FY 2009 Annual Report on Cost Assessment Activities

February 2010

Annual Report on Cost Assessment Activities

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Director, Cost Assessment and Program Evaluation

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FOREWORD

It is my honor and privilege to serve as the first Cost Assessment and Program Evaluation (CAPE) Director in the Department of Defense (DoD). A component of the Office of the Secretary of Defense (OSD), CAPE was established by the Weapon Systems Acquisition Reform Act of 2009, Public Law 111-23 (WSARA). Section 101(e) of WSARA requires the CAPE Director to 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 first annual report describes CAPE's progress in developing and implementing plans responsive to the cost estimation and assessment practices mandated by WSARA. Much remains to be done to realize the performance goals established by the President and the Congress. We are embarking on a journey that will require additional manpower, training, and investments in analytic methods and data. Our effort is focused on accuracy and best value to the taxpayer. Achieving these goals will take time.

The organization's ultimate intent is to provide sound and unbiased cost and schedule assessments that are essential for effective acquisition decision-making and oversight. I look forward to describing CAPE's continuing efforts to achieve this goal and the progress we make in future editions of this report.

Christine H. Fox
Director
Cost Assessment and Program Evaluation

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; (2) the DoD Planning, Programming, Budgeting, and Execution system; (3) resource discussions 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(e) (1) of WSARA requires that the CAPE submit an annual report to 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.

Since WSARA was enacted on May 22, 2009, the CAPE office has worked to fulfill these requirements in a short time period.

One of the main goals of WSARA is to avoid substantial growth in the costs of major DoD acquisition 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 the major DoD acquisition programs. The principal tools CAPE has to meet this responsibility are preparation of independent cost estimates for many major defense acquisition programs and automated information systems and, for all other major system acquisitions, review of cost estimates prepared by the military departments and defense agencies.

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 in place before WSARA. In addition, it identifies the main DoD cost data collection systems. CAPE intends to evaluate all of DoD's organizations and processes, keeping, or in some cases strengthening, what works, and discarding or repairing what does not.

- Chapter III describes the status of the certifications (required by sections 2366a and2366b[1] of title 10, *United States Code*) that major defense acquisition programs must obtain. For new programs, the certification requirements will help establish a realistic program definition and cost and schedule targets. For programs already underway, the certification requirements will 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 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 major defense acquisition programs.

- Chapter IV reviews the Department's FY 2009 cost estimation and cost analysis activities associated with major DoD acquisition programs. These cost activities include independent cost estimates, augmented by assessments of military department and defense agency cost estimates, which inform the DoD decision-makers at milestone reviews and at other important events. This chapter describes the cost assessment procedures in place for major defense acquisition programs and major automated information systems, and it summarizes the degree to which DoD cost estimation and assessment activities in FY 2009 complied with these procedures.

- Chapter V describes the plans for the future. CAPE is developing and refining plans 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 meet the needs of the Department. These plans address a wide range of issues and concerns, including organizations and human resources, cost estimating policy or procedure changes, cost data systems, improved tools and methods, and education and training opportunities for the DoD cost community.

The CAPE long-term goal is to ensure that the DoD cost estimating community has sufficient resources and is provided the necessary guidance and authorities to ensure that program cost and schedule estimates are properly prepared and considered in the Department's deliberations on all major DoD acquisition programs. The progress in reaching this goal will be described in subsequent editions of this report.

[1] Sections 2366a/b "Major defense acquisition programs: certification required before Milestone A/B or Key Decision Point 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 before the passage of WSARA. Chapter V of this report provides a description of plans to strengthen these institutions in the future 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 analysis organizations throughout DoD—in OSD, at the headquarters of the DoD Components (military departments and defense agencies), and in Components' field organizations.

At the OSD level, the newly established CAPE Director is now responsible for providing independent cost estimates, for both major defense acquisition programs and major automated information systems, when the program's Milestone Decision Authority is the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)). In addition, the CAPE Director will now review DoD Component cost estimates for other major defense acquisition programs and major automated information systems.

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 Milestone Decision Authority is the Component Head or Component Acquisition Executive. In addition, the Agencies support other important cost analyses and provide policy guidance unique to the military department.

There are also many field-level cost organizations. These organizations provide resources to support higher headquarters 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 budget 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 specialized cost and technical experience unique to specific system types (such as satellites, submarines, or tactical missiles).

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

In collaboration with the Service Cost Agencies, CAPE will be conducting a comprehensive survey of the size, shape, and organization of the DoD cost community in FY 2010. Preliminary indications suggest that the size of the entire government cost analysis workforce is at least 750 professional staff, and it may be higher. In addition, many cost organizations in DoD employ support contractors to varying degrees. CAPE will continue to gather information on workload and human resources for all of the DoD cost organizations and report on this information in future editions of this report.

Pre-WSARA Cost Estimation for Major Defense Acquisition Programs

This section briefly describes the DoD policies and procedures for cost estimation and cost assessments associated with major defense acquisition programs in place before the passage of WSARA in May 2009. It begins with a summary of the statutory and regulatory requirements for independent cost estimates for programs at milestone review decision points. It then provides an overview of the Cost Analysis Improvement Group (CAIG), the organization responsible for the majority of these independent cost estimates. The CAIG has since transitioned to the Deputy Director for Cost Assessment resident in CAPE. Next, the section explains the specific CAIG practices for milestone reviews. It concludes with a brief characterization of the complementary role of the military departments and defense agencies in providing cost estimates and assessments that also support the defense acquisition process.

Independent Cost Estimates

Public law (section 2434 of title 10, *United States Code*) requires that an independent estimate of the life-cycle cost for a major defense acquisition program be prepared and provided to the Milestone Decision Authority before the approval to proceed with Engineering and Manufacturing Development or the approval to proceed with Production and Deployment. This requirement was imposed by the direction of the Secretary of Defense in 1972 and required by law in 1983.

The Department's pre-WSARA implementation of this law was prescribed in DoD Instruction 5000.02, *Operation of the Defense Acquisition System* (see https://acc.dau.mil/CommunityBrowser.aspx ?id=332529). From the mid 1990s, the CAIG was responsible for the independent cost estimate for major programs for which the Milestone Decision Authority was the USD(AT&L). These programs are called ACAT ID. The CAIG was also responsible for making the independent cost estimate for pre-major defense acquisition programs approaching formal program initiation as a likely ACAT ID program. ACAT IC programs are those for which acquisition oversight has been delegated to the appropriate Component (and the Milestone Decision Authority is the Component Head or the Component Acquisition Executive). For ACAT IC programs and pre-major defense acquisition programs approaching formal program initiation as a likely ACAT IC program, the responsibility for the independent cost estimate was assigned to the appropriate Service Cost Agency or defense agency equivalent. 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.

In either case (ACAT ID or ACAT IC), DoD Instruction 5000.02 required that the independent cost estimate be considered by the Milestone Decision Authority at Milestone B[2], Milestone C[3], and possibly the Full-Rate Production Decision Review (when directed by the Milestone Decision Authority). In addition, the Milestone Decision Authority could request other independent cost estimates, or other ad hoc cost assessments, at any time.

[2] The Milestone B decision is approval for a program to enter the Engineering and Manufacturing Development phase. Section 2434 uses the term system development and demonstration.
[3] The Milestone C decision is approval for a program to begin Low-Rate Initial Production.

Cost Analysis Improvement Group

The CAIG was established in 1972 to conduct independent cost estimates for major defense acquisition programs and to serve as the principal advisor to the appropriate Milestone Decision Authority on matters of program life-cycle cost. The independent cost estimate was part of a larger cost assessment and review process conducted by the CAIG that is described later in this chapter. Guidance to the DoD Components on this review process was provided in DoD Manual 5000.4-M, *Cost Analysis Guidance and Procedures* (see http://www.dtic.mil/whs/directives/corres/pdf/500004m.pdf). This guidance established a disciplined and orderly process that required extensive cooperation and coordination among the CAIG, other OSD offices, and several elements within the DoD Component responsible for the acquisition program. The events and time lines associated with CAIG reviews were established to ensure that issues and concerns could be raised and resolved as necessary in a systematic and timely manner.

The CAIG also had several other responsibilities, as described in DoD Directive 5000.04, *Cost Analysis Improvement Group* (see www.dtic.mil/whs/directives/corres/pdf/500004p.pdf). The more important of these major responsibilities were to:

- Support the certification process of the USD(AT&L) for programs breaching established unit cost thresholds. The CAIG provided the USD(AT&L) with a recommendation concerning the reasonableness of the most recent program unit cost estimates. Appendix B describes the DoD process for major defense acquisition program unit cost reporting.
- Provide standard life-cycle cost terms and associated definitions used throughout DoD for cost estimation of defense acquisition programs. These terms and definitions are summarized in the Defense Acquisition Guidebook, chapter 3, section 3.1 (see https://dag.dau.mil). The use of standard cost terms and definitions throughout the DoD Components facilitates communication within the Government (between the acquisition and resource management communities), as well as between the Government and industry on program cost issues.
- Provide guidance on the use of the document known as the Cost Analysis Requirements Description (CARD). The CARD provides information on the acquisition program used in preparation of both the Component cost estimate and the CAIG independent cost estimate. The CARD is briefly described in the Defense Acquisition Guidebook, chapter 3, section 3.4.4.1; guidelines for the preparation of the CARD are provided in DoD Manual 5000.4-M, chapter 1. The CARD describes the key technical, programmatic, and operational characteristics of an acquisition program, including an assessment of program risks and measures being taken or planned to mitigate those risks. The foundation of a sound and credible cost estimate is a well-defined program, and the CARD is used to provide that foundation.
- Establish procedural guidance for certain cost data collection systems and monitor system implementation by the DoD Components. Systematic and institutionalized cost data collection throughout DoD is important to supporting credible cost estimates for current and future acquisition programs. Further information about the DoD cost data collection systems is provided later in this chapter and in Appendix C.
- Sponsor an annual DoD Cost Analysis Symposium known as DoDCAS (see http://www.dodcas.org), with attendees drawn primarily from government and private-sector cost research organizations. DoDCAS is used to facilitate the exchange of information concerning cost estimating models and methods, data collection, and contemporary issues of interest to the DoD

cost community. DoDCAS also provides members of the DoD cost community the opportunity to hear the insights of senior DoD officials on important topics.

- Sponsor an annual DoD-wide cost research workshop, at which representatives from organizations throughout DoD describe their cost research plans. This workshop facilitates the exchange of cost research and helps avoid duplication of effort among the DoD Components.

Before passage of WSARA, the CAIG generally did not have a role in assessments of major automated information systems, except those sufficiently expensive to also qualify as a major defense acquisition program. For these programs (which were both major automated information systems and major defense acquisition programs), the CAIG prepared an independent cost estimate at milestone reviews.

CAIG Reviews at Major Acquisition Milestones

Appendix D provides a description of the pre-WSARA cost estimation process for major automated information systems. The comments that follow sketch the CAIG process for milestone reviews of major defense acquisition programs that are not also major automated information systems.

In most cases, the CAIG process started 180 days before the planned Defense Acquisition Board Milestone meeting. At the 180-day point, the program office would provide a draft of the CARD to the CAIG. The CAIG staff would then review the CARD for completeness and consistency with other program documents (e.g., capability needs or requirements documents, acquisition strategy, etc.) and provide any necessary feedback to the program office on any additional information or revisions required. In the event that the CARD was found to be deficient to the point of unacceptability, the CAIG Chair would advise the appropriate senior acquisition official that the planned milestone review should be postponed.

At roughly the same time as the CARD was submitted, the CAIG staff typically would initiate a working-level kickoff meeting with representatives from the program office, the Component cost estimating team (if any), and other interested stakeholders from the Component staff and OSD staff. The purpose of the kickoff meeting was to discuss the general approach and any issues for the upcoming CAIG review. In addition, the meeting would be used to establish ground rules for any CAIG interactions or visits with the program office or appropriate program contractors and major subcontractors. CAIG reviews often addressed a broad range of cost, technical, or schedule issues, and therefore it was common for the CAIG staff to visit the program office or contractor facilities to obtain first-hand information about program status and risk areas. In many cases, the CAIG cost estimating team would be augmented with subject matter experts in areas such as technical assessments, systems engineering, contracting, financial management, manufacturing, industrial base issues, and software development.

The cost estimation techniques used by the CAIG varied by program acquisition phase. In the earlier acquisition phases, the CAIG estimate was commonly based on analogies and similar parametric approaches. In broad terms, at an early stage, estimates of the cost of a system, subsystem, or component were made by comparison to the historical cost of a similar item, adjusting for size, performance, technology, complexity, or other attributes. As the program definition was refined, the use of analogies was improved by increasing the level of detail of the cost estimate, if the appropriate

data were available. For example, a cost estimate of an aircraft program approaching a Milestone B decision might comprise several dozen estimates for the major subsystems and components (such as the landing gear, engine, empennage, and so forth).

As programs entered subsequent acquisition phases, the CAIG would attempt to build as much of the cost estimate as possible using any actual program costs available from prototypes, engineering and manufacturing development models, and production units. In general, increasing the use of actual cost experience from the program being estimated reduced the uncertainty in the resulting cost estimate.

The CAIG used the best available data sources, including costs from analogous programs, recent validated and relevant cost estimating relationships, actual costs from the earlier phases of the program being estimated, and historical progress (or learning) curves. The CAIG avoided so-called black-box cost models that did not permit insight into the data used to construct the model. The CAIG also accounted for technical and schedule risk by adjusting program parameters based on program knowledge and historical comparisons. For example, the CAIG estimate might include adjustments for system weight growth, software development productivity, and schedule durations to reflect historical experience on prior programs.

Throughout the CAIG review, the CAIG staff would periodically share emerging issues and concerns with the program office and Component staff. Typically, some issues were due to simple misunderstandings about program status or other information and data. Other issues were due to disagreements about cost estimating methods or program risk. Issues of the latter sort would not be subject to negotiation or compromise, because of the independent nature of the CAIG cost estimate. Rather, the program office and Component staff would be informed of those issues, which then would be presented to the Milestone Decision Authority. Toward the end of the CAIG review period, the CAIG would provide the Milestone Decision Authority with a final CAIG report that included a brief summary of program background and status; a comparison of the Component cost estimate and the CAIG independent cost estimate, with explanation of the key differences; an assessment of current program funding relative to the cost estimates; and recommendations concerning program funding and possibly other issues where appropriate.

Component Cost Estimates

DoD Instruction 5000.02 directs that a Component cost estimate be provided to the Milestone Decision Authority at Milestones A, B, C, and the Full-Rate Production Decision Review. The generic term “Component cost estimate” was used to provide considerable latitude to each military service or defense agency in assigning responsibility for preparation of this cost estimate. In some cases, the Component assigned the responsibility to the program office, which then provided a Program Office Life-Cycle Cost Estimate. In other cases, the Component adopted a more corporate approach, in which an initial program office cost estimate was subject to considerable review and appropriate adjustment as determined by the Service Cost Agency or defense agency equivalent, resulting in what was usually called a “Component cost position.”

DoD strengthened the requirement for Component cost estimates in a guidance memorandum issued 12 March 2009. This guidance remains in place today. For all major defense acquisition programs at milestone reviews, Components are required to establish a Component-level cost position. The term "position" is used to describe a corporate acknowledgment and endorsement of the Component cost estimate. To support the Department's full funding policy for acquisition programs, as well as specific statutory certification requirements (described in chapter III of this report), the Component is expected to fully fund the program to this cost position in the President's Budget Future Years Defense Program (FYDP). In addition, the appropriate Deputy Assistant Secretary of the Military Department for Cost and Economics (or defense agency equivalent) must sign the Component-level cost position and the Component Acquisition Executive and the Component Chief Financial Officer must endorse and certify that the FYDP fully funds the program consistent with the Component-level cost position.

Although the Component cost estimate is required by DoDI 5000.02 at the milestone reviews, it is regarded in DoD as a good practice for this estimate to be kept current, usually on an annual basis. The estimate is useful in program management and financial management throughout the life of the program. The estimate can be used to support (1) the preparation of annual budget justifications; (2) cost and price analyses associated with contract negotiations or source selection evaluations; (3) the monitoring of progress in achieving program cost goals; and (4) engineering trade-off analyses over the system life cycle. Most of these cost activities take place within the program office, augmented by specialized field-level cost organizations that were discussed earlier in this chapter.

DoD Cost Data Collection Systems

DoD has three primary collection systems for cost data for major defense acquisition programs. The Cost and Software Data Reporting (CSDR) system serves as the primary source of acquisition cost data for major contracts and subcontracts associated with major defense acquisition programs. 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 (VAMOSC) systems collect historical operating and support (O&S) costs for fielded major weapon systems. Appendix C provides additional information concerning all of these data collection systems.

Summary

This chapter sketched the cost assessment organizations, human resources, policies and procedures, and data collection systems that were in place when WSARA was enacted. These provide the foundation on which the Department is building as it continues to implement the legislation. The plans for this process and the vision of the changes to be made are described in chapter V of this report.

CHAPTER III – COMPLIANCE FOR CERTIFICATIONS AND REPORTING

Major defense acquisition programs 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 (as of the end of FY 2009) of the Department's activities to complete the certifications requiring independent cost estimates or assessments. In addition, it identifies the extent to which DoD is meeting its own regulatory cost and software data reporting 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 Milestone Decision Authority certify that several criteria are met by any major defense acquisition program approaching Milestone B (permission to enter Engineering and Manufacturing Development). To meet this requirement, the Milestone Decision Authority must sign a certification memorandum for the record that affirms that the program meets the specified criteria (concerning program affordability, technology maturity, and other considerations). This memorandum is then submitted to the congressional defense committees with the program's next Selected Acquisition Report. 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 major defense acquisition programs approaching Milestone A[4]. 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 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)**

(a)(5) a cost estimate for the program has been submitted, **with the concurrence of the Director of Cost Assessment and Program Evaluation**, and the level of resources required to develop and procure 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 included as part of WSARA are highlighted in bold text. Before passage of WSARA, the determination of the adequacy of program cost estimates was made by the Milestone Decision Authority, after consideration of the appropriate independent cost estimate (Milestone B) or cost assessment (Milestone A). After passage of WSARA on 22 May 2009, the determination of the

adequacy of program cost estimates is made by the Milestone Decision Authority—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 major defense acquisition program milestone certifications is provided in "Directive-Type Memorandum (DTM) 09-027 – *Implementation of the Weapon Systems Acquisition Reform Act 0f 2009*" (see https://acc.dau.mil /wsara). A complete listing of the Milestone A certification requirements is provided in attachment 2 (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).

Before passage of WSARA, the Department was up to date in meeting the sections 2366a/b certification requirements. The certification process before WSARA applied to major defense acquisition programs as they proceeded through Milestone A or Milestone B; it did not apply retroactively to major defense acquisition programs that had passed either milestone before the sections 2366a/b certification requirement was established. WSARA, however, not only expanded the sections 2366a/b certification criteria, but it also retroactively applied them to major defense acquisition programs 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 major defense acquisition programs that need to obtain the certifications required by sections 2366a/b.

The major defense acquisition programs that must be certified retroactively fall into one of two categories. The first category comprises programs scheduled to have a milestone review within 1 year of passage of WSARA (i.e., 22 May 2010) and anticipated to meet all of the certification criteria by that time. For this first category of programs, DoD will make the Milestone B certification at the program's next milestone (Milestone B, Milestone C, or the Full-Rate Production Decision). The second category comprises programs not anticipated to meet all the Milestone B criteria within 1 year of passage of WSARA. For this second category of programs, the Milestone Decision Authority shall review the program at a minimum annually to determine the extent to which the program currently satisfies the certification criteria, until such time as the Milestone Decision Authority determines that the program satisfies all the criteria and that the program can be certified. These retroactive certifications are referred to as "catch-up" certifications.

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

By the end of FY 2009, the office of USD(AT&L) had determined that there were a total of 63 major defense acquisition programs and pre-major defense acquisition programs that had yet to reach Milestone C, and therefore were required to obtain the certification required by sections 2366a/b. These 63 programs fell into three groups:

1. Fourteen of these programs had been certified by the end of FY 2009. These 14 programs are discussed in more detail below.
2. Another 14 programs were projected to receive the appropriate (Milestone B) certification at an upcoming milestone review before 22 May 2010 (1 year after passage of WSARA).

3. There were 35 programs that have yet to reach Milestone C that would not be certified prior to 22 May 2010. Of these, 22 would require a Milestone B certification, and 13 would require a Milestone A certification.

CAPE will continue to work with the USD(AT&L) staff to track the sections 2366a/b certification backlog for major defense acquisition programs and help guide the cost assessment community's resources to the priority programs. Information about future certifications, and associated cost estimates and analyses, will be included in subsequent editions of this report.

As noted earlier, by the end of FY 2009, DoD had certified a total of 14 major defense acquisition programs and pre-major defense acquisition programs in compliance with the certification requirements of sections 2366a/b. As can be seen in table 1, these 14 were primarily but not exclusively Milestone B certifications for major defense acquisition programs.

Table 1. Summary of 2366a/b Certification Status

	Milestone A	Milestone B	Total
ACAT ID	0	10	10
ACAT IC	0	1	1
Pre-MDAP	3	0	3
Total	3	11	14

All these certifications were supported by consideration of appropriate cost estimate(s) or analyses. Thirteen of the 14 certifications took place before passage of WSARA, and therefore the supporting cost estimates or analyses followed the pre-WSARA process for cost estimates as described in chapter II. For the 10 certifications associated with ACAT ID programs, the certification was supported typically by a combination of a program office cost estimate, a Service cost position, and an independent cost estimate prepared by the CAIG (which has since transitioned to Cost Assessment within CAPE). In the future, all sections 2366a/b certifications require the concurrence of CAPE.

Table 2 provides a complete listing of the sections 2366a/b certifications (and supporting cost estimates or analyses) made through the end of FY 2009.

Table 2. Major Defense Acquisition Programs Sections 2366a/b Certified (as of the end of FY 2009)

Program Name	Acronym	Component	Program Type	Milestone Event	Event Date	Certification Criteria	Supporting Cost Estimates or Analyses
Amphibious Assault Ship - America Class	LHA-6	Navy	ACAT ID	Milestone B	14-Feb-06	Milestone B	Navy Service Cost Position CAIG Independent Cost Estimate
Apache Block III	AB3	Army	ACAT ID	Milestone B	10-Jul-06	Milestone B	Army Service Cost Position CAIG Independent Cost Estimate
B-2 Extremely High Frequency Satellite Communication and Computer Upgrade Program Increment I	EHF SatCom Inc I	Air Force	ACAT IC	Milestone B	31-May-07	Milestone B	Air Force independent Cost Estimate Air Force Service Cost Position
Joint Cargo Aircraft	JCA	Joint	ACAT ID	Milestone C	13-Jun-07	Milestone B	Air Force/Army Joint Cost Position CAIG Independent Cost Estimate
Joint Tactical Radio System Airborne & Maritime/Fixed Station	AMF JTRS	Joint	ACAT ID	Milestone B	24-Mar-08	Milestone B	AMF JTRS Program Office Estimate CAIG Independent Cost Estimate
Broad Area Maritime Surveillance Unmanned Aircraft System	BAMS UAS	Navy	ACAT ID	Milestone B	18-Apr-08	Milestone B	Navy Service Cost Position CAIG Independent Cost Estimate
Global Positioning Satellite III	GPS-IIIA	Air Force	ACAT ID	Key Decision Point – B	8-May-08	Milestone B	Air Force Service Cost Position CAIG Independent Cost Estimate

Table 2. Major Defense Acquisition Programs Sections 2366a/b Certified (as of the end of FY 2009)

(cont.)

Program Name	Acronym	Component	Program Type	Milestone Event	Event Date	Certification Criteria	Supporting Cost Estimates or Analyses
Joint Precision Approach and Landing System	JPALS	Navy	ACAT ID	Milestone B	14-Jul-08	Milestone B	Navy Service Cost Position CAIG Independent Cost Estimate
Global Combat Support System Army	GCSS Army	Army	ACAT ID and IAM	Milestone B	21-Jul-08	Milestone B	Army Service Cost Position CAIG Independent Cost Estimate
Joint High Speed Vessel	JHSV	Navy	ACAT ID	Milestone B	12-Nov-08	Milestone B	Navy Service Cost Position CAIG Independent Cost Estimate
Ground Soldier Ensemble	GSE	Army	Pre-MDAP	Milestone A	19-Feb-09	Milestone A	GSE Program Office Estimate Army Service Cost Agency Sufficiency Review
Space Fence	SF	Air Force	Pre-MDAP	Key Decision Point - A	14-Mar-09	Milestone A	SF Program Office Estimate CAIG & AT&L/ARA Concurrence
Ship to Shore Connector	SSC	Navy	Pre-MDAP	Milestone A	21-May-09	Milestone A	Navy Service Cost Position CAIG Concurrence
E-2D Advanced Hawkeye	E-2D AHE	Navy	ACAT ID	Milestone C	11-Jun-09	Milestone B	Navy Service Cost Position CA Independent Cost Estimate

The term “ACAT ID” refers to a major defense acquisition program where the Milestone Decision Authority is the USD(AT&L).
The term “ACAT IC” refers to a major defense acquisition program where acquisition oversight has been delegated to the Component.
The term “pre-MDAP” refers to a program activity that is anticipated to result in a major defense acquisition program upon formal program entry into the defense acquisition management process (which usually occurs at Milestone B).
The term “ACAT IAM” refers to a major automated information system where the Milestone Decision Authority is the USD(AT&L) or (if delegated) the ASD(NII).

Four of the 14 certifications in table 2 were made in FY 2009; further information about the review process for these 4 programs is provided in chapter IV.

The following additional information about the certifications listed in table 2 needs to be noted.

- There are two space programs (Global Positioning Satellite-IIIA and Space Fence) in table 2 that were certified at milestone events known as Key Decision Points. At the time of these milestone events, the acquisition of space programs followed a different process and had different terminology than the acquisition of other major defense acquisition programs. The acquisition process for space programs at that time was contained in National Security Space Acquisition Policy 03-01, "Guidance for DoD Space System Acquisition Process." This policy was rescinded in March 2009. The new acquisition process for space programs is now being developed, and eventually it will be incorporated into DoD Instruction 5000.02.
- The Air Force KC-X Tanker Replacement Program had been certified, but its certification was rescinded on 24 September 2009. The program will be recertified at a future date.
- The Navy Standard Missile-6 (SM-6) received Milestone C approval on 24 August 2009. Certification of the SM-6 program has been delayed pending a determination that the program is fully funded in the FYDP.
- In addition to the certifications shown in table 2, the Army Acquisition Executive certified the Guided Multiple Launch Rocket System Alternative Warhead (GMLRS AW) as part of its Milestone A review on 11 September 2009. The GMLRS AW is one element of the Guided Multiple Launch Rocket System, which is a major defense acquisition program. The GMLRS AW has not been designated officially by OSD as a subprogram, however, and OSD does not report GMLRS AW as certified.

Cost and Software Data Reporting Compliance

As described in chapter II and Appendix C, the Cost and Software Data Reporting (CSDR) system serves as the primary source of acquisition cost data for major contracts and subcontracts for the major defense acquisition programs. The Defense Cost and Resource Center (DCARC) is the primary organization responsible for managing the CSDR system. The DCARC continually monitors each major defense acquisition program for compliance with the cost and software data reporting 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 the Deputy Director, Cost Assessment. 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 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.

Approximately 85 percent of the programs that have CDSR reporting were fully compliant or mostly compliant as of the end of FY 2009; the remaining 15 percent are classified as not compliant. The DCARC aggressively works with all the reporting programs to improve compliance with reporting requirements and data quality. The DCARC Web site (see http://dcarc.pae.osd.mil) provides downloadable report formats and definitions, report examples, and sample request for proposal language. The Web site also offers on-line CSDR process tutorials. Last, the DCARC provides free on-site training sessions for Government and industry organizations several times per year, all over the nation.

The plans to improve DoD cost data collection are discussed in chapter V.

CHAPTER IV – DoD COST ASSESSMENT ACTIVITIES IN FY 2009

This chapter provides a description of current DoD cost assessment procedures for major defense acquisition programs and major automated information systems, many of which were updated or added in light of WSARA. The chapter also provides a summary of the DoD cost estimates and cost analyses that were made in FY 2009 in support of milestone reviews, unit cost ("Nunn-McCurdy") breaches, and other decision events for major DoD acquisition programs.

Procedures for Cost Assessments at Milestone Reviews and Other Events

Cost Assessment Procedures for Major Defense Acquisition Programs

As discussed in chapter II, public law (section 2434 of title 10, *United States Code*) requires that an independent estimate of the life-cycle cost for a major defense acquisition program be prepared and presented to the appropriate Milestone Decision Authority before the approval to proceed with Engineering and Manufacturing Development, or approval to proceed with Production and Deployment. Before the passage of WSARA, DoD procedures for such independent cost estimates were prescribed in DoD Instruction 5000.02, *Operation of the Defense Acquisition System*. After the enactment of WSARA (on 22 May 2009), DoD updated these procedures in "Directive-Type Memorandum (DTM) 09-027 – *Implementation of the Weapon Systems Acquisition Reform Act of 2009*."

Under the new procedures, the CAPE Director is responsible for independent cost estimates and cost analyses made for major defense acquisition programs for which USD(AT&L) is the Milestone Decision Authority. Through the end of FY 2009, this responsibility had been delegated to the Acting Deputy Director for Cost Assessment—formerly the Chairman, CAIG. For major defense acquisition programs for which the Milestone Decision Authority is the Component Head or Component Acquisition Executive, the responsibility for the independent cost estimate is assigned to the Service Cost Agency or defense agency equivalent. However, these independent cost estimates prepared by the Components are now subject to the review of CAPE.

WSARA also revised the certification procedures for a major defense acquisition program that experienced a critical unit cost (Nunn-McCurdy) breach. Before WSARA, the USD(AT&L) could certify that the program met certain criteria, in which case the program could continue, or terminate it. One element of the required certification was the reasonableness of the new program unit costs. This determination was made by the USD(AT&L), after receiving the advice of the CAIG. Since WSARA, the determination that new program unit costs are reasonable is made by the USD(AT&L), with the concurrence of the CAPE Director.

Current DoD policy for major defense acquisition programs requires the Component to establish a formal position on the estimated cost of the program and moreover a commitment by the Component to full funding of the program consistent with the Component cost position. In practice, the Component typically establishes its cost position by a Component corporate review, led by the Service Cost Agency or defense agency equivalent, after consideration of a program office cost estimate and a Component independent cost estimate or analysis.

Cost Assessment Procedures for Major Automated Information Systems

WSARA has changed the cost assessment procedures for the major automated information systems. Before WSARA, the CAIG had no responsibilities for a major automated information system, unless the program was sufficiently expensive that it also qualified as a major defense acquisition program, in which case the CAIG was responsible for independent cost estimates at milestone reviews. WSARA specifies that CAPE is responsible for preparing independent cost estimates for any major automated information system that has experienced a Critical Change if the Milestone Decision Authority is the USD(AT&L). CAPE may also prepare an independent cost estimate for a major automated information system at any other time considered appropriate by the CAPE Director or upon the request of the USD(AT&L). In addition, for the major automated information systems for which acquisition oversight has been delegated to the Component, CAPE now reviews Component cost estimates at milestone reviews and also reviews revised program cost estimates in support of certifications for major automated information systems that have experienced a Critical Change.

The acquisition oversight of major automated information systems has also been changed by additional legislation. Until recently, a program that met the criteria for both a major defense acquisition program and a major automated information system 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 of Fiscal Year 2010, Public Law 111-84*. Today, a program that meets both criteria will be treated as either a major defense acquisition program or a major automated information system, but not both. As a general rule, a program that meets both criteria will be regarded as a major defense acquisition program if it requires the development of customized hardware, and it will be regarded as a major automated information system if it does not require the development of customized hardware.

Summary of DoD Cost Assessment Activities in FY 2009

Table 3 provides a brief summary of the major DoD cost assessment activities in FY 2009. For each major defense acquisition program with a milestone review or other event, table 3 identifies the supporting cost estimate(s) or analyses presented to the Milestone Decision Authority.

Table 3. DoD Major Defense Acquisition Program Cost Assessment Activities in FY 2009

Program Name	Acronym	Component	Program Type	Milestone or Other Event	Event Date	Supporting Cost Estimates or Analyses
Joint High Speed Vessel	JHSV	Joint	ACAT ID	Milestone B	12-Nov-08	Navy Service Cost Position CAIG Independent Cost Estimate
Airborne Warning and Control System Block 40/45 Upgrade Program	AWACS Upgrade	Air Force	ACAT IC	Milestone C	24-Nov-08	Air Force Independent Cost Estimate Air Force Service Cost Position
B-2 Radar Modernization Program	B-2 RMP	Air Force	ACAT IC	Milestone C	19-Dec-08	Air Force Independent Cost Estimate Air Force Service Cost Position
Advanced Extremely High Frequency	AEHF	Air Force	ACAT ID	Nunn-McCurdy Certification	29-Dec-08	Air Force Service Cost Position CAIG Independent Cost Estimate
Ground Soldier Ensemble	GSE	Army	Pre-MDAP	Milestone A	19-Feb-09	GSE Program Office Estimate Army Service Cost Agency Sufficiency Review
Family of Advanced Beyond-Line-of-Sight Terminals	FAB-T	Air Force	ACAT ID	Key Decision Point - C	27-Feb-09	Air Force Service Cost Position CAIG Independent Cost Estimate
Space Fence	SF	Air Force	Pre-MDAP	Key Decision Point - A	14-Mar-09	SF Program Office Estimate CAIG & AT&L/ARA Concurrence

Table 3. DoD Major Defense Acquisition Program Cost Assessment Activities in FY 2009 (cont.)

Program Name	Acronym	Component	Program Type	Milestone or Other Event	Event Date	Supporting Cost Estimates or Analyses
Defense Integrated Military Human Resources System	DIMHRS	DoD	ACAT ID and IAM	Critical Change Certification	7-Apr-09	Air Force Independent Cost Estimate
Ship-to-Shore Connector	SSC	Navy	Pre-MDAP	Milestone A	21-May-09	Navy Service Cost Position CAIG Concurrence
E-2D Advanced Hawkeye	E-2D AHE	Navy	ACAT ID	Milestone C/Nunn-McCurdy Certification	11-Jun-09	Navy Service Cost Position CA Independent Cost Estimate
Standard Missile-6	SM-6	Navy	ACAT ID	Milestone C	24-Aug-09	Navy Service Cost Position CA Independent Cost Estimate
Guided Multiple Launch Rocket System – Alternative Warhead	GMLRS AW	Army	ACAT IC	Milestone A	11-Sep-09	Army Service Cost Position CA Concurrence
B-2 Radar Modernization Program	B-2 RMP	Air Force	ACAT IC	Full Rate Production	18-Sep-09	Air Force Service Cost Position Air Force Independent Cost Estimate

The term “ACAT ID” refers to a major defense acquisition program where the Milestone Decision Authority is the USD(AT&L).
The term “ACAT IC” refers to a major defense acquisition program where acquisition oversight has been delegated to the Component.
The term “pre-MDAP” refers to a program activity that is anticipated to result in a major defense acquisition program upon formal program entry into the defense acquisition management process (which usually occurs at Milestone B).
The term “ACAT IAM” refers to a major automated information system where the Milestone Decision Authority is the USD(AT&L) or (if delegated) the ASD(NII).

There were 13 milestone review or other events supported by cost assessment activities in FY 2009. All of them were supported by the appropriate cost estimates or analyses (given the procedures that were in place at the time of the program milestone or other decision event). The majority of these took place before the passage of WSARA and therefore followed the pre-WSARA cost assessment procedures described in chapter II. For the milestone reviews (except for Milestone A) and the unit cost (Nunn-McCurdy) certifications, the review event was supported by (1) a CARD, which provides the technical and programmatic program definition that is used as the foundation of the cost estimates; (2) a Component cost position; and (3) the appropriate CAIG or Service Cost Agency independent cost estimate. The Milestone A reviews were supported by a Component cost estimate and an independent cost assessment or sufficiency review conducted by the CAIG or Service Cost Agency. After the passage of WSARA, at all milestone reviews or other events, the review event is supported by a Deputy Director for Cost Assessment independent cost estimate when the Milestone Decision Authority is the USD(AT&L); when the Milestone Decision Authority is delegated to the Component, the review event is supported by a review of the Component cost estimate by the Deputy Director for Cost Assessment.

Confidence Levels in Cost Estimates

WSARA requires (1) a statement concerning the confidence level used in establishing a cost estimate of a major defense acquisition program or a major automated information system, (2) the rationale for selecting the specific confidence level used in the estimate, and (3) the justification for selecting a confidence level if it is less than 80 percent. During the FY 2009 cost assessment activities, the approach taken by the Acting Deputy Director for Cost Assessment and the Service Cost Agencies was not consistent with an 80 percent confidence level. In general, the cost estimates made by the Acting Deputy Director for Cost Assessment have been built on a product-oriented work breakdown structure, 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.

A requirement to develop cost estimates and provide financial resources to programs at an 80 percent confidence level implies that the Department would program and budget excess resources that are not needed for successful completion of the program in approximately 4 of 5 cases. This approach to programming and budgeting of limited resources would be very inefficient for the Department, which manages a portfolio of more than 100 major defense acquisition programs.

It is difficult to calculate mathematically the precise confidence levels associated with life-cycle cost estimates prepared for acquisition programs. Based on the rigor in methods used in building estimates, the strong adherence to the collection and use of historical cost information, and the review of applied assumptions, the Acting Deputy Director for Cost Assessment projects that it is about equally likely that its estimates will prove too low or too high for the execution of the program as described.

Remarks about Specific Programs

- The cost assessment activities for two programs (Advanced Extremely High Frequency and E-2D Advanced Hawkeye) supported a program Nunn-McCurdy certification following a unit cost

breach. The first took place before the passage of WSARA and followed the procedures as described in Appendix B. The second took place after the passage of WSARA and followed the revised procedures explained in this chapter.

- One program (Defense Integrated Military Human Resources System (DIMHRS)) had cost assessment activity associated with a Critical Change Certification in April 2009. At that time, DIMHRS was considered both a major defense acquisition program and a major automated information system. The Critical Change Certification is unique to major automated information systems, however, and does not apply to major defense acquisition programs. Since the certification took place before the passage of WSARA, this event did not require CAIG involvement. However, as a result of the certification review process, DIMHRS was cancelled.
- Although it is not shown in table 3, the Air Force Mission Planning System, Increment IV (MPS Inc IV), reported a Critical Change (due to schedule variance) on 30 September 2009. The Acting Deputy Director for Cost Assessment subsequently initiated an independent cost estimate to support a program certification, since the USD(AT&L) is the Milestone Decision Authority for this program. The program certification activities for this program will be included in next year's Annual Report on Cost Assessment Activities.

Other Remarks

Table 3 identifies only the cost assessment activities that supported a milestone or other event that took place in FY 2009. Because the cost estimating and review process typically takes 6 months, there are other cost estimates begun in FY 2009 that will be concluded and support a decision event in FY 2010. For example, for the F-35 (Joint Strike Fighter) aircraft, the support to a multi-organization effort known as the Joint Estimating Team has required significant resources in FY 2009, although its work will continue well into the next year. The Acting Deputy Director for Cost Assessment also began an independent cost estimate for the Advanced Threat Infrared Countermeasures/Common Missile Warning System that will support a Defense Acquisition Executive review next year. In addition, there are other significant cost related activities not tied to a specific program decision event, such as an ongoing space industrial base study led by the Acting Deputy Director for Cost Assessment.

CHAPTER V – THE LOOK FORWARD

WSARA introduced major changes to the DoD cost estimation process. CAPE made significant progress in implementing the legislation during the 4 months from the passage of the act until the end of FY 2009. Full implementation of the WSARA provisions on cost assessment, however, will take several years. This chapter outlines the next steps.

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. The authorities and responsibilities that determine the size and qualifications of the cost estimating workforce, however, are spread over several organizations throughout the Department. Consequently, identifying and remedying issues with the size, shape, and organization of the entire 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 began this year with the activities to gather data on the work load, workforce demographics, and workforce management plans of the organizations that produce DoD cost estimates. CAPE will continue to work with the Service Cost Agencies and other appropriate organizations to gather pertinent data in the manner required for consistent historical tracking.

Another immediate challenge is to recruit qualified and talented people to perform the expanded cost estimate and oversight functions for CAPE. The provisions of WSARA expand CAPE responsibilities significantly. These provisions not only require a substantial expansion of CAPE personnel but also a set of skills and experience different than those possessed by the staff currently in place. As the specific ramifications of policy on work load become clearer, CAPE will continue to identify the personnel requirements and to ensure that the hiring process is effective and efficient.

Policies and Procedures

WSARA states that 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 specific implementation details refer to major defense acquisition programs and major automated information systems.

Much of this guidance is being built on existing policies and procedures, improved and strengthened as necessary. The current guidance for DoD cost estimating and cost analysis addresses (1) the statutory requirements for independent cost estimates; (2) the review process for military department and defense agency cost estimates (when the Milestone Decision Authority is the USD(AT&L); (3) the use of standard life-cycle cost terms and definitions; (4) the use of the CARD as the technical and programmatic baseline that serves as the foundation for Component and OSD cost estimates; and (5) DoD cost data

collection systems. All the current guidance are being reviewed in light of WSARA and revised as necessary.

In addition, new guidance that addresses the policies and procedures associated with the expanded CAPE responsibilities is being developed. WSARA requires that guidance be issued relating to the proper selection of confidence levels in cost estimates generally and specifically for the proper selection of confidence levels in cost estimates for major defense acquisition programs and major automated information systems. WSARA also requires that guidance be issued to require full consideration of life-cycle management and sustainability costs in both major defense acquisition programs and major automated information systems. In addition, new guidance is being developed to establish the process for CAPE review of Component cost estimates for programs where acquisition oversight has been delegated to the Component. The guidance for this process establishes notification procedures, the time line of the CAPE review, and documentation requirements for the Component cost estimate.

Assessments of Accuracy and Quality in Cost Estimates

WSARA requires this report to discuss the DoD's progress in improving the accuracy of its cost estimates and analyses and the overall quality of cost estimates prepared by each of the military departments and defense agencies.

Cost estimate accuracy in part can be assessed with "hard" metrics for cost growth. CAPE is working with USD(AT&L) to develop these metrics since many of the cost reporting data and mechanisms (such as Selected Acquisition Reports and Unit Cost Reporting) reside in USD(AT&L). In particular, CAPE is working closely with the newly established Director of Performance Assessments and Root Cause Analyses (PARCA) and collaboratively examining potential improvements to these data and reporting processes.

Cost estimate quality can also be gauged indirectly through semi-qualitative measures that are plausibly related to eventual cost estimate accuracy but not direct measures of it. Examples of such measures include completeness of estimate; realism of estimate; documentation quality (reproducibility of estimate); compliance with CAPE directives, policies, and guidance; data validity; and size and experience of the cost estimating teams. A quality cost estimate must also be tied to a well-defined program since no estimate can be better than the quality of the program definition that the cost analysts use in their estimates. Therefore, the rigor and discipline of program definition must be another measure of estimate quality.

Through policy and guidance, CAPE is working to clearly define the attributes of a quality estimate. Some of this guidance already exists. For example, the key document for program definition is the CARD described in chapter II. At a minimum, programs must be compliant with current standards for CARDs. In addition, recent acquisition reforms (competitive prototyping, Preliminary Design Review before Milestone B, technology maturity, among others) should lead to more informed CARDs and therefore more realistic cost estimates. New guidance for CARD preparation is being constructed based on the best practices emerging from these reforms.

Cost Data Systems

The degree to which quality estimates depend on accurate and detailed knowledge of the actual costs of past and current systems cannot be overemphasized. Accurate cost estimates are not possible without accurate and detailed data on what previous systems have cost. There have been periodic attempts to reduce burdens or workload imposed on contractors by eliminating the requirement for programs to gather these data. In the long term, however, the lack of these data means that the DoD would lose the capability to estimate costs accurately in support of acquisition decisions.

Data System Improvements

As described in Appendix C, DoD has three main cost data reporting systems: (1) the CSDR system is used for acquisition cost data; (2) the EVM Central Repository is used for centralized storing of EVM data reports; and (3) the VAMOSC data systems are used to collect O&S costs for the major fielded weapon systems.

While dramatic improvements have been made over the past decade in these data systems, there is still much to be done to achieve an all-electronic, single source of accurate cost data that is continuously available and used by all of DoD. The data are not as consistent, accessible, or stable as they could be. This significantly degrades the ability to perform quality control and anomaly detection. There is also more work to be done to get consistency between CSDR and EVM data, and there are many programs and contracts that are not compliant with DoD EVM policy.

CAPE is continuing to identify issues with the data collection system and issues of compliance with DoD requirements. CAPE's focus is to ensure that the data are:

- Accessible—This includes the ability to identify relevant data easily and to transfer the data to a usable format.
- Traceable—The data structure must be organized about the product, and it must be consistent both from contract to contract and, to the extent possible, within commodity types.
- Stable—The structure in which the data are reported (e.g., the Work Breakdown Structure elements) must be stable so that progress can be tracked over time.
- Complete—The data must be complete both in the sense that required data fields are completed for a particular system and that all appropriate systems are included.

In addition to improving existing databases, CAPE is continuing to identify or support the development of additional data systems that would improve the quality of estimates and the efficiency of producing them. For example, the proposal of a Defense Contract Management Agency data warehouse that contains direct hours and rates, overhead rates, and profit rates for all DoD contractors appears promising. Also, with many acquisition strategies using more contractor logistics support, DoD is losing visibility into sustainment costs for these programs. CAPE is attempting to develop a new contractor logistics support reporting system for major weapon system sustainment contracts that would be similar to the Cost and Software Data Reporting System that is in place today for acquisition contracts associated with major defense acquisition programs.

Tracking to Approved Estimate—PPBES and Acquisition

Cost estimates made to support milestone reviews and major program reviews should be used as the basis for budgeting. Often, however, changes to programs are necessary as they move beyond their acquisition milestone approval and proceed through successive iterations of the Planning, Programming, Budgeting and Execution System (PPBES). For a variety of reasons, it is often not easy to determine if the new program funding is consistent with the methodology used to produce the cost estimate at the last milestone review. For example, there may have been a significant change to the program's annual procurement quantities, which often leads to a change in unit procurement costs.

To address this issue, the Acting Deputy Director for Cost Assessment formed a Major Defense Acquisition Program (MDAP) Issue Team in collaboration with the USD(AT&L) and Comptroller staffs. The MDAP Issue Team began its work in July 2009, in support of the DoD FY 2011-15 program review. The purpose of the MDAP Issue Team was to ensure that the sections 2366a/b certified major defense acquisition programs were fully funded in the current FYDP and that they could remain certified. The MDAP Issue Team also attempted to identify upcoming unit cost (Nunn-McCurdy) breaches and evaluate needed improvements to DoD information systems for WSARA implementation.

Other Statutory Requirements

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)*. OMB's authority to issue this guidance rests on statute.

CAPE will commission an independent study concerning cost indexes. That study will examine how DoD cost indexes are created and identify any potential shortcomings or constraints in this process. Specific areas examined will include budgeting, measuring programs against constant-dollar baselines, and other cost analyses.

Monitoring of O&S Costs

WSARA requires CAPE to review existing systems and methods of the DoD for tracking and assessing operating and support costs on major defense acquisition programs. This review also must assess the feasibility and advisability of establishing baselines for operating and support costs. The results of the review will be provided as a report to the Congress 1 year after the enactment of WSARA (22 May 2010). A DoD team led by CAPE is well underway in examining these systems and methods, as well as the feasibility and advisability of establishing some form of baseline for program O&S costs.

Cost Education, Skills, and Tools

WSARA requires that CAPE lead the development of (1) improved analytical skills and competencies within the cost assessment workforce of the DoD and (2) improved tools, data, and methods to promote performance, economy, and efficiency in analyzing national security planning and allocation of defense resources.

CAPE is reviewing the current programs for training and education in cost analysis and identifying opportunities for enhancements. As one example, one option is to form a team of subject matter experts with representatives from the Deputy Director for Cost Assessment and the Service Cost Agencies to advise the Defense Acquisition University and the Service Acquisition Colleges on the curriculum of on-line and in-residence courses in cost analysis.

CAPE has also adapted the annual symposium and workshop to help the DoD cost community keep informed and share experiences in dealing with the provisions of WSARA. Last year, the theme of the DoD Cost Research Workshop was acquisition reform, and the presentations and discussion addressed the implementation of WSARA. In 2010, the theme of the DoD Cost Analysis Symposium will be theory and implementation of WSARA 2009. The plenary sessions will address the policy implications of WSARA implementation. Also, three concurrent sessions will examine (1) major automated information systems, (2) developing the cost community, and (3) estimating the unknowns (with specific topics including risk assessments and confidence levels and cost estimates for reviews at Milestone A).

Summary

CAPE is developing and refining 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 grow and improve 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.

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. The following paragraphs give a brief description and overview of these key offices responsible for independent cost estimates:

OSD - Office of the Deputy Director for Cost Assessment

The CAPE Deputy Directorate for Cost Assessment performs independent cost estimates for all major defense acquisition programs and major automated information systems 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 conducted in connection with other major defense acquisition programs and major automated information systems.

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

The Deputy 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 Navy major defense acquisition programs and major automated information systems. NCCA coordinates all Department of 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, government in-house support, etc.

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 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.

Aviation and Missile Life Cycle Management Command (AMCOM)

The AMCOM cost organization 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 Analyses of Alternatives, tradeoff studies and force structure estimates. It develops and prepares life-cycle cost estimates, and it conducts other related studies in support of weapon systems cost analysis. It performs cost risk analyses and cost risk assessments to support weapon systems program decisions. It also provides validation/review for cost estimates, Economic Analyses, and Business Case Analyses.

Navy

Naval Air Systems Command

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, databases, and various cost/benefit studies.

The focus of NAVAIR cost research is Total Ownership Cost initiatives, cost growth, modifications, cost/benefit analyses, engineering investigations, and building comprehensive databases.

Naval Sea Systems Command

The Cost Engineering and Industrial Analysis Division provides cost engineering and industrial base analysis for ships, ship-related combat systems, and weapons. It provides cost estimates in support of the Defense Acquisition Board review process, including Analysis of Alternatives 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.

The focus of the cost research program within NAVSEA is operating and support (O&S) cost estimating; Total Ownership Cost estimating; commonality and standardization of ship design and construction processes, as well as ship components or subassemblies (impact on acquisition and O&S costs); how build strategy affects ship costs; ship design trade-off analysis tools; and ship and weapon system cost modeling.

Naval Surface Warfare Center

The Cost Analysis 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 Cost Analysis 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, analyses of alternatives, 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

The Acquisition Cost Division supports the Electronic Systems Center 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

The Acquisition Cost 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.

National Reconnaissance Office (NRO) Cost Analysis Improvement Group

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

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 major defense acquisition programs. The requirement for unit cost reporting may be waived if the program has not entered Engineering and Manufacturing Development, 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* (see https://dag.dau.mil), chapter 10, section 10.9.1.3 ("Unit Cost Reports") and section 2.1.1 ("Acquisition Program Baseline").

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 Milestone Decision Authority. The original baseline estimate refers to the baseline approved at program initiation (usually Milestone B). A program is declared to have a unit cost breach (Nunn-McCurdy breach) when the current unit cost estimate exceeds either baseline estimate by more than certain specified percentages. Specifically, a unit cost breach takes place when any of the following conditions occurs, for either version of program unit cost (APUC or PAUC):

	"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 Selected Acquisition Report (SAR) with additional, breach-related information. For critical unit cost breaches, in addition to the notifying 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 2433 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 new unit cost estimates are reasonable. A complete description of the unit cost breach certification process can be found in the *Defense Acquisition Guidebook*, chapter 10, section 10.9.1.3.2.

Before passage of WSARA, the determination that new unit costs were reasonable was made by the USD(AT&L) after receiving the advice of the Cost Analysis Improvement Group. The criteria and process for a certification associated with a critical unit cost breach have been expanded by WSARA. Further discussion about the revised criteria and process, including the new role for CAPE, is provided in chapter IV of this report.

APPENDIX C

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 Cost and Software Data Reporting (CSDR) system serves as the primary source of acquisition cost data for major contracts and subcontracts associated with major defense acquisition programs. 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 (VAMOSC) systems collect historical operating and support (O&S) costs for major weapon systems.

Cost and Software Data Reporting

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 major defense acquisition programs.

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 major defense acquisition programs. 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 DoD Manual 5000.04-M-1, *Cost and Software Data Reporting (CSDR) Manual* (see www.dtic.mil/whs/directives/corres/pdf/500004m1p.pdf). This manual (as well as downloadable report formats and definitions, specific report examples, and other related information) can be found at the Defense Cost and Resource Center (DCARC) Web site (see 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 and to sponsored support contractors 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 major defense acquisition programs and major automated information systems. Information about the central repository is available at the DCARC Web site (see http://dcarc.pae.osd.mil/EVM/Index.aspx). More general information about EVM reporting is available in the *Defense Acquisition Guidebook* (see https://dag.dau.mil), chapter 11, section 11.3.1.

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 that follows the guidelines of the DoD Work Breakdown Structure Handbook (MIL-HDBK-881A). The Work Breakdown Structure 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 Work Breakdown Structure in cost reporting and cost estimating can be found in the *Defense Acquisition Guidebook,* chapter 3, section 3.7.1.1.

Visibility and Management of Operating and Support Costs

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. 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. In addition, VAMOSC data are important as a source for cost estimates of future systems, since cost estimates for future systems are often made by analogy to appropriate predecessor systems. VAMOSC data systems are managed by each military department:

- The Navy 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 1,000 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 (AFTOC) system, is managed by the Air Force Cost Analysis Agency. 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 reparable costs, and condemnation costs of major U.S. Air Force aircraft and engines.

APPENDIX D

Pre-WSARA Cost Estimation for Major Automated Information Systems

Cost Estimates and Analyses at Milestone Reviews

DoD Instruction 5000.02, *Operation of the Defense Acquisition System,* provides the guidance that had been in place, before the passage of WSARA, concerning cost estimates and economic analyses required for major automated information systems. DoDI 5000.02 required that a Component cost estimate be provided to the Milestone Decision Authority at Milestone A, Milestone B, and at the Full Deployment Decision Review. DoDI 5000.02 also required that an Economic Analysis be performed by the Component at the same milestone reviews as the Component cost estimate. An Economic Analysis is an assessment of the net costs and benefits of the proposed automation information system compared with program alternatives, including the status quo. In general, the best alternative will be the one that meets validated capability needs at the lowest life-cycle cost (measured in net present value).

The major automated information systems that are subject to review by OSD are denoted as "ACAT IAM" (where ACAT denotes Acquisition Category). For these programs, the Component cost estimate and the Economic Analysis were subject to independent review and assessment by the Director, Program Analysis and Evaluation (PA&E). The purpose of the PA&E assessment was to provide the Milestone Decision Authority with an independent determination that (1) the estimates of life-cycle costs and benefits are reasonable and traceable, (2) the net present value comparison is valid, and (3) the cost estimates are built on realistic program and schedule assumptions. Further information about the PA&E review procedures may be found in the *Defense Acquisition Guidebook* (see https://dag.dau.mil), chapter 3, section 3.6.

The major automated information systems where acquisition oversight was delegated to the Component are denoted as "ACAT IAC." For these programs, the Component cost estimate and Economic Analysis were both required, but were not subject to review by PA&E.

Before passage of WSARA, PA&E's CAIG in most cases did not have a role with cost assessments for the major automated information systems. However, an exception occurred when a major automated information system was sufficiently expensive that it also qualified as a major defense acquisition program. For these exceptions (where a program was both a major automated information system and a major defense acquisition program), the CAIG prepared an independent cost estimate at milestone reviews. Since passage of WSARA, however, CAPE now has additional cost assessment responsibilities for major automated information systems. These new responsibilities are described in chapter IV of this report.

Major Automated Information System Reporting

Public law (section 2445c of title 10, *United States Code*) requires annual and quarterly reports from major automated information programs, pre-major automated information systems programs, and "any other investment in automated information system [AIS] products or services that is expected to exceed

the [major automated information system] thresholds…" Details about the reporting requirements may be found in the *Defense Acquisition Guidebook,* chapter 10, section 10.9.2. Briefly, a Major Automated Information Systems Quarterly Report is used internally within the Department, and a Major Automated Information Systems Annual Report is provided to the congressional defense committees 45 days after submission of the President's Budget. The format of the quarterly report and annual report is 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 6 months, but less than 1 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 1 year or more or fails to achieve a full deployment decision within 5 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.

WSARA modified the certification process for a major automated information system that has experienced a Critical Change. The revision to this certification process is described in chapter IV of this report.

ABBREVIATIONS

ACAT	Acquisition Category
AFCAA	Air Force Cost Analysis Agency
AFTOC	Air Force Total Ownership Cost
APUC	Average Procurement Unit Cost
CA	Cost Assessment
CAIG	Cost Analysis Improvement Group
CAPE	Cost Assessment and Program Evaluation
CARD	Cost Analysis Requirements Description
CCDR	Contractor Cost Data Reporting
CSDR	Cost and Software Data Reporting System
DASA-CE	Deputy Assistant Secretary of the Army for Cost and Economics
DCARC	Defense Cost and Resource Center
DIMHRS	Defense Integrated Military Human Resources System
DoD	Department of Defense
DoDCAS	Department of Defense Cost Analysis Symposium
DTM	Directive-Type Memorandum
EVM	Earned Value Management
EVMS	Earned Value Management System
FYDP	Future Years Defense Program
GMLRS AW	Guided Multiple Launch Rocket System Alternative Warhead
MAIS	Major Automated Information System
MDA	Milestone Decision Authority
MDAP	Major Defense Acquisition Program
NCCA	Naval Center for Cost Analysis
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
PPBES	Planning, Programming, Budgeting and Execution System
SAR	Selected Acquisition Report
SM-6	Standard Missile-6
SRDR	Software Resources Data Reporting
USD(AT&L)	Under Secretary of Defense for Acquisition, Technology and Logistics
VAMOSC	Visibility and Management of Operating and Support Costs
WSARA	Weapon Systems Acquisition Reform Act