



FY 2011 Annual Report on Cost Assessment Activities



February 2012

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FY 2011 Annual Report on Cost Assessment Activities



Director, Cost Assessment and Program Evaluation February 2012

**Preparation of this report/study cost the Department of Defense
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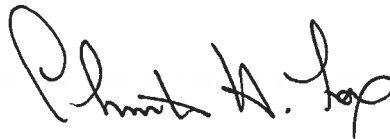
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FOREWORD

As required by the *Weapon Systems Acquisition Reform Act (WSARA) of 2009, Public Law 111-23*, Section 101(b), the Director of Cost Assessment and Program Evaluation (CAPE) in the Office of the Secretary of Defense (OSD) must report to Congress annually on the cost estimation and cost analysis activities that the Department conducted during the previous year, along with the progress the Department has made in improving the accuracy of its cost estimates and analyses. This third annual report describes the progress in developing and implementing plans responsive to the cost estimation and assessment practices mandated by WSARA.

In light of the uncertain fiscal environment, the need for thorough analyses and rigorous cost assessments has never been greater. Accurate cost estimates rely heavily on complete and accurate data, and the free exchange of programmatic information and formal documentation among the military departments, CAPE analysts, and other stakeholders. Over the past three years, I have seen the overall quality of the cost estimates prepared by the military departments, as well as CAPE, continue to improve and provide more relevant support to decision authorities. Work continues to make the cost assessment process more efficient and timely. Our commitment to continually improving our processes requires right-sized manpower, relevant training, and investment in analytic methods, tools, and data.

Progress towards achieving the WSARA objectives is measured incrementally, and will continue for years. I look forward to describing CAPE's progress in improving the Department's cost assessment process in subsequent editions of this report.



Christine H. Fox
Director

Cost Assessment and Program Evaluation

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CHAPTER I – INTRODUCTION

The office of CAPE provides independent analysis and advice to the Secretary of Defense and other senior officials on a wide range of issues concerning (1) cost estimation and cost analysis for major Department of Defense (DoD) acquisition programs (both Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) programs); (2) the DoD Planning, Programming, Budgeting, and Execution (PPBE) system; (3) resource decisions relating to military requirements; (4) analysis of alternatives to ensure that DoD considers the full range of program and non-materiel solutions; (5) evaluations of alternative military force structure, plans, and systems; and (6) the development of improved analytical skills and competencies within the cost assessment and program evaluation workforce of the Department. This report is concerned with the first topic—cost estimation and cost analysis.

Section 101(b) of WSARA¹ requires that the CAPE submit an annual report to the Congress on an assessment of:

(A) the extent to which each of the military departments and Defense Agencies have complied with policies, procedures, and guidance issued by the Director with regard to the preparation of cost estimates for major defense acquisition programs and major automated information systems;

(B) the overall quality of cost estimates prepared by each of the military departments and Defense Agencies for major defense acquisition programs and major automated information system programs; and

(C) any consistent differences in methodology or approach among the cost estimates prepared by the military departments, the Defense Agencies, and the Director.

One of the main goals of WSARA is to prevent substantial growth in the costs of MDAPs and MAIS programs. Toward that end, CAPE is responsible for ensuring that the cost estimation and cost analysis processes of the Department provide accurate information and realistic estimates of cost for these programs. This report describes the status of CAPE's continuing efforts in support of this goal.

The organization of this report is as follows:

- Chapter II provides an overview of cost analysis in the Department. It describes the range of cost analysis organizations throughout the Department and explains the process for preparing cost estimates that support the defense acquisition process. Also, it identifies the main DoD cost data collection systems.

¹ The annual report requirement of WSARA section 101(b) is codified in section 2334(f) of title 10, *United States Code*.

- Chapter III describes the status of the certifications (required by sections 2366a and 2366b² of title 10, *United States Code*) that MDAPs must obtain. For new programs, the certification requirements are intended to help establish realistic program definitions and cost and schedule targets. For programs already underway, the certification requirements are intended to put the applicable programs on a more stable footing and help preclude substantial additional cost growth. CAPE is committed to providing realistic and independent cost estimates to support decision-making and an informed certification process. This chapter also provides information about the degree of DoD compliance in meeting its own established requirements for cost data reporting for the MDAPs.
- Chapter IV reviews the Department’s FY 2011 cost estimation and cost analysis activities associated with MDAPs and MAIS programs. These cost activities include independent cost estimates, augmented by assessments of military department and Defense Agency cost estimates, which inform the DoD decision authorities at milestone reviews and at other important events. This chapter also summarizes the degree to which DoD cost estimation and assessment activities in FY 2011 complied with established procedures, and discusses overall quality and any consistent differences in methodology among the cost estimates.
- Chapter V describes the status of several key ongoing initiatives that will ensure that the cost assessment and cost estimating functions for the Department will change as required to meet both the expanded roles and responsibilities established by WSARA and the needs of the Department. These initiatives address a wide range of issues and concerns, including organizations and human resources, cost estimating policy or procedure changes, cost data systems, and education and training opportunities for the DoD cost community.

The CAPE long-term vision is to ensure that the DoD cost estimating community is provided the necessary guidance, authorities, and resources to ensure that program cost and schedule estimates are properly prepared and considered in the Department’s deliberations on all MDAPs and MAIS programs. The progress and challenges in achieving this vision will continue to be described in future editions of this report.

² Sections 2366a/b, “Major defense acquisition programs: certification required before Milestone A/B approval.”

CHAPTER II – OVERVIEW OF COST ANALYSIS IN DOD

This chapter identifies the organizations, policies, procedures, and supporting data systems for cost estimation in place throughout DoD. Chapter V of this report provides a description of efforts to continue to strengthen these institutions to meet the requirements of WSARA.

This report assumes a modest familiarity with the defense acquisition process on the part of the reader. Readers in need of an introduction to the defense acquisition process are encouraged to refer to the *Defense Acquisition Guidebook* (see <https://dag.dau.mil>).

Overview of Cost Analysis Organizations in DoD

There are cost organizations throughout DoD—in OSD, at the headquarters of the DoD Components (military departments and Defense Agencies), and in Components' field organizations. DoD has a wide range of cost organizations, with each group having a unique but complementary role in support of the defense acquisition process and the broader operations of the Department.

At the OSD level, the CAPE Director is responsible for providing independent cost estimates, for both MDAPs and MAIS programs, when the Milestone Decision Authority (MDA) for a program is the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)). Also, the CAPE Director establishes policies for preparation and review of DoD Component cost estimates for other MDAPs and MAIS programs.

Each military department headquarters has its own Service Cost Agency. These cost estimating agencies provide independent cost estimates when acquisition oversight is delegated to the Component and the MDA is the Component Head or Component Acquisition Executive. Also, the Agencies support other important cost analyses and provide policy guidance unique to each of the military departments. The Service Cost Agencies reside in the financial management organizations of their military departments, and are outside their military department's acquisition chain of command.

There are also many field-level cost organizations. These organizations provide resources to support higher headquarters cost estimates and analyses, and they also provide assistance to support day-to-day operations of program offices and similar entities. Examples of such activities include evaluation of contractor proposals and should-cost analyses; support to competitive source selections; cost estimates in support of the programming and budgeting processes; and cost estimates used in specific analytic studies, such as systems engineering design trades or analyses of alternatives. Field-level elements of the cost community workforce typically possess important specialized cost and technical experience unique to specific system types or commodity groups (such as satellites, submarines, or tactical missiles).

Appendix A provides a brief description of each Service Cost Agency and field-level cost organization.

Procedures for Cost Assessments at Milestone Reviews and Other Events

This section provides a description of DoD cost assessment procedures for MDAPs and MAIS programs, many of which have been updated or added after enactment of WSARA.

Cost Assessment Procedures for Major Defense Acquisition Programs

Public law (section 2334 of title 10, *United States Code*) requires that an independent estimate of the life cycle cost for an MDAP be prepared and presented to the MDA before the approval to proceed with Milestone A or B, or any decision to enter low-rate initial production or full-rate production.³ At these key milestone reviews, when the MDA is the USD(AT&L), the independent cost estimate is prepared by the Director, CAPE. When the MDA is delegated to the DoD Component, the independent cost estimate supporting a milestone decision is provided by the applicable Service Cost Agency or the Defense Agency equivalent, and subsequently reviewed by CAPE. In practice, independent cost estimates for a program are conducted by using a combination of historical precedence, results of extensive site visits, and the actual performance of that program to date. It is a careful, painstaking analysis that looks at all aspects of a program, including risks.

DoD policy and procedures for such independent cost estimates are prescribed in DoD Instruction 5000.02, *Operation of the Defense Acquisition System*. After the enactment of WSARA, DoD updated these procedures in Directive-Type Memorandum (DTM) 09-027 – *Implementation of the Weapon Systems Acquisition Reform Act of 2009*.

One important element of current DoD policy for MDAPs requires the Component to establish a formal position on the estimated cost of the program and, furthermore, the Component must commit to fully fund the program consistent with the Component cost position. In practice, the Component typically establishes its cost position by performing a Component-wide corporate review, led by the Service Cost Agency or the Defense Agency equivalent, after consideration of a program office cost estimate and preparation of a Component independent cost estimate or assessment.

WSARA also revised the procedures for the certification of an MDAP that experienced sufficient cost growth to trigger a critical unit cost (Nunn-McCurdy) breach (as defined in section 2433 of title 10, *United States Code*). Upon such a breach, the USD(AT&L) can certify that the program meets certain criteria (set forth in section 2433a of title 10, *United States Code*), in which case the program can continue, or it may be terminated. One element of the required certification is the reasonableness of the new estimates of program unit costs. The determination that new program unit costs are reasonable is made by the Director, CAPE, and certified by the USD(AT&L). As part of a standard business practice, CAPE prepares its own independent cost estimate that is used as a benchmark to support the assessment of reasonableness of the new unit cost estimates. Also, the CAPE independent cost estimate includes a quantitative assessment of the factors, both

³ Section 2344 also requires an independent cost estimate in advance of a recertification to restructure a MDAP under a Critical Nunn-McCurdy breach; a report for a critical breach on a MAIS; and at any other time considered appropriate by the Director, CAPE or upon the request of the Under Secretary of Defense for Acquisition, Technology and Logistics.

internal and external to the program, which led to the unit cost growth relative to the original baseline estimate. This assessment is provided to the Director of Performance Assessments and Root Cause Analyses (PARCA) to assist in the assessment of root causes of cost growth (e.g., failures in processes or decision-making). A review of the FY 2011 critical unit cost breaches and certifications, and supporting cost assessment activities, is provided in Chapter IV. Appendix B provides a description of the procedures for unit cost reporting, and the criteria for a Nunn-McCurdy unit cost breach.

Cost Assessment Procedures for Major Automated Information Systems

WSARA specifies that CAPE is responsible for preparing independent cost estimates for any MAIS program that has experienced a Critical Change (as defined in Appendix C) if the MDA is the USD(AT&L). CAPE may also prepare an independent cost estimate for a MAIS program at any other time considered appropriate by the CAPE Director, or upon the request of the USD(AT&L). In addition, for the MAIS programs for which acquisition oversight has been delegated to the Component, CAPE is responsible for establishing policies for preparation and review of Component cost estimates at milestone reviews, and for revised program cost estimates in support of certification of a MAIS program that has experienced a Critical Change.

The acquisition oversight of MAIS programs has also been changed by additional legislation. Until recently, a program that met the criteria for both a MDAP and a MAIS program had to meet the statutory and regulatory requirements for both types of programs. This was changed by section 817 of the *National Defense Authorization Act for Fiscal Year 2010, Public Law 111-84*. Today, a program that meets both criteria will be treated as either an MDAP or a MAIS program, but not both. As a general rule, a program that meets both criteria will be regarded as an MDAP if it requires the development of customized hardware, and it will be regarded as a MAIS program if it does not require the development of customized hardware.

Multi-Year Procurement

Public law (section 2306b of title 10, *United States Code*) establishes several criteria that must be satisfied and certified by the Secretary of Defense prior to the award for a multi-year contract for a defense acquisition program. Some of these criteria (concerning substantial savings, realistic cost estimates, and availability of funding) must be supported by a CAPE cost analysis of the proposed multi-year procurement strategy and contract structure, which includes a comparison of the estimated costs of multi-year and annual contract awards. The analysis is based on actual cost data and experience to date, as well as an evaluation of cost realism in the contractor's proposals.

Confidence Levels in Cost Estimates

WSARA, as originally enacted, required (1) a statement concerning the confidence level used in establishing a cost estimate of an MDAP or a MAIS program, (2) the rationale for selecting the specific confidence level used in the estimate, and (3) the justification for selecting a lower confidence level if it were less than 80 percent. The WSARA requirement for confidence levels in cost estimates was modified by section 811 of the *National Defense Authorization Act for Fiscal Year 2011, Public Law 111-383*. With this modification, there is no longer a requirement to justify the choice of a confidence level that is lower than 80 percent. Today, the requirement is to

select a confidence level such that it provides a high degree of confidence that the program can be completed without the need for significant adjustment to program budgets. In general, CAPE satisfies this requirement by ensuring that all of its cost estimates are built on a product-oriented Work Breakdown Structure, based on historical actual cost information whenever possible, and most importantly, based on conservative assumptions that are consistent with actual demonstrated contractor and government performance for a series of acquisition programs in which the Department has been successful.

Cost Estimates for Contract Negotiations

Section 811 of the *National Defense Authorization Act for Fiscal Year 2011, Public Law 111-383*, established that for MDAPs and MAIS programs, cost estimates developed for baselines and other program purposes are not to be used for the purpose of contract negotiations or obligation of funds. Section 811 also states that cost analyses and targets developed for the purpose of contract negotiations shall be based on the Government's reasonable expectation of successful contractor performance in accordance with the contractor's proposal and previous experience. As noted in Chapter V, proper policy and procedures are being developed—as part of the Department's "Should-Cost" initiative—to guide the development of cost estimates for contract negotiations, and to ensure that independent cost estimates are not used as the basis for negotiations on individual contracts.

Cost Analysis Requirements Description

CAPE requires and provides guidance on the technical content and use of a document known as the Cost Analysis Requirements Description (CARD). The CARD provides information on the acquisition program that is used in preparation of both the Component cost positions and the CAPE independent cost estimates. The CARD describes the key technical, programmatic, and operational characteristics of an acquisition program. The foundation of a sound and credible cost estimate is a well-defined program, and the CARD is used to provide that foundation.

DoD Cost Data Collection Systems

Systematic and institutionalized cost data collection and validation is critical to the preparation and support of credible cost estimates. DoD has three primary collection systems for cost data for MDAPs. The Cost and Software Data Reporting (CSDR) system serves as the primary source of acquisition cost data for major contracts and subcontracts associated with MDAPs. The Earned Value Management (EVM) Central Repository is used to collect and archive EVM reporting documents (such as Contract Performance Reports, Integrated Master Schedules, and Contract Funds Status Reports). The Visibility and Management of Operating and Support Costs (VAMOS) systems collect historical operating and support (O&S) costs for fielded major weapon systems. Appendix D provides additional details concerning all of these data collection systems, and Chapter V discusses current CAPE efforts to improve them.

Summary

This chapter reviewed the cost assessment organizations, policies and procedures, and data collection systems in DoD. These provide the foundation on which the Department is building as

it continues to implement WSARA and strengthen the cost assessment institutions. The initiatives that constitute this implementation and the vision of the changes that are being made are described in Chapter V of this report.

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CHAPTER III – COMPLIANCE FOR CERTIFICATIONS AND REPORTING

MDAPs are required by statute to obtain certain certifications. Some of these certifications must be supported by the appropriate independent cost estimate or assessment. This chapter describes the status of the Department's activities to complete the certifications requiring independent cost estimates or assessments as of the end of FY 2011. In addition, it identifies the extent to which DoD is meeting its own regulatory CSDR requirements.

Sections 2366a & 2366b Certification Requirements for Major Defense Acquisition Programs

The *National Defense Authorization Act for Fiscal Year 2006, Public Law 109-163* established a requirement that the MDA certify that several criteria are met by any MDAP approaching Milestone B (permission to enter Engineering and Manufacturing Development (EMD)). To meet this requirement, the MDA must sign a certification memorandum for the record that affirms that the program meets the specified criteria (concerning program affordability, technological maturity, and other considerations). This memorandum is then submitted to the congressional defense committees with the program's next Selected Acquisition Report (SAR). The specific certification criteria were strengthened and expanded in subsequent legislation, with additional criteria concerning reasonable cost and schedule estimates and full funding. Moreover, the *National Defense Authorization Act for Fiscal Year 2008, Public Law 110-181*, established additional certification criteria for MDAPs approaching Milestone A.⁴ Further, criteria for both sections 2366a and 2366b were added by section 801 of the *National Defense Authorization Act for Fiscal Year 2012, Public Law 112-81*. The current milestone certification criteria are codified in sections 2366a and 2366b of title 10, *United States Code*.

Some elements of the certification criteria for both Milestone A and Milestone B approval address the adequacy of program cost estimates. The current certification criteria concerning cost estimates for programs approaching Milestone A are provided in Figure 1.

⁴ The Milestone A decision is approval for a program to enter the Technology Development phase.

Figure 1:
Major Defense Acquisition Program Milestone A Certification
Requirements Concerning Cost Estimates

Implementation of Section 2366a of Title 10, United States Code, **as amended by the Weapon Systems Acquisition Reform Act of 2009 (Public Law 111-23) and the National Defense Authorization Act for 2012 (Public Law 112-81)**

(a)(6) that a cost estimate for the program has been submitted, **with the concurrence of the Director of Cost Assessment and Program Evaluation**, and that the level of resources required to develop, procure **and sustain** the program is consistent with the priority level assigned by the Joint Requirements Oversight Council

The criteria concerning cost estimates and funding for programs approaching Milestone B are provided in Figure 2.

Figure 2:
Major Defense Acquisition Program Milestone B Certification
Requirements Concerning Cost Estimates

Implementation of Section 2366b of Title 10, United States Code, **as amended by the Weapon Systems Acquisition Reform Act of 2009 (Public Law 111-23)**

(a)(1)(C) reasonable cost and schedule estimates have been developed to execute, **with the concurrence of the Director of Cost Assessment and Program Evaluation**, the product development and production plan under the program; and

(D) funding is available to execute the product development and production plan under the program, through the period covered by the future-years defense program submitted during the fiscal year in which the certification is made, consistent with the estimates described in paragraph (C) for the program

The most recent changes to the certification criteria are highlighted in bold text. Since enactment of WSARA, the determination of the adequacy of program cost estimates is made by the MDA—

with the concurrence of the CAPE Director—after consideration of the appropriate independent cost estimate.

Further discussion of the most recent DoD policies and procedures associated with MDAP milestone certifications is provided in DTM 09-027 – *Implementation of the Weapon Systems Acquisition Reform Act Of 2009* (see <https://acc.dau.mil/wsara>). A complete listing of the Milestone A certification requirements is provided in Attachment 2 of DTM 09-027 (see https://acc.dau.mil/dag_dtm09-027p3), and a listing of the Milestone B certification requirements is provided in Attachment 3 (see https://acc.dau.mil/dag_dtm09-027p4; also see section 2366a and 2366b amendments discussed above).

Before enactment of WSARA, the Department was up to date in meeting the section 2366a and 2366b certification requirements. The certification process before WSARA applied to MDAPs as they proceeded through Milestone A or Milestone B; it did not apply retroactively to MDAPs that had passed either milestone before the sections 2366a/b certification requirements were established. WSARA, however, not only expanded the sections 2366a/b certification criteria, but also retroactively applied them to MDAPs that had yet to reach Milestone C, had passed their Milestone A or Milestone B prior to the enactment of the certification requirements, and were not certified in accordance with the appropriate Milestone A or Milestone B criteria. This change created a significant backlog of MDAPs that need to obtain the certifications required by sections 2366a/b. These retroactive certifications are referred to as “catch-up” certifications.

For the MDAPs that were already past Milestone C at the time of WSARA enactment, there was some degree of ambiguity about the requirements for retroactive certifications. Based on a request by DoD, the Congress included a clarification that 2366a/b certifications were not required for MDAPs already past Milestone C approval in section 813 of the *National Defense Authorization Act for Fiscal Year 2011, Public Law 111-383*.

Sections 2366a/b Certification Status for Major Defense Acquisition Programs

By the end of FY 2011, there were a total of 30 MDAPs and pre-MDAPs that had been certified as required by sections 2366a/b. These 30 programs fall into two groups:

1. Twenty-two of these programs had been certified by the end of FY 2010.⁵ The cost assessment activities that supported these certifications were discussed in the previous two CAPE Annual Reports on Cost Assessment Activities.
2. Another eight programs were certified during FY 2011. Two of these programs⁶ were supported by cost assessment activities conducted in the prior year (FY 2010), and these activities are described in last year’s Annual Report. The other six programs were supported by cost assessment activities conducted in the same fiscal year (FY 2011). The cost assessment activities for these six programs are identified in Chapter IV.

⁵ In addition, the C-27J transport aircraft was certified, but this program was subsequently removed from the MDAP list.

⁶ These two programs are WIN-T Increment 2 and the MQ-1C Gray Eagle.

A list of these programs is provided in Appendix E.

Cost and Software Data Reporting Compliance

As described in Chapter II and Appendix D, the CSDR system serves as the primary source of acquisition cost data for major contracts and subcontracts for the MDAPs. The Defense Cost and Resource Center (DCARC) within CAPE is the primary organization responsible for managing the CSDR system. The DCARC continually monitors each MDAP for compliance with CSDR requirements where applicable.

CSDR reporting is not required when (1) the program is pre-Milestone A, with no prototypes, or (2) the CSDR requirements have been waived by CAPE. Waivers for CSDR requirements may be granted when (1) the program is a procurement of a commercial system, or (2) the program is purchased under competitively awarded, firm fixed-price contracts, as long as competitive conditions continue to exist.

For the programs for which CSDR reporting is required and that are monitored for compliance, the compliance ratings established by the DCARC are based on the following five criteria:

- CSDR reporting plans have been submitted and approved.
- Approved reporting plans have been included in the appropriate request for proposal.
- Supporting contract data requirements (i.e., Contract Data Requirements Lists) for the various CSDR reports have been submitted.
- CSDR reports have been submitted on time consistently.
- CSDR reports have passed DCARC validation procedures consistently.

A program is rated fully compliant when all five criteria are met with no missing or incomplete items. A program is rated mostly compliant when all CSDR reporting requirements are placed on contract, but one or more criteria are not completely met. A program is rated not compliant when either (1) contracts were awarded that did not meet CSDR reporting requirements, or (2) any deficiency in meeting any of the five criteria has been open and unresolved for more than 3 months past the required due date.

For FY 2011, approximately 97 percent of the programs that have CSDR reporting were fully or mostly compliant based on the criteria above; the remaining 3 percent (3 programs) are classified as not compliant. This is a slight improvement over FY 2010, where 93 percent of the programs were considered compliant or mostly compliant based on the same criteria. CAPE and DCARC are continuing to emphasize the importance of CSDR reporting compliance for achieving more accurate program life cycle cost estimates in the future.

The DCARC aggressively works with all the reporting programs to maintain compliance with reporting requirements and data quality. The DCARC web site (<http://dcarc.pae.osd.mil>) provides downloadable report formats and definitions, report examples, and sample language for inclusion in Requests for Proposals. The web site also offers on-line CSDR process tutorials. Also, the DCARC provides on-site training sessions for government and industry organizations several times per year, at sites throughout the nation. Other efforts to improve DoD cost data collection are described in Chapter V.

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CHAPTER IV – DOD COST ASSESSMENT ACTIVITIES IN FY 2011

This chapter provides a summary of the DoD cost estimates and cost analyses that were made in FY 2011 in support of milestone reviews and similar events, as well as unit cost (“Nunn-McCurdy”) breaches, for MDAPs and MAIS programs.

DoD Milestone Review Cost Assessment Activities in FY 2011

Table 1 provides a summary of the milestone or other review cost assessment activities in FY 2011. For each major acquisition program with a milestone review or other event, Table 1 identifies the program name and acronym, the responsible Component, the supporting cost estimate(s) or analyses presented to the MDA, and the review event being supported.

There were 17 milestone review or other events supported by cost assessment activities in FY 2011 (excluding several cost assessment activities associated with classified programs, which are not discussed in this unclassified report). All of the 17 events were supported by the appropriate cost estimates or analyses that complied with the requirements of WSARA and the established cost assessment procedures described in Chapter II. In particular, each of the milestone reviews was supported by (1) a Component cost position, and (2) the appropriate CAPE or Service Cost Agency independent cost estimate. As noted in Chapter III, six of these milestone reviews were also used to support a concurrent 2366a or 2366b certification.

The overall quality of the cost estimates prepared by each of the military departments continued to improve this year due to increased rigor. As noted in Chapter II, CAPE has instituted a policy—currently in place for all MDAPs—requiring that a signed, dated service cost estimate and position must be delivered to CAPE prior to preparation of an independent cost estimate to support each major milestone review of the Defense Acquisition Board (DAB). Also, the military department’s financial and acquisition communities must provide a statement affirming their commitment to fully fund the program to the Service Cost Position during the preparation of the next Program Objective Memorandum (POM) and Future Years Defense Program (FYDP).

The quality of the cost estimates for MDAPs provided by the military departments also continued to improve this year due to better data. This is largely attributable to improved availability of actual cost information for DoD programs as a result of the long-term initiative to collect contractor cost and software data reports at the DCARC, and the long-term efforts of each of the military departments to improve the collection of actual operating and support cost information through the VAMOS systems.

There were two notable pioneering cases (the Ohio Replacement and the Ground Combat Vehicle (GCV)) where CAPE prepared independent cost estimates early in the program development as part of the Materiel Solution Analysis phase leading to a Milestone A DAB review. The Materiel Solution Analysis phase presents the first substantial opportunity to influence design through trade-off studies that balance requirements, performance, technology choices, schedule, and cost considerations. The CAPE independent cost estimate is now an important element of this process.

For MAIS programs, due to resource constraints, OSD CAPE involvement in cost estimates has been limited to those programs that experience a “Critical Change,” as defined in statute (described in Appendix C), when the USD(AT&L) is the MDA. In addition, cost reporting for the MAIS programs currently is poor, and both quality and compliance need to be improved. There remains much work to be done to improve the management and preparation of cost estimates for the approximately 46 MAIS and pre-MAIS programs now in the DoD portfolio.

Similarly, OSD CAPE had only limited involvement in cost estimates prepared for major defense agency acquisition programs this year. For example, the Missile Defense Agency remains exempt from DoD acquisition regulations. Therefore, CAPE does not normally prepare independent cost estimates for the Missile Defense Agency’s major acquisition programs. However, in May 2011, CAPE was requested to prepare independent cost estimates for several program elements by the Missile Defense Agency. These estimates are in progress and will be completed in FY 2012/2013.

Table 1. Major Acquisition Program Milestone Review Cost Assessment Activities in FY 2011

<u>Program Name</u>	<u>Acronym</u>	<u>Component</u>	<u>Program Type</u>	<u>Cost Assessment Activity</u>	<u>Activity Date</u>	<u>Supported Event</u>	<u>Event Date</u>
DDG 1000 Zumwalt Class Destroyer	DDG 1000	Navy	ACAT ID	CAPE Independent Cost Estimate Navy Service Cost Position	6-Oct-10	Milestone B (2366b certification)	8-Oct-10
Mission Planning Systems - Increment IV	MPS Inc IV	Air Force	ACAT IAM	CAPE Independent Cost Estimate Air Force Service Cost Position	21-Oct-10	Critical Change Certification	23-Dec-10
H-1 Upgrades	AH-1Z/ UH-1Y	Navy	ACAT ID	CAPE Independent Cost Estimate Navy Service Cost Position	2-Nov-10	Full-Rate Production Decision	28-Nov-10
Ohio Class Replacement	OR	Navy	pre-MDAP	CAPE Independent Cost Estimate Navy Service Cost Position	12-Nov-10	Milestone A (2366a certification)	10-Jan-11
Joint Air-to-Surface Standoff Missile - Extended Range	JASSM-ER	Air Force	ACAT ID	CAPE Independent Cost Estimate Air Force Service Cost Position	15-Dec-10	Milestone C	10-Jan-11
Military GPS User Equipment	MGUE	Air Force	pre-MDAP	CAPE Independent Cost Estimate Air Force Service Cost Position	22-Dec-10	Milestone A	Deferred

Table 1. Major Acquisition Program Milestone Review Cost Assessment Activities in FY 2011 (cont.)

<u>Program Name</u>	<u>Acronym</u>	<u>Component</u>	<u>Program Type</u>	<u>Cost Assessment Activity</u>	<u>Activity Date</u>	<u>Supported Event</u>	<u>Event Date</u>
Global Positioning System IIIA Satellite	GPS IIIA	Air Force	ACAT ID	CAPE Independent Cost Estimate Air Force Service Cost Position	29-Dec-10	Milestone C	31-Jan-11
H-60 Multi-Year Contracts*	H-60 MYP	Army/Navy	ACAT ID/IC	CAPE Independent Estimate of Savings for Multi-Year Procurement Contracts	14-Feb-11	Award of Multi-Year Procurement Contract for FY 2012-16	N/A
Expeditionary Combat Support System Increment 1	ECSS Inc 1	Air Force	pre-MAIS	CAPE Independent Cost Estimate Air Force Service Cost Position	18-Feb-11	Critical Change Certification	22-Feb-11
KC-46 Tanker Modernization Program	KC-46	Air Force	ACAT ID	CAPE Independent Cost Estimate Air Force Service Cost Position	23-Feb-11	Milestone B (2366b certification)	24-Feb-11
Joint Air-to-Surface Standoff Missile - Extended Range	JASSM-ER	Air Force	ACAT ID	Updated CAPE Independent Cost Estimate Air Force Service Cost Position	25-Feb-11	Information paper to USD(AT&L)	N/A
Littoral Combat Ship	LCS	Navy	ACAT ID	CAPE Independent Cost Estimate Navy Service Cost Position	1-Apr-11	Milestone B (2366b certification)	7-Apr-11

* Applies to the Army UH-60M/HH-60M and the Navy MH-60R/MH-60S.

Table 1. Major Acquisition Program Milestone Review Cost Assessment Activities in FY 2011 (cont.)

<u>Program Name</u>	<u>Acronym</u>	<u>Component</u>	<u>Program Type</u>	<u>Cost Assessment Activity</u>	<u>Activity Date</u>	<u>Supported Event</u>	<u>Event Date</u>
Expeditionary Combat Support System Increment 1	ECSS Inc 1	Air Force	pre-MAIS	CAPE Independent Cost Estimate Air Force Service Cost Position	21-Apr-11	Milestone B	Deferred
Joint Tactical Radio System Handheld, Manpack and Small Form Fit (SFF)	JTRS HMS	Joint	ACAT ID	CAPE Independent Cost Estimate Joint Cost Position	7-Jun-11	Milestone C	17-Jun-11
AIM-9X Block II	AIM-9X II	Navy/ Air Force	ACAT IC	NCCA Independent Cost Estimate Navy Service Cost Position	23-Jun-11	Milestone C	24-Jun-11
B-2 Defensive Management System	B-2 DMS	Air Force	pre-MDAP	CAPE Independent Cost Estimate Air Force Service Cost Position	28-Jun-11	Milestone A (2366a certification)	29-Aug-11
Ground Combat Vehicle	GCV	Army	pre-MDAP	CAPE Independent Cost Estimate Army Service Cost Position	27-Jul-11	Milestone A (2366a certification)	17-Aug-11

The term “ACAT ID” refers to an MDAP where the MDA is the USD(AT&L).

The term “ACAT IC” refers to an MDAP where acquisition oversight has been delegated to the Component.

The term “pre-MDAP” refers to a program activity that is anticipated to result in an MDAP upon formal program initiation into the defense acquisition management process (which usually occurs at Milestone B).

The term “ACAT IAM” refers to a MAIS program where the MDA is the USD(AT&L).

The term “ACAT IAC” refers to a MAIS program where acquisition oversight has been delegated to the Component.

The term “pre-MAIS” refers to a program activity that is anticipated to result in a MAIS program upon formal program initiation.

Finally, we observe no consistent differences in methodology or approach between the cost estimates prepared by the military departments and CAPE. Generally, the approach employed by the military departments is evolving to become more similar to that employed in CAPE: collect actual cost information from ongoing and historical programs; use that information to prepare cost and schedule forecasts for new programs or programs proceeding to the next milestone in the acquisition process; and review the actual cost information collected, as each individual program proceeds, to update and adjust the cost and schedule forecasts for the program to reflect actual experience. As the Department improves the systematic collection of actual cost information over time, we fully expect smaller differences between the cost and schedule forecasts of the military departments and CAPE in the future.

Remarks about Specific Programs

- The Ohio Replacement program completed a Milestone A DAB review for which CAPE prepared an independent cost estimate. The CAPE report acknowledged the challenge of preparing a complete cost estimate for the program at Milestone A. Key to the CAPE assessment was the effect of DoD inflation indices when applied to the program which starts procurement beyond the FYDP. Analysis showed that there would be a significant loss of procurement buying power when the DoD indices are used, and that cost growth due to additional inflation needed to be included in program cost estimates. The issue of the use of DoD versus program specific inflation indices is discussed further in Chapter V.
- CAPE prepared an independent cost estimate for the Joint Air-to-Surface Standoff Missile – Extended Range (JASSM-ER) program in support of the DAB Milestone C review held on January 10, 2011. However, after that review, subsequent budget deliberations made by the Department led to several significant changes to the annual procurement quantities and associated funding for the JASSM-ER program. In light of these programmatic changes, CAPE prepared an updated cost estimate on February 25, 2011 that was provided in an information paper to the USD(AT&L).
- CAPE prepared an independent cost estimate for the Expeditionary Combat Support System (ECSS) Increment 1 on February 18, 2011, following Air Force declaration of a Critical Change to the program. The USD(AT&L) had also requested that CAPE prepare an independent cost estimate for the ECSS Milestone B DAB review, which had been scheduled for April 2011. After an assessment of program content and schedule execution, CAPE determined that the Critical Change independent cost estimate, without modification, remained valid and satisfied the requirement for the cost estimate to support the planned Milestone B DAB review.
- The KC-46 Tanker Modernization Program encompasses both the EMD contract for the aircraft and separate contracts for training system development, studies and analyses, testing, planning, and program support. The aircraft EMD contract has both fixed-price incentive (firm target) and firm fixed-price components with an overall contract ceiling price of \$4.9 billion. The current Air Force Service Cost Position and the CAPE independent cost estimate projected that the cost for Boeing to complete the EMD contract would exceed the ceiling price by approximately \$450 million. These independent estimates account for schedule and cost growth consistent with historically

analogous programs and would cover potential contract changes that arise during the development process. The KC-46 program funding for EMD has been set consistent with the Air Force Service Cost Position. Although the Department is not liable for any contract cost overruns that exceed the EMD contract ceiling price, it could be exposed to additional cost risks, such as those identified in the Service Cost Position and the CAPE independent cost estimate, if it becomes necessary to revise the terms of the existing contract.

- CAPE prepared an independent cost estimate for the Littoral Combat Ship (LCS) program in support of the Milestone B DAB review held on April 1, 2011. CAPE did not concur with the draft LCS Acquisition Program Baseline (APB) or the Acquisition Decision Memorandum (ADM). These documents were subsequently approved by the MDA. The ADM directed the Navy to fund the program to the Service Cost Position, which CAPE argued would result in insufficient funding in FY 2016. This in turn would have an adverse impact on the average unit procurement cost and run the risk of requiring additional resources to complete the ship builds. Also, CAPE recommended that the LCS Mission Module program, which provides tailored warfighting capability to the LCS seaframes, should be established as distinct subprograms for each mission area in order to more readily assess unit cost metrics and track cost performance.
- For the Milestone A DAB review of the GCV, the Army established affordability targets for both procurement and sustainment costs. For procurement, the CAPE independent cost estimate for the program exceeded the Army affordability target by more than 30 percent. For sustainment, both the Army Service Cost Position and the CAPE independent cost estimate project costs more than double the Army affordability target.

DoD Critical Unit Cost (Nunn-McCurdy) Breaches in FY 2011

Table 2 provides a summary of the cost assessment activities supporting certification decisions associated with critical unit cost (Nunn-McCurdy) breaches in FY 2011. For each major acquisition program with a critical breach, Table 2 identifies the program name and acronym, the responsible Component, the supporting cost estimate(s) or analyses presented to the USD(AT&L), and the date of the critical breach certification. Descriptions of unit cost (Nunn-McCurdy) reporting and the certification process associated with unit cost breaches are provided in Appendix B.

There were three critical breach certifications in FY 2011. All of them were supported by the appropriate cost estimates and analyses that complied with the requirements of WSARA and the established cost assessment procedures described in Chapter II. For the critical breach certifications, the event was supported by (1) new estimates of program unit cost, as reflected in the December 2010 SAR,⁷ and (2) the corresponding CAPE independent cost estimates for program unit cost. In all cases, the Department restructured the program and modified the program definition—including technical content, costs, and planned schedules—prior to the USD(AT&L) certification of the program to the Congress.

⁷ Each SAR was dated as of December 31, 2010; was submitted in February 2011; and supported the FY 2012 President's Budget.

Table 2. Nunn-McCurdy Critical Unit Cost Breaches in FY 2011

<u>Program Name</u>	<u>Acronym</u>	<u>Component</u>	<u>Program Type</u>	<u>Cost Assessment Activity</u>	<u>Activity Date</u>	<u>Supported Event</u>	<u>Event Date</u>
Excalibur	N/A	Army	ACAT IC	CAPE Independent Cost Estimate December 2010 SAR	7-Jan-11	Nunn-McCurdy Critical Breach Certification	10-Jan-11
Chemical Demilitarization-Assembled Chemical Weapons Alternatives	ACWA	DoD	ACAT ID	CAPE Independent Cost Estimate December 2010 SAR	27-May-11	Nunn-McCurdy Critical Breach Certification	14-Jun-11
Global Hawk	RQ-4 A/B	Air Force	ACAT ID	CAPE Independent Cost Estimate December 2010 SAR	7-Jun-11	Nunn-McCurdy Critical Breach Certification	14-Jun-11

Other Cost Assessment Activities in FY 2011

DoD Cost Analysis Symposium

The annual DoD Cost Analysis Symposium (DoDCAS), which is sponsored by CAPE, was held in February 2011 (see <http://www.dodcas.org>). The theme of the symposium was “Realizing Savings.” The plenary sessions and roundtable discussions were supported by several current and former senior DoD officials, who addressed the impact of DoD initiatives to realize cost savings and efficiency. Also, three concurrent track sessions were held that addressed:

- Realizing Savings in Acquisition: This track provided an in-depth look at the ongoing initiatives within DoD to reduce cost and control cost growth. Presentations discussed proposed methods for realizing savings and current efforts to reduce costs of defense programs.
- Space Systems: This consisted of a series of presentations from noted professionals on various aspects of the estimation of space systems including design, production, deployment, and operation, as well as presentations on the Space Industrial Base.
- Open Forum: We also offered an open forum track featuring presentations from cost professionals on a wide variety of topics of current interest to the cost community, including An Introduction to Cost Estimating (geared to newer analysts), Education and Training, Risk Analysis, Treatment of Inflation, and DoD Costing Policies.

The papers presented at the symposium are archived at the DoDCAS web site. The symposium had 423 participants in 2011.

CAPE Congressional Testimony

There were two instances of congressional testimony supported by CAPE in FY 2011.

- The Principal Under Secretary of Defense for Acquisition, Technology and Logistics, and the CAPE Deputy Director for Cost Assessment provided joint testimony before the Senate Subcommittee on Federal Financial Management, Government Information, Federal Services, and International Security on March 29, 2011. The testimony concerned the Department’s initiatives to combating cost growth in its major weapon systems. A printed transcript of the testimony is provided at the Senate Committee on Homeland Security and Government Affairs web site (see http://hsgac.senate.gov/public/index.cfm?FuseAction=Hearings.Hearing&Hearing_ID=7682325b-f637-47bb-a2ad-138782fbd7df#.TvI2JQZ91bY_email).
- The CAPE Director provided testimony on the F-35 Joint Strike Fighter program before the Senate Armed Services Committee on May 19, 2011. The testimony addressed the latest Joint Program Office and CAPE cost estimates, F-35 operating and support costs, and the projected strike-fighter shortfall. A transcript of the prepared statement is provided at the Committee web site (see http://armed-services.senate.gov/testimony.cfm?wit_id=10224&id=5213).

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CHAPTER V – THE LOOK FORWARD

WSARA introduced major changes to the DoD cost estimation process. Since its enactment, CAPE has made significant progress in implementing these changes. This chapter discusses the status and future plans for several key initiatives that collectively will provide this implementation.

Organizations and Human Resources

WSARA requires the CAPE Director to lead the development of improved analytical skills and competencies within the cost assessment and program evaluation workforce of the Department. However, as noted in Chapter II, the cost estimating workforce is distributed among several organizations throughout the Department. Consequently, identifying and remedying issues with the size, education, experience and organization of the DoD cost estimating workforce requires an integrated and collaborative effort, with the CAPE Director as the leader and primary advocate for the entire DoD cost community.

Efforts toward that end continued this year with activities to gather data on the workforce size, grade, and demographics, as well as experience and education levels. Beyond that, there is interest in measuring projected workload volume and content (i.e., what the cost assessment community is actually doing), to help assess whether scarce resources are properly focused on strategic priorities. CAPE will continue to work with the Service Cost Agencies and other appropriate organizations to gather pertinent data in the manner required for workforce management and consistent historical tracking. Workforce management will be more critical in the future as the cost community faces downsizing pressures along with the rest of the Department.

Policies and Procedures

WSARA states that the CAPE Director—in consultation with other officials of OSD, the military departments, and Defense Agencies—shall prescribe policies and procedures for the conduct of cost estimation and cost analysis for the acquisition programs of the DoD. These policies and procedures have general applicability to all acquisition programs, although the implementation details refer specifically to MDAPs and MAIS programs.

The guidance for cost assessment policies and procedures will be distributed through a series of formal issuances (directives, instructions, publications, manuals, and guides) and policy memoranda. The status of these documents is provided in Table 3.

Table 3. Status of CAPE Policy and Procedure Documents

Topic	Document Type	Status
DoDD 5105.xx Director, Cost Assessment and Program Evaluation (CAPE)	DoD Directive	Draft completed and in formal coordination.
DoDM 5000.04-M Cost Analysis Guidance and Procedures	DoD Publication	Draft in progress.
DoDM 5000.04-M-1 Cost and Software Data Reporting (CSDR) Manual	DoD Publication	New Manual completed and approved.
Major Automated Information System Programs	Memo	Draft completed. Reviewed and commented upon by services. Needs minor revisions.
Major Defense Acquisition Programs	Memo	Draft completed. Needs review and comment by services.
Nunn-McCurdy Procedures	Memo	Draft completed. Needs review and comment by services.
Operating & Support Cost-Estimating Guide	Guidebook	Draft in progress.
Confidence Levels in Cost Estimates	Memo	Work will start in FY 2012.
Multi-Year Procurement	Memo	Work will start in FY 2012.
Cost Research and Studies	Memo	Work will start in FY 2012.
Cost Analysis Training/Education	Memo	Work will start in FY 2012.

Remarks about Specific Documents

- DoD Directive 5105.xx will serve as the CAPE charter. The Directive defines overall CAPE responsibilities and authorities in the PPBE, acquisition, and requirements processes. The Directive will replace two earlier Directives: DoD Directive 5141.01, Director, Program Analysis and Evaluation (PA&E); and DoD Directive 5000.04, Cost Analysis Improvement Group (CAIG).
- DoD Manual 5000.04-M, *Cost Analysis Guidance and Procedures*, addresses (1) the statutory requirement for independent cost estimates; (2) the review process for military department and Defense Agency cost estimates (when the MDA is the USD(AT&L)); (3) the use of standard life cycle cost terms and definitions; and (4) guidelines for the preparation of the CARD.
- DoD Manual 5000.04-M-1, *Cost and Software Data Reporting (CSDR) Manual*, concerns cost data collection. This Manual is described in the next section of this chapter.
- There will be a policy memorandum that addresses the requirements for cost assessments concerning MAIS programs established by WSARA.
- There will be a policy memorandum that provides guidance concerning Component cost estimates, and independent cost estimates, supporting milestone reviews of MDAPs.
- There will be a policy memorandum concerning unit cost (Nunn-McCurdy) breach reviews. This memorandum will articulate the CAPE process to establish an independent cost estimate, and a position on the reasonableness of new estimates of program unit costs, following a critical unit cost breach.
- There will be an update to the OSD Operating and Support (O&S) Cost-Estimating Guide. The intent will be to place more emphasis on the role of O&S cost estimates in

support of key decisions in the defense acquisition process throughout the program life cycle. Moreover, the Guide will need to be expanded to address new ambitious legislative requirements concerning “Assessment, Management and Control of O&S Costs” contained in the *National Defense Authorization Act for Fiscal Year 2012, Public Law 112-81*. In part, the Act requires the Department to periodically update estimates of program O&S costs, and track and assess these estimates relative to prior estimates. The Act also calls for (1) better use of reliability and maintainability test and evaluation data to inform system design decisions and provide insights into sustainment cost estimates, and (2) new procedures to ensure that sustainment factors are fully considered at key management decision points, with emphasis on influencing system design in early development.

- There will be two interim policy memoranda, which will address (1) confidence levels in cost estimates and (2) cost analysis for multi-year procurement. These memoranda will provide cost assessment procedures that implement the legislative requirements for these two areas that were discussed in Chapter II. In addition, CAPE will assist the USD(AT&L) in promulgating guidance concerning cost estimates for contract negotiations (also explained in Chapter II).
- There will be a policy memorandum concerning DoD cost research and studies. The plan is to establish an online database of cost research studies and projects that would span the entire DoD cost community and other sponsors of cost research, making the information about cost research and studies readily available.
- There will be a policy memorandum for cost analysis training and education. The current plan for training and education is described later in this chapter.

Cost Data Systems

Systematic and institutionalized cost data collection throughout DoD is important to support credible cost estimates for current and future acquisition programs. As noted in Chapter II, DoD has three main cost data reporting systems: (1) the CSDR system, used for acquisition cost data; (2) the EVM Central Repository, used for centralized electronic warehousing of EVM data reports; and (3) the VAMOS data systems, used to collect O&S costs for the major fielded weapon systems. Additional information on these three data systems is provided in Appendix D.

This year, the DCARC continued to update and strengthen the procedures, report formats, and detailed implementation guidance for CSDR. A new version of DoDM 5000.04-M-1, *Cost and Software Data Reporting (CSDR) Manual*, has been approved and is effective as of November 4, 2011. The Manual serves as the main implementation guidance for the CSDR system. The new Manual adds a new report (Contractor Business Data Report) that provides data on plant-wide overhead and other indirect costs. The Manual also establishes an improved system for the electronic submission of plans and reports through use of a DoD Common Access Card. In addition, new versions of the CSDR report formats and instructions to reporting contractors have been developed and are effective for any applicable request for proposal or other solicitation as of January 1, 2012.

The DCARC also continued to develop cost reporting requirements for high-dollar value contractor logistics support and similar defense system sustainment contracts. The DCARC has developed a new standard format for the reporting of actual sustainment contract costs. The use of this standard format is not mandatory at this time, but the format and other similar formats are being used on a trial basis for twelve programs. The DCARC will review the lessons learned from the trial observation period before the report format for sustainment costs is finalized and formally incorporated into the CSDR reporting system.

Tracking to Approved Estimate—PPBE and Acquisition

Cost estimates made to support milestone reviews and other program reviews should be used as the basis for budgeting. However, as programs move beyond their acquisition milestone approval and proceed through successive iterations of the PPBE system, changes to programs are often necessary for a variety of reasons, including fiscal constraints. As part of the Department's program and budget review process, CAPE—in conjunction with USD(AT&L)—reviewed each program with significant funding changes from the latest baseline or prior year's President's Budget to determine the source of the cost estimate supporting the revised program and to ensure that the program remained fully funded. This process of tracking to the approved estimate will be even more important in the future, as the Department faces significant funding constraints, resulting in more reductions to program quantities and annual procurement rates, and more pressures to budget programs at less than full funding.

Cost Indexes

WSARA requires that CAPE periodically assess and update the cost indexes used by the Department to ensure that such indexes have a sound basis and meet the Department's needs for realistic cost estimation. The cost indexes used by DoD all rest on inflation forecasts made by the administration and issued by the Office of Management and Budget (OMB). The use of the OMB forecast is directed by OMB Circular No. A-11 (*Preparation, Submission and Execution of the Budget*). The USD(C) provides the DoD military departments and defense agencies with guidance in the DoD Financial Management Regulation (FMR) on how to prepare budget estimates that comply with OMB guidelines; this guidance includes instructions on the use of USD(C)-provided deflators that are calculated from the OMB inflation forecast.

In FY 2010 CAPE commissioned an independent study concerning cost indexes to provide a factual and analytical basis for responding to this provision of WSARA. Much of the study was focused on the treatment of inflation for the acquisition costs of MDAPs. The study found that in many cases, some DoD organizations—most notably, NAVSEA, NAVAIR, and many Air Force program offices—have developed specialized inflation projections for their programs. These projections are usually higher than the approved OMB/OSD deflators. However, if the programs experience inflation in line with the program-specific projections that is higher than the inflation reflected in the approved OMB/OSD deflators, then the programs will be systematically underfunded, leading to unnecessarily high real program cost growth. To prevent this cost growth, it would therefore be appropriate to permit the use of program-specific inflation projections, subject to oversight by CAPE and USD(C). However, the study also found that it is appropriate to use the OMB/OSD deflators to calculate program costs in constant-year dollars, for

purposes of estimating program cost growth (including assessments of Nunn-McCurdy unit cost thresholds). This approach conforms to OMB's preference that constant dollars reflect general purchasing power relative to the entire economy as a whole. Any program-specific inflation projection greater than the inflation inherent in the OMB/OSD deflators will not lead to measured cost growth as long as that projection is incorporated in the program baseline cost estimate.

CAPE and USD(C) intend to update the FMR guidance on the treatment of inflation to be consistent with the recommendations of this study.

Cost Analysis Education and Training

CAPE is leading several initiatives to improve the education and training of the larger DoD civilian and military workforce in cost assessment in accordance with the assigned responsibilities and goals of WSARA.

CAPE has supported the Navy, the Naval Postgraduate School (NPS), and the Air Force Institute of Technology to launch an accredited Master's Degree Program in Cost Estimating and Analysis that began in April 2011. This two-year, distance-learning program will improve the education of the cost estimating community in both the DoD and in the defense industrial base. In addition, the Army continues to sponsor a one-month residence program, taught by the NPS business school, which provides a certificate in cost management for Army personnel. Also, CAPE continues to sponsor a one-week resource analysis course taught at the Institute for Defense Analyses. CAPE also sponsors and hosts the annual DoD Cost Analysis Symposium as discussed in Chapter IV.

CAPE is now forming a working group, with representatives from each of the Service Cost Agencies, to further address cost analysis education and training. This group will work with and advise the Defense Acquisition University to evaluate and improve the Defense Acquisition Workforce Improvement Act curriculum for certification in cost estimation. The working group also will take an inventory of what additional cost analysis training and education is provided by the military departments and their field organizations.

Summary

CAPE is continuing to develop and refine plans for the Department's cost estimating and cost analysis functions. Implementation of these plans will ensure that the cost assessment organizations, workforce, policies and procedures, data collection systems, and training and education programs will be strengthened and improved as necessary to meet the expanded roles and responsibilities established by WSARA. CAPE will continue to work with the Department's other cost and acquisition organizations to strengthen cost assessment so that better cost and schedule estimates are properly prepared and considered in the deliberations of all major acquisition programs. The progress on these initiatives will be reported in future editions of this report.

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APPENDIX A

Cost Analysis Organizations in DoD

Independent Cost Assessment Organizations

There are four key offices for the preparation of independent cost estimates. Within OSD, the office responsible for independent cost estimates reports to the CAPE Director. Within the military departments, these offices all report to their Assistant Secretary for Financial Management and Comptroller. The following paragraphs give a brief description and overview of these key offices responsible for independent cost estimates.

OSD – Deputy Director for Cost Assessment

The CAPE Deputy Director for Cost Assessment performs independent cost estimates for all MDAPs and MAIS programs when acquisition oversight has not been delegated to a military department or Defense Agency, and it reviews all cost estimates and cost analyses prepared by the military departments and Defense Agencies in connection with other MDAPs and MAIS programs.

Army – Deputy Assistant Secretary of the Army for Cost and Economics

The Deputy Assistant Secretary of the Army for Cost and Economics (DASA-CE) develops statutory independent cost estimates and Component cost analyses of weapon and information systems. DASA-CE conducts independent reviews and validation of business case analyses, economic analyses, and special cost studies of major weapon and information systems, force structure, and operating and support cost. DASA-CE serves as the Cost and Economics advisor for Army Study Advisory Groups. It chairs and oversees the Army Cost Review Board, develops and approves the Army Cost Position for all major acquisition programs, and conducts in-depth risk analyses of major Army programs and associated costs.

Navy – Naval Center for Cost Analysis

The Naval Center for Cost Analysis (NCCA) prepares independent cost estimates for Department of the Navy MDAPs and MAIS programs. NCCA coordinates all Department of the Navy cost research. Its research includes improved methods for estimating specific cost elements for key development phases of acquisition programs. Examples of such cost elements include nonrecurring engineering, system integration, and government in-house support.

Air Force – Air Force Cost Analysis Agency

The Air Force Cost Analysis Agency (AFCAA) supports the Air Force by providing independent cost analyses and special studies in support of weapon system programs. AFCAA also conducts and coordinates cost research to develop analytical tools, models, and databases.

Additional Field-Level Cost Organizations and Activities

There are several field-level cost organizations. These typically are located at a major product center such as the Naval Air Systems Command or the Air Force Electronic Systems Center. This

section provides a summary of many of these important organizations; however, this list is not complete, and other organizations will need to be added to future editions of this annual report.

Army

TACOM Life Cycle Management Command (LCMC)

The TACOM LCMC Cost and Systems Analysis organization is responsible for preparation of program office estimates, life cycle cost estimates, economic analyses, and combat effectiveness modeling that support the development of combat and tactical vehicles. It manages the tools and databases to support cost and systems analysis processes for the TACOM LCMC. The major cost analysis activities are life cycle cost estimating, cost reporting and EVM, O&S cost baselines, support to Analyses of Alternatives (AoAs), source selection evaluations, and cost analyses associated with multi-year procurement.

Aviation and Missile Life Cycle Management Command (AMCOM)

The AMCOM Cost Analysis Division provides cost estimation and analysis support to Aviation, Missiles and Space Program Executive Offices and their Program/Project Offices. It manages the AMCOM Cost Analysis Program and develops, updates, or obtains Cost Estimating Relationships, cost factors, and mathematical and computerized cost models for estimating purposes. It develops cost estimates to support AoAs, tradeoff studies, and force structure cost estimates. It develops and prepares life cycle cost estimates, and it conducts other related studies in support of weapon system cost analyses. It performs cost risk analyses and cost risk assessments to support weapon system program decisions. It also provides validation/review for cost estimates, economic analyses, and business case analyses.

CECOM Life Cycle Management Command (LCMC)

The Communications-Electronics Command (CECOM) Cost Analysis Division provides cost estimation and analysis support to CECOM Program Executive Offices and their Program/Project Offices. It provides several cost analysis services, including life cycle cost estimating, Earned Value Management, economic analysis, modeling and simulation, computer software and database support, and review and validation of business case analyses and other cost analyses.

Navy

Naval Air Systems Command (NAVAIR)

The Cost Department of the Naval Air Systems Command provides a wide variety of cost analysis products and services. Its primary focus is to provide a clear and comprehensive understanding of life cycle cost and attendant uncertainties to be used in developing, acquiring, and supporting affordable naval aviation systems. Besides life cycle cost estimates, the Cost Department provides source selection cost evaluation support, Earned Value Management analysis, cost research and databases, and various cost/benefit studies.

Naval Sea Systems Command (NAVSEA)

The Cost Engineering and Industrial Analysis Division of NAVSEA provides cost engineering and industrial base analysis for ships, ship-related combat systems, and weapons. It provides cost

estimates in support of the DAB review process, including AoA studies. It also participates in contract proposal evaluations and the source selection process for builders and suppliers of ships and weapon systems, and it conducts analysis and forecasting of labor, industrial, and technical trends as they affect the overall acquisition of ships, combat systems, weapons, and other equipment.

Naval Surface Warfare Center

The Cost and Affordability Group resides within the Warfare Analysis Branch of the Requirements Analysis and Advanced Concepts Division of the Warfare Systems Department at the Naval Surface Warfare Center, Dahlgren Division. The Group produces cost estimates, cost-risk assessments, and affordability analyses for Combat Systems. The Group also develops cost-estimating methodology in support of systems development and production, AoAs, and strategic planning. Particular areas of expertise include model development and maintenance, cost-research databases, technology assessments, life cycle cost estimates, budget and force-level analyses, performance-based cost models, product-oriented cost models, proposal evaluation, and source selection reviews.

Air Force

Electronic Systems Center (ESC)

The ESC Cost Estimating Division supports the ESC by providing independent analysis and verification of electronic systems' cost to the Center's leadership, with a focus on improving the overall quality, objectivity, and credibility of cost estimates. The Cost Division leads the Center's modern, quick-reaction cost tools program and spearheads comprehensive cost training essential to cost analysts and program managers throughout the Center.

Air Force Space Command, Space and Missile Center (SMC)

The SMC Cost Estimating Division supports cost estimates and cost analyses associated with Air Force Space Command and the Space and Missile Center's mission of satellite acquisition, launch, and control.

Aeronautical Systems Center (ASC)

The ASC Cost and Economics Division is responsible for training, organizing, and equipping the cost analysis workforce at the ASC. This support is accomplished by leading estimates for program milestone decisions, managing the annual cost estimate process, supporting pre-award activities and source selections, and participating in policy discussions resulting in high-quality cost estimates and analysis across the Center.

Other

National Reconnaissance Office (NRO) Cost Analysis Improvement Group

The NRO Cost Analysis Improvement Group provides independent cost estimating support to the NRO. This support covers milestone decisions, budget submissions, EVM, ad hoc program support, data collection, methods development, and model/tool development.

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APPENDIX B

Major Defense Acquisition Program Unit Cost Reporting

Since 1982, Congress has required DoD to track and report on the unit cost for most MDAPs. The requirement for unit cost reporting may be waived if the program has not entered EMD, a reasonable cost estimate has not been established for the program, and the system configuration is not well defined. The provisions of the law concerning unit cost reporting, commonly referred to as the Nunn-McCurdy provisions, are found in section 2433 of title 10, *United States Code*. A complete description of the Department’s implementation of these provisions is provided in the *Defense Acquisition Guidebook* (<https://dag.dau.mil>): see Chapter 2, Section 2.1.1 (“The Acquisition Program Baseline”), Chapter 10, Section 10.9.1.3 (“APB Reporting”) and Section 10.9.1.5 (“Unit Cost Reports”).

There are two unit cost metrics subject to reporting, Program Acquisition Unit Cost (PAUC) and Average Procurement Unit Cost (APUC). PAUC is defined as the total program acquisition cost (sum of research, development, test, and evaluation plus procurement plus military construction) divided by the total program quantity of fully configured end items. APUC is defined as the program procurement cost divided by the procurement quantity. Both unit cost metrics are tracked in constant dollars of a base year fixed for each program.

The most current cost estimate for each unit cost metric is tracked relative to two baseline cost estimates. The current baseline estimate refers to the most recent baseline approved by the MDA. The original baseline estimate refers to the baseline approved at program initiation (usually Milestone B). A program is declared to have a unit cost (Nunn-McCurdy) breach when the current unit cost estimate exceeds either baseline estimate by more than certain specified percentages. Specifically, as shown in Table B-1, a unit cost breach takes place when any of the following conditions occurs, for either version of program unit cost (APUC or PAUC):

Table B-1. Nunn-McCurdy Breach Thresholds

	“Significant” Breach	“Critical” Breach
Current Baseline Estimate	+15%	+25%
Original Baseline Estimate	+30%	+50%

Note that there are two degrees associated with the severity of the unit cost breach. For significant unit cost breaches, the Department notifies the Congress of the breach within 45 days of the unit cost report and subsequently submits a program SAR with additional, breach-related information. For critical unit cost breaches, in addition to notifying the Congress and submitting the SAR, the Department is required to conduct a complete assessment of the program and determine if it should be terminated or continued. This assessment is led by USD(AT&L). The Department is required to terminate the program unless a letter signed by the USD(AT&L), providing the certification that the program currently meets certain criteria established in law (section 2433a of

title 10, *United States Code*), is submitted to the Congress within 60 days of the SAR submission. Among other things, USD(AT&L) must certify that the Director, CAPE has determined the new unit cost estimates are reasonable. A complete description of the critical unit cost breach certification process can be found in the *Defense Acquisition Guidebook*, Chapter 10, Section 10.9.1.5.2.2.

APPENDIX C

Major Automated Information System Reporting

Public law (section 2445c of title 10, *United States Code*) requires annual and quarterly reports from MAIS programs, pre-MAIS programs, and “any other investment in automated information system products or services that is expected to exceed the [MAIS] thresholds...” Details about the reporting requirements may be found in the *Defense Acquisition Guidebook*, Chapter 10, Section 10.9.2. Briefly, a MAIS Quarterly Report is used internally within the Department, and a MAIS Annual Report is provided to the congressional defense committees 45 days after submission of the President’s Budget. The formats of the quarterly report and annual report are similar. The reports provide a program description and the latest status regarding schedule, performance characteristics, development cost, and life cycle cost.

The reports compare the latest estimates of schedule, performance, and cost relative to the program baseline approved at the previous acquisition milestone. This comparison is used to determine if the program has a deviation known as either a Significant Change or Critical Change. A Significant Change occurs when a program has a schedule delay of more than six months, but less than one year; there is a significant, adverse change in the expected performance of the system; or the estimated development cost or life cycle cost has increased by at least 15 percent but less than 25 percent. For a program with a Significant Change, the Department is required to notify the congressional defense committees of the change within 45 days after receiving the report that identified the deviation. A Critical Change occurs when a program has a schedule delay of one year or more or fails to achieve a full deployment decision within five years of when funds for the program were first obligated; there is a change in expected performance that will undermine the ability of the system to perform its intended functions; or the estimated development cost or life cycle cost has increased by 25 percent or more. For a program with a Critical Change, the Department must conduct an evaluation of the program, and then submit a report and a formal certification to the congressional defense committees within 60 days after receiving the report that identified the deviation.

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APPENDIX D

DoD Cost Data Collection Systems

Three primary data collection systems are used by DoD as the major sources of cost data for major acquisition programs. The CSDR system serves as the primary source of acquisition cost data for major contracts and subcontracts associated with MDAPs. The EVM Central Repository is used to collect and archive EVM reporting documents (such as Contract Performance Reports, Integrated Master Schedules, and Contract Funds Status Reports). The VAMOS systems collect historical O&S costs for major weapon systems.

Cost and Software Data Reporting System

The CSDR system is the primary means that DoD uses to collect actual cost and related data on major defense contracts. Program managers support the CSDR system by reporting data on contractor development and production costs and resource usage incurred in performing DoD programs. Its two principal components are contractor cost data reporting (CCDR) and software resources data reporting (SRDR).

CCDR is the primary means within DoD to systematically collect data on the development and production costs incurred by contractors. DoD Instruction 5000.02, *Operation of the Defense Acquisition System*, establishes the CCDR requirements for major contracts and subcontracts (regardless of contract type) associated with MDAPs.

The SRDR system collects software metrics data to supplement the CCDR cost data to provide a better understanding and improved estimating of software-intensive programs. DoD Instruction 5000.02 establishes SRDR requirements for major contracts and subcontracts (regardless of contract type) associated with MDAPs. Data collected from applicable contracts include type and size of the software application(s), schedule, and labor resources needed for the software development.

Detailed procedures and other implementation guidance for both CSDR systems are found in DoDM 5000.04-M-1, *Cost and Software Data Reporting (CSDR) Manual*. This manual (as well as downloadable report formats and definitions, specific report examples, and other related information) can be found at the DCARC web site (<http://dcarc.pae.osd.mil>). The DCARC is the OSD office responsible for administering the CSDR system. Access to CSDR data is provided by the DCARC to DoD government cost analysts who are registered users.

Earned Value Management Central Repository

In collaboration with the staff of USD(AT&L), the DCARC hosts the EVM Central Repository. The central repository supports the centralized reporting, collection, archiving, and distribution of key EVM data reports (such as Contract Performance Reports, Integrated Master Schedules, and Contract Funds Status Reports) for MDAPs and MAIS programs. Information about the central repository is available at the DCARC web site (<http://dcarc.pae.osd.mil/EVMCR/Index.aspx>). More general information about EVM reporting is available in the *Defense Acquisition*

Guidebook (<https://dag.dau.mil>), Chapter 11, Section 11.3.1, and at the DoD Earned Value Management web site (<http://www.acq.osd.mil/evm>).

The central repository supports complete, timely, and secure transfer of electronic data from the contractor to the repository; secure and controlled warehousing of the data; and controlled, timely, and secure access to the data by authorized users. The main purpose of these data is to provide a consistent and timely situational awareness of acquisition execution.

Both the CCDR and the EVM reporting use a common, product-oriented taxonomy known as a Work Breakdown Structure (WBS) that follows the guidelines of the DoD Standard Practice, *Work Breakdown Structures for Defense Materiel Items* (MIL-STD-881C). The WBS is a hierarchy of product-oriented elements (hardware, deliverable software, data, and services) that collectively constitute the system to be developed or produced. Further information about the use of the WBS in cost reporting and cost estimating can be found in the *Defense Acquisition Guidebook*, Chapter 3, Section 3.7.1.1. The most recent WBS standard (dated October 3, 2011) is available at <http://dcarc.pae.osd.mil/Files/Policy/MIL-STD-881C.pdf>.

Visibility and Management of Operating and Support Costs Data System

DoD requires that each military department maintain a system that collects historical data on the O&S costs for major fielded weapon systems. The Deputy Director for Cost Assessment provides policy guidance on this requirement, known as the VAMOSC program; specifies the common format in which the data are to be reported; and monitors its implementation by each of the military departments. *The National Defense Authorization Act for Fiscal Year 2012, Public Law 112-81*, contains a provision that calls for strengthened CAPE oversight of the VAMOSC program.

Each department has its own unique VAMOSC data system that tracks actual O&S cost experience for major weapon systems. The data can be displayed by time frame, at various levels of detail, and by functional elements of cost (such as depot maintenance, fuel, consumable items, and so forth). Each VAMOSC system provides not only cost data, but related non-cost data (such as system quantities and operating tempo) as well. VAMOSC data can be used to analyze trends in O&S cost experience for each major system, as well as to identify and assess major cost drivers. VAMOSC data systems are managed by each military department as follows:

- The Navy's VAMOSC management information system collects and reports U.S. Navy and U.S. Marine Corps historical weapon system O&S costs. VAMOSC provides the direct O&S costs of weapon systems; some indirect costs (e.g., ship depot overhead); and related non-cost information such as flying hour metrics, steaming hours, age of aircraft, personnel counts for ships, etc. It is managed by the Naval Center for Cost Analysis.
- The Army's VAMOSC system, called the Operating and Support Management Information System (OSMIS), tracks operating and support information for over 1,400 major Army weapon/materiel systems and is maintained by the Office of the Deputy Assistant Secretary of the Army for Cost and Economics. OSMIS-tracked systems include combat vehicles, tactical vehicles, artillery systems, aircraft, electronic systems, and miscellaneous engineering systems.

- The Air Force's VAMOS system, called the Air Force Total Ownership Cost system, is managed by the AFCAA. It provides O&S cost information on all Air Force aircraft, space systems, and missiles. The O&S cost information collected includes unit-level manpower, fuel, depot maintenance overhaul costs, depot-level repairable costs, and condemnation costs of major U.S. Air Force aircraft and engines.

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APPENDIX E

Programs Receiving 2366a/b Certifications

Chapter III explained that by the end of FY 2011, there were a total of 30 MDAPs and pre-MDAPs that had been certified as required by sections 2366a/b of title 10, *United States Code* (see page 13). A listing of these 30 programs (as of September 30, 2011) is provided in Table E-1.

Table E-1. Programs Receiving 2366a/b Certifications

Programs certified by the end of FY 2010 (22 total)

<u>Program Name</u>	<u>Acronym</u>
E-2D Advanced Hawkeye	E-2D AHE
Joint Precision Approach and Landing System Increment 1A	JPALS Inc 1A
Space Fence	N/A
Airborne and Maritime/Fixed Station Joint Tactical Radio System	AMF JTRS
B-2 Extremely High Frequency SATCOM Capability	B-2 EHF
MQ-4C Unmanned Aircraft System Broad Area Maritime Surveillance	MQ-4C BAMS
Global Positioning System IIIA Satellite	GPS IIIA
Nett Warrior (formerly Ground Soldier Ensemble)	N/A
Joint High Speed Vessel	JHSV
LHA 6 America Class Amphibious Assault Ship	LHA 6
Ship to Shore Connector	SSC
Guided Multiple Launch Rocket System/Alternative Warhead	GMLRS AW
Integrated Air and Missile Defense	IAMD
Standard Missile – 6	SM-6
HC/MC-130 Recapitalization Program	HC/MC-130
P-8A Poseidon	P-8A
Small Diameter Bomb Increment II	SDB II
Wideband Global Satellite Communications (SATCOM)	WGS
Advanced Threat Infrared Countermeasures/Common Missile Warning System	ATIRCM/CMWS
Virginia Class Submarine	SSN 774
C-130 Avionics Modernization Program	C-130 AMP
Air and Missile Defense Radar	AMDR

Table E-1. Programs Receiving 2366a/b Certifications (cont.)

Programs certified during FY 2011 (8 total)

<u>Program Name</u>	<u>Acronym</u>
KC-46 Tanker Modernization Program	KC-46
B-2 Defensive Management System	B-2 DMS
DDG 1000 Zumwalt Class Destroyer	DDG 1000
Littoral Combat Ship	LCS
MQ-1C Unmanned Aircraft System Gray Eagle	MQ-1C Gray Eagle
Ground Combat Vehicle	GCV
Warfighter Information Network - Tactical Increment 2	WIN-T Inc 2
Ohio Class Replacement	N/A

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ABBREVIATIONS

ACAT	Acquisition Category
ACWA	Assembled Chemical Weapons Alternatives
ADM	Acquisition Decision Memorandum
AFCAA	Air Force Cost Analysis Agency
AIM	Air Intercept Missile
AMCOM	Aviation and Missile Life Cycle Management Command
AoA	Analysis of Alternatives
APB	Acquisition Program Baseline
APUC	Average Procurement Unit Cost
ASC	Aeronautical Systems Center
CAIG	Cost Analysis Improvement Group
CAPE	Cost Assessment and Program Evaluation
CARD	Cost Analysis Requirements Description
CCDR	Contractor Cost Data Reporting
CECOM	Communications-Electronics Command
CSDR	Cost and Software Data Reporting
DAB	Defense Acquisition Board
DASA-CE	Deputy Assistant Secretary of the Army for Cost and Economics
DCARC	Defense Cost and Resource Center
DMS	Defensive Management System
DoD	Department of Defense
DoDCAS	Department of Defense Cost Analysis Symposium
DTM	Directive-Type Memorandum
ECSS	Expeditionary Combat Support System
EMD	Engineering and Manufacturing Development
ESC	Electronic Systems Center
EVM	Earned Value Management
FMR	Financial Management Regulation
FYDP	Future Years Defense Program
GCV	Ground Combat Vehicle
GPS	Global Positioning System
HMS	Handhold, Manpack, and Small Form Fit
JASSM-ER	Joint Air-to-Surface Standoff Missile – Extended Range
JTRS	Joint Tactical Radio System
LCMC	Life Cycle Management Command
LCS	Littoral Combat Ship
MAIS	Major Automated Information System
MDA	Milestone Decision Authority
MDAP	Major Defense Acquisition Program

MPS	Mission Planning System
MYP	Multi-Year Procurement
NAVAIR	Naval Air Systems Command
NAVSEA	Naval Sea Systems Command
NCCA	Naval Center for Cost Analysis
NPS	Naval Postgraduate School
NRO	National Reconnaissance Office
O&S	Operating and Support
OMB	Office of Management and Budget
OR	Ohio Class Replacement
OSD	Office of the Secretary of Defense
OSMIS	Operating and Support Management Information System
PA&E	Program Analysis and Evaluation
PARCA	Performance Assessments and Root Cause Analyses
PAUC	Program Acquisition Unit Cost
POM	Program Objective Memorandum
PPBE	Planning, Programming, Budgeting and Execution
SAR	Selected Acquisition Report
SMC	Space and Missile Center
SRDR	Software Resources Data Reporting
TBD	To Be Determined
USD(AT&L)	Under Secretary of Defense for Acquisition, Technology and Logistics
USD(C)	Under Secretary of Defense (Comptroller)
VAMOSC	Visibility and Management of Operating and Support Costs
WBS	Work Breakdown Structure
WIN-T	Warfighter Information Network - Tactical
WSARA	Weapon Systems Acquisition Reform Act