



# FY 2012 Annual Report on Cost Assessment Activities



April 2013

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# **FY 2012 Annual Report on Cost Assessment Activities**



## **Director, Cost Assessment and Program Evaluation April 2013**

**Preparation of this report/study cost the Department of Defense  
a total of approximately \$43,000 in Fiscal Year 2013.**

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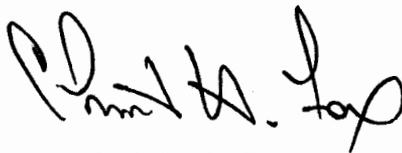
## FOREWORD

The *Weapon Systems Acquisition Reform Act (WSARA) of 2009, Public Law 111-23*, section 101, established the position of Director of Cost Assessment and Program Evaluation (CAPE) in the Office of the Secretary of Defense (OSD). The Director is responsible for ensuring that the cost estimation and cost analysis processes of the Department of Defense (DoD) provide accurate information and realistic estimates of cost for the DoD acquisition programs.

WSARA requires the Director, CAPE to report to the 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 fourth edition of the annual report describes the progress in developing and implementing plans responsive to the goals for cost estimation and assessment practices mandated by WSARA.

In light of the current uncertain fiscal environment, the need for thorough analyses and rigorous cost assessments has never been greater. Since my confirmation in 2009, 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. All of these efforts are described in this report.

Progress towards achieving the WSARA objectives is taking place incrementally, and will continue for years. Our progress in improving the Department's cost assessment process will continue to be described 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 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) analyses 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 WSARA<sup>1</sup> requires that 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.

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.
- Chapter III reviews the Department's FY 2012 cost estimation and cost analysis activities associated with MDAPs and MAIS programs. These activities include independent cost estimates (ICEs), 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 2012 complied with established procedures, and discusses overall quality and any consistent differences in methodology among the cost estimates.

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

- Chapter IV 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 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.

## **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 IV 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 Director, CAPE is responsible for providing ICEs, 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 Director, CAPE 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 ICEs 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.<sup>2</sup> At these key milestone reviews, when the MDA is USD(AT&L), the ICE is prepared by the Director, CAPE. When the MDA is delegated to the DoD Component, the ICE supporting a milestone decision is provided by the applicable Service Cost Agency or the Defense Agency equivalent, and subsequently reviewed by CAPE. In practice, an ICE for a program is 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 ICEs 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* (see <https://acc.dau.mil/wsara>).

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, to commit to fully fund the program consistent with the Component's 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 ICE 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, 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 USD(AT&L). As part of a standard business practice, CAPE prepares its own ICE that is used as a benchmark to support the assessment of reasonableness of the new unit cost estimates. Also, the CAPE ICE report includes a quantitative assessment of the factors, both 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 2012 critical unit cost breaches and certifications, and supporting cost assessment activities, is provided in Chapter III. Appendix B provides a description of the procedures for unit cost reporting, and the criteria for a Nunn-McCurdy unit cost breach.

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<sup>2</sup> Section 2344 also requires an independent cost estimate in advance of a certification of an MDAP under a critical unit-cost breach; a report for a critical change on a MAIS; and at any other time considered appropriate by the Director, CAPE or upon the request of USD(AT&L).

## 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.<sup>3</sup> 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. Since enactment of WSARA, the determination of the adequacy of program cost estimates is made by the MDA—with the concurrence of the Director, CAPE—after consideration of the appropriate ICE.

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*. More recently, the *National Defense Authorization Act for Fiscal Year 2013, Public Law 112-239*, repealed the requirement for retroactive 2366b certifications for those programs that received Milestone B approval before January 2006 (which is when the requirement for 2366b certification was originally established) but had not yet reached Milestone C.

Previous editions of this report described the status of the Department's efforts to reduce the backlog of catch-up certifications. With the recent legislative changes removing the requirement for these certifications, this reporting is no longer necessary and will be discontinued.

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<sup>3</sup> The Milestone A decision is approval for a program to enter the Technology Development phase.

## Cost Assessment Procedures for Major Automated Information Systems

WSARA specifies that CAPE is responsible for preparing an ICE for any MAIS program that has experienced a Critical Change (as defined in Appendix C) if the MDA is USD(AT&L). CAPE may also prepare an ICE for a MAIS program at any other time considered appropriate by the Director, CAPE, or upon the request of 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.

## 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. A review of the FY 2012 cost assessment activities associated with approval of multi-year procurement contracts is provided in Chapter III.

## 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 (section 2334 of title 10, United States Code)*. 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 legal 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 (section 2334 of title 10, United States Code)*, 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 IV, 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 ICEs 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 position and the CAPE ICE. 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 (VAMOSOC) 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 IV 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 IV of this report.

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## **CHAPTER III – DOD COST ASSESSMENT ACTIVITIES IN FY 2012**

This chapter provides a summary of the DoD cost estimates and cost analyses that were made in FY 2012 in support of milestone reviews, award of multi-year procurement contracts, and certifications following unit cost (“Nunn-McCurdy”) breaches.

### **DoD Milestone Review Cost Assessment Activities in FY 2012**

Table 1 provides a summary of the milestone or other review cost assessment activities in FY 2012. 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 13 milestone reviews and six other events supported by cost assessment activities in FY 2012 (excluding several cost assessment activities associated with classified programs, which are not discussed in this unclassified report). All of the 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, in most cases each of the milestone reviews was supported by (1) a Component cost position, and (2) the appropriate CAPE or Service Cost Agency ICE.

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 delivery of an ICE 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, 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. Further information about DoD cost data collection systems is provided in Appendix D.

Finally, there are 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, smaller differences between the cost and schedule forecasts of the military departments and CAPE are expected in the future.

For MAIS programs, due to resource constraints, 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 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 44 MAIS programs now in the DoD portfolio. Note that in FY 2012 there were no MAIS Critical Change certifications where USD(AT&L) was the MDA.

**Table 1. Major Acquisition Program Milestone or Other Review Cost Assessment Activities in FY 2012**

<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>
Guided Multiple Launch Rocket System Alternative Warhead	GMLRS AW	Army	ACAT IC	DASA-CE Independent Cost Estimate	14-Oct-11	Milestone B	19-Feb-12
				Army Service Cost Position	22-Nov-11		
Paladin Integrated Management	PIM	Army	ACAT IC	Army Service Cost Position	2-Dec-11	Post-Milestone B APB Approval	30-Mar-12
Stryker Nuclear, Biological and Chemical Reconnaissance Vehicle	Stryker NBCRV	Army	ACAT ID	CAPE Independent Cost Estimate	7-Dec-11	Full-Rate Production Decision	15-Dec-11
				Army Service Cost Position	29-Nov-11		
Common Infrared Countermeasures	CIRCM	Army	ACAT ID	CAPE Independent Cost Estimate	12-Dec-11	Milestone A	28-Dec-11
				Army Service Cost Position	10-Aug-11		
B61 Mod 12 Life Extension Program Tail Kit Assembly	B61 Mod 12 LEP TKA	Air Force	ACAT ID	CAPE Independent Cost Estimate	10-Feb-12	Milestone A	22-Feb-12
				Air Force Service Cost Position	31-Jan-12		
Chemical Demilitarization – Assembled Chemical Weapons Alternatives	Chem Demil - ACWA	DoD	ACAT ID	CAPE Independent Cost Estimate	16-Feb-12	Milestone B	21-Mar-12
				Joint Program Office Cost Estimate	6-Jun-11		

**Table 1. Major Acquisition Program Milestone or Other Review Cost Assessment Activities in FY 2012 (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>
Military Global Positioning System (GPS) User Equipment	MGUE	Air Force	ACAT ID	CAPE Independent Cost Estimate	17-Feb-12	Milestone A	9-Apr-12
				Air Force Service Cost Position	3-Feb-12		
F-35 Joint Strike Fighter Aircraft	JSF	Navy/Air Force, USMC	ACAT ID	CAPE Independent Cost Estimate	9-Mar-12	2366b Recertification	28-Mar-12
				Joint Program Office Cost Estimate	7-Mar-12		
Multi-Functional Information Distribution System Joint Tactical Radio System	MIDS JTRS	Navy	ACAT ID	CAPE Independent Cost Estimate	12-Mar-12	Full-Rate Production Decision	4-Apr-12
				Navy Service Cost Position	29-Feb-12		
Ground/Air Task Oriented Radar	G/ATOR	USMC	ACAT IC	Navy Service Cost Position	6-Apr-12	Post-Milestone B APB Approval	22-May-12
Advanced Threat Infrared Countermeasures	ATIRCM	Army	ACAT IC	DASA-CE Independent Cost Estimate	27-Apr-12	Milestone C	13-Aug-11
Integrated Air and Missile Defense	IAMD	Army	ACAT ID	Updated CAPE Independent Cost Estimate	7-Jun-12	Information Paper to USD(AT&L)	N/A
				Updated Army Service Cost Position	27-Apr-12		

**Table 1. Major Acquisition Program Milestone or Other Review Cost Assessment Activities in FY 2012 (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>
Ship to Shore Connector	SSC	Navy	ACAT ID	CAPE Independent Cost Estimate	25-Jun-12	Milestone B	5-Jul-12
				Navy Service Cost Position	15-Jun-12		
Advanced Anti-Radiation Guided Missile	AARGM	Navy	ACAT IC	Navy Service Cost Position	31-Jul-12	Full-Rate Production Decision	20-Aug-12
Joint Light Tactical Vehicle	JLTV	Army/USMC	ACAT ID	CAPE Independent Cost Estimate	8-Aug-12	Milestone B	20-Aug-12
				Joint Service Cost Position	12-Jul-12		
Apache Block 3A Remanufacture Program	AB3A Reman	Army	ACAT ID	CAPE Independent Cost Estimate	15-Aug-12	Full-Rate Production Decision	5-Sep-12
				Army Service Cost Position	12-Jul-12		
B-2 Extremely High Frequency Satellite Capability Increment 1	B-2 EHF Inc 1	Air Force	ACAT IC	Air Force Service Cost Position	22-Aug-12	Post-Milestone C APB Approval	20-Sep-12
Common Remotely Operated Weapon Station	CROWS	Army	ACAT IC	DASA-CE Independent Cost Estimate	13-Sep-12	Full-Rate Production Decision	28-Sep-12
LHA 6 America Class Amphibious Assault Ship	LHA 6	Navy	ACAT ID	Updated CAPE Independent Cost Estimate	25-Sep-12	Information Paper to USD(AT&L)	N/A

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

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

## Remarks about Specific Programs

- For the Chemical Demilitarization – Assembled Chemical Weapons Alternatives, there was no Service Cost Position for this program because it is an OSD managed activity.
- The CAPE ICE for the F-35 supported the restoration of the 2366b certification for the program. The F-35 lost its original 2366b certification status following the critical unit-cost (Nunn-McCurdy) breach that occurred in 2010.
- The revised CAPE ICE for the Army Integrated Air and Missile Defense program was requested by USD(AT&L) to reflect a restructure to the program proposed by the Army in February 2012.
- The revised CAPE ICE for the Navy LHA 6 program was requested by USD(AT&L) to reflect the addition of a second ship (LHA 7) and other fact-of-life changes.

## CAPE Independent Cost Estimates for Multi-Year Procurement

As noted in Chapter II, CAPE provides an independent cost analysis of a proposed multi-year procurement strategy and contract structure to support the Department's certification of substantial savings and other criteria, prior to the award of a multi-year contract for a defense acquisition program. Table 2 provides a summary of the cost assessment activities in FY 2012 supporting the award of multi-year procurement contracts. Table 2 identifies the program name and acronym, the responsible Component, the supporting cost estimate(s) or analyses, and the date of the Department's certification.

For aircraft program multi-year procurement contracts approved and negotiated during the past three years, DoD has achieved savings in the range of 10 to 18 percent through the use of multi-year procurement contracts, relative to the costs of using annual procurement contracts. These savings are measured relative to a CAPE baseline cost estimate, based on use of annual contracting strategies, of approximately \$28 billion in procurement costs for five major aircraft programs. The use of multi-year procurement contracts for these programs will provide substantial savings of acquisition resources to the military departments involved in the programs during the next five years.

**Table 2. Cost Analyses for Multi-Year Procurement Contract Awards in FY 2012**

<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>
Ch-47F Improved Cargo Helicopter	CH-47F	Army	ACAT IC	CAPE Independent Estimate of Savings for Multi-Year Procurement Contract	14-Feb-12	USD(AT&L) certification	1-Mar-12
V-22 Osprey	V-22	Navy	ACAT IC	CAPE Independent Estimate of Savings for Multi-Year Procurement Contract	17-Feb-12	USD(AT&L) certification	1-Mar-12
Virginia Class Submarine	SSN 774	Navy	ACAT ID	CAPE Independent Estimate of Savings for Multi-Year Procurement Contract	23-Feb-12	USD(AT&L) certification	1-Mar-12
DDG 51 Guided Missile Destroyer	DDG 51	Navy	ACAT ID	CAPE Independent Estimate of Savings for Multi-Year Procurement Contract	23-Feb-12	USD(AT&L) certification	1-Mar-12

## **DoD Critical Unit Cost (Nunn-McCurdy) Breaches in FY 2012**

Table 3 provides a summary of the cost assessment activities supporting certification decisions associated with critical unit cost (Nunn-McCurdy) breaches in FY 2012. For each major acquisition program with a critical breach, Table 3 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 two critical breach certifications in FY 2012. Both 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, each event was supported by (1) a new estimate of program unit cost, as reflected in a revised SAR, and (2) the corresponding CAPE ICE for program unit cost.

**Table 3. Nunn-McCurdy Critical Unit Cost Breaches in FY 2012**

<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>
Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System	JLENS	Army	ACAT ID	CAPE Independent Cost Estimate December 2011 SAR	16-May-12	Critical Unit-Cost Breach Certification	24-May-12
Evolved Expendable Launch Vehicles	EELV	Air Force	ACAT ID	CAPE Independent Cost Estimate March 2012 SAR	3-Jul-12	Critical Unit-Cost Breach Certification	12-Jul-12

## Other Cost Assessment Activities in FY 2012

### DoD Cost Analysis Symposium

The 45<sup>th</sup> annual DoD Cost Analysis Symposium (DoDCAS), which is sponsored by CAPE, was held in February 2012. The theme of the symposium was “Cost Analysis and the Downturn.” The plenary sessions and roundtable discussions were supported by several current and former senior DoD officials, who discussed the impact of a reduced budget on DoD and the status of the Department in implementing WSARA. Four concurrent track sessions were held that addressed:

- The New Budget Environment: This track consisted of a series of presentations from noted professionals on the effects of Federal budget reductions on DoD and the national security complex.
- Tools and Data: This track focused on the tools and data available to the cost community.
- Post-WSARA Assessments: This track consisted of a series of presentations that addressed how WSARA has changed acquisition procedures and cost analysis.
- Operating and Support Costs: This track provided an in-depth look at using operating and support cost estimates to make program decisions throughout the life cycle.

The papers presented at the symposium will be archived at the CAPE web site (<https://www.cape.osd.mil> “DoDCAS”).

### Missile Defense Agency Support

CAPE received requests from both the Congress and the Missile Defense Agency (MDA) in 2012 to assess several MDA programs. As MDA operates largely outside of DoD 5000 regulations, CAPE’s cost assessment responsibilities are typically limited to supporting MDA’s production decisions as defined by the initial use of Procurement funds. Development efforts and systems acquired using RDT&E funds are typically outside of CAPE’s cost assessment responsibilities. To support a production decision on Standard Missile-3 (SM-3) Block IB initially planned for FY 2012, CAPE was asked by MDA to develop an ICE for the SM-3 Block IB production buy. Shortly following that request, CAPE was asked by the House Armed Services Committee’s Strategic Subcommittee Chairman to develop ICEs for both the European Phased Adaptive Approach (EPAA) and Precision Tracking Space System (PTSS) efforts. As the SM-3 Block IB missile procurement was effectively a subset of the EPAA effort and as testing issues delayed the SM-3 Block IB production decision, the MDA request for an ICE became subordinate to the Congressional taskings. By its nature, EPAA comprises elements of several MDA programs including Aegis Ashore and Aegis Ballistic Missile Defense (BMD), several SM-3 variants, the AN/TPY-2 radar and modifications to the Command, Control, Battle Management, and Communications (C2BMC) system. CAPE completed its ICE of the EPAA system in October 2012, and the results provided a foundation for discussions on EPAA leading up to the preparation of the FY 2014 President’s Budget request.

CAPE completed its PTSS review in November 2012, although the report is still in draft form. CAPE's PTSS analysis was highly influential in the future plans for PTSS reflected in the FY 2014 President's Budget request. CAPE expended more than 6,000 man-hours during the yearlong effort to support development of the EPAA and the PTSS cost estimates.

### **National Nuclear Security Administration Support**

What began with a request from the Nuclear Weapons Council (NWC), chaired by USD(AT&L), for CAPE to assess the National Nuclear Security Administration (NNSA) cost estimate for the B61 Life Extension Program (LEP), grew in FY 2012 into a very large effort to lead the restructuring of the work NNSA is undertaking to modernize its weapons and facilities. The result of this effort will be apparent when the FY 2014 President's Budget request is transmitted to the Congress. Partially in response to this year's endeavor, section 3162 of the *National Defense Authorization Act for Fiscal Year 2013, Public Law 112-239*, greatly enhanced CAPE's role in reviewing NNSA's weapon modernization and facility recapitalization activities. CAPE directed nearly 8,000 man-hours in FY 2012 in support of NNSA, and this support is expected to continue to be a large effort in the future. It is currently planned to have NNSA personnel augment CAPE staff in preparation of future ICEs for NNSA activities.

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## **CHAPTER IV – THE LOOK FORWARD**

WSARA introduced major changes to the DoD cost estimation processes. 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 Director, CAPE 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 Director, CAPE as the leader and primary advocate for the entire DoD cost community.

Efforts toward that end began last 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. However, these efforts are currently suspended, due to the tremendous uncertainty in the projected DoD budget and personnel levels. OSD and the military departments are for the most part currently operating under a hiring freeze, and face the possibility of civilian furloughs or reductions. CAPE intends to resume these activities next year if there is more stability in the budget environment. 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 Director, CAPE—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 issuances is as follows:

DoD Directive 5105.84, *Director of Cost Assessment and Program Evaluation (DCAPE)*, was approved on May 11, 2012 and serves as the CAPE charter. The Directive defines overall CAPE responsibilities and authorities in the PPBE, acquisition, and requirements processes. Regarding cost assessment, the Directive establishes the Director CAPE as the principal official for independent cost estimation and cost analysis for the acquisition programs of DoD. The Directive replaced two earlier Directives: DoD Directive 5141.01, *Director, Program Analysis and Evaluation (PA&E)*; and DoD Directive 5000.04, *Cost Analysis Improvement Group (CAIG)*.

The Directive is available at <http://www.dtic.mil/whs/directives/corres/pdf/510584p.pdf>.

CAPE is now working to complete DoD Manual 5000.04-M, *Cost Analysis Guidance and Procedures*. This Manual will be the primary vehicle for implementing the cost assessment provisions of WSARA. In particular, it will provide guidance to the military departments and defense agencies concerning the preparation, presentation and documentation of life-cycle cost estimates for defense acquisition programs. This year, CAPE completed sections of the Manual concerning (1) guidance for the content of the CARD that is used to describe the technical and programmatic characteristics of a program for the purpose of preparing a cost estimate, (2) a description of standard life-cycle cost terms and definitions that will be used throughout DoD for cost estimation and cost data collection, and (3) an overview of DoD cost data collection (CSDR and VAMOS). CAPE is now working on the remaining sections, which will address the procedures for reviews of MDAP and MAIS programs.

DoD Manual 5000.04-M-1, *Cost and Software Data Reporting (CSDR) Manual*, concerns cost data collection. This Manual, which was approved on November 4, 2011, is described in the next section of this chapter.

In March 2012, CAPE prepared a draft of an update to the 2007 *O&S Cost-Estimating Guide*. This guide discusses the role of O&S cost estimates and analyses in support of the defense acquisition process throughout the program life cycle. The guide also provides the standard OSD O&S cost element structure. The cost element structure is a well-organized and defined taxonomy of O&S cost elements that are used for both cost estimation and cost data collection. The 2012 update provides stronger emphasis that O&S considerations should be analyzed and presented in order to play a key and actionable role in supporting program decisions, rather than preparing O&S cost estimates simply for the sake of having an estimate. The update also made some improvements to the standard cost element structure. The update was provided to representatives from the Service Cost Agencies and field-level cost organizations. CAPE has reviewed the service comments, and incorporated or adjudicated them. To complete this update, CAPE is now working to expand the guide to address new legislative requirements for major system O&S costs. The *National Defense Authorization Act for Fiscal Year 2012, Public Law 112-81*, established a new provision concerning "Assessment, Management and Control of O&S Costs" that in part 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.

In 2010, CAPE issued Directive-Type Memorandum (DTM) 09-007 on the topic “Estimating and Comparing the Full Costs of Civilian and Military Manpower and Contract Support.” During 2011 and 2012, CAPE updated this DTM to incorporate comments, and began the process of preparing a Department of Defense Instruction (DoDI 7041.dd) based on the existing DTM 09-007. In FY 2013, CAPE plans to complete the update of DTM 09-007, resulting in publication of DoDI 7041.dd on this topic. This DoDI will establish policy, assign responsibilities, and provide procedures to estimate and compare the full costs of active duty military and DoD civilian manpower, and contract support in a consistent manner across all DoD Components. To support the DoD community in performing the numerous calculations required by this instruction, CAPE will make available a web-enabled tool on the Full Cost of Manpower (FCoM), which will automatically calculate all cost elements required to maintain consistency with guidance in the DoDI, based on general user inputs. This web-based tool will be available via the CAPE website and will be usable by all personnel who possess a valid Common Access Card.

## 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.

The Defense Cost and Resource Center (DCARC) is the OSD office responsible for administering the CSDR system. 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 (i.e., 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 Manual can be obtained at the DCARC website, <http://dcarc.cape.osd.mil/>.

The DCARC also has developed cost reporting requirements for high-dollar value contractor logistics support and other similar defense system sustainment contracts for major weapon systems. This important initiative now will provide critical data for cost assessments of contractor support activities. The DCARC has developed a new contract report format and associated report instructions (Data Item Description) that will be used for cost reporting on new applicable sustainment contracts or contract modifications. The sustainment contract cost reporting requirement will not be applied retroactively to contracts awarded prior to May 2012. Both the report format and the Data Item Description are available at the DCARC website.

The DCARC has other initiatives to improve business processes and data quality. The DCARC hosts semiannual CSDR Focus Group meetings that provide a forum for DoD and industry stakeholders to raise issues and concerns, and share information about CSDR policies, processes, and practices. In addition, CAPE has established a senior CSDR Steering Committee with representatives from the Service Cost Agencies, the Missile Defense Agency, and the National Reconnaissance Office (NRO). The Steering Committee provides executive oversight of the CSDR program and establishes strategic priorities for future improvements. The DCARC continues to provide on-site training to users and providers at different locations several times each year. This training addresses DCARC policies, CSDR plan construction and reporting requirements, and DCARC information technology systems and applications.

### **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 Under Secretary of Defense(Comptroller), or 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. The study concluded that it would be appropriate to permit the use of program-specific inflation projections, subject to oversight by CAPE and USD(C).

This study is available on the CAPE website at <https://www.cape.osd.mil/> (click on “Public Reports”).

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

In FY 2011 and 2012, CAPE continued to work on this topic.

### **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 in establishing 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. The program is part-time and consists of two courses per quarter, for eight quarters. Tuition may be paid through the use of the Defense Acquisition Workforce Development Fund (section 852 of the *National Defense Authorization Act for Fiscal Year 2008, Public Law 110-181*). The first cohort commenced in Spring 2011 and is scheduled to graduate in March 2013. The second cohort commenced in Spring 2012 and is scheduled to graduate in March 2014. The third cohort is scheduled to begin in Summer 2013.

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. This course will develop a cadre of cost management experts who will apply cost-benefit analysis to the decision making process. Also, CAPE continues to sponsor a one-week resource analysis course taught four times each year at the Institute for Defense Analyses. CAPE also sponsors and hosts the annual DoD Cost Analysis Symposium as discussed in Chapter III.

### **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 ICEs. Within OSD, the office responsible for ICEs reports to the Director, CAPE. 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 ICEs.

#### **OSD – Deputy Director for Cost Assessment**

The CAPE Deputy Director for Cost Assessment prepares ICEs 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. The Deputy Director for Cost Assessment provides leadership to the entire DoD cost community with regard to workforce development and management, policy and procedures, cost data collection, cost analysis education and training, and cost research.

#### **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 ICEs and Component cost analyses of Army 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) advises the Secretary of the Navy, Chief of Naval Operations, and Commandant of the Marine Corps on cost and economic issues. NCCA leads the Department of the Navy cost community in issues of cost policy and policy implementation, with the goal of increasing the capability and efficiency of the Naval cost community. NCCA prepares ICEs for Department of the Navy MDAPs and MAIS programs, and also conducts economic analyses and special studies to support relevant defense issues. NCCA coordinates all Department of the Navy cost research. The Executive Director of NCCA is the Deputy Assistant Secretary of the Navy (Cost and Economics).

#### **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 for major space, aircraft and information systems as required by public law and DoD policy. AFCAA provides guidance, analytical support, and quantitative risk analyses to Air Force major commands and the Air Force corporate staff on the development of cost per flying-hour factors and resource requirements. AFCAA also conducts and coordinates cost research to develop

analytical tools, models, and databases. The Executive Director of AFCAA is the Deputy Assistant Secretary of the Air Force for Cost and Economics.

### **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 contracts.

##### **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.

### **Space and Naval Warfare Systems Command (SPAWAR)**

The Cost Estimating and Analysis Division (SPAWAR 01-6), depending on a program's acquisition category, may provide assistance to ACAT I program offices, perform an ICE for ACAT II programs prior to a Milestone B or C review, or independently review a program office cost estimate upon the request of the Program Executive Officer (C4I and Space). SPAWAR 01-6 also provides more general cost analysis support to the Program Executive Officer (PEO) as needed.

### **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.

### **Marine Corps Systems Command (MCSC)**

The Cost and Analysis Branch (C&AB) is the MCSC authority in the field of cost analysis. The C&AB conducts and oversees the development of cost estimates for MCSC weapon, IT, and non-standard training systems programs. The C&AB advises the Commander MCSC and PEOs on the historic, current, and emerging trends in all elements of cost estimating and cost analysis. The Branch works for the MCSC Commander as an independent agent that provides cost products to Program Management Offices (PMOs) and PEOs. The Branch is organized into analytical teams in direct cost support of the PMOs and PEOs and a general support studies team for conducting AoAs and other operations research studies and analyses. Through its processes the C&AB delivers life-cycle cost estimates to satisfy the "Will-Cost" estimate whereas PMOs perform the "Should-Cost" analysis.

### **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.

#### **Defense Information Systems Agency (DISA)**

The DISA Analysis and Internal Controls Division guides, directs, and strengthens cost analyses within DISA; and prepares cost estimates for the development, procurement, and sustainment of automated information systems and information technology capabilities. The Division provides independent support for DISA program/project costing efforts, and publishes DISA policies, practices and templates for cost estimation, cost/benefit analysis, and economic analysis.

## APPENDIX B

### Major Defense Acquisition Program Unit Cost Reporting

Since 1982, the 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 10, Section 10.9 (“Acquisition Program Baseline”), and Section 10.10.1.5 (“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 established 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 unit cost 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**

	<u>“Significant” Breach</u>	<u>“Critical” Breach</u>
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, led by USD(AT&L), and determine if it should be terminated or continued. The Department is required to terminate the program unless a letter signed by 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 10.10.1.5.2.2.

## 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 MAIS reporting requirements may be found in the *Defense Acquisition Guidebook*, Chapter 10, Section 10.11. 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. Defense contractors support the CSDR system, under contractual agreements, by reporting data on contractor development and production costs and resource usage incurred in performing DoD programs. The two principal components of the CSDR 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.

Access to CSDR data is provided by the DCARC to authorized and approved users. 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 website (<http://dcarc.cape.osd.mil>).

#### Cost and Software Data Reporting Compliance

The DCARC continually monitors each MDAP for compliance with CSDR requirements where applicable.

CSDR reporting is not required when (1) the program is in pre-Milestone A status, with no prototypes, or (2) the CSDR requirements have been waived by CAPE. Waivers for CSDR requirements may be granted when (1) a program is a procurement of a commercial system, or (2) a 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 three months past the required due date.

For FY 2012, approximately 94 percent of the programs that have CSDR reporting were fully or mostly compliant based on the criteria above; the remaining six percent (nine programs) are classified as not compliant. This is about the same level of compliance as during the last two years. Ninety-seven percent of the programs were considered compliant or mostly compliant in FY 2011, and 93 percent of the programs were considered compliant or mostly compliant in FY 2010. CAPE and the DCARC are continuing to emphasize the importance of CSDR reporting compliance for achieving more accurate program life cycle cost estimates in the future.

### **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 website, <http://dcarc.cape.osd.mil/EVM/EVMOverview.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 website, <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.cape.osd.mil/CSDR/Planning.aspx>

### 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 US Navy and US 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 VAMOSC system, called the Air Force Total Ownership Cost system, or AFTOC, 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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## ABBREVIATIONS

AARGM	Advanced Anti-Radiation Guided Missile
ACAT	Acquisition Category
ACWA	Assembled Chemical Weapons Alternatives
AFCAA	Air Force Cost Analysis Agency
AFTOC	Air Force Total Ownership Cost
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
ATIRCM	Advanced Threat Infrared Countermeasures
AW	Alternative Warhead
BMD	Ballistic Missile Defense
C2BMC	Command, Control, Battle Management, and Communications
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
CIRCM	Common Infrared Countermeasures
CROWS	Common Remotely Operated Weapon Station
CSDR	Cost and Software Data Reporting
DAB	Defense Acquisition Board
DASA-CE	Deputy Assistant Secretary of the Army for Cost and Economics
DCAPE	Director of Cost Assessment and Program Evaluation
DCARC	Defense Cost and Resource Center
DISA	Defense Information Systems Agency
DoD	Department of Defense
DoDCAS	Department of Defense Cost Analysis Symposium
DTM	Directive-Type Memorandum
EELV	Evolved Expendable Launch Vehicles
EHF	Extremely High Frequency
EMD	Engineering and Manufacturing Development
EPAA	European Phased Adaptive Approach
ESC	Electronic Systems Center
EVM	Earned Value Management
FCoM	Full Cost of Manpower
FMR	Financial Management Regulation
FYDP	Future Years Defense Program

G/ATOR	Ground/Air Task Oriented Radar
GMLRS	Guided Multiple Launch Rocket System
GPS	Global Positioning System
IAMD	Integrated Air and Missile Defense
ICE	Independent Cost Estimate
JLENS	Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System
JLTV	Joint Light Tactical Vehicle
JSF	Joint Strike Fighter
JTRS	Joint Tactical Radio System
LCMC	Life Cycle Management Command
LEP	Life Extension Program
MAIS	Major Automated Information System
MDA	Milestone Decision Authority
MDA	Missile Defense Agency
MDAP	Major Defense Acquisition Program
MGUE	Military GPS User Equipment
MIDS	Multi-Functional Information Distribution System
N/A	Not Applicable
NAVAIR	Naval Air Systems Command
NAVSEA	Naval Sea Systems Command
NBCRV	Nuclear, Biological and Chemical Reconnaissance Vehicle
NCCA	Naval Center for Cost Analysis
NNSA	National Nuclear Security Administration
NPS	Naval Postgraduate School
NRO	National Reconnaissance Office
NWC	Nuclear Weapons Council
O&S	Operating and Support
OMB	Office of Management and Budget
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
PEO	Program Executive Officer
PIM	Paladin Integrated Management
PMO	Program Management Office
POM	Program Objective Memorandum
PPBE	Planning, Programming, Budgeting and Execution
PTSS	Precision Tracking Space System
SAR	Selected Acquisition Report
SM-3	Standard Missile-3

SMC	Space and Missile Center
SPAWAR	Space and Naval Warfare Systems Command
SRDR	Software Resources Data Reporting
SSC	Ship to Shore Connector
TBD	To Be Determined
TKA	Tail Kit Assembly
USD(AT&L)	Under Secretary of Defense for Acquisition, Technology and Logistics
USD(C)	Under Secretary of Defense (Comptroller)
USMC	United States Marine Corps
VAMOSC	Visibility and Management of Operating and Support Costs
WBS	Work Breakdown Structure
WSARA	Weapon Systems Acquisition Reform Act