquisition strategy shall be sufficiently detailed to establish a management approach to achieve program goals.

C2.6.1. Resources. The acquisition strategy shall describe the planned funding approach including transition funding and funding under an evolutionary acquisition strategy. It shall detail advance procurement and staffing, if appropriate.

C2.6.1.1. Advance Procurement*

C2.6.1.1.1. In accordance with DoD Regulation 7000.14-R (reference (m)), 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, as authorized, to preclude serious and costly fluctuation in program continuity or when items have significantly longer lead times than other components, parts, and material of the same end item. 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 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. When advance procurement is part of a program, the cost of

components, material, parts, and effort budgeted for advance procurement shall be relatively low compared to the remaining portion of the cost of the end item. 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.

C2.6.1.1.2. 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.

C2.6.1.2. Program Office Staffing and Support Contractors. The acquisition strategy shall briefly describe the program office personnel and support contractor resources available to support the PM. It shall state whether resource limitations prevent the PM from pursuing a strategy or approach considered beneficial. It shall identify those strategies or approaches (e.g., award fee contract; or component breakout, with the government contracting for the component, and furnishing it to the prime contractor) and estimate the additional resources needed to implement them.

C2.6.2. Information Sharing and DoD Oversight. DoD oversight activities (i.e., contract management offices, contracting offices, technical activities, and program management offices) shall consider all relevant and credible information that might mitigate risk and reduce the need for DoD oversight before defining and applying direct DoD oversight of contractor operations. DoD buying and technical activities shall provide to the Director, Defense Contract Management Agency (DCMA), copies of reviews of contractor operations and other documents assessing or rating contractor performance or operations unless disclosure of this information would compromise national security. The Director, DCMA, shall make information relating to audits, reviews, or ratings of contractor operations, systems, or performance accessible to DoD buying and technical activities.

C2.6.3. Integrated Digital Environment (IDE)

C2.6.3.1. DoD policy requires the maximum use of digital operations throughout acquisition and the entire system life cycle. The acquisition strategy shall summarize how the PM will establish a cost-effective data management system and appropriate digital environment that shall allow every activity involved with the program, throughout its total life-cycle, to digitally exchange data. The IDE shall keep pace with evolving automation technologies, and shall use existing infrastructure (e.g., Internet) to the maximum extent practicable. The following shall also apply:

C2.6.3.1.1. PMs shall establish a data management system and appropriate digital environment to allow every activity involved with the program to cost effectively create, store, access, manipulate, and/or exchange data digitally. The IDE shall, at a minimum, meet the data management needs of the support strategy, system engineering process, modeling and simulation activities, T&E strategy, and periodic reporting requirements. The design shall allow ready access to anyone with a need-to-know (as determined by the PM), a technologically "current" personal computer, and Internet access through a Commercial, Off-the-Shelf (COTS) browser.

C2.6.3.1.2. Solicitations shall require specific proposals for an IDE solution to support acquisition and operational support activities. Unless analysis verifies prohibitive cost or time delays or a potential compromise of national security, new contracts shall require the contractor to provide on-line access to programmatic and technical data. Contracts shall give preference to on-line access (versus data exchange) through a contractor information service or an existing IT infrastructure. Contracts shall specify the required functionality and data standards. The data formats of independent standards-setting organizations shall take precedence over all other formats. The issue of data formats and transaction sets shall be independent of the method of access or delivery.

C2.6.3.1.3. Industry partners have been strongly encouraged to develop and implement IDE solutions that best meet their preferred business models. Consequently, program office IDE shall take maximum advantage of and have minimum impact on industry solutions.

C2.6.3.2. At milestone and other appropriate decision points and program reviews, the PM shall address the status and effectiveness of the IDE.

C2.6.4. Technical Representatives at Contractor Facilities. PMs shall make maximum use of DCMA personnel at contractor facilities. PMs and DCMA Contract Management Offices shall jointly develop and approve program support plans for all ACAT I program contracts to ensure agreement on contract oversight needs and perspectives. The PM shall only assign technical representatives to a contractor's facility, as necessary, and as agreed to by the Director, DCMA. A Memorandum of Agreement shall specify the duties of the technical representative and establish coordination and communication activities. Technical representatives shall not perform contract administration duties as outlined in Federal Acquisition Regulation (FAR) Section 42.302(a) (reference (n)).

C2.6.5. Government Property in the Possession of Contractors (GPPC)

C2.6.5.1. All PMs who own or use GPPC shall have a process to ensure continued management emphasis on reducing GPPC and prevent any unnecessary additions of GPPC. PMs shall examine their management of active and idle GPPC and special tooling or special test equipment that the Government may require the contractor to deliver, to ensure that decisions about retention, disposition, and requiring delivery are informed and timely. The PM shall

assign responsibility within the program office and detail actions, reviews, and reports to be used to manage and dispose of GPPC used on the program. This also includes government property that is not "owned" by the PM, but is allowed to be used on the program. The acquisition strategy shall address these planned actions.

C2.6.5.2. Government property may be furnished to contractors only under the criteria, restriction, and documentation requirements addressed in FAR 45.3 (reference (o)).

C2.6.5.3. The PM shall periodically review and continuously maintain oversight of GPPC to assure that property no longer needed for current contract performance or future needs is disposed of promptly or reutilized in accordance with applicable laws and regulations. The PM shall insure that Government property, left with the contractor but not needed for performance of the contract, is stored under a funded storage agreement. Individual decisions regarding particular property shall be documented in the contract file.

C2.6.6. Tailoring and Streamlining Plans

C2.6.6.1. The PM shall tailor all acquisition strategies to contain only those process requirements that are essential and cost-effective. The following policy applies:

C2.6.6.1.1. Acquisition process requirements shall be tailored to meet the specific needs of individual programs.

C2.6.6.1.2. Acquisition strategies shall incorporate a performance-based business environment (PBBE) to enable government customers and contractor suppliers to jointly capitalize on commercial process efficiencies to improve acquisition and sustainment processes.

C2.6.6.1.3. Management data requirements shall be limited to those essential for effective control.

C2.6.6.2. Request for Relief or Exemption. The acquisition strategy shall identify acquisition process requirements that fail to add value, are not essential, or are not cost effective, and shall indicate whether relief or exemption from those requirements is being sought or has already been obtained. The acquisition strategy shall include the status of pending requests.

C2.6.6.3. Applying Best Practices. In tailoring an acquisition strategy, the PM shall address management constraints imposed on the contractor(s). PMs shall avoid imposing government-unique restrictions that significantly increase industry compliance costs or unnecessarily deter qualified contractors, including non-traditional defense firms from proposing. Examples of practices that support the implementation of these policies include Integrated Product and Process Development (IPPD); performance-based specifications; management goals; reporting and incentives; an open systems approach that emphasizes

commercially supported practices, products, performance specifications, and performance-based standards; replacement of government-unique management and manufacturing systems with common, facility-wide systems; technology insertion for continuous affordability improvement throughout the product life cycle; realistic cost estimates and cost objectives; adequate competition among viable offerors; best value evaluation and award criteria; the use of past performance in source selection; results of software capability evaluations; government-industry partnerships, consistent with contract documents; and the use of pilot programs to explore innovative practices. The MDA shall review best practices at each decision point.

C2.6.7. Planning for Simulation-Based Acquisition (SBA) and Modeling and Simulation (M&S). SBA is the robust and interactive use of M&S throughout the product life cycle. The PM shall use SBA and M&S during system design, system T&E, and system modification and upgrade. In collaboration with industry and operational users, PMs shall integrate SBA/M&S into program planning activities; shall plan for life-cycle application, support, documentation, and reuse of models and simulations; and shall integrate SBA/M&S across the functional disciplines. The following SBA/M&S guidelines apply:

C2.6.7.1. PMs shall plan for SBA/M&S and make necessary investments early in the acquisition life cycle.

C2.6.7.2. The PM shall use verified, validated, and accredited models and simulations, and ensure credible applicability for each proposed use.

C2.6.7.3. The PM shall use data from system testing during development to validate the use of M&S.

C2.6.7.4. SBA/M&S shall support efficient test planning; pre-test results prediction; validation of system interoperability; and shall supplement design qualification, actual T&E, manufacturing, and operational support.

C2.6.7.5. The PM shall involve the OTA in SBA/M&S planning to support both developmental test and operational test objectives.

C2.6.7.6. DIA shall review and validate threat-related elements in SBA/M&S planning.

C2.6.7.7. The PM shall describe, in the acquisition strategy, the planned implementation of SBA/M&S throughout program development, including during engineering, manufacturing, and design trade studies; and in developmental, operational and live fire testing applications.

C2.6.8. Independent Expert Review of ACAT I-III Software Intensive Programs. The acquisition strategy shall describe the planned use of independent expert reviews for all ACAT I through ACAT III software-intensive programs.

C2.7. DESIGN CONSIDERATIONS AFFECTING THE ACQUISITION STRATEGY

The acquisition strategy shall describe how the PM's technical management approach, developed in accordance with Chapter 5, will support the acquisition decision process and performance-based business strategy described in the acquisition strategy. The acquisition strategy shall address how the design and development effort will generate appropriate performance measures for program control and MDA-level management insight. This discussion shall include, but not necessarily be limited to, the issues in the following paragraphs.

C2.7.1. Open Systems. PMs shall apply the open systems approach as an integrated business and technical strategy upon defining user needs. PMs shall assess the feasibility of using widely-supported commercial interface standards in developing systems. The open systems approach shall be an integral part of the overall acquisition strategy to enable rapid acquisition with demonstrated technology, evolutionary and conventional development, interoperability, life-cycle supportability, and incremental system upgradability without major redesign during initial procurement and reprocurement of systems, subsystems, components, spares, and services, and during post-production support. It shall enable continued access to cutting edge technologies and products and prevent being locked in to proprietary technology. PMs shall document their approach for using open systems and include a summary of their approach as part of their overall acquisition strategy.

C2.7.2. Interoperability. All acquired systems shall be interoperable with other U.S. and allied defense systems, as defined in the requirements and interoperability documents. The PM shall describe the treatment of interoperability requirements. If the acquisition strategy involves successive blocks satisfying time-phased requirements, this description shall address each block, as well as the transitions from block to block. This description shall identify enabling system engineering efforts such as network analysis, interface control efforts, open systems, data management, and standardization. It shall also identify related requirements or constraints (e.g., treaties or international standardization agreements) that impact interoperability requirements (e.g., standards required by the DoD Joint Technical Architecture (JTA) or the systems, forces, units, etc. for which interoperability is at, or could be at issue), and any waivers or deviations that have been obtained or are anticipated being sought. The acquisition strategy shall reflect full compliance with the interoperability policies in paragraph C5.2.3.5.11. and, for IT, including National Security Systems (NSS), section C6.3. The MDA shall adjudicate interoperability issues.

C2.7.2.1. Information Interoperability. The PM shall identify and assess the technical, schedule, cost, and funding critical path issues (i.e., issues that could impact the PM's ability to

execute the acquisition strategy) related to interoperability for the PM's acquisition program. The PM shall identify the critical path issues in other program(s) (i.e., system(s)) that will exchange information with the PM's delivered system, and assess the potential impact of these issues on the PM's program.

C2.7.2.2. Other-than Information Interoperability. The PM shall identify and assess the technical, schedule, cost, and funding critical path issues (see paragraph C2.7.2.1.) related to interoperability for the PM's acquisition program. The PM shall identify the critical path issues in other program(s) (i.e., system(s)) that will interoperate with or otherwise materially interact with the PM's delivered system (e.g., fuel formulation and delivery systems, mechanical connectors, armament, or power characteristics).

C2.7.3. IT Supportability. The acquisition strategy shall summarize the IT, including NSS, infrastructure and support considerations identified in the ORD and described in the Command, Control, Communications, Computers, and Intelligence Support Plan (C4ISP) (see Appendix 5). If IT, including NSS, infrastructure enhancements are required to support program execution, the acquisition strategy shall identify technical, schedule, and funding critical path issues for both the acquisition program and the IT, including NSS, infrastructure that could impact the PM's ability to execute the acquisition strategy. The acquisition strategy shall describe support shortfalls and issues and plans to resolve the issues, and provide additional supporting detail in the C4ISP.

C2.7.4. Protection of Critical Program Information and Anti-Tamper Measures. The PM shall ensure the acquisition strategy provides for compliance with the procedures regarding critical program information and anti-tamper measures in paragraph C6.7.5. The PM shall identify in the acquisition strategy, the technical, schedule, cost, and funding issues associated with executing requirements for protection of critical program information and technologies, and plans to resolve the issues.

C2.8. SUPPORT STRATEGY

C2.8.1. As part of the acquisition strategy, the PM shall develop and document a support strategy for life-cycle sustainment and continuous improvement of product affordability, reliability, and supportability, while sustaining readiness. This effort shall ensure that system support and life-cycle affordability considerations are addressed and documented as an integral part of the program's overall acquisition strategy. The support strategy shall define the supportability planning, analyses, and trade-offs conducted to determine the optimum support concept for a materiel system and strategies for continuous affordability improvement throughout the product life cycle. The support strategy shall continue to evolve toward greater detail, so that by Milestone C, it contains sufficient detail to define how the program will address the support and fielding requirements that meet readiness and performance objectives, lower TOC, reduce risks and avoid harm to the environment and human health. The support strategy

shall address all applicable support requirements to include, but not be limited to, the following elements:

C2.8.1.1. Product support (including software);

C2.8.1.2. Affordability improvements;

C2.8.1.3. Source of support;

C2.8.1.4. Human systems integration (HSI);

C2.8.1.5. Environment, safety, and occupational health (ESOH);

C2.8.1.6. Post deployment evaluation; and

C2.8.1.7. Long-term access to data to support the following:

C2.8.1.7.1. Competitive sourcing decisions;

C2.8.1.7.2. Conversion of product configuration technical data to performance specifications when required for enabling technology insertion to enhance product affordability and prevent product obsolescence; and

C2.8.1.7.3. Contract service risk assessments over the life of the system.

C2.8.2. The support strategy is an integral part of the systems engineering process (see C5.2.). Demonstration of assured supportability and life-cycle affordability shall be entrance criteria for the Production and Deployment Phase. The specific requirements associated with integrating the support strategy into the system engineering process shall be accomplished through IPPD (see C5.1.).

C2.8.3. Product Support. Product support is a package of logistics support functions necessary to maintain the readiness and operational capability of a system or subsystems.

C2.8.3.1. Product Support Management Planning. The PM, in coordination with Military Service logistics commands, shall include planning for full life-cycle product support management as part of the support strategy documented in the acquisition strategy. The planning shall include actions to assure sustainment, and to continually improve product affordability for programs in initial procurement, reprocurement, and post-production support. The planning shall describe an integrated acquisition and logistics strategy for the remaining life of the system or subsystem. This strategy shall be updated at least every five years during the product's life cycle, or with greater frequency, depending on the pace of technology. As a minimum, product

support management planning shall address how the program will accomplish the following objectives:

C2.8.3.1.1. Integrate supply chains to achieve cross-functional efficiencies and provide improved customer service through performance-based arrangements or contracts.

C2.8.3.1.2. Segment support by system or subsystem and delineate agreements to meet specific customer needs.

C2.8.3.1.3. Maintain relationship with the user/warfighter based on system readiness.

C2.8.3.1.4. Provide standard user interfaces for the customer via integrated sustainment support centers.

C2.8.3.1.5. Select best-value, long-term product support providers and integrators based on competition.

C2.8.3.1.6. Measure support performance based on high-level metrics, such as availability of mission-capable systems, instead of on distinct elements such as parts, maintenance, and data.

C2.8.3.1.7. Improve product affordability, system reliability, maintainability, and supportability via continuous, dedicated investment in technology refreshment through adoption of performance specifications, commercial standards, non-developmental items, and commercial-off-the-shelf items where feasible, in both the initial acquisition design phase and in all subsequent modification and reprocurement actions.

C2.8.3.2. Product Support Integrator. The PM may select a product support integrator from the DoD or private sector. Activities coordinated by support integrators can include, as appropriate, functions provided by organic organizations, private sector providers, or a partnership between organic and private sector providers. The PM shall ensure that the product support concept is integrated with other logistics support and combat support functions to provide agile and robust combat capability. The PM shall invite Military Service and Defense Logistics Agency (DLA) logistics activities to participate in product support strategy development and integrated product teams (IPTs). These participants shall help to ensure effective integration of system-oriented approaches with commodity-oriented approaches (common support approaches), optimize support to users, and maximize total logistics system value.

C2.8.4. Source of Support. The PM shall use the most effective source of support that optimizes performance and life-cycle cost, consistent with military requirements. The source of

support may be organic or commercial, but its primary focus is to optimize customer support and achieve maximum weapon system availability at the lowest TOC. Source of support decisions shall foster competition throughout the life of the system (see section C2.8.4.2., section C2.9.1., and paragraph C5.2.3.5.4.3.).

C2.8.4.1. Depot Maintenance Source of Support. 10 U.S.C. 2464 (reference (p)) and DoD policy require organic core maintenance capabilities. Such capabilities provide effective and timely response to surge demands, ensure competitive capabilities, and sustain institutional expertise. Within statutory limitations, 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 for non-core-related workload along with wholesale and selected retail materiel management functions. Best value over the life cycle of the system and use of existing contractor capabilities, particularly while the system is in production, shall be considered as key determinants in the overall decision process. The PM shall provide for long-term access to data required for competitive sourcing of systems support throughout its life cycle. Additional guidance appears in DoD Directive 4151.18 (reference (q)) and DoD Handbook 4151.18-H (reference (r)).

C2.8.4.2. Supply Source of Support

C2.8.4.2.1. It is DoD policy to give the PM latitude in selecting a source of supply support, including support management functions, that maximizes service to the user, while minimizing cost. The PM shall select a source of supply support that gives the PM and/or the support integrator sufficient control over financial and support functions to effectively make trade-off decisions that affect system readiness and cost. The PM shall select organic supply sources of support when they offer the best value. Particular attention shall be given to Prime Vendor contracts for specific commodities and Virtual Prime Vendor contracts for a wide range of parts support for specific sub-systems. When changing the support strategy for fielded equipment from organic support to contractor support or from contractor support to organic support, DoD owned inventory that is unique to that system must be addressed in the source of support decision.

C2.8.4.2.2. The PM shall use a competitive process to select the best value supply support provider. Access to multiple sources of supply is encouraged to reduce the risks associated with a single source. Supply support may be included as part of the overall system procurement or as a separate competition. The competitive selection process will result in a contract with a commercial source and/or an agreement with an organic source that prescribes a level of performance in terms of operational performance and cost. Additional guidance appears in DoD Directive 4140.1 (reference (s)) and DoD Regulation 4140.1-R (reference (t)).

C2.8.4.3. Contractor Logistics Support Integration, In-Theater. Civilian contractors execute support missions in a variety of contingency environments and operations other than

war. When support strategies employ contractors, PMs shall coordinate with users to identify the standards and procedures for integrating contractor logistics support into the theater of operations, per Joint Publication 4-0, Chapter 5 (reference (u)), and Service implementing guidance.

C2.8.5. HSI. The PM shall pursue HSI initiatives (see paragraph C5.2.3.5.9.) to optimize total system performance and minimize TOC. The PM shall integrate manpower, personnel, training, safety and occupational health (see paragraph C2.8.6.), habitability, human factors, and personnel survivability considerations into the acquisition process. The support strategy shall identify responsibilities, describe the technical and management approach for meeting HSI requirements, and summarize major elements of the associated training system. The following considerations apply:

C2.8.5.1. Manpower. The support strategy shall document the approach being used to provide the most efficient and cost effective mix of DoD manpower and contract support and identify any cost or schedule issues (e.g., uncompleted studies) that could impact the PM's ability to execute the program (see paragraph C4.5.4.1.). In all cases, the PM shall consult with the manpower community in advance of contracting for operational support services to ensure that sufficient workload is retained in-house to adequately provide for military career progression, sea-to-shore or overseas rotation, and combat augmentation. The PM shall ensure that inherently governmental and exempted commercial functions (see paragraph C4.5.4.) are not contracted.

C2.8.5.2. Personnel. The PM shall summarize major personnel initiatives that are necessary to achieve readiness or rotation objectives or reduce manpower or training costs. The support strategy shall address modifications to the knowledge, skills, and abilities of military occupational specialties for system operators, maintainers, or support personnel if the modifications have cost or schedule issues that could adversely impact program execution. The support strategy shall also address actions to combine, modify, or establish new military occupational specialties or additional skill indicators, or issues relating to hard-to-fill occupations if they impact the PM's ability to execute the program.

C2.8.5.3. Training

C2.8.5.3.1. The PM shall summarize major elements of the training system described in DoD Directive 1430.13 (reference (v)), in the support strategy, and identify training initiatives that enhance the user's capabilities, improve readiness, or reduce individual and collective training costs. Planned training shall maximize the use of new learning techniques, simulation technology, embedded training, and instrumentation systems to provide anytime, anyplace training that reduces the demand on the training establishment and reduces TOC. The PM shall work with the training community to develop options for individual, collective, and

joint training for the personnel who will operate, maintain, support, and provide training for the system.

C2.8.5.3.2. For non-IT, including non-NSS, interoperability training issues, and for IT, including NSS, interoperability issues not addressed in the C4ISP (see section C6.4. and Appendix 5), the acquisition strategy shall include a description of interoperability requirements necessary to support unit and joint training architectures. For those programs that require training infrastructure modifications, the PM shall identify technical, schedule, and funding issues that impact execution.

C2.8.5.4. Personnel Survivability and Habitability. For systems with missions that might expose it to combat threats, the PM shall address personnel survivability issues including protection against fratricide, detection, and instantaneous, cumulative, and residual nuclear, biological, and chemical effects; the integrity of the crew compartment; and provisions for rapid egress when the system is severely damaged or destroyed. If the system or program has been designated by DOT&E for live fire test and evaluation (LFT&E) oversight (see section C3.3.), the PM shall integrate T&E to address crew survivability issues into the LFT&E program to support the Secretary of Defense LFT&E Report to Congress (see paragraph C3.11.2.) (10 U.S.C. 2366 (reference (w))). The PM shall address special equipment or gear needed to sustain crew operations in the operational environment (see paragraph C5.2.3.5.9.2.). The PM shall also address habitability requirements (e.g., for the physical environment and support services) that are necessary for meeting and sustaining system performance, avoiding personnel retention problems, maintaining quality of life, and minimizing total system costs.

C2.8.5.5. Human Factors Engineering (HFE). The PM shall summarize steps being taken (e.g., contract deliverables or government/contractor IPT teams) to ensure the proper employment of HFE/cognitive engineering during systems engineering (see paragraph C5.2.3.5.9.1.) to provide for effective human-machine interfaces, meet HSI requirements, and (as appropriate) support a family-of-systems acquisition approach.

C2.8.6. Environment, Safety, and Occupational Health (ESOH) Considerations. As part of risk reduction, the PM shall prevent ESOH hazards, where possible, and shall manage ESOH hazards where they cannot be avoided. The support strategy shall contain a summary of the Programmatic ESOH Evaluation (PESHE) document, including ESOH risks, a strategy for integrating ESOH considerations into the systems engineering process, identification of ESOH responsibilities, and a method for tracking progress (see section C5.2.3.5.10.).

C2.8.7. Demilitarization and Disposal Planning

C2.8.7.1. During systems engineering, the PM shall consider materiel demilitarization and disposal. The PM shall minimize DoD's liability due to information and technology security, environmental, safety, and occupational health issues. The PM shall coordinate with

Service logistics activities and DLA, as appropriate, to identify and apply applicable demilitarization requirements necessary to eliminate the functional or military capabilities of assets (DoD 4140.1-R (reference (t)) and DoD 4160.21-M-1 (reference (x))). The PM shall coordinate with DLA to determine reutilization and hazardous-property disposal requirements for system equipment and by-products (reference (t) and DoD 4160.21-M (reference (y))).

C2.8.7.2. For munitions programs, the PM shall document the parts of the system that will require demilitarization and disposal, and address the inherent dangers associated with ammunition and explosives. This documentation shall be in place before the start of developmental test and evaluation and before the PM releases munitions or explosives to a non-military setting. The documentation shall provide the following: render safe procedures; step-by-step procedures for disassembling the munition item(s) to the point necessary to gain access to and/or to remove the energetic and hazardous materials; and identification of all energetics and hazardous materials, and the associated waste streams produced by the preferred demilitarization/disposition process.

C2.8.7.3. Demilitarization and disposal planning shall not consider open burn and open detonation as the primary methods of demilitarization or disposal.

C2.8.8. Life-Cycle Support Oversight. The support strategy shall address how the PM and other responsible organizations will maintain appropriate oversight of the fielded system. Oversight shall identify and properly address performance, readiness, ownership cost, and support issues, and shall include post deployment evaluation to support planning for assuring sustainment and implementing technology insertion, to continually improve product affordability. Oversight shall be consistent with the written charter of the PM's authority, responsibilities, and accountability for accomplishing approved program objectives (see DoD Instruction 5000.2, Section 4 (reference (a))).

C2.8.9. Post Deployment Evaluation. The PM shall use post deployment evaluations of the system, beginning at IOC, to verify whether the fielded system continues to meet or exceed thresholds and objectives for cost, performance, and support parameters approved at full rate production. The PM shall select the parameters for evaluations based on their relevance to future modifications or evolutionary block upgrades for performance, sustainability, and affordability improvements, or when there is a high level of risk that a KPP will not be sustained over the life of the system. The PM shall include these parameters in the APB and report them in the Defense Acquisition Executive Summary (DAES) (see section C7.15.3. and Appendix 1) for the period of time specified in the support strategy. Post deployment evaluations shall continue as operational support plans execute (including transition from organic to contract support and vice versa, if applicable), and shall be regularly updated depending on the pace of technology. The PM shall use existing reporting systems and operational feedback to evaluate the fielded system whenever possible.

C2.9. BUSINESS STRATEGY

As part of the acquisition strategy, the PM shall develop and document a business strategy.

C2.9.1. Competition. The acquisition strategy for all acquisition programs shall describe plans to attain program goals via competition, throughout all phases of the program's life cycle, or explain why competition is neither practicable nor in the best interests of the Government.

C2.9.1.1. Fostering a Competitive Environment

C2.9.1.1.1. Competition Advocates. The Head of each DoD Component with acquisition responsibilities shall designate a competition advocate for the Component and for each procurement activity (41 U.S.C. 418 (reference (z)) and 10 U.S.C. 2318 (reference (aa))). The advocate for competition for each procurement 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. 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 (reference (aa)).

C2.9.1.1.2. Ensuring Future Competition for Defense Products

C2.9.1.1.2.1. The decline in defense spending and subsequent industry consolidation have created a new industrial environment that DoD must consider when making acquisition and technology program decisions. For some critical and complex Defense products, the number of competitive suppliers is now, or will be, limited. While it is fundamental DoD policy to rely on the marketplace to meet Department requirements, there may be exceptional circumstances in which the Department needs to act to maintain future competition. Accordingly, DoD Components shall consider the effects of their acquisition and budget plans on future competition.

C2.9.1.1.2.2. The Deputies to CAEs shall confer routinely with the Deputy Under Secretary of Defense (Industrial Affairs) (DUSD(IA)) to discuss areas where future competition may be limited and provide the DUSD(IA) with information on such areas based on reporting from program managers and other sources. This group will review such areas that have been identified by program acquisition strategies, IPTs, sole-source Justifications and Approvals, and more generally from industry sources. Where appropriate, this group shall establish a DoD team to evaluate specific product or technology areas. Based on analysis and findings of the team, the USD(AT&L) will decide what, if any, DoD action is required to ensure future competition in the sector involved. USD(AT&L) shall direct any proposed changes in specific programs or direct the MDA to make such changes to a specific program.

C2.9.1.2. Building Competition into Individual Acquisition Strategies. PMs and contracting officers shall provide for full and open competition, unless one of the limited statutory exceptions applies (FAR Subpart 6.3 (reference (bb))). PMs and contracting officers shall use competitive procedures best suited to the circumstances of the acquisition program. To comply with these policies, PMs shall plan for competition from the inception of program activity. Such competition planning shall precede preparation of an acquisition strategy when, for example, a technology project or an effort involving advanced development or demonstration activities has potential to transition into an acquisition program. Competition planning must include the immediate effort being undertaken and any foreseeable future procurement as part of an acquisition program. Competitive prototyping, competitive alternative sources, and competition with other systems that may be able to accomplish the mission shall be used where practicable.

C2.9.1.2.1. Applying Competition to Acquisition Phases. The acquisition strategy prepared to support program initiation shall include plans for competition for the long term. The strategy shall be structured to make maximum use of competition through the life of the contemplated program to achieve performance and schedule requirements, improve product quality and reliability, and reduce cost.

C2.9.1.2.2. Applying Competition to Evolutionary Acquisition

C2.9.1.2.2.1. An evolutionary acquisition strategy must be based on time-phased requirements, consisting of an initial block of capability, and some number of subsequent blocks necessary to provide the full capability required. Plans for competition must be tailored to the nature of each block, and the relationship of the successive blocks to each other. For example, if each block adds a discrete capability in a segregable package to a pre-established modular open system architecture, it may be possible and desirable to obtain full and open competition for each block. If each successive block enhances capability by building on its predecessor, such that it is necessary that the supplier of the first block also create the next block, then competition for the initial block may establish the sole source for subsequent blocks.

C2.9.1.2.2.2. There is no presumption that successive blocks must be developed or produced by the same contractor. The acquisition strategy shall:

C2.9.1.2.2.2.1. Describe the plan for competition for the initial block. State how the solicitation will treat the initial block, and why. For example, the first block may be:

C2.9.1.2.2.2.1.1. A stand-alone requirement, independent of any future procurements of subsequent blocks;

C2.9.1.2.2.2.1.2. The first in a series of time-phased requirements, all of which are expected to need to be satisfied by the same prime contractor.

C2.9.1.2.2.2.2. State, for each successive block, whether competition at the prime contract level is practicable, and why.

C2.9.1.2.2.2.2.1. When competition is practicable, explain plans for the transition from one block to the next if there is a different prime contractor for each, and the manner in which integration issues will be addressed.

C2.9.1.2.2.2.2.2. When competition is not planned at the prime contract level, identify the FAR Part 6 reason for using other than full and open competition; explain how long, in terms of contemplated successive blocks, the sole source is expected to be necessary; and address when and how competition will be introduced, including plans for bringing competitive pressure to bear on the program through competition at major subcontractor or lower tiers or through other means.

C2.9.1.2.3. Industry Involvement. DoD policy encourages early industry involvement in the acquisition effort, consistent with the Federal Advisory Committee Act (FACA) (reference (cc)) and FAR Part 15 (reference (dd)). The acquisition strategy shall describe past and planned industry involvement. The PM shall apply knowledge gained from industry when developing the acquisition strategy; however, with the exception of the PM's support contractors, industry shall not directly participate in acquisition strategy development.

C2.9.1.3. Potential Obstacles to Competition

C2.9.1.3.1. Exclusive Teaming Arrangements. Two or more companies create an exclusive teaming arrangement when they agree to team to pursue a DoD acquisition program, and agree not to team with other competitors for that program. These teaming arrangements occasionally result in inadequate competition for DoD contracts. While the Department's preference is to allow the private sector to team and subcontract without DoD involvement, the Department shall intervene, if necessary, to assure adequate competition. The MDA shall approve any action to break up a team.

C2.9.1.3.2. Sub-Tier Competition

C2.9.1.3.2.1. All acquisition programs shall foster competition at sub-tier levels, as well as at the prime level. The PM shall focus on critical product and technology competition when formulating the acquisition strategy; when exchanging information with industry; and when managing the program system engineering and life cycle.

C2.9.1.3.2.2. Preparation of the acquisition strategy shall include an analysis of product and technology areas critical to meeting program needs. The acquisition strategy shall identify the potential industry sources to supply these needs. The acquisition strategy shall highlight areas of potential vertical integration (i.e., where potential prime contractors are also potential suppliers). Vertical integration may be detrimental to DoD interests if a firm employs internal capabilities without consideration of, or despite the superiority of, the capabilities of outside sources. The acquisition strategy shall describe the approaches the PM will use (e.g., requiring an open systems architecture, investing in alternate technology or product solutions, breaking out a subsystem or component, etc.) to establish or maintain access to competitive suppliers for critical areas at the system, subsystem, and component levels.

C2.9.1.3.2.3. During early exchanges of information with industry (e.g., the draft request for proposal process), PMs shall identify the critical product and technology areas that the primes plan to provide internally or through exclusive teaming. The PM shall assess the possible competitive effects of these choices. The PM shall take action to mitigate areas of risk. If the action requires a change to the approved acquisition strategy, the PM shall recommend the needed change to the MDA.

C2.9.1.3.2.4. As the designs evolve, the PM shall continue to analyze how the prime contractor is addressing the program's critical product and technology areas. This analysis may identify areas where the design unnecessarily restricts subsystem or component choices. Contractors shall be challenged during requirements and design reviews to support why planned materiel solutions for subsystem and component requirements critical to the program are appropriate when other choices are available. This monitoring shall continue through the system life cycle (e.g., reprocurements, logistics support).

C2.9.1.4. Potential Sources. The PM shall consider both international (consistent with possible information security and technology transfer restrictions) and domestic sources that can meet the need, and consider both commercial and non-developmental items as the primary source of supply, consistent with FAR Part 25 (reference (ee)) and Defense Federal Acquisition Regulation Supplement (DFARS) Part 225 (reference (ff)). The PM shall consider national policies on contracting and subcontracting with small business (15 U.S.C. 644(a) (reference (gg)) & 15 U.S.C. 644(j) (reference (hh))), small and disadvantaged business (15 U.S.C. 637(d)(4)-(6) (reference (ii))), women-owned small business (Pub. L. 100-533 (1988) (reference (jj))), and labor surplus areas (15 U.S.C. 644(d) (reference (kk))), and address considerations to secure participation of these entities at both prime and sub-tier levels. The PM shall consider intra-government work agreements, i.e., formal agreements, project orders or work requests, in which one government activity agrees to perform work for another, creating a supplier/customer relationship.

C2.9.1.4.1. Market Research. The PM shall use market research as a primary means to determine the availability and suitability of commercial and non-developmental items,

and the extent to which the interfaces for these items have broad market acceptance, standards-organization support, and stability. Market research shall support the acquisition planning and decision process, supplying technical and business information about commercial technology and industrial capabilities. Market research, tailored to program needs shall continue throughout the acquisition process and during post-production support. FAR Part 10 (reference (ll)) requires the acquisition strategy to include the results of completed market research and plans for future market research.

C2.9.1.4.2. Commercial and Non-Developmental Items

C2.9.1.4.2.1. The PM shall use sources of supply that provide for the most cost-effective system throughout its life cycle. The PM shall work with the user to define and modify, as necessary, requirements to facilitate the use of commercial and non-developmental items. This includes requirements for hardware, software, interoperability, data interchange, packaging, transport, delivery, and automatic test systems. Within the constraints of these requirements, the PM shall require contractors and subcontractors to use commercial and non-developmental items to the maximum extent possible. While some commercial items may not meet system-level requirements for ACAT I and IA programs, numerous commercial components, processes, practices, and technologies have application to DoD systems. This policy shall extend to subsystems, components, and spares levels based on the use of performance specifications and form, fit, function and interface specifications. Preference shall be first to commercial items, then to non-developmental items. FAR Section 2.101 (reference (mm)) contains definitions of commercial and non-developmental items.

C2.9.1.4.2.2. The commercial market place widely accepts and supports open interface standards, set by recognized standards organizations. These standards support interoperability, portability, scalability, and technology insertion. When selecting commercial or non-developmental items, the PM shall prefer open interface standards and commercial item descriptions. If acquiring products with closed interfaces, the PM shall conduct a business case analysis to justify acceptance of the associated economic impacts on TOC and risks to technology insertion and maturation over the service life of the system.

C2.9.1.4.3. Dual-Use Technologies and the Use of Commercial Plants

C2.9.1.4.3.1. Dual-use technologies are technologies that meet a military need, yet have sufficient commercial application to support a viable production base. Market research and analysis shall identify and evaluate possible dual-use technology and component development opportunities. Solicitation document(s) shall encourage offerors to use, and the PM shall give consideration to, dual-use technologies and components. System design shall facilitate the later insertion of leading edge, dual-use technologies and components throughout the system life cycle.

C2.9.1.4.3.2. Solicitation document(s) shall encourage offerors to use commercial plants and integrate military production into commercial production as much as possible.

C2.9.1.4.4. Industrial Capability

C2.9.1.4.4.1. The acquisition strategy shall summarize an analysis of the industrial base capability to design, develop, produce, support, and, if appropriate, restart the program (10 U.S.C. 2440 (reference (nn))) as appropriate for the next program phase. This analysis (see DoD Directive 5000.60 (reference (oo)) and DoD Handbook 5000.60-H (reference (pp))) shall identify DoD investments needed to create or enhance certain industrial capabilities, and the risk of industry being unable to provide program design or manufacturing capabilities at planned cost and schedule. If the analysis indicates an issue beyond the scope of the program, the PM shall notify the MDA through the PEO. When there is an indication that industrial capabilities needed by DoD are in danger of being lost, DoD Components shall perform an analysis to determine whether government action is required to preserve an industrial capability vital to national security. Prior to completing or terminating production, Components shall ensure an adequate industrial capability and capacity to meet post-production operational needs. Actions shall address product technology obsolescence, replacement of limited-life items, regeneration options for unique manufacturing processes, and conversion to performance requirements at the subsystems, component, and spares levels.

C2.9.1.4.4.2. In many cases, commercial demand now sustains the national and international technology and industrial base. The PM shall structure the acquisition strategy to promote sufficient program stability to encourage industry to invest, plan, and bear risks. Programs shall minimize the need for new defense-unique industrial capabilities. Foreign sources and international cooperative development shall be used where advantageous and within limitations of the law (DFARS Part 225 (reference (ff))).

C2.9.1.5. Small Business Innovation Research (SBIR) Technologies. The PM shall develop an acquisition strategy that plans for the use of technologies developed under the SBIR program, and gives favorable consideration for funding of successful SBIR technologies. At milestone and appropriate program reviews for ACAT I programs, the PM shall address the program's plans for funding the further development and insertion into the program of SBIR-developed technologies. A searchable database of SBIR-funded technologies exists at http://www.acq.osd.mil/sadbu/sbir/sitemap.html#awards.

C2.9.2. International Cooperation. The globalization of today's economy requires a high degree of coordination and international cooperation. Consistent with possible information security and technology transfer limitations, the PM shall adhere to the following guidelines.

C2.9.2.1. International Cooperative Strategy. The acquisition strategy shall discuss the potential for increasing, enhancing, and improving the conventional forces of the North Atlantic Treaty Organization (NATO) and the U.S., including reciprocal defense trade and cooperation, and international cooperative research, development, production, and logistic support. The acquisition strategy shall also consider the possible sale of military equipment. The discussion shall identify similar projects under development or in production by a U.S. ally. The acquisition strategy shall assess whether the similar project could satisfy U.S. requirements, and if so, recommend designating the program an International Cooperative Program. The MDA shall review and approve the acquisition strategy for all programs at each acquisition program decision in accordance with 10 U.S.C. 2350a (reference (qq)), paragraph (e). All international considerations shall remain consistent with the maintenance of a strong national technology and industrial base and mobilization capability. Restricted foreign competition for the program, due to industrial base considerations, shall require prior USD(AT&L) approval. Results of T&E of systems using approved International Test Operating procedures may be accepted without repeating the testing.

C2.9.2.2. International Interoperability. The growing requirement for effective international coalitions requires a heightened degree of international interoperability. Reciprocal trade and cooperative programs with allies and friendly nations serves this end. Programs shall strive to achieve deployment and sustainability of interoperable systems with our potential coalition partners.

C2.9.2.3. International Cooperation Compliance

C2.9.2.3.1. To promote increased consideration of international cooperation and interoperability issues early in the development process, the PM shall, at each acquisition program milestone, discuss cooperative opportunities in the acquisition strategy (10 U.S.C. 2350a (reference (qq))), including:

C2.9.2.3.1.1. Provide a statement indicating whether or not a project similar to the one under consideration is in development or production by one or more major allies or NATO organizations.

C2.9.2.3.1.2. If there is such a project, provide an assessment as to whether that project could satisfy, or be modified in scope to satisfy, U.S. military requirements.

C2.9.2.3.1.3. Provide an assessment of the advantages and disadvantages, with regard to program timing, life-cycle costs, technology sharing, standardization, and interoperability, of a cooperative program with one or more major allies or NATO organizations.

C2.9.2.3.2. PMs shall always give priority consideration to the most efficient and cost-effective solution over the system's life cycle. Generally, use or modification of systems or

equipment that the Department already owns is more cost- and schedule-effective than acquiring new materiel.

C2.9.2.4. Testing Required for Foreign Military Sales. An ACAT I or II system that has not successfully completed initial operational test and evaluation (IOT&E) shall require USD(AT&L) approval prior to any foreign military sale, commitment to sell, or DoD agreement to license for export. This policy does not preclude government-sponsored discussions of potential cooperative opportunities with allies or reasonable advance business planning or marketing discussions with potential foreign customers by defense contractors, provided appropriate authorizing licenses are in place.

C2.9.3. Contract Approach

C2.9.3.1. Major Contract(s) Planned. For each major contract planned to execute the acquisition strategy, the acquisition strategy shall describe what the basic contract buys; how major deliverable items are defined; options, if any, and prerequisites for exercising them; and the events established in the contract to support appropriate exit criteria for the phase or intermediate development activity. The PM shall use modular contracting, as described in FAR Section 39.103 (reference (rr)), for major IT acquisitions, to the extent practicable. PMs shall consider using modular contracting for other acquisition programs. In accordance with 10 U.S.C. 2306b (reference (ss)), the acquisition strategy shall address the PM's consideration of multiyear contracting for full rate production, and address the PM's assessment of whether the production program is suited to the use of multiyear contracting based on the requirements in FAR Subpart 17.1 (reference (tt)).

C2.9.3.2. Contract Type. For each major contract, the acquisition strategy shall identify the type of contract planned (e.g., firm fixed-price (FFP); fixed price incentive, firm target; cost plus incentive fee; or cost plus award fee) and the reasons it is suitable, including considerations of risk assessment and reasonable risk-sharing by the Government and the contractor(s). Fixed price development contracts of $25 million or more or fixed price type contracts for lead ships shall require the prior approval of the USD(AT&L) (DFARS Section 235.006 (reference (uu))), regardless of a program's ACAT.

C2.9.3.3. Contract Incentives. The acquisition strategy shall explain the planned contract incentive structure, and how it incentivizes the contractor(s) to provide the contracted product or services at or below the established cost objectives (see section C1.3.4.). If more than one incentive is planned for a contract, the acquisition strategy shall explain how the incentives complement each other and ensure the incentives will not interfere with one another.

C2.9.3.4. Integrated Contract Performance Management

C2.9.3.4.1. The PM shall obtain integrated cost and schedule performance data to monitor program execution. The PM shall require contractors to use internal management control systems that 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 PMs with information at a practical level of summarization. Unless waived by the MDA, the PM shall require that contractors' management information systems used in planning and controlling contract performance meet the Earned Value Management Systems (EVMS) guidelines set forth in American National Standards Institute/EIA 748-98, Chapter 2 (reference (vv)) (see Appendix 4). The PM shall not require a contractor to change its system provided it meets these guidelines, nor shall the PM impose a single system or specific method of management control. These guidelines shall not be used as a basis for reimbursing costs or making progress payments.

C2.9.3.4.2. The PM shall apply EVMS guidelines on applicable contracts within acquisition, upgrade, modification, or materiel maintenance programs, including highly sensitive classified programs, major construction programs, and other transaction agreements. EVMS guidelines shall apply to contracts executed with foreign governments, project work performed in government facilities, and contracts by specialized organizations such as the Defense Advanced Research Projects Agency. EVMS guidelines shall apply to research, development, test, and evaluation contracts, subcontracts, other transaction agreements, and intra-government work agreements with a value of $73 million or more (in FY 2000 constant dollars), or procurement or operations and maintenance contracts, subcontracts, other transaction agreements, and intra-government work agreements with a value of $315 million or more (in FY 2000 constant dollars). Use DFARS Clauses 252.234-7000 (reference (ww)) and 252.234-7001 (reference (xx)) to place EVMS requirements in solicitations and contracts.

C2.9.3.4.3. The C/SSR (see 7.15.7.3) shall apply to contracts, subcontracts, other transaction agreements, or intra-government work agreements below these thresholds, unless the PM requires EVMS compliance. Use DFARS Clauses 252.242-7005 (reference (yy)) and 252.242-7006 (reference (zz)) to place Cost/Schedule Status Report (C/SSR) requirements in solicitations and contracts.

C2.9.3.4.4. The PM shall not require compliance with EVMS guidelines or C/SSR requirements on FFP contracts (including FFP contracts with economic price adjustment provisions), time and materials contracts, and contracts that consist mostly of level-of-effort work. For exceptions to this rule, the PM shall obtain a waiver for individual contracts from the MDA.

C2.9.3.5. Integrated Baseline Reviews. PMs and their technical staffs or IPTs shall evaluate contract performance risks inherent in the contractor's planning baseline. This

evaluation shall be initiated within 6 months after contract award or intra-government agreement is reached for all contracts requiring EVMS or C/SSR compliance.

C2.9.3.6. Special Contract Terms and Conditions. The acquisition strategy shall identify any unusual contract terms and conditions and all existing or contemplated deviations to the FAR or DFARS.

C2.9.3.7. Warranties. The PM shall examine the value of warranties on major systems and pursue them when appropriate and cost-effective. If appropriate, the PM shall incorporate warranty requirements into major systems contracts in accordance with FAR Subpart 46.7 (reference (aaa)).

C2.9.3.8. Component Breakout. The PM shall consider component breakout on every program and break out components when there are significant cost savings (inclusive of Government administrative costs), the technical or schedule risk of furnishing government items to the prime contractor is manageable, and there are no other overriding Government interests (e.g., industrial capability considerations or dependence on contractor logistics support). The acquisition strategy shall address component breakout and briefly justify the component breakout strategy (see DFARS Appendix D (reference (bbb))). It shall list all components considered for breakout, and provide 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 not selected. The PM shall provide the rationale for a decision not to break out any components.

C2.9.4. Leasing. The PM shall consider the use of leasing in the acquisition of commercial vehicles and equipment whenever the PM determines that leasing of such vehicles is practicable and efficient. The PM shall not enter into any lease with a term of 18 months or more, or extend or renew any lease for a term of 18 months or more, for any vessel, aircraft, or vehicle, unless the PM has considered all costs of such a lease (including estimated termination liability) and has determined, in writing, that the lease is in the best interest of the Government. (10 U.S.C. 2401a (reference (ccc)))

C3. CHAPTER 3
TEST AND EVALUATION

C3.1. TEST AND EVALUATION (T&E) OVERVIEW

C3.1.1. T&E reveals information about the program and measures performance of the system against established requirements. The PM, in concert with the user and test communities, shall coordinate developmental test and evaluation (DT&E), operational test and evaluation (OT&E), LFT&E, family-of-systems interoperability testing, and modeling and simulation (M&S) activities, into an efficient continuum, closely integrated with requirements definition and systems design and development. The T&E strategy shall provide information about risk and risk mitigation, provide empirical data to validate models and simulations, evaluate technical performance and system maturity, and determine whether systems are operationally effective, suitable, and survivable against the threat detailed in the System Threat Assessment (see section C6.2.4.). The T&E strategy shall also address development and assessment of the weapons support test systems during the System Development and Demonstration Phase, and into production, to ensure satisfactory test system measurement performance, calibration traceability and support, required diagnostics, safety, and correct test requirements implementation. Adequate time and resources shall be planned to support pre-test predictions and post-test reconciliation of models and test results, for all major test events.

C3.1.2. The PM shall design DT&E objectives appropriate to each phase and milestone of an acquisition program. The OTA shall design OT&E objectives appropriate to each phase and milestone of a program, and submit them to the PM for inclusion in the Test and Evaluation Master Plan (TEMP). Completed IOT&E and completed LFT&E shall support a beyond LRIP decision for ACAT I and II programs for conventional weapons systems designed for use in combat. For this purpose, OT&E shall require more than an operational assessment (OA) 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 U.S.C. 2399 (reference (ddd)) and 10 U.S.C. 2366 (reference (w)))

C3.2. T&E STRATEGY

T&E planning shall begin during the Concept and Technology Development Phase. The PM shall form the T&E WIPT. Representatives from DT&E (contractor and government), OT&E, LFT&E, and intelligence communities shall support the WIPT. If a project or program enters the acquisition process later than concept and technology development, the PM shall form the WIPT prior to entering the acquisition process. A T&E WIPT can be useful for a pre-system acquisition activity (e.g., an advanced concept technology demonstration, an advanced technology demonstration, or joint war fighting experimentation) that has a likelihood of becoming an acquisition program. A continuous T&E WIPT can help ensure a smooth

transition, and can be used to prepare the initial TEMP. The early integration of T&E with program management ensures a test strategy consistent with and supportive of the acquisition strategy.

C3.2.1. Evaluation Strategy

C3.2.1.1. Projects that undergo a Milestone A decision shall have an evaluation strategy. Immediately upon forming, the T&E WIPT shall craft an evaluation strategy to support pre-acquisition and early acquisition process activity. The evaluation strategy shall primarily address M&S, including identifying and managing the associated risk, and early T&E strategy to evaluate system concepts against mission requirements. Pre-Milestone A projects will not have an ORD nor Critical Operational Issues (COIs), on which to base a detailed T&E plan. Therefore, the evaluation strategy shall rely on the Mission Needs Statement (MNS) as its basis.

C3.2.1.2. The evaluation strategy has no mandatory format. It shall follow the same approval process as prescribed for a TEMP. The strategy is due to the Office of the Secretary of Defense (OSD) (or to the MDA for less than ACAT I, IA, or non-OSD T&E oversight programs) not later than 180 days after the Milestone A decision or the date the program enters the acquisition cycle. For programs entering the acquisition cycle at Milestone B or beyond, a TEMP shall be required in lieu of the evaluation strategy. The evaluation strategy shall be the basis of and evolve into the T&E strategy in the TEMP.

C3.2.2. Evolutionary Acquisition Consideration. The T&E strategy for a program using an evolutionary acquisition strategy shall remain consistent with the time-phased requirements in the ORD. Test planning shall acknowledge the block deliveries established in the acquisition strategy and baselined in the APB. Test criteria shall be specific to each increment of the militarily-useful capability planned for each block.

C3.2.3. T&E Planning

C3.2.3.1. TEMP

C3.2.3.1.1. The PM and T&E WIPT shall produce a TEMP in support of Milestones B and C. They shall update the TEMP at the Full Rate Production Decision Review to reflect planning for block upgrades. The TEMP shall focus on the overall structure, major elements, and objectives of the T&E program and be consistent with the acquisition strategy, approved ORD, and C4ISP. (See section C6.4. and Appendix 5) It shall provide a road map for integrated simulation, test, and evaluation plans, schedules, and resource requirements necessary to accomplish the T&E program. It shall include sufficient detail to permit planning for the timely availability of the test resources required to support the T&E program.

C3.2.3.1.2. DOT&E and the cognizant OIPT leader shall approve the TEMP and T&E portions of integrated program management documents for all ACAT I programs, selected ACAT IAM programs, and other designated programs. Mandatory TEMP format and procedures appear in Appendix 2. This format may be used at the discretion of the MDA for ACAT II and III programs and highly sensitive classified programs.

C3.2.3.2. T&E Guidelines

C3.2.3.2.1. Early T&E activities shall harmonize MOEs, MOPs, and risk with the needs depicted in the MNS, and with the objectives and thresholds addressed in the analysis of alternatives, and defined in the ORD, APB, and TEMP, as these documents become available. The user shall establish quantitative criteria for as many MOEs and MOPs as practical. The TEMP shall contain test event or scenario descriptions and resource requirements (including special instrumentation, test articles, ranges and facilities, and threat targets and simulations validated in accordance with a DOT&E-approved process) and test limitations that impact the system evaluation. The Defense Intelligence Agency (DIA) shall validate the threat information associated with these elements of the T&E process.

C3.2.3.2.2. The following T&E guidelines apply:

C3.2.3.2.2.1. Test planning shall consider the use of ground test activities, to include hardware-in-the-loop simulation, prior to conducting full-up, system-level testing, such as flight-testing, in realistic environments.

C3.2.3.2.2.2. Planning, at minimum, shall address all system components (hardware, software, and human interfaces) critical to achieve and demonstrate contract technical performance specifications and ORD-defined operational effectiveness and suitability requirements.

C3.2.3.2.2.3. Phased criteria, quantitative when possible, shall determine hardware, software, and system maturity and readiness to proceed through the acquisition process. The various approved ORD KPPs and the MOEs and MOPs used in the analysis of alternatives and during T&E shall remain linked.

C3.2.3.2.2.4. Planning shall provide for completed DT&E, OT&E, and LFT&E, as required, before entering full-rate production.

C3.2.3.2.2.5. T&E on commercial and non-developmental items shall ensure performance, operational effectiveness, and operational suitability for the military application in the military environment, regardless of the manner of procurement. Test planning for these items shall recognize commercial testing and experience, but nonetheless determine the

appropriate DT&E, OT&E, and LFT&E needed to assure effective performance in the intended operational environment.

C3.2.3.2.2.6. Test planning and conduct shall take full advantage of existing investment in DoD ranges, facilities, and other resources, wherever practical, unless otherwise justified in the TEMP. The DoD Major Range and Test Facility Base is maintained and managed to support and provide capabilities for DoD acquisition programs in accordance with DoD Directive 3200.11 (reference (eee)).

C3.2.3.2.2.7. Planning shall consider the potential testing impacts on the environment (42 U.S.C. 4321-4370d and Executive Order (E.O.) 12114 (references (fff) and (ggg))).

C3.2.3.2.2.8. The concept of early and integrated T&E shall emphasize prototype testing during system development and demonstration and early OAs to identify technology risks and provide operational user impacts. OTAs shall maximize their involvement in early, pre-acquisition activities. The goal of integrated T&E shall be to provide early operational insights into the developmental process. This early operational insight should reduce the scope of the integrated OT&E thereby contributing to reduced cycle time and TOC.

C3.2.3.2.2.9. Appropriate use of accredited models and simulation to support DT&E, OT&E, and LFT&E shall be coordinated through the T&E WIPT.

C3.2.3.2.2.10. Planning shall consider a combined DT&E, OT&E, and/or LFT&E approach. The combined approach shall not compromise either developmental testing (DT) or operational testing (OT) objectives. Planning shall provide for an adequate OT period and report generation, including the DOT&E Beyond LRIP Report prior to the decision milestone.

C3.2.3.2.2.11. DOT&E and the Deputy Director, DT&E, Office of Strategic and Tactical Systems, Office of the USD(AT&L) shall have full and timely access to all available developmental, operational, and live fire T&E information.

C3.2.3.2.2.12. All DoD MDAPs, programs on the OSD T&E Oversight list, post-acquisition (legacy) systems, and all programs and systems that must interoperate with them, are subject to interoperability evaluations throughout their life cycles to validate their ability to support mission accomplishment. At the discretion of the USD(AT&L), ASD(C3I), DOT&E, United States Joint Forces Command (USJFCOM), and the Joint Staff, they shall place programs and systems deemed to have significant interoperability deficiencies on the Interoperability Watch List. PMs for a program on the Watch List will be required to undertake corrective actions to address interoperability deficiencies in order to be removed from the Interoperability Watch List.

C3.2.3.2.2.12.1. Programs on the Interoperability Watch List will provide periodic updates of current status towards correcting identified deficiencies to senior representatives of USD(AT&L), ASD(C3I), DOT&E, USJFCOM, and the Joint Staff. The PM, or other cognizant official, and the responsible test organization (either developmental or operational), in conjunction with the Joint Interoperability Test Command (JITC), shall provide these updates. These updates will support an assessment as to whether interoperability issues are being adequately addressed, and whether a status change is warranted (i.e., whether the program or system should be removed from the Interoperability Watch List, kept on the Interoperability Watch List, or proposed for T&E Oversight). Staff members of USD(AT&L), ASD(C3I), DOT&E, USJFCOM, and the Joint Staff shall prepare Quarterly reports summarizing the activities of systems and programs on the Watch List.

C3.2.3.2.2.12.2. For systems on the OSD T&E Oversight List, DOT&E shall provide assessments at early milestone reviews as to whether the system under review has a viable plan to demonstrate operational interoperability.

C3.2.3.2.2.13. For IT systems, including NSS, with interoperability requirements, the JITC shall provide system interoperability test certification memoranda to the Director, Joint Staff J-6, throughout the system life-cycle and regardless of ACAT. Based on interoperability evaluations and other pertinent factors, the Joint Staff J-6 will issue interoperability system validation memoranda to the respective Services, Agencies, and developmental and operational test organizations. The Joint Staff J-6 also provides interoperability requirements (CRD and ORD) and supportability (C4ISP) certifications.

C3.3. ANNUAL OSD T&E OVERSIGHT LIST

DOT&E and Director, Strategic and Tactical Systems (D, S&TS) shall jointly, and in consultation with the T&E executives of the cognizant DoD Components, publish an Annual OSD T&E Oversight List of programs designated for OSD T&E oversight. This list shall identify programs on developmental test, operational test, or live-fire test oversight. Programs can be on oversight for only one of the three areas, or for more than one area. The DoD memorandum entitled "Designation of Programs for OSD Test and Evaluation (T&E) Oversight" (reference (hhh)) contains the OSD T&E Oversight List.

C3.4. DEVELOPMENTAL TEST AND EVALUATION (DT&E)

C3.4.1. DT&E shall:

C3.4.1.1. Identify the technological capabilities and limitations of the alternative concepts and design options under consideration;

C3.4.1.2. Identify and describe design technical risks. Assist in the design of a system at the component, sub-system, and system level by reducing technical risk prior to transitioning to the next level;

C3.4.1.3. Stress the system under test at least to the limits of the Operational Mode Summary/Mission Profile by "pushing the envelope" to ensure expected operational performance environments can be satisfied. For some systems it may be appropriate to push beyond the normal operating limits to ensure the robustness of the design.

C3.4.1.4. Address the potential of satisfying OT&E requirements to the best extent possible by testing in operationally relevant environments (simulated or actual), without jeopardizing DT&E objectives, to reduce overall T&E redundancy and costs.

C3.4.1.5. Analyze the capabilities and limitations of alternatives to support cost-performance trade-offs;

C3.4.1.6. Assess progress toward meeting KPPs and other ORD requirements, COIs, mitigating acquisition technical risk, and achieving manufacturing process requirements and system maturity;

C3.4.1.7. Assess technical progress and maturity against critical technical parameters, to include interoperability, documented in the TEMP;

C3.4.1.8. Provide data and analytic support to the decision process to certify the system ready for OT&E;

C3.4.1.9. In the case of IT systems, support the information systems security certification process; and,

C3.4.1.10. Prior to full rate production, demonstrate the maturity of the production process through Production Qualification Testing of LRIP assets.

C3.4.2. D, S&TS shall assess compliance with DT&E policies and procedures in this Regulation.

C3.5. CERTIFICATION OF READINESS FOR OPERATIONAL TEST & EVALUATION (OT&E)

The developing agencies (i.e., materiel and combat developers) shall complete the following tasks before starting OT&E:

C3.5.1. Define risk management measures and indicators, with associated thresholds, to address performance and technical adequacy of both hardware and software.

C3.5.2. Establish the maturity criteria and performance exit criteria necessary for certification for OT&E. The PM shall document these maturity criteria and performance exit criteria in the TEMP.

C3.5.3. Support the conduct of Operational Test Readiness Reviews (OTRRs).

C3.5.4. Review all available interoperability assessments (e.g., OAs, JITC interoperability assessments, and standards conformance reports) during OTRRs to highlight potentially critical interoperability problems for assessment during OT&E.

C3.5.5. Complete a mission impact analysis of unmet criteria and thresholds, including critical interoperability problems to be assessed during OT&E.

C3.5.6. Prepare and distribute to TEMP signatories a DT&E report as prescribed below.

C3.5.7. Formally certify the system ready for OT&E.

C3.5.8. Certify and accredit communications systems (see DoD Instruction 5200.40 (reference (iii)));

C3.5.9. Conduct Environment, Safety, and Occupational Health (see subparagraph C5.2.3.5.10.) review for each test.

C3.6. OPERATIONAL TEST & EVALUATION (OT&E)

C3.6.1. OT&E shall determine the operational effectiveness and suitability of a system under realistic operational conditions, including combat; determine if the thresholds and objectives in the approved ORD and the COIs have been satisfied; and assess impacts to combat operations. The following procedures shall apply:

C3.6.1.1. The DoD Component OTA shall be responsible for OT&E.

C3.6.1.2. OT&E shall use threat or threat representative forces, targets, and threat countermeasures, validated by DIA or the DoD Component intelligence agency, as appropriate, and approved by DOT&E[1]. DOT&E shall oversee threat target, threat simulator, and threat simulation acquisitions and validation to meet developmental, operational, and live fire test and evaluation needs.

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[1] Normally not applicable to ACAT IA programs.

C3.6.1.3. Information assurance testing shall be conducted on information systems to ensure that planned and implemented security measures satisfy ORD and System Security Authorization Agreement (SSAA) requirements when the system is installed and operated in its intended environment. The PM, OT&E test authority, and designated approving authority shall coordinate and determine the level of risk associated with operating the system and the extent of security testing required (see section C6.6.). Any requirements to reconstitute or recover information system capabilities damaged by information assurance threat agents should also be tested during OT&E.

C3.6.1.4. Typical users shall operate and maintain the system or item under conditions simulating combat stress and peacetime conditions.

C3.6.1.5. The independent OTAs 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).

C3.6.1.6. Test planning shall consider M&S. OT&E should leverage M&S used during DT&E to improve its credibility and reduce M&S development time and costs. Whenever possible, an OA 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 OA, such assessments may utilize computer modeling and/or hardware in the loop, simulations (preferably with real operators in the loop), or an analysis of information contained in key program documents, consistent with section C3.1. above. The TEMP (see subparagraph C3.2.3.1.) shall explain the extent of M&S supporting OT&E.

C3.6.1.7. The OTA shall test and evaluate all hardware and software alterations that materially change system performance (operational effectiveness and suitability). This includes system upgrades and changes to correct deficiencies identified during T&E.

C3.6.1.8. 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 PM shall ensure the independent OTA is involved in the monitoring of or participating in all relevant testing to make use of any/all relevant results to complete OAs. The OTA shall determine the inclusion/exclusion of test data for use during OAs and shall determine the requirement for any additional operational testing needed for effectiveness and suitability.

C3.6.1.9. OTAs shall conduct an independent, dedicated phase of OT&E before full-rate production to evaluate operational effectiveness and suitability as required by 10 U.S.C. 2399 (reference (ddd)) for ACAT I and II programs.

C3.6.1.10. OTAs shall participate in early DT&E and M&S to provide operational insights to the PM, requirements developers, and acquisition decision makers.

C3.6.1.11. For systems with joint interoperability requirements, all available interoperability assessments (e.g., OAs, JITC interoperability assessments, standards conformance reports) should be reviewed during the OTRR before conducting IOT&E. Potentially critical interoperability problems shall be highlighted for assessment during OT&E.

C3.6.1.12. OT&E shall evaluate potentially adverse electromagnetic environmental effects (E3) and spectrum supportability situations. Operational testers shall use all available data, and shall review DD Form 1494 or JF-12 to determine which systems need field assessments.

C3.6.1.13. All weapon, Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR), and information programs that are dependent on external information sources, or that provide information to other DoD systems, shall be assessed for information assurance. The level of information assurance testing depends on the system risk and importance. Systems with the highest importance and risk shall be subject to penetration-type testing prior to the beyond LRIP decision. Systems with minimal risk and importance shall be subject to normal National Security Agency security and developmental testing, but shall not be subject to field penetration testing during OT&E.

C3.6.1.14. OT&E shall take maximum advantage of training and exercise activities to increase the realism and scope of OT and reduce testing costs.

C3.6.1.15. DOT&E shall determine the quantity of articles procured for OT&E for MDAPs; the cognizant OTA shall make this decision for non-MDAPs (10 U.S.C. 2399 (reference (ddd))).

C3.6.1.16. The operational effectiveness of MDAPs for large-scale training systems shall be determined based on their demonstrated training effectiveness.

C3.6.1.17. Each DoD Component shall provide weapons effectiveness data for weapons in the acquisition process to DOT&E for use in the Joint Munitions Effectiveness Manuals. The DoD Component shall provide the data prior to the weapon achieving initial operational capability, and shall prepare the data in coordination with the Joint Technical Coordinating Group for Munitions Effectiveness.

C3.6.1.18. DOT&E shall assess the adequacy of OT&E and LFT&E, and evaluate the operational effectiveness, suitability, and survivability, as applicable, of systems under DOT&E oversight.

C3.6.2. OT&E Plans

C3.6.2.1. DoD Components shall brief DOT&E on concepts for an OT&E or OA 120 days prior to start. They shall submit the T&E plan 60 days prior, and shall report major revisions as they occur. Test plans shall include test objectives; MOEs, MOPs, and measures of operational suitability; planned operational scenarios; threat representations; targets; resources; test limitations; and methods of data gathering and certification, reduction, and analysis. The detail of the planned test events shall permit DOT&E to assess operational realism.

C3.6.2.2. DOT&E shall approve, in writing, the adequacy of OT&E plans (including project funding) for all ACAT I programs, selected ACAT IAM programs, and other programs under DOT&E oversight (identified on the "Designation of Programs for OSD Test and Evaluation (T&E) Oversight" memorandum), prior to starting OT&E (see section C3.3.). DOT&E shall approve plans for all OAs in OSD T&E-oversight programs, prior to execution. This approval requirement shall apply to major revisions, as well.

C3.6.2.3. DOT&E-oversight programs beyond LRIP, shall require continued DOT&E test plan approval, monitoring, and Follow-On Operational Test and Evaluation (FOT&E) reporting to complete IOT&E activity; to refine IOT&E estimates; to verify correction of deficiencies; to evaluate significant changes to system design or employment; and to evaluate whether or not the system continues to meet operational needs and retain operational effectiveness in a substantially new environment, as appropriate.

C3.6.3. Use of Contractors in Support of OT&E

C3.6.3.1. Per 10 U.S.C. 2399 (reference (ddd)), persons employed by the contractor for the system being developed may only participate in OT&E of major defense acquisition programs to the extent that is planned for them to be involved in the operation, maintenance, and other support of the system when deployed in combat.

C3.6.3.2. 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 Department of Defense) may not be involved in any way in establishing criteria for data collection, performance assessment, or evaluation activities for OT&E. DOT&E may waive such limitation if DOT&E determines in writing that sufficient steps have been taken to ensure the impartiality of the contractor in providing the services. These limitations do not apply to a contractor that has participated in such development, production, or testing, solely in test or test support on behalf of the Department of Defense.

C3.7. ANTI-TAMPER VERIFICATION TESTING

Anti-tamper component-level verification testing shall take place prior to production as a function of DT/OT. Component-level testing shall not assess the strength of the anti-tamper provided, but instead verify that anti-tamper performs as specified by the source contractor or government agency.

C3.8. LIVE FIRE TEST AND EVALUATION (LFT&E)[2]

C3.8.1. 10 U.S.C. 2366 (reference (w)) mandates LFT&E for all covered systems. The term "covered system" is the DoD term that is intended to include all categories of systems or programs identified in reference (w) as requiring LFT&E, along with additional systems or programs as further described below (see Appendix 3):

C3.8.2. The term "covered system" means a system that DOT&E, acting for the Secretary of Defense, has determined to be:

C3.8.2.1. A major system within the meaning of that term in 10 U.S.C. 2302(5) (reference (jjj)) that is --

C3.8.2.1.1. User-occupied and designed to provide some degree of protection to its occupants in combat; or

C3.8.2.1.2. A conventional munitions program or missile program; or

C3.8.2.2. A conventional munitions program for which more than 1,000,000 rounds are planned to be acquired; or

C3.8.2.3. A modification to a covered system that is likely to affect significantly the survivability or lethality of such a system.

C3.8.3. Directed energy weapons (DEWs) are considered conventional (i.e., not nuclear, biological, or chemical) for the purpose of applying the law and this Regulation. LFT&E addresses the lethality of U.S. DEWs, and the vulnerability of U.S. systems to threat DEWs.

C3.8.4. Systems or programs without decision points mentioned in 10 U.S.C. 2366 (reference (w)), but otherwise meeting statutory criteria, shall be considered covered systems for LFT&E planning purposes. USD(AT&L) shall identify equivalent acquisition events for such systems or programs; and the PM shall schedule LFT&E accordingly. In general, Milestone B

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[2] Not applicable to ACAT IA programs.

shall correspond to the point at which a system or program, in terms of reference (w), "enters Engineering and Manufacturing Development," for the purpose of applying the waiver requirements of reference (w). Pre-acquisition projects such as advanced technology demonstrations or advanced concept technology demonstrations shall undergo LFT&E following their transition into an acquisition program, if they are a covered system. Commercial or non-developmental items may be covered systems or parts of covered systems, depending upon their intended use, and shall, upon such determination, be subject to LFT&E requirements. Program funding shall cover all LFT&E costs.

C3.8.5. LFT&E shall begin at the component, subsystem, and subassembly level, and culminate with tests of the complete system, configured for combat. A covered system shall not proceed beyond LRIP (or equivalent point) until LFT&E is completed and the prescribed Congressional committees receive the required LFT&E report (reference (w)). The PM shall conduct LFT&E sufficiently early in the program life cycle to allow time to correct any design deficiency demonstrated by LFT&E. The PM shall correct the design or recommend adjusting the employment of the covered system before proceeding beyond LRIP.

C3.8.6. DOT&E shall approve the adequacy of the LFT&E strategy before the program begins LFT&E. The LFT&E strategy shall include full-up, system-level testing (i.e., realistic survivability or lethality testing as defined in reference (w)), unless USD(AT&L) for ACAT ID programs, or the CAE for less-than ACAT ID programs, as delegated by the Secretary of Defense, waives such testing. Waiver requests shall include an alternative LFT&E strategy, jointly reviewed by DOT&E and USD(AT&L), and approved by DOT&E. This alternative strategy shall include LFT&E of components, subassemblies, or subsystems; and appropriate, additional, design analyses, M&S, and combat data analyses. Following waiver approval, the waiver authority shall certify, in writing, to the Congressional defense committees, before Milestone B, or entry into System Development and Demonstration (or upon program initiation if entering acquisition at system demonstration or later), that full-up, system-level testing would be unreasonably expensive and impracticable. The certification is required to be accompanied by a report explaining how the Department plans to evaluate the survivability or lethality of the system or program and assessing possible alternatives to realistic survivability testing of the system or program. Therefore, the waiver authority shall include the DOT&E-approved alternative LFT&E strategy with the certification. Essentially, the certification shall explain how USD(AT&L) or the CAE plans to evaluate the survivability or lethality of the system or program in lieu of full-up, system-level testing. TEMPs shall address waivers and the use of alternative LFT&E, when applicable. The MDA and the DoD Component shall consider LFT&E and the LFT&E waiver process when structuring programs and defining acquisition process entry points.

C3.8.7. Programs shall submit Congressional certifications and reports, required by 10 U.S.C. 2366(c) (reference (w)), through DOT&E and USD(AT&L) (DoD Directive 5141.2 (reference (kkk))).

C3.8.8. See Appendix 3 for additional detail.

C3.9. MODELING AND SIMULATION (M&S)

The PM shall identify and fund required M&S resources early in the acquisition life cycle, so that M&S may be integrated with the T&E program. The PM shall use test results to revise both the test program and test procedures. Test results shall also be used to develop and improve models and simulations. The T&E WIPT shall develop and document a robust, comprehensive, and detailed evaluation strategy for the TEMP, using both simulation and test resources, as appropriate. OTAs shall develop evaluation plans consistent with the evaluation strategy.

C3.10. FOREIGN COMPARATIVE TESTING (FCT)

10 U.S.C. 2350a(g) (reference (lll)) prescribes funding for U.S. T&E of selected allied equipment and technologies when such items and technologies have good potential to satisfy valid DoD requirements. USD(AT&L) shall centrally manage FCT.

C3.11. T&E REPORTING

Consistent with departmental policy, the MDA shall minimize T&E reporting requirements consistent with statute and prudent T&E management. USD(AT&L) and DOT&E shall have access to test data as testing progresses.

C3.11.1. DoD Component Reporting of Test Results

C3.11.1.1. ACAT I, selected ACAT IAM programs, and other programs designated for OSD T&E oversight shall provide formal, detailed, reports of results, conclusions, and recommendations from DT&E, OT&E, and LFT&E to DOT&E and USD(AT&L) (or ASD(C3I), as appropriate). For those reports supporting a decision point, the report shall generally be submitted 45 days before the decision point.

C3.11.1.2. All developmental and operational T&E agencies shall identify test and evaluation limitations. They shall report their assessment of the effect of these limitations on system performance, and on their ability to assess technical performance for DT&E or ORD requirements for OT&E.

C3.11.2. LFT&E Report[3]. The Secretary of Defense (or DOT&E if so delegated) shall approve and submit a written LFT&E report to Congress before a covered system proceeds beyond LRIP (10 U.S.C. 2366 (reference (w))). DOT&E shall monitor and review LFT&E of

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[3] Not applicable to ACAT IA programs.

each covered system. At the conclusion of LFT&E, the Director shall prepare an independent assessment report describing the results of the survivability or lethality LFT&E and state whether LFT&E was adequate to provide information to decision-makers on potential user casualties and system vulnerability or lethality when the system is employed in combat; and to ensure that knowledge of user casualties and system vulnerabilities or lethality is based on realistic testing, considering the validated operational requirements of the system, the expected threat, and susceptibility to attack. DOT&E shall prepare the OSD LFT&E Report within 45 days after receiving the DoD Component LFT&E Report.

C3.11.3. Beyond-Low Rate Initial Production (LRIP) Report[4]

C3.11.3.1. DOT&E shall analyze the results of IOT&E conducted for each MDAP. At the conclusion of IOT&E, the Director shall prepare a report stating the opinion of the Director as to:

C3.11.3.1.1. Whether the T&E performed were adequate; and

C3.11.3.1.2. Whether the results of such T&E confirm that the items or components actually tested are effective and suitable for combat.

C3.11.3.2. The Director shall submit Beyond-LRIP reports to the Secretary of Defense, USD(AT&L), and the congressional defense committees. Each such report shall be submitted to those committees in precisely the same form and with precisely the same content as the report originally was submitted to the Secretary and USD(AT&L) and shall be accompanied by such comments as the Secretary may wish to make on the report. A final decision within the DoD to proceed with a MDAP beyond LRIP may not be made until the Director has submitted to the Secretary of Defense the Beyond-LRIP Report with respect to that program and the congressional defense committees have received that report (10 U.S.C. 2399 (reference (ddd))). If the report indicates that either OT&E was inadequate or that the system as tested was ineffective or unsuitable, DOT&E shall continue to report his or her assessment of test adequacy and system operational effectiveness and suitability, based on FOT&E, in the DOT&E Annual Report.

C3.11.4. DOT&E Annual Report[5]. DOT&E shall prepare an annual OT&E and LFT&E activities report, in both classified and unclassified form, summarizing all OT&E and LFT&E activities, and addressing the adequacy of test resources within DoD during the previous fiscal

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[4] Not applicable to ACAT IA programs.

[5] Not applicable to ACAT IA programs.

year (10 U.S.C. 139 (reference (mmm))). The report shall include the status of information assurance, E3, and interoperability for each program. DOT&E shall submit the reports concurrently to the Secretary of Defense, USD(AT&L), and Congress, within 10 days of the President's Budget to Congress.

C3.11.5. FCT Notification[6]. USD(AT&L) shall notify the Speaker of the House, the President of the Senate, the House Armed Services Committee, the Senate Armed Services Committee, and the Appropriations Committees of the Senate and the House of Representatives at least 30 days prior to committing funds to start a new FCT evaluation (10 U.S.C. 2350a(g) (reference (lll))).

C3.11.6. Report to Congress. USD(AT&L), as delegated by the Secretary of Defense, shall include the following information in a biennial report to Congress, as required by 10 U.S.C. 2457(d) (reference (nnn)):

C3.11.6.1. Results of each specific assessment and evaluation of the costs and possible loss of nonnuclear combat effectiveness caused by the failure to standardize equipment within NATO.

C3.11.6.2. Identification of areas in which cooperative agreements may be made with members of NATO.

C3.11.6.3. The non-developmental equipment, software, munitions, and technologies of other members of NATO evaluated under 10 U.S.C. 2350a(g) (reference (lll)) and

C3.11.6.3.1. Developed by allies of the United States and other friendly countries that completed T&E against Service requirements during the previous fiscal year;

C3.11.6.3.2. Procured by the Services during the previous fiscal year as a result of successful T&E; and,

C3.11.6.3.3. Selected to initiate and/or continue evaluation in the current fiscal year.

C3.11.6.4. Procurement actions initiated on each new major system not complying with the policy of 10 U.S.C. 2457 (reference (nnn)).

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[6] Not applicable to ACAT IA programs.

C3.11.6.5. Procurement action initiated on each new major system that is not standardized or interoperable with equipment of other members of NATO, including a description of the system chosen and the reason for choosing that system.

C3.11.6.6. Identification of research and development programs that support or conform to common NATO requirements.

C3.11.6.7. Identification of common NATO military requirements, and action and efforts to determine common requirements; and

C3.11.6.8. The obligation of any funds under reference (lll) for T&E of NATO-member non-developmental items during the previous fiscal year.

C3.11.7. Electronic Warfare (EW) T&E Report. Pub. L. 103-160 (1993) (reference (ooo)) requires the Secretary of Defense to develop a DoD T&E Process for EW Systems and to report annually on the progress toward meeting this process. DoD memorandum, "Designation of Programs for OSD Test and Evaluation (T&E) Oversight" promulgates the reporting procedure, the list of EW programs required to report, and report format. Designated programs shall submit a one-page status report, through Service channels, to the Deputy Director, DT&E, Office of Strategic and Tactical Systems, Office of the USD(AT&L), by November 15th of each year.

C4. CHAPTER 4
LIFE-CYCLE RESOURCE ESTIMATES

C4.1. GENERAL

The Department shall consider the TOC of each acquisition program. For purposes of compliance with this Chapter and reporting costs in acquisition documents (e.g., the APB and Selected Acquisition Report (SAR)), however, use life-cycle costs as defined in DoD 5000.4-M (reference (j)).

C4.2. ANALYSIS OF MULTIPLE CONCEPTS

Each identified mission need has many possible concepts that will satisfy that need. Not all possible concepts can be explored in Concept Exploration. The analysis of multiple concepts is a process of looking at possible concepts and identifying those concepts that could not realistically satisfy the need at a cost and on a schedule that are acceptable to the user. The analysis of multiple concepts will aid decision-makers in placing appropriate boundaries on the type of concepts to explore.

C4.2.1. The analysis shall broadly examine each possible concept and describe the rationale for continuing interest in the concept or eliminating the concept from further consideration. The intent of the analysis shall be to define any limitations on the type of alternatives the Department of Defense will consider, while leaving the range of remaining alternatives as broad as possible, so as not to constrain innovation or creativity on the part of industry.

C4.2.2. The DoD Component(s) responding to a mission need likely to result in an ACAT I or IA program shall prepare the analysis of multiple concepts. The OIPT Leader shall review the analysis, in coordination with Program Analysis and Evaluation (PA&E) and other interested staff offices, and provide an assessment to the MDA.

C4.3. ANALYSIS OF ALTERNATIVES

Analyzing alternatives is part of the CAIV process. Alternatives analysis shall broadly examine multiple elements of project or program alternatives including technical risk and maturity, and costs.

C4.3.1. The analysis shall be quantitative, and induce decision makers and staffs at all levels to engage in qualitative discussions of key assumptions and variables, develop better program understanding, and foster joint ownership of the program and program decisions. There shall be a clear linkage between the analysis of alternatives, system requirements, and T&E MOEs (Pub. L. 104-106 (1996), Section 5123 (reference (e)) and 44 U.S.C. 3506 (reference

(c))). The analysis shall reveal insights into the program knowns and unknowns, and highlight relative advantages and disadvantages of the alternatives being considered. The activity conducting the analysis shall document its findings.

C4.3.2. The analysis shall include sensitivity analyses to possible changes in key assumptions (e.g., threat) or variables (e.g., selected performance capabilities). The analysis shall explicitly consider continued operating and support costs of the baseline. Where appropriate, the analysis shall address the interoperability and commonality of components or systems that are similar in function to other DoD Component programs or Allied programs (see 10 U.S.C. 2457 (reference (nnn))). For each alternative, the analysis of alternatives shall consider requirements for a new or modified IT, including a NSS, or support infrastructure.

C4.3.3. The analysis shall aid decision-makers in judging whether any of the proposed alternatives to an existing system offers sufficient military and/or economic benefit to justify the cost. For most systems, the analysis shall consider and baseline against the system(s) that the acquisition program will replace, if they exist. The analysis shall consider the benefits and detriments, if any, of accelerated and delayed introduction of military capabilities, including the effect on life-cycle costs. PA&E shall assess the analysis of alternatives in terms of its comprehensiveness, objectivity, and compliance with the Clinger-Cohen Act (reference (ppp)). PA&E shall provide the assessment to the DoD Component head or Principal Staff Assistant (PSA), and to the MDA. The PM and MDA shall consider the analysis, the PA&E assessment, and ensuing documentation at Milestone B (or C, if there is no Milestone B) for ACAT I and IA programs.

C4.3.4. Preparation Responsibilities

C4.3.4.1. The DoD Component, or for ACAT IA programs, the office of PSA, responsible for the mission area associated with the mission deficiency or technical opportunity normally prepares the analysis of alternatives. The Head of the DoD Component (or PSA for ACAT IA programs), or as delegated, but not the PM, shall determine the independent activity to conduct the analysis. If an analysis of alternatives IPT forms, the PM or designated representative may be a team member, but shall not be the IPT leader.

C4.3.4.2. The lead DoD Component for a joint program shall ensure a comprehensive analysis. If DoD Components supplement the lead Component's analysis, the lead Component shall ensure consistent assumptions and methodologies between the analyses.

C4.3.4.3. For ACAT ID and ACAT IAM programs, the Head of the DoD Component, PSA, or delegated official shall coordinate with the following offices early in the development of alternatives: USD(AT&L) or ASD(C3I), Joint Staff or PSA office, DOT&E, and Director, PA&E.

C4.3.4.4. Coordination shall ensure consideration of the full range of alternatives; the development of organizational and operational plans, with inputs from the Commanders in Chief of the Combatant Commands, that are consistent with U.S. military strategy; and the consideration of joint-service issues, such as interoperability, security, and common use. USD(AT&L) shall issue guidance for ACAT ID programs. USD(AT&L) or ASD(C3I) shall issue guidance for other programs. The Director, PA&E shall prepare the guidance in coordination with the offices listed above.

C4.3.5. Program Decision Points. Normally, the DoD Component completes the analysis and documents its findings in preparation for a program initiation decision. The 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 the system demonstration interim progress review. An analysis of alternatives is unlikely to be required for Milestone C, unless there was no Milestone B; unless the program or circumstances (e.g., threat, alliances, operating areas, technology) changed significantly; or unless there are competing procurement strategies for the same system. For ACAT IA programs, the PM shall incorporate the analysis of alternatives into the cost/benefit element structure and process described in C4.5.2.

C4.4. AFFORDABILITY

Affordability is the degree to which the life-cycle cost of an acquisition program is in consonance with the long-range investment and force structure plans of the Department of Defense or individual DoD Components. The following procedures establish the basis for fostering greater program stability through the assessment of program affordability and the determination of affordability constraints:

C4.4.1. Components shall plan programs consistent with the DoD Strategic Plan, and based on realistic projections of likely funding available in the Future Years Defense Program (FYDP) and in years beyond the FYDP.

C4.4.2. DoD Component sponsors shall emphasize affordability early in the proposed program. The ORD (CJCS Instruction 3170.01B (reference (f))) shall address cost.

C4.4.3. The MDA shall assess affordability at each decision point. No acquisition program shall proceed into System Development and Demonstration unless sufficient resources, including manpower, are programmed in the most recently approved FYDP, or will be programmed in the next Program Objective Memorandum (POM), Budget Estimate Submission (BES), or President's Budget (Pub. L. 104-106 (1996) (reference (qqq)) and OMB Circular A-11 (reference (b))).

C4.4.4. Cost Analysis Improvement Group (CAIG) (see section C7.12.) reviews shall ensure that cost data supporting affordability judgments for ACAT I programs are accurate. The Cost/Performance IPT (see paragraph C7.6.6.) shall ensure that cost and benefit data supporting affordability judgments for ACAT IA programs are accurate.

C4.4.5. The manpower estimate for the program shall address manpower affordability in terms of military end-strength, civilian full-time equivalents, and contractor work years.

C4.4.6. Prior to submitting the POM or BES to the Secretary of Defense, the Heads of the DoD Components shall consult with USD(AT&L) or ASD(C3I), as appropriate, when the POM or BES contains a significant change in funding for, or reflects a significant funding change in, any program subject to Defense Acquisition Board (DAB) or DoD CIO review (DoD Directive 5134.1 (reference (rrr))).

C4.4.7. Full Funding

C4.4.7.1. When the DAB or Information Technology Overarching Integrated Product Team (IT OIPT) (see paragraph C7.6.4.) reviews a program, the Head of the DoD Component responsible for the program shall report the funding for the program, as contained in the most recent, Secretary of Defense-approved FYDP, to USD(AT&L) or ASD(C3I), as appropriate. The Head of the DoD Component shall describe the best possible acquisition strategy, given currently approved program funding. If the DoD Component prefers a different approach, the Head of the DoD Component shall describe the DoD Component preference, as well.

C4.4.7.2. If, after review, USD(AT&L) or ASD(C3I) concludes that the FYDP funding for the program will not support the program as presented, the Head of the DoD Component shall commit to incorporate appropriate funding in the next FYDP update.

C4.5. RESOURCE ESTIMATES

C4.5.1. The PM shall prepare a life-cycle cost estimate (LCCE) for all ACAT I program initiation decisions and at all subsequent program decision points.

C4.5.1.1. OSD CAIG (see section C7.12.) shall prepare an independent LCCE and associated report for the decision authority for all ACAT ID programs, and for ACAT IC programs as requested by USD(AT&L), for all major decision points as specified in DoD Instruction 5000.2, enclosure 3 (reference (a)), or as directed by the MDA.

C4.5.1.2. The DoD Component cost agency shall prepare an independent LCCE and associated report for the decision authority for all ACAT IC programs, except those reviewed by the CAIG, for all major decision points as specified in DoD Instruction 5000.2, enclosure 3

(reference (a)), or as directed by the MDA. For programs with significant cost risk or high visibility, the CAE may request an additional DoD Component cost analysis estimate.

C4.5.1.3. For ACAT I programs, the MDA shall consider the independent LCCE before approving entry into system development and demonstration or into production and deployment (10 U.S.C. 2434 (reference (sss))).

C4.5.1.4. The DoD Component's manpower authority shall prepare a manpower estimate in support of program initiation for ACAT I programs. They shall update the estimate at subsequent milestones and the full-rate production decision review. The MDA shall consider the manpower estimate before approving entry into system development and demonstration and again before entry into production and deployment (10 U.S.C. 2434 (reference (sss))).

C4.5.1.5. For ACAT IA program initiation, the PM shall prepare a life-cycle cost and benefits estimate, often termed an economic analysis (EA). The EA shall consist of an LCCE and a life-cycle benefits estimate, including a return on investment (ROI) calculation (Pub. L. 104-106 (1996), Section 5123 (reference (e))). The MDA usually directs an update to the EA whenever program cost, schedule, or performance parameters significantly deviate from the approved APB.

C4.5.1.6. The PSA or sponsoring DoD Component shall ensure that the DoD Component also provides a cost analysis for all ACAT IA programs each time an EA is required. The DoD Component cost analysis is an independent estimate of life-cycle costs. The DoD Component may request a sufficiency review of the program office LCCE in lieu of conducting a full cost analysis. The MDA shall determine whether a sufficiency review is appropriate. If appropriate, the Cost WIPT shall establish the scope of the sufficiency review.

C4.5.1.6.1. PA&E shall assess the EA to determine the following:

C4.5.1.6.1.1. Reasonableness of the life-cycle cost and benefits estimates;

C4.5.1.6.1.2. Whether the cost, schedule, and performance goals are realistic;

C4.5.1.6.1.3. Reliability of the ROI calculation; and

C4.5.1.6.1.4. Traceability of the estimated benefits, as presented.

C4.5.1.6.2. PA&E shall provide results of the assessment to both the PM and MDA.

C4.5.1.6.3. For ACAT IA programs, the MDA shall consider the DoD Component cost analysis and PA&E assessment.

C4.5.2. Life-Cycle Cost Estimates (LCCEs)

C4.5.2.1. The estimating activity shall explicitly base the LCCE (or EA for ACAT IA programs) on program objectives; operational requirements; contract specifications; careful risk assessments; and, for ACAT I programs, a DoD program work breakdown structure (WBS), or, for ACAT IA programs, a life-cycle cost and benefit element structure agreed upon by the IPT. The LCCE (or EA) shall be comprehensive. It shall identify all cost elements, including operation and support costs, that affect the decision to proceed with development or production of the system, regardless of funding source or management control.

C4.5.2.2. The LCCE (or EA for ACAT IA programs) shall be consistent with the cost estimates in the analysis of alternatives, and shall explain major changes that may have occurred. It shall present a realistic appraisal of the level of cost most likely to be realized. The manpower estimates underpinning operation and support costs shall be consistent with the manpower estimate of section C4.5.4.2. The LCCE for ACAT IA programs shall include life-cycle benefits as well as life-cycle costs (Pub. L. 104-106 (1996), Section 5123 (reference (e)) and 44 U.S.C. 3506 (reference (c))).

C4.5.2.3. For an ACAT IA program, the PM shall develop and use the life-cycle benefits estimate portion of the EA to identify and project both mission and system benefits. Mission benefits include both quantitative monetary benefits, such as reduced operating costs; as well as non-monetary benefits, such as improved efficiency or functionality. System benefits also include both monetary and non-monetary benefits, such as reduced total ownership cost or higher reliability.

C4.5.3. Cost Analysis Requirements Description (CARD). For ACAT I programs, the DoD Component sponsoring the acquisition shall establish a CARD. The PM shall prepare, and an authority no lower than the DoD Component PEO, shall approve the CARD. For ACAT IA programs, the PM shall establish the CARD in coordination with appropriate IPT members. The CARD shall describe the salient features of both the acquisition program and the system itself, and provide the basis for the LCCEs. The CARD shall be flexible, tailored, and refer to information available in other documents available to cost estimators. For joint programs, the CARD shall cover the common program as agreed to by all participating DoD Components, as well as any unique, DoD Component requirements. The teams preparing the program office LCCE, the component cost analysis, if applicable, and the independent LCCE shall receive the CARD 180 days prior to a planned OIPT or DoD Component review, unless the OIPT leader agrees to another due date.

C4.5.4. Manpower. The DoD Components shall determine the most efficient and cost effective mix of government manpower and contract support for all systems. The DoD Components shall not contract for inherently governmental and exempted functions.

C4.5.4.1. Manpower Considerations

C4.5.4.1.1. For all programs regardless of acquisition category, DoD Components shall determine the source of support for all new, modified, and replacement systems based on the procedures, manpower mix criteria, and risk assessment instructions in Deputy Under Secretary of Defense (Program Integration), Office of the Under Secretary of Defense (Personnel & Readiness) (OUSD(P&R)), and Deputy Under Secretary of Defense (Installations), Office of USD(AT&L) annual memo, "DoD Inventory of Commercial and Inherently Governmental Activities Data Call." They shall consider the advantages of converting from one source to another (military, civilian, or private contract) (10 U.S.C. 129a (reference (ttt))), and the use of inter-service and intra-governmental support (DoD Instruction 4000.19 (reference (uuu))). The DoD Components shall competitively source support functions in accordance with DoD Directive 4100.15 (reference (vvv)) and DoD Instruction 4100.33 (reference (www)).

C4.5.4.1.2. The DoD Components shall determine manpower and contract support based on both peacetime and wartime requirements, and establish manpower authorizations at the minimum necessary to achieve specific vital objectives (DoD Directive 1100.4 (reference (xxx))). As part of this process, the DoD Components shall assess the risks (DoD Instruction 3020.37 (reference (yyy))) involved in contracting support for critical functions in-theater, or in other areas expecting hostile fire. Risk mitigation shall take precedence over cost savings in high-risk situations or when there are highly sensitive intelligence or security concerns.

C4.5.4.2. Manpower Estimate[7]

C4.5.4.2.1. The manpower estimate for ACAT I programs shall outline the DoD Component's official manpower position, and address whether the system is affordable from a military end-strength and civilian full-time equivalent (FTE) perspective. The DoD Component shall base manpower numbers on the level of system performance (e.g., reliability and maintainability) most likely to be achieved.

C4.5.4.2.2. The estimate shall report the total number of manpower requirements and authorizations needed to operate, maintain, support, and provide training for the system upon full operational deployment. It shall report the number of military (officer, warrant officer, and enlisted), DoD civilian manpower, and contract work-years for each fiscal year of the program, beginning with initial fielding and ending with system retirement/disposal. It shall indicate if there are any resource shortfalls in any fiscal year covered by the report. It shall state whether any increases in military end strengths or civilian FTEs (beyond what is included in the FYDP) or whether waiver(s) to existing manpower constraints is/are required to support full operational

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[7] Not applicable to ACAT IA programs.

deployment of the system. The estimate shall report Active, Reserve, and National Guard numbers separately. For joint programs, each DoD Component shall provide a separate estimate.

C4.5.4.2.3. The manpower estimate shall compare manpower requirements of the new system against the old or replaced system(s), if applicable. It shall address whether the new system meets or exceeds manpower objectives and thresholds in the ORD, if so established.

C4.5.4.2.4. The manpower estimate shall address whether there are any personnel issues that would adversely impact full operational deployment of the system. It shall clearly state the risks associated with and the likelihood of achieving manpower numbers reported in the estimate. It shall briefly assess the validity of the manpower numbers, stating whether the DoD Component used validated manpower methodologies and manpower mix criteria, and assessed all risks. The estimate shall address whether planned or recently completed manpower and personnel initiatives (e.g., reorganization, restructuring, or reengineering actions; or military occupational specialty consolidations), competitive sourcing initiatives (i.e., cost comparisons or direct conversions), or other actions could impact the manpower numbers.

C4.5.4.2.5. For ACAT ID programs, OUSD(P&R) shall review manpower estimates and provide comments to the OIPT.

C5. CHAPTER 5
PROGRAM DESIGN

C5.1. INTEGRATED PRODUCT AND PROCESS DEVELOPMENT (IPPD)

The PM shall employ IPPD to the maximum extent practicable. IPPD considers and integrates program activities throughout the entire program life cycle, including systems management, development, manufacturing, testing, deployment, operations, support, training, and eventual disposal. Using IPPD, multi-disciplined IPTs shall simultaneously optimize the product, product manufacturing, and supportability to meet system cost and performance objectives.

C5.2. SYSTEMS ENGINEERING

C5.2.1. The PM shall implement a sound systems engineering approach to translate approved operational needs and requirements into operationally suitable blocks of systems. The approach shall consist of a top-down, iterative process of requirements analysis, functional analysis and allocation, design synthesis and verification, and system analysis and control. Systems engineering shall permeate design, manufacturing, T&E, and support of the product. Systems engineering principles shall influence the balance between performance, risk, cost, and schedule.

C5.2.2. The systems engineering process shall:

C5.2.2.1. Transform approved operational needs and requirements (see CJCS Instruction 3170.01B (reference (f))) into an integrated system design solution through concurrent consideration of all life-cycle needs (i.e., development, manufacturing, T&E, deployment, operations, support, training, and disposal).

C5.2.2.2. Ensure the interoperability and integration of all operational, functional, and physical interfaces. Ensure that system definition and design reflect the requirements for all system elements: hardware, software, facilities, people, and data; and

C5.2.2.3. Characterize and manage technical risks.

C5.2.2.4. Apply scientific and engineering principles, using the system security engineering process, to identify security vulnerabilities and minimize or contain information assurance and force protection risks associated with these vulnerabilities (see DoD 5200.1-M (reference (zzz))).

C5.2.3. The following key systems engineering activities shall occur:

C5.2.3.1. Requirements Analysis. The PM shall work with the user to establish and refine operational and design requirements. Together, they shall determine appropriate operational performance objectives, within affordability constraints. Iterative requirements analyses shall accompany functional analysis/allocation to develop and refine system-level functional and performance requirements and external interfaces to facilitate the design of open systems. These analyses shall allocate and balance interoperability requirements among systems that must interoperate successfully to satisfy all appropriate CRDs the proposed system falls under. Anti-tamper requirements shall be expressly addressed. Requirements analysis shall provide traceability among user requirements and design requirements.

C5.2.3.2. Functional Analysis/Allocation. Iterative functional analyses/allocations shall define successively lower-level functional and performance requirements, including functional interfaces and architecture to achieve open systems and facilitate the use of a PBBE. Functional and performance requirements shall track with 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. System interface control requirements that are developed shall be documented.

C5.2.3.3. Design Synthesis and Verification. Design synthesis translates functional and performance requirements into design solutions that include alternative people, product, and process concepts and solutions, and internal and external interfaces. Design solutions shall be sufficiently detailed to verify that open system performance requirements have been met. Design verification shall include a cost-effective combination of design analysis, design M&S, and demonstration and testing. Verification shall address design tools, products, and processes.

C5.2.3.4. System Analysis and Control. System analysis and control activities shall provide the basis for evaluating and selecting alternatives, measuring progress, documenting design decisions, and enabling and managing block deliveries under an evolutionary acquisition strategy. They shall include the following:

C5.2.3.4.1. 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.

C5.2.3.4.2. The overall risk management effort shall include technology transition planning and shall establish transition criteria.

C5.2.3.4.3. The establishment of a risk management process (including planning, assessment (identification and analysis), handling, and monitoring) to be integrated and continuously applied throughout the program, including, but not limited to, the design process. The risk management effort shall address risk planning, the identification and analysis of

potential sources of risks including but not limited to cost, performance, and schedule risks based on the technology being used and its related design, manufacturing capabilities, potential industry sources, and test and support processes; risk handling strategies, and risk monitoring approaches. The overall risk management effort shall interface with technology transition planning, including the establishment of transition criteria for such technologies.

C5.2.3.4.4. The maximum use of performance requirements for items identified as high pay-off for technology insertion.

C5.2.3.4.5. A configuration management process to guide the system products, processes, and related documentation, and to facilitate the development of open systems. The configuration management effort includes identifying, documenting, and auditing 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.

C5.2.3.4.6. 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 performance requirements, designs, decisions, rationale, and other related program planning and reporting elements; facilitate technology insertion for affordability improvements during reprocurement and post-production support; support configuration procedures; and serve as a ready reference for the systems engineering effort.

C5.2.3.4.7. Performance metrics to measure technical development and design, actual versus planned; and to measure meeting system requirements in terms of performance, cost, schedule, and progress in implementing risk handling. Performance metrics shall be traceable to performance parameters identified by the operational user.

C5.2.3.4.8. A verification (including test and measurement) effectiveness review process to demonstrate and confirm verification adequacy and compliance with specified requirements.

C5.2.3.4.9. Interface controls to ensure all internal and external interface requirements changes are properly recorded and communicated to all affected configuration items.

C5.2.3.4.10. A structured review process to demonstrate and confirm completion of required accomplishments and their exit criteria as defined in program planning. Overall program planning shall include reviews to demonstrate, confirm, and coordinate progress.

C5.2.3.5. The following paragraphs discuss other important design considerations. Their impact on total system cost, schedule, and performance shall determine the extent of their consideration during, and their affect upon, the system design process.

C5.2.3.5.1. Manufacturing and Production[8]

C5.2.3.5.1.1. Producibility of the system design shall be a development priority. Design engineering efforts shall concurrently develop producible designs, capable manufacturing processes, and the necessary process controls to satisfy requirements and minimize manufacturing costs. The PM shall use existing manufacturing processes whenever possible. When the design requires new manufacturing capabilities, the PM shall consider process flexibility (e.g., rate and configuration insensitivity).

C5.2.3.5.1.2. Full rate production of a system shall require a stable design, proven manufacturing processes, and available or programmed production facilities and equipment.

C5.2.3.5.2. Modeling & Simulation (M&S)

C5.2.3.5.2.1. The PM shall judiciously employ and reuse advanced M&S and related technologies. The Department of Defense and industry shall collaborate to produce integration and interoperability capabilities spanning all acquisition functions and phases. Expected results include improved acquisition program execution and superior acquired systems.

C5.2.3.5.2.2. PMs shall leverage M&S and related technologies as part of the M&S approach supporting the acquisition strategy and program design. They shall properly integrate M&S and related technologies throughout systems acquisition. They shall identify and employ knowledge representation and communication techniques and procedures associated with the design, development, and life cycle of both the program and its system early in and throughout the program, as appropriate.

C5.2.3.5.2.3. Planning the M&S Approach

C5.2.3.5.2.3.1. The PM shall plan for and document the M&S approach as part of the acquisition strategy, and keep the approach current throughout the program life cycle. Planning shall comply with the DoD Component implementing directives.

C5.2.3.5.2.3.2. The PM shall accomplish the following:

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[8] Not applicable to ACAT IA programs.

C5.2.3.5.2.3.2.1. Map M&S onto the design process to identify the core M&S development that the contractor or DoD Component Science & Technology element must address;

C5.2.3.5.2.3.2.2. Identify which steps of the design process that M&S will accomplish or facilitate;

C5.2.3.5.2.3.2.3. Make necessary investments to enable execution of the M&S approach, including early identification of and planning for required resources;

C5.2.3.5.2.3.2.4. Integrate M&S efforts over the life cycle of the system, from requirements and concept development, through engineering, production, testing, sustainment, and post-production support;

C5.2.3.5.2.3.2.5. Relate M&S to other acquisition activities such as Simulation Test and Evaluation Process, CAIV, and IPPD;

C5.2.3.5.2.3.3. The appropriate Lead Executive Component Executive or Service Acquisition Executive (SAE) and T&E authorities shall approve the M&S approach.

C5.2.3.5.2.4. M&S Standards. M&S standards facilitate reuse, commonality, interoperability, and credibility. Properly applied, M&S standards reduce cost by providing approved solutions to common problems. As part of the M&S approach in the acquisition strategy, the PM shall identify and require contractors, where practicable, to use M&S standards, where they exist. Examples of such standards encompass authoritative algorithms and models, interoperability standards for simulations and command and control systems, and data interchange standards.

C5.2.3.5.2.5. Relationship of M&S and Testing. The PM shall use both testing and M&S to evaluate the performance and maturity of the system under development. In addition, the PM shall use M&S to predict the results of operational and live fire testing events prior to the conduct of those tests. The PM shall focus the testing program on those tests with the highest expected payback in knowledge gained. After the tests, the DoD Component M&S offices shall use test results to validate and mature the M&S tools and databases.

C5.2.3.5.2.6. M&S Support of SBA. Whenever and wherever possible throughout systems acquisition, the PM shall make effective use of M&S approaches to provide a robust analysis of system performance to compliment hardware-only T&E. The PM shall use M&S to assess a system against design to threats and analyze to threats in those scenarios and areas of the mission space or performance envelope where testing cannot be performed, is not cost effective, or additional data is required. These analyses are performed using validated M&S, and are supported by validated test data.

C5.2.3.5.3. Quality

C5.2.3.5.3.1. The quality management process shall be capable of the following key activities:

C5.2.3.5.3.1.1. Establish capable processes;

C5.2.3.5.3.1.2. Continuously improve processes;

C5.2.3.5.3.1.3. Monitor and control critical processes and product variation;

C5.2.3.5.3.1.4. Establish mechanisms for field product performance feedback; and

C5.2.3.5.3.1.5. Implement an effective root-cause analysis and corrective action system.

C5.2.3.5.3.2. The PM shall allow contractors to define and use a preferred quality management process that meets required program support capabilities. The PM shall not require third party certification or registration of a supplier's quality system.

C5.2.3.5.4. Acquisition Logistics. The PM shall conduct acquisition logistics management activities throughout the program life cycle. When using an evolutionary acquisition strategy, acquisition logistics activities shall address performance and support requirements for both the total life cycle and for each block, and shall consider and mitigate the impact of system variants or variations. The supportability of the design(s) and the acquisition of systems shall be cost-effective and shall provide the necessary infrastructure support to achieve peacetime and wartime readiness requirements. Supportability considerations shall be integral to all trade-off decisions.

C5.2.3.5.4.1. Supportability Analyses. PMs shall conduct supportability analyses as an integral part of the systems engineering process, beginning at program initiation and continuing throughout the program life cycle. The results of these analyses shall form the basis for the related design requirements included in the system performance specification and in the documentation of logistics support planning. The results shall also support subsequent decisions to achieve cost-effective support throughout the system life cycle. For products, this includes all new procurements and major modifications and upgrades, as well as reprocurement of systems, subsystems, components, spares, and services that are procured beyond the initial production contract award. PMs shall permit broad flexibility in contractor proposals to achieve program supportability objectives.

C5.2.3.5.4.2. Support Concepts. The PM shall establish logistics support concepts (e.g., organic, two-level, three-level, contractor, partnering, etc.) early in the program and refine the concepts throughout program development. TOC shall play a key role in the overall selection process. Support concepts for all systems shall provide cost effective, total-life-cycle, logistics support.

C5.2.3.5.4.3. Support Data. Contract requirements for deliverable support and support-related data shall be consistent with the planned support concept, and shall represent the minimum essential requirements to cost-effectively maintain the fielded system and foster source of support competition throughout the life of the fielded system. The PM shall coordinate government requirements for this data across program functional specialties to minimize redundant contract deliverables and inconsistencies.

C5.2.3.5.4.4. Support Resources

C5.2.3.5.4.4.1. Support resources, for both the total system over the expected life, and for each increment of introduced capability, are inherent to "full funding" calculations. Therefore, support resources requirements shall be a key element of program reviews and decision meetings. During program planning and execution logistics support, products and services shall be competitively sourced. The PM shall consider embedded training and maintenance techniques to enhance user capability and reduce life-cycle costs.

C5.2.3.5.4.4.2. The PM shall use DoD automatic test system (ATS) families or COTS components that meet defined ATS capabilities to meet all acquisition needs for automatic test equipment hardware and software. Critical hardware and software elements shall define ATS capabilities. The PM shall consider diagnostic, prognostic, system health management, and automatic identification technologies. The PM shall base ATS selection on a cost and benefit analysis over the complete system life cycle. Consistent with the above policy, the PM shall minimize the introduction of unique types of ATS into the DoD field, depot, and manufacturing operations.

C5.2.3.5.5. Open Systems Design

C5.2.3.5.5.1. PMs shall use a modular, standards-based architecture in the design of systems. They shall identify key interfaces and define the system level (system-of-systems, system, subsystem, or component) at and above which these interfaces use various types of standards. Preference shall be given to the use of open interface standards first, then to de facto interface standards, and finally to government and proprietary interface standards. PMs shall report on their progress using open standards for key interfaces at both Milestones B and C.

C5.2.3.5.5.2. PMs shall use an open systems approach to achieve the following objectives:

C5.2.3.5.5.2.1. To adapt to evolving requirements and threats;

C5.2.3.5.5.2.2. To accelerate transition from science and technology into acquisition and deployment;

C5.2.3.5.5.2.3. To enhance modularity and facilitate systems integration;

C5.2.3.5.5.2.4. To leverage commercial investment in new technologies and products;

C5.2.3.5.5.2.5. To reduce the development cycle time and total life-cycle cost;

C5.2.3.5.5.2.6. To ensure the system is fully interoperable with all systems with which it must interface, without major modification of existing components;

C5.2.3.5.5.2.7. To achieve commonality and reuse of components among systems;

C5.2.3.5.5.2.8. To provide users the ability to quickly and affordably interconnect and assemble existing platforms, systems, subsystems, and components as needed;

C5.2.3.5.5.2.9. To maintain continued access to cutting edge technologies and products from multiple suppliers during initial procurement, reprocurement, and post-production support;

C5.2.3.5.5.2.10. To mitigate the risks associated with technology obsolescence, being locked into proprietary technology, and reliance on a single source of supply over the life of a system;

C5.2.3.5.5.2.11. To conduct business case analyses to justify decisions to enhance life-cycle supportability and continuously improve product affordability through technology insertion during initial procurement, reprocurement, and post-production support; and

C5.2.3.5.5.2.12. To facilitate modular contracting.

C5.2.3.5.6. Software Management. The PM shall manage and engineer software-intensive systems using best processes and practices known to reduce cost, schedule, and performance risks.

C5.2.3.5.6.1. General. The PM shall base software systems design and development on systems engineering principles, to include the following:

C5.2.3.5.6.1.1. Develop architectural based software systems that support open system concepts; exploit COTS computer systems products; and allow incremental improvements based on modular, reusable, extensible software;

C5.2.3.5.6.1.2. Identify and exploit, where practicable, government and commercial software reuse opportunities before developing new software;

C5.2.3.5.6.1.3. Select the programming language in context of the systems and software engineering factors that influence overall life-cycle costs, risks, and the potential for interoperability;

C5.2.3.5.6.1.4. Use DoD standard data and follow data administrative policies in DoD Directive 8320.1 (reference (aaaa));

C5.2.3.5.6.1.5. Select contractors with domain experience in developing comparable software systems; with successful past performance; and with a mature software development capability and process. Contractors performing software development or upgrade(s) for use in an ACAT I or ACAT IA program shall undergo an evaluation, using either the tools developed by the Software Engineering Institute (SEI), or those approved by both the DoD Components and the Deputy Under Secretary of Defense (Science and Technology) (DUSD(S&T)). At a minimum, full compliance with SEI Capability Maturity Model Level 3, or its equivalent in an approved evaluation tool, is the Department's goal. However, if the prospective contractor does not meet full compliance, risk mitigation planning shall describe, in detail, the schedule and actions that will be taken to remove deficiencies uncovered in the evaluation process. Risk mitigation planning shall require PM approval. DUSD(S&T) shall define Level 3 equivalence for approved evaluation tools. The evaluation shall examine the business unit proposed to perform the work. The reuse of existing evaluation results performed within a two-year period prior to the date of the government solicitation is encouraged.

C5.2.3.5.6.1.6. Use a software measurement process in planning and tracking the software program, and to assess and improve the software development process and the associated software product. Provide those measures to the appropriate OSD oversight office. For example, MAIS PMs shall follow the process described in the Practical Software and System Measurement Guidebook (http://www.psmsc.com/).

C5.2.3.5.6.1.7. Assess information operations risks (DoD Directive S-3600.1 (reference (bbbb))) using techniques such as independent expert reviews;

C5.2.3.5.6.1.8. Prepare for life-cycle software support or maintenance by developing or acquiring the necessary documentation, host systems, test beds, and computer-aided software engineering tools consistent with planned support concepts; and by planning for transition of fielded software to the support/maintenance activity;

C5.2.3.5.6.1.9. Track COTS software purchases and maintenance licenses; and

C5.2.3.5.6.1.10. Structure a software development process that recognizes that emerging requirements will require modification to software over the life cycle of the system. In order to deliver truly state-of-the-software, this process should allow for periodic software enhancements.

C5.2.3.5.6.2. Software Spiral Development. When acquiring software for a system, the PM shall plan a spiral development process for both evolutionary and single-step-to-full-capability acquisition strategies. A cyclical, iterative build-test-fix-test-deploy process characterizes spiral development and yields continuous improvements in software. Each software release draws upon the experience and lessons of previous releases. The spiral development process shall accomplish the following:

C5.2.3.5.6.2.1. Facilitate requirements changes resulting from operational mission needs, technology opportunities, experimentation results, and technology obsolescence.

C5.2.3.5.6.2.2. Incorporate T&E of operational effectiveness, suitability, and supportability using experimentation, demonstration, rigorous testing, or certification.

C5.2.3.5.6.2.2.1. The T&E process shall be continuous throughout the system life cycle and involve the user, contractor, program office, and test community.

C5.2.3.5.6.2.2.2. The T&E process shall consider the near continuous nature of change in the baseline and use techniques such as regression testing to ensure that existing functionality has not been compromised.

C5.2.3.5.6.2.2.3. The PM shall consider the risks and extent of change impacts to enable a cost-effective, yet rigorous T&E process.

C5.2.3.5.6.2.3. Implement configuration, change, and data management.

C5.2.3.5.6.2.3.1. Documented actual deployed capability provides the starting point for development of the next improvement release and provides a baseline for verification, training, etc.

C5.2.3.5.6.2.3.2. The PM shall implement a configuration control board to include the user, program office, development contractor, integration contractor or agency, and any other critical stakeholder.

C5.2.3.5.6.2.3.3. For legacy systems, the configuration control board shall include the appropriate support and sustainment organizations.

C5.2.3.5.6.3. Review of Software-Intensive Programs. An independent expert review team shall review programs and report on technology and development risk, cost, schedule, design, development, project management processes and the application of systems and software engineering best practices. The team shall report their findings directly to the PM and the PEO or equivalent management official. DUSD(S&T) shall manage the team, composed of a small group of software systems engineering and technology experts.

C5.2.3.5.6.4. Software Security Considerations. The following security considerations apply to software management:

C5.2.3.5.6.4.1. A documented impact analysis statement, which addresses software reliability, shall accompany modifications to existing DoD software.

C5.2.3.5.6.4.2. The PM shall establish formal software change control processes.

C5.2.3.5.6.4.2.1. Software quality assurance personnel shall monitor the software change process.

C5.2.3.5.6.4.2.2. An independent verification and validation team shall provide additional review.

C5.2.3.5.6.4.3. The change control process shall indicate whether foreign nationals, in any way, participated in software development, modification, or remediation.

C5.2.3.5.6.4.4. Foreign nationals employed by contractors/subcontractors to develop, modify, or remediate software code specifically for DoD use shall each have a security clearance commensurate with the level of the program in which the software is being used.

C5.2.3.5.6.4.5. Primary vendors on DoD contracts may have subcontractors who employ cleared foreign nationals that work only in a certified or accredited environment (DoD Instruction 5200.40 (reference (iii))).

C5.2.3.5.6.4.6. Software quality assurance personnel shall review DoD software with coding done in foreign environments or by foreign nationals for malicious code.

C5.2.3.5.6.4.7. When employing COTS software, the contracting process shall give preference during product selection/evaluation to those vendors who can demonstrate that they took efforts to minimize the security risks associated with foreign nationals that have developed, modified, or remediated the COTS software being offered.

C5.2.3.5.6.4.8. Software quality assurance personnel shall check software sent to locations not directly controlled by the Department of Defense or its contractors for malicious code when returned to the DoD contractor's facilities.

C5.2.3.5.7. Commercial, Off-the-Shelf (COTS) Considerations

C5.2.3.5.7.1. When acquiring COTS software products or other commercial items, the PM shall implement a spiral development process (see subparagraph C5.2.3.5.6.2.). In this context, integration may encompass the amalgamation of multiple COTS components into one deployable system (or block of a system) or the assimilation of a single COTS product (such as an enterprise resource planning system). In either case, the PM shall ensure that the system co-evolves with essential changes to doctrine (for combat systems) or reengineered business processes (for combat support and IT systems). The PM shall apply commercial item best practices.

C5.2.3.5.7.2. No matter how much of a system is provided by commercial items, the PM shall engineer, develop, integrate, test, evaluate, deliver, sustain, and manage the overall system. Using commercial items offers significant opportunities for reduced cycle time, faster insertion of new technology, lower life cycle costs, greater reliability and availability, and support from a more robust industrial base. The keys to success involve thinking and acting as an informed consumer; planning for continuous evolution of the system; and maintaining a flexible posture throughout the life of the program. The use of commercial items often requires changes in the way systems are conceived, acquired, and sustained, to include:

C5.2.3.5.7.2.1. When purchasing a commercial item, the PM shall adopt commercial business practice(s). The extent to which the DoD business practices match the business practices supported by commercial items determines the likelihood that the items will meet DoD needs. It is likely, however, that a gap will exist—and the gap may be large. Negotiation, flexibility, and communication on the part of the stakeholders, the commercial vendors, and the program manager are required.

C5.2.3.5.7.2.2. The PM shall plan for robust evaluations to assist in fully identifying commercial capabilities, to choose between alternate architectures and designs, to determine whether new releases continue to meet requirements, and to ensure that the commercial items function as expected when linked to other system components. In addition, evaluation provides the critical source of information about the trade-offs that must be made between the capabilities of the system to be fielded and the system architecture and design that makes best use of commercial capabilities. Evaluating commercial items requires a focus on mission accomplishment, and matching the commercial item to system requirements.

C5.2.3.5.7.2.3. The PM shall remain aware of and influence product enhancements with key commercial item vendors to the extent practical and in compliance with

FACA (reference (cc)). Vendors are different from contractors and subcontractors; different practices and relationships are needed. Vendors react to the marketplace, not the unique needs of DoD programs. To successfully work with vendors, the PM shall adopt practices and expectations that are similar to other buyers in the marketplace. Traditional DoD acquisition and business models are not sufficient for programs acquiring commercial items, as they do not take into account the marketplace factors that motivate vendors.

C5.2.3.5.7.2.4. The PM shall engineer the system architecture and establish a rigorous change management process for life-cycle support. Systems that integrate multiple commercial items require extensive engineering to facilitate the insertion of planned new commercial technology. This is not a "one time" activity because unanticipated changes may drive reconsideration of engineering decisions throughout the life of the program. Failure to address changes in commercial items and the marketplace will potentially result in a system that cannot be maintained as vendors drop support for obsolete commercial items.

C5.2.3.5.7.2.5. The PM shall develop an appropriate T&E strategy for commercial items to include evaluating potential commercial items in a system test bed, when practical; focusing test beds on high-risk items; and testing commercial-item upgrades for unanticipated side effects in areas such as security, safety, reliability, and performance.

C5.2.3.5.7.2.6. Programs are encouraged to use code-scanning tools, within the scope and limitations of the licensing agreements, to ensure both COTS and Government off-the-shelf software do not pose any information assurance or security risks.

C5.2.3.5.8. Reliability, Availability, and Maintainability (RAM)

C5.2.3.5.8.1. The PM shall establish RAM activities early in the acquisition cycle. The PM shall develop RAM system requirements based on the ORD and TOC considerations, and state them in quantifiable, operational terms, measurable during DT&E and OT&E. RAM system requirements shall address all elements of the system, including support and training equipment. They shall be derived from, and support, the user's system readiness objectives. Reliability requirements shall address mission reliability and logistic reliability. Availability requirements shall address the readiness of the system. Maintainability requirements shall address servicing, preventive, and corrective maintenance.

C5.2.3.5.8.2. The PM shall plan and execute RAM design, manufacturing development, and test activities so that the system elements, including software, used to demonstrate system performance before the production decision reflect the mature design. IOT&E shall use production representative systems, actual operational procedures, and personnel with representative skill levels. To reduce testing costs, the PM shall utilize M&S in the demonstration of RAM requirements wherever appropriate.

C5.2.3.5.8.3. This policy applies not only to the system, but also to technical manuals, spare parts, tools, and support equipment.

C5.2.3.5.9. HSI. For all programs regardless of ACAT, the PM shall initiate a comprehensive strategy for HSI early in the acquisition process to minimize ownership costs and ensure that the system is built to accommodate the human performance characteristics of the user population that will operate, maintain, and support the system. The PM shall work with the manpower, personnel, training, safety and occupational health (see paragraph C5.2.3.5.10.), habitability, survivability, and HFE communities to translate the HSI thresholds and objectives in the ORD into quantifiable and measurable system requirements. The PM shall include these requirements in specifications, the TEMP, and other program documentation, as appropriate, and use them to address HSI in the statement of work and contract. The PM shall identify any HSI-related schedule or cost issues that could adversely impact program execution.

C5.2.3.5.9.1. HFE. The PM shall employ HFE during systems engineering (to include function allocation) to provide for effective human-machine interfaces. Where practicable and cost effective, design efforts shall seek to reduce manpower and training requirements. Design efforts shall minimize or eliminate system characteristics that require excessive cognitive, physical, or sensory skills; require extensive training or workload-intensive tasks; result in mission-critical errors; or produce safety or health hazards.

C5.2.3.5.9.2. Habitability and Personnel Survivability. The PM shall work with habitability and survivability representatives (see subparagraphs C2.8.5.4. and C5.2.3.5.12.) to set requirements for the physical environment and, if appropriate, essential personnel services (e.g., medical and mess) and minimum living conditions (e.g., berthing and personal hygiene) that have a direct impact on sustained mission effectiveness and recruitment and retention.

C5.2.3.5.9.3. Manpower Initiatives. The PM shall work with manpower and functional representatives to identify workload intensive tasks, process improvements, design options, or other initiatives to reduce manpower, improve the efficiency or effectiveness of support services, or enhance the cross-functional integration of support activities.

C5.2.3.5.9.4. Personnel Initiatives. The PM shall work with the personnel community and consider current personnel policy and recruitment trends when defining the human performance characteristics of the user population. To the extent possible, systems shall not require special cognitive, physical, or sensory skills beyond that found in the specified user population.

C5.2.3.5.9.5. Training. As platform functions become increasingly automated, HSI shall match the cognitive processes of the operators and maintainers to the information processes of the platform. Training subsystems, including training aids, devices, simulations, and simulators (commonly known as "TADSS") and embedded training capability (where

appropriate), shall evolve from being separate support functions into being an integral part of the platform's information architecture. The PM shall consider design options and emerging training technologies that can improve the users' performance and readiness, and reduce individual, collective, and joint training costs. The PM shall maximize simulation-supported embedded training. Training systems shall fully support and mirror the interoperability of the operational system. The PM shall base training decisions on training effectiveness evaluations (see DoD Directive 1430.13 (reference (v))). The PM shall document manpower and training requirements as soon as possible after program initiation.

C5.2.3.5.10. Environment, Safety, and Occupational Health (ESOH)

C5.2.3.5.10.1. All programs, regardless of acquisition category and throughout their life cycle, shall comply with this section. The PM shall ensure a system design that can be tested, operated, maintained, repaired, and disposed of in accordance with ESOH statutes, regulations, policies, and, as applicable, environmental treaties and agreements (collectively termed regulatory requirements) and the requirements of this section.

C5.2.3.5.10.2. The PM shall prepare a PESHE document early in the program life cycle (usually Milestone B). The PESHE shall identify ESOH risks, contain a strategy for integrating ESOH considerations into the systems engineering process, delineate ESOH responsibilities, and provide a method for tracking progress. The PM shall use the PESHE to identify and manage ESOH hazards, and to determine how to best meet ESOH regulatory requirements. The PM shall keep the PESHE updated over the system life cycle.

C5.2.3.5.10.3. The PM shall conduct ESOH analyses as described below. The PM shall provide details of these analyses, including supporting documentation, as part of the IPPD.

C5.2.3.5.10.4. ESOH Compliance. To minimize the cost and schedule risks over the system's life cycle that changing ESOH requirements and regulations represent, the PM shall regularly review ESOH regulatory requirements and evaluate their impact on the program's life-cycle cost, schedule, and performance.

C5.2.3.5.10.5. National Environmental Policy Act (NEPA). The PM is responsible for and shall comply with the NEPA (42 U.S.C. 4321-4370d (reference (fff))) and implementing regulations, 40 C.F.R. 1500-1508 (reference (cccc)), and E.O. 12114 (reference (ggg)), as applicable. The PM shall complete any analysis and documentation required under either NEPA or E.O. 12114 before the appropriate official may make a decision to proceed with a proposed action that may affect the human environment. The PM shall document the decision before implementing the proposed action. The PM shall include an appropriate completion schedule for NEPA and E.O. 12114 compliance in the acquisition strategy. The PM shall prepare NEPA and E.O. 12114 documentation in accordance with the DoD Component

implementation regulations and guidance. The CAE (or, for joint programs, the CAE of the Lead Executive Component), or designee, is the final approval authority for system-related NEPA and E.O. 12114 documentation. The PM shall forward a copy of final NEPA documentation to the Defense Technical Information Center for archiving.

C5.2.3.5.10.6. Safety and Health

C5.2.3.5.10.6.1. The PM shall identify and evaluate 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. The PM shall use and require contractors to use the industry and DoD standard practice for system safety, consistent with mission requirements. This standard practice manages risks encountered in the acquisition life cycle of systems, subsystems, equipment, and facilities. These risks include conditions that create significant risks of death, injury, acute/chronic illness, disability, and/or reduced job performance of personnel who produce, test, operate, maintain, support, or dispose of the system.

C5.2.3.5.10.6.2. The following policy applies to the acceptance of risk:

C5.2.3.5.10.6.2.1. The PM shall formally document each management decision accepting the risk associated with an identified hazard.

C5.2.3.5.10.6.2.2. "High Risk" hazards shall require CAE approval (Lead Executive Component authority prevails for joint programs).

C5.2.3.5.10.6.2.3. The acceptance of all risks involving explosives safety (see subparagraph C5.2.3.5.10.9.) shall require the appropriate risk acceptance authority to consult with the DoD Component's technical authority managing the explosives safety program.

C5.2.3.5.10.6.2.4. "Serious Risk" hazards shall require PEO approval.

C5.2.3.5.10.6.2.5. "Medium Risk" and "Low Risk" hazards shall require PM approval.

C5.2.3.5.10.6.3. Pub. L. 91-596 (1990) (reference (dddd)) makes Federal Occupational Safety and Health Act standards and regulations applicable to all federal (military or civilian) and contractor employees working on DoD acquisition contracts or in DoD operations and workplaces. In the case of military-unique equipment, systems, operations, or workplaces, Federal safety and health standards, in whole or in part, shall apply to the extent practicable.

C5.2.3.5.10.7. Hazardous Materials Management

C5.2.3.5.10.7.1. The PM shall establish a hazardous material management program consistent with eliminating and reducing the use of hazardous materials in processes and products (E.O. 13148 (reference (eeee))). The PM shall evaluate and manage the selection, use, and disposal of hazardous materials consistent with ESOH regulatory requirements and program cost, schedule, and performance goals. Where the PM cannot avoid using a hazardous material, he or she shall develop and implement plans and procedures for identifying, minimizing use of, tracking, storing, handling, packaging, transporting, and disposing of such material.

C5.2.3.5.10.7.2. As alternate technology becomes available, the PM shall replace hazardous materials in the system through changes in the system design, manufacturing, and maintenance processes, where technically and economically practicable. To minimize costs, the PM shall, whenever possible, work with the contractor and other PMs to identify and test mutually acceptable alternatives. DCMA shall coordinate this effort at contractor facilities under its cognizance. Where the Supervisor of Shipbuilding, Conversion, and Repair (SUPSHIP) provides contract management, the PM shall coordinate with SUPSHIP. The Contract Management Office, working in conjunction with the PM and IPT, shall help identify technical requirements, coordinate PM funding strategies, administer evaluation activities, and implement solutions.

C5.2.3.5.10.8. Pollution Prevention

C5.2.3.5.10.8.1. The PM shall identify and evaluate environmental and occupational health hazards and establish a pollution prevention program. The PM shall identify the impacts of the system on the environment during its life (including disposal), the types and amounts of pollution from all sources (air, water, noise, etc.) that will be released to the environment, actions needed to prevent or control the impacts, ESOH risks associated with using the new system, and other information needed to identify source reduction, alternative technologies, and recycling opportunities. The pollution prevention program shall serve to minimize system impacts on the environment and human health, as well as environmental compliance impacts on program TOC. A fundamental purpose of the pollution prevention program is to identify and quantify impacts, such as noise, as early as possible during system development, and to identify and implement actions needed to prevent or abate the impacts.

C5.2.3.5.10.8.2. In developing contract documents such as work statements, specifications, and other product descriptions, PMs shall eliminate the use of virgin material requirements, as practicable. They shall consider using recovered materials and reusable products. They shall further consider life-cycle costs, recyclability, the use of environmentally preferable products, waste prevention (including toxicity reduction or

elimination), and disposal, as appropriate. (FAR 11.002 and E.O. 13101 (references (ffff) and (gggg)))

C5.2.3.5.10.9. Explosives Safety. All acquisition programs that include or support munitions, explosives, or energetics shall comply with DoD explosives safety requirements. The PM shall establish an explosives safety program that ensures that munitions, explosives, and energetics are properly hazard classified, and safely developed, manufactured, tested, transported, handled, stored, maintained, demilitarized, and disposed. The PM shall evaluate and manage the use and selection of energetic materials and the design of munitions and explosive systems to reduce the possibility and the consequences of any munitions or explosives mishap and to optimize the trade-off of munitions reliability against unexploded ordnance liability.

C5.2.3.5.11. Interoperability. All acquisition programs shall satisfactorily address interoperability and integration. Users shall specify, and the appropriate authority shall validate, thresholds and objectives during the requirements generation process. The Joint Staff shall certify interoperability requirements. These requirements shall span the complete acquisition life cycle for all acquisition programs. Interoperability and supportability of IT acquisition program systems, including NSS, shall comply with DoD Directive 4630.5 (reference (hhhh)), DoD Instruction 4630.8 (reference (iiii)), and CJCS Instruction 6212.01B (reference (jjjj)). (Pub. L. 104-106 (1996) (reference (kkkk)) and 44 U.S.C. 3506 (reference (c)))

C5.2.3.5.11.1. IT Design Considerations. Available mission area (i.e., joint mission area and/or business/administrative mission areas) integrated architectures shall be used to develop IT, including NSS, interoperability requirements. The Joint Operational Architecture and the JTA shall serve as the foundation for evolutionary development of these mission area integrated architectures. Mission area integrated architectures shall state IT, including NSS, interoperability requirements in a family-of-systems mission area context. The user shall derive IT, including NSS, family-of-systems information exchange requirements (IERs) from the operational IERs of the mission area integrated architecture. During the requirements generation process, users shall develop interoperability KPPs in accordance with DoD Directive 4630.5 (reference (hhhh)), DoD Instruction 4630.8 (reference (iiii)), CJCS Instruction 3170.01B (reference (f)), and CJCS Instruction 6212.01B (reference (jjjj)) for all CRDs and ORDs. The DoD Components shall incorporate the IERs into the C4ISP (see Appendix 5).

C5.2.3.5.11.2. DoD Joint Technical Architecture (JTA). Implementation of the JTA is the use of applicable standards cited as mandated in the JTA. The implementation of the JTA is required for all new, or changes to existing, IT, including NSS. If the use of a JTA-mandated standard will negatively impact cost, schedule, or performance, a DoD CAE or cognizant OSD PSA may grant a waiver from use. For mission critical or mission essential programs, all granted waivers shall be submitted through ASD(C3I)/DoD CIO to USD(AT&L) for review. If no response is received within 2 weeks of the date of receipt, concurrence can be

assumed. To assure proper and timely consideration, all requests for a waiver shall state the cost, schedule, and performance impacts that will occur if the waiver is not granted, and any resulting operational limitations.

C5.2.3.5.11.3. Other than IT Design Considerations. Consistent with the interoperability KPP, the proposed system shall functionally operate with other systems, units, or forces, to include U.S. and U.S. coalition partners; allow appropriate training with other systems, units, or forces; physically integrate with other systems, units, or forces (considering chemical, mechanical, electrical, etc. interfaces); provide services to and accept services from other systems, units, or forces; and use the exchanged services and physical integration to operate effectively together.

C5.2.3.5.11.4. Standardization Considerations. Standardization advances interoperability through commonality of systems, subsystems, components, equipment, data, and architectures. The PM shall balance decisions to use standard systems, subsystems, and support equipment, against specific mission requirements (including corresponding information system elements that perform critical essential, or support functions with each mission area), technology growth, and cost effectiveness. The PM shall comply with the policy on military specifications and standards in paragraph C5.3.2. PMs shall consider compliance with international standardization agreements, such as the NATO Standardization Agreements, or the agreements of the Air Standards Coordinating Committee or American-British-Canadian-Australian Armies. The PM shall identify any international standardization agreements or U.S. implementing documents that apply to the program early in the design process to ensure interoperability with allied systems and equipment. The PM shall employ systems engineering analysis if compliance with the JTA or other international standardization agreements and/or other standards does not provide sufficient interoperability to satisfy user requirements.

C5.2.3.5.12. Survivability. Unless waived by the MDA, mission-critical systems, including crew, regardless of ACAT, shall be survivable to the threat levels anticipated in their projected operating environment as portrayed in the System Threat Assessment. Design and testing shall ensure that the system and crew can withstand man-made hostile environments without the crew suffering acute chronic illness, disability, or death.

C5.2.3.5.12.1. The PM shall fully assess system and crew survivability against all anticipated threats at all levels of conflict, early in the program, but in no case later than entering system demonstration or equivalent. This assessment shall also consider fratricide and detection. If the system or program has been designated by DOT&E, for LFT&E oversight (see section C3.8.), the PM shall integrate the T&E used to address crew survivability issues into the LFT&E program supporting the Secretary of Defense LFT&E Report to Congress (see paragraph C3.11.2.) (10 U.S.C. 2366 (reference (w))).

C5.2.3.5.12.2. The PM shall establish and maintain a survivability program throughout the system life cycle to attain overall program objectives. The program shall stress early investment in survivability enhancement efforts that improve system operational readiness and mission effectiveness by:

C5.2.3.5.12.2.1. Providing threat avoidance capabilities (low susceptibility);

C5.2.3.5.12.2.2. Incorporating hardening and threat tolerance features in system design (low vulnerability);

C5.2.3.5.12.2.3. Providing design features to reduce personnel casualties resulting from damage to or loss of the aircraft (casualty reduction);

C5.2.3.5.12.2.4. Maximizing wartime availability and sortie rates via operationally compatible threat damage tolerance and rapid reconstitution (reparability) features;

C5.2.3.5.12.2.5. Minimizing survivability program impact on overall program cost and schedule; and,

C5.2.3.5.12.2.6. Ensuring protection countermeasures and systems security applications are defined for critical component's vulnerability to validated threats for systems survivability, including conventional or nuclear advanced technology weapons; nuclear, biological, or chemical contamination; and EW threats.

C5.2.3.5.13. Mission Assuredness. The PM shall consider survivability and mission assuredness of systems vulnerable to physical and electronic attack. Security, survivability, and operational continuity (i.e., protection) shall be considered as technical performance requirements as they support achievement of other technical performance aspects such as accuracy, endurance, sustainability, interoperability, range, etc., as well as mission effectiveness in general (see section C6.6.). The PM shall include the considerations in the risk benefit analysis of system design and cost. Users shall be familiar with critical infrastructure protection and space control requirements, and account for necessary hardening, redundancy, backup, and other physical protection measures in developing system and family-of-system requirements.

C5.2.3.5.14. Information Assurance Requirements. The PM shall incorporate information assurance requirements into program design activities to ensure availability, integrity, authentication, confidentiality, and non-repudiation of critical system information. The PM shall consider the restoration of information systems by incorporating protection, detection, and reaction capabilities during system design. All automated information systems shall meet

the security requirements of DoD Directive 5200.28 (reference (llll)) and the accreditation requirements of DoD Instruction 5200.40 (reference (iii)).

C5.2.3.5.15. Anti-Tamper Provisions. Anti-tamper activities encompass the system engineering activities intended to prevent and/or delay exploitation of critical technologies in U.S. systems. These activities involve the entire life cycle of systems acquisition, including research, design, development, testing, implementation, and validation of anti-tamper measures. Properly employed, anti-tamper measures will add longevity to a critical technology by deterring efforts to reverse-engineer, exploit, or develop countermeasures against a system or system component.

C5.2.3.5.15.1. The PM shall develop and implement anti-tamper measures for all programs in accordance with the determination of the MDA as documented in the anti-tamper annex to the program protection plan. Anti-tamper capability, if determined to be required for a system, must be reflected in the systems specifications, integrated logistics support plan, and other program documents and design activities. Because of its function, anti-tamper should not be regarded as an option or a system capability that may later be traded off without a thorough operational and acquisition risk analysis. To accomplish this, the PM shall identify critical technologies, identify system vulnerabilities, and, with assistance from counter-intelligence organizations, perform threat analyses to the critical technologies. The PM shall research anti-tamper measures and determine which best fit the performance, cost, schedule, and risk of the program.

C5.2.3.5.15.2. The PM shall plan for post-production anti-tamper validation of end items. The Department's anti-tamper executive agent shall execute the validation plan approved by the MDA and report results to the SAE and USD(AT&L).

C5.3. OTHER DESIGN CONSIDERATIONS

The PM shall consider the following topics during program design and comply with each, as appropriate.

C5.3.1. Work Breakdown Structure (WBS). Systems engineering shall yield a program WBS. The PM shall prepare the WBS in accordance with the WBS guidance in MIL-HDBK-881 (reference (mmmm)). The WBS provides the framework for program and technical planning, cost estimating, resource allocation, performance measurement, technical assessment, and status reporting. The WBS shall include the WBS dictionary. The WBS shall define the system to be developed or produced. It shall display the system as a product-oriented family tree composed of hardware, software, services, data, and facilities. It shall relate the elements of work to each other and to the end product. The PM shall normally specify contract WBS elements only to level three for prime contractors and key subcontractors. Only low-level elements that address high risk, high value, or high technical interest areas of a program shall

require detailed reporting below level three. The PM shall have only one WBS for each program.

C5.3.2. Performance Specifications. The Department shall use performance specifications (i.e., DoD performance specifications, commercial item descriptions, and performance-based non-government standards) when purchasing new systems, major modifications, upgrades to current systems, and commercial and non-developmental items for programs in all acquisition categories. The Department shall emphasize conversion to performance specifications for reprocurements of existing systems at the subsystems level; and for components, spares, and services, where supported by a business case analysis; for programs in all acquisition categories.

C5.3.2.1. Implementing Performance Specifications

C5.3.2.1.1. If performance specifications are not practicable, the Department shall use non-Government standards. The following additional policy shall apply:

C5.3.2.1.1.1. If no acceptable non-Governmental standards exist, or if using performance specifications or non-Government standards is not cost effective, not practical, or does not meet the users' needs, over a product's life cycle, the Department may define an exact design solution with military specifications and standards, as last resort, with MDA-approved waiver.

C5.3.2.1.1.2. The CAE, or designee, may grant waivers for military specifications or standards across all programs.

C5.3.2.1.1.3. Waiver authorities may grant waivers for military specifications or standards for all or for a portion of the life of the system.

C5.3.2.1.1.4. Military specifications and standards contained in contracts and product configuration technical data packages for reprocurement of items already in inventory shall comply with the following:

C5.3.2.1.1.4.1. Be streamlined to remove non-value-added management, process, and oversight specifications and standards.

C5.3.2.1.1.4.2. Be replaced by Single Process Initiatives to improve product affordability.

C5.3.2.1.1.4.3. When justified as economically beneficial over the remaining product life cycle by a business case analysis, convert to performance-based acquisition and form, fit, function, and interface specifications to support programs in on-going procurement, future reprocurement, and post-production support.

C5.3.2.1.1.5. The Director, Naval Nuclear Propulsion, shall determine specifications and standards for naval nuclear propulsion plants, in accordance with 42 U.S.C. 7158 and E.O. 12344 (references (nnnn) and (oooo)).

C5.3.2.1.2. DoD Instruction 4120.24 and DoD 4120.24-M (references (pppp) and (qqqq)) contain additional standardization guidance.

C5.3.2.2. Implementing a Performance-Based Business Environment (PBBE)

C5.3.2.2.1. The PM shall structure the PBBE to accomplish the following:

C5.3.2.2.1.1. Convey product definition to industry in performance terms;

C5.3.2.2.1.2. Use systems engineering and management practices, including affordability, IPPD, and support, to fully integrate total life cycle considerations;

C5.3.2.2.1.3. Increase emphasis on past performance;

C5.3.2.2.1.4. Motivate process efficiency and effectiveness up and down the entire supplier base–primes, subcontractors and vendors–through the use of contractor chosen commercial products, practices, and processes;

C5.3.2.2.1.5. Encourage life-cycle risk management versus risk avoidance;

C5.3.2.2.1.6. Simplify acquisition and support operating methods by transferring tasks to industry where cost effective, risk-acceptable, commercial capabilities exist; and

C5.3.2.2.1.7. Use performance requirements or conversion to performance requirements during reprocurement of systems, subsystems, components, spares, and services beyond the initial production contract award, and during post-production support to facilitate technology insertion and modernization of operational weapons systems.

C5.3.2.2.2. Systems that benefit from a PBBE include highly interoperable systems, high tech/high cost systems, high return on investment systems, systems requiring a high degree of logistics readiness and/or technology insertion opportunity, and/or systems with a high TOC and/or a long predicted life.

C5.3.3. Metric System. The PM shall use the metric system of measurement for all elements of defense systems requiring new design, unless waived by the MDA as not in the best interest of the government (15 U.S.C. 205a-205k (reference (rrrr)) and E.O. 12770 (reference (ssss))).

C5.3.4. Insensitive Munitions[9]. All munitions and weapons, regardless of ACAT, shall conform to insensitive munitions (unplanned stimuli) criteria and use materials consistent with safety and interoperability requirements (see subparagraphs C5.2.3.5.10. and C5.2.3.5.11.). The requirements validation process shall determine insensitive munitions requirements and keep them current throughout the acquisition cycle. Interoperability, to include insensitive munitions policies, shall be certified per CJCS Instruction 3170.01B (reference (f)). Waivers for munitions/weapons, regardless of ACAT level, shall require JROC approval. The ultimate objective is to design and field munitions that have no adverse reaction to unplanned stimuli, analogous to Hazard Division 1.6 (see TB 700-2 (reference (tttt))).

C5.3.5. Value Engineering. The PM shall apply value engineering to projects and programs per 41 U.S.C. 432 (reference (uuuu)) and OMB Circular A-131 (reference (vvvv)). The PM shall consider an incentive approach and/or a mandatory approach as described in FAR Part 48 (reference (wwww)). The value-engineering program may include both internal DoD and contractor activity.

C5.3.6. Precise Time and Time Interval. To ensure uniformity in precise time and time interval operations, Coordinated Universal Time, as determined by the Master Clock at the United States Naval Observatory, shall be the DoD systems standard.

C5.3.7. Accessibility Requirements. PMs shall ensure that, where appropriate, system development includes accessibility requirements as outlined in Section 508 of the Rehabilitation Act of 1973 (29 U.S.C. 794d (reference (xxxx))). All electronic and information technology, including telecommunications, software, hardware, web sites, printers, fax machines, copiers, and information kiosks, where appropriate, shall include requirements to ensure people with disabilities are able to use the system and have access to the information or data.

C5.3.8. Corrosion Prevention and Control. The PM shall consider and implement corrosion prevention and control activities to minimize the impact of corrosion/material deterioration throughout the system life cycle. Corrosion prevention and control methods include, but are not limited to, the use of effective design practices, material selection, protective finishes, production processes, packaging, storage environments, protection during shipment, and maintenance procedures. PMs shall establish and maintain a corrosion prevention and control reporting

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[9] Not applicable to ACAT IA programs.

system for data collection and feedback, and use it to adequately address corrosion prevention and control logistic considerations and readiness issues.

C6. CHAPTER 6
INFORMATION SUPERIORITY

C6.1. GENERAL

Information superiority is defined as the capability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying an adversary's ability to do the same. Forces attain information superiority through the acquisition of systems and families-of-systems that are secure, reliable, interoperable, and able to communicate across a universal IT infrastructure, to include NSS. This IT infrastructure includes the data, information, processes, organizational interactions, skills, and analytical expertise, as well as systems, networks, and information exchange capabilities. Information superiority inherently depends on program design, but equally depends on the readiness of the implemented technology to provide direct user capabilities and the readiness of the supporting infrastructures that apply these technologies to be successfully employed.

C6.2. INTELLIGENCE SUPPORT

C6.2.1. Users shall base acquisition programs, initiated in response to a military threat, on authoritative current and projected threat information. The intelligence, requirements generation, and acquisition management communities shall collaborate early and continuously to ensure the use of timely, valid, threat information. This collaboration shall include joint examination of critical intelligence categories that could significantly influence the effective operation of the deployed system.

C6.2.2. Users shall assess and evaluate information superiority requirements. They shall determine the vulnerability of IT, including NSS, supporting infrastructures, and the effectiveness of risk mitigation methods to reduce vulnerability to an acceptable level.

C6.2.3. Threat Validation. For acquisition programs subject to DAB review, DIA shall validate System Threat Assessments and other threat information, including that contained in program documents. For other than DAB programs, the MDA shall designate the approving agency.

C6.2.4. System Threat Assessment

C6.2.4.1. The DoD Components shall prepare a System Threat Assessment to support program initiation. They shall keep the assessment current and in a validated status throughout the acquisition process. DIA shall review the assessment prior to all milestone decision points. For ACAT ID programs, the assessment shall be system-specific to the degree of system definition available at the time of the assessment. The assessment shall address the projected

threat at IOC and at IOC plus 10 years. The DoD Components shall structure threat assessments for ACAT IC programs similarly, but the ACAT IC assessments may address operationally related systems, when practicable.

C6.2.4.2. The System Threat Assessment shall include the following minimum elements:

C6.2.4.2.1. An executive summary to include the key intelligence judgments and significant changes in the threat environment;

C6.2.4.2.2. The mission need for the U.S. system;

C6.2.4.2.3. A system description;

C6.2.4.2.4. Discussion of the operational threat environment: the threat to be countered, the system specific threat, reactive threat, and technologically feasible threat; and

C6.2.4.2.5. Critical intelligence categories, and the intelligence production requirements supporting these critical intelligence categories, developed by the PM early in the acquisition process.

C6.3. INFORMATION INTEROPERABILITY

C6.3.1. For the purposes of this paragraph, information interoperability means the exchange and use of information in any electronic form. Information interoperability enables both effective war fighting and combat support operations, both within the Department of Defense and with external activities (e.g., within the federal government or with coalition partners). CJCS Instruction 3170.01B (reference (f)) requires users to develop an interoperability KPP and identify IERs. The ORD sponsor shall develop IERs and associated interoperability KPP using mission-area integrated architectures as prescribed in DoD Instruction 4630.8 (reference (iiii)) and CJCS Instruction 6212.01B (reference (jjjj)).

C6.3.2. The ORD sponsor shall characterize information interoperability, as applicable, within a family of systems, a mission area, and a mission, for all IT systems, including NSS. In developing the ORD, the ORD sponsor shall consider using the products described in the C4ISR Architecture Framework (renamed the DoD Architecture Framework in versions 2.1 and later) and universal resources such as the JTA. The ORD sponsor shall apply the following guidance to information interoperability:

C6.3.2.1. Manage, verify and maintain information interoperability throughout the system life cycle; and

C6.3.2.2. Participate in interoperability and supportability M&S assessments that are performed by the Military Departments or Lead Executive Component to determine the level of interoperability between systems and identify incompatibilities.

C6.3.3. The interoperability and supportability of IT acquisition programs, including NSS, shall comply with DoD Directive 4630.5 (reference (hhhh)), DoD Instruction 4630.8 (reference (iiii)), CJCS Instruction 3170.01B (reference (h)), and CJCS Instruction 6212.01B (reference (jjjj)). (Pub. L. 104-106 (1996), Section 5123 (reference (e)) and 44 U.S.C. 3506 (reference (c)))

C6.4. COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS, AND INTELLIGENCE SUPPORT

C6.4.1. The DoD Components shall identify and evaluate IT, including NSS, infrastructure and support requirements early in, and throughout, each program's life cycle. They shall consider these requirements in the analysis of alternatives and in developing and refining operational requirements. They shall also identify these requirements to support transition decisions for all advanced concept technology demonstrations.

C6.4.2. The DoD Components shall develop C4ISPs for programs in all acquisition categories when they connect in any way to the communications and information infrastructure. This includes IT systems, including NSS, and all infrastructure programs. Unless the program is on the special interest list, C4ISPs for upgrades to existing systems shall be limited to the scope of the upgrade as defined in the acquisition program, even when there is no C4ISP for the existing system. The DoD Components shall keep the C4ISP current throughout the program's acquisition process. The C4ISP shall be formally reviewed at each milestone, at each block in an evolutionary acquisition, at decision reviews, as appropriate, and whenever the concept of operations or IT, including NSS, support requirements change.

C6.4.3. ASD(C3I) shall review all C4ISPs for ACAT I and ACAT IA programs, and for special interest programs designated by ASD(C3I). Components shall develop internal procedures for the review of C4ISPs. Should interoperability issues arise between ACAT I or IA and less than ACAT I or IA programs, DoD Components shall, if requested, be able to provide the C4ISP for the less than ACAT I or IA program to ASD (C3I) to support issue resolution.

C6.4.4. The Department shall address and resolve critical interoperability and supportability concerns that surface during C4ISP reviews either prior to milestone or decision approval or through tasking in the Acquisition Decision Memorandum (ADM). The initial C4ISP is due at program initiation. Appendix 5 contains C4ISP preparation and review procedures, formats, and timelines.

C6.4.5. The DoD Components shall tailor C4ISPs based on the complexity, scale, mission criticality, or other unique aspects of the program or system's IT, including NSS, support and

interface requirements. At each decision point, C4ISPs shall contain progressively more detailed and specific, time-phased descriptions of the types of information needed; operational, systems, and technical architecture requirements; IERs; spectrum, supportability, security, connectivity, and interoperability issues; and IT, including NSS, infrastructure and support shortfalls. Infrastructure programs shall also prepare C4ISPs. The MDA, with advice from the appropriate CIO, may waive C4ISP preparation if the Requirements Authority has previously waived the requirement for an interoperability KPP in the ORD.

C6.5. ELECTROMAGNETIC ENVIRONMENTAL EFFECTS (E3) AND SPECTRUM SUPPORTABILITY

C6.5.1. The PM shall design all electric or electronic systems/equipment to be mutually compatible with other electric or electronic systems/equipment and the operational electromagnetic environment. All systems shall meet operational performance requirements. The PM shall design ordnance and associated systems to preclude inadvertent ignition, and to perform effectively, during or after exposure to the operational electromagnetic environment. For additional information, see DoD Directive 3222.3 (reference (yyyy)).

C6.5.2. The following applies to all electromagnetic spectrum-dependent systems and equipment, including commercial and non-developmental items:

C6.5.2.1. In accordance with OMB Circular A-11 (reference (b)), PMs shall determine system spectrum supportability prior to initiating cost estimates for development or procurement.

C6.5.2.2. Systems shall comply with statutory spectrum supportability management requirements (47 U.S.C. Chapter 8 (reference (zzzz))) and the National Telecommunications and Information Administration Manual of Regulations and Procedures for Federal Radio Frequency Management (47 C.F.R. 300.1 (reference (aaaaa))) and shall address requirements to achieve appropriate international spectrum supportability.

C6.5.2.3. Design criteria for systems that use the electromagnetic spectrum (spectrum dependent) must take into consideration other current and future DoD spectrum dependent systems, as well as, current and projected government/non-DoD and civil spectrum use.

C6.5.2.4. DoD components shall obtain radio frequency spectrum guidance from the Military Communications-Electronics Board (DoD Directive 4650.1 (reference (bbbbb))).

C6.5.3. The PM shall forward requirements for foreign spectrum support (i.e., DD Form 1494 via U.S. Supplement 1, Allied Communication Publication 190 (reference (ccccc))) through established channels (e.g., Service Spectrum Management Organization) to the Military Communications-Electronics Board to initiate host nation coordination with nations where

deployment of the system or support equipment is planned for outside of the continental United States.

C6.6. INFORMATION ASSURANCE

C6.6.1. PMs shall manage and engineer information systems using the best processes and practices known to reduce security risks, including the risks to timely accreditation. Per DoD Instruction 5200.40 (reference (iii)), they shall address information assurance requirements throughout the life cycle of all DoD systems. The PM shall incorporate approved CRD-derived and ORD-derived information assurance requirements into program design activities to ensure appropriate availability, integrity, authentication, confidentiality, and non-repudiation of program and system information and the information systems themselves, as specified in the applicable SSAA. PMs shall also provide for the survivability of information by incorporating protection, detection, reaction, and reconstitution capabilities into the system design, as appropriate, and as allocated in SSAAs.

C6.6.2. Accordingly, for each information system development, PMs shall:

C6.6.2.1. Conduct a system risk assessment based on system criticality, threat, and vulnerabilities;

C6.6.2.2. Incorporate appropriate countermeasures;

C6.6.2.3. Demonstrate the effectiveness of those countermeasures through the certification process conducted in accordance with DoD Instruction 5200.40 (reference (iii)) during DT&E;

C6.6.2.4. Ensure that the responsible designated approving authority accredits the system; and,

C6.6.2.5. Incorporate existing, or develop new, protection profiles to consolidate security-related requirements and provide effective management oversight of the overall security program.

C6.7. TECHNOLOGY PROTECTION

C6.7.1. PMs shall identify critical elements of their program, referred to as Critical Program Information (CPI). This applies to any acquisition program that requires protection to prevent unauthorized disclosure or inadvertent transfer of leading-edge technologies and sensitive data or systems, otherwise referred to as "compromise." CPI may be identified during the requirements generation process, may be integral to the program, may be inherited from a supporting program, or may result from acquisition techniques such as flexible technology insertion. For programs with CPI, the PM shall notify the DoD Component servicing counterintelligence agency

technology protection program manager of the identified CPI, and develop a program protection plan prior to Milestone B.

C6.7.2. Each program shall have an integrated, comprehensive, and coherent program protection plan and process over the entire system life cycle. The adequacy and effectiveness of protection shall be reviewed at each milestone or decision point. The PM shall prioritize identified protection vulnerabilities based upon the mission consequences if the CPI is lost or compromised, allowing a foreign interest to exploit the CPI. Technology protection planning and development of the program protection plan shall begin early in the acquisition life cycle. The following considerations apply:

C6.7.2.1. Attempt to shape or influence the projected threat environment in a direction favorable to U.S. national security interests.

C6.7.2.2. Systems of extraordinary importance to the national security, such as space, strategic, and C4ISR systems, shall have particularly stringent protection requirements, planning, and oversight due to the broad, serious, and enduring consequences of degradation or loss to the National Command Authorities and combatant commands.

C6.7.2.3. The DoD Component counterintelligence organizations shall provide the PM with information concerning the foreign intelligence and other related threats to the acquisition program with CPI.

C6.7.2.4. Security organizations shall identify system vulnerabilities and recommend cost-effective security measures using risk management evaluations.

C6.7.2.5. Counterintelligence organizations shall offer a variety of tailored services to address threats posed by foreign intelligence services to an acquisition program. The program protection plan shall identify those counterintelligence services.

C6.7.2.6. DoD Component counterintelligence organizations will identify a counterintelligence point of contact for each program with CPI. Throughout the life of the program, based on field counterintelligence activities supporting the program, the counterintelligence point of contact shall provide updated threat and other counterintelligence information to the PM.

C6.7.2.7. As technology allows, systems engineering activities shall use encryption, packaging or bundling, and other tamper-proofing techniques to maximize CPI protection. The PM shall consider anti-tamper techniques intended to prevent or delay exploitation of military critical technologies in weapons systems.

C6.7.3. The program protection plan shall address information systems security, defensive information warfare, TEMPEST, personnel security, classification management, physical security, operations security, technology transfer, counterintelligence, and international security requirements. Systems protection shall include: Information Assurance, Information Security, Anti-Terrorism, Counter-Terrorism, Force Protection, Continuity of Operations, Physical Security, Information Security, Operations Security, Threat Warning/Attack Assessment, Personnel Security, Foreign Disclosure, Technology Transfer, etc.

C6.7.4. The PM shall report a finding that no CPI exists to the MDA, if so determined. DoD Directive 5200.39 (reference (ddddd)), DoD 5200.1-M (reference (zzz)), and the DoD Technology Protection Handbook have more on technology, protection, and development of the program protection plan and anti-tamper.

C6.7.5. Anti-Tamper Measures

C6.7.5.1. The PM shall consider anti-tamper measures for use on any system with CPI, developed with allied partners, likely to be sold or provided to U.S. allies and friendly foreign governments, or likely to fall into enemy hands. The PM shall document the analysis and recommendation to use or not to use anti-tamper measures in a classified annex to the program protection plan, and report findings to the MDA at Milestone B and subsequent milestones. The MDA shall consider for approval, the PM's recommendation to implement or not to implement anti-tamper measures.

C6.7.5.2. At Milestone B, the PM shall address implementation of anti-tamper measures, and, in conceptual terms, the demonstration of these measures through working prototypes. The anti-tamper annex to the program protection plan at Milestone B shall include the following:

C6.7.5.2.1. A list of critical technologies;

C6.7.5.2.2. A threat analysis;

C6.7.5.2.3. Identified vulnerabilities; and

C6.7.5.2.4. A preliminary anti-tamper requirement.

C6.7.5.3. At Milestone C, the PM shall address how anti-tamper measures have been demonstrated, and how they will be tested during DT and OT, and made ready for production.

C6.7.5.3.1. The anti-tamper annex to the program protection plan at Milestone C shall include the following:

C6.7.5.3.1.1. All deliverables from Milestone B and applicable updates;

C6.7.5.3.1.2. An analysis of anti-tamper methods that apply to the system, including cost/benefit assessments;

C6.7.5.3.1.3. An explanation of which anti-tamper method(s) will be implemented; and

C6.7.5.3.1.4. Planning for validation of the anti-tamper implementation.

C6.7.5.3.2. The MDA shall review the validation planning at Milestone C.

C6.7.5.4. Developmental test and evaluation shall verify implementation of anti-tamper measures. During initial system production, the Department's anti-tamper executive agent shall validate anti-tamper measures on actual or representative system components provided by the PM. The anti-tamper executive agent shall report validation results to the appropriate SAE and USD(AT&L) at the Full-Rate Production decision review.

C6.7.5.5. Anti-tamper measures shall apply throughout the life cycle of the system. Maintenance instructions and technical orders shall clearly indicate that anti-tamper measures have been implemented; indicate the level at which maintenance is authorized, and include warnings that damage may occur if improper or unauthorized maintenance is attempted. To protect critical technologies, it may be necessary to limit the level and extent of maintenance a foreign customer may perform. This may mean that maintenance involving the anti-tamper measures will be accomplished only at the contractor or U.S. Government facility in the U.S. or overseas. Such maintenance restrictions may be no different than those imposed on U.S. Government users of anti-tamper protected systems. Contracts, purchase agreements, memoranda of understanding, memoranda of agreement, letters of agreement, or other similar documents shall state such maintenance and logistics restrictions. When a contract that includes anti-tamper protection requirements and associated maintenance and logistics restrictions also contains a warranty or other form of performance guarantee, the contract terms and conditions shall establish that unauthorized maintenance or other unauthorized activities:

C6.7.5.5.1. Shall be regarded as hostile attempts to exploit or reverse engineer the weapon system or the anti-tamper measure itself and

C6.7.5.5.2. Shall void the warranty or performance guarantee.

C6.8. IT REGISTRATION

All mission critical and mission essential information systems shall be registered with the DoD CIO in accordance with procedures in Appendix 7, before Milestone B approval or program initiation, whichever is earlier. The information required to be submitted as part of this registration shall be updated not less than quarterly.

C7. CHAPTER 7

PROGRAM DECISIONS, ASSESSMENTS, AND PERIODIC REPORTING

C7.1. PURPOSE

This Chapter establishes mandatory policies and procedures for making major program decisions for ACAT ID and ACAT IAM programs. It also addresses periodic reporting requirements.

C7.2. DECISION POINTS

There are three types of decision points: milestones, decision reviews, and interim progress reviews. Each decision point results in a decision to initiate, continue, advance, or terminate a project or program work effort or phase. The review associated with each decision point shall typically address program progress and risk, affordability, program trade-offs, acquisition strategy updates, and the development of exit criteria for the next phase or effort. The type and number of decision points shall be tailored to program needs. The MDA shall approve the program structure as part of the acquisition strategy.

C7.2.1. Milestone decision points shall initiate programs and authorize entry into the major acquisition process phases: Concept and Technology Development, System Development and Demonstration, and Production and Deployment. The information specified in DoD Instruction 5000.2, enclosure 3 (reference (a)), shall support milestone reviews.

C7.2.2. Decision reviews shall assess program progress and authorize continued program development.

C7.2.2.1. Programs beginning in the concept exploration work effort of the Concept and Technology Development Phase shall require a decision review to determine whether or not the concept is ready to be pursued in component advanced development. If the work content typically associated with component advanced development has been completed, a Milestone B review may substitute for this decision review.

C7.2.2.2. The MDA shall schedule a Full-Rate Production and Deployment Decision Review during the Production and Deployment Phase to consider the results of production qualification testing and IOT&E and to authorize full-rate production and deployment.

C7.2.2.3. Decision reviews are designed to be streamlined reviews and shall require only the information specified by the MDA or as required by statute. The information required to support the component advanced development and full-rate production and deployment decision reviews shall be tailored to support the review and be consistent with and not exceed the information specified in DoD Instruction 5000.2, enclosure 3 (reference (a)).

C7.2.3. Interim progress reviews shall assess program progress within the System Development and Demonstration phase. This review shall only require information as specified by the MDA.

C7.3. EXECUTIVE REVIEW PROCEDURES

The following paragraphs detail procedures for the assessment reviews associated with major decision points.

C7.3.1. Defense Acquisition Board (DAB) Review

C7.3.1.1. The DAB shall advise the Under Secretary of Defense (Acquisition, Technology, and Logistics) on critical acquisition decisions. The Under Secretary of Defense (Acquisition, Technology, and Logistics) shall chair the DAB, and the Vice Chairman of the Joint Chiefs of Staff shall serve as vice-chair. DAB membership shall comprise the following executives: Under Secretary of Defense (Comptroller); Under Secretary of Defense (Policy); Under Secretary of Defense (Personnel & Readiness); Assistant Secretary of Defense (Command, Control, Communications, and Intelligence)/Department of Defense Chief Information Officer; Director, Operational Test and Evaluation; and the Secretaries of the Army, Navy, and the Air Force. United States Joint Forces Command shall be available to comment on interoperability and integration issues that the JROC forwards to the DAB. The DAE may ask other department officials to participate in reviews, as required.

C7.3.1.2. The reviews shall focus on key principles to include interoperability, time-phased requirements related to an evolutionary approach, and demonstrated technical maturity. DAB reviews, and milestones in particular, typically require extensive supporting documentation, per enclosure 3 of reference (a).

C7.3.1.3. The Defense Acquisition Executive shall conduct DAB reviews at major program milestones and at the Full-Rate Production Decision Review (if not delegated to the CAE), and at other times, as necessary. An ADM shall document the decision(s) resulting from the review.

C7.3.1.4. The PM shall brief the acquisition program to the DAB and specifically emphasize technology maturity, risk management, affordability, critical program information, technology protection, and rapid delivery to the user. The PM shall address any interoperability and supportability requirements linked to other systems, and indicate whether those requirements will be satisfied by the acquisition strategy under review. If the program is part of a system-of-systems architecture, the PM shall brief the DAB in that context. If the architecture includes less than ACAT I programs that are key to achieving the expected operational capability, the PM shall also discuss the status of and dependence on those programs.

C7.3.2. DoD CIO Reviews

C7.3.2.1. DoD CIO Reviews shall provide the forum for ACAT IAM milestones, for deciding critical ACAT IAM issues when they cannot be resolved at the OIPT level, and for enabling the execution of the DoD CIO's acquisition-related responsibilities for IT, including NSS, under the Clinger-Cohen Act and Title 10 (references (ppp) and (eeeee)). Wherever possible, these reviews shall take place in the context of the existing IPT and acquisition milestone review process. Where appropriate, an ADM shall typically document the decision(s) resulting from the review.

C7.3.2.2. To meet the DoD CIO's acquisition-related responsibilities under references (ppp) and (eeeee), these reviews shall focus on key principles such as:

C7.3.2.2.1. Support of mission needs as described in Defense Planning Guidance, Joint Vision 2020, the DoD Information Management Strategic Plan, the operational view of the approved Global Information Grid (GIG) Integrated Architecture, and the approved GIG CRD.

C7.3.2.2.2. Compliance with GIG-related policies and the approved GIG Integrated Architecture.

C7.3.2.2.3. Interoperability implementation plans and status implications of program and budget decisions/alternatives.

C7.3.2.3. Principal participants at DoD CIO reviews shall include (as appropriate to the issue being examined) the following department officials: the Deputy DoD CIO; IT OIPT Leader; ACAT ID OIPT Leaders; Cognizant PEO(s) and PM(s); Cognizant OSD PSA; CAEs and CIOs of the Army, Navy, and Air Force. Participants shall also include (as appropriate to the issue being examined) executive-level representatives from the following organizations: Office of USD(AT&L); Office of the Under Secretary of Defense (Comptroller); Office of the Joint Chiefs of Staff; Office of DOT&E; Office of the Director, PA&E; and Defense Information Systems Agency.

C7.3.2.4. The DoD CIO may ask other department officials to participate in reviews, as required.

C7.4. EXIT CRITERIA

C7.4.1. MDAs shall use exit criteria to establish goals for ACAT I (10 USC 2220(a)(1) (reference (h))) and ACAT IA (Pub. L. 104-106 (1996), Section 5123 (reference (e))) programs during an acquisition phase. At each milestone decision point and at each decision review, the PM, in collaboration with the IPT, shall develop and propose exit criteria appropriate to the next

phase or effort of the program. The OIPT will review the proposed exit criteria and recommend exit criteria to the MDA. The MDA shall approve and publish exit criteria in the ADM.

C7.4.2. Phase-specific exit criteria normally track progress in important technical, schedule, or management risk areas. Unless waived or modified by the MDA, exit criteria must be substantially satisfied for the program to continue with additional activities within an acquisition phase or to proceed into the next acquisition phase, depending on the decision with which they are associated. Exit criteria shall not be part of the APB and are not intended to repeat or replace APB requirements or the entrance criteria specified in DoD Instruction 5000.2 (reference (a)). They shall not cause program deviations. The DAES (see paragraph C7.15.3. and Appendix 1) shall report the status of exit criteria.

C7.5. TECHNOLOGY MATURITY

C7.5.1. Technology maturity shall measure the degree to which proposed critical technologies meet program objectives. Technology maturity is a principal element of program risk. A technology readiness assessment shall examine program concepts, technology requirements, and demonstrated technology capabilities to determine technological maturity.

C7.5.2. The PM shall identify critical technologies via the WBS (see paragraph C5.3.1.). Technology readiness assessments for critical technologies shall occur sufficiently prior to milestone decision points B and C to provide useful technology maturity information to the acquisition review process.

C7.5.3. The DoD Component Science and Technology (S&T) Executive shall direct the technology readiness assessment and, for ACAT ID and ACAT IAM programs, submit the findings to the CAE who shall submit his or her report to the DUSD(S&T) with a recommended technology readiness level (TRL) (or some equivalent assessment) for each critical technology. When the Component S&T Executive submits his or her findings to the CAE, he or she shall provide the DUSD(S&T) an information copy of those findings. In cooperation with the Component S&T Executive and the program office, the DUSD(S&T) shall evaluate the technology readiness assessment and, if he/she concurs, forward findings to the OIPT leader and DAB. If the DUSD(S&T) does not concur with the technology readiness assessment findings, an independent technology readiness assessment, under the direction of the DUSD(S&T), shall be required.

C7.5.4. TRL descriptions appear at Appendix 6. TRLs enable consistent, uniform, discussions of technical maturity, across different types of technologies. Decision authorities shall consider the recommended TRLs (or some equivalent assessment methodology, e.g., Willoughby templates) when assessing program risk. TRLs are a measure of technical maturity. They do not discuss the probability of occurrence (i.e., the likelihood of attaining required maturity) or the impact of not achieving technology maturity.

C7.6. INTEGRATED PRODUCT TEAMS (IPTS) IN THE OVERSIGHT AND REVIEW PROCESS

C7.6.1. Defense acquisition works best when all of the Department's Components work together. Cooperation and empowerment are essential. The Department's acquisition community shall implement the concepts of IPPD and IPTs as extensively as possible.

C7.6.2. 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 IPT: the OIPT and WIPT(s). Each program shall have an OIPT and at least one WIPT. WIPTs shall focus on a particular topic such as cost/performance, test, or contracting. An Integrating IPT (IIPT) (which is a WIPT) shall coordinate WIPT efforts and cover all topics not otherwise assigned to another IPT. IPT participation is the primary way for any organization to participate in the acquisition program.

C7.6.3. Industry Participation

C7.6.3.1. Industry representatives may be invited to a WIPT or IIPT meeting to provide information, advice, and recommendations to the IPT; however, the following policy shall govern their participation.

C7.6.3.1.1. Industry representatives shall not be formal members of the IPT.

C7.6.3.1.2. Industry participation shall be consistent with FACA (reference (cc)).

C7.6.3.1.3. They may not be present during IPT deliberations on acquisition strategy or competition sensitive matters, nor during any other discussions that would give them a marketing or competitive advantage.

C7.6.3.1.4. At the beginning of each meeting, the IPT chair shall introduce each industry representative, including their affiliation, and their purpose for attending.

C7.6.3.1.5. The chair shall inform the IPT members of the need to restrict discussions while industry representatives are in the room, and/or the chair shall request the industry representatives to leave before matters are discussed that are inappropriate for them to hear.

C7.6.3.1.6. Support contractors may participate in WIPTs and IIPTs, but they may not commit the organization they support to a specific position. The organizations they support are responsible for ensuring the support contractors are employed in ways that do not create the potential for an organizational conflict of interest.

C7.6.3.2. Given the sensitive nature of OIPT discussions, neither industry representatives nor support contractors shall participate in OIPT discussions. However, the OIPT leader may permit contractors to make presentations to the OIPT when such views will better inform the OIPT, and will not involve the contractors directly in government decision making.

C7.6.4. Overarching IPT Procedures and Assessments

C7.6.4.1. All ACAT ID and IAM programs shall have an OIPT to provide assistance, oversight, and review as the program proceeds through its acquisition life cycle. An appropriate official within OSD, typically the Director of Strategic and Tactical Systems or the Principal Director, Command, Control, Communications, Intelligence, Surveillance, and Reconnaissance & Space, shall lead the OIPT for ACAT ID programs. The Deputy DoD CIO or designee shall lead the OIPT for ACAT IAM programs. The OIPT for ACAT IAM programs is called the IT OIPT. OIPTs shall comprise the PM, PEO, Component Staff, Joint Staff, and OSD staff involved in oversight and review of the particular ACAT ID or IAM program.

C7.6.4.2. The OIPT shall form upon departmental intention to start an acquisition program. The OIPT shall charter the IIPT and WIPTs. The OIPT shall consider the recommendations of the IIPT regarding the appropriate milestone for program initiation and the minimum information needed for the program initiation milestone review. OIPTs shall meet, thereafter, as necessary over the life of the program. The OIPT leader shall act to resolve issues when requested by any member of the OIPT, or when so directed by the 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. The OIPT shall bring only the highest-level issues to the MDA for decision.

C7.6.4.3. The OIPT shall normally convene two weeks before a planned decision point. It shall assess the information and recommendations that the MDA will receive, in the same context, and to the same ACAT level. It shall also assess family-of-system or system-of-system capabilities within mission areas in support of mission area operational architectures developed by the Joint Staff. If the program includes a pilot project, such as TOC Reduction, the PM shall report the status of the project to the OIPT. The OIPT shall then assess progress against stated goals. The PM's briefing to the OIPT shall specifically address interoperability and supportability (including spectrum supportability) with other systems, anti-tamper provisions, and indicate whether those requirements will be satisfied by the acquisition strategy under review. If the program is part of a family-of-systems architecture, the PM shall brief the OIPT in that context. If the architecture includes less than ACAT I programs that are key to achieving the expected operational capability, the PM shall also discuss the status of and dependence on those programs. The OIPT leader shall recommend to the MDA whether the anticipated review should go forward as planned.

C7.6.4.4. For ACAT ID decision points, the OIPT leader shall provide the DAB chair, principals, and advisors an integrated assessment using information gathered through the IPT process. The leader's assessment shall focus on core acquisition management issues and shall consider independent assessments, including technology readiness assessments, which the OIPT members normally prepare. These assessments typically occur in context of the OIPT review, and shall be reflected in the OIPT leader's report. There shall be no surprises at this point--all team members shall work issues in real time and shall be knowledgeable of their OIPT leader's assessment. OIPT and other staff members shall not require the PM to provide pre-briefs independent of the OIPT process.

C7.6.5. WIPT Procedures, Roles, and Responsibilities

C7.6.5.1. The PM, or designee, shall form and lead an IIPT to support the development of strategies for acquisition and contracts, cost estimates, evaluation of alternatives, logistics management, training, cost-performance trade-offs, etc. The PM, assisted by the IIPT, shall develop and propose to the OIPT, a WIPT structure. The IIPT shall coordinate the activities of the WIPTs and review issues they do not address. 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, the following basic tenets shall apply:

C7.6.5.1.1. The PM is in charge of the program.

C7.6.5.1.2. IPTs are advisory bodies to the PM.

C7.6.5.1.3. 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.

C7.6.5.2. The PM or PM's representative shall normally lead each IPT. At the invitation of the PM, an OSD action officer may co-chair IPT meetings. The following roles and responsibilities shall apply to all WIPTs:

C7.6.5.2.1. Assist the PM in developing strategies and in program planning, as requested by the PM.

C7.6.5.2.2. Establish an IPT plan of action and milestones.

C7.6.5.2.3. Propose tailored documentation and milestone requirements.

C7.6.5.2.4. Review and provide early input to documents.

C7.6.5.2.5. Coordinate WIPT activities with the OIPT members.

C7.6.5.2.6. Resolve or elevate issues in a timely manner.

C7.6.5.2.7. Assume responsibility to obtain principals' concurrences on issues, documents, or portions of documents.

C7.6.5.3. IPTs are critical to program success, and training is critical to IPT success. All WIPT members for ACAT ID and ACAT IAM programs shall receive formal, team-specific training and, as necessary, general IPT procedural training.

C7.6.6. Cost/Performance IPT

C7.6.6.1. ACAT ID and ACAT IAM (as required) programs shall establish a Cost/Performance IPT. The team shall include representatives of the user, costing, analysis, and budgeting communities, at minimum, and include other members as and when appropriate, including industry or contractors, consistent with statute and the policy in paragraph C7.6.3. Normally, the PM or the PM's representative shall lead the Cost/Performance IPT.

C7.6.6.2. The PM, supported by the Cost/Performance IPT, shall conduct and integrate all program cost and performance trade-off analyses. The empowered Cost/Performance IPT may effect performance or engineering and design changes provided they do not violate threshold values in the ORD and APB. If the changes require ORD or APB threshold value changes, the PM shall notify the OIPT leader. The PM shall quickly bring proposed changes before the ORD and/or APB approval authorities for decision. Prior to each major decision point, the PM shall report the Cost/Performance IPT cost and performance findings to the OIPT leader and brief their relationship to the program baseline.

C7.6.7. Independent Assessments. Assessments, independent of the developer and the user, ensure an impartial evaluation of program status. Consistent with statutory requirements and good management practice, the Department of Defense shall require independent assessments of program status (e.g., the independent cost estimate or technology readiness assessment). Senior acquisition officials shall consider these assessments when making acquisition decisions. Staff offices that provide independent assessments shall support the orderly and timely progression of programs through the acquisition process. IPTs shall have access to independent assessments to enable full and open discussion of issues.

C7.6.8. Component Programs. The decision review processes discussed in this section deal specifically with ACAT ID and ACAT IAM programs. CAEs shall develop similar tailored procedures for programs under their cognizance.

C7.7. PROGRAM INFORMATION

C7.7.1. It shall be Department policy to keep reporting requirements to a minimum. Nevertheless, complete and current program information is essential to the acquisition process. Consistent with the tables of required regulatory and statutory information appearing in DoD Instruction 5000.2 (reference (a)), decision authorities shall require PMs and other participants in the defense acquisition process to present only the minimum information necessary to understand program status and make informed decisions. The MDA shall "tailor-in" program information case-by-case, as necessary. IPTs shall facilitate the management and exchange of program information.

C7.7.2. The PM, DoD Component, or OSD staff prepares most program information. Some information requires approval by an acquisition executive. Other information is for consideration only. In most cases, information content and availability is more important than format. This Regulation clearly identifies the few mandatory document formats.

C7.7.3. PMs may submit mandatory information as stand-alone documents or as a single document. If the PM submits stand-alone documents, the PM shall not redundantly include the same information in each document.

C7.8. LIFE-CYCLE MANAGEMENT OF INFORMATION

PMs shall comply with record keeping responsibilities under the Federal Records Act for the information collected and retained in the form of electronic records (see DoD Directive 5015.2 (reference (fffff))). Electronic record keeping systems shall preserve the information submitted, as required by Title 44 (reference (ggggg)) and implementing regulations. Electronic record keeping systems shall also provide, wherever appropriate, for the electronic acknowledgment of electronic filings that are successfully submitted. PMs shall consider the record keeping functionality of any systems that store electronic documents and electronic signatures to ensure users have appropriate access to the information and can meet the agency's record keeping needs.

C7.9. JOINT REQUIREMENTS OVERSIGHT COUNCIL (JROC)

C7.9.1. The JROC shall review all deficiencies that may necessitate development of major systems prior to any consideration by the DAB or, as appropriate, the DoD CIO. The JROC shall validate the identified mission need, recommend a joint potential designator for meeting the need (CJCS Instruction 3170.01B (reference (f))), and forward the MNS, with JROC recommendations, to the USD(AT&L) or ASD(C3I), as appropriate. The JROC shall play a continuing role in the validation of KPPs.

C7.9.2. In accordance with 10 U.S.C. 181 (reference (i)), the JROC shall assist the Chairman of the Joint Chiefs of Staff in the following ways:

C7.9.2.1. Identify and assess the priority of joint military requirements (including existing systems and equipment) to meet the national military strategy;

C7.9.2.2. Consider alternatives to any acquisition program that has been identified to meet military requirements by evaluating the cost, schedule, and performance criteria of the program and of the identified alternatives; and

C7.9.2.3. Ensure that the assignment of the priorities of joint military requirements conforms to and reflects resource levels projected by the Secretary of Defense through defense planning guidance.

C7.9.3. The JROC shall be the initiation authority for CRDs. A CRD captures the overarching requirements for a mission area, forming a family-of-systems (e.g., space control, theater missile defense, etc.) or system-of-systems (e.g., national missile defense). CRDs, when required, shall guide the DoD Components in developing ORDs for future systems and upgrading existing systems (CJCS Instruction 3170.01B (reference (f))).

C7.10. JOINT PROGRAM MANAGEMENT

A joint program is any acquisition system, subsystem, component, or technology program with an acquisition strategy that includes funding by more than one DoD Component during any phase of a system's life cycle.

C7.10.1. Designation

C7.10.1.1. The Requirements Authority shall review and validate ACAT I or ACAT IA MNSs and ORDs. They shall recommend forming joint programs based on joint potential, and recommend assignment of lead executive component to USD(AT&L)/ASD(C3I). DoD Component Heads shall also recommend forming joint programs, as appropriate. The MDA shall make the decision to establish a joint program, and designate the lead executive component, as early as possible in the acquisition process.

C7.10.1.2. The DoD Components shall periodically review their programs and requirements to determine the potential for cooperation. They shall structure mission needs, operational requirements, and program strategies to encourage and to provide an opportunity for multi-Component participation.

C7.10.1.3. Joint programs shall include programs with a designated acquisition agent, considered the lead component, acting on behalf of one or more components, regardless of the

source of the designation (i.e., mutual agreement, statute, DoD Directive, or USD(AT&L) or ASD(C3I)) decision.

C7.10.2. Memorandum of Agreement. A Memorandum of Agreement shall specify the relationship and respective responsibilities of the lead executive component and the other participating components. The Memorandum of Agreement shall address, at minimum, the following topics: system requirements, funding, manpower, and the approval process for the ORD and other program documentation.

C7.10.3. Procedures. The following guidance applies to joint programs:

C7.10.3.1. The USD(AT&L)/ASD(C3I), with the advice and counsel of the military services and the JROC, shall make the decision to assign a lead executive component for a joint program. The assignment of a lead executive component shall consider the following:

C7.10.3.1.1. Demonstrated best business practices including a plan for effective, economical and efficient management of the joint program; and

C7.10.3.1.2. Demonstrated DoD Component willingness to fund the core program, essential to meet joint program needs.

C7.10.3.2. The MDA shall consolidate and co-locate joint programs at the lead executive component's program office, to the maximum extent practicable.

C7.10.3.3. The CAE of a designated acquisition agent given acquisition responsibilities shall utilize the acquisition and test organizations and facilities of the military departments to the maximum extent practicable.

C7.10.3.4. The designated lead executive component shall select a single qualified PM for the designated joint program. The selected joint PM is fully responsible and accountable for the cost, schedule, and performance of the development system.

C7.10.3.5. If the joint program is a consolidation of several programs with multiple Component PMs, the joint PM retains responsibility for overall system development and integration.

C7.10.3.6. 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 (specifically: one joint program ORD, one C4ISP, one TEMP, one APB, etc.).

C7.10.3.7. Documentation for decision points and periodic reports shall flow only through the lead executive component acquisition chain, supported by the participating components.

C7.10.3.8. The program shall use inter-Component logistics support to the maximum extent practicable, consistent with effective support to the operational forces and efficient use of DoD resources.

C7.10.3.9. The MDA shall designate a lead OTA to coordinate all operational test and evaluation. The lead OTA shall produce a single operational effectiveness and suitability report for the program.

C7.10.3.10. Unless statute, the MDA, or a memorandum of agreement signed by all components directs otherwise, the lead executive component shall budget for and manage the common RDT&E funds for assigned joint programs.

C7.10.3.11. Individual components shall budget for their unique requirements.

C7.10.3.12. The DoD Components shall not terminate or substantially reduce participation in joint ACAT ID programs without Requirements Authority review and USD(AT&L) approval; or in joint ACAT IA programs without Requirements Authority review and ASD(C3I) approval. The USD(AT&L) or ASD(C3I) may require a component to continue some or all funding, as necessary, to sustain the joint program in an efficient manner, despite approving their request to terminate or reduce participation. 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 the termination or reduced participation.

C7.11. INTERNATIONAL COOPERATIVE PROGRAM MANAGEMENT

An international cooperative program is any acquisition system, subsystem, component, or technology program with an acquisition strategy that includes participation by one or more foreign nations, through an international agreement, during any phase of a system's life cycle. All international cooperative programs shall fully comply with program protection requirements. Programs containing classified information shall have a Delegation of Disclosure Authority Letter prior to entering discussions with potential foreign partners.

C7.11.1. Designation. MDAs shall recommend forming international cooperative programs based on the international program acquisition strategy considerations addressed in paragraph C2.9.2. The Heads of the DoD Components shall also recommend forming international cooperative programs, as appropriate. The MDA shall make a decision to attempt to establish an international cooperative program as early as possible in the acquisition process. The DoD Components shall periodically review their programs to determine the potential for international cooperation.

C7.11.2. International Agreement. The cooperative program international agreement shall, in accordance with DoD Directive 5530.3 (reference (hhhhh)), specify the relationship and respective responsibilities of the Department of Defense and the participating nation(s).

C7.11.3. Procedures. The following guidance applies to international cooperative programs:

C7.11.3.1. The USD(AT&L)/ASD(C3I) or the applicable DoD Component, with the advice and counsel of the military services and the JROC, shall make the decision to pursue an international cooperative program. The decision process shall consider the following:

C7.11.3.1.1. Demonstrated best business practices including a plan for effective, economical and efficient management of the international cooperative program; and

C7.11.3.1.2. Demonstrated DoD Component willingness to fully fund their share of international cooperative program needs.

C7.11.3.1.3. The long-term interoperability and political-military benefits that may accrue from international cooperation.

C7.11.3.2. The DoD Component shall agree upon the international program's management structure and document this in the international agreement. The designated PM (U.S, or foreign) is fully responsible and accountable for the cost, schedule, and performance of the development system.

C7.11.3.3. The DoD Component shall remain responsible for preparation and approval of DoD-required documentation and reports (specifically: ORD, C4ISP, TEMP, APB, Delegation of Disclosure Authority Letter, etc.).

C7.11.3.4. Documentation for decision points and periodic reports shall flow through the DoD Component acquisition chain, supported by the participating nation(s), as required.

C7.11.3.5. The DoD Components shall not terminate or substantially reduce participation in international cooperative ACAT ID programs under signed international agreements without USD(AT&L) approval; or in international cooperative ACAT IAM programs without ASD(C3I) approval. A DoD Component may not terminate or substantially reduce U.S. participation in an international cooperative program until after providing notification to the USD(AT&L) or ASD(C3I). As a result of that notification, the USD(AT&L) or the ASD(C3I) may require the DoD Component to continue to provide some or all of the funding for that program in order to minimize the impact on the international cooperative program. Substantial reduction is defined as a funding or quantity decrease of 25% or more in the total funding or quantities in the latest President's Budget for that portion of the international

cooperative program funded by the DoD Component seeking the termination or reduced participation.

C7.12. COST ANALYSIS IMPROVEMENT GROUP (CAIG) PROCEDURES[10]

C7.12.1. Responding to 10 U.S.C. 2434 (reference (sss)), DoD Directive 5000.4 (reference (iiiii)) charters the OSD CAIG to provide independent program cost estimates. The DoD Component responsible for acquisition of a system shall cooperate with the CAIG and provide the cost, programmatic, and technical information required to estimate costs and appraise cost risks. The DoD Component shall also facilitate CAIG staff visits to the program office, product centers, test centers, and system contractor(s).

C7.12.2. The following guidance shall apply to ACAT ID programs (and ACAT IC, as requested by the USD(AT&L)) preparing for a Milestone B or C review; the decision review prior to entering full-rate production and deployment; or any other decision point as directed by the USD(AT&L):

C7.12.2.1. The PM and DoD Component shall provide draft life-cycle cost estimates to the CAIG at least 45 calendar days before the scheduled OIPT or, as applicable, the component review meeting.

C7.12.2.2. The PM and component shall provide life-cycle cost estimates and/or component cost positions to the OSD CAIG at least 21 calendar days before the scheduled OIPT or component review meeting. The CAIG shall provide feedback based on independent review of the life-cycle cost estimate(s), validating the methodology used to estimate costs and determining whether the estimate(s) require additional analysis.

C7.12.2.3. The PM and component shall provide final life-cycle cost estimates and/or component cost positions to the OSD CAIG at least 10 calendar days before the scheduled OIPT or component review meeting.

C7.13. CONTRACTOR COUNCILS

C7.13.1. DCMA shall support the formation of management, sector, and/or corporate councils by each prime contractor under DCMA cognizance supporting ACAT I, ACAT IA, or ACAT II programs. These councils provide an interface with the Contract Management Office Commander; the Defense Contract Audit Agency Resident Auditor; representatives from all affected acquisition management activities (including PMs, Item Managers, and Single Process Initiative Component Team Leaders), or designated representatives for any of the above listed

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[10] Not applicable to ACAT IA programs.

individuals. Acquisition managers or designees shall support both council activities and council-sponsored IPTs. Acquisition managers shall assist the councils to keep all the stakeholders informed about issues affecting multiple acquisition programs, to work issues quickly, and to elevate unresolved issues to appropriate levels for resolution. These councils may identify and propose acquisition process streamlining improvements. Acquisition managers shall assist and encourage councils to coordinate and integrate program audit and review activity, support and promote civil-military integration initiatives, and accept contractor Single Process Initiative proposals and other ideas that reduce TOC while meeting performance based specifications.

C7.13.2. Program office staff shall interface with contractors' councils, keeping in mind that such councils are not Federal Advisory Committees under FACA (reference (cc)). The staff may find that these councils strengthen the corporate relationship with DoD, provide an interface between company representatives and acquisition managers, communicate acquisition reform initiatives, or even resolve issues. In leading corporate endeavors such as Single Process Initiative proposals, civil-military integration ideas, or other initiatives designed to achieve efficiencies for the company, these councils may ultimately produce savings for the government.

C7.14. MANAGEMENT CONTROL

C7.14.1. PMs shall implement internal management controls in accordance with DoD Directive 5000.1 (reference (jjjjj)), DoD Instruction 5000.2 (reference (a)), this Regulation, and DoD Directive 5010.38 (reference (kkkkk)). APB parameters shall serve as control objectives. PMs shall identify deviations from approved APB parameters and exit criteria as materiel weaknesses. PMs shall focus on results, not process.

C7.14.2. PMs shall ensure that obligations and costs comply with applicable law. They shall safeguard assets against waste, loss, unauthorized use, and misappropriation; properly record and account for expenditures; maintain accountability over assets; and quickly correct identified weaknesses.

C7.15. PERIODIC REPORTING

Periodic reports shall include only those reports required by the MDA or statute. Except for the reports outlined in this section, the MDA shall tailor the scope and formality of reporting requirements.

C7.15.1. Program Plans

C7.15.1.1. Program plans describe the detailed activities of the acquisition program. In coordination with the PEO, the PM shall determine the type and number of program plans needed to manage program execution.

C7.15.1.2. Decision authorities shall not require approval of program plans, except by the PM, for other than the TEMP and C4ISP. Program plans shall not serve as decision point documentation or periodic reports.

C7.15.2. APB Reporting. PMs shall report the current estimate (see subparagraph C1.4.5.1.) of each APB parameter periodically to the MDA. The MDA shall direct the frequency of the reporting. PMs shall report current estimates for ACAT I and IA programs quarterly in the DAES.

C7.15.3. DAES -- DD ACQ(Q)1429

C7.15.3.1. The DAES is a multi-part document, reporting program information and assessments; PM, PEO, CAE comments; and cost and funding data. The DAES shall be an early-warning report to USD(AT&L) and ASD(C3I). The DAES describes actual program problems, warns of potential program problems, and describes mitigating actions taken. The PM may obtain permission from USD(AT&L) or ASD(C3I), as appropriate, to tailor DAES content. At minimum, the DAES shall report program assessments (including interoperability), unit costs (10 U.S.C. 2433 (reference (lllll))), and current estimates. It shall report the status of exit criteria and vulnerability assessments (FMFIA (reference (mmmmm))).

C7.15.3.2. The DAES shall present total costs and quantities for all years, as projected, through the end of the current acquisition phase. In keeping with the concept of total program reporting, the DAES shall present best estimates for costs beyond the FYDP, if the FYDP does not otherwise identify those costs. The total program concept refers to system acquisition activities from Concept and Technology Development through Production and Deployment. The DAES shall report approved program funding for programs that are subsystems to platforms and whose procurement is reported in the platform budget line.

C7.15.3.3. The Office of USD(AT&L) , the Office of ASD(C3I), the Offices of DoD CAEs, CIOs, and PEOs, and the program office shall each establish DAES focal points.

C7.15.3.4. DAES Reporting. USD(AT&L) shall designate ACAT I programs subject to DAES reporting and assign each program to a quarterly reporting group. ASD(C3I) shall designate ACAT IA programs subject to DAES reporting and assign each program to a quarterly reporting group. The PM shall use the CARS (see Appendix 1) to prepare the DAES, and submit both hard and electronic copies to USD(AT&L) by the last working day of the program's designated quarterly reporting month. ACAT IA programs shall submit an electronic copy of their DAES report to ASD(C3I) 30 days after the end of the quarter. The PM shall not delay the DAES for any reason.

C7.15.3.5. Out-of-Cycle DAES. There are two types of out-of-cycle DAES:

C7.15.3.5.1. The PM shall submit a DAES when there is reasonable cause to believe that a Nunn--McCurdy unit cost breach has occurred or will occur (10 U.S.C. 2433(c) (reference (llllll))). (Submitting DAES sections 5, 6.2, and 7, block #28, satisfies this requirement.)

C7.15.3.5.2. If submission of the DoD Component's POM or BES causes the program to deviate from the approved APB thresholds, the PM shall submit DAES sections 5., 6.2, and 8.

C7.15.3.6. Consistency of DAES Information. DAES information shall be consistent with that in the latest ADM, APB, and other mandatory or approved program documentation.

C7.15.4. Selected Acquisition Report (SAR) DD-COMP (Q&A) 823[11]

C7.15.4.1. In accordance with 10 U.S.C. 2432 (reference (nnnnn)), the PM shall submit a SAR to Congress for all ACAT I programs. The PM shall use CARS software to prepare the SAR.

C7.15.4.2. SAR Content and Submission

C7.15.4.2.1. The SAR shall report the status of total program cost, schedule, and performance; as well as program unit cost and unit cost breach information. For joint programs, the SAR shall report the information by participant. Each SAR shall include a full, life-cycle cost analysis for the reporting program, each of its evolutionary blocks, as available, and for its antecedent program, if applicable.

C7.15.4.2.2. The SAR for the quarter ending December 31 shall be called the annual SAR. The PM shall submit the annual SAR within 60 days after the President transmits the following fiscal year's budget to Congress. Annual SARs shall reflect the President's Budget and supporting documentation. The annual SAR is mandatory for all programs that meet SAR reporting criteria.

C7.15.4.2.3. The PM shall submit SARs for the quarters ending March 31, June 30, and September 30 not later than 45 days after the quarter ends. Quarterly SARs are reported on an exception basis, as follows:

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[11] Not applicable to ACAT IA programs.

C7.15.4.2.3.1. The current estimate (see C1.4.5.1.) exceeds the Program Acquisition Unit Cost (PAUC) objective or the Average Procurement Unit Cost (APUC) objective of the currently approved APB, both in base-year dollars, by 15 percent or more;

C7.15.4.2.3.2. The current estimate includes a 6-month or greater delay, for any schedule parameter, that occurred since the current estimate reported in the previous SAR;

C7.15.4.2.3.3. Milestone B or Milestone C approval occurs within the reportable quarter.

C7.15.4.2.4. Pre-Milestone B projects may submit RDT&E-only reports, excluding procurement, military construction, and acquisition-related operations and maintenance costs. Components shall notify USD(AT&L) with names of the projects for which they intend to submit RDT&E-only SARs 30 days before the reporting quarter ends. USD(AT&L) shall so notify Congress 15 days before reports are due.

C7.15.4.2.5. Whenever USD(AT&L) proposes changes to the content of a SAR, he or she shall submit notice of the proposed changes to the Armed Services Committees of the Senate and House of Representatives. USD(AT&L) may consider the changes approved, and incorporate them into the report, 60 days after the committees receive the change notice.

C7.15.4.3. SAR Waivers

C7.15.4.3.1. The Secretary of Defense may waive the requirement for submission of SARs for a program for a fiscal year if:

C7.15.4.3.1.1. The program has not entered system development and demonstration;

C7.15.4.3.1.2. A reasonable cost estimate has not been established for the program; and,

C7.15.4.3.1.3. The system configuration for the program is not well defined.

C7.15.4.3.2. As delegated by the Secretary of Defense, USD(AT&L) shall submit a written notification of each waiver for a fiscal year to the Armed Services Committees of the Senate and House of Representatives not later than 60 days before the President submits the budget to Congress, pursuant to 31 U.S.C. 1105 (reference (ooooo)), in that fiscal year.

C7.15.4.4. SAR Termination. USD(AT&L) shall consider terminating SAR reporting when 90 percent of expected production deliveries or planned acquisition expenditures have been made, or when the program is no longer considered an ACAT I program in accordance with 10 U.S.C. 2430 (reference (ppppp)).

C7.15.5. Unit Cost Reports (UCR) COMP (Q&AR) 1591[12]

C7.15.5.1. In accordance with 10 U.S.C. 2433 (reference (llllll)), the PM shall prepare UCRs for all ACAT I programs submitting SARs, except pre-Milestone B programs reporting RDT&E costs only.

C7.15.5.2. Unit Cost Content and Submission. The PM shall submit a written report on the unit costs of the program to the CAE on a quarterly basis. The written report shall be in the DAES. The PM shall submit the report by the last working day of the quarter, in accordance with DAES submission procedures. Reporting shall begin with submission of the initial SAR, and terminate with submission of the final SAR. Each report shall include the current estimate (see subparagraph C1.4.5.1.) of the PAUC and the APUC (in base-year dollars); cost and schedule variances, in dollars, for each of the major contracts since entering the contract; and all changes that the PM knows or expects to occur to program schedule or performance parameters, as compared to the currently approved APB.

C7.15.5.3. UCR Breaches

C7.15.5.3.1. The PM shall submit a UCR to the CAE immediately, whenever the PM has reasonable cause to believe that the current estimate (see subparagraph C1.4.5.1.) of either the PAUC or APUC (in base-year dollars) increases by 15% or more over the PAUC objective or APUC objective of the currently approved APB (in base year dollars), respectively. This is a Congressionally reportable unit cost breach.

C7.15.5.3.2. If the CAE determines that there is an increase in the current estimate of the PAUC or APUC cost of at least 15% or more over the currently approved APB, the CAE shall inform USD(AT&L) and the cognizant Head of the DoD Component. If the cognizant Head of the DoD Component subsequently determines that there is, in fact, an increase in the current estimate of the PAUC or APUC of at least 15% over the currently approved APB, the Head of the DoD Component shall notify Congress, in writing, of a breach. The notification shall be not later than 45 days after the end of the quarter, in the case of a quarterly report; or not later than 45 days after the date of the report, in the case of the reasonable cause report. In either case, notification shall include the date that the Head of the DoD Component made the determination.

C7.15.5.3.3. In addition, the Head of the DoD Component 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 shall contain the additional, breach-related information.

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[12] Not applicable to ACAT IA programs.

C7.15.5.3.4. If the current estimate of the PAUC or APUC increases by at least 25% over the PAUC objective or APUC objective of the currently approved APB, USD(AT&L) shall 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 (see subparagraph C7.15.4.2.). The certification shall state the following:

C7.15.5.3.4.1. Such acquisition program is essential to the national security.

C7.15.5.3.4.2. There are no alternative programs that will provide equal or greater military capability at less cost.

C7.15.5.3.4.3. The new estimates of the PAUC or APUC are reasonable.

C7.15.5.3.4.4. The management structure for the acquisition program is adequate to manage and control the PAUC and the APUC.

C7.15.5.3.5. If the Head of the DoD Component makes a determination of either a PAUC or APUC 15% or more increase, and a SAR containing the additional unit cost breach information is not submitted to Congress as required; or if the Head of the DoD Component makes a determination of a 25% increase in the PAUC or APUC, and a certification of USD(AT&L) 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. An increase in the PAUC or APUC of 25% or more resulting from the termination or cancellation of an entire program shall not require USD(AT&L) program certification.

C7.15.6. Program Assessments

C7.15.6.1. ACAT I Programs

C7.15.6.1.1. The Director, Acquisition Resources and Analysis shall determine, at the end of each fiscal year and for each program separately, if, as of the last day of the fiscal year, more than 10% of the total aggregate number of cost, schedule, and performance parameters for that program are breached against the APB threshold (10 U.S.C. 2220(b) (reference (qqqqq))). If more than 10% of thresholds are breached, for ACAT IC programs the appropriate CAE or a delegated representative (for ACAT IC programs), or the appropriate OIPT Leader or a delegated representative (for ACAT ID programs), shall conduct a timely review of the affected program. In conducting that review, the CAE or the OIPT Leader, together with the Vice Chairman of the Joint Chiefs of Staff, shall determine whether there is a continuing need for the program, and shall recommend to USD(AT&L) suitable actions to be taken, including termination, with respect to such program (10 U.S.C. 2220(c) (reference (rrrrr))).

C7.15.6.1.2. The Director, Acquisition Resources and Analysis shall also assess whether the average period for converting emerging technology to operational capability has decreased to 57.5 months or less (i.e., 50% of the baseline of 115 months established on October 13, 1994). The assessment shall be based on data provided by PMs in the schedule portion of Section 5 of the DAES, Approved Program Data, which will allow the CARS to automatically calculate the total time in number of months between program initiation and IOC.

C7.15.6.1.3. The Director, Acquisition Resources and Analysis shall include in the Secretary of Defense Annual Report to the President and to Congress the names of the programs that have breaches of more than ten percent and the assessment of average time if that average is not below 57.5 months (10 U.S.C. 2222(b) (reference (sssss))).

C7.15.6.2. ACAT IA Programs. Based on the data provided in the latest DAES report, the Deputy DoD CIO will determine whether any ACAT IA program, or any phase or increment of such program, has significantly deviated from the cost, performance, or schedule goals established for that program. If the Deputy DoD CIO determines that a significant deviation has occurred, the appropriate DoD Component CIO or CAE, and for ACAT IAM programs, the IT OIPT Leader or designee, shall conduct a timely review of the affected ACAT IA program. In conducting that review, the DoD Component CIO or CAE and the OIPT Leader, together with the cognizant PSA, 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 DoD CIO suitable actions to be taken, including termination, with respect to such program. The DoD CIO will also report significant deviations of ACAT IA programs to the Office of Management and Budget as required by Section 5127 of the Clinger-Cohen Act (40 U.S.C. 1427 (reference (k))).

C7.15.7. Contract Management Reports. Acquisition participants shall use the reports prescribed by this section for all applicable defense contracts. These reports ensure effective defense acquisition management. Participants shall use electronic media unless disclosure of this information would compromise national security. The WBS used to prepare these reports shall conform to the program WBS (see paragraph C5.3.1.). Except for high-cost or high-risk elements, the required level of reporting detail shall be limited to level three of the contract WBS.

C7.15.7.1. Contractor Cost Data Reporting (CCDR)[13]

C7.15.7.1.1. CCDR is the Department of Defense's primary means of collecting data on the costs that DoD contractors incur in performing DoD programs. This data enables

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[13] Not applicable to ACAT IA programs.

reasonable ACAT I program cost estimates and satisfies other analytical requirements. The Chair, CAIG, shall prescribe a format for submission of CCDRs. The Chair shall prescribe CCDR system policies and monitor implementation to ensure consistent and appropriate application throughout the Department of Defense.

C7.15.7.1.2. CCDR coverage shall extend from Milestone B or equivalent to the completion of production in accordance with procedures described in this section. Unless waived by the Chair, CAIG, CCDR reporting is required on all major contracts and subcontracts, regardless of contract type, for ACAT I programs valued at more than $42 million (FY 2000 constant dollars). CCDR reporting is not required for contracts priced below $6.5 million. The CCDR requirement on high-risk or high-technical-interest contracts priced between $6.5 and $42 million is left to the discretion of the Cost WIPT.

C7.15.7.1.3. CCDR reporting shall not be required on ship development and construction contracts because of their unique nature, and because of the availability of comparable data from modified Cost Performance Reports (CPRs). This exclusion does not apply to contracts for shipboard systems. CCDR reporting shall not be required for procurement of commercial systems, or for non-commercial systems bought under competitively awarded, firm fixed price contracts, as long as competitive conditions continue to exist.

C7.15.7.1.4. For ACAT I programs, the IPT process shall develop the CCDR plan and forward it to the Chair, CAIG, for approval. CCDR plan approval shall occur before issuing industry a solicitation for integration contracts. The CCDR plan reflects the proposed collection of cost data, by WBS, for a program. The plan shall describe the report format to be used and shall prescribe reporting frequency.

C7.15.7.1.5. A cost-effective reporting system requires tailoring the CCDR plan and appropriately defining the program WBS. Consistent with paragraph C7.6.3., contractors may participate in the IPT process.

C7.15.7.1.6. Each DoD Component shall designate, by title, an official who shall:

C7.15.7.1.6.1. Ensure that policies and procedures are established for implementing CCDR in accordance with this section, including CCDR data storage and distribution to appropriate DoD officials.

C7.15.7.1.6.2. Review all ACAT I program CCDR plans and CCDR plan changes for compliance with CCDR guidance and the program WBS, and forward same to the CAIG.

C7.15.7.1.6.3. Advise the Chair, CAIG, annually of the status of all CCDR programs, and address delinquent or deficient CCDR and its remedial action.

C7.15.7.1.7. The CCDR Project Office shall annually assess the need for field reviews of contractor implementation of CCDR for ACAT I. Service Cost Centers shall assess the need for field reviews of less than ACAT I programs.

C7.15.7.1.8. The following general policies guide the preparation of the CCDR Plan for all ACAT ID, IC, II, and III programs. In general, the level of detail and frequency of reporting of ACAT II and III programs shall normally be less stringent than the level and frequency applied to ACAT I programs as specified below:

C7.15.7.1.8.1. Level of Cost Reporting. Routine reporting shall be at the contract WBS level three for prime contractors and key subcontractors. Only low-level elements that address high risk, high value, or high technical interest areas of a program shall require detailed reporting below level three. The Cost WIPT shall identify these lower-level elements early in CCDR planning.

C7.15.7.1.8.2. Frequency. The Cost WIPT shall define CCDR frequency for development and production contracts to meet the needs of the program for cost data early in CCDR planning. CCDRs are fundamentally a "returned" (or actual) cost reporting system. Contractors generally do not need to file cost data while work is still pending. Thus, for production contracts, contractors shall normally submit CCDR reports upon the delivery of each annual lot. For developmental contracts, the contractor shall typically file CCDR reports after major events such as first flight or completion of prototype lot fabrication, before major milestones, and upon contract completion. In general, quarterly or annual reporting requirements shall not meet the above guidance.

C7.15.7.2. Cost Performance Report (CPR) DID DI-MGMT-81466 (DoD 5010.12-L (reference (ttttt))). The PM shall obtain a CPR (DD Form 2734/1, 2734/2, 2734/3, 2734/4, and 2734/5) on all contracts that require compliance with EVMS guidelines (see subparagraph C2.9.3.4. and Appendix 4). This report provides contract cost and schedule performance for program management. It also provides early indications of both contract cost and schedule problems and the effect of implemented management actions to resolve such problems. PMs shall use DID DI-MGMT-81466 to obtain the CPR. The following guidance applies:

C7.15.7.2.1. Flexibly-priced (e.g., fixed-price incentive or cost type) contracts that do not require compliance with EVMS guidelines, but for which the DoD Components require more data than is available on the C/SSR (see subparagraph C7.15.7.3.) may require CPRs. CPR formats, level of detail, frequency, and variance analysis shall be limited to the minimum necessary for effective management control.

C7.15.7.2.2. FFP contracts shall not require CPRs unless unusual circumstances dictate cost and schedule visibility.

C7.15.7.2.3. Systems used for internal contractor management shall summarize and report data for the CPR.

C7.15.7.2.4. The PM shall tailor the CPR to the minimum required data. The contracting officer and contractor shall negotiate and specify all reporting provisions in the contract, including reporting frequency, variance analysis requirements, and the contract WBS to report.

C7.15.7.2.5. The CPR shall be a primary means of documenting the on-going communication between the contractor and the PM to report cost and schedule trends to date, and to permit assessment of their likely effect on future performance on the contract.

C7.15.7.2.6. CPRs shall be provided via electronic methods, such as electronic access to contractors' internal data bases, or via Electronic Data Interchange using the American National Standards Institute Accredited Standards Committee X12 transaction set for Project Cost Reporting (839).

C7.15.7.3. Cost/Schedule Status Report (C/SSR) DID DI-MGMT-81467 (DoD 5010.12-L (reference (ttttt))).

C7.15.7.3.1. The PM shall obtain a C/SSR (DD Form 2735) on contracts over 12 months in duration, when the CPR does not apply. The C/SSR provides contract cost and schedule performance information for program management. The C/SSR has no specific application thresholds; however, the PM shall carefully evaluate application to contracts of less than $6.3 million (FY 2000 constant dollars). The PM shall require only the minimum information necessary for effective management control. FFP contracts shall not require the C/SSR unless unusual circumstances dictate cost and schedule visibility. PMs shall use DID DI-MGMT-81467 to obtain the C/SSR.

C7.15.7.3.2. C/SSRs shall be provided via electronic methods, such as electronic access to contractors' internal databases, or via Electronic Data Interchange using the American National Standards Institute Accredited Standards Committee X12 transaction set for Project Cost Reporting (839).

C7.15.7.4. Contract Funds Status Report (CFSR) DI-MGMT-81468 (DoD 5010.12-L (reference (ttttt))).

C7.15.7.4.1. The PM shall obtain a CFSR (DD Form 1586) on contracts over 6 months in duration. The CFSR provides the DoD Components with information to update and forecast contract funding requirements; to plan and decide on funding changes; to develop funding requirements and budget estimates in support of approved programs; and to determine

funds in excess of contract needs and available to be deobligated. PMs shall use DID DI-MGMT-81468 to obtain the CFSR.

C7.15.7.4.2. The CFSR has no specific application thresholds; however, the PM shall carefully evaluate application to contracts of less than $1.3 million (FY 2000 constant dollars). The PM shall require only the minimum information necessary for effective management control. FFP contracts shall not apply the CFSR unless unusual circumstances dictate specific funding visibility.

C7.15.7.4.3. CFSRs shall be provided via electronic methods, such as electronic access to contractors' internal databases, or via Electronic Data Interchange using the American National Standards Institute Accredited Standards Committee X12 transaction set for Project Cost Reporting (839).

C7.15.8. Cooperative Research and Development Projects Report. USD(AT&L) shall report cooperative research and development projects to Congress not later than March 1 of each year (10 U.S.C. 2350a (reference (qq))). The report shall contain descriptions of projects, funding, schedules, and status for both proposed projects and projects for which the Memoranda of Understanding (or other formal agreements) have been entered into (10 U.S.C. 2350a(f) (reference (uuuuu))).

AP1. APPENDIX 1
CONSOLIDATED ACQUISITION REPORTING SYSTEM (CARS)
MANDATORY PROCEDURES AND FORMATS

AP1.1. CONSOLIDATED ACQUISITION REPORTING SYSTEM (CARS)

AP1.1.1. CARS is a personal computer-based data entry and reporting software package. It maintains and reports information on defense programs. The use of CARS is mandatory for all MDAPs and MAIS acquisition programs, but non-MDAP and non-MAIS programs may also use the system.

AP1.1.2. CARS has three reporting modules that generate the APB, the SAR, and the DAES. The DAES and SAR include quarterly unit cost and unit cost breach exception reporting, respectively. CARS includes analysis routines, such as the Computational Module that supports the SAR cost change calculations, and SAR and DAES data checks. The Director, Acquisition Resources and Analysis, maintains a CARS help line for user support.

AP1.1.3. A unique program number (PNO) identification system controls the use of CARS. The Office of USD(AT&L) focal point assigns a PNO to each using ACAT I program. The Office of ASD(C3I) focal point assigns a PNO to each using ACAT IA program.

AP1.1.4. The CARS software specifies the format of the APB, SAR, and DAES, except for narrative or memo type information.

AP1.1.5. The three reporting modules share some, but not all, of the CARS data. For example, the DAES and SAR report the APB. The modules also share some contract information.

AP1.1.6. Only the appropriate Office of USD(AT&L) or DoD Component focal point can edit some of the CARS information, such as the SAR baseline and APB. The cognizant MDA must approve SAR baseline and APB changes. The appropriate Office of USD(AT&L) or DoD Component focal point distributes disks containing the revised or new information.

AP1.1.7. The Director, Acquisition Resources and Analysis, has responsibility for the development, upgrade, and maintenance of CARS. Direct questions and requests for copies of the software to that organization. The CARS software includes mandatory instructions for preparing the APB, SAR, DAES, and UCR, including administrative procedures. The CARS web page, http://www.acq.osd.mil/cars, also has the instructions. The automated Defense Acquisition Deskbook contains sample formats and examples.

AP2. APPENDIX 2
TEST AND EVALUATION MASTER PLAN
MANDATORY PROCEDURES AND FORMAT

AP2.1. INTRODUCTION AND PURPOSE

AP2.1.1. This Appendix provides procedures and formats to implement the requirements of 10 USC 2399(b)(1), "Operational Test and Evaluation." The TEMP shall document the overall structure and objectives of the T&E program. It shall provide the framework within which to generate detailed T&E plans. It shall document schedule and resource implications associated with the T&E program. The TEMP shall identify the necessary DT&E, OT&E, andLFT&E activities. It shall relate program schedule, test management strategy and structure, and required resources to COIs, critical technical parameters, KPPs and operational performance parameters (threshold and objective criteria) derived from the ORD, evaluation criteria, and major decision points.

AP2.1.2. The TEMP must include at least one critical technical parameter and one operational effectiveness issue for the evaluation of interoperability. Both the TEMP and operational test plans should also specify interoperability test concepts. The TEMPs should reference and extract performance requirements from the appropriate CRDs, ORDs, C4ISPs, and integrated architectures. The Joint Staff will ensure that all CRDs, and ORDs contain specific, testable, and measurable interoperability requirements and KPPs. USD(AT&L) and ASD(C3I)/DoD CIO will ensure that C4ISPs and integrated architectures reflect the appropriate family-of-systems context to support the systems interoperability requirements. The OTAs, the Joint Staff, and the system user or program proponent, in conjunction with Defense Information Systems Agency/JITC, should develop the test procedures and effectiveness measures based on the requirements and expected concepts of operations for the systems. The OTAs may develop additional issues to add to the TEMP and test plans based for interoperability and interoperability test and evaluation.

AP2.1.3. Multi-service or joint programs shall require a single integrated TEMP. A DoD Component-prepared annex to the basic TEMP may address DoD Component-unique content requirements, particularly evaluation criteria associated with COIs.

AP2.1.4. A program consisting of a collection of individual systems shall require a capstone TEMP. The capstone TEMP shall integrate the T&E program for the entire system. An annex to the basic capstone TEMP shall address individual system-unique content requirements. The need for a capstone TEMP depends upon the degree of integration and interoperability required to satisfy the total system's interoperability KPP, associated IERs, and other appropriate operational performance parameters (e.g., JTA compliance).

AP2.2. PREPARATION AND SUBMITTAL

AP2.2.1. The T&E WIPT shall develop the TEMP for ACAT I programs, selected ACAT IAM programs, and other programs on the OSD T&E Oversight List or otherwise under DOT&E oversight (collectively termed "OSD T&E-oversight programs"). The TEMP for an ACAT I program shall be submitted to the Deputy Director, Developmental Test and Evaluation, in the office of the Director, Strategic and Tactical Systems, for OSD approval, 30 days prior to Milestone B or subsequent program initiation. For other OSD T&E-oversight programs, the TEMP shall be submitted within 90 days of such designation.

AP2.2.2. Multi-Service for Joint Programs. The lead DoD Component shall prepare and coordinate the TEMP. The TEMP signature page requires approval signatures from the lead component and all participating components.

AP2.2.3. 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 USD(AT&L) DD, DT&E/S&TS.

AP2.2.4. TEMP Updates. Update the TEMP at program milestones and decision reviews (see section C7.2.), when the program baseline has been breached, when the associated ORD or C4ISP has been significantly modified, or on other occasions when the program has changed significantly. Evolutionary acquisition programs may require additional updates to ensure that the TEMP reflects the currently defined program. When a baseline breach occurs, the TEMP will be updated within 120 days of the date of the program manager's Program Deviation Report. When a program changes significantly, the TEMP due date will be negotiated between the program manager and the component TEMP approval authority. In the case of programs under OSD T&E oversight, the negotiations will take place between the program manager, component TEMP approval authority, DOT&E and DD, DT&E/S&TS.

AP2.2.5. Review and Approval. DOT&E and the cognizant OIPT leader shall be the OSD TEMP approval authorities for ACAT I programs, selected ACAT IAM programs, and those other acquisition category programs designated for OSD T&E oversight. The possible cognizant OIPT leaders are the Director for Strategic and Tactical Systems; the Director, Program Analysis and Integration; and the Director, Information Technology, Acquisition and Investment. Formal submission of the TEMP for OSD approval shall be accomplished no later than 30 days before the Milestone B or subsequent program initiation, unless otherwise agreed to in the IPT. Upon approval, the OSD approval Memorandum becomes part of the TEMP, and shall be attached to the front cover.

AP2.2.6. Circumstances when a TEMP is No Longer Required. When a program's development is completed and COIs 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:

AP2.2.6.1. Fully deployed system with no operationally significant product improvements or block modification efforts.

AP2.2.6.2. Full production ongoing and fielding initiated with no significant deficiencies observed in production qualification test results.

AP2.2.6.3. Partially fielded system in early production phase having successfully accomplished all developmental and operational test objectives.

AP2.2.6.4. Programs for which planned test and evaluation is only a part of routine aging and surveillance testing, service life monitoring, or tactics development.

AP2.2.6.5. Programs for which no further operational testing or live fire testing is required by any DoD Component.

AP2.2.6.6. Program for which future testing (e.g., product improvements or block upgrades) has been incorporated in a separate TEMP (e.g., an upgrade TEMP).

AP2.2.7. Requesting Cancellation of TEMP Requirement. Written requests for cancellation of a TEMP requirement must be forwarded to the Component TEMP approval authority, or, for TEMPS under OSD T&E oversight, through the Component TEMP approval authority to the cognizant OIPT leader. Justification, such as applicability of any the above circumstances, must be included in the request. The cognizant OIPT leader will jointly review the request with DOT&E and notify the Component TEMP approval authority of the result.

AP2.3. MANDATORY FORMAT

The mandatory TEMP format for all ACAT I programs, for IT, including NSS, programs regardless of ACAT, and for other DOT&E-oversight programs begins on the next page.

TEST AND EVALUATION MASTER PLAN

FOR

PROGRAM TITLE/SYSTEM NAME

Program Elements
Xxxxx

****

SUBMITTED BY

_____ _____
Program Manager DATE

CONCURRENCE

_____ _____
Program Executive Officer DATE
or Developing Agency (if not under the PEO structure)

_____ _____
Operational Test Agency DATE

_____ _____
User's Representative DATE

COMPONENT APPROVAL

_____ _____
Component Test and Evaluation Director DATE

_____ _____
DoD Component Acquisition Executive (ACAT I) DATE
Milestone Decision Authority (for less-than-ACAT I)

****

OSD APPROVAL

_____	_____	_____	_____
Director, Operational Test and Evaluation	Date	Cognizant OIPT Leader	Date

1. PART I--SYSTEM INTRODUCTION

a. Mission Description. Reference the MNS, CRD (if applicable), C4ISP, and ORD. Briefly summarize the mission need described therein. Describe the mission in terms of objectives and general capabilities. Include a description of the operational and logistical environment envisioned for the system.

b. System Description. Briefly describe the system design, to include the following items:

(1) Key features and subsystems, both hardware and software (such as architecture, interfaces, security levels, reserves) for each block/configuration, 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 non-developmental items. Include interoperability with existing and/or planned systems of other DoD Components or allies. Provide a diagram of the system architecture.

(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; resistance to reverse engineering/exploitation efforts (Anti-Tamper); development of new threat simulation, simulators, or targets).

c. System Threat Assessment. Reference the System Threat Assessment and briefly summarize the threat environment described therein.

d. Measures of Effectiveness and Suitability. List (see example matrix below) the performance (operational effectiveness and suitability) capabilities identified as required in the ORD. The critical operational effectiveness and suitability parameters and constraints must crosswalk to those used in the Analysis of Alternatives, and include manpower, personnel, training, software, computer resources, transportation (lift), compatibility, interoperability and integration, Information Assurance (IA), Electromagnetic Environmental Effects and Spectrum Supportability, etc. Focus on operational capabilities, not design specifications such as weight, size, etc. Limit the list to critical measures that apply to capabilities essential to mission accomplishment. Include and clearly identify all Key Performance Parameters (KPP). For each listed parameter, provide the threshold and the objective values from the ORD and the ORD reference. If the Operational Test Agency (OTA) or the DOT&E determines that the required capabilities and characteristics contained in the ORD provide insufficient measures for an adequate OT&E, the OTA or DOT&E shall propose additional measures through the IPT process. Upon receipt of such a proposal, the ORD approval authority shall establish the level of required performance characteristics.

Measures of Effectiveness and Suitability

Operational Requirement	Parameter	ORD Threshold	ORD Objective	ORD Reference
Mobility	Land Speed** Miles per hour on secondary roads	xx miles per hour	xx miles per hour	Paragraph xxx
Firepower	Accuracy Main Gun Probability of hit/stationary platform/ stationary target	xxx probability of hit @ xxx range	xxx probability of hit @ xxx range	Paragraph xxx
Supportability	Reliability Mean Time Between Operational Failure	xxx hours	xxx hours	Paragraph xxx

** Key Performance Parameter

e. Critical Technical Parameters

(1) List in a matrix format (see example below) the critical technical parameters of the sys-tem (including software maturity and performance measures) that will be evaluated (or reconfirmed if previously evaluated) during the remaining phases of developmental testing. In accordance with section C3.5. of this Regulation, include the maturity criteria and performance exit criteria necessary for operational test readiness certification. Critical technical parameters are measurable critical system characteristics that, when achieved, allow the attainment of operational performance requirements. They are not ORD requirements. Rather, they are technical measures derived from ORD requirements. Failure to achieve a critical technical parameter should be considered a reliable indicator that the system is behind in the planned development schedule or will likely not achieve an operational requirement. Limit the list of critical technical parameters to those that support critical operational issues. The system specification is usually a good reference for the identification of critical technical parameters.

(2) Next to each technical parameter, list a threshold for each stage of development. Developmental test events are opportunities to measure the performance of the system as it matures. For most technical parameters, the listed thresholds should reflect growth as the system progresses toward achieving its ORD requirements. Also, list the decision supported after each event to highlight technical performance required before entering the next acquisition or operational test phase.

(3) Ensure technical parameters are included for technical interoperability.

Critical Technical Parameters

Supported Operational Requirement (Include ORD reference)	**Technical Parameter**	**Developmental Stage Event**	**Threshold Value**	**DecisionSupported**
In most cases a measure of effectiveness or suitability from paragraph 1d	Technical measure(s) derived to support operational requirement	Developmental stage events (Described in TEMP Part III) designed to measure system performance against technical parameters.	Minimum value required at each developmental event. Most parameters will show growth as the system progress through testing. Final value should reflect level of performance necessary to satisfy the operational requirement.	May be any decision marking the entrance into a new acquisition phase or may be a readiness for operational test decision.
Example: Main Gun Probability of Hit, 94 % at 1,500 meters (ORD para. xxx.x)	Example: Auxiliary sight Boresight accuracy	Example: System Demo Test-Accuracy Test Prod Readiness Test-Accuracy Prod Qual Test	Example +/- 5 mils +/- 3 mils +/- 1 mil	Example Milestone B MS C (Low Rate Initial Production Decision) FRP DR

2. PART II--INTEGRATED TEST PROGRAM SUMMARY

a. Integrated Test Program Schedule

(1) Display on a chart (see Figure 1) the integrated time sequencing of the major test and evaluation phases and events, related activities, and planned cumulative funding expenditures by appropriation.

(2) Include event dates such as major decision points as defined in DoDI 5000.2; operational assessments, preliminary and critical design reviews, test article availability; software version releases; appropriate phases of developmental test and evaluation; live fire test and evaluation, JITC interoperability testing and certification date to support FRP Decision Review, and operational test and evaluation; low rate initial 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 shall be provided for multi-Service or Joint and Capstone TEMPs showing all DoD Component system event dates.

(4) Provide the date (fiscal quarter) when the decision to proceed beyond low-rate initial production is planned. (LRIP quantities required for initial operational test must be identified for approval by the DOT&E prior to entry into System Development and Demonstration Phase for ACAT I programs and other programs designated for DOT&E oversight).

b. Management

(1) Discuss the test and evaluation responsibility of all participating organizations (developers, testers, evaluators, users).

(2) Identify the T&E IPT structure, to include the sub-IPTs, such as a Modeling & Simulation WIPT or Reliability WIPT, with their participating organizations. A more detailed discussion can be contained in a separate T&E charter; however, sufficient detail is needed here for those persons not having convenient access to the charter.

(3) Provide the proposed or approved performance Exit Criteria to be assessed at the next major decision point. For a TEMP update, generated by a program breach or significant change, provide the Acquisition Decision Memorandum-approved Exit Criteria from the current phase's beginning milestone decision, or any revised ones generated by the breach or significant change.

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 that anti-tamper provisions have been implemented; 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, to include anti-tamper characteristics. 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 which are critical to determine whether or not 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 to evaluate the system's performance, 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, electromagnetic environment, blowing dust and sand, icing, wind conditions, steep terrain, wet soil conditions, high sea state, storm surge and tides, etc.) and interoperability with other weapon and support systems, as applicable, to include insensitive munitions, will be tested. Describe the developmental test and evaluation plans and procedures that will support the JITC/DISA interoperability certification recommendation to the Director, Joint Staff (J-6) in time to support the FRP Decision Review.

(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 in a realistic environment before production or deployment.

(2) The TEMP shall show how program schedule, test management structure, and required resources are related to operational requirements documented in the certified CRD (if applicable) and ORD, and derived requirements from the C4ISP; critical operational issues; test objectives; and major decision points. Testing shall 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) State the measures of effectiveness (MOEs) and measures of performance (MOPs). Define the evaluation criteria and data requirements for each MOE/MOP.

(5) 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 decision points supported. Operational test and evaluation that supports the beyond low rate initial production decision shall have test objectives,

to include anti-tamper characteristics that interface with operators and maintainers, that resolve all unresolved effectiveness and suitability COIs.

(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, the anti-tamper characteristics to be assessed in an operational environment and support systems as applicable, etc. Identify planned sources of information (e.g., developmental 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 shall clearly be stated and the reason(s) explained. Describe the operational test and evaluation plans and procedures that will support the JITC/DISA interoperability certification recommendation to the Director, Joint Staff (J-6) in time to support the FRP Decision Review.

(4) *Limitations.* Discuss the test and evaluation 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 and evaluation 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 C, "LFT&E Mandatory Procedures and Reports". 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 protection and tolerance to terminal effects of threat weapons and 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 approach and shot selection process; and major test and evaluation 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 entry into the System Development and Demonstration Phase. Live fire test and evaluation resource requirements (including test articles and instrumentation) shall be appropriately identified in the Test and Evaluation Resource Summary.

* Not applicable to AIS programs.

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, pre-production, 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 environmental 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, weapons, flares, chaff, sonobuoys, smoke generators, acoustic countermeasures, etc. that will be required for each phase of testing. Identify any major shortfalls. Each threat target shall 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 models and simulations to be used, including computer-driven simulation models and hardware/software-in-the-loop testbeds. Identify the resources required to accredit their usage.

(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 shall project the time-phased test and test support resources necessary to accomplish development, integration and demonstration testing and early operational assessment. The TEMP shall estimate, to the degree known, the key resources necessary to accomplish developmental test and evaluation, operational assessment, live fire test and evaluation, and operational test and evaluation. These shall include test and training ranges of the Major Range and Test Facility Base (MRTFB), test equipment and facilities of the MRTFB, capabilities designated by industry and academia, unique instrumentation, threat simulators, targets, and modeling and simulation. 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 shall 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 2.

9. ATTACHMENTS

Provide as appropriate.

FIGURE 1 - INTEGRATED TEST PROGRAM SCHEDULE

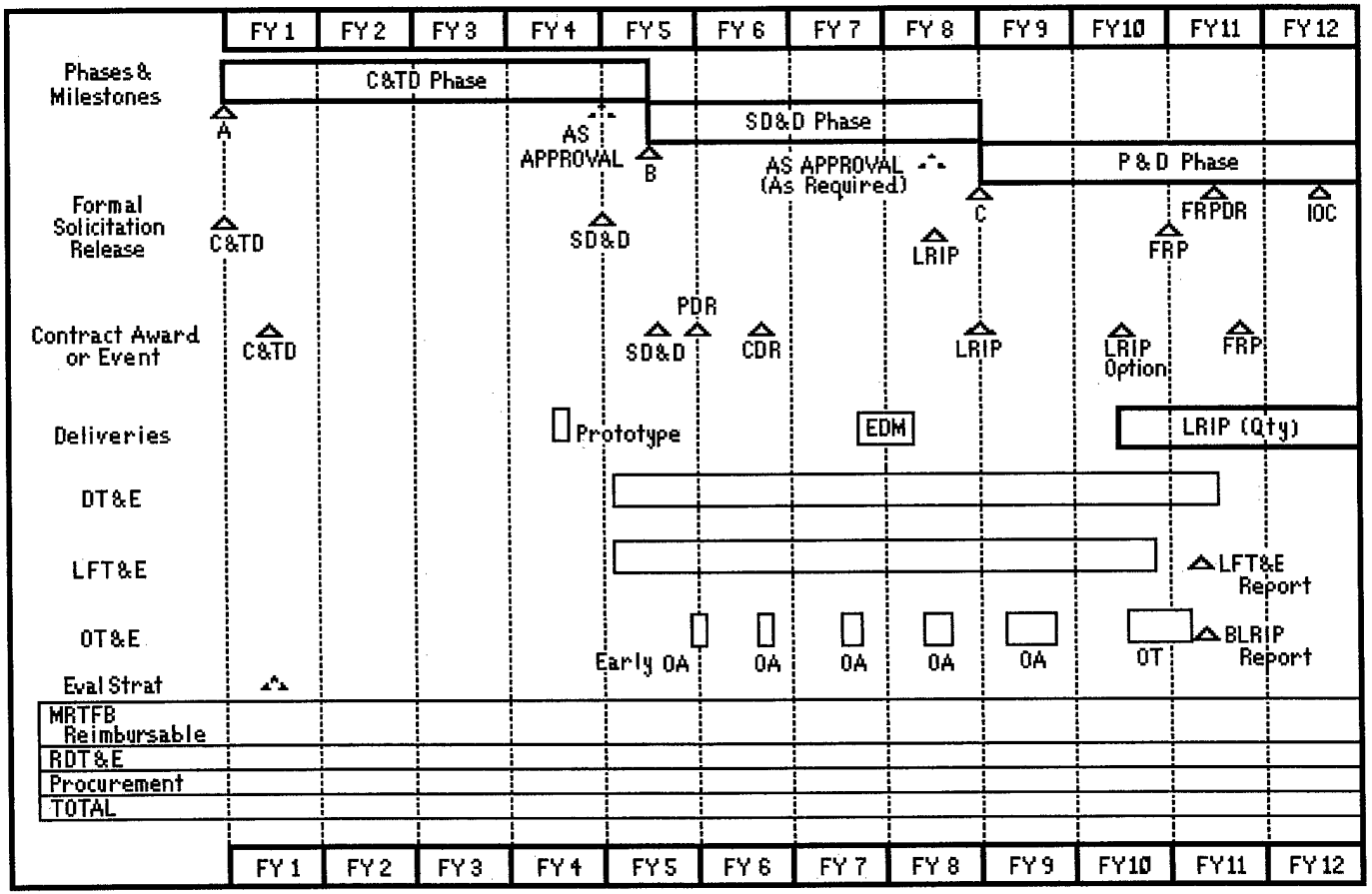

FIGURE 1 – Integrated Test Program Schedule

FIGURE 2 - PROGRAM POINTS OF CONTACT

NAME ORGANIZATION TELEPHONE (COMM/DSN)	E-MAIL ADDRESS
Service Secretary/Agency Director/Monitor/Coordinator	
User Representative	
Program Manager	
Developmental Test Director/Coordinator	
Operational Test Director/Coordinator	
OUSD(AT&L)/DT Action Officer	
OSD/DOT&E Action Officer	

AP3. APPENDIX 3
LIVE FIRE TEST AND EVALUATION
MANDATORY PROCEDURES & REPORTS[14]

AP3.1. INTRODUCTION AND PURPOSE

AP3.1.1. This Appendix provides guidelines to describe a disciplined management approach for the conduct of LFT&E within DoD, which, if followed, will enable an assessment of a system's vulnerability and lethality and ensure compliance with LFT&E legislation. The legislation, 10 U.S.C. 2366, contains requirements for vulnerability and lethality live fire testing of covered systems, as defined in this regulation. 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.

AP3.1.2. 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:

AP3.1.2.1. 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;

AP3.1.2.2. To ensure that knowledge of user casualties and system vulnerabilities or lethality is based on testing of the system under realistic combat conditions;

AP3.1.2.3. To allow any design deficiency identified by the testing and evaluation to be corrected in design or employment before proceeding beyond low-rate initial production; and

AP3.1.2.4. 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).

AP3.2. DEFINITIONS

The legislation covering LFT&E also provides definitions of "covered system," "major munitions program," "covered product improvement programs," "realistic survivability testing,"

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[14] Not applicable to AIS

"realistic lethality testing," and "configured for combat." The definitions of "covered system," "major munitions program," and "covered product improvement programs," are encompassed in the single DoD term "covered system."

AP3.2.1. Covered System. A system that the DOT&E, acting for the Secretary of Defense, has determined to be:

(A) a major system within the meaning of that term in 10 USC 2302(5) that is --

(i) user-occupied and designed to provide some degree of protection to its occupants in combat; or

(ii) a conventional munitions program or missile program; or

(B) a conventional munitions program for which more than 1,000,000 rounds are planned to be acquired; or

(C) a modification to a covered system that is likely to affect significantly the survivability or lethality of such a system.

Note: The term "covered system" as defined above is the DoD term that is intended to include all categories of systems or programs identified in 10 USC 2366 as requiring live fire test and evaluation. In addition, non-traditional systems or programs that do not have acquisition points referenced in 10 USC 2366, but otherwise meet the statutory criteria, are considered "covered systems" for the purpose of this regulation.

AP3.2.2. Live Fire Test and Evaluation

(A) testing within a DOT&E-approved LFT&E strategy that includes the firing of actual weapons (or surrogates if actual threat weapons are not available) at components, sub-systems, sub-assemblies, and/or full-up, system-level targets or systems to examine personnel casualties, system vulnerabilities, or system lethality; and

(B) he evaluation of the results of such testing.

(C) For purposes of this regulation, the term "live fire test and evaluation" does not include an assessment based exclusively on:

(i) computer modeling;

(ii) simulations; or

(iii) analyses of system requirements, engineering proposals, design specifications, or any other information contained in program documents.

Note: 10 USC 2366 requires an LFT&E program to include full-up, system-level testing unless a waiver is granted in accordance with statute and this regulation.

AP3.2.3. Full-up, System-Level Test.

(A) vulnerability testing conducted, using munitions likely to be encountered in combat, on a complete system loaded or equipped with all the dangerous materials that normally would be on board in combat (including flammables and explosives), and with all critical subsystems operating that could make a difference in determining the test outcome; or

(B) lethality testing of a production-representative munition or missile, for which the target is representative of the class of systems that includes the threat, and the target and test conditions are sufficiently realistic to demonstrate the lethal effects the weapon is designed to produce. Note: The term "full-up, system-level testing" is that testing that fully satisfies the statutory requirement for "realistic survivability testing" or "realistic lethality testing" as defined in 10 USC 2366.

AP3.2.4. 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. Survivability consists of susceptibility, vulnerability, and recoverability.

AP3.2.5. 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.

AP3.2.6. Lethality. The ability of a munition or directed energy weapon to cause damage that will cause the loss or a degradation in the ability of a target system to complete its designated mission(s).

AP3.2.7. 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.

AP3.2.8. Recoverability. Following combat damage, the ability to take emergency action to prevent loss of the system, to reduce personnel casualties, or to regain weapon system combat mission capabilities.

AP3.3. IMPLEMENTATION

AP3.3.1. An active, well-planned, well-managed and well-executed LFT&E strategy is essential to understanding system vulnerability/lethality and shall 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 Concept Exploration, 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 Production and Support. 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 shall be managed throughout all phases of the budget cycle.

AP3.3.2. LFT&E shall be initiated as early as possible and completed before entry into full-rate production and deployment, to identify and assess possible design deficiencies so that appropriate corrective actions can be taken. Beginning with component-level testing and analysis during component advanced development, live fire vulnerability/lethality test and evaluation continues through system integration and system demonstration with additional components/subsystem testing, and progresses to full-up system level LFT&E of production representative items (unless a waiver from full-up, system-level testing has been approved in accordance with this regulation) before the system proceeds beyond low-rate initial production (or equivalent point).

AP3.3.3. 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 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 shall be assumed to be covered and appropriate action taken. This includes waiver action if full-up, system-level testing would be unreasonably expensive and impractical. All LFT&E of covered systems is conducted by the Services with OSD oversight.

AP3.3.4. 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 validated threat document.

AP3.3.5. Pretest predictions are required for every live fire test event. The predictions may be based on computer models, engineering principles, or engineering judgment, and should address a level of detail comparable to the test damage assessment methodology. The DOT&E-approved LFT&E strategy shall address both the nature of the pretest predictions and the schedule of pretest prediction deliverables. The deliverables and supporting documentation should identify basic assumptions, model inputs, and known limitations. If the live fire evaluation plan incorporates the use of vulnerability or lethality models, the pretest predictions should exercise those models, and support the verification, validation, and accreditation of those models.

AP3.3.6. 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) shall 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.

AP3.3.7. Although the evaluation of live fire test results will address kill given a hit (i.e., vulnerability or lethality), the outcome of LFT&E shall not necessarily be expressed in terms of probabilities. Rather, live fire testing shall 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 shall address, where possible, the susceptibility of the system.

AP3.3.8. 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: during Concept Exploration, a decision shall be made whether the system meets the legislative or regulatory criteria for a covered system. Initial draft strategies shall identify proposed issues, existing data in support of the issues, and live fire tests to be conducted throughout the acquisition process. By Milestone B, 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 before proceeding beyond low-rate initial production.

AP3.4. RESPONSIBILITIES

AP3.4.1. USD(AT&L)

AP3.4.1.1. For a covered system acquisition program lacking traditional milestones cited in 10 USC 2366, designates equivalent events for the purpose of applying the schedule requirements for LFT&E.

AP3.4.1.2. May waive the requirement for full-up, system-level LFT&E in accordance with the provisions of 10 USC 2366, following DOT&E approval of the alternative LFT&E plan. In such a case, must certify in writing to the Congressional defense committees, before the system enters System Development and Demonstration (or equivalent point), that full-up, system-level testing would be unreasonably expensive and impracticable, and include the DOT&E-approved alternative plan. Note: The waiver decision authority is the CAE for less-than ACAT ID programs.

AP3.4.2. DOT&E

AP3.4.2.1. Serves as the OSD focal point for review, coordination, and approval of LFT&E policy.

AP3.4.2.2. Approves LFT&E strategies, as provided in the TEMP or equivalent document, and alternative LFT&E plans, when applicable, in support of a waiver from full-up, system-level testing.

AP3.4.2.3. Designates covered systems for LFT&E that meet the regulatory criteria. Annually reviews all potential systems for inclusion or deletion from the OSD T&E Oversight List.

AP3.4.2.4. Approves Services' LFT&E planning documents as identified for DOT&E approval in the LFT&E planning matrix included in the TEMP.

AP3.4.2.5. Reviews Services' LFT&E planning documents not requiring DOT&E approval, as identified in the LFT&E planning matrix included in the TEMP.

AP3.4.2.6. Reviews Services' LFT&E Reports.

AP3.4.2.7. Monitors and reviews the Services' LFT&E program during its conduct.

AP3.4.2.8. Submits an independent LFT&E report for each covered system (to include LFT&E programs conducted under the waiver provisions of 10 USC 2366) to the Secretary of Defense and, as delegated by the Secretary, to the Congress before a covered system can proceed beyond low-rate initial production.

AP3.4.2.9. Describes and assesses the status of LFT&E activities for each system requiring LFT&E as part of the DOT&E annual report to Congress required by 10 USC 139.

AP3.4.3. DoD Components

AP3.4.3.1. Recommend candidate covered systems for LFT&E.

AP3.4.3.2. Develop and implement the LFT&E strategy for each affected system and ensures this strategy is fully described in the TEMP.

AP3.4.3.3. 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.

AP3.4.3.4. Identify critical LFT&E issues, prepare and approve required plans, reports and other documentation.

AP3.4.3.5. Permit DOT&E to monitor, on-site, all LFT&E tests.

AP3.4.3.6. 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.

AP3.4.3.7. Submit alternative LFT&E strategy for approval to the Director, OT&E, if full-up, system-level testing would be unreasonably expensive and impracticable.

AP3.4.3.8. Submit request for waiver from full-up, system-level testing for approval to the USD(AT&L) for ACAT ID programs, or to the CAE for less-than ACAT ID programs, if full-up, system-level testing would be unreasonably expensive and impracticable. Include a copy of the approved alternative plan with the request for waiver.

AP3.4.3.9. Manage Service facilities and resources and provide guidance on operating these test facilities to support LFT&E.

AP3.5. LFT&E DOCUMENTS

Conduct of LFT&E shall require the preparation and submission to OSD of the following listed documents. 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 additional documentation shall be at the Service level.

AP3.5.1. 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) shall be appropriately identified early in the development cycle and appear in the Test and Evaluation Resource Summary. The TEMP shall include an LFT&E planning matrix that covers 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. (See also Appendix B).

AP3.5.2. 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 shall 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.

AP3.5.3. Detailed Test and Evaluation Report. The results and overall evaluation of all testing, identified in the LFT&E strategy, shall 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 shall 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, as delegated by the Secretary, of the Secretary of Defense assessment report to Congress. Service technical review is normally requested prior to transmittal.

AP3.6. WAIVERS

As delegated by the Secretary of Defense, waivers from full-up, system-level LFT&E are approved prior to Milestone B (or equivalent point) by USD(AT&L), for ACAT ID programs, or by the appropriate CAE, for less than ACAT ID programs, provided the requirements of Section 3.7 of this Regulation are met. 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, as delegated by the Secretary of Defense. Waivers from full-up, system-level, live fire testing (realistic survivability/lethality testing as defined in 10 USC 2366), for covered systems, including product improvements that significantly affect survivability or lethality, cannot be granted after Milestone B (or equivalent point), except through legislative relief.

ANNEX A – REFERENCES

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, "The Defense Acquisition System."

3. DoD Instruction 5000.2, "Operation of the Defense Acquisition System."

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 System Threat Assessment; 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 inerting of fuzes on stowed ammunition, or any other environmental, safety, health, 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 shall 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 shall 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.

AP4. APPENDIX 4
EARNED VALUE MANAGEMENT SYSTEMS (EVMS) GUIDELINES, MANDATORY PROCEDURES, & REPORTING

AP4.1. INTRODUCTION AND PURPOSE

Use of these Earned Value Management Systems (EVMS) guidelines is mandatory on selected contracts (see paragraph C2.9.3.4.). The contractors' management control systems shall include policies, procedures, and methods that are designed to ensure that they will meet the guidelines shown below. These guidelines are reproduced from the American National Standards Institute (ANSI)/Electronic Industries Alliance (EIA) EVMS standard (ANSI/EIA-748-98), Chapter 2. Guidance for implementing these guidelines on DOD contracts can be found in the Earned Value Management Implementation Guide (EVMIG) in the Defense Acquisition Deskbook.

AP4.2. ORGANIZATION

AP4.2.1. Define the authorized work elements for the program. A work breakdown structure (WBS), tailored for effective internal management control, is commonly used in this process.

AP4.2.2. Identify the program organizational structure including the major subcontractors responsible for accomplishing the authorized work, and define the organizational elements in which work will be planned and controlled.

AP4.2.3. Provide for the integration of the company's planning, scheduling, budgeting, work authorization and cost accumulation processes with each other, and as appropriate, the program work breakdown structure and the program organizational structure.

AP4.2.4. Identify the company organization or function responsible for controlling overhead (indirect costs).

AP4.2.5. Provide for integration of the program work breakdown structure and the program organizational structure in a manner that permits cost and schedule performance measurement by elements of either or both structures as needed.

AP4.3. PLANNING, SCHEDULING, AND BUDGETING

AP4.3.1. Schedule the authorized work in a manner which describes the sequence of work and identifies significant task interdependencies required to meet the requirements of the program.

AP4.3.2. Identify physical products, milestones, technical performance goals, or other indicators that will be used to measure progress.

AP4.3.3. Establish and maintain a time-phased budget baseline, at the control account level, against which program performance can be measured. Initial budgets established for performance measurement will be based on either internal management goals or the external customer negotiated target cost including estimates for authorized but undefinitized work. Budget for far-term efforts may be held in higher-level accounts until an appropriate time for allocation at the control account level. On government contracts, if an over target baseline is used for performance measurement reporting purposes, prior notification must be provided to the customer.

AP4.3.4. Establish budgets for authorized work with identification of significant cost elements (labor, material, etc.) as needed for internal management and for control of subcontractors.

AP4.3.5. To the extent it is practical to identify the authorized work in discrete work packages, establish budgets for this work in terms of dollars, hours, or other measurable units. Where the entire control account is not subdivided into work packages, identify the far term effort in larger planning packages for budget and scheduling purposes.

AP4.3.6. Provide that the sum of all work package budgets plus planning package budgets within a control account equals the control account budget.

AP4.3.7. Identify and control level of effort activity by time-phased budgets established for this purpose. Only that effort which is unmeasurable or for which measurement is impractical may be classified as level of effort.

AP4.3.8. Establish overhead budgets for each significant organizational component of the company for expenses, which will become indirect costs. Reflect in the program budgets, at the appropriate level, the amounts in overhead pools that are planned to be allocated to the program as indirect costs.

AP4.3.9. Identify management reserves and undistributed budget.

AP4.3.10. Provide that the program target cost goal is reconciled with the sum of all internal program budgets and management reserves.

AP4.4. ACCOUNTING CONSIDERATIONS

AP4.4.1. Record direct costs in a manner consistent with the budgets in a formal system controlled by the general books of account.

AP4.4.2. When a work breakdown structure is used, summarize direct costs from control accounts into the work breakdown structure without allocation of a single control account to two or more work breakdown structure elements.

AP4.4.3. Summarize direct costs from the control accounts into the contractor's organizational elements without allocation of a single control account to two or more organizational elements.

AP4.4.4. Record all indirect costs which will be allocated to the contract.

AP4.4.5. Identify unit costs, equivalent units costs, or lot costs when needed.

AP4.4.6. For EVMS, the material accounting system will provide for:

AP4.4.6.1. Accurate cost accumulation and allocation of costs to control accounts in a manner consistent with the budgets using recognized, acceptable, costing techniques.

AP4.4.6.2. Cost performance measurement at the point in time most suitable for the category of material involved, but no earlier than the time of progress payments or actual receipt of material.

AP4.4.6.3. Full accountability of all material purchased and all material transfers for the program, including the residual inventory.

AP4.5. ANALYSIS AND MANAGEMENT REPORTS

AP4.5.1. At least on a monthly basis, generate the following information at the control account and other levels as necessary for management control using actual cost data from, or reconcilable with, the accounting system:

AP4.5.1.1. Comparison of the amount of planned budget and the amount of budget earned for work accomplished. This comparison provides the schedule variance.

AP4.5.1.2. Comparison of the amount of the budget earned and the actual (applied where appropriate) direct costs for the same work. This comparison provides the cost variance.

AP4.5.2. Identify, at least monthly, the significant differences between both planned and actual schedule performance and planned and actual cost performance, and provide the reasons for the variances in the detail needed by program management.

AP4.5.3. Identify budgeted and applied (or actual) indirect costs at the level and frequency needed by management for effective control, along with the reasons for any significant variances.

AP4.5.4. Summarize the data elements and associated variances through the program organization and/or work breakdown structure to support management needs and any customer reporting specified in the contract.

AP4.5.5. Implement managerial actions taken as the result of earned value information.

AP4.5.6. Develop revised estimates of cost at completion based on performance to date, commitment values for material, and estimates of future conditions. Compare this information with the performance measurement baseline to identify variances at completion important to company management and any applicable customer reporting requirements including statements of funding requirements.

AP4.6. REVISIONS AND DATA MAINTENANCE

AP4.6.1. Incorporate authorized changes in a timely manner, 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 program organizations.

AP4.6.2. Reconcile current budgets to prior budgets in terms of changes to the authorized work and internal replanning in the detail needed by management for effective control.

AP4.6.3. Control retroactive changes to records pertaining to work performed that would change previously reported amounts for actual costs, earned value, or budgets. Adjustments should be made only for correction of errors, routine accounting adjustments, effects of customer or management directed changes, or to improve the baseline integrity and accuracy of performance measurement data.

AP4.6.4. Prevent revisions to the program budget except for authorized changes.

AP4.6.5. Document changes to the performance measurement baseline.

AP5. APPENDIX 5
COMMAND, CONTROL, COMMUNICATION, COMPUTERS, AND INTELLIGENCE (C4I) SUPPORT PLAN (C4ISP) MANDATORY PROCEDURES AND FORMATS

AP5.1. INTRODUCTION AND PURPOSE

AP5.1.1. This appendix provides the mandatory format and review process for the C4ISP, required by DoDI 5000.2, and by DoD 5000.2-R, Section C6.4. The C4ISP provides a mechanism to identify and resolve implementation issues related to an acquisition program's C4ISR infrastructure support and IT system, including NSS, interface requirements. It identifies C4ISR needs, dependencies, and interfaces for programs in all acquisition categories, focusing attention on interoperability, supportability, and sufficiency concerns. Interoperability is defined in DoD Instruction 5000.2 and in DoD 5000.2-R, Section C6.3. Supportability refers to the ability of existing and planned IT, including NSS, systems and infrastructure components to aid, protect, complement, and sustain development or operation of the system being acquired. Sufficiency refers to the extent to which requirements are satisfied and the necessary support is available. The C4ISP includes:

AP5.1.1.1. A system description;

AP5.1.1.2. Operational employment concept and employment rates, including mission area-focused operational, systems, and technical architecture views;

AP5.1.1.3. C4ISR support requirements derived through analysis from the employment concept/rates, architecture views, and the performance capabilities and characteristics specified by the Operational Requirements Document (ORD) or equivalent document validated by the requirements authority; and

AP5.1.1.4. Potential C4ISR shortfalls with proposed solutions or mitigation strategies.

AP5.1.2. The C4ISP shall describe system dependencies and interfaces in sufficient detail to enable test planning for interoperability KPPs and IERs. The Joint Staff shall provide supportability (by J-6) and intelligence (by J-2) certification of C4ISPs for all programs.

AP5.1.3. Each DoD Component shall establish an internal C4ISP management process that supports preparation and review of C4ISPs, leading to C4ISP approval by a designated Component official. This process shall include coordination with all affected DoD components. Comments raised during C4ISP review shall be resolved prior to approval. Each DoD

Component shall designate a principal point of contact (POC) to represent the Component on C4ISP policy and procedural matters.

AP5.1.4. DoD Components shall identify C4ISR information, infrastructure, and other IT, including NSS, interface and support requirements from the beginning of each program's life cycle. These considerations will facilitate preparation of the analysis of alternatives, and help refine operational goals. Concurrently with initial ORD preparation and validation, the Component shall develop a C4ISP that identifies the C4ISR support and IT, including NSS, capabilities that must be in place to meet the proposed operational requirements in the ORD and to satisfy the program's planned employment. A C4ISP must be in place by program initiation. As the program matures, or proceeds through multiple evolutionary blocks or phases, the Component shall keep the C4ISP current. Updates shall contain progressively more detailed and specific time-phased descriptions of the types of information needed; operational, systems, and technical architecture requirements; information exchange requirements (IERs); spectrum supportability, security, connectivity, and interoperability issues; and infrastructure, intelligence, and other IT, including NSS, support shortfalls. Changes in C4ISR information, infrastructure, and other IT, including NSS, interface requirements that result from proposed changes in the approved ORD shall be highlighted to facilitate review and evaluation.

AP5.1.5. DoD Components shall tailor C4ISPs according to the complexity, scale, mission criticality, or other unique aspects of the system's C4ISR support and IT, including NSS, interface requirements.

AP5.2. PREPARATION

AP5.2.1. Ideally, a working-level integrated product team (WIPT) should develop the C4ISP. The WIPT should comprise subject matter experts familiar with the system being acquired, the intended use of the system, and to the extent possible, the operational and system architectures within which the system will function. As the operational and system architectures mature, the WIPT should include consultations with the principal systems with which the system being acquired will interface. Assessing the capabilities of interfacing systems to satisfy the program's operational and derived requirements (Section 4 of the C4ISP) will require continuing collaboration among subject matter experts of all systems involved.

AP5.2.2. The Component shall allow sufficient time to prepare and update the C4ISP so that review of the C4ISP can be completed before an upcoming milestone or decision review. Preparation shall include careful consideration of the information, infrastructure, and interface support requirements levied by and on the program, and a thorough (and iterative) document review process. Managers of interfacing programs identified in the C4ISP should review the document during this process for completeness, and validate shortfalls and solutions (Section 5 of the C4ISP).

AP5.2.3. Components shall prepare the C4ISP at the classification level necessary to completely communicate the required information, without unnecessary reliance on reference documents that may not be generally available to users or reviewers. Components shall not keep a C4ISP unclassified merely to facilitate document review; however, unclassified C4ISPs with classified annexes may sometimes be appropriate. Components shall consider the implications of compiling detailed, sensitive but unclassified information and/or proprietary information in a document that receives wide distribution during review.

AP5.2.4. Before a C4ISP is distributed for review, Components shall certify that all satellite communications requirements of the acquisition program have been approved for inclusion in the SATCOM Emerging Requirements Data Base in accordance with CJCSI 6250.01.

AP5.3. COORDINATION

DoD Components shall manage the review of all C4ISPs within their Components, and shall obtain supportability and intelligence certifications through C4ISP review by the Joint Staff. OASD(C3I) shall lead a DoD-wide review of: (1) C4ISPs for all ACAT I and IA (ID, IC, IAM, and IAC) acquisition programs; and (2) C4ISPs for other acquisition programs in which OASD(C3I) has indicated a special interest. The Joint Staff, USJFCOM, other DoD Components, and USD(AT&L) and other DoD agencies may recommend programs for the C4ISP special interest list (e.g., identification of non-standard requirements for information, or mismatch of time critical information requirements and technical capabilities). Should interoperability issues arise between ACAT I or IA and less-than-ACAT I or IA programs, DoD Components shall, if requested, be able to provide the C4ISP for the less-than-ACAT I or IA program(s) to the ASD(C3I) to support issue resolution.

AP5.3.1. DoD-Wide Reviews led by OASD(C3I)

AP5.3.1.1. When a system interfaces or will interface with systems of other DoD Components during development, testing, training, or operation, the acquiring Component shall obtain the coordination of the affected Components prior to submitting the C4ISP for DoD review.

AP5.3.1.2. DoD review of C4ISPs shall precede each major milestone, beginning at program initiation, and other decision points as specifically directed. The DoD review process will be accomplished in stages. Stage 1 is review of the early draft, usually beginning no later than 6 months prior to milestone review. (Stage 1 review may go through several drafts.) Stage 2 is review of the final draft, beginning no later than 60 days before the milestone. Stage 3 is the submission of the Component-approved C4ISP with the relevant acquisition decision memorandum. Stage 2 and 3 submissions require a correlation/resolution matrix showing disposition of the critical and substantive comments received during the previous stage.

AP5.3.1.3. When the C4ISP includes requirements resulting from update of the ORD, DoD review normally shall not begin until the corresponding stage of ORD review has been completed. That is, Stage 1 review of the C4ISP shall follow Stage 1 review of the ORD, and Stage 2 review of the C4ISP shall follow Stage 2 review of the ORD.

AP5.3.1.4. Components shall submit the C4ISP electronically to the Director, OASD(C3I) Program Analysis and Integration (PA&I). They shall submit unclassified C4ISPs via the Joint C4ISP Assessment Tool (JCPAT) NIPRNET site. They shall submit classified C4ISPs, through SECRET, via the JCPAT SIPRNET site. The OASD(C3I) program lead or the JCPAT manager at DISA shall provide specific instructions, including recommended document formats to facilitate the DoD review process. The OASD(C3I) program lead shall provide procedures for submitting C4ISPs above the level of SECRET. Information copies of both approved and draft ORDs shall be submitted with the C4ISP to facilitate the review process.

AP5.3.2. DoD Review Process.

AP5.3.2.1. A broad range of activities review the C4ISP and use it as a vehicle to conduct a variety of interoperability and supportability assessments. At a minimum, the following offices review the C4ISP: ASD(C3I), Under Secretary of Defense (Acquisition, Technology and Logistics (USD(AT&L)), Director, Operational Test and Evaluation (DOT&E), Joint Staff (J-2, J-3, J-6, and J-8), MilDeps, USJFCOM, DISA, and NIMA.

AP5.3.2.2. After administrative evaluation of the C4ISP to determine its readiness for external review, the OASD(C3I) shall release the document for review, assessment, and comment. C4ISP review shall occur in conjunction with supportability and intelligence certification by the Joint Staff. CJCSI 3170.01B, CJCSI 3312.01, and CJCSI 6212.01B address Joint Staff review and certification procedures.

AP5.3.2.3. GS-15/O-6 division chief-level executives shall conduct the Stage 1 review. For Stage 1 review, the suspense date for comments to OASD(C3I) shall normally be 35 days from the date of the JCPAT distribution notice. Senior Executive Service/flag-level executives shall conduct the Stage 2 review for ACAT I programs; GS-15/O-6 division chief-level executives shall conduct Stage 2 reviews for non-ACAT I programs. Stage 2 shall include final supportability and intelligence certifications by the Joint Staff. For Stage 2 review, the suspense date for comments to the OASD(C3I) shall normally be 21 days from the date of the JCPAT distribution notice. Comments shall reflect the position of the responding CINC, MilDep, OSD Directorate, Joint Staff Directorate, or Agency.

AP5.3.2.4. In addition to review of individual C4ISPs, the OASD(C3I) shall extract information from the C4ISP and other sources to facilitate identification and resolution of cross-program C4ISR infrastructure and support issues. This includes shortfalls identified in C4ISPs

or through the C4ISP review process. The OASD(C3I) shall raise significant program-specific issues identified during this process with the Component preparing the C4ISP.

AP5.3.3. Shortfall Identification and Resolution.

AP5.3.3.1. Derived requirements are interoperability or support needs that are identified during C4ISP development. Derived requirements that cannot be satisfied constitute shortfalls. The C4ISP review process can also identify shortfalls. The C4ISP shall document all shortfalls, plans and schedules for their resolution, and strategies for mitigating the shortfalls until each is resolved. The acquisition strategy shall summarize shortfalls (see DoD 5000.2-R, Section 2.7.3).

AP5.3.3.2. When a shortfall is identified, the Component shall determine whether or not the shortfall constitutes a new mission need. If so, the Component shall submit the mission need into the requirements generation system in accordance with CJCSI 3170.01B. All shortfalls should be resolved at the lowest possible level. Shortfalls that cannot be resolved at the program office level should be addressed in accordance with DoD 5000.2-R, Part 7.

AP5.3.4. Feedback. The OASD(C3I) shall consolidate comments from each stage of the review, and provide official feedback to the Component preparing the C4ISP. Feedback shall include identification of critical interoperability and supportability issues that must be addressed during the program's milestone review process. Critical issues must be resolved either prior to the milestone or decision review, or through tasking in the Acquisition Decision Memorandum. The OASD(C3I) shall return formal comments as an attachment under a standard cover letter providing an overall assessment of the C4ISP, a statement as to whether there are any "critical" issues, and a statement concerning the program's readiness for a milestone decision from the standpoint of C4ISR supportability and IT, including NSS, interoperability. This letter will also forward any unresolved Stage 2 "critical" issues to the Overarching Integrated Product Team (OIPT), MDA, and program manager for consideration as part of the milestone or decision review.

AP5.3.5. C4ISP Completion. The objective of all participants is to complete the Stage 2 review prior to the milestone or decision review so that the MDA can address and resolve outstanding critical concerns raised during C4ISP coordination. However, C4ISP review status shall not by itself delay a program milestone review. The MDA shall address critical, open C4ISP issues even after milestone approval.

AP5.3.6. Approval of C4ISPs. Following satisfactory resolution of outstanding issues, the official designated by the Component shall approve the C4ISP. Copies of all approved C4ISPs shall be submitted electronically to the Director, OASD(C3I) Program Analysis and Integration (PA&I), with the relevant Acquisition Decision Memorandum. This includes both approved

C4ISPs that have undergone DoD-wide review led by OASD(C3I), and approved C4ISPs reviewed in accordance with Component procedures.

AP5.4. DOCUMENTATION INTERFACES

AP5.4.1. The C4ISP documents the C4ISR and IT, including NSS, support needed to respond to a CRD (if applicable) and an ORD by describing and evaluating the C4ISR information, infrastructure, and other IT, including NSS, interfaces that the acquisition program needs during development, testing, training, and operation. If the ORD is updated, the Component shall update the C4ISP accordingly.

AP5.4.2. The acquisition strategy addresses major C4ISR and IT, including NSS, support considerations for the acquisition program. This includes major information and C4ISR infrastructure enhancements critical to program success. This information is a summary of the details documented in the C4ISP.

AP5.4.3. The Test and Evaluation Master Plan (TEMP) addresses key system interfaces and measurable test parameters. The TEMP documents the overall structure and objectives of the tests that will be performed to evaluate system interoperability and C4ISR supportability. This includes interoperability KPPs and IERs from the associated ORD, plus the IT, including NSS, interfaces and IERs specified in the C4ISP. The C4ISP also identifies C4ISR support that must be provided to execute the TEMP.

AP5.5. MANDATORY FORMAT

AP5.5.1. The mandatory C4ISP format begins on the next page. Note: The Defense Acquisition Deskbook and the C4ISR Architecture Framework (renamed the DoD Architecture Framework in versions 2.1 and later) contain additional guidance for preparing the C4ISP and the selected architecture products (OV-1, OV-2, OV-3, OV-6c, SV-1, SV-6, and TV-1) that are required for the C4ISP.

AP5.5.2. The level of detail in a C4ISP will increase as an acquisition program proceeds from program initiation to Milestone C, and to follow-on blocks of an evolutionary acquisition. At program initiation, a C4ISP is not expected to contain all of the information about initial operating capabilities or future system interfaces that will be available at Milestone C or at the full-rate production decision point. Requirements, employment concepts, and architectures for both the system being acquired, and the systems with which it interfaces, will evolve and mature throughout the acquisition life cycle. A C4ISP is an analysis of requirements and planned solutions as of the current point in time. In preparing and maintaining a C4ISP, the Component is responsible for identifying what relevant interoperability, supportability, and sufficiency information is unknown, or which cannot reasonably be predicted, about the future environment within which the system will function. Likewise, a C4ISP is not expected to address all possible

contingencies. Rather, it should identify representative qualitative and quantitative information about likely scenarios and operating conditions, identifying to the extent possible where such generalizations introduce risk.

C4I SUPPORT PLAN

FOR

PROGRAM TITLE

1. Introduction: Provide a high-level system description and discussion of C4ISP contents. Identify the program, acquisition category, and status within the acquisition cycle; state the purpose and scope of the C4ISP; and reference all approved (or validated) and draft documents affecting the C4ISR and IT, including NSS, aspects of the system that is being acquired. Provide extensive references in Appendix A rather than in the body of the C4ISP. Identify points of contact for further discussion.

2. System Description: Provide a high-level overview of the specific system being acquired. Provide a graphic (block diagram) that shows the major elements/subsystems that make up the system being acquired, and how they fit together. For a weapon system, describe the purpose, design objectives, warhead characteristics, sensors, guidance and control capabilities and limitations (if appropriate), command and control environment, general performance envelope, and primary IT, including NSS, interfaces. For a command and control system, describe the system's function and interfaces with other IT, including NSS, systems. For an automated information system (AIS), describe the system's function, its mission criticality/essentiality, interfaces with other IT, including NSS, systems, and primary databases supported.

3. Operational Employment: Describe how the system being acquired will be employed, and the environment within which it will operate. Address all information interfaces, exchange requirements, and IT, including NSS, capabilities required to comply with the ORD, as well as other information interfaces and exchange requirements necessary to execute the concept of operation for the system at IOC and at subsequent major events, such as block upgrades or deployment of other key systems. A strategy-to-task (STT) methodology is the preferred approach for defining operational and system architecture views, as well as for determining derived requirements (Section 4). The STT framework links means and ends through a hierarchy of objectives. It provides an audit trail from broad objectives down to operational and tactical concepts where elements are linked together using weapons, platforms, other IT, including NSS, and tactics to achieve the objectives.

3.1 Operational Employment Concept: Define the system's operational concept on a mission area basis (or functional area basis for AISs). The operational concepts described should be based on Joint Guidance and on operational procedures pertaining to the system, and should show how the operational concept changes over time, if applicable. Clearly relate missions

performed to the joint mission areas specified in CJCS memorandum CM-1014-00, "Joint Mission Areas to Organize the Joint Operational Architecture" dated September 6, 2000. Describe the electromagnetic environment within which the system will operate. Identify system functions that are critical for specific missions.

Describe at a high level, the operational environment(s) within which the system will operate. This includes the types and characteristics of Service, joint, and combined forces likely to be employed, the electromagnetic environment, spectrum supportability requirements, and other factors that might constrain operations, and the availability of support functions/capabilities on which the system must rely for effective operation.

3.1.1 Operational Architecture Views: Provide a High Level Operational Concept Graphic (OV-1) for each mission area supported by the system. Similar missions may be covered in a single OV-1. For each OV-1, provide supporting text that describes the capabilities and functions of each node and interface, identifying those that are critical to success of the mission as depicted in Section 3. The OV-1 architecture view(s) must correlate with the OV-1 view(s) from the associated ORD. For each mission (or functional) area supported by the system, provide an Operational Node Connectivity Description (OV-2) that shows the intra-Service, inter-Service/joint, and combined/coalition C4ISR support and IT, including NSS, interfaces associated with that mission or function. For each OV-2, provide supporting text that describes the roles of each operational facility (OPFAC) node in the architecture, including the functions that each OPFAC performs that are critical to the success of the mission. Provide multiple OV-1 and OV-2 graphics if necessary because of operational concept changes over time.

3.1.2 Information Exchange Requirements (IERs): The lines connecting the nodes in the OV-2 represent information exchange needs, which encompass one or more IERs. Provide an OV-3 (Operational Information Exchange Matrix) operational architecture view that is cross-referenced to the OV-2 views, showing all individual IERs represented by the need lines. The IERs from the associated ORD will be a subset of the IERs in the C4ISP. All C4ISR support and IT, including NSS, IERs that are necessary for successful performance of the mission must be represented in the OV-2 and OV-3 views, whether or not they are identified as "critical" IERs. This includes intra-Service, inter-Service/joint, and combined/coalition information exchange requirements. Describe the interoperability key performance parameter (KPP), and show the construction of threshold and objective values, with supporting explanation of IER criticality.

The IERs should include all required fields specified in CJCSI 6212.01B for ORD IERs, plus the fields that are needed to specify attributes that are necessary for supportability assessment (see Section 3.4 on system IER matrix requirements). Large IER matrices and detailed supporting narrative should be included in Appendix B, rather than in the body of the C4ISP. Provide a copy of the OV-3 matrix as a separate, appended spreadsheet file.

3.2 Operational Employment Requirements: Identify the impact of the information exchanges and information needs on the supporting infrastructure and ISR systems, and on other

IT, including NSS, interfaces that are critical to mission success. Where possible, this information should be based on modeling of Operational Situations (OPSITs) within which the system will perform. Since it is impractical to model all possible situations, a high tempo situation such as a major theater war and a low tempo situation such as a Noncombatant Evacuation Operation (NEO) should be used. Where formal modeling has not been done, the best available information on likely and peak employment rates (communications load and throughput) should be used in its place. Discuss the threat and tactical considerations, describe time-critical events required to meet operational objectives, and address workload considerations based on the operational employment concept. Include Operational Event/Trace Description (OV-6c) views when needed to clarify the time-critical nature of information for each mission.

3.3 Systems Architecture View: Provide time-phased, mission-based graphical and narrative descriptions of current/future systems and connectivity providing, receiving, or supporting the functions of the system being acquired. For each mission or mission area described in Section 3.1, show the systems that are anticipated to fulfill the needs. For each mission area operational view (OV-2) described in section 3.1, there must be a corresponding System Interface Description (SV-1) view. Each notional OPFAC should be replaced by either an existing or a planned system or facility, and each need line should represent a particular communication system that will provide a path for the information exchange. The SV-1 architecture view(s) must correlate with the SV-1 view(s) from the associated ORD.

Provide increasing detail as the acquisition progresses from milestone to milestone and from evolutionary block to block. At a minimum, include existing or planned systems and networks that: (1) Provide input to, or receive output from, the system being acquired; (2) Support primary activities related to the system; and (3) Support nodes where interfacing systems are located. Describe the relevant information exchange capabilities, operation, and limitations of each system within the architecture. Identify key nodes for information exchanges including materiel equipment, physical connections, association of systems to nodes, circuits, networks, warfighting platforms, and relevant specific system and component performance parameters such as reliability/maintainability and availability.

3.4 Systems IER Matrix Information: A systems IER matrix enhances the information flows documented in the OV-3, and includes systems and communications information for each need line in the SV-1. Append the information required by an SV-6 systems IER matrix to each row of the OV-3 operational IER matrix (Section 3.1.2). Include details and any extensive supporting discussion in Appendix B.

3.5 Technical Architecture: Identify applicable technical standard(s) for each IER, based upon the DoD Joint Technical Architecture (JTA). Include a discussion of relevant interoperability considerations, addressing operations with joint and combined forces in particular. Discuss how the standards are or will be implemented, and identify applicable existing technical guidance and tailoring. Provide a Technical Architecture View (TV-1) that identifies the applicable standard(s) for each row of the OV-3 operational IER matrix (Section

3.1.2). Large TV-1 matrices and detailed supporting narrative should be included in Appendix C, rather than in the body of the C4ISP.

3.6 Defense-Wide Integrated Architectures: Provide a qualitative assessment of the extent to which the time-phased operational, systems, and technical architecture views in Section 3.1 through Section 3.5 are consistent with the evolving Global Information Grid (GIG) integrated architecture (including the joint operational and technical architectures), and with relevant mission area integrated architectures, as of the point in time at which the C4ISP is prepared. Highlight and characterize significant differences, regardless of whether they result from: (1) Incomplete or imperfect Defense-wide or mission area architectures; (2) Validated program requirements, employment concepts, or system development decisions that cannot be changed without a major program impact; or (3) Current differences that the DoD Component plans to resolve later in the system's acquisition life cycle. Describe the interoperability, supportability, or sufficiency impact of these differences, and also summarize them in Section 5.

4. Derived C4I Support Requirements: Document the derived C4ISR support and IT, including NSS, capabilities required to satisfy the development, testing, training, and operational employment of the system. Section 4 should be organized by the function performed (or mission, or organization, as appropriate) and the system that provides information to, or receives information from, the system being acquired. Section 4 is not a restatement of the basic operational requirements contained in the ORD. Rather, it is the result of a formal analysis that derives the C4ISR support and IT, including NSS, that must be in place to meet the operational requirements in the ORD when the system is employed as described in Section 3 of the C4ISP. Focus on the C4 (including IT and NSS) and ISR support requirements necessary for the system to be successfully developed and to perform its intended function, both as a consumer and as a producer/distributor of information. This includes requirements that must be satisfied by organizations or programs in other DoD Components, as well as requirements that must be satisfied by the program office for the system being acquired and by other organizations or programs throughout the DoD Component preparing and submitting the C4ISP.

The Strategy-to-Task (STT) methodology recommended in Section 3 is the preferred approach for identifying these derived requirements through hierarchical decomposition of the operational tasks performed by the system being developed. This analysis process may identify requirements that must be addressed through update of the ORD for either the system being acquired or another information consumer/producer system, or through development of a new Mission Needs Statement (MNS).

4.1 C4ISR Support to Operations: Couple each employment concept (Section 3.1) with the corresponding employment rates (Section 3.2) and the system architectures (Sections 3.3) to assess and characterize the requirements placed on C4ISR support systems and IT, including NSS, activities.

4.1.1 C4 (including IT and NSS) Support to Operations: Describe the support required from the C4 infrastructure and other IT, including NSS, (e.g., other weapon systems) by the

system being acquired. Each sub-section should show the demands of the system being acquired on the particular supporting/interfacing C4 system for each mission. Provide the following information for each external system interface: organizations or activities involved; networks or other means used to exchange information; transmission types (e.g., satellite communications (SATCOM) relay, landline, line-of-sight communications); other communication requirements (e.g., spectrum supportability requirements such as frequencies and bandwidth, certification status, supportability constraints or conflicts, and host nation authorization); sending/receiving databases and software, mission criticality.

Identify the primary IT, including NSS, capabilities of each system, including computer hardware/software, workstations, peripherals, central processors, and routing processors. Include relevant options such as scalability, operating system or software characteristics, etc. Identify new or updated data that may be required by the system. Identify data rates under a range of operating conditions. Identify the information security classification level(s) required and capabilities employed. For example, if data is encrypted, identify the type of encryption planned.

Address information assurance, infrastructure assurance, and protection of critical systems and infrastructures, giving special consideration to vulnerabilities resulting from reliance on other government or civil sector infrastructures and the risk of their loss, damage or destruction. The goal is to reduce risks imposed by those vulnerabilities and interdependencies during development.

4.1.2 ISR Support to Operations: Describe support required from ISR systems by the system being acquired. Each sub-section should show the support required from each supporting ISR system, together with the attributes this support must possess in order to satisfy the needs of the system being acquired. Address the full range of ISR support systems and information exchange requirements, including delivery platforms; intelligence tasking, collection, processing, exploitation, analysis, production, and dissemination activities and assets (such as personnel and facilities). Assess the qualitative and quantitative adequacy of supporting systems and activities. Include specific types and elements of information, and their associated characteristics and attributes such as accuracy, timeliness, estimated volume, and required update rates. For systems with ISR and geospatial information needs, address the area of coverage, timeliness, security, impact, quantity, quality, assuredness, robustness, flexibility, and scalability. The level of detail used in describing the operational support requirements should be sufficient to assess supportability.

4.2 C4ISR Support to Other Functions: Describe any special C4ISR support that is required for acquisition or sustainment of the system.

4.2.1 C4ISR Support to Development: Describe any special C4ISR support that is required for the successful development of the system being acquired. The supporting systems should be identified with the nature of the support they provide clearly shown.

4.2.2 C4ISR Support to Testing: Describe the plan to provide C4ISR support for the system's developmental and operational test and evaluation, including testing of IERs and the

interoperability KPP. (Plans for conducting tests of the IT, including NSS, capabilities of the system, including end-to-end testing, joint/combined interoperability certification testing, and testing of IERs/KPPs, are addressed in the TEMP.) Address required support for interoperability demonstrations and testing both within the DoD Component (internal testing), and by external activities such as the Joint Interoperability Test Command (JITC). Identify all information and C4ISR infrastructure and IT, including NSS, capabilities necessary for realistic test and evaluation. If the testing scheme proposes simulating one or more support systems, identify the related performance parameters.

4.2.3 C4ISR Support to Training: Identify the C4ISR infrastructure and IT, including NSS, required to support training activities both prior to and after IOC. Discuss anticipated C4I support to training required for each of the three mutually supporting pillars of training: unit, institution, and self-development. Identify anticipated operator, crew, and netted training that may be required to support joint or combined operations. Identify anticipated use of computer-based training modules, simulations, and major exercises.

5. Potential C4I Support Shortfalls and Proposed Solutions: Address known or potential shortfalls in required C4ISR support capabilities; shortfalls in manpower, training, or doctrine for C4ISR; and any other C4ISR or IT, including NSS, limitations that may reduce the operational effectiveness of the system, or impede its development, testing, or training. Shortfalls identified in Section 5 must be supported by the analysis in Section 4. Include all derived C4ISR support requirements (Section 4) that may not be satisfied by the date that they are needed. This includes C4ISR support requirements that may not be satisfied for either technical, schedule, or funding reasons; however, there is no requirement to quantify funding shortfalls unless the information is readily available. Include C4ISR-related shortfalls of other interfacing systems as well as shortfalls in the C4ISR infrastructure. Include potential shortfalls that are reasonably anticipated to exist, even though analysis is incomplete.

Shortfalls should be summarized in matrix format, organized by the supporting/interfacing system causing or affected by the shortfall. Each row of the matrix should identify the system, the shortfall, the impact of the shortfall on the applicable phase(s) of the system life cycle, and the proposed solution and/or mitigation strategy. Provide supporting discussion for each row of the matrix. Specify the impact of failure to resolve the shortfalls in terms of program resources and schedule, inability to achieve threshold performance, and system or war fighter vulnerability. Address the system's reliance on IT, including NSS, technology not currently available or affordable, and the system's reliance on other systems under development, or its dependency on schedules of other programs. Identify the plan and schedule to remedy each shortfall, including key issues that must be resolved. If the solution to an identified shortfall lies outside the control of the program office, provide a recommendation identifying the organization with the responsibility and authority to address the shortfall.

5.1 Operational Employment Shortfalls: Identify known or potential C4ISR shortfalls that will affect the ability to employ the system as envisioned by the ORD and employment concept. Address both the inability of the C4ISR infrastructure to meet quantitative or qualitative

requirements, and the inability of IT, including NSS, interfaces to provide or receive information as intended. Identify interface dependencies that remain undefined or unsatisfied, especially those beyond program office control. Note potential conflicting demands on infrastructure support from other systems and activities.

5.2 Other Shortfalls: Identify known or potential C4ISR shortfalls that impact other system acquisition and sustainment functions.

5.2.1 Development Support Shortfalls: Identify known or potential C4ISR shortfalls that impact definition and development of the system being acquired. Focus particularly on ISR related support needed to define the system. Include shortfalls that limit or preclude design tradeoff studies or other analyses during system development and demonstration.

5.2.2 Testing Support Shortfalls: Identify known or potential C4ISR shortfalls that impact developmental or operational testing of the system. Focus particularly on potential discontinuities between the testing plan and C4ISR support system and activity availability.

5.2.3 Training Support Shortfalls: Identify known or potential C4ISR shortfalls that impact the proposed training schemes for both system development and test, and operational employment.

Appendix A. References: Identify all related documents (with dates) used to prepare the C4ISP. Include all essential and any supporting products addressing operational, systems, or technical architecture views such as the System Threat Assessment, AoA, MNS, CRD, ORD, TEMP, System Acquisition Master Plan (SAMP), acquisition strategy, Acquisition Program Baseline (APB), C4I Support Plans for other systems, or any other C4ISR Architecture Framework (renamed the DoD Architecture Framework in versions 2.1 and later) products. Except for the current approved and draft ORD(s), do not include copies of the reference documents. Indicate sources for any documents that are not available electronically from the program office.

Appendix B. Information Exchange Requirements (IERs): Provide the set of IERs (and supporting discussion) for each operational and system interface, unless this information is incorporated in Section 3.1.2 and Section 3.4 of the C4ISP. Appendix B will consist of an OV-3 matrix and an SV-6 matrix, with narrative discussion as necessary. Provide a copy of the OV-3 matrix and the SV-6 matrix as separate, appended spreadsheet files.

Appendix C. Technical Standards: Provide the TV-1 matrix (and supporting discussion), with each row cross-referenced to the applicable row of the OV-3 matrix, unless this information is incorporated in Section 3.5 of the C4ISP.

Appendix D. Interface Control Agreements: Identify documentation that indicates what agreements have been made (and those that are required to be made) between dependent programs for C4ISR support. For example, if system A is relying on information from system B,

then this interface dependency must be documented. At a minimum, this dependency should be identified in the C4I Support Plans for both system A (the information recipient) and system B (the information provider).

Appendix E. Acronym List: As appropriate, also provide formal definitions for key terms. This appendix is not required to be in the form of an AV-2 Integrated Dictionary.

Other Appendices or Annexes. As required to provide supporting information not included in the body of the C4ISP. Additional information to satisfy Component-specific requirements (such as cost projections, or additional C4ISR Architecture Framework (renamed the DOD Architecture Framework in versions 2.1 and later)) products should be included in appendices/annexes or as separate documents, and should not be included in the body of the C4ISP.

AP6. APPENDIX 6
TECHNOLOGY READINESS LEVELS AND THEIR DEFINITIONS

AP6.1. TECHNOLOGY READINESS LEVELS

The following matrix lists the various technology readiness levels and provides a description of each.

Technology Readiness Level	**Description**
1. Basic principles observed and reported.	Lowest level of technology readiness. Scientific research begins to be translated into technology's basic properties.
2. Technology concept and/or application formulated.	Invention begins. Once basic principles are observed, practical applications can be invented. The application is speculative and there is no proof or detailed analysis to support the assumption. Examples are still limited to paper studies.
3. Analytical and experimental critical function and/or characteristic proof of concept.	Active research and development is initiated. This includes analytical studies and laboratory studies to physically validate analytical predictions of separate elements of the technology. Examples include components that are not yet integrated or representative.
4. Component and/or breadboard validation in laboratory environment.	Basic technological components are integrated to establish that the pieces will work together. This is relatively "low fidelity" compared to the eventual system. Examples include integration of "ad hoc" hardware in a laboratory.
5. Component and/or breadboard validation in relevant environment.	Fidelity of breadboard technology increases significantly. The basic technological components are integrated with reasonably realistic supporting elements so that the technology can be tested in simulated environment. Examples include "high fidelity"

	laboratory integration of components.
6. System/subsystem model or prototype demonstration in a relevant environment.	Representative model or prototype system, which is well beyond the breadboard tested for level 5, is tested in a relevant environment. Represents a major step up in a technology's demonstrated readiness. Examples include testing a prototype in a high fidelity laboratory environment or in simulated operational environment.
7. System prototype demonstration in an operational environment.	Prototype near or at planned operational system. Represents a major step up from level 6, requiring the demonstration of an actual system prototype in an operational environment. Examples include testing the prototype in a test bed aircraft.
8. Actual system completed and qualified through test and demonstration.	Technology has been proven to work in its final form and under expected conditions. In almost all cases, this level represents the end of true system development. Examples include developmental test and evaluation of the system in its intended weapon system to determine if it meets design specifications.
9. Actual system proven through successful mission operations.	Actual application of the technology in its final form and under mission conditions, such as those encountered in operational test and evaluation. Examples include using the system under operational mission conditions.

AP7. APPENDIX 7
INFORMATION TECHNOLOGY REGISTRATION

AP7.1. IT REGISTRATION

The IT Registry is an enterprise-wide, web-enabled, secure server operation via NIPRNET and SIPRNET. The use of the IT Registry is required for all mission critical information systems and mission essential information systems. The database must be loaded in an automated process from the reporting agency's local CIO database and/or updated interactively on-line through the secure web interface provided. After the initial submission, the data shall be updated not less than quarterly.

AP7.1.1. The following procedures are required to obtain an account for the IT Registry:

AP7.1.1.1. Register on the NIPRNET at https://www.itdb.c3i.osd.mil or on the SIPRNET at http://207.85.97.11. If all the data is unclassified, the NIPRNET site is recommended for registration.

AP7.1.1.2. The IT Registry homepage provides a link for new users to register.

AP7.1.1.3. Complete the application form for new users.

AP7.1.1.4. Upon verification of identity, the new user will be granted access to the database.

AP7.1.2. DoD Service and Agency Components will be able to update and query the data they provided through a secure web interface. Each Service and Agency Component's current IT Registry POC will have authorization to provide user IDs and access to the secure web interface for any user in its management chain.

AP7.1.3. The DoD Deputy Chief Information Officer has the responsibility for the development, upgrade, and maintenance of the IT Registry. Direct questions and requests for user manuals to that organization. The IT Registry web site has user manuals for download.

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